

**JULIE D. KOHLER**

PLEASE REPLY TO: Bridgeport  
WRITER'S DIRECT DIAL: (203) 337-4157  
E-Mail Address: jkohler@cohenandwolf.com

January 2, 2014

Attorney Melanie Bachman  
Acting Executive Director  
Connecticut Siting Council  
Ten Franklin Square  
New Britain, CT 06051

**Re: Notice of Exempt Modification  
Crown Castle/T-Mobile co-location  
Site ID CTHA056J  
290 Preston Avenue, Middletown CT**

Dear Attorney Bachman:

This office represents T-Mobile Northeast LLC ("T-Mobile") and has been retained to file exempt modification filings with the Connecticut Siting Council on its behalf.

In this case, Crown Castle ("Crown") owns the existing monopole telecommunications tower and related facility at 290 Preston Avenue, Middletown Connecticut (longitude -72.7429/latitude 41.557336)<sup>1</sup>. T-Mobile intends to replace six antennas and related equipment at this existing telecommunications facility in Middletown ("Middletown Facility"). Please accept this letter as notification, pursuant to R.C.S.A. § 16-50j-73, of construction which 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, Daniel T. Drew, and the property owners Ernest and Brenda Trumpold.

The existing Middletown Facility consists of a 148 foot tall monopole structure. T-Mobile plans to replace six antennas at a centerline of 140 feet. See the plans revised to September 17, 2013 attached hereto as Exhibit A. T-Mobile will also add fiber cable and reuse existing coax cabling all within the compound area. The existing Facility is structurally capable of supporting T-Mobile's proposed modifications, as indicated in the structural analysis dated December 10, 2013 attached hereto as Exhibit B.

The planned modifications to the Middletown Facility fall squarely within those activities

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<sup>1</sup> The tower was acquired by Crown Castle from AT&T on December 16, 2013. It is for this reason that there are several references to AT&T in the documents supporting this filing.

January 2, 2014  
Site ID CTHA056J  
Page 2

explicitly provided for in R.C.S.A. § 16-50j-72(b)(2).

1. The proposed modification will not increase the height of the tower. T-Mobile's replacement antennas will be installed at the 140 foot level of the 148 foot monopole tower. The enclosed tower drawing confirms that the proposed modification will not increase the height of the tower.

2. The installation of the T-Mobile equipment in the existing compound, as reflected on the attached site plan, will not require an extension of the site boundaries. T-Mobile's proposed equipment will be located entirely within the existing compound area.

3. The proposed modification to the Facility will not increase the noise levels at the existing facility by six decibels or more.

4. The operation of the replacement antennas will not increase the total radio frequency (RF) power density, measured at the base of the tower, to a level at or above the applicable standard. According to a Radio Frequency Emissions Analysis Report prepared by EBI dated December 30, 2013 T-Mobile's operations would add 0.581% of the FCC Standard. Therefore, the calculated "worst case" power density for the planned combined operation at the site including all of the proposed antennas would be 55.661% of the FCC Standard as calculated for a mixed frequency site as evidenced by the engineering exhibit attached hereto as Exhibit C.

For the foregoing reasons, T-Mobile respectfully submits that the proposed replacement antennas and equipment at the Middletown Facility constitutes an exempt modification under R.C.S.A. § 16-50j-72(b)(2).

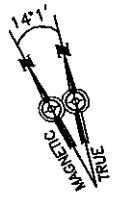
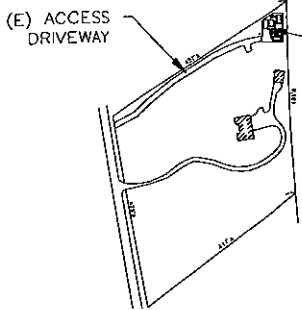
Sincerely,



Julie D. Kohler, Esq.

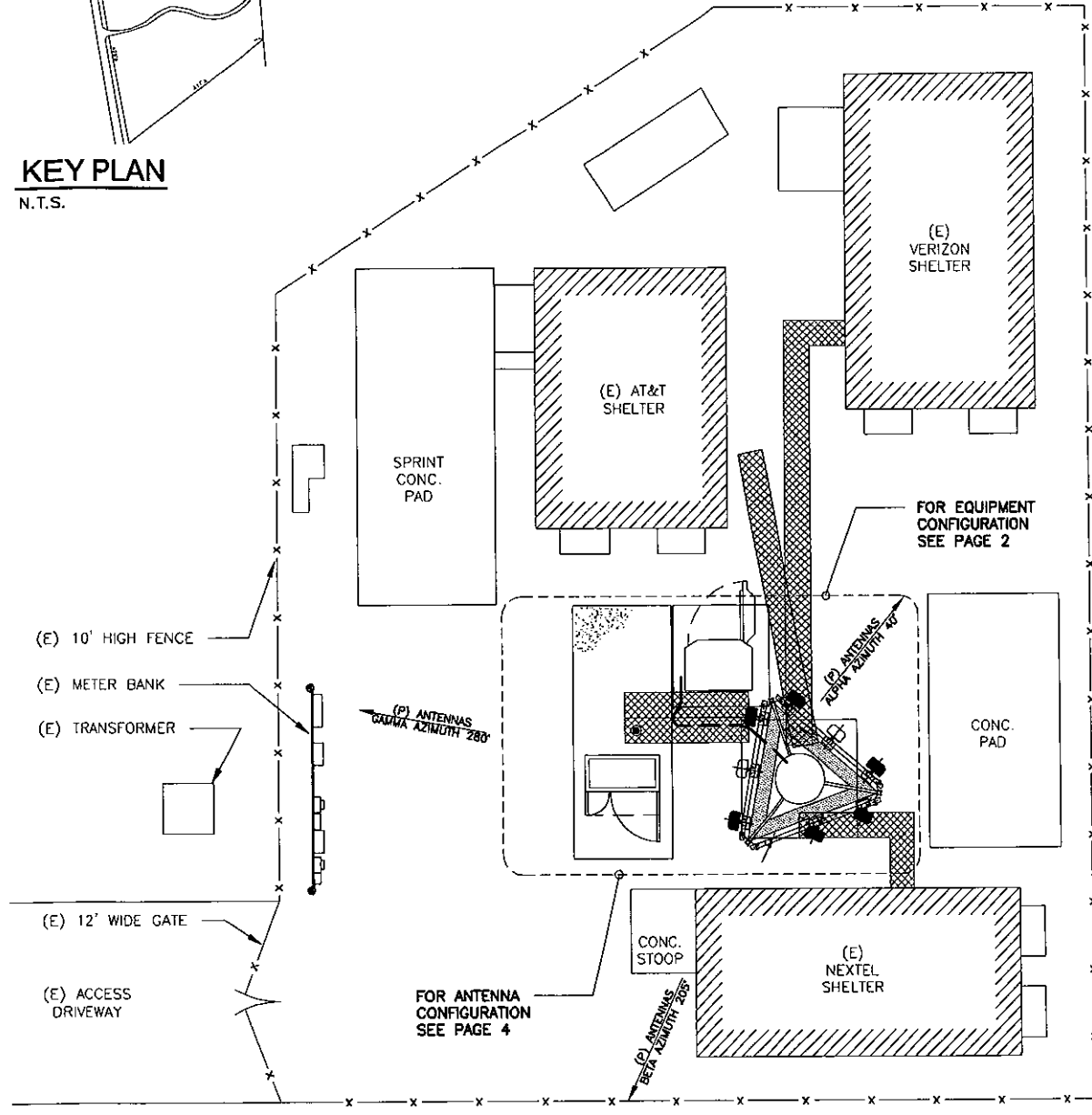
cc: City of Middletown, Mayor Daniel T. Drew  
Crown Castle  
Ernest and Brenda Trumpold  
Scott Chase, NSS

# **EXHIBIT A**



**KEY PLAN**

N.T.S.



ALL EQUIPMENT LOCATIONS ARE APPROXIMATE AND ARE SUBJECT TO APPROVAL BY LESSEE/LICENSEE'S STRUCTURAL & RF ENGINEERS. LOCATIONS OF POWER & TELEPHONE FACILITIES ARE SUBJECT TO APPROVAL BY UTILITY COMPANIES.

**SITE PLAN**

N.T.S.



CONFIGURATION

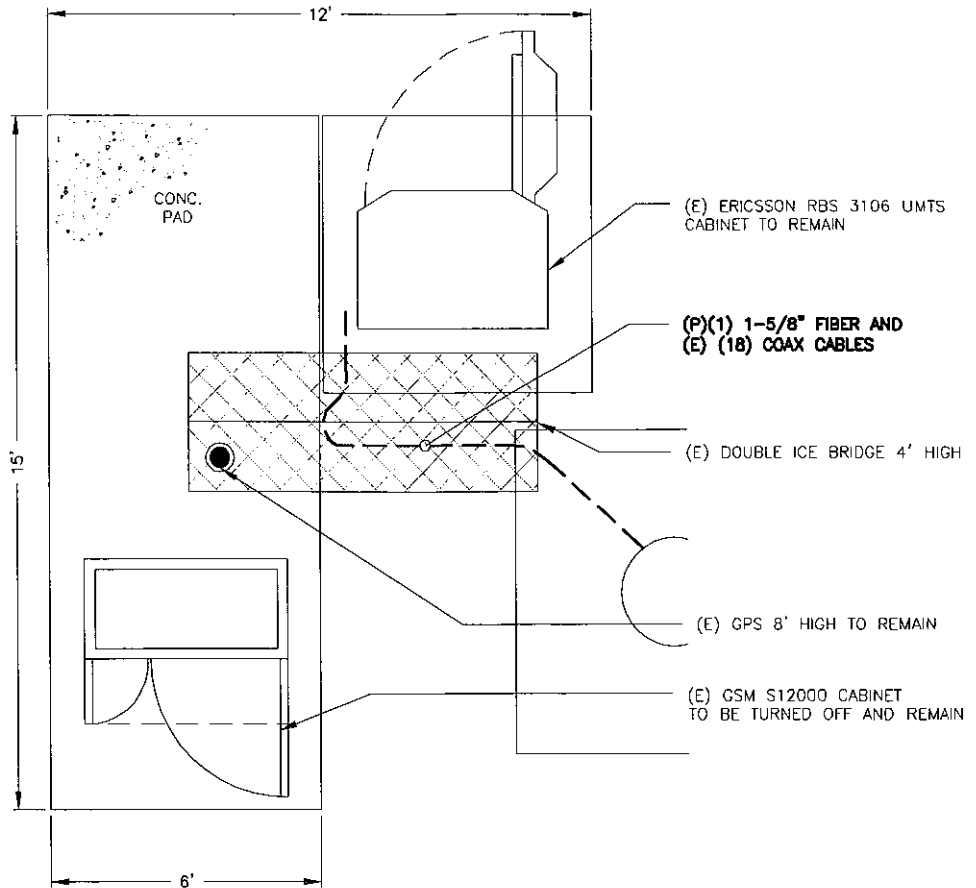
**2C**

SUBMITTALS	
LE REV A	09.09.13
LE REV 0	09.17.13

**ATLANTIS GROUP**  
 1340 Centre Street  
 Suite 203  
 Newton, MA 02459  
 Office: 617-965-0789  
 Fax: 617-213-5056

**LEASE EXHIBIT**  
 SITE NUMBER:  
 CT11056J  
 SITE NAME:  
 ATT MIDDLETOWN  
 SITE ADDRESS:  
 290 PRESTON AVE.,  
 MIDDLETOWN, CT 06457

**NORTHEAST SITE SOLUTIONS**  
 54 MAIN STREET, UNIT 3  
 STURBRIDGE, MA 01566  
 (508) 434-5237  
 FOR  
**T-MOBILE NORTHEAST, LLC**  
 35 GRIFFIN ROAD SOUTH  
 BLOOMFIELD, CT 06002  
 OFFICE: (860) 692-7100  
 FAX: (860) 692-7159



**EQUIPMENT LAYOUT**

N.T.S.

1  
LE-2

CONFIGURATION

**2C**

SUBMITTALS	
LE REV A	09.09.13
LE REV 0	09.17.13

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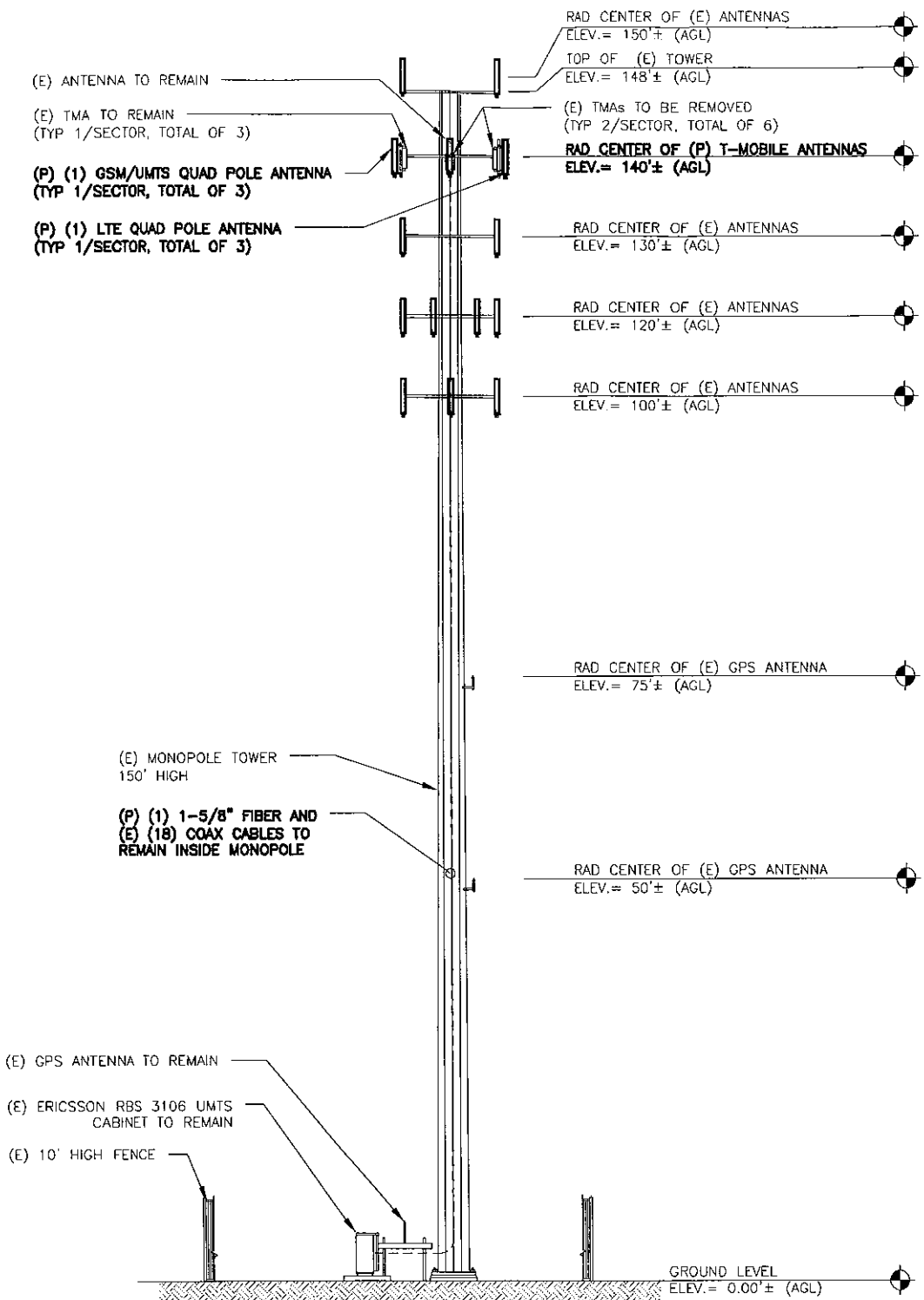
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 FAX: (860) 692-7159

DRAWN BY: E.B

CHECKED BY: S.M

PAGE 2 OF 4



**EAST ELEVATION** (1)  
N.T.S. LE-3

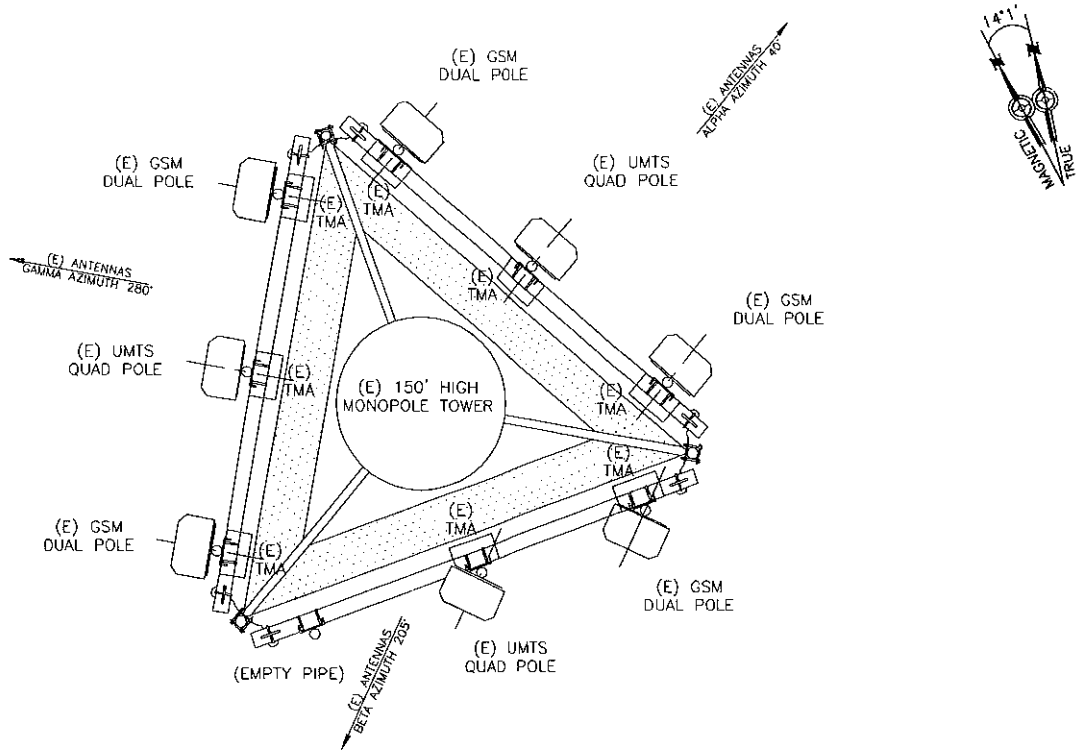
CONFIGURATION  
**2C**

SUBMITTALS	
LE REV A	09.09.13
LE REV 0	09.17.13

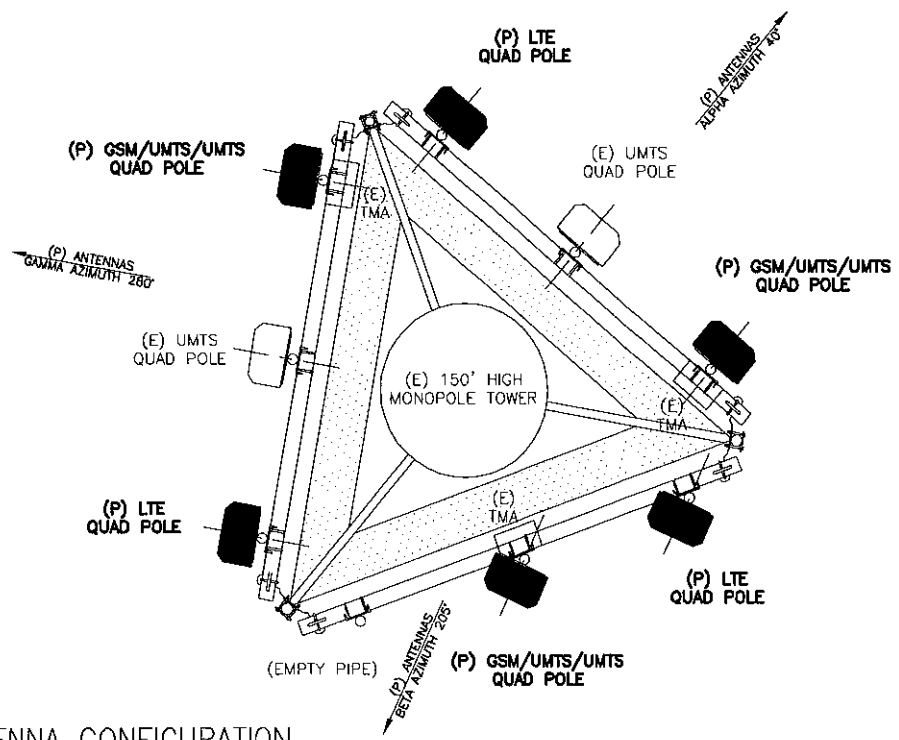
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EXISTING ANTENNA CONFIGURATION



PROPOSED ANTENNA CONFIGURATION

CONFIGURATION  
**2C**

SUBMITTALS	
LE REV A	09.09.13
LE REV 0	09.17.13

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# **EXHIBIT B**





**AT&T Towers**  
 2300 Northlake Center Dr Ste 405  
 Tucker, GA 30084

**B+T GRP**  
 1717 S. Boulder, Suite 300  
 Tulsa, OK 74119

December 10, 2013

B+T No.: 86667.003.01

**STRUCTURAL ANALYSIS**  
**148' Monopole Tower**

AT&T DESIGNATION:	Site ID: 14635 Site FA: 10035088 Site Name: Middletown SW AT&T Project: 4_T-Mobile Modification 9-18-13
ANALYSIS CRITERIA:	Codes: TIA/EIA-222-F (85 mph fastest mile) IBC 2006

SITE DATA: 290 Preston Avenue, Middletown, CT, Middlesex County  
 Latitude 41.557353°, Longitude -72.743277°  
 Market MA/RI/VT/NH/ME/CT

Ms. Charlotte Malone,

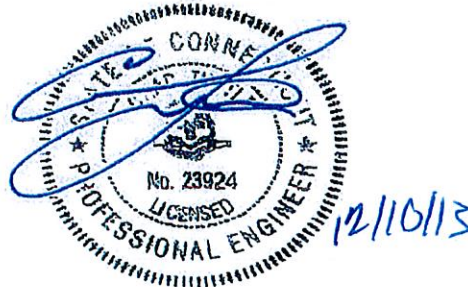
B+T Group is pleased to submit this Structural Analysis Report to determine the structural integrity of the aforementioned tower. The purpose of the analysis is to determine the suitability of the tower with the existing and proposed loading configuration detailed in the analysis report.

**Analysis Results**

Tower Stress Level with Proposed Equipment:	<b>97.9%</b>	<b>Pass</b>
Foundation Ratio with Proposed Equipment:	<b>97.1%</b>	<b>Pass</b>

We at B+T Group appreciate the opportunity of providing our continuing professional services to you and AT&T Towers. 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: Zach Smith  
 Analysis Reviewed by: Chad E. Tuttle, P.E.



**AT&T Proprietary (Internal use Only)**  
 Not for use or disclosure outside the AT&T companies  
 except under written agreement

**ANALYSIS RESULTS:**

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

111-148	61.2	Pass
99.33-115	95.8	Pass
90.5-99.333	<b>97.9</b>	Pass
75-90.5	88.7	Pass
60.5-79.75	95.5	Pass
39.75-60.5	89.4	Pass
30-45	89.3	Pass
0-30	93.7	Pass

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

1	Anchor Rods	Base	93.4	Pass
1	Base Plate	Base	83.4	Pass
1	Base Foundation(Soil Interaction)	Base	97.1	Pass

Notes:

- 1) See additional documentation in "Appendix B - Calculations" for calculation supporting the % capacity consumed.
- 2) Capacities up to 105% are considered acceptable based on analysis methods used.

**Recommendations:**

N/A

**ANALYSIS PROCEDURE:**

**Table 3 - Documents Provided**

Tower Data	PennSummit/PJF Project # 29201-0230	2/26/2001	Siterra
Foundation Information	PennSummit/PJF Project # 29201-0230	2/26/2001	Siterra
Geotech Report	Dr. Clarence Welti, P.E., P.C.	7/25/2000	Siterra
Loading	B+T Group Project No. 86667.005.01; 3_Verizon Modification 4-15-13	11/18/2013	On File
	Site Lease Application; 4_T-Mobile Modification 9-18-13	10/3/2013	Siterra
	NOC2; 4_T-Mobile Modification 9-18-13	10/4/2013	Siterra
Previous Structural Analysis	B+T Group Project No. 86667.005.01; 3_Verizon Modification 4-15-13	11/18/2013	On File
	B+T Group Project No. 86667.004.01; 2_Sprint Modification 12-14-2012	11/17/2013	On File
Modification Drawings	B+T Group Project No. 84934.003.00; 1_MOD LTE 6-15-12	11/8/2012	On File

**ANALYSIS METHOD:**

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

**ASSUMPTIONS:**

1. Tower and structures were built in accordance with the manufacturer's specifications.
2. The tower and structures have been maintained in accordance with the manufacturer's specifications.
3. The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Appendix A of this report.
4. Mount areas and weights are assumed based on photographs provided.
5. Refer to the base level drawing for transmission line distribution.
6. All loading for T-Mobile was taken from the Site Lease Application.
7. All other existing/reserved loading was taken from the previous analysis unless otherwise noted.
8. Generic future loading was considered in addition to the future loading in the NOC2 Form uploaded 10/4/13 to Siterra.

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

**APPENDIX A**  
**TOWER ANALYSIS LOADING**

**TOWER ANALYSIS LOADING:**

**Existing / Reserved Loading**

Antenna						Mount		Transmission Line	
Antenna Owner	Mount Height (ft)	Antenna CL (ft)	Quantity	Manufacturer	Model	Quantity	Type	Quantity	Size (in)
AT&T	148	150	3	KMW	AM-X-CD-16-65-00T			12	1-5/8
AT&T	148	149	6	Powerwave	AXCM-800/1900-90-13	1	L.P. Platform	1	3/8
AT&T	148	149	12	Powerwave	16"x14"x3" TME			2	7/8
AT&T	148	148	6	Ericsson	RBS6601				
AT&T	148	148	1	Raycap	DC6-48-60-18-8F				
T-Mobile	140	140	6*	EMS	RR65-18-00DPL2	1	L.P. Platform	18	1-5/8
T-Mobile	140	140	1*	RFS	APX16-DWW				
T-Mobile	140	140	2	RFS	APX16-DWW			1	1/2
T-Mobile	140	140	3*	Ericsson	7"x6"x3" TMA				
Sprint	124	125	6	Andrew	DB980F65T4E-M	1	L.P. Platform	6	1-5/8
Sprint	124	125	3	Powerwave	APXVSP18-C-A20			3	1-1/4"
Sprint	124	125	3	Alcatel	1900 RRH				
Sprint	124	125	3	Alcatel	800 RRH				
Verizon	110	111	6	Amphenol	LPA-80063/4CF	1	L.P. Platform	12	1-5/8
Verizon	110	111	1	Andrew	LNx-6514DS-T4M				
Verizon	110	111	2	Antel	BXA-70063-6CF				
Verizon	110	111	3	Raymsa	MG D3-800T0				
Verizon	110	111	6	RFS	FD9R6004/2C-3				
Metro PCS	90	90	3	Unknown	6"x6"x4" Panel	3	Pipe Mount	6	1-5/8
Metro PCS	55	55	1	Unknown	GPS	1	Standoff Mount	1	3/8
Unknown	50	50	1	Unknown	GPS	1	Standoff Mount	1	1/2

\*Equipment to be Removed

**Proposed Loading**

Antenna						Mount		Transmission Line	
Antenna Owner	Mount Height (ft)	Antenna CL (ft)	Quantity	Manufacturer	Model	Quantity	Type	Quantity	Size (in)
T-Mobile	140	140	6	Ericsson	AIR21			1	1 5/8"
T-Mobile	140	140	3	Andrew	OneBase Twin Dual Duplex TMA				

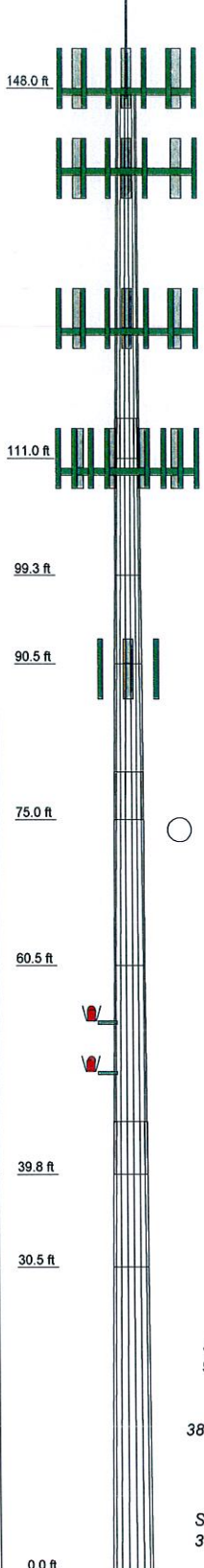
Note: See Base Level Drawing For Transmission Line Distribution

**Future Loading**

Antenna						Mount		Transmission Line	
Antenna Owner	Mount Height (ft)	Antenna CL (ft)	Quantity	Manufacturer	Model	Quantity	Type	Quantity	Size (in)
AT&T	148	149	3	KMW	AM-X-CD-16-65-00T			6	1-5/8"
AT&T	148	149	3	Ericsson	RRUS11				

**APPENDIX B**  
**CALCULATIONS**

Section	1	2	3	4	5	6	7	8
Length (ft)	37.000	15.667	8.833	15.500	19.250	20.750	14.500	30.500
Number of Sides	18	18	18	18	18	18	18	18
Thickness (in)	0.250	0.250	0.342	0.422	0.470	0.535	0.588	0.603
Socket Length (ft)	4.000			4.750		5.250		
Top Dia (in)	24.000	29.441	32.262	33.852	35.288	38.927	41.232	43.741
Bot Dia (in)	30.861	32.262	33.852	36.643	38.927	42.849	43.741	49.020
Grade	A607-65		53.190588ksi	54.952131ksi	55.140129ksi	56.275919ksi	56.37927ksi	56.896395ksi
Weight (K)	2.7	1.3	1.0	2.3	3.5	4.6	3.7	8.7



**DESIGNED APPURTENANCE LOADING**

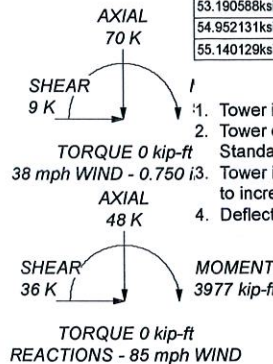
TYPE	ELEVATION	TYPE	ELEVATION
Lighting Rod 5/8" x 8" (E)	152	(2) DB980F65T4E-M w/Mount Pipe (Sprint-E)	124
AM-X-CD-16-65-00T-RET w/ Mount Pipe (ATI-E)	148	(2) DB980F65T4E-M w/Mount Pipe (Sprint-E)	124
AM-X-CD-16-65-00T-RET w/ Mount Pipe (ATI-E)	148	(2) DB980F65T4E-M w/Mount Pipe (Sprint-E)	124
AM-X-CD-16-65-00T-RET w/ Mount Pipe (ATI-E)	148	APXVSP18-C-A20 w/ Mount Pipe (Sprint-E)	124
(2) AXCM-800/1900-90-13 w/ Mount Pipe (ATI-E)	148	APXVSP18-C-A20 w/ Mount Pipe (Sprint-E)	124
(2) AXCM-800/1900-90-13 w/ Mount Pipe (ATI-E)	148	APXVSP18-C-A20 w/ Mount Pipe (Sprint-E)	124
(2) AXCM-800/1900-90-13 w/ Mount Pipe (ATI-E)	148	1900MHz RRH (Sprint-E)	124
(4) 16"x14"x3" (ATI-E-Shielded)	148	1900MHz RRH (Sprint-E)	124
(4) 16"x14"x3" (ATI-E-Shielded)	148	1900MHz RRH (Sprint-E)	124
(4) 16"x14"x3" (ATI-E-Shielded)	148	800MHZ RRH (Sprint-E)	124
(2) RBS6601 (ATI-E)	148	800MHZ RRH (Sprint-E)	124
(2) RBS6601 (ATI-E)	148	800MHZ RRH (Sprint-E)	124
(2) RBS6601 (ATI-E)	148	14' L.P. Platform (E)	124
DC6-48-60-18-8F (ATI-E)	148	(2) LPA-80063/4CF w/ Mount Pipe (E - Verizon)	110
AM-X-CD-16-65-00T-RET w/ Mount Pipe (ATI-Future)	148	(2) LPA-80063/4CF w/ Mount Pipe (E - Verizon)	110
AM-X-CD-16-65-00T-RET w/ Mount Pipe (ATI-Future)	148	(2) LPA-80063/4CF w/ Mount Pipe (E - Verizon)	110
AM-X-CD-16-65-00T-RET w/ Mount Pipe (ATI-Future)	148	BXA-70063-6CF w/ Mount Pipe (E - Verizon)	110
RRUS 11 (ATI-Future)	148	RRUS 11 (ATI-Future)	110
RRUS 11 (ATI-Future)	148	LNx-6514DS-T4M w/ Mount Pipe (E - Verizon)	110
RRUS 11 (ATI-Future)	148	BXA-70063-6CF w/ Mount Pipe (E - Verizon)	110
6' x 2" Mount Pipe (ATI-E)	148	6' x 2" Mount Pipe (ATI-E)	110
6' x 2" Mount Pipe (ATI-E)	148	6' x 2" Mount Pipe (ATI-E)	110
6' x 2" Mount Pipe (ATI-E)	148	MG D3 800TO w/Mount Pipe (E - Verizon)	110
Platform Mount (LP 714-1) (ATI-E)	148	MG D3 800TO w/Mount Pipe (E - Verizon)	110
APX16DWW-16DWW-C w/ Mount Pipe (T-Mobile-E)	140	MG D3 800TO w/Mount Pipe (E - Verizon)	110
APX16DWW-16DWW-C w/ Mount Pipe (T-Mobile-E)	140	(2) FD9R6004/2C-3L (E - Verizon)	110
(2) AIR 21 w/ Mount Pipe (T-Mobile-P)	140	(2) FD9R6004/2C-3L (E - Verizon)	110
(2) AIR 21 w/ Mount Pipe (T-Mobile-P)	140	(2) FD9R6004/2C-3L (E - Verizon)	110
(2) AIR 21 w/ Mount Pipe (T-Mobile-P)	140	14' L.P. Platform (E - Verizon)	110
(2) AIR 21 w/ Mount Pipe (T-Mobile-P)	140	6'x6"x4" Panel (E - Metro PCS)	90
ONEBASE TWIN DUAL DUPLEX TMA (T-Mobile-P)	140	6'x6"x4" Panel (E - Metro PCS)	90
ONEBASE TWIN DUAL DUPLEX TMA (T-Mobile-P)	140	6'x6"x4" Panel (E - Metro PCS)	90
ONEBASE TWIN DUAL DUPLEX TMA (T-Mobile-P)	140	6' x 2" Mount Pipe (E - Metro PCS)	90
6' x 2" Mount Pipe (T-Mobile-E)	140	GPS (E - Metro PCS)	55
(2) 6' x 2" Mount Pipe (T-Mobile-E)	140	Side Arm Mount [SO 702-1] (E - Metro PCS)	55
6' x 2" Mount Pipe (T-Mobile-E)	140	GPS (E)	50
14' L.P. Platform (T-Mobile-E)	140	Side Arm Mount [SO 702-1] (E)	50

**MATERIAL STRENGTH**

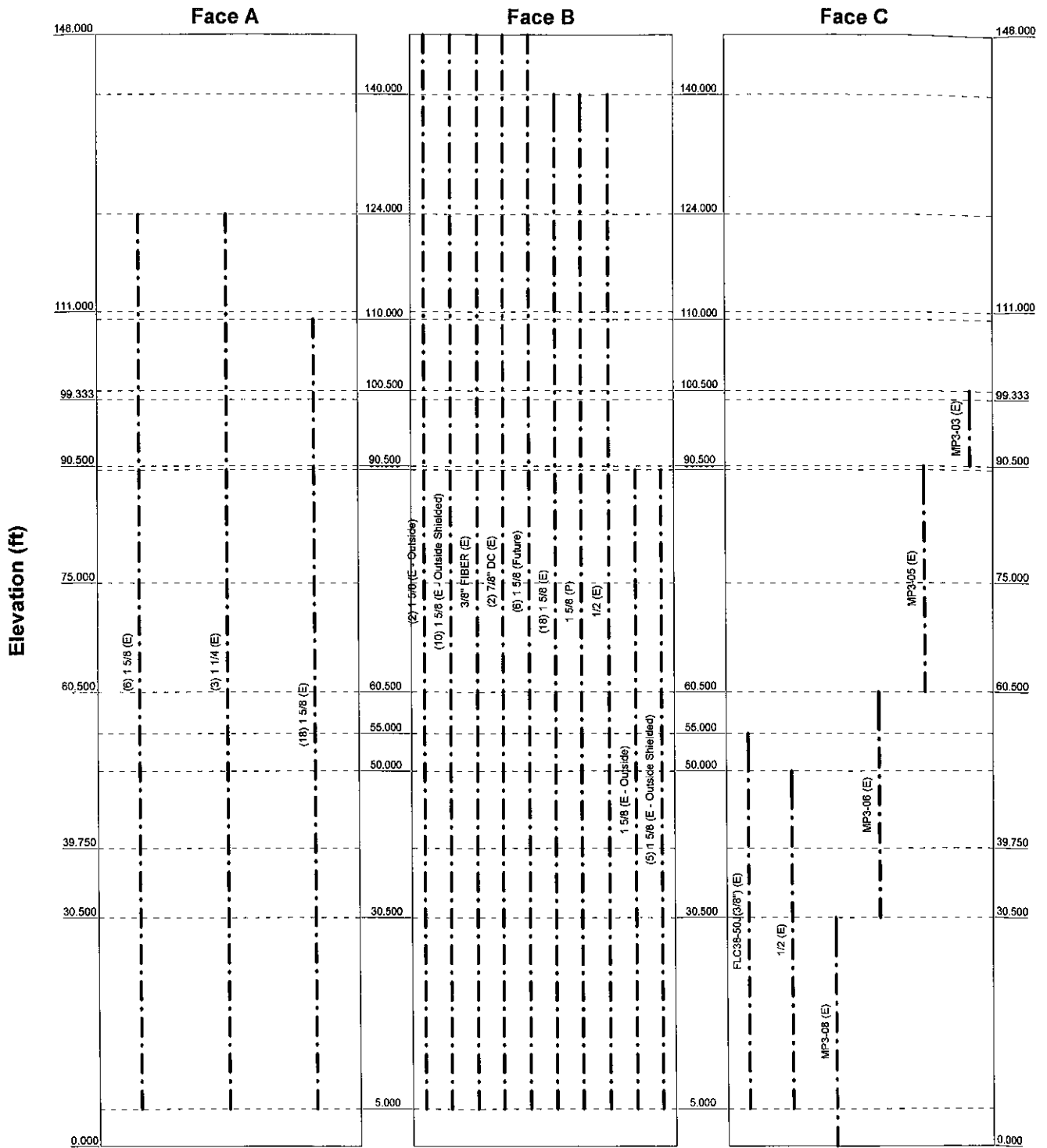
GRADE	Fy	Fu	GRADE	Fy	Fu
A607-65	65 ksi	80 ksi	56.275919ksi	56 ksi	71 ksi
53.190588ksi	53 ksi	68 ksi	56.37927ksi	56 ksi	71 ksi
54.952131ksi	55 ksi	70 ksi	56.896395ksi	57 ksi	72 ksi
55.140129ksi	55 ksi	70 ksi			

**TOWER DESIGN NOTES**

1. Tower is located in Middlesex County, Connecticut.
2. Tower designed for a 85 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 38 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 50 mph wind.



<p><b>B+T Group</b> 1717 S. Boulder Ave. Tulsa, OK 74119 Phone: (918) 587-4630 FAX: (918) 295-0265</p>	<p>Job: <b>86667.003.01 - Middletown, CT (USID# 14635)</b></p>		
	<p>Project: AT&amp;T Towers</p>	<p>Drawn by: zsmith</p>	<p>App'd:</p>
<p>Code: TIA/EIA-222-F</p>	<p>Date: 12/10/13</p>	<p>Scale: NTS</p>	
<p>Path:</p>	<p>Dwg No. <b>E-1</b></p>		

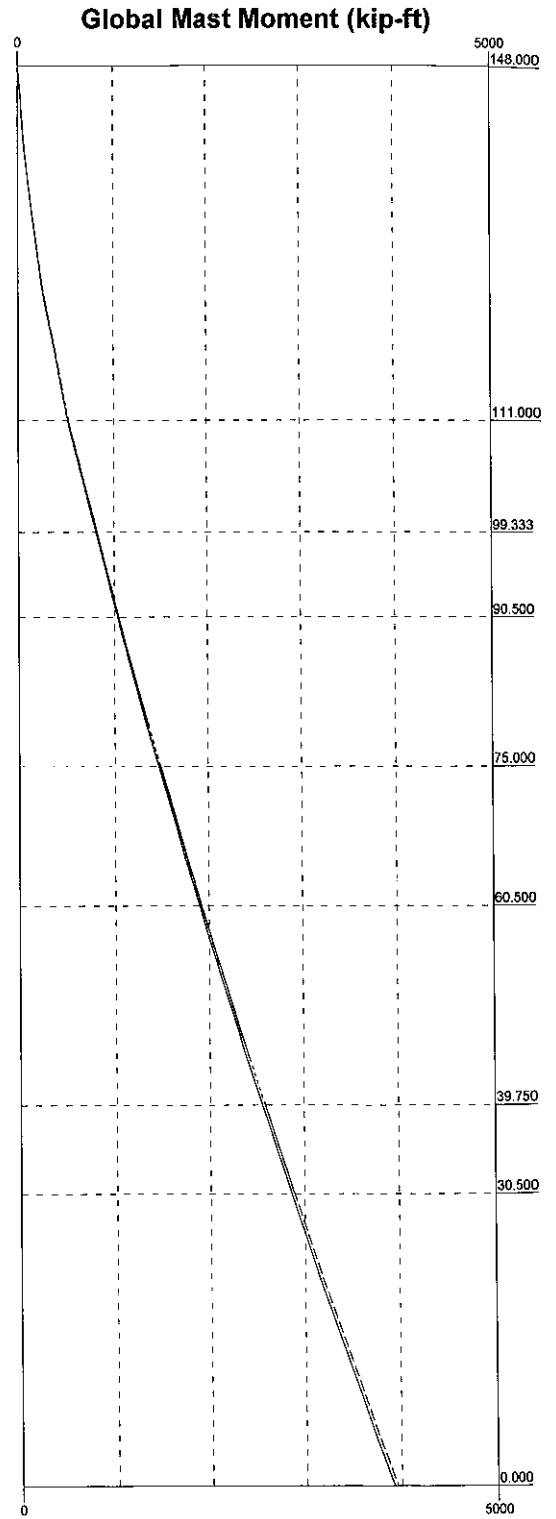
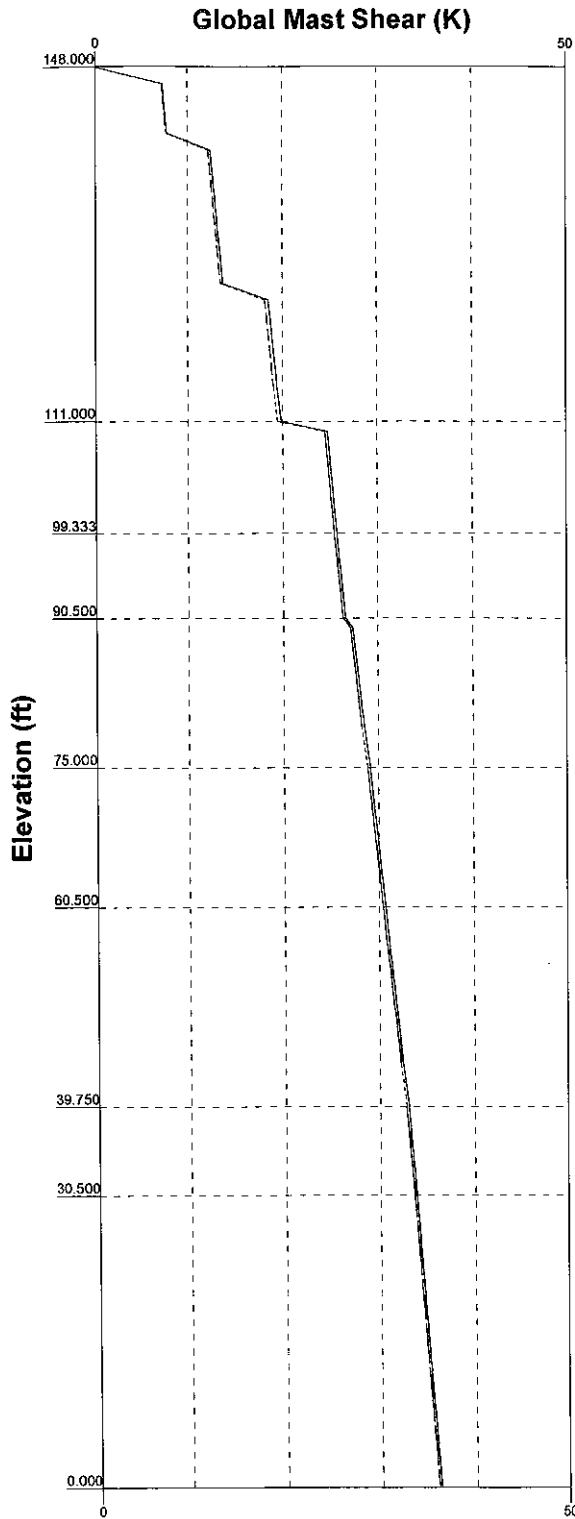


 <b>B+T Group</b> 1717 S. Boulder Ave. Tulsa, OK 74119 Phone: (918) 587-4630 FAX: (918) 295-0265	<b>B+T Group</b>		Job: <b>86667.003.01 - Middletown, CT (USID# 14635)</b>	
	Project:		Client: <b>AT&amp;T Towers</b>	Drawn by: <b>zsmith</b>
	Code: <b>TIA/EIA-222-F</b>		Date: <b>12/10/13</b>	App'd:
	Path:		Scale: <b>NTS</b>	Dwg No. <b>E-7</b>

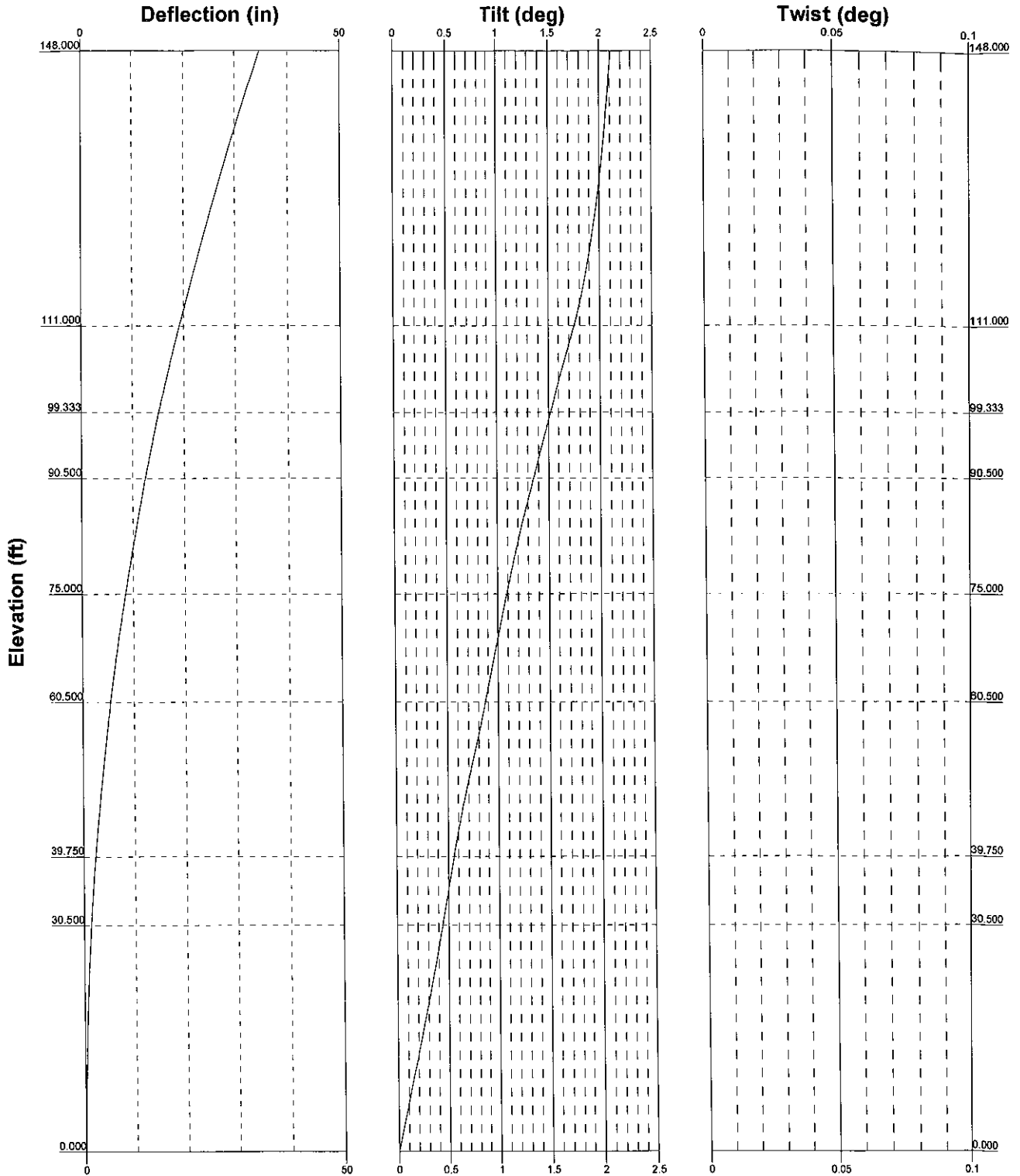



—— Vx      - - - - - Vz

—— Mx      - - - - - Mz



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	Project: AT&T Towers		
	Client: AT&T Towers	Drawn by: zsmith	App'd:
	Code: TIA/EIA-222-F	Date: 12/10/13	Scale: NTS
Path:	Dwg No. E-4		C:\Program Files\B+T Group\Projects\86667.003.01 - Middletown, CT\Drawings\Towers\Towers.dwg



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	Project:	Client: AT&T Towers	Drawn by: zsmith	App'd:
	Code: TIA/EIA-222-F	Date: 12/10/13	Scale: NTS	
	Path:	Dwg No. E-5		

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	<b>Project</b>	<b>Date</b> 12:03:34 12/10/13
	<b>Client</b> AT&T Towers	<b>Designed by</b> zsmith

## 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 Middlesex County, Connecticut.

Basic wind speed of 85 mph.

Nominal ice thickness of 0.750 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, feed line supports, and appurtenance mounts are not considered.

## Options

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

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L1	148.000-111.000	37.000	4.000	18	24.000	30.661	0.250	1.000	A607-65 (65 ksi)
L2	111.000-99.333	15.667	0.000	18	29.441	32.262	0.250	1.000	A607-65 (65 ksi)
L3	99.333-90.500	8.833	0.000	18	32.262	33.852	0.342	1.366	53.190588ksi (53 ksi)
L4	90.500-75.000	15.500	4.750	18	33.852	36.643	0.422	1.689	54.952131ksi (55 ksi)

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	<b>Project</b>	<b>Date</b> 12:03:34 12/10/13
	<b>Client</b> AT&T Towers	<b>Designed by</b> zsmith

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L5	75.000-60.500	19.250	0.000	18	35.288	38.927	0.470	1.880	55.140129ksi (55 ksi)
L6	60.500-39.750	20.750	5.250	18	38.927	42.849	0.535	2.139	56.275919ksi (56 ksi)
L7	39.750-30.500	14.500	0.000	18	41.232	43.741	0.588	2.351	56.37927ksi (56 ksi)
L8	30.500-0.000	30.500		18	43.741	49.020	0.603	2.413	56.896395ksi (57 ksi)

### Tapered Pole Properties

Section	Tip Dia. in	Area in <sup>2</sup>	I in <sup>4</sup>	r in	C in	I/C in <sup>3</sup>	J in <sup>4</sup>	I/Q in <sup>2</sup>	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
	31.134	24.131	2819.528	10.796	15.576	181.020	5642.767	12.068	4.956	19.825
L2	30.626	23.163	2493.598	10.363	14.956	166.729	4990.478	11.584	4.742	18.966
	32.759	25.401	3288.621	11.364	16.389	200.660	6581.568	12.703	5.238	20.952
L3	32.759	34.605	4454.590	11.332	16.389	271.804	8915.041	17.306	5.077	14.864
	34.374	36.329	5154.157	11.896	17.197	299.714	10315.096	18.168	5.357	15.683
L4	34.374	44.792	6324.332	11.868	17.197	367.760	12656.986	22.400	5.215	12.354
	37.208	48.532	8044.149	12.858	18.615	432.141	16098.884	24.270	5.706	13.517
L5	36.744	51.933	7954.037	12.360	17.926	443.711	15918.540	25.972	5.384	11.456
	39.527	57.361	10717.611	13.652	19.775	541.986	21449.324	28.686	6.024	12.819
L6	39.527	65.171	12135.843	13.629	19.775	613.705	24287.654	32.592	5.910	11.05
	43.510	71.830	16248.487	15.022	21.767	746.463	32518.354	35.922	6.600	12.341
L7	42.790	75.823	15824.510	14.429	20.946	755.504	31669.842	37.919	6.222	10.586
	44.416	80.505	18940.540	15.319	22.221	852.390	37906.003	40.260	6.664	11.338
L8	44.416	82.606	19420.657	15.314	22.221	873.996	38866.869	41.311	6.637	11
	49.776	92.714	27458.256	17.188	24.902	1102.646	54952.643	46.366	7.566	12.54

Tower Elevation ft	Gusset Area (per face) ft <sup>2</sup>	Gusset Thickness in	Gusset Grade	Adjust. Factor A <sub>f</sub>	Adjust. Factor A <sub>r</sub>	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in
L1 148.000-111.000				1	1	1		
L2 111.000-99.333				1	1	1		
L3 99.333-90.500				1	1	0.975769		
L4 90.500-75.000				1	1	0.953599		
L5 75.000-60.500				1	1	0.963898		
L6 60.500-39.750				1	1	0.95047		
L7 39.750-30.500				1	1	0.957465		
L8 30.500-0.000				1	1	0.959173		

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	<b>Project</b>	<b>Date</b> 12:03:34 12/10/13
	<b>Client</b> AT&T Towers	<b>Designed by</b> zsmith

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

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number	CAAA		Weight kbf
						ft <sup>2</sup> /ft		
1 5/8 (E - Outside)	B	No	CaAa (Out Of Face)	148.000 - 5.000	2	No Ice	0.198	0.001
						1/2" Ice	0.298	0.003
						1" Ice	0.398	0.005
						2" Ice	0.598	0.011
						4" Ice	0.998	0.030
1 5/8 (E - Outside Shielded)	B	No	CaAa (Out Of Face)	148.000 - 5.000	10	No Ice	0.000	0.001
						1/2" Ice	0.000	0.003
						1" Ice	0.000	0.005
						2" Ice	0.000	0.011
						4" Ice	0.000	0.030
3/8" FIBER (E)	B	No	Inside Pole	148.000 - 5.000	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
7/8" DC (E)	B	No	Inside Pole	148.000 - 5.000	2	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
1 5/8 (Future)	B	No	Inside Pole	148.000 - 5.000	6	No Ice	0.000	0.001
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.001
						2" Ice	0.000	0.001
						4" Ice	0.000	0.001
*///*	B	No	Inside Pole	140.000 - 5.000	18	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
1 5/8 (P)	B	No	Inside Pole	140.000 - 5.000	1	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
1/2 (E)	B	No	Inside Pole	140.000 - 5.000	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
*///*	A	No	Inside Pole	124.000 - 5.000	6	No Ice	0.000	0.001
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.001
						2" Ice	0.000	0.001
						4" Ice	0.000	0.001
1 1/4 (E)	A	No	Inside Pole	124.000 - 5.000	3	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
*///*	A	No	Inside Pole	110.000 - 5.000	18	No Ice	0.000	0.001
						1/2" Ice	0.000	0.001

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	<b>Project</b>	<b>Date</b> 12:03:34 12/10/13
	<b>Client</b> AT&T Towers	<b>Designed by</b> zsmith

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C <sub>AA</sub> ft <sup>2</sup> /ft	Weight klf
						1" Ice	0.000	0.001
						2" Ice	0.000	0.001
						4" Ice	0.000	0.001
*** 1 5/8 (E - Outside)	B	No	CaAa (Out Of Face)	90.000 - 5.000	1	No Ice	0.198	0.001
						1/2" Ice	0.298	0.003
						1" Ice	0.398	0.005
						2" Ice	0.598	0.011
						4" Ice	0.998	0.030
1 5/8 (E - Outside Shielded)	B	No	CaAa (Out Of Face)	90.000 - 5.000	5	No Ice	0.000	0.001
						1/2" Ice	0.000	0.003
						1" Ice	0.000	0.005
						2" Ice	0.000	0.011
						4" Ice	0.000	0.030
*** *** FLC38-50J(3/8") (E)	C	No	CaAa (Out Of Face)	55.000 - 5.000	1	No Ice	0.000	0.000
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.002
						2" Ice	0.000	0.006
						4" Ice	0.000	0.022
*** 1/2 (E)	C	No	CaAa (Out Of Face)	50.000 - 5.000	1	No Ice	0.000	0.000
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.002
						2" Ice	0.000	0.007
						4" Ice	0.000	0.023
*** MP3-08 (E)	C	No	CaAa (Out Of Face)	30.500 - 0.000	1	No Ice	0.467	0.010
						1/2" Ice	0.551	0.015
						1" Ice	0.634	0.020
						2" Ice	0.800	0.030
						4" Ice	1.134	0.051
MP3-06 (E)	C	No	CaAa (Out Of Face)	60.500 - 30.500	1	No Ice	0.434	0.010
						1/2" Ice	0.518	0.015
						1" Ice	0.601	0.020
						2" Ice	0.768	0.030
						4" Ice	1.101	0.051
MP3-05 (E)	C	No	CaAa (Out Of Face)	90.500 - 60.500	1	No Ice	0.348	0.010
						1/2" Ice	0.432	0.015
						1" Ice	0.515	0.020
						2" Ice	0.682	0.030
						4" Ice	1.015	0.051
MP3-03 (E)	C	No	CaAa (Out Of Face)	100.500 - 90.500	1	No Ice	0.262	0.010
						1/2" Ice	0.345	0.015
						1" Ice	0.428	0.020
						2" Ice	0.595	0.030
						4" Ice	0.928	0.051
***								

### Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A <sub>R</sub> ft <sup>2</sup>	A <sub>F</sub> ft <sup>2</sup>	C <sub>AA</sub> In Face ft <sup>2</sup>	C <sub>AA</sub> Out Face ft <sup>2</sup>	Weight K
L1	148.000-111.000	A	0.000	0.000	0.000	0.000	0.107
		B	0.000	0.000	0.000	14.652	1.316
		C	0.000	0.000	0.000	0.000	0.000

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	<b>Project</b>	<b>Date</b> 12:03:34 12/10/13
	<b>Client</b> AT&T Towers	<b>Designed by</b> zsmith

Tower Section	Tower Elevation ft	Face	A <sub>R</sub> ft <sup>2</sup>	A <sub>F</sub> ft <sup>2</sup>	C <sub>A</sub> A <sub>A</sub> In Face ft <sup>2</sup>	C <sub>A</sub> A <sub>A</sub> Out Face ft <sup>2</sup>	Weight K
L2	111.000-99.333	A	0.000	0.000	0.000	0.000	0.296
		B	0.000	0.000	0.000	4.620	0.465
		C	0.000	0.000	0.000	0.305	0.012
L3	99.333-90.500	A	0.000	0.000	0.000	0.000	0.238
		B	0.000	0.000	0.000	3.498	0.352
		C	0.000	0.000	0.000	2.311	0.087
L4	90.500-75.000	A	0.000	0.000	0.000	0.000	0.418
		B	0.000	0.000	0.000	9.108	0.712
		C	0.000	0.000	0.000	5.399	0.153
L5	75.000-60.500	A	0.000	0.000	0.000	0.000	0.391
		B	0.000	0.000	0.000	8.613	0.669
		C	0.000	0.000	0.000	5.051	0.144
L6	60.500-39.750	A	0.000	0.000	0.000	0.000	0.559
		B	0.000	0.000	0.000	12.326	0.957
		C	0.000	0.000	0.000	9.012	0.209
L7	39.750-30.500	A	0.000	0.000	0.000	0.000	0.249
		B	0.000	0.000	0.000	5.495	0.427
		C	0.000	0.000	0.000	4.018	0.095
L8	30.500-0.000	A	0.000	0.000	0.000	0.000	0.687
		B	0.000	0.000	0.000	15.147	1.176
		C	0.000	0.000	0.000	14.249	0.310

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

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A <sub>R</sub> ft <sup>2</sup>	A <sub>F</sub> ft <sup>2</sup>	C <sub>A</sub> A <sub>A</sub> In Face ft <sup>2</sup>	C <sub>A</sub> A <sub>A</sub> Out Face ft <sup>2</sup>	Weight K
L1	148.000-111.000	A	0.883	0.000	0.000	0.000	0.000	0.107
		B		0.000	0.000	0.000	27.724	2.712
		C		0.000	0.000	0.000	0.000	0.000
L2	111.000-99.333	A	0.862	0.000	0.000	0.000	0.000	0.296
		B		0.000	0.000	0.000	8.742	0.905
		C		0.000	0.000	0.000	0.477	0.022
L3	99.333-90.500	A	0.851	0.000	0.000	0.000	0.000	0.238
		B		0.000	0.000	0.000	6.506	0.671
		C		0.000	0.000	0.000	3.565	0.164
L4	90.500-75.000	A	0.837	0.000	0.000	0.000	0.000	0.418
		B		0.000	0.000	0.000	16.812	1.525
		C		0.000	0.000	0.000	7.562	0.285
L5	75.000-60.500	A	0.817	0.000	0.000	0.000	0.000	0.391
		B		0.000	0.000	0.000	15.898	1.438
		C		0.000	0.000	0.000	7.074	0.266
L6	60.500-39.750	A	0.788	0.000	0.000	0.000	0.000	0.559
		B		0.000	0.000	0.000	22.139	1.980
		C		0.000	0.000	0.000	11.739	0.408
L7	39.750-30.500	A	0.756	0.000	0.000	0.000	0.000	0.249
		B		0.000	0.000	0.000	9.869	0.883
		C		0.000	0.000	0.000	5.233	0.193
L8	30.500-0.000	A	0.750	0.000	0.000	0.000	0.000	0.687
		B		0.000	0.000	0.000	26.622	2.358
		C		0.000	0.000	0.000	18.061	0.605

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	<b>Project</b>	<b>Date</b> 12:03:34 12/10/13
	<b>Client</b> AT&T Towers	<b>Designed by</b> zsmith

### Feed Line Center of Pressure

Section	Elevation <i>ft</i>	CP <sub>X</sub>	CP <sub>Z</sub>	CP <sub>X</sub> <i>Ice</i>	CP <sub>Z</sub> <i>Ice</i>
		<i>in</i>	<i>in</i>	<i>in</i>	<i>in</i>
L1	148.000-111.000	0.438	0.253	0.698	0.403
L2	111.000-99.333	0.412	0.273	0.675	0.436
L3	99.333-90.500	0.141	0.398	0.295	0.584
L4	90.500-75.000	0.236	0.532	0.490	0.745
L5	75.000-60.500	0.245	0.543	0.510	0.766
L6	60.500-39.750	0.159	0.592	0.429	0.807
L7	39.750-30.500	0.161	0.599	0.436	0.820
L8	30.500-0.000	0.026	0.576	0.251	0.774

### Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment °	Placement <i>ft</i>	C <sub>A</sub> A <sub>1</sub>		Weight <i>K</i>	
			Horz Lateral <i>ft</i>	Vert <i>ft</i>			Front <i>ft</i> <sup>2</sup>	Side <i>ft</i> <sup>2</sup>		
Lighting Rod 5/8" x 8" (E)	C	None			0.000	152.000	No Ice	0.500	0.500	0.031
							1/2" Ice	1.314	1.314	0.037
							1" Ice	2.144	2.144	0.047
							2" Ice	3.613	3.613	0.084
							4" Ice	5.683	5.683	0.227
*///*										
AM-X-CD-16-65-00T-RET w/ Mount Pipe (AT&T-E)	C	From Leg	4.000	0.000	0.000	148.000	No Ice	8.498	6.304	0.074
							1/2" Ice	9.149	7.479	0.139
							1" Ice	9.767	8.368	0.212
							2" Ice	11.031	10.179	0.385
							4" Ice	13.679	14.024	0.874
AM-X-CD-16-65-00T-RET w/ Mount Pipe (AT&T-E)	B	From Leg	4.000	0.000	0.000	148.000	No Ice	8.498	6.304	0.074
							1/2" Ice	9.149	7.479	0.139
							1" Ice	9.767	8.368	0.212
							2" Ice	11.031	10.179	0.385
							4" Ice	13.679	14.024	0.874
AM-X-CD-16-65-00T-RET w/ Mount Pipe (AT&T-E)	A	From Leg	4.000	0.000	0.000	148.000	No Ice	8.498	6.304	0.074
							1/2" Ice	9.149	7.479	0.139
							1" Ice	9.767	8.368	0.212
							2" Ice	11.031	10.179	0.385
							4" Ice	13.679	14.024	0.874
(2) AXCM-800/1900-90-13 w/ Mount Pipe (AT&T-E)	C	From Leg	4.000	0.000	1.000	148.000	No Ice	5.980	4.120	0.053
							1/2" Ice	6.440	4.770	0.097
							1" Ice	6.900	5.420	0.141
							2" Ice	7.820	6.720	0.229
							4" Ice	9.660	9.320	0.404
(2) AXCM-800/1900-90-13 w/ Mount Pipe (AT&T-E)	B	From Leg	4.000	0.000	1.000	148.000	No Ice	5.980	4.120	0.053
							1/2" Ice	6.440	4.770	0.097
							1" Ice	6.900	5.420	0.141
							2" Ice	7.820	6.720	0.229
							4" Ice	9.660	9.320	0.404
(2) AXCM-800/1900-90-13 w/ Mount Pipe (AT&T-E)	A	From Leg	4.000	0.000	1.000	148.000	No Ice	5.980	4.120	0.053
							1/2" Ice	6.440	4.770	0.097
							1" Ice	6.900	5.420	0.141
							2" Ice	7.820	6.720	0.229
							4" Ice	9.660	9.320	0.404



<b>tnxTower</b>  <b>B+T Group</b> 1717 S. Boulder Ave. Tulsa, OK 74119 Phone: (918) 587-4630 FAX: (918) 295-0265	<b>Job</b> 86667.003.01 - Middletown, CT (USID# 14635)	<b>Page</b> 7 of 20
	<b>Project</b>	<b>Date</b> 12:03:34 12/10/13
	<b>Client</b> AT&T Towers	<b>Designed by</b> zsmith

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C <sub>AA</sub>		Weight	
			Horz	Lateral			Front	Side		
			ft	ft	°	ft	ft <sup>2</sup>	ft <sup>2</sup>	K	
(4) 16"x14"x3" (AT&T-E-Shielded)	C	From Leg	4.000		0.000	148.000	4" Ice	9.660	9.320	0.404
			0.000				No Ice	0.000	0.544	0.010
			1.000				1/2" Ice	0.000	0.675	0.022
							1" Ice	0.000	0.815	0.036
							2" Ice	0.000	1.119	0.072
(4) 16"x14"x3" (AT&T-E-Shielded)	B	From Leg	4.000		0.000	148.000	4" Ice	0.000	1.832	0.181
			0.000				No Ice	0.000	0.544	0.010
			1.000				1/2" Ice	0.000	0.675	0.022
							1" Ice	0.000	0.815	0.036
							2" Ice	0.000	1.119	0.072
(4) 16"x14"x3" (AT&T-E-Shielded)	A	From Leg	4.000		0.000	148.000	4" Ice	0.000	1.832	0.181
			0.000				No Ice	0.000	0.544	0.010
			1.000				1/2" Ice	0.000	0.675	0.022
							1" Ice	0.000	0.815	0.036
							2" Ice	0.000	1.119	0.072
(2) RBS6601 (AT&T-E)	C	From Leg	4.000		0.000	148.000	4" Ice	0.000	1.832	0.181
			0.000				No Ice	2.942	1.190	0.055
			0.000				1/2" Ice	3.172	1.351	0.074
							1" Ice	3.410	1.521	0.097
							2" Ice	3.913	1.887	0.151
(2) RBS6601 (AT&T-E)	B	From Leg	4.000		0.000	148.000	4" Ice	5.023	2.721	0.302
			0.000				No Ice	2.942	1.190	0.055
			0.000				1/2" Ice	3.172	1.351	0.074
							1" Ice	3.410	1.521	0.097
							2" Ice	3.913	1.887	0.151
(2) RBS6601 (AT&T-E)	A	From Leg	4.000		0.000	148.000	4" Ice	5.023	2.721	0.302
			0.000				No Ice	2.942	1.190	0.055
			0.000				1/2" Ice	3.172	1.351	0.074
							1" Ice	3.410	1.521	0.097
							2" Ice	3.913	1.887	0.151
DC6-48-60-18-8F (AT&T-E)	A	From Leg	4.000		0.000	148.000	4" Ice	5.023	2.721	0.302
			0.000				No Ice	2.567	4.317	0.019
			0.000				1/2" Ice	2.798	4.596	0.050
							1" Ice	3.038	4.885	0.085
							2" Ice	3.543	5.488	0.167
AM-X-CD-16-65-00T-RET w/ Mount Pipe (AT&T-Future)	C	From Leg	4.000		0.000	148.000	4" Ice	4.658	6.797	0.383
			0.000				No Ice	8.498	6.304	0.074
			1.000				1/2" Ice	9.149	7.479	0.139
							1" Ice	9.767	8.368	0.212
							2" Ice	11.031	10.179	0.385
AM-X-CD-16-65-00T-RET w/ Mount Pipe (AT&T-Future)	B	From Leg	4.000		0.000	148.000	4" Ice	13.679	14.024	0.874
			0.000				No Ice	8.498	6.304	0.074
			1.000				1/2" Ice	9.149	7.479	0.139
							1" Ice	9.767	8.368	0.212
							2" Ice	11.031	10.179	0.385
AM-X-CD-16-65-00T-RET w/ Mount Pipe (AT&T-Future)	A	From Leg	4.000		0.000	148.000	4" Ice	13.679	14.024	0.874
			0.000				No Ice	8.498	6.304	0.074
			1.000				1/2" Ice	9.149	7.479	0.139
							1" Ice	9.767	8.368	0.212
							2" Ice	11.031	10.179	0.385
RRUS 11 (AT&T-Future)	C	From Leg	4.000		0.000	148.000	4" Ice	13.679	14.024	0.874
			0.000				No Ice	3.249	1.373	0.051
			1.000				1/2" Ice	3.491	1.551	0.071
							1" Ice	3.741	1.738	0.095
							2" Ice	4.268	2.138	0.153
RRUS 11	B	From Leg	4.000		0.000	148.000	4" Ice	5.426	3.042	0.313
							No Ice	3.249	1.373	0.051

<b>tnxTower</b>  <b>B+T Group</b> 1717 S. Boulder Ave. Tulsa, OK 74119 Phone: (918) 587-4630 FAX: (918) 295-0265	<b>Job</b>		86667.003.01 - Middletown, CT (USID# 14635)		<b>Page</b>		8 of 20	
	<b>Project</b>				<b>Date</b>		12:03:34 12/10/13	
	<b>Client</b>		AT&T Towers		<b>Designed by</b>		zsmith	

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C <sub>A</sub> A <sub>A</sub> Front	C <sub>A</sub> A <sub>A</sub> Side	Weight
			Horz	Lateral					
(AT&T-Future)			0.000						
			1.000						
						1/2" Ice	3.491	1.551	0.071
						1" Ice	3.741	1.738	0.095
						2" Ice	4.268	2.138	0.153
						4" Ice	5.426	3.042	0.313
RRUS 11	A	From Leg	4.000		0.000	No Ice	3.249	1.373	0.051
(AT&T-Future)			0.000			1/2" Ice	3.491	1.551	0.071
			1.000			1" Ice	3.741	1.738	0.095
						2" Ice	4.268	2.138	0.153
						4" Ice	5.426	3.042	0.313
6' x 2" Mount Pipe	C	From Leg	4.000		0.000	No Ice	1.425	1.425	0.022
(AT&T-E)			0.000			1/2" Ice	1.925	1.925	0.033
			0.000			1" Ice	2.294	2.294	0.048
						2" Ice	3.060	3.060	0.090
						4" Ice	4.702	4.702	0.231
6' x 2" Mount Pipe	B	From Leg	4.000		0.000	No Ice	1.425	1.425	0.022
(AT&T-E)			0.000			1/2" Ice	1.925	1.925	0.033
			0.000			1" Ice	2.294	2.294	0.048
						2" Ice	3.060	3.060	0.090
						4" Ice	4.702	4.702	0.231
6' x 2" Mount Pipe	A	From Leg	4.000		0.000	No Ice	1.425	1.425	0.022
(AT&T-E)			0.000			1/2" Ice	1.925	1.925	0.033
			0.000			1" Ice	2.294	2.294	0.048
						2" Ice	3.060	3.060	0.090
						4" Ice	4.702	4.702	0.231
Platform Mount [LP 714-1]	C	None			0.000	No Ice	37.470	37.470	1.600
(AT&T-E)						1/2" Ice	44.230	44.230	2.040
						1" Ice	50.990	50.990	2.480
						2" Ice	64.510	64.510	3.360
						4" Ice	91.550	91.550	5.119
***									
APX16DWV-16DWVS-C w/	C	From Leg	4.000		40.000	No Ice	7.466	3.494	0.061
Mount Pipe			0.000			1/2" Ice	7.994	4.263	0.110
(T-Mobile-E)			0.000			1" Ice	8.518	4.960	0.165
						2" Ice	9.595	6.403	0.298
						4" Ice	11.873	9.490	0.683
APX16DWV-16DWVS-C w/	A	From Leg	4.000		40.000	No Ice	7.466	3.494	0.061
Mount Pipe			0.000			1/2" Ice	7.994	4.263	0.110
(T-Mobile-E)			0.000			1" Ice	8.518	4.960	0.165
						2" Ice	9.595	6.403	0.298
						4" Ice	11.873	9.490	0.683
(2) AIR 21 w/ Mount Pipe	C	From Leg	4.000		40.000	No Ice	6.771	5.701	0.112
(T-Mobile-P)			0.000			1/2" Ice	7.292	6.552	0.169
			0.000			1" Ice	7.807	7.329	0.232
						2" Ice	8.869	8.938	0.383
						4" Ice	11.116	12.371	0.807
(2) AIR 21 w/ Mount Pipe	B	From Leg	4.000		85.000	No Ice	6.771	5.701	0.112
(T-Mobile-P)			0.000			1/2" Ice	7.292	6.552	0.169
			0.000			1" Ice	7.807	7.329	0.232
						2" Ice	8.869	8.938	0.383
						4" Ice	11.116	12.371	0.807
(2) AIR 21 w/ Mount Pipe	A	From Leg	4.000		40.000	No Ice	6.771	5.701	0.112
(T-Mobile-P)			0.000			1/2" Ice	7.292	6.552	0.169
			0.000			1" Ice	7.807	7.329	0.232
						2" Ice	8.869	8.938	0.383
						4" Ice	11.116	12.371	0.807
ONEBASE TWIN DUAL	C	From Leg	4.000		0.000	No Ice	0.674	0.306	0.011
DUPLEX TMA			0.000			1/2" Ice	0.786	0.392	0.016

<b>tnxTower</b>  <b>B+T Group</b> 1717 S. Boulder Ave. Tulsa, OK 74119 Phone: (918) 587-4630 FAX: (918) 295-0265	<b>Job</b> 86667.003.01 - Middletown, CT (USID# 14635)	<b>Page</b> 9 of 20
	<b>Project</b>	<b>Date</b> 12:03:34 12/10/13
	<b>Client</b> AT&T Towers	<b>Designed by</b> zsmith

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C <sub>AA</sub> Front	C <sub>AA</sub> Side	Weight
			Horz	Vert					
			ft	ft	°	ft	ft <sup>2</sup>	ft <sup>2</sup>	K
(T-Mobile-P)			0.000						
						1" Ice	0.908	0.486	0.022
						2" Ice	1.176	0.699	0.040
						4" Ice	1.816	1.231	0.103
ONEBASE TWIN DUAL	B	From Leg	4.000		0.000	No Ice	0.674	0.306	0.011
DUPLEX TMA			0.000			1/2" Ice	0.786	0.392	0.016
(T-Mobile-P)			0.000			1" Ice	0.908	0.486	0.022
						2" Ice	1.176	0.699	0.040
						4" Ice	1.816	1.231	0.103
ONEBASE TWIN DUAL	A	From Leg	4.000		0.000	No Ice	0.674	0.306	0.011
DUPLEX TMA			0.000			1/2" Ice	0.786	0.392	0.016
(T-Mobile-P)			0.000			1" Ice	0.908	0.486	0.022
						2" Ice	1.176	0.699	0.040
						4" Ice	1.816	1.231	0.103
6' x 2" Mount Pipe	C	From Leg	4.000		0.000	No Ice	1.425	1.425	0.022
(T-Mobile-E)			0.000			1/2" Ice	1.925	1.925	0.033
			0.000			1" Ice	2.294	2.294	0.048
						2" Ice	3.060	3.060	0.090
						4" Ice	4.702	4.702	0.231
(2) 6' x 2" Mount Pipe	B	From Leg	4.000		0.000	No Ice	1.425	1.425	0.022
(T-Mobile-E)			0.000			1/2" Ice	1.925	1.925	0.033
			0.000			1" Ice	2.294	2.294	0.048
						2" Ice	3.060	3.060	0.090
						4" Ice	4.702	4.702	0.231
6' x 2" Mount Pipe	A	From Leg	4.000		0.000	No Ice	1.425	1.425	0.022
(T-Mobile-E)			0.000			1/2" Ice	1.925	1.925	0.033
			0.000			1" Ice	2.294	2.294	0.048
						2" Ice	3.060	3.060	0.090
						4" Ice	4.702	4.702	0.231
14' L.P. Platform	C	None			0.000	No Ice	32.000	32.000	1.600
(T-Mobile-E)						1/2" Ice	37.000	37.000	2.040
						1" Ice	42.000	42.000	2.480
						2" Ice	52.000	52.000	3.360
						4" Ice	72.000	72.000	5.119
***									
(2) DB980F65T4E-M	C	From Leg	4.000		45.000	No Ice	4.371	3.954	0.034
w/Mount Pipe			0.000			1/2" Ice	4.959	5.045	0.074
(Sprint-E)			1.000			1" Ice	5.471	5.849	0.120
						2" Ice	6.522	7.492	0.235
						4" Ice	8.983	10.977	0.593
(2) DB980F65T4E-M	B	From Leg	4.000		90.000	No Ice	4.371	3.954	0.034
w/Mount Pipe			0.000			1/2" Ice	4.959	5.045	0.074
(Sprint-E)			1.000			1" Ice	5.471	5.849	0.120
						2" Ice	6.522	7.492	0.235
						4" Ice	8.983	10.977	0.593
(2) DB980F65T4E-M	A	From Leg	4.000		70.000	No Ice	4.371	3.954	0.034
w/Mount Pipe			0.000			1/2" Ice	4.959	5.045	0.074
(Sprint-E)			1.000			1" Ice	5.471	5.849	0.120
						2" Ice	6.522	7.492	0.235
						4" Ice	8.983	10.977	0.593
APXVSP18-C-A20 w/	C	From Leg	4.000		45.000	No Ice	8.498	6.946	0.083
Mount Pipe			0.000			1/2" Ice	9.149	8.127	0.151
(Sprint-E)			1.000			1" Ice	9.767	9.021	0.227
						2" Ice	11.031	10.844	0.406
						4" Ice	13.679	14.851	0.909
APXVSP18-C-A20 w/	B	From Leg	4.000		90.000	No Ice	8.498	6.946	0.083
Mount Pipe			0.000			1/2" Ice	9.149	8.127	0.151
(Sprint-E)			1.000			1" Ice	9.767	9.021	0.227

<b>tnxTower</b>  <b>B+T Group</b> 1717 S. Boulder Ave. Tulsa, OK 74119 Phone: (918) 587-4630 FAX: (918) 295-0265	<b>Job</b> 86667.003.01 - Middletown, CT (USID# 14635)	<b>Page</b> 10 of 20
	<b>Project</b>	<b>Date</b> 12:03:34 12/10/13
	<b>Client</b> AT&T Towers	<b>Designed by</b> zsmith

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft	C <sub>AA</sub> Front ft <sup>2</sup>	C <sub>AA</sub> Side ft <sup>2</sup>	Weight K	
APXVSPP18-C-A20 w/ Mount Pipe (Sprint-E)	A	From Leg	4.000 0.000 1.000	70.000	124.000	2" Ice	11.031	10.844	0.406
						4" Ice	13.679	14.851	0.909
						No Ice	8.498	6.946	0.083
						1/2" Ice	9.149	8.127	0.151
						1" Ice	9.767	9.021	0.227
						2" Ice	11.031	10.844	0.406
1900MHz RRH (Sprint-E)	C	From Leg	4.000 0.000 1.000	0.000	124.000	4" Ice	13.679	14.851	0.909
						No Ice	2.907	3.801	0.044
						1/2" Ice	3.145	4.065	0.075
						1" Ice	3.391	4.337	0.110
						2" Ice	3.909	4.908	0.192
						4" Ice	5.050	6.152	0.407
1900MHz RRH (Sprint-E)	B	From Leg	4.000 0.000 1.000	0.000	124.000	No Ice	2.907	3.801	0.044
						1/2" Ice	3.145	4.065	0.075
						1" Ice	3.391	4.337	0.110
						2" Ice	3.909	4.908	0.192
						4" Ice	5.050	6.152	0.407
						No Ice	2.907	3.801	0.044
1900MHz RRH (Sprint-E)	A	From Leg	4.000 0.000 1.000	0.000	124.000	1/2" Ice	3.145	4.065	0.075
						1" Ice	3.391	4.337	0.110
						2" Ice	3.909	4.908	0.192
						4" Ice	5.050	6.152	0.407
						No Ice	2.907	3.801	0.044
						1/2" Ice	3.145	4.065	0.075
800MHZ RRH (Sprint-E)	C	From Leg	4.000 0.000 1.000	0.000	124.000	1" Ice	2.931	2.481	0.098
						2" Ice	3.407	2.928	0.157
						4" Ice	4.462	3.927	0.318
						No Ice	2.490	2.068	0.053
						1/2" Ice	2.706	2.271	0.074
						1" Ice	2.931	2.481	0.098
800MHZ RRH (Sprint-E)	B	From Leg	4.000 0.000 1.000	0.000	124.000	2" Ice	3.407	2.928	0.157
						4" Ice	4.462	3.927	0.318
						No Ice	2.490	2.068	0.053
						1/2" Ice	2.706	2.271	0.074
						1" Ice	2.931	2.481	0.098
						2" Ice	3.407	2.928	0.157
800MHZ RRH (Sprint-E)	A	From Leg	4.000 0.000 1.000	0.000	124.000	4" Ice	4.462	3.927	0.318
						No Ice	2.490	2.068	0.053
						1/2" Ice	2.706	2.271	0.074
						1" Ice	2.931	2.481	0.098
						2" Ice	3.407	2.928	0.157
						4" Ice	4.462	3.927	0.318
14' L.P. Platform (E)	C	None		0.000	124.000	No Ice	32.000	32.000	1.600
						1/2" Ice	37.000	37.000	2.040
						1" Ice	42.000	42.000	2.480
						2" Ice	52.000	52.000	3.360
						4" Ice	72.000	72.000	5.119
						No Ice	32.000	32.000	1.600
***									
***									
(2) LPA-80063/4CF w/ Mount Pipe (E - Verizon)	C	From Leg	4.000 0.000 1.000	50.000	110.000	No Ice	7.248	7.260	0.038
						1/2" Ice	7.719	7.957	0.104
						1" Ice	8.200	8.672	0.176
						2" Ice	9.195	10.156	0.344
						4" Ice	11.320	13.391	0.796
						No Ice	7.248	7.260	0.038
(2) LPA-80063/4CF w/ Mount Pipe (E - Verizon)	B	From Leg	4.000 0.000 1.000	50.000	110.000	1/2" Ice	7.719	7.957	0.104
						1" Ice	8.200	8.672	0.176
						2" Ice	9.195	10.156	0.344
						4" Ice	11.320	13.391	0.796
						No Ice	7.248	7.260	0.038
						1/2" Ice	7.719	7.957	0.104
(2) LPA-80063/4CF w/ Mount Pipe (E - Verizon)	A	From Leg	4.000 0.000 1.000	50.000	110.000	2" Ice	9.195	10.156	0.344
						4" Ice	11.320	13.391	0.796
						No Ice	7.248	7.260	0.038
						1/2" Ice	7.719	7.957	0.104
						1" Ice	8.200	8.672	0.176
						No Ice	7.248	7.260	0.038

<b>tnxTower</b>  <b>B+T Group</b> 1717 S. Boulder Ave. Tulsa, OK 74119 Phone: (918) 587-4630 FAX: (918) 295-0265	<b>Job</b> 86667.003.01 - Middletown, CT (USID# 14635)	<b>Page</b> 11 of 20
	<b>Project</b>	<b>Date</b> 12:03:34 12/10/13
	<b>Client</b> AT&T Towers	<b>Designed by</b> zsmith

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C <sub>A</sub> A <sub>1</sub> Front	C <sub>A</sub> A <sub>1</sub> Side	Weight	
			Horz	Vert						ft
							ft <sup>2</sup>	ft <sup>2</sup>	K	
BXA-70063-6CF w/ Mount Pipe (E - Verizon)	A	From Leg	4.000	0.000	0.000	110.000	2" Ice	9.195	10.156	0.344
							4" Ice	11.320	13.391	0.796
							No Ice	7.979	5.695	0.040
							1/2" Ice	8.621	6.849	0.100
							1" Ice	9.228	7.715	0.168
							2" Ice	10.473	9.497	0.331
LNx-6514DS-T4M w/ Mount Pipe (E - Verizon)	B	From Leg	4.000	0.000	50.000	110.000	4" Ice	13.082	13.262	0.798
							No Ice	8.568	7.004	0.058
							1/2" Ice	9.220	8.185	0.127
							1" Ice	9.838	9.081	0.203
							2" Ice	11.104	10.904	0.384
							4" Ice	13.754	14.926	0.889
BXA-70063-6CF w/ Mount Pipe (E - Verizon)	C	From Leg	4.000	0.000	0.000	110.000	No Ice	7.979	5.695	0.040
							1/2" Ice	8.621	6.849	0.100
							1" Ice	9.228	7.715	0.168
							2" Ice	10.473	9.497	0.331
							4" Ice	13.082	13.262	0.798
							No Ice	3.337	2.158	0.018
MG D3 800TO w/Mount Pipe (E - Verizon)	C	From Leg	4.000	0.000	50.000	110.000	1/2" Ice	3.676	2.482	0.037
							1" Ice	4.023	2.813	0.061
							2" Ice	4.832	3.498	0.122
							4" Ice	6.570	5.012	0.304
							No Ice	3.337	2.158	0.018
							1/2" Ice	3.676	2.482	0.037
MG D3 800TO w/Mount Pipe (E - Verizon)	B	From Leg	4.000	0.000	50.000	110.000	1" Ice	4.023	2.813	0.061
							2" Ice	4.832	3.498	0.122
							4" Ice	6.570	5.012	0.304
							No Ice	3.337	2.158	0.018
							1/2" Ice	3.676	2.482	0.037
							1" Ice	4.023	2.813	0.061
MG D3 800TO w/Mount Pipe (E - Verizon)	A	From Leg	4.000	0.000	50.000	110.000	2" Ice	4.832	3.498	0.122
							4" Ice	6.570	5.012	0.304
							No Ice	3.337	2.158	0.018
							1/2" Ice	3.676	2.482	0.037
							1" Ice	4.023	2.813	0.061
							2" Ice	4.832	3.498	0.122
(2) FD9R6004/2C-3L (E - Verizon)	C	From Leg	4.000	0.000	0.000	110.000	4" Ice	6.570	5.012	0.304
							No Ice	0.367	0.085	0.003
							1/2" Ice	0.451	0.136	0.005
							1" Ice	0.543	0.196	0.009
							2" Ice	0.755	0.343	0.020
							4" Ice	1.281	0.740	0.063
(2) FD9R6004/2C-3L (E - Verizon)	B	From Leg	4.000	0.000	0.000	110.000	No Ice	0.367	0.085	0.003
							1/2" Ice	0.451	0.136	0.005
							1" Ice	0.543	0.196	0.009
							2" Ice	0.755	0.343	0.020
							4" Ice	1.281	0.740	0.063
							No Ice	0.367	0.085	0.003
(2) FD9R6004/2C-3L (E - Verizon)	A	From Leg	4.000	0.000	0.000	110.000	1/2" Ice	0.451	0.136	0.005
							1" Ice	0.543	0.196	0.009
							2" Ice	0.755	0.343	0.020
							4" Ice	1.281	0.740	0.063
							No Ice	0.367	0.085	0.003
							1/2" Ice	0.451	0.136	0.005
14' L.P. Platform (E - Verizon)	C	None			0.000	110.000	No Ice	32.000	32.000	1.600
							1/2" Ice	37.000	37.000	2.040
							1" Ice	42.000	42.000	2.480
							2" Ice	52.000	52.000	3.360
							4" Ice	72.000	72.000	5.119
							No Ice	32.000	32.000	1.600
*///* 6'x6"x4" Panel (E - Metro PCS)	C	From Leg	2.000	0.000	80.000	90.000	No Ice	4.700	2.950	0.025
							1/2" Ice	5.147	3.381	0.049
							1" Ice	5.602	3.819	0.079
							2" Ice	6.533	4.719	0.155
							0.000			



<b>tnxTower</b>  <b>B+T Group</b> 1717 S. Boulder Ave. Tulsa, OK 74119 Phone: (918) 587-4630 FAX: (918) 295-0265	<b>Job</b> 86667.003.01 - Middletown, CT (USID# 14635)	<b>Page</b> 13 of 20
	<b>Project</b>	<b>Date</b> 12:03:34 12/10/13
	<b>Client</b> AT&T Towers	<b>Designed by</b> zsmith

## 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	148 - 111	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-20.224	-1.267	-0.347
			Max. Mx	5	-9.851	-449.972	3.932
			Max. My	8	-9.906	3.729	-441.646
			Max. Vy	5	19.435	-449.972	3.932
			Max. Vx	8	19.062	3.729	-441.646
			Max. Torque	3			1.074
			Max Tension	1	0.000	0.000	0.000
L2	111 - 99.333	Pole	Max. Compression	14	-28.028	-2.329	-1.001
			Max. Mx	5	-14.242	-821.112	7.201
			Max. My	8	-14.284	6.930	-808.149
			Max. Vy	5	25.718	-821.112	7.201

<b>tnxTower</b>  <b>B+T Group</b> 1717 S. Boulder Ave. Tulsa, OK 74119 Phone: (918) 587-4630 FAX: (918) 295-0265	<b>Job</b> 86667.003.01 - Middletown, CT (USID# 14635)	<b>Page</b> 14 of 20
	<b>Project</b>	<b>Date</b> 12:03:34 12/10/13
	<b>Client</b> AT&T Towers	<b>Designed by</b> zsmith

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L3	99.333 - 90.5	Pole	Max. Vx	8	25.457	6.930	-808.149
			Max. Torque	3			0.707
			Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-30.455	-2.691	-1.445
			Max. Mx	5	-16.115	-1052.211	9.075
			Max. My	8	-16.152	8.913	-1037.060
			Max. Vy	5	26.623	-1052.211	9.075
			Max. Vx	8	26.363	8.913	-1037.060
L4	90.5 - 75	Pole	Max. Torque	11			-0.383
			Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-34.348	-3.465	-2.194
			Max. Mx	5	-18.887	-1351.766	11.296
			Max. My	8	-18.919	11.241	-1333.928
			Max. Vy	5	28.506	-1351.766	11.296
			Max. Vx	8	28.246	11.241	-1333.928
			Max. Torque	11			-0.353
L5	75 - 60.5	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-42.238	-4.923	-3.606
			Max. Mx	5	-24.990	-1922.479	15.247
			Max. My	8	-25.015	15.395	-1899.835
			Max. Vy	5	30.696	-1922.479	15.247
			Max. Vx	8	30.437	15.395	-1899.835
			Max. Torque	12			-0.295
			Max Tension	1	0.000	0.000	0.000
L6	60.5 - 39.75	Pole	Max. Compression	14	-48.572	-5.781	-4.991
			Max. Mx	5	-30.056	-2411.064	18.166
			Max. My	8	-30.073	18.784	-2385.014
			Max. Vy	5	32.377	-2411.064	18.166
			Max. Vx	8	32.135	18.784	-2385.014
			Max. Torque	12			-0.247
			Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-56.345	-6.831	-6.119
L7	39.75 - 30.5	Pole	Max. Mx	5	-36.415	-2892.016	20.868
			Max. My	8	-36.428	21.669	-2862.642
			Max. Vy	5	33.849	-2892.016	20.868
			Max. Vx	8	33.608	21.669	-2862.642
			Max. Torque	6			-0.184
			Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-70.052	-8.571	-8.291
			Max. Mx	5	-48.053	-3962.471	26.463
L8	30.5 - 0	Pole	Max. My	8	-48.053	27.750	-3926.352
			Max. Vy	5	36.355	-3962.471	26.463
			Max. Vx	8	36.121	27.750	-3926.352
			Max. Torque	6			-0.318

### Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	18	70.052	-8.741	0.015
	Max. H <sub>x</sub>	11	48.073	36.328	-0.205
	Max. H <sub>z</sub>	2	48.073	-0.205	36.095
	Max. M <sub>x</sub>	2	3920.974	-0.205	36.095
	Max. M <sub>z</sub>	5	3962.471	-36.328	0.205
	Max. Torsion	12	0.304	31.359	17.870
	Min. Vert	1	48.073	0.000	0.000



<b>tnxTower</b>  <b>B+T Group</b> 1717 S. Boulder Ave. Tulsa, OK 74119 Phone: (918) 587-4630 FAX: (918) 295-0265	<b>Job</b> 86667.003.01 - Middletown, CT (USID# 14635)	<b>Page</b> 15 of 20
	<b>Project</b>	<b>Date</b> 12:03:34 12/10/13
	<b>Client</b> AT&T Towers	<b>Designed by</b> zsmith

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
	Min. H <sub>x</sub>	5	48.073	-36.328	0.205
	Min. H <sub>z</sub>	8	48.073	0.205	-36.095
	Min. M <sub>x</sub>	8	-3926.352	0.205	-36.095
	Min. M <sub>z</sub>	11	-3959.662	36.328	-0.205
	Min. Torsion	6	-0.318	-31.359	-17.870

### Tower Mast Reaction Summary

Load Combination	Vertical K	Shear <sub>x</sub> K	Shear <sub>z</sub> K	Overturning Moment, M <sub>x</sub> kip-ft	Overturning Moment, M <sub>z</sub> kip-ft	Torque kip-ft
Dead Only	48.073	0.000	0.000	2.619	-1.355	0.000
Dead+Wind 0 deg - No Ice	48.073	0.205	-36.095	-3920.974	-30.572	-0.106
Dead+Wind 30 deg - No Ice	48.073	18.342	-31.362	-3409.778	-2007.216	0.053
Dead+Wind 60 deg - No Ice	48.073	31.564	-18.225	-1984.292	-3446.337	0.204
Dead+Wind 90 deg - No Ice	48.073	36.328	-0.205	-26.463	-3962.471	0.302
Dead+Wind 120 deg - No Ice	48.073	31.359	17.870	1939.262	-3417.322	0.318
Dead+Wind 150 deg - No Ice	48.073	17.986	31.157	3386.150	-1956.788	0.244
Dead+Wind 180 deg - No Ice	48.073	-0.205	36.095	3926.352	27.750	0.101
Dead+Wind 210 deg - No Ice	48.073	-18.342	31.362	3415.165	2004.389	-0.068
Dead+Wind 240 deg - No Ice	48.073	-31.564	18.225	1989.688	3443.517	-0.213
Dead+Wind 270 deg - No Ice	48.073	-36.328	0.205	31.857	3959.662	-0.297
Dead+Wind 300 deg - No Ice	48.073	-31.359	-17.870	-1933.877	3414.517	-0.304
Dead+Wind 330 deg - No Ice	48.073	-17.986	-31.157	-3380.773	1953.976	-0.235
Dead+Ice+Temp	70.052	0.000	0.000	8.291	-8.571	-0.000
Dead+Wind 0 deg+Ice+Temp	70.052	0.015	-8.718	-970.230	-11.518	-0.051
Dead+Wind 30 deg+Ice+Temp	70.052	4.383	-7.558	-840.541	-502.876	-0.014
Dead+Wind 60 deg+Ice+Temp	70.052	7.577	-4.372	-483.385	-861.810	0.028
Dead+Wind 90 deg+Ice+Temp	70.052	8.741	-0.015	5.538	-992.147	0.061
Dead+Wind 120 deg+Ice+Temp	70.052	7.562	4.346	495.224	-858.963	0.079
Dead+Wind 150 deg+Ice+Temp	70.052	4.358	7.543	854.462	-497.944	0.075
Dead+Wind 180 deg+Ice+Temp	70.052	-0.015	8.718	986.995	-5.824	0.051
Dead+Wind 210 deg+Ice+Temp	70.052	-4.383	7.558	857.310	485.534	0.013
Dead+Wind 240 deg+Ice+Temp	70.052	-7.577	4.372	500.156	844.470	-0.028
Dead+Wind 270 deg+Ice+Temp	70.052	-8.741	0.015	11.231	974.810	-0.062
Dead+Wind 300 deg+Ice+Temp	70.052	-7.562	-4.346	-478.458	841.627	-0.079
Dead+Wind 330 deg+Ice+Temp	70.052	-4.358	-7.543	-837.698	480.605	-0.075
Dead+Wind 0 deg - Service	48.073	0.071	-12.490	-1356.800	-11.519	-0.037
Dead+Wind 30 deg - Service	48.073	6.347	-10.852	-1179.712	-696.422	0.019
Dead+Wind 60 deg - Service	48.073	10.922	-6.306	-685.800	-1195.094	0.070
Dead+Wind 90 deg - Service	48.073	12.570	-0.071	-7.408	-1373.921	0.103
Dead+Wind 120 deg - Service	48.073	10.851	6.183	673.695	-1184.994	0.108
Dead+Wind 150 deg - Service	48.073	6.224	10.781	1175.008	-678.920	0.083
Dead+Wind 180 deg - Service	48.073	-0.071	12.490	1362.194	8.694	0.036
Dead+Wind 210 deg - Service	48.073	-6.347	10.852	1185.108	693.596	-0.021
Dead+Wind 240 deg - Service	48.073	-10.922	6.306	691.197	1192.270	-0.071
Dead+Wind 270 deg - Service	48.073	-12.570	0.071	12.804	1371.097	-0.102
Dead+Wind 300 deg - Service	48.073	-10.851	-6.183	-668.300	1182.171	-0.106
Dead+Wind 330 deg - Service	48.073	-6.224	-10.781	-1169.613	676.096	-0.082

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	<b>Project</b>	<b>Date</b> 12:03:34 12/10/13
	<b>Client</b> AT&T Towers	<b>Designed by</b> zsmith

### Solution Summary

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
1	0.000	-48.073	0.000	0.000	48.073	0.000	0.000%
2	0.205	-48.073	-36.095	-0.205	48.073	36.095	0.000%
3	18.342	-48.073	-31.362	-18.342	48.073	31.362	0.000%
4	31.564	-48.073	-18.225	-31.564	48.073	18.225	0.000%
5	36.328	-48.073	-0.205	-36.328	48.073	0.205	0.000%
6	31.359	-48.073	17.870	-31.359	48.073	-17.870	0.000%
7	17.986	-48.073	31.157	-17.986	48.073	-31.157	0.000%
8	-0.205	-48.073	36.095	0.205	48.073	-36.095	0.000%
9	-18.342	-48.073	31.362	18.342	48.073	-31.362	0.000%
10	-31.564	-48.073	18.225	31.564	48.073	-18.225	0.000%
11	-36.328	-48.073	0.205	36.328	48.073	-0.205	0.000%
12	-31.359	-48.073	-17.870	31.359	48.073	17.870	0.000%
13	-17.986	-48.073	-31.157	17.986	48.073	31.157	0.000%
14	0.000	-70.052	0.000	-0.000	70.052	-0.000	0.000%
15	0.015	-70.052	-8.718	-0.015	70.052	8.718	0.000%
16	4.383	-70.052	-7.558	-4.383	70.052	7.558	0.000%
17	7.577	-70.052	-4.372	-7.577	70.052	4.372	0.000%
18	8.741	-70.052	-0.015	-8.741	70.052	0.015	0.000%
19	7.562	-70.052	4.346	-7.562	70.052	-4.346	0.000%
20	4.358	-70.052	7.543	-4.358	70.052	-7.543	0.000%
21	-0.015	-70.052	8.718	0.015	70.052	-8.718	0.000%
22	-4.383	-70.052	7.558	4.383	70.052	-7.558	0.000%
23	-7.577	-70.052	4.372	7.577	70.052	-4.372	0.000%
24	-8.741	-70.052	0.015	8.741	70.052	-0.015	0.000%
25	-7.562	-70.052	-4.346	7.562	70.052	4.346	0.000%
26	-4.358	-70.052	-7.543	4.358	70.052	7.543	0.000%
27	0.071	-48.073	-12.490	-0.071	48.073	12.490	0.000%
28	6.347	-48.073	-10.852	-6.347	48.073	10.852	0.000%
29	10.922	-48.073	-6.306	-10.922	48.073	6.306	0.000%
30	12.570	-48.073	-0.071	-12.570	48.073	0.071	0.000%
31	10.851	-48.073	6.183	-10.851	48.073	-6.183	0.000%
32	6.224	-48.073	10.781	-6.224	48.073	-10.781	0.000%
33	-0.071	-48.073	12.490	0.071	48.073	-12.490	0.000%
34	-6.347	-48.073	10.852	6.347	48.073	-10.852	0.000%
35	-10.922	-48.073	6.306	10.922	48.073	-6.306	0.000%
36	-12.570	-48.073	0.071	12.570	48.073	-0.071	0.000%
37	-10.851	-48.073	-6.183	10.851	48.073	6.183	0.000%
38	-6.224	-48.073	-10.781	6.224	48.073	10.781	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	0.00085263
3	Yes	6	0.00000001	0.00005335
4	Yes	6	0.00000001	0.00005361
5	Yes	4	0.00000001	0.00090891
6	Yes	6	0.00000001	0.00005221
7	Yes	6	0.00000001	0.00005222
8	Yes	4	0.00000001	0.00082389
9	Yes	6	0.00000001	0.00005350
10	Yes	6	0.00000001	0.00005345

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	<b>Project</b>	<b>Date</b> 12:03:34 12/10/13
	<b>Client</b> AT&T Towers	<b>Designed by</b> zsmith

11	Yes	4	0.00000001	0.00080870
12	Yes	6	0.00000001	0.00005221
13	Yes	6	0.00000001	0.00005200
14	Yes	4	0.00000001	0.00008781
15	Yes	5	0.00000001	0.00051313
16	Yes	5	0.00000001	0.00062186
17	Yes	5	0.00000001	0.00062433
18	Yes	5	0.00000001	0.00052520
19	Yes	5	0.00000001	0.00062684
20	Yes	5	0.00000001	0.00062540
21	Yes	5	0.00000001	0.00052048
22	Yes	5	0.00000001	0.00061990
23	Yes	5	0.00000001	0.00062050
24	Yes	5	0.00000001	0.00051524
25	Yes	5	0.00000001	0.00060656
26	Yes	5	0.00000001	0.00060495
27	Yes	4	0.00000001	0.00021812
28	Yes	5	0.00000001	0.00011773
29	Yes	5	0.00000001	0.00011893
30	Yes	4	0.00000001	0.00022400
31	Yes	5	0.00000001	0.00011355
32	Yes	5	0.00000001	0.00011337
33	Yes	4	0.00000001	0.00021728
34	Yes	5	0.00000001	0.00011832
35	Yes	5	0.00000001	0.00011843
36	Yes	4	0.00000001	0.00021911
37	Yes	5	0.00000001	0.00011278
38	Yes	5	0.00000001	0.00011172

### Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	148 - 111	34.589	29	2.108	0.002
L2	115 - 99.333	20.705	29	1.818	0.000
L3	99.333 - 90.5	15.150	29	1.521	0.000
L4	90.5 - 75	12.492	29	1.350	0.000
L5	79.75 - 60.5	9.658	29	1.165	0.000
L6	60.5 - 39.75	5.494	35	0.869	0.000
L7	45 - 30.5	3.070	35	0.624	0.000
L8	30.5 - 0	1.410	35	0.444	0.000

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

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
152.000	Lighting Rod 5/8" x 8'	29	34.589	2.108	0.002	23997
148.000	AM-X-CD-16-65-00T-RET w/ Mount Pipe	29	34.589	2.108	0.002	23997
140.000	APX16DWV-16DWVS-C w/ Mount Pipe	29	31.086	2.065	0.002	14998
124.000	(2) DB980F65T4E-M w/Mount Pipe	29	24.286	1.938	0.001	4998
110.000	(2) LPA-80063/4CF w/ Mount Pipe	29	18.826	1.732	0.000	3174
90.000	6'x6"x4" Panel	29	12.351	1.341	0.000	3140
55.000	GPS	35	4.548	0.779	0.000	3637
50.000	GPS	35	3.775	0.699	0.000	4397

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	<b>Project</b>	<b>Date</b> 12:03:34 12/10/13
	<b>Client</b> AT&T Towers	<b>Designed by</b> zsmith

### Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	148 - 111	99.530	4	6.072	0.007
L2	115 - 99.333	59.638	4	5.239	0.001
L3	99.333 - 90.5	43.661	4	4.384	0.001
L4	90.5 - 75	36.009	4	3.893	0.000
L5	79.75 - 60.5	27.847	4	3.359	0.000
L6	60.5 - 39.75	15.846	10	2.506	0.000
L7	45 - 30.5	8.857	10	1.801	0.000
L8	30.5 - 0	4.069	10	1.281	0.000

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

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
152.000	Lighting Rod 5/8" x 8'	4	99.530	6.072	0.007	8520
148.000	AM-X-CD-16-65-00T-RET w/ Mount Pipe	4	99.530	6.072	0.007	8520
140.000	APX16DWV-16DWVS-C w/ Mount Pipe	4	89.469	5.947	0.006	5324
124.000	(2) DB980F65T4E-M w/ Mount Pipe	4	69.931	5.582	0.002	1772
110.000	(2) LPA-80063/4CF w/ Mount Pipe	4	54.237	4.990	0.001	1122
90.000	6'x6"x4" Panel	4	35.604	3.866	0.000	1101
55.000	GPS	10	13.118	2.248	0.000	1266
50.000	GPS	10	10.889	2.016	0.000	1529

### Compression Checks

### Pole Design Data

Section No.	Elevation ft	Size	L ft	L <sub>u</sub> ft	K/lr	F <sub>a</sub> ksi	A in <sup>2</sup>	Actual P K	Allow. P <sub>a</sub> K	Ratio P/P <sub>a</sub>
L1	148 - 111 (1)	TP30.661x24x0.25	37.000	0.000	0.0	39.000	23.560	-9.837	918.829	0.011
L2	111 - 99.333 (2)	TP32.262x29.441x0.25	15.667	0.000	0.0	39.000	25.401	-14.224	990.653	0.014
L3	99.333 - 90.5 (3)	TP33.852x32.262x0.342 H1-3+VT (1.34 CR) - 3	8.833	0.000	0.0	31.914	36.329	-16.099	1159.420	0.014
L4	90.5 - 75 (4)	TP36.643x33.852x0.422	15.500	0.000	0.0	32.971	47.386	-18.873	1562.370	0.012
L5	75 - 60.5 (5)	TP38.927x35.288x0.47	19.250	0.000	0.0	33.084	57.361	-24.979	1897.740	0.013
L6	60.5 - 39.75 (6)	TP42.849x38.927x0.535	20.750	0.000	0.0	33.766	70.145	-30.048	2368.480	0.013
L7	39.75 - 30.5 (7)	TP43.741x41.232x0.588	14.500	0.000	0.0	33.828	80.505	-36.410	2723.300	0.013
L8	30.5 - 0 (8)	TP49.02x43.741x0.603	30.500	0.000	0.0	34.138	92.714	-48.053	3165.060	0.015

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	<b>Project</b>	<b>Date</b> 12:03:34 12/10/13
	<b>Client</b> AT&T Towers	<b>Designed by</b> zsmith

### Pole Bending Design Data

Section No.	Elevation ft	Size	Actual	Actual	Allow.	Ratio	Actual	Actual	Allow.	Ratio
			$M_x$ kip-ft	$f_{bx}$ ksi	$F_{bx}$ ksi	$\frac{f_{bx}}{F_{bx}}$	$M_y$ kip-ft	$f_{by}$ ksi	$F_{by}$ ksi	$\frac{f_{by}}{F_{by}}$
L1	148 - 111 (1)	TP30.661x24x0.25	451.337	31.395	39.000	0.805	0.000	0.000	39.000	0.000
L2	111 - 99.333 (2)	TP32.262x29.441x0.25	824.173	49.288	39.000	1.264	0.000	0.000	39.000	0.000
L3	99.333 - 90.5 (3)	TP33.852x32.262x0.342	1056.35 8	42.295	31.914	1.325	0.000	0.000	31.914	0.000
L4	90.5 - 75 (4)	TP36.643x33.852x0.422	1357.20 0	39.544	32.971	1.199	0.000	0.000	32.971	0.000
L5	75 - 60.5 (5)	TP38.927x35.288x0.47	1930.19 2	42.736	33.084	1.292	0.000	0.000	33.084	0.000
L6	60.5 - 39.75 (6)	TP42.849x38.927x0.535	2420.50 8	40.815	33.766	1.209	0.000	0.000	33.766	0.000
L7	39.75 - 30.5 (7)	TP43.741x41.232x0.588	2903.03 3	40.869	33.828	1.208	0.000	0.000	33.828	0.000
L8	30.5 - 0 (8)	TP49.02x43.741x0.603	3977.01 7	43.282	34.138	1.268	0.000	0.000	34.138	0.000

### Pole Shear Design Data

Section No.	Elevation ft	Size	Actual	Actual	Allow.	Ratio	Actual	Actual	Allow.	Ratio
			$V$ K	$f_v$ ksi	$F_v$ ksi	$\frac{f_v}{F_v}$	$T$ kip-ft	$f_{vt}$ ksi	$F_{vt}$ ksi	$\frac{f_{vt}}{F_{vt}}$
L1	148 - 111 (1)	TP30.661x24x0.25	19.509	0.828	26.000	0.064	0.721	0.024	26.000	0.001
L2	111 - 99.333 (2)	TP32.262x29.441x0.25	25.848	1.018	26.000	0.078	0.308	0.009	26.000	0.000
L3	99.333 - 90.5 (3)	TP33.852x32.262x0.342	26.753	0.736	21.276	0.069	0.276	0.005	21.276	0.000
L4	90.5 - 75 (4)	TP36.643x33.852x0.422	28.637	0.604	21.981	0.055	0.219	0.003	21.981	0.000
L5	75 - 60.5 (5)	TP38.927x35.288x0.47	30.826	0.537	22.056	0.049	0.110	0.001	22.056	0.000
L6	60.5 - 39.75 (6)	TP42.849x38.927x0.535	32.499	0.463	22.510	0.041	0.023	0.000	22.510	0.000
L7	39.75 - 30.5 (7)	TP43.741x41.232x0.588	33.971	0.422	22.552	0.037	0.062	0.000	22.552	0.000
L8	30.5 - 0 (8)	TP49.02x43.741x0.603	36.474	0.393	22.759	0.035	0.213	0.001	22.759	0.000

### Pole Interaction Design Data

Section No.	Elevation ft	Ratio	Ratio	Ratio	Ratio	Ratio	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
		$P$	$f_{bx}$	$f_{by}$	$f_v$	$f_{vt}$			
		$P_a$	$F_{bx}$	$F_{by}$	$F_v$	$F_{vt}$			
L1	148 - 111 (1)	0.011	0.805	0.000	0.064	0.001	0.817	1.333	HI-3+VT ✓
L2	111 - 99.333 (2)	0.014	1.264	0.000	0.078	0.000	1.280	1.333	HI-3+VT ✓
L3	99.333 - 90.5 (3)	0.014	1.325	0.000	0.069	0.000	1.340 ✗	1.333	HI-3+VT ✗
L4	90.5 - 75 (4)	0.012	1.199	0.000	0.055	0.000	1.212	1.333	HI-3+VT ✓
L5	75 - 60.5 (5)	0.013	1.292	0.000	0.049	0.000	1.306	1.333	HI-3+VT ✓

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	<b>Project</b>	<b>Date</b> 12:03:34 12/10/13
	<b>Client</b> AT&T Towers	<b>Designed by</b> zsmith

Section No.	Elevation ft	Ratio	Ratio	Ratio	Ratio	Ratio	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
		$\frac{P}{P_a}$	$\frac{f_{bx}}{F_{bx}}$	$\frac{f_{by}}{F_{by}}$	$\frac{f_v}{F_v}$	$\frac{f_{vt}}{F_{vt}}$			
L6	60.5 - 39.75 (6)	0.013	1.209	0.000	0.041	0.000	1.222	1.333	H1-3+VT ✓
L7	39.75 - 30.5 (7)	0.013	1.208	0.000	0.037	0.000	1.222	1.333	H1-3+VT ✓
L8	30.5 - 0 (8)	0.015	1.268	0.000	0.035	0.000	1.283	1.333	H1-3+VT ✓

### Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	SF*P <sub>allow</sub> K	% Capacity	Pass Fail
L1	148 - 111	Pole	TP30.661x24x0.25	1	-9.837	1224.799	**	**
L2	111 - 99.333	Pole	TP32.262x29.441x0.25	2	-14.224	1320.540	**	**
L3	99.333 - 90.5	Pole	TP33.852x32.262x0.342	3	-16.099	1545.507	**	**
L4	90.5 - 75	Pole	TP36.643x33.852x0.422	4	-18.873	2082.639	**	**
L5	75 - 60.5	Pole	TP38.927x35.288x0.47	5	-24.979	2529.687	**	**
L6	60.5 - 39.75	Pole	TP42.849x38.927x0.535	6	-30.048	3157.184	**	**
L7	39.75 - 30.5	Pole	TP43.741x41.232x0.588	7	-36.410	3630.159	**	**
L8	30.5 - 0	Pole	TP49.02x43.741x0.603	8	-48.053	4219.025	**	**
Summary								**
Pole (L3)								**
RATING =							**	**









Reinforcement Capacity



Dimensions and Properties														Compression				Axial				
Model	Weight (lb/ft)	Area (in <sup>2</sup> )	Moment of Inertia (in <sup>4</sup> )	Moment of Inertia (in <sup>4</sup> )	Centroid from Mat'g Edge (in)	Centroid from Bolt Hole Center (in)	Web Thickness (in)	Width (in)	Flange Width (in)	Flange Thickness (in)	Hole Diameter (in)	Yield Stress (ksi)	Ultimate Stress (ksi)	Slender Ratio Unbraced Length (in)	Slender Ratio Coefficient	Slender Ratio Unbraced Length (in)	Slender Ratio Coefficient	ASD-9 Allowable Axial (kip)	ASD-9 Allowable Axial w/ Increase (kip)	Governing Axial	Design Axial Strength (kip)	Governing Axial
MP103	9.9	2.92	0.46	6.57	0.59	0	0.30	4.06	1.57	0.64	1.21875	65	80	0.80	18	1.00	18	78.5	176.9	Rupture	346.3	Rupture
MP105	19.2	5.65	2.15	20.79	0.79	0	0.5	5.33	2.09	0.91	1.21875	65	80	0.80	18	1.00	18	191.3	459.3	Rupture	498.3	Rupture
MP106	28.8	8.47	4.95	52.50	0.91	0	0.64	6.89	2.61	1.01	1.21875	65	80	0.80	24	1.00	24	298.7	758.3	Rupture	698.3	Rupture
MP308	35.1	10.32	6.44	82.29	0.95	0	0.76	7.93	2.8	1.01	1.21875	65	80	0.80	24	1.00	24	365.0	487.9	Rupture	598.3	Rupture
PL5.75x1	19.6	5.75	0.48	15.84	0.5	0	1	5.75	0	0	1.21875	65	80	0.80	14	1.00	14	179.8	216.3	Rupture	288.3	Rupture

## 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  $(1) \times (\text{Rod Diameter})$

### Site Data

BU#:	14635	
Site Name:	MIDDLETOWN SW	
App #:	N/A	
Anchor Rod Data		
Qty:	16	
Diam:	2.25	in
Rod Material:	A615-J	
Yield, Fy:	75	ksi
Strength, Fu:	100	ksi
Bolt Circle:	56	in
Anchor Spacing:	6	in

### Plate Data

W=Side:	55	in
Thick:	3	in
Grade:	55	ksi
Clip Distance:	6	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:	49.02	in
Thick:	0.375	in
Grade:	65	ksi
# of Sides:	18	"0" IF Round

### Stress Increase Factor

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

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

### Base Reactions

TIA Revision:	F	
Unfactored Moment, M:	3456.57663	ft-kips
Unfactored Axial, P:	48.0525	kips
Unfactored Shear, V:	36.474048	kips

### Anchor Rod Results

TIA F --> Maximum Rod Tension	182.2 Kips
Allowable Tension:	195.0 Kips
Anchor Rod Stress Ratio:	93.4% <b>Pass</b>

### Base Plate Results

Base Plate Stress:	45.9 ksi	Flexural Check
Allowable PL Bending Stress:	55.0 ksi	
Base Plate Stress Ratio:	83.4% <b>Pass</b>	

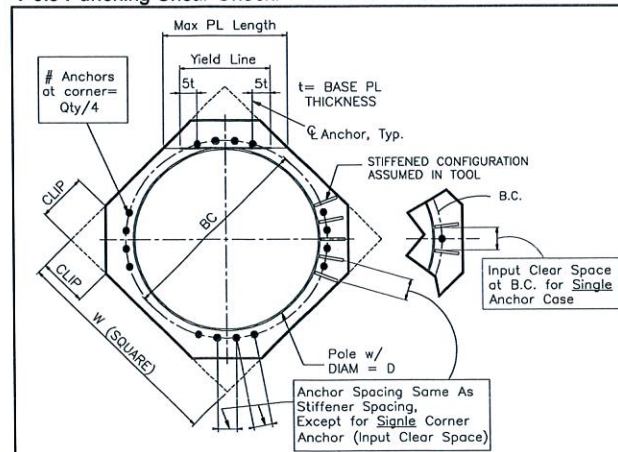
### N/A - Unstiffened

### Stiffener Results

Horizontal Weld :	N/A
Vertical Weld:	N/A
Plate Flex+Shear, $f_b/F_b + (f_v/F_v)^2$ :	N/A
Plate Tension+Shear, $f_t/F_t + (f_v/F_v)^2$ :	N/A
Plate Comp. (AISC Bracket):	N/A

### Pole Results

Pole Punching Shear Check:	N/A
----------------------------	-----



## Anchor Rod Information for TIA/EIA-222-F and TIA-222-G-2

Site Information	
ID:	14635
Name:	MIDDLETOWN SW
App. #:	N/A



Base Reactions	
Moment:	3977 ft-kip
Axial:	48 kip
Shear:	36 kip
Base Plate Type:	Square

Design Information	
TIA Code:	F
ASIF:	1.333
Failure:	100%
eta Factor:	0.50

Original Anchor Rod Data	
Quantity:	16
Diameter:	2.25 in
Material:	A615 GR 75
Bolt Circle:	56.0 in
Bolt Spacing:	6 in
Bolt Group Area:	63.62 in <sup>2</sup>
Bolt Group MOI:	24938 in <sup>4</sup>

First Added Anchor Rod Data	
Quantity:	3
Diameter:	1.75 in
Material:	A772
Bolt Circle:	64.5 in
Bolt Group Area:	7.22 in <sup>2</sup>
Bolt Group MOI:	3755 in <sup>4</sup>

Second Added Anchor Rod Data	
Quantity:	
Diameter:	
Material:	
Bolt Circle:	
Bolt Group Area:	0.00 in <sup>2</sup>
Bolt Group MOI:	0 in <sup>4</sup>

Third Added Anchor Rod Data	
Quantity:	
Diameter:	
Material:	
Bolt Circle:	
Bolt Group Area:	0.00 in <sup>2</sup>
Bolt Group MOI:	0 in <sup>4</sup>

Reactions Seen by Original AR Group	
Moment:	3456.6 kip-ft
Axial:	48.1 kip
Shear:	36.5 kip

Reactions Seen by First Added AR Group	
Moment:	520.4 kip-ft
Axial:	0.0 kip
Shear:	0.0 kip

Reactions Seen by Second Added AR Group	
Moment:	0.0 kip-ft
Axial:	0.0 kip
Shear:	0.0 kip

Reactions Seen by Second Added AR Group	
Moment:	0.0 kip-ft
Axial:	0.0 kip
Shear:	0.0 kip

Original AR Capacity Check	
Tension Load:	182.2 kip
Allowable load:	194.8 kip
AR Capacity:	93.5% Pass

First Added AR Capacity Check	
Tension Load:	128.4 kip
Allowable load:	158.7 kip
AR Capacity:	80.9% Pass

Second Added AR Capacity Check	
Tension Load:	0.0 kip
Allowable load:	0.0 kip
AR Capacity:	0.0%

Second Added AR Capacity Check	
Tension Load:	0.0 kip
Allowable load:	0.0 kip
AR Capacity:	0.0%

PROJECT	<b>14635 - Middletown SW</b>		
SUBJECT	<b>Foundation Analysis</b>		
DATE	<b>12/10/13</b>	PAGE	1 OF 1

## Monopole Pad & Pier Foundation Analysis

Rev. Type: **F**

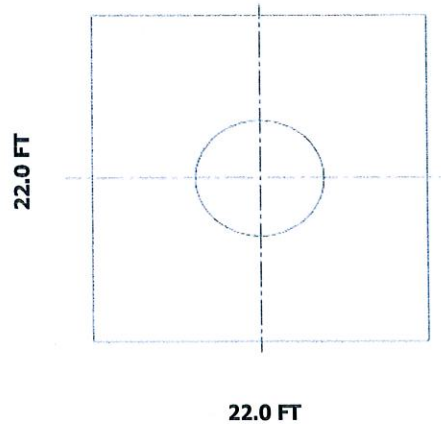
Design Loads:

Input unfactored loads

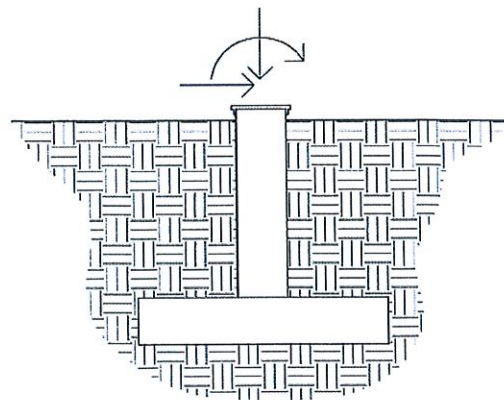
Shear:	<u><b>36.0</b></u>	kips
Moment:	<u><b>3,977.0</b></u>	ft-kips
Tower Height:	<u><b>148.0</b></u>	ft
Tower Weight:	<u><b>48.0</b></u>	kips

Pad & Pier Dimensions / Properties:

Pole Diameter at Base:	<u><b>49.02</b></u>	in
Bearing Depth:	<u><b>8.0</b></u>	ft
Pad Width:	<u><b>22.0</b></u>	ft
Neglected Depth:	<u><b>2.0</b></u>	ft
Thickness:	<u><b>3.0</b></u>	ft
Pier Diameter:	<u><b>7.0</b></u>	ft
Pier Height Above Grade:	<u><b>0.5</b></u>	ft
BP Dist. Above Pier:	<u><b>3.0</b></u>	in
Clear Cover:	<u><b>3.0</b></u>	in
Pier Rebar Size:	<u><b>11</b></u>	
Pier Rebar Quantity:	<u><b>28</b></u>	
Pad Rebar Size:	<u><b>11</b></u>	
Pad Rebar Quantity:	<u><b>21</b></u>	
Pier Tie Size:	<u><b>5</b></u>	
Tie Quantity:	<u><b>16</b></u>	
Rebar Yield Strength:	<u><b>60000</b></u>	psi
Concrete Strength:	<u><b>3000</b></u>	psi
Concrete Unit Weight:	<u><b>0.15</b></u>	kcf



Elevation Overview



Soil Data:

Allowable Values

Soil Unit Weight:	<u><b>0.125</b></u>	kcf
Ult. Bearing Capacity:	<u><b>12.000</b></u>	ksf
Angle of Friction:	<u><b>34.000</b></u>	deg
Cohesion:	<u><b>0.000</b></u>	ksf
Passive Pressure:	<u><b>0.000</b></u>	ksf
Base Friction:	<u><b>0.260</b></u>	

\*\* Notes:

### Summary of Results

Req'd Pier Diam.	OK
Overturning	97.1%
Shear Capacity	40.8%
Bearing	72.6%
Pad Shear - 1-way	71.4%
Pad Shear - 2-way	6.5%
Pad Moment Capacity	40.8%
Pier Moment Capacity	79.4%

# **EXHIBIT C**



# EBI Consulting

environmental | engineering | due diligence

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

T-Mobile Existing Facility

Site ID: CT11056J

ATT Middletown  
290 Preston Avenue  
Middletown, CT 06457

**December 30, 2013**

**EBI Project Number: 69132812**

December 30, 2013

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

Re: Emissions Values for Site: **CT11056J - ATT Middletown**

EBI Consulting was directed to analyze the proposed T-Mobile facility located at 290 Preston Avenue, Middletown, CT, for the purpose of determining whether the emissions from the Proposed T-Mobile Antenna Installation located on this property are within specified federal limits.

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

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

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

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



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

Additional details can be found in FCC OET 65.

## **CALCULATIONS**

Calculations were done for the proposed T-Mobile Wireless antenna facility located at 290 Preston Avenue, Middletown, CT, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since T-Mobile is proposing highly focused directional panel antennas, which project most of the emitted energy out toward the horizon, the actual antenna pattern gain value in the direction of the sample area was used. For this report the sample point is a 6 foot person standing at the base of the tower

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

- 1) 2 GSM channels (1935.000 MHz—to 1945.000 MHz) were considered for each sector of the proposed installation.
- 2) 2 UMTS channels (2110.000 MHz to 2120.000 MHz / 2140.000 MHz to 2145.000 MHz) were considered for each sector of the proposed installation
- 3) 2 LTE channels (2110.000 MHz to 2120.000 MHz / 2140.000 MHz to 2145.000 MHz) were considered for each sector of the proposed installation
- 4) All radios at the proposed installation were considered to be running at full power and were uncombined in their RF transmissions paths per carrier prescribed configuration. Per FCC OET Bulletin No. 65 - Edition 97-01 recommendations to achieve the maximum anticipated value at each sample point, all power levels emitting from the proposed antenna installation are increased by a factor of 2.56 to account for possible in-phase reflections from the surrounding environment. This is rarely the case, and if so, is never continuous.
- 5) For the following calculations the sample point was the top of a six foot person standing at the base of the tower. The actual gain in this direction was used per the manufactures supplied specifications.
- 6) The antenna used in this modeling is the Ericsson AIR21 for LTE, UMTS and GSM. This is based on feedback from the carrier with regards to anticipated antenna selection. This antenna has a 15.6 dBd gain value at its main lobe. Actual antenna gain values were used for all calculations as per the manufacturers specifications

- 7) The antenna mounting height centerline of the proposed antennas is **140 feet** above ground level (AGL)
- 8) Emissions values for additional carriers were taken from the Connecticut Siting Council active database. Values in this database are provided by the individual carriers themselves.

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

Site ID	CT110561 - ATT Middletown
Site Address	290 Preston Avenue, Middletown, CT 06457
Site Type	Monopole

Sector 1																	
Antenna Number	Antenna Make	Antenna Model	Status	Frequency Band	Technology	Power Out Per Channel (Watts)	Number of Channels	Composite Power	Antenna Gain in direction of sample point (dBd)	Antenna Height (ft)	Antenna analysis height	Cable Size	Cable Loss (dB)	Additional Loss	ERP	Power Density Value	Power Density Percentage
1a	Ericsson	AIR21 B4A/B2P	Active	AWS - 2100 MHz	LTE	60	2	120	-3.95	140	134	None	0	0	48.326044	0.967559	0.09676%
1b	Ericsson	AIR21 B4A/B2P	Not Used	-	-	-	-	0	-3.95	140	134	None	0	0	0	0	0.00000%
2a	Ericsson	AIR21 B2A / B4P	Active	PCS - 1950 MHz	GSM / UMTS	30	2	60	-3.95	140	134	1-5/8"	0	0	24.163022	0.48378	0.04838%
2B	Ericsson	AIR21 B2A / B4P	Passive	AWS - 2100 MHz	UMTS	30	2	60	-3.95	140	134	1-5/8"	0	0	24.163022	0.48378	0.04838%
															Sector total Power Density Value:		0.194%
Sector 2																	
Antenna Number	Antenna Make	Antenna Model	Status	Frequency Band	Technology	Power Out Per Channel (Watts)	Number of Channels	Composite Power	Antenna Gain in direction of sample point (dBd)	Antenna Height (ft)	Antenna analysis height	Cable Size	Cable Loss (dB)	Additional Loss	ERP	Power Density Value	Power Density Percentage
1a	Ericsson	AIR21 B4A/B2P	Active	AWS - 2100 MHz	LTE	60	2	120	-3.95	140	134	None	0	0	48.326044	0.967559	0.09676%
1b	Ericsson	AIR21 B4A/B2P	Not Used	-	-	-	-	0	-3.95	140	134	None	0	0	0	0	0.00000%
2a	Ericsson	AIR21 B2A / B4P	Active	PCS - 1950 MHz	GSM / UMTS	30	2	60	-3.95	140	134	1-5/8"	0	0	24.163022	0.48378	0.04838%
2B	Ericsson	AIR21 B2A / B4P	Passive	AWS - 2100 MHz	UMTS	30	2	60	-3.95	140	134	1-5/8"	0	0	24.163022	0.48378	0.04838%
															Sector total Power Density Value:		0.194%
Sector 3																	
Antenna Number	Antenna Make	Antenna Model	Status	Frequency Band	Technology	Power Out Per Channel (Watts)	Number of Channels	Composite Power	Antenna Gain in direction of sample point (dBd)	Antenna Height (ft)	Antenna analysis height	Cable Size	Cable Loss (dB)	Additional Loss	ERP	Power Density Value	Power Density Percentage
1a	Ericsson	AIR21 B4A/B2P	Active	AWS - 2100 MHz	LTE	60	2	120	-3.95	140	134	None	0	0	48.326044	0.967559	0.09676%
1b	Ericsson	AIR21 B4A/B2P	Not Used	-	-	-	-	0	-3.95	140	134	None	0	0	0	0	0.00000%
2a	Ericsson	AIR21 B2A / B4P	Active	PCS - 1950 MHz	GSM / UMTS	30	2	60	-3.95	140	134	1-5/8"	0	0	24.163022	0.48378	0.04838%
2B	Ericsson	AIR21 B2A / B4P	Passive	AWS - 2100 MHz	UMTS	30	2	60	-3.95	140	134	1-5/8"	0	0	24.163022	0.48378	0.04838%
															Sector total Power Density Value:		0.194%

Site Composite MPE %	
Carrier	MPE %
T-Mobile	0.581%
AT&T	14.480%
Sprint	0.010%
Verizon Wireless	21.450%
Metro PCS	15.010%
Nextel	4.130%
<b>Total Site MPE %</b>	<b>55.661%</b>

## Summary

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

The anticipated Maximum Composite contributions from the T-Mobile facility are **0.581% (0.194% from each sector)** of the allowable FCC established general public limit considering all three sectors simultaneously sampled at the ground level.

The anticipated composite MPE value for this site assuming all carriers present is **55.661%** of the allowable FCC established general public limit sampled at the ground level. This is based upon values listed in the Connecticut Siting Council database for existing carrier emissions

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



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