EM-CING-098-131112

HPC Wireless Services
46 Mill Plain Rd.
Floor 2
Danbury, CT, 06811
P.: 203.797.1112

HPC WIRELESS SERVICES

ORIGINAL

November 8, 2013

RECEIVED
NOV 12 2013
CONNECTICUT
SITING COUNCIL

VIA OVERNIGHT COURIER

Connecticut Siting Council
10 Franklin Square
New Britain, Connecticut 06051
Attn: Ms. Melanie Bachman, Acting Executive Director

Re: New Cingular Wireless PCS, LLC – Exempt Modification
453 Loon Meadow Road (aka 402 Loon Meadow Road), Norfolk

Dear Ms. Roberts:

This letter and attachments are submitted on behalf of New Cingular Wireless PCS, LLC ("AT&T"). AT&T is making modifications to certain existing sites in its Connecticut system in order to implement LTE technology. Please accept this letter and attachments as notification, pursuant to Section 16-50j-73 of the Regulations of Connecticut State Agencies ("R.S.C.A."), of construction that constitutes an exempt modification pursuant to R.C.S.A. Section 16-50j-72(b)(2). In compliance with R.C.S.A. Section 16-50j-73, a copy of this letter and attachments is being sent to the First Selectman of the Town of Norfolk.

AT&T plans to modify the existing wireless communications facility owned by SNET and located at 453 Loon Meadow Road (aka 402 Loon Meadow Road), Norfolk (coordinates 42° -00'-32" N, 73°-10'-51" W). Attached are a compound plan and elevation depicting the planned changes, and documentation of the structural sufficiency of the structure to accommodate the revised antenna configuration. Also included is a power density report 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 16-50j-72(b)(2).

1. AT&T will add three (3) LTE panel antennas on existing unused pipe mounts attached to the existing platform, at the same centerline height of approximately 142'. Six (6) RRHs (remote radio units) and a Surge Arrestor will be placed behind the LTE antennas on new mounting pipes attached to the platform, also at a centerline height of

approximately 142'. AT&T will also place DC power and fiber runs along the existing coaxial cable run. These changes will not extend the height of the approximately 160' structure.

2. AT&T will place related equipment in an existing Equipment Shelter, mount a new GPS antenna on the existing Equipment Shelter, and remove the existing GPS antenna from the Tower leg. These changes will be within the existing compound and will have no effect on the site boundaries.

3. The proposed changes will not increase the noise level at the existing facility by six (6) decibels or more. The incremental effect of the proposed changes 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 environments as calculated for a mixed frequency site. As indicated on the attached report prepared by C Squared Systems, LLC, AT&T's operations at the site will result in a power density of approximately 1.59%; the combined site operations will result in a total power density of approximately 10.27%.

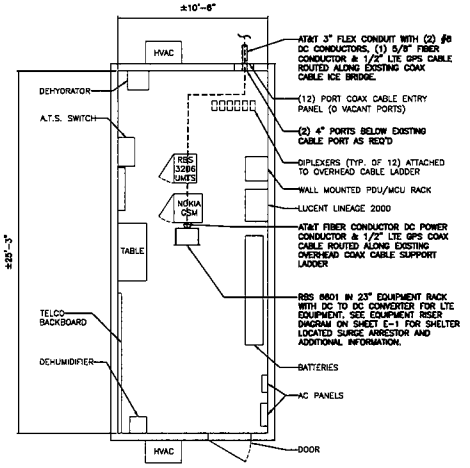
Please do not hesitate to contact me by phone at (203) 610-1071, or by e-mail at mjhowlett@optonline.net, if there are any questions concerning this matter. Thank you for your consideration.

Respectfully yours,

Melanie J. Howlett

Attachments

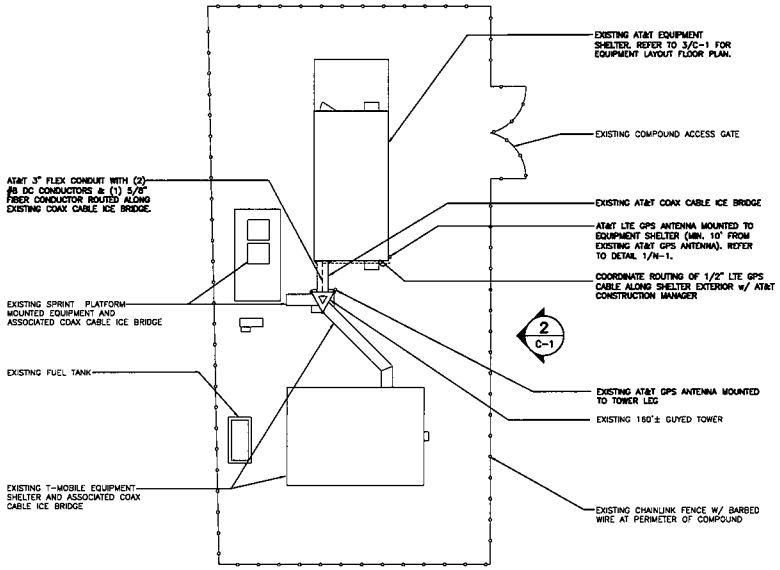
cc: Honorable Susan M. Dyer, First Selectman, Town of Norfolk
SNET c/o RCC Consultants (underlying property owner)



3 C-1 **EQUIPMENT BUILDING FLOOR PLAN**
SCALE: 1/4" = 1'-0"

APPROX. NORTH

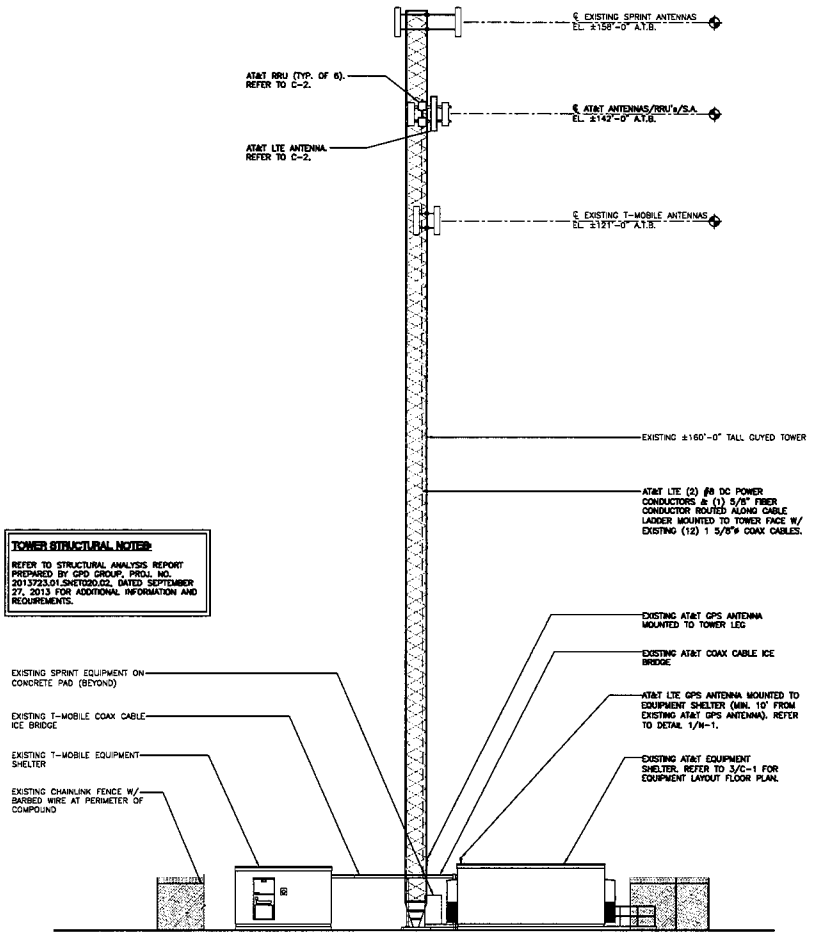
GRAPHIC SCALE
(IN FEET)
1 inch = 4 ft.



1 C-1 **COMPOUND PLAN**
SCALE: 1" = 10'

APPROX. NORTH

GRAPHIC SCALE
(IN FEET)
1 inch = 10 ft.



TOWER STRUCTURAL NOTE:

REFER TO STRUCTURAL ANALYSIS REPORT PREPARED BY GPD GROUP, PROJ. NO. 2013723.01.SNET020.02, DATED SEPTEMBER 27, 2013 FOR ADDITIONAL INFORMATION AND REQUIREMENTS.

2 C-1 **NORTHEAST ELEVATION**
SCALE: 1" = 10'-0"

GRAPHIC SCALE
(IN FEET)
1 inch = 10 ft.

DESIGNED BY:	DEB
DRAWN BY:	NMR
CHK'D BY:	CFC

REV.	DATE	DRAWN BY	CHK'D BY	
1	11/20/13	NMR	DEB	CONSTRUCTION - CLIENT REVIEW
0	09/22/12	NMR	DEB	CONSTRUCTION

PROFESSIONAL ENGINEER SEAL

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CENTEK engineering
Centered on Solutions
(203) 488-0580
(203) 488-8587 Fax
63-2 North Branford Road
Branford, CT 06405
www.CentekEng.com

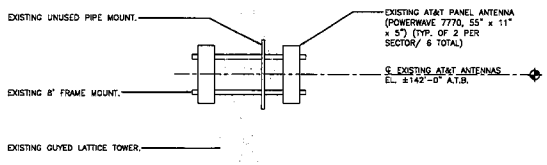
AT&T MOBILITY
WIRELESS COMMUNICATIONS FACILITY LTE UPGRADE
CT1006
NORFOLK
455 LOON MOUNTAIN ROAD
NORFOLK, CT 06058

DATE:	09/22/12
SCALE:	AS NOTED
JOB NO.	12063.C001

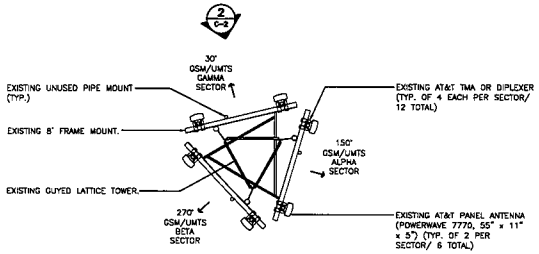
PLANS AND ELEVATION

C-1

Sheet No. 3 of 5

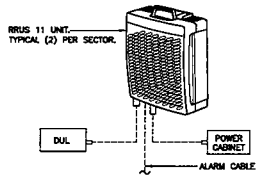


2 C-2 EXISTING ANTENNA SECTOR ELEVATION
SCALE: 1/4" = 1'-0"



1 C-2 EXISTING ANTENNA PLAN
SCALE: 1/4" = 1'-0"

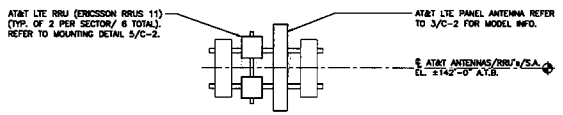
APPROX. NORTH



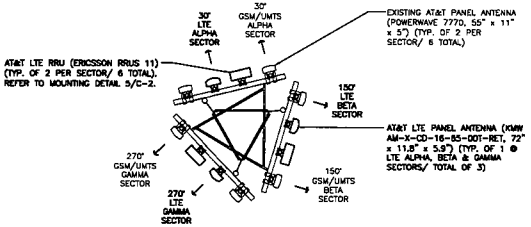
RRU (REMOTE RADIO UNIT)				
EQUIPMENT		DIMENSIONS	WEIGHT	CLEARANCES
MAKE: ERICSSON MODEL: RRUS 11		17.6"L x 17.3"W x 7.2"D	BAND 4: 44 LBS. BAND 12: 50 LBS.	ABOVE: 16" MIN. BELOW: 12" MIN. SIDE: 0" MIN.

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

6 C-2 RRU DETAIL
NOT TO SCALE



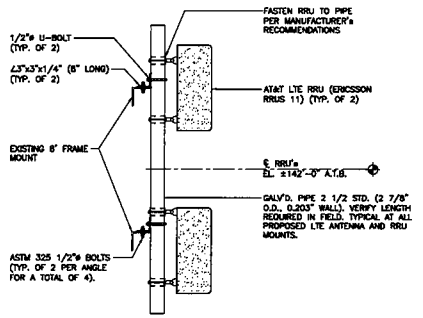
4 C-2 PROPOSED LTE ANTENNA SECTOR ELEVATION
SCALE: 1/4" = 1'-0"



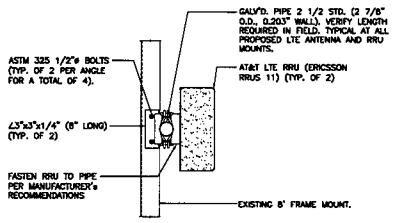
3 C-2 PROPOSED ANTENNA PLAN
SCALE: 1/4" = 1'-0"

APPROX. NORTH

NOTES:
1. AT&T LTE SURGE ARRESTOR (ANDREW ABT-DFDM-ADBM, 3.2" x 1.7" x 1.6", 1.1lbs.) (TYP. OF 1) NOT SHOWN FOR CLARITY. MOUNT PER MANUFACTURERS RECOMMENDATIONS.
2. PROVIDE MOUNTING PIPES, CROSSOVERS & ASSOCIATED HARDWARE TO COMPLETE THE PROPOSED UPGRADE.
3. REFER TO STRUCTURAL ANALYSIS AND FINAL AT&T RFDS PRIOR TO INSTALLATION OF ANTENNAS AND COAX.



SECTION



PLAN

5 C-2 RRU MOUNT DETAILS
SCALE: 1" = 1'-0"

DESIGNED BY:	DEB
DRAWN BY:	HMR
CHK'D BY:	CFC

REV.	DATE	DRAWN BY	CHK'D BY	
1	11/07/12	HMR	DEB	CONSTRUCTION
0	08/22/12	HMR	DEB	CONSTRUCTION - CLIENT REVIEW

PROFESSIONAL ENGINEER SEAL

at&t

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(203) 488-8587 Fax
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Branford, CT 06405
www.CentekEng.com

AT&T MOBILITY
WIRELESS COMMUNICATIONS FACILITY (LTE UPGRADE)
CT1006
NORFOLK
453 LOON MEADOW ROAD
NORFOLK, CT 06058

DATE:	08/22/12
SCALE:	AS NOTED
JOB NO.	12063.C001

LTE EQUIPMENT DETAILS

C-2

Sheet No. 4 of 9

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

November 13, 2013

The Honorable Susan M. Dyer
First Selectman
Town of Norfolk
P. O. Box 552
Norfolk, CT 06058

RE: **EM-CING-098-131112** – New Cingular Wireless PCS, LLC notice of intent to modify an existing telecommunications facility located at 453 Loon Meadow Road, Norfolk, Connecticut.

Dear First Selectman Dyer:

The Connecticut Siting Council (Council) received a request to modify an existing telecommunications facility, pursuant to Regulations of Connecticut State Agencies Section 16-50j-72, a copy of which has already been provided to you.

If you have any questions or comments regarding the proposal, please call me or inform the Council by November 27, 2013.

Thank you for your cooperation and consideration.

Very truly yours,

Melanie Bachman
Acting Executive Director

MB/cm

c: Joanne M. Munch, Chm, Zoning Bd. Of Appeals,Chm., Town of Norfolk

CSC
CONNECTICUT SITING COUNCIL

AT&T Towers
2300 Northlake Center Dr., Suite 405
Tucker, GA 30084-4032
(404) 532-5859

Kevin Clements
520 South Main Street, Suite 2531
Akron, Ohio 44311
(330) 572-3546
kclements@gpdgroup.com

GPD# 2013723.01.SNET020.02
September 27, 2013

STRUCTURAL ANALYSIS REPORT

AT&T DESIGNATION:	**Site USID:**	**SNET020**
	Site FA:	**10137487**
	Client #:	**CT1006**
	Site Name:	**NORFOLK**
	AT&T Project:	**Wireline Cingular Tower Only Modification 11-19-2012**
ANALYSIS CRITERIA:	**Codes:**	**TIA/EIA-222-F, 2003 IBC, 2005 CTBC & ASCE 7-05** **80-mph with 0" ice** **28-mph with 3/4" ice**
SITE DATA:		**402 Loon Meadow Drive, Norfolk, CT 06058, Litchfield County** **Latitude 42° 0' 32.004" N, Longitude 73° 10' 51.000" W** **Market: NEW ENGLAND** **160' Guyed Tower**

Ms. Charlotte Malone,

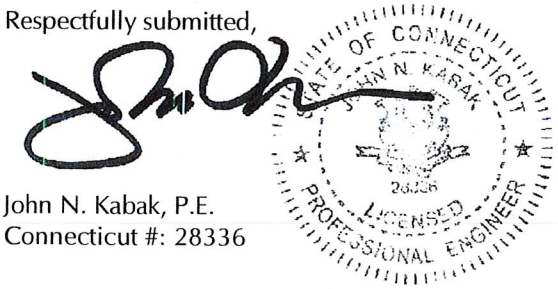
GPD is pleased to submit this Structural Analysis Report to determine the structural integrity of the aforementioned tower. The purpose of the analysis is to determine the suitability of the tower with the existing and proposed loading configuration detailed in the analysis report.

Analysis Results

Tower Stress Level with Proposed Equipment:	54.5%	Pass
Foundation Ratio with Proposed Equipment:	93.2%	Pass

We at GPD appreciate the opportunity of providing our continuing professional services to you and AT&T Mobility. If you have any questions or need further assistance on this or any other projects please do not hesitate to call.

Respectfully submitted,



John N. Kabak, P.E.
Connecticut #: 28336

SUMMARY & RESULTS

The purpose of this analysis was to verify whether the existing structure is capable of carrying the proposed loading configuration as specified by AT&T. This report was commissioned by Ms. Charlotte Malone of AT&T.

The proposed 1-5/8" coax shall be installed on tower face B in two rows of six while the Fiber shall be stacked on the DC Power coax next to the 1-5/8" coax in order for the analysis results to be valid. See Appendix C for the coax layout.

TOWER SUMMARY AND RESULTS

Member	Capacity	Results
Legs	41.4%	Pass
Diagonals	54.5%	Pass
Horizontals	32.5%	Pass
Guy Wires	52.5%	Pass
Torque Arm	17.6%	Pass
Member Bolts	52.0%	Pass
Tower Foundation	93.0%	Pass
Guy Anchor Foundation	93.2%	Pass

ANALYSIS METHOD

tnxTower (Version 6.1.3.1), a commercially available software program, was used to create a three-dimensional model of the tower and calculate primary member stresses for various dead, live, wind, and ice load cases. Selected output from the analysis is included in Appendix B. The following table details the information provided to complete this structural analysis. This analysis is solely based on this information and is being completed without the benefit of a recent detailed site visit.

DOCUMENTS PROVIDED

Document	Remarks	Source
Site Lease Application	AT&T Application, uploaded 8/12/2013	Siterra
Notice of Co-location Form	Not Provided	N/A
Tower Design	Not Provided	N/A
Foundation Design	Not Provided	N/A
Geotechnical Report	WEI Project #: 2010-1212, dated 9/15/2010	Siterra
Previous Structural Analysis	GPD Group Job #: 2012864.92, dated 10/2/2012	Siterra
Tower Mapping	GPD & MTSI Northeast, dated 7/21/2010	Siterra
Foundation Investigation	WEI Project #: 2010-1212, dated 9/15/2010	Siterra

ASSUMPTIONS

This structural analysis is based on the theoretical capacity of the members and is not a condition assessment of the tower. This analysis is from information supplied, and therefore, its results are based on and are as accurate as that supplied data. GPD has made no independent determination, nor is it required to, of its accuracy. The following assumptions were made for this structural analysis.

1. The tower member sizes and shapes are considered accurate as supplied. The material grade is as per data supplied and/or as assumed and as stated in the materials section.
2. The antenna configuration is as supplied and/or as modeled in the analysis. It is assumed to be complete and accurate. All antennas, mounts, coax and waveguides are assumed to be properly installed and supported as per manufacturer requirements.
3. Some assumptions are made regarding antennas and mount sizes and their projected areas based on best interpretation of data supplied and of best knowledge of antenna type and industry practice.
4. All mounts, if applicable, are considered adequate to support the loading. No actual analysis of the mount(s) is performed. This analysis is limited to analyzing the tower only.
5. The soil parameters are as per data supplied or as assumed and stated in the calculations.
6. Foundations are properly designed and constructed to resist the original design loads indicated in the documents provided.
7. The tower and structures have been properly maintained in accordance with TIA Standards and/or with manufacturer's specifications.
8. All welds and connections are assumed to develop at least the member capacity unless determined otherwise and explicitly stated in this report.
9. All prior structural modifications are assumed to be as per data supplied/available and to have been properly installed.
10. Loading interpreted from photos is accurate to $\pm 5'$ AGL, antenna size accurate to ± 3.3 sf, and coax equal to the number of existing antennas without reserve.
11. Foundation steel was not able to be determined through testing for the tower base. Therefore it was assumed that the foundation steel in place is equal to the minimum steel required by code.
12. All existing loading was obtained from the previous structural analysis performed by GPD (Job #: 2012864.92, dated 10/2/2012), the tower mapping performed by GPD & MTSI Northeast (dated 7/21/10), site photos, and the provided site lease application and is assumed to be accurate.
13. The proposed 1-5/8" coax shall be installed on tower face B in two rows of six while the Fiber shall be stacked on the DC Power coax next to the 1-5/8" coax in order for the analysis results to be valid. See Appendix C for the coax layout.
14. Leg A is assumed to be at an azimuth of 340° based on the tower mapping performed by GPD & MTSI Northeast (dated 7/21/10).

If any of these assumptions are not valid or have been made in error, this analysis may be affected, and GPD Group should be allowed to review any new information to determine its effect on the structural integrity of the tower.

DISCLAIMER OF WARRANTIES

GPD GROUP has not performed a recent site visit to the tower to verify the member sizes or antenna/coax loading. If the existing conditions are not as represented on the tower elevation contained in this report, we should be contacted immediately to evaluate the significance of the discrepancy. This is not a condition assessment of the tower or foundation. This report does not replace a full tower inspection. The tower and foundations are assumed to have been properly fabricated, erected, maintained, in good condition, twist free, and plumb.

The engineering services rendered by GPD GROUP in connection with this Structural Analysis are limited to a computer analysis of the tower structure and theoretical capacity of its main structural members. All tower components have been assumed to only resist dead loads when no other loads are applied. No allowance was made for any damaged, bent, missing, loose, or rusted members (above and below ground). No allowance was made for loose bolts or cracked welds.

GPD GROUP does not analyze the fabrication of the structure (including welding). It is not possible to have all the very detailed information needed to perform a thorough analysis of every structural sub-component and connection of an existing tower. GPD GROUP provides a limited scope of service in that we cannot verify the adequacy of every weld, plate connection detail, etc. The purpose of this report is to assess the feasibility of adding appurtenances usually accompanied by transmission lines to the structure.

It is the owner's responsibility to determine the amount of ice accumulation in excess of the specified code recommended amount, if any, that should be considered in the structural analysis.

The attached sketches are a schematic representation of the analyzed tower. If any material is fabricated from these sketches, the contractor shall be responsible for field verifying the existing conditions, proper fit, and clearance in the field. Any mentions of structural modifications are reasonable estimates and should not be used as a precise construction document. Precise modification drawings are obtainable from GPD GROUP, but are beyond the scope of this report.

Miscellaneous items such as antenna mounts, etc., have not been designed or detailed as a part of our work. We recommend that material of adequate size and strength be purchased from a reputable tower manufacturer.

GPD GROUP makes no warranties, expressed and/or implied, in connection with this report and disclaims any liability arising from material, fabrication, and erection of this tower. GPD GROUP will not be responsible whatsoever for, or on account of, consequential or incidental damages sustained by any person, firm, or organization as a result of any data or conclusions contained in this report. The maximum liability of GPD GROUP pursuant to this report will be limited to the total fee received for preparation of this report.

APPENDIX A

Tower Analysis Summary Form

Tower Analysis Summary Form

General Info

Site Name	NORFOLK
Site Number	SNET020
FA Number	10137487
Date of Analysis	9/27/2013
Company Performing Analysis	GPD

The information contained in this summary report is not to be used independently from the PE stamped tower analysis.

Tower Info	Description	Date
Tower Type (G, SST, MP)	G	
Tower Height (top of steel AGL)	160'	
Tower Manufacturer	n/a	
Tower Model	n/a	
Tower Design	n/a	
Foundation Design	n/a	
Geotech Report	WEI Project #: 2010-1212	9/15/2010
Tower Mapping	GPD & MTSI Northeast	7/21/2010
Previous Structural Analysis	GPD Job #: 2012864.92	10/2/2012
Foundation Mapping	WEI Project #: 2010-1212	9/15/2010

Design Parameters

Design Code Used	TIA/EIA-222-F, 2003 IBC 2005 CTBC & ASCE 7-05
Location of Tower (County, State)	Litchfield, Connecticut
Basic Wind Speed (mph)	80 (fastest-mile)
Ice Thickness (in)	0.75
Structure Classification (I, II, III)	
Exposure Category (B, C, D)	
Topographic Category (1 to 5)	

Analysis Results (% Maximum Usage)

Existing/Reserved + Future + Proposed Condition	
Tower (%)	54.5%
Guy Wires (%)	52.5%
Foundation (%)	93.2%
Foundation Adequate?	Yes

Steel Yield Strength (ksi)

Legs	50
Braces	36
Member Bolts	A325
Guy Wires	EHS

Note: Steel grades assumed based on past experience with similar towers.

Existing / Reserved Loading

Antenna								Mount			Transmission Line			
Antenna Owner	Mount Height (ft)	Antenna CL (ft)	Quantity	Type	Manufacturer	Model	Azimuth	Quantity	Manufacturer	Type	Quantity	Model	Size	Attachment Leg/Face
AT&T Mobility	160	168	1	Dipole	Unknown	10' Dipole		1	Unknown	Pipe Mount	1	Unknown	7/8"	Face A
AT&T Mobility	160	160	1	Omni	Unknown	3' Omni				Flush Mount				
Sprint	158	158	6	Panel	Decibel	DB980H90E-M	30/150/270	3	Unknown	12' Boom Gate	6	Unknown	1-5/8"	Face A
Sprint	158	158	3	Panel	RFS	APXVSPP18-C-A20	50/170/250			on the same mounts	3	Hybriflex	1-1/4"	Face A
Sprint	154	154	3	RRU	Andrew	800MHz 2x50w				Flush Mounted				
Sprint	154	154	3	RRU	Panasonic	1900MHz 2x40w				Flush Mounted				
Sprint	154	154	3	Filter	Andrew	800MHz 2x50w Notch Filter				Flush Mounted				
AT&T Mobility	148	148	1	Yagi	Unknown	4' Yagi				Torque Arm Mount	1	Unknown	1/2"	Face A
AT&T Mobility	142	142	9	Panel	CSS	DUO1417-8686-4-0	30/150/270	3	Unknown	8' Frame	5	Unknown	7/8"	Face A
AT&T Mobility	142	144	3	TMA	ADC	ADC1226494				on the same mounts	4	Unknown	7/8"	Face B
AT&T Mobility	142	141	6	TMA	ADC	ADC1226494				on the same mounts				
Unknown	137							2	Unknown	4' Sidearm				
AT&T Mobility	121	121	6	Panel	EMS	RR90-17-02DP	40/160/280	3	Unknown	4' Standoff	6	Unknown	1-1/4"	Face A
AT&T Mobility	121	121	6	TMA	Unknown	TMA				on the same mounts				
Sprint	75	75	1	GPS	PCTEL	GPS-TMG-HR-26NCM		1	Unknown	2' Sidearm	1	Unknown	1/4"	Face A
AT&T Mobility	13	13	1	GPS	Unknown	GPS		1	Unknown	1' Sidearm	1	Unknown	1/2"	Face B

Note: (9) DUO1417-8686-4-0 antennas, all TMA's and all coax at 142' shall be removed prior to the installation of the proposed loading. All other existing loading shall remain.

Proposed Loading

Antenna								Mount			Transmission Line			
Antenna Owner	Mount Height (ft)	Antenna CL (ft)	Quantity	Type	Manufacturer	Model	Azimuth	Quantity	Manufacturer	Type	Quantity	Model	Size	Attachment Leg/Face
AT&T Mobility	142	142	3	Panel	KMW	AM-X-CD-16-65-00T	30/150/270			on the existing mounts	12	LDF7-50A	1-5/8"	Face B
AT&T Mobility	142	142	6	Panel	Powerwave	7770	30/150/270			on the existing mounts	1	DC/Fiber Bundle	1-1/2"	Face B
AT&T Mobility	142	142	6	RRU	Ericsson	RRU 11				on the existing mounts				
AT&T Mobility	142	142	1	Surge Unit	Andrew	ABT-DFDM-ADBH				on the existing mounts				

Note: The proposed loading shall be in addition to the remaining existing loading at the proposed elevation.

Note: The proposed 1-5/8" coax shall be installed on tower face B in two rows of six while the Fiber shall be stacked on the DC Power coax next to the 1-5/8" coax in order for the analysis results to be valid. See Appendix C for the coax layout.

Future Loading

Antenna								Mount			Transmission Line			
Antenna Owner	Mount Height (ft)	Antenna CL (ft)	Quantity	Type	Manufacturer	Model	Azimuth	Quantity	Manufacturer	Type	Quantity	Model	Size	Attachment Leg/Face

APPENDIX B

tnxTower Output File

Tower Input Data

The main tower is a 3x guyed tower with an overall height of 160.00 ft above the ground line.
The base of the tower is set at an elevation of 0.00 ft above the ground line.
The face width of the tower is 4.00 ft at the top and tapered at the base.
This tower is designed using the TIA/EIA-222-F standard.
The following design criteria apply:

Tower is located in Litchfield County, Connecticut.
Basic wind speed of 80 mph.
Nominal ice thickness of 0.7500 in.
Ice thickness is considered to increase with height.
Ice density of 56 pcf.
A wind speed of 28 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 50 mph.
Pressures are calculated at each section.
Safety factor used in guy design is 2.
Stress ratio used in tower member design is 1.333.
Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	*Face or Leg*	*Allow Shield*	*Component Type*	*Placement* *ft*	*Face Offset* *in*	*Lateral Offset (Frac FW)*	*#*	*# Per Row*	*Clear Spacing* *in*	*Width or Diameter* *in*	*Perimeter* *in*	*Weight* *plf*
Climbing Ladder	B	Yes	Af (CfAe)	160.00 - 8.00	-2.0000	0	1	1	3.8400	3.8400	15.3600	4.81
LDF5-50A (7/8 FOAM)	A	Yes	Ar (CfAe)	160.00 - 8.00	-2.0000	-0.35	1	1	1.0000	1.0900		0.33
LDF7-50A (1-5/8 FOAM)	A	Yes	Ar (CfAe)	158.00 - 8.00	0.0000	0.1	6	6	0.5000	1.9800		0.82
Hybriflex (1-1/4")	A	Yes	Ar (CfAe)	158.00 - 8.00	0.0000	-0.15	3	3	0.5000	1.5400		1.30
LDF4-50A (1/2 FOAM)	A	Yes	Ar (CfAe)	148.00 - 8.00	-2.0000	0.1	1	1	0.0000	0.0000		0.15
LDF6-50A (1-1/4 FOAM)	A	Yes	Ar (CfAe)	121.00 - 8.00	-3.0000	0	6	5	1.0000	0.0000		0.66
LDF1-50A (1/4 FOAM)	A	Yes	Ar (CfAe)	75.00 - 8.00	0.0000	-0.075	1	1	0.3500	0.3500		0.06
LDF4-50A (1/2 FOAM)	B	Yes	Ar (CfAe)	13.00 - 8.00	0.0000	-0.25	1	1	0.6300	0.6300		0.15
LDF7-50A (1-5/8 FOAM)	B	Yes	Ar (CfAe)	142.00 - 8.00	0.0000	0	12	6	1.0000	1.9800		0.82
1.5" DC/Fiber Bundle	B	Yes	Ar (CfAe)	142.00 - 8.00	0.0000	0.2	1	1	1.5000	1.5000		0.80

Discrete Tower Loads

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 lb
10' Dipole	A	From Leg	0.50 0.00 8.00	0.0000	160.00	No Ice	2.00	2.00	20.00
						1/2" Ice	3.02	3.02	35.50
						1" Ice	4.07	4.07	57.47
						2" Ice	5.70	5.70	121.40
						4" Ice	8.26	8.26	333.58
Pipe Mount 3'x2.375"	A	From Leg	0.25 0.00 1.50	0.0000	160.00	No Ice	0.58	0.58	11.40
						1/2" Ice	0.77	0.77	16.96
						1" Ice	0.97	0.97	24.74
						2" Ice	1.42	1.42	47.61
						4" Ice	2.54	2.54	126.78
3' Omni	B	From Face	0.50 0.00 0.00	0.0000	160.00	No Ice	0.52	0.52	15.00
						1/2" Ice	0.71	0.71	19.81
						1" Ice	0.90	0.90	26.81
						2" Ice	1.33	1.33	47.99
						4" Ice	2.44	2.44	123.33
Rohn 12' Boom Gate	A	From Leg	1.29 1.53 0.00	50.0000	158.00	No Ice	15.35	14.00	557.70
						1/2" Ice	21.29	20.81	741.30
						1" Ice	27.23	27.62	924.90
						2" Ice	39.11	41.24	1292.10
						4" Ice	62.87	68.48	2026.50
Rohn 12' Boom Gate	B	From Leg	1.29 1.53 0.00	50.0000	158.00	No Ice	15.35	14.00	557.70
						1/2" Ice	21.29	20.81	741.30
						1" Ice	27.23	27.62	924.90
						2" Ice	39.11	41.24	1292.10
						4" Ice	62.87	68.48	2026.50
Rohn 12' Boom Gate	C	From Leg	1.29 1.53 0.00	50.0000	158.00	No Ice	15.35	14.00	557.70
						1/2" Ice	21.29	20.81	741.30
						1" Ice	27.23	27.62	924.90
						2" Ice	39.11	41.24	1292.10
						4" Ice	62.87	68.48	2026.50
(2) DB980H90E-M w/ Mount Pipe	A	From Leg	2.57 3.06 0.00	50.0000	158.00	No Ice	4.04	3.62	30.40
						1/2" Ice	4.50	4.48	66.41
						1" Ice	4.95	5.22	108.76
						2" Ice	5.87	6.74	215.74
						4" Ice	8.05	10.00	549.44
(2) DB980H90E-M w/ Mount Pipe	B	From Leg	2.57 3.06 0.00	50.0000	158.00	No Ice	4.04	3.62	30.40
						1/2" Ice	4.50	4.48	66.41
						1" Ice	4.95	5.22	108.76
						2" Ice	5.87	6.74	215.74
						4" Ice	8.05	10.00	549.44
(2) DB980H90E-M w/ Mount Pipe	C	From Leg	2.57 3.06 0.00	50.0000	158.00	No Ice	4.04	3.62	30.40
						1/2" Ice	4.50	4.48	66.41
						1" Ice	4.95	5.22	108.76
						2" Ice	5.87	6.74	215.74
						4" Ice	8.05	10.00	549.44
APXVSPP18-C-A20 w/ Mount Pipe	A	From Leg	2.57 3.05 0.00	70.0000	158.00	No Ice	8.26	6.71	78.90
						1/2" Ice	8.81	7.66	144.31
						1" Ice	9.36	8.49	217.47
						2" Ice	10.50	10.20	390.34
						4" Ice	12.88	13.98	872.84
APXVSPP18-C-A20 w/ Mount Pipe	B	From Leg	2.57 3.05 0.00	70.0000	158.00	No Ice	8.26	6.71	78.90
						1/2" Ice	8.81	7.66	144.31
						1" Ice	9.36	8.49	217.47
						2" Ice	10.50	10.20	390.34

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 lb
							4" Ice	12.88	13.98	872.84
APXVSPP18-C-A20 w/ Mount Pipe	C	From Leg	2.57	3.05	30.0000	158.00	No Ice	8.26	6.71	78.90
							1/2" Ice	8.81	7.66	144.31
				0.00			1" Ice	9.36	8.49	217.47
							2" Ice	10.50	10.20	390.34
							4" Ice	12.88	13.98	872.84
800MHz 2x50w	A	From Leg	0.50		0.0000	154.00	No Ice	2.49	2.07	53.00
			0.00				1/2" Ice	2.71	2.27	74.19
			0.00				1" Ice	2.93	2.48	98.39
							2" Ice	3.41	2.93	156.61
							4" Ice	4.46	3.93	317.77
800MHz 2x50w	B	From Leg	0.50		0.0000	154.00	No Ice	2.49	2.07	53.00
			0.00				1/2" Ice	2.71	2.27	74.19
			0.00				1" Ice	2.93	2.48	98.39
							2" Ice	3.41	2.93	156.61
							4" Ice	4.46	3.93	317.77
800MHz 2x50w	C	From Leg	0.50		0.0000	154.00	No Ice	2.49	2.07	53.00
			0.00				1/2" Ice	2.71	2.27	74.19
			0.00				1" Ice	2.93	2.48	98.39
							2" Ice	3.41	2.93	156.61
							4" Ice	4.46	3.93	317.77
1900MHz 2x40w	A	From Leg	0.50		0.0000	154.00	No Ice	2.49	3.06	90.00
			0.00				1/2" Ice	2.71	3.30	116.87
			0.00				1" Ice	2.93	3.54	147.08
							2" Ice	3.41	4.06	218.35
							4" Ice	4.46	5.19	409.64
1900MHz 2x40w	B	From Leg	0.50		0.0000	154.00	No Ice	2.49	3.06	90.00
			0.00				1/2" Ice	2.71	3.30	116.87
			0.00				1" Ice	2.93	3.54	147.08
							2" Ice	3.41	4.06	218.35
							4" Ice	4.46	5.19	409.64
1900MHz 2x40w	C	From Leg	0.50		0.0000	154.00	No Ice	2.49	3.06	90.00
			0.00				1/2" Ice	2.71	3.30	116.87
			0.00				1" Ice	2.93	3.54	147.08
							2" Ice	3.41	4.06	218.35
							4" Ice	4.46	5.19	409.64
800MHz 2x50w Notch Filter	A	From Leg	0.50		0.0000	154.00	No Ice	0.85	0.37	11.00
			0.00				1/2" Ice	0.97	0.46	17.21
			0.00				1" Ice	1.11	0.56	25.11
							2" Ice	1.40	0.78	46.73
							4" Ice	2.09	1.33	118.76
800MHz 2x50w Notch Filter	B	From Leg	0.50		0.0000	154.00	No Ice	0.85	0.37	11.00
			0.00				1/2" Ice	0.97	0.46	17.21
			0.00				1" Ice	1.11	0.56	25.11
							2" Ice	1.40	0.78	46.73
							4" Ice	2.09	1.33	118.76
800MHz 2x50w Notch Filter	C	From Leg	0.50		0.0000	154.00	No Ice	0.85	0.37	11.00
			0.00				1/2" Ice	0.97	0.46	17.21
			0.00				1" Ice	1.11	0.56	25.11
							2" Ice	1.40	0.78	46.73
							4" Ice	2.09	1.33	118.76
4' Yagi	B	From Face	6.50		0.0000	148.00	No Ice	0.79	0.79	5.00
			0.00				1/2" Ice	1.03	1.03	11.34
			0.00				1" Ice	1.28	1.28	20.48
							2" Ice	1.81	1.81	47.76
							4" Ice	3.11	3.11	142.65
Pipe Mount 4'x2.375"	B	From Face	6.00		0.0000	148.00	No Ice	0.87	0.87	18.50

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 lb
			0.00			1/2" Ice	1.11	1.11	25.81
			0.00			1" Ice	1.36	1.36	35.97
						2" Ice	1.90	1.90	65.40
						4" Ice	3.23	3.23	165.03
8' Frame	A	From Leg	0.48	50.0000	142.00	No Ice	14.48	3.61	310.00
			0.57			1/2" Ice	18.67	4.62	454.00
			0.00			1" Ice	22.86	5.62	598.00
						2" Ice	31.24	7.63	886.00
						4" Ice	48.00	11.65	1462.00
8' Frame	B	From Leg	0.48	50.0000	142.00	No Ice	14.48	3.61	310.00
			0.57			1/2" Ice	18.67	4.62	454.00
			0.00			1" Ice	22.86	5.62	598.00
						2" Ice	31.24	7.63	886.00
						4" Ice	48.00	11.65	1462.00
8' Frame	C	From Leg	0.48	50.0000	142.00	No Ice	14.48	3.61	310.00
			0.57			1/2" Ice	18.67	4.62	454.00
			0.00			1" Ice	22.86	5.62	598.00
						2" Ice	31.24	7.63	886.00
						4" Ice	48.00	11.65	1462.00
AM-X-CD-16-65-00T w/ Mount Pipe	A	From Leg	0.96	50.0000	142.00	No Ice	8.55	6.65	89.03
			1.15			1/2" Ice	9.18	7.68	155.08
			0.00			1" Ice	9.79	8.56	231.41
						2" Ice	11.06	10.38	412.89
						4" Ice	13.71	14.23	912.24
AM-X-CD-16-65-00T w/ Mount Pipe	B	From Leg	0.96	50.0000	142.00	No Ice	8.55	6.65	89.03
			1.15			1/2" Ice	9.18	7.68	155.08
			0.00			1" Ice	9.79	8.56	231.41
						2" Ice	11.06	10.38	412.89
						4" Ice	13.71	14.23	912.24
AM-X-CD-16-65-00T w/ Mount Pipe	C	From Leg	0.96	50.0000	142.00	No Ice	8.55	6.65	89.03
			1.15			1/2" Ice	9.18	7.68	155.08
			0.00			1" Ice	9.79	8.56	231.41
						2" Ice	11.06	10.38	412.89
						4" Ice	13.71	14.23	912.24
(2) 7770.00 w/Mount Pipe	A	From Leg	0.96	50.0000	142.00	No Ice	5.88	4.10	61.54
			1.15			1/2" Ice	6.31	4.73	108.55
			0.00			1" Ice	6.75	5.37	162.39
						2" Ice	7.66	6.70	289.57
						4" Ice	9.58	9.87	654.40
(2) 7770.00 w/Mount Pipe	B	From Leg	0.96	50.0000	142.00	No Ice	5.88	4.10	61.54
			1.15			1/2" Ice	6.31	4.73	108.55
			0.00			1" Ice	6.75	5.37	162.39
						2" Ice	7.66	6.70	289.57
						4" Ice	9.58	9.87	654.40
(2) 7770.00 w/Mount Pipe	C	From Leg	0.96	50.0000	142.00	No Ice	5.88	4.10	61.54
			1.15			1/2" Ice	6.31	4.73	108.55
			0.00			1" Ice	6.75	5.37	162.39
						2" Ice	7.66	6.70	289.57
						4" Ice	9.58	9.87	654.40
(2) RRU-11	A	From Leg	0.96	50.0000	142.00	No Ice	1.91	1.47	44.00
			1.15			1/2" Ice	2.10	1.65	59.71
			0.00			1" Ice	2.30	1.83	78.03
						2" Ice	2.72	2.22	123.32
						4" Ice	3.68	3.10	253.87
(2) RRU-11	B	From Leg	0.96	50.0000	142.00	No Ice	1.91	1.47	44.00
			1.15			1/2" Ice	2.10	1.65	59.71
			0.00			1" Ice	2.30	1.83	78.03

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 lb
(2) RRU-11	C	From Leg	0.96 1.15 0.00	50.0000	142.00	2" Ice 4" Ice No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.72 3.68 1.91 2.10 2.30 2.72 3.68	2.22 3.10 1.47 1.65 1.83 2.22 3.10	123.32 253.87 44.00 59.71 78.03 123.32 253.87
ABT-DFDM-ADBH	A	From Leg	0.96 1.15 0.00	50.0000	142.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.03 0.05 0.08 0.18 0.47	0.05 0.09 0.13 0.25 0.58	1.14 1.80 3.08 8.24 34.48
4' Sidearm - Flat (GPD)	B	From Leg	2.00 0.00 0.00	0.0000	137.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.80 1.05 1.30 1.80 2.80	3.20 4.00 4.80 6.40 9.60	55.67 70.83 85.99 116.31 176.95
4' Sidearm - Flat (GPD)	C	From Leg	2.00 0.00 0.00	0.0000	137.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.80 1.05 1.30 1.80 2.80	3.20 4.00 4.80 6.40 9.60	55.67 70.83 85.99 116.31 176.95
RR90-17-02DP w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	60.0000	121.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.59 5.09 5.58 6.59 8.73	3.32 4.09 4.78 6.23 9.31	34.18 71.62 115.19 223.87 556.85
RR90-17-02DP w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	-60.0000	121.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.59 5.09 5.58 6.59 8.73	3.32 4.09 4.78 6.23 9.31	34.18 71.62 115.19 223.87 556.85
RR90-17-02DP w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	60.0000	121.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.59 5.09 5.58 6.59 8.73	3.32 4.09 4.78 6.23 9.31	34.18 71.62 115.19 223.87 556.85
RR90-17-02DP w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	-60.0000	121.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.59 5.09 5.58 6.59 8.73	3.32 4.09 4.78 6.23 9.31	34.18 71.62 115.19 223.87 556.85
RR90-17-02DP w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	60.0000	121.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.59 5.09 5.58 6.59 8.73	3.32 4.09 4.78 6.23 9.31	34.18 71.62 115.19 223.87 556.85
RR90-17-02DP w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	-60.0000	121.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.59 5.09 5.58 6.59 8.73	3.32 4.09 4.78 6.23 9.31	34.18 71.62 115.19 223.87 556.85
(2) TMA	A	From Leg	4.00 0.00 0.00	0.0000	121.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.00 0.00 0.00 0.00 0.00	0.41 0.51 0.63 0.88 1.49	3.00 8.10 14.80 33.72 99.19

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 lb
(2) TMA	B	From Leg	4.00 0.00 0.00	0.0000	121.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.00 0.00 0.00 0.00 0.00	0.41 0.51 0.63 0.88 1.49	3.00 8.10 14.80 33.72 99.19
(2) TMA	C	From Leg	4.00 0.00 0.00	0.0000	121.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.00 0.00 0.00 0.00 0.00	0.41 0.51 0.63 0.88 1.49	3.00 8.10 14.80 33.72 99.19
4' Standoff - Flat (GPD)	A	From Leg	2.00 0.00 0.00	0.0000	121.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.96 3.08 4.20 6.44 10.92	6.13 8.58 11.03 15.93 25.73	74.61 106.30 137.99 201.37 328.13
4' Standoff - Flat (GPD)	B	From Leg	2.00 0.00 0.00	0.0000	121.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.96 3.08 4.20 6.44 10.92	6.13 8.58 11.03 15.93 25.73	74.61 106.30 137.99 201.37 328.13
4' Standoff - Flat (GPD)	C	From Leg	2.00 0.00 0.00	0.0000	121.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.96 3.08 4.20 6.44 10.92	6.13 8.58 11.03 15.93 25.73	74.61 106.30 137.99 201.37 328.13
GPS-TMG-HR-26NCM	C	From Leg	2.00 0.00 0.00	0.0000	75.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.80 1.05 1.30 1.80 2.80	0.93 1.17 1.41 1.89 2.85	25.19 31.85 38.51 51.83 78.47
2' Sidearm - Round (GPD)	C	From Leg	1.00 0.00 0.00	0.0000	75.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.80 1.05 1.30 1.80 2.80	0.93 1.17 1.41 1.89 2.85	25.19 31.85 38.51 51.83 78.47
GPS	B	From Leg	1.00 0.00 0.00	0.0000	13.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.17 0.24 0.32 0.51 1.02	0.17 0.24 0.32 0.51 1.02	0.87 3.85 7.85 19.56 62.07
1' Sidearm - Flat (GPD)	B	From Leg	0.50 0.00 0.00	0.0000	13.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.80 1.05 1.30 1.80 2.80	0.80 1.00 1.20 1.60 2.40	19.13 23.79 28.45 37.77 56.41

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
160.00	10' Dipole	27	1.335	0.0197	0.0619	315497
158.00	Rohn 12' Boom Gate	27	1.343	0.0212	0.0642	315497
154.00	800MHz 2x50w	27	1.357	0.0240	0.0688	262914
148.00	4' Yagi	27	1.381	0.0271	0.0761	131457

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
145.75	Guy	27	1.390	0.0276	0.0792	110704
142.00	8' Frame	27	1.407	0.0275	0.0847	97874
137.00	4' Sidearm - Flat (GPD)	27	1.431	0.0250	0.0930	296392
121.00	RR90-17-02DP w/ Mount Pipe	27	1.492	0.0130	0.1221	28960
86.00	Guy	27	1.364	0.0224	0.2040	32265
75.00	GPS-TMG-HR-26NCM	27	1.333	0.0214	0.2234	146284
13.00	GPS	27	0.382	0.1294	0.2528	53341

Bolt Design Data

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt lb	Allowable Load lb	Ratio Load / Allowable	Allowable Ratio	Criteria
T1	160	Leg	A325N	0.6250	12	2495.95	12885.40	0.194 ✔	1	Bolt DS
		Diagonal	A325N	0.6250	2	2888.07	9583.59	0.301 ✔	1.333	Member Block Shear
		Horizontal	A325N	0.6250	2	469.46	4791.80	0.098 ✔	1.333	Member Block Shear
T2	141	Leg	A325N	0.6250	12	3740.80	12885.40	0.290 ✔	1.333	Bolt DS
		Diagonal	A325N	0.6250	1	3536.09	5097.66	0.694 ✔	1.333	Member Bearing
		Horizontal	A325N	0.6250	1	1226.60	4553.91	0.269 ✔	1.333	Member Block Shear
T3	121	Leg	A325N	0.6250	12	3054.80	12885.40	0.237 ✔	1	Bolt DS
		Diagonal	A325N	0.6250	1	2451.98	5097.66	0.481 ✔	1.333	Member Bearing
		Horizontal	A325N	0.6250	1	868.26	4553.91	0.191 ✔	1.333	Member Block Shear
T4	101	Leg	A325N	0.6250	12	3202.12	12885.40	0.249 ✔	1	Bolt DS
		Diagonal	A325N	0.6250	1	4362.20	6442.72	0.677 ✔	1.333	Bolt Shear
		Horizontal	A325N	0.6250	1	1981.22	4553.91	0.435 ✔	1.333	Member Block Shear
T5	86	Leg	A325N	0.6250	12	3918.48	12885.40	0.304 ✔	1	Bolt DS
		Diagonal	A325N	0.6250	1	4358.24	6442.72	0.676 ✔	1.333	Bolt Shear
		Horizontal	A325N	0.6250	1	613.37	4553.91	0.135 ✔	1	Member Block Shear
T6	66	Leg	A325N	0.6250	12	5603.99	12885.40	0.435 ✔	1.333	Bolt DS
		Diagonal	A325N	0.6250	1	2765.07	6442.72	0.429 ✔	1.333	Bolt Shear
		Horizontal	A325N	0.6250	1	646.77	4553.91	0.142 ✔	1	Member Block Shear
T7	46	Leg	A325N	0.6250	12	4286.11	12885.40	0.333 ✔	1	Bolt DS
		Diagonal	A325N	0.6250	1	2129.57	6442.72	0.331 ✔	1.333	Bolt Shear
		Horizontal	A325N	0.6250	1	677.25	4553.91	0.149 ✔	1	Member Block Shear
T8	26	Leg	A325N	0.7500	3	0.00	19438.30	0.000 ✔	1.333	Bolt Tension
		Diagonal	A325N	0.6250	1	2527.92	5097.66	0.496 ✔	1.333	Member Bearing
		Horizontal	A325N	0.6250	1	685.94	4553.91	0.151 ✔	1	Member Block Shear

Section Capacity Table

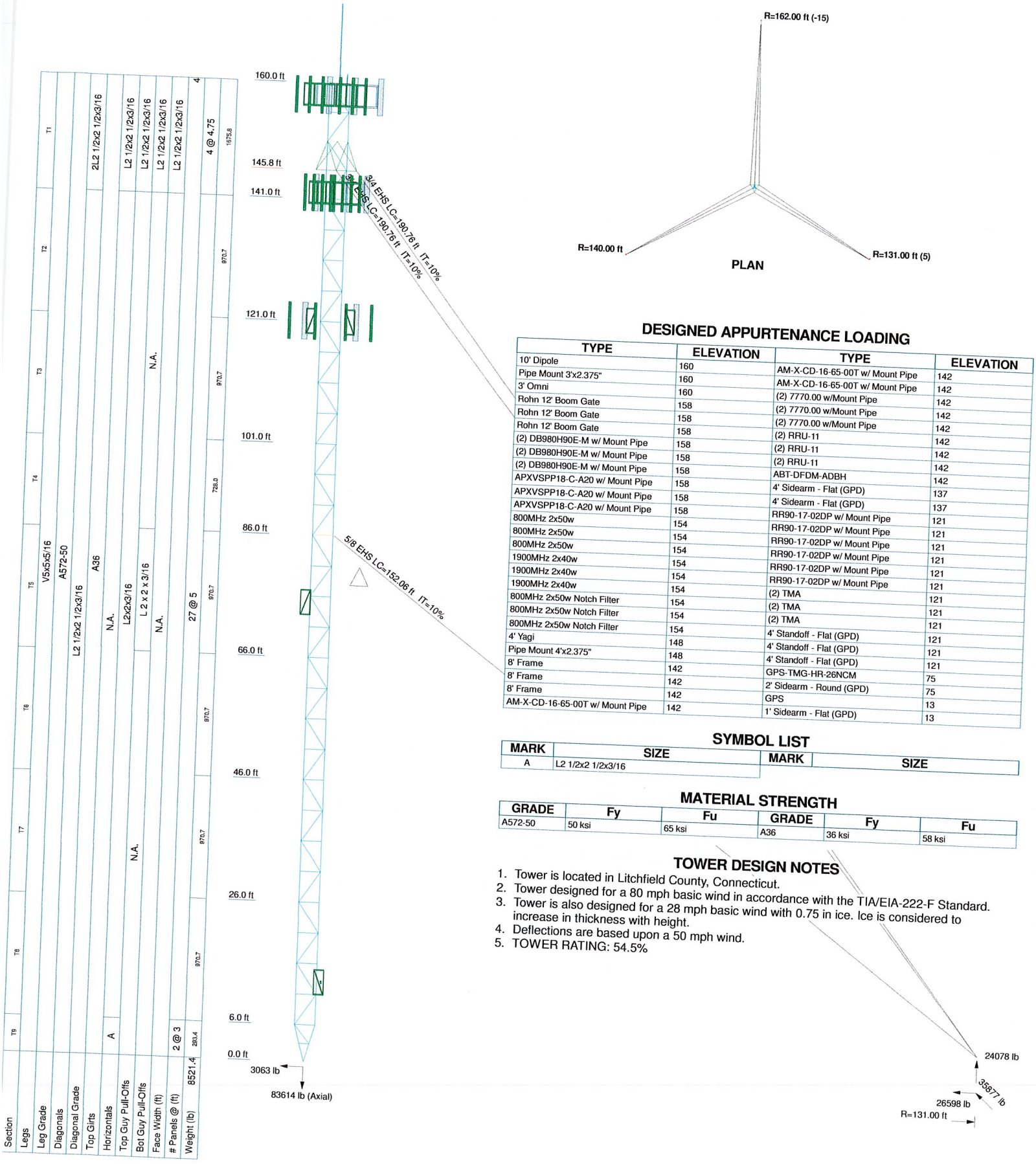
Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	$SF*P_{allow}$ lb	% Capacity	Pass Fail
T1	160 - 141	Leg	V5x5x5/16	2	-14975.70	69021.30	21.7	Pass
T2	141 - 121	Leg	V5x5x5/16	28	-22444.80	90674.26	24.8	Pass
T3	121 - 101	Leg	V5x5x5/16	55	-17753.10	68022.70	26.1	Pass
T4	101 - 86	Leg	V5x5x5/16	84	-19212.70	68022.70	28.2	Pass
T5	86 - 66	Leg	V5x5x5/16	105	-23510.90	68022.70	34.6	Pass
T6	66 - 46	Leg	V5x5x5/16	132	-33623.90	90674.26	37.1	Pass
T7	46 - 26	Leg	V5x5x5/16	159	-34141.20	90674.26	37.7	Pass
T8	26 - 6	Leg	V5x5x5/16	186	-27254.20	68022.70	40.1	Pass
T9	6 - 0	Leg	V5x5x5/16	213	-29767.20	71827.30	41.4	Pass
T1	160 - 141	Diagonal	2L2 1/2x2 1/2x3/16	9	-6524.41	29647.12	22.0	Pass
T2	141 - 121	Diagonal	L2 1/2x2 1/2x3/16	53	-4383.64	8042.20	54.5	Pass
T3	121 - 101	Diagonal	L2 1/2x2 1/2x3/16	61	-2979.08	8042.20	37.0	Pass
T4	101 - 86	Diagonal	L2 1/2x2 1/2x3/16	88	-4362.20	8042.20	54.2	Pass
T5	86 - 66	Diagonal	L2 1/2x2 1/2x3/16	129	-4358.24	8042.20	54.2	Pass
T6	66 - 46	Diagonal	L2 1/2x2 1/2x3/16	156	-2765.07	8042.20	34.4	Pass
T7	46 - 26	Diagonal	L2 1/2x2 1/2x3/16	163	-2129.57	8042.20	26.5	Pass
T8	26 - 6	Diagonal	L2 1/2x2 1/2x3/16	196	-3112.21	8042.20	38.7	Pass
T9	6 - 0	Diagonal	L2 1/2x2 1/2x3/16	222	-577.99	10295.90	5.6	Pass
T1	160 - 141	Horizontal	L2 1/2x2 1/2x3/16	24	-909.85	15036.37	6.1	Pass
T2	141 - 121	Horizontal	L2x2x3/16	32	1226.60	16652.77	7.4	Pass
T3	121 - 101	Horizontal	L2x2x3/16	59	868.26	16652.77	5.2	Pass
T4	101 - 86	Horizontal	L2x2x3/16	85	-1650.94	10170.54	16.2	Pass
T5	86 - 66	Horizontal	L2x2x3/16	113	-407.22	7629.81	5.3	Pass
T6	66 - 46	Horizontal	L2x2x3/16	134	-582.38	10170.54	5.7	Pass
T7	46 - 26	Horizontal	L2x2x3/16	162	-445.43	7629.81	5.8	Pass
T8	26 - 6	Horizontal	L2x2x3/16	188	-472.06	7629.81	6.2	Pass
T9	6 - 0	Horizontal	L2 1/2x2 1/2x3/16	215	6331.65	19483.20	32.5	Pass
T1	160 - 141	Top Girt	L2 1/2x2 1/2x3/16	5	-659.62	14278.03	4.6	Pass
T1	160 - 141	Guy A@145.75	3/4	236	12024.20	29150.00	41.2	Pass
T5	86 - 66	Guy A@86	5/8	243	10366.80	21200.00	48.9	Pass
T1	160 - 141	Guy B@145.75	3/4	230	12934.20	29150.00	44.4	Pass
T5	86 - 66	Guy B@86	5/8	242	11127.80	21200.00	52.5	Pass
T1	160 - 141	Guy C@145.75	3/4	223	12720.70	29150.00	43.6	Pass
T5	86 - 66	Guy C@86	5/8	241	10868.30	21200.00	51.3	Pass
T1	160 - 141	Top Guy Pull-Off@145.75	L2 1/2x2 1/2x3/16	17	-2479.15	16060.92	15.4	Pass
T5	86 - 66	Top Guy Pull-Off@86	L 2 x 2 x 3/16	106	5545.23	20586.85	26.9	Pass
T1	160 - 141	Bottom Guy Pull-Off@145.75	L2 1/2x2 1/2x3/16	12	-3010.24	16060.92	18.7	Pass
T1	160 - 141	Torque Arm Top@145.75	2L2 1/2x2x1/4	231	8093.36	46008.00	17.6	Pass
T1	160 - 141	Torque Arm Bottom@145.75	2L3x2 1/2x1/4	239	-7900.16	64087.57	12.3	Pass

Summary	ELC:	Existing/Proposed
Leg (T9)	41.4	Pass
Diagonal (T2)	54.5	Pass
Horizontal (T9)	32.5	Pass
Top Girt (T1)	4.6	Pass
Guy A (T5)	48.9	Pass
Guy B (T5)	52.5	Pass
Guy C (T5)	51.3	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	$SF*P_{allow}$ lb	% Capacity	Pass Fail
						Top Guy Pull-Off (T5)	26.9	Pass
						Bottom Guy Pull-Off (T1)	18.7	Pass
						Torque Arm Top (T1)	17.6	Pass
						Torque Arm Bottom (T1)	12.3	Pass
						Bolt Checks	52.0	Pass
						Rating =	54.5	Pass

APPENDIX C

Tower Elevation Drawing



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
10' Dipole	160	AM-X-CD-16-65-00T w/ Mount Pipe	142
Pipe Mount 3'x2.375"	160	AM-X-CD-16-65-00T w/ Mount Pipe	142
3' Omni	160	(2) 7770.00 w/Mount Pipe	142
Rohn 12' Boom Gate	158	(2) 7770.00 w/Mount Pipe	142
Rohn 12' Boom Gate	158	(2) 7770.00 w/Mount Pipe	142
Rohn 12' Boom Gate	158	(2) RRU-11	142
(2) DB980H90E-M w/ Mount Pipe	158	(2) RRU-11	142
(2) DB980H90E-M w/ Mount Pipe	158	(2) RRU-11	142
(2) DB980H90E-M w/ Mount Pipe	158	ABT-DFDM-ADBH	142
APXVSPP18-C-A20 w/ Mount Pipe	158	4' Sidearm - Flat (GPD)	137
APXVSPP18-C-A20 w/ Mount Pipe	158	4' Sidearm - Flat (GPD)	137
APXVSPP18-C-A20 w/ Mount Pipe	158	RR90-17-02DP w/ Mount Pipe	121
800MHz 2x50w	154	RR90-17-02DP w/ Mount Pipe	121
800MHz 2x50w	154	RR90-17-02DP w/ Mount Pipe	121
800MHz 2x50w	154	RR90-17-02DP w/ Mount Pipe	121
1900MHz 2x40w	154	RR90-17-02DP w/ Mount Pipe	121
1900MHz 2x40w	154	RR90-17-02DP w/ Mount Pipe	121
1900MHz 2x40w	154	(2) TMA	121
800MHz 2x50w Notch Filter	154	(2) TMA	121
800MHz 2x50w Notch Filter	154	(2) TMA	121
800MHz 2x50w Notch Filter	154	4' Standoff - Flat (GPD)	121
4' Yagi	148	4' Standoff - Flat (GPD)	121
Pipe Mount 4'x2.375"	148	4' Standoff - Flat (GPD)	121
8' Frame	142	GPS-TMG-HR-26NCM	75
8' Frame	142	2' Sidearm - Round (GPD)	75
8' Frame	142	GPS	13
AM-X-CD-16-65-00T w/ Mount Pipe	142	1' Sidearm - Flat (GPD)	13

SYMBOL LIST

MARK	SIZE	MARK	SIZE
A	L2 1/2x2 1/2x3/16		

MATERIAL STRENGTH

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

TOWER DESIGN NOTES

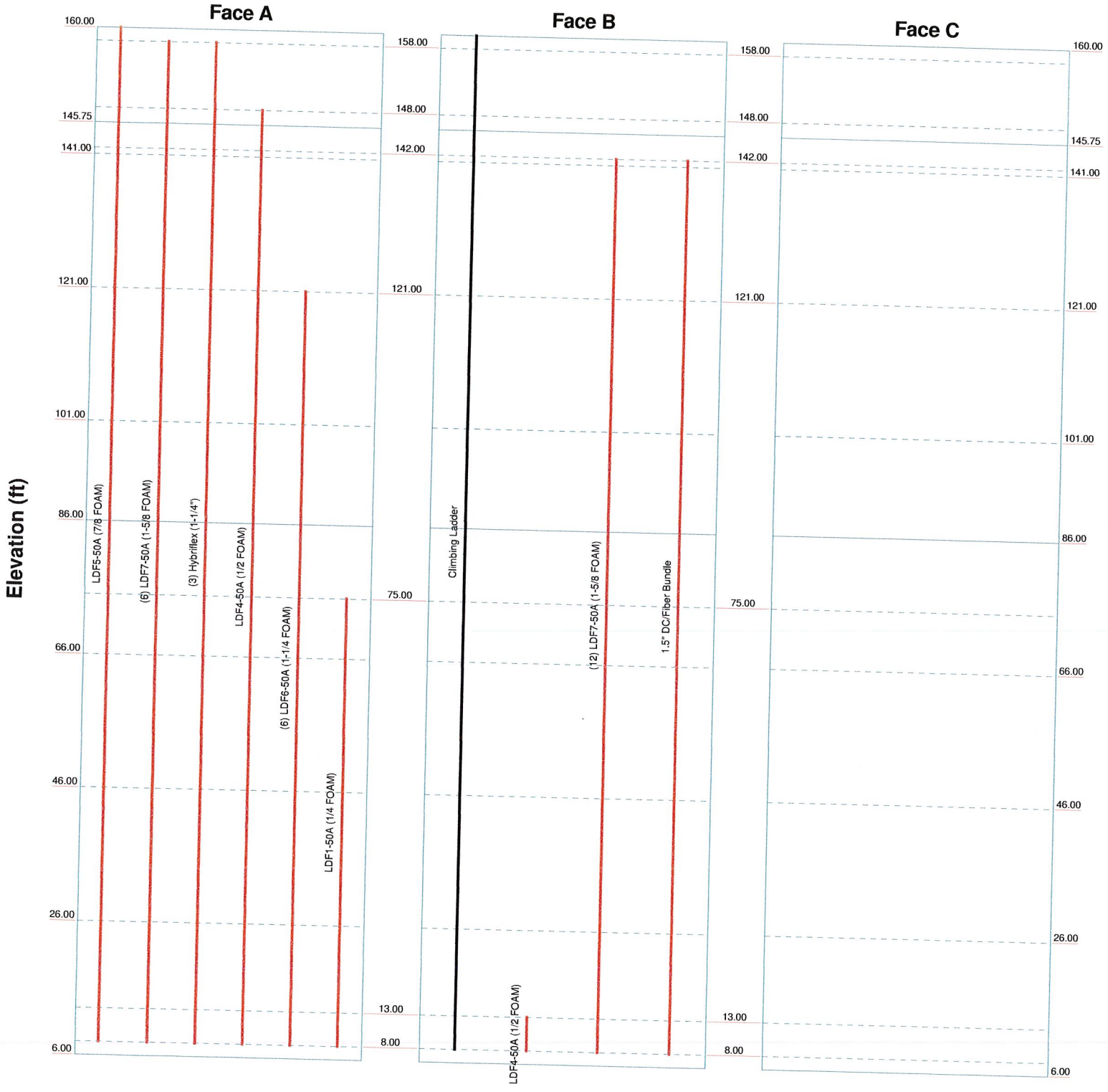
1. Tower is located in Litchfield County, Connecticut.
2. Tower designed for a 80 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 28 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 54.5%

GPD Group
520 South Main St. Suite 2531
Akron, OH 44311
Phone: (330) 572-2100
FAX: (330) 572-2101

Job: SNET020 NORFOLK			
Project: 2013723.01.SNET020.02			
Client: AT&T Mobility	Drawn by: imaham	App'd:	
Code: TIA/EIA-222-F	Date: 09/27/13	Scale: NTS	
Path: N:\2011\AT and T\SNET020\4 2013723.01 SNET020.02 AT&T rerun\TNX\SNET020 NORFOLK.eri		Dwg No. E-1	

Feed Line Distribution Chart
6' - 160'

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



GPD Group
520 South Main St. Suite 2531
Akron, OH 44311
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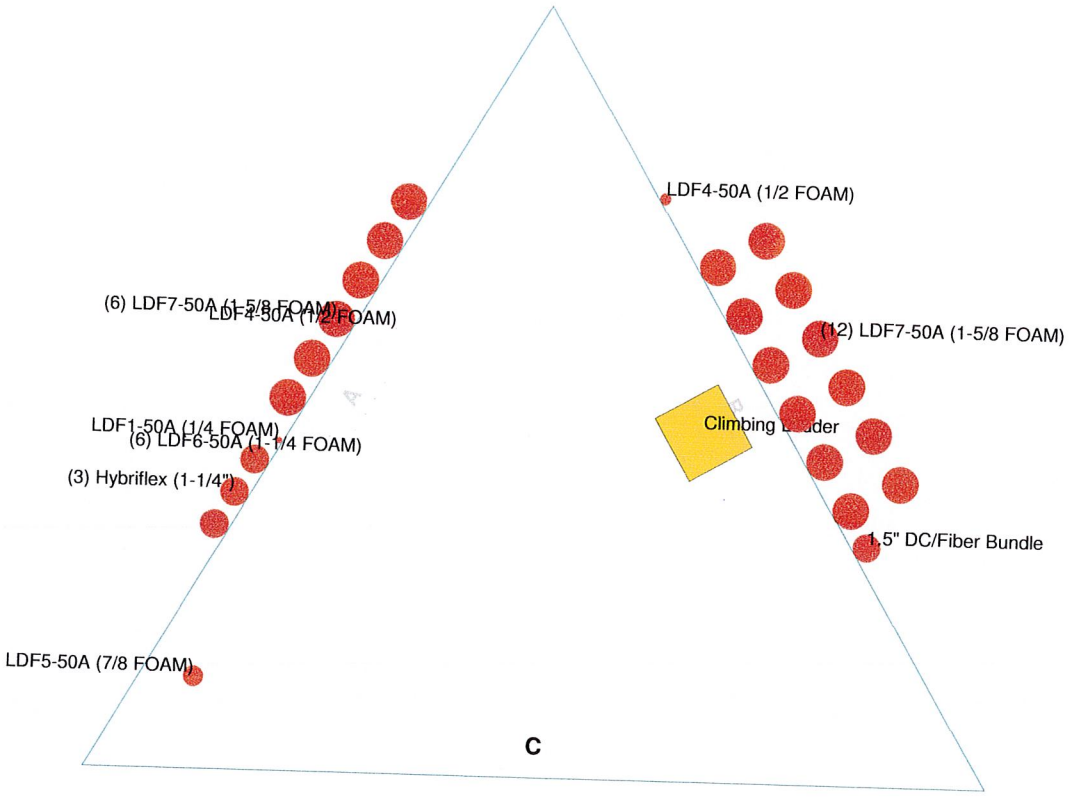
FAX: (330) 572-2101

Job: SNET020 NORFOLK			
Project: 2013723.01.SNET020.02			
Client: AT&T Mobility	Drawn by: imaham	App'd:	
Code: TIA/EIA-222-F	Date: 09/27/13	Scale: NTS	
Path: N:\2011\ATandT\SNET020\4 2013723.01 SNET020.02 AT&T rerun\TNX\SNET020 NORFOLK.eri		Dwg No. E-7	

Feed Line Plan

Round Flat App In Face App Out Face



GPD Group
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Akron, OH 44311
Phone: (330) 572-2100
FAX: (330) 572-2101

Job: SNET020 NORFOLK			
Project: 2013723.01.SNET020.02			
Client: AT&T Mobility	Drawn by: imaham	App'd:	
Code: TIA/EIA-222-F	Date: 09/27/13	Scale: NTS	
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APPENDIX D

Foundation Analysis

GPD GROUP

Guyed Tower Anchor Foundation TIA/EIA-222-F
SNET020 NORFOLK
2013723.01.SNET020.02

Guy Anchor Location	
Azimuth/Leg	*A/B/C*
Radius	*131'*

Tower Reactions	
Vertical	24.078 k
Horizontal	26.598 k

Anchor Block Geometry	
Width	5 ft
Height	5 ft
Length	12.5 ft
Depth	4.5 ft

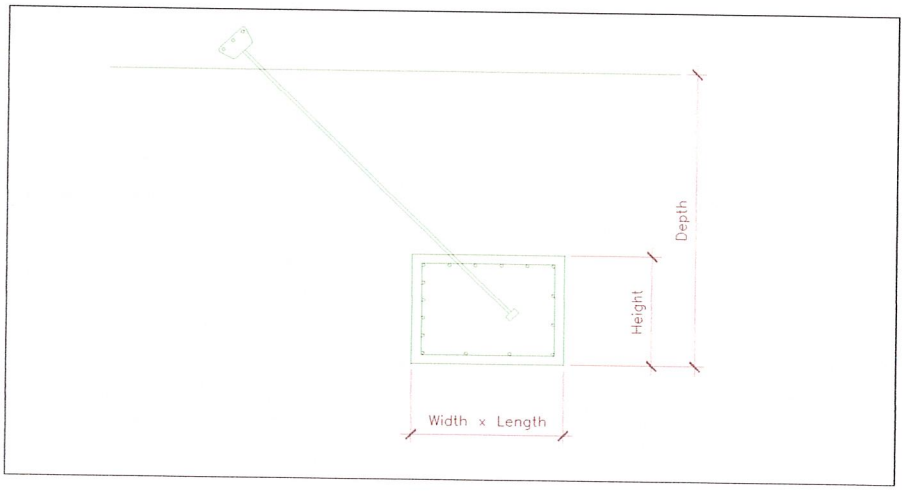
Soil Capacity Calcualtions		
W_s	-3.45 k	
W_c	42.19 k	
$(W_s+W_c)/1.5$	25.82 k	
$(W_s/2)+(W_c/1.25)$	32.02 k	
Uplift Resistance	25.82 k	
Horizontal Resistance	61.75 k	
Uplift Capacity=	93.2%	OK
Horizontal Capacity=	43.1%	OK

Anchor Block Reinformement	
Is Reinforcement Known?	no
	4
	60
	3
	# 8
	14
	# 8
	14
	# 8
	2

Capacity Summary		
Soil Capacity=	93.2%	OK
Controlling Capacity=	**93.2%**	**OK**

<--- Reinforcement capacity not verified

Soil Properties						
Layer	C, psf	∅, degrees	γ_{soil}, pcf	$\gamma_{concrete}$, pcf	μ	d, ft
1	0	0	120	150	0	2.5
2	2500	0	135	150	0.4	2.5
3						
4						
Add'l Horizontal Frictional Resistance (Ultimate)			0	k		



GPD GROUP

Guyed Tower Base Foundation
SNET020 NORFOLK
2013723.01.SNET020.02

Tower Reactions	
Axial	83.614 k
Shear	3.063 k
Pad & Pier Geometry	
Height	3.5 ft
Height above Grade	0.5 ft
Pad Width	4 ft
Pad Thickness	4 ft
Pier Shape	Square
Square Pier Width	4 ft

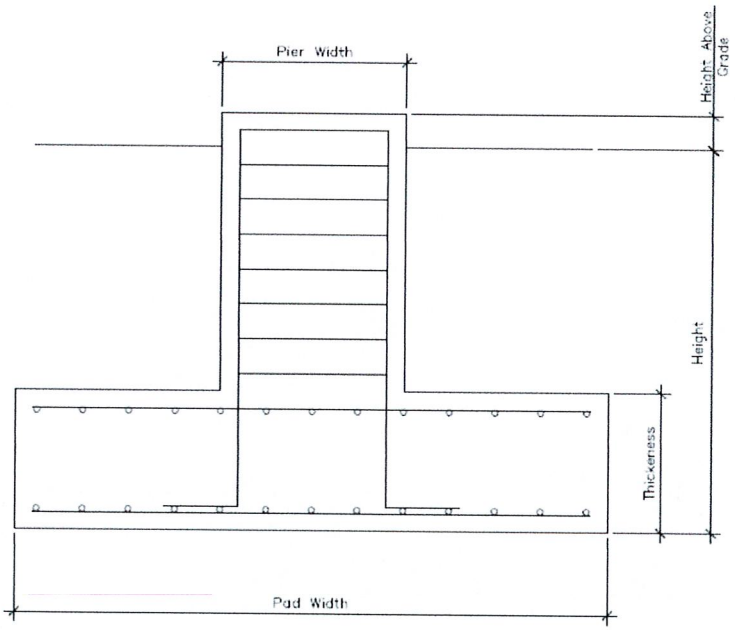
Pad & Pier Reinforcing	
F_c'	3 ksi
Clear Cover	3 in
Rebar Fy	60 ksi
Pad Rebar Size	# 8
Pad Rebar Quantity	6
Pier Rebar Size	
Pier Rebar Quantity	

Soil Properties	
Concrete Unit Weight	150 pcf
Soil Unit Weight	135 pcf
Bearing Type	Net
Allowable Bearing	7.5 ksf
Water Table Depth	99 ft

Bearing Capacity Calculations	
Vs	0.00 ft^3
Vc	64.00 ft^3
Ws	0.00 k
Wc	9.60 k
Q_{max}	6.97 ksf
Q_{max} @ 45°	7.45 ksf

Reinforcing Calculations		
Pad Moment Capacity		
Mu=	0.00 k-ft	
∅Mn=	225.77 k-ft	
Moment Capacity	0.0%	**OK**
Punching Shear		
Vu=	108.70 k	
ØVc=	2616.09 k	
Shear Capacity	4.2%	**OK**
Pier Compression		
Pu=	117.0596 k	
øPn=	#N/A k	
Compression Capacity	#N/A	**#N/A**

Overall Capacities		
Bearing Capacity	93.0%	**OK**
Reinforcement Capacity	4.2%	**OK**
Controlling Capacity	**93.0%**	**OK**



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

Calculated Radio Frequency Emissions

at&t

CT1006

(Norfolk)

402 Loon Meadow Drive, Norfolk, CT 06058

(a.k.a. 435 Loon Meadow Road)

June 10, 2013

Table of Contents

List of Tables

List of Figures

1. Introduction

The purpose of this report is to investigate compliance with applicable FCC regulations for the proposed modifications to the existing AT&T antenna arrays mounted on the guide wire tower located at 402 Loon Meadow Drive in Norfolk, CT. The coordinates of the tower are 42° 0' 32.00" N, 73° 10' 51.00" W.

AT&T is proposing the following modifications:

1) Install three multi-band (700/850/1900/2100 MHz) antennas for their LTE network (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 UMTS	*142*	*880*	*1*	*500*	*0.0089*	*0.5867*	*1.52%*
Cingular UMTS	*142*	*1900*	*1*	*500*	*0.0089*	*1.0000*	*0.89%*
Cingular GSM	*142*	*880*	*4*	*296*	*0.0211*	*0.5867*	*3.60%*
Cingular GSM	*142*	*1930*	*2*	*427*	*0.0152*	*1.0000*	*1.52%*
VoiceStream	123.5	1930			0.0169	1.0000	1.69%
PageNet	167	931.1875			0.0210	0.6208	3.38%
Sprint CDMA/LTE	152.4	1900	2	778	0.0241	1.0000	2.41%
Sprint CDMA/LTE	152.4	850	1	438	0.0068	0.5667	1.20%
AT&T UMTS	142	880	2	565	0.0020	0.5867	0.34%
AT&T UMTS	142	1900	2	875	0.0031	1.0000	0.31%
AT&T LTE	142	734	1	1313	0.0023	0.4893	0.48%
AT&T GSM	142	880	1	283	0.0005	0.5867	0.09%
AT&T GSM	142	1900	4	525	0.0037	1.0000	0.37%
						Total	**10.27%**

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 5/1/2013. 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. Blanks in Table 1 indicate omitted information in the CSC database.

[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 GPD Group Structural Analysis dated April 24, 2013.

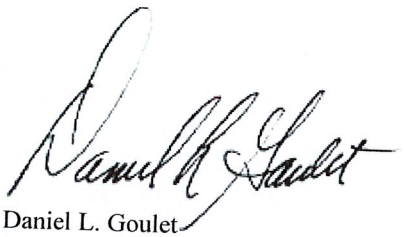
5. Conclusion

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 **10.27% of the FCC limit**.

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

6. Statement of Certification

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



Daniel L. Goulet
C Squared Systems, LLC

June 10, 2013
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.

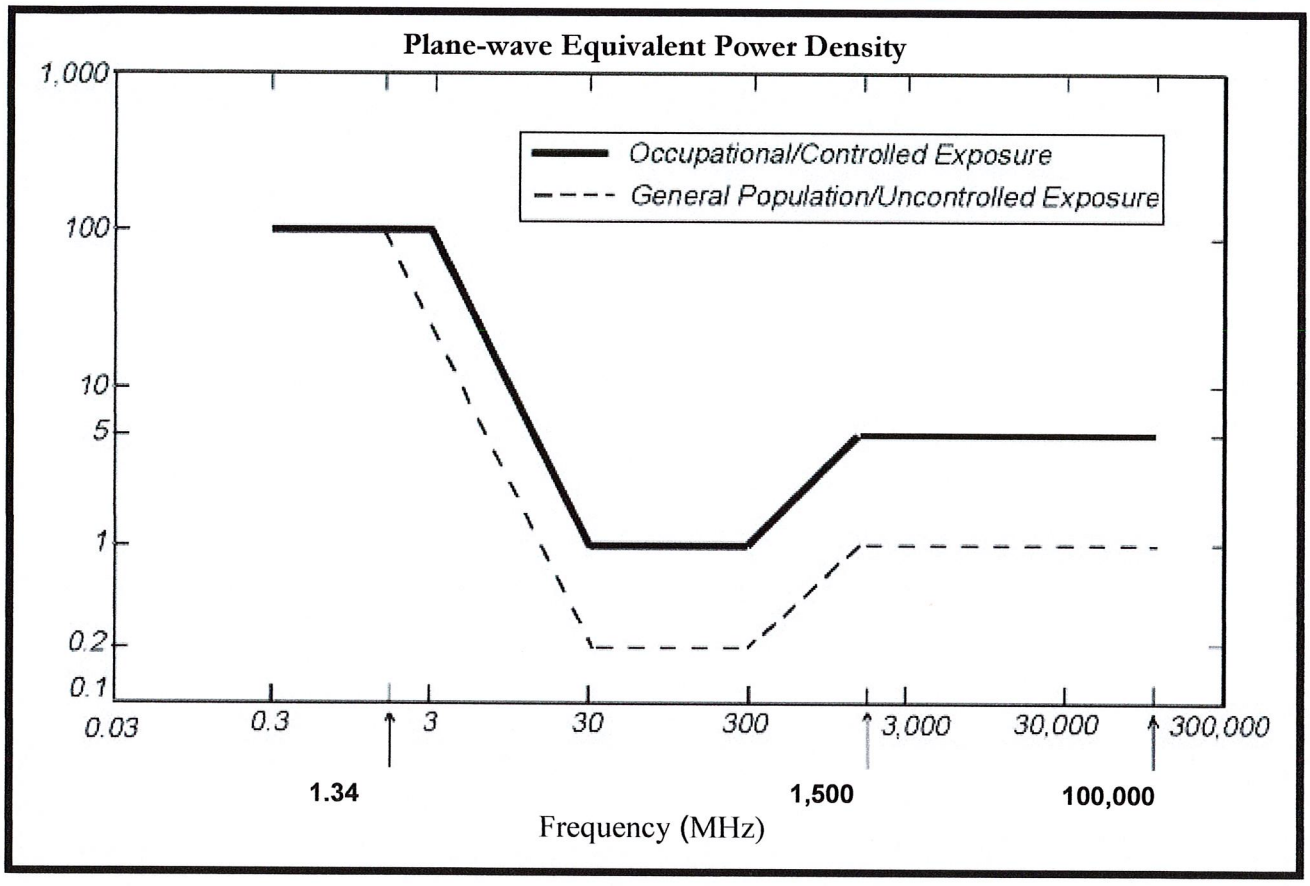
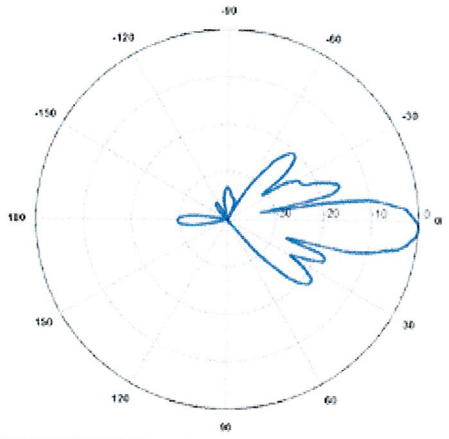


Figure 1: Graph of FCC Limits for Maximum Permissible Exposure (MPE)

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

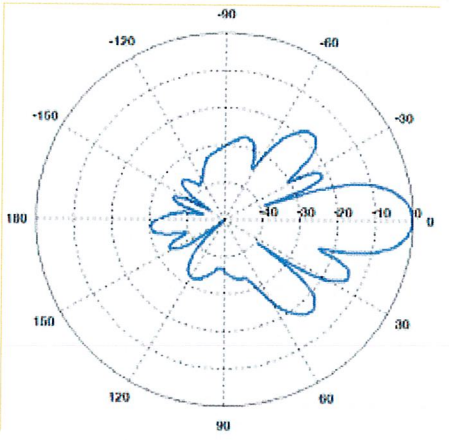
700 MHz

Manufacturer:	KMW Communications
Model #:	AM-X-CD-16-65-00T-RET
Frequency Band:	698-806 MHz
Gain:	13.4 dBd
Vertical Beamwidth:	12.3°
Horizontal Beamwidth:	65°
Polarization:	Dual Slant ± 45°
Size L x W x D:	72.0" x 11.8" x 5.9"



850 MHz

Manufacturer:	Powerwave
Model #:	7770
Frequency Band:	824-896 MHz
Gain:	11.5 dBd
Vertical Beamwidth:	15°
Horizontal Beamwidth:	82°
Polarization:	Dual Linear ± 45°
Size L x W x D:	55.0" x 11.0" x 5.0"



1900 MHz

Manufacturer:	Powerwave
Model #:	7770
Frequency Band:	1850-1990 MHz
Gain:	13.4 dBd
Vertical Beamwidth:	7°
Horizontal Beamwidth:	86°
Polarization:	Dual Linear ± 45°
Size L x W x D:	55.0" x 11.0" x 5.0"