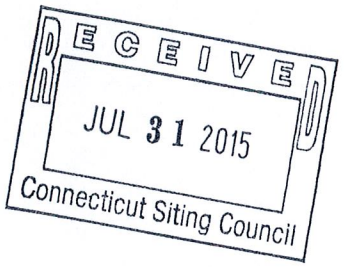
·T· · ·Mobile·

Please Reply To:
Sam Simons
35 Griffin Road South
Bloomfield, CT 06002
203-482-5156
Sam.Simons@T-Mobile.com

July 28, 2015

Attorney Melanie Bachman
Acting Executive Director
Connecticut Siting Council
Ten Franklin Square
New Britain, CT 06501



Re: **EM-TMOBILE-107-131226**
T-Mobile Site ID CT11083Q
700 Grassy Hill Road, Orange CT
Notice of Construction Completion

Dear Attorney Bachman:

The Connecticut Siting Council ("Council") acknowledged the above referenced T-Mobile Northeast LLC ("T-Mobile") notice of exempt modification on January 13, 2014.T-Mobile hereby notifies the Council that construction of the acknowledged modifications were complete as of December 4, 2015.

Please don't hesitate to contact me with any questions.

Sincerely,

Sam Simons

Samuel Simons, T-Mobile

cc: Mark Richard, T-Mobile

·T· · ·Mobile·

Please Reply To:
Sam Simons
35 Griffin Road South
Bloomfield, CT 06002
203-482-5156
Sam.Simons@T-Mobile.com

May 11, 2015

Attorney Melanie Bachman
Acting Executive Director
Connecticut Siting Council
Ten Franklin Square
New Britain, CT 06501

Re: EM-T-Mobile-107-131226
T-Mobile Site ID CT11083Q
700 Grassy Hill Road, Orange CT
Notice of Construction Completion

Dear Attorney Bachman:

The Connecticut Siting Council ("Council") acknowledged the above referenced T-Mobile Northeast LLC ("T-Mobile") notice of exempt modification on January 13, 2014. T-Mobile hereby notifies the Council that construction of the acknowledged modifications were complete as of September 16, 2014.

Please don't hesitate to contact me with any questions.

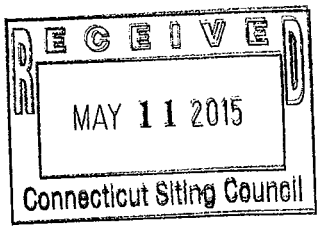
Sincerely,

Sam Simons

Samuel Simons, T-Mobile

cc: Mark Richard, T-Mobile

·T· · ·Mobile·



Please Reply To:
Sam Simons
35 Griffin Road South
Bloomfield, CT 06002
203-482-5156
Sam.Simons@T-Mobile.com

May 5, 2015

Attorney Melanie Bachman
Acting Executive Director
Connecticut Siting Council
Ten Franklin Square
New Britain, CT 06501

Re: **EM-T-MOBILE-107-131226**
T-Mobile Site ID CT11083Q
700 Grassy Hill Road, Orange CT
Notice of Construction Completion

Dear Attorney Bachman:

The Connecticut Siting Council ("Council") acknowledged the above referenced T-Mobile Northeast LLC ("T-Mobile") notice of exempt modification on January 13, 2014. T-Mobile hereby notifies the Council that construction of the acknowledged modifications were complete as of March 10, 2015.

Please don't hesitate to contact me with any questions.

Sincerely,

Sam Simons

Samuel Simons, T-Mobile

cc: Mark Richard, T-Mobile

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

January 13, 2014

Alex Giannaras
HPC Wireless Services
22 Shelter Rock Lane
Danbury, CT 06810

RE: **EM-T-MOBILE-107-131226** – T-Mobile Northeast LLC notice of intent to modify an existing telecommunications facility located at Grassy Hill Road, Orange, Connecticut.

Dear Mr. Giannaras:

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

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

The proposed modifications including the placement of all necessary equipment and shelters within the tower compound are to be implemented as specified here and in your notice dated December 23, 2013. The modifications are in compliance with the exception criteria in Section 16-50j-72 (b) of the Regulations of Connecticut State Agencies as changes to an existing facility site that would not increase tower height, extend the boundaries of the tower site, increase noise levels at the tower site boundary by six decibels, and increase the total radio frequencies electromagnetic radiation power density measured at the tower site boundary to or above the standard adopted by the State Department of Environmental Protection pursuant to General Statutes § 22a-162. This facility has also been carefully modeled to ensure that radio frequency emissions are conservatively below State and federal standards applicable to the frequencies now used on this tower.

This decision is under the exclusive jurisdiction of the Council. Please be advised that the validity of this action shall expire one year from the date of this letter. Any additional change to this facility will require explicit notice to this agency pursuant to Regulations of Connecticut State Agencies Section 16-50j-73. Such notice shall include all relevant information regarding the proposed change with cumulative worst-case modeling of radio frequency exposure at the closest point of uncontrolled access to the tower base, consistent with Federal Communications Commission, Office of Engineering and Technology, Bulletin 65. Thank you for your attention and cooperation.

Very truly yours,

Melanie A. Bachman
Acting Executive Director

MAB/RDM/jb

c: The Honorable James M. Zeoli, First Selectman, Town of Orange
Paul Dinice, Zoning Enforcement Officer, Town of Orange
Crown Castle

CSC
CONNECTICUT SITING COUNCIL

EM-T-MOBILE-107-131226

HPC Wireless Services
22 Shelter Rock Lane
Danbury, CT, 06810
P.: 203.797.1112

HPC WIRELESS SERVICES

ORIGINAL

December 23, 2013

VIA OVERNIGHT COURIER

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

Re: T-Mobile Northeast LLC – exempt modification
Grassy Hill Road, Orange, Connecticut

Dear Ms. Bachman:

This letter and attachments are submitted on behalf of T-Mobile Northeast LLC ("T-Mobile"). T-Mobile 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 R.C.S.A. Section 16-50j-73, 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 Orange.

T-Mobile plans to modify the existing wireless communications facility owned by Crown Castle and located at Grassy Hill Road in the Town of Orange (coordinates 41°-17'-7.69" N, 73°-02'-33.21" 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 T-Mobile'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. T-Mobile will replace three (3) of its six (6) existing panel antennas with new antennas at a center line of approximately 109' and will remove three (3) of six (6)

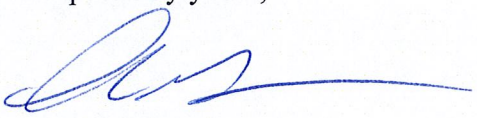
existing antennas. Three (3) of six (6) TMAs will be removed. A hybrid cable will be run from the equipment to the antenna along the existing coaxial cable run. The proposed modifications will not extend the height of the approximately 140' structure.

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

3. 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 EBI Consulting, T-Mobile's operations at the site will result in a power density of approximately 0.745%; the combined site operations will result in a total power density of approximately 54.695%.

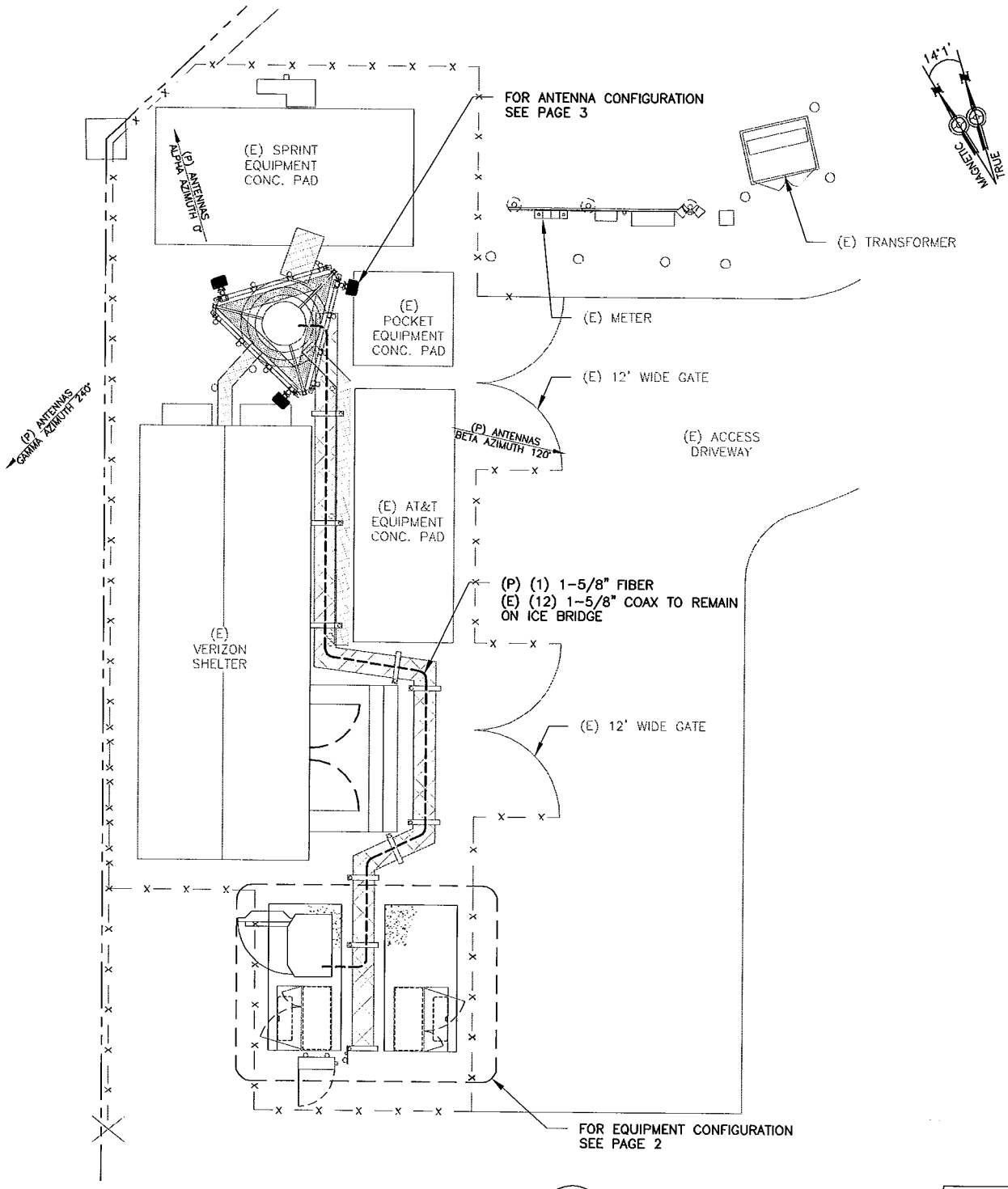
Please feel free to contact me by phone at (617) 281-0084 or by e-mail at agiannaras@hpcwireless.com with questions concerning this matter. Thank you for your consideration.

Respectfully yours,



Alex Giannaras

cc: Honorable James Zeoli, First Selectman, Town of Orange
Crown Castle (underlying property owner)



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.

1 / LE-1

CONFIGURATION

1B

SUBMITTALS	
LE REV A	09.10.13
LE REV 0	12.20.13

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

LEASE EXHIBIT

SITE NUMBER:
CT11083Q

SITE NAME:
CT083/SPRINT/GRASSY HILL

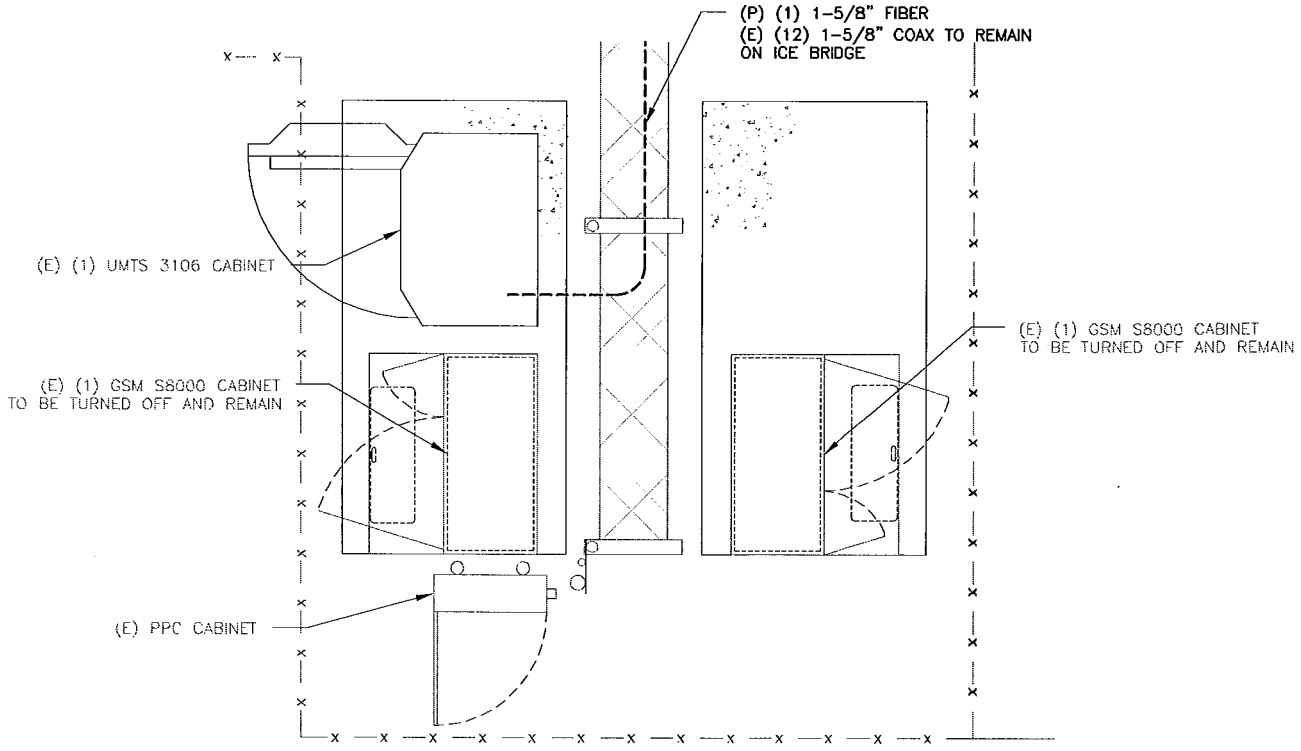
SITE ADDRESS:
700 GRASSY HILL RD.
ORANGE, CT 06477

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

DRAWN BY: MtH | CHECKED BY: SM



EQUIPMENT LAYOUT

N.T.S.

1
LE-2

CONFIGURATION
1B

SUBMITTALS	
LE REV A	09.10.13
LE REV 0	12.20.13

ATLANTIS GROUP
1340 Centre Street
Suite 203
Newton, MA 02459
Office: 617-965-0789
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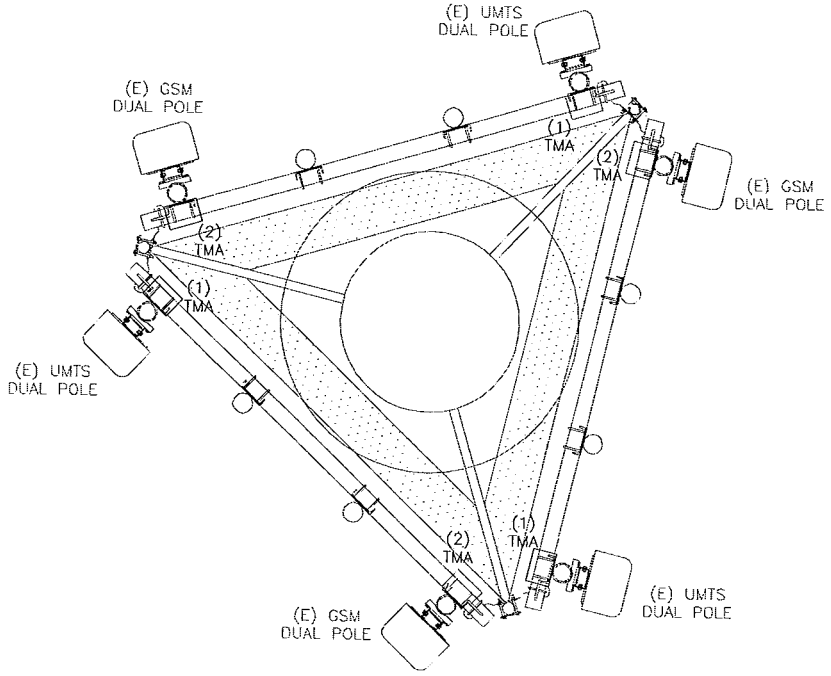
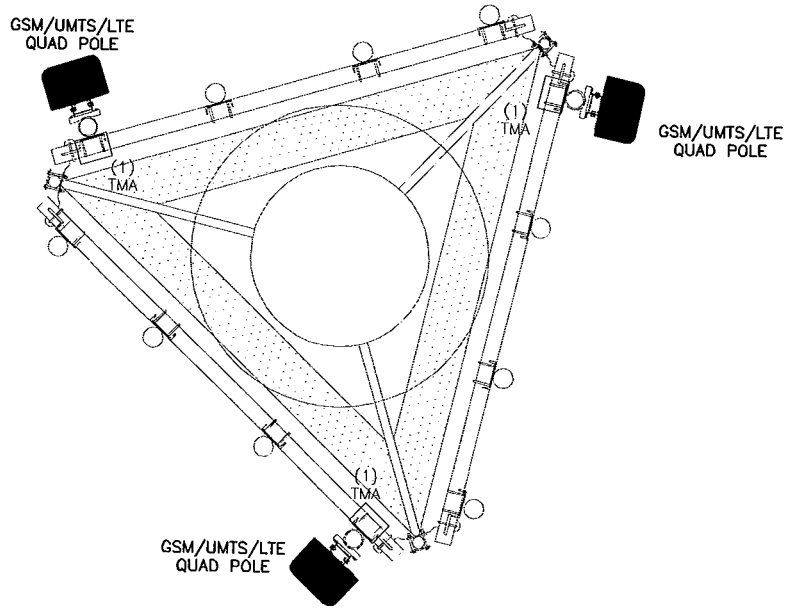
DRAWN BY: MtH | CHECKED BY: SM



EXISTING ANTENNA CONFIGURATION



PROPOSED ANTENNA CONFIGURATION

CONFIGURATION

1B

SUBMITTALS	
LE REV A	09.10.13
LE REV 0	12.20.13

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

LEASE EXHIBIT

SITE NUMBER:
CT11083Q

SITE NAME:
CT083/SPRINT/GRASSY HILL

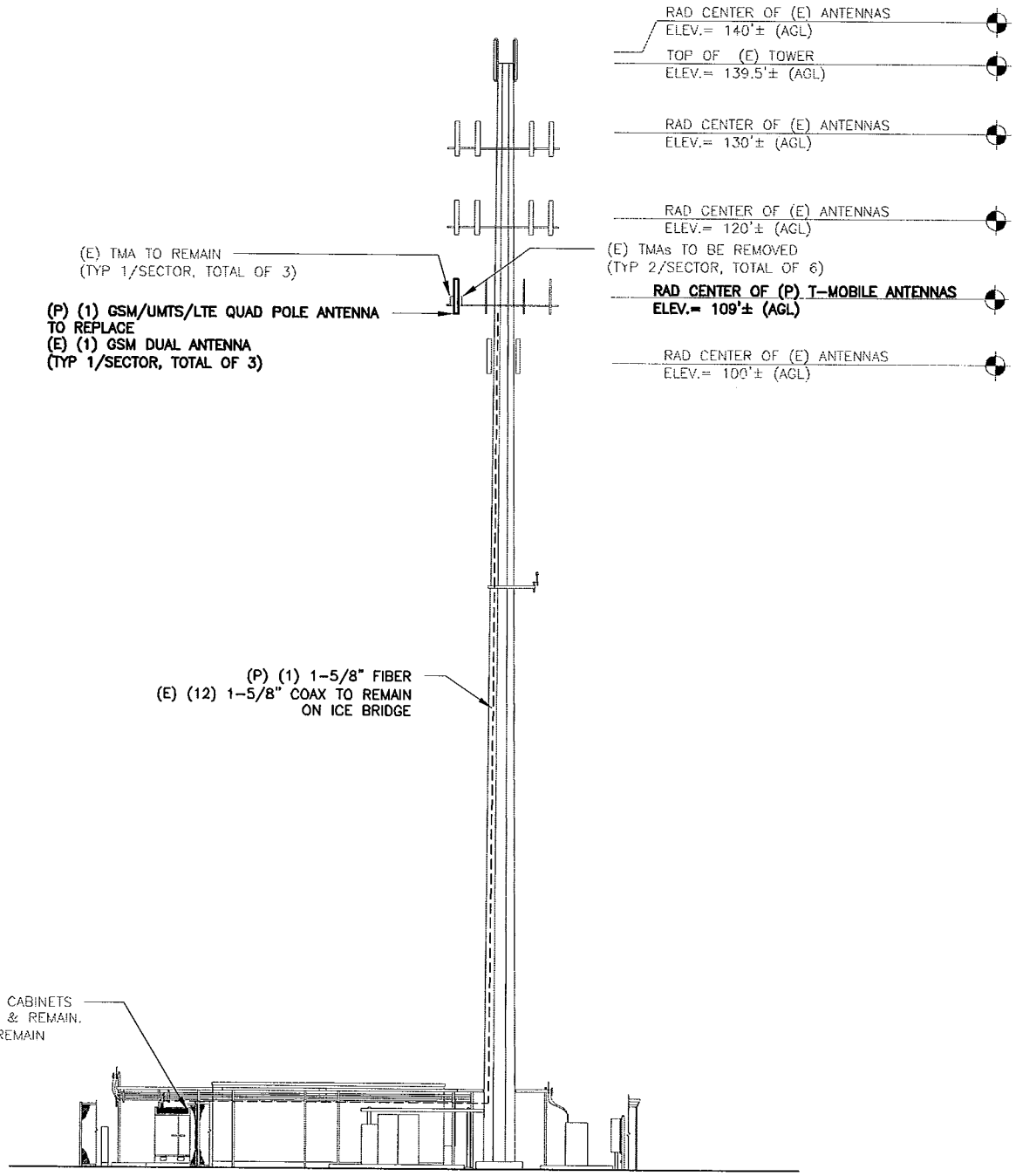
SITE ADDRESS:
700 GRASSY HILL RD.
ORANGE, CT 06477

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

DRAWN BY: MtH | CHECKED BY: SM



ELEVATION 1 / LE-4

N.T.S.

CONFIGURATION

1B

SUBMITTALS	
LE REV A	09.10.13
LE REV 0	12.20.13

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

LEASE EXHIBIT

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ORANGE, CT 06477

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(508) 434-5237

FOR

T-MOBILE NORTHEAST, LLC
35 GRIFFIN ROAD SOUTH
BLOOMFIELD, CT 06002
OFFICE: (860) 692-7100
FAX: (860) 692-7159

DRAWN BY: MtH | CHECKED BY: SM

Date: **December 12, 2013**

Jason Rouse
Crown Castle
3530 Toringdon Way, Suite 300
Charlotte, NC 28277
(704) 405-6605

Vertical Structures, Inc.
309 Spangler Drive, Suite E
Richmond, KY 40475
(859) 624-8360
csandlin@verticalstructures.com

Subject: **Structural Analysis Report**

Carrier Designation:	***T-Mobile* Change-Out**	
	Carrier Site Number:	CT11083Q
	Carrier Site Name:	N/A
Crown Castle Designation:	**Crown Castle BU Number:**	881541
	Crown Castle Site Name:	Rogers Property
	Crown Castle JDE Job Number:	243611
	Crown Castle Work Order Number:	685885
	Crown Castle Application Number:	198183 Rev. 6
Engineering Firm Designation:	**Vertical Structures, Inc. Project Number:**	2013-004-076
Site Data:	**Grassy Hill Road, Orange, CT, New Haven County** **Latitude *41° 17' 7.75"*, Longitude *-73° 2' 33.27"*** **139.5 Foot - Monopole Tower**	

Dear Jason Rouse,

Vertical Structures, Inc. is pleased to submit this **"Structural Analysis Report"** to determine the structural integrity of the above mentioned tower. This analysis has been performed in accordance with the Crown Castle Structural 'Statement of Work' and the terms of Crown Castle Purchase Order Number 600331.

The purpose of the analysis is to determine acceptability of the tower stress level. Based on our analysis we have determined the tower stress level for the structure and foundation, under the following load case, to be:

LC4.7: Modified Structure w/ Existing + Reserved + Proposed Equipment **Sufficient Capacity**
Note: See Table I and Table II for the proposed and existing/reserved loading, respectively.

The analysis has been performed in accordance with the TIA/EIA-222-F standard and the 2005 Connecticut State Building Code based upon a wind speed of 85 mph fastest mile.

All modifications and equipment proposed in this report shall be installed in accordance with the attached drawings for the determined available structural capacity to be effective.

We at *Vertical Structures, Inc.* appreciate the opportunity of providing our continuing professional services to you and Crown Castle. If you have any questions or need further assistance on this or any other projects please give us a call.

Respectfully submitted by:

Chris Sandlin, P.E.
Project Engineer

STATE OF CONNECTICUT
JOHN [illegible]
14220
REGISTERED
PROFESSIONAL ENGINEER
12/12/13

tnxTower Report - version 6.1.3.1

Date: **December 12, 2013**

Jason Rouse
Crown Castle
3530 Toringdon Way, Suite 300
Charlotte, NC 28277
(704) 405-6605

Vertical Structures, Inc.
309 Spangler Drive, Suite E
Richmond, KY 40475
(859) 624-8360
csandlin@verticalstructures.com

Subject: **Structural Analysis Report**

Carrier Designation:	***T-Mobile* Change-Out**	
	Carrier Site Number:	CT11083Q
	Carrier Site Name:	N/A
Crown Castle Designation:	**Crown Castle BU Number:**	881541
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We at *Vertical Structures, Inc.* appreciate the opportunity of providing our continuing professional services to you and Crown Castle. If you have any questions or need further assistance on this or any other projects please give us a call.

Respectfully submitted by:

Chris Sandlin, P.E.
Project Engineer

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 139.5 ft Monopole tower designed by EEI in 2004. The tower was originally designed for a wind speed of 90 mph per TIA/EIA-222-F. For the purpose of this analysis, the modifications detailed in B&T Project No. 88674.001.01 are considered complete.

2) ANALYSIS CRITERIA

The structural analysis was performed for this tower in accordance with the requirements of TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a fastest mile wind speed of 85 mph with no ice and 50 mph under service loads. Also, per Crown Castle's direction and in accordance with ASCE-7-05 we have considered a fastest mile wind speed of 38 mph with an escalating 0.75 inch ice thickness.

Table 1 - Proposed Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
108.0	109.0	3	ericsson	AIR 21 B2A B4P w/ Mount Pipe	1	1 5/8	
		3	ericsson	KRY 112 144/1 TMA			

Table 2 - Existing and Reserved Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
136.0	140.0	3	ericsson	RRUS-11 BTS	1 2 6	5/8 3/8 1 5/8	1
		3	kathrein	800 10121 w/ mount pipe			
		6	powerwave technologies	LGP21401 TMA			
		3	powerwave technologies	P65-16-XLH-RR w/ Mount Pipe			
		1	raycap	DC6-48-60-18-8F			
	136.0	1		T-Arm Mount [TA 702-3]			
130.0	134.0	1	andrew	VHLP2-11	3 3	1/2 5/16	1
	132.0	3	argus technologies	LLPX310R w/ Mount Pipe			
		1	dragonwave	A-ANT-23G-2-C			
		3	samsung telecommunications	FDD_R6_RRH TMA			
	130.0	1		12' (4" Tube) T-Arm (3)			
		3	alcatel lucent	800 External Notch Filter	3	1 1/4	2
		9	celwave	ACU-A20-N Diplexer			
		3	celwave	APXVSPP18-C-A20 w/ Mount Pipe			
		6	css	CSS-XS4-65-R w/ Mount Pipe	6	1 1/4	1

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
128.0	128.0	1		Side Arm Mount [SO 102-3]			2
		3	alcatel lucent	1900MHz RRH (65MHz) TMA			
		3	alcatel lucent	800MHZ RRH TMA			
124.0	124.0	1			6	1 5/8	1
120.0	120.0	1		Side Arm Mount [SO 102-1]			2
		1	rfs celwave	TMA-DB-T1-6Z-8AB-0Z w/ Mount Pipe			
118.0	118.0	1		T-Arm Mount [TA 602-3]			1
		3	alcatel lucent	RRH2X40-AWS BTS	1	1 5/8	2
		3	antel	BXA-171063-8BF-EDIN-0 w/ Mount Pipe			
		3	antel	BXA-70063-6CF-EDIN-0 w/ Mount Pipe			
		6	celwave	FD9R6004/2C-3L Diplexer	12	1 5/8	1
		6	decibel	DB846F65ZAXY w/Mount Pipe			
		3	rymsa	MG D3-800Tx w/ Mount Pipe			
108.0	109.0	3	ems wireless	RR90-17-02DP w/ Mount Pipe			3
		6	ericsson	KRY 112 71 TMA			
		3	rfs	APXV18-206516S-C-A20 w/ Mount Pipe			
		3	rfs	ATMAA1412D-1A20 TMA			
	108.0	1		T-Arm Mount [TA 602-3]	12	1 5/8	1
100.0	100.0	3	celwave	APXV18-206517-C w/Mount Pipe	6	1 5/8	1
75.0	77.0	1	lucent	KS24019-L112A	1	1/2	1
	75.0	1		Side Arm Mount [SO 701-1]			

Notes:
1) Existing Equipment
2) Reserved Equipment
3) Equipment To Be Removed

Table 3 - Design Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
140	140	12	dapa	48000		
		1	eei	Low Profile Platform		
130	130	12	dapa	48000		
		1	eei	Low Profile Platform		
120	120	12	dapa	48000		
		1	eei	Low Profile Platform		
110	110	12	dapa	48000		
		1	eei	Low Profile Platform		
100	100	12	dapa	48000		
		1	eei	Low Profile Platform		
75	75	1		GPS		

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
Online Application	T-Mobile Change-Out Revision #6	198183	CCIsites
Tower Drawing	EEI Drawing No. GS55077	2207700	CCIsites
Foundation Drawing	EEI Drawing No. 12364-140	2208511	CCIsites
Geotechnical Report	Clarence Welti Assoc., Inc. Report Dated 'February 16, 2004'	2245154	CCIsites
Rework Drawings	B&T Project No. 88674.001.01	4024239	CCIsites

3.1) Analysis Method

tnxTower (version 6.1.3.1), 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 A. Crown Castle's CCIplate 1.5 analysis tool was used to evaluate the anchor bolts, base plate, and any flange splices.

3.2) 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 specification.
3) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.
4) When applicable, transmission cables are considered as structural components for calculating wind loads as allowed by TIA/EIA-222-F.

This analysis may be affected if any assumptions are not valid or have been made in error. Vertical Structures, Inc. should be notified to determine the effect on the structural integrity of the tower.

4) ANALYSIS RESULTS

Table 5 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (lb)	SF*P_allow (lb)	% Capacity	Pass / Fail
L1	139.5 - 93.04	Pole	TP26.99x15.5x0.25	1	-7969.33	1063078.12	91.3	Pass
L2	93.04 - 46.38	Pole	TP37.91x25.5205x0.375	2	-17069.60	2242999.02	90.2	Pass
L3	46.38 - 0	Pole	TP48.5x35.874x0.375	3	-26695.30	2756230.66	97.2	Pass
							Summary	
						Pole (L3)	97.2	Pass
						Rating =	97.2	Pass

Table 6 - Tower Component Stresses vs. Capacity - LC4.7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	75.4	Pass
1	Base Plate	0	72.8	Pass
1	Base Foundation Soil Interaction	0	86.8	Pass

Structure Rating (max from all components) =	**97.2%**

Notes:
1) See additional documentation in "Appendix C – Additional Calculations" for calculations supporting the % capacity.
2) Capacities up to 105% are considered acceptable based on analysis methods used.

4.1) Recommendations

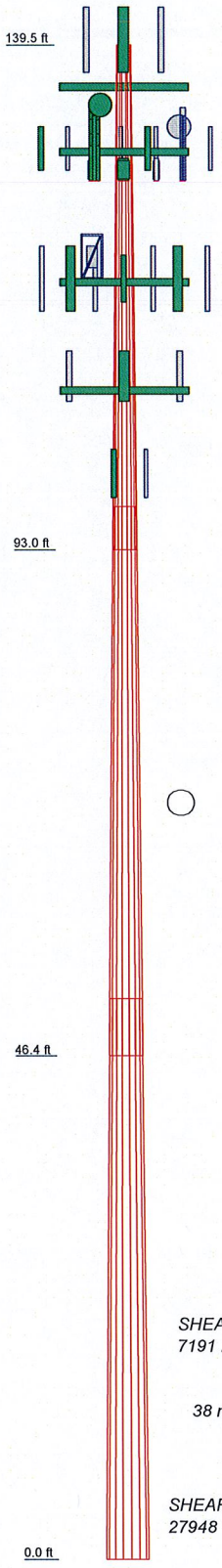
Perform the modifications detailed in B&T Project No. 88674.001.01.

APPENDIX A

TNXTOWER OUTPUT

Section	1	2	3
Length (ft)	46.46	50.58	51.63
Number of Sides	18	18	18
Thickness (in)	0.2500	0.3750	0.3750
Socket Length (ft)	3.92	5.25	
Top Dia (in)	15.5000	25.5205	35.8740
Bot Dia (in)	26.9900	37.9100	48.5000
Grade		A572-65	
Weight (lb)	2633.8	6420.3	8743.3

Total Weight: 17797.4

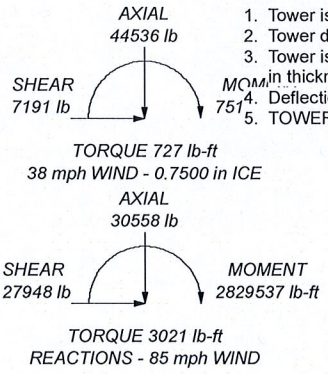


DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
T-Arm Mount [TA 702-3]	136	TMA-DB-T1-6Z-8AB-0Z w/ Mount Pipe	120
800 10121 w/ mount pipe	136	(2) DB846F65ZAXY w/Mount Pipe	118
800 10121 w/ mount pipe	136	(2) DB846F65ZAXY w/Mount Pipe	118
800 10121 w/ mount pipe	136	MG D3-800Tx w/ Mount Pipe	118
P65-16-XLH-RR w/ Mount Pipe	136	MG D3-800Tx w/ Mount Pipe	118
P65-16-XLH-RR w/ Mount Pipe	136	MG D3-800Tx w/ Mount Pipe	118
P65-16-XLH-RR w/ Mount Pipe	136	(2) FD9R6004/2C-3L Diplexer	118
RRUS-11 BTS	136	(2) FD9R6004/2C-3L Diplexer	118
RRUS-11 BTS	136	(2) FD9R6004/2C-3L Diplexer	118
RRUS-11 BTS	136	BXA-171063-8BF-EDIN-0 w/ Mount Pipe	118
DC6-48-60-18-8F	136		
(2) LGP21401 TMA (VSI)	136	BXA-171063-8BF-EDIN-0 w/ Mount Pipe	118
(2) LGP21401 TMA (VSI)	136		
(2) LGP21401 TMA (VSI)	136	BXA-171063-8BF-EDIN-0 w/ Mount Pipe	118
12' (4" Tube) T-Arm (3)	130		
APXVSPP18-C-A20 w/ Mount Pipe	130	BXA-70063-6CF-EDIN-0 w/ Mount Pipe	118
APXVSPP18-C-A20 w/ Mount Pipe	130		
APXVSPP18-C-A20 w/ Mount Pipe	130	BXA-70063-6CF-EDIN-0 w/ Mount Pipe	118
800 External Notch Filter	130		
800 External Notch Filter	130	BXA-70063-6CF-EDIN-0 w/ Mount Pipe	118
800 External Notch Filter	130	RRH2X40-AWS BTS	118
(3) ACU-A20-N Diplexer	130	RRH2X40-AWS BTS	118
(3) ACU-A20-N Diplexer	130	RRH2X40-AWS BTS	118
(3) ACU-A20-N Diplexer	130	T-Arm Mount [TA 602-3]	118
(2) CSS-XS4-65-R w/ Mount Pipe (VSI)	130	(2) DB846F65ZAXY w/Mount Pipe	118
(2) CSS-XS4-65-R w/ Mount Pipe (VSI)	130	AIR 21 B2A B4P w/ Mount Pipe (T-Mobile)	108
(2) CSS-XS4-65-R w/ Mount Pipe (VSI)	130	AIR 21 B2A B4P w/ Mount Pipe (T-Mobile)	108
LLPX310R w/ Mount Pipe	130	KRY 112 144/1 TMA (VSI) (T-Mobile)	108
LLPX310R w/ Mount Pipe	130	KRY 112 144/1 TMA (VSI) (T-Mobile)	108
LLPX310R w/ Mount Pipe	130	KRY 112 144/1 TMA (VSI) (T-Mobile)	108
FDD_R6_RRH TMA	130	(3) 7'x2" Antenna Mount Pipe (T-Mobile)	108
FDD_R6_RRH TMA	130	(3) 7'x2" Antenna Mount Pipe (T-Mobile)	108
FDD_R6_RRH TMA	130	(3) 7'x2" Antenna Mount Pipe (T-Mobile)	108
6'x4" Pipe Mount	130		
6'x4" Pipe Mount	130	T-Arm Mount [TA 602-3] (T-Mobile)	108
A-ANT-23G-2-C (VSI)	130	AIR 21 B2A B4P w/ Mount Pipe (T-Mobile)	108
VHLP2-11	130		
1900MHz RRH (65MHz) TMA	128	APXV18-206517-C w/Mount Pipe	100
1900MHz RRH (65MHz) TMA	128	APXV18-206517-C w/Mount Pipe	100
800MHZ RRH TMA	128	APXV18-206517-C w/Mount Pipe	100
800MHZ RRH TMA	128	Side Arm Mount [SO 701-1]	75
800MHZ RRH TMA	128	KS24019-L112A	75
Side Arm Mount [SO 102-3]	128		
1900MHz RRH (65MHz) TMA	128		
Side Arm Mount [SO 102-1]	120		

MATERIAL STRENGTH

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



TOWER DESIGN NOTES

1. Tower is located in New Haven 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.
5. TOWER RATING: 97.2%

Vertical Structures, Inc.
309 Spangler Drive, Suite E
Richmond, KY 40475
Phone: (859) 624-8360
FAX: (859) 624-9369

Job: Rogers Property, CT BU#881541			
Project: Vertical Structures Job No. 2013-004-076			
Client: Crown Castle	Drawn by: Chris Sandlin	App'd:	
Code: TIA/EIA-222-F	Date: 12/12/13	Scale: NTS	
Path: \\NAS11\CSandlin\Open\2013-004-076-Rogers Property CT\TNX\881541.eri		Dwg No. E-1	

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 New Haven County, Connecticut.
Basic wind speed of 85 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 38 mph is used in combination with ice.
Temperature drop of 50 °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

Consider Moments - Legs	Distribute Leg Loads As Uniform	Treat Feedline Bundles As Cylinder
Consider Moments - Horizontals	Assume Legs Pinned	Use ASCE 10 X-Brace Ly Rules
Consider Moments - Diagonals	√ Assume Rigid Index Plate	√ Calculate Redundant Bracing Forces
Use Moment Magnification	√ Use Clear Spans For Wind Area	Ignore Redundant Members in FEA
√ Use Code Stress Ratios	√ Use Clear Spans For KL/r	√ SR Leg Bolts Resist Compression
√ Use Code Safety Factors - Guys	Retension Guys To Initial Tension	√ All Leg Panels Have Same Allowable
√ Escalate Ice	√ Bypass Mast Stability Checks	Offset Girt At Foundation
Always Use Max Kz	√ Use Azimuth Dish Coefficients	√ Consider Feedline Torque
Use Special Wind Profile	√ Project Wind Area of Appurt.	Include Angle Block Shear Check
√ Include Bolts In Member Capacity	√ Autocalc Torque Arm Areas	Poles
√ Leg Bolts Are At Top Of Section	√ SR Members Have Cut Ends	Include Shear-Torsion Interaction
√ Secondary Horizontal Braces Leg	Sort Capacity Reports By Component	Always Use Sub-Critical Flow
Use Diamond Inner Bracing (4 Sided)	√ Triangulate Diamond Inner Bracing	Use Top Mounted Sockets
Add IBC .6D+W Combination	Use TIA-222-G Tension Splice Capacity Exemption	

Tapered Pole Section Geometry

Section	*Elevation*	*Section Length*	*Splice Length*	*Number of Sides*	*Top Diameter*	*Bottom Diameter*	*Wall Thickness*	*Bend Radius*	*Pole Grade*
	ft	*ft*	*ft*		*in*	*in*	*in*	*in*	
L1	139.50-93.04	46.46	3.92	18	15.5000	26.9900	0.2500	1.0000	A572-65 (65 ksi)
L2	93.04-46.38	50.58	5.25	18	25.5205	37.9100	0.3750	1.5000	A572-65 (65 ksi)
L3	46.38-0.00	51.63		18	35.8740	48.5000	0.3750	1.5000	A572-65 (65 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	15.7391	12.1009	355.5445	5.4138	7.8740	45.1542	711.5567	6.0516	2.2880	9.152
	27.4064	21.2182	1916.7638	9.4927	13.7109	139.7983	3836.0497	10.6111	4.3102	17.241
L2	26.8892	29.9295	2390.8862	8.9267	12.9644	184.4188	4784.9184	14.9676	3.8316	10.218
	38.4948	44.6760	7952.1562	13.3249	19.2583	412.9214	15914.7760	22.3423	6.0122	16.032
L3	37.7311	42.2527	6727.0540	12.6022	18.2240	369.1315	13462.9597	21.1304	5.6538	15.077
	49.2482	57.2808	16760.5346	17.0844	24.6380	680.2717	33543.1232	28.6458	7.8760	21.003

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in
L1 139.50-93.04				1	1	1		
L2 93.04-46.38				1	1	1		
L3 46.38-0.00				1	1	1		

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
LDF7-50A (1-5/8 FOAM)	B	No	Inside Pole	139.50 - 0.00	6	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
						1" Ice	0.00	0.82
						2" Ice	0.00	0.82
						4" Ice	0.00	0.82
FB-L98-002-XXX (3/8")	B	No	Inside Pole	139.50 - 0.00	2	No Ice	0.00	0.10
						1/2" Ice	0.00	0.10
						1" Ice	0.00	0.10
						2" Ice	0.00	0.10
						4" Ice	0.00	0.10
WR-VG86ST-BRD (Power Cable)	B	No	Inside Pole	139.50 - 0.00	1	No Ice	0.00	0.15
						1/2" Ice	0.00	0.15
						1" Ice	0.00	0.15
						2" Ice	0.00	0.15
						4" Ice	0.00	0.15
LDF4-50A (1/2 FOAM)	B	No	Inside Pole	132.00 - 0.00	1	No Ice	0.00	0.15
						1/2" Ice	0.00	0.15
						1" Ice	0.00	0.15
						2" Ice	0.00	0.15
						4" Ice	0.00	0.15
LDF4-50A (1/2 FOAM)	B	No	CaAa (Out Of Face)	132.00 - 0.00	2	No Ice	0.00	0.15
						1/2" Ice	0.00	0.84
						1" Ice	0.00	2.14
						2" Ice	0.00	6.58
						4" Ice	0.00	22.78
9207(5/16")	B	No	Inside Pole	132.00 - 0.00	3	No Ice	0.00	0.06
						1/2" Ice	0.00	0.06
						1" Ice	0.00	0.06
						2" Ice	0.00	0.06
						4" Ice	0.00	0.06
2" Rigid Conduit	B	No	CaAa (Out Of	132.00 - 0.00	2	No Ice	0.10	2.80

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
			Face)			1/2" Ice	0.15	4.33
						1" Ice	0.20	6.47
						2" Ice	0.30	12.57
						4" Ice	0.50	32.12
LDF6-50A (1-1/4 FOAM)	B	No	Inside Pole	130.00 - 0.00	6	No Ice	0.00	0.66
						1/2" Ice	0.00	0.66
						1" Ice	0.00	0.66
						2" Ice	0.00	0.66
						4" Ice	0.00	0.66
HB114-1-0813U4-M5J (1-1/4")	B	No	CaAa (Out Of Face)	130.00 - 0.00	3	No Ice	0.05	0.66
						1/2" Ice	0.08	1.91
						1" Ice	0.12	3.76
						2" Ice	0.18	9.31
						4" Ice	0.32	27.73
LDF7-50A (1-5/8 FOAM)	B	No	Inside Pole	124.00 - 0.00	6	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
						1" Ice	0.00	0.82
						2" Ice	0.00	0.82
						4" Ice	0.00	0.82
561 (1-5/8 AIR)	B	No	Inside Pole	118.00 - 0.00	12	No Ice	0.00	1.35
						1/2" Ice	0.00	1.35
						1" Ice	0.00	1.35
						2" Ice	0.00	1.35
						4" Ice	0.00	1.35
HB158-1-08U8-S8J18 (1 5/8")	B	No	CaAa (Out Of Face)	118.00 - 0.00	1	No Ice	0.20	0.80
						1/2" Ice	0.30	2.31
						1" Ice	0.40	4.44
						2" Ice	0.60	10.52
						4" Ice	1.00	30.02
LDF7-50A (1-5/8 FOAM) (T-Mobile)	B	No	Inside Pole	109.00 - 0.00	12	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
						1" Ice	0.00	0.82
						2" Ice	0.00	0.82
						4" Ice	0.00	0.82
MLE Hybrid 9Power/18Fiber RL 2 (1.625" Cable) (T-Mobile)	B	No	CaAa (Out Of Face)	109.00 - 0.00	1	No Ice	0.16	0.63
						1/2" Ice	0.26	1.92
						1" Ice	0.36	3.83
						2" Ice	0.56	9.48
						4" Ice	0.96	28.11
LDF7-50A (1-5/8 FOAM)	B	No	Inside Pole	100.00 - 0.00	6	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
						1" Ice	0.00	0.82
						2" Ice	0.00	0.82
						4" Ice	0.00	0.82
LDF4-50A (1/2 FOAM)	B	No	Inside Pole	77.00 - 0.00	1	No Ice	0.00	0.15
						1/2" Ice	0.00	0.15
						1" Ice	0.00	0.15
						2" Ice	0.00	0.15
						4" Ice	0.00	0.15

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight lb
L1	139.50-93.04	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	21.019	1485.02
		C	0.000	0.000	0.000	0.000	0.00

Tower Section	Tower Elevation ft	Face	A_R ft²	A_F ft²	C_AA_A In Face ft²	C_AA_A Out Face ft²	Weight lb
L2	93.04-46.38	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	33.338	2558.99
		C	0.000	0.000	0.000	0.000	0.00
L3	46.38-0.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	33.138	2546.03
		C	0.000	0.000	0.000	0.000	0.00

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft²	A_F ft²	C_AA_A In Face ft²	C_AA_A Out Face ft²	Weight lb
L1	139.50-93.04	A	0.871	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	41.368	2267.84
		C		0.000	0.000	0.000	0.000	0.00
L2	93.04-46.38	A	0.819	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	65.844	3641.96
		C		0.000	0.000	0.000	0.000	0.00
L3	46.38-0.00	A	0.750	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	63.537	3543.74
		C		0.000	0.000	0.000	0.000	0.00

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	139.50-93.04	0.5067	0.2925	0.7902	0.4562
L2	93.04-46.38	0.7330	0.4232	1.1602	0.6698
L3	46.38-0.00	0.7733	0.4465	1.2514	0.7225

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft Vert ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft²	C_AA_A Side ft²	Weight lb
T-Arm Mount [TA 702-3]	A	None		0.0000	136.00	No Ice	5.64	5.64	339.00
						1/2" Ice	6.55	6.55	429.00
						1" Ice	7.46	7.46	519.00
						2" Ice	9.28	9.28	699.00
						4" Ice	12.92	12.92	1059.00
800 10121 w/ mount pipe	A	From Centroid-Face	4.00 0.00 4.00	10.0000	136.00	No Ice	5.80	4.71	66.00
						1/2" Ice	6.34	5.56	114.74
						1" Ice	6.86	6.28	169.92
						2" Ice	7.94	7.81	302.91

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
800 10121 w/ mount pipe	B	From Centroid-Face	4.00 0.00 4.00	0.0000	136.00	4" Ice No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	10.23 5.80 6.34 6.86 7.94 10.23	11.23 4.71 5.56 6.28 7.81 11.23	689.93 66.00 114.74 169.92 302.91 689.93
800 10121 w/ mount pipe	C	From Centroid-Face	4.00 0.00 4.00	-10.0000	136.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.80 6.34 6.86 7.94 10.23	4.71 5.56 6.28 7.81 11.23	66.00 114.74 169.92 302.91 689.93
P65-16-XLH-RR w/ Mount Pipe	A	From Centroid-Face	4.00 0.00 4.00	30.0000	136.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.88 9.63 10.36 11.75 14.66	6.60 7.88 9.00 10.93 15.02	82.20 150.58 227.07 408.37 921.72
P65-16-XLH-RR w/ Mount Pipe	B	From Centroid-Face	4.00 0.00 4.00	30.0000	136.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.88 9.63 10.36 11.75 14.66	6.60 7.88 9.00 10.93 15.02	82.20 150.58 227.07 408.37 921.72
P65-16-XLH-RR w/ Mount Pipe	C	From Centroid-Face	4.00 0.00 4.00	30.0000	136.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.88 9.63 10.36 11.75 14.66	6.60 7.88 9.00 10.93 15.02	82.20 150.58 227.07 408.37 921.72
RRUS-11 BTS	A	From Centroid-Face	4.00 0.00 4.00	30.0000	136.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.42 4.71 5.00 5.61 6.94	1.19 1.35 1.53 1.90 2.75	55.00 80.77 109.98 179.45 368.09
RRUS-11 BTS	B	From Centroid-Face	4.00 0.00 4.00	30.0000	136.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.42 4.71 5.00 5.61 6.94	1.19 1.35 1.53 1.90 2.75	55.00 80.77 109.98 179.45 368.09
RRUS-11 BTS	C	From Centroid-Face	4.00 0.00 4.00	30.0000	136.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.42 4.71 5.00 5.61 6.94	1.19 1.35 1.53 1.90 2.75	55.00 80.77 109.98 179.45 368.09
DC6-48-60-18-8F	C	From Centroid-Face	4.00 0.00 4.00	30.0000	136.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.57 2.80 3.04 3.54 4.66	4.32 4.60 4.88 5.49 6.80	18.90 50.21 85.17 166.87 382.77
(2) LGP21401 TMA (VSI)	A	From Centroid-Face	4.00 0.00 4.00	10.0000	136.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.29 1.45 1.61 1.97 2.79	0.36 0.48 0.60 0.87 1.52	14.10 21.26 30.32 54.89 135.29
(2) LGP21401 TMA (VSI)	B	From Centroid-Face	4.00 0.00 4.00	0.0000	136.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.29 1.45 1.61 1.97 2.79	0.36 0.48 0.60 0.87 1.52	14.10 21.26 30.32 54.89 135.29
(2) LGP21401 TMA (VSI)	C	From	4.00	-10.0000	136.00	No Ice	1.29	0.36	14.10

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
		Centroid-Face	0.00 4.00			1/2" Ice 1" Ice 2" Ice 4" Ice	1.45 1.61 1.97 2.79	0.48 0.60 0.87 1.52	21.26 30.32 54.89 135.29
**									
12' (4" Tube) T-Arm (3)	C	None		0.0000	130.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	13.50 16.71 19.92 26.34 39.18	13.50 16.71 19.92 26.34 39.18	600.00 750.00 900.00 1200.00 1800.00
APXVSPP18-C-A20 w/ Mount Pipe	A	From Centroid-Face	4.75 2.75 0.00	10.0000	130.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.50 9.15 9.77 11.03 13.68	6.95 8.13 9.02 10.84 14.85	82.55 150.56 226.53 405.98 908.95
APXVSPP18-C-A20 w/ Mount Pipe	B	From Centroid-Face	4.75 2.75 0.00	20.0000	130.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.50 9.15 9.77 11.03 13.68	6.95 8.13 9.02 10.84 14.85	82.55 150.56 226.53 405.98 908.95
APXVSPP18-C-A20 w/ Mount Pipe	C	From Centroid-Face	4.75 2.75 0.00	-20.0000	130.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.50 9.15 9.77 11.03 13.68	6.95 8.13 9.02 10.84 14.85	82.55 150.56 226.53 405.98 908.95
800 External Notch Filter	A	From Centroid-Face	4.75 2.75 0.00	10.0000	130.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.77 0.89 1.02 1.30 1.97	0.37 0.46 0.56 0.79 1.34	11.00 16.81 24.26 44.81 114.01
800 External Notch Filter	B	From Centroid-Face	4.75 2.75 0.00	20.0000	130.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.77 0.89 1.02 1.30 1.97	0.37 0.46 0.56 0.79 1.34	11.00 16.81 24.26 44.81 114.01
800 External Notch Filter	C	From Centroid-Face	4.75 2.75 0.00	-20.0000	130.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.77 0.89 1.02 1.30 1.97	0.37 0.46 0.56 0.79 1.34	11.00 16.81 24.26 44.81 114.01
(3) ACU-A20-N Diplexer	A	From Centroid-Face	4.75 2.75 0.00	10.0000	130.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.14 0.19 0.25 0.40 0.80	0.08 0.12 0.17 0.30 0.67	1.04 2.32 4.41 11.80 44.85
(3) ACU-A20-N Diplexer	B	From Centroid-Face	4.75 2.75 0.00	20.0000	130.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.14 0.19 0.25 0.40 0.80	0.08 0.12 0.17 0.30 0.67	1.04 2.32 4.41 11.80 44.85
(3) ACU-A20-N Diplexer	C	From Centroid-Face	4.75 2.75 0.00	-20.0000	130.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.14 0.19 0.25 0.40 0.80	0.08 0.12 0.17 0.30 0.67	1.04 2.32 4.41 11.80 44.85
(2) CSS-XS4-65-R w/ Mount Pipe (VSI)	A	From Centroid-Face	4.75 2.75	30.0000	130.00	No Ice 1/2" Ice	3.38 3.78	3.32 3.92	19.60 52.51

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
		ce	0.00			1" Ice	4.21	4.54	90.90
						2" Ice	5.11	5.83	187.04
						4" Ice	7.02	8.81	483.88
(2) CSS-XS4-65-R w/ Mount Pipe (VSI)	B	From Centroid-Fa	4.75 2.75	30.0000	130.00	No Ice 1/2" Ice	3.38 3.78	3.32 3.92	19.60 52.51
		ce	0.00			1" Ice	4.21	4.54	90.90
						2" Ice	5.11	5.83	187.04
						4" Ice	7.02	8.81	483.88
(2) CSS-XS4-65-R w/ Mount Pipe (VSI)	C	From Centroid-Fa	4.75 2.75	30.0000	130.00	No Ice 1/2" Ice	3.38 3.78	3.32 3.92	19.60 52.51
		ce	0.00			1" Ice	4.21	4.54	90.90
						2" Ice	5.11	5.83	187.04
						4" Ice	7.02	8.81	483.88
LLPX310R w/ Mount Pipe	A	From Centroid-Fa	4.75 2.75	40.0000	130.00	No Ice 1/2" Ice	5.43 5.99	3.38 4.15	50.56 92.42
		ce	2.00			1" Ice	6.51	4.80	139.94
						2" Ice	7.57	6.19	255.23
						4" Ice	9.86	9.25	597.44
LLPX310R w/ Mount Pipe	B	From Centroid-Fa	4.75 2.75	10.0000	130.00	No Ice 1/2" Ice	5.43 5.99	3.38 4.15	50.56 92.42
		ce	2.00			1" Ice	6.51	4.80	139.94
						2" Ice	7.57	6.19	255.23
						4" Ice	9.86	9.25	597.44
LLPX310R w/ Mount Pipe	C	From Centroid-Fa	4.75 2.75	0.0000	130.00	No Ice 1/2" Ice	5.43 5.99	3.38 4.15	50.56 92.42
		ce	2.00			1" Ice	6.51	4.80	139.94
						2" Ice	7.57	6.19	255.23
						4" Ice	9.86	9.25	597.44
FDD_R6_RRH TMA	A	From Centroid-Fa	4.75 2.75	40.0000	130.00	No Ice 1/2" Ice	1.79 1.97	0.78 0.92	33.00 44.50
		ce	2.00			1" Ice	2.16	1.07	58.31
						2" Ice	2.57	1.39	93.60
						4" Ice	3.49	2.14	200.35
FDD_R6_RRH TMA	B	From Centroid-Fa	4.75 2.75	10.0000	130.00	No Ice 1/2" Ice	1.79 1.97	0.78 0.92	33.00 44.50
		ce	2.00			1" Ice	2.16	1.07	58.31
						2" Ice	2.57	1.39	93.60
						4" Ice	3.49	2.14	200.35
FDD_R6_RRH TMA	C	From Centroid-Fa	4.75 2.75	0.0000	130.00	No Ice 1/2" Ice	1.79 1.97	0.78 0.92	33.00 44.50
		ce	2.00			1" Ice	2.16	1.07	58.31
						2" Ice	2.57	1.39	93.60
						4" Ice	3.49	2.14	200.35
6'x4" Pipe Mount	B	From Centroid-Fa	4.75 2.75	0.0000	130.00	No Ice 1/2" Ice	2.25 2.62	2.25 2.62	65.00 84.10
		ce	0.00			1" Ice	3.00	3.00	107.47
						2" Ice	3.78	3.78	167.65
						4" Ice	5.56	5.56	346.05
6'x4" Pipe Mount	C	From Centroid-Fa	4.75 2.75	0.0000	130.00	No Ice 1/2" Ice	2.25 2.62	2.25 2.62	65.00 84.10
		ce	0.00			1" Ice	3.00	3.00	107.47
						2" Ice	3.78	3.78	167.65
						4" Ice	5.56	5.56	346.05
**									
Side Arm Mount [SO 102-3]	C	None		0.0000	128.00	No Ice	3.00	3.00	81.00
						1/2" Ice	3.48	3.48	111.00
						1" Ice	3.96	3.96	141.00

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" Ice	4.92	4.92	201.00
						4" Ice	6.84	6.84	321.00
1900MHz RRH (65MHz) TMA	A	From Centroid-Face	3.50 0.00 0.00	10.0000	128.00	No Ice	2.77	2.70	60.00
						1/2" Ice	3.01	2.94	83.90
						1" Ice	3.26	3.18	111.08
						2" Ice	3.78	3.70	176.02
						4" Ice	4.93	4.85	353.75
1900MHz RRH (65MHz) TMA	B	From Centroid-Face	3.50 0.00 0.00	20.0000	128.00	No Ice	2.77	2.70	60.00
						1/2" Ice	3.01	2.94	83.90
						1" Ice	3.26	3.18	111.08
						2" Ice	3.78	3.70	176.02
						4" Ice	4.93	4.85	353.75
1900MHz RRH (65MHz) TMA	C	From Centroid-Face	3.50 0.00 0.00	-20.0000	128.00	No Ice	2.77	2.70	60.00
						1/2" Ice	3.01	2.94	83.90
						1" Ice	3.26	3.18	111.08
						2" Ice	3.78	3.70	176.02
						4" Ice	4.93	4.85	353.75
800MHZ RRH TMA	A	From Centroid-Face	3.50 0.00 0.00	10.0000	128.00	No Ice	2.49	2.07	53.00
						1/2" Ice	2.71	2.27	74.19
						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 RRH TMA	B	From Centroid-Face	3.50 0.00 0.00	20.0000	128.00	No Ice	2.49	2.07	53.00
						1/2" Ice	2.71	2.27	74.19
						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 RRH TMA	C	From Centroid-Face	3.50 0.00 0.00	-20.0000	128.00	No Ice	2.49	2.07	53.00
						1/2" Ice	2.71	2.27	74.19
						1" Ice	2.93	2.48	98.39
						2" Ice	3.41	2.93	156.61
						4" Ice	4.46	3.93	317.77
**									
Side Arm Mount [SO 102-1]	A	From Centroid-Face	3.50 0.00 0.00	0.0000	120.00	No Ice	1.50	1.50	25.00
						1/2" Ice	1.74	1.75	35.00
						1" Ice	1.98	2.00	45.00
						2" Ice	2.46	2.50	65.00
						4" Ice	3.42	3.50	105.00
TMA-DB-T1-6Z-8AB-0Z w/ Mount Pipe	A	From Centroid-Face	3.50 0.00 0.00	0.0000	120.00	No Ice	7.03	4.23	73.20
						1/2" Ice	7.96	5.29	130.43
						1" Ice	8.79	6.19	193.70
						2" Ice	10.21	7.68	342.34
						4" Ice	13.24	10.87	765.46
T-Arm Mount [TA 602-3]	C	None		0.0000	118.00	No Ice	11.59	11.59	774.30
						1/2" Ice	15.44	15.44	990.35
						1" Ice	19.29	19.29	1206.41
						2" Ice	26.99	26.99	1638.52
						4" Ice	42.39	42.39	2502.73
(2) DB846F65ZAXY w/Mount Pipe	A	From Centroid-Face	6.00 0.00 0.00	-40.0000	118.00	No Ice	7.27	7.82	46.55
						1/2" Ice	7.88	9.01	113.93
						1" Ice	8.48	9.91	189.25
						2" Ice	9.72	11.81	367.34
						4" Ice	12.33	15.98	867.35
(2) DB846F65ZAXY w/Mount Pipe	B	From Centroid-Face	6.00 0.00 0.00	-20.0000	118.00	No Ice	7.27	7.82	46.55
						1/2" Ice	7.88	9.01	113.93
						1" Ice	8.48	9.91	189.25
						2" Ice	9.72	11.81	367.34

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
						4" Ice	12.33	15.98	867.35
(2) DB846F65ZAXY w/Mount Pipe	C	From Centroid-Face	6.00 0.00 0.00	0.0000	118.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.27 7.88 8.48 9.72 12.33	7.82 9.01 9.91 11.81 15.98	46.55 113.93 189.25 367.34 867.35
MG D3-800Tx w/ Mount Pipe	A	From Centroid-Face	6.00 0.00 0.00	-20.0000	118.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.71 4.19 4.63 5.65 7.82	3.56 4.39 5.09 6.54 9.69	36.90 72.30 113.62 217.30 539.41
MG D3-800Tx w/ Mount Pipe	B	From Centroid-Face	6.00 0.00 0.00	-20.0000	118.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.71 4.19 4.63 5.65 7.82	3.56 4.39 5.09 6.54 9.69	36.90 72.30 113.62 217.30 539.41
MG D3-800Tx w/ Mount Pipe	C	From Centroid-Face	6.00 0.00 0.00	-20.0000	118.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.71 4.19 4.63 5.65 7.82	3.56 4.39 5.09 6.54 9.69	36.90 72.30 113.62 217.30 539.41
(2) FD9R6004/2C-3L Diplexer	A	From Centroid-Face	6.00 0.00 0.00	-40.0000	118.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.37 0.45 0.54 0.75 1.28	0.08 0.14 0.20 0.34 0.74	3.10 5.40 8.79 19.61 62.87
(2) FD9R6004/2C-3L Diplexer	B	From Centroid-Face	6.00 0.00 0.00	-20.0000	118.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.37 0.45 0.54 0.75 1.28	0.08 0.14 0.20 0.34 0.74	3.10 5.40 8.79 19.61 62.87
(2) FD9R6004/2C-3L Diplexer	C	From Centroid-Face	6.00 0.00 0.00	0.0000	118.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.37 0.45 0.54 0.75 1.28	0.08 0.14 0.20 0.34 0.74	3.10 5.40 8.79 19.61 62.87
BXA-171063-8BF-EDIN-0 w/ Mount Pipe	A	From Centroid-Face	6.00 0.00 0.00	-20.0000	118.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.64 4.27 4.80 5.93 8.34	3.82 4.85 5.59 7.12 10.52	36.05 73.32 116.47 224.03 558.26
BXA-171063-8BF-EDIN-0 w/ Mount Pipe	B	From Centroid-Face	6.00 0.00 0.00	-20.0000	118.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.64 4.27 4.80 5.93 8.34	3.82 4.85 5.59 7.12 10.52	36.05 73.32 116.47 224.03 558.26
BXA-171063-8BF-EDIN-0 w/ Mount Pipe	C	From Centroid-Face	6.00 0.00 0.00	-20.0000	118.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.64 4.27 4.80 5.93 8.34	3.82 4.85 5.59 7.12 10.52	36.05 73.32 116.47 224.03 558.26
BXA-70063-6CF-EDIN-0 w/ Mount Pipe	A	From Centroid-Face	6.00 0.00 0.00	-20.0000	118.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.23 8.98 9.70 11.08 13.96	6.06 7.32 8.44 10.35 14.36	46.20 109.79 181.31 352.18 842.64
BXA-70063-6CF-EDIN-0 w/	B	From	6.00	-20.0000	118.00	No Ice	8.23	6.06	46.20

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
Mount Pipe		Centroid-Face	0.00 0.00			1/2" Ice	8.98	7.32	109.79
						1" Ice	9.70	8.44	181.31
						2" Ice	11.08	10.35	352.18
						4" Ice	13.96	14.36	842.64
BXA-70063-6CF-EDIN-0 w/ Mount Pipe	C	From Centroid-Face	6.00 0.00 0.00	-20.0000	118.00	No Ice	8.23	6.06	46.20
						1/2" Ice	8.98	7.32	109.79
						1" Ice	9.70	8.44	181.31
						2" Ice	11.08	10.35	352.18
						4" Ice	13.96	14.36	842.64
RRH2X40-AWS BTS	A	From Centroid-Face	6.00 0.00 0.00	-20.0000	118.00	No Ice	2.52	1.59	44.00
						1/2" Ice	2.75	1.80	61.40
						1" Ice	2.99	2.01	81.69
						2" Ice	3.50	2.46	131.76
						4" Ice	4.61	3.48	275.24
RRH2X40-AWS BTS	B	From Centroid-Face	6.00 0.00 0.00	-20.0000	118.00	No Ice	2.52	1.59	44.00
						1/2" Ice	2.75	1.80	61.40
						1" Ice	2.99	2.01	81.69
						2" Ice	3.50	2.46	131.76
						4" Ice	4.61	3.48	275.24
RRH2X40-AWS BTS	C	From Centroid-Face	6.00 0.00 0.00	-20.0000	118.00	No Ice	2.52	1.59	44.00
						1/2" Ice	2.75	1.80	61.40
						1" Ice	2.99	2.01	81.69
						2" Ice	3.50	2.46	131.76
						4" Ice	4.61	3.48	275.24
**									
T-Arm Mount [TA 602-3] (T-Mobile)	C	None		0.0000	108.00	No Ice	11.59	11.59	774.30
						1/2" Ice	15.44	15.44	990.35
						1" Ice	19.29	19.29	1206.41
						2" Ice	26.99	26.99	1638.52
						4" Ice	42.39	42.39	2502.73
AIR 21 B2A B4P w/ Mount Pipe (T-Mobile)	A	From Centroid-Face	6.00 0.00 1.00	0.0000	108.00	No Ice	7.14	5.96	117.05
						1/2" Ice	7.83	7.09	177.37
						1" Ice	8.43	7.96	244.68
						2" Ice	9.66	9.72	403.93
						4" Ice	12.25	13.45	854.96
AIR 21 B2A B4P w/ Mount Pipe (T-Mobile)	B	From Centroid-Face	6.00 0.00 1.00	0.0000	108.00	No Ice	7.14	5.96	117.05
						1/2" Ice	7.83	7.09	177.37
						1" Ice	8.43	7.96	244.68
						2" Ice	9.66	9.72	403.93
						4" Ice	12.25	13.45	854.96
AIR 21 B2A B4P w/ Mount Pipe (T-Mobile)	C	From Centroid-Face	6.00 0.00 1.00	0.0000	108.00	No Ice	7.14	5.96	117.05
						1/2" Ice	7.83	7.09	177.37
						1" Ice	8.43	7.96	244.68
						2" Ice	9.66	9.72	403.93
						4" Ice	12.25	13.45	854.96
KRY 112 144/1 TMA (VSI) (T-Mobile)	A	From Centroid-Face	6.00 0.00 1.00	0.0000	108.00	No Ice	0.41	0.19	11.02
						1/2" Ice	0.50	0.26	14.12
						1" Ice	0.60	0.33	18.44
						2" Ice	0.82	0.51	31.51
						4" Ice	1.36	0.97	80.86
KRY 112 144/1 TMA (VSI) (T-Mobile)	B	From Centroid-Face	6.00 0.00 1.00	0.0000	108.00	No Ice	0.41	0.19	11.02
						1/2" Ice	0.50	0.26	14.12
						1" Ice	0.60	0.33	18.44
						2" Ice	0.82	0.51	31.51
						4" Ice	1.36	0.97	80.86
KRY 112 144/1 TMA (VSI) (T-Mobile)	C	From Centroid-Face	6.00 0.00	0.0000	108.00	No Ice	0.41	0.19	11.02
						1/2" Ice	0.50	0.26	14.12

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
		ce	1.00			1" Ice	0.60	0.33	18.44
						2" Ice	0.82	0.51	31.51
						4" Ice	1.36	0.97	80.86
(3) 7'x2" Antenna Mount Pipe (T-Mobile)	A	From Centroid-Face	6.00 0.00 0.00	0.0000	108.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.66 2.39 2.83 3.71 5.58	1.66 2.39 2.83 3.71 5.58	26.00 38.58 55.84 104.97 266.00
(3) 7'x2" Antenna Mount Pipe (T-Mobile)	B	From Centroid-Face	6.00 0.00 0.00	0.0000	108.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.66 2.39 2.83 3.71 5.58	1.66 2.39 2.83 3.71 5.58	26.00 38.58 55.84 104.97 266.00
(3) 7'x2" Antenna Mount Pipe (T-Mobile)	C	From Centroid-Face	6.00 0.00 0.00	0.0000	108.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.66 2.39 2.83 3.71 5.58	1.66 2.39 2.83 3.71 5.58	26.00 38.58 55.84 104.97 266.00
**									
APXV18-206517-C w/Mount Pipe	A	From Centroid-Face	1.75 1.00 0.00	30.0000	100.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.95 4.42 4.90 5.93 8.12	3.43 4.25 4.95 6.40 9.51	48.30 84.04 125.74 230.26 554.40
APXV18-206517-C w/Mount Pipe	B	From Centroid-Face	1.75 1.00 0.00	30.0000	100.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.95 4.42 4.90 5.93 8.12	3.43 4.25 4.95 6.40 9.51	48.30 84.04 125.74 230.26 554.40
APXV18-206517-C w/Mount Pipe	C	From Centroid-Face	1.75 1.00 0.00	30.0000	100.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.95 4.42 4.90 5.93 8.12	3.43 4.25 4.95 6.40 9.51	48.30 84.04 125.74 230.26 554.40
**									
Side Arm Mount [SO 701-1]	C	From Centroid-Leg	2.75 0.00 0.00	0.0000	75.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.85 1.14 1.43 2.01 3.17	1.67 2.34 3.01 4.35 7.03	65.00 79.00 93.00 121.00 177.00
KS24019-L112A	C	From Centroid-Leg	4.25 0.00 2.00	0.0000	75.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.10 0.18 0.26 0.42 0.74	0.10 0.18 0.26 0.42 0.74	5.00 6.50 8.00 11.00 17.00

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft²	Weight lb
A-ANT-23G-2-C (VSI)	B	Paraboloid w/Shroud (HP)	From Centroid -Face	4.75 2.25 2.00	10.0000		130.00	2.17	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.72 4.01 4.30 4.88 6.04	12.30 32.88 53.46 94.62 176.94
VHLP2-11	C	Paraboloid w/Shroud (HP)	From Centroid -Face	4.75 2.25 4.00	-30.0000		130.00	2.17	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.72 4.01 4.30 4.88 6.04	31.00 51.56 72.12 113.24 195.48

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in²	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
L1	139.5 - 93.04 (1)	TP26.99x15.5x0.25	46.46	0.00	0.0	39.000	20.4489	-7969.33	797508.00	0.010
L2	93.04 - 46.38 (2)	TP37.91x25.5205x0.375	50.58	0.00	0.0	39.000	43.1454	-17069.60	1682670.00	0.010
L3	46.38 - 0 (3)	TP48.5x35.874x0.375	51.63	0.00	0.0	39.000	53.0176	-26695.30	2067690.00	0.013

Pole Bending Design Data

Section No.	Elevation ft	Size	Actual M_x lb-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y lb-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
L1	139.5 - 93.04 (1)	TP26.99x15.5x0.25	509203.33	-47.076	39.000	1.207	0.00	0.000	39.000	0.000
L2	93.04 - 46.38 (2)	TP37.91x25.5205x0.375	1491950.00	-46.505	39.000	1.192	0.00	0.000	39.000	0.000
L3	46.38 - 0 (3)	TP48.5x35.874x0.375	2429083.33	-50.048	39.000	1.283	0.00	0.000	39.000	0.000

Pole Interaction Design Data

Section No.	Elevation ft	Size	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	139.5 - 93.04 (1)	TP26.99x15.5x0.25	0.010	1.207	0.000	1.217 ✔	1.333	H1-3 ✔
L2	93.04 - 46.38 (2)	TP37.91x25.5205x0.375	0.010	1.192	0.000	1.203 ✔	1.333	H1-3 ✔
L3	46.38 - 0 (3)	TP48.5x35.874x0.375	0.013	1.283	0.000	1.296	1.333	H1-3 ✔

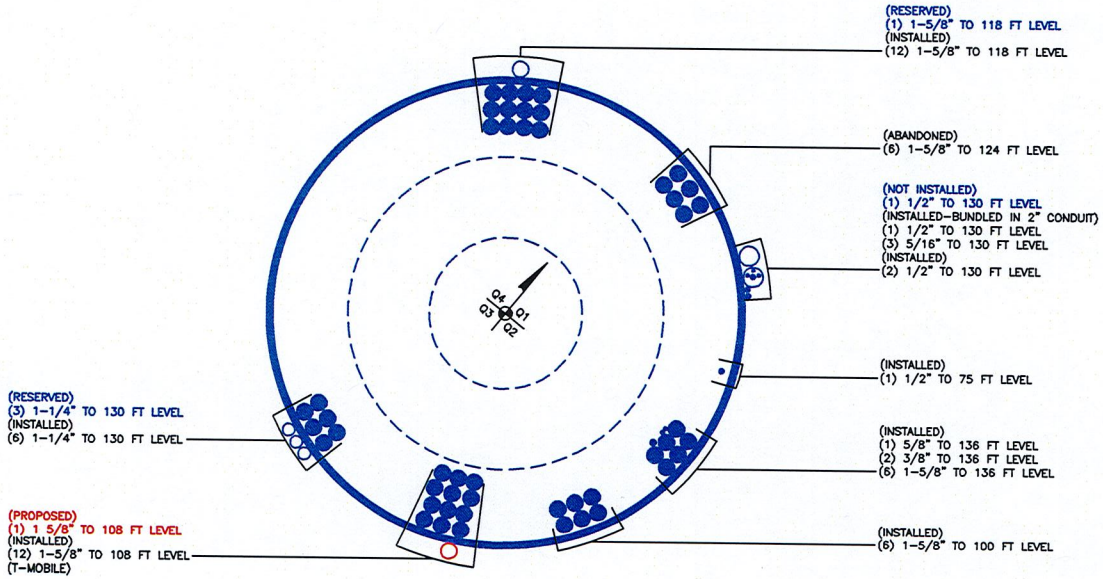
Section No.	Elevation ft	Size	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
						✔		

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	$SF*P_{allow}$ lb	% Capacity	Pass Fail
L1	139.5 - 93.04	Pole	TP26.99x15.5x0.25	1	-7969.33	1063078.12	91.3	Pass
L2	93.04 - 46.38	Pole	TP37.91x25.5205x0.375	2	-17069.60	2242999.02	90.2	Pass
L3	46.38 - 0	Pole	TP48.5x35.874x0.375	3	-26695.30	2756230.66	97.2	Pass
							Summary	
						Pole (L3)	97.2	Pass
						RATING =	**97.2**	**Pass**

APPENDIX B

BASE LEVEL DRAWING



BUSINESS UNIT: 881541 TOWER ID: C_BASELEVEL

PORT INFORMATION			
ELEV.	SIZE	LOCATION	STATUS
10'-0"	10"x30"	E & W	.
7'-0"	10"x30"	S	.
3'-3"	10"x30"	E & W	.

25/02/08	APPLICATION ADDED PER WORK ORDER # 291173	ADC
02/03/11	AS-BUILT INFORMATION ADDED PER WORK ORDER # 30348	ADC
14/04/11	APPLICATION ADDED PER WORK ORDER # 402289	RJK
30/11/11	AS-BUILT INFORMATION ADDED PER WORK ORDER # 44903	KHH
30/05/12	APPLICATION ADDED PER WORK ORDER # 488940	AM
18/09/13	UPDATED PER WORK ORDER # 841192	ADJ
18/09/13	UPDATED PER WORK ORDER # 851329	AJM
18/09/13	UPDATED PER WORK ORDER # 851329	AJM
18/09/13	UPDATED PER WORK ORDER # 851329	AJM
18/09/13	UPDATED PER WORK ORDER # 851874	AJM

DRAWN BY: VSG
CHECKED BY: GPK
DRAWING DATE: 25/02/08

SITE NUMBER:
SITE NAME:

SITE NAME

ROGERS PROPERTY

BUSINESS UNIT NUMBER

881541

SITE ADDRESS

NEW HAVEN, CT 06477
NEW HAVEN
UNITED STATES COUNTY
USA

SHEET TITLE

BASE LEVEL

SHEET NUMBER

A1-0

BASE LEVEL DRAWING

SCALE: 1" = 1'-0" | 1

PLOT DATE: 9/19/2012 FILE NAME: 881541_BASELEVEL.DWG
Xref R:\TEMPLATES\TYPICAL BLOCKS FOR TEMPLATES\TITLE BLOCK STD-VER 5.1.dwg

APPENDIX C

ADDITIONAL CALCULATIONS

Stiffened or Unstiffened, Ungrouted, Circular Base Plate - Any Rod Material

TIA Rev F

Site Data

BU#: *881541 (MODIFIED)*
Site Name: *Rogers Property, CT*
App #: *198183, Rev. 6*

Pole Manufacturer:	*Other*

Reactions		
Moment:	2829.537	ft-kips
Axial:	30.558	kips
Shear:	27.948	kips

Anchor Rod Data		
Qty:	16	
Diam:	2.25	in
Rod Material:	A615-J	
Strength (Fu):	100	ksi
Yield (Fy):	75	ksi
Bolt Circle:	57	in

Plate Data		
Diam:	63	in
Thick:	2	in
Grade:	60	ksi
Single-Rod B-eff:	9.62	in

Stiffener Data (Welding at both sides)		
Config:	1	*
Weld Type:	Both	
Groove Depth:	0.375	in **
Groove Angle:	45	degrees
Fillet H. Weld:	0.3125	in
Fillet V. Weld:	0.3125	in
Width:	6	in
Height:	15	in
Thick:	0.75	in
Notch:	0.75	in
Grade:	50	ksi
Weld str.:	70	ksi

Pole Data		
Diam:	48.5	in
Thick:	0.375	in
Grade:	65	ksi
# of Sides:	18	"0" IF Round
Fu	80	ksi
Reinf. Fillet Weld	0	"0" if None

Stress Increase Factor		
ASIF:	1.333	

If No stiffeners, Criteria:	AISC ASD	<-Only Applcable to Unstiffened Cases

Anchor Rod Results

		Stiffened
Maximum Rod Tension:	147.0 Kips	Service, ASD
Allowable Tension:	195.0 Kips	Fty*ASIF
Anchor Rod Stress Ratio:	75.4% **Pass**	

Base Plate Results

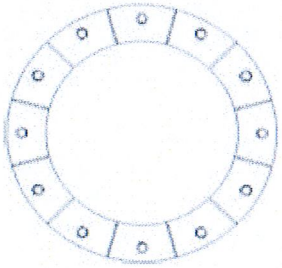
	Flexural Check	Stiffened
Base Plate Stress:	39.0 ksi	Service, ASD
Allowable Plate Stress:	60.0 ksi	0.75*Fy*ASIF
Base Plate Stress Ratio:	65.1% **Pass**	Y.L. Length: N/A, Roark

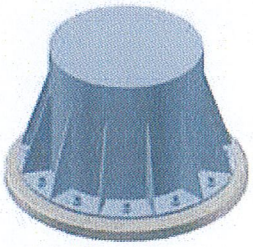
Stiffener Results

Horizontal Weld :	65.8% **Pass**
Vertical Weld:	61.6% **Pass**
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	24.0% **Pass**
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	66.6% **Pass**
Plate Comp. (AISC Bracket):	72.8% **Pass**

Pole Results

Pole Punching Shear Check:	15.8% **Pass**





* 0 = none, 1 = every bolt, 2 = every 2 bolts, 3 = 2 per bolt

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

Overturning Calculation for Rectangular Mat Foundations (Eccentrically Loaded)

Customer:	Crown Castle
Site Name:	Rogers Property, CT BU#881541
Job Number:	2013-004-076
Tower Model:	140' EEI Monopole
Date:	12/12/2013

Soil Ultimate Bearing	8	ksf
Unit wt soil	0.125	kcf
Unit wt concrete	0.15	kcf
Mat Length (long dimension)	23	ft
Mat Width (short dimension)	23	ft
Mat Thickness	3	ft
Depth of Soil Over Mat	4	ft
Has Pedestals? (Y or N)	Y	
Pedestal Round or Square? (R or S)	S	
Number of Pedestals	1	
Pedestal Height	5	ft
Pedestal Diameter or Width	7	ft
Applied Shear	27.948	kip
Applied Axial Force	30.558	kip
Applied Moment	2829.537	k-ft

Load Eccentricity on Pad

distance from long axis =	3.5	ft
distance from short axis =	3.5	ft

wt. Concrete =	274.800	kip		
wt. Soil =	240.000	kip		
Shear Moment =	223.584	k-ft		
P*e =	106.953	k-ft	106.953	k-ft
	(about long axis)		(about short axis)	
Allowable Bearing =	4	ksf		
Mat Width / 6 =	3.83	ft	3.83	ft
e =	5.79	ft	5.79	ft
I =	17.12	ft	17.12	ft
Net Bearing =	1.90	ksf	1.90	ksf
	BEARING ADEQUATE			
x =	2.964	ft	2.964	ft
Resisting Moment =	5463.423	k-ft	5463.423	k-ft
SF =	1.729		1.729	
	OVERTURNING ADEQUATE			

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

T-Mobile Existing Facility

Site ID: CT11083Q

CT083 / Sprint / Grassy Hill
700 Grassy Hill Road
Orange, CT 06477

December 20, 2013

21 B Street · Burlington, MA 01803 · Tel: (781) 273.2500 · Fax: (781) 273.3311

EBI Consulting
environmental | engineering | due diligence

December 20, 2013

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

Re: Emissions Values for Site: **CT11083Q - CT083/Sprint/Grassy Hill**

EBI Consulting was directed to analyze the proposed T-Mobile facility located at 700 Grassy Hill Road, Orange, 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 97-01and ANSI/IEEE Std C95.1. The FCC regulates Maximum Permissible Exposure in units of microwatts per square centimeter (μW/cm2). The number of μW/cm2 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 (μW/cm2). The general population exposure limit for the cellular band is 567 μW/cm2, and the general population exposure limit for the PCS band is 1000 μW/cm2. 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 700 Grassy Hill Road, Orange, 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 / 1980.000 MHz—to 1985.000 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 **109 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	CT11083Q - CT083/Sprint/Grassy Hill
Site Addresss	700 Grassy Hill Road, Orange, CT 06477
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)	analysis height	Cable Size	Cable Loss (dB)	Additional Loss	ERP	Power Density Value	Power Density Percentage
1a	Ericsson	AIR21 B2A / B4P	Active	AWS - 2100 MHz	LTE	40	2	80	-3.95	109	103	7/8"	1.2	0	24.439369	0.828174	0.08282%
1B	Ericsson	AIR21 B2A / B4P	Passive	PCS - 1950 MHz	GSM / UMTS	40	4	160	-3.95	109	103	7/8"	1.2	0	48.878738	1.656348	0.16563%
														Sector total Power Density Value:		0.248%	

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)	analysis height	Cable Size	Cable Loss (dB)	Additional Loss	ERP	Power Density Value	Power Density Percentage
1a	RFS	APX16DWV-16DWVS	Passive	AWS - 2100 MHz	LTE	40	2	80	-3.95	109	103	7/8"	1.2	0	24.439369	0.828174	0.08282%
1B	RFS	APX16DWV-16DWVS	Passive	PCS - 1950 MHz	GSM / UMTS	40	4	160	-3.95	109	103	1-5/8"	1.2	0	48.878738	1.656348	0.16563%
														Sector total Power Density Value:		0.248%	

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)	analysis height	Cable Size	Cable Loss (dB)	Additional Loss	ERP	Power Density Value	Power Density Percentage
1a	RFS	APX16DWV-16DWVS	Passive	AWS - 2100 MHz	LTE	40	2	80	-3.95	109	103	7/8"	1.2	0	24.439369	0.828174	0.08282%
1B	RFS	APX16DWV-16DWVS	Passive	PCS - 1950 MHz	GSM / UMTS	40	4	160	-3.95	109	103	1-5/8"	1.2	0	48.878738	1.656348	0.16563%
														Sector total Power Density Value:		0.248%	

Site Composite MPE %

Carrier	MPE %
T-Mobile	0.745%
Sprint	4.960%
Sprint WiMAX	3.590%
Verizon Wireless	22.870%
MetroPCS	6.810%
Clearwire	1.130%
AT&T	14.590%
Total Site MPE %	**54.695%**

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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 **0.745% (0.248% 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 **54.695%** 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 within the allowable 100% threshold standard per the federal government.

Scott Heffernan
RF Engineering Director

EBI Consulting
21 B Street
Burlington, MA 01803

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

December 26, 2013

The Honorable James M. Zeoli
First Selectman
Town of Orange
Town Hall
617 Orange Center Road
Orange, CT 06477-2423

RE: **EM-T-MOBILE-107-131226** – T-Mobile Northeast LLC notice of intent to modify an existing telecommunications facility located at Grassy Hill Road, Orange, Connecticut.

Dear First Selectman Zeoli:

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 January 10, 2014.

Thank you for your cooperation and consideration.

Very truly yours,

Melanie Bachman
Acting Executive Director

MB/jb

c: Paul Dinice, Zoning Enforcement Officer, Town of Orange