

March 10, 2015

Members of the Siting Council Connecticut Siting Council Ten Franklin Square New Britain, CT 06051

RE:

Notice of Exempt Modification

2 Taugwonk Spur, Stonington, CT 06378

N 41.38201305 W -71.9036014

T-Mobile Site #: CT11046D_L700

Dear Members of the Siting Council:

On behalf of T-Mobile, SBA Communications is submitting an exempt modification application to the Connecticut Siting council for modification of existing equipment at a tower facility located at 2 Taugwonk Spur, Stonington, CT 06378.

The 2 Taugwonk Spur, Stonington, CT facility consists of a 190' Monopole Tower owned and operated by SBA Properties, LLC. In order to accommodate technological changes and enhance system performance in the State of Connecticut, T-Mobile plans to modify the equipment configurations at many of its existing cell sites. Please accept this letter and attachments as notification, pursuant to R.C.S.A. Section 16-50j-73, of construction which constitutes an exempt modification pursuant to R.C.S.A. Section 16-50j-72(b)(2). In compliance with R.C.S.A. Section 16-50j-73, a copy of this letter and attachments is being sent to the chief elected official of the municipality in which the affected cell site is located.

As part of T-Mobile's modernization project, T-Mobile desires to upgrade their equipment to meet the new standards of 4G technology. The new equipment will allow customers to download files and browse the internet at a high rate of speed while also allowing their phones to be compatible with the latest 4G technology.

Attached is a summary of the planned modifications, including power density calculations reflecting the change in T-Mobile's operations at the site along with the required fee of \$625.

The changes to the facility do not constitute modifications 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 or altered. 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).

- The overall height of the structure will be unaffected.
- 2. The proposed changes will not extend the site boundaries. There will be no effect on the site compound other than the new equipment cabinets.
- The proposed changes will not increase the noise level at the existing facility by six decibels or more.
- 4. The changes in radio frequency power density 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.

For the foregoing reasons, SBA Communications on behalf of T-Mobile, respectfully submits that he proposed changes at the referenced site constitute exempt modifications under R.C.S.A. Section 16-50j-72(b)(2).

Please feel free to call me at $508.251.0720 \times 3804$ with any questions you may have concerning this matter.

Thank you,

Kri Pelletier

SBA Communications Corporation
33 Boston Post Road West Suite 320

Marlborough, MA 01752

508-251-0720 x 3804 + T

508-251-1755 + F

203-446-7700 + C

kpelletier@sbasite.com



T-Mobile Equipment Modification

2 Taugwonk Spur, Stonington, CT Site number CT11046D_L700

Tower Owner:

SBA Properties, LLC

Equipment Configuration:

Monopole

Current and/or approved:

· (3) Ericsson Air B2A B4P

· (3) Ericsson Air B4A B2P

(3) Ericsson KRY 112 144 TMAs

· (12) 1-5/8" Feed lines

· (1) 1-5/8" Fiber

Planned Modifications:

- (3) Ericsson Air B2A B4P
- (3) Ericsson Air B4A B2P
- (3) Commscope LNX-6515DS
- · (3) Ericsson KRY 112 144/1
- (3) Ericsson S11B12
- · (12) 1-5/8" Feed lines
- · (1) 1-5/8" Fiber

Structural Information:

The attached structural analysis demonstrates that the tower and foundation will have adequate structural capacity to accommodate the proposed modifications.

Power Density:

The anticipated Maximum Composite contributions from the T-Mobile facility are 4.35% of the allowable FCC established general public limit. The anticipated composite MPE value for this site assuming all carriers present is 33.66% of the allowable FCC established general public limit sampled at the ground level.

Carrier	MPE%
T-Mobile	4.35
Nextel	1.58 %
Public Safety	0.38 %
Sprint	3.07 %
CL&P	21.96 %
MetroPCS	2.32 %
Site Total MPE %:	33.66 %



March 10, 2015

Mr. Edward Haberek, Jr. First Selectman Town of Stonington 152 Elm Street Stonington, CT 06378

RE: Telecommunications Facility @ 2 Taugwonk Spur, Stonington, CT

Dear Mr. Haberek,

In order to accommodate technological changes and enhance system performance in the State of Connecticut, T-Mobile will be changing its equipment configuration at certain cell sites.

As required by Regulations of Connecticut State Agencies (R.C.S.A.) Section 16-50j-73, the Connecticut Siting Council has been notified of the changes and will review T-Mobile's proposal. Please accept this letter as notification under Section 16-50j-73 of construction which constitutes an exempt modification pursuant to R.C.S.A. Section 16-50j-72(b)(2).

The accompanying letter to the Siting Council fully describes T-Mobile's proposal for the referenced cell site. However, if you have any questions or require any further information on our plans or the Siting Council's procedures, please call me at 508.251.0720 x 3804.

Thank you,

Kri Pelletier

SBA Communications Company

33 Boston Post Road West Suite 320

Marlborough, MA 01752 508-251-0720 x 3804 + T

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203-446-7700 + C

kpelletier@sbasite.com



March 10, 2015

Louis J. D'Amato & John C. D'Amato D'Amato Investments, LLC 183 Quarry Road Milford, CT 06460

RE:

Telecommunications Facility @ 2 Taugwonk Spur, Stonington, CT

Dear Sirs:

In order to accommodate technological changes and enhance system performance in the State of Connecticut, T-Mobile will be changing its equipment configuration at certain cell sites.

As required by Regulations of Connecticut State Agencies (R.C.S.A.) Section 16-50j-73, the Connecticut Siting Council has been notified of the changes and will review T-Mobile's proposal. Please accept this letter as notification under Section 16-50j-73 of construction which constitutes an exempt modification pursuant to R.C.S.A. Section 16-50j-72(b)(2).

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Thank you,

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

T-Mobile Existing Facility

Site ID: CT11046D

Stonington / I-95/X91_1 2 Taugwank Spur Road Stonington, CT 06378

March 6, 2015

EBI Project Number: 6215001355

Site Compliance Summary		
Compliance Status:	COMPLIANT	
Site total MPE% of		
FCC general public allowable limit:	33.66 %	



March 6, 2015

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

Emissions Analysis for Site: CT11046D – Stonington / I-95/X91_1

EBI Consulting was directed to analyze the proposed T-Mobile facility located at **2 Taugwank Spur Road, Stonington, 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 (μ W/cm²). The number of μ W/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 (μ W/cm²). The general population exposure limit for the 700 MHz Band is 467 μ W/cm², and the general population exposure limit for the PCS and AWS bands is 1000 μ W/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 **2 Taugwank Spur Road, Stonington, 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, all calculations were performed assuming a lobe representing the maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was focused at the base of the tower. For this report the sample point is the top of 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 (PCS Band 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel
- 2) 2 UMTS channels (AWS Band 2100 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.
- 3) 2 LTE channels (AWS Band 2100 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel.
- 4) 1 LTE channel (700 MHz Band) was considered for each sector of the proposed installation. This channel has a transmit power of 30 Watts.
- 5) 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.



- 6) For the following calculations the sample point was the top of a six foot person standing at the base of the tower. The maximum gain of the antenna per the antenna manufactures supplied specifications minus 10 dB was used in this direction. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.
- 7) The antennas used in this modeling are the **Ericsson AIR21 B4A/B2P** for 1900 MHz (PCS) and 2100 MHz (AWS) channels and the **Commscope LNX-6515DS-VTM** for 700 MHz channels. This is based on feedback from the carrier with regards to anticipated antenna selection. The **Ericsson AIR21 B4A/B2P** has a maximum gain of **15.9 dBd** at its main lobe. The **Commscope LNX-6515DS-VTM** has a maximum gain of **14.6 dBd** at its main lobe. The maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was used for all calculations. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.
- 8) The antenna mounting height centerline of the proposed antennas is **172.5 feet** above ground level (AGL).
- 9) 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 calculations were done with respect to uncontrolled / general public threshold limits.



T-Mobile Site Inventory and Power Data

Sector:	A	Sector:	В	Sector:	С
Antenna #:	1	Antenna #:	1	Antenna #:	1
Make / Model:	Ericsson AIR21 B4A/B2P	Make / Model:	Ericsson AIR21 B4A/B2P	Make / Model:	Ericsson AIR21 B4A/B2P
Gain:	15.9 dBd	Gain:	15.9 dBd	Gain:	15.9 dBd
Height (AGL):	172.5	Height (AGL):	172.5	Height (AGL):	172.5
Frequency Bands	1900 MHz(PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz(PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz(PCS) / 2100 MHz (AWS)
Channel Count	2	Channel Count	2	# PCS Channels:	2
Total TX Power:	120	Total TX Power:	120	# AWS Channels:	120
ERP (W):	4,668.54	ERP (W):	4,668.54	ERP (W):	4,668.54
Antenna A1 MPE%	0.61	Antenna B1 MPE%	0.61	Antenna C1 MPE%	0.61
Antenna #:	2	Antenna #:	2	Antenna #:	2
Make / Model:	Ericsson AIR21 B2A/B4P	Make / Model:	Ericsson AIR21 B2A/B4P	Make / Model:	Ericsson AIR21 B2A/B4P
Gain:	15.9 dBd	Gain:	15.9 dBd	Gain:	15.9 dBd
Height (AGL):	172.5	Height (AGL):	172.5	Height (AGL):	172.5
Frequency Bands	1900 MHz(PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz(PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz(PCS) / 2100 MHz (AWS)
Channel Count	4	Channel Count	4	Channel Count	4
Total TX Power:	120	Total TX Power:	120	Total TX Power:	120
ERP (W):	4,668.54	ERP (W):	4,668.54	ERP (W):	4,668.54
Antenna A2 MPE%	0.61	Antenna B2 MPE%	0.61	Antenna C2 MPE%	0.61
Antenna #:	3	Antenna #:	3	Antenna #:	3
Make / Model:	Commscope LNX- 6515DS-VTM	Make / Model:	Commscope LNX- 6515DS-VTM	Make / Model:	Commscope LNX- 6515DS-VTM
Gain:	14.6 dBd	Gain:	14.6 dBd	Gain:	14.6 dBd
Height (AGL):	172.5	Height (AGL):	172.5	Height (AGL):	172.5
Frequency Bands	700 Mhz	Frequency Bands	700 Mhz	Frequency Bands	700 Mhz
Channel Count	1	Channel Count	1	Channel Count	1
Total TX Power:	30	Total TX Power:	30	Total TX Power:	30
ERP (W):	865.21	ERP (W):	865.21	ERP (W):	865.21
Antenna A3 MPE%	0.24	Antenna B3 MPE%	0.24	Antenna C3 MPE%	0.24

Site Composite MPE%				
Carrier	MPE%			
T-Mobile	4.35			
Nextel	1.58 %			
Public Safety	0.38 %			
Sprint	3.07 %			
CL&P	21.96 %			
MetroPCS	2.32 %			
Site Total MPE %:	33.66 %			

T-Mobile Sector 1 Total:	1.45 %
T-Mobile Sector 2 Total:	1.45 %
T-Mobile Sector 3 Total:	1.45 %
Site Total:	33.66 %



Summary

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

The anticipated maximum composite contributions from the T-Mobile facility as well as the site composite emissions value with regards to compliance with FCC's allowable limits for general public exposure to RF Emissions are shown here:

T-Mobile Sector	Power Density Value (%)
Sector 1:	1.45 %
Sector 2:	1.45 %
Sector 3:	1.45 %
T-Mobile Total:	4.35 %
Site Total:	33.66 %
Site Compliance Status:	COMPLIANT

The anticipated composite MPE value for this site assuming all carriers present is **33.66%** of the allowable FCC established general public limit sampled at the ground level. This is based upon values listed in the Connecticut Siting Council database for existing carrier emissions.

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

Scott Heffernan

RF Engineering Director

EBI Consulting

21 B Street

Burlington, MA 01803



FDH Engineering, Inc., 6521 Meridien Drive Raleigh, NC 27616, Ph. 919.755.1012

Structural Analysis for SBA Network Services, Inc.

190' Monopole Tower

SBA Site Name: Stony Brook SBA Site ID: CT00235-B-02 T-Mobile Site ID: CT11046D

Site Address: Taugwonk Spur Road No. 2, Stonington, CT 06378-2008

FDH Project Number 15BEFV1400 (R1)

Analysis Results

Tower Components	76.4%	Sufficient
Foundation	84.8%	Sufficient

Prepared By:

Christopher Lee, EIT Project Engineer

FDH Engineering, Inc.

6521 Meridien Drive Raleigh, NC 27616 (919) 755-1012 info@fdh-inc.com Reviewed By:

Dennis D. Abel, PE Director of Structural Engineering CT PE License No. 23247



02-23-2015

February 23, 2015

Prepared pursuant to TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures and 2005 Connecticut State Building Code

Document No. ENG-RPT-501S

Revision Date: 06/17/11

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EXECUTIVE SUMMARY

At the request of SBA Network Services, Inc., FDH Engineering, Inc. performed a structural analysis of the monopole located in Stonington, CT to determine whether the tower is structurally adequate to support both the existing and proposed loads pursuant to the *Structural Standards for Steel Antenna Towers and Antenna Supporting Structures, TIA/EIA-222-F* and 2005 Connecticut State Building Code (2005 CSBC). Information pertaining to the existing/proposed antenna loading, current tower geometry, foundation dimensions, geotechnical data, and member sizes was obtained from:

Paul J. Ford and Company (Job No. 29298-318) original design drawings dated May 6, 1998
SAGE Environmental, Inc. (Project No. S598) Geotechnical Report dated April 22, 1998
FDH, Inc. (Job No. 08-10050T) Steel Data Monopole Tower Report dated December 29, 2008
FDH, Inc. (Job No. 08-10050T) TIA Inspection Report dated December 29, 2008
SBA Network Services, Inc.

The basic design wind speed per the *TIA/EIA-222-F* standards and *2005 CSBC* is 85 mph without ice and 38 mph with 3/4" radial ice. Ice is considered to increase in thickness with height.

Conclusions

With the existing and proposed antennas from T-Mobile in place at 172.5 ft, the tower meets the requirements of the *TIA/EIA-222-F* standards and *2005 CSBC* provided the **Recommendations** listed below are satisfied. Furthermore, provided the foundation was designed and constructed to support the original design reactions (see Paul J. Ford and Company Job No. 29298-318), the foundation should have the necessary capacity to support the existing and proposed loading. For a more detailed description of the analysis of the tower, see the **Results** section of this report.

Our structural analysis has been performed assuming all information provided to FDH Engineering, Inc. is accurate (i.e., the steel data, tower layout, existing antenna loading, and proposed antenna loading) and that the tower has been properly erected and maintained per the original design drawings.

Recommendations

To ensure the requirements of the *TIA/EIA-222-F* standards and *2005 CSBC* are met with the existing and proposed loading in place, we have the following recommendations:

- 1. The proposed feed lines should be installed inside the pole's shaft.
- RRU/RRH Stipulation: The equipment may be installed in any arrangement determined by the client.

APPURTENANCE LISTING

The proposed and existing antennas with their corresponding cables/coax lines are shown in **Table 1**. *If the actual layout determined in the field deviates from the layout, FDH Engineering, Inc. should be contacted to perform a revised analysis.*

Table 1 - Appurtenance Loading

Existing Loading:

Antenna Elevation (ft)	Description	Feed Lines ¹	Carrier	Mount Elevation (ft)	Mount Type
194	(1) Telwave ANT150D3 Dipole	(1) 7/8"	SPD	190	Direct Mount
191	(9) Decibel DB844H90E-XY	(9) 1-5/8"	Nextel	190	(1) 14.5' Low Profile Platform
184	(6) Kathrein 742 351	(12) 1-5/8"	Metro PCS	184	(1)13' Low Profile Platform (Assumed, C _a A _a = 14.66 ft ²)
172.5	(3) Ericsson Air B2A B4P (3) Ericsson Air B4A B2P (3) Ericsson KRY 112 144 TMAs	(12) 1-5/8" (1) 1-5/8" Fiber	T-Mobile	172.5	(1) 13' Low Profile Platform
-	-	-	-	158.5	(1) 13' Low Profile Platform
158.5	(1) RFS PD458-2N Omni	(2) 7/0"	New	150	(2) Standoffs
156	(1) RFS 114202C Omni	(2) 7/8"	Cingular	150	(Assumed, C _a A _a = 1.67 ft ² each)
145	(4) Decibel DB980F65E-M (2) Decibel 980F65T2E-MS	(6) 1-5/8"	Sprint	145	(1) 14.5' Low Profile Platform
123	(2) Telewave ANT450D6 Omnis	(4) 7/0"	CL&P	120	(3) Standoffs
129.5	(1) RFS 220-7N Omni	(4) 7/8"	CL&P	120	(Assumed, C _a A _a = 1.67 ft ² each)
46.5	(1) GPS	(1) 1/2"	Sprint	46.5	(1) 4' Standoff

^{1.} Feed lines installed inside the pole's shaft unless otherwise noted.

Proposed Loading:

Antenna Elevation (ft)	Description	Coax and Lines	Carrier	Mount Elevation (ft)	Mount Type
172.5	(3) Ericsson Air B2A B4P (3) Ericsson Air B4A B2P (3) Commscope LNX-6515DS (3) Ericsson KRY 112 144/1 (3) Ericsson S11B12	(12) 1-5/8" (1) 1-5/8" Fiber	T-Mobile	172.5	(1) 13' Low Profile Platform w/ Site Pro PRK-1245 Support Kit

RESULTS

The following yield strength of steel for individual members was used for analysis:

Table 2 - Material Strength

Member Type	Yield Strength
Tower Shaft Sections	60 & 65 ksi
Base Plate	50 ksi
Anchor Bolts	75 ksi

Table 3 displays the summary of the ratio (as a percentage) of force in the member to their capacities. Values greater than 100% indicate locations where the maximum force in the member exceeds its capacity. **Table 4** displays the maximum foundation reactions.

If the assumptions outlined in this report differ from actual field conditions, FDH Engineering, Inc. should be contacted to perform a revised analysis. Furthermore, as no information pertaining to the allowable twist and sway requirements for the existing or proposed appurtenances was provided, deflection and rotation were not taken into consideration when performing this analysis.

See the **Appendix** for detailed modeling information

Table 3 - Summary of Working Percentage of Structural Components

Section No.	Elevation ft	Component Type	Size	% Capacity*	Pass Fail
L1	190 - 140	Pole	TP35.001x24x0.25	67.4	Pass
L2	140 - 94.5	Pole	TP44.513x33.5109x0.375	73.6	Pass
L3	94.5 - 50	Pole	TP53.554x42.5528x0.4375	76.4	Pass
L4	50 - 25.25	Pole	TP58.124x51.1938x0.5	72.0	Pass
L5	25.25 - 0	Pole	TP62.68x55.529x0.5	76.2	Pass
		Anchor Bolts	(24) 2.25"ø w/ BC=70"	70.8	Pass
		Base Plate	SQ PL 71" x 3.5" thk	47.5	Pass

^{*}Capacities include a 1/3 allowable stress increase for wind per TIA/EIA-222-F standards.

Table 4 - Maximum Base Reactions

Base Reactions	Current Analysis (TIA/EIA-222-F)	Original Design (TIA/EIA-222-F)
Axial*	61 k	60 k
Shear	36 k	43 k
Moment	4,920 k-ft	5,800 k-ft

^{*}Per our experience with foundations of similar type, the axial loading should not control the foundation analysis.

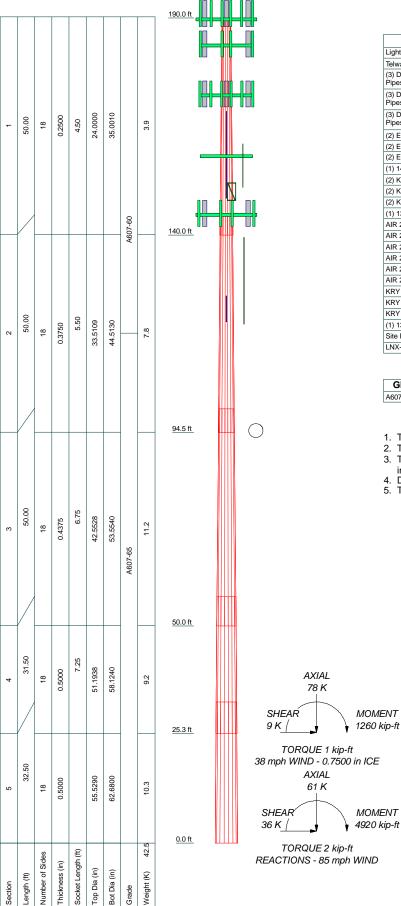
GENERAL COMMENTS

This engineering analysis is based upon the theoretical capacity of the structure. It is not a condition assessment of the tower and its foundation. It is the responsibility of SBA Network Services, Inc. to verify that the tower modeled and analyzed is the correct structure (with accurate antenna loading information) modeled. If there are substantial modifications to be made or the assumptions made in this analysis are not accurate, FDH Engineering, Inc. should be notified immediately to perform a revised analysis.

LIMITATIONS

All opinions and conclusions are considered accurate to a reasonable degree of engineering certainty based upon the evidence available at the time of this report. All opinions and conclusions are subject to revision based upon receipt of new or additional/updated information. All services are provided exercising a level of care and diligence equivalent to the standard and care of our profession. No other warranty or guarantee, expressed or implied, is offered. Our services are confidential in nature and we will not release this report to any other party without the client's consent. The use of this engineering work is limited to the express purpose for which it was commissioned and it may not be reused, copied, or distributed for any other purpose without the written consent of FDH Engineering, Inc.

APPENDIX



DESIGNED APPURTENANCE LOADING

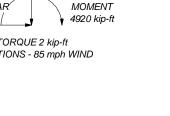
TYPE	ELEVATION	TYPE	ELEVATION
Lightning Rod	190	LNX-6515DS w/ Mount Pipe	172.5
Telwave ANT150D3 Dipole	190	LNX-6515DS w/ Mount Pipe	172.5
(3) Decibel DB844H90E-XY w/ Mount	190	S11B12	172.5
Pipes		S11B12	172.5
(3) Decibel DB844H90E-XY w/ Mount Pipes	190	S11B12	172.5
<u> </u>	400	(3) Empty Pipe Mount	158.5
(3) Decibel DB844H90E-XY w/ Mount Pipes	190	(3) Empty Pipe Mount	158.5
(2) Empty Pipe Mount	190	(3) Empty Pipe Mount	158.5
(2) Empty Pipe Mount	190	(1) 13' Low Profile Platform	158.5
(2) Empty Pipe Mount	190	(1) Standoff (Assumed)	150
(1) 14.5' Low Profile Platform	190	(1) Standoff (Assumed)	150
(2) Kathrein 742 351 w/ Mount Pipes	184	RFS PD458-2N Omni	150
(2) Kathrein 742 351 w/ Mount Pipes	184	RFS 114202C Omni	150
(2) Kathrein 742 351 w/ Mount Pipes	184	(2) Decibel DB980F65E-M w/ Mount Pipes	145
(1) 13' Low Profile Platform	184	• • • • • • • • • • • • • • • • • • • •	
AIR 21 B2A/B4P w/Mount Pipe	172.5	(2) Decibel DB980F65E-M w/ Mount Pipes	145
AIR 21 B2A/B4P w/Mount Pipe	172.5	(2) Decibel 980F65T2E-MS w/ Mount	145
AIR 21 B2A/B4P w/Mount Pipe	172.5	Pipes	
AIR 21 B4A/B2P w/Mount Pipe	172.5	Empty Mount Pipe	145
AIR 21 B4A/B2P w/Mount Pipe	172.5	Empty Mount Pipe	145
AIR 21 B4A/B2P w/Mount Pipe	172.5	Empty Mount Pipe	145
KRY 112 144/1	172.5	(1) 14.5' Low Profile Platform	145
KRY 112 144/1	172.5	(3) Standoffs (Assumed)	120
KRY 112 144/1	172.5	(2) Telewave ANT450D6 Omnis	120
(1) 13' Low Profile Platform	172.5	RFS 220-7N Omni	120
Site Pro PRK-1245 Support Kit	172.5	(1) 4' Standoff	46.5
LNX-6515DS w/ Mount Pipe	172.5	GPS	46.5

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A607-60	60 ksi	75 ksi	A607-65	65 ksi	80 ksi

TOWER DESIGN NOTES

- 1. Tower is located in New London County, Connecticut.
- Tower is located if New Edition County, Connecticut.
 Tower designed for a 85 mph basic wind in accordance with the TIA/EIA-222-F Standard.
 Tower is also designed for a 38 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
 Deflections are based upon a 50 mph wind.
 TOWER RATING: 76.4%



Tower Analysis

FDH Engineering, Inc. 6521 Meridien Drive, Suite 107 Raleigh, North Carolina 27616 Phone: 9197551012 FAX: 9197551031

Stony Brook, CT00235-B-02			
roject: 15BEFV1400 (R1)			
Client: SBA Network Services, Inc.	Drawn by: CLee	App'd:	
code: TIA/EIA-222-F	Date: 02/23/15	Scale: NTS	
ath:		Dwg No. E-	



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

T-Mobile Existing Facility

Site ID: CT11046D

Stonington / I-95/X91_1 2 Taugwank Spur Road Stonington, CT 06378

March 6, 2015

EBI Project Number: 6215001355

Site Compliance Summary		
Compliance Status:	COMPLIANT	
Site total MPE% of FCC general public allowable limit:	33.66 %	



March 6, 2015

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

Emissions Analysis for Site: CT11046D – Stonington / I-95/X91_1

EBI Consulting was directed to analyze the proposed T-Mobile facility located at **2 Taugwank Spur Road, Stonington, 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 (μ W/cm²). The number of μ W/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 (μ W/cm²). The general population exposure limit for the 700 MHz Band is 467 μ W/cm², and the general population exposure limit for the PCS and AWS bands is 1000 μ W/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 **2 Taugwank Spur Road, Stonington, 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, all calculations were performed assuming a lobe representing the maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was focused at the base of the tower. For this report the sample point is the top of 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 (PCS Band 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel
- 2) 2 UMTS channels (AWS Band 2100 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.
- 3) 2 LTE channels (AWS Band 2100 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel.
- 4) 1 LTE channel (700 MHz Band) was considered for each sector of the proposed installation. This channel has a transmit power of 30 Watts.
- 5) 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.



- 6) For the following calculations the sample point was the top of a six foot person standing at the base of the tower. The maximum gain of the antenna per the antenna manufactures supplied specifications minus 10 dB was used in this direction. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.
- 7) The antennas used in this modeling are the **Ericsson AIR21 B4A/B2P** for 1900 MHz (PCS) and 2100 MHz (AWS) channels and the **Commscope LNX-6515DS-VTM** for 700 MHz channels. This is based on feedback from the carrier with regards to anticipated antenna selection. The **Ericsson AIR21 B4A/B2P** has a maximum gain of **15.9 dBd** at its main lobe. The **Commscope LNX-6515DS-VTM** has a maximum gain of **14.6 dBd** at its main lobe. The maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was used for all calculations. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.
- 8) The antenna mounting height centerline of the proposed antennas is **172.5 feet** above ground level (AGL).
- 9) 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 calculations were done with respect to uncontrolled / general public threshold limits.



T-Mobile Site Inventory and Power Data

Sector:	A	Sector:	В	Sector:	С
Antenna #:	1	Antenna #:	1	Antenna #:	1
Make / Model:	Ericsson AIR21 B4A/B2P	Make / Model:	Ericsson AIR21 B4A/B2P	Make / Model:	Ericsson AIR21 B4A/B2P
Gain:	15.9 dBd	Gain:	15.9 dBd	Gain:	15.9 dBd
Height (AGL):	172.5	Height (AGL):	172.5	Height (AGL):	172.5
Frequency Bands	1900 MHz(PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz(PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz(PCS) / 2100 MHz (AWS)
Channel Count	2	Channel Count	2	# PCS Channels:	2
Total TX Power:	120	Total TX Power:	120	# AWS Channels:	120
ERP (W):	4,668.54	ERP (W):	4,668.54	ERP (W):	4,668.54
Antenna A1 MPE%	0.61	Antenna B1 MPE%	0.61	Antenna C1 MPE%	0.61
Antenna #:	2	Antenna #:	2	Antenna #:	2
Make / Model:	Ericsson AIR21 B2A/B4P	Make / Model:	Ericsson AIR21 B2A/B4P	Make / Model:	Ericsson AIR21 B2A/B4P
Gain:	15.9 dBd	Gain:	15.9 dBd	Gain:	15.9 dBd
Height (AGL):	172.5	Height (AGL):	172.5	Height (AGL):	172.5
Frequency Bands	1900 MHz(PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz(PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz(PCS) / 2100 MHz (AWS)
Channel Count	4	Channel Count	4	Channel Count	4
Total TX Power:	120	Total TX Power:	120	Total TX Power:	120
ERP (W):	4,668.54	ERP (W):	4,668.54	ERP (W):	4,668.54
Antenna A2 MPE%	0.61	Antenna B2 MPE%	0.61	Antenna C2 MPE%	0.61
Antenna #:	3	Antenna #:	3	Antenna #:	3
Make / Model:	Commscope LNX- 6515DS-VTM	Make / Model:	Commscope LNX- 6515DS-VTM	Make / Model:	Commscope LNX- 6515DS-VTM
Gain:	14.6 dBd	Gain:	14.6 dBd	Gain:	14.6 dBd
Height (AGL):	172.5	Height (AGL):	172.5	Height (AGL):	172.5
Frequency Bands	700 Mhz	Frequency Bands	700 Mhz	Frequency Bands	700 Mhz
Channel Count	1	Channel Count	1	Channel Count	1
Total TX Power:	30	Total TX Power:	30	Total TX Power:	30
ERP (W):	865.21	ERP (W):	865.21	ERP (W):	865.21
Antenna A3 MPE%	0.24	Antenna B3 MPE%	0.24	Antenna C3 MPE%	0.24

Site Composite MPE%			
Carrier	MPE%		
T-Mobile	4.35		
Nextel	1.58 %		
Public Safety	0.38 %		
Sprint	3.07 %		
CL&P	21.96 %		
MetroPCS	2.32 %		
Site Total MPE %:	33.66 %		

T-Mobile Sector 1 Total:	1.45 %
T-Mobile Sector 2 Total:	1.45 %
T-Mobile Sector 3 Total:	1.45 %
Site Total:	33.66 %



Summary

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

The anticipated maximum composite contributions from the T-Mobile facility as well as the site composite emissions value with regards to compliance with FCC's allowable limits for general public exposure to RF Emissions are shown here:

T-Mobile Sector	Power Density Value (%)
Sector 1:	1.45 %
Sector 2:	1.45 %
Sector 3:	1.45 %
T-Mobile Total:	4.35 %
Site Total:	33.66 %
Site Compliance Status:	COMPLIANT

The anticipated composite MPE value for this site assuming all carriers present is **33.66%** of the allowable FCC established general public limit sampled at the ground level. This is based upon values listed in the Connecticut Siting Council database for existing carrier emissions.

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

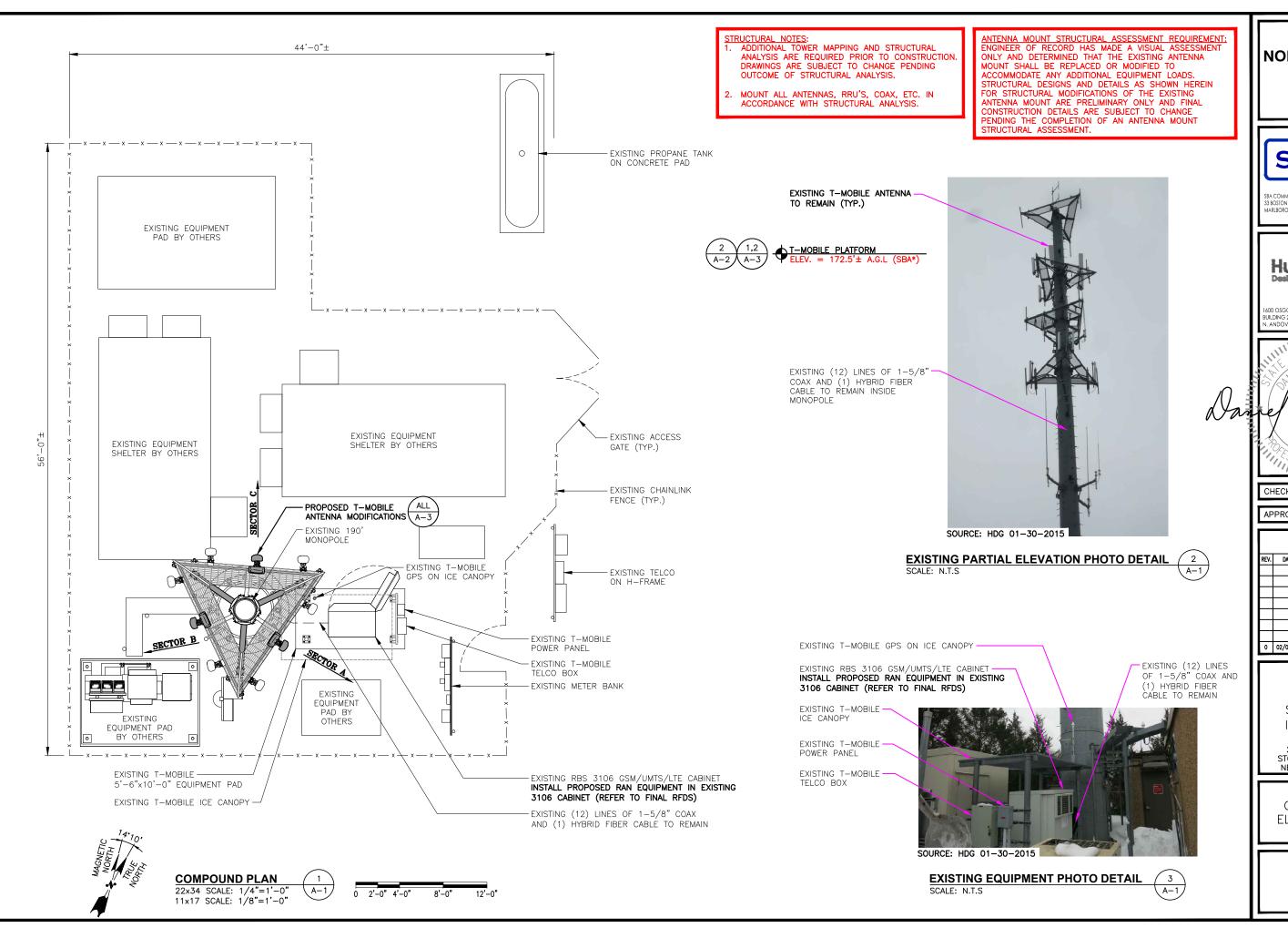
Scott Heffernan

RF Engineering Director

EBI Consulting

21 B Street

Burlington, MA 01803



T-MOBILE **NORTHEAST LLC**

> 35 GRIFFIN ROAD SOUTH BLOOMFIELD, CT 06002 OFFICE: (860) 648-1116



BA COMMUNICATIONS CORP. 33 BOSTON POST ROAD WEST, SUITE 320 TEL: (508) 251-0720 MARLBOROUGH, MA 01752 FAX: (508) 251-175:



BUILDING 20 NORTH, SUITE 3090 TEL: (978) 557-5553 N. ANDOVER, MA 01845 FAX: (978) 336-5586



CHECKED BY:

APPROVED BY:

DPH

	SUBMITTALS			
RE	/. DATE DESCRIPTION BY			
0	02/09/15	ISSUED FOR CONSTRUCTION	JA	
_				

SITE NUMBER: CT11046D SITE NAME:

STONINGTON/ I-95/ X91_1

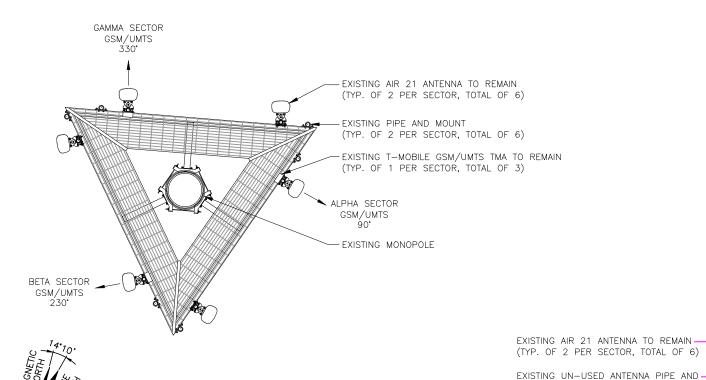
SITE ADDRESS: 2 TAUGWONK SPUR STONINGTON, CT 06378

NEW LONDON COUNTY SHEET TITLE

COMPOUND & ELEVATION PLAN

SHEET NUMBER

A-1



PROPOSED T-MOBILE ANTENNA

(TYP. OF 1 PER SECTOR, TOTAL OF 3)

(TYP. OF 1 PER SECTOR, TOTAL OF 3)

EXISTING AIR 21 ANTENNA TO REMAIN (TYP. OF 2 PER SECTOR, TOTAL OF 6) -EXISTING UN-USED ANTENNA PIPE AND CROSS-OVER PLATE SHALL BE REMOVED (TYP. OF 2 PER SECTOR, TOTAL OF 6)

PROPOSED T-MOBILE RRU PROPOSED PIPE (3

EXISTING T-MOBILE GSM/UMTS TMA TO REMAIN (TYP. OF 1 PER SECTOR, TOTAL OF 3)

ON PROPOSED PIPE

- EXISTING MONOPOLE

PROPOSED MONOPOLE

REINFORCEMENT KIT (SITE PRO1 PRK 1245)

ALPHA SECTOR

LTE 90°

ANTENNA MOUNT STRUCTURAL ASSESSMENT REQUIREMENT: ENGINEER OF RECORD HAS MADE A VISUAL ASSESSMENT ONLY AND DETERMINED THAT THE EXISTING ANTENNA MOUNT SHALL BE REPLACED OR MODIFIED TO ACCOMMODATE ANY ADDITIONAL EQUIPMENT LOADS. STRUCTURAL DESIGNS AND DETAILS AS SHOWN HEREIN FOR STRUCTURAL MODIFICATIONS OF THE EXISTING ANTENNA MOUNT ARE PRELIMINARY ONLY AND FINAL CONSTRUCTION DETAILS ARE SUBJECT TO CHANGE PENDING THE COMPLETION OF AN ANTENNA MOUNT TRUCTURAL ASSESSMENT.

- STRUCTURAL NOTES:

 1. ADDITIONAL TOWER MAPPING AND STRUCTURAL

 TO CONSTRUCT ANALYSIS ARE REQUIRED PRIOR TO CONSTRUCTION DRAWINGS ARE SUBJECT TO CHANGE PENDING OUTCOME OF STRUCTURAL ANALYSIS.
- MOUNT ALL ANTENNAS, RRU'S, COAX, ETC. IN ACCORDANCE WITH STRUCTURAL ANALYSIS.

SPECIAL WORK NOTE: VERTICALLY CENTER ON EXISTING MOUNTING RAIL, THE PIPE MAST AND ANTENNA

PROPOSED T-MOBILE ANTENNA ON PROPOSED PIPE (TYP. OF 1 PER SECTOR, TOTAL OF 3)



PROPOSED T-MOBILE RRU ON PROPOSED PIPE (TYP. OF 1 PER SECTOR, TOTAL OF 3)



PROPOSED MONOPOLE REINFORCEMENT KIT (SITE PRO1 PRK 1245)

NEW LONDON COUNTY SHEET TITLE EXISTING & PROPOSED ANTENNA PLANS

T-MOBILE **NORTHEAST LLC**

35 GRIFFIN ROAD SOUTH

BLOOMFIELD, CT 06002 OFFICE: (860) 648-1116

3 BOSTON POST ROAD WEST, SUITE 320 TEL: (508) 251-0720 MARLBOROUGH, MA 01752 FAX: (508) 251-175:

BUILDING 20 NORTH, SUITE 3090 TEL: (978) 557-5553 N. ANDOVER, MA 01845 FAX: (978) 336-5586

SBA

BA COMMUNICATIONS CORP.

Hudson Design Groupus

CHECKED BY:

APPROVED BY:

SUBMITTALS

0 02/09/15 ISSUED FOR CONSTRUCTION JA

CT11046D

SITE NAME:

STONINGTON/

I-95/ X91_1

SITE ADDRESS: 2 TAUGWONK SPUR

STONINGTON, CT 06378

DESCRIPTION

DPH

SHEET NUMBER

A-2



SCALE: N.T.S

CROSS-OVER PLATE SHALL BE REMOVED

(TYP. OF 1 PER SECTOR, TOTAL OF 3)

PROPOSED ANTENNA PLAN SCALE: N.T.S

EXISTING ANTENNA PLAN

GAMMA SECTOR

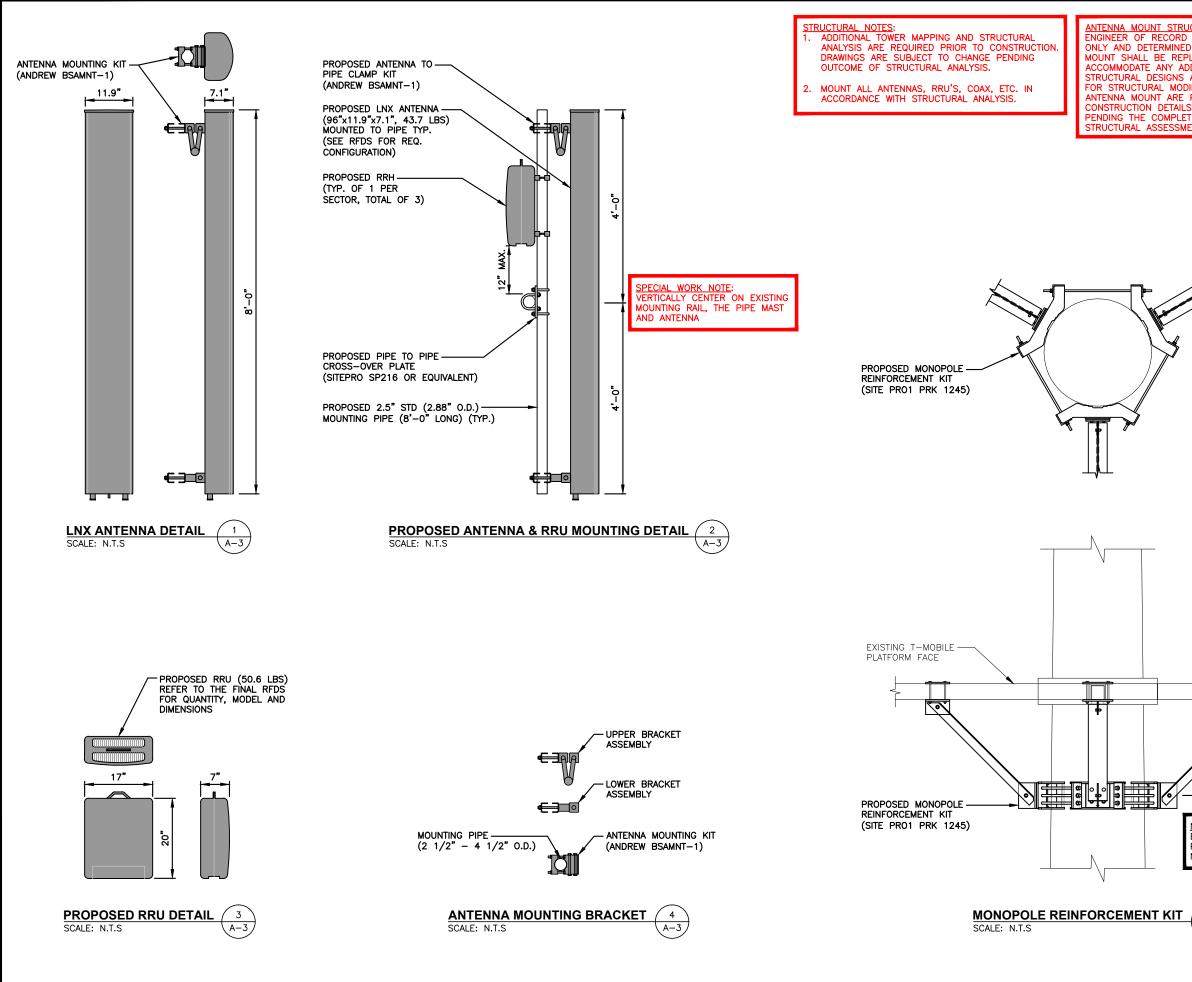
330°

SCALE: N.T.S

BETA SECTOR

LTE 230°

PROPOSED ANTENNA PHOTO DETAIL



ANTENNA MOUNT STRUCTURAL ASSESSMENT REQUIREMENT: ENGINEER OF RECORD HAS MADE A VISUAL ASSESSMENT ONLY AND DETERMINED THAT THE EXISTING ANTENNA MOUNT SHALL BE REPLACED OR MODIFIED TO

ANALYSIS ARE REQUIRED PRIOR TO CONSTRUCTION DRAWINGS ARE SUBJECT TO CHANGE PENDING

CCOMMODATE ANY ADDITIONAL EQUIPMENT LOADS. TRUCTURAL DESIGNS AND DETAILS AS SHOWN HEREIN FOR STRUCTURAL MODIFICATIONS OF THE EXISTING ANTENNA MOUNT ARE PRELIMINARY ONLY AND FINAL CONSTRUCTION DETAILS ARE SUBJECT TO CHANGE PENDING THE COMPLETION OF AN ANTENNA MOUNT

NOTE: EXISTING MOUNTING

PIPES AND ANTENNAS

NOT SHOWN FOR CLARIT

STRUCTURAL ASSESSMENT. SBA BA COMMUNICATIONS CORP. 33 BOSTON POST ROAD WEST, SUITE 320 TEL: (508) 251-0720 MARLBOROUGH, MA 01752 FAX: (508) 251-175:



T-MOBILE

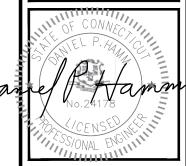
NORTHEAST LLC

35 GRIFFIN ROAD SOUTH

BLOOMFIELD, CT 06002

OFFICE: (860) 648-1116

BUILDING 20 NORTH, SUITE 3090 TEL: (978) 557-5553 N. ANDOVER, MA 01845 FAX: (978) 336-5586



CHECKED BY:

APPROVED BY:

SUBMITTALS DESCRIPTION 0 02/09/15 ISSUED FOR CONSTRUCTION JA

DPH

SITE NUMBER: CT11046D SITE NAME: STONINGTON/ I-95/ X91_1 SITE ADDRESS:

2 TAUGWONK SPUR STONINGTON, CT 06378 NEW LONDON COUNTY

> SHEET TITLE **DETAILS**

A-3