



May 27, 2014

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

RE: Notice of Exempt Modification  
500 Moose Hill Road  
Monroe, CT 06468  
Sprint Site #: NV2.5\_CT03XC364  
N 41° 19' 15.48"  
W -73° 12' 5.12"

Dear Mr. Martin and Members of the Siting Council:

On behalf of Sprint Spectrum, SBA Communications is submitting an exempt modification application to the Connecticut Siting Council for modification of existing equipment at a tower facility located at 500 Moose Hill Road, Monroe, CT.

The 500 Moose Hill Road facility consists of a 149' MONOPOLE Tower owned and operated by SBA Infrastructure, LLC. In order to accommodate technological changes and enhance system performance in the State of Connecticut, Sprint Spectrum 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 Sprint's Network Vision modification project, Sprint 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 Sprint'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).

1. 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.
3. 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 Sprint Spectrum, respectfully submits that the 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 x 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@sbsite.com](mailto:kpelletier@sbsite.com)



**Sprint Spectrum  
Equipment Modification**

500 Moose Hill Road, Monroe, CT  
Site number CT03XC364

**Tower Owner:** SBA Infrastructure, LLC

**Equipment Configuration:** MONOPOLE Tower

**Current and/or approved:**

- (3) RFS APXVSP18-C-A20
- (3) Alcatel lucent 1900 MHz RRHs
- (3) Alcatel lucent 800 MHz RRHs
- (3) Alcatel lucent 800 MHz Filters
- (4) RFS ACU-A20-N RETs
- (3) Argus LLPX310R
- (1) Andrew VHLP2-11 Dish
- (1) Andrew VHLP800-11-DW1 Dish
- (3) U-RAS Flexible RRH ODUs
- (3) 1-1/4" Feed lines
- (2) 1/2" Feed lines
- (6) 5/16" Feed lines

**Planned Modifications:**

- (3) RFS APXVTM14-C-I20
- (3) ALU TD-RRH8x20-25 RRUs
- (3) RFS APXVSP18-C-A20
- (3) Alcatel lucent 1900 MHz RRHs
- (3) Alcatel lucent 800 MHz RRHs
- (3) Alcatel lucent 800 MHz Filters
- (4) RFS ACU-A20-N RETs
- (3) Argus LLPX310R
- (1) Andrew VHLP2-11 Dish
- (1) Andrew VHLP800-11-DW1 Dish
- (3) U-RAS Flexible RRH ODUs
- (4) 1-1/4" Feed lines
- (2) 1/2" Feed Lines
- (6) 5/16" Feed lines

**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 Sprint facility are 11.266% of the allowable FCC established general public limit. The anticipated composite MPE value for this site assuming all carriers present is 99.966% of the allowable FCC established general public limit sampled at the ground level.

Site Composite MPE %	
Carrier	MPE %
Sprint	11.266%
T-Mobile	0.240%
Clearwire	0.860%
Microwave (Sprint)	10.570%
AT&T	9.890%
Nextel	6.580%
Verizon Wireless	60.560%
Total Site MPE %	99.966%



May 27, 2014

Mr. Steve Vavrek  
First Selectman  
Town of Monroe  
Monroe Town Hall  
7 Fan Hill Road  
Monroe, CT 06468

RE: Telecommunications Facility @ 500 Moose Hill Road, Monroe, CT

Dear Mr. Vavrek,

In order to accommodate technological changes and enhance system performance in the State of Connecticut, Sprint Spectrum 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 Sprint'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 Sprint'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,

A handwritten signature in blue ink, appearing to read "Kri Pelletier", is positioned below the "Thank you," text.

Kri Pelletier  
SBA Communications Company  
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@sbsite.com](mailto:kpelletier@sbsite.com)

RADIO FREQUENCY FCC REGULATORY COMPLIANCE  
MAXIMUM PERMISSIBLE EXPOSURE (MPE) ASSESSMENT

Sprint Existing Facility

Site ID: CT03XC364

Monroe / Dwyer

500 Moose Hill Road  
Monroe, CT 06468

**May 20, 2014**

**EBI Project Number: 62143080**

May 20, 2014

Sprint  
Attn: RF Engineering Manager  
1 International Boulevard, Suite 800  
Mahwah, NJ 07495

Re: Radio Frequency Maximum Permissible Exposure (MPE) Assessment for Site:  
**CT03XC364 - Monroe / Dwyer**

**Site Total: 99.966% - MPE % in full compliance**

EBI Consulting was directed to analyze the proposed upgrades to the existing Sprint facility located at 500 Moose Hill Road, Monroe, CT, for the purpose of determining whether the radio frequency (RF) exposure levels from the proposed Sprint equipment upgrades on this property are within specified federal limits.

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

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

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

Public exposure to radio frequencies is regulated and enforced in units of microwatts per square centimeter ( $\mu\text{W}/\text{cm}^2$ ). The general population exposure limit for the cellular band (850 MHz Band) is approximately  $567 \mu\text{W}/\text{cm}^2$ , and the general population exposure limit for the 1900 MHz and 2500 MHz bands is  $1000 \mu\text{W}/\text{cm}^2$ . Because each carrier will be using different frequency bands, and each frequency band has different exposure limits, it is necessary to report percent of MPE rather than power density.

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

Additional details can be found in FCC OET 65.

## **CALCULATIONS**

Calculations were done for the proposed upgrades to the existing Sprint Wireless antenna facility located at 500 Moose Hill Road, Monroe, CT, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. All calculations were performed assuming the main lobe of the antenna was focused at the base of the tower to present a worst case scenario. Actual values seen from this site will be dramatically less than those shown in this report. 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 emissions were calculated using the following assumptions:

- 1) 3 channels in the 1900 MHz Band were considered for each sector of the proposed installation.
- 2) 1 channel in the 800 MHz Band was considered for each sector of the proposed installation
- 3) 2 channels in the 2500 MHz Band 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 maximum gain of the antenna per the antenna manufactures supplied specifications was used in this direction.



- 6) The antennas used in this modeling are the RFS APXVSPP18-C-A20 and the RFS APXVTMM-C-120. This is based on feedback from the carrier with regards to anticipated antenna selection. The RFS APXVSPP18-C-A20 has a 15.9 dBd gain value at its main lobe at 1900 MHz and 13.4 dBd at its main lobe for 850 MHz. The RFS APXVTMM-C-120 has a 15.9 dBd gain value at its main lobe at 2500 MHz. All calculations were performed assuming the main lobe of the antenna was focused at the base of the tower to present a worst case scenario.
- 7) The antenna mounting height centerline for the proposed antennas is **147 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	CT03XC364 - Monroe ./ Dwyer
Site Address	500 Moose Hill Road, Monroe, CT 06468
Site Type	Monopole

**Sector 1**

Antenna Number	Antenna Make	Antenna Model	Radio Type	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 (dB)	ERP	Power Density Percentage
1a	RFS	APXVSP18-C-A20	RRH	1900 MHz	CDMA / LTE	20	3	60	15.9	147	141	1/2 "	0.5	3	1042.6805	1.88547%
1a	RFS	APXVSP18-C-A20	RRH	850 MHz	CDMA / LTE	20	1	20	13.4	147	141	1/2 "	0.5	3	195.44744	0.62333%
1B	RFS	APXVTMM14-C-120	RRH	2500 MHz	CDMA / LTE	20	2	40	13.4	147	141	1/2 "	0.5	3	390.89489	1.24665%
Sector total Power Density Value:																3.755%

**Sector 2**

Antenna Number	Antenna Make	Antenna Model	Radio Type	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 (dB)	ERP	Power Density Percentage
2a	RFS	APXVSP18-C-A20	RRH	1900 MHz	CDMA / LTE	20	3	60	15.9	147	141	1/2 "	0.5	3	1042.6805	1.88547%
2a	RFS	APXVSP18-C-A20	RRH	850 MHz	CDMA / LTE	20	1	20	13.4	147	141	1/2 "	0.5	3	195.44744	0.62333%
2B	RFS	APXVTMM14-C-120	RRH	2500 MHz	CDMA / LTE	20	2	40	13.4	147	141	1/2 "	0.5	3	390.89489	1.24665%
Sector total Power Density Value:																3.755%

**Sector 3**

Antenna Number	Antenna Make	Antenna Model	Radio Type	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 (dB)	ERP	Power Density Percentage
3a	RFS	APXVSP18-C-A20	RRH	1900 MHz	CDMA / LTE	20	3	60	15.9	147	141	1/2 "	0.5	3	1042.6805	1.88547%
3a	RFS	APXVSP18-C-A20	RRH	850 MHz	CDMA / LTE	20	1	20	13.4	147	141	1/2 "	0.5	3	195.44744	0.62333%
3B	RFS	APXVTMM14-C-120	RRH	2500 MHz	CDMA / LTE	20	2	40	13.4	147	141	1/2 "	0.5	3	390.89489	1.24665%
Sector total Power Density Value:																3.755%

Site Composite MPE %	
Carrier	MPE %
Sprint	11.266%
T-Mobile	0.240%
Clearwire	0.860%
Microwave (Sprint)	10.570%
AT&T	9.890%
Nextel	6.580%
Verizon Wireless	60.560%
<b>Total Site MPE %</b>	<b>99.966%</b>

## Summary

All calculations performed for this analysis yielded results that were well within the allowable limits for general public Maximum Permissible Exposure (MPE) to radio frequency energy.

The anticipated Maximum Composite contributions from the Sprint facility are **15.252% (5.084% 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 **57.862%** of the allowable FCC established general public limit sampled at 6 feet above ground level. This total composite site value is based upon MPE 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.**

**149' Monopole Tower**

**SBA Site Name: Moosehill  
SBA Site ID: CT13056-A-03  
Sprint Site ID: CT03XC364**

FDH Project Number 1462G21400

**Analysis Results**

Tower Components	97.6%	Sufficient
Foundation	97.9%	Sufficient

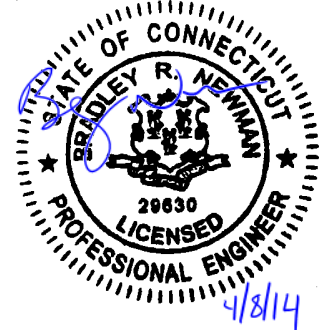
Prepared By:

Blake A. Wilson, EI  
Project Engineer

Reviewed By:

Bradley R. Newman, PE  
Senior Project Engineer  
CT PE License No. 29630

**FDH Engineering, Inc.**  
6521 Meridien Drive  
Raleigh, NC 27616  
(919) 755-1012  
info@fdh-inc.com



April 8, 2014

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

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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 Monroe, 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 Building Code (CBC)*. Information pertaining to the existing/proposed antenna loading, current tower geometry, geotechnical data, and member sizes was obtained from:

- Sabre Communications Corporation (Job No. 02-03107 Revision A) Structural Design Report dated April 3, 2002
- FDH, Inc. (Job No. 08-07121T Revised) TIA Inspection Report dated November 10, 2008
- SBA Network Services, Inc.

The *basic design wind speed* per the *TIA/EIA-222-F* standards and *2005 CBC* 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 Sprint in place at 147 ft, the tower meets the requirements of the *TIA/EIA-222-F* standards and *2005 CBC* provided the **Recommendations** listed below are satisfied. Furthermore, provided the foundations were designed and constructed to support the original design reactions (see Sabre Job No.02-03107 Revision A), the foundation should have the necessary capacity to support both 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 CBC* are met with the existing and proposed loading in place, we have the following recommendations:

1. The proposed feedlines must be installed outside the pole's shaft, as shown in **Figure 1**.
2. RRU/RRH Stipulation: The proposed equipment may be installed in any arrangement as 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	Feedlines <sup>1</sup>	Carrier	Mount Elevation (ft)	Mount Type
152.5	(1) Decibel DB404-B Dipole	(1) 7/8"	Town of Monroe	149	(1) Pipe Mount
147 <sup>2</sup>	(3) RFS APXVSP18-C-A20 (3) Alcatel lucent 1900 MHz RRHs (3) Alcatel lucent 800 MHz RRHs (3) Alcatel lucent 800 MHz Filters (4) RFS ACU-A20-N RETs (3) Argus LLPX310R (1) Andrew VHLP2-11 Dish (1) Andrew VHLP800-11-DW1 Dish (3) U-RAS Flexible RRH ODUs	(3) 1-1/4" (2) 1/2" (6) 5/16"	Sprint/Clearwire	147	(1) 12.5' Low Profile Platform
139	(6) Powerwave 7770 (3) Powerwave P65-16 (6) Powerwave LGP 21401 TMAs (6) Powerwave LGP 13519 Diplexers (6) Ericsson RRUS-11 RRHs (1) Raycap DC6-48-60-18-8F Surge Suppressor	(12) 1-1/4" (1) 0.393" (2) 0.645"	AT&T	139	(1) 13' Low Profile Platform
---	---	---	---	128	(1) 12.5' Low Profile Platform
121	(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	121	(1) 13' Low Profile Platform
109	(12) Decibel DB844H90E-XY	(12) 7/8"	Nextel	109	(1) 14' Low Profile Platform
99 <sup>3</sup>	(1) Antel BXA-70063/4CF (2) Antel BXA-171063/8BF (1) Antel BXA-70063/6CF (1) Antel BXA-171063/12BF (4) RFS APL866513-42TO (2) Antel LPA-80063/6CF (1) Swedcom SLCP 2x6014F (3) Kathrein 7442213_2110_P45_02.0 (3) Alcatel Lucent RRH 2x40-AWS RRHs (6) RFS FD9R6004/2C-3L Diplexers (1) RFS DB-T1-6Z-8AB-0Z Distribution Box	(12) 1-5/8" (1) 1-5/8" Fiber	Verizon	99	(1) 12.5' Low Profile Platform
65.5 <sup>4</sup>	(1) Decibel 26OB GPS	(1) 1/2"	Sprint	64	(1) 3' Standoff

1. Feed lines installed inside the pole's shaft unless otherwise noted.
2. The (3) 1-1/4" coax for Sprint/Clearwire is installed on the outside of the pole's shaft, single stacked.
3. The (12) 1-5/8" coax for Verizon at 99 ft is installed on the outside of the pole's shaft, double stacked.
4. The (1) 1/2" coax for Sprint at 64 ft is installed on the outside of the pole's shaft.

**Proposed Loading:**

Antenna Elevation (ft)	Description	Feedlines <sup>1</sup>	Carrier	Mount Elevation (ft)	Mount Type
147	(3) RFS APXVTM14-C-I20 (3) ALU TD-RRH8x20-25 RRUs (3) RFS APXVSPP18-C-A20 (3) Alcatel lucent 1900 MHz RRHs (3) Alcatel lucent 800 MHz RRHs (3) Alcatel lucent 800 MHz Filters (4) RFS ACU-A20-N RETs (3) Argus LLPX310R (1) Andrew VHLP2-11 Dish (1) Andrew VHLP800-11-DW1 Dish (3) U-RAS Flexible RRH ODUs	(4) 1-1/4" (2) 1/2 (6) 5/16	Sprint/Clearwire	147	(1) 12.5' Low Profile Platform

1. The (4) 1-1/4" coax for Sprint/Clearwire is installed on the outside of the pole's shaft, single stacked.



## 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	65 ksi
Flange Plate	60 ksi
Flange Bolts	Fu = 120 ksi
Base Plate	60 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. *Note: Capacities up to 100 % are considered acceptable.* **Table 4** displays the maximum foundation reactions. **Table 5** displays the maximum antennas rotations at service wind speeds (dishes only).

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	149 – 129	Pole	TP28.82x24x0.1875	34.6	Pass
	129	Flange Bolts	(8) 1" Ø w/ BC = 32.5"	68.8	Pass
	129	Flange Plate	36.25" Ø PL x 1" thk.	61.1	Pass
L2	129 – 96	Pole	TP36.9x28.82x0.25	68.3	Pass
L3	96 - 47.25	Pole	TP48.15x35.237x0.3125	96.8	Pass
L4	47.25 – 0	Pole	TP58.91x46.0768x0.375	97.6	Pass
		Anchor Bolts	(16) 2.25" Ø w/ BC = 66"	94.5	Pass
		Base Plate	PL 64" Sq x 3" Thk.	75.1	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	42 k	45 k
Shear*	39 k	39 k
Moment	4,111 k-ft	4,184 k-ft

\* Per our experience with foundations of similar type, the shear loading should not control the foundation analysis.

**Table 5 - Maximum Antenna Rotations at Service Wind Speeds (Dishes Only)**

Centerline Elevation (ft)	Antenna	Tilt* (deg)	Twist* (deg)
147	(1) Andrew VHLP2-11 Dish (1) Andrew VHLP800-11-DW1 Dish	1.8896	0.0034

\*Allowable tilt and twist values to be determined by the carrier.

## 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**

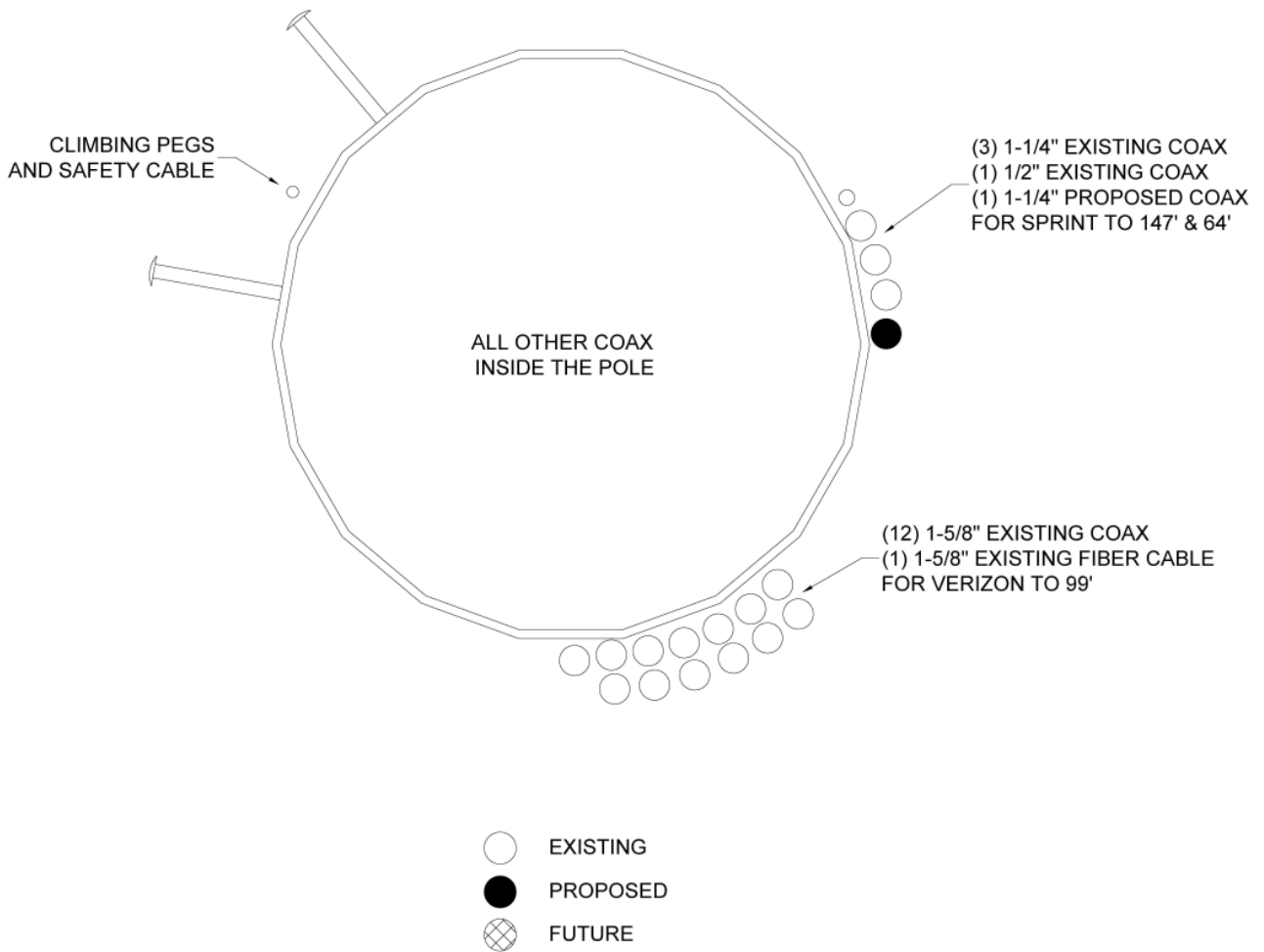


Figure 1 – Assumed Feed Line Layout

## DESIGNED APPURTENANCE LOADING

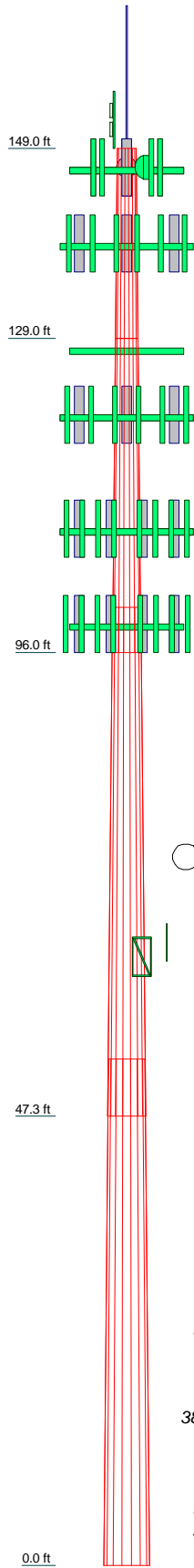
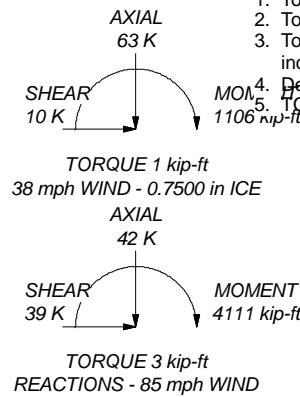
TYPE	ELEVATION	TYPE	ELEVATION
Lightning Rod	149	(2) 7770.00 w/Mount Pipe	139
Pipe Mount	149	P65-16 w/Mount Pipe	139
DB404-B	149	P65-16 w/Mount Pipe	139
Pipe Mount	149	P65-16 w/Mount Pipe	139
APXVSPP18-C-A20 w/Mount Pipe	147	(2) LGP21401 TMA	139
APXVSPP18-C-A20 w/Mount Pipe	147	(2) LGP21401 TMA	139
APXVSPP18-C-A20 w/Mount Pipe	147	(4) Empty Mount Pipe	128
LLPX310R w/Mount Pipe	147	(4) Empty Mount Pipe	128
LLPX310R w/Mount Pipe	147	(4) Empty Mount Pipe	128
LLPX310R w/Mount Pipe	147	12.5' Low Profile Platform	128
U-RAS Flexible RRH ODU	147	KRY 112 144 TMA	121
U-RAS Flexible RRH ODU	147	13' Low Profile Platform	121
U-RAS Flexible RRH ODU	147	AIR 21 B4A/B2P w/Mount Pipe	121
1900 MHz RRH	147	AIR 21 B4A/B2P w/Mount Pipe	121
1900 MHz RRH	147	KRY 112 144 TMA	121
1900 MHz RRH	147	KRY 112 144 TMA	121
800 MHz RRH	147	AIR 21 B2A/B4P w/Mount Pipe	121
800 MHz RRH	147	AIR 21 B2A/B4P w/Mount Pipe	121
800 MHz RRH	147	AIR 21 B2A/B4P w/Mount Pipe	121
800 MHz Filter	147	AIR 21 B4A/B2P w/Mount Pipe	121
800 MHz Filter	147	(4) DB844H90E-XY w/Mount Pipe	109
800 MHz Filter	147	(4) DB844H90E-XY w/Mount Pipe	109
ACU-A20-N RET	147	(4) DB844H90E-XY w/Mount Pipe	109
ACU-A20-N RET	147	14' Low Profile Platform	109
ACU-A20-N RET	147	LPA-80063/6CF w/ Mount Pipe	99
12.5' Low Profile Platform	147	LPA-80063/6CF w/ Mount Pipe	99
APXVTM14-C-I20 w/Mount Pipe	147	SLCP 2x6014F w/ Mount Pipe	99
APXVTM14-C-I20 w/Mount Pipe	147	742213_2110_P45_02.0 w/ Mount Pipe	99
APXVTM14-C-I20 w/Mount Pipe	147	742213_2110_P45_02.0 w/ Mount Pipe	99
TD-RRH8x20-25	147	742213_2110_P45_02.0 w/ Mount Pipe	99
TD-RRH8x20-25	147	RRH2X40-AWS	99
TD-RRH8x20-25	147	RRH2X40-AWS	99
VHLP2-11	147	RRH2X40-AWS	99
VHLP800-11-DW1	147	(2) FD9R6004/2C-3L Diplexer	99
(2) LGP21401 TMA	139	(2) FD9R6004/2C-3L Diplexer	99
(2) LGP13519 Diplexer	139	(2) FD9R6004/2C-3L Diplexer	99
(2) LGP13519 Diplexer	139	DB-T1-6Z-8AB-0Z	99
(2) LGP13519 Diplexer	139	12.5' Low Profile Platform	99
(2) RRUS-11	139	BXA-171063-12BF w/ Mount Pipe	99
(2) RRUS-11	139	APL866513-42TO w/ Mount Pipe	99
(2) RRUS-11	139	APL866513-42TO w/ Mount Pipe	99
DC6-48-60-18-8F Surge Arrestor	139	(2) APL866513-42TO w/ Mount Pipe	99
Empty Mount Pipe	139	BXA-70063/4CF w/ Mount Pipe	99
Empty Mount Pipe	139	BXA-171063/8BF w/ Mount Pipe	99
Empty Mount Pipe	139	BXA-171063/8BF w/ Mount Pipe	99
13' Low Profile Platform	139	BXA-70063/6CF w/Mount Pipe	99
(2) 7770.00 w/Mount Pipe	139	Decibel - 260B GPS	64
(2) 7770.00 w/Mount Pipe	139	3' Standoff	64

### MATERIAL STRENGTH

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

### TOWER DESIGN NOTES

1. Tower is located in Fairfield 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: 97.6%



Section	1	2	3	4	Grade	Weight (K)
Length (ft)	20.00	33.00	53.50	53.25	A572-65	22.7
Number of Sides	18	18	18	18		
Thickness (in)	0.1875	0.2500	0.3125	0.3750		
Socket Length (ft)		4.75	6.00	46.0768		
Top Dia (in)	24.0000	28.8200	36.2370	58.9100		
Bot Dia (in)	28.8200	36.9000	48.1500			
Grade						
Weight (K)	1.1	2.9	7.5	11.2		

**FDH Engineering, Inc.**

6521 Meridian Drive, Suite 107

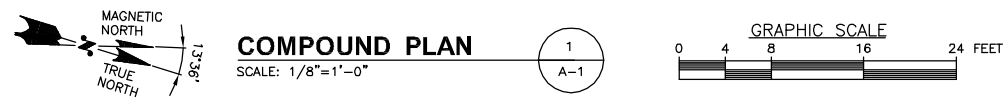
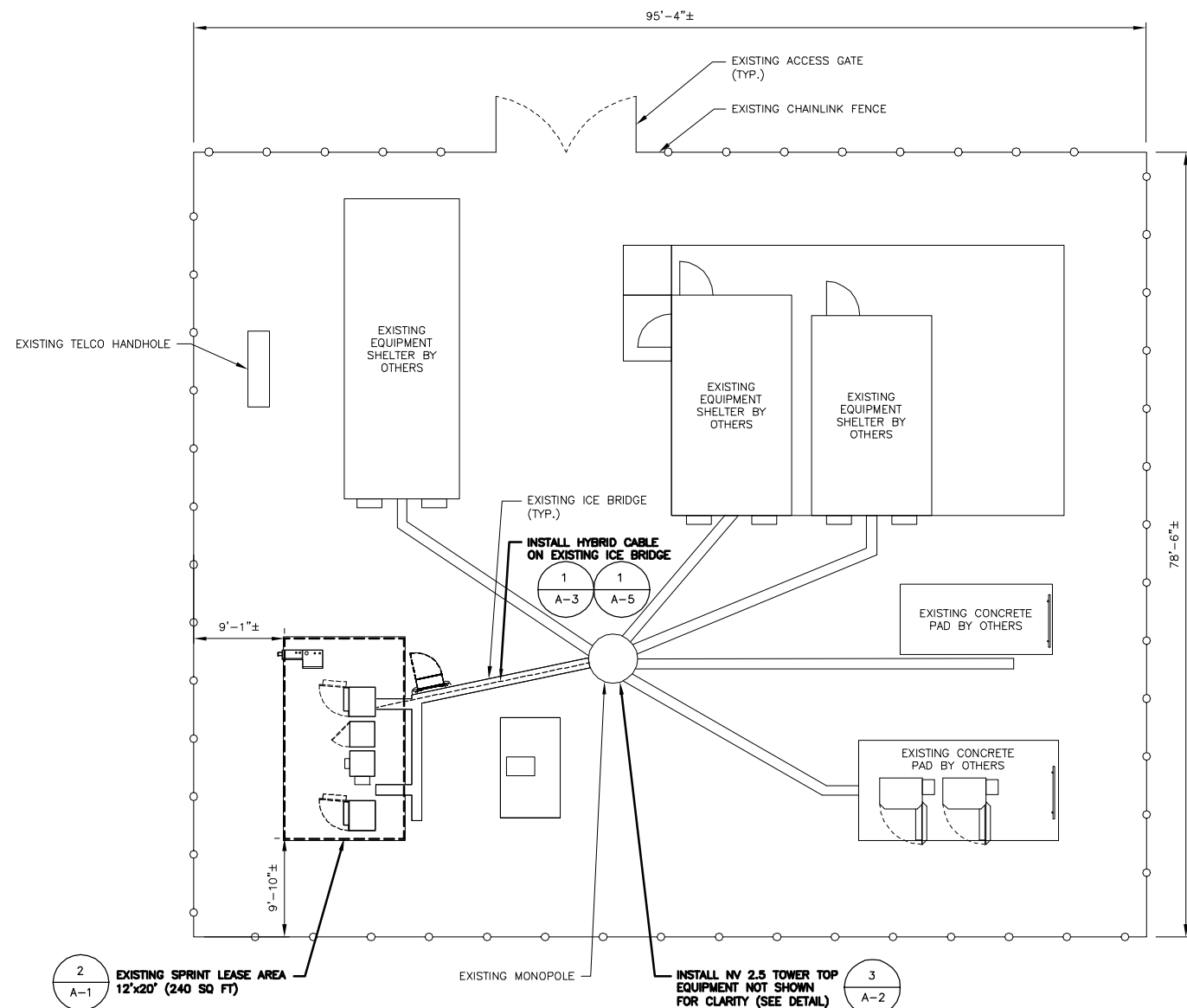
Raleigh, North Carolina

Phone: 9197551012

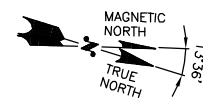
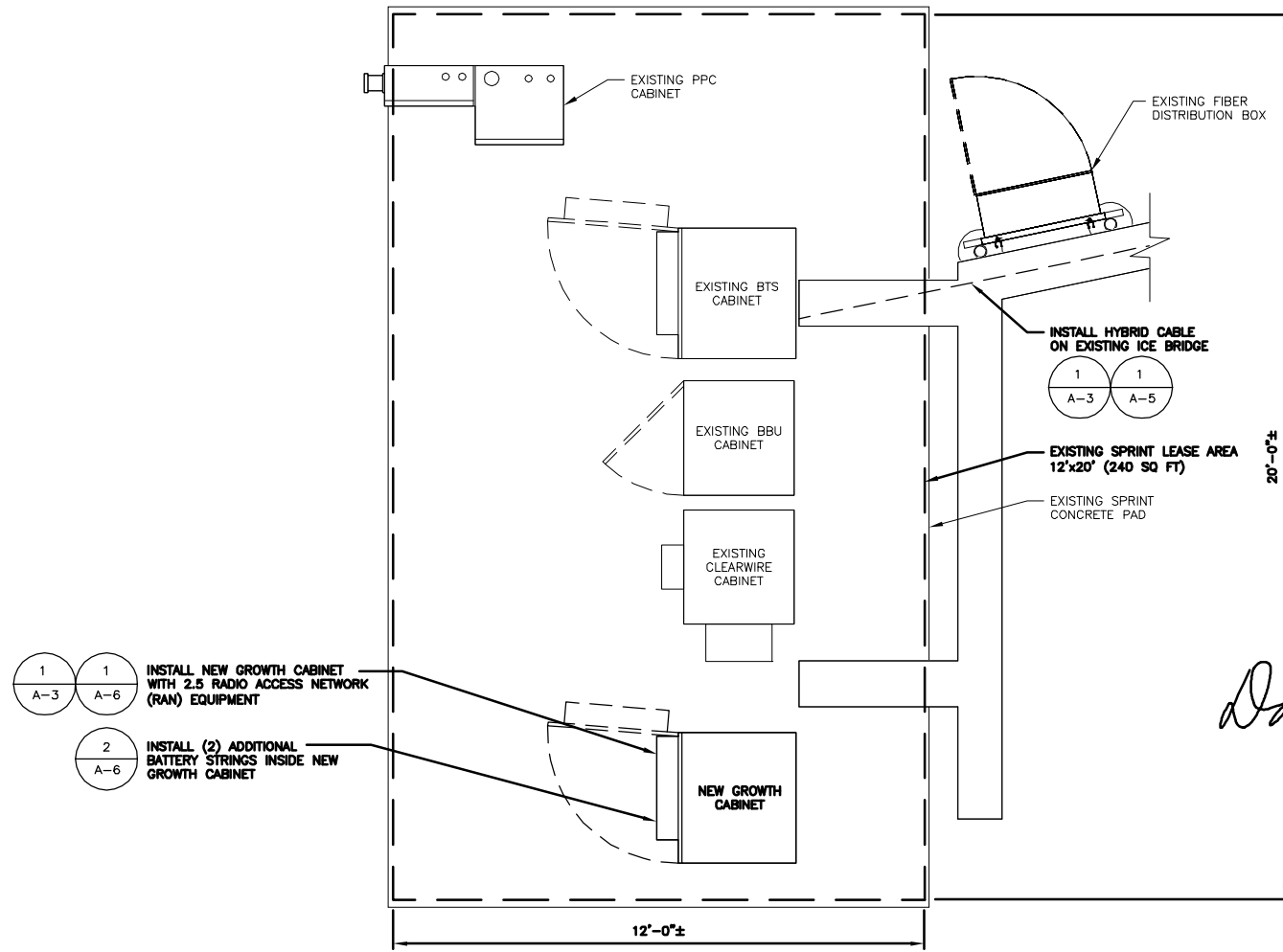
FAX: 9197551031

<b>Job: Moosehill, CT13056-A-03</b>			
Project: 1462G21400			
Client: SBA Network Services, Inc.	Drawn by: Blake Wilson	App'd:	
Code: TIA/EIA-222-F	Date: 04/08/14	Scale: NTS	
Path:	Dwg No. E-1		

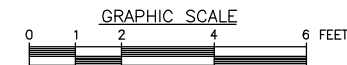
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**COMPOUND PLAN**  
SCALE: 1/8"=1'-0"  
1 A-1



**EQUIPMENT PLAN**  
SCALE: 1/2"=1'-0"  
2 A-1



- EXISTING CLEARWIRE CABINET
- EXISTING BBU CABINET
- EXISTING BTS CABINET
- INSTALL NEW GROWTH CABINET WITH 2.5 RADIO ACCESS NETWORK (RAN) EQUIPMENT (1 A-3, 1 A-6)
- INSTALL (2) ADDITIONAL BATTERY STRINGS INSIDE NEW GROWTH CABINET (2 A-6)



SOURCE: HDG 4-1-14

**RAN EQUIPMENT PHOTO DETAIL**  
SCALE: N.T.S.  
3 A-1



1 INTERNATIONAL BLVD, SUITE 800  
MAHWAH, NJ 07495  
TEL: (800) 357-7641



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



1600 OSGOOD STREET  
BUILDING 20 NORTH, SUITE 3090  
N. ANDOVER, MA 01845 TEL: (978) 557-5553  
FAX: (978) 336-5586



*Daniel P. Hamm*

CHECKED BY: MP

APPROVED BY: DPH

SUBMITTALS			
REV.	DATE	DESCRIPTION	BY
0	05/08/14	ISSUED FOR CONSTRUCTION	JA

SITE NUMBER:  
CT03XC364-B  
SITE NAME:  
MONROE-DWYER  
SITE ADDRESS:  
500 MOOSE HILL ROAD  
MONROE, CT 06468

SHEET TITLE  
COMPOUND AND  
EQUIPMENT PLANS

SHEET NUMBER

A-1

*Daniel P. Hamm*

CHECKED BY: MP

APPROVED BY: DPH

SUBMITTALS			
REV.	DATE	DESCRIPTION	BY
0	05/08/14	ISSUED FOR CONSTRUCTION	JA

SITE NUMBER:  
CT03XC364-B  
SITE NAME:  
MONROE-DWYER  
SITE ADDRESS:  
500 MOOSE HILL ROAD  
MONROE, CT 06468

SHEET TITLE  
ELEVATION AND  
ANTENNA PLANS

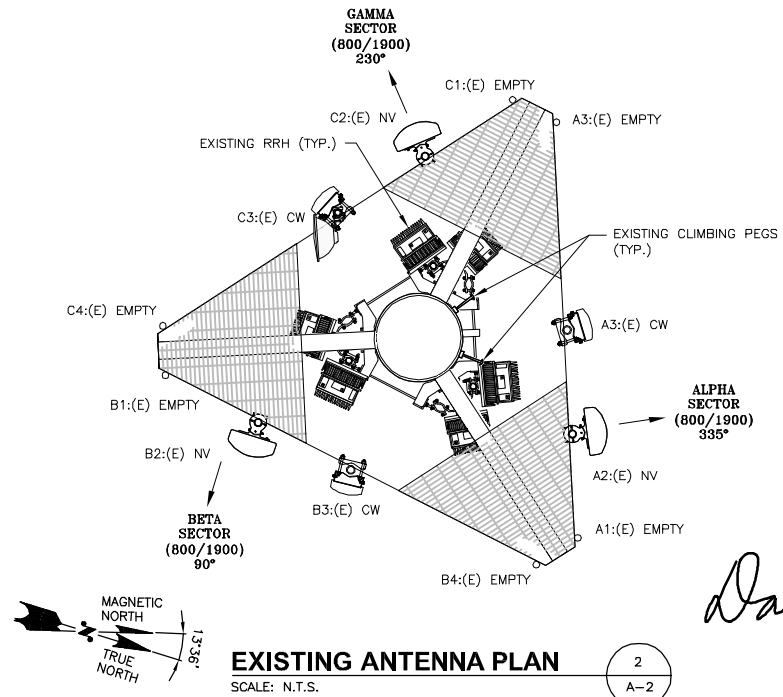
SHEET NUMBER

A-2

NOTE:  
EXISTING AZIMUTHS TAKEN FROM  
CONSTRUCTION DRAWINGS BY  
LULAY ILLESCAS ASSOCIATES, INC.  
DATED 8/8/12.  
G.C. TO VERIFY AZIMUTHS IN FIELD.

**SPECIAL CONSTRUCTION NOTE:**  
SPRINT TOWER TOP WORK IS CONTINGENT ON THE FOLLOWING:  
\* COMPLETION OF A GLOBAL STRUCTURAL STABILITY ANALYSIS (PROVIDED BY TOWER OWNER).  
\* COMPLETION OF AN ANTENNA/RRH MOUNT STRUCTURAL ASSESSMENT (PROVIDED BY A&E VENDOR).  
\* GC SHALL FURNISH, INSTALL AND COMPLETE ALL REQUIRED STRUCTURAL MODIFICATIONS AS INDICATED IN BEFORE-MENTIONED ANALYSIS AND ASSESSMENT.  
\* SBA COMMUNICATIONS CORPORATION SHALL PROVIDE WRITTEN ACCEPTANCE/ APPROVAL FOR THE COMPLETION OF ALL TOWER/FOUNDATION STRUCTURAL MODIFICATIONS INCLUDING (AS NECESSARY) CONTROLLED CONSTRUCTION INSPECTIONS, SHOP-DRAWING APPROVALS, MATERIALS TEST RESULTS, AND FINAL ENGINEER'S AFFIDAVIT.

NOTE:  
SPRINT RAD CENTER SHOWN IN RED TEXT BASED ON SBA-PROVIDED COLLOCATION APPLICATION, EQUIPMENT DATABASE, AND STRUCTURAL ANALYSIS. THE SBA-PROVIDED ANTENNA RAD CENTER SHALL SUPERSEDE ANY CONFLICTING INFORMATION DERIVED FROM THE SPRINT NV 2.5 RFDS.



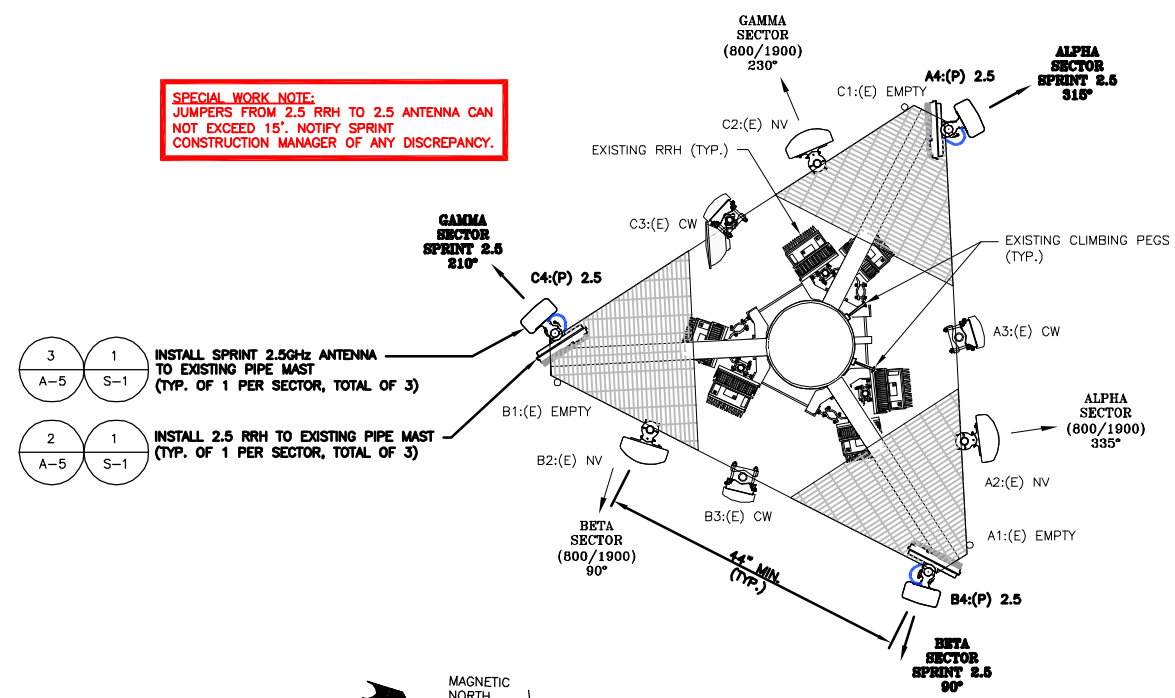
**EXISTING ANTENNA PLAN**  
SCALE: N.T.S.

**ANTENNA STATUS LEGEND:**

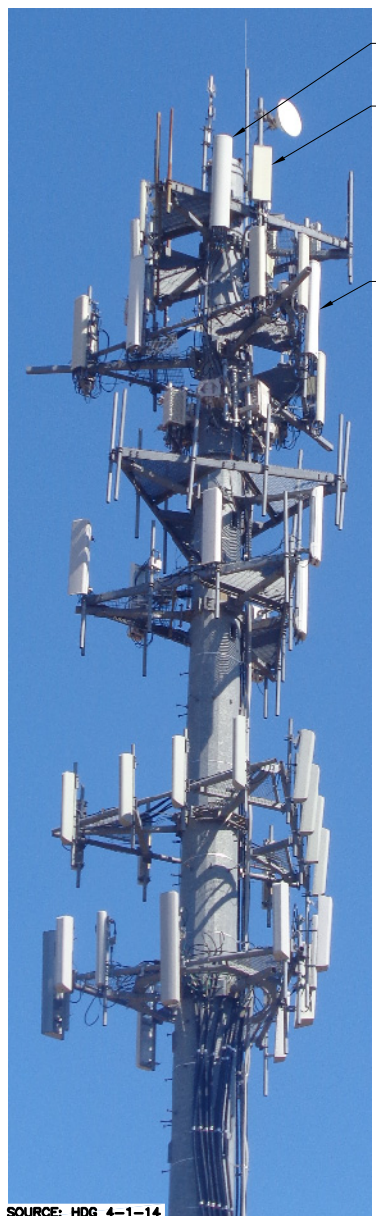
EMPTY - EMPTY PIPE  
(E) - EXISTING  
(P) - INSTALL  
CW - CLEARWIRE ANTENNA  
NV - SPRINT ANTENNA (MODEL #APXVSP18-C-A20)  
2.5 - SPRINT ANTENNA

NOTES:  
1) VERIFY PROPOSED AZIMUTHS WITH RF ENGINEER PRIOR TO INSTALLATION

**SPECIAL WORK NOTE:**  
JUMPERS FROM 2.5 RRH TO 2.5 ANTENNA CAN NOT EXCEED 15'. NOTIFY SPRINT CONSTRUCTION MANAGER OF ANY DISCREPANCY.



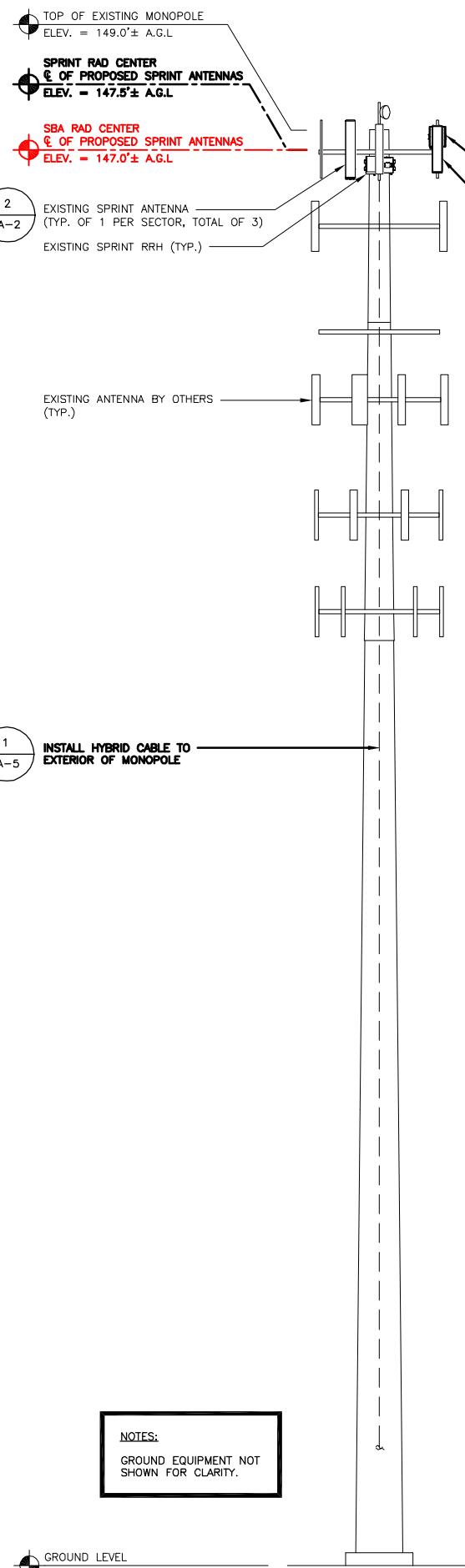
**PROPOSED ANTENNA PLAN**  
SCALE: N.T.S.



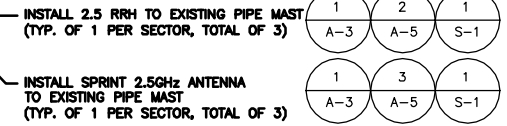
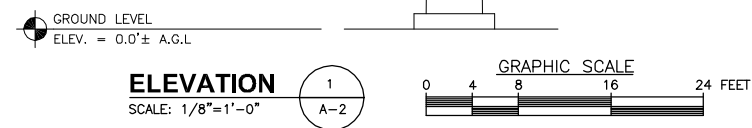
**EXISTING PARTIAL ELEVATION PHOTO DETAIL**  
SCALE: N.T.S.

SOURCE: HDG 4-1-14

EXISTING SPRINT EQUIPMENT  
EXISTING CLEARWIRE ANTENNA  
EXISTING ANTENNA BY OTHERS (TYP.)



NOTES:  
GROUND EQUIPMENT NOT SHOWN FOR CLARITY.



INSTALL 2.5 RRH TO EXISTING PIPE MAST (TYP. OF 1 PER SECTOR, TOTAL OF 3)  
INSTALL SPRINT 2.5GHz ANTENNA TO EXISTING PIPE MAST (TYP. OF 1 PER SECTOR, TOTAL OF 3)

**ELEVATION**  
SCALE: 1/8"=1'-0"

1  
A-2