



March 11, 2015

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

RE: Notice of Exempt Modification
500 Moosehill Road, Monroe, CT 06468
N 41° 19' 15.48"
W 73° 12' 5.12"
T-Mobile Site #: CT11664C_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 500 Moosehill Road, Monroe, CT 06468.

The 500 Moosehill Road, Monroe, CT 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, 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 L700 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).

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 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 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



T-Mobile Equipment Modification

500 Moosehill Road, Monroe, CT 06468
Site number CT11664C_L700

Tower Owner: SBA Infrastructure, LLC

Equipment Configuration: Monopole

Current and/or approved:

- (3) Ericsson Air 21 B2A/B4P
- (3) Ericsson Air 21 B4A/B2P
- (3) Ericsson KRY 112 144/1
- (12) 1-5/8" Feedlines
- (1) 1-5/8" Fiber

Planned Modifications:

- (3) Ericsson Air 21 B2A/B4P
- (3) Ericsson Air 21 B4A/B2P
- (3) Commscope LNX-6515DS
- (3) Ericsson S11B12
- (3) Ericsson KRY 112 144/1
- (12) 1-5/8" Feedlines
- (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 9.13% of the allowable FCC established general public limit. The anticipated composite MPE value for this site assuming all carriers present is 55.22% of the allowable FCC established general public limit sampled at the ground level.

| Site Composite MPE% | |
|--------------------------|----------------|
| Carrier | MPE% |
| T-Mobile | 9.13 |
| Clearwire | 0.86 % |
| Sprint | 16.31 % |
| AT&T | 9.89 % |
| Nextel | 6.58 % |
| Verizon Wireless | 12.45 % |
| Site Total MPE %: | 55.22 % |

March 11, 2015

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

RE: Telecommunications Facility @ 500 Moosehill Road, Monroe, CT 06468

Dear Mr. Vavrek,

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
508-251-1755 + F
203-446-7700 + C
kpelletier@sbsite.com



March 11, 2015

St. John's Greek Catholic Cemetery Association, Inc.
c/o Apple Valley Bank
286 Maple Avenue
Cheshire, CT 06410

RE: Telecommunications Facility @ 500 Moosehill Road, Monroe, CT 06468

To Whom It May Concern:

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
508-251-1755 + F
203-446-7700 + C
kpelletier@sbsite.com

SBA Network Services, LLC

To: CONNECTICUT SITING COUNCIL 129986

Check Number: 2091861
Date: 02/17/2015

| Invoice Number | Invoice Date | Description | Gross Amount | Taxes Withheld | Net Amount |
|----------------|--------------|-------------------|--------------|----------------|------------|
| PRSF02161523 | 02/17/2015 | CT11664C_L700 CSC | \$625.00 | \$0.00 | \$625.00 |

\$625.00 \$0.00 \$625.00

SBA Network Services, LLC
5900 Broken Sound Parkway NW
Boca Raton, FL 33487-2797
(561) 995-7676

Wells Fargo Bank

2091861

061209756

129986

Six Hundred Twenty Five Dollars And 00 Cents

DATE

AMOUNT

02/17/2015

\$625.00

Void After 120 Days

Pay to the Order of:

CONNECTICUT SITING COUNCIL
ACCOUNTS RECEIVABLE
TEN FRANKLIN SQUARE
NEW BRITAIN, CT 06051

Bruce Lagarias

⑈ 2091861 ⑆ ⑆ 061209756 ⑆ ⑆ 2079900424566 ⑆ ⑆

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

T-Mobile Existing Facility

Site ID: CT11664C

St. Johns Cemetery
500 Moose Hill Road
Monroe, CT 06468

March 10, 2015

EBI Project Number: 6215001360

| Site Compliance Summary | |
|--|------------------|
| Compliance Status: | COMPLIANT |
| Site total MPE% of FCC general public allowable limit: | 55.22 % |

March 10, 2015

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

Emissions Analysis for Site: **CT11664C – St. Johns Cemetery**

EBI Consulting was directed to analyze the proposed T-Mobile facility located at **500 Moose Hill Road, Monroe, CT**, for the purpose of determining whether the emissions from the Proposed T-Mobile Antenna Installation located on this property are within specified federal limits.

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

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

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

Public exposure to radio frequencies is regulated and enforced in units of microwatts per square centimeter ($\mu\text{W}/\text{cm}^2$). The general population exposure limit for the 700 MHz Band is $467 \mu\text{W}/\text{cm}^2$, and the general population exposure limit for the PCS and AWS 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 T-Mobile 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. 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& B2A/B4P)** 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& B2A/B4P)** have 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 **121 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: | B | Sector: | C |
|-----------------|--------------------------------|-----------------|--------------------------------|-----------------|--------------------------------|
| 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): | 121 | Height (AGL): | 121 | Height (AGL): | 121 |
| 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% | 1.27 | Antenna B1 MPE% | 1.27 | Antenna C1 MPE% | 1.27 |
| 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): | 121 | Height (AGL): | 121 | Height (AGL): | 121 |
| 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% | 1.27 | Antenna B2 MPE% | 1.27 | Antenna C2 MPE% | 1.27 |
| 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): | 121 | Height (AGL): | 121 | Height (AGL): | 121 |
| 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% | 0.50 | Antenna B3 MPE% | 0.50 | Antenna C3 MPE% | 0.50 |

| Site Composite MPE% | |
|--------------------------|----------------|
| Carrier | MPE% |
| T-Mobile | 9.13 |
| Clearwire | 0.86 % |
| Sprint | 16.31 % |
| AT&T | 9.89 % |
| Nextel | 6.58 % |
| Verizon Wireless | 12.45 % |
| Site Total MPE %: | 55.22 % |

| | |
|--------------------------|----------------|
| T-Mobile Sector 1 Total: | 3.04 % |
| T-Mobile Sector 2 Total: | 3.04 % |
| T-Mobile Sector 3 Total: | 3.04 % |
| Site Total: | 55.22 % |

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: | 3.04 % |
| Sector 2: | 3.04 % |
| Sector 3 : | 3.04 % |
| T-Mobile Total: | 9.13 % |
| | |
| Site Total: | 55.22 % |
| | |
| Site Compliance Status: | COMPLIANT |

The anticipated composite MPE value for this site assuming all carriers present is **55.22%** 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



**Structural Analysis for
SBA Network Services, Inc.**

149' Monopole Tower

**SBA Site Name: Moosehill
SBA Site ID: CT13056-A-04
T-Mobile Site ID: CT11664C**

FDH Project Number 15BDTR1400

Analysis Results

| | | |
|------------------|--------|------------|
| Tower Components | 99.1 % | Sufficient |
| Foundation | 99.8 % | Sufficient |

Prepared By:

Kelsey Sargent
Project Engineer

Reviewed By:

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

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



02-12-2015

February 12, 2015

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 T-Mobile in place at 121ft, 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. Feedlines should be installed inside the pole's shaft unless otherwise noted, as shown in **Figure 1**.
2. RRU/RRH Stipulation: The equipment may be installed in any arrangement as determined by the client.
3. TMAs should be installed behind the existing and proposed antennas.

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 ¹ | Carrier | Mount Elevation (ft) | Mount Type |
|------------------------|--|---|------------------|----------------------|--------------------------------|
| 152.5 | (1) Decibel DB404-B | (1) 7/8" | Town of Monroe | 149 | (1) Pipe Mount |
| 147 | (3) RFS APXVTM14-C-I20 (3) ALU TD-RRH8x20-25 (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 (3) Argus LLPX310R (1) Andrew VHLP2-11 (1) Andrew VHLP800-11-DW1 (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 |
| 139 | (6) Powerwave 7770 (3) Powerwave P65-16 (6) Powerwave LGP 21401 (6) Powerwave LGP 13519 (6) Ericsson RRUS-11 (1) Raycap DC6-48-60-18-8F | (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 21 B2A/B4P (3) Ericsson Air 21 B4A/B2P (3) Ericsson KRY 112 144/1 | (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 ³ | (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 (6) RFS FD9R6004/2C-3L (1) RFS DB-T1-6Z-8AB-0Z | (12) 1-5/8" (1) 1-5/8" Fiber | Verizon | 99 | (1) 12.5' Low Profile Platform |
| 65.5 ⁴ | (1) Decibel 26OB | (1) 1/2" | Sprint | 64 | (1) 3' Standoff |

1. Feedlines installed inside the pole's shaft unless otherwise noted.
2. The (4) 1-1/4" coax for Sprint/Clearwire at 147' 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 Carrier Final Loading:

| Antenna Elevation (ft) | Description | Feedlines ¹ | Carrier | Mount Elevation (ft) | Mount Type |
|------------------------|---|------------------------------------|----------|----------------------|---|
| 121 | (3) Ericsson Air 21 B2A/B4P (3) Ericsson Air 21 B4A/B2P (3) Commscope LNX-6515DS (3) Ericsson S11B12 (3) Ericsson KRY 112 144/1 | (12) 1-5/8" (1) 1-5/8" Fiber | T-Mobile | 121 | (1) 13' Low Profile Platform (1) SitePro PRK1245 |

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 | 32.7 | Pass |
| | 129 | Flange Bolts | (8) 1" Ø w/ BC = 32.5" | 65.2 | Pass |
| | 129 | Flange Plate | 36.25" Ø PL x 1" thk. | 57.7 | Pass |
| L2 | 129 – 96 | Pole | TP36.9x28.82x0.25 | 67.9 | Pass |
| L3 | 96 - 47.25 | Pole | TP48.15x35.237x0.3125 | 98.1 | Pass |
| L4 | 47.25 – 0 | Pole | TP58.91x46.0768x0.375 | 99.1 | Pass |
| | | Anchor Bolts | (16) 2.25" Ø w/ BC = 66" | 96.1 | Pass |
| | | Base Plate | PL 64" Sq x 3" Thk. | 76.2 | 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 | 40 k | 45 k |
| Shear* | 39 k | 39 k |
| Moment | 4,117 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 | 1.8866 | 0.0010 |

*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

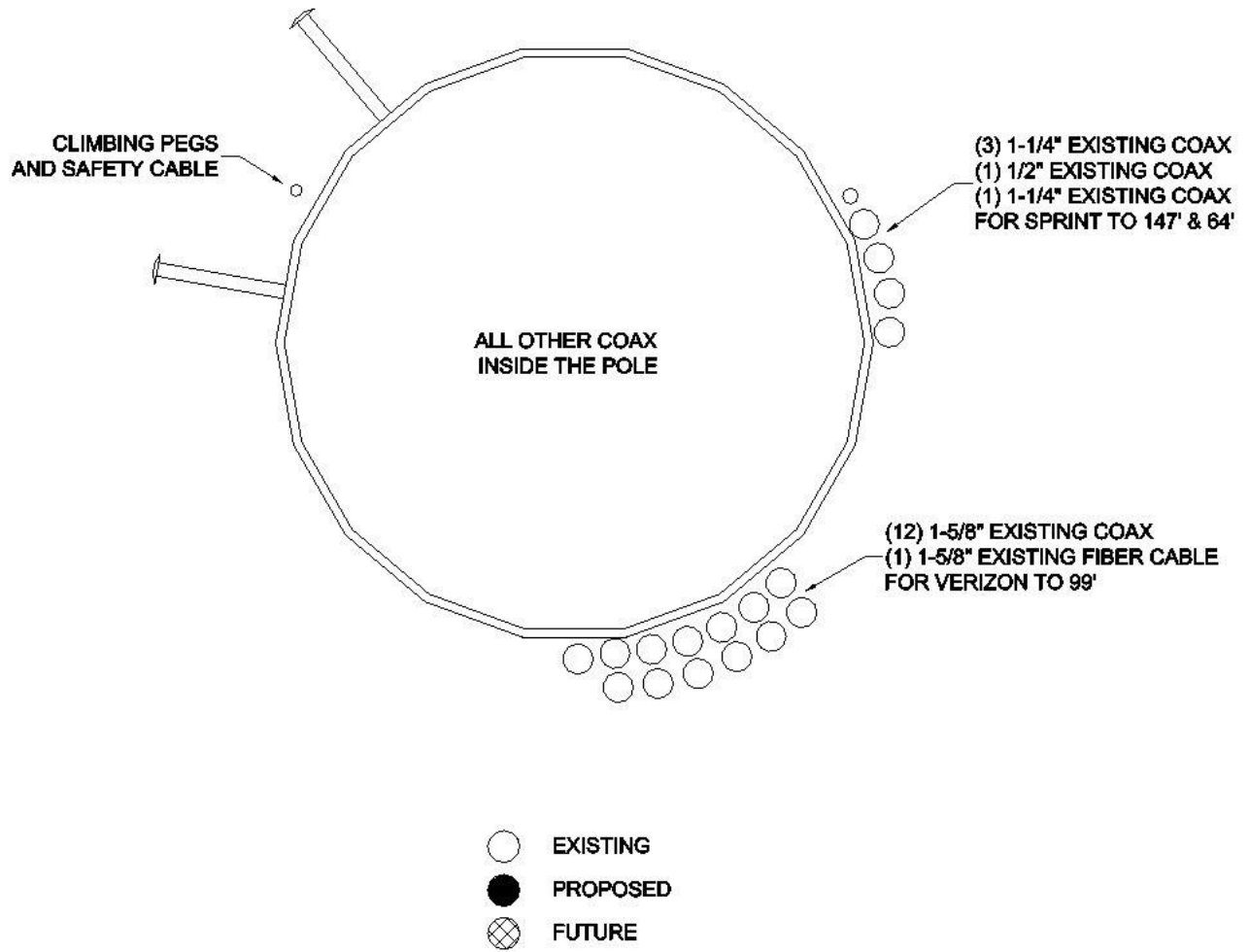


Figure 1 – Assumed Feed Line Layout

DESIGNED APPURTENANCE LOADING

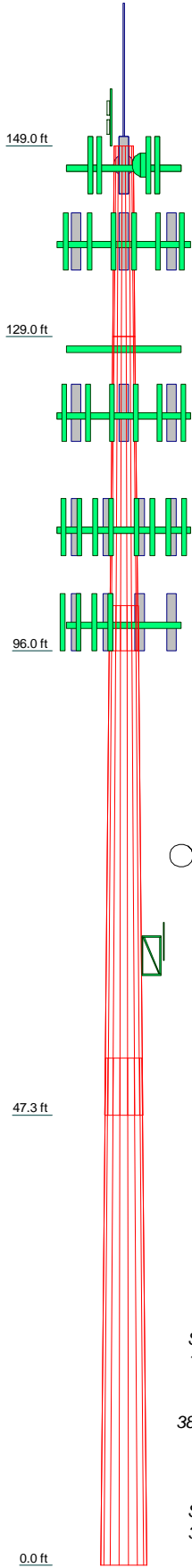
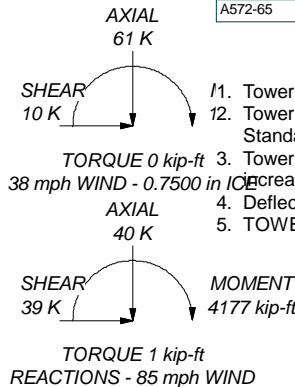
| TYPE | ELEVATION | TYPE | ELEVATION |
|-----------------------------|-----------|------------------------------------|-----------|
| Lightning Rod w/ Mount Pipe | 149 | (4) Empty Pipe Mount | 128 |
| DB404-B | 149 | (4) Empty Pipe Mount | 128 |
| Pipe Mount | 149 | (4) Empty Pipe Mount | 128 |
| APXVSP18-C-A20 w/Mount Pipe | 147 | 12.5' Low Profile Platform | 128 |
| APXVSP18-C-A20 w/Mount Pipe | 147 | AIR 21 B2A/B4P w/Mount Pipe | 121 |
| APXVSP18-C-A20 w/Mount Pipe | 147 | AIR 21 B4A/B2P w/Mount Pipe | 121 |
| LLPX310R w/Mount Pipe | 147 | AIR 21 B4A/B2P w/Mount Pipe | 121 |
| LLPX310R w/Mount Pipe | 147 | AIR 21 B4A/B2P w/Mount Pipe | 121 |
| LLPX310R w/Mount Pipe | 147 | AIR 21 B4A/B2P w/Mount Pipe | 121 |
| LLPX310R w/Mount Pipe | 147 | KRY 112 144/1 | 121 |
| U-RAS Flexible RRH ODU | 147 | KRY 112 144/1 | 121 |
| U-RAS Flexible RRH ODU | 147 | KRY 112 144/1 | 121 |
| U-RAS Flexible RRH ODU | 147 | 13' Low Profile Platform | 121 |
| 1900 MHz RRH | 147 | SitePro PRK-1245 | 121 |
| 1900 MHz RRH | 147 | LNx-6515DS w/ Mount Pipe | 121 |
| 1900 MHz RRH | 147 | LNx-6515DS 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 | S11B12 | 121 |
| 800 MHz Filter | 147 | S11B12 | 121 |
| 800 MHz Filter | 147 | S11B12 | 121 |
| 800 MHz Filter | 147 | LNx-6515DS w/ Mount Pipe | 121 |
| (2) ACU-A20-N RET | 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 | (4) DB844H90E-XY w/ Mount Pipe | 109 |
| 12.5' Low Profile Platform | 147 | 14' Low Profile Platform | 109 |
| APXVTM14-C-I20 w/Mount Pipe | 147 | (2) APL866513-42TO w/ Mount Pipe | 99 |
| APXVTM14-C-I20 w/Mount Pipe | 147 | (2) APL866513-42TO w/ Mount Pipe | 99 |
| APXVTM14-C-I20 w/Mount Pipe | 147 | LPA-80063/6CF w/ Mount Pipe | 99 |
| TD-RRH8x20-25 | 147 | LPA-80063/6CF w/ Mount Pipe | 99 |
| TD-RRH8x20-25 | 147 | 742213_2110_P45_02.0 w/ Mount Pipe | 99 |
| TD-RRH8x20-25 | 147 | 742213_2110_P45_02.0 w/ Mount Pipe | 99 |
| VHLP2-11 | 147 | 742213_2110_P45_02.0 w/ Mount Pipe | 99 |
| VHLP800-11-DW1 | 147 | 742213_2110_P45_02.0 w/ Mount Pipe | 99 |
| (2) LGP21401 TMA | 139 | RRH2X40-AWS | 99 |
| (2) LGP13519 Diplexer | 139 | RRH2X40-AWS | 99 |
| (2) LGP13519 Diplexer | 139 | RRH2X40-AWS | 99 |
| (2) RRUS-11 | 139 | (2) FD9R6004/2C-3L Diplexer | 99 |
| (2) RRUS-11 | 139 | (2) FD9R6004/2C-3L Diplexer | 99 |
| (2) RRUS-11 | 139 | (2) FD9R6004/2C-3L Diplexer | 99 |
| DC6-48-60-18-8F | 139 | DB-T1-6Z-8AB-0Z | 99 |
| Empty Pipe Mount | 139 | 12.5' Low Profile Platform | 99 |
| Empty Pipe Mount | 139 | BXA-171063-12BF w/ Mount Pipe | 99 |
| Empty Pipe Mount | 139 | SLCP 2x6014F w/ Mount Pipe | 99 |
| 13' Low Profile Platform | 139 | APL866513-42TO w/ Mount Pipe | 99 |
| (2) 7770.00 w/Mount Pipe | 139 | APL866513-42TO w/ Mount Pipe | 99 |
| (2) 7770.00 w/Mount Pipe | 139 | BXA-70063/4CF w/ Mount Pipe | 99 |
| (2) 7770.00 w/Mount Pipe | 139 | BXA-171063/8BF w/ Mount Pipe | 99 |
| P65-16 w/Mount Pipe | 139 | BXA-171063/8BF w/ Mount Pipe | 99 |
| P65-16 w/Mount Pipe | 139 | BXA-70063/6CF w/Mount Pipe | 99 |
| P65-16 w/Mount Pipe | 139 | Decibel - 260B GPS | 64 |
| (2) LGP21401 TMA | 139 | 3' Standoff | 64 |
| (2) LGP21401 TMA | 139 | | |

MATERIAL STRENGTH

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

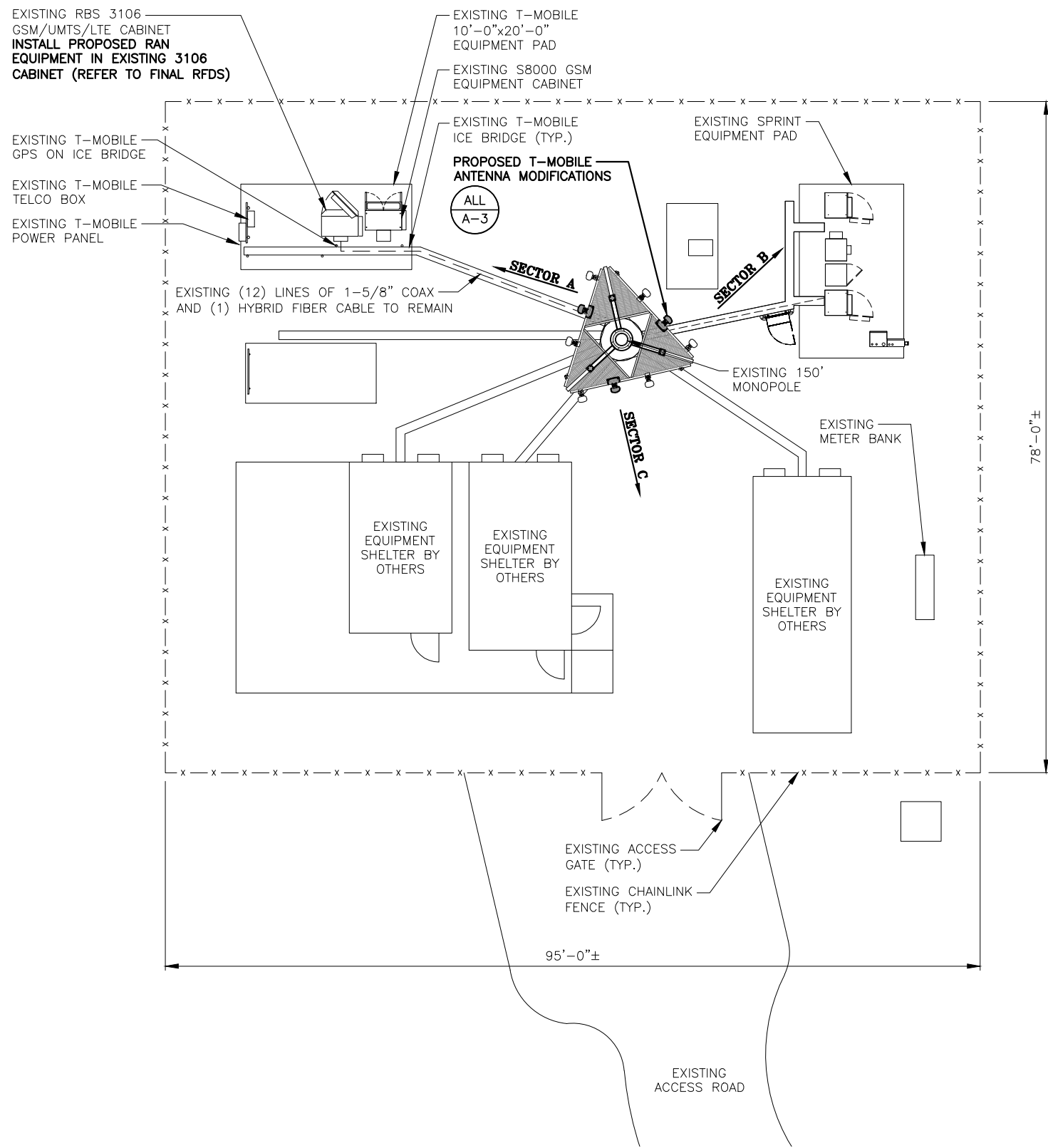
TOWER DESIGN NOTES

11. Tower is located in Fairfield County, Connecticut.
12. Tower designed for a 85 mph basic wind in accordance with the TIA/EIA-222-F Standard.
13. Tower is also designed for a 38 mph basic wind with 0.75 in ice. Ice is considered to 38 mph WIND - 0.7500 in increase in thickness with height.
14. Deflections are based upon a 50 mph wind.
15. TOWER RATING: 99.1%



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

| | |
|--|---|
| <p>FDH Engineering, Inc. 6521 Meridian Drive, Suite 107 Raleigh, North Carolina 27616 Phone: 9197551012 FAX: 9197551031</p> | <p>Job: Moosehill, CT13056-A-04</p> |
| | <p>Project: 15BDTR1400</p> |
| | <p>Client: SBA Network Services, Inc. Drawn by: KSargent App'd:</p> |
| | <p>Code: TIA/EIA-222-F Date: 02/12/15 Scale: NTS</p> |
| | <p>Path: _____ Dwg No. E-1</p> |



COMPOUND PLAN

22x34 SCALE: 3/16"=1'-0"
11x17 SCALE: 3/32"=1'-0"

1
A-1

0 2'-8" 5'-4" 10'-8" 16'-0"

STRUCTURAL NOTES:
1. ADDITIONAL TOWER MAPPING AND STRUCTURAL ANALYSIS ARE REQUIRED PRIOR TO CONSTRUCTION. DRAWINGS ARE SUBJECT TO CHANGE PENDING OUTCOME OF STRUCTURAL ANALYSIS.
2. MOUNT ALL ANTENNAS, RRU'S, COAX, ETC. IN ACCORDANCE WITH STRUCTURAL ANALYSIS.

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 STRUCTURAL ASSESSMENT.



EXISTING T-MOBILE ANTENNA TO REMAIN (TYP.)

2
A-2

1,2
A-3

T-MOBILE PLATFORM
ELEV. = 121.0'± A.G.L. (SBA*)

EXISTING (12) LINES OF 1-5/8" COAX AND (1) HYBRID FIBER CABLE TO REMAIN INSIDE MONOPOLE

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

2
A-1

EXISTING T-MOBILE GPS ON ICE BRIDGE

EXISTING T-MOBILE TELCO BOX

EXISTING RBS 3106 GSM/UMTS/LTE CABINET
INSTALL PROPOSED RAN EQUIPMENT IN EXISTING 3106 CABINET (REFER TO FINAL RFDS)

EXISTING T-MOBILE POWER PANEL

EXISTING T-MOBILE ICE BRIDGE (TYP.)

EXISTING (12) LINES OF 1-5/8" COAX AND (1) HYBRID FIBER CABLE TO REMAIN

EXISTING S8000 GSM EQUIPMENT CABINET



SOURCE: HDG 01-19-2015

EXISTING EQUIPMENT PHOTO DETAIL
SCALE: N.T.S.

3
A-1

**T-MOBILE
NORTHEAST LLC**

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



SBA COMMUNICATIONS CORP.
33 BOSTON POST ROAD WEST, SUITE 320 TEL: (508) 251-0720
MARLBOROUGH, MA 01752 FAX: (508) 251-1755



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



Daniel P. Hamm

CHECKED BY: KB

APPROVED BY: DPH

| SUBMITTALS | | | |
|------------|----------|-------------------------|----|
| REV. | DATE | DESCRIPTION | BY |
| 0 | 02/05/15 | ISSUED FOR CONSTRUCTION | JA |

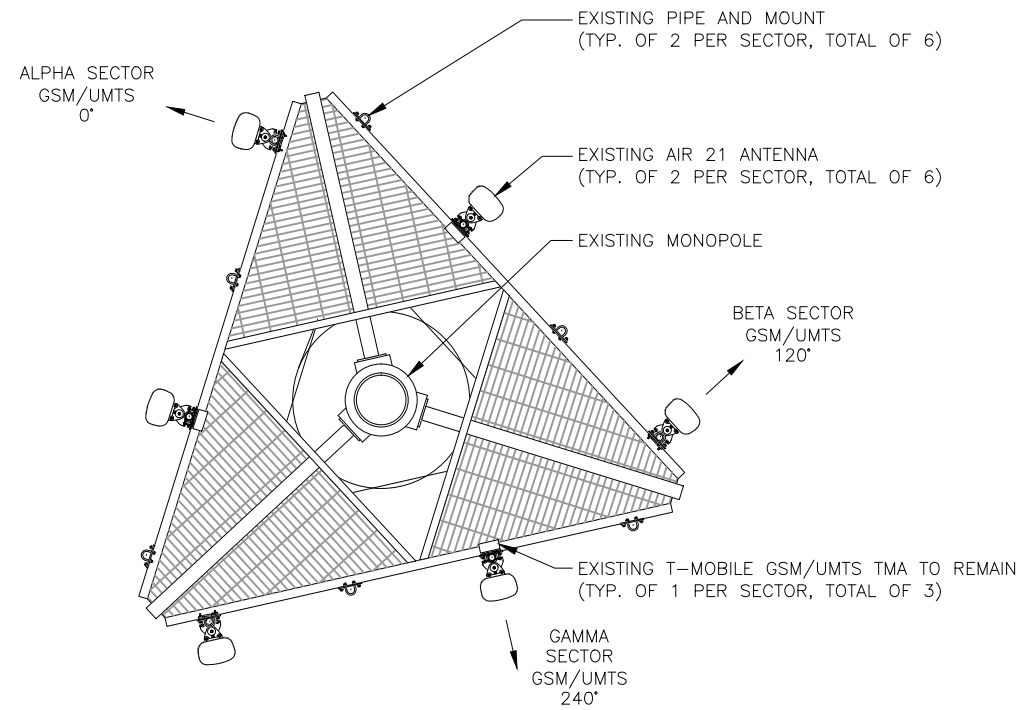
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CT11664C

SITE NAME:
ST. JOHN'S CEMETARY

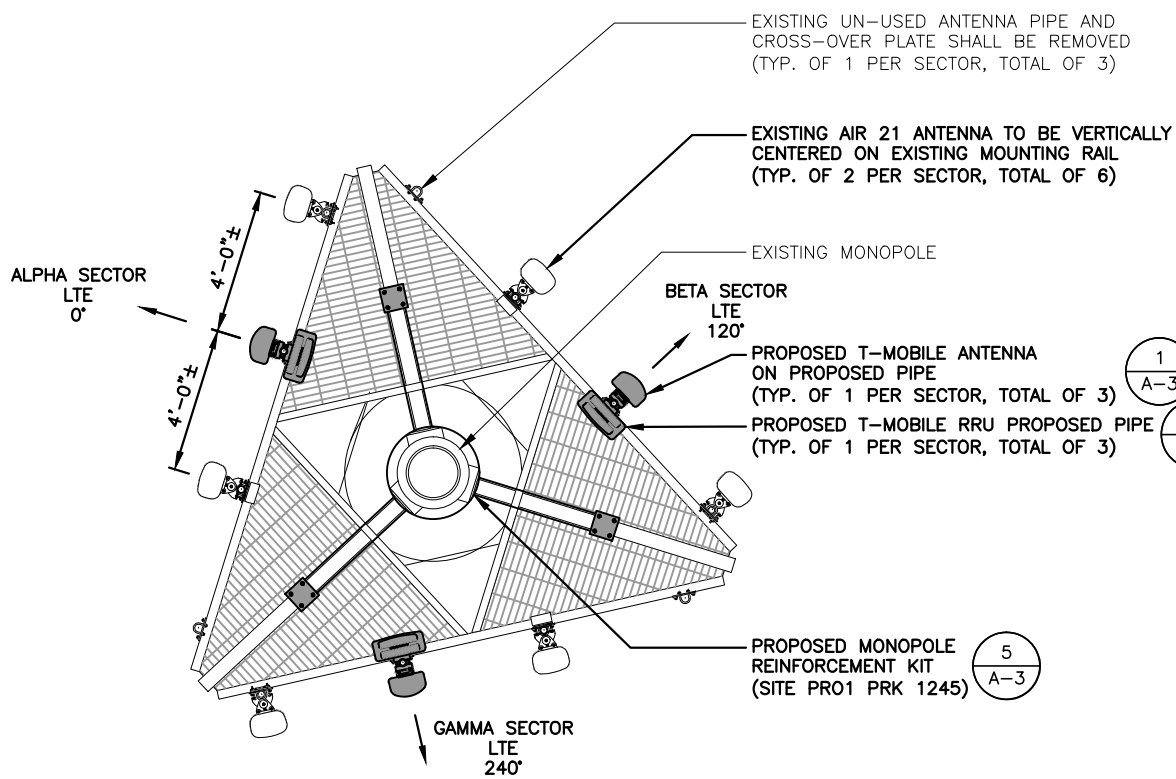
SITE ADDRESS:
500 MOOSE HILL ROAD
MONROE, CT 06468
FAIRFIELD COUNTY

SHEET TITLE
COMPOUND &
ELEVATION PLAN

SHEET NUMBER
A-1



EXISTING ANTENNA PLAN (1) A-2
SCALE: N.T.S



PROPOSED ANTENNA PLAN (2) A-2
SCALE: N.T.S

STRUCTURAL NOTES:
 1. ADDITIONAL TOWER MAPPING AND STRUCTURAL ANALYSIS ARE REQUIRED PRIOR TO CONSTRUCTION. DRAWINGS ARE SUBJECT TO CHANGE PENDING OUTCOME OF STRUCTURAL ANALYSIS.
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SPECIAL WORK NOTE:
 VERTICALLY CENTER ON EXISTING MOUNTING RAIL, THE PIPE MAST AND ANTENNA

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

- EXISTING AIR 21 ANTENNA TO BE VERTICALLY CENTERED ON EXISTING MOUNTING RAIL (TYP. OF 2 PER SECTOR, TOTAL OF 6)
- EXISTING UN-USED ANTENNA PIPE AND CROSS-OVER PLATE SHALL BE REMOVED (TYP. OF 1 PER SECTOR, TOTAL OF 3)



SOURCE: HDG 01-19-2015
PROPOSED ANTENNA PHOTO DETAIL (3) A-2
 SCALE: N.T.S

Daniel P. Hamm
 STATE OF CONNECTICUT
 DANIEL P. HAMM
 No. 24178
 LICENSED PROFESSIONAL ENGINEER

CHECKED BY: KB
 APPROVED BY: DPH

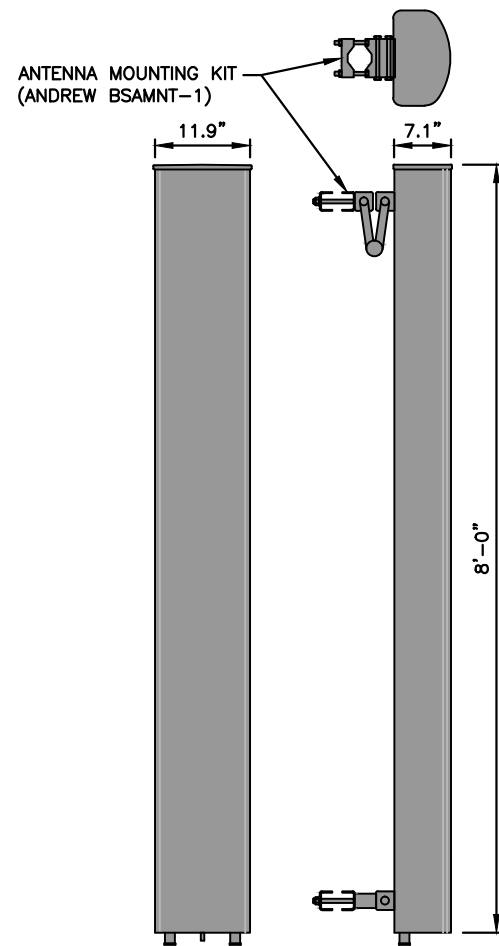
SUBMITTALS

| REV. | DATE | DESCRIPTION | BY |
|------|----------|-------------------------|----|
| 0 | 02/05/15 | ISSUED FOR CONSTRUCTION | JA |

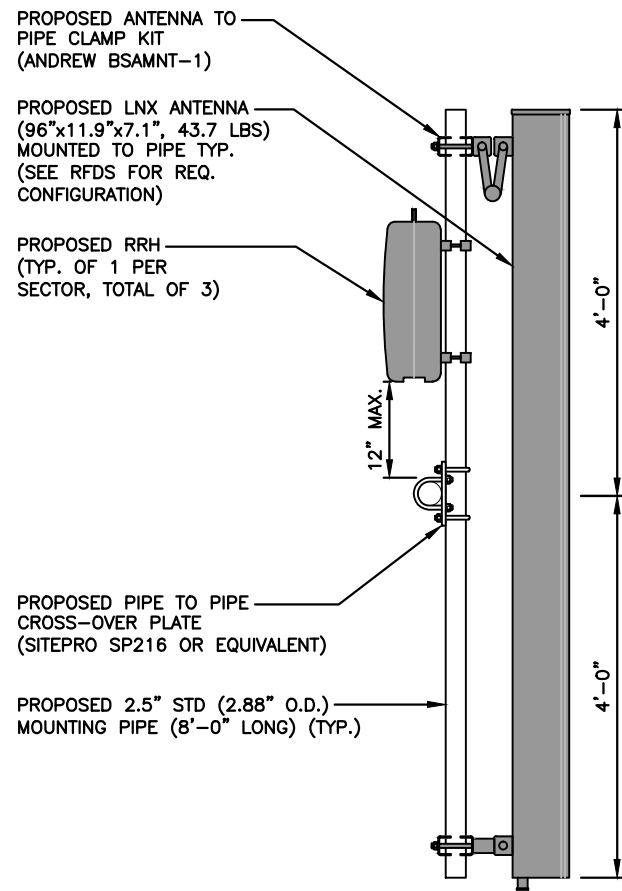
SITE NUMBER: CT11664C
 SITE NAME: ST. JOHN'S CEMETARY
 SITE ADDRESS: 500 MOOSE HILL ROAD, MONROE, CT 06468, FAIRFIELD COUNTY

SHEET TITLE: EXISTING & PROPOSED ANTENNA PLANS

SHEET NUMBER: A-2



LNx ANTENNA DETAIL 1
SCALE: N.T.S. A-3

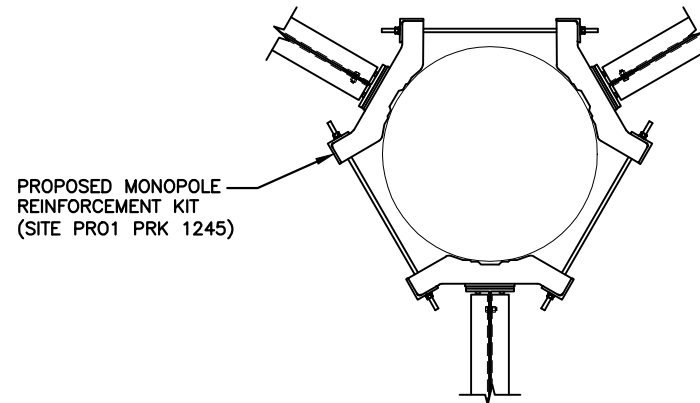


PROPOSED ANTENNA & RRU MOUNTING DETAIL 2
SCALE: N.T.S. A-3

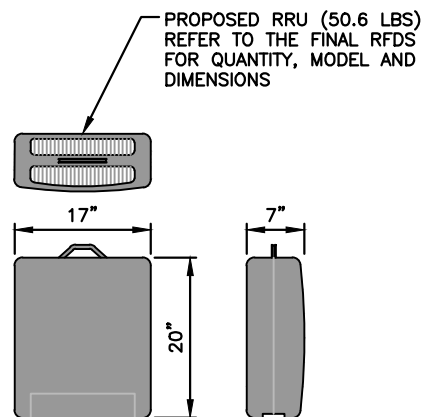
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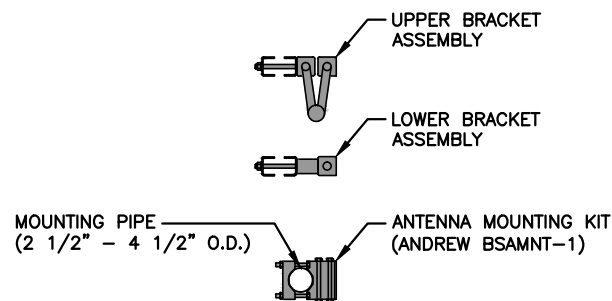
SPECIAL WORK NOTE:
 VERTICALLY CENTER ON EXISTING MOUNTING RAIL, THE PIPE MAST AND ANTENNA



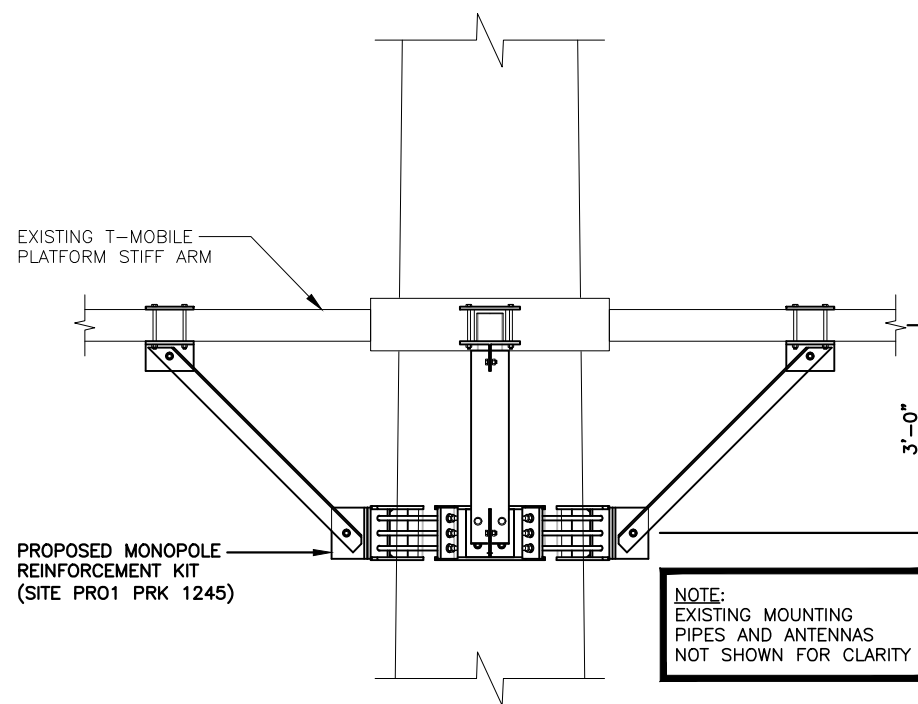
PROPOSED MONOPOLE REINFORCEMENT KIT (SITE PRO1 PRK 1245)



PROPOSED RRU DETAIL 3
SCALE: N.T.S. A-3



ANTENNA MOUNTING BRACKET 4
SCALE: N.T.S. A-3



MONOPOLE REINFORCEMENT KIT 5
SCALE: N.T.S. A-3

T-MOBILE NORTHEAST LLC
 35 GRIFFIN ROAD SOUTH
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Hudson Design Group
 1600 OSGOOD STREET
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 N. ANDOVER, MA 01845 FAX: (978) 336-5586

STATE OF CONNECTICUT
 DANIEL P. HAMM
 No. 24178
 LICENSED PROFESSIONAL ENGINEER

Daniel P. Hamm

CHECKED BY: KB

APPROVED BY: DPH

SUBMITTALS

| REV. | DATE | DESCRIPTION | BY |
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SITE NUMBER:
 CT11664C
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 MONROE, CT 06468
 FAIRFIELD COUNTY

SHEET TITLE
 DETAILS

SHEET NUMBER
A-3