Filed by:
Kri Pelletier, Property Specialist - SBA Communications
134 Flanders Rd., Suite 125, Westborough, MA 01581
508.251.0720 x 3804 - kpelletier@sbasite.com

June 20, 2018

Melanie A. Bachman
Acting Executive Director
Connecticut Siting Council
Ten Franklin Square
New Britain, CT 06051

Notice of Exempt Modification
111 Stone Hill Road, Voluntown, CT
41 36 23.08 N
-71 51 4.08 W
Sprint #: CT54XC704

Dear Ms. Bachman:

Sprint currently maintains antennas at the 175-foot level of the existing 180-foot Self Support Tower at 111 Stone Hill Road in Voluntown, CT. The tower is owned by SBA Towers II LLC. The property is owned by the Thomas M. and Patricia A. Sweet. Sprint now intends to replace (6) existing cell antennas with (6) newer technology cell antennas at the 175-foot level of the tower. The proposed full scope of work is as follows:

Remove:
- (6) 1-5/8" lines

Remove and Replace:
- Remove:
  - (6) Decibel DB980H90EMS Panel Antennas (actual); and
  - (6) Decibel DB980H90EMS Panel Antennas (entitlements only)
- Replace with:
  - (3) RFS APXVTM14-C-I20 Panel Antennas; and
  - (3) Commscope NNVV-65B-R4 Panel Antennas

Install:
- (3) ALU 1900 Mhz RRUs
- (6) ALU 800 Mhz RRUs
- (3) ALU TD-RRH8x20-25 RRUs
- (4) 1-1/4" fiber

Existing Equipment to Remain (Including entitlements):
- (3) Sector Frames

This facility was originally approved by the Town of Voluntown's Planning and Zoning Commission with Special Exception on December 13, 2000. Approval was given for a 180' tower with the condition with no conditions. It is SBA's opinion that this proposed modification is in full compliance.

Please accept this letter as notification pursuant to Regulations of Connecticut State Agencies §16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. §16.50j-72(b)(2). In accordance with R.C.S.A. § 16.50j-73, a copy of this letter is being sent to the Town of Voluntown's First Selectman, Tracey Hanson, Zoning Enforcement Officer, Peter Zvingilas, as well as to the Property Owner. (Separate notice is not being sent to tower owner, as it belongs to SBA.)

The planned modifications to the facility fall squarely within those activities explicitly provided for in R.C.S.A. §16.50j-72(b)(2).

1. The proposed modifications will not result in an increase in the height of the existing structure.
2. The proposed modification will not require the extension of the site boundary.
3. The proposed modifications will not increase noise levels at the facility by six decibels or more, or to levels that exceed state and local criteria.
4. The operation of the replacement antennas will not increase radio frequency emissions at the facility to a level at or above the Federal Communications Commission safety standard.
5. The proposed modification will not cause a change or alteration in the physical or environmental characteristics of the site.
6. The existing structure and its foundation can support the proposed loading.

For the foregoing reasons, Sprint respectfully submits that the proposed modifications to the above-referenced telecommunication facility constitute an exempt modifications under R.C.S.A. § 16-50j-72(b)(2).

Sincerely,

Kri Pelletier
Property Specialist
SBA COMMUNICATIONS CORPORATION
134 Flanders Rd., Suite 125
Westborough, MA 01581
508.251.0720 x3804 + T
508.366.2610 + F
203.446.7700 + C
kpelletier@sbasite.com

Attachments
cc: Tracey Hanson, First Selectman / with attachments
Voluntown Town Hall, 115 Main Street, Voluntown, CT 06384
Peter Zvingilas, Zoning Enforcement Officer / with attachments
Voluntown Town Hall, 115 Main Street, Voluntown, CT 06384
Thomas M. & Patricia A. Sweet / with attachments
497 Ekonk Hill Road Voluntown CT 06384

POWER DENSITY

SPRINT Site Inventory and Power Data by Antenna

Sector:	A	Sector:	B	Sector:	C
Antenna #:	**1**	Antenna #:	**1**	Antenna #:	**1**
Make / Model:	Commscope NNVV-65B-R4	Make / Model:	Commscope NNVV-65B-R4	Make / Model:	Commscope NNVV-65B-R4
Gain:	12.75 / 15.05 dBd	Gain:	12.75 / 15.05 dBd	Gain:	12.75 / 15.05 dBd
Height (AGL):	**175 feet**	Height (AGL):	**175 feet**	Height (AGL):	**175 feet**
Frequency Bands	850 MHz / 1900 MHz (PCS)	Frequency Bands	850 MHz / 1900 MHz (PCS)	Frequency Bands	850 MHz / 1900 MHz (PCS)
Channel Count	10	Channel Count	10	Channel Count	10
Total TX Power(W):	280 Watts	Total TX Power(W):	280 Watts	Total TX Power(W):	280 Watts
ERP (W):	7,378.61	ERP (W):	7,378.61	ERP (W):	7,378.61
Antenna A1 MPE%	**1.15 %**	Antenna B1 MPE%	**1.15 %**	Antenna C1 MPE%	**1.15 %**
Antenna #:	**2**	Antenna #:	**2**	Antenna #:	**2**
Make / Model:	RFS APXVTM14-ALU- I20	Make / Model:	RFS APXVTM14-ALU- I20	Make / Model:	RFS APXVTM14-ALU- I20
Gain:	15.9 dBd	Gain:	15.9 dBd	Gain:	15.9 dBd
Height (AGL):	**175 feet**	Height (AGL):	**175 feet**	Height (AGL):	**175 feet**
Frequency Bands	2500 MHz (BRS)	Frequency Bands	2500 MHz (BRS)	Frequency Bands	2500 MHz (BRS)
Channel Count	8	Channel Count	8	Channel Count	8
Total TX Power(W):	160 Watts	Total TX Power(W):	160 Watts	Total TX Power(W):	160 Watts
ERP (W):	6,224.72	ERP (W):	6,224.72	ERP (W):	6,224.72
Antenna A2 MPE%	**0.78 %**	Antenna B2 MPE%	**0.78 %**	Antenna C2 MPE%	**0.78 %**

Site Composite MPE%	
Carrier	MPE%
SPRINT – Max per sector	**1.93 %**
AT&T	1.36 %
Verizon Wireless	1.74 %
Site Total MPE %:	**5.03 %**

SPRINT Sector A Total:	1.93 %
SPRINT Sector B Total:	1.93 %
SPRINT Sector C Total:	1.93 %
Site Total:	5.03 %

SPRINT _ Frequency Band / Technology	# Channe	Watts ERP (Per	Height (feet)	Total Power Density	Frequency	Allowable MPE (uW/cm	Calculated % MPE
Sprint 850 MHz CDMA	1	376.73	17	0	850	56	0.09%
Sprint 850 MHz LTE	2	941.82	17	2	850	56	0.42%
Sprint 1900 MHz (PCS)	5	511.82	17	3	1900 MHz (PCS)	100	0.32%
Sprint 1900 MHz (PCS)	2	1,279.56	17	3	1900 MHz (PCS)	100	0.32%
Sprint 2500 MHz (BRS)	8	778.09	17	7	2500 MHz (BRS)	100	0.78%
						Total:	**1.93%**

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Use of this system constitutes your agreement to the service conditions in the current FedEx Service Guide, available on fedex.com.FedEx will not be responsible for any claim in excess of $100 per package, whether the result of loss, damage, delay, non-delivery,misdelivery,or misinformation, unless you declare a higher value, pay an additional charge, document your actual loss and file a timely claim.Limitations found in the current FedEx Service Guide apply. Your right to recover from FedEx for any loss, including intrinsic value of the package, loss of sales, income interest, profit, attorney's fees, costs, and other forms of damage whether direct, incidental,consequential, or special is limited to the greater of $100 or the authorized declared value. Recovery cannot exceed actual documented loss.Maximum for items of extraordinary value is $1,000, e.g. jewelry, precious metals, negotiable instruments and other items listed in our ServiceGuide. Written claims must be filed within strict time limits, see current FedEx Service Guide.

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111 STONE HILL RD

Location	111 STONE HILL RD	**Mblu**	043/ 006-00/ 0111/ /
Acct#	043/006-00/0111	**Owner**	SWEET THOMAS M & PATRICIA A
Assessment	$117,520	**Appraisal**	$167,880
PID	7193	**Building Count**	1

Current Value

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2015	$102,600	$65,280	$167,880
Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2015	$71,820	$45,700	$117,520

Owner of Record

Owner	SWEET THOMAS M & PATRICIA A	**Sale Price**	$0
Co-Owner		**Certificate**	1
Address	497 EKONK HILL RD VOLUNTOWN, CT 06384	**Book & Page**	60/ 733
		Sale Date	01/01/1900

Ownership History

Ownership History				
Owner	**Sale Price**	**Certificate**	**Book & Page**	**Sale Date**
SWEET THOMAS M & PATRICIA A	$0	1	60/ 733	01/01/1900

Building Information

Building 1 : Section 1

Year Built:	1974
Living Area:	1,400
Replacement Cost:	$136,800
Building Percent Good:	75
Replacement Cost Less Depreciation:	$102,600

Building Photo

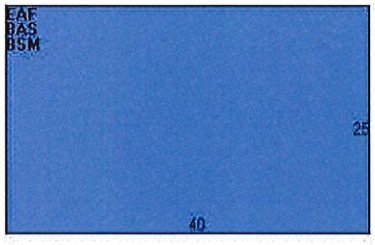
Building Attributes	
Field	**Description**
Style	Cape
Model	Residential

Grade:	C
Stories	1.25
Occupancy	1
Exterior Wall 1	Vinyl Siding
Exterior Wall 2	
Roof Structure	Gable
Roof Cover	Asphalt
Interior Wall 1	Drywall
Interior Wall 2	
Interior Flr 1	Carpet
Interior Flr 2	
Heat Fuel	Oil
Heat Type:	Hot Water
AC Type:	None
Total Bedrooms:	2 Bedrooms
Total Bthrms:	1
Total Half Baths:	0
Extra Fixtures	0
Total Rooms:	6
Bath Style:	Average
Kitchen Style:	Average
Fireplaces	1
Xtra Openings	
Gas Fireplaces	
Blocked FPL	
SF Fin Bsmt	
Fin Bsmt Qual	
Bsmt Gar	0
Jac/Whlpl	
Woodstove:	
Pellet Stove	
Res Elevator	

Building Photo

(http://images.vgsi.com/photos/VoluntownCTPhotos//\00\00\02/37.jpg)

Building Layout



Building Sub-Areas (sq ft)			Legend
Code	Description	Gross Area	Living Area
BAS	First Floor	1,000	1,000
EAF	Expansn attc fin	1,000	400
BSM	Basement	1,000	0
		3,000	1,400

Extra Features

Extra Features	Legend
No Data for Extra Features	

Land

Land Use

Use Code	1010
Description	Single Family
Zone	VD

Land Line Valuation

Size (Acres)	2.00
Frontage	
Depth	

Neighborhood 50
Alt Land Appr No
Category

Assessed Value $45,700
Appraised Value $65,280

Outbuildings

Outbuildings	Legend
No Data for Outbuildings	

Valuation History

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2016	$102,600	$65,280	$167,880
2015	$102,600	$65,280	$167,880
2014	$107,040	$65,280	$172,320

Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2016	$71,820	$45,700	$117,520
2015	$71,820	$45,700	$117,520
2014	$74,930	$45,700	$120,630

EBI Consulting
environmental | engineering | due diligence

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

SPRINT Existing Facility

Site ID: CT54XC704

Voluntown
111 Stone Hill Road
Voluntown, CT 06384

June 15, 2018

EBI Project Number: 6218004399

Site Compliance Summary	
Compliance Status:	COMPLIANT
Site total MPE% of FCC general population allowable limit:	5.03 %

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

EBI Consulting
environmental | engineering | due diligence

June 15, 2018

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

Emissions Analysis for Site: **CT54XC704 – Voluntown**

EBI Consulting was directed to analyze the proposed SPRINT facility located at **111 Stone Hill Road, Voluntown, CT**, for the purpose of determining whether the emissions from the Proposed SPRINT Antenna Installation located on this property are within specified federal limits.

All information used in this report was analyzed as a percentage of current Maximum Permissible Exposure (% MPE) as listed in the FCC OET Bulletin 65 Edition 97-01and ANSI/IEEE Std C95.1. The FCC regulates Maximum Permissible Exposure in units of microwatts per square centimeter (μW/cm2). The number of $\mu W/cm^2$ 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 population 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 population 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.

General population exposure to radio frequencies is regulated and enforced in units of microwatts per square centimeter ($\mu W/cm^2$). The general population exposure limits for the 850 MHz Band is approximately 567 $\mu W/cm^2$. The general population exposure limit for the 1900 MHz (PCS) and 2500 MHz (BRS) bands is 1000 $\mu W/cm^2$. 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 SPRINT Wireless antenna facility located at **111 Stone Hill Road, Voluntown, CT**, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since SPRINT 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) 1 CDMA channels (850 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 20 Watts per Channel.

2) 2 LTE channels (850 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 50 Watts per Channel.

3) 5 CDMA channels (1900 MHz (PCS)) were considered for each sector of the proposed installation. These Channels have a transmit power of 16 Watts per Channel.

4) 2 LTE channels (1900 MHz (PCS)) were considered for each sector of the proposed installation. These Channels have a transmit power of 40 Watts per Channel.

5) 8 LTE channels (2500 MHz (BRS)) were considered for each sector of the proposed installation. These Channels have a transmit power of 20 Watts per Channel.

6) 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.

7) For the following calculations, the sample point was the top of a 6-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.

8) The antennas used in this modeling are the **Commscope NNVV-65B-R4 and the RFS APXVTM14-ALU-I20** for transmission in the 850 MHz, 1900 MHz (PCS) and 2500 MHz (BRS) frequency bands. This is based on feedback from the carrier with regards to anticipated antenna selection. Maximum gain values for all antennas are listed in the Inventory and Power Data table below. 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.

9) The antenna mounting height centerlines of the proposed antennas are **175 feet** above ground level (AGL) for **Sector A**, **175 feet** above ground level (AGL) for **Sector B** and **175 feet** above ground level (AGL) for Sector C.

10) 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 population threshold limits.

SPRINT Site Inventory and Power Data by Antenna

Sector:	A	Sector:	B	Sector:	C
Antenna #:	**1**	Antenna #:	**1**	Antenna #:	**1**
Make / Model:	Commscope NNVV-65B-R4	Make / Model:	Commscope NNVV-65B-R4	Make / Model:	Commscope NNVV-65B-R4
Gain:	12.75 / 15.05 dBd	Gain:	12.75 / 15.05 dBd	Gain:	12.75 / 15.05 dBd
Height (AGL):	**175 feet**	Height (AGL):	**175 feet**	Height (AGL):	**175 feet**
Frequency Bands	850 MHz / 1900 MHz (PCS)	Frequency Bands	850 MHz / 1900 MHz (PCS)	Frequency Bands	850 MHz / 1900 MHz (PCS)
Channel Count	10	Channel Count	10	Channel Count	10
Total TX Power(W):	280 Watts	Total TX Power(W):	280 Watts	Total TX Power(W):	280 Watts
ERP (W):	7,378.61	ERP (W):	7,378.61	ERP (W):	7,378.61
Antenna A1 MPE%	**1.15 %**	Antenna B1 MPE%	**1.15 %**	Antenna C1 MPE%	**1.15 %**
Antenna #:	**2**	Antenna #:	**2**	Antenna #:	**2**
Make / Model:	RFS APXVTM14-ALU-I20	Make / Model:	RFS APXVTM14-ALU-I20	Make / Model:	RFS APXVTM14-ALU-I20
Gain:	15.9 dBd	Gain:	15.9 dBd	Gain:	15.9 dBd
Height (AGL):	**175 feet**	Height (AGL):	**175 feet**	Height (AGL):	**175 feet**
Frequency Bands	2500 MHz (BRS)	Frequency Bands	2500 MHz (BRS)	Frequency Bands	2500 MHz (BRS)
Channel Count	8	Channel Count	8	Channel Count	8
Total TX Power(W):	160 Watts	Total TX Power(W):	160 Watts	Total TX Power(W):	160 Watts
ERP (W):	6,224.72	ERP (W):	6,224.72	ERP (W):	6,224.72
Antenna A2 MPE%	**0.78 %**	Antenna B2 MPE%	**0.78 %**	Antenna C2 MPE%	**0.78 %**

Site Composite MPE%	
Carrier	**MPE%**
SPRINT – Max per sector	**1.93 %**
AT&T	1.36 %
Verizon Wireless	1.74 %
Site Total MPE %:	**5.03 %**

SPRINT Sector A Total:	1.93 %
SPRINT Sector B Total:	1.93 %
SPRINT Sector C Total:	1.93 %
Site Total:	5.03 %

SPRINT _ Frequency Band / Technology Max Power Values (Per Sector)	**# Channels**	**Watts ERP (Per Channel)**	**Height (feet)**	**Total Power Density ($\mu W/cm^2$)**	**Frequency (MHz)**	**Allowable MPE ($\mu W/cm^2$)**	**Calculated % MPE**
Sprint 850 MHz CDMA	1	376.73	175	0.47	850 MHz	567	0.09%
Sprint 850 MHz LTE	2	941.82	175	2.37	850 MHz	567	0.42%
Sprint 1900 MHz (PCS) CDMA	5	511.82	175	3.22	1900 MHz (PCS)	1000	0.32%
Sprint 1900 MHz (PCS) LTE	2	1,279.56	175	3.22	1900 MHz (PCS)	1000	0.32%
Sprint 2500 MHz (BRS) LTE	8	778.09	175	7.84	2500 MHz (BRS)	1000	0.78%
						Total:	**1.93%**

Summary

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

The anticipated maximum composite contributions from the SPRINT facility as well as the site composite emissions value with regards to compliance with FCC's allowable limits for general population exposure to RF Emissions are shown here:

SPRINT Sector	Power Density Value (%)
Sector A:	1.93 %
Sector B:	1.93 %
Sector C:	1.93 %
SPRINT Maximum Total (per sector):	1.93 %
Site Total:	5.03 %
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **5.03 %** of the allowable FCC established general population 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.

ALLPRO
CONSULTING GROUP, INC.
9221 Lyndon B. Johnson Freeway, #204, Dallas, TX 75243 ★ PHONE 972-231-8893 ★ FAX 1-866-364-8375
www.allprocgi.com ★ e-mail: info@allprocgi.com

Tower Structural Analysis Report for
SBA Communications Corporation

Existing 180' Self Support Tower

SBA Site Name: Voluntown
SBA Site Number: CT10024-A-02
Carrier Name: Sprint Nextel
Carrier Site ID/Name: CT54XC704 / Voluntown
App #: 73332, v3

Site Location:
111 Stone Hill Road,
Voluntown, CT 06384
New London County

Latitude: 41.606411
Longitude: -71.851133

ACGI Job # 18-3608

ANALYSIS RESULTS		
Tower Components	62.9 %	**Pass**
Tower Foundation Capacity	71.7 %	**Pass**
Net Change in Tower Stress	-11.1 %	**Change from previous Structural Analysis Tower Engineering Solutions Project # 37275, dated 08/21/2017**

Prepared By:
Brayan Andrade, EIT
Staff Engineer

05/25/2018
Approved By:
Joji Geroge, P.E.
CT PE #24444

TABLE OF CONTENTS

1. ANALYSIS SUMMARY

The existing 180' Self Support Tower located in Voluntown, CT was analyzed by Allpro Consulting Group, Inc (ACGI) for the existing loads and the proposed **Sprint Nextel** antennas and coaxes as authorized by SBA Communication Corp. Based on the results of the analysis, the existing tower with mentioned proposed and existing loading is found **to be in code compliance** with *TIA-222-G, Structural Standards for Steel Antenna Towers and Antenna Supporting Structures and IBC 2012.*

2. SCOPE & SOURCE OF INFORMATION

The purpose of this structural analysis is to determine whether the existing structure is capable of supporting additional proposed loads.

SOURCE OF INFORMATION		
Tower Data:	Rohn Industries, Inc. Tower Engineering Solutions Allpro Consulting Group, Inc.	Original Tower Drawings by Rohn Industries, Inc. (File No. 42895AE002 dated 04/24/2001) Previous Structural Analysis by Tower Engineering Solutions, Project # 37275 dated 08/21/2017. Previous Structural Analysis by Allpro Consulting Group, Inc., ACGI# 17-8038, dated 01/11/2018
Foundation Data:	Rohn Industries, Inc.	Existing MAT foundation data is as per original foundation design by Rohn Industries, Inc. (File No. 42895AE002 dated 04/24/2001)
Geotechnical Report:	Dr. Clarence Welti, P.E.	Geotechnical report by Dr. Clarence Welti, P.E. dated 3/5/2001.
Loading Data:	Tower Engineering Solutions SBA Communication Corp.	Existing Loading as per previous Structural Analysis by Tower Engineering Solutions, Project # 37275 dated 08/21/2017. Site information based on SBA Site Summary, dated 08/15/2017. Proposed final loading for Sprint Nextel as per SBA Portal, App #73332, v3.
Authorization:	SBA Communication Corp.	

3. ANALYSIS METHODS & DATA

The analysis was performed in accordance with Telecommunication Industry Association specification TIA-222-G. The tower was modeled using TNX Tower, a 3-D finite element program. TNX Tower is a general-purpose modeling, analysis, and design program created specifically for communication towers using the TIA-222-G standards. The 3-D model included the tower, with existing appurtenances and all proposed loads.

SITE DATA	
SBA Site Name:	Voluntown
SBA Site Number:	CT10024-A-02
Carrier Site ID:	CT54XC704 / Voluntown
City, State:	Voluntown, CT
County:	New London County
Code Wind Load Requirement:	TIA-222-G & IBC 2012 (135 mph ultimate wind speed equivalent to 105 mph basic wind speed)
Wind Load Used:	TIA-222-G Code: • Basic wind speed of 105 mph (3 second gust wind speed) • Structure Class II*. • Exposure Category B. • Topographic Category 1. • Crest Height 0.00 ft. • A wind speed of 50 mph is used in combination with ice • Nominal ice thickness of 0.75 in.
Seismic Check:	S_s=0.168 < 1.0, thus seismic loading can be ignored as per 2.7.3 of the TIA-222-G Code

*This structural analysis is based upon the tower being classified as a class II; however, if a different classification is required subsequent to the date hereof, the tower classification will be changed to meet such requirement and a new structural analysis will be run.

TOWER DATA	
Tower Type:	Self Support Tower
Height:	180'
Cross Section:	Triangular
Steel Strength:	Legs – 50 ksi , Braces – 36 ksi
Type of Foundation:	Mat Foundation

TOWER HISTORY	
Tower Manufacturer / Model:	Rohn Industries, Inc.
Date of Original Design:	04/24/2001
Previous Modifications:	N/A
Original Design Code Requirements:	TIA/EIA-222-F-1996 90 mph basic wind speed + 0.5" ice

4. CONCLUSIONS

RESULT SUMMARY		
MEMBER	*% Capacity*	*Pass/Acceptable*
Legs	**60.7 %**	**Pass**
Diagonals	**62.9 %**	**Pass**
Top Girt	**5.1 %**	**Pass**
Bolt checks	**62.9 %**	**Pass**
Anchor Bolts	**71.7 %**	**Pass**
Foundation (see attached MathCAD for details)	**Net Soil Pressure (13.1 %)**	**Pass**
	Horizontal shear (11.1 %)	**Pass**
	Safety against overturning (58.3 %)	**Pass**
OVERALL TOWER RATING = 71.7 %		

As per the results of the analysis, the existing tower **is in code compliance** for the new and existing antenna loads.

Maximum tower stress **is less than 100%, the acceptable stress ratio** making it **in code compliance** under the TIA-222-G code and 2012 International Building Code adopted by 2016 CSBC (Connecticut State Building Code).

5. DISCLAIMER

Installation procedures and related loading are not within the scope of this analysis. A contractor experienced in similar work should perform all installation work. The engineering services provided by Allpro Consulting Group, Inc. (ACGI) are limited to the computer analysis and calculations of the structure with the proposed and existing loads. This analysis is considered void if the loading mentioned in this report is changed or is different as installed. It is assumed that the existing structure is properly maintained and is in good condition free of any defects. Scope of this analysis does not include existing connections, except as noted in this report.

ACGI does not make any warranties, expressed or implied in connection with this engineering analysis report and disclaims any liability arising from deficiencies or any existing conditions of the original structure. ACGI will not be responsible for consequential or incidental damages sustained by any parties as a result of any data or conclusions included in this Report. The maximum liability of ACGI pursuant to this report shall be limited to the consulting fee received for the preparation of the report.

6. ASSUMPTIONS

This analysis was completed based on the following assumptions:

- Tower has been properly maintained.
- Tower erection was in accordance to manufacturer drawings and modification reports.
- Leg flanges have been properly designed by manufacturer to not be a limiting reaction.
- Welds have been properly designed and installed by manufacturer to not be a limiting reaction.
- Foundation data was not provided. It is assumed that the foundation is designed to resist the original tower reactions.
- Foundation does not have structural damage.
- Bolts have been properly tightened according to manufacturer specifications.
- Appurtenance, mount and transmission line sizes and weights are best estimates using the tnxTower database and manufacturer information.

7. APPURTENANCE LISTING

EXISTING LOAD DESCRIPTION					
ELEV (ft.)	***Qty.***	***Antenna Description***	***Mount Type & Qty.***	***TX. LINE (in)***	***TENANT***
175±	12	Decibel DB980H90EMS Antenna	(3) Sector Frames	(6) 1-5/8"	Sprint Nextel
165±	9	Powerwave- 7770.00 Antenna	(3) Sector Frames	(12) 1-5/8" (1) 1/2" Fiber (2) 3/4" DC Power	AT&T
	3	Powerwave - P65-17-XLH-RR Antenna			
	6	Powerwave- LGP21401 TMAs			
	6	Powerwave- LGP21903 Diplexers			
	6	Ericsson - RRUS-11 RRUs			
164±	1	Raycap - DC6-48-60-18-8F-Surge			
153±	3	Antel BXA-70063-6CF-EDIN-4 Antenna	(3) Sector Frames	(10) 1-5/8" Coax (2) 1-5/8" Hybrid	Verizon
	6	Commscope JAHH-65B-R3B Antenna			
	3	Alcatel Lucent RRH 2X90 AWS			
	3	Alcatel Lucent RRH 2X60 700			
	3	Nokia RRH 4X40 850			
	2	RFS DB-T1-6Z-8AB-0Z-Fiber Junction Box			

FINAL SPRINT NEXTEL LOAD DESCRIPTION					
ELEV (ft.)	***Qty.***	***Antenna Description***	***Mount Type & Qty.***	***TX. LINE (in)***	***TENANT***
175±	**3**	**RFS APXVTM14-C-I20**	(3) Sector Frames	**(4) 1-1/4" Fiber**	Sprint Nextel
	3	**Commscope NNVV-65B-R4**			
	3	**ALU 1900 Mhz RRUs**			
	6	**ALU 800 Mhz RRUs**			
	3	**ALU TD-RRH8x20-25 RRUs**			

1. ACGI should be notified of any discrepancies found in the data listed in this report.
2. Notify ACGI if any potential physical and other interference with existing antennas for a redesign.

8. SUMMARY OF WORKING PERCENTAGE OF STRUCTURAL COMPONENTS

Section Capacity Table

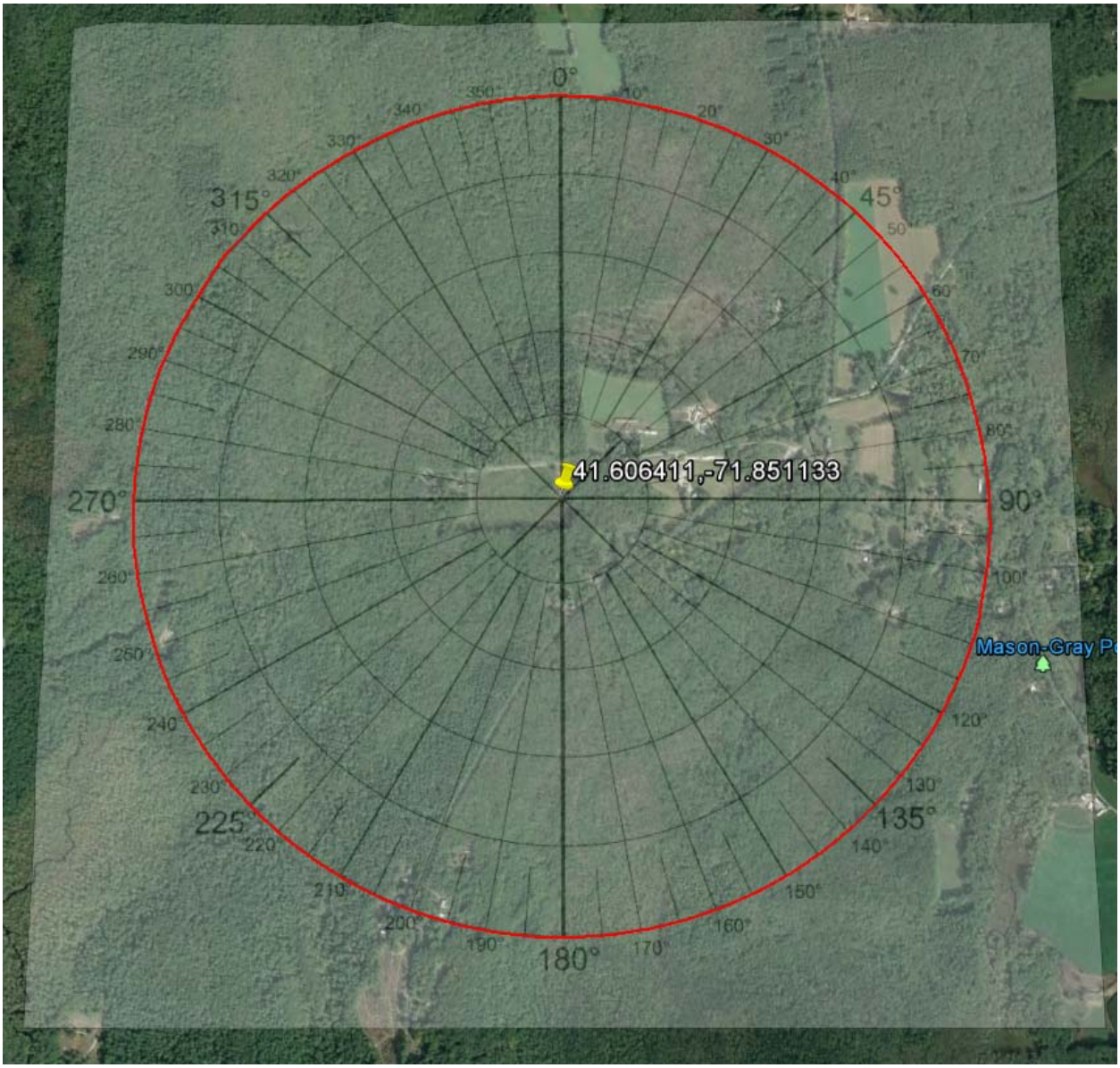
Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
T1	180 - 160	Leg	ROHN 2.5 STD	2	-22.594	63.560	35.5	Pass
		Diagonal	L2x2x1/4	9	-4.685	19.169	24.4	Pass
							49.5 (b)	
		Top Girt	L2x2x1/4	4	-0.463	12.807	3.6	Pass
T2	160 - 140	Leg	ROHN 3 EH	38	-68.712	119.063	57.7	Pass
		Diagonal	L2x2x1/4	45	-4.505	15.483	29.1	Pass
							52.8 (b)	
		Top Girt	L2x2x1/4	42	-0.648	12.807	5.1	Pass
T3	140 - 120	Leg	ROHN 4 EH	74	-106.298	175.707	60.5	Pass
		Diagonal	L2x2x1/4	78	-4.648	10.143	45.8	Pass
							51.9 (b)	
T4	120 - 100	Leg	ROHN 5 EH	101	-137.315	239.377	57.4	Pass
		Diagonal	L2 1/2x2 1/2x1/4	105	-5.179	12.490	41.5	Pass
							49.2 (b)	
T5	100 - 80	Leg	ROHN 6 EHS	122	-166.811	274.759	60.7	Pass
		Diagonal	L2 1/2x2 1/2x1/4	126	-5.474	9.517	57.5	Pass
T6	80 - 60	Leg	ROHN 6 EH	143	-196.406	343.099	57.2	Pass
		Diagonal	L3x3x1/4	147	-6.192	13.134	47.1	Pass
							49.1 (b)	
T7	60 - 40	Leg	ROHN 8 EHS	164	-221.469	386.368	57.3	Pass
		Diagonal	L3 1/2x3 1/2x1/4	168	-6.837	14.360	47.6	Pass
							54.0 (b)	
T8	40 - 20	Leg	ROHN 8 EH	179	-249.607	505.565	49.4	Pass
							51.6 (b)	
		Diagonal	L4x4x1/4	183	-8.077	18.230	44.3	Pass
							62.8 (b)	
T9	20 - 0	Leg	ROHN 8 EH	194	-276.699	505.537	54.7	Pass
		Diagonal	L4x4x1/4	198	-8.118	15.322	53.0	Pass
							62.9 (b)	
							Summary	
						Leg (T5)	60.7	Pass
						Diagonal (T9)	62.9	Pass
						Top Girt (T2)	5.1	Pass
						Bolt Checks	62.9	Pass
						RATING =	**62.9**	**Pass**

APPENDIX

TOWER DATA

(APPENDIX N) MUNICIPALITY - SPECIFIC STRUCTURAL DESIGN PARAMETERS												
				Wind Design Parameters								
Municipality	**Ground Snow Load**	**MCE Spectral Accelerations** (%g)		**Ultimate Design Wind Speeds, V_{ult}** (mph)			**Nominal Design Wind Speeds, V_{asd}** (mph)			**Wind-Borne Debris Regions[1]**		**Hurricane-Prone Regions**
		S_s	S_1	Risk Cat.I	Risk Cat.II	Risk Cat III-IV	Risk Cat. I	Risk Cat. II	Risk Cat. III-IV	Risk Cat. II & III except Occup I-2	Risk Cat III Occup I-2 & Risk Cat. IV	
Sprague	30	0.171	0.061	120	130	140	93	101	108		Type A	Yes
Stafford	35	0.173	0.064	115	125	135	89	97	105			Yes
Stamford	30	0.249	0.069	110	120	130	85	93	101			Yes
Sterling	35	0.170	0.061	125	135	145	97	105	112		Type A	Yes
Stonington	30	0.159	0.058	125	140	150	97	108	116	Type B	Type A	Yes
Stratford	30	0.201	0.064	115	125	135	89	97	105		Type B	Yes
Suffield	35	0.176	0.065	110	120	130	85	93	101			Yes
Thomaston	35	0.186	0.064	110	120	130	85	93	101			Yes
Thompson	40	0.172	0.063	120	130	140	93	101	108			Yes
Tolland	35	0.175	0.064	115	125	135	89	97	105			Yes
Torrington	40	0.182	0.065	110	120	125	85	93	97			Yes
Trumbull	30	0.207	0.065	115	125	135	89	97	105			Yes
Union	40	0.172	0.064	115	125	135	89	97	105			Yes
Vernon	30	0.177	0.064	115	125	135	89	97	105			Yes
Voluntown	30	0.168	0.060	125	135	145	97	105	112		Type A	Yes
Wallingford	30	0.183	0.063	115	125	135	89	97	105			Yes
Warren	40	0.186	0.065	105	115	125	81	89	97			
Washington	35	0.192	0.065	105	120	125	81	93	97			Yes
Waterbury	35	0.189	0.064	110	125	130	85	97	101			Yes
Waterford	30	0.161	0.058	125	135	145	97	105	112	Type B	Type A	Yes
Watertown	35	0.189	0.064	110	120	130	85	93	101			Yes
Westbrook	30	0.167	0.059	120	135	145	93	105	112	Type B	Type A	Yes
West Hartford	30	0.181	0.064	115	125	135	89	97	105			Yes
West Haven	30	0.188	0.062	115	125	135	89	97	105		Type B	Yes
Weston	30	0.224	0.067	110	120	130	85	93	101			Yes
Westport	30	0.226	0.067	110	120	130	85	93	101		Type B	Yes
Wethersfield	30	0.181	0.064	115	125	135	89	97	105			Yes
Willington	35	0.174	0.063	115	125	135	89	97	105			Yes
Wilton	30	0.231	0.068	110	120	130	85	93	101			Yes
Winchester	40	0.177	0.065	105	120	125	81	93	97			Yes
Windham	30	0.173	0.062	120	130	140	93	101	108			Yes
Windsor	35	0.179	0.064	115	125	135	89	97	105			Yes
Windsor Locks	35	0.177	0.064	110	125	130	85	97	101			Yes
Wolcott	35	0.187	0.064	110	125	130	85	97	101			Yes
Woodbridge	30	0.191	0.063	115	125	135	89	97	105			Yes
Woodbury	35	0.194	0.065	110	120	130	85	93	101			Yes
Woodstock	40	0.172	0.063	120	130	140	93	101	108			Yes

1. Wind-Borne Debris Regions: Type A: Full Municipality.
Type B: Areas south of Interstate 95.



Exposure Category “B”

Topographic Category “1”

USGS Design Maps Summary Report

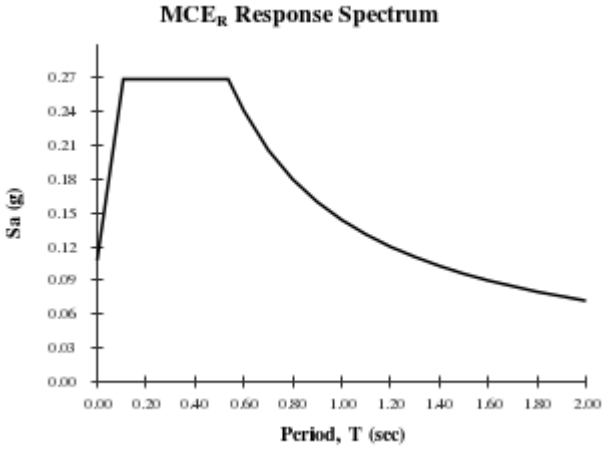
User–Specified Input

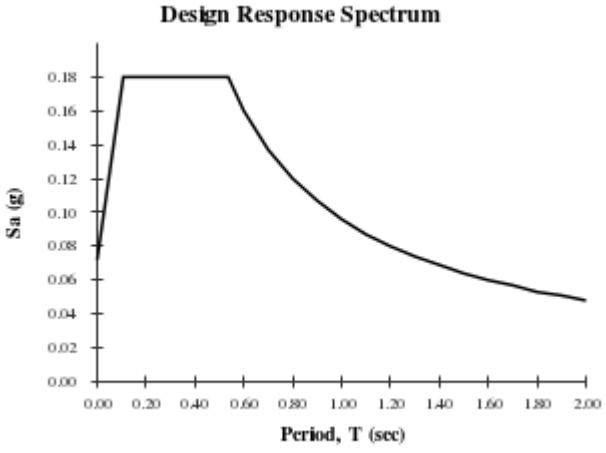
Building Code Reference Document	2012/2015 International Building Code (which utilizes USGS hazard data available in 2008)
Site Coordinates	41.60641°N, 71.85113°W
Site Soil Classification	Site Class D – "Stiff Soil"
Risk Category	I/II/III

USGS–Provided Output

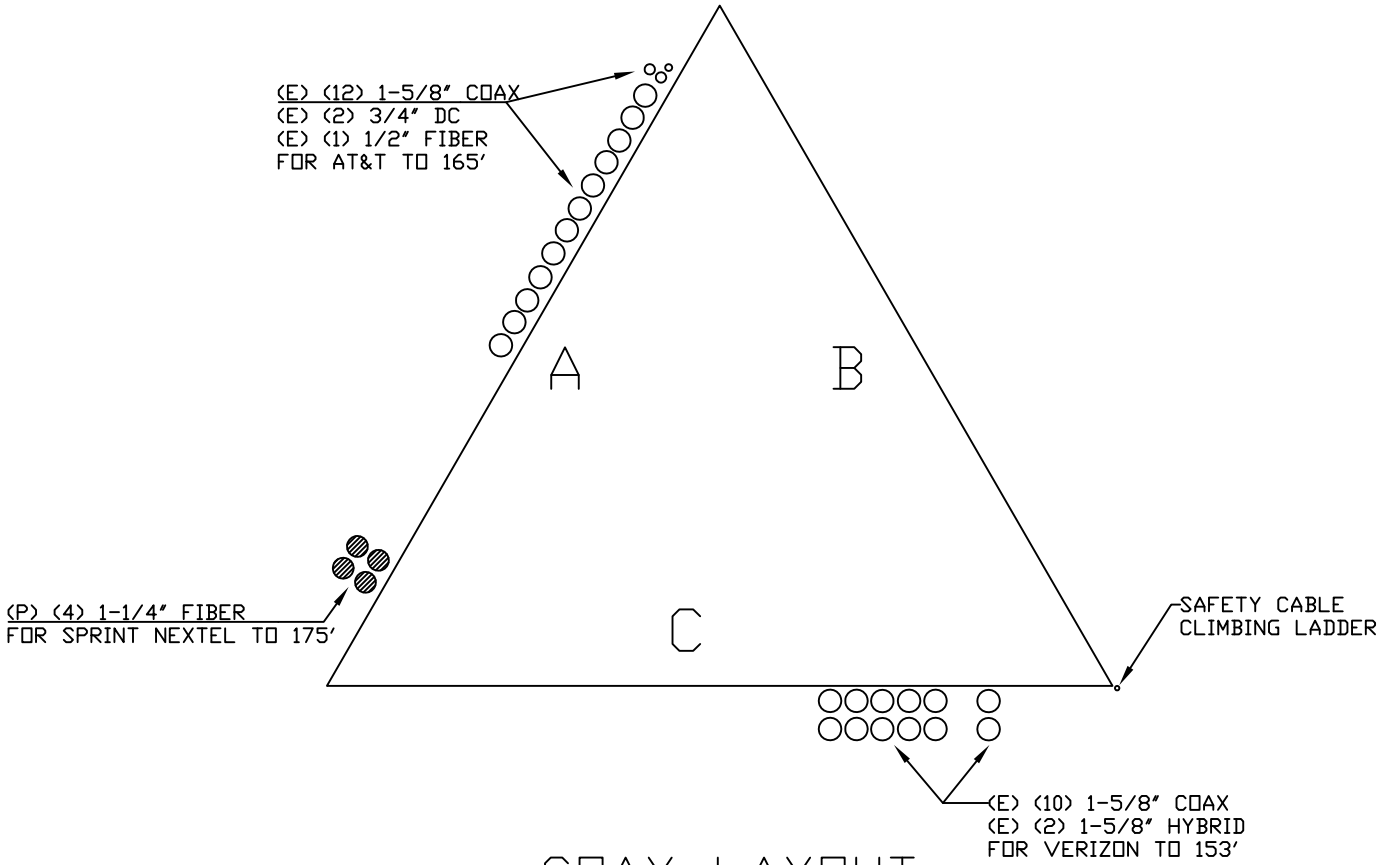
S_S =	0.168 g	S_{MS} =	0.269 g	S_{DS} =	0.180 g
S_1 =	0.060 g	S_{M1} =	0.144 g	S_{D1} =	0.096 g

For information on how the SS and S1 values above have been calculated from probabilistic (risk-targeted) and deterministic ground motions in the direction of maximum horizontal response, please return to the application and select the "2009 NEHRP" building code reference document.





COAX LAYOUT

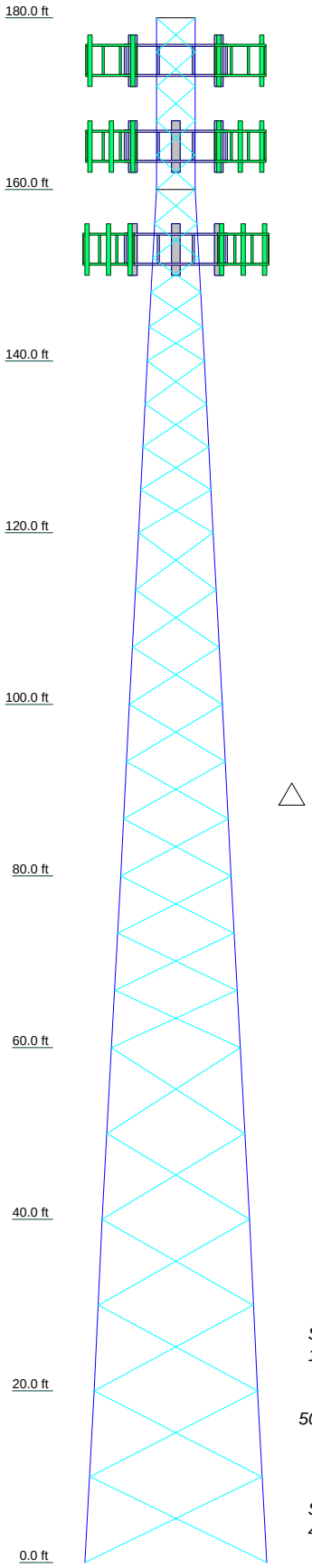


COAX LAYOUT

N.T.S.

TOWER ELEVATION DRAWING

Section	T1	T2	T3	T4	T5	T6	T7	T8	T9		
Legs	ROHN 2.5 STD	ROHN 3 EH	ROHN 4 EH	ROHN 5 EH	ROHN 6 EHS	ROHN 6 EH	ROHN 8 EHS	ROHN 8 EH			
Leg Grade	A572-50										
Diagonals	L2x2x1/4			L2 1/2x2 1/2x1/4		L3x3x1/4	L3 1/2x3 1/2x1/4	L4x4x1/4			
Diagonal Grade	A36										
Top Girts	L2x2x1/4			N.A.							
Face Width (ft)	4.58		6.63		8.68	10.78	12.91	14.92	17.09	19.04	21.12
# Panels @ (ft)	10 @ 4		4 @ 5		9 @ 6.66667			6 @ 10			
Weight (K)	1.0	1.4	1.7	2.2	2.5	3.2	3.5	4.5	4.8		24.5



MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower is located in New London County, Connecticut.
2. Tower designed for Exposure B to the TIA-222-G Standard.
3. Tower designed for a 105 mph basic wind in accordance with the TIA-222-G Standard.
4. Tower is also designed for a 50 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Structure Class II.
7. Topographic Category 1 with Crest Height of 0.000 ft
8. TOWER RATING: 62.9%

ALL REACTIONS ARE FACTORED

MAX. CORNER REACTIONS AT BASE:
DOWN: 283 K
SHEAR: 29 K

UPLIFT: -246 K
SHEAR: 25 K

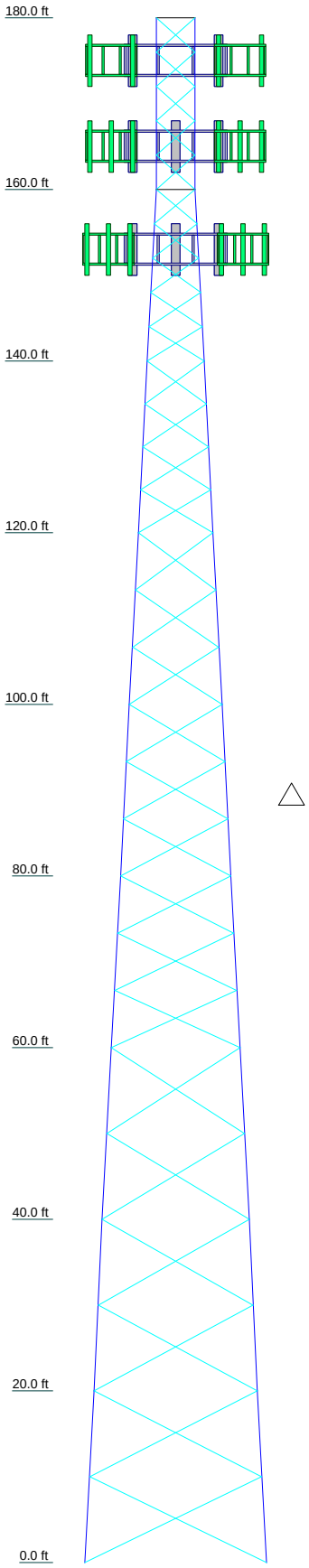
AXIAL 117 K
SHEAR 11 K *MOMENT 1199 kip-ft*
TORQUE 4 kip-ft
50 mph WIND - 0.750 in ICE

AXIAL 46 K
SHEAR 46 K *MOMENT 4900 kip-ft*
TORQUE 21 kip-ft
REACTIONS - 105 mph WIND

Allpro consulting Group, Inc.
9221 Lyndon B Johnson Fwy
Dallas, TX 75243
Phone: 972-231-8893
FAX: 866-364-8375

Job: CT10024-A-02 Voluntown			
Project: 18-3608			
Client: SBA Communication Corporation	Drawn by: Bandrade	App'd:	
Code: TIA-222-G	Date: 05/25/18	Scale: NTS	
Path:		Dwg No. E-1	

Section	T1	T2	T3	T4	T5	T6	T7	T8	T9
Legs	ROHN 2.5 STD	ROHN 3 EH	ROHN 4 EH	ROHN 5 EH	ROHN 6 EHS	ROHN 6 EH	ROHN 8 EHS	ROHN 8 EH	
Leg Grade	A572-50								
Diagonals	L2x2x1/4			L2 1/2x2 1/2x1/4		L3x3x1/4	L3 1/2x3 1/2x1/4	L4x4x1/4	
Diagonal Grade	A36								
Top Girts	L2x2x1/4			N.A.					
Face Width (ft)	4.58		6.63	8.68	10.78	12.91	14.92	17.09	19.04
# Panels @ (ft)	10 @ 4		4 @ 5	9 @ 6.66667				6 @ 10	
Weight (K)	1.0	1.4	1.7	2.2	2.5	3.2	3.5	4.5	4.8



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
APXVTM14-C-I20 (Sprint Nextel)	175	(2) RRUS 11 (ATI)	165
APXVTM14-C-I20 (Sprint Nextel)	175	(2) RRUS 11 (ATI)	165
APXVTM14-C-I20 (Sprint Nextel)	175	(3) Sector Frames (ATI)	165
NNVV-65B-R4 Antenna (Sprint)	175	DC6-48-60-18-8F (ATI)	164
NNVV-65B-R4 Antenna (Sprint)	175	Antel BXA-70063-6CF-EDIN-4 (Verizon)	153
NNVV-65B-R4 Antenna (Sprint)	175		
1900 MHz RRH (Sprint Nextel)	175	Antel BXA-70063-6CF-EDIN-4 (Verizon)	153
1900 MHz RRH (Sprint Nextel)	175		
1900 MHz RRH (Sprint Nextel)	175	Antel BXA-70063-6CF-EDIN-4 (Verizon)	153
(2) 800 MHz RRH (Sprint Nextel)	175		
(2) 800 MHz RRH (Sprint Nextel)	175	(2) Commscope JAHH-65B-R3B (Verizon)	153
(2) 800 MHz RRH (Sprint Nextel)	175		
TD-RRH8x20-25 (Sprint Nextel)	175	(2) Commscope JAHH-65B-R3B (Verizon)	153
TD-RRH8x20-25 (Sprint Nextel)	175		
TD-RRH8x20-25 (Sprint Nextel)	175	(2) Commscope JAHH-65B-R3B (Verizon)	153
(3) Sector Frames (Sprint Nextel)	175		
P65-17-XLH-RR (ATI)	165	ALU RRH 2X90 AWS (Verizon)	153
P65-17-XLH-RR (ATI)	165	ALU RRH 2X90 AWS (Verizon)	153
P65-17-XLH-RR (ATI)	165	ALU RRH 2X90 AWS (Verizon)	153
(3) 7770 (ATI)	165	ALU RRH 2X60 700 (Verizon)	153
(3) 7770 (ATI)	165	ALU RRH 2X60 700 (Verizon)	153
(3) 7770 (ATI)	165	ALU RRH 2X60 700 (Verizon)	153
(2) LGP21903 Diplexer (ATI)	165	Nokia RRH 4X40 850 (Verizon)	153
(2) LGP21903 Diplexer (ATI)	165	Nokia RRH 4X40 850 (Verizon)	153
(2) LGP21903 Diplexer (ATI)	165	Nokia RRH 4X40 850 (Verizon)	153
(2) LGP21401 TMAs (ATI)	165	DB-T1-6Z-8AB-0Z (Verizon)	153
(2) LGP21401 TMAs (ATI)	165	DB-T1-6Z-8AB-0Z (Verizon)	153
(2) LGP21401 TMAs (ATI)	165	(3) Sector Frames (Verizon)	153
(2) RRUS 11 (ATI)	165		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
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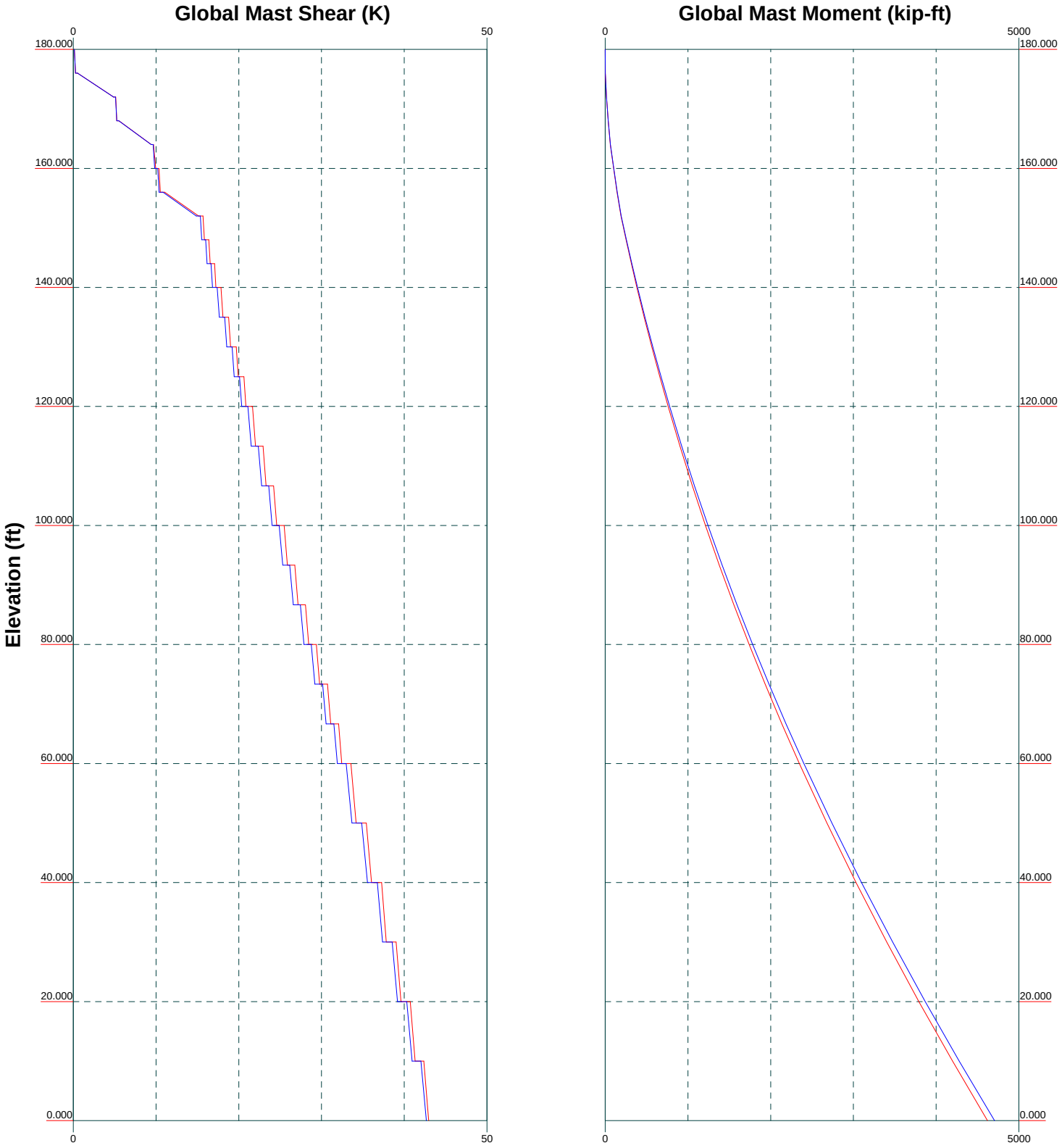
Project: ***18-3608***			
Client: SBA Communication Corporation	Drawn by: Bandrade	App'd:	
Code: TIA-222-G	Date: 05/25/18	Scale: NTS	
Path:		Dwg No. E-1	

MISCELLANEOUS PLOTS

TIA-222-G - 105 mph/50 mph 0.750 in Ice Exposure B

Maximum Values

Vx Vz Mx Mz



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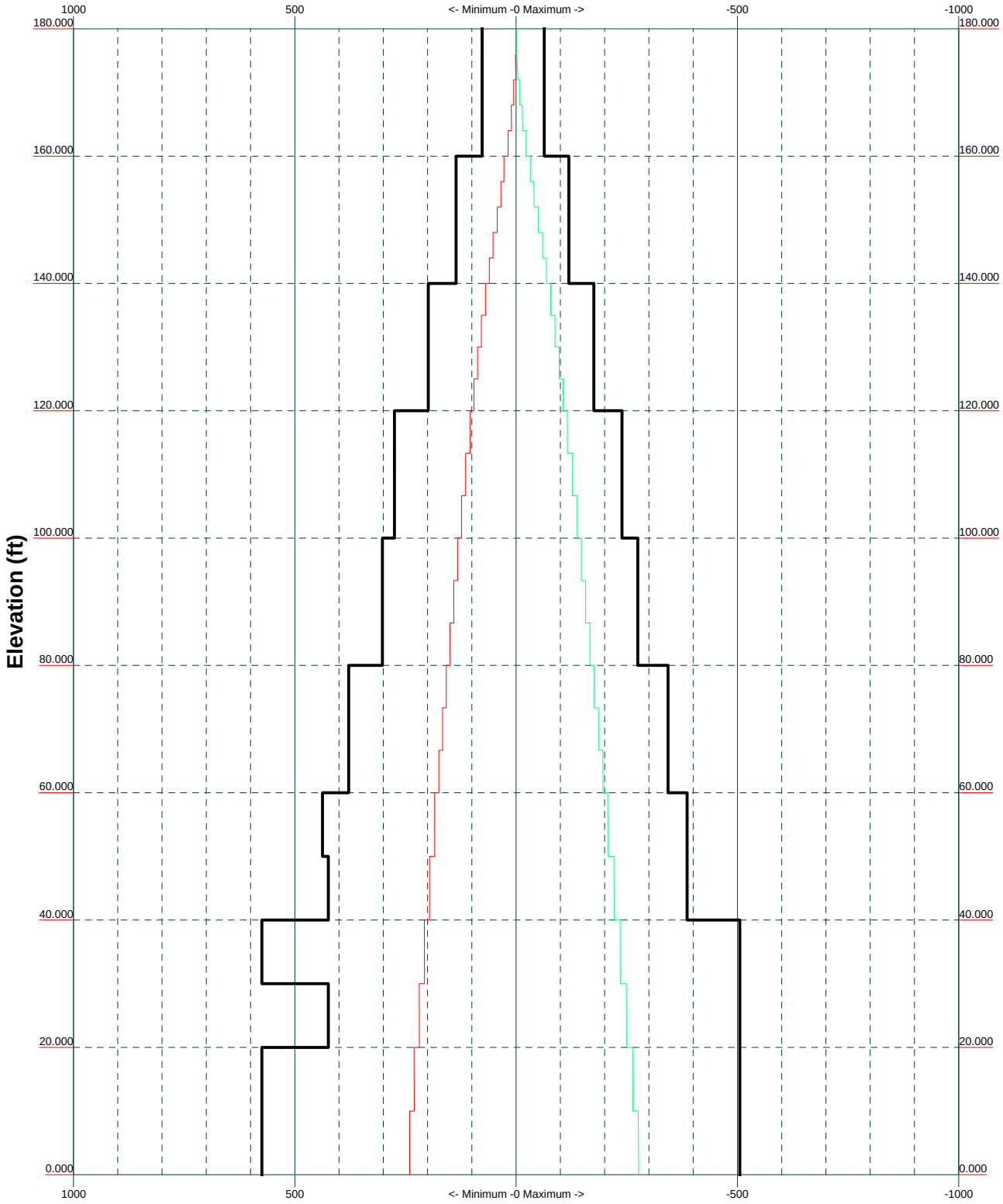
Project: ***18-3608***			
Client: SBA Communication Corporation	Drawn by: Bandrade	App'd:	
Code: TIA-222-G	Date: 05/25/18	Scale: NTS	
Path:		Dwg No. E-4	

TIA-222-G - 105 mph/50 mph 0.750 in Ice Exposure B

Leg Capacity ——— **Leg Compression (K)**



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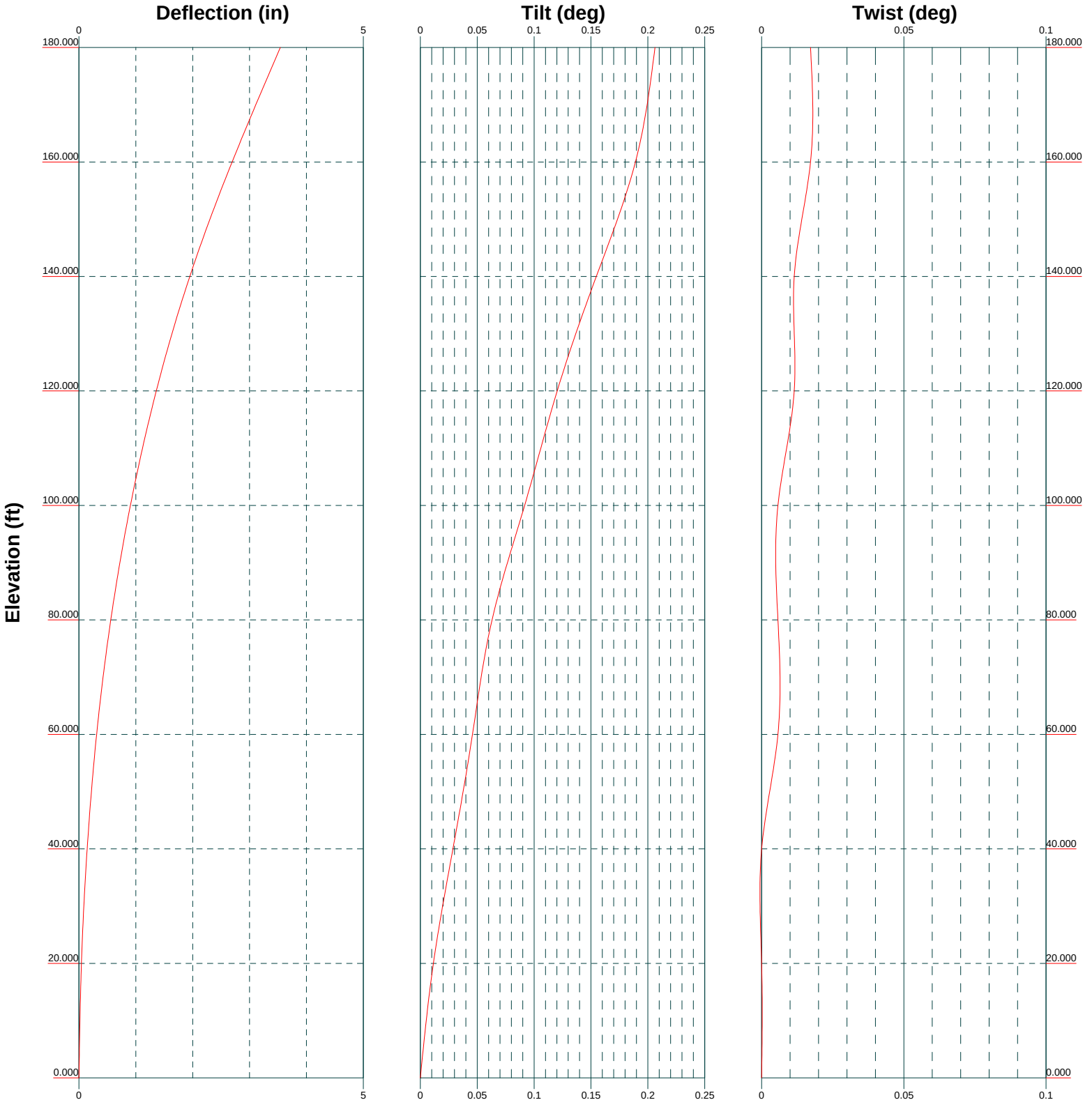
Project: ***18-3608***			
Client: SBA Communication Corporation	Drawn by: Bandrade	App'd:	
Code: TIA-222-G	Date: 05/25/18	Scale: NTS	
Path:		Dwg No. E-3	

TIA-222-G - Service - 60 mph

Maximum Values



Allpro consulting Group, Inc.
9221 Lyndon B Johnson Fwy
Dallas, TX 75243
Phone: 972-231-8893
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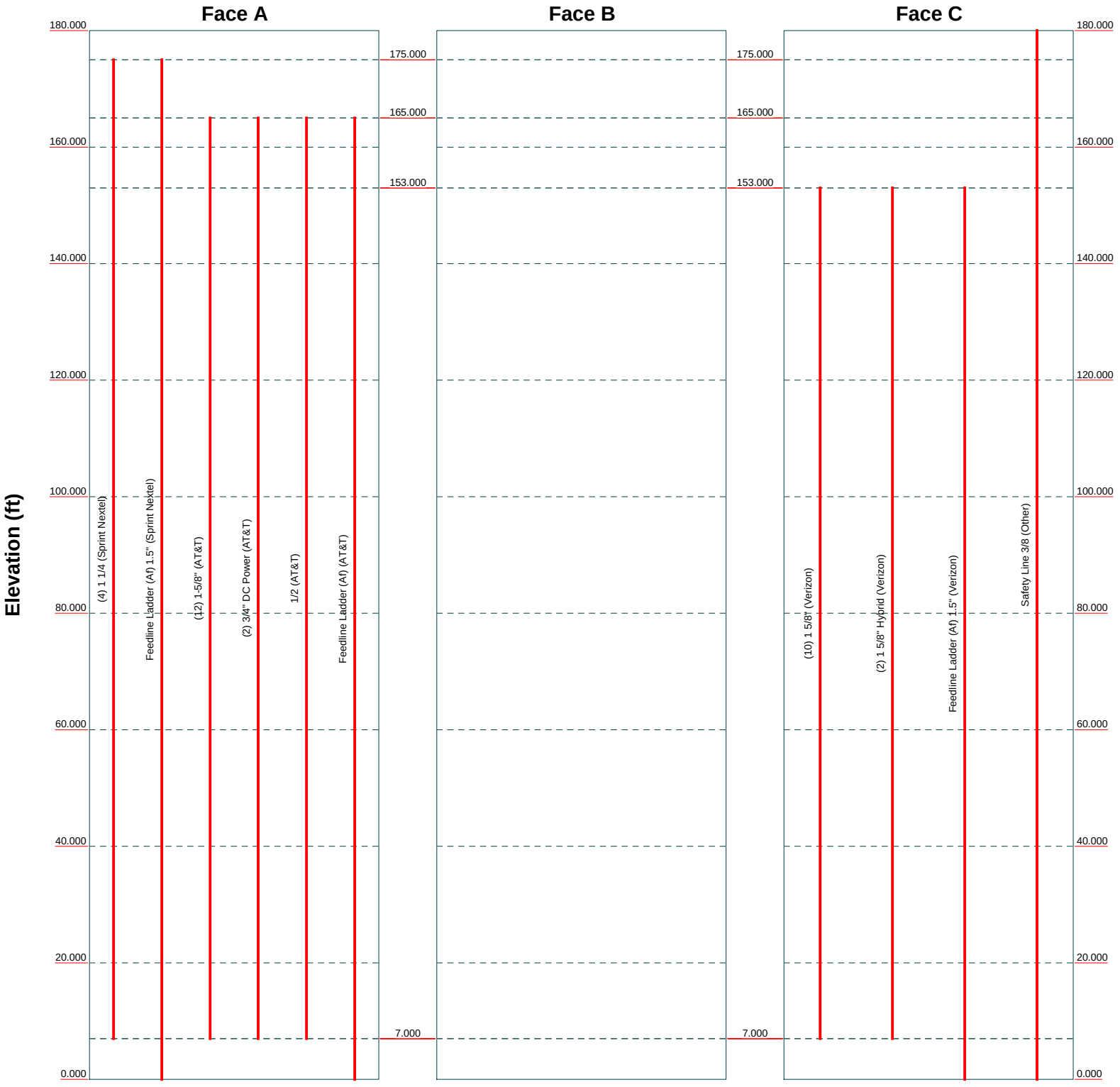
Job: ***CT10024-A-02 Voluntown***			
Project: ***18-3608***			
Client: SBA Communication Corporation	Drawn by: Bandrade	App'd:	
Code: TIA-222-G	Date: 05/25/18	Scale: NTS	
Path:		Dwg No. E-5	

Feed Line Distribution Chart
0' - 180'

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



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Path:		Dwg No. E-7	

TNX TOWER CALCULATION PRINTOUT

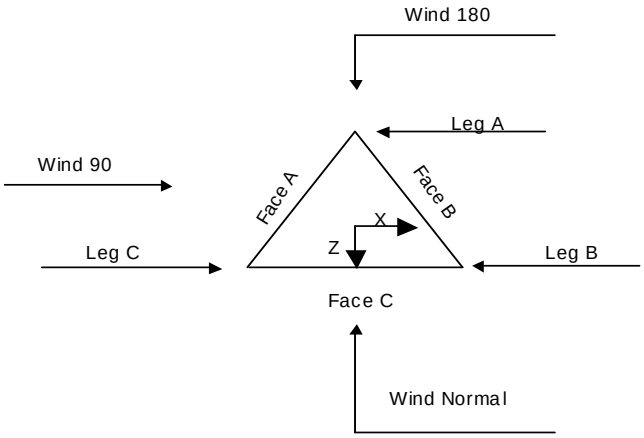
Tower Input Data

The main tower is a 3x free standing tower with an overall height of 180.000 ft above the ground line.
The base of the tower is set at an elevation of 0.000 ft above the ground line.
The face width of the tower is 4.580 ft at the top and 21.120 ft at the base.
This tower is designed using the TIA-222-G standard.
The following design criteria apply:

Tower is located in New London County, Connecticut.
ASCE 7-10 Wind Data is used (wind speeds converted to nominal values).
Basic wind speed of 105 mph.
Structure Class II.
Exposure Category B.
Topographic Category 1.
Crest Height 0.000 ft.
Nominal ice thickness of 0.750 in.
Ice thickness is considered to increase with height.
Ice density of 56.000 pcf.
A wind speed of 50 mph is used in combination with ice.
Temperature drop of 50.000 °F.
Deflections calculated using a wind speed of 60 mph.
Pressures are calculated at each section.
Stress ratio used in tower member design is 1.
Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

	Consider Moments - Legs		Distribute Leg Loads As Uniform		Use ASCE 10 X-Brace Ly Rules
	Consider Moments - Horizontals		Assume Legs Pinned		Calculate Redundant Bracing Forces
	Consider Moments - Diagonals	√	Assume Rigid Index Plate		Ignore Redundant Members in FEA
	Use Moment Magnification	√	Use Clear Spans For Wind Area		SR Leg Bolts Resist Compression
√	Use Code Stress Ratios	√	Use Clear Spans For KL/r		All Leg Panels Have Same Allowable
√	Use Code Safety Factors - Guys	√	Retension Guys To Initial Tension		Offset Girt At Foundation
	Escalate Ice	√	Bypass Mast Stability Checks	√	Consider Feed Line Torque
	Always Use Max Kz	√	Use Azimuth Dish Coefficients	√	Include Angle Block Shear Check
	Use Special Wind Profile	√	Project Wind Area of Appurt.		Use TIA-222-G Bracing Resist. Exemption
√	Include Bolts In Member Capacity	√	Autocalc Torque Arm Areas		Use TIA-222-G Tension Splice Exemption
	Leg Bolts Are At Top Of Section		Add IBC .6D+W Combination		Poles
	Secondary Horizontal Braces Leg		Sort Capacity Reports By Component		Include Shear-Torsion Interaction
	Use Diamond Inner Bracing (4 Sided)		Triangulate Diamond Inner Bracing		Always Use Sub-Critical Flow
	SR Members Have Cut Ends		Treat Feed Line Bundles As Cylinder		Use Top Mounted Sockets
	SR Members Are Concentric				Pole Without Linear Attachments
					Pole With Shroud Or No Appurtenances
					Outside and Inside Corner Radii Are Known



Triangular Tower

Tower Section Geometry

Tower Section	Tower Elevation	Assembly Database	Description	Section Width	Number of Sections	Section Length
	ft			ft		ft
T1	180.000-160.000			4.580	1	20.000
T2	160.000-140.000			4.580	1	20.000
T3	140.000-120.000			6.630	1	20.000
T4	120.000-100.000			8.680	1	20.000
T5	100.000-80.000			10.780	1	20.000
T6	80.000-60.000			12.910	1	20.000
T7	60.000-40.000			14.920	1	20.000
T8	40.000-20.000			17.090	1	20.000
T9	20.000-0.000			19.040	1	20.000

Tower Section Geometry *(cont'd)*

Tower Section	Tower Elevation	Diagonal Spacing	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset	Bottom Girt Offset
	ft	ft				in	in
T1	180.000-160.000	4.000	X Brace	No	No	0.000	0.000
T2	160.000-140.000	4.000	X Brace	No	No	0.000	0.000
T3	140.000-120.000	5.000	X Brace	No	No	0.000	0.000
T4	120.000-100.000	6.667	X Brace	No	No	0.000	0.000
T5	100.000-80.000	6.667	X Brace	No	No	0.000	0.000
T6	80.000-60.000	6.667	X Brace	No	No	0.000	0.000

Tower Section	Tower Elevation ft	Diagonal Spacing ft	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset in	Bottom Girt Offset in
T7	60.000-40.000	10.000	X Brace	No	No	0.000	0.000
T8	40.000-20.000	10.000	X Brace	No	No	0.000	0.000
T9	20.000-0.000	10.000	X Brace	No	No	0.000	0.000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T1 180.000-160.000	Pipe	ROHN 2.5 STD	A572-50 (50 ksi)	Equal Angle	L2x2x1/4	A36 (36 ksi)
T2 160.000-140.000	Pipe	ROHN 3 EH	A572-50 (50 ksi)	Equal Angle	L2x2x1/4	A36 (36 ksi)
T3 140.000-120.000	Pipe	ROHN 4 EH	A572-50 (50 ksi)	Equal Angle	L2x2x1/4	A36 (36 ksi)
T4 120.000-100.000	Pipe	ROHN 5 EH	A572-50 (50 ksi)	Equal Angle	L2 1/2x2 1/2x1/4	A36 (36 ksi)
T5 100.000-80.000	Pipe	ROHN 6 EHS	A572-50 (50 ksi)	Equal Angle	L2 1/2x2 1/2x1/4	A36 (36 ksi)
T6 80.000-60.000	Pipe	ROHN 6 EH	A572-50 (50 ksi)	Equal Angle	L3x3x1/4	A36 (36 ksi)
T7 60.000-40.000	Pipe	ROHN 8 EHS	A572-50 (50 ksi)	Equal Angle	L3 1/2x3 1/2x1/4	A36 (36 ksi)
T8 40.000-20.000	Pipe	ROHN 8 EH	A572-50 (50 ksi)	Equal Angle	L4x4x1/4	A36 (36 ksi)
T9 20.000-0.000	Pipe	ROHN 8 EH	A572-50 (50 ksi)	Equal Angle	L4x4x1/4	A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Top Girt Type	Top Girt Size	Top Girt Grade	Bottom Girt Type	Bottom Girt Size	Bottom Girt Grade
T1 180.000-160.000	Equal Angle	L2x2x1/4	A36 (36 ksi)	Solid Round		A36 (36 ksi)
T2 160.000-140.000	Equal Angle	L2x2x1/4	A36 (36 ksi)	Solid Round		A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
T1 180.000-160.0	0.000	0.000	A36 (36 ksi)	1	1	1.05	36.000	36.000	36.000

Tower Elevation ft	Gusset Area (per face) ft²	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
00									
T2 160.000-140.000	0.000	0.000	A36 (36 ksi)	1	1	1.05	36.000	36.000	36.000
T3 140.000-120.000	0.000	0.000	A36 (36 ksi)	1	1	1.05	36.000	36.000	36.000
T4 120.000-100.000	0.000	0.000	A36 (36 ksi)	1	1	1.05	36.000	36.000	36.000
T5 100.000-80.000	0.000	0.000	A36 (36 ksi)	1	1	1.05	36.000	36.000	36.000
T6 80.000-60.000	0.000	0.000	A36 (36 ksi)	1	1	1.05	36.000	36.000	36.000
T7 60.000-40.000	0.000	0.000	A36 (36 ksi)	1	1	1.05	36.000	36.000	36.000
T8 40.000-20.000	0.000	0.000	A36 (36 ksi)	1	1	1.05	36.000	36.000	36.000
T9 20.000-0.000	0.000	0.000	A36 (36 ksi)	1	1	1.05	36.000	36.000	36.000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Calc K Single Angles	Calc K Solid Rounds	K Factors[1] Legs	X Brace Diags X Y	K Brace Diags X Y	Single Diags X Y	Girts X Y	Horiz. X Y	Sec. Horiz. X Y	Inner Brace X Y
T1 180.000-160.000	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T2 160.000-140.000	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T3 140.000-120.000	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T4 120.000-100.000	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T5 100.000-80.000	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T6 80.000-60.000	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T7 60.000-40.000	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T8 40.000-20.000	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T9 20.000-0.000	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1

[1]*Note: K factors are applied to member segment lengths. K-braces without inner supporting members will have the K factor in the out-of-plane direction applied to the overall length.*

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U
T1 180.000-160.000	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T2 160.000-140.000	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T3 140.000-120.000	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T4 120.000-100.000	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T5 100.000-80.000	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T6 80.000-60.000	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T7 60.000-40.000	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T8 40.000-20.000	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T9 20.000-0.000	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Connection Type	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
		Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.
T1 180.000-160.000	Flange	0.750 A325N	4	0.625 A325N	1	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0
T2 160.000-140.000	Flange	0.875 A325N	4	0.625 A325N	1	0.625 A325N	0	0.000 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0
T3 140.000-120.000	Flange	1.000 A325N	4	0.625 A325N	1	0.625 A325N	0	0.000 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0
T4 120.000-100.000	Flange	1.000 A325N	6	0.625 A325N	1	0.625 A325N	0	0.000 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0
T5 100.000-80.000	Flange	1.000 A325N	6	0.625 A325N	1	0.625 A325N	0	0.000 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0

Tower Elevation ft	Leg Connection Type	Leg Bolt Size in	Leg No.	Diagonal Bolt Size in	Diagonal No.	Top Girt Bolt Size in	Top Girt No.	Bottom Girt Bolt Size in	Bottom Girt No.	Mid Girt Bolt Size in	Mid Girt No.	Long Horizontal Bolt Size in	Long Horizontal No.	Short Horizontal Bolt Size in	Short Horizontal No.
T6 80.000-60.000	Flange	1.000 A325N	8	0.750 A325N	1	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0
T7 60.000-40.000	Flange	1.000 A325N	8	0.750 A325N	1	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0
T8 40.000-20.000	Flange	1.000 A325N	8	0.750 A325N	1	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0
T9 20.000-0.000	Flange	1.250 A325N	0	0.750 A325N	1	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight klf
1 1/4 (Sprint Nextel)	A	No	Ar (CaAa)	175.000 - 7.000	0.000	-0.4	4	2	0.500	1.550		0.001
Feedline Ladder (Af)	A	No	Af (CaAa)	175.000 - 0.000	0.000	-0.4	1	1	0.500	2.500		0.006
1.5" (Sprint Nextel) ***												
1-5/8" (AT&T)	A	No	Ar (CaAa)	165.000 - 7.000	0.000	0.25	12	12	0.500	1.980		0.001
3/4" DC Power (AT&T)	A	No	Ar (CaAa)	165.000 - 7.000	0.000	0.35	2	1	0.500	0.865		0.000
1/2 (AT&T)	A	No	Ar (CaAa)	165.000 - 7.000	0.000	0.45	1	1	0.500	0.580		0.000
Feedline Ladder (Af) (AT&T) ***	A	No	Af (CaAa)	165.000 - 0.000	0.000	0.25	1	1	0.500	3.000		0.008
1 5/8" (Verizon)	C	No	Ar (CaAa)	153.000 - 7.000	0.000	-0.2	10	5	0.500	1.980		0.001
1 5/8" Hybrid (Verizon)	C	No	Ar (CaAa)	153.000 - 7.000	0.000	-0.05	2	1	0.500	1.980		0.001
Feedline Ladder (Af) 1.5" (Verizon) ***	C	No	Af (CaAa)	153.000 - 0.000	0.000	-0.2	1	1	0.500	1.500		0.004
Safety Line 3/8 (Other)	C	No	Ar (CaAa)	180.000 - 0.000	0.000	-0.5	1	1	0.375	0.375		0.000

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
T1	180.000-160.000	A	0.000	0.000	31.085	0.000	0.218
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.750	0.000	0.004
T2	160.000-140.000	A	0.000	0.000	82.873	0.000	0.541
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	34.888	0.000	0.221
T3	140.000-120.000	A	0.000	0.000	82.873	0.000	0.541
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	53.270	0.000	0.338
T4	120.000-100.000	A	0.000	0.000	82.873	0.000	0.541
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	53.270	0.000	0.338
T5	100.000-80.000	A	0.000	0.000	82.873	0.000	0.541
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	53.270	0.000	0.338
T6	80.000-60.000	A	0.000	0.000	82.873	0.000	0.541
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	53.270	0.000	0.338
T7	60.000-40.000	A	0.000	0.000	82.873	0.000	0.541
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	53.270	0.000	0.338
T8	40.000-20.000	A	0.000	0.000	82.873	0.000	0.541
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	53.270	0.000	0.338
T9	20.000-0.000	A	0.000	0.000	60.284	0.000	0.449
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	36.638	0.000	0.251

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
T1	180.000-160.000	A	1.767	0.000	0.000	62.110	0.000	0.977
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	7.819	0.000	0.097
T2	160.000-140.000	A	1.745	0.000	0.000	166.489	0.000	2.625
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	59.350	0.000	1.060
T3	140.000-120.000	A	1.720	0.000	0.000	165.700	0.000	2.591
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	86.607	0.000	1.559
T4	120.000-100.000	A	1.692	0.000	0.000	164.793	0.000	2.551
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	85.989	0.000	1.535
T5	100.000-80.000	A	1.658	0.000	0.000	163.724	0.000	2.505
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	85.261	0.000	1.508
T6	80.000-60.000	A	1.617	0.000	0.000	162.415	0.000	2.449
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	84.369	0.000	1.474
T7	60.000-40.000	A	1.564	0.000	0.000	160.713	0.000	2.377
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	83.210	0.000	1.432
T8	40.000-20.000	A	1.486	0.000	0.000	158.239	0.000	2.275
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	81.524	0.000	1.371
T9	20.000-0.000	A	1.331	0.000	0.000	109.810	0.000	1.548

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	56.557	0.000	0.906

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
T1	180.000-160.000	-14.663	-7.194	-9.720	-3.062
T2	160.000-140.000	-4.223	-10.927	-4.564	-7.758
T3	140.000-120.000	-2.313	-11.557	-3.391	-7.238
T4	120.000-100.000	-2.790	-14.707	-4.149	-9.297
T5	100.000-80.000	-3.277	-17.918	-4.912	-11.430
T6	80.000-60.000	-3.753	-21.060	-5.646	-13.569
T7	60.000-40.000	-4.234	-24.232	-6.365	-15.806
T8	40.000-20.000	-4.708	-27.359	-7.035	-18.157
T9	20.000-0.000	-5.788	-27.861	-7.033	-16.796

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T1	1	1 1/4	160.00 - 175.00	0.6000	0.5117
T1	2	Feedline Ladder (Af) 1.5"	160.00 - 175.00	0.6000	0.5117
T1	4	1-5/8"	160.00 - 165.00	0.6000	0.5117
T1	5	3/4" DC Power	160.00 - 165.00	0.6000	0.5117
T1	6	1/2	160.00 - 165.00	0.6000	0.5117
T1	7	Feedline Ladder (Af)	160.00 - 165.00	0.6000	0.5117
T1	13	Safety Line 3/8	160.00 - 180.00	0.6000	0.5117
T2	1	1 1/4	140.00 - 160.00	0.6000	0.5535
T2	2	Feedline Ladder (Af) 1.5"	140.00 - 160.00	0.6000	0.5535
T2	4	1-5/8"	140.00 - 160.00	0.6000	0.5535
T2	5	3/4" DC Power	140.00 - 160.00	0.6000	0.5535
T2	6	1/2	140.00 - 160.00	0.6000	0.5535
T2	7	Feedline Ladder (Af)	140.00 - 160.00	0.6000	0.5535
T2	9	1 5/8"	140.00 - 153.00	0.6000	0.5535
T2	10	1 5/8" Hybrid	140.00 -	0.6000	0.5535

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
			153.00		
T2	11	Feedline Ladder (Af) 1.5"	140.00 - 153.00	0.6000	0.5535
T2	13	Safety Line 3/8	140.00 - 160.00	0.6000	0.5535
T3	1	1 1/4	120.00 - 140.00	0.6000	0.6000
T3	2	Feedline Ladder (Af) 1.5"	120.00 - 140.00	0.6000	0.6000
T3	4	1-5/8"	120.00 - 140.00	0.6000	0.6000
T3	5	3/4" DC Power	120.00 - 140.00	0.6000	0.6000
T3	6	1/2	120.00 - 140.00	0.6000	0.6000
T3	7	Feedline Ladder (Af)	120.00 - 140.00	0.6000	0.6000
T3	9	1 5/8"	120.00 - 140.00	0.6000	0.6000
T3	10	1 5/8" Hybrid	120.00 - 140.00	0.6000	0.6000
T3	11	Feedline Ladder (Af) 1.5"	120.00 - 140.00	0.6000	0.6000
T3	13	Safety Line 3/8	120.00 - 140.00	0.6000	0.6000
T4	1	1 1/4	100.00 - 120.00	0.6000	0.6000
T4	2	Feedline Ladder (Af) 1.5"	100.00 - 120.00	0.6000	0.6000
T4	4	1-5/8"	100.00 - 120.00	0.6000	0.6000
T4	5	3/4" DC Power	100.00 - 120.00	0.6000	0.6000
T4	6	1/2	100.00 - 120.00	0.6000	0.6000
T4	7	Feedline Ladder (Af)	100.00 - 120.00	0.6000	0.6000
T4	9	1 5/8"	100.00 - 120.00	0.6000	0.6000
T4	10	1 5/8" Hybrid	100.00 - 120.00	0.6000	0.6000
T4	11	Feedline Ladder (Af) 1.5"	100.00 - 120.00	0.6000	0.6000
T4	13	Safety Line 3/8	100.00 - 120.00	0.6000	0.6000
T5	1	1 1/4	80.00 - 100.00	0.6000	0.6000
T5	2	Feedline Ladder (Af) 1.5"	80.00 - 100.00	0.6000	0.6000
T5	4	1-5/8"	80.00 - 100.00	0.6000	0.6000
T5	5	3/4" DC Power	80.00 - 100.00	0.6000	0.6000
T5	6	1/2	80.00 - 100.00	0.6000	0.6000
T5	7	Feedline Ladder (Af)	80.00 - 100.00	0.6000	0.6000
T5	9	1 5/8"	80.00 - 100.00	0.6000	0.6000
T5	10	1 5/8" Hybrid	80.00 - 100.00	0.6000	0.6000
T5	11	Feedline Ladder (Af) 1.5"	80.00 - 100.00	0.6000	0.6000
T5	13	Safety Line 3/8	80.00 - 100.00	0.6000	0.6000
T6	1	1 1/4	60.00 - 80.00	0.6000	0.6000
T6	2	Feedline Ladder (Af) 1.5"	60.00 - 80.00	0.6000	0.6000
T6	4	1-5/8"	60.00 - 80.00	0.6000	0.6000
T6	5	3/4" DC Power	60.00 - 80.00	0.6000	0.6000
T6	6	1/2	60.00 - 80.00	0.6000	0.6000
T6	7	Feedline Ladder (Af)	60.00 - 80.00	0.6000	0.6000
T6	9	1 5/8"	60.00 - 80.00	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T6	10	1 5/8" Hybrid	60.00 - 80.00	0.6000	0.6000
T6	11	Feedline Ladder (Af) 1.5"	60.00 - 80.00	0.6000	0.6000
T6	13	Safety Line 3/8	60.00 - 80.00	0.6000	0.6000
T7	1	1 1/4	40.00 - 60.00	0.6000	0.6000
T7	2	Feedline Ladder (Af) 1.5"	40.00 - 60.00	0.6000	0.6000
T7	4	1-5/8"	40.00 - 60.00	0.6000	0.6000
T7	5	3/4" DC Power	40.00 - 60.00	0.6000	0.6000
T7	6	1/2	40.00 - 60.00	0.6000	0.6000
T7	7	Feedline Ladder (Af)	40.00 - 60.00	0.6000	0.6000
T7	9	1 5/8"	40.00 - 60.00	0.6000	0.6000
T7	10	1 5/8" Hybrid	40.00 - 60.00	0.6000	0.6000
T7	11	Feedline Ladder (Af) 1.5"	40.00 - 60.00	0.6000	0.6000
T7	13	Safety Line 3/8	40.00 - 60.00	0.6000	0.6000
T8	1	1 1/4	20.00 - 40.00	0.6000	0.6000
T8	2	Feedline Ladder (Af) 1.5"	20.00 - 40.00	0.6000	0.6000
T8	4	1-5/8"	20.00 - 40.00	0.6000	0.6000
T8	5	3/4" DC Power	20.00 - 40.00	0.6000	0.6000
T8	6	1/2	20.00 - 40.00	0.6000	0.6000
T8	7	Feedline Ladder (Af)	20.00 - 40.00	0.6000	0.6000
T8	9	1 5/8"	20.00 - 40.00	0.6000	0.6000
T8	10	1 5/8" Hybrid	20.00 - 40.00	0.6000	0.6000
T8	11	Feedline Ladder (Af) 1.5"	20.00 - 40.00	0.6000	0.6000
T8	13	Safety Line 3/8	20.00 - 40.00	0.6000	0.6000
T9	1	1 1/4	7.00 - 20.00	0.6000	0.6000
T9	2	Feedline Ladder (Af) 1.5"	0.00 - 20.00	0.6000	0.6000
T9	4	1-5/8"	7.00 - 20.00	0.6000	0.6000
T9	5	3/4" DC Power	7.00 - 20.00	0.6000	0.6000
T9	6	1/2	7.00 - 20.00	0.6000	0.6000
T9	7	Feedline Ladder (Af)	0.00 - 20.00	0.6000	0.6000
T9	9	1 5/8"	7.00 - 20.00	0.6000	0.6000
T9	10	1 5/8" Hybrid	7.00 - 20.00	0.6000	0.6000
T9	11	Feedline Ladder (Af) 1.5"	0.00 - 20.00	0.6000	0.6000
T9	13	Safety Line 3/8	0.00 - 20.00	0.6000	0.6000

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
***									
APXVTM14-C-I20	A	From Leg	3.000	0.000	175.000	No Ice	6.342	3.607	0.056
(Sprint Nextel)			0.000			1/2" Ice	6.716	3.967	0.096
			0.000			1" Ice	7.097	4.333	0.140
APXVTM14-C-I20	B	From Leg	3.000	0.000	175.000	No Ice	6.342	3.607	0.056
(Sprint Nextel)			0.000			1/2" Ice	6.716	3.967	0.096
			0.000			1" Ice	7.097	4.333	0.140
APXVTM14-C-I20	C	From Leg	3.000	0.000	175.000	No Ice	6.342	3.607	0.056
(Sprint Nextel)			0.000			1/2" Ice	6.716	3.967	0.096
			0.000			1" Ice	7.097	4.333	0.140
NNVV-65B-R4 Antenna	A	From Leg	3.000	0.000	175.000	No Ice	12.271	5.750	0.085
(Sprint)			0.000			1/2" Ice	12.766	6.207	0.157

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.000			1" Ice	13.268	6.671	0.236
NNVV-65B-R4 Antenna (Sprint)	B	From Leg	3.000 0.000 0.000	0.000	175.000	No Ice 1/2" Ice 1" Ice	12.271 12.766 13.268	5.750 6.207 6.671	0.085 0.157 0.236
NNVV-65B-R4 Antenna (Sprint)	C	From Leg	3.000 0.000 0.000	0.000	175.000	No Ice 1/2" Ice 1" Ice	12.271 12.766 13.268	5.750 6.207 6.671	0.085 0.157 0.236
1900 MHz RRH (Sprint Nextel)	A	From Leg	3.000 0.000 0.000	0.000	175.000	No Ice 1/2" Ice 1" Ice	2.313 2.517 2.728	2.375 2.581 2.794	0.050 0.074 0.101
1900 MHz RRH (Sprint Nextel)	B	From Leg	3.000 0.000 0.000	0.000	175.000	No Ice 1/2" Ice 1" Ice	2.313 2.517 2.728	2.375 2.581 2.794	0.050 0.074 0.101
1900 MHz RRH (Sprint Nextel)	C	From Leg	3.000 0.000 0.000	0.000	175.000	No Ice 1/2" Ice 1" Ice	2.313 2.517 2.728	2.375 2.581 2.794	0.050 0.074 0.101
(2) 800 MHz RRH (Sprint Nextel)	A	From Leg	3.000 0.000 0.000	0.000	175.000	No Ice 1/2" Ice 1" Ice	2.058 2.240 2.429	1.710 1.879 2.056	0.050 0.071 0.094
(2) 800 MHz RRH (Sprint Nextel)	B	From Leg	3.000 0.000 0.000	0.000	175.000	No Ice 1/2" Ice 1" Ice	2.058 2.240 2.429	1.710 1.879 2.056	0.050 0.071 0.094
(2) 800 MHz RRH (Sprint Nextel)	C	From Leg	3.000 0.000 0.000	0.000	175.000	No Ice 1/2" Ice 1" Ice	2.058 2.240 2.429	1.710 1.879 2.056	0.050 0.071 0.094
TD-RRH8x20-25 (Sprint Nextel)	A	From Leg	3.000 0.000 0.000	0.000	175.000	No Ice 1/2" Ice 1" Ice	3.704 3.946 4.196	1.294 1.465 1.642	0.066 0.090 0.117
TD-RRH8x20-25 (Sprint Nextel)	B	From Leg	3.000 0.000 0.000	0.000	175.000	No Ice 1/2" Ice 1" Ice	3.704 3.946 4.196	1.294 1.465 1.642	0.066 0.090 0.117
TD-RRH8x20-25 (Sprint Nextel)	C	From Leg	3.000 0.000 0.000	0.000	175.000	No Ice 1/2" Ice 1" Ice	3.704 3.946 4.196	1.294 1.465 1.642	0.066 0.090 0.117
(3) Sector Frames (Sprint Nextel)	C	None		0.000	175.000	No Ice 1/2" Ice 1" Ice	43.570 61.820 80.070	43.570 61.820 80.070	1.880 2.700 3.520
***									
P65-17-XLH-RR (AT&T)	A	From Leg	3.000 0.000 0.000	0.000	165.000	No Ice 1/2" Ice 1" Ice	11.467 12.083 12.707	6.800 7.384 7.976	0.059 0.121 0.191
P65-17-XLH-RR (AT&T)	B	From Leg	3.000 0.000 0.000	0.000	165.000	No Ice 1/2" Ice 1" Ice	11.467 12.083 12.707	6.800 7.384 7.976	0.059 0.121 0.191
P65-17-XLH-RR (AT&T)	C	From Leg	3.000 0.000 0.000	0.000	165.000	No Ice 1/2" Ice 1" Ice	11.467 12.083 12.707	6.800 7.384 7.976	0.059 0.121 0.191
(3) 7770 (AT&T)	A	From Leg	3.000 0.000 0.000	0.000	165.000	No Ice 1/2" Ice 1" Ice	5.508 5.867 6.233	2.928 3.273 3.625	0.035 0.068 0.105
(3) 7770 (AT&T)	B	From Leg	3.000 0.000 0.000	0.000	165.000	No Ice 1/2" Ice 1" Ice	5.508 5.867 6.233	2.928 3.273 3.625	0.035 0.068 0.105
(3) 7770 (AT&T)	C	From Leg	3.000 0.000 0.000	0.000	165.000	No Ice 1/2" Ice 1" Ice	5.508 5.867 6.233	2.928 3.273 3.625	0.035 0.068 0.105
(2) LGP21903 Diplexer	A	From Leg	3.000	0.000	165.000	No Ice	0.231	0.158	0.005

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
(AT&T)			0.000			1/2" Ice	0.294	0.213	0.007
			0.000			1" Ice	0.365	0.276	0.011
(2) LGP21903 Diplexer	B	From Leg	3.000	0.000	165.000	No Ice	0.231	0.158	0.005
(AT&T)			0.000			1/2" Ice	0.294	0.213	0.007
			0.000			1" Ice	0.365	0.276	0.011
(2) LGP21903 Diplexer	C	From Leg	3.000	0.000	165.000	No Ice	0.231	0.158	0.005
(AT&T)			0.000			1/2" Ice	0.294	0.213	0.007
			0.000			1" Ice	0.365	0.276	0.011
(2) LGP21401 TMAs	A	From Leg	3.000	0.000	165.000	No Ice	1.290	1.290	0.013
(AT&T)			0.000			1/2" Ice	1.850	1.850	0.020
			0.000			1" Ice	2.410	2.410	0.027
(2) LGP21401 TMAs	B	From Leg	3.000	0.000	165.000	No Ice	1.290	1.290	0.013
(AT&T)			0.000			1/2" Ice	1.850	1.850	0.020
			0.000			1" Ice	2.410	2.410	0.027
(2) LGP21401 TMAs	C	From Leg	3.000	0.000	165.000	No Ice	1.290	1.290	0.013
(AT&T)			0.000			1/2" Ice	1.850	1.850	0.020
			0.000			1" Ice	2.410	2.410	0.027
(2) RRUS 11	A	From Leg	3.000	0.000	165.000	No Ice	2.522	1.020	0.055
(AT&T)			0.000			1/2" Ice	2.719	1.158	0.074
			0.000			1" Ice	2.923	1.304	0.097
(2) RRUS 11	B	From Leg	3.000	0.000	165.000	No Ice	2.522	1.020	0.055
(AT&T)			0.000			1/2" Ice	2.719	1.158	0.074
			0.000			1" Ice	2.923	1.304	0.097
(2) RRUS 11	C	From Leg	3.000	0.000	165.000	No Ice	2.522	1.020	0.055
(AT&T)			0.000			1/2" Ice	2.719	1.158	0.074
			0.000			1" Ice	2.923	1.304	0.097
(3) Sector Frames	C	None		0.000	165.000	No Ice	33.500	23.960	1.098
(AT&T)						1/2" Ice	40.500	31.100	1.599
						1" Ice	47.500	38.240	2.100
DC6-48-60-18-8F	A	From Leg	3.000	0.000	164.000	No Ice	1.560	4.783	0.026
(AT&T)			0.000			1/2" Ice	1.722	5.063	0.063
			0.000			1" Ice	1.892	5.350	0.104
***									
Antel	A	From Leg	3.000	0.000	153.000	No Ice	7.731	4.158	0.017
BXA-70063-6CF-EDIN-4			0.000			1/2" Ice	8.777	4.887	0.038
(Verizon)			0.000			1" Ice	9.823	5.616	0.058
Antel	B	From Leg	3.000	0.000	153.000	No Ice	7.731	4.158	0.017
BXA-70063-6CF-EDIN-4			0.000			1/2" Ice	8.777	4.887	0.038
(Verizon)			0.000			1" Ice	9.823	5.616	0.058
Antel	C	From Leg	3.000	0.000	153.000	No Ice	7.731	4.158	0.017
BXA-70063-6CF-EDIN-4			0.000			1/2" Ice	8.777	4.887	0.038
(Verizon)			0.000			1" Ice	9.823	5.616	0.058
(2) Commscope	A	From Leg	3.000	0.000	153.000	No Ice	9.660	5.983	0.063
JAHH-65B-R3B			0.000			1/2" Ice	10.383	6.544	0.115
(Verizon)			0.000			1" Ice	11.106	7.105	0.166
(2) Commscope	B	From Leg	3.000	0.000	153.000	No Ice	9.660	5.983	0.063
JAHH-65B-R3B			0.000			1/2" Ice	10.383	6.544	0.115
(Verizon)			0.000			1" Ice	11.106	7.105	0.166
(2) Commscope	C	From Leg	3.000	0.000	153.000	No Ice	9.660	5.983	0.063
JAHH-65B-R3B			0.000			1/2" Ice	10.383	6.544	0.115
(Verizon)			0.000			1" Ice	11.106	7.105	0.166
ALU RRH 2X90 AWS	A	From Leg	3.000	0.000	153.000	No Ice	2.540	2.540	0.057
(Verizon)			0.000			1/2" Ice	3.234	3.234	0.140
			0.000			1" Ice	3.928	3.928	0.223
ALU RRH 2X90 AWS	B	From Leg	3.000	0.000	153.000	No Ice	2.540	2.540	0.057
(Verizon)			0.000			1/2" Ice	3.234	3.234	0.140
			0.000			1" Ice	3.928	3.928	0.223

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
ALU RRH 2X90 AWS	C	From Leg	3.000	0.000	153.000	No Ice	2.540	2.540	0.057
(Verizon)			0.000			1/2" Ice	3.234	3.234	0.140
			0.000			1" Ice	3.928	3.928	0.223
ALU RRH 2X60 700	A	From Leg	3.000	0.000	153.000	No Ice	1.880	1.880	0.035
(Verizon)			0.000			1/2" Ice	2.466	2.466	0.104
			0.000			1" Ice	3.052	3.052	0.173
ALU RRH 2X60 700	B	From Leg	3.000	0.000	153.000	No Ice	1.880	1.880	0.035
(Verizon)			0.000			1/2" Ice	2.466	2.466	0.104
			0.000			1" Ice	3.052	3.052	0.173
ALU RRH 2X60 700	C	From Leg	3.000	0.000	153.000	No Ice	1.880	1.880	0.035
(Verizon)			0.000			1/2" Ice	2.466	2.466	0.104
			0.000			1" Ice	3.052	3.052	0.173
Nokia RRH 4X40 850	A	From Leg	3.000	0.000	153.000	No Ice	2.200	2.200	0.055
(Verizon)			0.000			1/2" Ice	2.765	2.765	0.105
			0.000			1" Ice	3.330	3.330	0.155
Nokia RRH 4X40 850	B	From Leg	3.000	0.000	153.000	No Ice	2.200	2.200	0.055
(Verizon)			0.000			1/2" Ice	2.765	2.765	0.105
			0.000			1" Ice	3.330	3.330	0.155
Nokia RRH 4X40 850	C	From Leg	3.000	0.000	153.000	No Ice	2.200	2.200	0.055
(Verizon)			0.000			1/2" Ice	2.765	2.765	0.105
			0.000			1" Ice	3.330	3.330	0.155
DB-T1-6Z-8AB-0Z	B	From Leg	3.000	0.000	153.000	No Ice	4.800	2.000	0.044
(Verizon)			0.000			1/2" Ice	5.070	2.193	0.080
			0.000			1" Ice	5.348	2.393	0.120
DB-T1-6Z-8AB-0Z	C	From Leg	3.000	0.000	153.000	No Ice	4.800	2.000	0.044
(Verizon)			0.000			1/2" Ice	5.070	2.193	0.080
			0.000			1" Ice	5.348	2.393	0.120
(3) Sector Frames	C	None		0.000	153.000	No Ice	33.500	23.960	1.098
(Verizon)						1/2" Ice	40.500	31.100	1.599
						1" Ice	47.500	38.240	2.100

Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.6 Wind 0 deg - No Ice
3	0.9 Dead+1.6 Wind 0 deg - No Ice
4	1.2 Dead+1.6 Wind 30 deg - No Ice
5	0.9 Dead+1.6 Wind 30 deg - No Ice
6	1.2 Dead+1.6 Wind 60 deg - No Ice
7	0.9 Dead+1.6 Wind 60 deg - No Ice
8	1.2 Dead+1.6 Wind 90 deg - No Ice
9	0.9 Dead+1.6 Wind 90 deg - No Ice
10	1.2 Dead+1.6 Wind 120 deg - No Ice
11	0.9 Dead+1.6 Wind 120 deg - No Ice
12	1.2 Dead+1.6 Wind 150 deg - No Ice
13	0.9 Dead+1.6 Wind 150 deg - No Ice
14	1.2 Dead+1.6 Wind 180 deg - No Ice
15	0.9 Dead+1.6 Wind 180 deg - No Ice
16	1.2 Dead+1.6 Wind 210 deg - No Ice

Comb. No.	Description
17	0.9 Dead+1.6 Wind 210 deg - No Ice
18	1.2 Dead+1.6 Wind 240 deg - No Ice
19	0.9 Dead+1.6 Wind 240 deg - No Ice
20	1.2 Dead+1.6 Wind 270 deg - No Ice
21	0.9 Dead+1.6 Wind 270 deg - No Ice
22	1.2 Dead+1.6 Wind 300 deg - No Ice
23	0.9 Dead+1.6 Wind 300 deg - No Ice
24	1.2 Dead+1.6 Wind 330 deg - No Ice
25	0.9 Dead+1.6 Wind 330 deg - No Ice
26	1.2 Dead+1.0 Ice+1.0 Temp
27	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp
28	1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp
29	1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp
30	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp
31	1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp
32	1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp
33	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp
34	1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp
35	1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp
36	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp
37	1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp
38	1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp
39	Dead+Wind 0 deg - Service
40	Dead+Wind 30 deg - Service
41	Dead+Wind 60 deg - Service
42	Dead+Wind 90 deg - Service
43	Dead+Wind 120 deg - Service
44	Dead+Wind 150 deg - Service
45	Dead+Wind 180 deg - Service
46	Dead+Wind 210 deg - Service
47	Dead+Wind 240 deg - Service
48	Dead+Wind 270 deg - Service
49	Dead+Wind 300 deg - Service
50	Dead+Wind 330 deg - Service

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	180 - 160	3.541	43	0.204	0.016
T2	160 - 140	2.693	43	0.190	0.015
T3	140 - 120	1.949	43	0.153	0.012
T4	120 - 100	1.360	43	0.118	0.010
T5	100 - 80	0.905	43	0.091	0.008
T6	80 - 60	0.560	43	0.065	0.005
T7	60 - 40	0.311	43	0.045	0.004
T8	40 - 20	0.145	43	0.027	0.002
T9	20 - 0	0.044	43	0.013	0.001

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
175.000	APXVTM14-C-I20	43	3.324	0.202	0.015	160464
165.000	P65-17-XLH-RR	43	2.898	0.195	0.015	53488
164.000	DC6-48-60-18-8F	43	2.857	0.194	0.015	50157
153.000	Antel BXA-70063-6CF-EDIN-4	43	2.417	0.179	0.014	35192

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	180 - 160	17.448	11	1.007	0.076
T2	160 - 140	13.261	11	0.936	0.073
T3	140 - 120	9.599	11	0.756	0.060
T4	120 - 100	6.693	11	0.583	0.048
T5	100 - 80	4.454	11	0.448	0.037
T6	80 - 60	2.755	11	0.322	0.027
T7	60 - 40	1.527	11	0.221	0.018
T8	40 - 20	0.713	11	0.133	0.011
T9	20 - 0	0.218	11	0.066	0.006

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
175.000	APXVTM14-C-I20	11	16.379	0.996	0.076	33049
165.000	P65-17-XLH-RR	11	14.276	0.963	0.074	11016
164.000	DC6-48-60-18-8F	11	14.071	0.959	0.074	10330
153.000	Antel BXA-70063-6CF-EDIN-4	11	11.901	0.882	0.069	7210

Bolt Design Data

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt K	Allowable Load per Bolt K	Ratio Load / Allowable	Allowable Ratio	Criteria
T1	180	Leg	A325N	0.750	4	4.560	29.821	0.153 ✔	1	Bolt Tension
		Diagonal	A325N	0.625	1	4.507	9.108	0.495 ✔	1	Member Block Shear
T2	160	Leg	A325N	0.875	4	15.124	40.589	0.373 ✔	1	Bolt Tension
		Diagonal	A325N	0.625	1	4.813	9.108	0.528 ✔	1	Member Block Shear
T3	140	Leg	A325N	1.000	4	23.839	53.014	0.450 ✔	1	Bolt Tension
		Diagonal	A325N	0.625	1	4.729	9.108	0.519 ✔	1	Member Block Shear
T4	120	Leg	A325N	1.000	6	20.554	53.014	0.388 ✔	1	Bolt Tension

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt K	Allowable Load per Bolt K	Ratio Load / Allowable	Allowable Ratio	Criteria
		Diagonal	A325N	0.625	1	5.138	10.440	0.492 ✔	1	Member Bearing
T5	100	Leg	A325N	1.000	6	24.885	53.014	0.469 ✔	1	Bolt Tension
		Diagonal	A325N	0.625	1	5.437	10.440	0.521 ✔	1	Member Bearing
T6	80	Leg	A325N	1.000	8	21.843	53.014	0.412 ✔	1	Bolt Tension
		Diagonal	A325N	0.750	1	6.192	12.615	0.491 ✔	1	Member Bearing
T7	60	Leg	A325N	1.000	8	24.468	53.014	0.462 ✔	1	Bolt Tension
		Diagonal	A325N	0.750	1	6.808	12.615	0.540 ✔	1	Member Bearing
T8	40	Leg	A325N	1.000	8	27.362	53.014	0.516 ✔	1	Bolt Tension
		Diagonal	A325N	0.750	1	7.916	12.615	0.628 ✔	1	Member Bearing
T9	20	Diagonal	A325N	0.750	1	7.931	12.615	0.629 ✔	1	Member Bearing

Compression Checks

Leg Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	180 - 160	ROHN 2.5 STD	20.000	4.000	50.7 K=1.00	1.704	-22.594	63.560	0.355 [1] ✔
T2	160 - 140	ROHN 3 EH	20.035	4.007	42.3 K=1.00	3.016	-68.712	119.063	0.577 [1] ✔
T3	140 - 120	ROHN 4 EH	20.035	5.009	40.7 K=1.00	4.407	-106.298	175.707	0.605 [1] ✔
T4	120 - 100	ROHN 5 EH	20.037	6.679	43.6 K=1.00	6.112	-137.315	239.377	0.574 [1] ✔
T5	100 - 80	ROHN 6 EHS	20.038	6.679	36.0 K=1.00	6.713	-166.811	274.759	0.607 [1] ✔
T6	80 - 60	ROHN 6 EH	20.034	6.678	36.5 K=1.00	8.405	-196.406	343.099	0.572 [1] ✔
T7	60 - 40	ROHN 8 EHS	20.039	10.020	41.2 K=1.00	9.719	-221.469	386.368	0.573 [1] ✔
T8	40 - 20	ROHN 8 EH	20.032	10.016	41.8 K=1.00	12.763	-249.607	505.565	0.494 [1] ✔
T9	20 - 0	ROHN 8 EH	20.036	10.018	41.8 K=1.00	12.763	-276.699	505.537	0.547 [1] ✔

[1] $P_u / \phi P_n$ controls

Diagonal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	180 - 160	L2x2x1/4	6.081	2.762	93.6 K=1.10	0.938	-4.685	19.169	0.244 [1] ✔
T2	160 - 140	L2x2x1/4	7.569	3.614	113.2 K=1.02	0.938	-4.505	15.483	0.291 [1] ✔
T3	140 - 120	L2x2x1/4	9.797	4.710	144.5 K=1.00	0.938	-4.648	10.143	0.458 [1] ✔
T4	120 - 100	L2 1/2x2 1/2x1/4	12.380	6.003	146.7 K=1.00	1.190	-5.179	12.490	0.415 [1] ✔
T5	100 - 80	L2 1/2x2 1/2x1/4	14.217	6.877	168.1 K=1.00	1.190	-5.474	9.517	0.575 [1] ✔
T6	80 - 60	L3x3x1/4	16.038	7.764	157.4 K=1.00	1.440	-6.192	13.134	0.471 [1] ✔
T7	60 - 40	L3 1/2x3 1/2x1/4	19.337	9.430	163.1 K=1.00	1.690	-6.837	14.360	0.476 [1] ✔
T8	40 - 20	L4x4x1/4	21.078	10.272	155.1 K=1.00	1.940	-8.077	18.230	0.443 [1] ✔
T9	20 - 0	L4x4x1/4	22.901	11.205	169.1 K=1.00	1.940	-8.118	15.322	0.530 [1] ✔

[1] P_u / ϕP_n controls

Top Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	180 - 160	L2x2x1/4	4.580	4.340	128.1 K=0.96	0.938	-0.463	12.807	0.036 [1] ✔
T2	160 - 140	L2x2x1/4	4.580	4.340	128.1 K=0.96	0.938	-0.648	12.807	0.051 [1] ✔

[1] P_u / ϕP_n controls

Tension Checks

Leg Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	180 - 160	ROHN 2.5 STD	20.000	4.000	50.7	1.704	18.239	76.682	0.238 [1] ✔
T2	160 - 140	ROHN 3 EH	20.035	4.007	42.3	3.016	60.496	135.717	0.446 [1] ✔

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T3	140 - 120	ROHN 4 EH	20.035	5.009	40.7	4.407	95.357	198.335	0.481 [1] ✔
T4	120 - 100	ROHN 5 EH	20.037	6.679	43.6	6.112	123.321	275.039	0.448 [1] ✔
T5	100 - 80	ROHN 6 EHS	20.038	6.679	36.0	6.713	149.308	302.097	0.494 [1] ✔
T6	80 - 60	ROHN 6 EH	20.034	6.678	36.5	8.405	174.741	378.222	0.462 [1] ✔
T7	60 - 40	ROHN 8 EHS	20.039	10.020	41.2	9.719	195.743	437.369	0.448 [1] ✔
T8	40 - 20	ROHN 8 EH	20.032	10.016	41.8	12.763	218.896	574.322	0.381 [1] ✔
T9	20 - 0	ROHN 8 EH	20.036	10.018	41.8	12.763	240.679	574.322	0.419 [1] ✔

[1] P_u / ϕP_n controls

Diagonal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	180 - 160	L2x2x1/4	6.081	2.762	56.8	0.563	4.507	24.485	0.184 [1] ✔
T2	160 - 140	L2x2x1/4	6.887	3.278	66.9	0.563	4.813	24.485	0.197 [1] ✔
T3	140 - 120	L2x2x1/4	8.511	4.076	82.7	0.563	4.729	24.485	0.193 [1] ✔
T4	120 - 100	L2 1/2x2 1/2x1/4	12.380	6.003	95.5	0.752	5.138	32.707	0.157 [1] ✔
T5	100 - 80	L2 1/2x2 1/2x1/4	14.217	6.877	109.2	0.752	5.437	32.707	0.166 [1] ✔
T6	80 - 60	L3x3x1/4	16.038	7.764	101.9	0.916	6.192	39.843	0.155 [1] ✔
T7	60 - 40	L3 1/2x3 1/2x1/4	19.337	9.430	105.3	1.103	6.808	47.999	0.142 [1] ✔
T8	40 - 20	L4x4x1/4	21.078	10.272	99.9	1.291	7.916	56.156	0.141 [1] ✔
T9	20 - 0	L4x4x1/4	22.901	11.205	108.9	1.291	7.931	56.156	0.141 [1] ✔

[1] P_u / ϕP_n controls

Top Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	180 - 160	L2x2x1/4	4.580	4.340	85.5	0.938	0.472	30.391	0.016 [1] ✔
T2	160 - 140	L2x2x1/4	4.580	4.340	85.5	0.938	0.687	30.391	0.023 [1] ✔

[1] P_u / ϕP_n controls

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
T1	180 - 160	Leg	ROHN 2.5 STD	2	-22.594	63.560	35.5	Pass
		Diagonal	L2x2x1/4	9	-4.685	19.169	24.4	Pass
							49.5 (b)	
		Top Girt	L2x2x1/4	4	-0.463	12.807	3.6	Pass
T2	160 - 140	Leg	ROHN 3 EH	38	-68.712	119.063	57.7	Pass
		Diagonal	L2x2x1/4	45	-4.505	15.483	29.1	Pass
							52.8 (b)	
		Top Girt	L2x2x1/4	42	-0.648	12.807	5.1	Pass
T3	140 - 120	Leg	ROHN 4 EH	74	-106.298	175.707	60.5	Pass
		Diagonal	L2x2x1/4	78	-4.648	10.143	45.8	Pass
							51.9 (b)	
T4	120 - 100	Leg	ROHN 5 EH	101	-137.315	239.377	57.4	Pass
		Diagonal	L2 1/2x2 1/2x1/4	105	-5.179	12.490	41.5	Pass
							49.2 (b)	
T5	100 - 80	Leg	ROHN 6 EHS	122	-166.811	274.759	60.7	Pass
		Diagonal	L2 1/2x2 1/2x1/4	126	-5.474	9.517	57.5	Pass
T6	80 - 60	Leg	ROHN 6 EH	143	-196.406	343.099	57.2	Pass
		Diagonal	L3x3x1/4	147	-6.192	13.134	47.1	Pass
							49.1 (b)	
T7	60 - 40	Leg	ROHN 8 EHS	164	-221.469	386.368	57.3	Pass
		Diagonal	L3 1/2x3 1/2x1/4	168	-6.837	14.360	47.6	Pass
							54.0 (b)	
T8	40 - 20	Leg	ROHN 8 EH	179	-249.607	505.565	49.4	Pass
							51.6 (b)	
		Diagonal	L4x4x1/4	183	-8.077	18.230	44.3	Pass
							62.8 (b)	
T9	20 - 0	Leg	ROHN 8 EH	194	-276.699	505.537	54.7	Pass
		Diagonal	L4x4x1/4	198	-8.118	15.322	53.0	Pass
							62.9 (b)	
							Summary	
						Leg (T5)	60.7	Pass
						Diagonal (T9)	62.9	Pass
						Top Girt (T2)	5.1	Pass
						Bolt Checks	62.9	Pass
						RATING =	**62.9**	**Pass**

MATHCAD CALCULATION PRINTOUT

Existing 180 ft. Self Support Tower Foundation Check

Customer Name: SBA Communications Corporation
Customer Site Name: Voluntown
Customer Site ID: CT10024-A-02

Carrier Name: Sprint Nextel
Carrier Site Name: CT54XC704 / Voluntown
Site Location: 111 Stone Hill Road,
Voluntown, CT 06384

Foundation check

-Foundation Reactions-

(As per TNX output results from the Tower Structural Analysis by Allpro Consulting Group Inc.)

Total Shear $S := 46 \cdot kips$

Moment $M := 4900 \cdot ft\_K$

Down load, Tower weight $Pv := 46 \cdot kips$

Compression on Pedestal: $P_c := 283 \cdot kips$

Uplift on Pedestal: $P_{up} := 246 \cdot kips$

Shear on Pedestal: $Sh := 29 \cdot kips$

-Soil Properties- **Soil data is as per Geotechnical Report by Mactec Engineering and Consulting, INC. Projetc # 3558-05-0729, dated 08/30/2005.**

Factor of Saftey $FS_b := 2$

Allowable Bearing Capacity $Brg_{all} := 6ksf$

Ultimate Bearing Capacity $Brg_{ult} := 12ksf$

Internal angle of friction for soil, $\phi := 30 \cdot deg$ (Reduced Internal Friction due to backfill Actual 34 deg)

Unit wt. of soil, $\gamma_s := 0.125 \cdot kcf$

Alowable Passive Pressure see next page

Cohesion of soil, $c_u := 0 \cdot ksf$

Friction Factor $FF := 0.6$

Depth to be neglected $L_{neg} := 3.5ft$ (frost depth)

-Material Parameters-

Conforming to the design requirements as in ACI 318-10

Unit wt. of concrete, $\gamma_c := 0.150 \cdot kcf$

Concrete compressive strength, $f_c := 3000 \cdot psi$

Rebar yield strength, $f_y := 60000 \cdot psi$

-Factor of Safety for soil strength-

$\phi_{s\_Bear} := 0.75$ as per TIA-222-G code for bearing, 9.4.1

$\phi_{s\_friction} := 0.75$ as per TIA-222-G code for skin friction resistance, 9.4.1

$\phi_{s\_lateral} := 0.75$ as per TIA-222-G code for lateral resistance, 9.4.1

$\phi_{s\_uplift} := 0.75$ as per TIA-222-G code for lateral resistance, 9.4.1

DIMENSIONS

Dimensions of foundation as per Foundation design by ROHN DWG # A010521-1 dated 3/21/2001.

Tower face width $TWFW := 21.12 \cdot ft$ Tower ht. $Tw_{ht} := 180 \cdot ft$

The tower location is eccentric by $L_{pe} := 0 \cdot ft$

Type of column, col.t=0 for circular,=1 for rectangular/square $col_t := 0$

Depth of mat, $D_f := 5 \cdot ft$

Thickness of mat, $T_f := 5 \cdot ft$

Pedestal size, $Ped_s := 0 \cdot ft$ No. of pedestals $Nped := 0$

Extension above the grade, $E_g := 0.5 \cdot ft$

Mat Dimensions, LxB $L := 31.5 \cdot ft$ x $B := 31.5 \cdot ft$

-Reinforcement Data-

Typical concrete cover $cc := 3in$

MAT CALCULATIONS

$K_p := \tan\left(45 \cdot deg + \frac{\Phi}{2}\right)^2$ $K_p = 3$

$P_{pave} := \frac{\left(D_f - T_f - L_{neg}\right) \cdot K_p \cdot \gamma_s + \left(D_f - L_{neg}\right) \cdot K_p \cdot \gamma_s}{2}$ $P_{pave} = -0.375 \cdot ksf$

Safety against overturning and location of resultant on the base

Resisting Moments about mid axis parallel to base

$Area_{ped} := if\left(col_t = 1, Ped_s^2, \frac{\pi}{4} \cdot Ped_s^2\right)$ $Area_{ped} = 0$

component	value, kips	lever arm, ft	resisting moment, ft-kips
1) Concrete wt.	$C_w := L \cdot B \cdot T_f \cdot (\gamma_c) + Area_{ped} \cdot \gamma_c \cdot (D_f + E_g - T_f) \cdot Nped$	$L_c := \frac{L}{2}$	$R_c := C_w \cdot L_c$
	$C_w = 744.187 \cdot kips$	$L_c = 15.75\,ft$	$R_c = 11720.953 \cdot ft\_K$
2) Soil wt.	$S_w := \left[L \cdot B \cdot (D_f - T_f) - Area_{ped} \cdot (D_f - T_f) \cdot Nped\right] \cdot \gamma_s$	$L_s := \frac{L}{2}$	$R_s := S_w \cdot L_s$
	$S_w = 0 \cdot kips$	$L_s = 15.75\,ft$	$R_s = 0 \cdot ft\_K$
3) Wt. of soil wedge	$W_w := (D_f) \cdot \frac{1}{2} \cdot (D_f \cdot \tan(\phi)) \cdot B \cdot (\gamma_s)$	$L_w := \left(L + D_f \cdot \frac{\tan(\phi)}{3}\right)$	$R_w := W_w \cdot L_w$
	$W_w = 28.416 \cdot kips$	$L_w = 32.462\,ft$	$R_w = 922.462 \cdot ft\_K$
4) Passive pressure	$Pe_p := T_f \cdot B \cdot P_{pave}$	$L_p := \frac{T_f}{3}$	$R_p := Pe_p \cdot L_p$
	$Pe_p = -59.062 \cdot kips$	$L_p = 1.667\,ft$	$R_p = -98.437 \cdot ft\_K$
5) Vertical	$Pv = 46 \cdot kips$	$L_v := \frac{L}{2}$	$R_v := Pv \cdot L_v$
$S_{w1} := L \cdot B \cdot D_f \cdot \gamma_s$	$S_{w1} = 620.156 \cdot kips$ <--- for net calcs		
Total weight	$T_w := C_w + S_w + W_w + Pv$ $T_w = 818.604 \cdot kips$	$L_v = 15.75\,ft$	$R_v = 724.5 \cdot ft\_K$
Total resisting Moment=	$M_r := R_c + R_s + R_w + R_p + R_v$	$M_r = 13269.478 \cdot ft\_K$	

Overturning Moments

component	value, kips	lever arm, ft	Overturning Moment ft-kips
1) Moment on foundation due to eccentric location of tower	$Pv = 46\cdot kips$	$L_{pe} = 0$	$M_{pe} := L_{pe}\cdot Pv$ $M_{pe} = 0\cdot ft\_K$
2) Moment on foundation	-	-	$M = 4900\cdot ft\_K$
3) Moment due to horizontal shear	$S_t := S$	$L_{hs} := D_f + E_g$ $L_{hs} = 5.5\,ft$	$O_{hs} := L_{hs}\cdot S_t$ $O_{hs} = 253\cdot ft\_K$

Total Overturning Moment= $M_o := M + O_{hs} + M_{pe}$ $M_o = 5153\cdot ft\_K$

Check Safety Factor against Overturning about mid axis parallel to base

$SF := \frac{M_r}{M_o}$ $SF = 2.575$ > 1.5 **O.K!**

Calculate eccentricity, e

$e := \frac{M_o}{T_w}$ $e = 6.295\,ft$

Check location of eccentricity and determine pressure distribution under the mat

$L_{loc} := \frac{L}{6}$ $L_{loc} = 5.25\,ft$ For net bearing calcs $T_{w1} := S_{w1} + W_w$ $T_{w1} = 648.573\cdot kips$

$P_{max1} := if\left[e \le L_{loc}, \frac{T_w}{L\cdot B}\cdot\left[1 + \left(6\cdot\frac{e}{L}\right)\right], 4\cdot\frac{T_w}{3\cdot B\cdot(L - 2\cdot e)}\right]$ $P_{max1} = 1.832\cdot ksf$

$P_{max2} := \left(\frac{T_{w1}}{L\cdot B}\right)$ $P_{max2} = 0.654\cdot ksf$ $P_{net} := P_{max1} - P_{max2}$ $P_{max} := P_{net}$

Net soil pressure, $P_{net} = 1.179\cdot ksf$ < $Brg_{ult}\cdot\phi_{s\_Bear} = 9\cdot ksf$ **O.K.!**

$P_{min} := if\left[e \le L_{loc}, \frac{T_w}{L\cdot B}\cdot\left[1 - \left(6\cdot\frac{e}{L}\right)\right], 0\cdot ksf\right]$ $P_{min} = 0\cdot ksf$

Check for horizontal shear $P_{hor} := Pe_p + \left(Pv + C_w + S_w\right)\cdot FF$

$P_{hor} = 415.05\cdot kips$ > $S = 46\cdot kips$ Since P.hor < S It is safe!

REINFORCED CONCRETE DESIGN CALCULATIONS

General Input parameters

Concrete Cover $cc := 3.0 \cdot in$

Reduction factors as per respective ACI sections

$\phi_{shear} := 0.75$ as per ACI 9.3.2.3

$\phi_{compr} := 0.75$ as per ACI 9.3.2.2

$\phi_{axten} := 0.9$ as per ACI 9.3.2.2 a

Reinforced concrete load factor as per EIA 3.1.16 $RC_{fac} := 1.0$

(Loads already factored under TIA/EIA-222-G Code)

Check for wide beam or single shear in mat

Allowable shear stress in concrete for wide beam shear criteria=

$\nu_{wide} := 2 \cdot \phi_{shear} \cdot \sqrt{f_c \cdot psi}$ $\nu_{wide} = 82.158 \cdot psi$

Effective depth of stee $d := T_f - cc$ $d = 57 \cdot in$ $L_{eff} := if\left(e \le L_{loc}, L, L - 2 \cdot e\right)$ $L_{eff} = 18.91\ ft$

$$dist := if\left[Nped = 3, \left(\frac{L}{2} - \frac{1}{3} \cdot \sin(60 \cdot deg) \cdot TWFW - \frac{1}{2} \cdot Ped_s - d\right), \left(\frac{L}{2} - \frac{TWFW}{2} - \frac{1}{2} \cdot Ped_s - d\right)\right]$$

Factor load by RC $P_{maxf} := P_{max} \cdot RC_{fac}$ $P_{minf} := P_{min} \cdot RC_{fac}$

shear on the face of concrete=

$$Shear_{wide} := (dist) \cdot B \cdot \left| \frac{\left[P_{maxf} + \left[P_{maxf} - \frac{P_{maxf} - P_{minf}}{L_{eff}} \cdot (dist)\right]\right]}{2} \right|$$ $Shear_{wide} = 16.147 \cdot kips$

Area of concrete in shear= $A_{shear} := B \cdot d$ $A_{shear} = 21546 \cdot in^2$

Shear stress acting on concrete fa $\nu_{act} := \frac{Shear_{wide}}{A_{shear}}$ $\nu_{act} = 0.749 \cdot psi$

$\nu_{act} = 0.749 \cdot psi$ < $\nu_{wide} = 82.158 \cdot psi$ **O.K!**

Check for punching or two-way shear in mat

Calculate allowable shear stress in concrete for punching/two-way shear

$\beta := \frac{L}{B}$ $\beta = 1$

$$\nu_{punch} := if\left[\left(2 + \frac{4}{\beta}\right) \cdot \phi_{shear} \cdot \sqrt{f_c \cdot psi} \le 4 \cdot \phi_{shear} \cdot \sqrt{f_c \cdot psi}, \left(2 + \frac{4}{\beta}\right) \cdot \phi_{shear} \cdot \sqrt{f_c \cdot psi}, 4 \cdot \phi_{shear} \cdot \sqrt{f_c \cdot psi}\right]$$

$\nu_{punch} = 164.317 \cdot psi$

$P_{avg} := \frac{P_{maxf} + P_{minf}}{2}$

$$Area_{col} := if\left[col_t = 0, \frac{\pi}{4} \cdot \left(Ped_s + d\right)^2, \left(Ped_s + d\right)^2\right]$$

$$Peri_{col} := if\left[col_t = 0, 2 \cdot \pi \cdot \frac{Ped_s + d}{2}, 4 \cdot \left(Ped_s + d\right)\right]$$

Factor vertical load $Pvf := RC_{fac} \cdot Pv$

Shear stress acting on the concrete face= $\nu_{act} := \frac{P_c - Area_{col} \cdot P_{avg}}{Peri_{col} \cdot d \cdot 4}$

$\nu_{act} = 6.676 \cdot psi$ < $\nu_{punch} = 164.317 \cdot psi$ **O.K!**

Design of mat footing

$C_{wped} := Area_{ped} \cdot \gamma_c \cdot (D_f + E_g - T_f) \cdot Nped$ Wt. of concrete pedestals

$P_{upnet} := P_{up} - \frac{C_{wped} + S_w \cdot 0.95}{Nped}$ $P_{upnet} = 246 \cdot kips$

Net uplift acting at mat level creating bending moment in the slab. Soil wt. reduced by 5 % to account for variation in compaction . ACI 9.3.2.2

Calculate bending moment for mat design:

$\phi_{bend} := 0.9$ $Langle := if(Nped = 3, \sin(60 \cdot deg), 1)$

$\beta_1 := if\left[f_c \le 4000 \cdot psi, 0.85, if\left[f_c \ge 8000 \cdot psi, 0.65, 0.85 - \left(\frac{f_c}{psi} - 4000\right) \cdot 0.05\right]\right]$ ACI 10.2.7.3

$B_{mo} := RC_{fac} \cdot \left[(TWFW \cdot P_{upnet}) \cdot Langle + S_t \cdot (D_f + E_g)\right]$ $B_{mo} = 5448.52 \cdot ft\_K$

$B_{mo1} := \frac{P_{max} - P_{min}}{(L - 2 \cdot e) \cdot 2} \cdot \left(TWFW \cdot Langle \cdot \frac{1}{3} + \frac{Ped_s}{2}\right) \cdot \left[\left[(L - 2 \cdot e) - \left(TWFW \cdot Langle \cdot \frac{1}{3} + \frac{Ped_s}{2}\right)\right]^2 \cdot 0.5\right] \cdot B$

$W_e := TWFW \cdot Langle + Ped_s$ $W_e = 21.12\,ft$

Reinforcement middle bandwidth.

$B_{mo1} = 486909.062\,ft \cdot lb$

required R_u $R_u := \frac{B_{mo}}{\phi_{bend} \cdot B \cdot d^2}$ $R_u = 59.153 \cdot psi$ $m := \frac{f_y}{\beta_1 \cdot f_c}$ $m = 23.529$

required

$\rho := \frac{1}{m} \cdot \left[1 - \sqrt{1 - \left(\frac{2 \cdot m \cdot R_u}{f_y}\right)}\right]$ $\rho = 0.001$

required area of steel for mat=

$Ast_f := \rho \cdot B \cdot d$ $Ast_f = 21.494 \cdot in^2$

minimum area of steel required,

$Ast_{minf} := .0018 \cdot B \cdot T_f$ $Ast_{minf} = 40.824 \cdot in^2$ per ACI 10.5.3 & 7.12

$Ast_{fuse} := if(Ast_f > Ast_{minf}, Ast_f, Ast_{minf})$ $Ast_{fuse} = 40.824 \cdot in^2$

bar size used $f_{bar} := 8$ $f_{dia} := \frac{f_{bar}}{8} \cdot in$ $f_{dia} = 1 \cdot in$

Bar area= $f_{abar} := \pi \cdot \frac{f_{dia}^2}{4}$ $f_{abar} = 0.785 \cdot in^2$

Number of bars required= $Nf_{bars} := if\left(Ast_{fuse} = Ast_{minf}, \frac{Ast_{fuse}}{f_{abar}}, \frac{Ast_{fuse}}{f_{abar}} \cdot \frac{L}{W_e}\right)$ $Nf_{bars} = 51.979$

(Total 32 Horizontal bars provided each way, Top and Bottom Total = 64, Since minimum

reinforcement is governing use total)

$Nf_{bars} := 64$ OK !

Summary

-Foundation Reactions-

Shear $S = 46 \cdot kips$

Down load $Pv = 46 \cdot kips$ (Weight)

Uplift load $P_{up} = 246 \cdot kips$

Moment; $M = 4900 \cdot ft \cdot kip$

Size of Mat

$L = 31.5\,ft$ $B = 31.5\,ft$

Depth of base of mat $D_f = 5\,ft$ Thickness of Mat $T_f = 5\,ft$

Pedestal size $Ped_s = 0$

The tower location is eccentric by $L_{pe} = 0$ with respect to the mat foundation center towards the base

Stability Calculations

Safety Factor against Overturning	$SF = 2.575$	> 1.5	$\frac{1.5}{SF} = 58.25 \cdot \%$	O.K !
Net soil pressure	$P_{net} = 1.179 \cdot ksf$	< $Brg_{ult} \cdot \phi_{s\_Bear} = 9 \cdot ksf$	$\frac{P_{net}}{Brg_{ult} \cdot \phi_{s\_Bear}} = 13.1 \cdot \%$	O.K.!
Check for horizontal shear	$P_{hor} = 415.05 \cdot kips$	> $S = 46 \cdot kips$	$\frac{S}{P_{hor}} = 11.08 \cdot \%$	O.K.!

EXISTING 180' SELF SUPPORT TOWER ANCHOR BOLT CHECK

REACTIONS ON THE FOUNDATION

As per Tnx output (see attached)

Down load; $Pv := 283 \cdot kips$ Shear; $V_u := 29 \cdot kips$

Uplift load; $P_{up} := 246 \cdot kips$ Moment; $M := 0 \cdot kips \cdot ft$

Anchor Rod Data is as per tower design by Valmont Structures Eng File No.A-120742-F-1006960, dated 07/29/2004.

Number of Anchor Rods: $N_{anchors} := 10$

Diameter of Anchors: $D_{anchors} := 1.0in$ $n := 8in^{-1}$

Area of anchor bolts $A_b := \frac{\pi \cdot \left(D_{anchors}^{2}\right)}{4} = 0.785 \cdot in^2$

Net Tensile Area of Anchors: $A_{net} := \frac{\pi}{4} \cdot \left(D_{anchors} - \frac{0.9743}{n}\right)^2 = 0.606 \cdot in^2$

Minimum Yield Stress $F_{Yanchors} := 105ksi$ (Grade A354)

Ultimate Tensile Stress: $F_{Uanchors} := 125ksi$

Saftey Factor for Anchor: $\phi_t := 0.8$ (Section 4.9.9, TIA-222-G Addendum 2)

Allowable Axial Load per Anchor: $T_{cap} := \phi_t \cdot F_{Uanchors} \cdot A_{net}$

$T_{cap} = 60.574 \cdot kips$

Interaction Equation for Anchor Rods as per Section 4.9.9, TIA-222-G Addendum 1 and Figure 4.4

For detail type (D) as per Figure 4.4 $\eta := 0.50$

$P_u := if\left(\eta > 0.5, P_{up}, Pv\right) = 283 \cdot kips$

Maximum Load on Anchor: $T_{max} := \frac{P_u + \frac{V_u}{\eta}}{N_{anchors}}$

$T_{max} = 34.1 \cdot kips$

Anchor Rod Capacity: $\frac{T_{max}}{T_{cap}} = 56.294 \cdot \%$ OK!

$Anchor\_Rod\_Check := if\left(T_{max} < T_{cap}, "OK", "Not\ OK"\right)$

Anchor_Rod_Check = "OK"

For detail type (d), when the clear distance from top of concrete to the bottom of leveling nut exceeds 1.0 times the diameter of the anchor rod, the interaction equation as per section 4.9.9.,TIA-222-G Addendum 1 shall also be satisfied.

Clear distance > $D_{anchors}$ We need to check!

$I_{ar} := 2.0in$ (estimated)

$M_u := 0.65 \cdot I_{ar} \cdot V_u = 3.142 \cdot kips \cdot ft$

$\frac{V_u}{N_{anchors}} = 2.9 \cdot kips$ $\frac{P_u}{N_{anchors}} = 28.3 \cdot kips$ $\frac{M_u}{N_{anchors}} = 0.314 \cdot kips \cdot ft$

Design Shear Strength of anchor rod $\phi_v := 0.75$

$\phi R_{nv} := \phi_v \cdot 0.45 \cdot F_{Uanchors} \cdot A_b = 33.134 \cdot kips$

Design Tensile Strength of anchor rod $\phi_t = 0.8$

$\phi R_{nt} := \phi_t \cdot F_{Uanchors} \cdot A_{net} = 60.574 \cdot kips$

Design Flexural Strength of anchor rod $\phi_f := 0.9$

M.n = M.p = FyZ <= 1.6*FySy (AISC Specifications F11)

$S_y := \pi \cdot \frac{\left(D_{anchors} - \frac{0.9743}{n}\right)^3}{32} = 3.848 \times 10^{-5} \cdot ft^3$ $Z := \frac{\left(D_{anchors} - \frac{0.9743}{n}\right)^3}{6} = 6.533 \times 10^{-5} \cdot ft^3$

$\phi R_{nm} := \min\left(\phi_f F_{Yanchors} \cdot Z, \phi_f \cdot 1.6 \cdot F_{Yanchors} \cdot S_y\right) = 0.838 \cdot kips \cdot ft$

$$Bending := \left(\frac{\frac{V_u}{N_{anchors}}}{\phi R_{nv}}\right)^2 + \left(\frac{\frac{P_u}{N_{anchors}}}{\phi R_{nt}} + \frac{\frac{M_u}{N_{anchors}}}{\phi R_{nm}}\right)^2 = 0.717$$

Bending_Check := if(Bending > 1.05, "NOT OK" , "ACCEPTABLE")

Bending_Check := if(Bending < 1, "OK" , Bending_Check)

Bending_Check = "OK"

Summary

-Foundation Reactions from Tower Base-

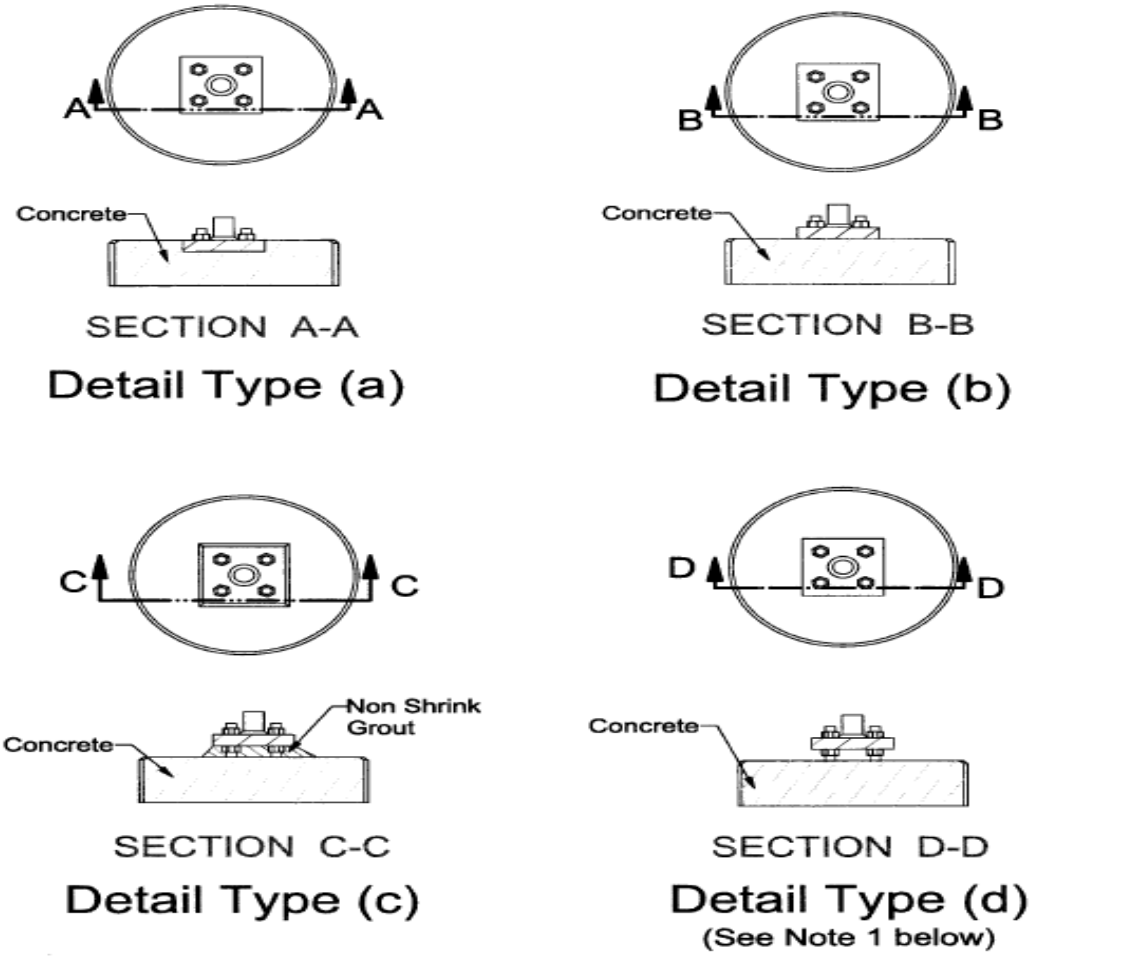
Shear	$V_u = 29 \cdot kips$
Down load	$Pv = 283 \cdot kips$
Uplift load	$P_{up} = 246 \cdot kips$
Moment	$M = 0 \cdot ft \cdot kip$

Anchor Rod Check $T_{max} = 34.1 \cdot kips$ < $T_{cap} = 60.574 \cdot kips$

Anchor_Rod_Check := if($T_{max} < T_{cap}$, "OK" , "Not OK")

Anchor_Rod_Check = "OK"

ANSI/TIA-222-G



Note:

1. When clear distance from top of concrete to the bottom face of the leveling nut exceeds 1.5 times the diameter of the anchor rod, bending of the anchor rod shall be considered (refer to 4.9.9).

Figure 4-4: Anchor Rod Detail Types

4.9.9 Anchor Rods

For anchor rods, the following interaction equation shall be satisfied:

$$\left(\frac{P_u + \frac{V_u}{\eta}}{\phi R_{nt}} \right) \leq 1$$

where:

$\phi = 0.80$

P_u = tension force for detail types (a), (b) & (c) and larger of compression or tension force for type (d) as depicted in Figure 4-4.

V_u = shear force (direct shear and torsion components) corresponding to P_u

R_{nt} = nominal tensile strength of anchor rod as per 4.9.6.1

η = 0.90 for detail type (a)
= 0.70 for detail type (b)
= 0.55 for detail type (c)
= 0.50 for detail type (d)

For detail type (d), when the clear distance from the top of concrete to the bottom leveling nut exceeds 1.0 times the diameter of the anchor rod, the following interaction equation shall also be satisfied:

$$\left(\frac{V_u}{\phi R_{nv}} \right)^2 + \left(\left| \frac{P_u}{\phi R_{nt}} \right| + \left| \frac{M_u}{\phi R_{nm}} \right| \right)^2 \leq 1$$

where:

M_u = bending moment corresponding to V_u
= 0.65 $l_{ar} V_u$

l_{ar} = length from top of concrete to bottom of anchor rod leveling nut

Addendum 1

ϕR_{nv} = design shear strength of anchor rod as per 4.9.6.3

ϕR_{nm} = design flexural strength of anchor rod in accordance with 4.7.1 using the tensile root diameter for the determination of z

d_{rt} = tensile root diameter of rod, in [mm]
= d – 0.9743/n inches
= d – 0.9382(p) mm

d = nominal rod diameter, in [mm]

n = number of threads per inch

p = pitch of threads, mm

4.9.6.3 Design Shear Strength

The design shear strength of a bolt, ϕR_{nv}, shall be taken as:

$\phi = 0.75$

(a) When threads are excluded from the shear plane:
$R_{nv} = 0.55\ F_{ub}\ A_b$

(b) When threads are included in the shear plane:
$R_{nv} = 0.45\ F_{ub}\ A_b$

where:

F_{ub} = Specified minimum tensile strength of bolt

A_b = nominal unthreaded area of bolt

4.7.1 Solid Round Members

For solid round members, M_n shall be determined as follows:

$M_n = F_y'Z$

where:

F_y' = effective yield stress as determined from 4.5.4.1

Z = plastic section modulus

4.5.4.1 Effective Yield Stress

For 60^O and 90^O angle members, the effective yield stress for axial compression, F'_y, shall be determined as follows:

$w/t \le 0.47\sqrt{\frac{E}{F_y}}$	$F'_y = F_y$
$0.47\sqrt{\frac{E}{F_y}} < w/t \le 0.85\sqrt{\frac{E}{F_y}}$	$F'_y = [1.677\text{-}0.677\left(\frac{w/t}{0.47\sqrt{E/F_y}}\right)]\ F_y$
$0.85\sqrt{\frac{E}{F_y}} < w/t \le 25$	$F'_y = [0.0332\ \pi^2\ E/(w/t)^2]$

The width to thickness ratio (w/t) shall not exceed 25 for angle members (refer to Figure 4-3).

For solid round members, the effective yield stress, F'_y, shall be equal to F_y.

For tubular round members, the diameter to thickness ratio (D/t) shall not exceed 400. The effective yield stress, F'_y, shall be determined as follows:

$D/t \le 0.114\ E/F_y$	$F'_y = F_y$
$0.114\ E/F_y < D/t \le 0.448\ E/F_y$	$F'_y = \left(\frac{0.0379E}{(D/t)F_y} + \frac{2}{3}\right)F_y$
$0.448\ E/F_y < D/t \le 400$	$F'_y = \frac{0.337E}{(D/t)}$

Antenna Mount Structural Analysis

Source: SBA Date: 11.12.2017

SBA Site:	**CT10024-A Voluntown**
Sprint Site Number:	**CT54XC704**
Project:	**Sprint DO Macro Upgrade**
Prepared For:	**Sprint**
Mount Description:	**(3) Sector Frames**
Site Location:	**111 Stone Hill Rd, Voluntown, CT** **New London County** **41.606411°, -71.851133°**
Design Codes:	**ANSI/TIA-222-G** **IBC 2012 w/ 2016 CT Building Code**
Analysis Load Case:	**Sprint Final Configuration**
Analysis Result:	**Adequate @ 101% - See Conclusion**

STATE OF CONNECTICUT
GREGORY DURGIN
No. 32155
LICENSED
PROFESSIONAL ENGINEER

Revision 0
March 21, 2018

CT54XC704-PASSING-MOUNT-STRUCTURAL-ANALYSIS-03-21-18

1.0 Introduction

An antenna mount structural analysis has been performed on Sprint's existing mount assembly located at the CT10024-A Voluntown communications site in New London County, CT considering the final equipment loading configuration listed in Section 3.0.

2.0 Analysis Criteria

An elastic three-dimensional model of the mount structure has been analyzed pursuant to the following criteria:

- IBC 2012 – International Building Code.
- ANSI/TIA-222-G – Structural Standard for Antenna Supporting Structures and Antennas.
- AISC – Steel Construction Manual.
- ANSI/AWS D1.1 – Structural Welding Code.

Wind w/o ice = 133 mph (3-sec gust Ultimate Wind Speed) Wind w/o ice = 103 mph (3-sec gust Equivalent per TIA-222-G Tower Code)	
Wind with ice = 50 mph (3-sec gust, 3/4" Ice) Exposure Category B	Topographic Category 1 Structure Class II

The following documents were provided:

- Mount and Tower Record Documents
  SBA
- Tower Structural Analysis
  Allpro, 1/11/18.
- RF Design
  Sprint DOMU Project

The results of the analysis are illustrated in Section 4.0. If any of the existing or proposed conditions reported in this analysis are fadnot properly represented, please contact our office immediately to request an amended report.

3.0 Appurtenance Information

Table 3.1 – Sprint Final Configuration[1]

COR	(Quantity) Appurtenance Make/Model	Mount Description
175.0'±	(3) RFS APXVTM14-ALU-I20[2]	*(3) Sector Frames*
	(3) COMMSCOPE NNVV-65B-R4[2]	
	(6) ALU 800MHz RRH[3]	
	(3) ALU 1900MHz RRH[3]	
	(3) ALU 2500MHz RRH[3]	

1. *Refer to antenna installation Construction Drawings (by others, when applicable) for additional information regarding final antenna and equipment orientations.*
2. *Panel antennas to be installed in Positions 1 and 4.*
3. *RRH units to be installed on dual swivel brackets to new Pipe2.0STD x 4' mount pipes on existing standoff frames as close to tower legs as possible with Sitepro1 BBPM-U back-to-back pipe mount brackets.*

4.0 Analysis Results

Table 4.1 – Existing Mount Capacity

Load Case	Governing Mount Component[1]	% Capacity[2]	Result
Final Sprint Configuration	Connection Plates	101%	**Adequate**

1. *Refer to the Calculations & Software Output portion of this report for mount component and structural information.*
2. *Listed results are expressed as a percentage of available mount member capacity based upon the assumed material strengths listed in Table 4.3. 105% is an acceptable allowable stress percentage for mount components.*

Table 4.3 – Structural Component Material Strengths

Structural Component	Nominal Strength/Material[1]
Pipe	F_y = 35 ksi (A53, Gr. B)
Tube	F_y = 46 ksi (A500, Gr. B)
Structural Shapes (L, C, W, etc.), Plate / Bar	F_y = 36 ksi (A36)
Uni-Strut	F_y = 33 ksi (A570, Gr. 33)
Connection Bolts	A325
Stainless Steel Bolts	18-8 Stainless, Grade 316/304 F_y = 74 ksi (Yield) & F_u = 29 ksi (Tension)
U-Bolts / Threaded Rod	SAE J429 Grade 2 (Substitution: ASTM A449) F_y = 57 ksi (Yield) & F_u = 74 ksi (Tension)
Welds	E70XX Electrodes

1. *Strengths listed were assumed for this analysis and are based upon ASTM, AISC, RCSC, AWS and ACI preferred specification values. Values and materials are consistent with industry standards. Material strengths were taken from original design documents when available.*

5.0 Conclusion & Recommendations

Based on Sprint's final equipment loading configuration, the mount assembly has sufficient capacity to support the loading considered in this analysis pursuant to the listed standards.

Antennas and equipment shall be installed centered vertically on the mount front face rail. If this assumption is incorrect, the results of this analysis will be inaccurate and not valid. Panel antennas to be installed in Positions 1 and 4. RRH units to be installed on dual swivel brackets to new Pipe2.0STD x 4' mount pipes on existing standoff frames as close to tower legs as possible with Sitepro1 BBPM-U back-to-back pipe mount brackets. (6) RRH mount pipes with (12) BBPM-U brackets will be required to mount all RRH units.

This analysis only encompasses the antenna mount assembly. The tower, overall mount support structure, foundation, etc. are beyond the scope of this analysis. If any of the existing or proposed conditions (appurtenance loading, member sizes, etc.) reported in this analysis are not properly represented, please contact our office immediately to request an amended report.

Prepared by:

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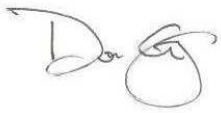
Reviewed and Approved by:



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6.0 Standard Conditions

- All data required to complete our structural analysis was furnished by our client and provided record data. GeoStructural has not conducted a site visit or independent study to verify existing conditions and the results of this analysis are based solely on the information provided. It has been assumed that the tower, antenna support structure and foundation have been constructed according to the provided existing drawings, previous structural analysis reports, mapping documents, etc.

- The default Structure Classification is Class II in accordance with ANSI/TIA-222-G §A.2.2 & §A.15.3 and has been assumed for this analysis. The owner shall verify this classification conforms with original or desired reliability criteria.

- This analysis assumes that the structure has been properly installed and maintained in accordance with ANSI/TIA-222-G §15.5 and that no physical deterioration has occurred in any of the components of the structure. Damaged, missing, or rusted members were not considered.

- This analysis verifies the adequacy of the main components of the structure. Not all connections, welds, bolts, plates, etc. were individually detailed and analyzed. Where not specifically analyzed, the existing connection plates, welds, bolts, etc. were assumed adequate to develop the full capacity of the main structural members.

- No consideration has been made for unusual or extreme wind events, rime/in-cloud ice loadings, harmonic or nodal vibration, vortex shedding or other similar conditions.

- It is the owner's responsibility to determine the appropriate design wind speed and amount of ice accumulation beyond code minimum values that should be considered in the analysis.

- This analysis report does not constitute a maintenance and condition assessment. No certifications regarding maintenance and condition are expressed or implied. If desired, GeoStructural can provide these services under a subsequent contract.

- This analysis only encompasses the antenna mount assembly. The tower, overall mount support structure, foundation, etc. are beyond the scope of this analysis. If desired, GeoStructural can provide these services under a subsequent contract.

7.0 Calculations & Software Output

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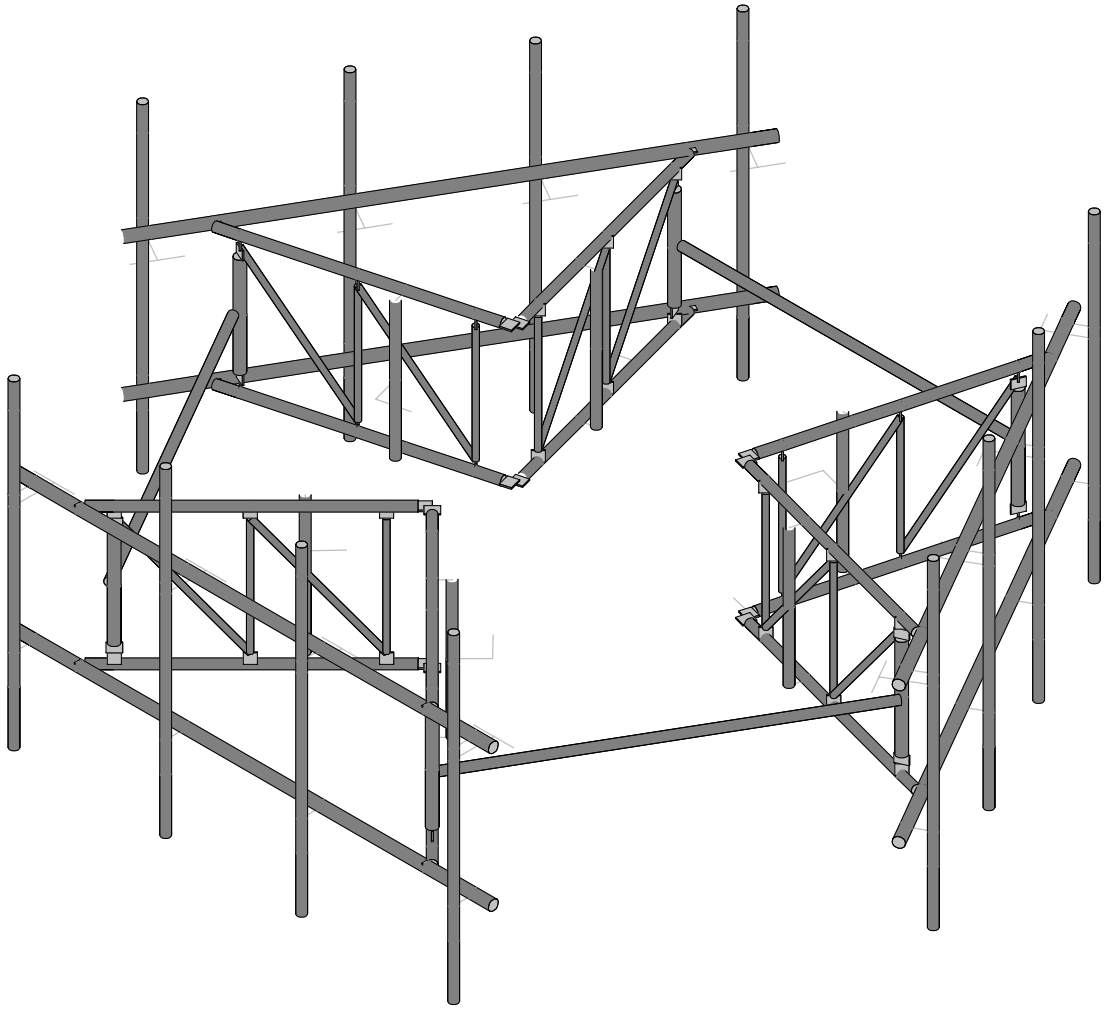

Envelope Only Solution

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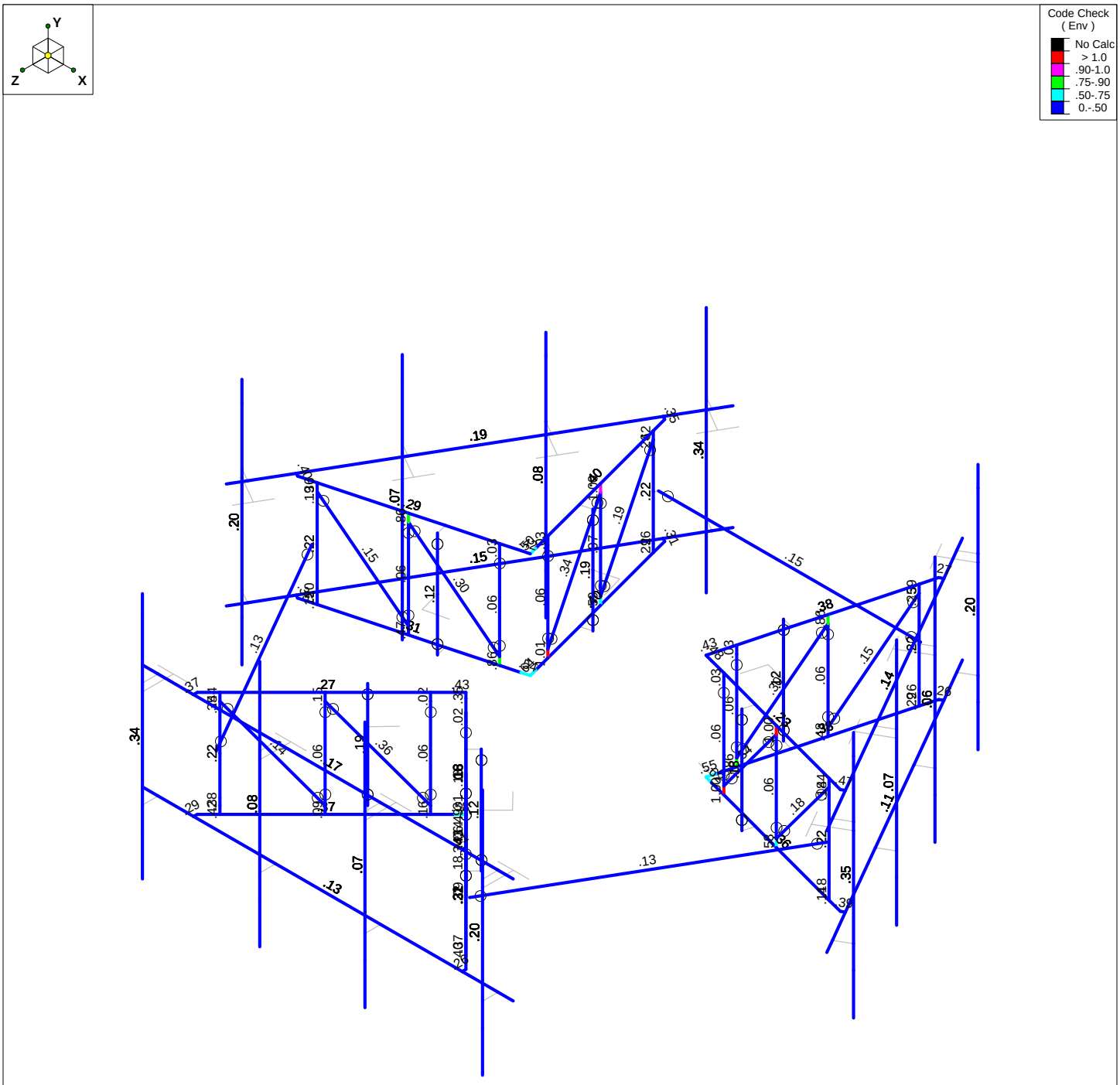

Member Code Checks Displayed (Enveloped)
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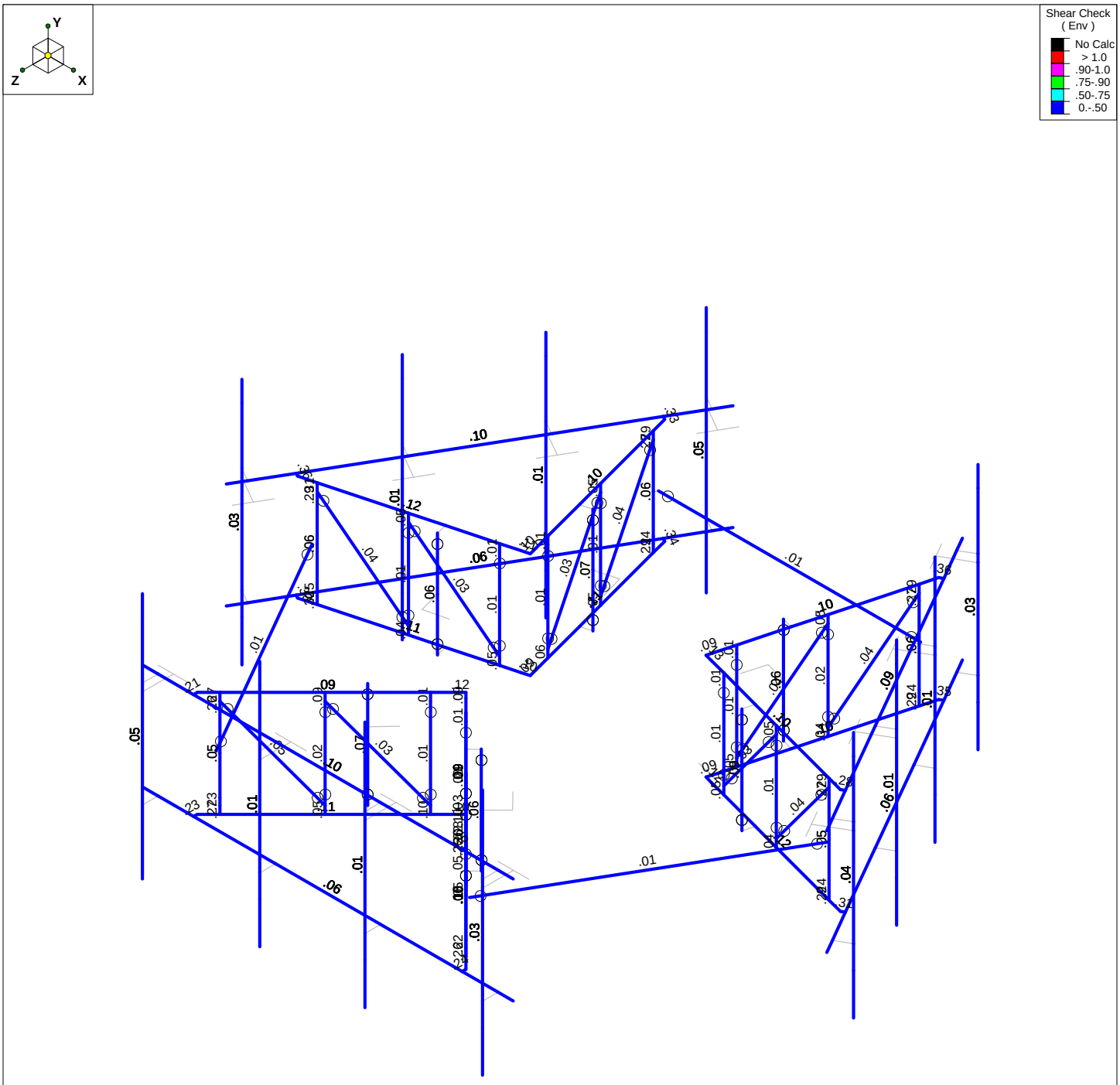

Member Shear Checks Displayed (Enveloped)
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		CT54XC704_Mount Analysis_R0 1...

Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distributed	Area(Me...	Surface(P...
1	D	DL		-1		25				
2	Di	SL				25		69		
3	Lm [500]	LL				1				
4	Lv [250]	LL				2				
5	Woz	WL				25		276		
6	Wox	WL				25		276		
7	Wiz	WL				25		276		
8	Wix	WL				25		276		
9	Ez	EL				25				
10	Ex	EL				25				
39		OL1								
40		OL2								
41		OL3				48				
42		OL4								

Load Combination Design

	Description	ASIF	CD	Service	Hot Rol...	Cold Form...	Wood	Concrete	Masonry	Aluminum	Stainless	Connection
1	1) 1.4D				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
2	2) 1.2D+1.0...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
3	2) 1.2D+1.0...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
4	2) 1.2D+1.0...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
5	2) 1.2D+1.0...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
6	2) 1.2D+1.0...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
7	2) 1.2D+1.0...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
8	2) 1.2D+1.0...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
9	2) 1.2D+1.0...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
10	2) 1.2D+1.0...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
11	2) 1.2D+1.0...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
12	2) 1.2D+1.0...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
13	2) 1.2D+1.0...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
14	3) 0.9D+1.0...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
15	3) 0.9D+1.0...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
16	3) 0.9D+1.0...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
17	3) 0.9D+1.0...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
18	3) 0.9D+1.0...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
19	3) 0.9D+1.0...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
20	3) 0.9D+1.0...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
21	3) 0.9D+1.0...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
22	3) 0.9D+1.0...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
23	3) 0.9D+1.0...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
24	3) 0.9D+1.0...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
25	3) 0.9D+1.0...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
26	4) 1.2D+1.0...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
27	4) 1.2D+1.0...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
28	4) 1.2D+1.0...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
29	4) 1.2D+1.0...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
30	4) 1.2D+1.0...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
31	4) 1.2D+1.0...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
32	4) 1.2D+1.0...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
33	4) 1.2D+1.0...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
34	4) 1.2D+1.0...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
35	4) 1.2D+1.0...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
36	4) 1.2D+1.0...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
37	4) 1.2D+1.0...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Load Combination Design (Continued)

	Description	ASIF	CD	Service	Hot Rol...	Cold Form...	Wood	Concrete	Masonry	Aluminum	Stainless	Connection
38	5) 1.2D+1.5L...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
39	5) 1.2D+1.5L...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
40	5) 1.2D+1.5L...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
41	5) 1.2D+1.5L...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
42	5) 1.2D+1.5L...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
43	5) 1.2D+1.5L...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
44	5) 1.2D+1.5L...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
45	5) 1.2D+1.5L...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
46	5) 1.2D+1.5L...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
47	5) 1.2D+1.5L...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
48	5) 1.2D+1.5L...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
49	5) 1.2D+1.5L...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
50	6) 1.2D+1.5Lv				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
51	7) (1.2+0.2Sd...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
52	7) (1.2+0.2Sd...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
53	7) (1.2+0.2Sd...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
54	7) (1.2+0.2Sd...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
55	7) (1.2+0.2Sd...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
56	7) (1.2+0.2Sd...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
57	7) (1.2+0.2Sd...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
58	7) (1.2+0.2Sd...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
59	7) (1.2+0.2Sd...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
60	7) (1.2+0.2Sd...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
61	7) (1.2+0.2Sd...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
62	7) (1.2+0.2Sd...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
63	8) (0.9-0.2Sd...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
64	8) (0.9-0.2Sd...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
65	8) (0.9-0.2Sd...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
66	8) (0.9-0.2Sd...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
67	8) (0.9-0.2Sd...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
68	8) (0.9-0.2Sd...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
69	8) (0.9-0.2Sd...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
70	8) (0.9-0.2Sd...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
71	8) (0.9-0.2Sd...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
72	8) (0.9-0.2Sd...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
73	8) (0.9-0.2Sd...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
74	8) (0.9-0.2Sd...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Envelope Joint Reactions

	Joint		X [k]	LC	Y [k]	LC	Z [k]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	N39	max	1.172	41	1.766	26	3.146	2	-.039	63	.39	24	.065	50
2		min	-.933	11	.378	68	-1.636	20	-.198	32	-.401	18	-.022	29
3	N6	max	1.142	5	1.079	32	2.022	14	-.024	65	.404	12	.05	50
4		min	-1.186	47	.219	14	-3.507	8	-.127	37	-.406	6	-.023	5
5	N90	max	1.852	17	1.105	36	1.753	2	.058	27	1.007	11	.143	32
6		min	-3.19	11	.211	18	-1.105	20	-.007	21	-.978	5	.023	14
7	N123	max	2.818	5	1.745	30	.897	25	.084	36	.993	23	.203	36
8		min	-1.477	23	.371	73	-1.569	7	.018	69	-.978	17	.04	67
9	N162	max	2.989	5	1.106	28	1.989	3	.091	36	1.233	12	-.017	25
10		min	-1.754	23	.212	22	-1.163	21	-.005	18	-1.234	18	-.126	31
11	N195	max	1.383	17	1.743	34	.961	15	.123	28	1.203	24	-.037	71
12		min	-2.619	11	.371	64	-1.805	9	.023	68	-1.219	18	-.182	28
13	Totals:	max	10.631	5	8.481	31	10.26	2						
14		min	-10.631	23	1.824	74	-10.26	20						

Envelope Member Section Deflections Service

Member	Sec	x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y' Ratio	LC	(n) L/z' Ratio	LC
No Data to Print ...													

Envelope AISC 14th(360-10): LRFD Steel Code Checks

	Member	Shape	Code Check	Loc[ft]	LC	Shear ...	Loc[ft]	Dir	LC	phi*Pnc...	phi*Pnt ...	phi*Mn ...	phi*Mn ...	Cb	Eqn
1	M158	3/8"x3"	1.008	0	35	.056	0	z	35	35.009	36.45	.285	2.278	1...	H1-1b
2	M101	3/8"x3"	1.003	0	30	.055	.25	z	36	35.009	36.45	.285	2.278	1...	H1-1b
3	M70	3/8"x3"	1.002	0	33	.051	.25	z	29	35.009	36.45	.285	2.278	1...	H1-1b
4	M127	3/8"x3"	.998	0	26	.053	0	z	29	35.009	36.45	.285	2.278	1...	H1-1b
5	M98	3/8"x3"	.863	0	29	.048	0	z	30	35.009	36.45	.285	2.278	1...	H1-1b
6	M124	3/8"x3"	.862	0	30	.047	.25	z	36	35.009	36.45	.285	2.278	1...	H1-1b
7	M155	3/8"x3"	.860	0	31	.046	.25	z	30	35.009	36.45	.285	2.278	1...	H1-1b
8	M67	3/8"x3"	.858	0	26	.049	0	z	36	35.009	36.45	.285	2.278	1...	H1-1b
9	M149	3/8"x3.5"	.638	0	30	.092	0	y	10	40.84	42.525	.332	3.101	1...	H1-1b
10	M92	3/8"x3.5"	.623	0	28	.119	.25	y	29	40.84	42.525	.332	3.101	1...	H1-1b
11	M156	3/8"x3"	.587	0	35	.046	0	y	31	35.009	36.45	.285	2.278	1...	H1-1b
12	M48	3/8"x3.5"	.582	0	31	.105	0	z	26	40.84	42.525	.332	3.101	1...	H1-1b
13	M99	3/8"x3"	.576	0	29	.037	0	y	9	35.009	36.45	.285	2.278	1...	H1-1b
14	M91	3/8"x3.5"	.548	0	35	.090	0	y	6	40.84	42.525	.332	3.101	1...	H1-1b
15	M148	3/8"x3.5"	.543	0	37	.099	0	y	10	40.84	42.525	.332	3.101	1...	H1-1b
16	M120	3/8"x3.5"	.502	0	36	.104	0	y	13	40.84	42.525	.332	3.101	1...	H1-1b
17	M47	3/8"x3.5"	.491	0	34	.098	0	y	13	40.84	42.525	.332	3.101	1...	H1-1b
18	M63	3/8"x3.5"	.479	0	34	.133	0	y	34	40.84	42.525	.332	3.101	1...	H1-1b
19	M96	3/8"x3"	.476	0	29	.037	0	y	9	35.009	36.45	.285	2.278	1...	H1-1b
20	M61A	3/8"x3.5"	.471	.121	5	.285	0	y	10	42.125	42.525	.332	3.101	1...	H1-1b
21	M153	3/8"x3"	.468	0	35	.038	.25	y	6	35.009	36.45	.285	2.278	1...	H1-1b
22	M21	3/8"x3"	.441	0	6	.271	0	y	6	35.009	36.45	.285	2.278	1...	H1-1b
23	M71	3/8"x3"	.436	0	32	.289	0	y	16	35.009	36.45	.285	2.278	2...	H1-1b
24	M18	3/8"x3"	.435	0	9	.260	0	y	10	35.009	36.45	.285	2.278	1...	H1-1b
25	M11	3/8"x3.5"	.428	0	26	.116	0	y	29	40.84	42.525	.332	3.101	1...	H1-1b
26	M62A	3/8"x3.5"	.428	0	29	.090	0	y	13	40.84	42.525	.332	3.101	1...	H1-1b
27	M119	3/8"x3.5"	.421	0	31	.114	0	y	6	40.84	42.525	.332	3.101	1...	H1-1b
28	M128	3/8"x3"	.416	0	26	.287	.25	y	8	35.009	36.45	.285	2.278	1...	H1-1b
29	M58	3/8"x3"	.416	0	12	.271	0	y	6	35.009	36.45	.285	2.278	1...	H1-1b
30	M123	PIPE_2.0	.402	0	11	.096	5.405		2	21.179	32.13	1.872	1.872	1...	H1-1b
31	M152	PIPE_2.0	.400	0	11	.109	0		33	21.179	32.13	1.872	1.872	2...	H1-1b
32	M55	3/8"x3"	.400	0	4	.258	0	y	10	35.009	36.45	.285	2.278	1...	H1-1b
33	M117	3/8"x3.5"	.396	.121	11	.357	0	y	5	42.125	42.525	.332	3.101	1...	H1-1b
34	M90	3/8"x3.5"	.391	.121	11	.307	0	y	28	42.125	42.525	.332	3.101	1...	H1-1b
35	M68	3/8"x3"	.387	0	2	.287	.25	y	8	35.009	36.45	.285	2.278	1...	H1-1b
36	M40	3/8"x3.5"	.380	.209	6	.229	0	y	6	41.344	42.525	.332	3.101	1...	H1-1b
37	M94	PIPE_2.0	.380	0	5	.098	5.896		7	21.179	32.13	1.872	1.872	2...	H1-1b
38	M65	PIPE_2.0	.379	0	5	.100	5.896		13	21.179	32.13	1.872	1.872	1...	H1-1b
39	M9	3/8"x3.5"	.375	.121	2	.213	0	y	6	42.125	42.525	.332	3.101	1...	H1-1b
40	M53	PIPE_2.0	.371	.553	37	.114	0		26	21.179	32.13	1.872	1.872	3...	H1-1b
41	M35	3/8"x3.5"	.366	.209	9	.218	0	y	10	41.344	42.525	.332	3.101	1...	H1-1b
42	M95	PIPE_2.0	.361	.553	29	.116	0		29	21.179	32.13	1.872	1.872	2...	H1-1b
43	M42	Rohn 1.50x...	.361	1.853	30	.032	0		6	6.105	9.932	.38	.38	1...	H1-1a
44	M125	3/8"x3"	.355	0	31	.305	0	y	12	35.009	36.45	.285	2.278	2...	H1-1b
45	M10	3/8"x3.5"	.355	0	27	.090	0	y	34	40.84	42.525	.332	3.101	1...	H1-1b
46	M118	3/8"x3.5"	.354	.121	10	.332	0	y	2	42.125	42.525	.332	3.101	1...	H1-1b
47	M26	3/8"x3.5"	.352	0	12	.261	.209	y	12	41.344	42.525	.332	3.101	1...	H1-1b
48	M146	3/8"x3.5"	.351	.121	5	.333	0	y	11	42.125	42.525	.332	3.101	1...	H1-1b
49	M58B	PIPE_2.0	.346	2.5	23	.043	2.5		11	14.915	32.13	1.872	1.872	1...	H1-1b
50	M3	PIPE_2.0	.343	2.5	20	.049	2.5		8	14.915	32.13	1.872	1.872	2...	H1-1b

Envelope AISC 14th(360-10): LRFD Steel Code Checks (Continued)

	Member	Shape	Code Check	Loc[ft]	LC	Shear ..	Loc[ft]	Dir	LC	phi*Pnc...	phi*Pnt ...	phi*Mn ...	phi*Mn ...	Cb	Eqn
51	M25	3/8"x3.5"	.342	0	3	.255	.209	y	4	41.344	42.525	.332	3.101	1...	H1-1b
52	M87	Rohn 1.50x...	.342	1.853	34	.031	3.785		12	6.105	9.932	.38	.38	1...	H1-1a
53	M115	PIPE_2.0	.342	2.5	5	.052	2.5		5	14.915	32.13	1.872	1.872	1...	H1-1b
54	M144	Rohn 1.50x...	.341	1.853	26	.034	0		11	6.105	9.932	.38	.38	1...	H1-1a
55	M52	PIPE_2.0	.320	.553	38	.098	0		37	21.179	32.13	1.872	1.872	3...	H1-1b
56	M37	Rohn 1.50x...	.313	1.853	34	.029	0		17	6.105	9.932	.38	.38	1...	H1-1a
57	M147	3/8"x3.5"	.311	.121	3	.339	0	y	8	42.125	42.525	.332	3.101	1...	H1-1b
58	M151	PIPE_2.0	.310	.553	35	.114	5.896		11	21.179	32.13	1.872	1.872	2...	H1-1b
59	M8	3/8"x3.5"	.310	.121	2	.249	0	y	9	42.125	42.525	.332	3.101	1...	H1-1b
60	M139	Rohn 1.50x...	.298	1.853	30	.030	3.785		6	6.105	9.932	.38	.38	1...	H1-1a
61	M82	Rohn 1.50x...	.298	1.853	26	.040	3.785		6	6.105	9.932	.38	.38	1...	H1-1a
62	M122	PIPE_2.0	.291	0	7	.120	5.896		5	21.179	32.13	1.872	1.872	2...	H1-1b
63	M46	3/8"x3.5"	.289	.121	8	.228	0	y	12	42.125	42.525	.332	3.101	1...	H1-1b
64	M97	3/8"x3"	.287	0	8	.289	.25	y	2	35.009	36.45	.285	2.278	1...	H1-1b
65	M157	3/8"x3"	.286	0	8	.289	.25	y	2	35.009	36.45	.285	2.278	1...	H1-1b
66	M60A	3/8"x3.5"	.275	.121	7	.364	0	y	13	42.125	42.525	.332	3.101	1...	H1-1b
67	M16	PIPE_2.0	.267	0	25	.085	5.896		7	21.179	32.13	1.872	1.872	1...	H1-1b
68	M45	3/8"x3.5"	.262	.121	8	.243	0	y	3	42.125	42.525	.332	3.101	1...	H1-1b
69	M89	3/8"x3.5"	.262	.121	13	.347	0	y	7	42.125	42.525	.332	3.101	2...	H1-1b
70	M131	3/8"x3.5"	.260	0	2	.273	.209	y	8	41.344	42.525	.332	3.101	1...	H1-1b
71	M80	3/8"x3.5"	.258	.209	8	.243	0	y	2	41.344	42.525	.332	3.101	1...	H1-1b
72	M142	3/8"x3.5"	.257	.209	8	.243	0	y	2	41.344	42.525	.332	3.101	1...	H1-1b
73	M73	3/8"x3.5"	.255	0	2	.274	.209	y	8	41.344	42.525	.332	3.101	1...	H1-1b
74	M66	PIPE_2.0	.233	2.027	5	.105	5.896		11	21.179	32.13	1.872	1.872	1...	H1-1b
75	M134	PIPE_2.5	.222	1.25	2	.056	2.5		8	48.186	50.715	3.596	3.596	1...	H1-1b
76	M76	PIPE_2.5	.221	1.25	2	.056	2.5		8	48.186	50.715	3.596	3.596	1...	H1-1b
77	M133	PIPE_2.5	.221	1.25	6	.057	2.5		11	48.186	50.715	3.596	3.596	1...	H1-1b
78	M32	PIPE_2.5	.219	1.25	12	.055	1.25		12	48.186	50.715	3.596	3.596	1...	H1-1b
79	M77	PIPE_2.5	.215	1.25	10	.054	2.5		4	48.186	50.715	3.596	3.596	1...	H1-1b
80	M31	PIPE_2.5	.208	1.25	4	.053	1.25		4	48.186	50.715	3.596	3.596	1...	H1-1b
81	M137	3/8"x3.5"	.202	.209	11	.253	0	y	6	41.344	42.525	.332	3.101	1...	H1-1b
82	M166	PIPE_2.0	.198	2.5	17	.025	2.5		4	14.915	32.13	1.872	1.872	1...	H1-1b
83	M57A	PIPE_2.0	.195	2.5	20	.028	2.5		8	14.915	32.13	1.872	1.872	2...	H1-1b
84	M109	PIPE_2.0	.195	2.5	11	.030	2.5		11	14.915	32.13	1.872	1.872	1...	H1-1b
85	M116	PIPE_2.5	.191	10.25	17	.096	10.3...		11	15.797	50.715	3.596	3.596	3...	H1-1b
86	M208	PIPE_2.0	.188	1.708	11	.067	0		13	27.933	32.13	1.872	1.872	1...	H1-1b
87	M192	PIPE_2.0	.188	1.708	8	.074	1.708		6	27.933	32.13	1.872	1.872	1...	H1-1b
88	M141	Rohn 1.50x...	.188	0	36	.044	0		7	6.105	9.932	.38	.38	1...	H1-1b*
89	M130	3/8"x3.5"	.187	0	11	.287	.209	y	12	41.344	42.525	.332	3.101	2...	H1-1b
90	M84	Rohn 1.50x...	.185	0	32	.037	3.785		9	6.105	9.932	.38	.38	1...	H1-1b*
91	M15	PIPE_2.0	.184	.553	33	.093	5.896		9	21.179	32.13	1.872	1.872	2...	H1-1b
92	M85	3/8"x3.5"	.184	.209	4	.245	0	y	10	41.344	42.525	.332	3.101	1...	H1-1b
93	M200	PIPE_2.0	.181	1.708	11	.091	1.708		10	27.933	32.13	1.872	1.872	1...	H1-1b
94	M34	Rohn 1.50x...	.180	0	49	.048	0		4	6.105	9.932	.38	.38	1...	H1-1b*
95	M74	3/8"x3.5"	.177	0	4	.272	.209	y	4	41.344	42.525	.332	3.101	1...	H1-1b
96	M7	PIPE_2.5	.169	10.3...	3	.102	10.3...		8	15.797	50.715	3.596	3.596	2...	H1-1b
97	M59	3/8"x3"	.163	0	28	.098	0	y	36	35.009	36.45	.285	2.278	1...	H1-1b
98	M145	PIPE_2.5	.155	10.25	5	.060	10.3...		4	15.797	50.715	3.596	3.596	2...	H1-1b
99	M20	3/8"x3"	.154	0	28	.093	0	y	30	35.009	36.45	.285	2.278	1...	H1-1b
100	M79	Rohn 1.50x...	.153	0	28	.042	0		8	6.105	9.932	.38	.38	1...	H1-1b*
101	M174	PIPE_2.0	.152	4.241	2	.011	8.482		8	13.562	32.13	1.872	1.872	1...	H1-1b
102	M136	Rohn 1.50x...	.151	0	31	.036	3.785		6	6.105	9.932	.38	.38	1...	H1-1b*
103	M154	3/8"x3"	.149	0	5	.302	0	y	6	35.009	36.45	.285	2.278	1...	H1-1b
104	M39	Rohn 1.50x...	.145	0	27	.049	0		12	6.105	9.932	.38	.38	1...	H1-1b*
105	M100	3/8"x3"	.143	0	10	.293	0	y	10	35.009	36.45	.285	2.278	1...	H1-1b
106	M56	3/8"x3"	.141	0	48	.083	0	y	29	35.009	36.45	.285	2.278	1...	H1-1b
107	M59B	PIPE_2.5	.136	1.75	11	.090	10.3...		6	15.797	50.715	3.596	3.596	3...	H1-1b

Envelope AISC 14th(360-10): LRFD Steel Code Checks (Continued)

	Member	Shape	Code Check	Loc[ft]	LC	Shear ...	Loc[ft]	Dir	LC	phi*Pnc...	phi*Pnt ...	phi*Mn ...	phi*Mn ...	Cb	Eqn
108	M17	3/8"x3"	.133	0	36	.082	0	y	35	35.009	36.45	.285	2.278	1...	H1-1b
109	M44	PIPE_2.5	.133	10.3...	9	.064	10.3...		8	15.797	50.715	3.596	3.596	2...	H1-1b
110	M30	PIPE_2.0	.127	4.241	6	.009	0		6	13.562	32.13	1.872	1.872	1...	H1-1b
111	M173	PIPE_2.0	.126	4.241	10	.009	0		10	13.562	32.13	1.872	1.872	1...	H1-1b
112	M196	PIPE_2.0	.121	1.708	8	.055	0		11	27.933	32.13	1.872	1.872	1...	H1-1b
113	M204	PIPE_2.0	.121	1.708	11	.056	0		3	27.933	32.13	1.872	1.872	1...	H1-1b
114	M212	PIPE_2.0	.120	1.708	6	.057	0		6	27.933	32.13	1.872	1.872	1...	H1-1b
115	M88	PIPE_2.5	.110	1.75	11	.060	10.3...		11	15.797	50.715	3.596	3.596	2...	H1-1b
116	M57	3/8"x3"	.091	0	10	.050	0	y	12	35.009	36.45	.285	2.278	1...	H1-1b
117	M54	3/8"x3"	.085	0	41	.054	0	y	39	35.009	36.45	.285	2.278	1...	H1-1b
118	M175	PIPE_2.0	.079	2.5	8	.011	5.917		5	14.915	32.13	1.872	1.872	2...	H1-1b
119	M185	PIPE_2.0	.077	2.5	4	.013	5.917		13	14.915	32.13	1.872	1.872	2...	H1-1b
120	M175A	PIPE_2.0	.073	2.5	12	.012	5.917		9	14.915	32.13	1.872	1.872	1...	H1-1b
121	M47A	PIPE_2.0	.069	2.5	8	.012	5.917		10	14.915	32.13	1.872	1.872	4...	H1-1b
122	M180	PIPE_2.0	.068	2.5	4	.013	5.917		6	14.915	32.13	1.872	1.872	1...	H1-1b
123	M140	Rohn 1.50x...	.066	1.459	13	.014	0		8	7.438	9.932	.38	.38	1...	H1-1b
124	M170B	PIPE_2.0	.065	2.5	13	.012	5.917		2	14.915	32.13	1.872	1.872	2...	H1-1b
125	M78	Rohn 1.50x...	.063	1.459	2	.017	0		7	7.438	9.932	.38	.38	1	H1-1b
126	M83	Rohn 1.50x...	.062	1.459	8	.014	0		2	7.438	9.932	.38	.38	1	H1-1b
127	M135	Rohn 1.50x...	.061	1.459	6	.012	0		13	7.438	9.932	.38	.38	1...	H1-1b
128	M38	Rohn 1.50x...	.061	1.459	3	.018	0		11	7.438	9.932	.38	.38	1...	H1-1b
129	M33	Rohn 1.50x...	.058	1.459	10	.018	0		4	7.438	9.932	.38	.38	1...	H1-1b
130	M138	Rohn 1.50x...	.057	1.459	5	.011	0		12	7.438	9.932	.38	.38	1...	H1-1b
131	M143	Rohn 1.50x...	.057	1.459	2	.012	0		5	7.438	9.932	.38	.38	1	H1-1b
132	M86	Rohn 1.50x...	.057	1.459	10	.012	0		6	7.438	9.932	.38	.38	1...	H1-1b
133	M81	Rohn 1.50x...	.056	1.459	13	.013	0		12	7.438	9.932	.38	.38	1...	H1-1b
134	M41	Rohn 1.50x...	.056	1.459	6	.012	0		6	7.438	9.932	.38	.38	1...	H1-1b
135	M36	Rohn 1.50x...	.056	1.459	9	.012	0		11	7.438	9.932	.38	.38	1...	H1-1b
136	M72	3/8"x3"	.026	0	10	.010	0	y	6	35.009	36.45	.285	2.278	1...	H1-1b
137	M126	3/8"x3"	.026	0	6	.008	0	y	11	35.009	36.45	.285	2.278	1...	H1-1b
138	M69	3/8"x3"	.026	0	13	.010	0	y	12	35.009	36.45	.285	2.278	1...	H1-1b
139	M129	3/8"x3"	.026	0	3	.009	0	y	5	35.009	36.45	.285	2.278	1...	H1-1b
140	M22	3/8"x3"	.025	0	4	.010	0	y	6	35.009	36.45	.285	2.278	1...	H1-1b
141	M19	3/8"x3"	.024	0	7	.009	0	y	10	35.009	36.45	.285	2.278	1...	H1-1b

SPECIAL CONSTRUCTION NOTE:
SPRINT WORK IS CONTINGENT ON THE FOLLOWING:
* COMPLETION OF A GLOBAL STRUCTURAL STABILITY ANALYSIS.
* COMPLETION OF AN ANTENNA/RRH MOUNT STRUCTURAL ASSESSMENT.
* GC SHALL FURNISH, INSTALL AND COMPLETE ALL REQUIRED STRUCTURAL MODIFICATIONS AS INDICATED IN BEFORE-MENTIONED ANALYSIS AND ASSESSMENT.

Sprint

PROGRAM: DO MACRO UPGRADE
EQUIPMENT DEPLOYMENT

SITE NUMBER: CT54XC704

SITE ADDRESS: 111 STONE HILL ROAD
VOLUNTOWN, CT 06384

SITE TYPE: EXISTING 181' SELF SUPPORT TOWER

PROJECT INFORMATION

SITE INFORMATION:

LATITUDE: 41° 36' 23.18" N
(PER SBA RECORDS) 41.60641111°

LONGITUDE: -71° 51' 03.78" W
(PER SBA RECORDS) -71.85113333°

STRUCTURE HEIGHT: 181'±

STRUCTURE TYPE: SELF SUPPORT TOWER

APPLICANT:

SPRINT
1 INTERNATIONAL BLVD, SUITE 800
MAHWAH, NJ 07495

TOWER OWNER:

SBA TOWERS II LLC.
8051 CONGRESS AVENUE
BOCA RATON, FL 33487

SBA SITE ID: CT10024-A

SBA SITE NAME: VOLUNTOWN

SBA CONTACT: STEPHEN ROTH
(860) 539-4920
sroth@sbasite.com

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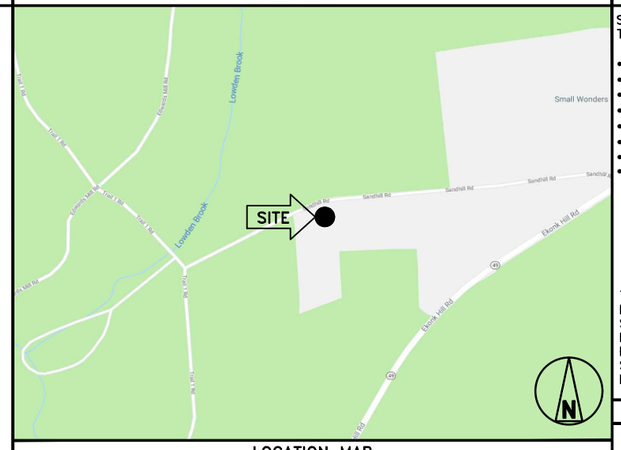
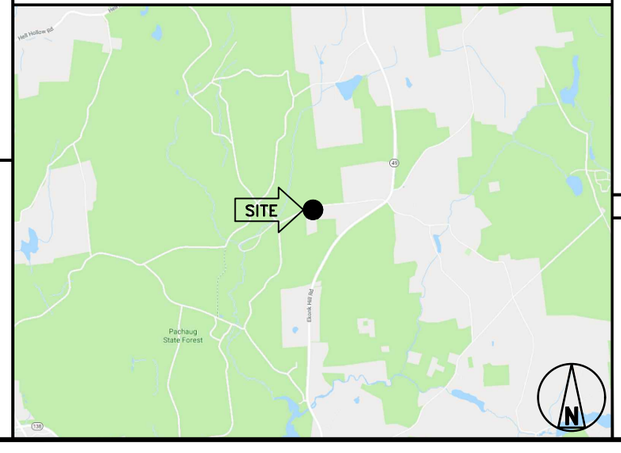
AREA MAP



LOCATION MAP



PROJECT DESCRIPTION

SPRINT PROPOSES TO MODIFY AN EXISTING UNMANNED TELECOMMUNICATIONS FACILITY.

- REMOVE (6) PANEL ANTENNAS
- INSTALL (6) PANEL ANTENNAS
- INSTALL (3) 2.5 GHz RRH'S
- RELOCATE (3) 1900 MHz RRH'S
- INSTALL (6) 800 MHz RRH'S
- REMOVE (6) COAX CABLES
- INSTALL (4) HYBRID CABLES
- INSTALL RAN EQUIPMENT INSIDE EXISTING MMBTS CABINET

THESE PLANS HAVE BEEN DEVELOPED FOR THE MODIFICATION OF AN EXISTING UNMANNED TELECOMMUNICATIONS FACILITY OWNED OR LEASED BY SPRINT IN ACCORDANCE WITH THE SCOPE OF WORK PROVIDED BY SPRINT. INFINIGY HAS INCORPORATED THIS SCOPE OF WORK IN THE PLANS. THESE PLANS ARE NOT FOR CONSTRUCTION UNLESS ACCOMPANIED BY A PASSING STRUCTURAL STABILITY ANALYSIS PREPARED BY A LICENSED STRUCTURAL ENGINEER. STRUCTURAL ANALYSIS MUST INCLUDE BOTH TOWER AND MOUNT.

APPLICABLE CODES

ALL WORK SHALL BE PERFORMED AND MATERIALS INSTALL IN ACCORDANCE WITH THE CURRENT EDITIONS OF THE FOLLOWING CODES AS ADOPTED BY THE LOCAL GOVERNING AUTHORITIES. NOTHING IN THESE PLANS IS TO BE CONSTRUED TO PERMIT WORK NOT CONFORMING TO THESE CODES.

1. INTERNATIONAL BUILDING CODE (2012 IBC)
2. TIA-222-G OR LATEST EDITION
3. NFPA 780 – LIGHTNING PROTECTION CODE
4. 2014 NATIONAL ELECTRIC CODE OR LATEST EDITION
5. ANY OTHER NATIONAL OR LOCAL APPLICABLE CODES, MOST RECENT EDITIONS
6. CT BUILDING CODE
7. LOCAL BUILDING CODE
8. CITY/COUNTY ORDINANCES

GENERAL NOTES

1. THIS IS AN UNMANNED TELECOMMUNICATION FACILITY AND NOT FOR HUMAN HABITATION:
   - ADA COMPLIANCE NOT REQUIRED.
   - POTABLE WATER OR SANITARY SERVICE IS NOT REQUIRED.
   - NO OUTDOOR STORAGE OR ANY SOLID WASTE RECEPTACLES REQUIRED.
2. CONTRACTOR SHALL VERIFY ALL PLANS, EXISTING DIMENSIONS, AND CONDITIONS ON JOB SITE. CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ARCHITECT/ENGINEER IN WRITING OF ANY DISCREPANCIES BEFORE PROCEEDING WITH THE WORK. FAILURE TO NOTIFY THE ARCHITECT/ENGINEER PLACE THE RESPONSIBILITY ON THE CONTRACTOR TO CORRECT THE DISCREPANCIES AT THE CONTRACTOR'S EXPENSE.

DRAWING INDEX

SHEET NO.	SHEET TITLE	REV.
T-1	TITLE SHEET & PROJECT DATA	0
SP-1	OUTLINE SPECIFICATIONS	0
SP-2	OUTLINE SPECIFICATIONS	0
SP-3	OUTLINE SPECIFICATIONS	0
A-1	SITE PLAN	0
A-2	TOWER ELEVATION	0
A-3	ANTENNA LAYOUT & MOUNTING DETAILS	0
A-4	EQUIPMENT & MOUNTING DETAILS	0
A-5	DETAILS	0
E-1	ELECTRICAL & GROUNDING DETAILS	0
RF-1	RF DATA SHEET	0
RF-2	PLUMBING DIAGRAM	0

APPROVALS

TITLE	SIGNATURE	DATE
PROJECT MANAGER:		
CONSTRUCTION:		
RF ENGINEER:		
ZONING/SITE ACQ:		
OPERATIONS:		
TOWER OWNER:		

THE FOLLOWING PARTIES HEREBY APPROVE AND ACCEPT THESE DOCUMENTS AND AUTHORIZE THE CONTRACTOR TO PROCEED WITH THE CONSTRUCTION DESCRIBED HEREIN. ALL DOCUMENTS ARE SUBJECT TO REVIEW BY THE LOCAL BUILDING DEPARTMENT AND MAY IMPOSE CHANGES OR MODIFICATIONS.

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

PROJECT MANAGER:
SBA
SBA COMMUNICATIONS CORP.
134 FLANDERS ROAD, SUITE 125
WESTBOROUGH, MA 01581
TEL: (508) 251-0720

PLANS PREPARED BY:
INFINIGY
FROM ZERO TO INFINIGY
the solutions are endless
1033 Watervliet Shaker Rd | Albany, NY 12205
Phone: 518-690-0790 | Fax: 518-690-0793
www.infinigy.com
JOB NUMBER 526-104

ENGINEERING LICENSE:
STATE OF CONNECTICUT
CHRISTOPHER J. WARREN
No. 23544
4-17-18
LICENSED PROFESSIONAL ENGINEER

CHECKED BY:

APPROVED BY:

REVISIONS:

DESCRIPTION	DATE	BY	REV.
ISSUED FOR CONSTRUCTION	03/23/18	RWF	0

SITE NUMBER:
CT54XC704

SITE ADDRESS:
111 STONE HILL ROAD
VOLUNTOWN, CT 06384

SHEET DESCRIPTION:
TITLE SHEET
& PROJECT DATA

SHEET NUMBER:
T-1

THESE OUTLINE SPECIFICATIONS IN CONJUNCTION WITH THE SPRINT STANDARD CONSTRUCTION SPECIFICATIONS, INCLUDING CONTRACT DOCUMENTS AND THE CONSTRUCTION DRAWINGS DESCRIBE THE WORK TO BE PERFORMED BY THE CONTRACTOR.

SECTION 01 100 – SCOPE OF WORK

PART 1 – GENERAL

1.1 THE WORK: THESE STANDARD CONSTRUCTION SPECIFICATIONS IN CONJUNCTION WITH THE SPRINT CONSTRUCTION STANDARDS FOR WIRELESS SITES, CONTRACT DOCUMENTS AND THE CONSTRUCTION DRAWINGS DESCRIBE THE WORK TO BE PERFORMED BY THE CONTRACTOR.

1.2 RELATED DOCUMENTS:

A. THE REQUIREMENTS OF THIS SECTION APPLY TO ALL SECTIONS IN THIS SPECIFICATION.

B. SPRINT "STANDARD CONSTRUCTION DETAILS FOR WIRELESS SITES" ARE INCLUDED IN AND MADE A PART OF THESE SPECIFICATIONS HEREWITH.

1.3 PRECEDENCE: SHOULD CONFLICTS OCCUR BETWEEN THE STANDARD CONSTRUCTION SPECIFICATIONS FOR WIRELESS SITES INCLUDING THE STANDARD CONSTRUCTION DETAILS FOR WIRELESS SITES AND THE CONSTRUCTION DRAWINGS, INFORMATION ON THE CONSTRUCTION DRAWINGS SHALL TAKE PRECEDENCE. NOTIFY SPRINT CONSTRUCTION MANAGER IF THIS OCCURS.

1.4 NATIONALLY RECOGNIZED CODES AND STANDARDS:

A. THE WORK SHALL COMPLY WITH APPLICABLE NATIONAL AND LOCAL CODES AND STANDARDS, LATEST EDITION, AND PORTIONS THEREOF, INCLUDED BUT NOT LIMITED TO THE FOLLOWING:

1. GR-63-CORE NEBS REQUIREMENTS: PHYSICAL PROTECTION
5. GR-78-CORE GENERIC REQUIREMENTS FOR THE PHYSICAL DESIGN AND MANUFACTURE OF TELECOMMUNICATIONS EQUIPMENT.
3. GR-1089 CORE, ELECTROMAGNETIC COMPATIBILITY AND ELECTRICAL SAFETY –GENERIC CRITERIA FOR NETWORK TELECOMMUNICATIONS EQUIPMENT.
4. NATIONAL FIRE PROTECTION ASSOCIATION CODES AND STANDARDS (NFPA) INCLUDING NFPA 70 (NATIONAL ELECTRICAL CODE – "NEC") AND NFPA 101 (LIFE SAFETY CODE).
5. AMERICAN SOCIETY FOR TESTING OF MATERIALS (ASTM)
6. INSTITUTE OF ELECTRONIC AND ELECTRICAL ENGINEERS (IEEE)
7. AMERICAN CONCRETE INSTITUTE (ACI)
8. AMERICAN WIRE PRODUCERS ASSOCIATION (AWPA)
9. CONCRETE REINFORCING STEEL INSTITUTE (CRSI)
10. AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO)
11. PORTLAND CEMENT ASSOCIATION (PCA)
12. NATIONAL CONCRETE MASONRY ASSOCIATION (NCMA)
13. BRICK INDUSTRY ASSOCIATION (BIA)
14. AMERICAN WELDING SOCIETY (AWS)
15. NATIONAL ROOFING CONTRACTORS ASSOCIATION (NRCA)
16. SHEET METAL AND AIR CONDITIONING CONTRACTORS' NATIONAL ASSOCIATION (SMACNA)
17. DOOR AND HARDWARE INSTITUTE (DHI)
18. OCCUPATIONAL SAFETY AND HEALTH ACT (OSHA)
19. APPLICABLE BUILDING CODES INCLUDING UNIFORM BUILDING CODE, SOUTHERN BUILDING CODE, BOCA, AND THE INTERNATIONAL BUILDING CODE.

1.5 DEFINITIONS:

A. WORK: THE SUM OF TASKS AND RESPONSIBILITIES IDENTIFIED IN THE CONTRACT DOCUMENTS.

B. COMPANY: SPRINT CORPORATION

C. ENGINEER: SYNONYMOUS WITH ARCHITECT & ENGINEER AND "A&E". THE DESIGN PROFESSIONAL HAVING PROFESSIONAL RESPONSIBILITY FOR DESIGN OF THE PROJECT.

D. CONTRACTOR: CONSTRUCTION CONTRACTOR; CONSTRUCTION VENDOR; INDIVIDUAL OR ENTITY WHO AFTER EXECUTION OF A CONTRACT IS BOUND TO ACCOMPLISH THE WORK.

E. THIRD PARTY VENDOR OR AGENCY: A VENDOR OR AGENCY ENGAGED SEPARATELY BY THE COMPANY, A&E, OR CONTRACTOR TO PROVIDE MATERIALS OR TO ACCOMPLISH SPECIFIC TASKS RELATED TO BUT NOT INCLUDED IN THE WORK.

F. OFCI: OWNER FURNISHED, CONTRACTOR INSTALLED EQUIPMENT.

G. CONSTRUCTION MANAGER – ALL PROJECTS RELATED COMMUNICATION TO FLOW THROUGH SPRINT REPRESENTATIVE IN CHARGE OF PROJECT...

1.6 SITE FAMILIARITY: CONTRACTOR SHALL BE RESPONSIBLE FOR FAMILIARIZING HIMSELF WITH ALL CONTRACT DOCUMENTS, FIELD CONDITIONS AND DIMENSIONS PRIOR TO PROCEEDING WITH CONSTRUCTION. ANY DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF THE SPRINT CONSTRUCTION MANAGER PRIOR TO THE COMMENCEMENT OF WORK. NO COMPENSATION WILL BE AWARDED BASED ON CLAIM OF LACK OF KNOWLEDGE OR FIELD CONDITIONS.

1.7 POINT OF CONTACT: COMMUNICATION BETWEEN SPRINT AND THE CONTRACTOR SHALL FLOW THROUGH THE SINGLE SPRINT CONSTRUCTION MANAGER APPOINTED TO MANAGE THE PROJECT FOR SPRINT.

1.8 ON-SITE SUPERVISION: THE CONTRACTOR SHALL SUPERVISE AND DIRECT THE WORK AND SHALL BE RESPONSIBLE FOR CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES, AND PROCEDURES IN ACCORDANCE WITH THE CONTRACT DOCUMENTS. THE CONTRACTOR SHALL EMPLOY A COMPETENT SUPERINTENDENT WHO SHALL BE IN ATTENDANCE AT THE SITE AT ALL TIMES DURING PERFORMANCE OF THE WORK.

1.9 DRAWINGS, SPECIFICATIONS AND DETAILS REQUIRED AT JOBSITE: THE CONSTRUCTION CONTRACTOR SHALL MAINTAIN A FULL SET OF THE CONSTRUCTION DRAWINGS, STANDARD CONSTRUCTION DETAILS FOR WIRELESS SITES AND THE STANDARD CONSTRUCTION SPECIFICATIONS FOR WIRELESS SITES AT THE JOBSITE FROM MOBILIZATION THROUGH CONSTRUCTION COMPLETION.

A. THE JOBSITE DRAWINGS, SPECIFICATIONS AND DETAILS SHALL BE CLEARLY MARKED DAILY IN RED PENCIL WITH ANY CHANGES IN CONSTRUCTION OVER WHAT IS DEPICTED IN THE DOCUMENTS. AT CONSTRUCTION COMPLETION, THIS JOBSITE MARKUP SET SHALL BE DELIVERED TO THE COMPANY OR COMPANY'S DESIGNATED REPRESENTATIVE TO BE FORWARDED TO THE COMPANY'S A&E VENDOR FOR PRODUCTION OF "AS-BUILT" DRAWINGS.

B. DETAILS ARE INTENDED TO SHOW DESIGN INTENT. MODIFICATIONS MAY BE REQUIRED TO SUIT JOB DIMENSIONS OR CONDITIONS, AND SUCH MODIFICATIONS SHALL BE INCLUDED AS PART OF THE WORK. CONTRACTOR SHALL NOTIFY SPRINT CONSTRUCTION MANAGER OF ANY VARIATIONS PRIOR TO PROCEEDING WITH THE WORK.

C. DIMENSIONS SHOWN ARE TO FINISH SURFACES UNLESS NOTED OTHERWISE. SPACING BETWEEN EQUIPMENT IS THE REQUIRED CLEARANCE. SHOULD THERE BE ANY QUESTIONS REGARDING THE CONTRACT DOCUMENTS, EXISTING CONDITIONS AND/OR DESIGN INTENT, THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING A CLARIFICATION FROM THE SPRINT CONSTRUCTION MANAGER PRIOR TO PROCEEDING WITH THE WORK.

1.10 USE OF JOB SITE: THE CONTRACTOR SHALL CONFINE ALL CONSTRUCTION AND RELATED OPERATIONS INCLUDING STAGING AND STORAGE OF MATERIALS AND EQUIPMENT, PARKING, TEMPORARY FACILITIES, AND WASTE STORAGE TO THE LEASE PARCEL UNLESS OTHERWISE PERMITTED BY THE CONTRACT DOCUMENTS.

1.11 UTILITIES SERVICES: WHERE NECESSARY TO CUT EXISTING PIPES, ELECTRICAL WIRES, CONDUITS, CABLES, ETC., OF UTILITY SERVICES, OR OF FIRE PROTECTION OR COMMUNICATIONS SYSTEMS, THEY SHALL BE CUT AND CAPPED AT SUITABLE PLACES OR WHERE SHOWN. ALL SUCH ACTIONS SHALL BE COORDINATED WITH THE UTILITY COMPANY INVOLVED:

1.12 PERMITS / FEES: WHEN REQUIRED THAT A PERMIT OR CONNECTION FEE BE PAID TO A PUBLIC UTILITY PROVIDER FOR NEW SERVICE TO THE CONSTRUCTION PROJECT, PAYMENT OF SUCH FEE SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.

1.13 CONTRACTOR SHALL TAKE ALL MEASURES AND PROVIDE ALL MATERIAL NECESSARY FOR PROTECTING EXISTING EQUIPMENT AND PROPERTY.

1.14 METHODS OF PROCEDURE (MOPS) FOR CONSTRUCTION: CONTRACTOR SHALL PERFORM WORK AS DESCRIBED IN THE FOLLOWING INSTALLATION AND COMMISSIONING MOPS.

NOTE: IN SHORT-FORM SPECIFICATIONS ON THE DRAWINGS, A/E TO INSERT LIST OF APPLICABLE MOPS INCLUDING EN-2012-001, EN-2013-002, EL-0568, AND TS-0193

1.15 USE OF ELECTRONIC PROJECT MANAGEMENT SYSTEMS:

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.1 TEMPORARY UTILITIES AND FACILITIES: THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL TEMPORARY UTILITIES AND FACILITIES NECESSARY EXCEPT AS OTHERWISE INDICATED IN THE CONSTRUCTION DOCUMENTS. TEMPORARY UTILITIES AND FACILITIES INCLUDE POTABLE WATER, HEAT, HVAC, ELECTRICITY, SANITARY FACILITIES, WASTE DISPOSAL FACILITIES, AND TELEPHONE/COMMUNICATION SERVICES. PROVIDE TEMPORARY UTILITIES AND FACILITIES IN ACCORDANCE WITH OSHA AND THE AUTHORITY HAVING JURISDICTION. CONTRACTOR MAY UTILIZE THE COMPANY ELECTRICAL SERVICE IN THE COMPLETION OF THE WORK WHEN IT BECOMES AVAILABLE. USE OF THE LESSORS OR SITE OWNER'S UTILITIES OR FACILITIES IS EXPRESSLY FORBIDDEN EXCEPT AS OTHERWISE ALLOWED IN THE CONTRACT DOCUMENTS.

3.2 ACCESS TO WORK: THE CONTRACTOR SHALL PROVIDE ACCESS TO THE JOB SITE FOR AUTHORIZED COMPANY PERSONNEL AND AUTHORIZED REPRESENTATIVES OF THE ARCHITECT/ENGINEER DURING ALL PHASES OF THE WORK.

3.3 TESTING: REQUIREMENTS FOR TESTING BY THIS CONTRACTOR SHALL BE AS INDICATED HEREWITH, ON THE CONSTRUCTION DRAWINGS, AND IN THE INDIVIDUAL SECTIONS OF THESE SPECIFICATIONS. SHOULD COMPANY CHOOSE TO ENGAGE ANY THIRD-PARTY TO CONDUCT ADDITIONAL TESTING, THE CONTRACTOR SHALL COOPERATE WITH AND PROVIDE A WORK AREA FOR COMPANY'S TEST AGENCY.

3.4 DIMENSIONS: VERIFY DIMENSIONS INDICATED ON DRAWINGS WITH FIELD DIMENSIONS BEFORE FABRICATION OR ORDERING OF MATERIALS. DO NOT SCALE DRAWINGS.

3.5 EXISTING CONDITIONS: NOTIFY THE SPRINT CONSTRUCTION MANAGER OF EXISTING CONDITIONS DIFFERING FROM THOSE INDICATED ON THE DRAWINGS. DO NOT REMOVE OR ALTER STRUCTURAL COMPONENTS WITHOUT PRIOR WRITTEN APPROVAL FROM THE ARCHITECT AND ENGINEER.

SECTION 01 200 – COMPANY FURNISHED MATERIAL AND EQUIPMENT

PART 1 – GENERAL

1.1 THE WORK: THESE STANDARD CONSTRUCTION SPECIFICATIONS IN CONJUNCTION WITH THE OTHER CONTRACT DOCUMENTS AND THE CONSTRUCTION DRAWINGS DESCRIBE THE WORK TO BE PERFORMED BY THE CONTRACTOR.

1.2 RELATED DOCUMENTS:

A. THE REQUIREMENTS OF THIS SECTION APPLY TO ALL SECTIONS IN THIS SPECIFICATION.

B. SPRINT "STANDARD CONSTRUCTION DETAILS FOR WIRELESS SITES" ARE INCLUDED IN AND MADE A PART OF THESE SPECIFICATIONS HEREWITH.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.1 RECEIPT OF MATERIAL AND EQUIPMENT:

A. A COMPANY FURNISHED MATERIAL AND EQUIPMENT IS IDENTIFIED ON THE RF DATA SHEET IN THE CONSTRUCTION DOCUMENTS.

B. THE CONTRACTOR IS RESPONSIBLE FOR SPRINT PROVIDED MATERIAL AND EQUIPMENT AND UPON RECEIPT SHALL:

1 ACCEPT DELIVERIES AS SHIPPED AND TAKE RECEIPT.

2. VERIFY COMPLETENESS AND CONDITION OF ALL DELIVERIES.

3. TAKE RESPONSIBILITY FOR EQUIPMENT AND PROVIDE INSURANCE PROTECTION AS REQUIRED IN AGREEMENT.

4. RECORD ANY DEFECTS OR DAMAGES AND WITHIN TWENTY-FOUR HOURS AFTER RECEIPT, REPORT TO SPRINT OR ITS DESIGNATED PROJECT REPRESENTATIVE OF SUCH.

5. PROVIDE SECURE AND NECESSARY WEATHER PROTECTED WAREHOUSING.

6. COORDINATE SAFE AND SECURE TRANSPORTATION OF MATERIAL AND EQUIPMENT, DELIVERING AND OFF-LOADING FROM CONTRACTOR'S WAREHOUSE TO SITE.

3.2 DELIVERABLES:

A. COMPLETE SHIPPING AND RECEIPT DOCUMENTATION IN ACCORDANCE WITH COMPANY PRACTICE.

B. IF APPLICABLE, COMPLETE LOST/STOLEN/DAMAGED DOCUMENTATION REPORT AS NECESSARY IN ACCORDANCE WITH COMPANY PRACTICE, AND AS DIRECTED BY COMPANY.

C. UPLOAD DOCUMENTATION INTO SPRINT SITE MANAGEMENT SYSTEM (SMS) AND/OR PROVIDE HARD COPY DOCUMENTATION AS REQUESTED.

SECTION 01 300 – CELL SITE CONSTRUCTION CO.

PART 1 – GENERAL

1.1 THE WORK: THESE STANDARD CONSTRUCTION SPECIFICATIONS IN CONJUNCTION WITH THE OTHER CONTRACT DOCUMENTS AND THE CONSTRUCTION DRAWINGS DESCRIBE THE WORK TO BE PERFORMED BY THE CONTRACTOR.

1.2 RELATED DOCUMENTS:

A. THE REQUIREMENTS OF THIS SECTION APPLY TO ALL SECTIONS IN THIS SPECIFICATION.

B. SPRINT "STANDARD CONSTRUCTION DETAILS FOR WIRELESS SITES" ARE INCLUDED IN AND MADE A PART OF THESE SPECIFICATIONS HEREWITH.

1.3 NOTICE TO PROCEED

A. NO WORK SHALL COMMENCE PRIOR TO COMPANY'S WRITTEN NOTICE TO PROCEED AND THE ISSUANCE OF THE WORK ORDER.

B. UPON RECEIVING NOTICE TO PROCEED, CONTRACTOR SHALL FULLY PERFORM ALL WORK NECESSARY TO PROVIDE SPRINT WITH AN OPERATIONAL WIRELESS FACILITY.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.1 FUNCTIONAL REQUIREMENTS:

A. THE ACTIVITIES DESCRIBED IN THIS PARAGRAPH REPRESENT MINIMUM ACTIONS AND PROCESSES REQUIRED TO SUCCESSFULLY COMPLETE THE WORK. THE ACTIVITIES DESCRIBED ARE NOT EXHAUSTIVE, AND CONTRACTOR SHALL TAKE ANY AND ALL ACTIONS AS NECESSARY TO SUCCESSFULLY COMPLETE THE CONSTRUCTION OF A FULLY FUNCTIONING WIRELESS FACILITY AT THE SITE IN ACCORDANCE WITH COMPANY PROCESSES.

B. SUBMIT SPECIFIC DOCUMENTATION AS INDICATED HEREIN, AND OBTAIN REQUIRED APPROVALS WHILE THE WORK IS BEING PERFORMED.

C. MANAGE AND CONDUCT ALL FIELD CONSTRUCTION SERVICE RELATED ACTIVITIES

D. PROVIDE CONSTRUCTION ACTIVITIES TO THE EXTENT REQUIRED BY THE CONTRACT DOCUMENTS, INCLUDING BUT NOT LIMITED TO THE FOLLOWING:

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

PROJECT MANAGER:
SBA
SBA COMMUNICATIONS CORP.
134 FLANDERS ROAD, SUITE 125
WESTBOROUGH, MA 01581
TEL: (508) 251-0720

PLANS PREPARED BY:
INFINIGY
FROM ZERO TO INFINIGY
the solutions are endless
1033 Watervliet Shaker Rd | Albany, NY 12205
Phone: 518-690-0790 | Fax: 518-690-0793
www.infinigy.com
JOB NUMBER 526-104

ENGINEERING LICENSE:

STATE OF CONNECTICUT
CHRISTOPHER J. WARREN
No. 23544
4-17-18
LICENSED PROFESSIONAL ENGINEER

CHECKED BY:

APPROVED BY:

REVISIONS:

DESCRIPTION	DATE	BY	REV.
ISSUED FOR CONSTRUCTION	03/23/18	RWF	0

SITE NUMBER:
CT54XC704

SITE ADDRESS:
111 STONE HILL ROAD
VOLUNTOWN, CT 06384

SHEET DESCRIPTION:
OUTLINE SPECIFICATIONS

SHEET NUMBER:
SP-1

CONTINUE FROM SP-1

1. PERFORM ANY REQUIRED SITE ENVIRONMENTAL MITIGATION.
2. PREPARE GROUND SITES; PROVIDE DE-GRUBBING; AND ROUGH AND FINAL GRADING, AND COMPOUND SURFACE TREATMENTS.
3. MANAGE AND CONDUCT ALL ACTIVITIES FOR INSTALLATION OF UTILITIES INCLUDING ELECTRICAL AND TELCO BACKHAUL.
4. INSTALL UNDERGROUND FACILITIES INCLUDING UNDERGROUND POWER AND COMMUNICATIONS CONDUITS, AND UNDERGROUND GROUNDING SYSTEM.
5. INSTALL ABOVE GROUND GROUNDING SYSTEMS.
6. PROVIDE NEW HVAC INSTALLATIONS AND MODIFICATIONS.
7. INSTALL "H-FRAMES", CABINETS AND SHELTERS AS INDICATED.
8. INSTALL ROADS, ACCESS WAYS, CURBS AND DRAINS AS INDICATED.
9. ACCOMPLISH REQUIRED MODIFICATION OF EXISTING FACILITIES.
10. PROVIDE ANTENNA SUPPORT STRUCTURE FOUNDATIONS.
11. PROVIDE SLABS AND EQUIPMENT PLATFORMS.
12. INSTALL COMPOUND FENCING, SIGHT SHIELDING, LANDSCAPING AND ACCESS BARRIERS.
13. PERFORM INSPECTION AND MATERIAL TESTING AS REQUIRED HEREINAFTER.
14. CONDUCT SITE RESISTANCE TO EARTH TESTING AS REQUIRED HEREINAFTER
15. INSTALL FIXED GENERATOR SETS AND OTHER STANDBY POWER SOLUTIONS.
16. INSTALL TOWERS, ANTENNA SUPPORT STRUCTURES AND PLATFORMS ON EXISTING TOWERS AS REQUIRED.
17. INSTALL CELL SITE RADIOS, MICROWAVE, GPS, COAXIAL MAINLINE, ANTENNAS, CROSS BAND COUPLERS, TOWER TOP AMPLIFIERS, LOW NOISE AMPLIFIERS AND RELATED EQUIPMENT.
18. PERFORM, DOCUMENT, AND CLOSE OUT ANY CONSTRUCTION CONTROL DOCUMENTS THAT MAY BE REQUIRED BY GOVERNMENT AGENCIES AND LANDLORDS.
19. PERFORM ANTENNAL AND COAX SWEEP TESTING AND MAKE ANY AND ALL NECESSARY CORRECTIONS.
20. REMAIN ON SITE MOBILIZED THROUGHOUT HAND-OFF AND INTEGRATION TO ASSIST AS NEEDED UNTIL SITE IS DEEMED SUBSTANTIALLY COMPLETE AND PLACED "ON AIR."

3.2 GENERAL REQUIREMENTS FOR CIVIL CONSTRUCTION:

A. CONTRACTOR SHALL KEEP THE SITE FREE FROM ACCUMULATING WASTE MATERIAL, DEBRIS, AND TRASH. AT THE COMPLETION OF THE WORK, CONTRACTOR SHALL REMOVE FROM THE SITE ALL REMAINING RUBBISH, IMPLEMENTS, TEMPORARY FACILITIES, AND SURPLUS MATERIALS.

B. EQUIPMENT ROOMS SHALL AT ALL TIMES BE MAINTAINED "BROOM CLEAN" AND CLEAR OF DEBRIS.

C. CONTRACTOR SHALL TAKE ALL REASONABLE PRECAUTIONS TO DISCOVER AND LOCATE ANY HAZARDOUS CONDITION.

1. IN THE EVENT CONTRACTOR ENCOUNTERS ANY HAZARDOUS CONDITION WHICH HAS NOT BEEN ABATED OR OTHERWISE MITIGATED, CONTRACTOR AND ALL OTHER PERSONS SHALL IMMEDIATELY STOP WORK IN THE AFFECTED AREA AND NOTIFY COMPANY IN WRITING. THE WORK IN THE AFFECTED AREA SHALL NOT BE RESUMED EXCEPT BY WRITTEN NOTIFICATION BY COMPANY.
2. CONTRACTOR AGREES TO USE CARE WHILE ON THE SITE AND SHALL NOT TAKE ANY ACTION THAT WILL OR MAY RESULT IN OR CAUSE THE HAZARDOUS CONDITION TO BE FURTHER RELEASED IN THE ENVIRONMENT, OR TO FURTHER EXPOSE INDIVIDUALS TO THE HAZARD.

D. CONTRACTOR'S ACTIVITIES SHALL BE RESTRICTED TO THE PROJECT LIMITS. SHOULD AREAS OUTSIDE THE PROJECT LIMITS BE AFFECTED BY CONTRACTOR'S ACTIVITIES, CONTRACTOR SHALL IMMEDIATELY RETURN THEM TO ORIGINAL CONDITION

E. CONDUCT TESTING AS REQUIRED HEREIN.

3.3 DELIVERABLES:

A. CONTRACTOR SHALL REVIEW, APPROVE, AND SUBMIT TO SPRINT SHOP DRAWINGS, PRODUCT DATA, SAMPLES, AND SIMILAR SUBMITTALS AS REQUIRED HEREINAFTER

B. PROVIDE DOCUMENTATION INCLUDING, BUT NOT LIMITED TO, THE FOLLOWING. DOCUMENTATION SHALL BE FORWARDED IN ORIGINAL FORMAT AND/OR UPLOADED INTO SMS.

1. ALL CORRESPONDENCE AND PRELIMINARY CONSTRUCTION REPORTS.
2. PROJECT PROGRESS REPORTS.
3. CIVIL CONSTRUCTION START DATE (POPULATE FIELD IN SMS AND/OR FORWARD NOTIFICATION).
4. ELECTRICAL SERVICE COMPLETION DATE (POPULATE FIELD IN SMS AND/OR FORWARD NOTIFICATION).
5. LINES AND ANTENNA INSTALL DATE (POPULATE FIELD IN SMS AND/OR FORWARD NOTIFICATION).
6. POWER INSTALL DATE (POPULATE FIELD IN SMS AND/OR FORWARD NOTIFICATION).
7. TELCO READY DATE (POPULATE FIELD IN SMS AND/OR FORWARD NOTIFICATION).
8. PPC (OR SHELTER) INSTALL DATE (POPULATE FIELD IN SMS AND/OR FORWARD NOTIFICATION).
9. TOWER CONSTRUCTION START DATE (POPULATE FIELD IN SMS AND/OR FORWARD NOTIFICATION).
10. TOWER CONSTRUCTION COMPLETE DATE (POPULATE FIELD IN SMS AND/OR FORWARD NOTIFICATION).
11. BTS AND RADIO EQUIPMENT DELIVERED AT SITE DATE (POPULATE FIELD IN SMS AND/OR FORWARD NOTIFICATION).
12. NETWORK OPERATIONS HANDOFF CHECKLIST (HOC WALK) COMPLETE (UPLOAD FORM IN SMS)
13. CIVIL CONSTRUCTION COMPLETE DATE (POPULATE FIELD IN SMS AND/OR FORWARD NOTIFICATION).
14. SITE CONSTRUCTION PROGRESS PHOTOS UNLOADED INTO SMS.

SECTION 01 400 – SUBMITTALS & TESTS

PART 1 – GENERAL

1.1 THE WORK: THESE STANDARD CONSTRUCTION SPECIFICATIONS IN CONJUNCTION WITH THE OTHER CONTRACT DOCUMENTS AND THE CONSTRUCTION DRAWINGS DESCRIBE THE WORK TO BE PERFORMED BY THE CONTRACTOR.

1.2 RELATED DOCUMENTS:

A. THE REQUIREMENTS OF THIS SECTION APPLY TO ALL SECTIONS IN THIS SPECIFICATION.

B. SPRINT "STANDARD CONSTRUCTION DETAILS FOR WIRELESS SITES" ARE INCLUDED IN AND MADE A PART OF THESE SPECIFICATIONS HEREWITH.

1.3 SUBMITTALS:

A. THE WORK IN ALL ASPECTS SHALL COMPLY WITH THE CONSTRUCTION DRAWINGS AND THESE SPECIFICATIONS.

B. SUBMIT THE FOLLOWING TO COMPANY REPRESENTATIVE FOR APPROVAL.

1. CONCRETE MIX-DESIGNS FOR TOWER FOUNDATIONS, ANCHORS PIERS, AND CONCRETE PAVING.
2. CONCRETE BREAK TESTS AS SPECIFIED HEREIN.
3. SPECIAL FINISHES FOR INTERIOR SPACES, IF ANY.
4. ALL EQUIPMENT AND MATERIALS SO IDENTIFIED ON THE CONSTRUCTION DRAWINGS.
5. CHEMICAL GROUNDING DESIGN

D. ALTERNATES: AT THE COMPANY'S REQUEST, ANY ALTERNATIVES TO THE MATERIALS OR METHODS SPECIFIED SHALL BE SUBMITTED TO SPRINT'S CONSTRUCTION MANAGER FOR APPROVAL PRIOR TO BEING SHIPPED TO SITE. SPRINT WILL REVIEW AND APPROVE ONLY THOSE REQUESTS MADE IN WRITING. NO VERBAL APPROVALS WILL BE CONSIDERED. SUBMITTAL FOR APPROVAL SHALL INCLUDE A STATEMENT OF COST REDUCTION PROPOSED FOR USE OF ALTERNATE PRODUCT.

1.4 TESTS AND INSPECTIONS:

A. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL CONSTRUCTION TESTS, INSPECTIONS AND PROJECT DOCUMENTATION.

B. CONTRACTOR SHALL ACCOMPLISH TESTING INCLUDING BUT NOT LIMITED TO THE FOLLOWING:

1. COAX SWEEPS AND FIBER TESTS PER TS-0200 REV 4 ANTENNA LINE ACCEPTANCE STANDARDS.
2. AGL, AZIMUTH AND DOWNTILT USING ELECTRONIC COMMERCIAL MADE-FOR-THE-PURPOSE ANTENNA ALIGNMENT TOOL.
3. CONTRACTOR SHALL BE RESPONSIBLE FOR ANY AND ALL CORRECTIONS TO ANY WORK IDENTIFIED AS UNACCEPTABLE IN SITE INSPECTION ACTIVITIES AND/OR AS A RESULT OF TESTING.

C. REQUIRED CLOSEOUT DOCUMENTATION INCLUDES, BUT IS NOT LIMITED TO THE FOLLOWING;

1. AZIMUTH, DOWNTILT, AGL – UPLOAD REPORT FROM ANTENNA ALIGNMENT TOOL TO SITERRA TASK 465. INSTALLED AZIMUTH, DOWNTILT, AND AGL MUST CONFORM TO THE RF DATA SHEETS. SWEEP AND FIBER TESTS
2. SCANABLE BARCODE PHOTOGRAPHS OF TOWER TOP AND INACCESSIBLE SERIALIZED EQUIPMENT
3. ALL AVAILABLE JURISDICTIONAL INFORMATION
4. PDF SCAN OF REDLINES PRODUCED IN FIELD
5. ELECTRONIC AS-BUILT DRAWINGS IN AUTOCAD AND PDF FORMATS. ANY FIELD CHANGE MUST BE REFLECTED BY MODIFYING THE PLANS, ELEVATIONS, AND DETAILS IN THE DRAWING SETS. GENERAL NOTES INDICATING MODIFICATIONS WILL NOT BE ACCEPTED. CHANGES SHALL BE HIGHLIGHTED AS "CLOUDS" IDENTIFIED AS THE "AS-BUILT" CONDITION.
6. LIEN WAIVERS
7. FINAL PAYMENT APPLICATION
8. REQUIRED FINAL CONSTRUCTION PHOTOS
9. CONSTRUCTION AND COMMISSIONING CHECKLIST COMPLETE WITH NO DEFICIENT ITEMS
10. ALL POST NTP TASKS INCLUDING DOCUMENT UPLOADS COMPLETED IN SITERRA (SPRINTS DOCUMENT REPOSITORY OF RECORD).

1.5 COMMISSIONING: PERFORM ALL COMMISSIONING AS REQUIRED BY APPLICABLE MOPs

1.6 INTEGRATION: PERFORM ALL INTEGRATION ACTIVITIES AS REQUIRED BY APPLICABLE MOPs

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.1 REQUIREMENTS FOR TESTING:

A. THIRD PARTY TESTING AGENCY:

1. WHEN THE USE OF A THIRD PARTY INDEPENDENT TESTING AGENCY IS REQUIRED, THE AGENCY THAT IS SELECTED MUST PERFORM SUCH WORK ON A REGULAR BASIS IN THE STATE WHERE THE PROJECT IS LOCATED AND HAVE A THOROUGH UNDERSTANDING OF LOCAL AVAILABLE MATERIALS, INCLUDING THE SOIL, ROCK, AND GROUNDWATER CONDITIONS.
2. THE THIRD PARTY TESTING AGENCY IS TO BE FAMILIAR WITH THE APPLICABLE REQUIREMENTS FOR THE TESTS TO BE DONE, EQUIPMENT TO BE USED, AND ASSOCIATED HEALTH AND SAFETY ISSUES.
3. EXPERIENCE IN SOILS, CONCRETE, MASONRY, AGGREGATE, AND ASPHALT TESTING USING ASTM, AASJTO, AND OTHER METHODS IS NEEDED.
4. EXPERIENCE IN SOILS, CONCRETE, MASONRY, AGGREGATE, AND ASPHALT TESTING USING ASTM, AASJTO, AND OTHER METHODS IS NEEDED.

3.2 REQUIRED TESTS:

A. CONTRACTOR SHALL ACCOMPLISH TESTING INCLUDING BUT NOT LIMITED TO THE FOLLOWING:

1. CONCRETE CYLINDER BREAK TESTS FOR THE TOWER AND ANCHOR FOUNDATIONS AS SPECIFIED IN SECTION: PORTLAND CEMENT CONCRETE PAVING.
2. ASPHALT ROADWAY COMPACTED THICKNESS, SURFACE SMOOTHNESS, AND COMPACTED DENSITY TESTING AS SPECIFIED IN SECTION: HOT MIX ASPHALT PAVING.
3. FIELD QUALITY CONTROL TESTING AS SPECIFIED IN SECTION: PORTLAND CEMENT CONCRETE PAVING.
4. TESTING REQUIRED UNDER SECTION: AGGREGATE BASE FOR ACCESS ROADS, PADS AND ANCHOR LOCATIONS
5. STRUCTURAL BACKFILL COMPACTION TESTS FOR THE TOWER FOUNDATION.
6. SITE RESISTANCE TO EARTH TESTING PER EXHIBIT: CELL SITE GROUNDING SYSTEM DESIGN.
7. ANTENNA AND COAX SWEEP TESTS PER EXHIBIT: ANTENNA TRANSMISSION LINE ACCEPTANCE STANDARDS.
8. GROUNDING AT ANTENNA MASTS FOR GPS AND ANTENNAS
9. ALL OTHER TESTS REQUIRED BY COMPANY OR JURISDICTION.

3.3 REQUIRED INSPECTIONS

A. SCHEDULE INSPECTIONS WITH COMPANY REPRESENTATIVE.

B. CONDUCT INSPECTIONS INCLUDING BUT NOT LIMITED TO THE FOLLOWING:

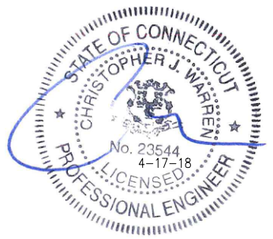
1. GROUNDING SYSTEM INSTALLATION PRIOR TO EARTH CONCEALMENT DOCUMENTED WITH DIGITAL PHOTOGRAPHS BY CONTRACTOR, APPROVED BY A&E OR SPRINT REPRESENTATIVE.
2. FORMING FOR CONCRETE AND REBAR PLACEMENT PRIOR TO POUR DOCUMENTED WITH DIGITAL PHOTOGRAPHS BY CONTRACTOR, APPROVED BY A&E OR SPRINT REPRESENTATIVE.
3. COMPACTION OF BACKFILL MATERIALS; AGGREGATE BASE FOR ROADS, PADS, AND ANCHORS; ASPHALT PAVING; AND SHAFT BACKFILL FOR CONCRETE AND WOOD POLES, BY INDEPENDENT THIRD PARTY AGENCY.
4. PRE- AND POST-CONSTRUCTION ROOFTOP AND STRUCTURAL INSPECTIONS ON EXISTING FACILITIES.
5. TOWER ERECTION SECTION STACKING AND PLATFORM ATTACHMENT DOCUMENTED BY DIGITAL PHOTOGRAPHS BY THIRD PARTY AGENCY.
6. ANTENNA AZIMUTH , DOWN TILT AND PER SUNLIGHT TOOL SUNSIGHT INSTRUMENTS – ANTENNALIGN ALIGNMENT TOOL (AAT)

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

PROJECT MANAGER:
SBA
SBA COMMUNICATIONS CORP.
134 FLANDERS ROAD, SUITE 125
WESTBOROUGH, MA 01581
TEL: (508) 251-0720

PLANS PREPARED BY:
INFINIGY
FROM ZERO TO INFINIGY
the solutions are endless
1033 Watervliet Shaker Rd | Albany, NY 12205
Phone: 518-690-0790 | Fax: 518-690-0793
www.infinigy.com
JOB NUMBER 526-104

ENGINEERING LICENSE:



CHECKED BY:

APPROVED BY:

REVISIONS:

DESCRIPTION	DATE	BY	REV.
ISSUED FOR CONSTRUCTION	03/23/18	RWF	0

SITE NUMBER:
CT54XC704

SITE ADDRESS:
111 STONE HILL ROAD
VOLUNTOWN, CT 06384

SHEET DESCRIPTION:
OUTLINE SPECIFICATIONS

SHEET NUMBER:
SP-2

CONTINUE FROM SP-2

7. VERIFICATION DOCUMENTED WITH THE ANTENNA CHECKLIST REPORT, BY A&E, SITE DEVELOPMENT REP, OR RF REP.

8. FINAL INSPECTION CHECKLIST AND HANDOFF WALK (HOC.). SIGNED FORM SHOWING ACCEPTANCE BY FIELD OPS IS TO BE UPLOADED INTO SMS.

9. COAX SWEEP AND FIBER TESTING DOCUMENTS SUBMITTED VIA SMS FOR RF APPROVAL.

10. SCAN-ABLE BARCODE PHOTOGRAPHS OF TOWER TOP AND INACCESSIBLE SERIALIZED EQUIPMENT

11. ALL AVAILABLE JURISDICTIONAL INFORMATION

12. PDF SCAN OF REDLINES PRODUCED IN FIELD

C. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY AND ALL CORRECTIONS TO ANY WORK IDENTIFIED AS UNACCEPTABLE IN SITE INSPECTION ACTIVITIES AND/OR AS A RESULT OF TESTING.

D. CONSTRUCTION INSPECTIONS AND CORRECTIVE MEASURES SHALL BE DOCUMENTED BY THE CONTRACTOR WITH WRITTEN REPORTS AND PHOTOGRAPHS. PHOTOGRAPHS MUST BE DIGITAL AND OF SUFFICIENT QUALITY TO CLEARLY SHOW THE SITE CONSTRUCTION. PHOTOGRAPHS MUST CLEARLY IDENTIFY THE PHOTOGRAPHED ITEM AND BE LABELED WITH THE SITE CASCADE NUMBER, SITE NAME, DESCRIPTION, AND DATE.

3.4 DELIVERABLES: TEST AND INSPECTION REPORTS AND CLOSEOUT DOCUMENTATION SHALL BE UPLOADED TO THE SMS AND/OR FORWARDED TO SPRINT FOR INCLUSION INTO THE PERMANENT SITE FILES.

A. THE FOLLOWING TEST AND INSPECTION REPORTS SHALL BE PROVIDED AS APPLICABLE.

1. CONCRETE MIX AND CYLINDER BREAK REPORTS.

2. STRUCTURAL BACKFILL COMPACTION REPORTS.

3. SITE RESISTANCE TO EARTH TEST.

4. ANTENNA AZIMUTH AND DOWN TILT VERIFICATION

5. TOWER ERECTION INSPECTIONS AND MEASUREMENTS DOCUMENTING TOWER INSTALLED PER SUPPLIER'S REQUIREMENTS AND THE APPLICABLE SECTIONS HEREIN.

6. COAX CABLE SWEEP TESTS PER COMPANY'S "ANTENNA LINE ACCEPTANCE STANDARDS".

B. REQUIRED CLOSEOUT DOCUMENTATION INCLUDES THE FOLLOWING;

1. TEST WELLS AND TRENCHES: PHOTOGRAPHS OF ALL TEST WELLS; PHOTOGRAPHS SHOWING ALL OPEN EXCAVATIONS AND TRENCHING PRIOR TO BACKFILLING SHOWING A TAPE MEASURE VISIBLE IN THE EXCAVATIONS INDICATING DEPTH.

2. CONDUITS, CONDUCTORS AND GROUNDING: PHOTOGRAPHS SHOWING TYPICAL INSTALLATION OF CONDUCTORS AND CONNECTORS; PHOTOGRAPHS SHOWING TYPICAL BEND RADIUS OF INSTALLED GROUND WIRES AND GROUND ROD SPACING;

3. CONCRETE FORMS AND REINFORCING: CONCRETE FORMING AT TOWER AND EQUIPMENT/SHELTER PAD/FOUNDATIONS – PHOTOGRAPHS SHOWING ALL REINFORCING STEEL, UTILITY AND CONDUIT STUB OUTS; PHOTOGRAPHS SHOWING CONCRETE POUR OF SHELTER SLAB/FOUNDATION, TOWER FOUNDATION AND GUY ANCHORS WITH VIBRATOR IN USE; PHOTOGRAPHS SHOWING EACH ANCHOR ON GUYED TOWERS, BEFORE CONCRETE POUR.

4. TOWER, ANTENNAS AND MAINLINE: INSPECTION AND PHOTOGRAPHS OF SECTION STACKING; INSPECTION AND PHOTOGRAPHS OF PLATFORM COMPONENT ATTACHMENT POINTS; PHOTOGRAPHS OF TOWER TOP GROUNDING; PHOTOS OF TOWER COAX LINE COLOR CODING AT THE TOP AND AT GROUND LEVEL; INSPECTION AND PHOTOGRAPHS OF OPERATIONAL OF TOWER LIGHTING, AND PLACEMENT OF FAA REGISTRATION SIGN; PHOTOGRAPHS SHOWING ADDITIONAL GROUNDING POINTS FOR TOWERS GREATER THAN 200 FEET.; PHOTOS OF ANTENNA GROUND BAR, EQUIPMENT GROUND BAR, AND MASTER GROUND BAR; PHOTOS OF GPS ANTENNA(S); PHOTOS OF EACH SECTOR OF ANTENNAS; ONE PHOTOGRAPH LOOKING AT THE SECTOR AND ONE FROM BEHIND SHOWING THE PROJECTED COVERAGE AREA; PHOTOS OF COAX WEATHERPROOFING – TOP AND BOTTOM; PHOTOS OF COAX GROUNDING--TOP AND BOTTOM; PHOTOS OF ANTENNA AND MAST GROUNDING; PHOTOS OF COAX CABLE ENTRY INTO SHELTER; PHOTOS OF PLATFORM MECHANICAL CONNECTIONS TO TOWER/MONOPOLE.

5. ROOF TOPS: PRE-CONSTRUCTION AND POST-CONSTRUCTION VISUAL INSPECTION AND PHOTOGRAPHS OF THE ROOF AND INTERIOR TO DETERMINE AND DOCUMENT CONDITIONS; ROOF TOP CONSTRUCTION INSPECTIONS AS REQUIRED BY THE JURISDICTION; PHOTOGRAPHS OF CABLE TRAY AND/OR ICE BRIDGE; PHOTOGRAPHS OF DOGHOUSE/CABLE EXIT FROM ROOF;

6. SITE LAYOUT – PHOTOGRAPHS OF THE OVERALL COMPOUND, INCLUDING EQUIPMENT PLATFORM FROM ALL FOUR CORNERS.

7. FINISHED UTILITIES: CLOSE-UP PHOTOGRAPHS OF THE PPC BREAKER PANEL; CLOSE-UP PHOTOGRAPH OF THE INSIDE OF THE TELCO PANEL AND NIU; CLOSE-UP PHOTOGRAPH OF THE POWER METER AND DISCONNECT; PHOTOS OF POWER AND TELCO ENTRANCE TO COMPANY ENCLOSURE; PHOTOGRAPHS AT METER BOX AND/OR FACILITY DISTRIBUTION PANEL.

8. REQUIRED MATERIALS CERTIFICATIONS: CONCRETE MIX DESIGNS; MILL CERTIFICATION FOR ALL REINFORCING AND STRUCTURAL STEEL; AND ASPHALT PAVING MIX DESIGN.

9. ANY AND ALL SUBMITTALS BY THE JURISDICTION OR COMPANY.

SECTION 01 400 – SUBMITTALS & TESTS

PART 1 – GENERAL

1.1 THE WORK: THESE STANDARD CONSTRUCTION SPECIFICATIONS IN CONJUNCTION WITH THE OTHER CONTRACT DOCUMENTS AND THE CONSTRUCTION DRAWINGS DESCRIBE THE WORK TO BE PERFORMED BY THE CONTRACTOR.

1.2 RELATED DOCUMENTS:

A. THE REQUIREMENTS OF THIS SECTION APPLY TO ALL SECTIONS IN THIS SPECIFICATION.

B. SPRINT "STANDARD CONSTRUCTION DETAILS FOR WIRELESS SITES" ARE INCLUDED IN AND MADE A PART OF THESE SPECIFICATIONS HEREWITH.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.1 WEEKLY REPORTS:

A. CONTRACTOR SHALL PROVIDE SPRINT WITH WEEKLY REPORTS SHOWING PROJECT STATUS. THIS STATUS REPORT FORMAT WILL BE PROVIDED TO THE CONTRACTOR BY SPRINT. THE REPORT WILL CONTAIN SITE ID NUMBER, THE MILESTONES FOR EACH SITE, INCLUDING THE BASELINE DATE, ESTIMATED COMPLETION DATE AND ACTUAL COMPLETION DATE.

B. REPORT INFORMATION WILL BE TRANSMITTED TO SPRINT VIA ELECTRONIC MEANS AS REQUIRED. THIS INFORMATION WILL PROVIDE A BASIS FOR PROGRESS MONITORING AND PAYMENT.

3.2 PROJECT CONFERENCE CALLS:

A. SPRINT MAY HOLD WEEKLY PROJECT CONFERENCE CALLS. CONTRACTOR WILL BE REQUIRED TO COMMUNICATE SITE STATUS, MILESTONE COMPLETIONS AND UPCOMING MILESTONE PROJECTIONS, AND ANSWER ANY OTHER SITE STATUS QUESTIONS AS NECESSARY.

3.3 PROJECT TRACKING IN SMS:

A. CONTRACTOR SHALL PROVIDE SCHEDULE UPDATES AND PROJECTIONS IN THE SMS SYSTEM ON A WEEKLY BASIS.

3.4 ADDITIONAL REPORTING:

A. ADDITIONAL OR ALTERNATE REPORTING REQUIREMENTS MAY BE ADDED TO THE REPORT AS DETERMINED TO BE REASONABLY NECESSARY BY COMPANY.

3.5 PROJECT PHOTOGRAPHS:

A. FILE DIGITAL PHOTOGRAPHS OF COMPLETED SITE IN JPEG FORMAT IN THE SMS PHOTO LIBRARY FOR THE RESPECTIVE SITE. PHOTOGRAPHS SHALL BE CLEARLY LABELED WITH SITE NUMBER, NAME AND DESCRIPTION, AND SHALL INCLUDE AT A MINIMUM THE FOLLOWING AS APPLICABLE:

1. 1SHELTER AND TOWER OVERVIEW.

2. TOWER FOUNDATION(S) – FORMS AND STEEL BEFORE POUR (EACH ANCHOR ON GUYED TOWERS).

3. TOWER FOUNDATION(S) POUR WITH VIBRATOR IN USE (EACH ANCHOR ON GUYED TOWERS).

4. TOWER STEEL AS BEING INSTALLED INTO HOLE (SHOW ANCHOR STEEL ON GUYED TOWERS).

5. PHOTOS OF TOWER SECTION STACKING.

6. CONCRETE TESTING / SAMPLES.

7. PLACING OF ANCHOR BOLTS IN TOWER FOUNDATION.

8. BUILDING/WATER TANK FROM ROAD FOR TENANT IMPROVEMENTS OR COMMENTS.

9. SHELTER FOUNDATION--FORMS AND STEEL BEFORE POURING.

10. SHELTER FOUNDATION POUR WITH VIBRATOR IN USE.

11. COAX CABLE ENTRY INTO SHELTER.

12. PLATFORM MECHANICAL CONNECTIONS TO TOWER/MONOPOLE.

13. ROOFTOP PRE AND POST CONSTRUCTION PHOTOS TO INCLUDE PENETRATIONS AND INTERIOR CEILING.

14. PHOTOS OF TOWER TOP COAX LINE COLOR CODING AND COLOR CODING AT GROUND LEVEL.

15. PHOTOS OF ALL APPROPRIATE COMPANY OR REGULATORY SIGNAGE.

16. PHOTOS OF EQUIPMENT BOLT DOWN INSIDE SHELTER.

17. POWER AND TELCO ENTRANCE TO COMPANY ENCLOSURE AND POWER AND TELCO SUPPLY LOCATIONS INCLUDING METER/DISCONNECT.

18. ELECTRICAL TRENCH(S) WITH ELECTRICAL / CONDUIT BEFORE BACKFILL.

19. ELECTRICAL TRENCH(S) WITH FOIL-BACKED TAPE BEFORE FURTHER BACKFILL.

20. TELCO TRENCH WITH TELEPHONE / CONDUIT BEFORE BACKFILL.

21. TELCO TRENCH WITH FOIL-BACKED TAPE BEFORE FURTHER BACKFILL.

22. SHELTER GROUND-RING TRENCH WITH GROUND-WIRE BEFORE BACKFILL (SHOW ALL CAD WELDS AND BEND RADII).

23. TOWER GROUND-RING TRENCH WITH GROUND-WIRE BEFORE BACKFILL (SHOW ALL CAD WELDS AND BEND RADII).

24. FENCE GROUND-RING TRENCH WITH GROUND-WIRE BEFORE BACKFILL (SHOW ALL CAD WELDS AND BEND RADII).

25. ALL BTS GROUND CONNECTIONS.

26. ALL GROUND TEST WELLS.

27. ANTENNA GROUND BAR AND EQUIPMENT GROUND BAR.

28. ADDITIONAL GROUNDING POINTS ON TOWERS ABOVE 200'.

29. HVAC UNITS INCLUDING CONDENSERS ON SPLIT SYSTEMS.

30. GPS ANTENNAS.

31. CABLE TRAY AND/OR WAVEGUIDE BRIDGE.

32. DOGHOUSE/CABLE EXIT FROM ROOF.

33. EACH SECTOR OF ANTENNAS; ONE PHOTOGRAPH LOOKING AT THE SECTOR AND ONE FROM BEHIND SHOWING THE PROJECTED COVERAGE AREA.

34. MASTER BUS BAR.

35. TELCO BOARD AND NIU.

36. ELECTRICAL DISTRIBUTION WALL.

37. CABLE ENTRY WITH SURGE SUPPRESSION.

38. ENTRANCE TO EQUIPMENT ROOM.

39. COAX WEATHERPROOFING--TOP AND BOTTOM OF TOWER.

40. COAX GROUNDING –TOP AND BOTTOM OF TOWER.

41. ANTENNA AND MAST GROUNDING.

42. LANDSCAPING – WHERE APPLICABLE.

3.6 FINAL PROJECT ACCEPTANCE: COMPLETE ALL REQUIRED REPORTING TASKS PER CONTRACT, CONTRACT DOCUMENTS OR THE SPRINT INTEGRATED CONSTRUCTION STANDARDS FOR WIRELESS SITES AND UPLOAD INTO SITERRA.

PLANS PREPARED FOR:

Sprint

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

PROJECT MANAGER:

SBA

SBA COMMUNICATIONS CORP.
134 FLANDERS ROAD, SUITE 125
WESTBOROUGH, MA 01581
TEL: (508) 251-0720

PLANS PREPARED BY:

INFINIGY

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the solutions are endless
1033 Watervliet Shaker Rd | Albany, NY 12205
Phone: 518-690-0790 | Fax: 518-690-0793
www.infinigy.com
JOB NUMBER 526-104

ENGINEERING LICENSE:

STATE OF CONNECTICUT
CHRISTOPHER J. WARREN
No. 23544
4-17-18
LICENSED PROFESSIONAL ENGINEER

CHECKED BY:

APPROVED BY:

REVISIONS:

DESCRIPTION	DATE	BY	REV.
ISSUED FOR CONSTRUCTION	03/23/18	RWF	0

SITE NUMBER:

CT54XC704

SITE ADDRESS:

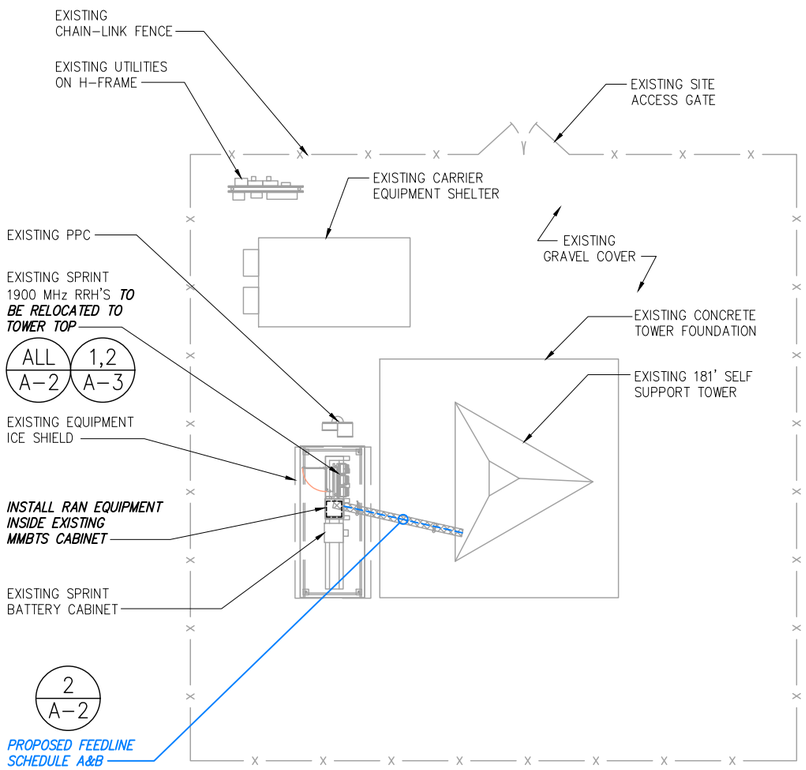
111 STONE HILL ROAD
VOLUNTOWN, CT 06384

SHEET DESCRIPTION:

OUTLINE SPECIFICATIONS

SHEET NUMBER:

SP-3



INFORMATION CONTAINED WITHIN DRAWINGS ARE BASED ON PROVIDED INFORMATION AND ARE NOT THE RESULT OF A FIELD SURVEY.

N

GRAPHIC SCALE:

15' 7.5' 0 7.5' 15'

SCALE (11x17): 1" = 15'-0"
SCALE (22x34): 1" = 7'-6"

OVERALL SITE PLAN | SCALE: AS NOTED | 1

SOURCE: WESTCHESTER SERVICES 11/12/17

SPRINT EQUIPMENT PHOTO DETAIL | SCALE: NTS | 2

PLANS PREPARED FOR:

Sprint

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

PROJECT MANAGER:

SBA

SBA COMMUNICATIONS CORP.
134 FLANDERS ROAD, SUITE 125
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SITE NUMBER:

CT54XC704

SITE ADDRESS:

111 STONE HILL ROAD
VOLUNTOWN, CT 06384

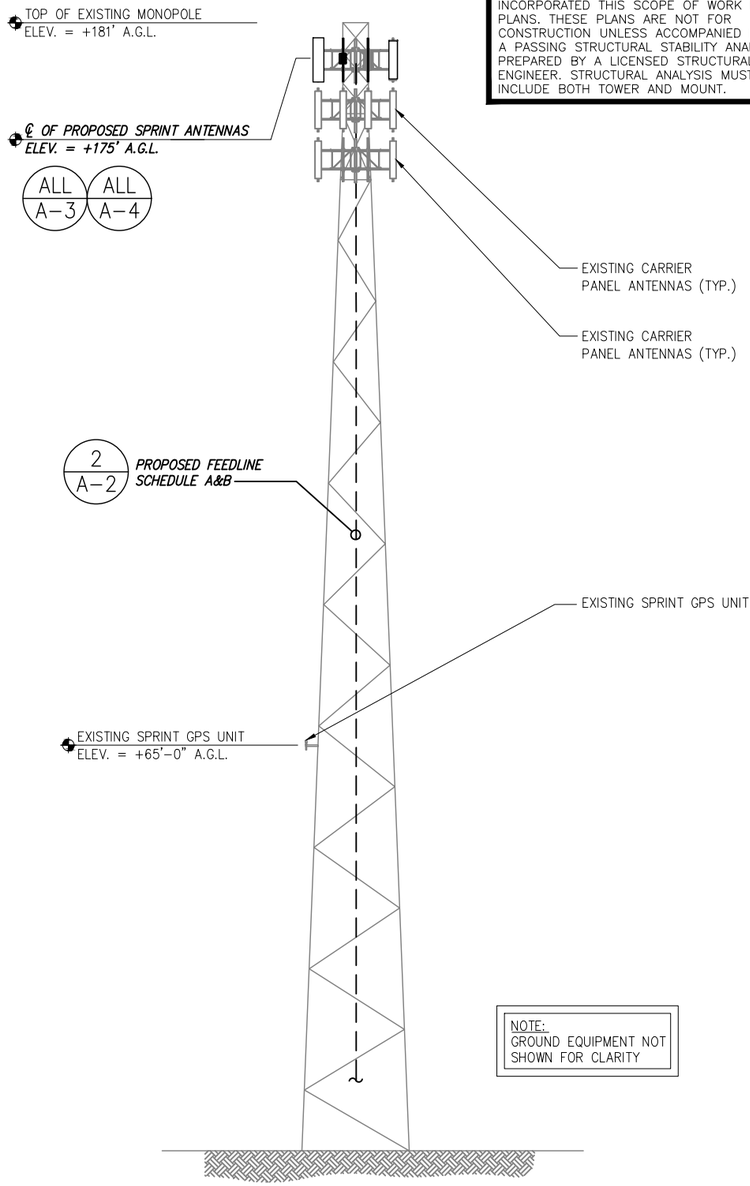
SHEET DESCRIPTION:

SITE PLAN

SHEET NUMBER:

A-1

THESE PLANS HAVE BEEN DEVELOPED FOR THE MODIFICATION OF AN EXISTING UNMANNED TELECOMMUNICATIONS FACILITY OWNED OR LEASED BY SPRINT IN ACCORDANCE WITH THE SCOPE OF WORK PROVIDED BY SPRINT. INFINIGY HAS INCORPORATED THIS SCOPE OF WORK IN THE PLANS. THESE PLANS ARE NOT FOR CONSTRUCTION UNLESS ACCOMPANIED BY A PASSING STRUCTURAL STABILITY ANALYSIS PREPARED BY A LICENSED STRUCTURAL ENGINEER. STRUCTURAL ANALYSIS MUST INCLUDE BOTH TOWER AND MOUNT.

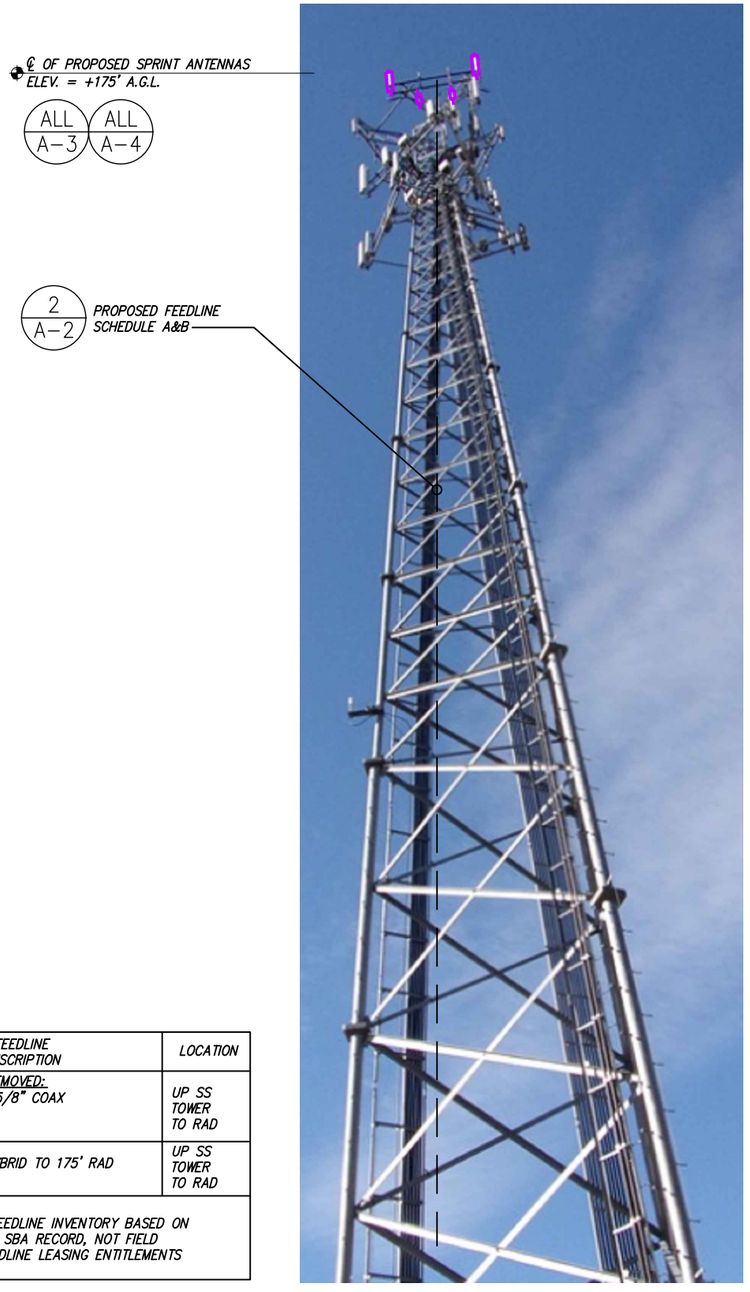


NOTE:
GROUND EQUIPMENT NOT SHOWN FOR CLARITY

SPECIAL INSTALLATION NOTE:
JUMPERS FROM RRHs TO ANTENNA SHALL NOT EXCEED 15'. NOTIFY SPRINT CONSTRUCTION MANAGER OF ANY DISCREPANCY

NOTE:
VERIFY PROPOSED AZIMUTHS WITH RF ENGINEER PRIOR TO INSTALLATION

TOWER ELEVATION | NO SCALE | 1



FEEDLINE SCHEDULE	FEEDLINE DESCRIPTION	LOCATION
A	EXISTING TO BE REMOVED: (6) 1 5/8" COAX	UP SS TOWER TO RAD
B	PROPOSED: (4) HYBRID TO 175' RAD	UP SS TOWER TO RAD

NOTE:
EXISTING SPRINT EQUIPMENT FEEDLINE INVENTORY BASED ON COLOCATION APPLICATION AND SBA RECORD, NOT FIELD OBSERVATIONS. RFDS AND FEEDLINE LEASING ENTITLEMENTS MAY DIFFER.

TOWER ELEVATION PHOTO DETAIL | NO SCALE | 2

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

PROJECT MANAGER:
SBA
SBA COMMUNICATIONS CORP.
134 FLANDERS ROAD, SUITE 125
WESTBOROUGH, MA 01581
TEL: (508) 251-0720

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CHECKED BY:

APPROVED BY:

REVISIONS:

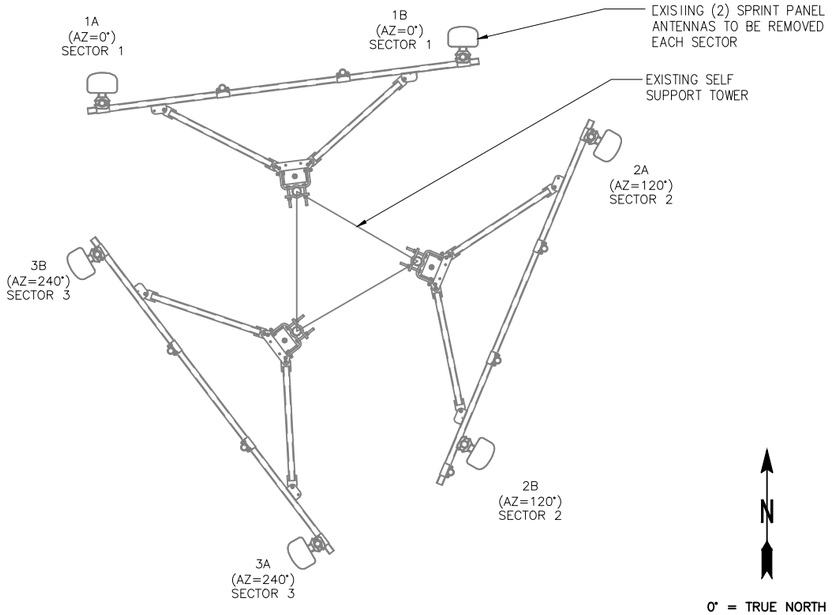
DESCRIPTION	DATE	BY	REV.
ISSUED FOR CONSTRUCTION	03/23/18	RWF	0

SITE NUMBER:
CT54XC704

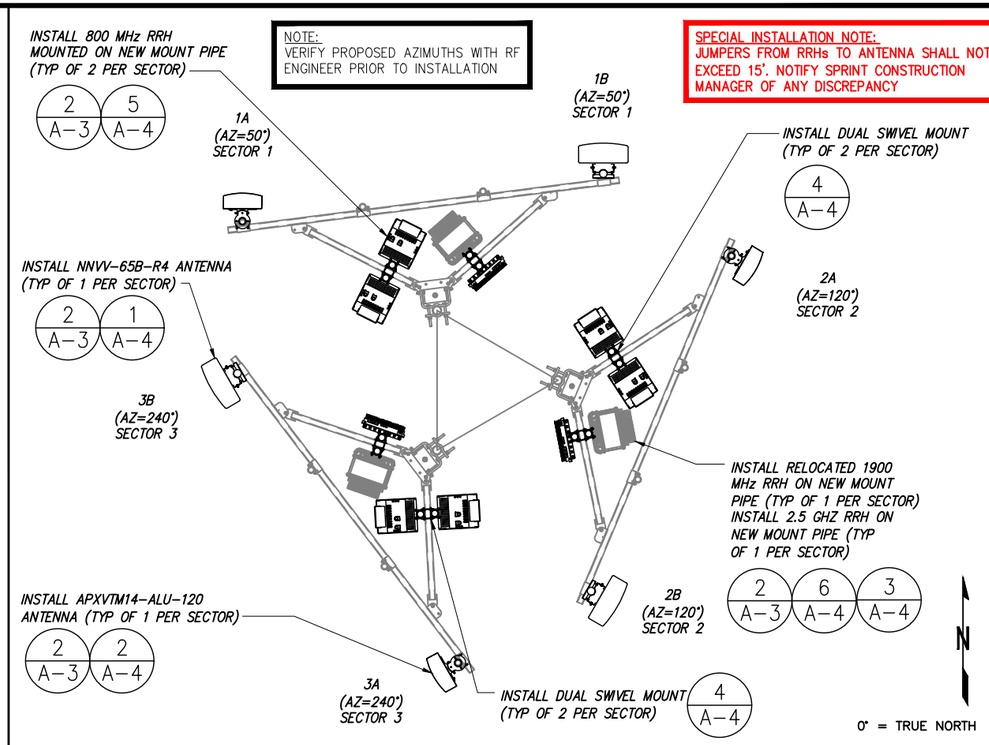
SITE ADDRESS:
111 STONE HILL ROAD
VOLUNTOWN, CT 06384

SHEET DESCRIPTION:
TOWER ELEVATION

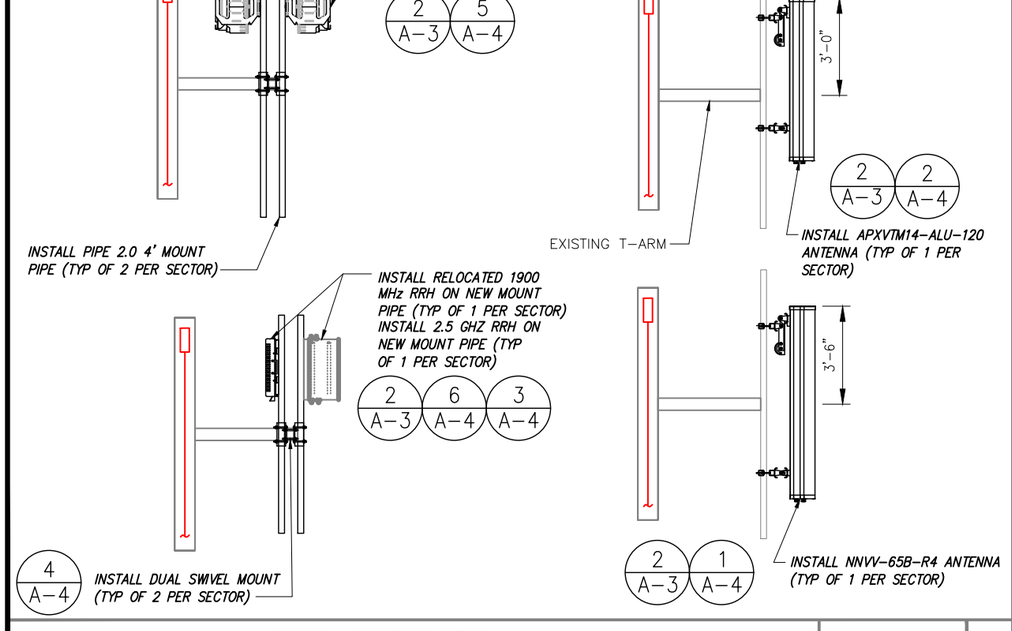
SHEET NUMBER:
A-2



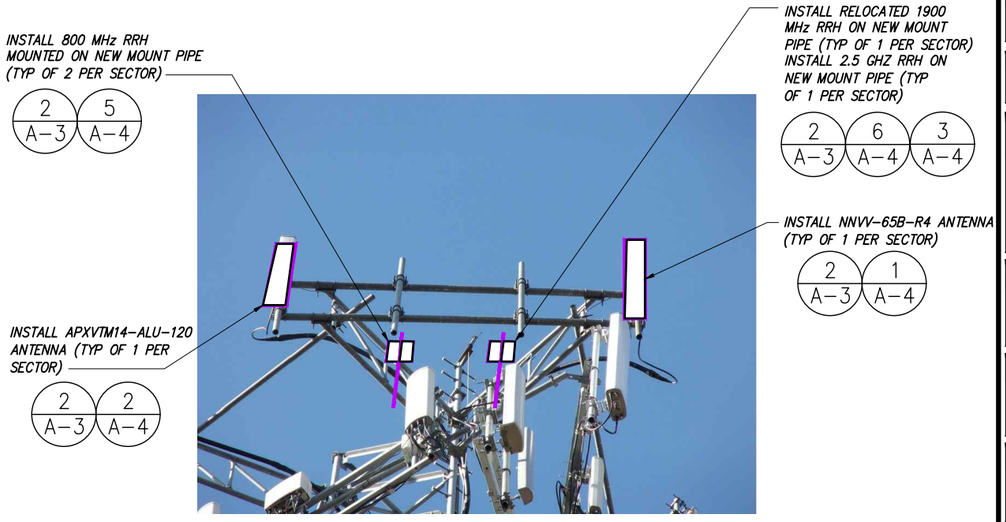
EXISTING ANTENNA LAYOUT | NO SCALE | 1



FINAL ANTENNA LAYOUT | NO SCALE | 2



TYPICAL MOUNTING DETAIL | NO SCALE | 3



ANTENNA & RRH MOUNT PHOTO DETAIL | NO SCALE | 4

PLANS PREPARED FOR:

Sprint

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

PROJECT MANAGER:

SBA

SBA COMMUNICATIONS CORP.
134 FLANDERS ROAD, SUITE 125
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APPROVED BY:

REVISIONS:

DESCRIPTION	DATE	BY	REV.
ISSUED FOR CONSTRUCTION	03/23/18	RWF	0

SITE NUMBER:

CT54XC704

SITE ADDRESS:

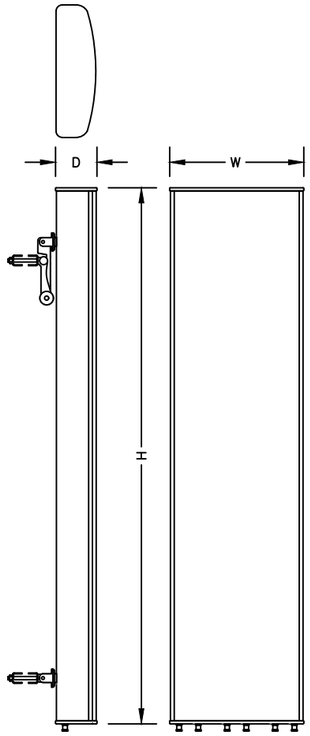
111 STONE HILL ROAD
VOLUNTOWN, CT 06384

SHEET DESCRIPTION:

ANTENNA LAYOUT
& MOUNTING DETAILS

SHEET NUMBER:

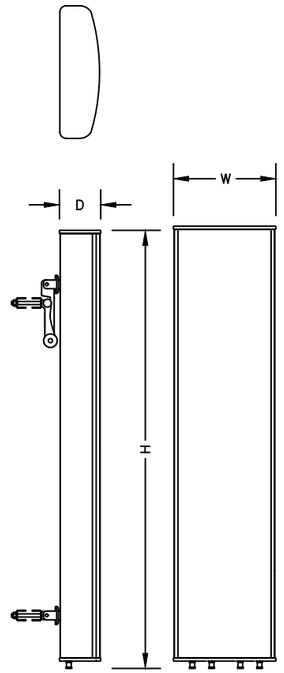
A-3



ANTENNA SPECIFICATIONS

MANUF.	COMMSCOPE
MODEL #	NNVV-65B-R4
HEIGHT	72"
WIDTH	19.6"
DEPTH	7.8"
WEIGHT	84.7± LBS.

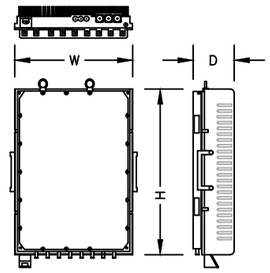
ANTENNA DETAIL | NO SCALE | 1



ANTENNA SPECIFICATIONS

MANUF.	RFS
MODEL #	APXVTM14-ALU-I20
HEIGHT	56.3"
WIDTH	12.6"
DEPTH	6.3"
WEIGHT	56.2± LBS.

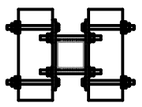
ANTENNA DETAIL | NO SCALE | 2



2.5 GHZ RRH SPECIFICATIONS

MANUF.	NOKIA (ALU)
MODEL #	TD-RRH8X20-25
HEIGHT	26.1"
WIDTH	18.6"
DEPTH	6.7"
WEIGHT	70± LBS

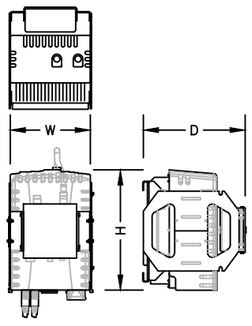
2.5 RRH | NO SCALE | 3



DUAL SWIVEL MOUNT SPECIFICATIONS

MANUF.	SITEPRO 1
MODEL #	BBPM-U

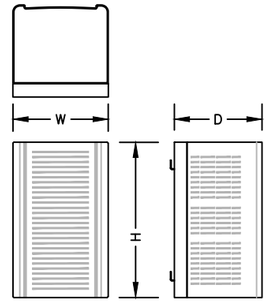
DUAL SWIVEL MOUNT DETAIL | NO SCALE | 4



800 MHZ RRH SPECIFICATIONS

MANUF.	NOKIA (ALU)
MODEL #	800MHZ 2X50W
HEIGHT	19.7"
WIDTH	13"
DEPTH	10.8"
WEIGHT	53± LBS

800 MHz RRH | NO SCALE | 5



1900 MHZ RRH SPECIFICATIONS

MANUF.	NOKIA (ALU)
MODEL #	1900 4X45 65MHZ
HEIGHT	25"
WIDTH	11.1"
DEPTH	11.4"
WEIGHT	60± LBS

1900 MHz RRH (EXISTING TO BE RELOCATED) | NO SCALE | 6

PLANS PREPARED FOR:
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MAHWAH, NJ 07495
TEL: (800) 357-7641

PROJECT MANAGER:
SBA
SBA COMMUNICATIONS CORP.
134 FLANDERS ROAD, SUITE 125
WESTBOROUGH, MA 01581
TEL: (508) 251-0720

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ENGINEERING LICENSE:

CHECKED BY:

APPROVED BY:

REVISIONS:

DESCRIPTION	DATE	BY	REV.
ISSUED FOR CONSTRUCTION	03/23/18	RWF	0

SITE NUMBER:
CT54XC704

SITE ADDRESS:
111 STONE HILL ROAD
VOLUNTOWN, CT 06384

SHEET DESCRIPTION:
EQUIPMENT & MOUNTING DETAILS

SHEET NUMBER:
A-4

RFS HYBRIFLEX RISER CABLE SCHEDULE

Fiber Only (Existing DC Power)	**Hybrid cable** MN: HB058-M12-050F 12x multi-mode fiber pairs, Top: Outdoor protected connectors, Bottom: LC Connectors, 5/8 cable, 50 ft	50 ft
	MN: HB058-M12-075F	75 ft
	MN: HB058-M12-100F	100 ft
	MN: HB058-M12-125F	125 ft
	MN: HB058-M12-150F	150 ft
	MN: HB058-M12-175F	175 ft
	MN: HB058-M12-200F	200 ft
8 AWG Power	**Hybrid cable** MN: HB114-08U3M12-050F 3x 8 AWG power pairs, 12x multi-mode fiber pairs, Outdoor rated connectors & LC Connectors, 1 1/4 cable, 50 ft	50 ft
	MN: HB114-08U3M12-075F	75 ft
	MN: HB114-08U3M12-100F	100 ft
	MN: HB114-08U3M12-125F	125 ft
	MN: HB114-08U3M12-150F	150 ft
	MN: HB114-08U3M12-175F	175 ft
	MN: HB114-08U3M12-200F	200 ft
6 AWG Power	**Hybrid cable** MN: HB114-13U3M12-225F 3x 6 AWG power pair, 12x multi-mode fiber pairs, Outdoor rated connectors & LC Connectors, 1 1/4 cable, 225 ft	225 ft
	MN: HB114-13U3M12-250F	250 ft
	MN: HB114-13U3M12-275F	275 ft
	MN: HB114-13U3M12-300F	300 ft
4 AWG Power	**Hybrid cable** MN: HB114-21U3M12-325F 3x 4 AWG power pair, 12x multi-mode fiber pairs, Outdoor rated connectors & LC Connectors, 1 1/4 cable, 325 ft	325 ft
	MN: HB114-21U3M12-350F	350 ft
	MN: HB114-21U3M12-375F	375 ft

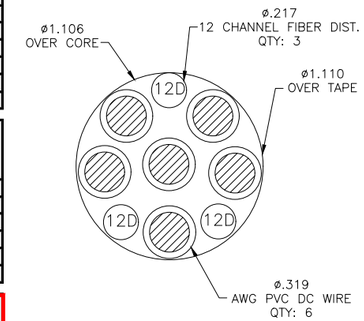
RFS HYBRIFLEX JUMPER CABLE SCHEDULE

Fiber Only	**Hybrid Jumper cable** MN: HBF012-M3-5F1 5 ft, 3x multi-mode fiber pairs, Outdoor & LC connectors, 1/2 cable	5 ft
	MN: HBF012-M3-10F1	10 ft
	MN: HBF012-M3-15F1	15 ft
	MN: HBF012-M3-20F1	20 ft
	MN: HBF012-M3-25F1	25 ft
	MN: HBF012-M3-30F1	30 ft
8 AWG Power	**Hybrid Jumper cable** MN: HBF058-08U1M3-5F1 5 ft, 1x 8 AWG power pair, 3x multi-mode fiber pairs, Outdoor & LC Connectors, 5/8 cable	5 ft
	MN: HBF058-08U1M3-10F1	10 ft
	MN: HBF058-08U1M3-15F1	15 ft
	MN: HBF058-08U1M3-20F1	20 ft
	MN: HBF058-08U1M3-25F1	25 ft
	MN: HBF058-08U1M3-30F1	30 ft
6 AWG Power	**Hybrid Jumper cable** MN: HBF058-13U1M3-5F1 5 ft, 1x 6 AWG power pair, 3x multi-mode fiber pairs, Outdoor & LC Connectors, 5/8 cable	5 ft
	MN: HBF058-13U1M3-10F1	10 ft
	MN: HBF058-13U1M3-15F1	15 ft
	MN: HBF058-13U1M3-20F1	20 ft
	MN: HBF058-13U1M3-25F1	25 ft
	MN: HBF058-13U1M3-30F1	30 ft
4 AWG Power	**Hybrid Jumper cable** MN: HBF078-21U1M3-5F1 5 ft, 1x 4 AWG power pair, 3x multi-mode fiber pairs, Outdoor & LC Connectors, 7/8 cable	5 ft
	MN: HBF078-21U1M3-10F1	10 ft
	MN: HBF078-21U1M3-15F1	15 ft
	MN: HBF078-21U1M3-20F1	20 ft
	MN: HBF078-21U1M3-25F1	25 ft
	MN: HBF078-21U1M3-30F1	30 ft

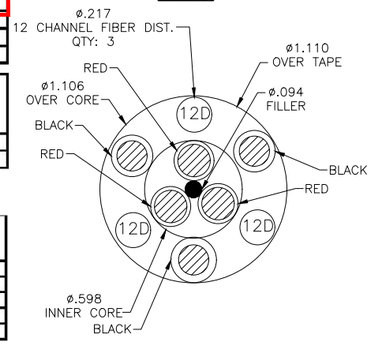
NOTE:
SPRINT CM TO CONFIRM HYBRID OR FIBER RISER CABLE AND HYBRID OR FIBER JUMPER CABLE MODEL NUMBERS IF HYBRID CABLES ARE REQUIRED BEFORE PREPARING BOM.

* PROPOSED CABLE LENGTH WAS DETERMINED USING THE SUM OF THE RAD CENTER OF ANTENNAS, AND DISTANCE FROM EXISTING EQUIPMENT AREA TO TOWER BASE WITH AN ADDITIONAL 20' BUFFER. LENGTH TO BE VERIFIED IN FIELD PRIOR TO ORDERING MATERIALS.

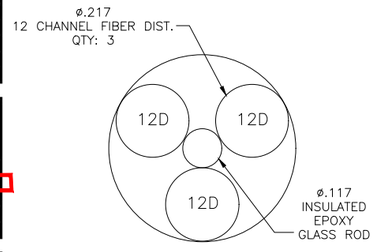
* SPRINT CM TO CONFIRM HYBRID RISER CABLE AND HYBRID JUMPER CABLE MODEL NUMBERS BEFORE PREPARING BOM.



4 AWG



8 & 6 AWG



FIBER ONLY

800/1900/2500 CROSS SECTION DATA

NO SCALE | 1

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

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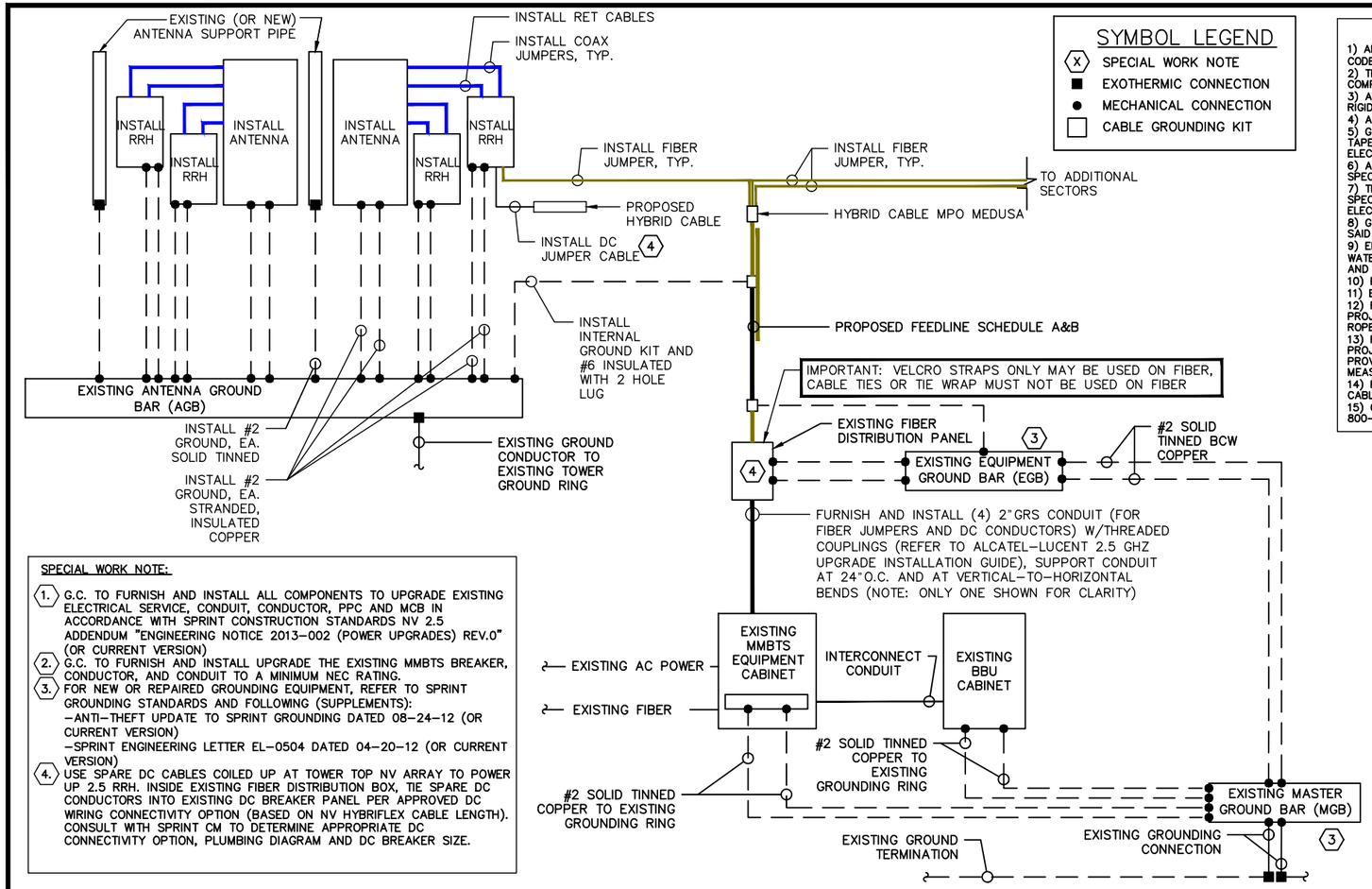
111 STONE HILL ROAD
VOLUNTOWN, CT 06384

SHEET DESCRIPTION:
DETAILS

SHEET NUMBER:
A-5



SYMBOL LEGEND

- (X) SPECIAL WORK NOTE
- ■ EXOTHERMIC CONNECTION
- ● MECHANICAL CONNECTION
- □ CABLE GROUNDING KIT

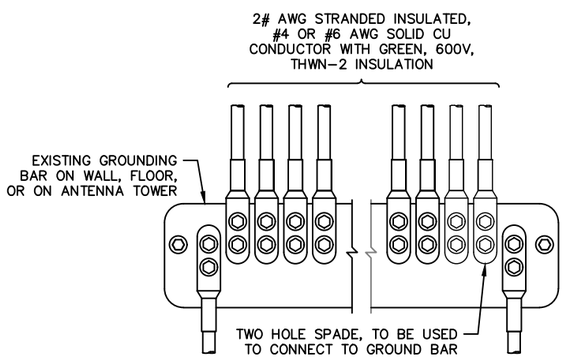
SPECIAL WORK NOTE:

1. G.C. TO FURNISH AND INSTALL ALL COMPONENTS TO UPGRADE EXISTING ELECTRICAL SERVICE, CONDUIT, CONDUCTOR, PPC AND MCB IN ACCORDANCE WITH SPRINT CONSTRUCTION STANDARDS NV 2.5 ADDENDUM "ENGINEERING NOTICE 2013-002 (POWER UPGRADES) REV.0" (OR CURRENT VERSION)
2. G.C. TO FURNISH AND INSTALL UPGRADE THE EXISTING MMBTS BREAKER, CONDUCTOR, AND CONDUIT TO A MINIMUM NEC RATING.
3. FOR NEW OR REPAIRED GROUNDING EQUIPMENT, REFER TO SPRINT GROUNDING STANDARDS AND FOLLOWING (SUPPLEMENTS):
   -ANTI-THEFT UPDATE TO SPRINT GROUNDING DATED 08-24-12 (OR CURRENT VERSION)
   -SPRINT ENGINEERING LETTER EL-0504 DATED 04-20-12 (OR CURRENT VERSION)
4. USE SPARE DC CABLES COILED UP AT TOWER TOP NV ARRAY TO POWER UP 2.5 RRH. INSIDE EXISTING FIBER DISTRIBUTION BOX, TIE SPARE DC CONDUCTORS INTO EXISTING DC BREAKER PANEL PER APPROVED DC WIRING CONNECTIVITY OPTION (BASED ON NV HYBRIFLEX CABLE LENGTH). CONSULT WITH SPRINT CM TO DETERMINE APPROPRIATE DC CONNECTIVITY OPTION, PLUMBING DIAGRAM AND DC BREAKER SIZE.

TYPICAL POWER AND GROUNDING ONE LINE DIAGRAMS

1 / E-1

SCALE: N.T.S.

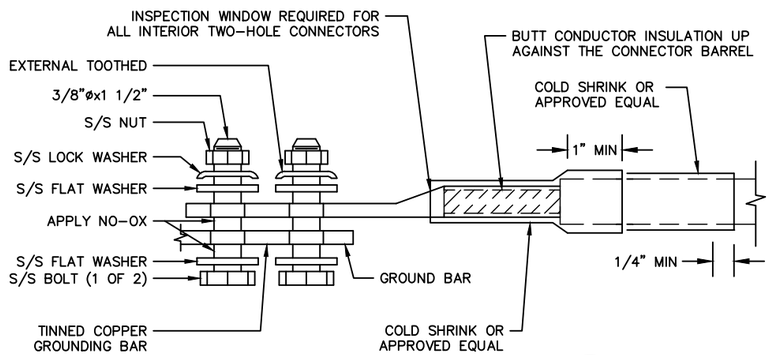


1. APPLY NO-OX TO LUG AND BAR CONTACT SURFACE. DO NOT COAT INLINE LUG.
2. IF STOLEN GROUND BARS ARE ENCOUNTERED, CONTACT SPRINT CM FOR REPLACEMENT THREADED ROD KIT.

INSTALLATION OF GROUNDING CONDUCTOR TO GROUNDING BAR

2 / E-1

SCALE: N.T.S.



TWO HOLE LUG

3 / E-1

SCALE: N.T.S.

ELECTRICAL NOTES

1) ALL ELECTRICAL WORK SHALL CONFORM TO THE REQUIREMENTS OF THE NATIONAL ELECTRICAL CODE (NEC) AS WELL AS APPLICABLE STATE AND LOCAL CODES.
2) THE ELECTRICAL CONTRACTOR SHALL COORDINATE ALL CONDUIT ROUTING WITH LOCAL UTILITY COMPANIES AND SPRINT CONSTRUCTION MANAGER.
3) ALL CONDUITS ROUTED BELOW GRADE SHALL TRANSITION TO RIGID GALVANIZED ELBOWS WITH RIGID GALVANIZED STEEL CONDUIT ABOVE GRADE.
4) ALL METAL CONDUITS SHALL BE PROVIDED WITH GROUNDING BUSHINGS.
5) GENERAL CONTRACTOR SHALL PROVIDE ALL DIRECT BURIED CONDUITS WITH PLASTIC WARNING TAPE IDENTIFYING CONTENTS. TAPE COLORS SHALL BE ORANGE FOR TELEPHONE AND RED FOR ELECTRIC.
6) ALL ELECTRICAL ITEMS SHALL BE U.L. APPROVED OR LISTED AND PROCURED PER SPECIFICATION REQUIREMENTS.
7) THE ELECTRICAL WORK INCLUDES ALL LABOR AND MATERIALS DESCRIBED BY DRAWINGS AND SPECIFICATIONS INCLUDING INCIDENTAL WORK TO PROVIDE COMPLETE OPERATING AND APPROVED ELECTRICAL SYSTEM.
8) GENERAL CONTRACTOR SHALL PAY FEES FOR PERMITS, AND IS RESPONSIBLE FOR OBTAINING SAID PERMITS AND COORDINATION OF INSPECTIONS.
9) ELECTRICAL AND TELCO WIRING OUTSIDE A BUILDING AND EXPOSED TO WEATHER SHALL BE IN WATER TIGHT GALVANIZED RIGID STEEL CONDUITS OR SCHEDULE 80 PVC (AS PERMITTED BY CODE) AND WHERE REQUIRED IN LIQUID TIGHT FLEXIBLE METAL OR NONMETALLIC CONDUITS.
10) BURIED CONDUIT SHALL BE SCHEDULE 40 PVC.
11) ELECTRICAL WIRING SHALL BE COPPER WITH TYPE XHHW, THWN, OR THIN INSULATION.
12) RUN ELECTRICAL CONDUIT OR CABLE BETWEEN ELECTRICAL UTILITY DEMARCATION POINT AND PROJECT OWNER CELL SITE PPC AS INDICATED ON THIS DRAWING. PROVIDE FULL LENGTH PULL ROPE. COORDINATE INSTALLATION WITH UTILITY COMPANY.
13) RUN TELCO CONDUIT OR CABLE BETWEEN TELEPHONE UTILITY DEMARCATION POINT AND PROJECT OWNER CELL SITE TELCO CABINET AND BTS CABINET AS INDICATED ON THIS DRAWING PROVIDE FULL LENGTH PULL ROPE IN INSTALLED TELCO CONDUIT. PROVIDE GREENLEE CONDUIT MEASURING TAPE AT EACH END.
14) FIBER OPTIC CIRCUITS SHALL BE IN ACCORDANCE WITH NEC ARTICLE 770-OPTICAL FIBER CABLES AND RACEWAYS.
15) COMMUNICATIONS CIRCUITS SHALL BE IN ACCORDANCE WITH NEC ARTICLE 800-COMMUNICATIONS SYSTEMS.

PROTECTIVE GROUNDING SYSTEMS GENERAL NOTES:

1. GROUNDING SHALL BE IN ACCORDANCE WITH NEC ARTICLE 250-GROUNDING AND BONDING.
2. GROUNDING SHALL BE IN ACCORDANCE WITH SPRINT SSEO DOCUMENTS 3.018.02.004 "BONDING, GROUNDING AND TRANSIENT PROTECTION FOR CELL SITES" AND 3.018.10.002 "SITE RESISTANCE TO EARTH TESTING".
3. PROVIDE GROUND CONNECTIONS FOR ALL METALLIC STRUCTURES, ENCLOSURES, RACEWAYS AND OTHER CONDUCTIVE ITEMS ASSOCIATED WITH THE INSTALLATION OF CARRIER'S EQUIPMENT.
4. GROUND CONNECTIONS: CLEAN SURFACES THOROUGHLY BEFORE APPLYING GROUND LUGS OR CLAMPS. IF SURFACE IS COATED, REMOVE THE COATING, APPLY A NON-CORROSIVE APPROVED COMPOUND TO CLEAN SURFACE AND INSTALL LUGS OR CLAMPS. WHERE GALVANIZING IS REMOVED FROM METAL, IT SHALL BE PAINTED OR TOUCHED UP WITH "GALVAMOX" OR EQUAL.
5. ALL GROUNDING WIRES SHALL PROVIDE A STRAIGHT, DOWNWARD PATH TO GROUND WITH GRADUAL BENDS AS REQUIRED. GROUND WIRES SHALL NOT BE LOOPED OR SHARPLY BENT.
6. ALL CLAMPS AND SUPPORTS USED TO SUPPORT THE GROUNDING SYSTEM CONDUCTORS AND PVC CONDUITS SHALL BE PVC TYPE (NON CONDUCTIVE). DO NOT USE METAL BRACKETS OR SUPPORTS WHICH WOULD FORM A COMPLETE RING AROUND ANY GROUNDING CONDUCTOR.
7. ALL GROUND WIRES SHALL BE #2 SOLID TINNED BCW UNLESS NOTED OTHERWISE.
8. PROVIDE DEDICATED #2 AWG COPPER GROUND WIRE FROM EACH ANTENNA MOUNTING PIPE TO ASSOCIATED CIGBE.
9. GROUND ANTENNA BASES, FRAMES, CABLE RACKS, AND OTHER METALLIC COMPONENTS WITH #2 INSULATED TINNED STRANDED COPPER GROUNDING CONDUCTORS AND CONNECT TO INSULATED SURFACE MOUNTED GROUND BARS. CONNECTION DETAILS SHALL FOLLOW MANUFACTURER'S SPECIFICATIONS FOR GROUNDING.
10. EACH EQUIPMENT CABINET SHALL BE CONNECTED TO THE MASTER ISOLATION GROUND BAR (MGB) WITH #2 SOLID TINNED BCW EQUIPMENT CABINETS WALL HAVE (2) CONNECTIONS.
11. GROUND HYBRIFLEX SHIELD AT TOP, BOTTOM AND AT TRANSITION TO HYBRIFLEX JUMPER CABLES AT EQUIPMENT CABINET ENTRANCE USING MANUFACTURER'S GUIDELINES. WHEN HYBRIFLEX CABLE EXCEEDS 200', GROUND AT INTERVALS NOT EXCEEDING 100'.
12. THE CONTRACTOR SHALL VERIFY THAT THE EXISTING GROUND BARS HAVE ENOUGH SPACE/HOLES FOR ADDITIONAL TWO HOLE LUGS.
13. EXOTHERMIC WELDING IS RECOMMENDED FOR GROUNDING CONNECTION WHERE PRACTICAL OTHERWISE. THE CONNECTION SHALL BE MADE USING COMPRESSION TYPE-2 HOLES, LONG BARREL LUGS OR DOUBLE CRIMP "C" CLAMP. THE COPPER CABLES SHALL BE COATED WITH AN ANTI-OXIDANT (THOMAS BETTS KOPR-SHILD) BEFORE MAKING THE CRIMP CONNECTIONS THE CONTRACTOR SHALL FOLLOW MANUFACTURER'S RECOMMENDED TORQUES ON THE BOLT ASSEMBLY TO SECURE CONNECTIONS.
14. AT ALL TERMINATIONS AT EQUIPMENT ENCLOSURES, PANEL, AND FRAMES OF EQUIPMENT AND WHERE EXPOSED FOR GROUNDING. CONDUCTOR TERMINATION SHALL BE PERFORMED UTILIZING TWO HOLE BOLTED TONGUE COMPRESSION TYPE LUGS WITH STAINLESS STEEL SELF-TAPPING SCREWS.
15. THE MASTER GROUND BAR (MGB) SHALL BE MADE OF BARE 1/4"x2" COPPER (FOR OUTDOOR APPLICATIONS IT SHALL BE TINNED COPPER) AND LARGE ENOUGH TO ACCOMMODATE THE REQUIRED NUMBER OF GROUND CONNECTIONS. THE HARDWARE SECURING THE MGB SHALL ELECTRICAL INSULATE THE MGB FROM ANY STRUCTURE TO WHICH IT IS FASTENED.
16. ALL BOLTS, WASHERS, AND NUTS USED ON GROUNDING CONNECTIONS SHALL BE STAINLESS STEEL.
17. ALL GROUNDING CONNECTIONS SHALL BE COATED WITH A COPPER SHIELD ANTI-CORROSIVE AGENT SUCH AS T&B KOPR SHIELD. VERIFY PRODUCT WITH SPRINT CONSTRUCTION MANAGER.
18. FOR NEW OR REPAIRED GROUNDING EQUIPMENT. REFER TO SPRINT GROUNDING STANDARDS AND FOLLOWING (SUPPLEMENTS):
    -ANTI-THEFT UPDATE TO SPRINT GROUNDING DATED 08-24-12 (OR CURRENT VERSION)
    -SPRINT ENGINEERING LETTER EL-0504 DATED 04-20-12 (OR CURRENT VERSION)

PLANS PREPARED FOR:
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JOB NUMBER 526-104

ENGINEERING LICENSE:
STATE OF CONNECTICUT
CHRISTOPHER J. WARREN
No. 23544
4-17-18
LICENSED PROFESSIONAL ENGINEER

CHECKED BY:

APPROVED BY:

REVISIONS:

DESCRIPTION	DATE	BY	REV.
ISSUED FOR CONSTRUCTION	03/23/18	RWF	0

SITE NUMBER:
CT54XC704

SITE ADDRESS:
111 STONE HILL ROAD
VOLUNTOWN, CT 06384

SHEET DESCRIPTION:
ELECTRICAL & GROUNDING DETAILS

SHEET NUMBER:
E-1

SprintVision

RF Design Sheet

Site Identification	
Cascade	CT54XC704
SMS Schedule ID	12323504
SMS Schedule Name	DO Macro Upgrade
PID	
RRU OEM	ALU
Switch OEM	Alcatel Lucent
RFDS Issue Date	2017-08-15 00:00:00.0
RFDS Revision Date	2017-11-08 11:06:07.0
RFDS Revision	3

Filter Analysis Complete	YES
RFDS - Issue Date	08/15/2017
Design Status	Complete
Project Description	DO Macro Upgrade - Add 800MHz (3G + 4G) and 2500 MHz

Contact Information	
Engineer Email	Bill.M.Hastings@sprint.com
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RF Engineer Phone	978-590-9700
RF Manager	Jonathan Hull
RF Manager Email	Jonathan.B.Hull@Sprint.com
RF Manager Phone	617-233-2920

Carrier Count	
2500 LTE	3
1900 LTE	1
1900 EVDO	
1900 Voice	1
800 LTE	1
800 Voice	1

Location Details	
Latitude	41.60639
Longitude	-71.85472
Market	Northern Connecticut
Region	Northeast
City	Voluntown
State	CT
Zip Code	CT/06384
County	New London

2500MHz	3
1900MHz	3
800MHz	3

Band: 2500	Alpha	Beta	Gamma	Delta	Epsilon	Zeta
Radio Model						
Model Number	TD-RRH8x20-25	TD-RRH8x20-25	TD-RRH8x20-25	N/A	N/A	N/A
Weight (lbs)	76.2	76.2	76.2	N/A	N/A	N/A
Dimensions	26 x 18.6 x 6.7	26 x 18.6 x 6.7	26 x 18.6 x 6.7	N/A	N/A	N/A
Manufacturer	ALU	ALU	ALU	N/A	N/A	N/A
Number of RRUs needed	1	1	1	0	0	0
Trunk Cable 1						
Model Number	Hybriflex	N/A	N/A	N/A	N/A	N/A
Weight (Lbs.)	1	N/A	N/A	N/A	N/A	N/A
Dimensions (In.)	1.54	N/A	N/A	N/A	N/A	N/A
Manufacturer	ALU	N/A	N/A	N/A	N/A	N/A

Band: 800	Alpha	Beta	Gamma	Delta	Epsilon	Zeta
Radio Model						
Model Number	RRH-2x50-800	RRH-2x50-800	RRH-2x50-800	N/A	N/A	N/A
Weight (lbs)	69.1	69.1	69.1	N/A	N/A	N/A
Dimensions	16 x 13 x 10	16 x 13 x 10	16 x 13 x 10	N/A	N/A	N/A
Manufacturer	ALU	ALU	ALU	N/A	N/A	N/A
Number of RRUs needed	2	2	2	0	0	0

Band: 2500	Alpha		Beta		Gamma		Delta		Epsilon		Zeta	
Antenna1												
Model Number	APXVTM14-ALU-I20		APXVTM14-ALU-I20		APXVTM14-ALU-I20							
Weight (lbs)	56.2		56.2		56.2		N/A		N/A		N/A	
Dimensions	56.3 x 12.6 x 6.3		56.3 x 12.6 x 6.3		56.3 x 12.6 x 6.3		N/A		N/A		N/A	
Manufacturer	RFS		RFS		RFS		N/A		N/A		N/A	
Ant1 Top Jumper Make/Mode/Qtyl	2.5 Jumper	8	2.5 Jumper	8	2.5 Jumper	8	N/A	0	N/A	0	N/A	0
Ant 1 RF requested Diameter	1/2"		1/2"		1/2"		N/A		N/A		N/A	
Ant 1 RF requested Top Jumper Length(ft)	8		8		8		N/A		N/A		N/A	
Antenna 1 Azimuth	0		120		240		N/A		N/A		N/A	
Antenna 1 Mechanical DT	N/A		N/A		N/A		N/A		N/A		N/A	
Antenna 1 Center Line (ft)	174.9671972		174.9671972		174.9671972		N/A		N/A		N/A	
Antenna 1 Electrical DT	2		2		2		N/A		N/A		N/A	
Antenna 1 Electrical DT 2	N/A		N/A		N/A		N/A		N/A		N/A	
Antenna 1 Electrical DT 3	N/A		N/A		N/A		N/A		N/A		N/A	
Antenna 1 Twist	N/A		N/A		N/A		N/A		N/A		N/A	

Band: 1900	Alpha		Beta		Gamma		Delta		Epsilon		Zeta	
Antenna1												
Model Number	NNVV-65B-R4		NNVV-65B-R4		NNVV-65B-R4							
Weight (lbs)	84.7		84.7		84.7		N/A		N/A		N/A	
Dimensions	72 x 19.6 x 7.8		72 x 19.6 x 7.8		72 x 19.6 x 7.8		N/A		N/A		N/A	
Manufacturer	CommScope		CommScope		CommScope		N/A		N/A		N/A	
Ant1 Top Jumper Make/Mode/Qtyl	800/1900 Jumper	4	800/1900 Jumper	4	800/1900 Jumper	4	N/A	0	N/A	0	N/A	0
Ant 1 RF requested Diameter	1/2"		1/2"		1/2"		N/A		N/A		N/A	
Ant 1 RF requested Top Jumper Length(ft)	8		8		8		N/A		N/A		N/A	
Antenna 1 Azimuth	0		120		240		N/A		N/A		N/A	
Antenna 1 Mechanical DT	N/A		N/A		N/A		N/A		N/A		N/A	
Antenna 1 Center Line (ft)	174.9671972		174.9671972		174.9671972		N/A		N/A		N/A	
Antenna 1 Electrical DT	3		3		3		N/A		N/A		N/A	
Antenna 1 Electrical DT 2	N/A		N/A		N/A		N/A		N/A		N/A	
Antenna 1 Electrical DT 3	N/A		N/A		N/A		N/A		N/A		N/A	
Antenna 1 Twist	N/A		N/A		N/A		N/A		N/A		N/A	

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CHRISTOPHER J. WARREN
No. 23544
4-17-18
LICENSED PROFESSIONAL ENGINEER

CHECKED BY:

APPROVED BY:

REVISIONS:

DESCRIPTION	DATE	BY	REV.
ISSUED FOR CONSTRUCTION	03/23/18	RWF	0

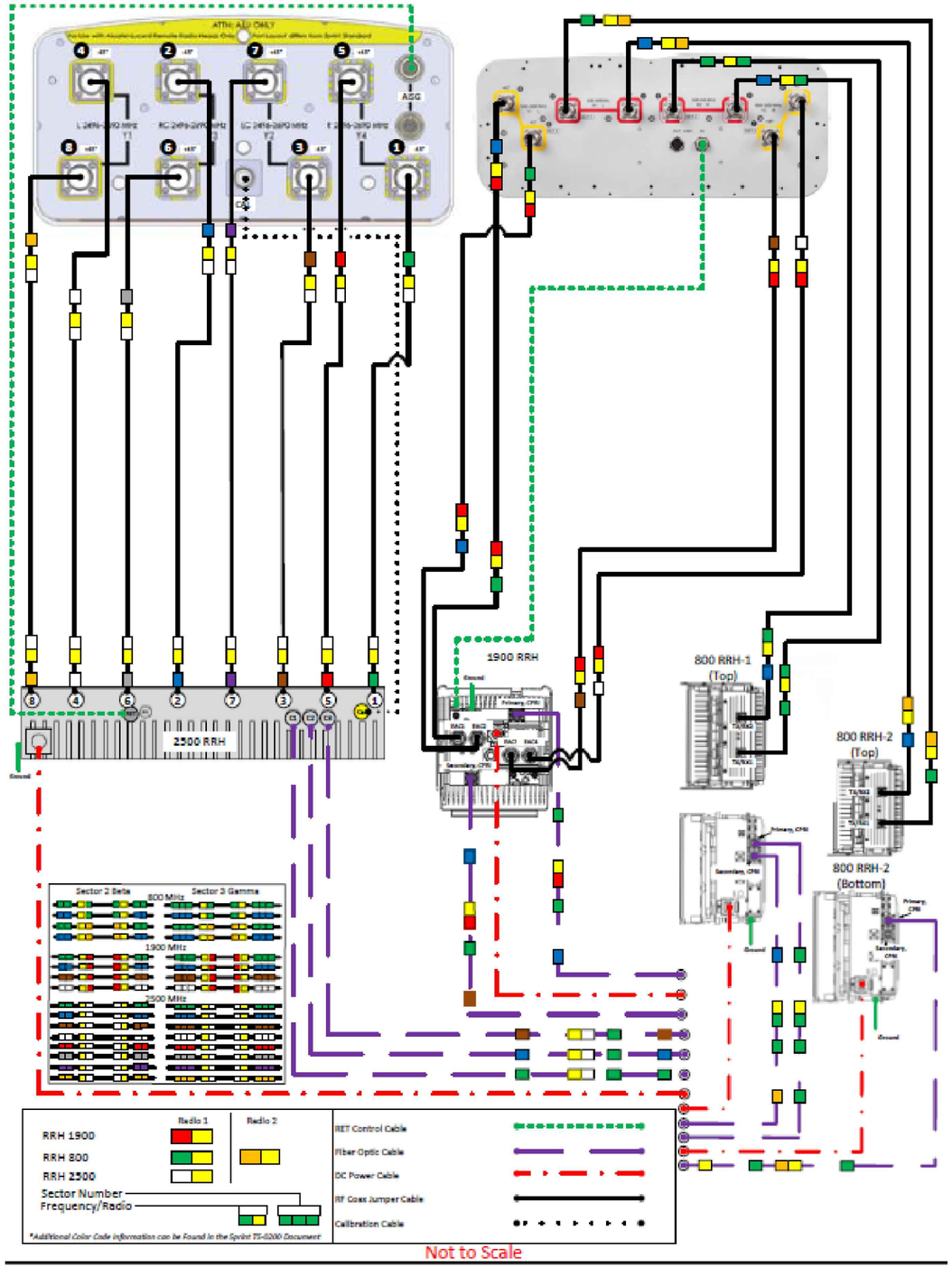
SITE NUMBER:
CT54XC704

SITE ADDRESS:
111 STONE HILL ROAD
VOLUNTOWN, CT 06384

SHEET DESCRIPTION:
RF DATA SHEET

SHEET NUMBER:
RF-1

ALU 211 APXVTM14-ALU-I20 & NNVV-65B-R4 wo Filters



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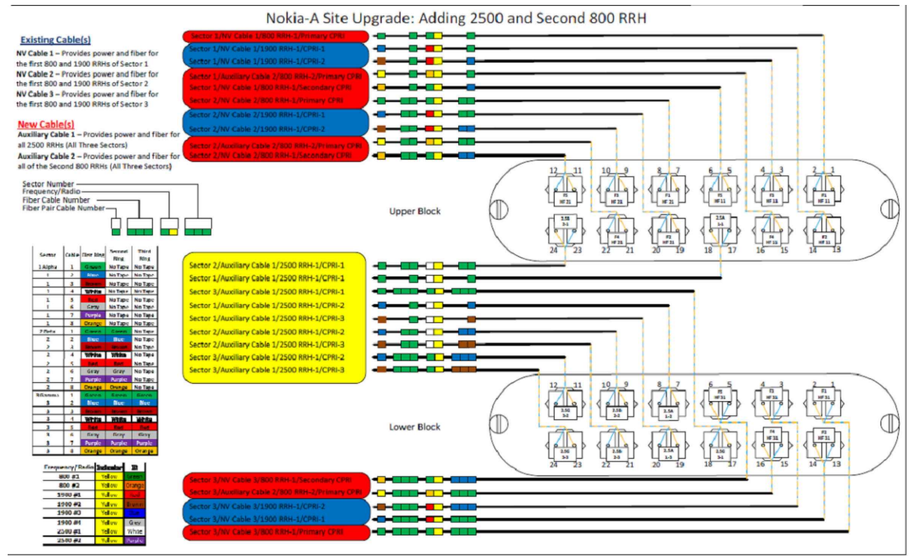

PLUMBING DIAGRAM | NO SCALE | 1

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PROJECT MANAGER:

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APPROVED BY:

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DESCRIPTION	DATE	BY	REV.
ISSUED FOR CONSTRUCTION	03/23/18	RWF	0

SITE NUMBER:

CT54XC704

SITE ADDRESS:

111 STONE HILL ROAD
VOLUNTOWN, CT 06384

SHEET DESCRIPTION:

PLUMBING DIAGRAM

SHEET NUMBER:

RF-2