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

December 21, 2016

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

Notice of Exempt Modification
1021 Blue Hills Avenue, Bloomfield, CT 06002
41.8201031 N
-72.6965269 W
AT&T #: 10035110 _LTE

Dear Ms. Bachman:

AT&T currently maintains nine (9) antennas at the 98-foot level and (1) antenna at the 65-foot level of the existing 125-foot Self-Support Tower at 1021 Blue Hills Avenue. The tower is owned by SBA Towers, LLC. The property is owned by Blue Hills Fire District. AT&T does not propose any antenna work at this time. It does, however, intend to replace (3) existing RRUs with (3) newer RRUs. AT&T's full scope of proposed work is as follows:

Remove: None

Remove and Replace:
- Remove (3) LTE RRUS-11/A2 and replace with (3) RRUs-32-B2

Install:
- (1) RRU bracket D21BRRUDSM
- (12) Powerwave 7020.00 RET

Existing Equipment to Remain (including entitlements):
- (6) Powerwave 7770 Panel Antennas
- (2) CCI HPA-65R-BUU-H8 Panel Antennas
- (1) CCI HPA-65R-BUU-H6 Panel Antennas
- (1) Nokia CS72188.01 LMU Antenna (at 65')
- (6) Powerwave LGP21401 TMAs
- (6) Ericsson RRUS 11
- (6) Powerwave LGP21903 diplexers
- (3) Kathrein 782 10253
- (1) Raycap DC6-48-60-18-8F
- (12) 7/8" lines
- (2) ¾" DC
- (1) ½" fiber
- (1) ½" line at (65')
- (1) 3" flex conduit

This facility was approved with Special Permit by the Board of Appeals of the Town of Bloomfield on December 1, 1997. The tower was to be located 12 feet from the property line at 1021 Blue Hills Ave with an 8' chain link fence placed around the tower. This modification complies with the aforementioned conditions.

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 Honorable Joan Gamble, Mayor of Bloomfield, as well as the property owner, Blue Hills Fire District. (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, AT&T 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: The Honorable Joan Gamble, Mayor of Bloomfield—as elected official
Bloomfield Town Hall, 800 Bloomfield Ave., Bloomfield, CT 06002
Blue Hills Fire District–as property owner
1021 Blue Hills Avenue Bloomfield CT 06002-3715

POWER DENSITY

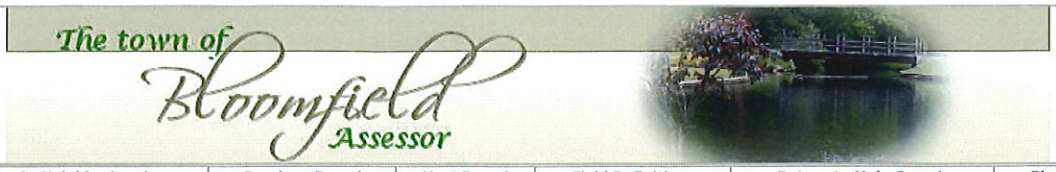
AT&T Site Inventory and Power Data

Sector:	A	Sector:	B	Sector:	C
Antenna #:	1	Antenna #:	1	Antenna #:	1
Make / Model:	Powerwave 7770	Make / Model:	Powerwave 7770	Make / Model:	Powerwave 7770
Gain:	11.4 / 13.4 dBd	Gain:	11.4 / 13.4 dBd	Gain:	11.4 / 13.4 dBd
Height (AGL):	**98 feet**	Height (AGL):	**98 feet**	Height (AGL):	**98 feet**
Frequency Bands	850 MHz / 1900 MHz (PCS)	Frequency Bands	850 MHz / 1900 MHz (PCS)	Frequency Bands	850 MHz / 1900 MHz (PCS)
Channel Count	4	Channel Count	4	Channel Count	4
Total TX Power(W):	120 Watts	Total TX Power(W):	120 Watts	Total TX Power(W):	120 Watts
ERP (W):	2,140.89	ERP (W):	2,140.89	ERP (W):	2,140.89
Antenna A1 MPE%	**1.18 %**	Antenna B1 MPE%	**1.18 %**	Antenna C1 MPE%	**1.18 %**
Antenna #:	**2**	Antenna #:	**2**	Antenna #:	**2**
Make / Model:	CCI HPA-65R-BUU-H8	Make / Model:	CCI HPA-65R-BUU-H8	Make / Model:	CCI HPA-65R-BUU-H6
Gain:	13.15 / 14.95 dBd	Gain:	13.15 / 14.95 dBd	Gain:	13.15 / 14.95 dBd
Height (AGL):	**98 feet**	Height (AGL):	**98 feet**	Height (AGL):	**98 feet**
Frequency Bands	700 MHz / 1900 MHz (PCS)	Frequency Bands	700 MHz / 1900 MHz (PCS)	Frequency Bands	700 MHz / 1900 MHz (PCS)
Channel Count	4	Channel Count	4	Channel Count	4
Total TX Power(W):	240 Watts	Total TX Power(W):	240 Watts	Total TX Power(W):	240 Watts
ERP (W):	6,229.75	ERP (W):	6,229.75	ERP (W):	5,462.56
Antenna A2 MPE%	**3.85 %**	Antenna B2 MPE%	**3.85 %**	Antenna C2 MPE%	**3.23 %**
Antenna #:	**3**	Antenna #:	**3**	Antenna #:	**3**
Make / Model:	Powerwave 7770	Make / Model:	Powerwave 7770	Make / Model:	Powerwave 7770
Gain:	11.4 / 13.4 dBd	Gain:	11.4 / 13.4 dBd	Gain:	11.4 / 13.4 dBd
Height (AGL):	**98 feet**	Height (AGL):	**98 feet**	Height (AGL):	**98 feet**
Frequency Bands	850 MHz / 1900 MHz (PCS)	Frequency Bands	850 MHz / 1900 MHz (PCS)	Frequency Bands	850 MHz / 1900 MHz (PCS)
Channel Count	4	Channel Count	4	Channel Count	4
Total TX Power(W):	120 Watts	Total TX Power(W):	120 Watts	Total TX Power(W):	120 Watts
ERP (W):	2,140.89	ERP (W):	2,140.89	ERP (W):	2,140.89
Antenna A3 MPE%	**1.18 %**	Antenna B3 MPE%	**1.18 %**	Antenna C3 MPE%	**1.18 %**

Site Composite MPE%	
Carrier	**MPE%**
AT&T – Max per sector	**6.20 %**
Verizon	7.16 %
T-Mobile	2.84 %
MetroPCS	2.55 %
Clearwire	0.15 %
Sprint	2.32 %
Nextel	0.44 %
XM Sat Radio	0.16 %
Page Net	0.08 %
Blue Hills FD	1.75 %
Site Total MPE %:	**23.65 %**

AT&T Sector A Total:	6.20 %
AT&T Sector B Total:	6.20 %
AT&T Sector C Total:	5.59 %
Site Total:	23.65 %

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



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Owner and Parcel Information

Owner Name	BLUE HILLS FIRE DIST BLUE HILLS AVE COR	**Today's Date**	December 21, 2016
Mailing Address	ROCKWELL AVENUE	**Parcel ID**	7809 (Account #: R90158)
	BLOOMFIELD, CT 06002	**Fire District**	B
Location Address	1021 BLUE HILLS AVE	**Census Tract**	4712
Map / Lot	130-2 / 14	**Acreage**	1.23
Use Class / Description	922 Mun Bldg Com	**Parcel Map**	Show Parcel Map / Owner List By Radius
Assessing Neighborhood	0001A	**Utilities**	

Current Appraised Value Information

Building Value	XF Value	OB Value	Land Value	Special Land Value	Total Appraised Value	Net Appraised Value	Current Assessment
$ 432,500	$ 0	$ 0	$ 396,800		$ 829,300	$ 829,300	$ 580,510

Assessment History

Year	Building	OB/Misc	Land	Total Assessment
Current	$ 302,750	0	$ 277,760	$ 580,510
2013	$ 195,510	0	$ 201,320	$ 396,830
2009	$ 195,510	0	$ 201,320	$ 396,830

Land Information

Use	Class	Zoning	Area	Value
Mun Bldg Com	E	GWB	1.23 AC	$ 196,800
Com Cell Site	C	GWB	1 BL	$ 200,000

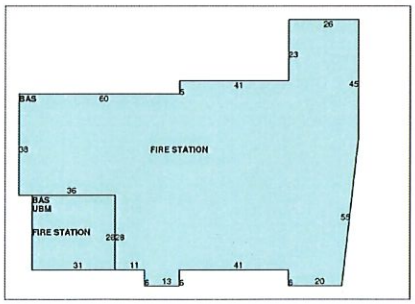
Commercial Building Information

Style	Year Built	Eff Year Built	Gross Area	Stories	Grade	Exterior Wall	Interior Wall	Wall Height	# Units
Fire Station	1962	1977	10,112	1	D	Brick Veneer	Drywall	12	1
Roof Cover	**Roof Structure**	**Floor Type**	**Heat Type**	**Heat Fuel**	**AC Type**	**Sprinkler**	**Construction**	**Plumbing**	**Comm Walls**
Asphalt Shingl	Gable	Carpet	Gas	Hot Water	None 0%	0%	Masonry	Average	0%

Building Sub Areas

Code	Description	Living Area	Gross Area	Effective Area
BAS	First Floor	9,244	9,244	
UBM	Basement	0	868	
	Totals	**9,244**	**10,112**	**9,418**

Building Sketch Enlarge



Building Photo Enlarge

Out Buildings / Extra Features

Description	Sub Description	Area	Year Built	Value
No Out Building/Misc Information available for this parcel.				

Sale Information

Sale Date	Sale Price	Deed Book/Page	Sale Qualification	Reason	Vacant or Improved	Owner
00/00/0000		91/ 376	Unqualified	Old sale- Validity unknown	Vacant	BLUE HILLS FIRE DIST BLUE HILLS AVE COR

Permit Information

Permit ID	Issue Date	Type	Description	Amount	Inspection Date	% Complete	Date Complete	Comments
B-13-3795	02/12/2013	CM	Commercial	$ 20,000		0	10/01/2013	REPL CABINET WITH 2 CABINETS
B-12-3651	12/14/2012	CM	Commercial	$ 15,000		0	10/01/2013	REPL 6 ANTENNAS
B-12-3250	08/16/2012	CM	Commercial	$ 25,000		0	10/01/2013	ADD 3 ANTENNAS
B21447	12/17/2001			$ 75,000		0		

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

AT&T Existing Facility

Site ID: CT1148

Bloomfield East
1021 Blue Hills Avenue
Bloomfield, CT 06002

December 8, 2016

EBI Project Number: 6216005603

Site Compliance Summary	
Compliance Status:	COMPLIANT
Site total MPE% of FCC general public allowable limit:	23.65 %

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

EBI Consulting
environmental | engineering | due diligence

December 8, 2016

AT&T Mobility – New England
Attn: Cameron Syme, RF Manager
550 Cochituate Road
Suite 550 – 13&14
Framingham, MA 06040

Emissions Analysis for Site: **CT1148 – Bloomfield East**

EBI Consulting was directed to analyze the proposed AT&T facility located at **1021 Blue Hills Avenue, Bloomfield, CT**, for the purpose of determining whether the emissions from the Proposed AT&T 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 public may be exposed or in which persons who are exposed as a consequence of their employment may not be made fully aware of the potential for exposure or cannot exercise control over their exposure. Therefore, members of the general public would always be considered under this category when exposure is not employment related, for example, in the case of a telecommunications tower that exposes persons in a nearby residential area.

Public exposure to radio frequencies is regulated and enforced in units of microwatts per square centimeter ($\mu W/cm^2$). The general population exposure limits for the 700 and 850 MHz Bands are approximately 467 $\mu W/cm^2$ and 567 $\mu W/cm^2$ respectively. The general population exposure limit for the 1900 MHz (PCS), 2100 MHz (AWS) and 2300 MHz (WCS) 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 AT&T Wireless antenna facility located at **1021 Blue Hills Avenue, Bloomfield, CT**, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since AT&T is proposing highly focused directional panel antennas, which project most of the emitted energy out toward the horizon, all calculations were performed assuming a lobe representing the maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was focused at the base of the tower. For this report the sample point is the top of a 6-foot person standing at the base of the tower.

For all calculations, all equipment was calculated using the following assumptions:

1) 2 UMTS channels (850 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

2) 2 UMTS channels (1900 MHz (PCS)) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

3) 2 LTE channels (700 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 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 60 Watts per Channel.

5) 2 GSM channels (850 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

6) 2 GSM channels (1900 MHz (PCS)) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

7) 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.

8) 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.

9) The antennas used in this modeling are the **Powerwave 7770, CCI HPA-65R-BUU-H6 and the CCI HPA-65R-BUU-H8** for transmission in the 700 MHz, 850 MHz and 1900 MHz (PCS) 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.

10) The antenna mounting height centerlines of the proposed antennas are **98 feet** above ground level (AGL) for **Sector A**, **98 feet** above ground level (AGL) for **Sector B** and **98 feet** above ground level (AGL) for Sector C.

11) Emissions values for additional carriers were taken from the Connecticut Siting Council active database. Values in this database are provided by the individual carriers themselves.

All calculations were done with respect to uncontrolled / general public threshold limits.

AT&T Site Inventory and Power Data by Antenna

Sector:	A	Sector:	B	Sector:	C
Antenna #:	**1**	Antenna #:	**1**	Antenna #:	**1**
Make / Model:	Powerwave 7770	Make / Model:	Powerwave 7770	Make / Model:	Powerwave 7770
Gain:	11.4 / 13.4 dBd	Gain:	11.4 / 13.4 dBd	Gain:	11.4 / 13.4 dBd
Height (AGL):	**98 feet**	Height (AGL):	**98 feet**	Height (AGL):	**98 feet**
Frequency Bands	850 MHz / 1900 MHz (PCS)	Frequency Bands	850 MHz / 1900 MHz (PCS)	Frequency Bands	850 MHz / 1900 MHz (PCS)
Channel Count	4	Channel Count	4	Channel Count	4
Total TX Power(W):	120 Watts	Total TX Power(W):	120 Watts	Total TX Power(W):	120 Watts
ERP (W):	2,140.89	ERP (W):	2,140.89	ERP (W):	2,140.89
Antenna A1 MPE%	**1.18 %**	Antenna B1 MPE%	**1.18 %**	Antenna C1 MPE%	**1.18 %**
Antenna #:	**2**	Antenna #:	**2**	Antenna #:	**2**
Make / Model:	CCI HPA-65R-BUU-H8	Make / Model:	CCI HPA-65R-BUU-H8	Make / Model:	CCI HPA-65R-BUU-H6
Gain:	13.15 / 14.95 dBd	Gain:	13.15 / 14.95 dBd	Gain:	13.15 / 14.95 dBd
Height (AGL):	**98 feet**	Height (AGL):	**98 feet**	Height (AGL):	**98 feet**
Frequency Bands	700 MHz / 1900 MHz (PCS)	Frequency Bands	700 MHz / 1900 MHz (PCS)	Frequency Bands	700 MHz / 1900 MHz (PCS)
Channel Count	4	Channel Count	4	Channel Count	4
Total TX Power(W):	240 Watts	Total TX Power(W):	240 Watts	Total TX Power(W):	240 Watts
ERP (W):	6,229.75	ERP (W):	6,229.75	ERP (W):	5,462.56
Antenna A2 MPE%	**3.85 %**	Antenna B2 MPE%	**3.85 %**	Antenna C2 MPE%	**3.23 %**
Antenna #:	**3**	Antenna #:	**3**	Antenna #:	**3**
Make / Model:	Powerwave 7770	Make / Model:	Powerwave 7770	Make / Model:	Powerwave 7770
Gain:	11.4 / 13.4 dBd	Gain:	11.4 / 13.4 dBd	Gain:	11.4 / 13.4 dBd
Height (AGL):	**98 feet**	Height (AGL):	**98 feet**	Height (AGL):	**98 feet**
Frequency Bands	850 MHz / 1900 MHz (PCS)	Frequency Bands	850 MHz / 1900 MHz (PCS)	Frequency Bands	850 MHz / 1900 MHz (PCS)
Channel Count	4	Channel Count	4	Channel Count	4
Total TX Power(W):	120 Watts	Total TX Power(W):	120 Watts	Total TX Power(W):	120 Watts
ERP (W):	2,140.89	ERP (W):	2,140.89	ERP (W):	2,140.89
Antenna A3 MPE%	**1.18 %**	Antenna B3 MPE%	**1.18 %**	Antenna C3 MPE%	**1.18 %**

Site Composite MPE%	
Carrier	**MPE%**
AT&T – Max per sector	**6.20 %**
Verizon	7.16 %
T-Mobile	2.84 %
MetroPCS	2.55 %
Clearwire	0.15 %
Sprint	2.32 %
Nextel	0.44 %
XM Sat Radio	0.16 %
Page Net	0.08 %
Blue Hills FD	1.75 %
Site Total MPE %:	**23.65 %**

AT&T Sector A Total:	6.20 %
AT&T Sector B Total:	6.20 %
AT&T Sector C Total:	5.59 %
Site Total:	23.65 %

AT&T Max Power Values: Sectors A & B

AT&T _ Frequency Band / Technology Per Sector (Max Values)	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density ($\mu W/cm^2$)	Frequency (MHz)	Allowable MPE ($\mu W/cm^2$)	Calculated % MPE
AT&T 850 MHz UMTS	2	414.12	98	3.52	850 MHz	567	0.62%
AT&T 1900 MHz (PCS) UMTS	2	656.33	98	5.58	1900 MHz (PCS)	1000	0.56%
AT&T 700 MHz LTE	2	1,239.23	98	10.53	700 MHz	467	2.25%
AT&T 1900 MHz (PCS) LTE	2	1,875.65	98	15.93	1900 MHz (PCS)	1000	1.59%
AT&T 850 MHz GSM	2	414.12	98	3.52	850 MHz	567	0.62%
AT&T 1900 MHz (PCS) GSM	2	656.33	98	5.58	1900 MHz (PCS)	1000	0.56%
						Total*:	6.20%

*NOTE: Totals may vary by 0.01% due to summing of remainders

Summary

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

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

AT&T Sector	Power Density Value (%)
Sector A:	6.20 %
Sector B:	6.20 %
Sector C:	5.59 %
AT&T Maximum Total (per sector):	6.20 %
Site Total:	23.65 %
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **23.65 %** of the allowable FCC established general public limit sampled at the ground level. This is based upon values listed in the Connecticut Siting Council database for existing carrier emissions.

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

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 125' Self Support Tower

SBA Site Name: Bloomfield
SBA Site Number: CT01725-A-02
Application #:51286, v1
Carrier Name: AT&T
Carrier Site ID: FA# 10035110 USID# 14526

Site Location:
1021 Blue Hills Avenue,
Bloomfield, CT 06002-3715
Hartford County

Latitude: 41.820119°
Longitude: -72.696514 °

ACGI Job # 16-4565
(Refer previous: ACGI# 16-0654 dated 02/24/2016)

ANALYSIS RESULTS		
Tower Components	87.0 %	**Pass**
Tower Foundation Capacity	50.0 %	**Pass**
Net Change in Stress	-8.7 %	**Change from previous SA by Allpro Consulting Group, Inc., ACGI #16-0654, dated 02/24/2016**

Prepared By:
Tao Xiang, EIT

12/08/2016
Approved By:
Joji George, P.E.
CT PE# 24444

TABLE OF CONTENTS

1. ANALYSIS SUMMARY

The existing 125' Self Support Tower located in Bloomfield, CT was analyzed by Allpro Consulting Group, Inc (ACGI) for the existing loads and the proposed **AT&T** 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:	Fred A. Nudd Corporation	Original Structural Design Report by Fred A. Nudd Corporation, Project# 5566A dated March 11, 1998.
	B&T Group	Previous failing structural analysis by B&T Group, Project Number: 101023.003.001 dated January 21, 2016.
	Allpro Consulting Group, Inc.	Previous modification report by Allpro Consulting Group, Inc., ACGI# 16-0291 dated 02/17/2016.
		Previous modification report by Allpro Consulting Group, Inc., ACGI# 16-0654 dated 02/24/2016.
Foundation Data:	Fred A. Nudd Corporation	Foundation Design Drawings by Fred A. Nudd Corporation, Drawing# 97-5566-2 dated 12/18/97
Geotechnical Report:	FDH Engineering, Inc.	Geotechnical Evaluation of Subsurface Conditions, Project Number 1206690EG1 dated 08/10/2012.
Loading Data:	Allpro Consulting Group, Inc.	Previous modification report by Allpro Consulting Group, Inc., ACGI# 16-0654 dated 02/24/2016.
	SBA Communication Corp.	SBA site summary dated 11/15/2016
		Proposed final loading AT&T as per SBA Portal, Application# 51286, v1.
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 EIA-222-C, EIA-222-D, TIA/EIA-222-F or TIA-222-G standards. The 3-D model included the tower, with existing appurtenances and all proposed loads.

SITE DATA	
SBA Site Name:	Bloomfield
SBA Site Number:	CT01725-A-02
Carrier Site Name:	AT&T- FA# 10035110 USID# 14526
City, State:	Bloomfield, CT
County:	Hartford
Code Wind Load Requirement:	ANSI/TIA-222-G &International Building Code (122 mph ultimate wind speed equivalent to 95 mph basic wind speed)
Wind Load Used:	ANSI/TIA-222-G Code: • Basic wind speed of 95 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 1.0 in.

TOWER DATA	
Tower Type:	Self - Support Tower
Height:	125.0'
Cross Section:	Triangular
Steel Strength:	Legs – 55 ksi Braces – 36 ksi
Type of Foundation:	Mat foundation

TOWER HISTORY	
Tower Manufacturer / Model:	Fred A. Nudd Corporation, Model: S9BPA
Date of Original Design:	March 11, 1998
Previous Modifications:	Previous modification report by Allpro Consulting Group, Inc., ACGI# 16-0291 dated 02/17/2016.
Original Design Code Requirements:	ANSI/TIA/EIA 222-E, Design wind & Ice: 80 mph/60 mph + 1/2" ice

4. CONCLUSIONS

RESULT SUMMARY		
MEMBER	***% Capacity***	***Pass/Acceptable***
Legs	**86.3 %**	**Pass**
Diagonals	**87.0 %**	**Pass**
Horizontals	**36.1 %**	**Pass**
Secondary Horizontals	**19.2 %**	**Pass**
Top Girt	**19.5 %**	**Pass**
Bottom girts	**19.9 %**	**Pass**
Bolt checks	**87.0 %**	**Pass**
Foundation (Overturning)	**50.0 %**	**Pass**
Foundation (Net soil bearing)	**17.3 %**	**Pass**
Foundation (Horizontal Shear)	**36.7 %**	**Pass**
Foundation (Uplift)	**44.7 %**	**Pass**
Foundation (Reinforcement)	**75.9 %**	**Pass**
OVERALL TOWER RATING = 87.0 % (Pass)		

MAXIMUM DISH ROTATION AT SERVICE WIND SPEED Twist and Sway (deg), 10 dB degradation limit					
Elev. (ft)	*MW Dish*	*Twist (deg)*	*Sway (deg)*	*Allowable (deg)*	*Result*
123±	**(E) (1) Andrew VHLP2.5 Dish**	**0.015**	**0.365**	**Carrier to provide**	**-**
117±	**(E) (1) Andrew VHLP2.5 Dish**	**0.008**	**0.357**	**Carrier to provide**	**-**

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

Maximum tower member stress **is more than allowable,** making **it in code compliance** under the TIA-222-G code and 2012 International 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***
135±	2	Cellwave PD455	(1) Platform w/ rails @ 125.0'	(1) 1-1/4" (2) 1/2" (2) 7/8"	Blue Hills Fire & PD
	1	Cellwave AS MONR 31			
125±	5	Cellwave PD455			
	1	Cellwave PD165S			
125±	3	Commscope LNX-6515DS-A1M	(1) Platform w/ rails @ 125.0'	(13) 1-5/8"	T-Mobile
	3	Ericsson S11B12			
	3	Ericsson AIR21 B2A/B4P			
	3	Ericsson AIR21 B4A/B2P			
	3	Ericsson KRY 112 144/1			
120±	2	Samsung U-RAS Flexible	(3) Sector Frames @ 120'	(7) 5/16" (3) 1/2"	Clearwire
	2	Dragonwave HORIZON DUO			
	3	Kathrein 840 10054			
	2	Andrew VHLP2.5 dish			
	1	Motorola Timing 2000			
110±	3	Amphenol BXA-70063-4CF-EDIN-6 panel antenna	(3) Sector Frames @ 107'	(18) 1-5/8" + (2) 1-5/8" Hybrids + (2) 1/2" GPS line	Verizon
	9	Andrew SBNHH-1D65B panel antenna			
	3	Alcatel Lucent RRH2x60-AWS radio			
	3	Alcatel Lucent RRH2x60-700 radio			
	3	Alcatel Lucent RRH 4x45-PCS radio			
	2	Andrew GPS			
	1	RFS Cellwave DB-T1-6Z-8AB-0Z distribution box			
98±	6	Powerwave 7770 panel antenna	(3) Sector Frames @ 98'	(12) 7/8" (2) 3/4" DC + (1) 1/2" Fiber within 3" Flex conduits	AT&T
	2	CCI HPA-65R-BUU-H8 panel antenna			
	1	CCI HPA-65R-BUU-H6 panel antenna			
	6	Powerwave LGP21401 TMA			
	6	Ericsson RRUs 11			
	3	Ericsson RRUs A2			
	6	Powerwave LGP21903 diplexer			
	1	Raycap DC6-48-60-18-8F			
87±	3	Alcatel Lucent 1900MHz RRH	(3) Sector Frames @ 87'	(3) 1-1/4" (1) 0.7"	Sprint
	3	Alcatel Lucent 800MHZ RRH			
	3	Alcatel Lucent TD-RRH8x20-25			
	4	RFS Cellwave ACU-A20-N			
	3	RFS APXVSPP18-C-A20			
	3	RFS APXVTM14-C-120			
	3	Samsung 800 MHz Filter			
75±	3	RFS Cellwave APXV18-206517S-C	Direct mount @ 75'	(6) 1-5/8"	Metro
65±	1	Nokia CS72188.01 LMU Antenna	(1) Standoff @ 65'	(1) 1/2''	AT&T

PROPOSED LOAD DESCRIPTION					
ELEV (ft.)	***Qty.***	***Antenna Description***	***Mount Type & Qty.***	***TX. LINE (in)***	***TENANT***
98±	6	Powerwave 7770.00	(3) Sector Frames @ 98'	(12) 7/8" (2) 3/4" DC + (1) 1/2" Fiber within 3" Flex conduits	AT&T*
	2	CCI HPA-65R-BUU-H8			
	1	CCI HPA-65R-BUU-H6			
	6	Powerwave LGP21401			
	12	Powerwave 7020.00 RET			
	6	Ericsson RRUS 11			
	3	Ericsson RRUS 32 B2			
	6	Powerwave LGP21901 Diplexer			
	3	Kathrein 782 10253			
	1	Raycap DC6-48-60-18-8F			
65±	1	Nokia CS72188.01 LMU Antenna	(1) Standoff @ 65'	(1) 1/2"	

*The (1) 1/2" Fiber cable and (2) 3/4" DC Power cable for AT&T will be installed in (1) 3" flex conduit.

Notes: ACGI should be notified for a redesign in case of any discrepancies found in the data listed in this report and any potential physical & other interference with existing antennas.

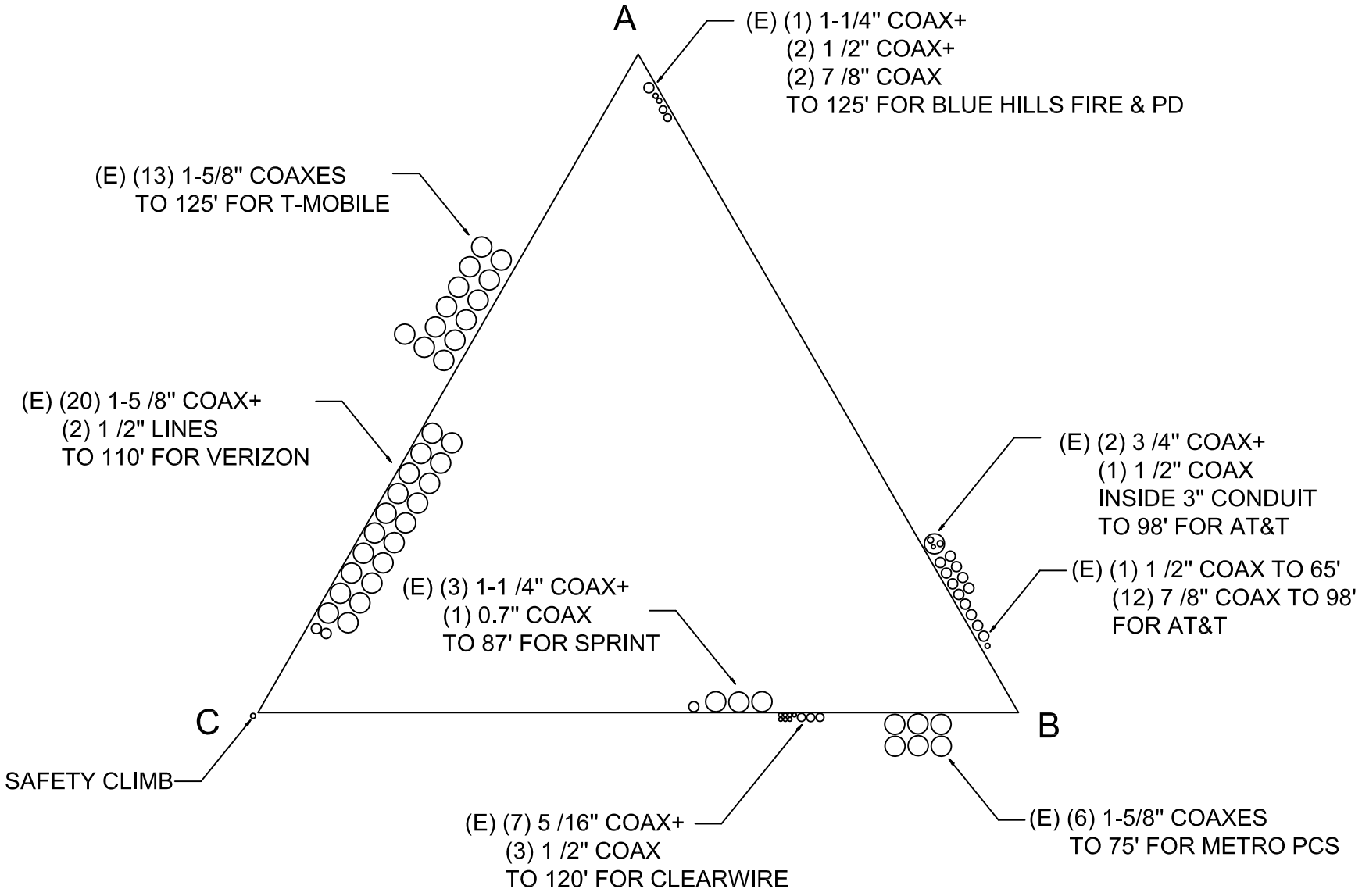
8. SUMMARY OF WORKING PERCENTAGE OF STRUCTURAL COMPONENTS

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	øP$_{allow}$ K	% Capacity	Pass Fail
T1	125 - 120	Leg	P2.5x.203	1	-9.252	77.815	11.9	Pass
T2	120 - 100	Leg	P2.5x.203	25	-44.413	61.057	72.7	Pass
T3	100 - 80	Leg	P3.5x.226	52	-93.064	112.760	82.5	Pass
T4	80 - 60	Leg	P5x.258	79	-140.944	183.884	76.6	Pass
T5	60 - 40	Leg	P6x.28	100	-187.590	249.417	75.2	Pass
T6	40 - 20	Leg	P6x.28	121	-224.218	259.755	86.3	Pass
T7	20 - 0	Leg	P8x.322	142	-264.313	363.459	72.7	Pass
T1	125 - 120	Diagonal	5/8	10	3.403	9.940	34.2	Pass
T2	120 - 100	Diagonal	L1 1/2x1 1/2x3/16	38	-4.255	7.026	60.6 68.8 (b)	Pass
T3	100 - 80	Diagonal	L2x2x3/16	59	-6.111	11.293	54.1 74.4 (b)	Pass
T4	80 - 60	Diagonal	L2 1/2x2 1/2x3/16	86	-6.960	14.057	49.5 71.6 (b)	Pass
T5	60 - 40	Diagonal	L2 1/2x2 1/2x3/16	107	-7.081	11.935	59.3 72.3 (b)	Pass
T6	40 - 20	Diagonal	L3x3x3/16	128	-8.992	12.270	73.3 87.0 (b)	Pass
T7	20 - 0	Diagonal	L3 1/2x3 1/2x1/4	149	-9.175	22.585	40.6 64.0 (b)	Pass
T1	125 - 120	Horizontal	L1 1/2x1 1/2x3/16	16	-2.594	7.190	36.1	Pass
T6	40 - 20	Secondary Horizontal	L3x3x1/4	130	-3.886	20.219	19.2	Pass
T1	125 - 120	Top Girt	L1 1/2x1 1/2x3/16	4	-1.401	7.190	19.5	Pass
T1	125 - 120	Bottom Girt	L1 1/2x1 1/2x3/16	7	-1.431	7.190	19.9	Pass
							Summary	
						Leg (T6)	86.3	Pass
						Diagonal (T6)	87.0	Pass
						Horizontal (T1)	36.1	Pass
						Secondary Horizontal (T6)	19.2	Pass
						Top Girt (T1)	19.5	Pass
						Bottom Girt (T1)	19.9	Pass
						Bolt Checks	87.0	Pass
						RATING =	**87.0**	**Pass**

APPENDIX

COAX LAYOUT



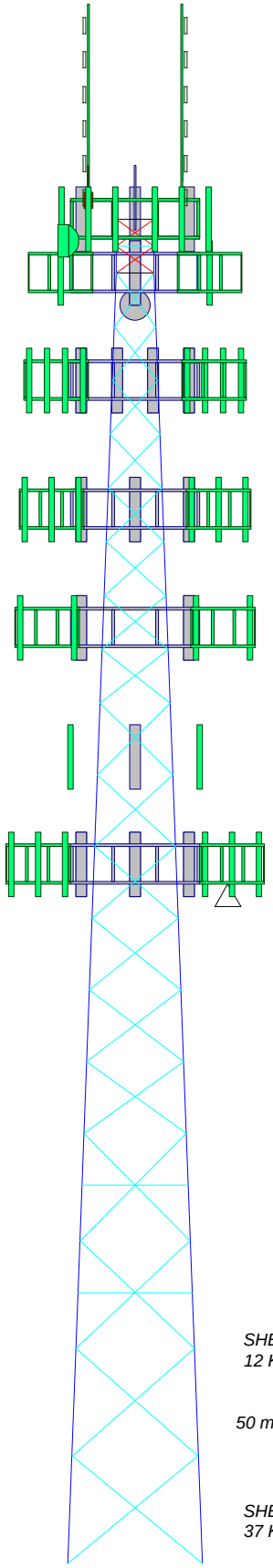
COAX LAYOUT

N.T.S

TOWER ELEVATION DRAWING

Section	T1	T2	T3	T4	T5	T6	T7
Legs		P2.5x.203	P3.5x.226	P5x.258		P6x.28	P8x.322
Leg Grade				A572-55			
Diagonals	SR 5/8	L1 1/2x1 1/2x3/16	L2x2x3/16	L2 1/2x2 1/2x3/16		L3x3x3/16	L3 1/2x3 1/2x1/4
Diagonal Grade				A36			
Top Girts	A			N.A.			
Bottom Girts	A			N.A.			
Horizontals	A			N.A.			
Sec. Horizontals	N.A.					L3x3x1/4	N.A.
Face Width (ft)	3.5		5	6.5	8	9.5	11
# Panels @ (ft)	2 @ 2.5		8 @ 5		6 @ 6.66667		4 @ 10
Weight (K)	0.2	0.7	1.0	1.5	1.8	2.2	2.9

125.0 ft
120.0 ft
100.0 ft
80.0 ft
60.0 ft
40.0 ft
20.0 ft
0.0 ft



SYMBOL LIST

MARK	SIZE	MARK	SIZE
A	L1 1/2x1 1/2x3/16		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-55	55 ksi	70 ksi	A36	36 ksi	58 ksi

TOWER DESIGN NOTES

1. Tower is located in Hartford County, Connecticut.
2. Tower designed for Exposure B to the TIA-222-G Standard.
3. Tower designed for a 95 mph basic wind in accordance with the TIA-222-G Standard.
4. Tower is also designed for a 50 mph basic wind with 1.00 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: 87%

ALL REACTIONS ARE FACTORED

MAX. CORNER REACTIONS AT BASE:
DOWN: 276 K
SHEAR: 23 K

UPLIFT: -247 K
SHEAR: 22 K

AXIAL
147 K
SHEAR 12 K *MOMENT 1026 kip-ft*

TORQUE 1 kip-ft
50 mph WIND - 1.000 in ICE

AXIAL
41 K
SHEAR 37 K *MOMENT 2839 kip-ft*

TORQUE 2 kip-ft
REACTIONS - 95 mph WIND

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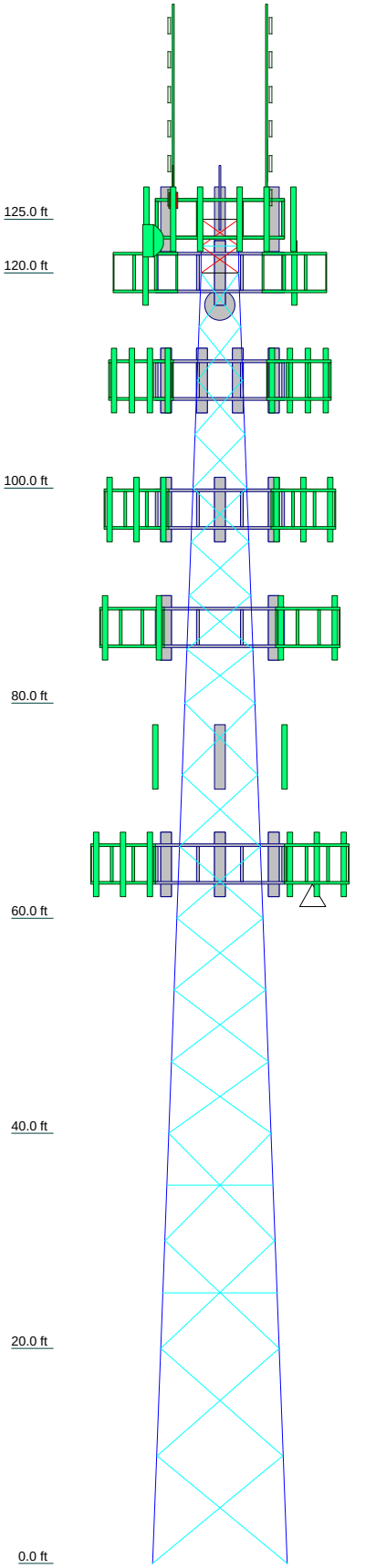
FAX: 866-364-8375

Job: **CT01725-A-02/Bloomfield, CT**			
Project: **ACGI# 16-4565**			
Client: SBA Network Services	Drawn by: Txiang	App'd:	
Code: TIA-222-G	Date: 12/09/16	Scale: NTS	
Path: P:\2016\Structural\16-4565 CT01725-A-02 Bloomfield\Tnx Tower\CT01725-A-02_Bloomfield_AT&T.tnx.16.cRi		Dwg No. E-1	

Section	T1	T2	T3	T4	T5	T6	T7
Legs		P2.5x.203	P3.5x.226	P5x.258		P6x.28	P8x.322
Leg Grade				A572-55			
Diagonals	SR 5/8	L1 1/2x1 1/2x3/16	L2x2x3/16	L2 1/2x2 1/2x3/16		L3x3x3/16	L3 1/2x3 1/2x1/4
Diagonal Grade				A36			
Top Girts	A			N.A.			
Bottom Girts	A			N.A.			
Horizontals	A			N.A.			
Sec. Horizontals	N.A.					L3x3x1/4	N.A.
Face Width (ft)	3.5		5	6.5	8	9.5	11
# Panels @ (ft)	2 @ 2.5		8 @ 5		6 @ 6.66667		4 @ 10
Weight (K)	0.2	0.7	1.0	1.5	1.8	2.2	2.9



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
Lightning Rod 5/8" x 5' (E)	125	Sector Mount [SM 802-3] (E)	110
Flash Beacon Lighting (E)	125	GPS_A (Verizon)	110
(2) PD455 (Blue-Hills Fire District)	125	GPS_A (Verizon)	110
(3) PD455 (Blue-Hills Fire District _ Bloomfield Police)	125	BXA-70063-4CF-EDIN-6 w/ Mount Pipe (Verizon)	110
(2) PD455 (Blue-Hills Fire District)	125	HPA-65R-BUU-H8 (ATI)	98
Cellwave AS MONR 31 (Blue-Hills Fire District)	125	HPA-65R-BUU-H8 (ATI)	98
		HPA-65R-BUU-H6 (ATI)	98
Cellwave PD165S (Blue-Hills Fire District)	125	(2) LGP21401 (ATI)	98
		(2) LGP21401 (ATI)	98
AIR21 B2A/B4P w/ Mount Pipe (T-Mobile)	125	(2) LGP21401 (ATI)	98
AIR21 B2A/B4P w/ Mount Pipe (T-Mobile)	125	(2) RRUS-11 (ATI)	98
		(2) RRUS-11 (ATI)	98
AIR21 B2A/B4P w/ Mount Pipe (T-Mobile)	125	(2) RRUS-11 (ATI)	98
		DC6-48-60-18-8F (ATI)	98
AIR21 B4A/B2P w/ Mount Pipe (T-Mobile)	125	Sector Mount [SM 802-3] (E)	98
		(2) 7770.00 w/ Mount Pipe (ATI)	98
AIR21 B4A/B2P w/ Mount Pipe (T-Mobile)	125	(4) 7020 RET (ATI)	98
		(4) 7020 RET (ATI)	98
AIR21 B4A/B2P w/ Mount Pipe (T-Mobile)	125	(4) 7020 RET (ATI)	98
KRY 112 144/1 (T-Mobile)	125	RRUS 32 B2 (ATI)	98
KRY 112 144/1 (T-Mobile)	125	RRUS 32 B2 (ATI)	98
KRY 112 144/1 (T-Mobile)	125	RRUS 32 B2 (ATI)	98
LNX-6515DS-A1M w/ Mount Pipe (T-Mobile)	125	(2) LGP21901 Diplexer (ATI)	98
		(2) LGP21901 Diplexer (ATI)	98
LNX-6515DS-A1M w/ Mount Pipe (T-Mobile)	125	(2) LGP21901 Diplexer (ATI)	98
		Kathrein 782 10253 (ATI)	98
LNX-6515DS-A1M w/ Mount Pipe (T-Mobile)	125	Kathrein 782 10253 (ATI)	98
		Kathrein 782 10253 (ATI)	98
S11B12 (T-Mobile)	125	(2) 7770.00 w/ Mount Pipe (ATI)	98
S11B12 (T-Mobile)	125	(2) 7770.00 w/ Mount Pipe (ATI)	98
S11B12 (T-Mobile)	125	800MHZ RRH (Sprint)	87
Platform Mount [LP 602-1] (E)	125	800 MHz Filter (Sprint)	87
840 10054 w/ Mount Pipe (Clearwire)	120	800 MHz Filter (Sprint)	87
840 10054 w/ Mount Pipe (Clearwire)	120	800 MHz Filter (Sprint)	87
840 10054 w/ Mount Pipe (Clearwire)	120	(2) ACU-A20-N (Sprint)	87
U-RAS (Clearwire)	120	ACU-A20-N (Sprint)	87
U-RAS (Clearwire)	120	ACU-A20-N (Sprint)	87
HORIZON DUO (Clearwire)	120	(2) 4' x 2" Pipe Mount (E)	87
HORIZON DUO (Clearwire)	120	(2) 4' x 2" Pipe Mount (E)	87
4' x 2" Pipe Mount (Clearwire)	120	(2) 4' x 2" Pipe Mount (E)	87
4' x 2" Pipe Mount (Clearwire)	120	Sector Mount [SM 502-3] (E)	87
4' x 2" Pipe Mount (Clearwire)	120	APXVSPP18-C-A20 w/ Mount Pipe (Sprint)	87
Sector Mount [SM 402-3] (E-2PIPIES/SEC)	120	APXVSPP18-C-A20 w/ Mount Pipe (Sprint)	87
Motorola Timing 2000 (Clearwire)	120	APXVSPP18-C-A20 w/ Mount Pipe (Sprint)	87
VHLP2.5 (Clearwire)	120	APXVTM14-C-120 w/ Mount Pipe (Sprint)	87
VHLP2.5 (Clearwire)	120	APXVTM14-C-120 w/ Mount Pipe (Sprint)	87
BXA-70063-4CF-EDIN-6 w/ Mount Pipe (Verizon)	110	APXVTM14-C-120 w/ Mount Pipe (Sprint)	87
BXA-70063-4CF-EDIN-6 w/ Mount Pipe (Verizon)	110	TD-RRH8x20-25 (Sprint)	87
DB-T1-6Z-8AB-0Z (Verizon)	110	TD-RRH8x20-25 (Sprint)	87
(3) SBNHH-1D65B w/ Mount Pipe (Verizon)	110	TD-RRH8x20-25 (Sprint)	87
(3) SBNHH-1D65B w/ Mount Pipe (Verizon)	110	1900MHz RRH (Sprint)	87
(3) SBNHH-1D65B w/ Mount Pipe (Verizon)	110	1900MHz RRH (Sprint)	87
RRH2x60-AWS (Verizon)	110	1900MHz RRH (Sprint)	87
RRH2x60-AWS (Verizon)	110	800MHZ RRH (Sprint)	87
RRH2x60-AWS (Verizon)	110	800MHZ RRH (Sprint)	87
RRH2x60-700 (Verizon)	110	APXV18-206517S-C w/ Mount Pipe (MetroPCS)	75
RRH2x60-700 (Verizon)	110	APXV18-206517S-C w/ Mount Pipe (MetroPCS)	75
RRH2x60-700 (Verizon)	110	APXV18-206517S-C w/ Mount Pipe (MetroPCS)	75
RRH 4x45-PCS (Verizon)	110	CS72188.01 LMU antenna (ATI)	65
RRH 4x45-PCS (Verizon)	110	Sector Mount [SM 802-3] (E)	65
RRH 4x45-PCS (Verizon)	110		

SYMBOL LIST

MARK	SIZE	MARK	SIZE
A	L1 1/2x1 1/2x3/16		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-55	55 ksi	70 ksi	A36	36 ksi	58 ksi

TOWER DESIGN NOTES

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Dalla,TX 75243
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FAX: 866-364-8375

CT01725-A-02/Bloomfield, CT

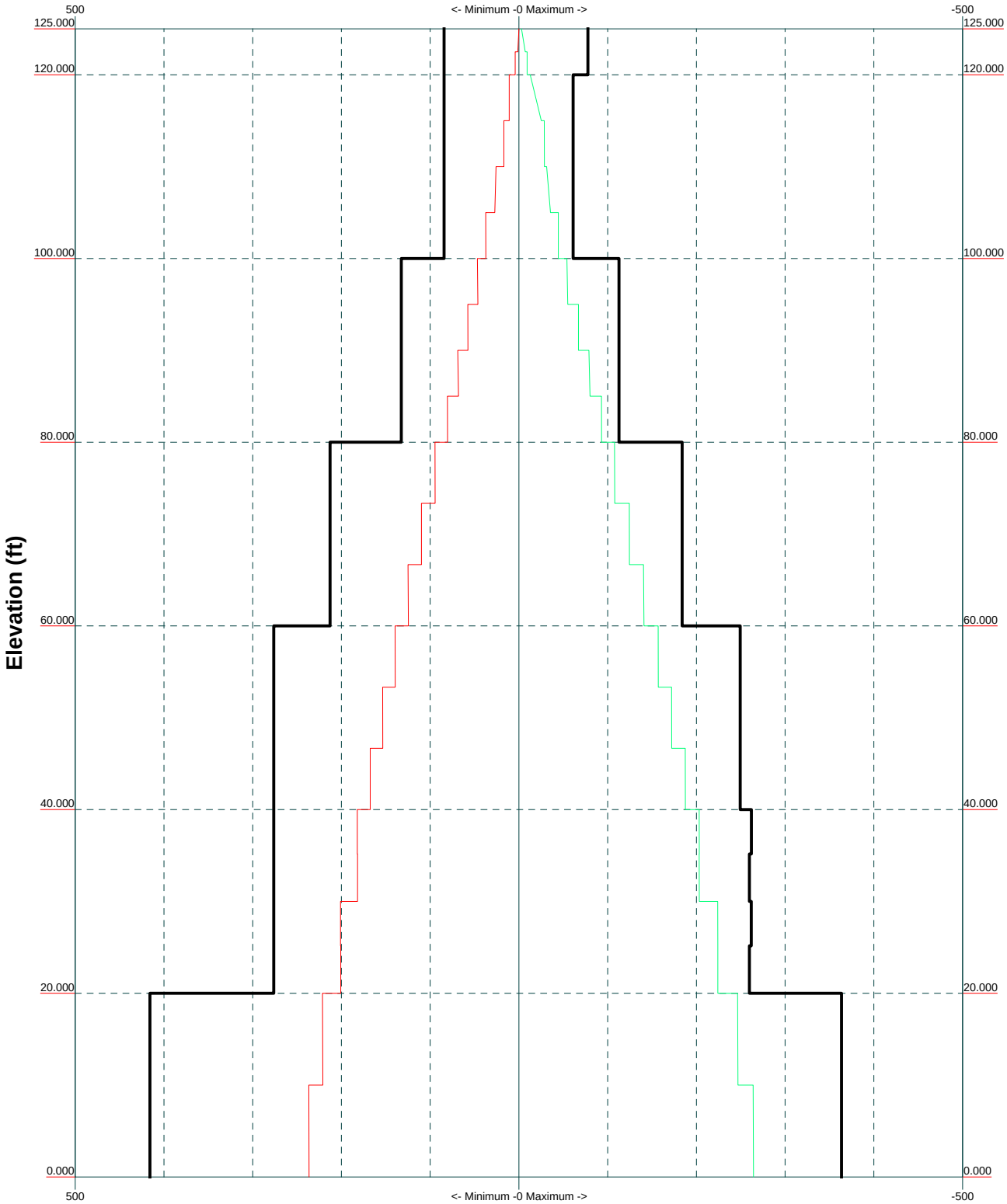
Project: *ACGI# 16-4565*

Client: SBA Network Services	Drawn by: Txiang	App'd:
Code: TIA-222-G	Date: 12/09/16	Scale: NTS
Path: P:\2016\Structural\16-4565 CT01725-A-02 Bloomfield\Tnx Tower\CT01725-A-02_Bloomfield_AT&T.tnx.16.ERI		Dwg No. E-1

MISCELLANEOUS PLOTS

TIA-222-G - 95 mph/50 mph 1.000 in Ice Exposure B

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



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Phone: 972-231-8893
FAX: 866-364-8375

Job: ***CT01725-A-02/Bloomfield, CT***			
Project: ***ACGI# 16-4565***			
Client: SBA Network Services	Drawn by: Txiang	App'd:	
Code: TIA-222-G	Date: 12/09/16	Scale: NTS	
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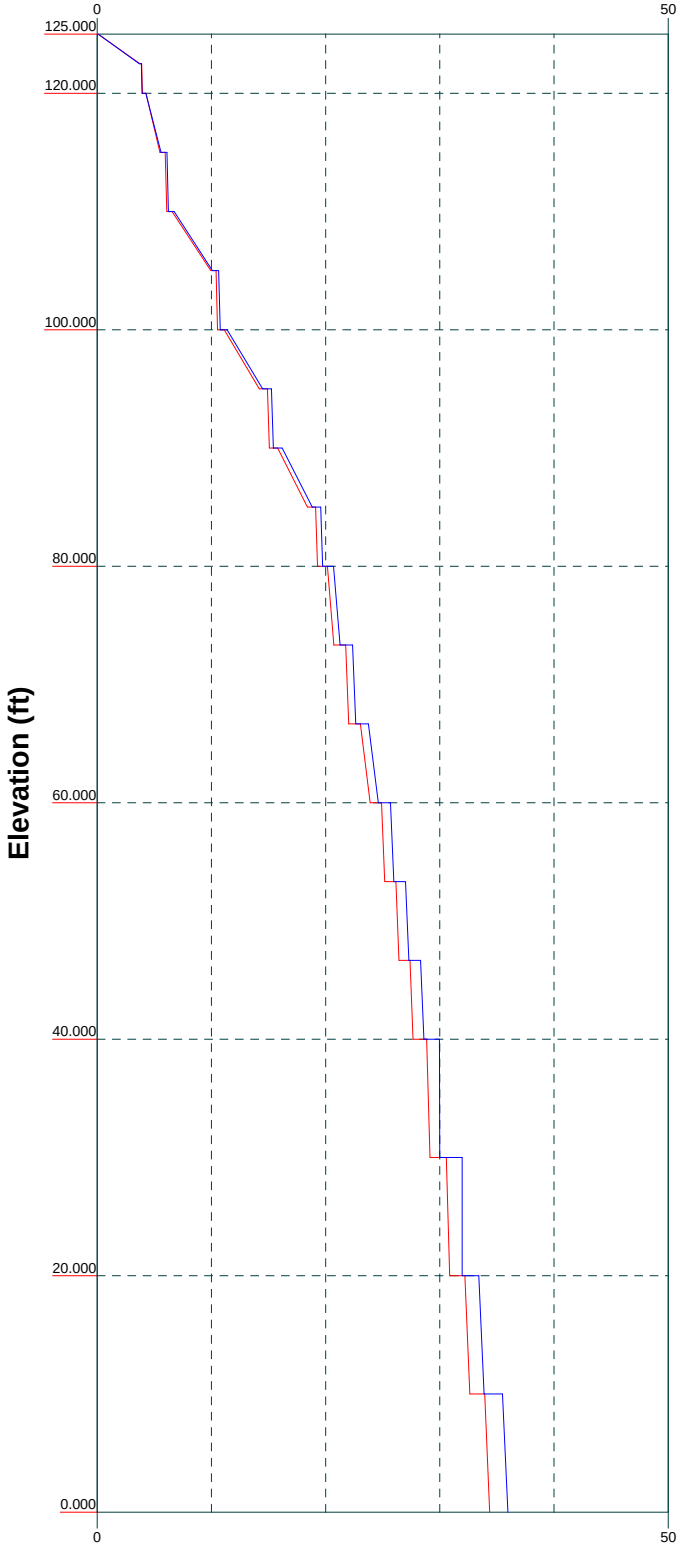
TIA-222-G - 95 mph/50 mph 1.000 in Ice Exposure B

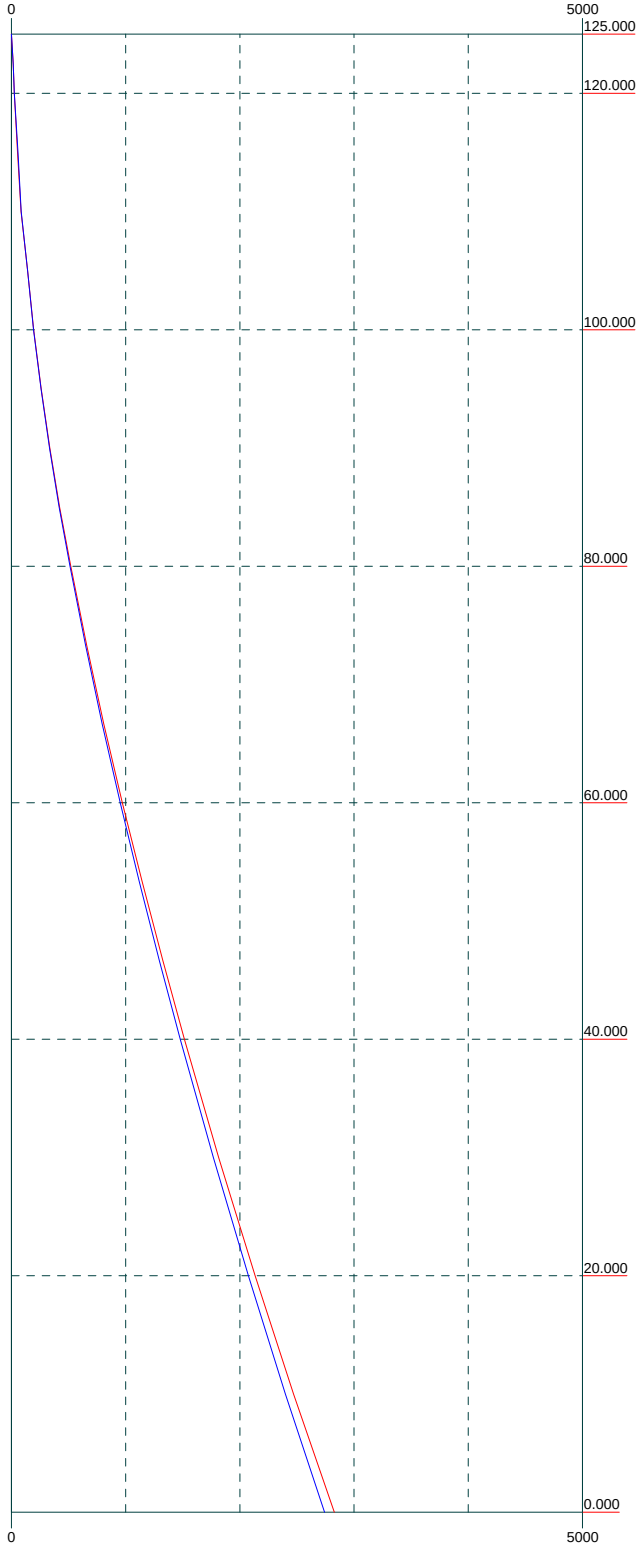
Maximum Values

Vx Vz Mx Mz

Global Mast Shear (K)



Global Mast Moment (kip-ft)



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Phone: 972-231-8893
FAX: 866-364-8375

Job: ***CT01725-A-02/Bloomfield, CT***			
Project: ***ACGI# 16-4565***			
Client: SBA Network Services	Drawn by: Txiang	App'd:	
Code: TIA-222-G	Date: 12/09/16	Scale: NTS	
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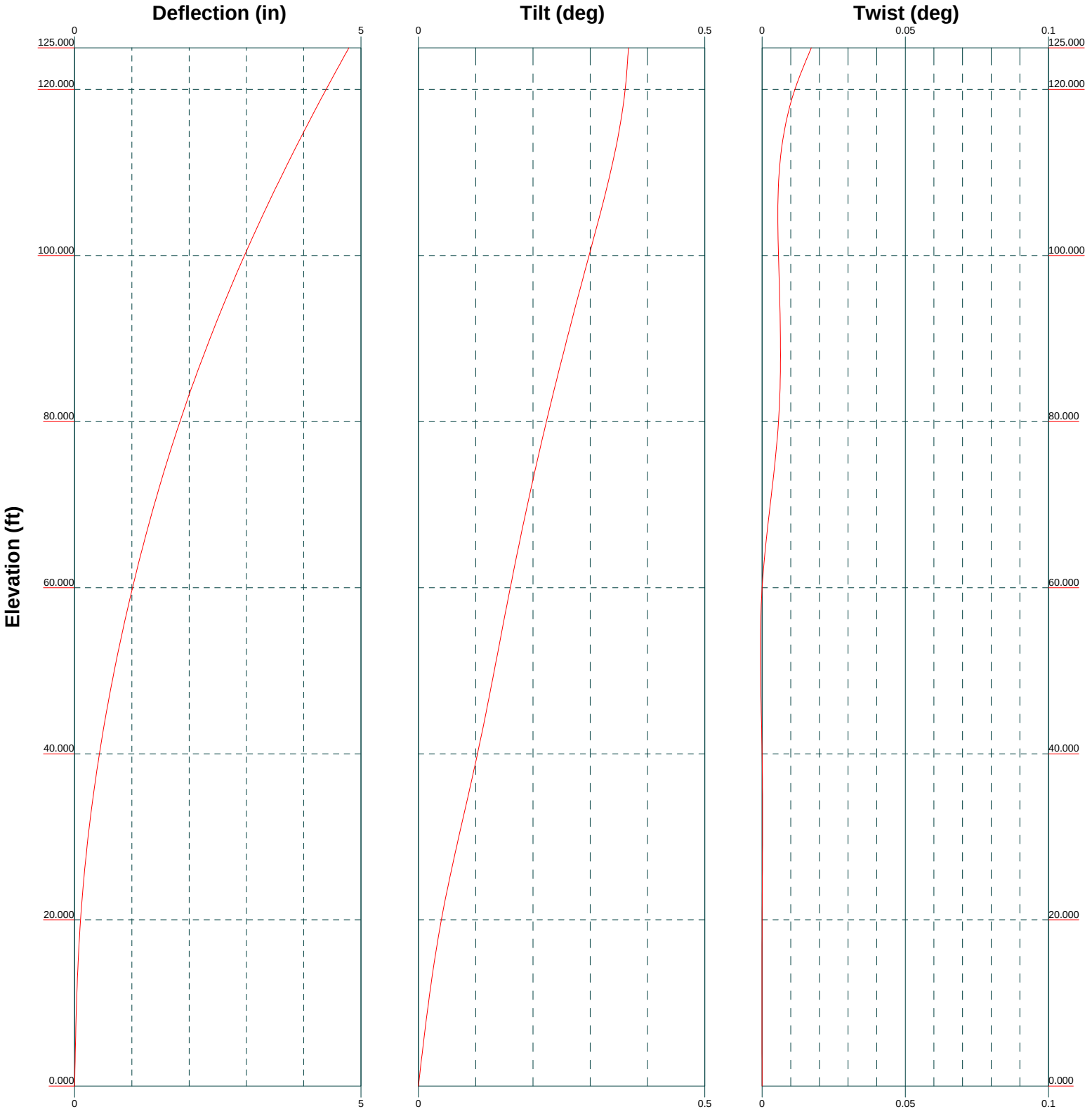
TIA-222-G - Service - 60 mph

Maximum Values

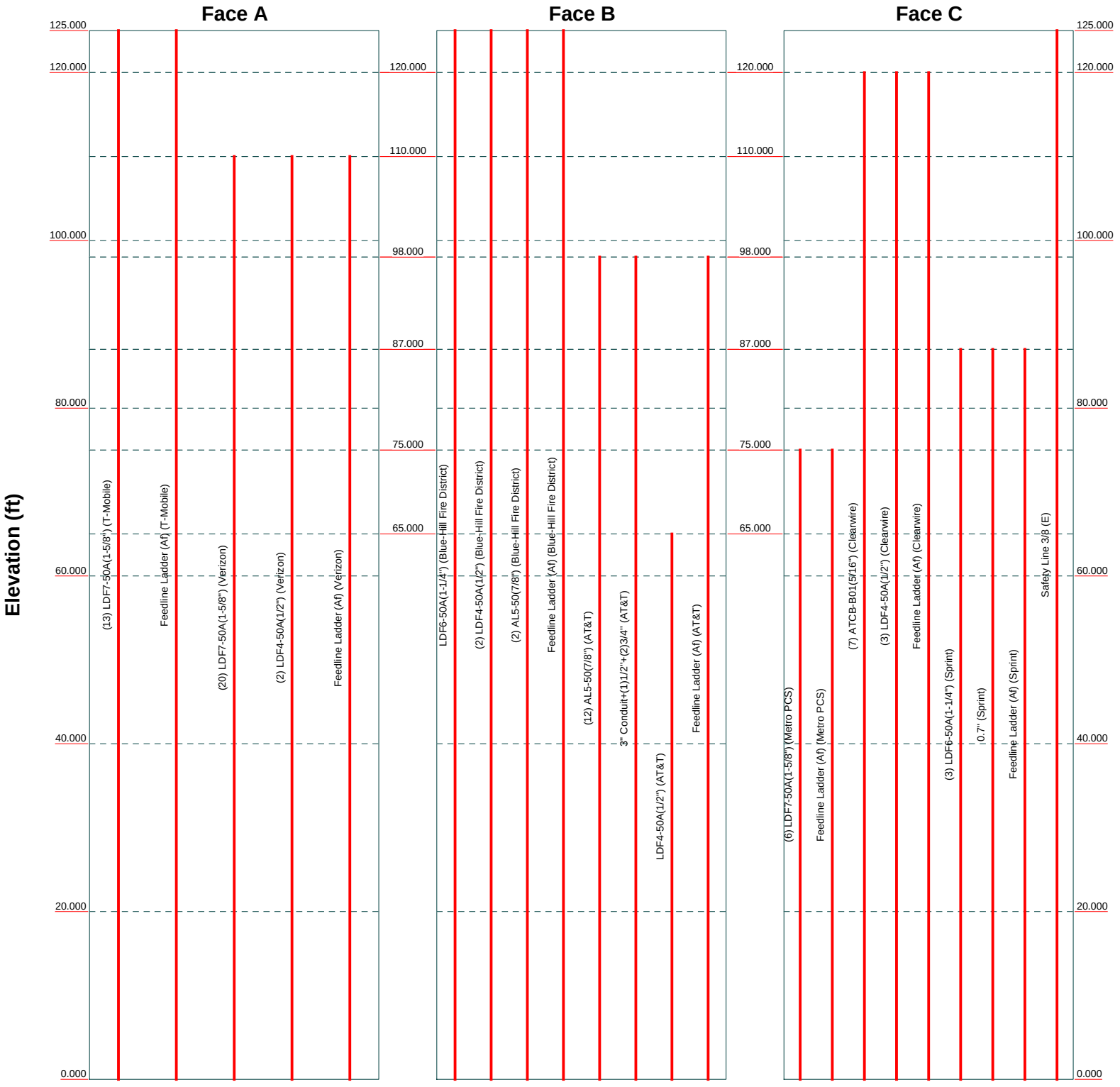


Allpro Consulting Group Inc.
9221 Lyndon B, Johnson Freeway. #204
Dalla,TX 75243
Phone: 972-231-8893
FAX: 866-364-8375

Job: ***CT01725-A-02/Bloomfield, CT***			
Project: ***ACGI# 16-4565***			
Client: SBA Network Services	Drawn by: Txiang	App'd:	
Code: TIA-222-G	Date: 12/09/16	Scale: NTS	
Path: P:\2016\Structural\16-4565 CT01725-A-02 Bloomfield\Tnx Tower\CT01725-A-02_Bloomfield_AT&T.tnx.16.tRI		Dwg No. E-5	

Feed Line Distribution Chart
0' - 125'

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



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Path: P:\2016\Structural\16-4565 CT01725-A-02 Bloomfield\Tnx Tower\CT01725-A-02_Bloomfield_AT&T.tnx.16.1RI		Dwg No. E-7	

TNX TOWER CALCULATION PRINTOUT

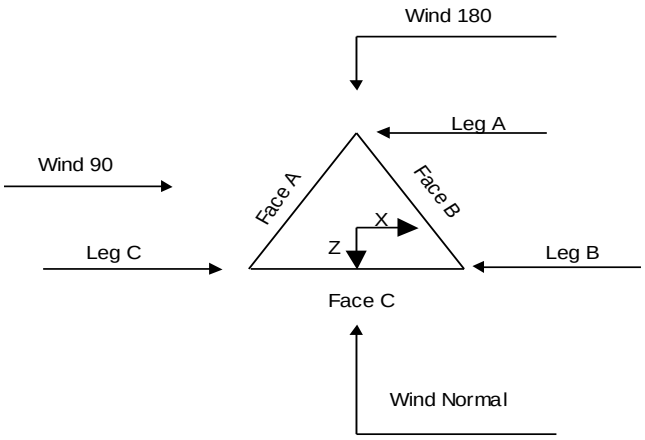
Tower Input Data

The main tower is a 3x free standing tower with an overall height of 125.000 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 3.500 ft at the top and 12.500 ft at the base.
This tower is designed using the TIA-222-G standard.
The following design criteria apply:

Tower is located in Hartford County, Connecticut.
ASCE 7-10 Wind Data is used (wind speeds converted to nominal values).
Basic wind speed of 95 mph.
Structure Class II.
Exposure Category B.
Topographic Category 1.
Crest Height 0.000 ft.
Nominal ice thickness of 1.000 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.
A non-linear (P-delta) analysis was used.
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				



Triangular Tower

Tower Section Geometry

Tower Section	Tower Elevation	Assembly Database	Description	Section Width	Number of Sections	Section Length
	ft			ft		ft
T1	125.000-120.000			3.500	1	5.000
T2	120.000-100.000			3.500	1	20.000
T3	100.000-80.000			5.000	1	20.000
T4	80.000-60.000			6.500	1	20.000
T5	60.000-40.000			8.000	1	20.000
T6	40.000-20.000			9.500	1	20.000
T7	20.000-0.000			11.000	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	125.000-120.000	2.500	TX Brace	No	Yes	0.000	0.000
T2	120.000-100.000	5.000	X Brace	No	No	0.000	0.000
T3	100.000-80.000	5.000	X Brace	No	No	0.000	0.000
T4	80.000-60.000	6.667	X Brace	No	No	0.000	0.000
T5	60.000-40.000	6.667	X Brace	No	No	0.000	0.000
T6	40.000-20.000	10.000	X Brace	No	Yes	0.000	0.000
T7	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 125.000-120.000	Pipe	P2.5x.203	A572-55 (55 ksi)	Solid Round	5/8	A36 (36 ksi)
T2 120.000-100.000	Pipe	P2.5x.203	A572-55 (55 ksi)	Equal Angle	L1 1/2x1 1/2x3/16	A36 (36 ksi)
T3 100.000-80.000	Pipe	P3.5x.226	A572-55 (55 ksi)	Equal Angle	L2x2x3/16	A36 (36 ksi)
T4 80.000-60.000	Pipe	P5x.258	A572-55 (55 ksi)	Equal Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T5 60.000-40.000	Pipe	P6x.28	A572-55 (55 ksi)	Equal Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T6 40.000-20.000	Pipe	P6x.28	A572-55 (55 ksi)	Equal Angle	L3x3x3/16	A36 (36 ksi)
T7 20.000-0.000	Pipe	P8x.322	A572-55 (55 ksi)	Equal Angle	L3 1/2x3 1/2x1/4	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 125.000-120.000	Equal Angle	L1 1/2x1 1/2x3/16	A36 (36 ksi)	Equal Angle	L1 1/2x1 1/2x3/16	A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	*No. of Mid Girts*	*Mid Girt Type*	*Mid Girt Size*	*Mid Girt Grade*	*Horizontal Type*	*Horizontal Size*	*Horizontal Grade*
T1 125.000-120.000	None	Single Angle		A36 (36 ksi)	Equal Angle	L1 1/2x1 1/2x3/16	A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	*Secondary Horizontal Type*	*Secondary Horizontal Size*	*Secondary Horizontal Grade*	*Inner Bracing Type*	*Inner Bracing Size*	*Inner Bracing Grade*
T6 40.000-20.000	Single Angle	L3x3x1/4	A36 (36 ksi)	Solid Round		A572-50 (50 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 125.000-120.000	0.000	0.000	A36 (36 ksi)	1	1	1.05	0.000	0.000	36.000
T2 120.000-100.000	0.000	0.000	A36 (36 ksi)	1	1	1.05	0.000	0.000	36.000
T3 100.000-80.000	0.000	0.000	A36 (36 ksi)	1	1	1.05	0.000	0.000	36.000
T4 80.000-60.000	0.000	0.000	A36 (36 ksi)	1	1	1.05	0.000	0.000	36.000
T5 60.000-40.000	0.000	0.000	A36 (36 ksi)	1	1	1.05	0.000	0.000	36.000
T6 40.000-20.000	0.000	0.000	A36 (36 ksi)	1	1	1.05	0.000	0.000	36.000
T7 20.000-0.000	0.000	0.000	A36 (36 ksi)	1	1	1.05	0.000	0.000	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 125.000-120.000	Yes	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T2 120.000-100.000	Yes	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T3 100.000-80.000	Yes	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T4 80.000-60.000	Yes	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T5 60.000-40.000	Yes	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T6 40.000-20.000	Yes	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T7 20.000-0.000	Yes	No	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 125.000-120.000	0.000	1	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T2 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
T3 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
T4 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
T5 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
T6 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
T7 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 125.000-120.000	Flange	0.750 A325N	4	0.500 A325X	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0
T2 120.000-100.000	Flange	0.750 A325N	6	0.500 A325X	1	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0
T3 100.000-80.000	Flange	1.000 A325N	6	0.500 A325X	1	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0
T4 80.000-60.000	Flange	1.000 A325N	8	0.500 A325X	1	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0
T5 60.000-40.000	Flange	1.000 A325N	8	0.625 A325X	1	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0
T6 40.000-20.000	Flange	1.250 A325N	8	0.625 A325X	1	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0
T7 20.000-0.000	Flange	1.500 A36	8	0.625 A325X	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
LDF7-50A(1-5/8") (T-Mobile)	A	No	Ar (CaAa)	125.000 - 0.000	0.000	0	13	6	0.500	1.980		0.001
Feedline Ladder (Af) (T-Mobile) **#**	A	No	Af (CaAa)	125.000 - 0.000	0.000	0	1	1	3.000	1.500		0.008
LDF6-50A(1-1/4") (Blue-Hill Fire District)	B	No	Ar (CaAa)	125.000 - 0.000	-0.500	0.4	1	1	0.850 0.750	1.550		0.001
LDF4-50A(1/2") (Blue-Hill Fire District)	B	No	Ar (CaAa)	125.000 - 0.000	-0.500	0.37	2	2	0.630	0.630		0.000
AL5-50(7/8") (Blue-Hill Fire District)	B	No	Ar (CaAa)	125.000 - 0.000	-0.500	0.35	2	2	0.850 0.750	1.100		0.000
Feedline Ladder (Af) (Blue-Hill Fire District) **#**	B	No	Af (CaAa)	125.000 - 0.000	-0.500	0.33	1	1	3.000	3.000		0.008
LDF7-50A(1-5/8") (Verizon)	A	No	Ar (CaAa)	110.000 - 0.000	-3.000	0.23	20	10	0.500	1.980		0.001
LDF4-50A(1/2") (Verizon)	A	No	Ar (CaAa)	110.000 - 0.000	-1.500	0.33	2	1	0.500	0.630		0.000
Feedline Ladder (Af) (Verizon) **#**	A	No	Af (CaAa)	110.000 - 0.000	-0.500	0.3	1	1	3.000	1.500		0.008
LDF7-50A(1-5/8") (Metro PCS)	C	No	Ar (CaAa)	75.000 - 0.000	0.000	0.42	6	3	0.500	1.980		0.001
Feedline Ladder (Af) (Metro PCS)	C	No	Af (CaAa)	75.000 - 0.000	0.000	0.42	1	1	3.000	3.000		0.008
ATCB-B01(5/16") (Clearwire)	C	No	Ar (CaAa)	120.000 - 0.000	0.000	0.085	7	4	0.315	0.315		0.000
LDF4-50A(1/2") (Clearwire)	C	No	Ar (CaAa)	120.000 - 0.000	0.000	0.1	3	3	0.500	0.630		0.000
Feedline Ladder (Af) (Clearwire) **#**	C	No	Af (CaAa)	120.000 - 0.000	0.000	0.05	1	1	3.000	3.000		0.008
AL5-50(7/8") (AT&T)	B	No	Ar (CaAa)	98.000 - 0.000	0.000	0.3	12	8	0.850 0.750	1.100		0.000
3" Conduit+(1)1/2"+(2)3/4" (AT&T)	B	No	Ar (CaAa)	98.000 - 0.000	0.000	0.23	1	1	3.000	3.000		0.004
LDF4-50A(1/2") (AT&T)	B	No	Ar (CaAa)	65.000 - 0.000	0.000	0.23	1	1	0.500	0.630		0.000
Feedline Ladder (Af) (AT&T)	B	No	Af (CaAa)	98.000 - 0.000	0.000	0.25	1	1	3.000	3.000		0.008

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
#												
LDF6-50A(1-1/4") (Sprint)	C	No	Ar (CaAa)	87.000 - 0.000	-0.500	0.05	3	3	0.850 0.750	1.550		0.001
0.7" (Sprint)	C	No	Ar (CaAa)	87.000 - 0.000	-0.500	0.025	1	1	0.630	0.700		0.000
Feedline Ladder (Af) (Sprint)	C	No	Af (CaAa)	87.000 - 0.000	-0.500	0	1	1	3.000	3.000		0.008
#												
Safety Line 3/8 (E)	C	No	Ar (CaAa)	125.000 - 0.000	0.000	0	1	1	0.375	0.375		0.000

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number	C_AA_A ft^2/ft	Weight klf
#							

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
T1	125.000-120.000	A	0.000	0.000	14.120	0.000	0.095
		B	0.000	0.000	5.005	0.000	0.049
		C	0.000	0.000	0.188	0.000	0.001
T2	120.000-100.000	A	0.000	0.000	99.840	0.000	0.632
		B	0.000	0.000	20.020	0.000	0.198
		C	0.000	0.000	18.940	0.000	0.192
T3	100.000-80.000	A	0.000	0.000	143.200	0.000	0.883
		B	0.000	0.000	58.180	0.000	0.471
		C	0.000	0.000	26.185	0.000	0.266
T4	80.000-60.000	A	0.000	0.000	143.200	0.000	0.883
		B	0.000	0.000	62.735	0.000	0.502
		C	0.000	0.000	64.960	0.000	0.603
T5	60.000-40.000	A	0.000	0.000	143.200	0.000	0.883
		B	0.000	0.000	63.680	0.000	0.504
		C	0.000	0.000	73.400	0.000	0.670
T6	40.000-20.000	A	0.000	0.000	143.200	0.000	0.883
		B	0.000	0.000	63.680	0.000	0.504
		C	0.000	0.000	73.400	0.000	0.670
T7	20.000-0.000	A	0.000	0.000	143.200	0.000	0.883
		B	0.000	0.000	63.680	0.000	0.504
		C	0.000	0.000	73.400	0.000	0.670

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	125.000-120.000	A	2.280	0.000	0.000	17.380	0.000	0.424
		B		0.000	0.000	18.938	0.000	0.314
		C		0.000	0.000	2.468	0.000	0.038
T2	120.000-100.000	A	2.256	0.000	0.000	124.123	0.000	2.949
		B		0.000	0.000	75.216	0.000	1.238
		C		0.000	0.000	72.963	0.000	1.174
T3	100.000-80.000	A	2.211	0.000	0.000	177.730	0.000	4.147
		B		0.000	0.000	150.765	0.000	2.796
		C		0.000	0.000	92.936	0.000	1.536
T4	80.000-60.000	A	2.156	0.000	0.000	176.186	0.000	4.062
		B		0.000	0.000	159.739	0.000	2.931
		C		0.000	0.000	170.561	0.000	3.066
T5	60.000-40.000	A	2.085	0.000	0.000	174.178	0.000	3.953
		B		0.000	0.000	164.266	0.000	2.934
		C		0.000	0.000	180.726	0.000	3.238
T6	40.000-20.000	A	1.981	0.000	0.000	171.259	0.000	3.797
		B		0.000	0.000	160.068	0.000	2.778
		C		0.000	0.000	175.767	0.000	3.068
T7	20.000-0.000	A	1.775	0.000	0.000	165.473	0.000	3.497
		B		0.000	0.000	151.742	0.000	2.482
		C		0.000	0.000	165.934	0.000	2.747

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
T1	125.000-120.000	-0.582	-0.435	0.979	0.437
T2	120.000-100.000	-0.820	-0.929	0.125	0.060
T3	100.000-80.000	0.308	-1.143	1.041	-0.162
T4	80.000-60.000	-0.323	-0.347	0.578	0.562
T5	60.000-40.000	-0.604	-0.214	0.571	0.795
T6	40.000-20.000	-0.700	-0.252	0.635	0.897
T7	20.000-0.000	-0.792	-0.288	0.686	0.997

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T1	1	LDF7-50A(1-5/8")	120.00 - 125.00	0.6000	0.1231
T1	2	Feedline Ladder (Af)	120.00 - 125.00	0.6000	0.1231
T1	4	LDF6-50A(1-1/4")	120.00 - 125.00	1.0000	1.0000
T1	5	LDF4-50A(1/2")	120.00 - 125.00	0.6000	0.1231
T1	6	AL5-50(7/8")	120.00 - 125.00	0.6000	0.1231
T1	7	Feedline Ladder (Af)	120.00 - 125.00	0.6000	0.1231

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T1	30	Safety Line 3/8	120.00 - 125.00	0.6000	0.1231
T2	1	LDF7-50A(1-5/8")	100.00 - 120.00	0.6000	0.4915
T2	2	Feedline Ladder (Af)	100.00 - 120.00	0.6000	0.4915
T2	4	LDF6-50A(1-1/4")	100.00 - 120.00	1.0000	1.0000
T2	5	LDF4-50A(1/2")	100.00 - 120.00	0.6000	0.4915
T2	6	AL5-50(7/8")	100.00 - 120.00	0.6000	0.4915
T2	7	Feedline Ladder (Af)	100.00 - 120.00	0.6000	0.4915
T2	9	LDF7-50A(1-5/8")	100.00 - 110.00	0.6000	0.4915
T2	10	LDF4-50A(1/2")	100.00 - 110.00	0.6000	0.4915
T2	11	Feedline Ladder (Af)	100.00 - 110.00	0.6000	0.4915
T2	17	ATCB-B01(5/16")	100.00 - 120.00	0.6000	0.4915
T2	18	LDF4-50A(1/2")	100.00 - 120.00	0.6000	0.4915
T2	19	Feedline Ladder (Af)	100.00 - 120.00	0.6000	0.4915
T2	30	Safety Line 3/8	100.00 - 120.00	0.6000	0.4915
T3	1	LDF7-50A(1-5/8")	80.00 - 100.00	0.6000	0.5434
T3	2	Feedline Ladder (Af)	80.00 - 100.00	0.6000	0.5434
T3	4	LDF6-50A(1-1/4")	80.00 - 100.00	1.0000	1.0000
T3	5	LDF4-50A(1/2")	80.00 - 100.00	0.6000	0.5434
T3	6	AL5-50(7/8")	80.00 - 100.00	0.6000	0.5434
T3	7	Feedline Ladder (Af)	80.00 - 100.00	0.6000	0.5434
T3	9	LDF7-50A(1-5/8")	80.00 - 100.00	0.6000	0.5434
T3	10	LDF4-50A(1/2")	80.00 - 100.00	0.6000	0.5434
T3	11	Feedline Ladder (Af)	80.00 - 100.00	0.6000	0.5434
T3	17	ATCB-B01(5/16")	80.00 - 100.00	0.6000	0.5434
T3	18	LDF4-50A(1/2")	80.00 - 100.00	0.6000	0.5434
T3	19	Feedline Ladder (Af)	80.00 - 100.00	0.6000	0.5434
T3	21	AL5-50(7/8")	80.00 - 98.00	0.6000	0.5434
T3	22	3" Conduit+(1)1/2"+(2)3/4"	80.00 - 98.00	0.6000	0.5434
T3	24	Feedline Ladder (Af)	80.00 - 98.00	0.6000	0.5434
T3	26	LDF6-50A(1-1/4")	80.00 - 87.00	0.6000	0.5434
T3	27	0.7"	80.00 - 87.00	0.6000	0.5434
T3	28	Feedline Ladder (Af)	80.00 - 87.00	0.6000	0.5434
T3	30	Safety Line 3/8	80.00 - 100.00	0.6000	0.5434
T4	1	LDF7-50A(1-5/8")	60.00 - 80.00	0.6000	0.6000
T4	2	Feedline Ladder (Af)	60.00 - 80.00	0.6000	0.6000
T4	4	LDF6-50A(1-1/4")	60.00 - 80.00	1.0000	1.0000
T4	5	LDF4-50A(1/2")	60.00 - 80.00	0.6000	0.6000
T4	6	AL5-50(7/8")	60.00 - 80.00	0.6000	0.6000
T4	7	Feedline Ladder (Af)	60.00 - 80.00	0.6000	0.6000
T4	9	LDF7-50A(1-5/8")	60.00 - 80.00	0.6000	0.6000
T4	10	LDF4-50A(1/2")	60.00 - 80.00	0.6000	0.6000
T4	11	Feedline Ladder (Af)	60.00 - 80.00	0.6000	0.6000
T4	13	LDF7-50A(1-5/8")	60.00 - 75.00	0.6000	0.6000
T4	14	Feedline Ladder (Af)	60.00 - 75.00	0.6000	0.6000
T4	17	ATCB-B01(5/16")	60.00 - 80.00	0.6000	0.6000
T4	18	LDF4-50A(1/2")	60.00 - 80.00	0.6000	0.6000
T4	19	Feedline Ladder (Af)	60.00 - 80.00	0.6000	0.6000
T4	21	AL5-50(7/8")	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
T4	22	3" Conduit+(1)1/2"+(2)3/4"	60.00 - 80.00	0.6000	0.6000
T4	23	LDF4-50A(1/2")	60.00 - 65.00	0.6000	0.6000
T4	24	Feedline Ladder (Af)	60.00 - 80.00	0.6000	0.6000
T4	26	LDF6-50A(1-1/4")	60.00 - 80.00	0.6000	0.6000
T4	27	0.7"	60.00 - 80.00	0.6000	0.6000
T4	28	Feedline Ladder (Af)	60.00 - 80.00	0.6000	0.6000
T4	30	Safety Line 3/8	60.00 - 80.00	0.6000	0.6000
T5	1	LDF7-50A(1-5/8")	40.00 - 60.00	0.6000	0.6000
T5	2	Feedline Ladder (Af)	40.00 - 60.00	0.6000	0.6000
T5	4	LDF6-50A(1-1/4")	40.00 - 60.00	1.0000	1.0000
T5	5	LDF4-50A(1/2")	40.00 - 60.00	0.6000	0.6000
T5	6	AL5-50(7/8")	40.00 - 60.00	0.6000	0.6000
T5	7	Feedline Ladder (Af)	40.00 - 60.00	0.6000	0.6000
T5	9	LDF7-50A(1-5/8")	40.00 - 60.00	0.6000	0.6000
T5	10	LDF4-50A(1/2")	40.00 - 60.00	0.6000	0.6000
T5	11	Feedline Ladder (Af)	40.00 - 60.00	0.6000	0.6000
T5	13	LDF7-50A(1-5/8")	40.00 - 60.00	0.6000	0.6000
T5	14	Feedline Ladder (Af)	40.00 - 60.00	0.6000	0.6000
T5	17	ATCB-B01(5/16")	40.00 - 60.00	0.6000	0.6000
T5	18	LDF4-50A(1/2")	40.00 - 60.00	0.6000	0.6000
T5	19	Feedline Ladder (Af)	40.00 - 60.00	0.6000	0.6000
T5	21	AL5-50(7/8")	40.00 - 60.00	0.6000	0.6000
T5	22	3" Conduit+(1)1/2"+(2)3/4"	40.00 - 60.00	0.6000	0.6000
T5	23	LDF4-50A(1/2")	40.00 - 60.00	0.6000	0.6000
T5	24	Feedline Ladder (Af)	40.00 - 60.00	0.6000	0.6000
T5	26	LDF6-50A(1-1/4")	40.00 - 60.00	0.6000	0.6000
T5	27	0.7"	40.00 - 60.00	0.6000	0.6000
T5	28	Feedline Ladder (Af)	40.00 - 60.00	0.6000	0.6000
T5	30	Safety Line 3/8	40.00 - 60.00	0.6000	0.6000
T6	1	LDF7-50A(1-5/8")	20.00 - 40.00	0.6000	0.6000
T6	2	Feedline Ladder (Af)	20.00 - 40.00	0.6000	0.6000
T6	4	LDF6-50A(1-1/4")	20.00 - 40.00	1.0000	1.0000
T6	5	LDF4-50A(1/2")	20.00 - 40.00	0.6000	0.6000
T6	6	AL5-50(7/8")	20.00 - 40.00	0.6000	0.6000
T6	7	Feedline Ladder (Af)	20.00 - 40.00	0.6000	0.6000
T6	9	LDF7-50A(1-5/8")	20.00 - 40.00	0.6000	0.6000
T6	10	LDF4-50A(1/2")	20.00 - 40.00	0.6000	0.6000
T6	11	Feedline Ladder (Af)	20.00 - 40.00	0.6000	0.6000
T6	13	LDF7-50A(1-5/8")	20.00 - 40.00	0.6000	0.6000
T6	14	Feedline Ladder (Af)	20.00 - 40.00	0.6000	0.6000
T6	17	ATCB-B01(5/16")	20.00 - 40.00	0.6000	0.6000
T6	18	LDF4-50A(1/2")	20.00 - 40.00	0.6000	0.6000
T6	19	Feedline Ladder (Af)	20.00 - 40.00	0.6000	0.6000
T6	21	AL5-50(7/8")	20.00 - 40.00	0.6000	0.6000
T6	22	3" Conduit+(1)1/2"+(2)3/4"	20.00 - 40.00	0.6000	0.6000
T6	23	LDF4-50A(1/2")	20.00 - 40.00	0.6000	0.6000
T6	24	Feedline Ladder (Af)	20.00 - 40.00	0.6000	0.6000
T6	26	LDF6-50A(1-1/4")	20.00 - 40.00	0.6000	0.6000
T6	27	0.7"	20.00 - 40.00	0.6000	0.6000
T6	28	Feedline Ladder (Af)	20.00 - 40.00	0.6000	0.6000
T6	30	Safety Line 3/8	20.00 - 40.00	0.6000	0.6000
T7	1	LDF7-50A(1-5/8")	0.00 - 20.00	0.6000	0.6000
T7	2	Feedline Ladder (Af)	0.00 - 20.00	0.6000	0.6000
T7	4	LDF6-50A(1-1/4")	0.00 - 20.00	1.0000	1.0000
T7	5	LDF4-50A(1/2")	0.00 - 20.00	0.6000	0.6000
T7	6	AL5-50(7/8")	0.00 - 20.00	0.6000	0.6000
T7	7	Feedline Ladder (Af)	0.00 - 20.00	0.6000	0.6000
T7	9	LDF7-50A(1-5/8")	0.00 - 20.00	0.6000	0.6000
T7	10	LDF4-50A(1/2")	0.00 - 20.00	0.6000	0.6000
T7	11	Feedline Ladder (Af)	0.00 - 20.00	0.6000	0.6000
T7	13	LDF7-50A(1-5/8")	0.00 - 20.00	0.6000	0.6000
T7	14	Feedline Ladder (Af)	0.00 - 20.00	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T7	17	ATCB-B01(5/16")	0.00 - 20.00	0.6000	0.6000
T7	18	LDF4-50A(1/2")	0.00 - 20.00	0.6000	0.6000
T7	19	Feedline Ladder (Af)	0.00 - 20.00	0.6000	0.6000
T7	21	AL5-50(7/8")	0.00 - 20.00	0.6000	0.6000
T7	22	3" Conduit+(1)1/2"+(2)3/4"	0.00 - 20.00	0.6000	0.6000
T7	23	LDF4-50A(1/2")	0.00 - 20.00	0.6000	0.6000
T7	24	Feedline Ladder (Af)	0.00 - 20.00	0.6000	0.6000
T7	26	LDF6-50A(1-1/4")	0.00 - 20.00	0.6000	0.6000
T7	27	0.7"	0.00 - 20.00	0.6000	0.6000
T7	28	Feedline Ladder (Af)	0.00 - 20.00	0.6000	0.6000
T7	30	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
Lightning Rod 5/8" x 5' (E)	B	From Leg	3.000 0.000 5.500	0.000	125.000	No Ice 1/2" Ice 1" Ice	0.313 0.826 1.322	0.313 0.826 1.322	0.031 0.035 0.041
Flash Beacon Lighting (E) **#**	C	From Leg	3.000 0.000 1.000	0.000	125.000	No Ice 1/2" Ice 1" Ice	2.700 3.100 3.500	2.700 3.100 3.500	0.050 0.070 0.090
(2) PD455 (Blue-Hills Fire District)	A	From Leg	3.000 0.000 10.000	0.000	125.000	No Ice 1/2" Ice 1" Ice	3.560 7.130 10.700	3.560 7.130 10.700	0.023 0.046 0.069
(3) PD455 (Blue-Hills Fire District & Bloomfield Police)	B	From Leg	3.000 0.000 10.000	0.000	125.000	No Ice 1/2" Ice 1" Ice	3.560 7.130 10.700	3.560 7.130 10.700	0.023 0.046 0.069
(2) PD455 (Blue-Hills Fire District)	C	From Leg	3.000 0.000 10.000	0.000	125.000	No Ice 1/2" Ice 1" Ice	3.560 7.130 10.700	3.560 7.130 10.700	0.023 0.046 0.069
Cellwave AS MONR 31 (Blue-Hills Fire District)	A	From Leg	3.000 0.000 2.000	0.000	125.000	No Ice 1/2" Ice 1" Ice	0.944 1.393 1.801	0.944 1.393 1.801	0.022 0.033 0.047
Cellwave PD165S (Blue-Hills Fire District) **#**	C	From Leg	3.000 0.000 2.000	0.000	125.000	No Ice 1/2" Ice 1" Ice	0.944 1.393 1.801	0.944 1.393 1.801	0.022 0.033 0.047
AIR21 B2A/B4P w/ Mount Pipe (T-Mobile)	A	From Leg	3.000 0.000 0.000	0.000	125.000	No Ice 1/2" Ice 1" Ice	6.533 6.978 7.432	4.356 4.775 5.202	0.070 0.112 0.159
AIR21 B2A/B4P w/ Mount Pipe (T-Mobile)	B	From Leg	3.000 0.000 0.000	0.000	125.000	No Ice 1/2" Ice 1" Ice	6.533 6.978 7.432	4.356 4.775 5.202	0.070 0.112 0.159
AIR21 B2A/B4P w/ Mount Pipe (T-Mobile)	C	From Leg	3.000 0.000 0.000	0.000	125.000	No Ice 1/2" Ice 1" Ice	6.533 6.978 7.432	4.356 4.775 5.202	0.070 0.112 0.159
AIR21 B4A/B2P w/ Mount Pipe	A	From Leg	3.000 0.000	0.000	125.000	No Ice 1/2" Ice	6.840 7.397	5.681 6.581	0.044 0.101

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*
(T-Mobile)			0.000			1" Ice	7.932	7.376	0.165
AIR21 B4A/B2P w/ Mount Pipe	B	From Leg	3.000	0.000	125.000	No Ice	6.840	5.681	0.044
			0.000			1/2" Ice	7.397	6.581	0.101
(T-Mobile)			0.000			1" Ice	7.932	7.376	0.165
AIR21 B4A/B2P w/ Mount Pipe	C	From Leg	3.000	0.000	125.000	No Ice	6.840	5.681	0.044
			0.000			1/2" Ice	7.397	6.581	0.101
(T-Mobile)			0.000			1" Ice	7.932	7.376	0.165
KRY 112 144/1	A	From Leg	3.000	0.000	125.000	No Ice	0.408	0.204	0.011
(T-Mobile)			0.000			1/2" Ice	0.497	0.273	0.014
			0.000			1" Ice	0.594	0.351	0.019
KRY 112 144/1	B	From Leg	3.000	0.000	125.000	No Ice	0.408	0.204	0.011
(T-Mobile)			0.000			1/2" Ice	0.497	0.273	0.014
			0.000			1" Ice	0.594	0.351	0.019
KRY 112 144/1	C	From Leg	3.000	0.000	125.000	No Ice	0.408	0.204	0.011
(T-Mobile)			0.000			1/2" Ice	0.497	0.273	0.014
			0.000			1" Ice	0.594	0.351	0.019
LNX-6515DS-A1M w/ Mount Pipe	A	From Leg	3.000	0.000	125.000	No Ice	11.683	9.842	0.083
			0.000			1/2" Ice	12.404	11.366	0.173
(T-Mobile)			0.000			1" Ice	13.135	12.914	0.273
LNX-6515DS-A1M w/ Mount Pipe	B	From Leg	3.000	0.000	125.000	No Ice	11.683	9.842	0.083
			0.000			1/2" Ice	12.404	11.366	0.173
(T-Mobile)			0.000			1" Ice	13.135	12.914	0.273
LNX-6515DS-A1M w/ Mount Pipe	C	From Leg	3.000	0.000	125.000	No Ice	11.683	9.842	0.083
			0.000			1/2" Ice	12.404	11.366	0.173
(T-Mobile)			0.000			1" Ice	13.135	12.914	0.273
S11B12	A	From Leg	3.000	0.000	125.000	No Ice	3.306	1.361	0.051
(T-Mobile)			0.000			1/2" Ice	3.550	1.540	0.072
			0.000			1" Ice	3.802	1.728	0.096
S11B12	B	From Leg	3.000	0.000	125.000	No Ice	3.306	1.361	0.051
(T-Mobile)			0.000			1/2" Ice	3.550	1.540	0.072
			0.000			1" Ice	3.802	1.728	0.096
S11B12	C	From Leg	3.000	0.000	125.000	No Ice	3.306	1.361	0.051
(T-Mobile)			0.000			1/2" Ice	3.550	1.540	0.072
			0.000			1" Ice	3.802	1.728	0.096
Platform Mount [LP 602-1]	C	None		0.000	125.000	No Ice	32.030	32.030	1.343
(E)						1/2" Ice	38.710	38.710	1.800
						1" Ice	45.390	45.390	2.257
#									
840 10054 w/ Mount Pipe	A	From Leg	3.000	0.000	120.000	No Ice	5.413	2.385	0.051
(Clearwire)			0.000			1/2" Ice	5.833	2.917	0.088
			0.000			1" Ice	6.263	3.466	0.129
840 10054 w/ Mount Pipe	B	From Leg	3.000	0.000	120.000	No Ice	5.413	2.385	0.051
(Clearwire)			0.000			1/2" Ice	5.833	2.917	0.088
			0.000			1" Ice	6.263	3.466	0.129
840 10054 w/ Mount Pipe	C	From Leg	3.000	0.000	120.000	No Ice	5.413	2.385	0.051
(Clearwire)			0.000			1/2" Ice	5.833	2.917	0.088
			0.000			1" Ice	6.263	3.466	0.129
U-RAS	A	From Leg	3.000	0.000	120.000	No Ice	1.804	0.778	0.030
(Clearwire)			0.000			1/2" Ice	1.988	0.918	0.045
			0.000			1" Ice	2.180	1.067	0.058
U-RAS	B	From Leg	3.000	0.000	120.000	No Ice	1.804	0.778	0.030
(Clearwire)			0.000			1/2" Ice	1.988	0.918	0.045
			0.000			1" Ice	2.180	1.067	0.058
HORIZON DUO	A	From Leg	3.000	0.000	120.000	No Ice	0.547	0.343	0.007
(Clearwire)			0.000			1/2" Ice	0.648	0.426	0.012
			0.000			1" Ice	0.759	0.518	0.018
HORIZON DUO	C	From Leg	3.000	0.000	120.000	No Ice	0.547	0.343	0.007

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*
(Clearwire)			0.000			1/2" Ice	0.648	0.426	0.012
			0.000			1" Ice	0.759	0.518	0.018
4' x 2" Pipe Mount	A	From Leg	3.000	0.000	120.000	No Ice	0.785	0.785	0.029
(Clearwire)			0.000			1/2" Ice	1.028	1.028	0.035
			0.000			1" Ice	1.281	1.281	0.044
4' x 2" Pipe Mount	B	From Leg	3.000	0.000	120.000	No Ice	0.785	0.785	0.029
(Clearwire)			0.000			1/2" Ice	1.028	1.028	0.035
			0.000			1" Ice	1.281	1.281	0.044
4' x 2" Pipe Mount	C	From Leg	3.000	0.000	120.000	No Ice	0.785	0.785	0.029
(Clearwire)			0.000			1/2" Ice	1.028	1.028	0.035
			0.000			1" Ice	1.281	1.281	0.044
Sector Mount [SM 402-3]	C	None		0.000	120.000	No Ice	18.910	18.910	0.851
(E-2PIPIES/SEC)						1/2" Ice	26.780	26.780	1.233
						1" Ice	34.650	34.650	1.616
#									
GPS_A	A	From Leg	3.000	0.000	110.000	No Ice	0.297	0.297	0.001
(Verizon)			0.000			1/2" Ice	0.374	0.374	0.005
			3.000			1" Ice	0.459	0.459	0.010
GPS_A	B	From Leg	3.000	0.000	110.000	No Ice	0.297	0.297	0.001
(Verizon)			0.000			1/2" Ice	0.374	0.374	0.005
			3.000			1" Ice	0.459	0.459	0.010
BXA-70063-4CF-EDIN-6 w/	A	From Leg	3.000	0.000	110.000	No Ice	5.399	3.693	0.028
Mount Pipe			0.000			1/2" Ice	5.844	4.295	0.070
(Verizon)			3.000			1" Ice	6.299	4.913	0.118
BXA-70063-4CF-EDIN-6 w/	B	From Leg	3.000	0.000	110.000	No Ice	5.399	3.693	0.028
Mount Pipe			0.000			1/2" Ice	5.844	4.295	0.070
(Verizon)			3.000			1" Ice	6.299	4.913	0.118
BXA-70063-4CF-EDIN-6 w/	C	From Leg	3.000	0.000	110.000	No Ice	5.399	3.693	0.028
Mount Pipe			0.000			1/2" Ice	5.844	4.295	0.070
(Verizon)			3.000			1" Ice	6.299	4.913	0.118
DB-T1-6Z-8AB-0Z	C	From Leg	3.000	0.000	110.000	No Ice	5.600	2.333	0.044
(Verizon)			0.000			1/2" Ice	5.915	2.558	0.080
			3.000			1" Ice	6.240	2.791	0.120
(3) SBNHH-1D65B w/	A	From Leg	3.000	0.000	110.000	No Ice	8.637	7.071	0.066
Mount Pipe			0.000			1/2" Ice	9.293	8.260	0.135
(Verizon)			3.000			1" Ice	9.917	9.170	0.212
(3) SBNHH-1D65B w/	B	From Leg	3.000	0.000	110.000	No Ice	8.637	7.071	0.066
Mount Pipe			0.000			1/2" Ice	9.293	8.260	0.135
(Verizon)			3.000			1" Ice	9.917	9.170	0.212
(3) SBNHH-1D65B w/	C	From Leg	3.000	0.000	110.000	No Ice	8.637	7.071	0.066
Mount Pipe			0.000			1/2" Ice	9.293	8.260	0.135
(Verizon)			3.000			1" Ice	9.917	9.170	0.212
RRH2x60-AWS	A	From Leg	3.000	0.000	110.000	No Ice	3.957	1.816	0.060
(Verizon)			0.000			1/2" Ice	4.272	2.075	0.083
			3.000			1" Ice	4.596	2.360	0.109
RRH2x60-AWS	B	From Leg	3.000	0.000	110.000	No Ice	3.957	1.816	0.060
(Verizon)			0.000			1/2" Ice	4.272	2.075	0.083
			3.000			1" Ice	4.596	2.360	0.109
RRH2x60-AWS	C	From Leg	3.000	0.000	110.000	No Ice	3.957	1.816	0.060
(Verizon)			0.000			1/2" Ice	4.272	2.075	0.083
			3.000			1" Ice	4.596	2.360	0.109
RRH2x60-700	A	From Leg	3.000	0.000	110.000	No Ice	3.957	1.816	0.060
(Verizon)			0.000			1/2" Ice	4.272	2.075	0.083
			3.000			1" Ice	4.596	2.360	0.109
RRH2x60-700	B	From Leg	3.000	0.000	110.000	No Ice	3.957	1.816	0.060
(Verizon)			0.000			1/2" Ice	4.272	2.075	0.083
			3.000			1" Ice	4.596	2.360	0.109

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
RRH2x60-700	C	From Leg	3.000	0.000	110.000	No Ice	3.957	1.816	0.060
(Verizon)			0.000			1/2" Ice	4.272	2.075	0.083
			3.000			1" Ice	4.596	2.360	0.109
RRH 4x45-PCS	A	From Leg	3.000	0.000	110.000	No Ice	2.698	2.771	0.060
(Verizon)			0.000			1/2" Ice	2.936	3.011	0.084
			3.000			1" Ice	3.183	3.260	0.111
RRH 4x45-PCS	B	From Leg	3.000	0.000	110.000	No Ice	2.698	2.771	0.060
(Verizon)			0.000			1/2" Ice	2.936	3.011	0.084
			3.000			1" Ice	3.183	3.260	0.111
RRH 4x45-PCS	C	From Leg	3.000	0.000	110.000	No Ice	2.698	2.771	0.060
(Verizon)			0.000			1/2" Ice	2.936	3.011	0.084
			3.000			1" Ice	3.183	3.260	0.111
Sector Mount [SM 802-3]	C	None		0.000	110.000	No Ice	24.410	24.410	0.930
(E)						1/2" Ice	31.390	31.390	1.362
						1" Ice	38.370	38.370	1.794
#									
(2) 7770.00 w/ Mount Pipe	A	From Leg	3.000	0.000	98.000	No Ice	6.119	4.254	0.055
(AT&T)			0.000			1/2" Ice	6.626	5.014	0.103
			0.000			1" Ice	7.128	5.711	0.157
(2) 7770.00 w/ Mount Pipe	B	From Leg	3.000	0.000	98.000	No Ice	6.119	4.254	0.055
(AT&T)			0.000			1/2" Ice	6.626	5.014	0.103
			0.000			1" Ice	7.128	5.711	0.157
(2) 7770.00 w/ Mount Pipe	C	From Leg	3.000	0.000	98.000	No Ice	6.119	4.254	0.055
(AT&T)			0.000			1/2" Ice	6.626	5.014	0.103
			0.000			1" Ice	7.128	5.711	0.157
HPA-65R-BUU-H8	A	From Leg	3.000	0.000	98.000	No Ice	12.976	7.516	0.068
(AT&T)			0.000			1/2" Ice	13.558	8.087	0.142
			0.000			1" Ice	14.147	8.666	0.223
HPA-65R-BUU-H8	B	From Leg	3.000	0.000	98.000	No Ice	12.976	7.516	0.068
(AT&T)			0.000			1/2" Ice	13.558	8.087	0.142
			0.000			1" Ice	14.147	8.666	0.223
HPA-65R-BUU-H6	C	From Leg	3.000	0.000	98.000	No Ice	9.486	5.486	0.043
(AT&T)			0.000			1/2" Ice	9.956	5.942	0.100
			0.000			1" Ice	10.434	6.405	0.164
(2) LGP21401	A	From Leg	3.000	0.000	98.000	No Ice	1.288	0.233	0.014
(AT&T)			0.000			1/2" Ice	1.445	0.313	0.021
			0.000			1" Ice	1.611	0.403	0.030
(2) LGP21401	B	From Leg	3.000	0.000	98.000	No Ice	1.288	0.233	0.014
(AT&T)			0.000			1/2" Ice	1.445	0.313	0.021
			0.000			1" Ice	1.611	0.403	0.030
(2) LGP21401	C	From Leg	3.000	0.000	98.000	No Ice	1.288	0.233	0.014
(AT&T)			0.000			1/2" Ice	1.445	0.313	0.021
			0.000			1" Ice	1.611	0.403	0.030
(2) RRUS-11	A	From Leg	3.000	0.000	98.000	No Ice	3.249	1.373	0.048
(AT&T)			0.000			1/2" Ice	3.491	1.551	0.068
			0.000			1" Ice	3.741	1.738	0.092
(2) RRUS-11	B	From Leg	3.000	0.000	98.000	No Ice	3.249	1.373	0.048
(AT&T)			0.000			1/2" Ice	3.491	1.551	0.068
			0.000			1" Ice	3.741	1.738	0.092
(2) RRUS-11	C	From Leg	3.000	0.000	98.000	No Ice	3.249	1.373	0.048
(AT&T)			0.000			1/2" Ice	3.491	1.551	0.068
			0.000			1" Ice	3.741	1.738	0.092
DC6-48-60-18-8F	C	From Leg	3.000	0.000	98.000	No Ice	1.467	1.467	0.019
(AT&T)			0.000			1/2" Ice	1.667	1.667	0.037
			0.000			1" Ice	1.878	1.878	0.057
CS72188.01 LMU antenna	C	From Leg	3.000	0.000	65.000	No Ice	0.200	0.200	0.000
(AT&T)			0.000			1/2" Ice	0.300	0.300	0.000

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft	Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.000				1" Ice	0.400	0.400	0.001
Sector Mount [SM 802-3]	C	None			0.000	98.000	No Ice	24.410	24.410	0.930
(E)							1/2" Ice	31.390	31.390	1.362
							1" Ice	38.370	38.370	1.794
#										
#										
APXVSPP18-C-A20 w/	A	From Leg	3.000		0.000	87.000	No Ice	8.498	6.946	0.083
Mount Pipe			0.000				1/2" Ice	9.149	8.127	0.151
(Sprint)			0.000				1" Ice	9.767	9.021	0.227
APXVSPP18-C-A20 w/	B	From Leg	3.000		0.000	87.000	No Ice	8.498	6.946	0.083
Mount Pipe			0.000				1/2" Ice	9.149	8.127	0.151
(Sprint)			0.000				1" Ice	9.767	9.021	0.227
APXVSPP18-C-A20 w/	C	From Leg	3.000		0.000	87.000	No Ice	8.498	6.946	0.083
Mount Pipe			0.000				1/2" Ice	9.149	8.127	0.151
(Sprint)			0.000				1" Ice	9.767	9.021	0.227
APXVTM14-C-120 w/	A	From Leg	3.000		0.000	87.000	No Ice	7.134	4.959	0.077
Mount Pipe			0.000				1/2" Ice	7.662	5.754	0.131
(Sprint)			0.000				1" Ice	8.183	6.472	0.193
APXVTM14-C-120 w/	B	From Leg	3.000		0.000	87.000	No Ice	7.134	4.959	0.077
Mount Pipe			0.000				1/2" Ice	7.662	5.754	0.131
(Sprint)			0.000				1" Ice	8.183	6.472	0.193
APXVTM14-C-120 w/	C	From Leg	3.000		0.000	87.000	No Ice	7.134	4.959	0.077
Mount Pipe			0.000				1/2" Ice	7.662	5.754	0.131
(Sprint)			0.000				1" Ice	8.183	6.472	0.193
TD-RRH8x20-25	A	From Leg	3.000		0.000	87.000	No Ice	4.720	1.703	0.070
(Sprint)			0.000				1/2" Ice	5.014	1.920	0.097
			0.000				1" Ice	5.316	2.145	0.128
TD-RRH8x20-25	B	From Leg	3.000		0.000	87.000	No Ice	4.720	1.703	0.070
(Sprint)			0.000				1/2" Ice	5.014	1.920	0.097
			0.000				1" Ice	5.316	2.145	0.128
TD-RRH8x20-25	C	From Leg	3.000		0.000	87.000	No Ice	4.720	1.703	0.070
(Sprint)			0.000				1/2" Ice	5.014	1.920	0.097
			0.000				1" Ice	5.316	2.145	0.128
1900MHz RRH	A	From Leg	3.000		0.000	87.000	No Ice	2.907	3.801	0.044
(Sprint)			0.000				1/2" Ice	3.145	4.065	0.075
			0.000				1" Ice	3.391	4.337	0.110
1900MHz RRH	B	From Leg	3.000		0.000	87.000	No Ice	2.907	3.801	0.044
(Sprint)			0.000				1/2" Ice	3.145	4.065	0.075
			0.000				1" Ice	3.391	4.337	0.110
1900MHz RRH	C	From Leg	3.000		0.000	87.000	No Ice	2.907	3.801	0.044
(Sprint)			0.000				1/2" Ice	3.145	4.065	0.075
			0.000				1" Ice	3.391	4.337	0.110
800MHZ RRH	A	From Leg	3.000		0.000	87.000	No Ice	2.490	2.068	0.053
(Sprint)			0.000				1/2" Ice	2.706	2.271	0.074
			0.000				1" Ice	2.931	2.481	0.098
800MHZ RRH	B	From Leg	3.000		0.000	87.000	No Ice	2.490	2.068	0.053
(Sprint)			0.000				1/2" Ice	2.706	2.271	0.074
			0.000				1" Ice	2.931	2.481	0.098
800MHZ RRH	C	From Leg	3.000		0.000	87.000	No Ice	2.490	2.068	0.053
(Sprint)			0.000				1/2" Ice	2.706	2.271	0.074
			0.000				1" Ice	2.931	2.481	0.098
800 MHz Filter	A	From Leg	3.000		0.000	87.000	No Ice	1.820	0.604	0.009
(Sprint)			0.000				1/2" Ice	2.008	0.747	0.019
			0.000				1" Ice	2.205	0.899	0.032
800 MHz Filter	B	From Leg	3.000		0.000	87.000	No Ice	1.820	0.604	0.009
(Sprint)			0.000				1/2" Ice	2.008	0.747	0.019
			0.000				1" Ice	2.205	0.899	0.032

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
800 MHz Filter	C	From Leg	3.000	0.000	87.000	No Ice	1.820	0.604	0.009
(Sprint)			0.000			1/2" Ice	2.008	0.747	0.019
			0.000			1" Ice	2.205	0.899	0.032
(2) ACU-A20-N	A	From Leg	3.000	0.000	87.000	No Ice	0.078	0.136	0.001
(Sprint)			0.000			1/2" Ice	0.121	0.189	0.002
			0.000			1" Ice	0.173	0.251	0.004
ACU-A20-N	B	From Leg	3.000	0.000	87.000	No Ice	0.078	0.136	0.001
(Sprint)			0.000			1/2" Ice	0.121	0.189	0.002
			0.000			1" Ice	0.173	0.251	0.004
ACU-A20-N	C	From Leg	3.000	0.000	87.000	No Ice	0.078	0.136	0.001
(Sprint)			0.000			1/2" Ice	0.121	0.189	0.002
			0.000			1" Ice	0.173	0.251	0.004
(2) 4' x 2" Pipe Mount	A	From Leg	3.000	0.000	87.000	No Ice	0.785	0.785	0.029
(E)			0.000			1/2" Ice	1.028	1.028	0.035
			0.000			1" Ice	1.281	1.281	0.044
(2) 4' x 2" Pipe Mount	B	From Leg	3.000	0.000	87.000	No Ice	0.785	0.785	0.029
(E)			0.000			1/2" Ice	1.028	1.028	0.035
			0.000			1" Ice	1.281	1.281	0.044
(2) 4' x 2" Pipe Mount	C	From Leg	3.000	0.000	87.000	No Ice	0.785	0.785	0.029
(E)			0.000			1/2" Ice	1.028	1.028	0.035
			0.000			1" Ice	1.281	1.281	0.044
Sector Mount [SM 502-3]	C	None		0.000	87.000	No Ice	33.020	33.020	1.673
(E)						1/2" Ice	47.360	47.360	2.224
						1" Ice	61.700	61.700	2.775
#									
APXV18-206517S-C w/	A	From Leg	3.000	0.000	75.000	No Ice	5.404	4.700	0.052
Mount Pipe			0.000			1/2" Ice	5.960	5.860	0.097
(MetroPCS)			0.000			1" Ice	6.481	6.734	0.150
APXV18-206517S-C w/	B	From Leg	3.000	0.000	75.000	No Ice	5.404	4.700	0.052
Mount Pipe			0.000			1/2" Ice	5.960	5.860	0.097
(MetroPCS)			0.000			1" Ice	6.481	6.734	0.150
APXV18-206517S-C w/	C	From Leg	3.000	0.000	75.000	No Ice	5.404	4.700	0.052
Mount Pipe			0.000			1/2" Ice	5.960	5.860	0.097
(MetroPCS)			0.000			1" Ice	6.481	6.734	0.150
#									
#									
***									
Motorola Timing 2000	C	From Leg	3.000	0.000	120.000	No Ice	0.073	0.073	0.700
(Clearwire)			0.000			1/2" Ice	0.119	0.119	2.092
			0.000			1" Ice	0.165	0.165	3.484
***									
(4) 7020 RET	A	From Leg	3.000	0.000	98.000	No Ice	0.344	0.100	0.002
(AT&T)			0.000			1/2" Ice	0.422	0.145	0.005
			0.000			1" Ice	0.507	0.197	0.009
(4) 7020 RET	B	From Leg	3.000	0.000	98.000	No Ice	0.344	0.100	0.002
(AT&T)			0.000			1/2" Ice	0.422	0.145	0.005
			0.000			1" Ice	0.507	0.197	0.009
(4) 7020 RET	C	From Leg	3.000	0.000	98.000	No Ice	0.344	0.100	0.002
(AT&T)			0.000			1/2" Ice	0.422	0.145	0.005
			0.000			1" Ice	0.507	0.197	0.009
RRUS 32 B2	A	From Leg	3.000	0.000	98.000	No Ice	3.517	2.512	0.053
(AT&T)			0.000			1/2" Ice	3.863	2.826	0.079
			0.000			1" Ice	4.209	3.140	0.105
RRUS 32 B2	B	From Leg	3.000	0.000	98.000	No Ice	3.517	2.512	0.053
(AT&T)			0.000			1/2" Ice	3.863	2.826	0.079
			0.000			1" Ice	4.209	3.140	0.105
RRUS 32 B2	C	From Leg	3.000	0.000	98.000	No Ice	3.517	2.512	0.053

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
(AT&T)			0.000			1/2" Ice	3.863	2.826	0.079
			0.000			1" Ice	4.209	3.140	0.105
(2) LGP21901 Diplexer	A	From Leg	3.000	0.000	98.000	No Ice	1.946	0.518	0.031
(AT&T)			0.000			1/2" Ice	2.190	0.677	0.042
			0.000			1" Ice	2.434	0.836	0.053
(2) LGP21901 Diplexer	B	From Leg	3.000	0.000	98.000	No Ice	1.946	0.518	0.031
(AT&T)			0.000			1/2" Ice	2.190	0.677	0.042
			0.000			1" Ice	2.434	0.836	0.053
(2) LGP21901 Diplexer	C	From Leg	3.000	0.000	98.000	No Ice	1.946	0.518	0.031
(AT&T)			0.000			1/2" Ice	2.190	0.677	0.042
			0.000			1" Ice	2.434	0.836	0.053
Kathrein 782 10253	A	From Leg	3.000	0.000	98.000	No Ice	0.125	0.071	0.003
(AT&T)			0.000			1/2" Ice	0.195	0.129	0.004
			0.000			1" Ice	0.265	0.187	0.005
Kathrein 782 10253	B	From Leg	3.000	0.000	98.000	No Ice	0.125	0.071	0.003
(AT&T)			0.000			1/2" Ice	0.195	0.129	0.004
			0.000			1" Ice	0.265	0.187	0.005
Kathrein 782 10253	C	From Leg	3.000	0.000	98.000	No Ice	0.125	0.071	0.003
(AT&T)			0.000			1/2" Ice	0.195	0.129	0.004
			0.000			1" Ice	0.265	0.187	0.005
***									
Sector Mount [SM 802-3]	C	None		0.000	65.000	No Ice	24.410	24.410	0.930
(E)						1/2" Ice	31.390	31.390	1.362
						1" Ice	38.370	38.370	1.794

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight K
VHLP2.5	A	Paraboloid	From	4.000	0.000		120.000	2.917	No Ice	6.681	0.048
(Clearwire)		w/Shroud (HP)	Leg	0.000					1/2" Ice	7.069	0.077
				-3.000					1" Ice	7.456	0.106
VHLP2.5	C	Paraboloid	From	4.000	0.000		120.000	2.917	No Ice	6.681	0.048
(Clearwire)		w/Shroud (HP)	Leg	0.000					1/2" Ice	7.069	0.077
				3.000					1" Ice	7.456	0.106
#											

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

Comb. No.	Description
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
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	125 - 120	4.788	47	0.366	0.019
T2	120 - 100	4.392	47	0.362	0.011
T3	100 - 80	2.966	47	0.297	0.005
T4	80 - 60	1.839	47	0.221	0.003
T5	60 - 40	1.012	47	0.158	0.002
T6	40 - 20	0.434	47	0.102	0.001
T7	20 - 0	0.104	47	0.042	0.000

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
125.000	Lightning Rod 5/8" x 5'	47	4.788	0.366	0.019	21701
123.000	VHLP2.5	47	4.629	0.365	0.015	21701
120.000	840 10054 w/ Mount Pipe	47	4.392	0.362	0.011	21701
117.000	VHLP2.5	47	4.160	0.357	0.008	17990
110.000	GPS_A	47	3.643	0.336	0.008	16911
98.000	(2) 7770.00 w/ Mount Pipe	47	2.839	0.289	0.005	15739
87.000	APXVSPP18-C-A20 w/ Mount Pipe	47	2.198	0.246	0.004	15457
75.000	APXV18-206517S-C w/ Mount Pipe	47	1.606	0.204	0.002	16310
65.000	CS72188.01 LMU antenna	47	1.193	0.173	0.002	18817

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	125 - 120	18.939	18	1.423	0.072
T2	120 - 100	17.399	18	1.407	0.046
T3	100 - 80	11.802	18	1.175	0.021
T4	80 - 60	7.331	18	0.880	0.012
T5	60 - 40	4.036	18	0.629	0.007
T6	40 - 20	1.733	18	0.405	0.004
T7	20 - 0	0.415	18	0.166	0.001

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
125.000	Lightning Rod 5/8" x 5'	18	18.939	1.423	0.072	6139
123.000	VHLP2.5	18	18.320	1.418	0.061	6139
120.000	840 10054 w/ Mount Pipe	18	17.399	1.407	0.046	6139
117.000	VHLP2.5	18	16.497	1.388	0.035	5241
110.000	GPS_A	18	14.473	1.316	0.031	4705
98.000	(2) 7770.00 w/ Mount Pipe	18	11.302	1.144	0.020	4126
87.000	APXVSPP18-C-A20 w/ Mount Pipe	18	8.759	0.980	0.015	3963
75.000	APXV18-206517S-C w/ Mount Pipe	18	6.403	0.812	0.010	4124
65.000	CS72188.01 LMU antenna	18	4.760	0.687	0.008	4747

Bolt Design Data

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt K	Allowable Load K	Ratio Load / Allowable	Allowable Ratio	Criteria
T1	125	Leg	A325N	0.750	4	1.043	29.821	0.035 ✔	1	Bolt Tension
T2	120	Leg	A325N	0.750	6	6.231	29.821	0.209 ✔	1	Bolt Tension
		Diagonal	A325X	0.500	1	4.104	5.966	0.688 ✔	1	Member Block Shear
T3	100	Leg	A325N	1.000	6	13.409	53.014	0.253 ✔	1	Bolt Tension
		Diagonal	A325X	0.500	1	5.959	8.005	0.744 ✔	1	Member Block Shear
T4	80	Leg	A325N	1.000	8	15.622	53.014	0.295 ✔	1	Bolt Tension
		Diagonal	A325X	0.500	1	6.960	9.719	0.716 ✔	1	Bolt Shear
T5	60	Leg	A325N	1.000	8	20.956	53.014	0.395 ✔	1	Bolt Tension
		Diagonal	A325X	0.625	1	6.892	9.534	0.723 ✔	1	Member Block Shear
T6	40	Leg	A325N	1.250	8	25.103	82.835	0.303 ✔	1	Bolt Tension
		Diagonal	A325X	0.625	1	8.516	9.787	0.870 ✔	1	Member Bearing
T7	20	Leg	A36	1.500	8	29.595	57.653	0.513 ✔	1	Bolt Tension
		Diagonal	A325X	0.625	1	8.354	13.050	0.640 ✔	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	125 - 120	P2.5x.203	5.000	2.500	31.7 K=1.00	1.704	-9.252	77.815	0.119 [1] ✔
T2	120 - 100	P2.5x.203	20.019	5.005	63.4 K=1.00	1.704	-44.413	61.057	0.727 [1] ✔
T3	100 - 80	P3.5x.226	20.019	5.005	44.9 K=1.00	2.680	-93.064	112.760	0.825 [1] ✔
T4	80 - 60	P5x.258	20.019	6.673	42.6 K=1.00	4.300	-140.944	183.884	0.766 [1] ✔
T5	60 - 40	P6x.28	20.019	6.673	35.7 K=1.00	5.581	-187.590	249.417	0.752 [1] ✔
T6	40 - 20	P6x.28	20.019	5.181	27.7 K=1.00	5.581	-224.218	259.755	0.863 [1] ✔
T7	20 - 0	P8x.322	20.019	10.009	40.9 K=1.00	8.399	-264.313	363.459	0.727 [1] ✔

[1] P_u / ϕP_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 $\frac{P_u}{\phi P_n}$
T2	120 - 100	L1 1/2x1 1/2x3/16	6.686	3.176	129.9 K=1.00	0.527	-4.255	7.026	0.606 [1] ✔
T3	100 - 80	L2x2x3/16	8.054	3.798	116.8 K=1.01	0.715	-6.111	11.293	0.541 [1] ✔
T4	80 - 60	L2 1/2x2 1/2x3/16	10.224	4.836	117.9 K=1.01	0.902	-6.960	14.057	0.495 [1] ✔
T5	60 - 40	L2 1/2x2 1/2x3/16	11.403	5.380	130.5 K=1.00	0.902	-7.081	11.935	0.593 [1] ✔
T6	40 - 20	L3x3x3/16	14.592	7.039	141.7 K=1.00	1.090	-8.992	12.270	0.733 [1] ✔
T7	20 - 0	L3 1/2x3 1/2x1/4	15.718	7.501	129.7 K=1.00	1.690	-9.175	22.585	0.406 [1] ✔

[1] P_u / ϕP_n controls

Horizontal 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	125 - 120	L1 1/2x1 1/2x3/16	3.500	3.260	128.2 K=0.96	0.527	-2.594	7.190	0.361 [1] ✔

[1] P_u / ϕP_n controls

Secondary Horizontal 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 $\frac{P_u}{\phi P_n}$
T6	40 - 20	L3x3x1/4	10.612	10.060	126.0 K=0.97	1.440	-3.886	20.219	0.192 [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	125 - 120	L1 1/2x1 1/2x3/16	3.500	3.260	128.2 K=0.96	0.527	-1.401	7.190	0.195 [1] ✔

[1] $P_u / \phi P_n$ controls

Bottom 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	125 - 120	L1 1/2x1 1/2x3/16	3.500	3.260	128.2 K=0.96	0.527	-1.431	7.190	0.199 [1] ✔

[1] $P_u / \phi P_n$ 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	125 - 120	P2.5x.203	5.000	2.500	31.7	1.704	4.172	84.350	0.049 [1] ✔
T2	120 - 100	P2.5x.203	20.019	5.005	63.4	1.704	37.384	84.350	0.443 [1] ✔
T3	100 - 80	P3.5x.226	20.019	5.005	44.9	2.680	80.456	132.637	0.607 [1] ✔
T4	80 - 60	P5x.258	20.019	6.673	42.6	4.300	124.976	212.843	0.587 [1] ✔
T5	60 - 40	P6x.28	20.019	6.673	35.7	5.581	167.646	276.277	0.607 [1] ✔
T6	40 - 20	P6x.28	20.019	4.828	25.8	5.581	201.058	276.277	0.728 [1] ✔
T7	20 - 0	P8x.322	20.019	10.009	40.9	8.399	236.763	415.763	0.569 [1] ✔

[1] $P_u / \phi P_n$ 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	125 - 120	5/8	4.301	4.007	307.7	0.307	3.403	9.940	0.342 [1] ✔
T2	120 - 100	L1 1/2x1 1/2x3/16	6.686	3.176	87.0	0.308	4.104	13.381	0.307 [1] ✔
T3	100 - 80	L2x2x3/16	8.054	3.798	76.5	0.448	5.959	19.499	0.306 [1] ✔
T4	80 - 60	L2 1/2x2 1/2x3/16	10.224	4.836	76.6	0.589	6.668	25.616	0.260 [1] ✔
T5	60 - 40	L2 1/2x2 1/2x3/16	11.403	5.380	85.0	0.571	6.892	24.851	0.277 [1] ✔
T6	40 - 20	L3x3x3/16	14.056	6.780	88.3	0.712	8.516	30.968	0.275 [1] ✔
T7	20 - 0	L3 1/2x3 1/2x1/4	15.718	7.501	84.1	1.127	8.354	49.019	0.170 [1] ✔

[1] P_u / ϕP_n controls

Horizontal 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	125 - 120	L1 1/2x1 1/2x3/16	3.500	3.260	85.7	0.527	0.160	17.086	0.009 [1] ✔

[1] P_u / ϕP_n controls

Secondary Horizontal 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 $\frac{P_u}{\phi P_n}$
T6	40 - 20	L3x3x1/4	10.612	10.060	129.8	1.440	3.886	46.656	0.083 [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	125 - 120	L1 1/2x1 1/2x3/16	3.500	3.260	85.7	0.527	0.585	17.086	0.034 [1]

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
									✔

[1] P_u / ϕP_n controls

Bottom 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	125 - 120	L1 1/2x1 1/2x3/16	3.500	3.260	85.7	0.527	0.313	17.086	0.018 [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	125 - 120	Leg	P2.5x.203	1	-9.252	77.815	11.9	Pass
T2	120 - 100	Leg	P2.5x.203	25	-44.413	61.057	72.7	Pass
T3	100 - 80	Leg	P3.5x.226	52	-93.064	112.760	82.5	Pass
T4	80 - 60	Leg	P5x.258	79	-140.944	183.884	76.6	Pass
T5	60 - 40	Leg	P6x.28	100	-187.590	249.417	75.2	Pass
T6	40 - 20	Leg	P6x.28	121	-224.218	259.755	86.3	Pass
T7	20 - 0	Leg	P8x.322	142	-264.313	363.459	72.7	Pass
T1	125 - 120	Diagonal	5/8	10	3.403	9.940	34.2	Pass
T2	120 - 100	Diagonal	L1 1/2x1 1/2x3/16	38	-4.255	7.026	60.6 68.8 (b)	Pass
T3	100 - 80	Diagonal	L2x2x3/16	59	-6.111	11.293	54.1 74.4 (b)	Pass
T4	80 - 60	Diagonal	L2 1/2x2 1/2x3/16	86	-6.960	14.057	49.5 71.6 (b)	Pass
T5	60 - 40	Diagonal	L2 1/2x2 1/2x3/16	107	-7.081	11.935	59.3 72.3 (b)	Pass
T6	40 - 20	Diagonal	L3x3x3/16	128	-8.992	12.270	73.3 87.0 (b)	Pass
T7	20 - 0	Diagonal	L3 1/2x3 1/2x1/4	149	-9.175	22.585	40.6 64.0 (b)	Pass
T1	125 - 120	Horizontal	L1 1/2x1 1/2x3/16	16	-2.594	7.190	36.1	Pass
T6	40 - 20	Secondary Horizontal	L3x3x1/4	130	-3.886	20.219	19.2	Pass
T1	125 - 120	Top Girt	L1 1/2x1 1/2x3/16	4	-1.401	7.190	19.5	Pass
T1	125 - 120	Bottom Girt	L1 1/2x1 1/2x3/16	7	-1.431	7.190	19.9	Pass
							Summary	
						Leg (T6)	86.3	Pass
						Diagonal (T6)	87.0	Pass
						Horizontal (T1)	36.1	Pass
						Secondary Horizontal (T6)	19.2	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$øP_{allow}$ K	% Capacity	Pass Fail
						Top Girt (T1)	19.5	Pass
						Bottom Girt (T1)	19.9	Pass
						Bolt Checks	87.0	Pass
						RATING =	**87.0**	**Pass**

MATHCAD CALCULATION PRINTOUT

Existing 125 ft Self Support Tower Foundation Check

Customer Name: SBA Communications Corp
Customer Site Number: CT01725-A-02
Customer Site Name: Bloomfield

ACGI Job # 16-4565
(Previous Job #16-0654, dated 02/24/2016)

Dec 9, 2016

Foundation check

-Foundation Reactions-

(As per TNX output, Factored, G Code)

Total Shear	$S := 37 \cdot kips$	Compression on Pedestal:	$P_c := 276 \cdot kips$
Moment	$M := 2839 \cdot ft\_K$	Uplift on Pedestal:	$P_{up} := 247 \cdot kips$
Down load, Tower weight	$Pv := 41 kips$	Shear on Pedestal:	$Sh := 23 \cdot kips$

-Soil Properties- **Soil data as per Report of Geotechnical Evaluation of Subsurface Conditions by FDH Engineering, Project# 1206690EG1 dated 08/10/2012.**

Allowable Bearing Capacity	$Brg_{allw} := 5.0 \cdot ksf$	Safety Factor $SF := 2.0$	(Estimated)
Internal friction angle,	$\phi := 30 deg$	$Brg_{uc} := SF \cdot Brg_{allw} = 10 \cdot ksf$	
Unit wt. of soil,	$\gamma_s := 0.110 \cdot kcf$		
Alowable Passive Pressure	see next page		
Cohesion of soil,	$c_u := 0 \cdot ksf$		
Friction Factor	$FF := 0.3$		(Estimated)
Depth to be neglected	$L_{neg} := 0 \cdot ft$		

-Material Parameters-

Conforming to the design requirements as in ACI 318-011

Unit wt. of concrete,	$\gamma_c := 0.150 \cdot kcf$
Concrete compressive strength,	$f_c := 3000 \cdot psi$
Rebar yield strength,	$f_y := 60000 \cdot psi$

DIMENSIONS

Tower face width $TWFW := 12.5 \cdot ft$ Tower ht. $Tw_{ht} := 125 \cdot ft$

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

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

Depth of mat,	$D_f := 4.25 \cdot ft$		
Thickness of mat,	$T_f := 4.25 \cdot ft$		
Pedestal size,	$Ped_s := 0 \cdot ft$	No. of pedestals	$Nped := 0$
Extension above the grade,	$E_g := 0 \cdot ft$		

Mat Dimensions, LxB $L := 29 \cdot ft$ x $B := L$ $B = 29 ft$ $Brg_{allw} = 5 \cdot ksf$

- Foundation Dimensions as per Original Foundation Design by Fred A. Nudd Corporation, Dwg# 97-5566-2 dated 12/16/1997.

-Reinforcement Data-

Typical concrete cover	$cc := 3 in$
Vertical rebar size	$d_{bar} := 8$

MAT SIZING CALCULATIONS

Check of mat size

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

$P_{pave} := \frac{(D_f - T_f - L_{neg})\cdot K_p\cdot\gamma_s + (D_f - L_{neg})\cdot K_p\cdot\gamma_s}{2} = 0.701\cdot ksf$

Calculate safety against overturning and location of resultant on the base

Resisting Moments about mid axis parallel to base

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

component	value, kips	lever arm, ft	resisting moment, ft-kips
1) Concrete wt.	$C_w := L\cdot B\cdot T_f\cdot(\gamma_c) + Area_{ped}\cdot\gamma_c\cdot(D_f + E_g - T_f)\cdot Nped$	$L_c := \frac{L}{2}$	$R_c := C_w\cdot L_c$
	$C_w = 536.137\cdot kips$	$L_c = 14.5\,ft$	$R_c = 7773.994\cdot ft\_K$
2) Soil wt.	$S_w := \left[L\cdot B\cdot(D_f - T_f) - Area_{ped}\cdot(D_f - T_f)\cdot Nped\right]\cdot\gamma_s$	$L_s := \frac{L}{2}$	$R_s := S_w\cdot L_s$
	$S_w = 0\cdot kips$	$L_s = 14.5\,ft$	$R_s = 0\cdot ft\_K$
3) Wt. of soil wedge	$W_w := (D_f)\cdot\frac{1}{2}\cdot(D_f\cdot\tan(\phi))\cdot B\cdot(\gamma_s)$	$L_w := \left(L + D_f\cdot\frac{\tan(\phi)}{3}\right)$	$R_w := W_w\cdot L_w$
	$W_w = 16.633\cdot kips$	$L_w = 29.818\,ft$	$R_w = 495.97\cdot ft\_K$
4) Passive pressure	$Pe_p := T_f\cdot B\cdot P_{pave}$	$L_p := \frac{T_f}{3}$	$R_p := Pe_p\cdot L_p$
	$Pe_p = 86.429\cdot kips$	$L_p = 1.417\,ft$	$R_p = 122.441\cdot ft\_K$
5) Vertical	$Pv = 41\cdot kips$	$L_v := \frac{L}{2}$	$R_v := Pv\cdot L_v$
	$S_{w1} := L\cdot B\cdot D_f\cdot\gamma_s$ $S_{w1} = 393.167\cdot kips$ <--- for net calcs		
Total weight=	$T_w := C_w + S_w + W_w + Pv$ $T_w = 593.771\cdot kips$	$L_v = 14.5\,ft$	$R_v = 594.5\cdot ft\_K$

Total resisting Moment= $M_r := R_c + R_s + R_w + R_p + R_v$ $M_r = 8986.905\cdot ft\_K$

Overturning Moments

component	value, kips	lever arm, ft	Overturning Moment ft-kips
1) Moment on foundation due to eccentric location of tower	$Pv = 41\cdot kips$	$L_{pe} = 0$	$M_{pe} := L_{pe}\cdot Pv$ $M_{pe} = 0\cdot ft\_K$
2) Moment on foundation	-	-	$M = 2839\cdot ft\_K$
3) Moment due to horizontal shear	$S_t := S$	$L_{hs} := D_f + E_g$	$O_{hs} := L_{hs}\cdot S_t$
		$L_{hs} = 4.25\,ft$	$O_{hs} = 157.25\cdot ft\_K$

Total Overturning Moment= $M_o := M + O_{hs} + M_{pe}$ $M_o = 2996.25 \cdot ft\_K$

Check Safety Factor against Overturning about mid axis parallel to base

$SF := \frac{M_r}{M_o}$ $SF = 2.999$ > 1.5 OK!

Calculate eccentricity, e $e := \frac{L}{2} - \frac{M_r - M_o}{T_w}$ $e = 4.411\ ft$

Check location of eccentricity and determine pressure distribution under the mat

$L_{loc} := \frac{L}{6}$ $L_{loc} = 4.833\ ft$

For net bearing calcs $T_{w1} := S_{w1} + W_w$ $T_{w1} = 409.801 \cdot kips$

$P_{max1} := if\left[e \le L_{loc}, \frac{T_w}{L \cdot B} \cdot \left[1 + \left(6 \cdot \frac{e}{L}\right)\right], 4 \cdot \frac{T_w}{3 \cdot B \cdot (L - 2 \cdot e)}\right]$ $P_{max1} = 1.35 \cdot ksf$

$P_{max2} := \left(\frac{T_{w1}}{L \cdot B}\right)$ $P_{max2} = 0.487 \cdot ksf$ $P_{net} := P_{max1} - P_{max2}$ $P_{max} := P_{net}$

Net soil pressure, $P_{net} = 0.863 \cdot ksf$ < $Brg_{allw} = 5 \cdot ksf$ **Pass!** $\frac{P_{net}}{0.75 Brg_{uc}} = 11.508 \cdot \%$

$P_{min} := if\left[e \le L_{loc}, \frac{T_w}{L \cdot B} \cdot \left[1 - \left(6 \cdot \frac{e}{L}\right)\right], 0 \cdot ksf\right]$ $P_{min} = 0.062 \cdot ksf$

Check for horizontal shear $P_{hor} := Pe_p + Pv \cdot 0.35$

$P_{hor} = 100.779 \cdot kips$ $S = 37 \cdot kips$ Since P.hor > S it is safe! $\frac{S}{P_{hor}} = 36.714 \cdot \%$

Check for uplift

Component	Down load value, kips	
1) Soil Weight	$S_{w1} := \left[L \cdot B \cdot (D_f - T_f) - Area_{ped} \cdot (D_f - T_f) \cdot Nped\right] \cdot \gamma_s$	$S_{w1} = 0 \cdot kips$
2) Wt. of soil wedge	$W_{w1} := (D_f) \cdot \frac{1}{2} \cdot (D_f \cdot \tan(\phi)) \cdot B \cdot (\gamma_s)$	$W_{w1} = 16.633 \cdot kips$
3)Concrete wt.	$C_{w1} := L \cdot B \cdot T_f \cdot (\gamma_c) + Area_{ped} \cdot \gamma_c \cdot (D_f + E_g - T_f) \cdot Nped$	$C_{w1} = 536.137 \cdot kips$

Total down load:

$TWT1 := S_{w1} + W_{w1} + C_{w1}$ $TWT1 = 552.771 \cdot kips$ Total down load

Skin friction around footing:

$SKF := FF \cdot c_u \cdot (L + B) \cdot 2 \cdot 2 \cdot ft$ $SKF = 0 \cdot kips$

$T_{down} := (TWT1 + SKF)$ $T_{down} = 552.771 \cdot kips$ > $P_{up} = 247 \cdot kips$ $\frac{P_{up}}{T_{down}} = 44.684 \cdot \%$ **OK!**

REINFORCED CONCRETE CHECK CALCULATIONS

General Input parameters

Concrete Cover, $cc := 3.0 \cdot in$

Reduction factors as per respective ACI sections

$\phi_{shear} := 0.85$ 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-222-G Code)

Check for wide beam or single shear in mat

Allowable shear stress in concrete for wide beam shear criteria =

$\nu_{wide} := 2 \cdot \phi_{shear} \cdot \sqrt{f_c \cdot psi}$ $\nu_{wide} = 93.113 \cdot psi$

Effective depth of stee $d := T_f - cc$ $d = 48 \cdot in$ $L_{eff} := if\left(e \le L_{loc}, L, L - 2 \cdot e\right)$ $L_{eff} = 29\,ft$

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

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

shear on the face of concrete=

$$Shear_{wide} := (dist) \cdot B \cdot \left[\frac{P_{maxf} + \left[P_{maxf} - \frac{P_{maxf} - P_{minf}}{L_{eff}} \cdot (dist)\right]}{2}\right]$$ $Shear_{wide} = 99.135 \cdot kips$

Area of concrete in shear= $A_{shear} := B \cdot d$ $A_{shear} = 16704 \cdot in^2$

Shear stress acting on concrete fa $\nu_{act} := \frac{Shear_{wide}}{A_{shear}}$ $\nu_{act} = 5.935 \cdot psi$

$\nu_{act} = 5.935 \cdot psi$ < $\nu_{wide} = 93.113 \cdot psi$ **O.K!**

Check for punching or two-way shear in mat

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

$\beta := \frac{L}{B}$ $\beta = 1$ $\nu_{punch} := if\left[\left(2 + \frac{4}{\beta}\right) \cdot \phi_{shear} \cdot \sqrt{f_c \cdot psi} \le 4 \cdot \phi_{shear} \cdot \sqrt{f_c \cdot psi}, \left(2 + \frac{4}{\beta}\right) \cdot \phi_{shear} \cdot \sqrt{f_c \cdot psi}, 4 \cdot \phi_{shear} \cdot \sqrt{f_c \cdot psi}\right]$

$\nu_{punch} = 186.226 \cdot psi$ $Area_{col} := if\left[col_t = 0, \frac{\pi}{4} \cdot \left(Ped_s + d\right)^2, \left(Ped_s + d\right)^2\right]$

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

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

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

$\nu_{act} = 9.332 \cdot psi$ < $\nu_{punch} = 186.226 \cdot psi$ **O.K!**

Check of mat footing

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

$P_{upnet} := P_{up} - \frac{C_{wped} + S_w \cdot 0.95}{Nped}$ $P_{upnet} = 247 \cdot kips$

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

$B_{mo} := RC_{fac} \cdot \left[(TWFW \cdot P_{upnet}) \cdot Langle + S_t \cdot (D_f + E_g)\right]$ $B_{mo} = 3244.75 \cdot ft\_K$

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

$W_e := TWFW \cdot Langle + Ped_s$ $W_e = 12.5\,ft$

Reinforcement middle bandwidth.

$B_{mo1} = 307563.715\,ft \cdot lb$

required R_u $R_u := \frac{B_{mo}}{\phi_{bend} \cdot B \cdot d^2}$ $R_u = 53.958 \cdot psi$ $m := \frac{f_y}{\beta_1 \cdot f_c}$ $m = 23.529$

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 =

$Ast_f := \rho \cdot B \cdot d$ $Ast_f = 15.184 \cdot in^2$

minimum area of steel required,

$Ast_{minf} := .0018 \cdot B \cdot T_f$ $Ast_{minf} = 31.946 \cdot in^2$ per ACI 10.5.3 & 7.12

$Ast_{fuse} := if(Ast_f > Ast_{minf}, Ast_f, Ast_{minf})$ $Ast_{fuse} = 31.946 \cdot in^2$

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

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

Number of bars required = $Nf_{bars} := if\left(Ast_{fuse} = Ast_{minf}, ceil\left(\frac{Ast_{fuse}}{f_{abar}}\right), ceil\left(\frac{Ast_{fuse}}{f_{abar}} \cdot \frac{L}{W_e}\right)\right)$ $Nf_{bars} = 41$

Used $Nf_{bars\_used} := 27 \cdot 2 = 54$ > $Nf_{bars} = 41$

($Nf_{bars\_used} = 54$) # $f_{bar} = 8$ bars at the Top and Bottom of the mat is OK!

Reinforcement ratio, $Reinf_{ratio} := \frac{Nf_{bars}}{Nf_{bars\_used}} = 75.926 \cdot \%$

Foundation Check Summary

-Foundation Reactions-

Shear; $S = 37 \cdot kips$

Down load; $Pv = 41 \cdot kips$

Uplift load; $P_{up} = 247 \cdot kips$

Moment; $M = 2839 \cdot ft\_K$

Stability Calculations

Safety Factor against Overturning, $SF = 2.999$ > 1.5 OK! $\frac{1.5}{SF} = 50.01 \cdot \%$

Net soil pressure, $P_{net} = 0.863 \cdot ksf$ < $Brg_{allw} = 5 \cdot ksf$ **OK!** $\frac{P_{net}}{Brg_{allw}} = 17.261 \cdot \%$

Check for horizontal shear, $P_{hor} = 100.779 \cdot kips$ > $S = 37 \cdot kips$ **OK!** $\frac{S}{P_{hor}} = 36.714 \cdot \%$

Check for Uplift, $T_{down} = 552.771 \cdot kips$ > $P_{up} = 247 \cdot kips$ **OK!** $\frac{P_{up}}{T_{down}} = 44.684 \cdot \%$

Steel Reinforcement Check, $Reinf_{ratio} = 75.926 \cdot \%$ OK!

PROJECT TEAM

SITE ACQUISITION & ZONING:

SBA COMMUNICATIONS CORP.
134 FLANDERS ROAD, SUITE 125
WESTBOROUGH, MA 01581

ENGINEERING:

TRYLON TSF
1825 W. WALNUT HILL LANE SUITE 302
IRVING, TX 75038
PHONE: 1-855-669-5421

RF ENGINEER:

AT&T MOBILITY - NEW ENGLAND
550 COCHITUATE ROAD
SUITE 550 13 & 14
FRAMINGHAM, MA 01701
CAMERON SYME
508-596-7146
cs6970@att.com

CONSTRUCTION MANAGEMENT:

EMPIRE TELECOM
16 ESQUIRE ROAD
BILLERICA, MA 01821
GRZEGORZ "GREG" DORMAN
484-683-1750
gdorman@empiretelecomm.com

TOWER OWNER:

SBA TOWERS LLC
134 FLANDERS ROAD, SUITE 125
WESTBOROUGH, MA 01581

SBA SITE ID: CT01725-A
SBA SITE NAME: BLOOMFIELD

SBA REGIONAL SITE MANAGER: STEPHEN ROTH
(860)539-4920
sroth@sbasite.com

GENERAL NOTES

DO NOT SCALE DRAWINGS

CONTRACTOR SHALL VERIFY ALL PLANS AND EXISTING DIMENSIONS AND CONDITIONS ON THE JOB SITE AND SHALL IMMEDIATELY NOTIFY THE ARCHITECT/ENGINEER IN WRITING OF ANY DISCREPANCIES BEFORE PROCEEDING WITH THE WORK OR BE RESPONSIBLE FOR SAME.

THE FACILITY IS UNMANNED AND NOT FOR HUMAN HABITATION. A TECHNICIAN WILL VISIT THE SITE AS REQUIRED FOR ROUTINE MAINTENANCE. THE PROJECT WILL NOT RESULT IN ANY SIGNIFICANT DISTURBANCE OR EFFECT ON DRAINAGE; NO SANITARY SEWER SERVICE, POTABLE WATER, OR TRASH DISPOSAL IS REQUIRED AND NO COMMERCIAL SIGNAGE IS PROPOSED.

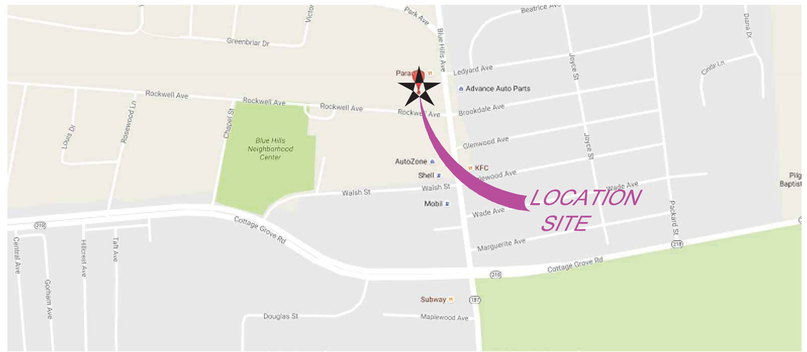
SITE INFORMATION

LATITUDE:	41° 49' 12.37116" N
LONGITUDE:	-72° 41' 47.49684" W
LAT./LONG. TYPE:	NAD 83
GROUND ELEVATION:	N/A
APN/UPC:	N/A
AREA OF CONSTRUCTION:	EXISTING
ZONING/JURISDICTION:	UNKNOWN
CURRENT ZONING:	UNKNOWN
EXISTING USE:	UNMANNED TELECOMMUNICATIONS FACILITY
COUNTY:	HARTFORD
HANDICAP REQUIREMENTS:	FACILITY IS UNMANNED AND NOT FOR HUMAN HABITATION. HANDICAPPED ACCESS NOT REQUIRED.

at&t Mobility

LTE MULTI CARRIER RRU ADD
CT1148
BLOOMFIELD EAST
1021 BLUE HILLS AVENUE
BLOOMFIELD, CT 06002
FA CODE: 10035110

VICINITY MAP



NOT TO SCALE

NORTH

DRIVING DIRECTIONS

LEGACY ORANGE 1021 BLUE HILLS AVE I 91 NORTH TO EXIT 35 TO RT 218 TURN LEFT AT END OF RAMP FOLLOW TO BLUE HILLS AVE RT 187 TURN RIGHT SITE LOCATED DEPARTMENT ON LEFT.

CODE COMPLIANCE

BUILDING CODE: 2012 INTERNATIONAL BUILDING CODE WITH CONNECTICUT STATE AMENDMENTS

ELECTRICAL CODE: 2014 NATIONAL ELECTRICAL CODE WITH CONNECTICUT STATE AMENDMENTS

SUBCONTRACTOR'S WORK SHALL COMPLY WITH ALL APPLICABLE NATIONAL, STATE, AND LOCAL CODES AS ADOPTED BY THE LOCAL AUTHORITY HAVING JURISDICTION (AHJ) FOR THE LOCATION. THE EDITION OF THE AHJ ADOPTED CODES AND STANDARDS IN EFFECT ON THE DATE OF CONTRACT AWARD SHALL GOVERN THE DESIGN.

FOR ANY CONFLICTS BETWEEN SECTIONS OF LISTED CODES AND STANDARDS REGARDING MATERIAL, METHODS OF CONSTRUCTION, OR OTHER REQUIREMENTS, THE MOST RESTRICTIVE REQUIREMENT SHALL GOVERN. WHERE THERE IS CONFLICT BETWEEN A GENERAL REQUIREMENT AND A SPECIFIC REQUIREMENT, THE SPECIFIC REQUIREMENT SHALL GOVERN.

CONNECTICUT ONE CALL SYSTEM INC. 1-800-922-4455 STOP-CALL BEFORE YOU DIG!

CONNECTICUT LAW REQUIRES TWO WORKING DAYS NOTICE PRIOR TO ANY EARTH MOVING ACTIVITIES BY CALLING 800-922-4455 OR DIAL 811

APPROVALS

AT&T (RF): _____ DATE: _____

AT&T (CONST.): _____ DATE: _____

AT&T (OPS): _____ DATE: _____

TOWER OWNER: _____ DATE: _____

JURISDICTIONAL APPROVAL

BASED ON INFORMATION PROVIDED BY AT&T REGULATORY COMPLIANCE PROFESSIONALS AND LEGAL COUNSEL, THIS TELECOMMUNICATIONS EQUIPMENT DEPLOYMENT IS CONSIDERED AN ELIGIBLE FACILITY UNDER THE MIDDLE CLASS TAX RELIEF AND JOB CREATION ACT OF 2012, 47 USC 1455(A), SECTION 6409(A), AND IS SUBJECT TO AN ELIGIBLE FACILITY REQUEST, EXPEDITED REVIEW AND LIMITED/PARTIAL ZONING PRE-EMPTION FOR LOCAL DISCRETIONARY PERMITS (VARIANCE, SPECIAL PERMIT, SITE PLAN REVIEW OR ADMINISTRATIVE REVIEW).

PROJECT DESCRIPTION

THIS PROJECT WILL BE COMPRISED OF:
CHANGES ON THE EXISTING LATTICE TOWER:

- REMOVE (3) EXISTING RRUS-11/A2 (1) PER SECTOR FOR (3) SECTORS.
- INSTALL (3) NEW RRUS-32-B2, (1) PER SECTOR FOR (3) SECTORS.
- REUSE (3) EXISTING RRUS11.
- REUSE (1) EXISTING FIBER TRUNK.
- REUSE (2) EXISTING DC TRUNK.
- REUSE (1) EXISTING DC/FIBER SQUID.
- REUSE (6) EXISTING RF CABLES.

Michael Plahovinsak
Digitally signed by Michael Plahovinsak
Date: 2016.11.25 13:15:30 -05'00'

SHEET	DESCRIPTION
T-1	TITLE SHEET
GN-1	GROUNDING & GENERAL NOTES
A-1	SITE PLAN
A-2	EQUIPMENT LAYOUT
A-3	ANTENNA LAYOUTS & TOWER ELEVATION
A-4	DETAILS
G-1	GROUNDING, ONE-LINE DIAGRAM & DETAILS

at&t Mobility
550 COCHITUATE ROAD
FRAMINGHAM,MA 01701

EMPIRE telecom
16 ESQUIRE ROAD
BILLERICA, MA 01821

SBA
SBA COMMUNICATIONS CORP.
134 FLANDERS ROAD, SUITE
125 WESTBOROUGH, MA 01581

PLANS PREPARED BY:
Trylon
1825 W. WALNUT HILL LANE SUITE 302
IRVING, TX 5038
1-855-669-5421

NO.	DATE	DESCRIPTION	BY
A	11/22/16	FOR REVIEW	AC

SITE INFORMATION:

CT1148
BLOOMFIELD EAST
FA CODE: 10035110

1021 BLUE HILLS AVENUE
BLOOMFIELD, CT 06002

SEAL:

STATE OF CONNECTICUT
MICHAEL F. PLAHOVINSAK
No. 25849
REGISTERED PROFESSIONAL ENGINEER
11-25-2016

MICHAEL F. PLAHOVINSAK, P.E. #25849
Sole Proprietor - Independent Engineer
18301 S.R. 161, Plain City, OH 43064
614-398-6250 / mike@mfpeng.com

SHEET TITLE:

TITLE SHEET

SHEET NUMBER:

T-1

GENERAL NOTES:

1. FOR THE PURPOSE OF CONSTRUCTION DRAWING, THE FOLLOWING DEFINITIONS SHALL APPLY:
   CONTRACTOR – EMPIRE TELECOM
   SUBCONTRACTOR – GENERAL CONTRACTOR (CONSTRUCTION)
   OWNER – AT&T MOBILITY
   OEM – ORIGINAL EQUIPMENT MANUFACTURER

2. PRIOR TO THE SUBMISSION OF BIDS, THE BIDDING SUBCONTRACTOR SHALL VISIT THE CELL SITE TO FAMILIARIZE WITH THE EXISTING CONDITIONS AND TO CONFIRM THAT THE WORK CAN BE ACCOMPLISHED AS SHOWN ON THE CONSTRUCTION DRAWINGS. ANY DISCREPANCY FOUND SHALL BE BROUGHT TO THE ATTENTION OF CONTRACTOR.

3. ALL MATERIALS FURNISHED AND INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS, AND ORDINANCES. SUBCONTRACTOR SHALL ISSUE ALL APPROPRIATE NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES, REGULATIONS, AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY REGARDING THE PERFORMANCE OF THE WORK. ALL WORK CARRIED OUT SHALL COMPLY WITH ALL APPLICABLE MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS AND LOCAL JURISDICTIONAL CODES, ORDINANCES AND APPLICABLE REGULATIONS.

4. DRAWINGS PROVIDED HERE ARE NOT TO BE SCALED AND ARE INTENDED TO SHOW OUTLINE ONLY.

5. UNLESS NOTED OTHERWISE, THE WORK SHALL INCLUDE FURNISHING MATERIALS, EQUIPMENT, APPURTENANCES, AND LABOR NECESSARY TO COMPLETE ALL INSTALLATIONS AS INDICATED ON THE DRAWINGS.

6. THE SUBCONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE.

7. IF THE SPECIFIED EQUIPMENT CANNOT BE INSTALLED AS SHOWN ON THESE DRAWINGS, THE SUBCONTRACTOR SHALL PROPOSE AN ALTERNATIVE INSTALLATION SPACE FOR APPROVAL BY THE CONTRACTOR.

8. SUBCONTRACTOR SHALL DETERMINE ACTUAL ROUTING OF CONDUIT, POWER AND T1 CABLES, GROUNDING CABLES AS SHOWN ON THE POWER, GROUNDING AND TELCO PLAN DRAWING. SUBCONTRACTOR SHALL UTILIZE EXISTING TRAYS AND/OR SHALL ADD NEW TRAYS AS NECESSARY. SUBCONTRACTOR SHALL CONFIRM THE ACTUAL ROUTING WITH THE CONTRACTOR. ROUTING OF TRENCHING SHALL BE APPROVED BY CONTRACTOR

9. THE SUBCONTRACTOR SHALL PROTECT EXISTING IMPROVEMENTS, PAVEMENTS, CURBS, LANDSCAPING AND STRUCTURES. ANY DAMAGED PART SHALL BE REPAIRED AT SUBCONTRACTOR'S EXPENSE TO THE SATISFACTION OF OWNER.

10. SUBCONTRACTOR SHALL LEGALLY AND PROPERLY DISPOSE OFF ALL SCR1 'AP MATERIALS SUCH AS COAXIAL CABLES AND OTHER ITEMS REMOVED FROM THE EXISTING FACILITY. ANTENNAS REMOVED SHALL BE RETURNED TO THE OWNER'S DESIGNATED LOCATION.

11. SUBCONTRACTOR SHALL LEAVE PREMISES IN CLEAN CONDITION.

12. ALL CONCRETE REPAIR WORK SHALL BE DONE IN ACCORDANCE WITH AMERICAN CONCRETE INSTITUTE (ACI) 301.

13. ANY NEW CONCRETE NEEDED FOR THE CONSTRUCTION SHALL HAVE 4000 PSI STRENGTH AT 28 DAYS UNLESS OTHERWISE SPECIFIED. ALL CONCRETING WORK SHALL BE DONE IN ACCORDANCE WITH ACI 318 CODE REQUIREMENTS.

14. ALL STRUCTURAL STEEL WORK SHALL BE DETAILED, FABRICATED AND ERECTED IN ACCORDANCE WITH AISC SPECIFICATIONS. ALL STRUCTURAL STEEL SHALL BE ASTM A36 (Fy=36 ksi). ALL STEEL EXPOSED TO WEATHER SHALL BE HOT DIPPED GALVANIZED. TOUCH UP ALL SCRATCHES AND OTHER MARKS IN THE FIELD AFTER STEEL IS ERECTED USING A COMPATIBLE ZINC RICH PAINT.

15. CONSTRUCTION SHALL COMPLY WITH SPECIFICATION 25741-000-3APS-A00Z-00002, "GENERAL CONSTRUCTION SERVICES FOR CONSTRUCTION OF AT&T MOBILITY SITES."

16. SUBCONTRACTOR SHALL VERIFY ALL EXISTING DIMENSIONS AND CONDITIONS PRIOR TO COMMENCING ANY WORK. ALL DIMENSIONS OF EXISTING CONSTRUCTION SHOWN ON THE DRAWINGS MUST BE VERIFIED. SUBCONTRACTOR SHALL NOTIFY THE CONTRACTOR OF ANY DISCREPANCIES PRIOR TO ORDERING MATERIAL OR PROCEEDING WITH CONSTRUCTION.

17. THE EXISTING CELL SITE IS IN FULL COMMERCIAL OPERATION. ANY CONSTRUCTION WORK BY SUBCONTRACTOR SHALL NOT DISRUPT THE EXISTING NORMAL OPERATION. ANY WORK ON EXISTING EQUIPMENT MUST BE COORDINATED WITH CONTRACTOR. ALSO, WORK MAY NEED TO BE SCHEDULED FOR AN APPROPRIATE MAINTENANCE WINDOW USUALLY IN LOW TRAFFIC PERIODS AFTER MIDNIGHT.

18. SINCE THE CELL SITE MAY BE ACTIVE, ALL SAFETY PRECAUTIONS MUST BE TAKEN WHEN WORKING AROUND HIGH LEVELS OF ELECTROMAGNETIC RADIATION. EQUIPMENT SHOULD BE SHUTDOWN PRIOR TO PERFORMING ANY WORK THAT COULD EXPOSE THE WORKERS TO DANGER. PERSONAL RF EXPOSURE MONITORS ARE REQUIRED TO BE WORN TO ALERT OF ANY DANGEROUS EXPOSURE LEVELS.

19. SUBCONTRACTOR'S WORK SHALL COMPLY WITH ALL APPLICABLE NATIONAL, STATE, AND LOCAL CODES AS ADOPTED BY THE LOCAL AUTHORITY HAVING JURISDICTION (AHJ) FOR THE LOCATION. THE EDITION OF THE AHJ ADOPTED CODES AND STANDARDS IN EFFECT ON THE DATE OF CONTRACT AWARD SHALL GOVERN THE DESIGN.

    - INTERNATIONAL BUILDING CODE: IBC 2009 WITH LOCAL & COUNTY AMENDMENTS
    - NATIONAL ELECTRICAL CODE: NEC 2011 WITH LOCAL & COUNTY AMENDMENTS
    - FIRE/LIFE SAFETY CODE: NFPA-101 2009 WITH LOCAL & COUNTY AMENDMENTS

20. SUBCONTRACTOR'S WORK SHALL COMPLY WITH THE LATEST EDITION OF THE FOLLOWING STANDARDS:

    - AMERICAN CONCRETE INSTITUTE (ACI) 318, BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE
    - AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC), MANUAL OF STEEL CONSTRUCTION, THIRTEENTH EDITION
    - AMERICAN SOCIETY OF TESTING OF MATERIALS, ASTM
    - TELECOMMUNICATIONS INDUSTRY ASSOCIATION (ANSI/TIA-222-G-1), STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWER AND ANTENNA SUPPORTING STRUCTURES:
    - TIA 607, COMMERCIAL BUILDING GROUNDING AND BONDING REQUIREMENTS FOR TELECOMMUNICATIONS
    - OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION, OSHA
    - INSTITUTE FOR ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE) 81, GUIDE FOR MEASURING EARTH RESISTIVELY, GROUND IMPEDANCE, AND EARTH SURFACE POTENTIALS OF A GROUND SYSTEM IEEE 1100 (1999) RECOMMENDED PRACTICE FOR POWERING AND GROUNDING OF ELECTRONIC EQUIPMENT
    - TELCORDIA GR-1503, COAXIAL CABLE CONNECTIONS

21. FOR ANY CONFLICTS BETWEEN SECTIONS OF LISTED CODES AND STANDARDS REGARDING MATERIAL, METHODS OF CONSTRUCTION, OR OTHER REQUIREMENTS, THE MOST RESTRICTIVE REQUIREMENT SHALL GOVERN. WHERE THERE IS CONFLICT BETWEEN A GENERAL REQUIREMENT AND A SPECIFIC REQUIREMENT, THE SPECIFIC REQUIREMENT SHALL GOVERN.

GROUNDING NOTES:

1. THE SUBCONTRACTOR SHALL REVIEW AND INSPECT THE EXISTING FACILITY GROUNDING SYSTEM AND LIGHTNING PROTECTION SYSTEM (AS DESIGNED AND INSTALLED) FOR STRICT COMPLIANCE WITH THE NEC (AS ADOPTED BY THE AHJ), THE SITE-SPECIFIC (UL, LPI, OR NFPA) LIGHTING PROTECTION CODE, AND GENERAL COMPLIANCE WITH TELCORDIA AND TIA GROUNDING STANDARDS. THE SUBCONTRACTOR SHALL REPORT ANY VIOLATIONS OR ADVERSE FINDINGS TO THE CONTRACTOR FOR RESOLUTION.

2. ALL GROUND ELECTRODE SYSTEMS (INCLUDING TELECOMMUNICATION, RADIO, LIGHTNING PROTECTION, AND AC POWER GES'S) SHALL BE BONDED TOGETHER, AT OR BELOW GRADE, BY TWO OR MORE COPPER BONDING CONDUCTORS IN ACCORDANCE WITH THE NEC.

3. THE SUBCONTRACTOR SHALL PERFORM IEEE FALL-OF-POTENTIAL RESISTANCE TO EARTH TESTING (PER IEEE 1100 AND 81) FOR NEW GROUND ELECTRODE SYSTEMS. THE SUBCONTRACTOR SHALL FURNISH AND INSTALL SUPPLEMENTAL GROUND ELECTRODES AS NEEDED TO ACHIEVE A TEST RESULT OF 5 OHMS OR LESS. TESTS SHALL BE PERFORMED IN ACCORDANCE WITH 25471-000-3PS-EG00-0001, DESIGN & TESTING OF FACILITY GROUNDING FOR CELL SITES.

4. METAL RACEWAY SHALL NOT BE USED AS THE NEC REQUIRED EQUIPMENT GROUND CONDUCTOR. STRANDED COPPER CONDUCTORS WITH GREEN INSULATION, SIZED IN ACCORDANCE WITH THE NEC, SHALL BE FURNISHED AND INSTALLED WITH THE POWER CIRCUITS TO BTS EQUIPMENT.

5. EACH BTS CABINET FRAME SHALL BE DIRECTLY CONNECTED TO THE MASTER GROUND BAR WITH GREEN INSULATED SUPPLEMENTAL EQUIPMENT GROUND WIRES, 6 AWG STRANDED COPPER OR LARGER FOR INDOOR BTS; 2 AWG STRANDED COPPER FOR OUTDOOR BTS.

6. EXOTHERMIC WELDS SHALL BE USED FOR ALL GROUNDING CONNECTIONS BELOW GRADE.

7. APPROVED ANTIOXIDANT COATINGS (I.E., CONDUCTIVE GEL OR PASTE) SHALL BE USED ON ALL COMPRESSION AND BOLTED GROUND CONNECTIONS.

8. ICE BRIDGE BONDING CONDUCTORS SHALL BE EXOTHERMICALLY BONDED OR BOLTED WITH STAINLESS STEEL HARDWARE TO THE BRIDGE AND THE TOWER GROUND BAR.

9. ALUMINUM CONDUCTOR OR COPPER CLAD STEEL CONDUCTOR SHALL NOT BE USED FOR GROUNDING CONNECTIONS.

10. MISCELLANEOUS ELECTRICAL AND NON-ELECTRICAL METAL BOXES, FRAMES AND SUPPORTS SHALL BE BONDED TO THE GROUND RING, IN ACCORDANCE WITH THE NEC.

11. METAL CONDUIT AND TRAY SHALL BE GROUNDED AND MADE ELECTRICALLY CONTINUOUS WITH LISTED BONDING FITTINGS OR BY BONDING ACROSS THE DISCONTINUITY WITH 6 AWG COPPER WIRE UL APPROVED GROUNDING TYPE CONDUIT CLAMPS.

12. GROUND CONDUCTORS USED IN THE FACILITY GROUND AND LIGHTNING PROTECTION SYSTEMS SHALL NOT BE ROUTED THROUGH METALLIC OBJECTS THAT FORM A RING AROUND THE CONDUCTOR, SUCH AS METALLIC CONDUITS, METAL SUPPORT CLIPS OR SLEEVES THROUGH WALLS OR FLOORS. WHEN IT IS REQUIRED TO BE HOUSED IN CONDUIT TO MEET CODE REQUIREMENTS OR LOCAL CONDITIONS, NON-METALLIC MATERIAL SUCH AS PVC PLASTIC CONDUIT SHALL BE USED. WHERE USE OF METAL CONDUIT IS UNAVOIDABLE (E.G., NON-METALLIC CONDUIT PROHIBITED BY LOCAL CODE) THE GROUND CONDUCTOR SHALL BE BONDED TO EACH END OF THE METAL CONDUIT.

13. ALL TOWER GROUNDING SYSTEMS SHALL COMPLY WITH THE REQUIREMENTS OF ANSI/TIA 222. FOR TOWERS BEING BUILT TO REV-G OF THE STANDARD, THE WIRE SIZE OF THE BURIED GROUND RING AND CONNECTIONS BETWEEN THE TOWER AND THE BURIED GROUND RING SHALL BE CHANGED FROM 2 AWG TO 2/0 AWG. IN ADDITION, THE MINIMUM LENGTH OF THE GROUND RODS SHALL BE INCREASED FROM EIGHT FEET (8') TO TEN FEET (10').

14. ALL NEW STRUCTURES WITH A FOUNDATION AND/OR FOOTING HAVING 20 FT. OR MORE ½" OR GREATER ELECTRICALLY CONDUCTIVE REINFORCING STEEL MUST HAVE IT BONDED TO THE GROUND RING USING AN EXOTHERMIC WELD CONNECTION USING #2 AWG SOLID TINNED COPPER GROUND WIRE, PER NEC 250.50.

at&t Mobility
550 COCHITUATE ROAD
FRAMINGHAM,MA 01701

EMPIRE telecom
16 ESQUIRE ROAD
BILLERICA, MA 01821

SBA
SBA COMMUNICATIONS CORP.
134 FLANDERS ROAD, SUITE
125 WESTBOROUGH, MA 01581

PLANS PREPARED BY:
Trylon
1825 W. WALNUT HILL LANE SUITE 302
IRVING, TX 5038
1-855-669-5421

NO.	DATE	DESCRIPTION	BY
A	11/22/16	FOR REVIEW	AC

SITE INFORMATION:

CT1148
BLOOMFIELD EAST
FA CODE: 10035110

1021 BLUE HILLS AVENUE
BLOOMFIELD, CT 06002

SEAL:

STATE OF CONNECTICUT
MICHAEL F. PLAHOVINSAK
No. 25849
PROFESSIONAL ENGINEER
11-25-2016

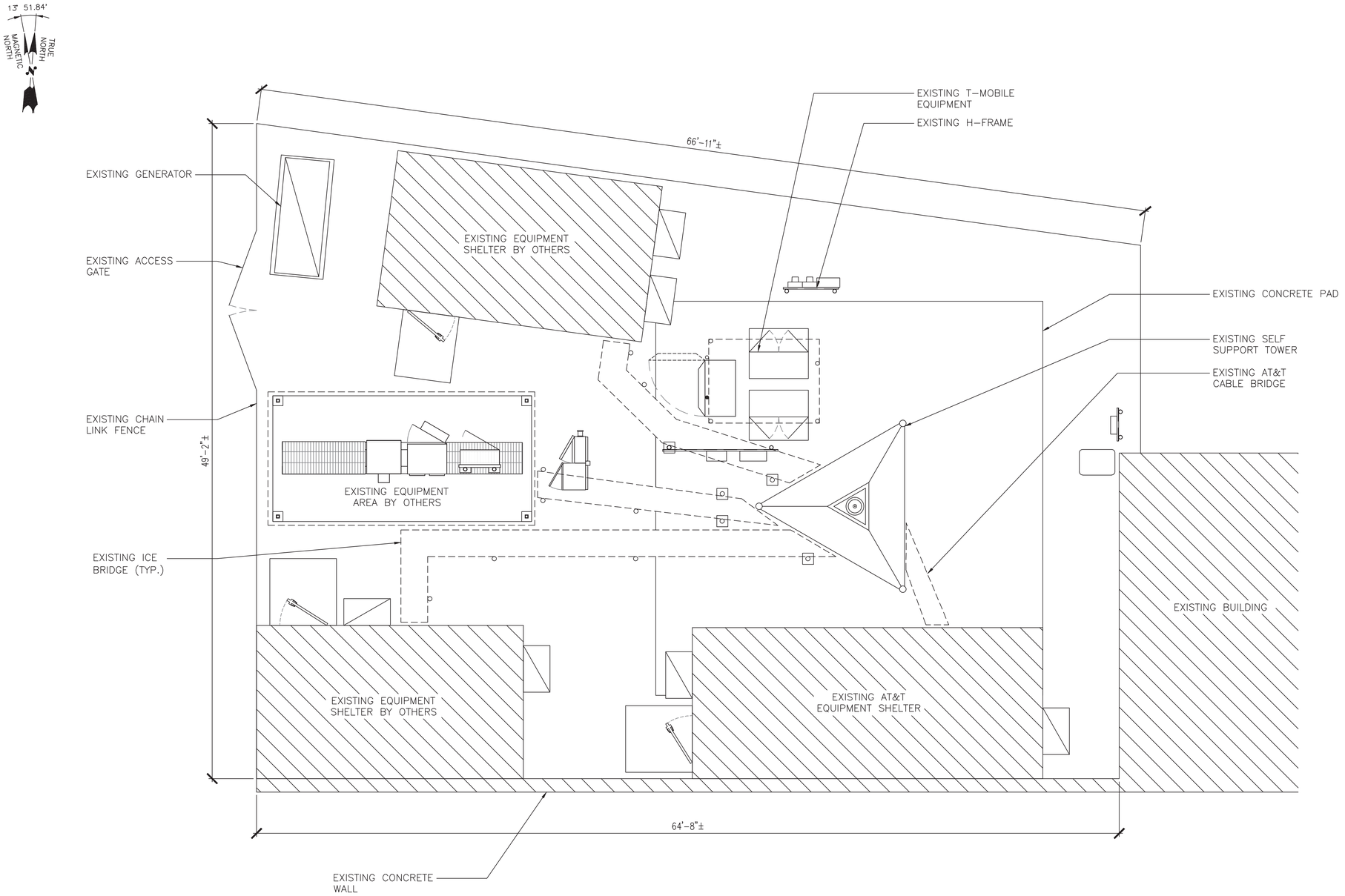
MICHAEL F. PLAHOVINSAK, P.E. #25849
Sole Proprietor - Independent Engineer
18301 S.R. 161, Plain City, OH 43064
614-398-6250 / mike@mfpeng.com

SHEET TITLE:

GENERAL NOTES &
GROUNDING NOTES

SHEET NUMBER:

GN-1



SITE PLAN

22"x34" SCALE: 1/4" = 1'-0"
11"x17" SCALE: 1/8" = 1'-0"

4' 3' 2' 1' 0" 4'

1

at&t Mobility
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16 ESQUIRE ROAD
BILLERICA, MA 01821

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SBA COMMUNICATIONS CORP.
134 FLANDERS ROAD, SUITE
125 WESTBOROUGH, MA 01581

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BLOOMFIELD, CT 06002

SEAL:

STATE OF CONNECTICUT
MICHAEL F. PLAHOVINSAK
No. 25849
REGISTERED PROFESSIONAL ENGINEER
SIGNATURE
12-25-2016

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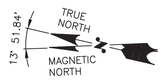
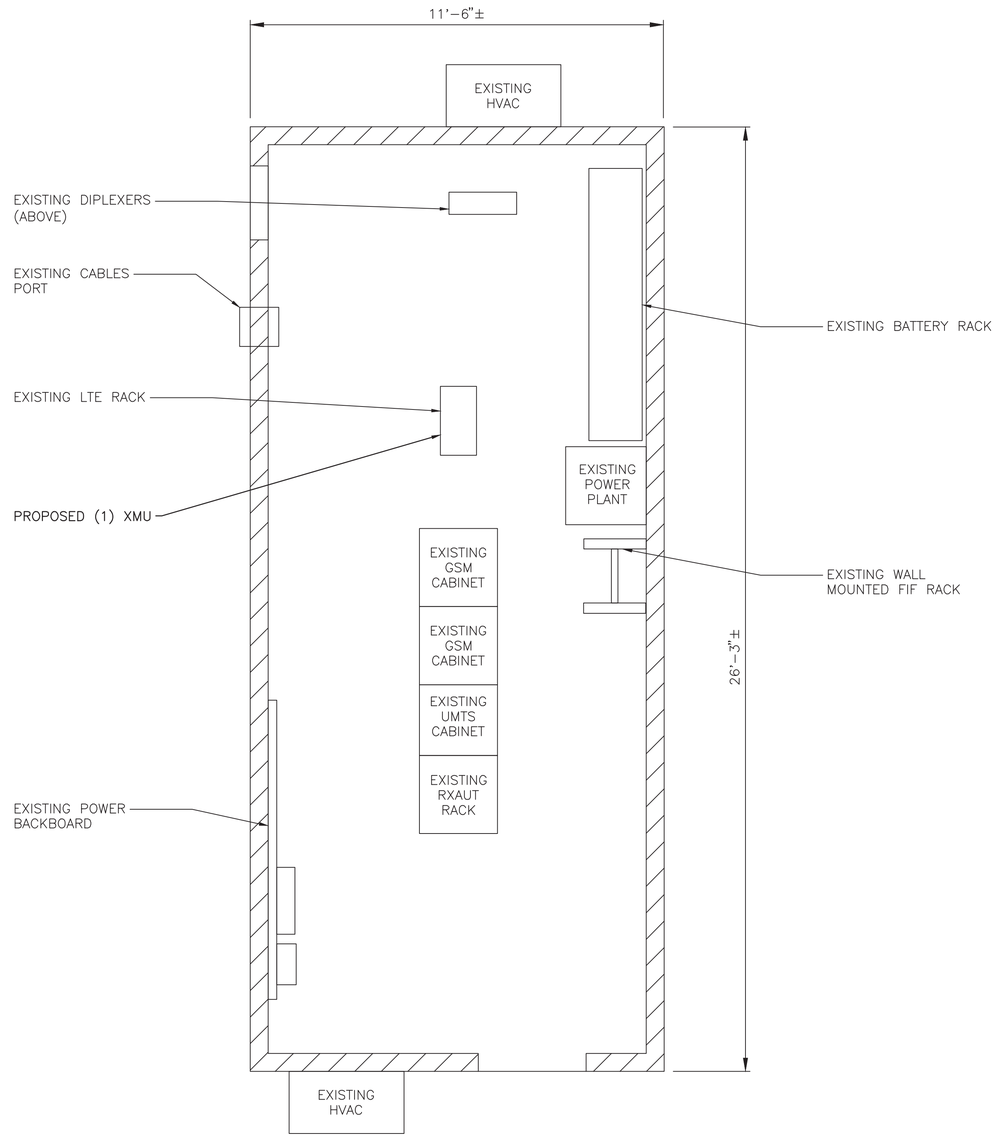
SHEET TITLE:

SITE PLAN

SHEET NUMBER:

A-1





ENLARGED PARTIAL SITE PLAN

22"x34" SCALE: 1/2" = 1'-0"
11"x17" SCALE: 1/4" = 1'-0"

2' 1' 0" 2'

1

at&t Mobility
550 COCHITUATE ROAD
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1021 BLUE HILLS AVENUE
BLOOMFIELD, CT 06002

SEAL:

11-25-2016

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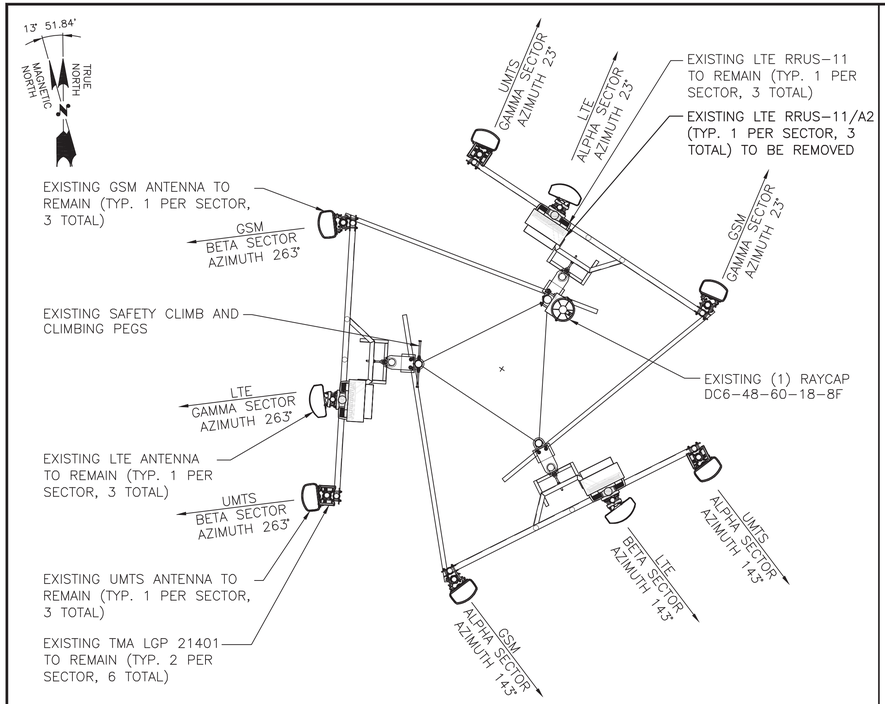
SHEET TITLE:

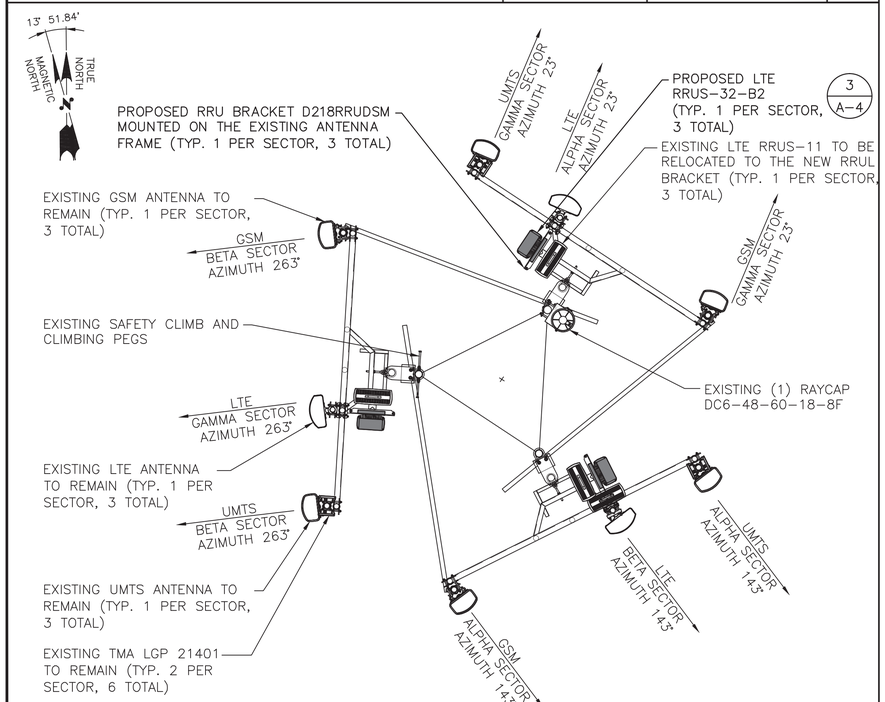
EQUIPMENT LAYOUTS

SHEET NUMBER:

A-2



EXISTING ANTENNA LAYOUT | 22"x34" SCALE: 3/8" = 1'-0" / 11"x17" SCALE: 3/16" = 1'-0" | 2' 1' 0" 2' | 1



PROPOSED ANTENNA LAYOUT | 22"x34" SCALE: 3/8" = 1'-0" / 11"x17" SCALE: 3/16" = 1'-0" | 2' 1' 0" 2' | 2

SPECIAL PRE-CONSTRUCTION WORK NOTE (SBA-PROVIDED TOWER STRUCTURAL ANALYSIS SPECIAL EQUIPMENT INSTALLATION REQUIREMENTS): GENERAL CONTRACTOR SHALL FURNISH AND INSTALL ALL SPECIAL OR SUPPLEMENTAL ADDITIONAL TOWER-MOUNTED EQUIPMENT PER RECOMMENDATIONS FROM SBA-PROVIDED TOWER STRUCTURAL ANALYSIS FOR ANY SPECIAL SHIELDING OF TOWER TOP EQUIPMENT AND FOR ANY SPECIAL FEEDLINE BUNDLING OR RELOCATION.

2 / A-3 PROPOSED ANTENNA LAYOUT

3 / A-4 MOUNT DETAIL

SOURCE: TRYLON 11/15/16

EXISTING BLUE HILLS FIRE & PD ANTENNAS ± 135.0' AGL

TOP OF EXISTING TOWER & T-MOBILE ANTENNAS ± 125.0' AGL

EXISTING CLEARWIRE ANTENNAS ± 120.0' AGL

EXISTING VERIZON ANTENNAS ± 110.0' AGL

EXISTING AT&T ANTENNAS RAD CENTER ± 98' AGL TO REMAIN

EXISTING SPRINT ANTENNAS ± 87.0' AGL

EXISTING METRO ANTENNA ± 75.0' AGL

EXISTING UNKNOWN ANTENNAS ± 51.0' AGL

GRADE EL. 0'-0" A.G.L.

NOTE:
CARRIER POSITIONS AND RAD ELEVATIONS PROVIDED BY SBA, TRYLON HAS NOT INDEPENDENTLY FIELD VERIFIED.

PROPOSED ELEVATION | 3

at&t Mobility
550 COCHITUATE ROAD
FRAMINGHAM,MA 01701

EMPIRE telecom
16 ESQUIRE ROAD
BILLERICA, MA 01821

SBA
SBA COMMUNICATIONS CORP.
134 FLANDERS ROAD, SUITE
125 WESTBOROUGH, MA 01581

PLANS PREPARED BY:
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IRVING, TX 5038
1-855-669-5421

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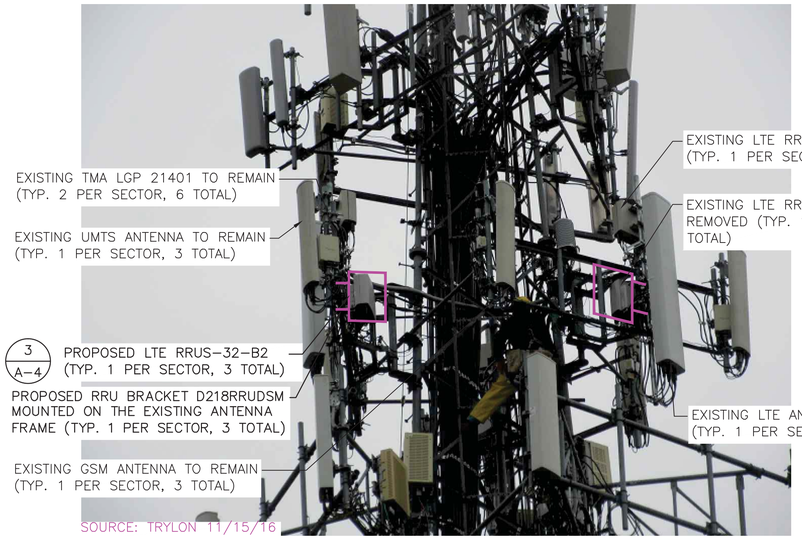
SHEET TITLE:

ANTENNA LAYOUTS, TOWER ELEVATION & MOUNTING DETAILS

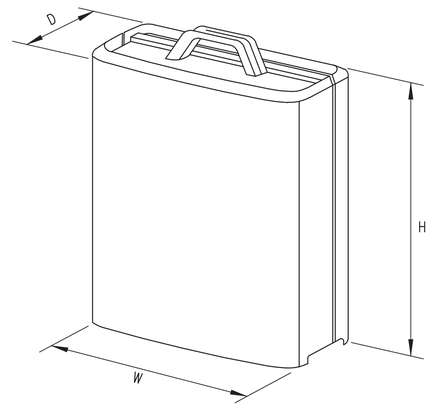
SHEET NUMBER:

A-3



SOURCE: TRYLON 11/15/16

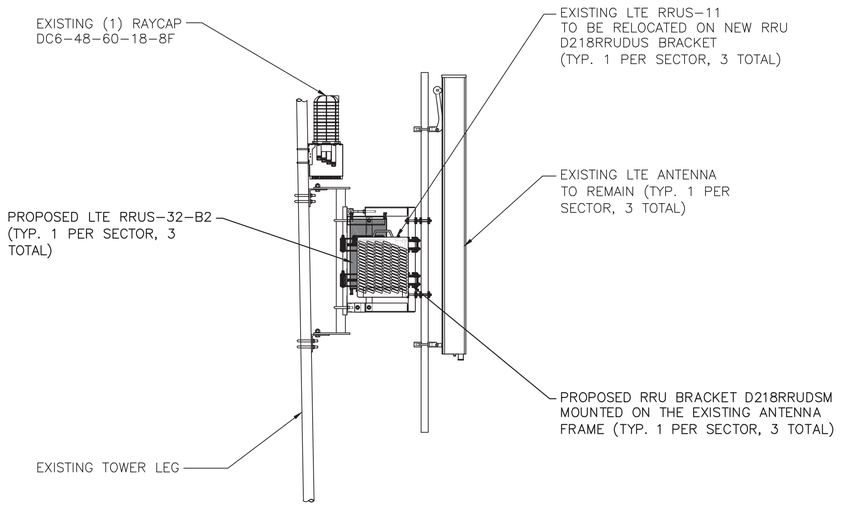
RRUS MOUNT DETAILS | N.T.S | 1



SEE SPECIAL WORK NOTE REGARDING PAINT TO MATCH REQUIREMENTS

MODEL	H x W x D	WEIGHT
RRUS-32-B2	20.9" x 9.5" x 3.3"	77 LBS

RRUS DETAILS | N.T.S | 2



MOUNTING DETAIL | 22"x34" SCALE: 1/2" = 1'-0" | 11"x17" SCALE: 1/4" = 1'-0" | 2' 1' 0" 2' | 3

NOT USED

at&t Mobility
550 COCHITUATE ROAD
FRAMINGHAM,MA 01701

EMPIRE telecom
16 ESQUIRE ROAD
BILLERICA, MA 01821

SBA
SBA COMMUNICATIONS CORP.
134 FLANDERS ROAD, SUITE
125 WESTBOROUGH, MA 01581

PLANS PREPARED BY:
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1-855-669-5421

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REGISTERED
11-25-2016

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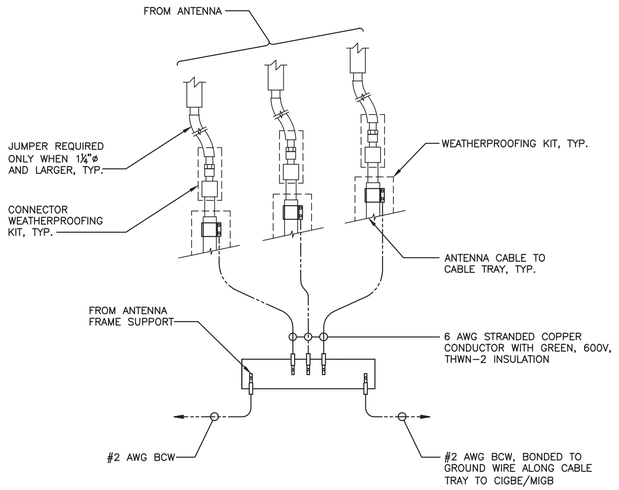
SHEET TITLE:

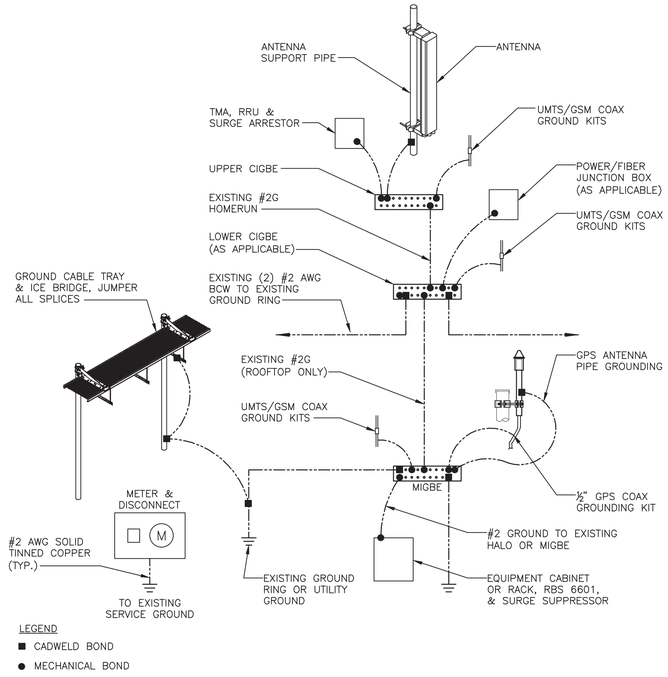
DETAILS

SHEET NUMBER:

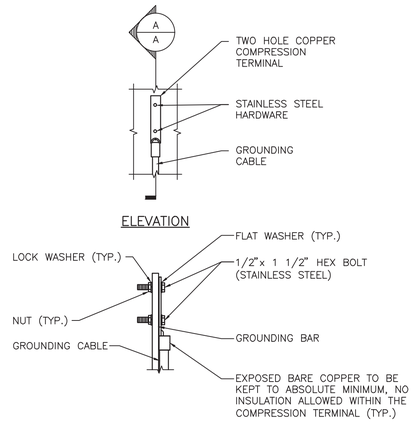
A-4



GROUND WIRE TO GROUND BAR CONNECTION DETAILS | N.T.S | 1



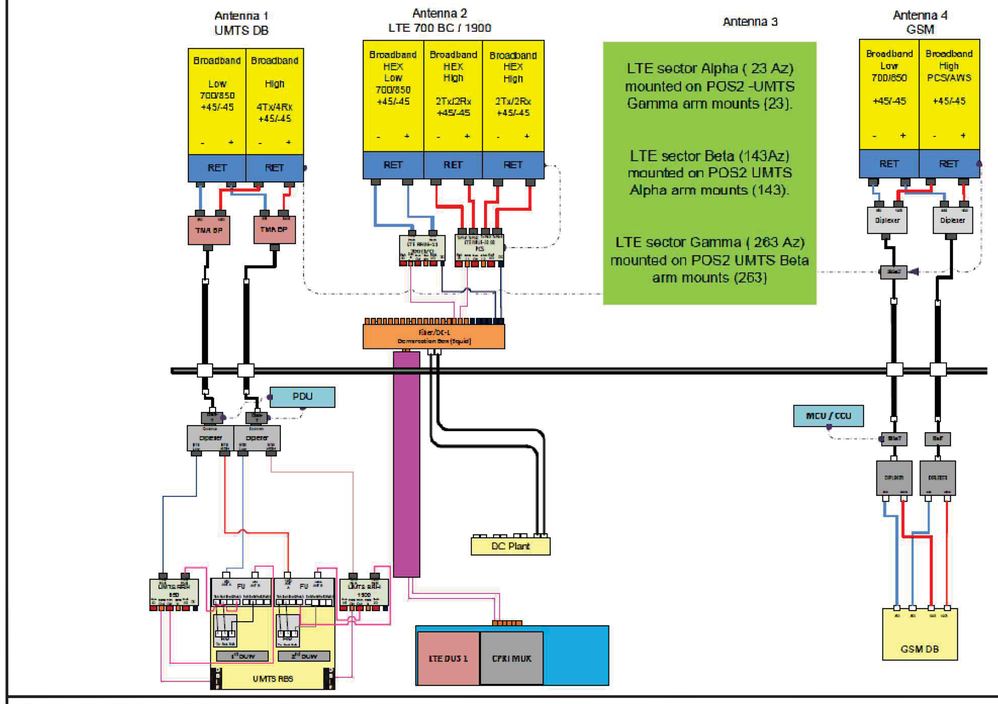
GROUND RISER DIAGRAM | N.T.S | 2



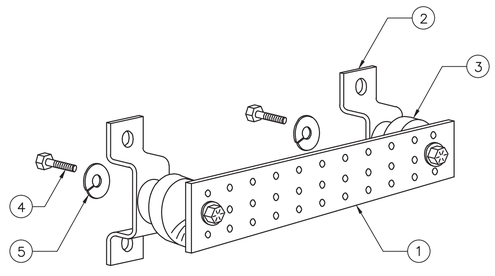
NOTE:

1. "DOUBLING UP" OR "STACKING" OF CONNECTIONS IS NOT PERMITTED.
2. OXIDE INHIBITING COMPOUND TO BE USED AT ALL LOCATIONS.
3. CADWELD DOWNLEADS FROM UPPER EGB, LOWER EGB, AND MGB.

TYPICAL GROUND BAR CONNECTION DETAILS | N.T.S | 3



RUN WIRING DIAGRAM | N.T.S | 4



ITEM NO.	QTY.	DESCRIPTION
1	1	SOLID GROUND BAR (20'x 4'x ¼")
2	2	WALL MOUNTING BRACKET
3	2	INSULATORS
4	4	⅜"-11x1" H.H.C.S.
5	4	⅜" LOCK WASHER

NOTES:

EACH GROUND CONDUCTOR TERMINATING ON ANY GROUND BAR SHALL HAVE AN IDENTIFICATION TAG ATTACHED AT EACH END THAT WILL IDENTIFY ITS ORIGIN AND DESTINATION

SECTION "P" – SURGE PRODUCERS
- CABLE ENTRY PORTS (HATCH PLATES) (#2)
- GENERATOR FRAMEWORK (IF AVAILABLE) (#2)
- TELCO GROUND BAR
- COMMERCIAL POWER COMMON NEUTRAL/GROUND BOND (#2)
- +24V POWER SUPPLY RETURN BAR (#2)
- −48V POWER SUPPLY RETURN BAR (#2)
- RECTIFIER FRAMES

SECTION "A" – SURGE ABSORBERS
- INTERIOR GROUND RING (#2)
- EXTERNAL EARTH GROUND FIELD (BURIED GROUND RING) (#2)
- METALLIC COLD WATER PIPE (IF AVAILABLE) (#2)
- BUILDING STEEL (IF AVAILABLE) (#2)

GROUND BAR DETAILS | N.T.S | 5

at&t Mobility
550 COCHITUATE ROAD
FRAMINGHAM,MA 01701

EMPIRE telecom
16 ESQUIRE ROAD
BILLERICA, MA 01821

SBA
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134 FLANDERS ROAD, SUITE
125 WESTBOROUGH, MA 01581

PLANS PREPARED BY:
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SHEET TITLE:

GROUNDING, ONE-LINE DIAGRAM & DETAILS

SHEET NUMBER:

G-1