10 Industrial Ave, Suite 3
Mahwah, NJ 07430
Phone: (845)499-4712
Jennifer Notaro
Real Estate Consultant

September 3, 2014

Hand Delivered

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

CC to Property Owner
2702 Forest View Lane
Kissimmee, FL 34744

RE: Sprint Spectrum L.P. notice of intent to modify an existing telecommunications facility located at 2 Progress Avenue Seymor Ct 06484. Known to Sprint Spectrum L.P. as site CT33XC610.

Dear Ms. Bachman:

In order to accommodate technological changes, implement Code Division Multiple Access ("CDMA") and/or Long Term Evolution ("LTE") capabilities, and enhance system performance in the state of Connecticut, Sprint Spectrum L.P. plans to modify the equipment configurations at many of its existing cell sites. Please accept this letter and attachments as notification, pursuant to R.C.S.A. Section 16-50j-73, of construction which constitutes an exempt modification pursuant to R.C.S.A. Section 16-50j-72(b)(2). In compliance with R.C.S.A. Section 16-50j-73, a copy of this letter and its attachments is being sent to the chief elected official of the municipality in which affected cell site is located.

CDMA employs Spread-Spectrum technology and special coding scheme to allow multiple users to be multiplexed over the same physical channel.

LTE is a new high-performance air interface for cellular mobile communications. It is designed to increase the capacity and speed of mobile telephone networks.

Attached is a summary of the planned modifications, including power density calculations reflecting the change in Sprint's operations at the site. Also included is documentation of the structural sufficiency of the tower to accommodate the revised antenna configuration.

The changes to the facility do not constitute modification as defined Connecticut General Statues ("C.G.S.") Section 16-50i(d) because the general physical characteristics of the facility will not be significantly changed or altered. Rather, the planned changes to the facility fall squarely within those activities explicitly provided for the R.C.S.A. Section 16-50j-72(b)(2).

1. The height of the overall structure will not be affected.
2. The proposed changes will not extend the site boundaries. There will be no effect on the site compound.
3. The proposed changes will not increase the noise level at the existing facility by 6 decibels or more.
4. Radio Frequency power density may increase due to the use of one or more CDMA transmissions. Moreover, LTE will utilize additional radio frequencies newly licensed by the FCC for cellular mobile communications. However, the changes will not increase the calculated "worst case" power density for the combined operations at the site to a level at or above the applicable standard for uncontrolled environments as calculated for a mixed frequency site.

For the foregoing reasons Sprint Spectrum L.P. respectfully submits that the proposed changes at the referenced site constitute exempt modifications under R.C.S.A. Section 16-50j-72(b)(2).

Please feel free to call me at (845)-499-4712 or email JNotaro@Transcendwireless.com with questions concerning this matter.
Thank you for your consideration.

Sincerely,

Jennifer Notaro
Real Estate Consultant

EBI Consulting
environmental | engineering | due diligence

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

Sprint Existing Facility

Site ID: CT33XC610

S. Bethany / EMAC

2 Progress Avenue
Seymour, CT 06483

September 2, 2014

EBI Project Number: 62144451

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

EBI Consulting
environmental | engineering | due diligence

September 2, 2014

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

Re: Radio Frequency Maximum Permissible Exposure (MPE) Assessment for Site:
CT33XC610 - S. Bethany / EMAC

Site Total: 43.08% - MPE% in full compliance

EBI Consulting was directed to analyze the proposed upgrades to the existing Sprint facility located at **2 Progress Avenue, Seymour, CT**, for the purpose of determining whether the radio frequency (RF) exposure levels from the proposed Sprint equipment upgrades on this property are within specified federal limits.

All information used in this report was analyzed as a percentage of current Maximum Permissible Exposure (% MPE) as listed in the FCC OET Bulletin 65 Edition 97-01and ANSI/IEEE Std C95.1. The FCC regulates Maximum Permissible Exposure in units of microwatts per square centimeter (µW/cm2). The number of µW/cm2 calculated at each sample point is called the power density. The exposure limit for power density varies depending upon the frequencies being utilized. Wireless Carriers and Paging Services use different frequency bands each with different exposure limits, therefore it is necessary to report results and limits in terms of percent MPE rather than power density.

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

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

Public exposure to radio frequencies is regulated and enforced in units of microwatts per square centimeter ($\mu W/cm^2$). The general population exposure limit for the cellular band (850 MHz Band) is approximately 567 $\mu W/cm^2$, and the general population exposure limit for the 1900 MHz and 2500 MHz 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 upgrades to the existing Sprint Wireless antenna facility located at **2 Progress Avenue, Seymour, CT**, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. 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 emissions were calculated using the following assumptions:

1) 3 channels in the 1900 MHz Band were considered for each sector of the proposed installation.

2) 1 channel in the 800 MHz Band was considered for each sector of the proposed installation.

3) 2 channels in the 2500 MHz Band were considered for each sector of the proposed installation.

4) All radios at the proposed installation were considered to be running at full power and were uncombined in their RF transmissions paths per carrier prescribed configuration. Per FCC OET Bulletin No. 65 - Edition 97-01 recommendations to achieve the maximum anticipated value at each sample point, all power levels emitting from the proposed antenna installation are increased by a factor of 2.56 to account for possible in-phase reflections from the surrounding environment. This is rarely the case, and if so, is never continuous.

5) For the following calculations the sample point was the top of a six foot person standing at the base of the tower. The maximum gain of the antenna per the antenna manufactures supplied specifications 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.

6) The antennas used in this modeling are the RFS APXVSPP18-C-A20 and the RFS APXVTM14-C-I20. This is based on feedback from the carrier with regards to anticipated antenna selection. The RFS APXVSPP18-C-A20 has a 15.9 dBd gain value at its main lobe at 1900 MHz and 13.4 dBd at its main lobe for 850 MHz. The RFS APXVTM14-C-I20 has a 15.9 dBd gain value at its main lobe at 2500 MHz. 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.

7) The antenna mounting height centerline for the proposed antennas is **170 feet** above ground level (AGL).

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

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

Site ID	CT33XC610 - S. Bethany / EMAC
Site Addresss	2 Progress Avenue, Seymour, CT, 06483
Site Type	Self Support Tower

Sector 1

Antenna Number	Antenna Make	Antenna Model	Radio Type	Frequency Band	Technology	Power Out Per Channel (Watts)	Number of Channels	Composite Power	Antenna Gain (10 db reduction)	Antenna Height (ft)	analysis height	Cable Size	Cable Loss (dB)	Additional Loss (dB)	ERP	Power Density Percentage
1a	RFS	APXVSPP18-C-A20	RRH	1900 MHz	CDMA / LTE	20	3	60	5.9	170	164	1/2 "	0.5	0	208.04	0.28%
1a	RFS	APXVSPP18-C-A20	RRH	850 MHz	CDMA / LTE	20	1	20	3.4	170	164	1/2 "	0.5	0	39.00	0.09%
1B	RFS	APXVTMM14-C-120	RRH	2500 MHz	CDMA / LTE	20	2	40	5.9	170	164	1/2 "	0.5	0	138.69	0.33%
														Sector total Power Density Value:		0.70%

Sector 2

Antenna Number	Antenna Make	Antenna Model	Radio Type	Frequency Band	Technology	Power Out Per Channel (Watts)	Number of Channels	Composite Power	Antenna Gain (10 db reduction)	Antenna Height (ft)	analysis height	Cable Size	Cable Loss (dB)	Additional Loss (dB)	ERP	Power Density Percentage
2a	RFS	APXVSPP18-C-A20	RRH	1900 MHz	CDMA / LTE	20	3	60	5.9	170	164	1/2 "	0.5	0	208.04	0.28%
2a	RFS	APXVSPP18-C-A20	RRH	850 MHz	CDMA / LTE	20	1	20	3.4	170	164	1/2 "	0.5	0	39.00	0.09%
2B	RFS	APXVTMM14-C-120	RRH	2500 MHz	CDMA / LTE	20	2	40	5.9	170	164	1/2 "	0.5	0	138.69	0.33%
														Sector total Power Density Value:		0.70%

Sector 3

Antenna Number	Antenna Make	Antenna Model	Radio Type	Frequency Band	Technology	Power Out Per Channel (Watts)	Number of Channels	Composite Power	Antenna Gain (10 db reduction)	Antenna Height (ft)	analysis height	Cable Size	Cable Loss (dB)	Additional Loss (dB)	ERP	Power Density Percentage
3a	RFS	APXVSPP18-C-A20	RRH	1900 MHz	CDMA / LTE	20	3	60	5.9	170	164	1/2 "	0.5	0	208.04	0.28%
3a	RFS	APXVSPP18-C-A20	RRH	850 MHz	CDMA / LTE	20	1	20	3.4	170	164	1/2 "	0.5	0	39.00	0.09%
3B	RFS	APXVTMM14-C-120	RRH	2500 MHz	CDMA / LTE	20	2	40	5.9	170	164	1/2 "	0.5	0	138.69	0.33%
														Sector total Power Density Value:		0.70%

Site Composite MPE %	
Carrier	MPE %
Sprint	2.09%
Mike Gardella	0.63%
Town	3.13%
Verizon Wireless	22.96%
AT&T	13.81%
T-Mobile	0.46%
Total Site MPE %	**43.08%**

EBI Consulting
environmental | engineering | due diligence

Summary

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

The anticipated Maximum Composite contributions from the Sprint facility are **2.09% (0.70% from sector 1, 0.70% from sector 2 and 0.70% from sector 3)** of the allowable FCC established general public limit considering all three sectors simultaneously sampled at the ground level.

The anticipated composite MPE value for this site assuming all carriers present is **43.08%** of the allowable FCC established general public limit sampled at 6 feet above ground level. This total composite site value is based upon MPE values listed in the Connecticut Siting Council database for existing carrier emissions.

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

Scott Heffernan
RF Engineering Director

EBI Consulting
21 B Street
Burlington, MA 01803

STRUCTURAL ASSESSMENT – 280-FOOT SELF-SUPPORT TOWER
FOR: TRANSCEND WIRELESS – SPRINT

SITE NAME: S. BETHANY / EMAC COMMUNICATIONS
SITE ID: CT33XC610

TOWER: PASS 94.0%
FOUNDATION: PASS

RAMAKER & ASSOCIATES, INC.
JOB NUMBER: 29016

1120 Dallas Street, Sauk City, WI 53583
Phone: 608-643-4100 ▲ Fax: 608-643-7999
www.ramaker.com

STRUCTURAL ASSESSMENT

SITE: S. Bethany / EMAC Communications
2 Progress Ave.
Seymour, New Haven County, Connecticut

PREPARED FOR: Transcend Wireless

CONTACT PERSON: Mike Kithcart
Transcend Wireless
48 Spruce Street, Oakland, NJ 07436

PREPARED BY: Ramaker & Associates, Inc.
1120 Dallas Street
Sauk City, Wisconsin 53583
Telephone: (608) 643-4100
Facsimile: (608) 643-7999

RAMAKER JOB NUMBER: 29016

DATE OF REPORT ISSUANCE: July 23, 2014

Jonathan Styx
Engineering Technician

07/23/14
Date

James R. Skowronski, P.E.
Supervising Engineer

07/23/14
Date

TABLE OF CONTENTS

LIST OF APPENDICES

SECTION 1

EXECUTIVE SUMMARY

This report summarizes the structural analysis conducted by Ramaker & Associates, Inc. (RAMAKER) for Transcend Wireless on behalf of Sprint, who intends to install additional equipment on an existing tower.

The Sprint proposed loading includes installing three (3) RFS APXV9TM14-ALU-120 panel antennas and three (3) Alcatel-Lucent TD-RRH 8x20 units on the three (3) existing T-Arms at a centerline elevation of 170-feet AGL. The proposed antennas shall be fed with one (1) new 5/8-inch hybrid cable.

Results of our tower analysis show that the tower will be stressed to a maximum of 94.0 percent of capacity under proposed loading conditions. **Tower modifications are required but are beyond the scope of this report.** All proposed model foundation reactions are less than the original design reactions. Therefore, it is anticipated that the existing foundation will provide adequate strength under proposed loading conditions.

Results of our mount assessment show that by engineering calculation and inspection, the antenna and RRH mounting structure is capable of supporting the existing and proposed Sprint 2.5 equipment deployment without causing an overstress condition in the antenna and RRH mounting structure, **provided the proposed structural modifications are completed prior to installation of new equipment per construction drawings by Ramaker & Associates.**

In summary, the tower and foundations will pass the TIA/EIA-222-F code requirements under proposed loading conditions. The mounting structure will pass the TIA-222 code requirements under proposed loading conditions.

SECTION 2
INTRODUCTION

2.1 PROJECT INFORMATION

This report summarizes the structural analysis conducted by Ramaker & Associates, Inc. (RAMAKER) for Transcend Wireless on behalf of Sprint, who intends to install additional equipment on an existing tower.

2.2 PURPOSE OF REPORT

The analysis activities of this report were conducted for the purposes of creating and analyzing a model of the subject structure under the required loading conditions. Base reactions from the resulting model were also determined for tower foundation and support development. Recommendations regarding the analysis results, loading configuration, and structural modifications are also provided.

2.3 SCOPE OF SERVICES

RAMAKER developed a finite element model (FEM) of the tower, using tnxTower, for member force, joint deflection, and structure reaction determinations. Subsequently, this report was drafted to provide our engineering recommendations. All information contained herein is valid only for the described structure configuration and loading conditions. RAMAKER reserves the right to modify our recommendations should alterations to the tower loading occur.

SECTION 3
MODEL DEVELOPMENT

3.1 INTRODUCTION

RAMAKER developed a FEM of the tower superstructure. Required static loads consisting of the antenna configuration, wind forces, ice loads, and linear appurtenances (including cable loads) were then applied to the FEM. As a result, all member forces, allowable capacities, and base reactions were computed. Additionally, potentially overstressed members were identified.

3.2 EXISTING STRUCTURE INFORMATION

Existing structure information was gathered from:

- Original tower drawings by Pirod, file number A-116966, dated July 24, 2002.

3.3 TOWER LOADING

RAMAKER understands that the tower loading to be used for this analysis will consist of the existing and proposed antenna, mount, and cable configurations as shown in the following chart:

Elevation	Appurtenance	Mount	Coax	Owner	Status
280	(1) Lightning Rod	Pole Mount	-	Tower	Existing
	(1) Beacon	Top of Tower	(1) 5/8		
	(1) 5' Omni	9-arm Halo Mount	(3) 1-5/8	EMAC	Existing
	(1) Decibel DB420				
	(2) FM Broadcast Antenna				
250	(6) EMS RR90-17-DP	(3) T-Frames	(12) 1-5/8	T-Mobile	Existing
235	(1) 5' Dipole Antenna	9-arm Halo Mount	(1) 7/8	EMAC	Existing
225	(1) Security Camera	Leg Mount	(1) 1/4	EMAC	Existing
170	(3) RFS APXVSPP18-C	(3) T-Frames	(3) 1-5/8	Sprint	Existing
	(3) Alcatel-Lucent 1900 MHz RRH				
	(3) Alcatel-Lucent 800 MHz RRH				
	(3) RFS APXV9TM14-ALU-120		**(1) 1-1/4 Hyrbid**		**Proposed**
	(3) Alcatel-Lucent TD-RRH 8x20				
160	(3) KMW AM-X-CW-16-65-00T	(3) T-Frames	(6) 1-5/8	AT&T	Existing
	(3) Kathrein 800 10121				
	(6) 10" x 9" x 3" TMA's				
	(3) Ericsson RRUS-11				
	(1) Raycap DC6-48-60-18-8F				
150	(3) 6'x6-1/2"x3-1/2" Panel Antennas	Leg Mount	(3) 7/8	Metro PCS	Existing

Elevation	Appurtenance	Mount	Coax	Owner	Status
142	(3) Small Beacon Spurs	Leg Mount	(3) 5/8	Tower	Existing
140	(6) 5' x 1' Panel Antennas	(3) T-Frames	(12) 1-5/8	Verizon	Existing
	(3) 5' x 3" Panel Antennas				
	(3) 5' x 8" Panel Antennas				
40	(1) Yagi	Leg Mount	(1) 5/8	EMAC	Existing

3.4 WIND AND ICE LOAD

Wind forces used in model development are in compliance with the TIA/EIA-222-F Standard. These guidelines call for an analysis to be performed which assumes a basic wind speed of 85 miles-per-hour (mph) without ice in New Haven County. The tower is also designed for a 74 mph basic wind speed with 0.50-inch of radial ice.

SECTION 4
ANALYSIS RESULTS

4.1 ANALYSIS RESULTS

The tower superstructure was analyzed with the combined existing and proposed antenna loading with and without radial ice. The computed maximum tower member stress capacities are as follows:

Component Type	Percent Capacity
Leg	77.1
Diagonal	88.4
Horizontal	57.8
Bolt	94.0
RATING =	**94.0**

4.2 BASE REACTIONS

The computed maximum reactions under the corresponding maximum moment are as follows:

Load Type	Original Design	Proposed Model
Total Axial (k)	153.3	148.7
Total Shear (k)	130.6	81.4
Total Moment (k-ft)	18,719.1	12,560.0
Leg Uplift (k)	720.9	454.0
Leg Compression (k)	823.1	567.5
Leg Shear (k)	-	52.4

All proposed model foundation reactions are less than the original design reactions. Therefore, it is anticipated that the existing foundation will provide adequate strength under proposed loading conditions.

4.3 MOUNT ASSESSMENT

Results of our mount assessment show that by engineering calculation and inspection, the antenna and RRH mounting structure is capable of supporting the existing and proposed Sprint 2.5 equipment deployment without causing an overstress condition in the antenna and RRH mounting structure, **provided the proposed structural modifications are completed prior to installation of new equipment per construction drawings by Ramaker & Associates.**

This assessment is inclusive of the entire antenna mounting structure, including tower platforms, arms, and all other aspects of the mounting structure that will support the Sprint 2.5 equipment deployment. This assessment assumes that the mounting structure(s) has been installed correctly, is free from deterioration, and is maintained properly.

SECTION 5
LIMITATIONS

The recommendations contained within this report were developed using general project information provided by the owner, tower manufacturer, general field observations, reference information and laboratory testing data, as applicable. All recommendations pertain only to the proposed tower construction, location, and loading as described in this report. RAMAKER assumes no responsibility for failures caused by factors beyond our control. These include but are not limited to the following:

1. Missing, corroding, and/or deteriorating members
2. Improper manufacturing and/or construction
3. Improper maintenance

RAMAKER assumes no responsibility for modifications completed prior to or hereafter in which RAMAKER was not directly involved. These modifications include but are not limited to the following:

1. Replacing or strengthening bracing members
2. Reinforcing or extending vertical members
3. Installing or removing antenna mounting gates or side arms
4. Changing loading configurations

Furthermore, RAMAKER hereby states that this document represents the entire report and that it assumes no liability for any factual changes that may occur after the date of this report. All representations, recommendations and conclusions are based on the information contained and set forth herein. If you are aware of any information contrary to that contained herein, or if you are aware of any defects arising from the original design, material, fabrication and erection deficiencies, you should disregard this report and immediately contact RAMAKER. RAMAKER isn't liable for any representation, recommendation or conclusion not expressly stated herein.

The tower owner is responsible for verifying that the existing loading on the tower is consistent with the loading applied to the tower within this report.

SECTION 6

REFERENCES

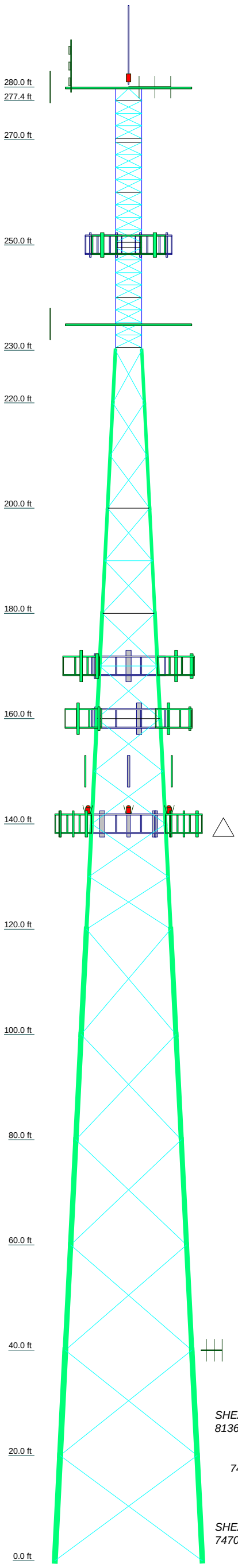
1. 2003 International Building Code.

2. Telecommunications Industries Association, Structural Standards for Steel Antenna Towers and Antenna Supporting Structures, TIA Standard TIA/EIA-222-F 1996, Washington, D.C.

APPENDIX A

TOWER FIGURES

Section	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	T13	T14	T15	T16
Legs		SR 1 3/4	SR 2	SR 2 1/2	Pirod 105245	Pirod 105218		Pirod 105219	Pirod 105220		Pirod 112743		Pirod 112744		Pirod 112745	Pirod 112740
Leg Grade				A572-50							A36					
Diagonals			SR 7/8	SR 1	A	L3x3x3/16		L3x3x5/16	L3 1/2x3 1/2x5/16				2L3 1/2x3 1/2x5/16x3/4			
Diagonal Grade			A572-50													
Top Girts	B	N.A.	SR 1	N.A.	N.A.	L3x3x3/16	L3x3x3/16	L4x4x1/4	L3 1/2x3 1/2x5/16				N.A.			
Mid Girts	N.A.	N.A.	SR 1	SR 1							N.A.					
Bottom Girts	B	SR 1	SR 1	L2x2x3/16							N.A.					
Horizontals	C	SR 3/4					L3x3x3/16	L4x4x1/4				N.A.				
Face Width (ft) 28	5					6	8	10	12	14	16	18	20	22	24	26
# Panels @ (ft)	20 @ 2.375							11 @ 10					6 @ 20			
Weight (lb) 75131.2	179.8	440.1	1350.4	1874.1	1178.7	2610.4	2855.0	4603.7	5270.2	5152.9	7284.4	7398.5	8134.9	8261.1	9201.0	9336.2



MAX. CORNER REACTIONS AT BASE:
DOWN: 567523 lb
SHEAR: 50038 lb

UPLIFT: -454014 lb
SHEAR: 52402 lb

AXIAL
148682 lb

SHEAR
81362 lb

MOMENT
12559928 lb-ft

TORQUE 28906 lb-ft
74 mph WIND - 0.5000 in ICE

AXIAL
98372 lb

SHEAR
74708 lb

MOMENT
11325541 lb-ft

TORQUE 18049 lb-ft
REACTIONS - 85 mph WIND

DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
Flash Beacon Lighting (tower)	281	AM-X-CW-16-65-00T w/Mount Pipe (ATI)	160
Lightning Rod 1/2"x4' on 15' Pole (tower)	280	AM-X-CW-16-65-00T w/Mount Pipe (ATI)	160
(9) PiROD 12' T-Frame (tower)	280	AM-X-CW-16-65-00T w/Mount Pipe (ATI)	160
5' Omni (EMAC)	280	800 10121 w/ Mount Pipe (ATI)	160
DB420 (EMAC)	280	800 10121 w/ Mount Pipe (ATI)	160
TFC2K (or equiv.)	280	800 10121 w/ Mount Pipe (ATI)	160
PiROD 15' T-Frame (T-Mobile)	250	TMA 10"x9"x3" (ATI)	160
PiROD 15' T-Frame (T-Mobile)	250	TMA 10"x9"x3" (ATI)	160
PiROD 15' T-Frame (T-Mobile)	250	TMA 10"x9"x3" (ATI)	160
(2) RR90-17-DP (T-Mobile)	250	TMA 10"x9"x3" (ATI)	160
(2) RR90-17-DP (T-Mobile)	250	TMA 10"x9"x3" (ATI)	160
(2) RR90-17-DP (T-Mobile)	250	TMA 10"x9"x3" (ATI)	160
(9) PiROD 12' T-Frame (tower)	235	RRUS-11 (ATI)	160
5' Dipole (EMAC)	235	RRUS-11 (ATI)	160
Camera and Mount (Big Brother)	225	RRUS-11 (ATI)	160
PiROD 12' Lightweight T-Frame (Sprint)	170	DC6-48-60-18-8F (ATI)	160
PiROD 12' Lightweight T-Frame (Sprint)	170	6'x6.5"x3.5" Panel Antenna w/Mount Pipe (Metro PCS)	150
PiROD 12' Lightweight T-Frame (Sprint)	170		
APXVSPP18-C w/Mount Pipe (Sprint)	170	6'x6.5"x3.5" Panel Antenna w/Mount Pipe (Metro PCS)	150
APXVSPP18-C w/Mount Pipe (Sprint)	170		
APXVSPP18-C w/Mount Pipe (Sprint)	170	6'x6.5"x3.5" Panel Antenna w/Mount Pipe (Metro PCS)	150
1900MHz 4x40W RRH (Sprint)	170	Small Beacon (tower)	142
1900MHz 4x40W RRH (Sprint)	170	Small Beacon (tower)	142
1900MHz 4x40W RRH (Sprint)	170	Small Beacon (tower)	142
800MHz 2x50W RRH (Sprint)	170	PiROD 12' T-Frame (Verizon)	140
800MHz 2x50W RRH (Sprint)	170	PiROD 12' T-Frame (Verizon)	140
800MHz 2x50W RRH (Sprint)	170	PiROD 12' T-Frame (Verizon)	140
APXV9TM14-ALU-120 w/ 3.5" mount pipe (Sprint (new))	170	(2) 5' x 1' Panel Antenna w/Mount Pipe (Verizon)	140
APXV9TM14-ALU-120 w/ 3.5" mount pipe (Sprint (new))	170	(2) 5' x 1' Panel Antenna w/Mount Pipe (Verizon)	140
		(2) 5' x 1' Panel Antenna w/Mount Pipe (Verizon)	140
APXV9TM14-ALU-120 w/ 3.5" mount pipe (Sprint (new))	170	5' x 3" Panel Antenna W/ Mount Pipe (Verizon)	140
		5' x 3" Panel Antenna W/ Mount Pipe (Verizon)	140
TD-RRH 8x20 (Sprint (new))	170	5' x 5" Panel Antenna w/Mount Pipe (Verizon)	140
TD-RRH 8x20 (Sprint (new))	170	5' x 8" Panel Antenna w/Mount Pipe (Verizon)	140
TD-RRH 8x20 (Sprint (new))	170	5' x 8" Panel Antenna w/Mount Pipe (Verizon)	140
TD-RRH 8x20 (Sprint (new))	170	5' x 8" Panel Antenna w/Mount Pipe (Verizon)	140
PiROD 12' Lightweight T-Frame (ATI)	160	5' x 8" Panel Antenna w/Mount Pipe (Verizon)	140
PiROD 12' Lightweight T-Frame (ATI)	160	6' Yagi (EMAC)	40
PiROD 12' Lightweight T-Frame (ATI)	160		

SYMBOL LIST

MARK	SIZE	MARK	SIZE
A	L2 1/2x2 1/2x3/16	C	N.A.
B	L2x2x3/16		

MATERIAL STRENGTH

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

TOWER DESIGN NOTES

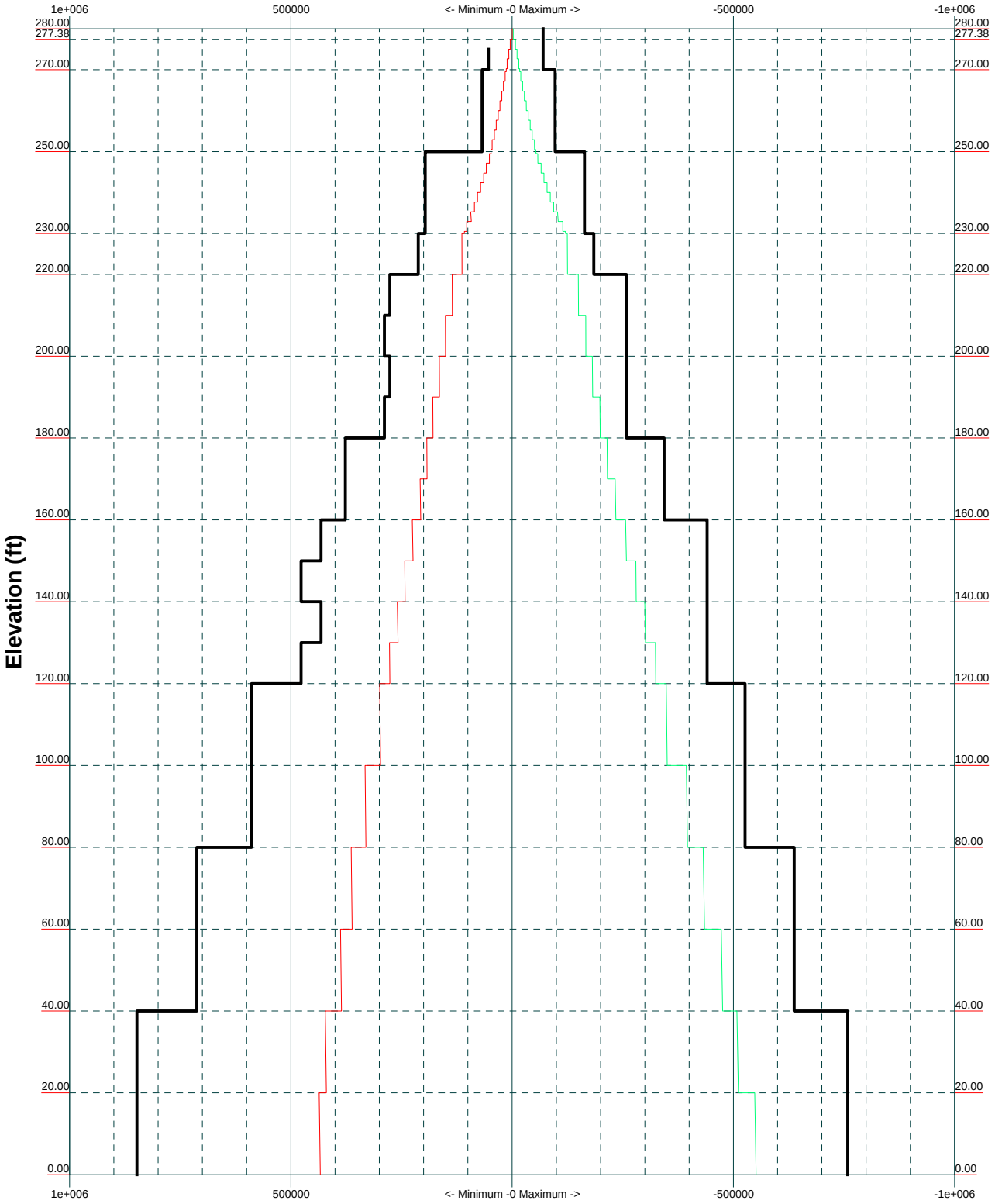
1. Tower is located in New Haven County, Connecticut.
2. Tower designed for a 85 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 74 mph basic wind with 0.50 in ice.
4. Deflections are based upon a 60 mph wind.
5. TOWER RATING: 94%

Ramaker & Associates
1120 Dallas St.
Sauk City, WI 53583
Phone: (608) 643-4100
FAX: (608) 643-7999

Job: **S. Bethany / EMAC Communications (CT33XC610**
Project: **29016**
Client: Sprint | Drawn by: JDS | App'd:
Code: TIA/EIA-222-F | Date: 07/23/14 | Scale: NTS
Path: I:\29000\29016\Structural\tnx\29016 amk check.eri | Dwg No. E-1

TIA/EIA-222-F - 85 mph/74 mph 0.5000 in Ice

Leg Capacity ——— **Leg Compression (lb)**



Ramaker & Associates
1120 Dallas St.
Sauk City, WI 53583
Phone: (608) 643-4100
FAX: (608) 643-7999

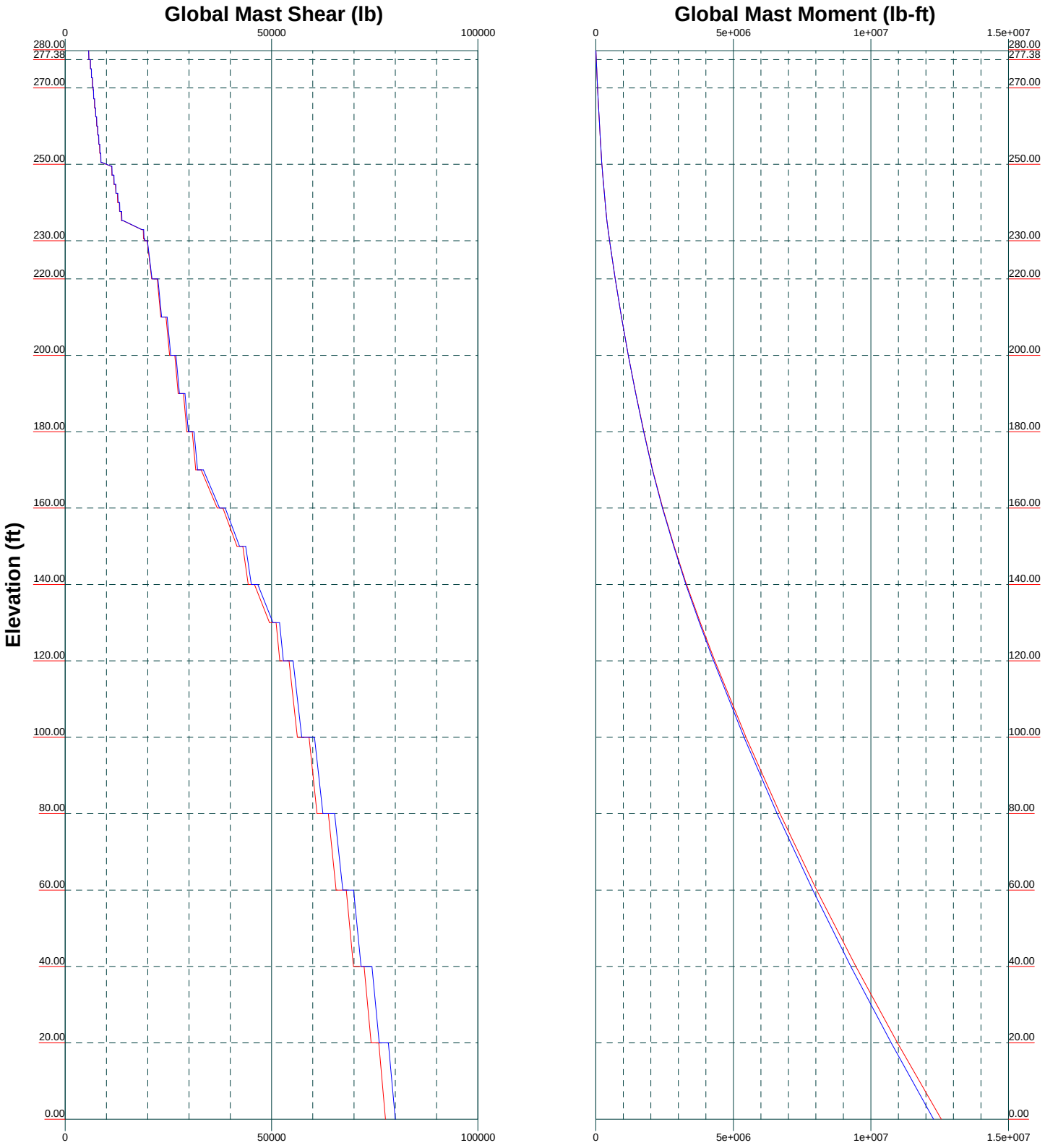
Job: ***S. Bethany / EMAC Communications (CT33XC61***			
Project: ***29016***			
Client: Sprint	Drawn by: JDS	App'd:	
Code: TIA/EIA-222-F	Date: 07/23/14	Scale: NTS	
Path: I:\29000\29016\Structural\tnx\29016 amk check.eri		Dwg No. E-3	

TIA/EIA-222-F - 85 mph/74 mph 0.5000 in Ice

Vx Vz

Maximum Values

Mx Mz

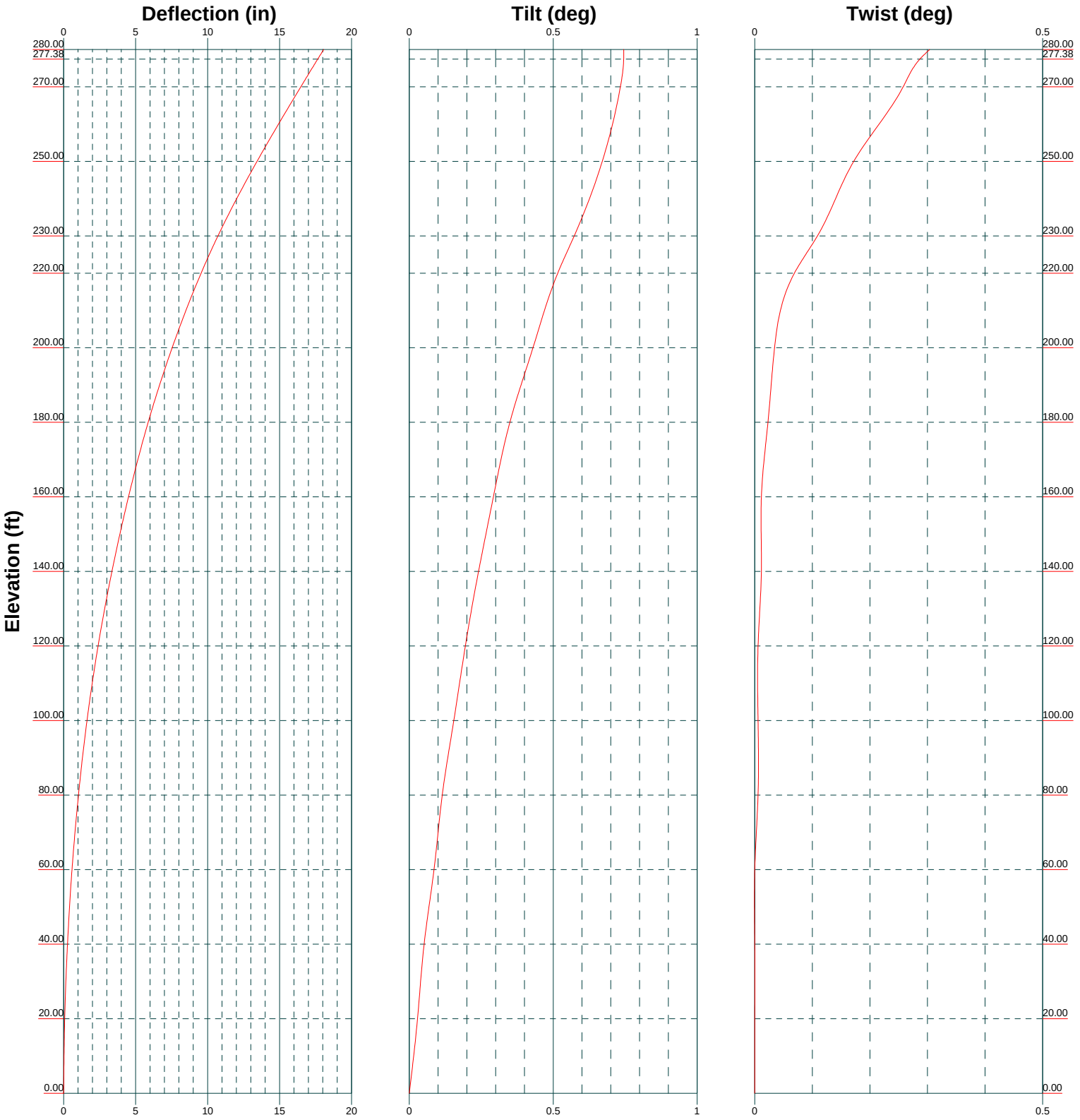


Ramaker & Associates
1120 Dallas St.
Sauk City, WI 53583
Phone: (608) 643-4100
FAX: (608) 643-7999

Job: S. Bethany / EMAC Communications (CT33XC61			
Project: 29016			
Client: Sprint	Drawn by: JDS	App'd:	
Code: TIA/EIA-222-F	Date: 07/23/14	Scale: NTS	
Path: I:\29000\29016\Structural\tnx\29016 amk check.eri		Dwg No. E-4	

TIA/EIA-222-F - Service - 60 mph

Maximum Values

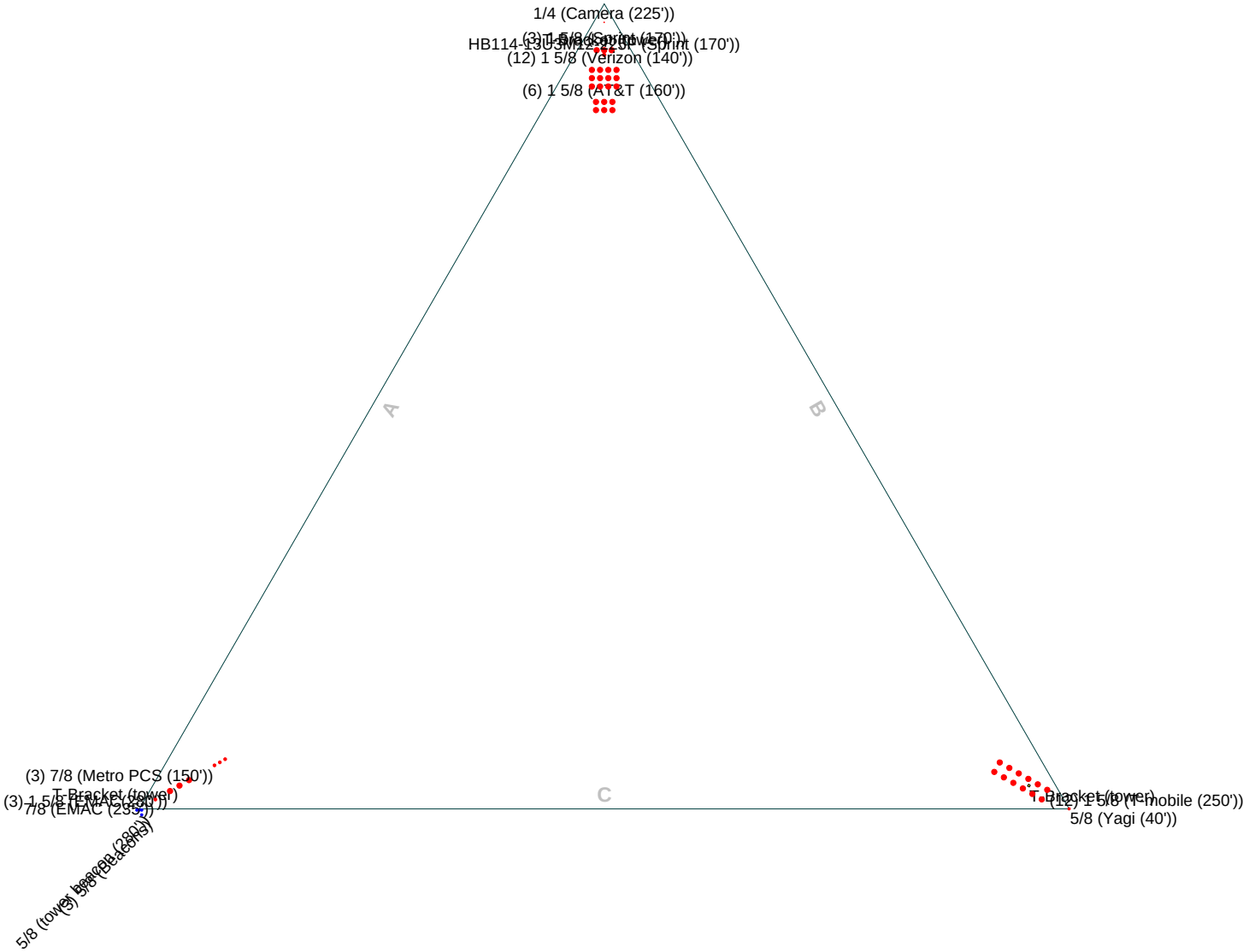


Ramaker & Associates
1120 Dallas St.
Sauk City, WI 53583
Phone: (608) 643-4100
FAX: (608) 643-7999

Job: ***S. Bethany / EMAC Communications (CT33XC61(***			
Project: ***29016***			
Client: Sprint	Drawn by: JDS	App'd:	
Code: TIA/EIA-222-F	Date: 07/23/14	Scale: NTS	
Path: I:\29000\29016\Structural\tnx\29016 amk check.eri		Dwg No. E-5	

Feed Line Plan

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

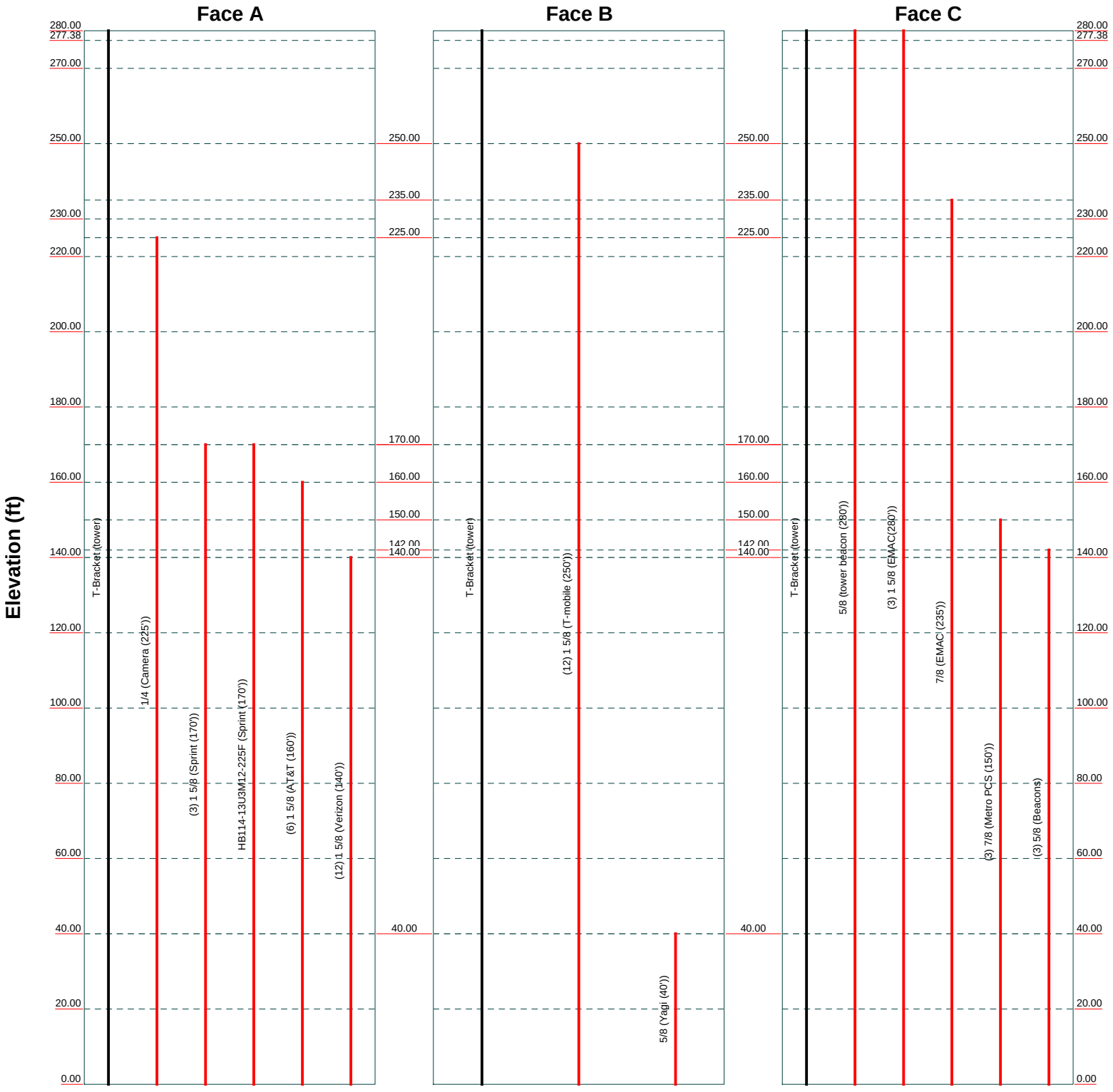


Ramaker & Associates
1120 Dallas St.
Sauk City, WI 53583
Phone: (608) 643-4100
FAX: (608) 643-7999

Job:	***S. Bethany / EMAC Communications (CT33XC610***		
Project:	***29016***		
Client: Sprint		Drawn by: JDS	App'd:
Code: TIA/EIA-222-F		Date: 07/23/14	Scale: NTS
Path: I:\29000\29016\Structural\tnx\29016 amk check.eri			Dwg No. E-7

Feed Line Distribution Chart
0' - 280'

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

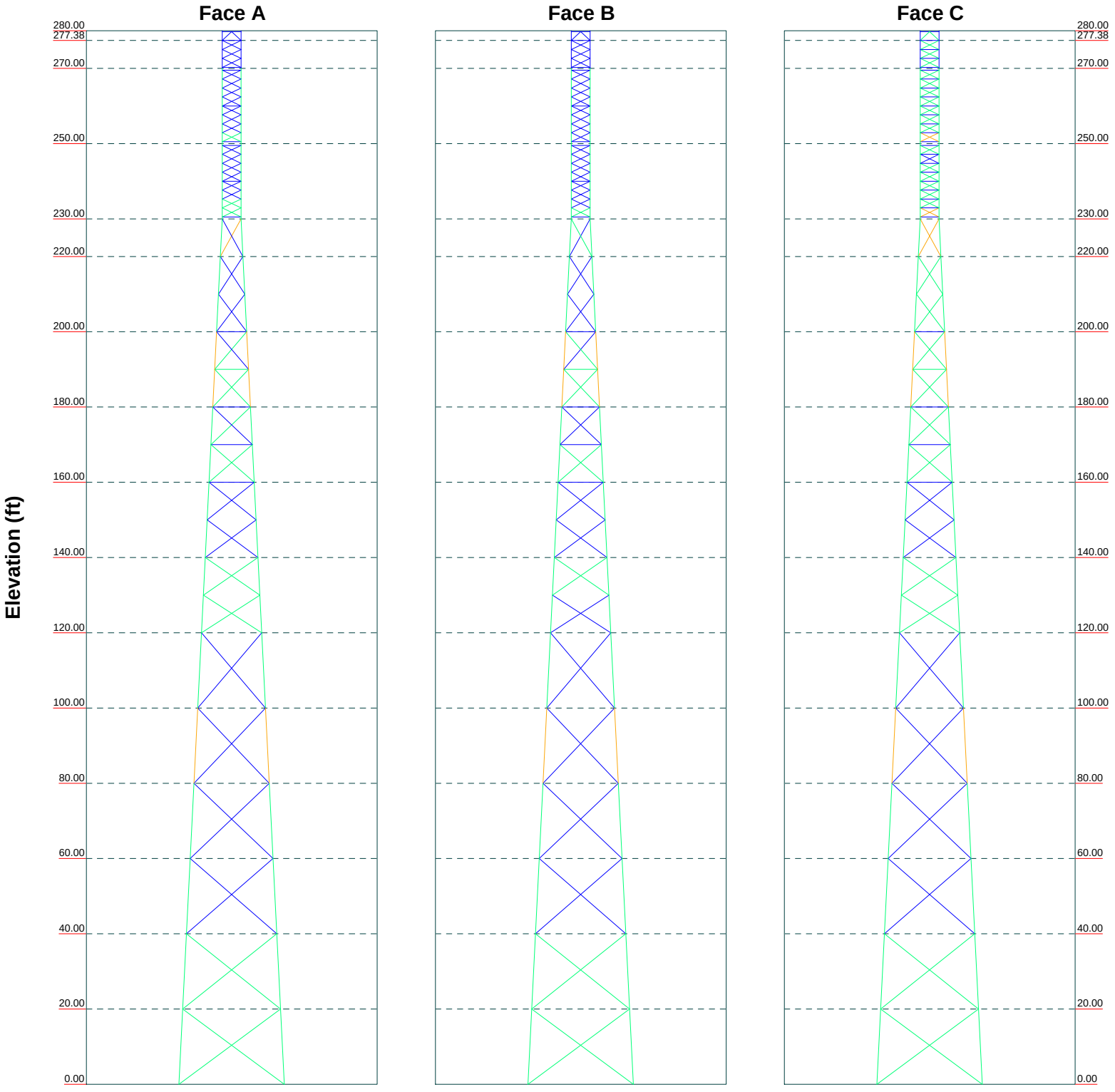


Ramaker & Associates
1120 Dallas St.
Sauk City, WI 53583
Phone: (608) 643-4100
FAX: (608) 643-7999

Job: ***S. Bethany / EMAC Communications (CT33XC61(***			
Project: ***29016***			
Client: Sprint	Drawn by: JDS	App'd:	
Code: TIA/EIA-222-F	Date: 07/23/14	Scale: NTS	
Path: I:\29000\29016\Structural\tnx\29016 amk check.eri		Dwg No. E-7	

Stress Distribution Chart
0' - 280'

> 100% | 90%-100% | 75%-90% | 50%-75% | < 50% Overstress



Ramaker & Associates
1120 Dallas St.
Sauk City, WI 53583
Phone: (608) 643-4100
FAX: (608) 643-7999

Job: ***S. Bethany / EMAC Communications (CT33XC61***		
Project: ***29016***		
Client: Sprint	Drawn by: JDS	App'd:
Code: TIA/EIA-222-F	Date: 07/23/14	Scale: NTS
Path: I:\29000\29016\Structural\tnx\29016 amk check.eri		Dwg No. E-8

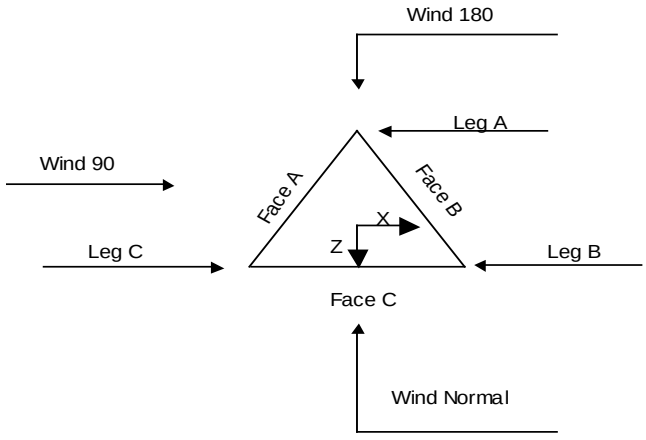
APPENDIX B

TOWER CALCULATIONS

Tower Input Data

The main tower is a 3x free standing tower with an overall height of 280.00 ft above the ground line.
The base of the tower is set at an elevation of 0.00 ft above the ground line.
The face width of the tower is 5.00 ft at the top and 28.00 ft at the base.
This tower is designed using the TIA/EIA-222-F standard.
The following design criteria apply:

- Tower is located in New Haven County, Connecticut.
- Basic wind speed of 85 mph.
- Nominal ice thickness of 0.5000 in.
- Ice density of 56 pcf.
- A wind speed of 74 mph is used in combination with ice.
- Temperature drop of 50 °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 1.333.
- Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.



Triangular Tower

Tower Section Geometry

Tower Section	Tower Elevation ft	Assembly Database	Description	Section Width ft	Number of Sections	Section Length ft
T1	280.00-277.38			5.00	1	2.63
T2	277.38-270.00			5.00	1	7.38
T3	270.00-250.00			5.00	1	20.00
T4	250.00-230.00			5.00	1	20.00
T5	230.00-220.00			5.00	1	10.00
T6	220.00-200.00			6.00	1	20.00
T7	200.00-180.00			8.00	1	20.00
T8	180.00-160.00			10.00	1	20.00
T9	160.00-140.00			12.00	1	20.00
T10	140.00-120.00			14.00	1	20.00
T11	120.00-100.00			16.00	1	20.00
T12	100.00-80.00			18.00	1	20.00
T13	80.00-60.00			20.00	1	20.00
T14	60.00-40.00			22.00	1	20.00
T15	40.00-20.00			24.00	1	20.00
T16	20.00-0.00			26.00	1	20.00

Tower Section Geometry *(cont'd)*

Tower Section	Tower Elevation ft	Diagonal Spacing ft	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset in	Bottom Girt Offset in
T1	280.00-277.38	2.38	K Brace Down	No	Yes	3.0000	0.0000
T2	277.38-270.00	2.38	X Brace	No	Steps	0.0000	3.0000
T3	270.00-250.00	2.38	X Brace	No	Steps	6.0000	6.0000
T4	250.00-230.00	2.38	X Brace	No	Steps	6.0000	6.0000
T5	230.00-220.00	10.00	X Brace	No	No	0.0000	0.0000
T6	220.00-200.00	10.00	X Brace	No	No	0.0000	0.0000
T7	200.00-180.00	10.00	X Brace	No	Yes	0.0000	0.0000
T8	180.00-160.00	10.00	X Brace	No	Yes	0.0000	0.0000
T9	160.00-140.00	10.00	X Brace	No	No	0.0000	0.0000
T10	140.00-120.00	10.00	X Brace	No	No	0.0000	0.0000
T11	120.00-100.00	20.00	X Brace	No	No	0.0000	0.0000
T12	100.00-80.00	20.00	X Brace	No	No	0.0000	0.0000
T13	80.00-60.00	20.00	X Brace	No	No	0.0000	0.0000
T14	60.00-40.00	20.00	X Brace	No	No	0.0000	0.0000
T15	40.00-20.00	20.00	X Brace	No	No	0.0000	0.0000
T16	20.00-0.00	20.00	X Brace	No	No	0.0000	0.0000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T1 280.00-277.38	Solid Round	1 3/4	A572-50 (50 ksi)	Solid Round	7/8	A572-50 (50 ksi)
T2 277.38-270.00	Solid Round	1 3/4	A572-50 (50 ksi)	Solid Round	7/8	A572-50 (50 ksi)
T3 270.00-250.00	Solid Round	2	A572-50 (50 ksi)	Solid Round	7/8	A572-50 (50 ksi)
T4 250.00-230.00	Solid Round	2 1/2	A572-50	Solid Round	1	A572-50

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
			(50 ksi)			(50 ksi)
T5 230.00-220.00	Truss Leg	Pirod 105245	A572-50 (50 ksi)	Equal Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T6 220.00-200.00	Truss Leg	Pirod 105218	A572-50 (50 ksi)	Equal Angle	L3x3x3/16	A36 (36 ksi)
T7 200.00-180.00	Truss Leg	Pirod 105218	A572-50 (50 ksi)	Equal Angle	L3x3x3/16	A36 (36 ksi)
T8 180.00-160.00	Truss Leg	Pirod 105219	A572-50 (50 ksi)	Equal Angle	L3x3x5/16	A36 (36 ksi)
T9 160.00-140.00	Truss Leg	Pirod 105220	A572-50 (50 ksi)	Equal Angle	L3 1/2x3 1/2x5/16	A36 (36 ksi)
T10 140.00-120.00	Truss Leg	Pirod 105220	A572-50 (50 ksi)	Equal Angle	L3 1/2x3 1/2x5/16	A36 (36 ksi)
T11 120.00-100.00	Truss Leg	Pirod 112743	A572-50 (50 ksi)	Double Equal Angle	2L3 1/2x3 1/2x5/16x3/4	A36 (36 ksi)
T12 100.00-80.00	Truss Leg	Pirod 112743	A572-50 (50 ksi)	Double Equal Angle	2L3 1/2x3 1/2x5/16x3/4	A36 (36 ksi)
T13 80.00-60.00	Truss Leg	Pirod 112744	A572-50 (50 ksi)	Double Equal Angle	2L3 1/2x3 1/2x5/16x3/4	A36 (36 ksi)
T14 60.00-40.00	Truss Leg	Pirod 112744	A572-50 (50 ksi)	Double Equal Angle	2L3 1/2x3 1/2x5/16x3/4	A36 (36 ksi)
T15 40.00-20.00	Truss Leg	Pirod 112745	A572-50 (50 ksi)	Double Equal Angle	2L3 1/2x3 1/2x5/16x3/4	A36 (36 ksi)
T16 20.00-0.00	Truss Leg	Pirod 112740	A572-50 (50 ksi)	Double Equal Angle	2L3 1/2x3 1/2x5/16x3/4	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 280.00-277.38	Equal Angle	L2x2x3/16	A36 (36 ksi)	Equal Angle	L2x2x3/16	A36 (36 ksi)
T2 277.38-270.00	Solid Round		A36 (36 ksi)	Solid Round	1	A572-50 (50 ksi)
T3 270.00-250.00	Solid Round	1	A572-50 (50 ksi)	Solid Round	1	A572-50 (50 ksi)
T4 250.00-230.00	Solid Round	1	A572-50 (50 ksi)	Equal Angle	L2x2x3/16	A36 (36 ksi)
T7 200.00-180.00	Equal Angle	L3x3x3/16	A36 (36 ksi)	Equal Angle		A36 (36 ksi)
T8 180.00-160.00	Equal Angle	L4x4x1/4	A36 (36 ksi)	Equal Angle		A36 (36 ksi)
T9 160.00-140.00	Equal Angle	L3 1/2x3 1/2x5/16	A36 (36 ksi)	Solid Round		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 280.00-277.38	None	Solid Round		A572-50 (50 ksi)	Solid Round	3/4	A572-50 (50 ksi)
T2 277.38-270.00	None	Solid Round		A572-50 (50 ksi)	Solid Round	3/4	A572-50 (50 ksi)
T3 270.00-250.00	1	Solid Round	1	A572-50 (50 ksi)	Solid Round	3/4	A572-50 (50 ksi)
T4 250.00-230.00	1	Solid Round	1	A572-50 (50 ksi)	Solid Round	3/4	A572-50 (50 ksi)
T7 200.00-180.00	None	Solid Round		A572-50 (50 ksi)	Equal Angle	L3x3x3/16	A36 (36 ksi)
T8 180.00-160.00	None	Solid Round		A572-50 (50 ksi)	Equal Angle	L4x4x1/4	A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in
T1 280.00-277.38	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T2 277.38-270.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T3 270.00-250.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T4 250.00-230.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T5 230.00-220.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T6 220.00-200.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T7 200.00-180.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T8 180.00-160.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T9 160.00-140.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T10 140.00-120.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T11 120.00-100.00	0.00	0.0000	A36 (36 ksi)	1	1	1	Mid-Pt	36.0000
T12 100.00-80.00	0.00	0.0000	A36 (36 ksi)	1	1	1	Mid-Pt	36.0000
T13 80.00-60.00	0.00	0.0000	A36 (36 ksi)	1	1	1	Mid-Pt	36.0000
T14 60.00-40.00	0.00	0.0000	A36 (36 ksi)	1	1	1	Mid-Pt	36.0000
T15 40.00-20.00	0.00	0.0000	A36 (36 ksi)	1	1	1	Mid-Pt	36.0000
T16 20.00-0.00	0.00	0.0000	A36 (36 ksi)	1	1	1	Mid-Pt	36.0000

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	Yes	Yes	1	1	1	1	1	1	1	1
280.00-277.38				1	1	1	1	1	1	1
T2	Yes	Yes	1	1	1	1	1	1	1	1
277.38-270.00				1	1	1	1	1	1	1
T3	Yes	Yes	1	1	1	1	1	1	1	1
270.00-250.00				1	1	1	1	1	1	1
T4	Yes	Yes	1	1	1	1	1	1	1	1
250.00-230.00				1	1	1	1	1	1	1
T5	Yes	Yes	1	1	1	1	1	1	1	1
230.00-220.00				1	1	1	1	1	1	1
T6	Yes	Yes	1	1	1	1	1	1	1	1
220.00-200.00				1	1	1	1	1	1	1
T7	Yes	Yes	1	1	1	1	1	1	1	1
200.00-180.00				1	1	1	1	1	1	1
T8	Yes	Yes	1	1	1	1	1	1	1	1
180.00-160.00				1	1	1	1	1	1	1
T9	Yes	Yes	1	1	1	1	1	1	1	1
160.00-140.00				1	1	1	1	1	1	1
T10	Yes	Yes	1	1	1	1	1	1	1	1
140.00-120.00				1	1	1	1	1	1	1
T11	Yes	Yes	1	1	1	1	1	1	1	1
120.00-100.00				1	1	1	1	1	1	1
T12	Yes	Yes	1	1	1	1	1	1	1	1
100.00-80.00				1	1	1	1	1	1	1
T13	Yes	Yes	1	1	1	1	1	1	1	1
80.00-60.00				1	1	1	1	1	1	1
T14	Yes	Yes	1	1	1	1	1	1	1	1
60.00-40.00				1	1	1	1	1	1	1
T15	Yes	Yes	1	1	1	1	1	1	1	1
40.00-20.00				1	1	1	1	1	1	1
T16 20.00-0.00	Yes	Yes	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1

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

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Truss-Leg K Factors: Truss-Legs Used As Leg Members — Leg Panels	X Brace Diagonals	Z Brace Diagonals	Truss-Legs Used As Inner Members — Leg Panels	X Brace Diagonals	Z Brace Diagonals
T5	1	1	1	1	0.85	0.85
230.00-220.00						
T6	1	1	1	1	0.85	0.85
220.00-200.00						
T7	1	1	1	1	0.85	0.85
200.00-180.00						
T8	1	1	1	1	0.85	0.85
180.00-160.00						

T9 160.00-140.00	1	1	1	1	0.85	0.85
T10 140.00-120.00	1	1	1	1	0.85	0.85
T11 120.00-100.00	1	1	1	1	0.85	0.85
T12 100.00-80.00	1	1	1	1	0.85	0.85
T13 80.00-60.00	1	1	1	1	0.85	0.85
T14 60.00-40.00	1	1	1	1	0.85	0.85
T15 40.00-20.00	1	1	1	1	0.85	0.85
T16 20.00-0.00	1	1	1	1	0.85	0.85

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 280.00-277.38	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T2 277.38-270.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T3 270.00-250.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T4 250.00-230.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T5 230.00-220.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T6 220.00-200.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T7 200.00-180.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T8 180.00-160.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T9 160.00-140.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T10 140.00-120.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T11 120.00-100.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T12 100.00-80.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T13 80.00-60.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T14 60.00-40.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T15 40.00-20.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T16 20.00-0.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Connection Type	Leg Bolt Size in	Leg No.	Diagonal Bolt Size in	Diagonal No.	Top Girt Bolt Size in	Top Girt No.	Bottom Girt Bolt Size in	Bottom Girt No.	Mid Girt Bolt Size in	Mid Girt No.	Long Horizontal Bolt Size in	Long Horizontal No.	Short Horizontal Bolt Size in	Short Horizontal No.
T1 280.00-277.38	Sleeve DS	0.6250 A325N	0	0.6250 A325X	0	0.3000 A325X	0	0.3000 A325N	0	0.6250 A325X	0	0.3000 A325N	0	0.6250 A325X	0
T2 277.38-270.00	Sleeve DS	0.6250 A325N	5	0.6250 A325X	0	0.3000 A325X	0	0.3000 A325N	0	0.6250 A325X	0	0.3000 A325N	0	0.6250 A325X	0
T3 270.00-250.00	Sleeve DS	0.7500 A325N	5	0.6250 A325X	0	0.3000 A325X	0	0.3000 A325N	0	0.6250 A325X	0	0.3000 A325N	0	0.6250 A325X	0
T4 250.00-230.00	Flange	1.0000 A325N	6	0.6250 A325N	0	0.3000 A325N	0	0.3000 A325N	0	0.6250 A325X	0	0.3000 A325N	0	0.6250 A325X	0
T5 230.00-220.00	Flange	1.0000 A325N	6	1.0000 A325N	1	0.3000 A325N	0	0.3000 A325N	0	0.6250 A325X	0	0.3000 A325N	0	0.6250 A325X	0
T6 220.00-200.00	Flange	1.0000 A325N	6	1.0000 A325N	1	0.3000 A325N	0	0.3000 A325N	0	0.6250 A325X	0	0.3000 A325N	0	0.6250 A325X	0
T7 200.00-180.00	Flange	1.0000 A325N	6	1.0000 A325N	1	1.0000 A325N	1	0.3000 A325N	0	0.6250 A325X	0	1.0000 A325N	1	0.6250 A325X	0
T8 180.00-160.00	Flange	1.2500 A325N	6	1.2500 A325N	1	1.2500 A325N	1	0.3000 A325N	0	0.6250 A325X	0	1.2500 A325N	1	0.6250 A325X	0
T9 160.00-140.00	Flange	1.2500 A325N	6	1.2500 A325N	1	1.2500 A325N	1	0.3000 A325N	0	0.6250 A325X	0	0.3000 A325N	0	0.6250 A325X	0
T10 140.00-120.00	Flange	1.2500 A325N	6	1.2500 A325N	1	0.3000 A325N	0	0.3000 A325N	0	0.6250 A325X	0	0.3000 A325N	0	0.6250 A325X	0
T11 120.00-100.00	Flange	1.2500 A325N	12	1.0000 A325N	2	0.3000 A325N	0	0.3000 A325N	0	0.6250 A325X	0	0.3000 A325N	0	0.6250 A325X	0
T12 100.00-80.00	Flange	1.2500 A325N	12	1.0000 A325N	2	0.3000 A325N	0	0.3000 A325N	0	0.6250 A325X	0	0.3000 A325N	0	0.6250 A325X	0
T13 80.00-60.00	Flange	1.2500 A325N	12	1.0000 A325N	2	0.3000 A325N	0	0.3000 A325N	0	0.6250 A325X	0	0.3000 A325N	0	0.6250 A325X	0
T14 60.00-40.00	Flange	1.2500 A325N	12	1.0000 A325N	2	0.3000 A325N	0	0.3000 A325N	0	0.6250 A325X	0	0.3000 A325N	0	0.6250 A325X	0
T15 40.00-20.00	Flange	1.2500 A325N	12	1.0000 A325N	2	0.3000 A325N	0	0.3000 A325N	0	0.6250 A325X	0	0.3000 A325N	0	0.6250 A325X	0
T16 20.00-0.00	Flange	2.0000 A687	6	1.0000 A325N	2	0.3000 A325N	0	0.3000 A325N	0	0.6250 A325X	0	0.3000 A325N	0	0.6250 A325X	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 plf
T-Bracket (tower)	A	No	Af (Leg)	280.00 - 0.00	0.0000	0.05	1	1	0.7500	0.7500	3.0000	1.50
T-Bracket (tower)	B	No	Af (Leg)	280.00 - 0.00	0.0000	0.05	1	1	0.7500	0.7500	3.0000	1.50
T-Bracket (tower)	C	No	Af (Leg)	280.00 - 0.00	0.0000	0.05	1	1	0.7500	0.7500	3.0000	1.50
5/8 (tower beacon (280'))	C	No	Ar (CaAa)	280.00 - 0.00	0.0000	0.5	1	1	0.8800	0.8800		0.40
1 5/8 (EMAC(280')) ******	C	No	Ar (Leg)	280.00 - 0.00	0.0000	0.05	3	3	1.9800	1.9800		1.04
1 5/8 (T-mobile (250'))	B	No	Ar (Leg)	250.00 - 0.00	0.0000	0.06	12	6	1.9800	1.9800		1.04

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 plf
*****												
7/8 (EMAC (235'))	C	No	Ar (Leg)	235.00 - 0.00	0.0000	0.02	1	1	1.1100	1.1100		0.54
******												
1/4 (Camera (225'))	A	No	Ar (Leg)	225.00 - 0.00	0.0000	0.02	1	1	0.2900	0.2900		0.07
******												
1 5/8 (Sprint (170'))	A	No	Ar (Leg)	170.00 - 0.00	0.0000	0.05	3	1	0.7500	1.9800		1.04
HB114-13U3M12-225F (Sprint (170'))	A	No	Ar (Leg)	170.00 - 0.00	0.0000	0.055	1	1	1.2500	1.2500		0.37
******												
1 5/8 (AT&T (160'))	A	No	Ar (Leg)	160.00 - 0.00	0.0000	0.11	6	2	1.0000	1.9800		1.04
********												
7/8 (Metro PCS (150'))	C	No	Ar (Leg)	150.00 - 0.00	0.0000	0.1	3	3	1.1100	1.1100		0.54
*******												
5/8 (Beacons)	C	No	Ar (CaAa)	142.00 - 0.00	0.0000	0.5	3	2	0.8800	0.8800		0.40
********												
1 5/8 (Verizon (140'))	A	No	Ar (Leg)	140.00 - 0.00	0.0000	0.08	12	3	1.0000	1.9800		1.04
******												
5/8 (Yagi (40'))	B	No	Ar (Leg)	40.00 - 0.00	0.0000	0	1	1	0.8800	0.8800		0.40

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 lb
T1	280.00-277.38	A	1.299	0.328	0.000	0.000	3.94
		B	0.000	0.328	0.000	0.000	3.94
		C	1.299	0.328	0.231	0.000	13.18
T2	277.38-270.00	A	3.651	0.922	0.000	0.000	11.06
		B	0.000	0.922	0.000	0.000	11.06
		C	3.651	0.922	0.649	0.000	37.02
T3	270.00-250.00	A	9.900	2.500	0.000	0.000	30.00
		B	0.000	2.500	0.000	0.000	30.00
		C	9.900	2.500	1.760	0.000	100.40
T4	250.00-230.00	A	10.363	2.500	0.000	0.000	30.00
		B	19.800	2.500	0.000	0.000	279.60
		C	30.162	2.500	1.760	0.000	103.10
T5	230.00-220.00	A	5.996	1.250	0.000	0.000	15.35
		B	10.021	1.250	0.000	0.000	139.80
		C	15.775	1.250	0.880	0.000	55.60
T6	220.00-200.00	A	12.233	2.500	0.000	0.000	31.40
		B	20.283	2.500	0.000	0.000	279.60
		C	31.550	2.500	1.760	0.000	111.20
T7	200.00-180.00	A	12.233	2.500	0.000	0.000	31.40
		B	20.283	2.500	0.000	0.000	279.60
		C	31.550	2.500	1.760	0.000	111.20
T8	180.00-160.00	A	14.925	2.500	0.000	0.000	66.30
		B	22.975	2.500	0.000	0.000	279.60
		C	31.550	2.500	1.760	0.000	111.20
T9	160.00-140.00	A	26.992	2.500	0.000	0.000	226.00

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 lb
		B	32.267	2.500	0.000	0.000	279.60
		C	34.325	2.500	2.288	0.000	129.80
T10	140.00-120.00	A	39.667	2.500	0.000	0.000	475.60
		B	42.167	2.500	0.000	0.000	279.60
		C	37.100	2.500	7.040	0.000	167.60
T11	120.00-100.00	A	39.667	2.500	0.000	0.000	475.60
		B	42.167	2.500	0.000	0.000	279.60
		C	37.100	2.500	7.040	0.000	167.60
T12	100.00-80.00	A	39.667	2.500	0.000	0.000	475.60
		B	42.167	2.500	0.000	0.000	279.60
		C	37.100	2.500	7.040	0.000	167.60
T13	80.00-60.00	A	39.667	2.500	0.000	0.000	475.60
		B	42.167	2.500	0.000	0.000	279.60
		C	37.100	2.500	7.040	0.000	167.60
T14	60.00-40.00	A	39.667	2.500	0.000	0.000	475.60
		B	42.167	2.500	0.000	0.000	279.60
		C	37.100	2.500	7.040	0.000	167.60
T15	40.00-20.00	A	39.667	2.500	0.000	0.000	475.60
		B	43.633	2.500	0.000	0.000	287.60
		C	38.567	2.500	7.040	0.000	167.60
T16	20.00-0.00	A	39.667	2.500	0.000	0.000	475.60
		B	43.633	2.500	0.000	0.000	287.60
		C	38.567	2.500	7.040	0.000	167.60

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 lb
T1	280.00-277.38	A	0.500	1.956	0.620	0.000	0.000	6.43
		B		0.000	0.620	0.000	0.000	6.43
		C		1.956	0.620	0.493	0.000	29.82
T2	277.38-270.00	A	0.500	5.494	1.741	0.000	0.000	18.08
		B		0.000	1.741	0.000	0.000	18.08
		C		5.494	1.741	1.387	0.000	83.77
T3	270.00-250.00	A	0.500	14.900	4.722	0.000	0.000	49.03
		B		0.000	4.722	0.000	0.000	49.03
		C		14.900	4.722	3.760	0.000	227.18
T4	250.00-230.00	A	0.500	15.779	4.722	0.000	0.000	49.03
		B		29.800	4.722	0.000	0.000	662.21
		C		45.579	4.722	3.760	0.000	234.80
T5	230.00-220.00	A	0.500	9.746	2.361	0.000	0.000	27.28
		B		15.438	2.361	0.000	0.000	331.11
		C		24.108	2.361	1.880	0.000	128.83
T6	220.00-200.00	A	0.500	20.567	4.722	0.000	0.000	60.08
		B		31.950	4.722	0.000	0.000	662.21
		C		48.217	4.722	3.760	0.000	257.65
T7	200.00-180.00	A	0.500	20.567	4.722	0.000	0.000	60.08
		B		31.950	4.722	0.000	0.000	662.21
		C		48.217	4.722	3.760	0.000	257.65
T8	180.00-160.00	A	0.500	24.925	4.722	0.000	0.000	151.12
		B		36.308	4.722	0.000	0.000	662.21
		C		48.217	4.722	3.760	0.000	257.65
T9	160.00-140.00	A	0.500	39.525	9.689	0.000	0.000	593.22
		B		45.633	9.689	0.000	0.000	662.21
		C		53.492	4.722	4.966	0.000	311.50
T10	140.00-120.00	A	0.500	49.767	19.622	0.000	0.000	1324.98
		B		50.600	19.622	0.000	0.000	662.21

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 lb
		C		58.767	4.722	15.817	0.000	430.46
T11	120.00-100.00	A	0.500	49.767	19.622	0.000	0.000	1324.98
		B		50.600	19.622	0.000	0.000	662.21
		C		58.767	4.722	15.817	0.000	430.46
T12	100.00-80.00	A	0.500	49.767	19.622	0.000	0.000	1324.98
		B		50.600	19.622	0.000	0.000	662.21
		C		58.767	4.722	15.817	0.000	430.46
T13	80.00-60.00	A	0.500	49.767	19.622	0.000	0.000	1324.98
		B		50.600	19.622	0.000	0.000	662.21
		C		58.767	4.722	15.817	0.000	430.46
T14	60.00-40.00	A	0.500	49.767	19.622	0.000	0.000	1324.98
		B		50.600	19.622	0.000	0.000	662.21
		C		58.767	4.722	15.817	0.000	430.46
T15	40.00-20.00	A	0.500	49.767	19.622	0.000	0.000	1324.98
		B		53.733	19.622	0.000	0.000	687.07
		C		61.900	4.722	15.817	0.000	430.46
T16	20.00-0.00	A	0.500	49.767	19.622	0.000	0.000	1324.98
		B		53.733	19.622	0.000	0.000	687.07
		C		61.900	4.722	15.817	0.000	430.46

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
T1	280.00-277.38	-3.2413	1.8791	-3.1411	1.8235
T2	277.38-270.00	-4.2696	2.4753	-3.7783	2.1934
T3	270.00-250.00	-4.1281	2.3932	-3.7057	2.1513
T4	250.00-230.00	1.5257	3.9391	1.2099	3.7062
T5	230.00-220.00	0.9481	3.1741	0.6768	2.9861
T6	220.00-200.00	1.1137	3.6717	0.8226	3.4696
T7	200.00-180.00	1.3246	4.3660	0.9891	4.1706
T8	180.00-160.00	1.4542	3.9581	1.0980	3.7437
T9	160.00-140.00	0.6422	1.9987	0.0992	2.7302
T10	140.00-120.00	-1.3750	0.3158	-2.0370	2.0765
T11	120.00-100.00	-1.5265	0.3474	-2.2796	2.3205
T12	100.00-80.00	-1.6959	0.3830	-2.5352	2.5777
T13	80.00-60.00	-1.8326	0.4114	-2.7505	2.7940
T14	60.00-40.00	-1.9904	0.4445	-2.9917	3.0367
T15	40.00-20.00	-1.4375	0.8388	-2.2501	3.6945
T16	20.00-0.00	-1.5395	0.8965	-2.4133	3.9606

Discrete Tower Loads

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 lb
Lightning Rod 1/2"x4' on 15'	A	From Leg	0.00	0.0000	280.00	No Ice	5.45	5.45	128.70

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 lb
Pole			0.00			1/2" Ice	7.40	7.40	187.46
(tower)			8.00						
Flash Beacon Lighting	C	None		0.0000	281.00	No Ice	2.70	2.70	50.00
(tower)						1/2" Ice	3.10	3.10	70.00
******									
(9) PiROD 12' T-Frame	C	None		0.0000	280.00	No Ice	12.20	12.20	360.00
(tower)						1/2" Ice	17.60	17.60	490.00
5' Omni	C	From Leg	12.00	0.0000	280.00	No Ice	1.00	1.00	25.00
(EMAC)			4.00			1/2" Ice	1.39	1.39	32.86
			0.00						
DB420	C	From Leg	12.00	0.0000	280.00	No Ice	3.33	3.33	34.00
(EMAC)			-4.00			1/2" Ice	5.99	5.99	44.20
			4.00						
TFC2K	C	From Face	16.00	0.0000	280.00	No Ice	11.00	11.00	36.00
(or equiv.)			0.00			1/2" Ice	19.80	19.80	46.80
			0.00						
*****									
PiROD 15' T-Frame	A	From Face	4.00	0.0000	250.00	No Ice	15.00	15.00	500.00
(T-Mobile)			0.00			1/2" Ice	20.60	20.60	650.00
			0.00						
PiROD 15' T-Frame	B	From Face	4.00	0.0000	250.00	No Ice	15.00	15.00	500.00
(T-Mobile)			0.00			1/2" Ice	20.60	20.60	650.00
			0.00						
PiROD 15' T-Frame	C	From Face	4.00	0.0000	250.00	No Ice	15.00	15.00	500.00
(T-Mobile)			0.00			1/2" Ice	20.60	20.60	650.00
			0.00						
(2) RR90-17-DP	A	From Face	4.00	0.0000	250.00	No Ice	4.36	1.97	18.00
(T-Mobile)			0.00			1/2" Ice	4.77	2.31	40.42
			0.00						
(2) RR90-17-DP	B	From Face	4.00	0.0000	250.00	No Ice	4.36	1.97	18.00
(T-Mobile)			0.00			1/2" Ice	4.77	2.31	40.42
			0.00						
(2) RR90-17-DP	C	From Face	4.00	0.0000	250.00	No Ice	4.36	1.97	18.00
(T-Mobile)			0.00			1/2" Ice	4.77	2.31	40.42
			0.00						
*****									
(9) PiROD 12' T-Frame	C	None		0.0000	235.00	No Ice	12.20	12.20	360.00
(tower)						1/2" Ice	17.60	17.60	490.00
5' Dipole	C	From Leg	12.00	0.0000	235.00	No Ice	1.50	1.50	25.00
(EMAC)			4.00			1/2" Ice	2.25	2.25	35.00
			0.00						
******									
Camera and Mount	C	From Leg	2.00	0.0000	225.00	No Ice	5.60	5.60	150.00
(Big Brother)			0.00			1/2" Ice	5.92	5.92	208.37
			0.00						
******									
PiROD 12' Lightweight T-Frame	A	From Leg	4.00	0.0000	170.00	No Ice	10.20	10.20	253.00
(Sprint)			0.00			1/2" Ice	16.20	16.20	355.00
			0.00						
PiROD 12' Lightweight T-Frame	B	From Leg	4.00	0.0000	170.00	No Ice	10.20	10.20	253.00
(Sprint)			0.00			1/2" Ice	16.20	16.20	355.00
			0.00						
PiROD 12' Lightweight T-Frame	C	From Leg	4.00	0.0000	170.00	No Ice	10.20	10.20	253.00
(Sprint)			0.00			1/2" Ice	16.20	16.20	355.00
			0.00						
APXVSPP18-C w/Mount Pipe	A	From Leg	4.00	0.0000	170.00	No Ice	8.26	6.71	78.90
(Sprint)			0.00			1/2" Ice	8.81	7.66	144.31

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 lb
			0.00						
APXVSPP18-C w/Mount Pipe	B	From Leg	4.00	0.0000	170.00	No Ice	8.26	6.71	78.90
(Sprint)			0.00			1/2" Ice	8.81	7.66	144.31
			0.00						
APXVSPP18-C w/Mount Pipe	C	From Leg	4.00	0.0000	170.00	No Ice	8.26	6.71	78.90
(Sprint)			0.00			1/2" Ice	8.81	7.66	144.31
			0.00						
1900MHz 4x40W RRH	A	From Leg	2.00	0.0000	170.00	No Ice	2.71	2.61	60.00
(Sprint)			-2.00			1/2" Ice	2.95	2.84	83.12
			3.00						
1900MHz 4x40W RRH	B	From Leg	2.00	0.0000	170.00	No Ice	2.71	2.61	60.00
(Sprint)			-2.00			1/2" Ice	2.95	2.84	83.12
			3.00						
1900MHz 4x40W RRH	C	From Leg	2.00	0.0000	170.00	No Ice	2.71	2.61	60.00
(Sprint)			-2.00			1/2" Ice	2.95	2.84	83.12
			3.00						
800MHz 2x50W RRH	A	From Leg	2.00	0.0000	170.00	No Ice	2.40	2.25	64.00
(Sprint)			-2.00			1/2" Ice	2.61	2.46	86.12
			0.00						
800MHz 2x50W RRH	B	From Leg	2.00	0.0000	170.00	No Ice	2.40	2.25	64.00
(Sprint)			-2.00			1/2" Ice	2.61	2.46	86.12
			0.00						
800MHz 2x50W RRH	C	From Leg	2.00	0.0000	170.00	No Ice	2.40	2.25	64.00
(Sprint)			-2.00			1/2" Ice	2.61	2.46	86.12
			0.00						
****									
APXV9TM14-ALU-120 w/ 3.5"	A	From Leg	4.00	0.0000	170.00	No Ice	8.20	6.75	128.00
mount pipe			-6.00			1/2" Ice	8.85	7.59	201.91
(Sprint (new))			0.00						
APXV9TM14-ALU-120 w/ 3.5"	B	From Leg	4.00	0.0000	170.00	No Ice	8.20	6.75	128.00
mount pipe			-6.00			1/2" Ice	8.85	7.59	201.91
(Sprint (new))			0.00						
APXV9TM14-ALU-120 w/ 3.5"	C	From Leg	4.00	0.0000	170.00	No Ice	8.20	6.75	128.00
mount pipe			-6.00			1/2" Ice	8.85	7.59	201.91
(Sprint (new))			0.00						
TD-RRH 8x20	A	From Leg	4.00	0.0000	170.00	No Ice	4.32	1.41	66.13
(Sprint (new))			-6.00			1/2" Ice	4.60	1.61	90.06
			0.00						
TD-RRH 8x20	B	From Leg	4.00	0.0000	170.00	No Ice	4.32	1.41	66.13
(Sprint (new))			-6.00			1/2" Ice	4.60	1.61	90.06
			0.00						
TD-RRH 8x20	C	From Leg	4.00	0.0000	170.00	No Ice	4.32	1.41	66.13
(Sprint (new))			-6.00			1/2" Ice	4.60	1.61	90.06
			0.00						
******									
PiROD 12' Lightweight T-Frame	A	From Leg	3.00	60.0000	160.00	No Ice	10.20	10.20	253.00
(AT&T)			0.00			1/2" Ice	16.20	16.20	355.00
			0.00						
PiROD 12' Lightweight T-Frame	B	From Leg	3.00	60.0000	160.00	No Ice	10.20	10.20	253.00
(AT&T)			0.00			1/2" Ice	16.20	16.20	355.00
			0.00						
PiROD 12' Lightweight T-Frame	C	From Leg	3.00	60.0000	160.00	No Ice	10.20	10.20	253.00
(AT&T)			0.00			1/2" Ice	16.20	16.20	355.00
			0.00						
AM-X-CW-16-65-00T w/Mount	A	From Leg	3.00	60.0000	160.00	No Ice	8.26	6.07	63.70
Pipe			2.00			1/2" Ice	8.81	7.01	126.08
(AT&T)			0.00						

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 lb
AM-X-CW-16-65-00T w/Mount Pipe	B	From Leg	3.00 2.00 0.00	60.0000	160.00	No Ice 1/2" Ice	8.26 8.81	6.07 7.01	63.70 126.08
(AT&T)									
AM-X-CW-16-65-00T w/Mount Pipe	C	From Leg	3.00 2.00 0.00	60.0000	160.00	No Ice 1/2" Ice	8.26 8.81	6.07 7.01	63.70 126.08
(AT&T)									
800 10121 w/ Mount Pipe	A	From Leg	3.00 -6.00 0.00	60.0000	160.00	No Ice 1/2" Ice	6.44 7.23	5.59 6.76	92.62 150.34
(AT&T)									
800 10121 w/ Mount Pipe	B	From Leg	3.00 -6.00 0.00	60.0000	160.00	No Ice 1/2" Ice	6.44 7.23	5.59 6.76	92.62 150.34
(AT&T)									
800 10121 w/ Mount Pipe	C	From Leg	3.00 -6.00 0.00	60.0000	160.00	No Ice 1/2" Ice	6.44 7.23	5.59 6.76	92.62 150.34
(AT&T)									
TMA 10"x9"x3"	A	From Leg	3.00 -6.00 0.00	60.0000	160.00	No Ice 1/2" Ice	0.88 1.00	0.29 0.38	25.00 30.51
(AT&T)									
TMA 10"x9"x3"	A	From Leg	3.00 -6.00 0.00	60.0000	160.00	No Ice 1/2" Ice	0.88 1.00	0.29 0.38	25.00 30.51
(AT&T)									
TMA 10"x9"x3"	B	From Leg	3.00 -6.00 0.00	60.0000	160.00	No Ice 1/2" Ice	0.88 1.00	0.29 0.38	25.00 30.51
(AT&T)									
TMA 10"x9"x3"	B	From Leg	3.00 -6.00 0.00	60.0000	160.00	No Ice 1/2" Ice	0.88 1.00	0.29 0.38	25.00 30.51
(AT&T)									
TMA 10"x9"x3"	C	From Leg	3.00 -6.00 0.00	60.0000	160.00	No Ice 1/2" Ice	0.88 1.00	0.29 0.38	25.00 30.51
(AT&T)									
TMA 10"x9"x3"	C	From Leg	3.00 -6.00 0.00	60.0000	160.00	No Ice 1/2" Ice	0.88 1.00	0.29 0.38	25.00 30.51
(AT&T)									
RRUS-11	A	From Leg	3.00 0.00 0.00	60.0000	160.00	No Ice 1/2" Ice	2.94 3.17	1.25 1.41	55.00 74.32
(AT&T)									
RRUS-11	B	From Leg	3.00 0.00 0.00	60.0000	160.00	No Ice 1/2" Ice	2.94 3.17	1.25 1.41	55.00 74.32
(AT&T)									
RRUS-11	C	From Leg	3.00 0.00 0.00	60.0000	160.00	No Ice 1/2" Ice	2.94 3.17	1.25 1.41	55.00 74.32
(AT&T)									
DC6-48-60-18-8F	C	From Leg	0.00 0.00 0.00	0.0000	160.00	No Ice 1/2" Ice	1.47 1.67	1.47 1.67	33.00 50.72
(AT&T)									
******									
6'x6.5"x3.5" Panel Antenna w/Mount Pipe	A	From Leg	2.00 0.00 0.00	0.0000	150.00	No Ice 1/2" Ice	5.23 5.78	4.90 6.07	65.55 110.80
(Metro PCS)									
6'x6.5"x3.5" Panel Antenna w/Mount Pipe	B	From Leg	2.00 0.00 0.00	0.0000	150.00	No Ice 1/2" Ice	5.23 5.78	4.90 6.07	65.55 110.80
(Metro PCS)									
6'x6.5"x3.5" Panel Antenna w/Mount Pipe	C	From Leg	2.00 0.00 0.00	0.0000	150.00	No Ice 1/2" Ice	5.23 5.78	4.90 6.07	65.55 110.80
(Metro PCS)									
******									
Small Beacon	A	From Leg	1.00	0.0000	142.00	No Ice	0.31	0.31	7.00

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 lb
(tower)			0.00 0.00			1/2" Ice	0.40	0.40	11.00
Small Beacon	B	From Leg	1.00	0.0000	142.00	No Ice	0.31	0.31	7.00
(tower)			0.00 0.00			1/2" Ice	0.40	0.40	11.00
Small Beacon	C	From Leg	1.00	0.0000	142.00	No Ice	0.31	0.31	7.00
(tower)			0.00 0.00			1/2" Ice	0.40	0.40	11.00
******									
PiROD 12' T-Frame	A	From Leg	4.00	0.0000	140.00	No Ice	12.20	12.20	360.00
(Verizon)			0.00 0.00			1/2" Ice	17.60	17.60	490.00
PiROD 12' T-Frame	B	From Leg	4.00	0.0000	140.00	No Ice	12.20	12.20	360.00
(Verizon)			0.00 0.00			1/2" Ice	17.60	17.60	490.00
PiROD 12' T-Frame	C	From Leg	4.00	0.0000	140.00	No Ice	12.20	12.20	360.00
(Verizon)			0.00 0.00			1/2" Ice	17.60	17.60	490.00
(2) 5' x 1' Panel Antenna	A	From Leg	4.00	0.0000	140.00	No Ice	7.00	4.94	53.25
w/Mount Pipe			0.00			1/2" Ice	7.47	5.62	106.42
(Verizon)			0.00						
(2) 5' x 1' Panel Antenna	B	From Leg	4.00	0.0000	140.00	No Ice	7.00	4.94	53.25
w/Mount Pipe			0.00			1/2" Ice	7.47	5.62	106.42
(Verizon)			0.00						
(2) 5' x 1' Panel Antenna	C	From Leg	4.00	0.0000	140.00	No Ice	7.00	4.94	53.25
w/Mount Pipe			0.00			1/2" Ice	7.47	5.62	106.42
(Verizon)			0.00						
5' x 3" Panel Antenna W/ Mount	A	From Leg	4.00	0.0000	140.00	No Ice	2.29	3.48	43.25
Pipe			5.00			1/2" Ice	2.65	4.15	70.66
(Verizon)			0.00						
5' x 3" Panel Antenna W/ Mount	B	From Leg	4.00	0.0000	140.00	No Ice	2.29	3.48	43.25
Pipe			5.00			1/2" Ice	2.65	4.15	70.66
(Verizon)			0.00						
5' x 5" Panel Antenna w/Mount	C	From Leg	4.00	0.0000	140.00	No Ice	3.26	3.97	43.25
Pipe			5.00			1/2" Ice	3.64	4.64	76.95
(Verizon)			0.00						
5' x 8" Panel Antenna w/Mount	A	From Leg	4.00	0.0000	140.00	No Ice	4.72	3.97	48.25
Pipe			0.00			1/2" Ice	5.11	4.64	88.27
(Verizon)			0.00						
5' x 8" Panel Antenna w/Mount	B	From Leg	4.00	0.0000	140.00	No Ice	4.72	3.97	48.25
Pipe			0.00			1/2" Ice	5.11	4.64	88.27
(Verizon)			0.00						
5' x 8" Panel Antenna w/Mount	C	From Leg	4.00	0.0000	140.00	No Ice	4.72	3.97	48.25
Pipe			0.00			1/2" Ice	5.11	4.64	88.27
(Verizon)			0.00						
******									
6' Yagi	B	From Leg	2.00	0.0000	40.00	No Ice	3.00	3.00	10.00
(EMAC)			0.00 0.00			1/2" Ice	4.00	4.00	20.00

Truss-Leg Properties

Section Designation	Area in^2	Area Ice in^2	Self Weight lb	Ice Weight lb	Equiv. Diameter in	Equiv. Diameter Ice in	Leg Area in^2
Pirod 105245	1090.3344	1814.3549	644.58	218.92	7.5718	12.5997	5.3014
Pirod 105218	2425.3141	3778.2146	687.74	449.92	8.4212	13.1188	7.2158
Pirod 105218	2425.3141	3778.2146	687.74	449.92	8.4212	13.1188	7.2158
Pirod 105219	2597.9095	4038.9458	1033.89	484.40	9.0205	14.0241	9.4248
Pirod 105220	2735.0688	4240.4956	1202.65	499.65	9.4968	14.7239	11.9282
Pirod 105220	2735.0688	4240.4956	1202.65	499.65	9.4968	14.7239	11.9282
Pirod 112743	3389.3479	5023.2440	1678.45	674.36	11.7686	17.4418	14.7262
Pirod 112743	3389.3479	5023.2440	1678.45	674.36	11.7686	17.4418	14.7262
Pirod 112744	3520.4700	5193.9136	1883.35	688.08	12.2239	18.0344	17.8187
Pirod 112744	3520.4700	5193.9136	1883.35	688.08	12.2239	18.0344	17.8187
Pirod 112745	3701.5410	5446.9486	2152.50	714.24	12.8526	18.9130	21.2058
Pirod 112740	3701.5410	5446.9486	2152.50	714.24	12.8526	18.9130	21.2058

Force Totals

Load Case	Vertical Forces lb	Sum of Forces X lb	Sum of Forces Z lb	Sum of Overturning Moments, M_x lb-ft	Sum of Overturning Moments, M_z lb-ft	Sum of Torques lb-ft
Leg Weight	51668.55					
Bracing Weight	23462.65					
Total Member Self-Weight	75131.19			-13110.74	-8730.62	
Total Weight	98372.14			-13110.74	-8730.62	
Wind 0 deg - No Ice		6.43	-74696.82	-11263581.49	-9630.14	-6191.12
Wind 30 deg - No Ice		36257.12	-62786.32	-9522222.81	-5499857.71	3202.23
Wind 60 deg - No Ice		62157.34	-35886.56	-5458582.95	-9440565.16	11557.60
Wind 90 deg - No Ice		72503.11	-6.43	-14010.26	-10989426.78	16945.23
Wind 120 deg - No Ice		64692.55	37342.84	5611345.63	-9752373.85	18046.88
Wind 150 deg - No Ice		36245.99	62779.90	9495101.82	-5498299.70	13743.00
Wind 180 deg - No Ice		-6.43	71761.99	10876275.67	-7831.10	6050.59
Wind 210 deg - No Ice		-36257.12	62786.32	9496001.33	5482396.47	-3202.23
Wind 240 deg - No Ice		-64698.98	37353.97	5612903.64	9735812.13	-11855.77
Wind 270 deg - No Ice		-72503.11	6.43	-12211.22	10971965.55	-16945.23
Wind 300 deg - No Ice		-62150.92	-35875.43	-5457024.94	9422204.40	-17608.18
Wind 330 deg - No Ice		-36245.99	-62779.90	-9521323.29	5480838.46	-13743.00
Member Ice	30212.26					
Total Weight Ice	148682.45			-45461.78	-20281.47	
Wind 0 deg - Ice		4.92	-81353.53	-12459948.75	-20970.81	-9697.46
Wind 30 deg - Ice		39528.85	-68456.14	-10574122.63	-6099802.62	5509.62
Wind 60 deg - Ice		67794.21	-39141.01	-6081679.18	-10475316.69	18824.42
Wind 90 deg - Ice		79049.18	-4.92	-46151.12	-12178129.81	27300.54
Wind 120 deg - Ice		70456.69	40672.50	6161184.72	-10771887.22	28996.01
Wind 150 deg - Ice		39520.33	68451.21	10482509.73	-6098608.65	21790.92
Wind 180 deg - Ice		-4.92	78273.48	12025779.05	-19592.13	9300.87
Wind 210 deg - Ice		-39528.85	68456.14	10483199.07	6059239.69	-5509.62
Wind 240 deg - Ice		-70461.61	40681.03	6162378.69	10732013.63	-19298.55
Wind 270 deg - Ice		-79049.18	4.92	-44772.44	12137566.87	-27300.54
Wind 300 deg - Ice		-67789.29	-39132.48	-6080485.21	10434064.41	-28125.29
Wind 330 deg - Ice		-39520.33	-68451.21	-10573433.29	6058045.72	-21790.92
Total Weight	98372.14			-13110.74	-8730.62	
Wind 0 deg - Service		3.20	-37219.18	-5604362.88	1399.74	-3084.85
Wind 30 deg - Service		18065.83	-31284.54	-4736696.28	-2734215.38	1595.57
Wind 60 deg - Service		30971.13	-17881.19	-2711906.86	-4697751.27	5758.80
Wind 90 deg - Service		36126.12	-3.20	959.81	-5469502.40	8443.30
Wind 120 deg - Service		32234.35	18606.82	2803905.30	-4853116.16	8992.22
Wind 150 deg - Service		18060.29	31281.33	4739064.09	-2733439.07	6847.72

Load Case	Vertical Forces lb	Sum of Forces X lb	Sum of Forces Z lb	Sum of Overturning Moments, M_x lb-ft	Sum of Overturning Moments, M_z lb-ft	Sum of Torques lb-ft
Wind 180 deg - Service		-3.20	35756.84	5427261.44	2296.14	3014.82
Wind 210 deg - Service		-18065.83	31284.54	4739512.29	2737911.26	-1595.57
Wind 240 deg - Service		-32237.55	18612.36	2804681.61	4857260.24	-5907.37
Wind 270 deg - Service		-36126.12	3.20	1856.21	5473198.28	-8443.30
Wind 300 deg - Service		-30967.93	-17875.65	-2711130.55	4700998.95	-8773.63
Wind 330 deg - Service		-18060.29	-31281.33	-4736248.07	2737134.96	-6847.72

Load Combinations

Comb. No.	Description
1	Dead Only
2	Dead+Wind 0 deg - No Ice
3	Dead+Wind 30 deg - No Ice
4	Dead+Wind 60 deg - No Ice
5	Dead+Wind 90 deg - No Ice
6	Dead+Wind 120 deg - No Ice
7	Dead+Wind 150 deg - No Ice
8	Dead+Wind 180 deg - No Ice
9	Dead+Wind 210 deg - No Ice
10	Dead+Wind 240 deg - No Ice
11	Dead+Wind 270 deg - No Ice
12	Dead+Wind 300 deg - No Ice
13	Dead+Wind 330 deg - No Ice
14	Dead+Ice+Temp
15	Dead+Wind 0 deg+Ice+Temp
16	Dead+Wind 30 deg+Ice+Temp
17	Dead+Wind 60 deg+Ice+Temp
18	Dead+Wind 90 deg+Ice+Temp
19	Dead+Wind 120 deg+Ice+Temp
20	Dead+Wind 150 deg+Ice+Temp
21	Dead+Wind 180 deg+Ice+Temp
22	Dead+Wind 210 deg+Ice+Temp
23	Dead+Wind 240 deg+Ice+Temp
24	Dead+Wind 270 deg+Ice+Temp
25	Dead+Wind 300 deg+Ice+Temp
26	Dead+Wind 330 deg+Ice+Temp
27	Dead+Wind 0 deg - Service
28	Dead+Wind 30 deg - Service
29	Dead+Wind 60 deg - Service
30	Dead+Wind 90 deg - Service
31	Dead+Wind 120 deg - Service
32	Dead+Wind 150 deg - Service
33	Dead+Wind 180 deg - Service
34	Dead+Wind 210 deg - Service
35	Dead+Wind 240 deg - Service
36	Dead+Wind 270 deg - Service
37	Dead+Wind 300 deg - Service
38	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force lb	Major Axis Moment lb-ft	Minor Axis Moment lb-ft
T1	280 - 277.375	Leg	Max Tension	1	0.00	0.00	0.00
			Max. Compression	23	-2459.51	-0.00	0.00
			Max. Mx	24	-2294.12	642.81	280.41
			Max. My	26	-1797.36	349.42	606.22
			Max. Vy	24	-2572.31	642.81	280.41
			Max. Vx	26	-2426.13	349.42	606.22
		Diagonal	Max Tension	24	4955.00	0.00	0.00
			Max. Compression	18	-4988.17	0.00	0.00
			Max. Mx	24	4955.00	3.20	0.00
			Max. My	19	1990.43	0.00	-0.09
			Max. Vy	24	-3.71	0.00	0.00
			Max. Vx	19	0.10	0.00	0.00
		Top Girt	Max Tension	25	3929.86	4.64	4.24
			Max. Compression	19	-3885.53	4.71	4.68
			Max. Mx	24	-1411.11	5.14	-0.67
			Max. My	24	-3582.25	4.64	5.26
			Max. Vy	24	-7.51	5.14	-0.67
			Max. Vx	24	-2.12	4.64	5.26
		Bottom Girt	Max Tension	21	144.10	0.00	0.00
			Max. Compression	15	-65.88	0.00	0.00
			Max. Mx	14	20.26	-13.66	0.00
			Max. My	24	33.75	0.00	-0.00
			Max. Vy	14	10.93	0.00	0.00
			Max. Vx	24	0.00	0.00	0.00
T2	277.375 - 270	Leg	Max Tension	21	13300.87	-91.60	717.61
			Max. Compression	23	-17175.15	-108.63	7.07
			Max. Mx	18	-14715.97	887.16	-288.81
			Max. My	26	-2296.87	-433.55	-753.70
			Max. Vy	24	-3048.70	-125.09	-52.61
			Max. Vx	26	-2550.28	-62.43	-116.42
		Diagonal	Max Tension	24	4483.89	0.00	0.00
			Max. Compression	18	-4527.26	0.00	0.00
			Max. Mx	23	1325.08	-4.23	0.04
			Max. My	18	-4503.08	-2.28	4.11
			Max. Vy	23	-5.14	-4.23	0.04
			Max. Vx	18	-1.51	-2.28	4.11
		Horizontal	Max Tension	21	190.02	0.00	0.00
			Max. Compression	2	-81.81	0.00	0.00
			Max. Mx	14	59.88	7.08	0.00
			Max. My	24	58.88	0.00	0.00
			Max. Vy	14	-5.67	0.00	0.00
			Max. Vx	24	-0.00	0.00	0.00
		Bottom Girt	Max Tension	25	1211.96	0.00	0.00
			Max. Compression	23	-1192.90	0.00	0.00
			Max. Mx	14	25.56	11.22	0.00
			Max. My	24	131.89	0.00	0.00
			Max. Vy	14	8.97	0.00	0.00
			Max. Vx	24	-0.00	0.00	0.00
T3	270 - 250	Leg	Max Tension	21	47981.16	-122.23	1153.90
			Max. Compression	23	-53546.21	540.99	-122.39
			Max. Mx	24	-15197.10	1399.58	420.93
			Max. My	15	-52741.84	139.23	-1197.67
			Max. Vy	24	-3892.81	592.62	113.15
			Max. Vx	15	-3480.21	-72.08	541.56
		Diagonal	Max Tension	24	5580.54	0.00	0.00
			Max. Compression	18	-5564.36	0.00	0.00
			Max. Mx	22	2527.81	-4.77	0.31
			Max. My	24	-4965.86	-2.15	-5.45
			Max. Vy	22	-5.35	-4.77	0.31
			Max. Vx	24	1.99	-2.15	-5.45
		Horizontal	Max Tension	21	582.08	0.00	0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force lb	Major Axis Moment lb-ft	Minor Axis Moment lb-ft
			Max. Compression	15	-475.02	0.00	0.00
			Max. Mx	14	66.35	7.08	0.00
			Max. My	24	60.05	0.00	0.00
			Max. Vy	14	-5.67	0.00	0.00
			Max. Vx	24	-0.00	0.00	0.00
		Top Girt	Max Tension	19	1270.02	0.00	0.00
			Max. Compression	17	-1245.40	0.00	0.00
			Max. Mx	14	0.54	11.22	0.00
			Max. My	24	-56.62	0.00	0.00
			Max. Vy	14	8.97	0.00	0.00
			Max. Vx	24	-0.00	0.00	0.00
		Bottom Girt	Max Tension	21	1654.26	0.00	0.00
			Max. Compression	15	-1651.40	0.00	0.00
			Max. Mx	14	17.58	11.22	0.00
			Max. My	24	257.73	0.00	0.00
			Max. Vy	14	8.97	0.00	0.00
			Max. Vx	24	-0.00	0.00	0.00
		Mid Girt	Max Tension	21	463.41	0.00	0.00
			Max. Compression	15	-348.78	0.00	0.00
			Max. Mx	14	16.88	11.22	0.00
			Max. My	24	60.62	0.00	0.00
			Max. Vy	14	8.97	0.00	0.00
			Max. Vx	24	-0.00	0.00	0.00
T4	250 - 230	Leg	Max Tension	21	107994.14	-47.55	490.65
			Max. Compression	23	-120359.05	3700.96	-1651.04
			Max. Mx	19	-119894.60	-3789.55	-1494.33
			Max. My	15	-119194.83	-180.47	4044.37
			Max. Vy	19	8680.15	-3789.55	-1494.33
			Max. Vx	15	-9095.35	-180.47	4044.37
		Diagonal	Max Tension	18	9001.41	0.00	0.00
			Max. Compression	18	-9210.51	0.00	0.00
			Max. Mx	23	1618.58	-8.03	-0.21
			Max. My	24	-7556.78	-1.46	-8.83
			Max. Vy	22	-7.41	-8.02	0.32
			Max. Vx	24	3.21	-1.46	-8.83
		Horizontal	Max Tension	21	1058.70	0.00	0.00
			Max. Compression	15	-922.24	0.00	0.00
			Max. Mx	14	105.61	7.08	0.00
			Max. My	18	70.85	0.00	0.00
			Max. Vy	14	-5.67	0.00	0.00
			Max. Vx	18	-0.00	0.00	0.00
		Top Girt	Max Tension	19	1919.73	0.00	0.00
			Max. Compression	17	-1847.85	0.00	0.00
			Max. Mx	14	6.32	11.22	0.00
			Max. My	24	-165.65	0.00	0.00
			Max. Vy	14	8.97	0.00	0.00
			Max. Vx	24	-0.00	0.00	0.00
		Bottom Girt	Max Tension	21	1389.84	0.00	0.00
			Max. Compression	15	-1252.41	0.00	0.00
			Max. Mx	14	26.47	-13.66	0.00
			Max. My	18	-2.60	0.00	-0.00
			Max. Vy	14	10.93	0.00	0.00
			Max. Vx	18	0.00	0.00	0.00
		Mid Girt	Max Tension	21	797.52	0.00	0.00
			Max. Compression	15	-665.10	0.00	0.00
			Max. Mx	14	36.53	11.22	0.00
			Max. My	18	70.67	0.00	0.00
			Max. Vy	14	8.97	0.00	0.00
			Max. Vx	18	-0.00	0.00	0.00
T5	230 - 220	Leg	Max Tension	21	113415.87	-3817.69	-173.33
			Max. Compression	23	-125264.30	6239.69	335.99

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force lb	Major Axis Moment lb-ft	Minor Axis Moment lb-ft
			Max. Mx	21	113178.42	-6640.53	-205.54
			Max. My	20	-6874.11	-197.82	-10449.52
			Max. Vy	17	486.68	-6622.55	-405.17
			Max. Vx	20	1065.92	-197.82	-10449.52
		Diagonal	Max Tension	25	9705.87	85.94	9.85
			Max. Compression	19	-10807.67	0.00	0.00
			Max. Mx	25	3804.15	88.79	12.44
			Max. My	19	-10777.95	-64.92	-78.89
			Max. Vy	25	22.60	88.79	12.44
			Max. Vx	19	15.43	0.00	0.00
T6	220 - 200	Leg	Max Tension	21	150831.02	-5739.96	-36.49
			Max. Compression	23	-166831.36	7579.04	62.19
			Max. Mx	23	-166831.36	7579.04	62.19
			Max. My	20	-7982.78	-198.06	-10449.52
			Max. Vy	15	-339.32	7531.10	28.38
			Max. Vx	22	627.68	-104.28	8056.68
		Diagonal	Max Tension	18	9054.38	0.00	0.00
			Max. Compression	18	-9358.87	0.00	0.00
			Max. Mx	19	3915.51	127.07	-24.70
			Max. My	19	-4940.96	-16.80	-36.81
			Max. Vy	19	-32.98	127.07	-24.70
			Max. Vx	25	-6.84	0.00	0.00
T7	200 - 180	Leg	Max Tension	21	179165.71	-5283.65	0.86
			Max. Compression	19	-199202.43	7096.15	-384.24
			Max. Mx	23	-181448.26	7579.04	62.21
			Max. My	20	-8946.37	-114.63	-6896.27
			Max. Vy	23	369.75	7579.04	62.21
			Max. Vx	22	-500.71	-116.92	6892.99
		Diagonal	Max Tension	25	8849.39	0.00	0.00
			Max. Compression	19	-10156.59	0.00	0.00
			Max. Mx	21	6758.77	99.80	-5.43
			Max. My	19	-10122.19	-51.25	-27.41
			Max. Vy	19	-29.85	99.31	-10.07
			Max. Vx	18	4.94	0.00	0.00
		Horizontal	Max Tension	21	6628.37	0.00	0.00
			Max. Compression	19	-5377.02	0.00	0.00
			Max. Mx	19	-5377.02	-65.02	0.00
			Max. My	25	-2518.63	0.00	1.88
			Max. Vy	19	28.90	0.00	0.00
			Max. Vx	25	-0.83	0.00	0.00
		Top Girt	Max Tension	21	5638.52	0.00	0.00
			Max. Compression	23	-4732.62	0.00	0.00
			Max. Mx	19	-4730.87	-51.37	0.00
			Max. My	25	-2238.55	0.00	1.48
			Max. Vy	19	25.69	0.00	0.00
			Max. Vx	25	-0.74	0.00	0.00
T8	180 - 160	Leg	Max Tension	21	207898.52	-4858.06	22.55
			Max. Compression	19	-234629.17	6956.61	-104.86
			Max. Mx	23	-214449.87	7097.77	294.30
			Max. My	20	-10250.83	47.98	-6242.68
			Max. Vy	12	-1087.56	-4041.73	-21.16
			Max. Vx	22	1422.71	-123.61	6037.41
		Diagonal	Max Tension	25	9916.11	0.00	0.00
			Max. Compression	19	-11555.34	0.00	0.00
			Max. Mx	19	2021.43	126.11	-10.93
			Max. My	18	-8252.11	-34.72	-20.42
			Max. Vy	21	42.28	125.25	-8.59
			Max. Vx	18	3.81	0.00	0.00
		Horizontal	Max Tension	21	7892.42	0.00	0.00
			Max. Compression	19	-6316.89	0.00	0.00
			Max. Mx	14	789.87	-152.61	0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force lb	Major Axis Moment lb-ft	Minor Axis Moment lb-ft
			Max. My	25	-2825.23	0.00	4.41
			Max. Vy	14	55.50	0.00	0.00
			Max. Vx	25	-1.60	0.00	0.00
		Top Girt	Max Tension	21	8170.78	0.00	0.00
			Max. Compression	19	-6701.10	0.00	0.00
			Max. Mx	19	-6701.10	-126.13	0.00
			Max. My	25	-3113.02	0.00	3.64
			Max. Vy	19	50.45	0.00	0.00
			Max. Vx	25	-1.46	0.00	0.00
T9	160 - 140	Leg	Max Tension	21	242715.06	-4899.36	10.43
			Max. Compression	19	-280584.31	5512.23	-8.89
			Max. Mx	19	-256486.13	6956.60	-104.88
			Max. My	20	-15846.78	-253.19	-8226.55
			Max. Vy	25	-1227.99	-6485.91	114.28
			Max. Vx	22	-616.74	-246.69	8218.32
		Diagonal	Max Tension	24	10114.58	0.00	0.00
			Max. Compression	24	-10218.14	0.00	0.00
			Max. Mx	19	7162.70	176.37	-13.65
			Max. My	18	-9928.48	-24.63	-38.97
			Max. Vy	19	-55.22	176.37	-13.65
			Max. Vx	18	6.18	0.00	0.00
		Top Girt	Max Tension	21	6207.54	0.00	0.00
			Max. Compression	19	-5007.47	0.00	0.00
			Max. Mx	25	6167.73	-183.81	0.00
			Max. My	25	-2231.50	0.00	5.31
			Max. Vy	25	61.27	0.00	0.00
			Max. Vx	25	1.77	0.00	0.00
T10	140 - 120	Leg	Max Tension	21	277247.74	-5328.99	6.25
			Max. Compression	19	-324730.93	10319.26	-274.75
			Max. Mx	21	276202.65	-10945.14	-59.71
			Max. My	20	-21583.64	-388.40	-10540.12
			Max. Vy	21	-1174.66	-5702.38	11.83
			Max. Vx	20	-1430.90	-129.51	-5539.99
		Diagonal	Max Tension	24	11064.81	0.00	0.00
			Max. Compression	24	-11738.09	0.00	0.00
			Max. Mx	17	6640.40	187.78	-10.65
			Max. My	18	-10135.81	12.29	-42.81
			Max. Vy	17	60.74	187.78	-10.65
			Max. Vx	18	6.10	0.00	0.00
T11	120 - 100	Leg	Max Tension	17	299204.25	-10917.07	-192.98
			Max. Compression	19	-350646.30	12366.36	-55.24
			Max. Mx	19	-350646.30	12366.36	-55.24
			Max. My	20	-23991.18	132.06	-19985.85
			Max. Vy	8	457.96	-11338.34	-15.24
			Max. Vx	26	-826.87	131.87	19972.68
		Diagonal	Max Tension	24	14047.22	0.00	0.00
			Max. Compression	19	-15999.94	0.00	0.00
			Max. Mx	17	11725.46	-499.57	21.66
			Max. My	18	-15443.20	-82.54	151.32
			Max. Vy	17	-125.48	-499.57	21.66
			Max. Vx	18	-15.75	0.00	0.00
T12	100 - 80	Leg	Max Tension	17	332324.88	-11783.63	-8.36
			Max. Compression	15	-396418.15	12517.65	58.30
			Max. Mx	21	328861.24	-16668.60	-29.46
			Max. My	20	-27359.98	131.89	-19985.85
			Max. Vy	21	637.57	-16668.60	-29.46
			Max. Vx	20	-913.32	131.89	-19985.85
		Diagonal	Max Tension	24	15595.93	0.00	0.00
			Max. Compression	24	-15587.56	0.00	0.00
			Max. Mx	17	11396.96	-519.77	89.19
			Max. My	25	11154.20	-519.36	-91.55

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force lb	Major Axis Moment lb-ft	Minor Axis Moment lb-ft
			Max. Vy	17	-135.09	-519.77	89.19
			Max. Vx	25	10.85	0.00	0.00
T13	80 - 60	Leg	Max Tension	17	363687.19	-16651.22	-15.40
			Max. Compression	15	-434891.67	17055.28	61.99
			Max. Mx	19	-433988.40	17079.72	-103.37
			Max. My	26	-31858.03	4787.99	16735.51
			Max. Vy	21	-874.77	-16668.60	-29.45
			Max. Vx	26	-740.48	4787.99	16735.51
		Diagonal	Max Tension	24	13884.29	0.00	0.00
			Max. Compression	24	-16306.04	0.00	0.00
			Max. Mx	17	10132.08	-555.72	69.82
			Max. My	25	-13886.03	-336.58	-81.86
			Max. Vy	17	-145.64	-555.72	69.82
			Max. Vx	25	9.99	0.00	0.00
T14	60 - 40	Leg	Max Tension	17	387825.23	-7016.62	-0.99
			Max. Compression	15	-475825.80	4580.37	54.26
			Max. Mx	17	385599.94	-23669.81	8.59
			Max. My	26	-36919.83	4787.87	16735.57
			Max. Vy	21	1199.23	-23654.79	-31.81
			Max. Vx	26	806.91	4787.87	16735.57
		Diagonal	Max Tension	24	16650.43	0.00	0.00
			Max. Compression	11	-14765.16	0.00	0.00
			Max. Mx	17	13707.92	-571.71	74.66
			Max. My	25	13460.03	-571.40	-76.45
			Max. Vy	17	-154.80	-571.71	74.66
			Max. Vx	18	9.50	0.00	0.00
T15	40 - 20	Leg	Max Tension	17	422197.95	-23669.81	8.62
			Max. Compression	15	-511257.54	25032.21	64.16
			Max. Mx	19	-509502.12	25045.83	-148.97
			Max. My	16	-40215.11	12287.40	-24500.38
			Max. Vy	21	-1561.62	-23654.79	-31.80
			Max. Vx	26	-1170.75	12278.94	24493.65
		Diagonal	Max Tension	11	13626.46	0.00	0.00
			Max. Compression	24	-18058.28	0.00	0.00
			Max. Mx	17	6955.44	-676.31	83.65
			Max. My	25	-16515.22	-389.73	-123.95
			Max. Vy	17	-169.23	-676.31	83.65
			Max. Vx	25	12.48	0.00	0.00
T16	20 - 0	Leg	Max Tension	17	435896.30	49.44	23.91
			Max. Compression	15	-551528.83	-0.00	-0.64
			Max. Mx	19	-546600.62	25045.83	-149.02
			Max. My	16	-49741.88	12287.26	-24500.47
			Max. Vy	23	1458.99	25038.57	84.85
			Max. Vx	26	1507.41	12278.77	24493.75
		Diagonal	Max Tension	25	20126.39	0.00	0.00
			Max. Compression	6	-16757.12	0.00	0.00
			Max. Mx	16	18136.51	-622.50	96.53
			Max. My	18	5864.67	-569.98	105.54
			Max. Vy	16	-174.22	-622.50	96.53
			Max. Vx	18	-11.09	0.00	0.00

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical lb	Horizontal, X lb	Horizontal, Z lb
Leg C	Max. Vert	23	564041.75	43453.05	-24666.92

Location	Condition	Gov. Load Comb.	Vertical lb	Horizontal, X lb	Horizontal, Z lb
	Max. H_x	10	498798.64	43662.06	-24937.53
	Max. H_z	17	-454013.63	-45589.85	25836.87
	Min. Vert	17	-454013.63	-45589.85	25836.87
	Min. H_x	17	-454013.63	-45589.85	25836.87
	Min. H_z	10	498798.64	43662.06	-24937.53
Leg B	Max. Vert	19	565450.28	-43564.33	-24528.30
	Max. H_x	25	-452508.29	45662.38	25635.24
	Max. H_z	25	-452508.29	45662.38	25635.24
	Min. Vert	25	-452508.29	45662.38	25635.24
	Min. H_x	6	499360.07	-43726.56	-24839.44
	Min. H_z	6	499360.07	-43726.56	-24839.44
Leg A	Max. Vert	15	567522.79	-175.82	50037.90
	Max. H_x	11	33284.20	1750.22	2736.53
	Max. H_z	2	499847.97	-117.28	50298.74
	Min. Vert	21	-450434.71	211.03	-52316.04
	Min. H_x	5	33357.81	-1734.27	2744.26
	Min. H_z	21	-450434.71	211.03	-52316.04

Tower Mast Reaction Summary

Load Combination	Vertical lb	$Shear_x$ lb	$Shear_z$ lb	Overturning Moment, M_x lb-ft	Overturning Moment, M_z lb-ft	Torque lb-ft
Dead Only	98372.14	0.00	-0.00	-12959.60	-8731.69	0.01
Dead+Wind 0 deg - No Ice	98372.14	6.43	-74696.81	-11325536.56	-9610.89	-6168.94
Dead+Wind 30 deg - No Ice	98372.14	36257.12	-62786.32	-9574859.79	-5530459.94	3276.05
Dead+Wind 60 deg - No Ice	98372.14	62157.35	-35886.56	-5488672.84	-9493195.25	11586.58
Dead+Wind 90 deg - No Ice	98372.14	72503.11	-6.43	-13751.40	-11050475.40	16918.96
Dead+Wind 120 deg - No Ice	98372.14	64692.55	37342.84	5642693.62	-9806131.22	18049.00
Dead+Wind 150 deg - No Ice	98372.14	36245.99	62779.90	9548180.49	-5528713.01	13774.24
Dead+Wind 180 deg - No Ice	98372.14	-6.43	71761.99	10937119.93	-7820.00	6028.50
Dead+Wind 210 deg - No Ice	98372.14	-36257.12	62786.33	9549041.58	5512814.02	-3274.25
Dead+Wind 240 deg - No Ice	98372.14	-64698.98	37353.97	5644206.27	9789538.04	-11884.29
Dead+Wind 270 deg - No Ice	98372.14	-72503.11	6.42	-11966.44	11032967.51	-16918.57
Dead+Wind 300 deg - No Ice	98372.14	-62150.92	-35875.43	-5487093.59	9474810.75	-17610.56
Dead+Wind 330 deg - No Ice	98372.14	-36245.99	-62779.90	-9573932.86	5511457.27	-13776.02
Dead+Ice+Temp	148682.45	-0.00	0.00	-45244.71	-20289.67	-0.10
Dead+Wind 0 deg+Ice+Temp	148682.44	4.92	-81353.42	-12559910.34	-21019.96	-9596.35
Dead+Wind 30 deg+Ice+Temp	148682.45	39528.85	-68456.05	-10659351.21	-6149399.72	5661.85
Dead+Wind 60 deg+Ice+Temp	148682.45	67794.17	-39140.99	-6130510.67	-10560632.46	18843.97
Dead+Wind 90 deg+Ice+Temp	148682.45	79049.10	-4.97	-45852.83	-12276957.25	27178.29
Dead+Wind 120 deg+Ice+Temp	148682.44	70456.59	40672.45	6211619.92	-10858624.58	28905.74
Dead+Wind 150 deg+Ice+Temp	148682.45	39520.26	68451.17	10568296.12	-6147875.55	21763.86
Dead+Wind 180 deg+Ice+Temp	148682.45	-4.92	78273.44	12124247.10	-19663.30	9201.31
Dead+Wind 210 deg+Ice+Temp	148682.45	-39528.78	68456.09	10568927.96	6108339.28	-5659.14
Dead+Wind 240 deg+Ice+Temp	148682.44	-70461.51	40680.97	6212745.05	10818536.23	-19315.82
Dead+Wind 270 deg+Ice+Temp	148682.45	-79049.10	4.88	-44499.14	12236163.30	-27177.70
Dead+Wind 300 deg+Ice+Temp	148682.45	-67789.25	-39132.46	-6129290.08	10519187.62	-28038.38
Dead+Wind 330 deg+Ice+Temp	148682.45	-39520.32	-68451.13	-10658624.87	6107512.14	-21766.53
Dead+Wind 0 deg - Service	98372.14	3.20	-37219.17	-5649859.70	-9190.16	-3068.47
Dead+Wind 30 deg - Service	98372.14	18065.83	-31284.54	-4777504.31	-2760113.62	1620.90
Dead+Wind 60 deg - Service	98372.14	30971.15	-17881.19	-2741424.49	-4734670.15	5773.23
Dead+Wind 90 deg - Service	98372.14	36126.12	-3.20	-13370.34	-5510666.00	8443.30
Dead+Wind 120 deg - Service	98372.14	32234.35	18606.81	2805152.53	-4890674.09	8995.73
Dead+Wind 150 deg - Service	98372.14	18060.29	31281.33	4751190.92	-2759292.21	6853.12
Dead+Wind 180 deg - Service	98372.14	-3.20	35756.84	5443275.76	-8298.47	3011.31
Dead+Wind 210 deg - Service	98372.14	-18065.83	31284.54	4751627.50	2742572.08	-1620.47

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	lb	lb	lb	lb-ft	lb-ft	lb-ft
Dead+Wind 240 deg - Service	98372.14	-32237.58	18612.36	2805914.41	4873617.86	-5922.11
Dead+Wind 270 deg - Service	98372.14	-36126.12	3.20	-12481.00	5493158.33	-8443.18
Dead+Wind 300 deg - Service	98372.14	-30967.93	-17875.65	-2740646.02	4716720.57	-8776.78
Dead+Wind 330 deg - Service	98372.14	-18060.29	-31281.33	-4777051.28	2741846.94	-6853.56

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX lb	PY lb	PZ lb	PX lb	PY lb	PZ lb	% Error
1	0.00	-98372.14	-0.00	-0.00	98372.14	0.00	0.000%
2	6.43	-98372.14	-74696.82	-6.43	98372.14	74696.81	0.000%
3	36257.12	-98372.14	-62786.32	-36257.12	98372.14	62786.32	0.000%
4	62157.34	-98372.14	-35886.56	-62157.35	98372.14	35886.56	0.000%
5	72503.11	-98372.14	-6.43	-72503.11	98372.14	6.43	0.000%
6	64692.55	-98372.14	37342.84	-64692.55	98372.14	-37342.84	0.000%
7	36245.99	-98372.14	62779.90	-36245.99	98372.14	-62779.90	0.000%
8	-6.43	-98372.14	71761.99	6.43	98372.14	-71761.99	0.000%
9	-36257.12	-98372.14	62786.32	36257.12	98372.14	-62786.33	0.000%
10	-64698.98	-98372.14	37353.97	64698.98	98372.14	-37353.97	0.000%
11	-72503.11	-98372.14	6.43	72503.11	98372.14	-6.42	0.000%
12	-62150.92	-98372.14	-35875.43	62150.92	98372.14	35875.43	0.000%
13	-36245.99	-98372.14	-62779.90	36245.99	98372.14	62779.90	0.000%
14	0.00	-148682.45	-0.00	0.00	148682.45	-0.00	0.000%
15	4.92	-148682.45	-81353.53	-4.92	148682.44	81353.42	0.000%
16	39528.85	-148682.45	-68456.14	-39528.85	148682.45	68456.05	0.000%
17	67794.21	-148682.45	-39141.01	-67794.17	148682.45	39140.99	0.000%
18	79049.18	-148682.45	-4.92	-79049.10	148682.45	4.97	0.000%
19	70456.69	-148682.45	40672.50	-70456.59	148682.44	-40672.45	0.000%
20	39520.33	-148682.45	68451.21	-39520.26	148682.45	-68451.17	0.000%
21	-4.92	-148682.45	78273.48	4.92	148682.45	-78273.44	0.000%
22	-39528.85	-148682.45	68456.14	39528.78	148682.45	-68456.09	0.000%
23	-70461.61	-148682.45	40681.03	70461.51	148682.44	-40680.97	0.000%
24	-79049.18	-148682.45	4.92	79049.10	148682.45	-4.88	0.000%
25	-67789.29	-148682.45	-39132.48	67789.25	148682.45	39132.46	0.000%
26	-39520.33	-148682.45	-68451.21	39520.32	148682.45	68451.13	0.000%
27	3.20	-98372.14	-37219.18	-3.20	98372.14	37219.17	0.000%
28	18065.83	-98372.14	-31284.54	-18065.83	98372.14	31284.54	0.000%
29	30971.15	-98372.14	-17881.19	-30971.15	98372.14	17881.19	0.000%
30	36126.12	-98372.14	-3.20	-36126.12	98372.14	3.20	0.000%
31	32234.35	-98372.14	18606.82	-32234.35	98372.14	-18606.81	0.000%
32	18060.29	-98372.14	31281.33	-18060.29	98372.14	-31281.33	0.000%
33	-3.20	-98372.14	35756.84	3.20	98372.14	-35756.84	0.000%
34	-18065.83	-98372.14	31284.54	18065.83	98372.14	-31284.54	0.000%
35	-32237.58	-98372.14	18612.36	32237.58	98372.14	-18612.36	0.000%
36	-36126.12	-98372.14	3.20	36126.12	98372.14	-3.20	0.000%
37	-30967.93	-98372.14	-17875.65	30967.93	98372.14	17875.65	0.000%
38	-18060.29	-98372.14	-31281.33	18060.29	98372.14	31281.33	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance

1	Yes	4	0.00000001	0.00000001
2	Yes	4	0.00000001	0.00000077
3	Yes	4	0.00000001	0.00000139
4	Yes	4	0.00000001	0.00000113
5	Yes	4	0.00000001	0.00000135
6	Yes	4	0.00000001	0.00000175
7	Yes	4	0.00000001	0.00000166
8	Yes	4	0.00000001	0.00000098
9	Yes	4	0.00000001	0.00000136
10	Yes	4	0.00000001	0.00000115
11	Yes	4	0.00000001	0.00000137
12	Yes	4	0.00000001	0.00000135
13	Yes	4	0.00000001	0.00000169
14	Yes	4	0.00000001	0.00000001
15	Yes	4	0.00000001	0.00000230
16	Yes	4	0.00000001	0.00000325
17	Yes	4	0.00000001	0.00000324
18	Yes	4	0.00000001	0.00000334
19	Yes	4	0.00000001	0.00000401
20	Yes	4	0.00000001	0.00000358
21	Yes	4	0.00000001	0.00000303
22	Yes	4	0.00000001	0.00000319
23	Yes	4	0.00000001	0.00000303
24	Yes	4	0.00000001	0.00000336
25	Yes	4	0.00000001	0.00000351
26	Yes	4	0.00000001	0.00000363
27	Yes	4	0.00000001	0.00000102
28	Yes	4	0.00000001	0.00000114
29	Yes	4	0.00000001	0.00000122
30	Yes	4	0.00000001	0.00000115
31	Yes	4	0.00000001	0.00000105
32	Yes	4	0.00000001	0.00000116
33	Yes	4	0.00000001	0.00000122
34	Yes	4	0.00000001	0.00000114
35	Yes	4	0.00000001	0.00000102
36	Yes	4	0.00000001	0.00000115
37	Yes	4	0.00000001	0.00000123
38	Yes	4	0.00000001	0.00000116

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	280 - 277.375	18.063	35	0.7454	0.3055
T2	277.375 - 270	17.641	35	0.7450	0.2893
T3	270 - 250	16.475	31	0.7358	0.2600
T4	250 - 230	13.432	31	0.6732	0.1727
T5	230 - 220	10.717	31	0.5750	0.1085
T6	220 - 200	9.546	31	0.5148	0.0705
T7	200 - 180	7.537	31	0.4299	0.0371
T8	180 - 160	5.871	31	0.3497	0.0204
T9	160 - 140	4.505	27	0.2905	0.0134
T10	140 - 120	3.353	27	0.2433	0.0091
T11	120 - 100	2.390	27	0.1955	0.0059
T12	100 - 80	1.621	27	0.1565	0.0043
T13	80 - 60	1.028	27	0.1174	0.0031
T14	60 - 40	0.579	27	0.0851	0.0021
T15	40 - 20	0.267	27	0.0531	0.0013
T16	20 - 0	0.072	27	0.0261	0.0006

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
281.00	Flash Beacon Lighting	35	18.063	0.7454	0.3055	25169
280.00	Lightning Rod 1/2"x4' on 15' Pole	35	18.063	0.7454	0.3055	25169
250.00	PiROD 15' T-Frame	31	13.432	0.6732	0.1727	14384
235.00	(9) PiROD 12' T-Frame	31	11.352	0.6033	0.1252	9428
225.00	Camera and Mount	31	10.116	0.5443	0.0890	9284
170.00	PiROD 12' Lightweight T-Frame	31	5.155	0.3172	0.0159	18623
160.00	PiROD 12' Lightweight T-Frame	27	4.505	0.2905	0.0134	24109
150.00	6'x6.5"x3.5" Panel Antenna w/Mount Pipe	27	3.905	0.2667	0.0112	25269
142.00	Small Beacon	27	3.460	0.2481	0.0095	25695
140.00	PiROD 12' T-Frame	27	3.353	0.2433	0.0091	25708
40.00	6' Yagi	27	0.267	0.0531	0.0013	46053

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	280 - 277.375	41.143	19	1.7049	0.8200
T2	277.375 - 270	40.181	19	1.7043	0.7756
T3	270 - 250	37.518	19	1.6838	0.6955
T4	250 - 230	30.538	19	1.5424	0.4581
T5	230 - 220	24.303	19	1.3195	0.2846
T6	220 - 200	21.613	19	1.1821	0.1836
T7	200 - 180	17.003	15	0.9850	0.0972
T8	180 - 160	13.199	15	0.7971	0.0538
T9	160 - 140	10.097	15	0.6583	0.0360
T10	140 - 120	7.495	15	0.5490	0.0252
T11	120 - 100	5.331	15	0.4396	0.0168
T12	100 - 80	3.608	15	0.3509	0.0125
T13	80 - 60	2.284	15	0.2626	0.0092
T14	60 - 40	1.284	15	0.1900	0.0064
T15	40 - 20	0.589	15	0.1183	0.0040
T16	20 - 0	0.157	15	0.0582	0.0019

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
281.00	Flash Beacon Lighting	19	41.143	1.7049	0.8200	11382
280.00	Lightning Rod 1/2"x4' on 15' Pole	19	41.143	1.7049	0.8200	11382
250.00	PiROD 15' T-Frame	19	30.538	1.5424	0.4581	6336

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
235.00	(9) PiROD 12' T-Frame	19	25.763	1.3840	0.3294	4163
225.00	Camera and Mount	19	22.922	1.2496	0.2326	4072
170.00	PiROD 12' Lightweight T-Frame	15	11.572	0.7209	0.0424	7903
160.00	PiROD 12' Lightweight T-Frame	15	10.097	0.6583	0.0360	10240
150.00	6'x6.5"x3.5" Panel Antenna w/Mount Pipe	15	8.740	0.6029	0.0305	10773
142.00	Small Beacon	15	7.735	0.5599	0.0262	10994
140.00	PiROD 12' T-Frame	15	7.495	0.5490	0.0252	11019
40.00	6' Yagi	15	0.589	0.1183	0.0040	20486

Bolt Design Data

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt lb	Allowable Load lb	Ratio Load / Allowable	Allowable Ratio	Criteria
T2	277.375	Leg	A325N	0.6250	5	3435.03	12885.40	0.267 ✔	1.333	Bolt DS
T3	270	Leg	A325N	0.7500	5	10709.20	18555.00	0.577 ✔	1.333	Bolt DS
T4	250	Leg	A325N	1.0000	6	17999.00	34425.90	0.523 ✔	1.333	Bolt Tension
T5	230	Leg	A325N	1.0000	6	18902.60	34557.10	0.547 ✔	1.333	Bolt Tension
		Diagonal	A325N	1.0000	1	9705.87	7748.44	1.253 ✔	1.333	Member Block Shear
T6	220	Leg	A325N	1.0000	6	25138.50	34557.40	0.727 ✔	1.333	Bolt Tension
		Diagonal	A325N	1.0000	1	9054.38	8428.13	1.074 ✔	1.333	Member Block Shear
T7	200	Leg	A325N	1.0000	6	29861.00	34557.30	0.864 ✔	1.333	Bolt Tension
		Diagonal	A325N	1.0000	1	8849.39	8428.13	1.050 ✔	1.333	Member Block Shear
		Horizontal	A325N	1.0000	1	6628.37	8428.13	0.786 ✔	1.333	Member Block Shear
		Top Girt	A325N	1.0000	1	5638.52	8428.13	0.669 ✔	1.333	Member Block Shear
T8	180	Leg	A325N	1.2500	6	34512.90	53996.00	0.639 ✔	1.333	Bolt Tension
		Diagonal	A325N	1.2500	1	9916.11	14953.10	0.663 ✔	1.333	Member Block Shear
		Horizontal	A325N	1.2500	1	7892.42	11600.00	0.680 ✔	1.333	Member Block Shear
		Top Girt	A325N	1.2500	1	8170.78	11600.00	0.704 ✔	1.333	Member Block Shear
T9	160	Leg	A325N	1.2500	6	40435.70	53996.10	0.749 ✔	1.333	Bolt Tension
		Diagonal	A325N	1.2500	1	10114.60	17218.80	0.587 ✔	1.333	Member Block Shear
		Top Girt	A325N	1.2500	1	6207.54	14500.00	0.428 ✔	1.333	Member Block Shear
T10	140	Leg	A325N	1.2500	6	46208.00	53995.50	0.856 ✔	1.333	Bolt Tension
		Diagonal	A325N	1.2500	1	11064.80	17218.80	0.643 ✔	1.333	Member Block Shear
T11	120	Leg	A325N	1.2500	12	24933.70	53996.10	0.462 ✔	1.333	Bolt Tension
		Diagonal	A325N	1.0000	2	7023.61	25148.40	0.279 ✔	1.333	Member Block Shear
T12	100	Leg	A325N	1.2500	12	27693.70	53996.00	0.513 ✔	1.333	Bolt Tension

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt lb	Allowable Load lb	Ratio Load / Allowable	Allowable Ratio	Criteria
		Diagonal	A325N	1.0000	2	7797.97	25148.40	0.310 ✔	1.333	Member Block Shear
T13	80	Leg	A325N	1.2500	12	30307.30	53995.90	0.561 ✔	1.333	Bolt Tension
		Diagonal	A325N	1.0000	2	6942.15	25148.40	0.276 ✔	1.333	Member Block Shear
T14	60	Leg	A325N	1.2500	12	32318.80	53995.70	0.599 ✔	1.333	Bolt Tension
		Diagonal	A325N	1.0000	2	8325.21	25148.40	0.331 ✔	1.333	Member Block Shear
T15	40	Leg	A325N	1.2500	12	35183.20	53995.50	0.652 ✔	1.333	Bolt Tension
		Diagonal	A325N	1.0000	2	9029.14	32986.70	0.274 ✔	1.333	Bolt Shear
T16	20	Leg	A687	2.0000	6	72649.40	155509.00	0.467 ✔	1.333	Bolt Tension
		Diagonal	A325N	1.0000	2	10063.20	25148.40	0.400 ✔	1.333	Member Block Shear

Compression Checks

Leg Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T1	280 - 277.375	1 3/4	2.63	2.38	65.1 K=1.00	21.820	2.4053	-1940.53	52484.10	0.037* ✔
T2	277.375 - 270	1 3/4	7.38	2.38	65.1 K=1.00	21.820	2.4053	-17175.10	52484.10	0.327 ✔
T3	270 - 250	2	20.00	2.38	57.0 K=1.00	23.223	3.1416	-53546.20	72957.10	0.734 ✔
T4	250 - 230	2 1/2	20.00	2.38	45.6 K=1.00	25.022	4.9087	-120359.00	122825.00	0.980 ✔
T5	230 - 220	Pirod 105245	10.02	10.02	37.8 K=1.00	26.132	5.3014	-125264.00	138539.00	0.904 ✔
T6	220 - 200	Pirod 105218	20.03	10.02	32.4 K=1.00	26.848	7.2158	-166831.00	193727.00	0.861 ✔
T7	200 - 180	Pirod 105218	20.03	10.02	32.4 K=1.00	26.848	7.2158	-199202.00	193727.00	1.028 ✔
T8	180 - 160	Pirod 105219	20.03	10.02	28.4 K=1.00	27.351	9.4248	-234629.00	257781.00	0.910 ✔
T9	160 - 140	Pirod 105220	20.03	10.02	25.2 K=1.00	27.723	11.9282	-280584.00	330691.00	0.848 ✔
T10	140 - 120	Pirod 105220	20.03	10.02	25.2 K=1.00	27.723	11.9282	-324731.00	330691.00	0.982 ✔
T11	120 - 100	Pirod 112743	20.03	20.03	32.6 K=1.00	26.826	14.7262	-350646.00	395045.00	0.888 ✔
T12	100 - 80	Pirod 112743	20.03	20.03	32.6 K=1.00	26.826	14.7262	-396418.00	395045.00	1.003 ✔
T13	80 - 60	Pirod 112744	20.03	20.03	32.6	26.829	17.8187	-434892.00	478061.00	0.910

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T14	60 - 40	Pirod 112744	20.03	20.03	32.6 K=1.00	26.829	17.8187	-475826.00	478061.00	0.995 ✔
T15	40 - 20	Pirod 112745	20.03	20.03	32.5 K=1.00	26.833	21.2057	-511258.00	569005.00	0.899 ✔
T16	20 - 0	Pirod 112740	20.03	20.03	32.5 K=1.00	26.833	21.2057	-551529.00	569005.00	0.969 ✔

* DL controls

Truss-Leg Diagonal Data

Section No.	Elevation ft	Diagonal Size	L_d ft	Kl/r	F_a ksi	A in^2	Actual V lb	Allow. V_a lb	Stress Ratio
T5	230 - 220	0.5	1.47	141.2	7.490	0.1963	1066.73	1645.93	0.648 ✔
T6	220 - 200	0.5	1.46	140.0	7.617	0.1963	629.63	1673.80	0.376 ✔
T7	200 - 180	0.5	1.46	140.0	7.617	0.1963	503.28	1673.80	0.301 ✔
T8	180 - 160	0.625	1.45	111.1	11.525	0.3068	407.62	3957.30	0.103 ✔
T9	160 - 140	0.625	1.43	110.2	11.648	0.3068	1228.38	3999.74	0.307 ✔
T10	140 - 120	0.625	1.43	110.2	11.648	0.3068	1436.22	3999.74	0.359 ✔
T11	120 - 100	0.75	1.73	110.5	12.229	0.4418	830.86	7440.53	0.112 ✔
T12	100 - 80	0.75	1.73	110.5	12.229	0.4418	929.19	7440.53	0.125 ✔
T13	80 - 60	0.75	1.71	109.5	12.452	0.4418	910.93	7576.20	0.120 ✔
T14	60 - 40	0.75	1.71	109.5	12.452	0.4418	1216.88	7576.20	0.161 ✔
T15	40 - 20	0.875	1.70	93.0	16.281	0.6013	1701.83	13483.00	0.126 ✔
T16	20 - 0	0.875	1.70	93.0	16.281	0.6013	1656.54	13483.00	0.123 ✔

Diagonal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T1	280 - 277.375	7/8	3.45	3.35	128.6 K=0.70	9.036	0.6013	-4988.17	5433.76	0.918 ✔
T2	277.375 - 270	7/8	5.54	2.69	132.7 K=0.90	8.485	0.6013	-4527.26	5102.45	0.887 ✔
T3	270 - 250	7/8	5.54	2.68	132.1 K=0.90	8.559	0.6013	-5564.36	5146.53	1.081 ✔
T4	250 - 230	1	5.54	2.65	114.6 K=0.90	11.374	0.7854	-9210.51	8933.11	1.031 ✔
T5	230 - 220	L2 1/2x2 1/2x3/16	11.42	4.98	120.8 K=1.00	10.170	0.9020	-10807.70	9173.15	1.178 ✔

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T6	220 - 200	L3x3x3/16	12.50	5.63	115.0 K=1.01	10.881	1.0900	-9001.61	11860.60	0.759 ✓
T7	200 - 180	L3x3x3/16	13.80	6.33	127.4 K=1.00	9.200	1.0900	-9842.96	10028.40	0.982 ✓
T8	180 - 160	L3x3x5/16	15.24	7.04	143.4 K=1.00	7.259	1.7800	-11555.30	12920.60	0.894 ✓
T9	160 - 140	L3 1/2x3 1/2x5/16	16.80	7.84	136.4 K=1.00	8.032	2.0900	-10218.10	16786.50	0.609 ✓
T10	140 - 120	L3 1/2x3 1/2x5/16	17.62	8.27	143.8 K=1.00	7.224	2.0900	-11738.10	15099.10	0.777 ✓
T11	120 - 100	2L3 1/2x3 1/2x5/16x3/4	26.26	12.43	137.9 K=1.00	7.847	4.1800	-15999.90	32800.60	0.488 ✓
T12	100 - 80	2L 'a' > 69.2610 in - 277 2L3 1/2x3 1/2x5/16x3/4	27.59	13.12	145.6 K=1.00	7.042	4.1800	-15587.60	29434.70	0.530 ✓
T13	80 - 60	2L 'a' > 72.2905 in - 285 2L3 1/2x3 1/2x5/16x3/4	29.01	13.85	153.7 K=1.00	6.324	4.1800	-16306.00	26435.30	0.617 ✓
T14	60 - 40	2L 'a' > 75.4644 in - 294 2L3 1/2x3 1/2x5/16x3/4	30.49	14.60	162.0 K=1.00	5.688	4.1800	-14765.20	23776.90	0.621 ✓
T15	40 - 20	2L 'a' > 78.7658 in - 303 2L3 1/2x3 1/2x5/16x3/4	32.02	15.38	170.7 K=1.00	5.127	4.1800	-18058.30	21429.00	0.843 ✓
T16	20 - 0	2L 'a' > 82.1790 in - 312 2L3 1/2x3 1/2x5/16x3/4 2L 'a' > 85.6902 in - 322	33.61	16.18	179.6 K=1.00	4.631	4.1800	-16757.10	19358.80	0.866 ✓

Horizontal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T2	277.375 - 270	3/4	5.00	4.85	217.5 K=0.70	3.158	0.4418	-81.81	1395.01	0.059 ✓
T3	270 - 250	KL/R > 200 (C) - 35 3/4	5.00	4.83	216.5 K=0.70	3.185	0.4418	-475.02	1407.06	0.338 ✓
T4	250 - 230	KL/R > 200 (C) - 101 3/4	5.00	4.79	214.7 K=0.70	3.241	0.4418	-922.24	1431.64	0.644 ✓
T7	200 - 180	KL/R > 200 (C) - 167 L3x3x3/16	9.00	7.58	152.7 K=1.00	6.406	1.0900	-5377.02	6982.12	0.770 ✓
T8	180 - 160	L4x4x1/4	11.00	9.58	144.7 K=1.00	7.137	1.9400	-6316.89	13845.00	0.456 ✓

Top Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T1	280 - 277.375	L2x2x3/16	5.00	4.85	107.2 K=1.14	12.045	0.7150	-3885.53	8612.28	0.451 ✔
T3	270 - 250	1	5.00	4.83	162.4 K=0.70	5.662	0.7854	-1245.40	4447.02	0.280 ✔
T4	250 - 230	1	5.00	4.79	161.0 K=0.70	5.761	0.7854	-1847.85	4524.69	0.408 ✔
T7	200 - 180	L3x3x3/16	8.00	6.58	132.6 K=1.00	8.499	1.0900	-4732.62	9264.37	0.511 ✔
T8	180 - 160	L4x4x1/4	10.00	8.58	129.6 K=1.00	8.896	1.9400	-6701.10	17258.90	0.388 ✔
T9	160 - 140	L3 1/2x3 1/2x5/16	12.00	10.58	184.1 K=1.00	4.408	2.0900	-5007.47	9212.73	0.544 ✔

Bottom Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T1	280 - 277.375	L2x2x3/16	5.00	4.85	137.1 K=0.93	7.942	0.7150	-65.88	5678.52	0.012 ✔
T2	277.375 - 270	1	5.00	4.85	163.1 K=0.70	5.614	0.7854	-1192.90	4408.93	0.271 ✔
T3	270 - 250	1	5.00	4.83	162.4 K=0.70	5.662	0.7854	-1651.40	4447.02	0.371 ✔
T4	250 - 230	L2x2x3/16	5.00	4.79	136.0 K=0.93	8.079	0.7150	-1252.41	5776.74	0.217 ✔

Mid Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T3	270 - 250	1	5.00	4.83	162.4 K=0.70	5.662	0.7854	-348.78	4447.02	0.078 ✔
T4	250 - 230	1	5.00	4.79	161.0 K=0.70	5.761	0.7854	-665.10	4524.69	0.147 ✔

Tension Checks

Leg Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T2	277.375 - 270	1 3/4	7.38	2.38	65.1	32.500	1.2339	13300.90	40100.60	0.332 ✔
T3	270 - 250	2	20.00	2.38	57.0	32.500	1.5625	47981.20	50780.20	0.945 ✔
T4	250 - 230	2 1/2	20.00	2.38	45.6	30.000	4.9087	107994.00	147262.00	0.733 ✔
T5	230 - 220	Pirod 105245	10.02	10.02	37.8	30.000	5.3014	113416.00	159043.00	0.713 ✔
T6	220 - 200	Pirod 105218	20.03	10.02	32.4	30.000	7.2158	150831.00	216475.00	0.697 ✔
T7	200 - 180	Pirod 105218	20.03	10.02	32.4	30.000	7.2158	179166.00	216475.00	0.828 ✔
T8	180 - 160	Pirod 105219	20.03	10.02	28.4	30.000	9.4248	207078.00	282743.00	0.732 ✔
T9	160 - 140	Pirod 105220	20.03	10.02	25.2	30.000	11.9282	242614.00	357847.00	0.678 ✔
T10	140 - 120	Pirod 105220	20.03	10.02	25.2	30.000	11.9282	277248.00	357847.00	0.775 ✔
T11	120 - 100	Pirod 112743	20.03	20.03	32.6	30.000	14.7262	299204.00	441786.00	0.677 ✔
T12	100 - 80	Pirod 112743	20.03	20.03	32.6	30.000	14.7262	332325.00	441786.00	0.752 ✔
T13	80 - 60	Pirod 112744	20.03	20.03	32.6	30.000	17.8187	363687.00	534562.00	0.680 ✔
T14	60 - 40	Pirod 112744	20.03	20.03	32.6	30.000	17.8187	387825.00	534562.00	0.726 ✔
T15	40 - 20	Pirod 112745	20.03	20.03	32.5	30.000	21.2057	422198.00	636173.00	0.664 ✔
T16	20 - 0	Pirod 112740	20.03	20.03	32.5	30.000	21.2057	435896.00	636173.00	0.685 ✔

Truss-Leg Diagonal Data

Section No.	Elevation ft	Diagonal Size	L_d ft	Kl/r	F_a ksi	A in^2	Actual V lb	Allow. V_a lb	Stress Ratio
T5	230 - 220	0.5	1.47	141.2	7.490	0.1963	1066.73	1645.93	0.648 ✔
T6	220 - 200	0.5	1.46	140.0	7.617	0.1963	629.63	1673.80	0.376 ✔
T7	200 - 180	0.5	1.46	140.0	7.617	0.1963	503.28	1673.80	0.301 ✔
T8	180 - 160	0.625	1.45	111.1	11.525	0.3068	407.62	3957.30	0.103 ✔
T9	160 - 140	0.625	1.43	110.2	11.648	0.3068	1228.38	3999.74	0.307 ✔
T10	140 - 120	0.625	1.43	110.2	11.648	0.3068	1436.22	3999.74	0.359 ✔
T11	120 - 100	0.75	1.73	110.5	12.229	0.4418	830.86	7440.53	0.112 ✔
T12	100 - 80	0.75	1.73	110.5	12.229	0.4418	929.19	7440.53	0.125 ✔
T13	80 - 60	0.75	1.71	109.5	12.452	0.4418	910.93	7576.20	0.120 ✔
T14	60 - 40	0.75	1.71	109.5	12.452	0.4418	1216.88	7576.20	0.161 ✔

Section No.	Elevation ft	Diagonal Size	L_d ft	Kl/r	F_a ksi	A in^2	Actual V lb	Allow. V_a lb	Stress Ratio
T15	40 - 20	0.875	1.70	93.0	16.281	0.6013	1701.83	13483.00	0.126 ✔
T16	20 - 0	0.875	1.70	93.0	16.281	0.6013	1656.54	13483.00	0.123 ✔

Diagonal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T1	280 - 277.375	7/8	3.45	3.35	183.6	30.000	0.6013	4955.00	18039.60	0.275 ✔
T2	277.375 - 270	7/8	5.54	2.69	147.4	30.000	0.6013	4483.89	18039.60	0.249 ✔
T3	270 - 250	7/8	5.54	2.68	146.8	30.000	0.6013	5580.54	18039.60	0.309 ✔
T4	250 - 230	1	5.54	2.65	127.3	30.000	0.7854	9001.41	23561.90	0.382 ✔
T5	230 - 220	L2 1/2x2 1/2x3/16	11.42	4.98	80.1	21.600	0.9020	9705.87	19483.20	0.498 ✔
T6	220 - 200	L3x3x3/16	11.93	5.38	71.5	21.600	1.0900	9054.38	23544.00	0.385 ✔
T7	200 - 180	L3x3x3/16	13.13	6.02	79.5	21.600	1.0900	8849.39	23544.00	0.376 ✔
T8	180 - 160	L3x3x5/16	15.24	7.04	94.9	21.600	1.7800	9916.11	38448.00	0.258 ✔
T9	160 - 140	L3 1/2x3 1/2x5/16	16.80	7.84	89.9	21.600	2.0900	10114.60	45144.00	0.224 ✔
T10	140 - 120	L3 1/2x3 1/2x5/16	17.62	8.27	94.6	21.600	2.0900	11064.80	45144.00	0.245 ✔
T11	120 - 100	2L3 1/2x3 1/2x5/16x3/4	26.26	12.43	141.6	21.600	4.1800	14047.20	90288.00	0.156 ✔
T12	100 - 80	2L 'a' > 69.2610 in - 277 2L3 1/2x3 1/2x5/16x3/4	27.59	13.12	149.3	21.600	4.1800	15595.90	90288.00	0.173 ✔
T13	80 - 60	2L 'a' > 72.2905 in - 286 2L3 1/2x3 1/2x5/16x3/4	29.01	13.85	157.3	21.600	4.1800	13884.30	90288.00	0.154 ✔
T14	60 - 40	2L 'a' > 75.4644 in - 295 2L3 1/2x3 1/2x5/16x3/4	30.49	14.60	165.7	21.600	4.1800	16650.40	90288.00	0.184 ✔
T15	40 - 20	2L 'a' > 78.7658 in - 304 2L3 1/2x3 1/2x5/16x3/4	32.02	15.38	174.3	21.600	4.1800	13626.50	90288.00	0.151 ✔
T16	20 - 0	2L 'a' > 82.1790 in - 313 2L3 1/2x3 1/2x5/16x3/4 2L 'a' > 85.6902 in - 322	33.61	16.18	183.2	21.600	4.1800	20126.40	90288.00	0.223 ✔

Horizontal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T2	277.375 - 270	3/4	5.00	4.85	310.7	30.000	0.4418	190.02	13253.60	0.014 ✓
T3	270 - 250	3/4	5.00	4.83	309.3	30.000	0.4418	582.08	13253.60	0.044 ✓
T4	250 - 230	3/4	5.00	4.79	306.7	30.000	0.4418	1058.70	13253.60	0.080 ✓
T7	200 - 180	L3x3x3/16	9.00	7.58	102.2	21.600	1.0900	6628.37	23544.00	0.282 ✓
T8	180 - 160	L4x4x1/4	11.00	9.58	96.0	21.600	1.9400	7892.42	41904.00	0.188 ✓

Top Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T1	280 - 277.375	L2x2x3/16	5.00	4.85	94.4	21.600	0.7150	3929.86	15444.00	0.254 ✓
T3	270 - 250	1	5.00	4.83	232.0	30.000	0.7854	1270.02	23561.90	0.054 ✓
T4	250 - 230	1	5.00	4.79	230.0	30.000	0.7854	1919.73	23561.90	0.081 ✓
T7	200 - 180	L3x3x3/16	8.00	6.58	89.5	21.600	1.0900	5638.52	23544.00	0.239 ✓
T8	180 - 160	L4x4x1/4	10.00	8.58	86.4	21.600	1.9400	8170.78	41904.00	0.195 ✓
T9	160 - 140	L3 1/2x3 1/2x5/16	12.00	10.58	122.2	21.600	2.0900	6207.54	45144.00	0.138 ✓

Bottom Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T1	280 - 277.375	L2x2x3/16	5.00	4.85	94.4	21.600	0.7150	144.10	15444.00	0.009 ✓
T2	277.375 - 270	1	5.00	4.85	233.0	30.000	0.7854	1211.96	23561.90	0.051 ✓
T3	270 - 250	1	5.00	4.83	232.0	30.000	0.7854	1654.26	23561.90	0.070 ✓
T4	250 - 230	L2x2x3/16	5.00	4.79	93.2	21.600	0.7150	1389.84	15444.00	0.090 ✓

Mid Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T3	270 - 250	1	5.00	4.83	232.0	30.000	0.7854	463.41	23561.90	0.020 ✔
T4	250 - 230	1	5.00	4.79	230.0	30.000	0.7854	797.52	23561.90	0.034 ✔

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	$SF*P_{allow}$ lb	% Capacity	Pass Fail
T1	280 - 277.375	Leg	1 3/4	1	-1897.60	52484.10	6.4	Pass
		Diagonal	7/8	11	-4988.17	7243.20	68.9	Pass
		Top Girt	L2x2x3/16	4	-3885.53	11480.17	33.8	Pass
		Bottom Girt	L2x2x3/16	7	-65.88	7569.47	0.9	Pass
T2	277.375 - 270	Leg	1 3/4	18	13300.90	53454.10	24.9	Pass
		Diagonal	7/8	23	-4527.26	6801.57	66.6	Pass
		Horizontal	3/4	35	-81.81	1859.55	4.4	Pass
		Bottom Girt	1	20	-1192.90	5877.10	20.3	Pass
T3	270 - 250	Leg	2	44	47981.20	67690.00	70.9	Pass
		Diagonal	7/8	55	-5564.36	6860.32	81.1	Pass
		Horizontal	3/4	101	-475.02	1875.61	25.3	Pass
		Top Girt	1	46	-1245.40	5927.88	21.0	Pass
		Bottom Girt	1	48	-1651.40	5927.88	27.9	Pass
		Mid Girt	1	51	-348.78	5927.88	5.9	Pass
T4	250 - 230	Leg	2 1/2	108	-120359.00	163725.72	73.5	Pass
		Diagonal	1	121	-9210.51	11907.84	77.3	Pass
		Horizontal	3/4	167	-922.24	1908.38	48.3	Pass
		Top Girt	1	112	-1847.85	6031.41	30.6	Pass
		Bottom Girt	L2x2x3/16	114	-1252.41	7700.39	16.3	Pass
		Mid Girt	1	117	-665.10	6031.41	11.0	Pass
T5	230 - 220	Leg	Pirod 105245	174	-125264.00	184672.48	67.8	Pass
		Diagonal	L2 1/2x2 1/2x3/16	178	-10807.70	12227.81	88.4	Pass
T6	220 - 200	Leg	Pirod 105218	183	-166831.00	258238.08	64.6	Pass
		Diagonal	L3x3x3/16	187	-9001.61	15810.18	56.9	Pass
T7	200 - 180	Leg	Pirod 105218	199	-199202.00	258238.08	77.1	Pass
		Diagonal	L3x3x3/16	205	-9842.96	13367.86	73.6	Pass
		Horizontal	L3x3x3/16	212	-5377.02	9307.17	57.8	Pass
		Top Girt	L3x3x3/16	202	-4732.62	12349.40	38.3	Pass
T8	180 - 160	Leg	Pirod 105219	220	-234629.00	343622.06	68.3	Pass
		Diagonal	L3x3x5/16	226	-11555.30	17223.16	67.1	Pass
		Horizontal	L4x4x1/4	233	-6316.89	18455.38	34.2	Pass
		Top Girt	L4x4x1/4	224	-6701.10	23006.11	29.1	Pass
T9	160 - 140	Leg	Pirod 105220	241	-280584.00	440811.08	63.7	Pass
		Diagonal	L3 1/2x3 1/2x5/16	246	-10218.10	22376.40	45.7	Pass
		Top Girt	L3 1/2x3 1/2x5/16	245	-5007.47	12280.57	40.8	Pass
T10	140 - 120	Leg	Pirod 105220	259	-324731.00	440811.08	73.7	Pass
		Diagonal	L3 1/2x3 1/2x5/16	267	-11738.10	20127.10	58.3	Pass
T11	120 - 100	Leg	Pirod 112743	274	-350646.00	526594.96	66.6	Pass
		Diagonal	2L3 1/2x3 1/2x5/16x3/4	277	-15999.90	43723.20	36.6	Pass
T12	100 - 80	Leg	Pirod 112743	284	-396418.00	526594.96	75.3	Pass
		Diagonal	2L3 1/2x3 1/2x5/16x3/4	285	-15587.60	39236.45	39.7	Pass
T13	80 - 60	Leg	Pirod 112744	293	-434892.00	637255.29	68.2	Pass
		Diagonal	2L3 1/2x3 1/2x5/16x3/4	294	-16306.00	35238.25	46.3	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	SF*P_{allow} lb	% Capacity	Pass Fail
T14	60 - 40	Leg	Pirod 112744	302	-475826.00	637255.29	74.7	Pass
		Diagonal	2L3 1/2x3 1/2x5/16x3/4	303	-14765.20	31694.61	46.6	Pass
T15	40 - 20	Leg	Pirod 112745	311	-511258.00	758483.63	67.4	Pass
		Diagonal	2L3 1/2x3 1/2x5/16x3/4	312	-18058.30	28564.86	63.2	Pass
T16	20 - 0	Leg	Pirod 112740	320	-551529.00	758483.63	72.7	Pass
		Diagonal	2L3 1/2x3 1/2x5/16x3/4	322	-16757.10	25805.28	64.9	Pass
							Summary	
						Leg (T7)	77.1	Pass
						Diagonal (T5)	88.4	Pass
						Horizontal (T7)	57.8	Pass
						Top Girt (T9)	40.8	Pass
						Bottom Girt (T3)	27.9	Pass
						Mid Girt (T4)	11.0	Pass
						Bolt Checks	94.0	Pass
						RATING =	**94.0**	**Pass**

APPENDIX C

MOUNT CALCULATIONS

WINDSPEED BY LOCATION

Applied Technology Council

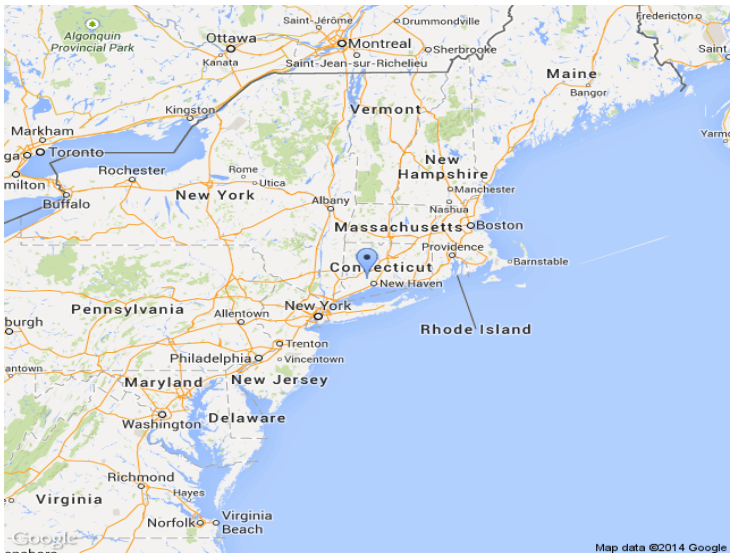
Search Results

Latitude: 41.3914
Longitude: -73.0533

ASCE 7-10 Wind Speeds (3-sec peak gust MPH*):

Risk Category I: 112
Risk Category II: 122
Risk Category III-IV: 132
MRI 10 Year:** 76
MRI 25 Year:** 86
MRI 50 Year:** 92
MRI 100 Year:** 99

ASCE 7-05: 106
ASCE 7-93: 81



*MPH(Miles per hour)

**MRI Mean Recurrence Interval (years)

Users should consult with local building officials to determine if there are community-specific wind speed requirements that govern.

Sponsored by the ATC Endowment Fund Applied Technology Council 201 Redwood Shores Parkway, Suite 240 Redwood City, California 94065 (650) 595-1542

RAMAKER & ASSOCIATES, INC.
1120 Dallas Street
Sauk City, WI 53583
Office: (608) 643-4100

Job:	29016
Project:	S Bethany/EMAC Communications (CT33XC610-C)
By:	JMO
Date:	7/23/2014

Topographic Effects TIA-222

2.6.6.2 Topographic Categories

The topographic category for a structure shall be assessed as being one of the following:

1. Category 1: No abrupt changes in general topography, e.g. flat or rolling terrain, no wind speed-up consideration shall be required.
2. Category 2: Structures located at or near the crest of an escarpment. Wind speed-up shall be considered to occur in all directions. Structures located vertically on the lower half of an escarpment or horizontally beyond 8 times the height of the escarpment from its crest, shall be permitted to be considered as Topographic Category 1.
3. Category 3: Structures located in the upper half of a hill. Wind speed-up shall be considered to occur in all directions. Structures located vertically on the lower half of a hill shall be permitted to be considered as Topographic Category 1.
4. Category 4: Structures located in the upper half of a ridge. Wind speed-up shall be considered to occur in all directions. Structures located vertically on the lower half of a ridge shall be permitted to be considered as Topographic Category 1.

Topographic Category	3		
H =	330	ft	height of hill
Exposure Category	B		
z =	170	ft	height of antennas above ground level
Ke =	0.90		
Kt =	0.53		
f =	2.00		
Kh =	2.80		
Kzt =	**1.37**		

RAMAKER & ASSOCIATES, INC.
1120 Dallas Street
Sauk City, WI 53583
Office: (608) 643-4100

Job:	29016
Project:	S Bethany/EMAC Communications (CT33XC610-C)
By:	JMO
Date:	7/23/2014

Wind Load on Antennas TIA-222

2.6.9.6 Velocity Pressure

$q_z = 0.00256\ K_z\ K_{zt}\ K_d\ V^2\ I$

Occupancy:	II		Classification of Structures (Table 2-1)
Exposure:	B		Exposure Category
V:	106	mph	Basic Wind Speed (Annex B)
z:	170	ft	Height above ground level to the center of the antenna
I:	1.00		Importance Factor (Table 2-3)
K_z:	1.15		Velocity Pressure Coefficient (2.6.5.2)
K_{zt}:	1.37		Topographic Factor (2.6.6.4)
K_d:	0.95		Wind Direction Probability Factor (Table 2-2)
q_z =	**43.1**	**psf**	

G_h:	1.00	Appurtenances and their Connections

Mount & Antenna Wind Loads

Appurtenance	Height	Width	h/D	Shape	C_a	A_f	**$F = q_z G_h C_a A_a$**	
Pipe1-1/4STD x 12 ft	144.0 in	1.7 in	86.7	Round	1.200	1.66 sf	**85.8 lb**	7.1 plf
HSS2-1/2X2-1/2X1/4 x 2 ft	24.0 in	2.5 in	9.6	Flat	1.487	0.42 sf	**26.7 lb**	13.3 plf
L4X4X1/4 x 0.625 ft	7.5 in	4.0 in	1.9	Flat	1.200	0.21 sf	**10.8 lb**	17.2 plf
SR 1"x34"	34.0 in	1.0 in	34.0	Round	1.200	0.24 sf	**12.2 lb**	4.3 plf
SR 1.25"x30"	30.0 in	1.3 in	24.0	Round	1.178	0.26 sf	**13.2 lb**	5.3 plf
SR 0.75"x51"	51.0 in	0.8 in	68.0	Round	1.200	0.27 sf	**13.7 lb**	3.2 plf
Pipe2STD x 7 ft	84.0 in	2.4 in	35.3	Round	1.200	1.39 sf	**71.7 lb**	10.2 plf
Pipe4STD x 5.25 ft	63.0 in	4.5 in	14.0	Round	0.706	1.97 sf	**59.8 lb**	11.4 plf
APXV9TM14-ALU-120	56.3 in	12.6 in	4.5	Flat	1.287	4.93 sf	**273.1 lb**	
TD-RRH8x20	26.1 in	18.6 in	1.4	Flat	1.200	3.37 sf	**174.2 lb**	
APXVSPP18-C-A20	72.0 in	11.9 in	6.1	Flat	1.358	5.95 sf	**347.6 lb**	

RAMAKER & ASSOCIATES, INC.
1120 Dallas Street
Sauk City, WI 53583
Office: (608) 643-4100

Job:	29016
Project:	S Bethany/EMAC Communications (CT33XC610-C)
By:	JMO
Date:	7/23/2014

Wind Load on Antennas TIA-222

2.6.9.6 Velocity Pressure

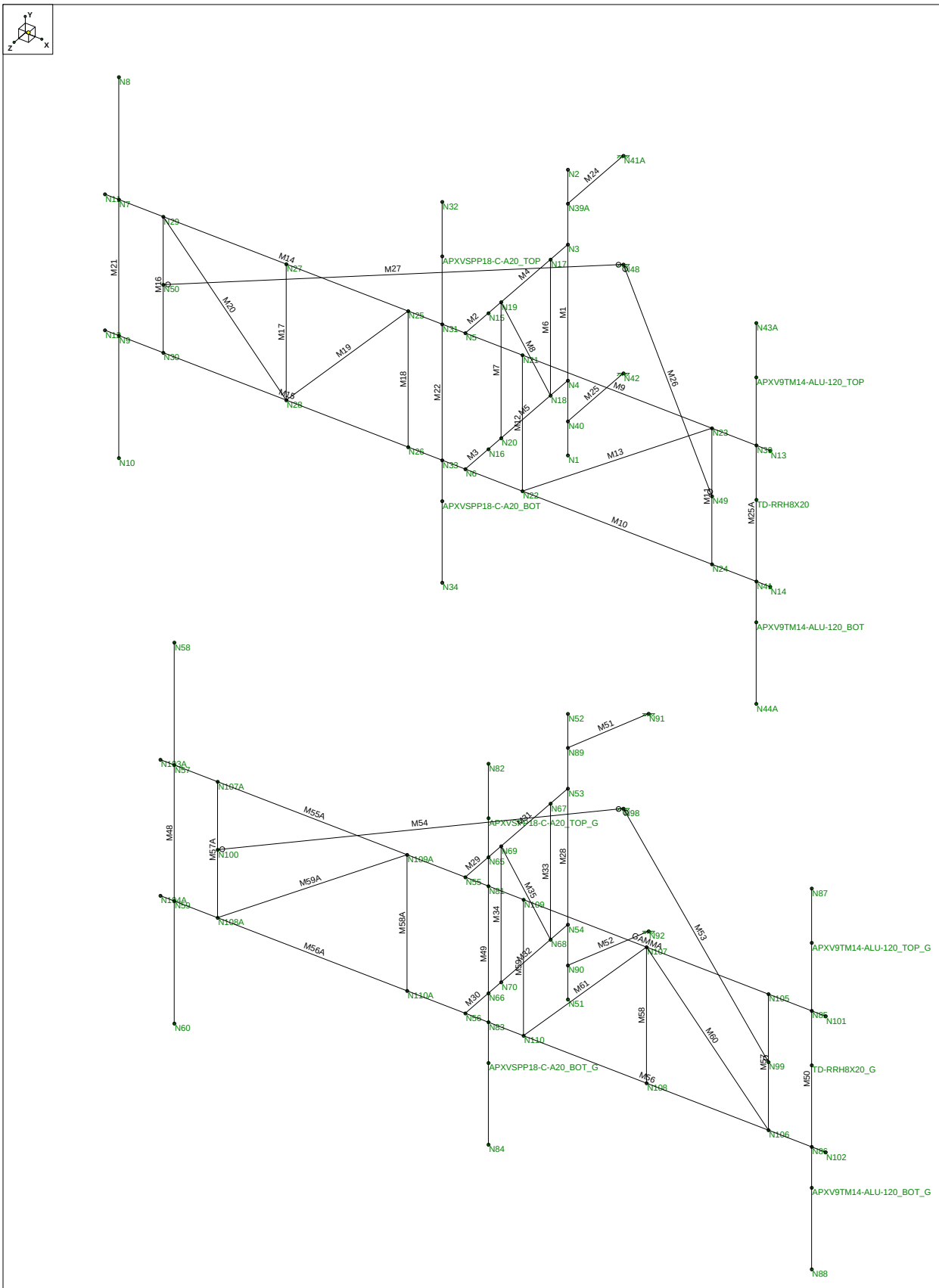
$q_z = 0.00256\ K_z\ K_{zt}\ K_d\ V^2\ I$

Occupancy:	II		Classification of Structures (Table 2-1)
Exposure:	B		Exposure Category
V:	106	mph	Basic Wind Speed (Annex B)
z:	170	ft	Height above ground level to the center of the antenna
I:	1.00		Importance Factor (Table 2-3)
K_z:	1.15		Velocity Pressure Coefficient (2.6.5.2)
K_{zt}:	1.37		Topographic Factor (2.6.6.4)
K_d:	0.95		Wind Direction Probability Factor (Table 2-2)
q_z =	**43.1**	**psf**	

G_h:	1.00	Appurtenances and their Connections

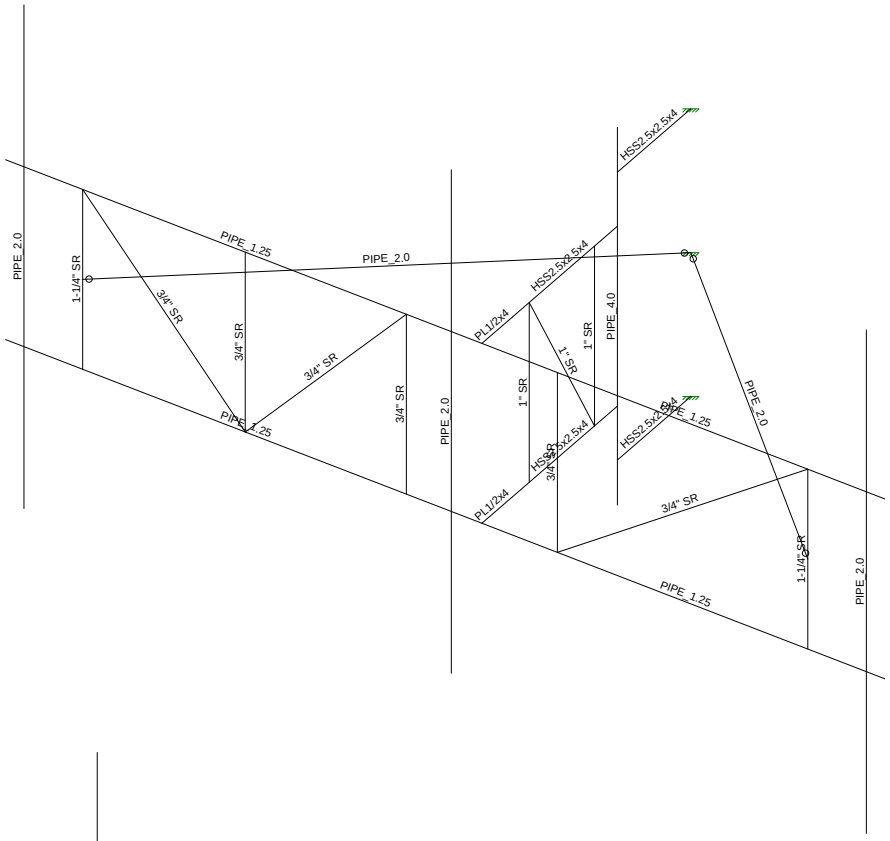
Mount & Antenna Wind Loads

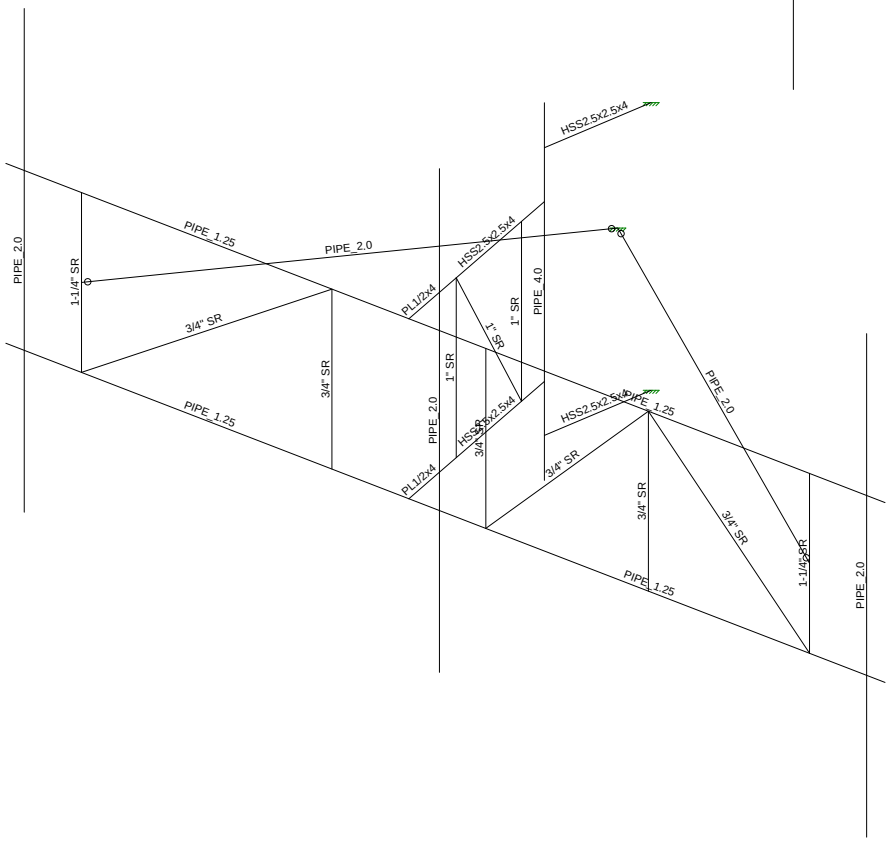
Appurtenance	Height	Depth	h/D	Shape	C_a	A_f	**$F = q_z G_h C_a A_a$**	
Pipe1-1/4STD x 12 ft	144.0 in	1.7 in	86.7	Round	1.200	1.66 sf	**85.8 lb**	7.1 plf
HSS2-1/2X2-1/2X1/4 x 2 ft	24.0 in	2.5 in	9.6	Flat	1.487	0.42 sf	**26.7 lb**	13.3 plf
L4X4X1/4 x 0.625 ft	7.5 in	4.0 in	1.9	Flat	1.200	0.21 sf	**10.8 lb**	17.2 plf
SR 1"x34"	34.0 in	1.0 in	34.0	Round	1.200	0.24 sf	**12.2 lb**	4.3 plf
SR 1.25"x30"	30.0 in	1.3 in	24.0	Round	1.178	0.26 sf	**13.2 lb**	5.3 plf
SR 0.75"x51"	51.0 in	0.8 in	68.0	Round	1.200	0.27 sf	**13.7 lb**	3.2 plf
Pipe2STD x 7 ft	84.0 in	2.4 in	35.3	Round	1.200	1.39 sf	**71.7 lb**	10.2 plf
Pipe4STD x 5.25 ft	63.0 in	4.5 in	14.0	Round	0.706	1.97 sf	**59.8 lb**	11.4 plf
APXV9TM14-ALU-120	56.3 in	6.3 in	8.9	Flat	1.465	2.46 sf	**155.3 lb**	
TD-RRH8x20	26.1 in	6.7 in	3.9	Flat	1.262	1.21 sf	**66.0 lb**	
APXVSPP18-C-A20	72.0 in	7.0 in	10.3	Flat	1.509	3.50 sf	**227.7 lb**	



Envelope Only Solution

Ramaker & Associates	S Bethany/EMAC Communications (CT33XC610-C)	SK - 1
JMO		July 23, 2014 at 11:02 AM
29016		29016 Mount.r3d





Envelope Only Solution

Ramaker & Associates	S Bethany/EMAC Communications (CT33XC610-C)	SK - 2
JMO		July 23, 2014 at 11:03 AM
29016		29016 Mount.r3d

Hot Rolled Steel Properties

	Label	E [ksi]	G [ksi]	Nu	Therm (\1E..Density[k/ft...		Yield[ksi]	Ry	Fu[ksi]	Rt
1	A36 Gr.36	29000	11154	.3	.65	.49	36	1.5	58	1.2
2	A572 Gr.50	29000	11154	.3	.65	.49	50	1.1	58	1.2
3	A992	29000	11154	.3	.65	.49	50	1.1	58	1.2
4	A500 Gr.42	29000	11154	.3	.65	.49	42	1.3	58	1.1
5	A500 Gr.46	29000	11154	.3	.65	.49	46	1.2	58	1.1
6	A53 Gr. B	29000	11154	.3	.65	.49	35	1.5	60	1.2

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design R...	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	Pipe 1.25	PIPE_1.25	Beam	Pipe	A53 Gr. B	Typical	.625	.184	.184	.368
2	SR 0.75	3/4" SR	Beam	Pipe	A36 Gr.36	Typical	.442	.016	.016	.031
3	SR 1.25	1-1/4" SR	Beam	Pipe	A36 Gr.36	Typical	1.227	.12	.12	.24
4	Pipe 2.0	PIPE_2.0	Beam	Pipe	A53 Gr. B	Typical	1.02	.627	.627	1.25
5	HSS2.5x2.5x1/4	HSS2.5x2....	Beam	SquareTube	A36 Gr.36	Typical	1.97	1.63	1.63	2.79
6	SR 1.0	1" SR	Beam	Pipe	A36 Gr.36	Typical	.785	.049	.049	.098
7	PL4x1/2	PL1/2x4	Beam	RECT	A36 Gr.36	Typical	2	.042	2.667	.154
8	Pipe 4.0	PIPE_4.0	Beam	RECT	A53 Gr. B	Typical	2.96	6.82	6.82	13.6

Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rules
1	M1	N2	N1			Pipe 4.0	Beam	RECT	A53 Gr. B	Typical
2	M2	N5	N15			PL4x1/2	Beam	RECT	A36 Gr.36	Typical
3	M3	N6	N16			PL4x1/2	Beam	RECT	A36 Gr.36	Typical
4	M4	N15	N3			HSS2.5x2.5x1/4	Beam	SquareTube	A36 Gr.36	Typical
5	M5	N4	N16			HSS2.5x2.5x1/4	Beam	SquareTube	A36 Gr.36	Typical
6	M6	N17	N18			SR 1.0	Beam	Pipe	A36 Gr.36	Typical
7	M7	N19	N20			SR 1.0	Beam	Pipe	A36 Gr.36	Typical
8	M8	N18	N19			SR 1.0	Beam	Pipe	A36 Gr.36	Typical
9	M9	N5	N13			Pipe 1.25	Beam	Pipe	A53 Gr. B	Typical
10	M10	N6	N14			Pipe 1.25	Beam	Pipe	A53 Gr. B	Typical
11	M11	N23	N24			SR 1.25	Beam	Pipe	A36 Gr.36	Typical
12	M12	N21	N22			SR 0.75	Beam	Pipe	A36 Gr.36	Typical
13	M13	N22	N23			SR 0.75	Beam	Pipe	A36 Gr.36	Typical
14	M14	N5	N11			Pipe 1.25	Beam	Pipe	A53 Gr. B	Typical
15	M15	N6	N12			Pipe 1.25	Beam	Pipe	A53 Gr. B	Typical
16	M16	N29	N30			SR 1.25	Beam	Pipe	A36 Gr.36	Typical
17	M17	N27	N28			SR 0.75	Beam	Pipe	A36 Gr.36	Typical
18	M18	N25	N26			SR 0.75	Beam	Pipe	A36 Gr.36	Typical
19	M19	N25	N28			SR 0.75	Beam	Pipe	A36 Gr.36	Typical
20	M20	N29	N28			SR 0.75	Beam	Pipe	A36 Gr.36	Typical
21	M21	N8	N10			Pipe 2.0	Beam	Pipe	A53 Gr. B	Typical
22	M22	N32	N34			Pipe 2.0	Beam	Pipe	A53 Gr. B	Typical
23	M25A	N43A	N44A			Pipe 2.0	Beam	Pipe	A53 Gr. B	Typical
24	M24	N39A	N41A			HSS2.5x2.5x1/4	Beam	SquareTube	A36 Gr.36	Typical
25	M25	N40	N42			HSS2.5x2.5x1/4	Beam	SquareTube	A36 Gr.36	Typical
26	M26	N49	N48			Pipe 2.0	Beam	Pipe	A53 Gr. B	Typical
27	M27	N50	N48			Pipe 2.0	Beam	Pipe	A53 Gr. B	Typical
28	M28	N52	N51			Pipe 4.0	Beam	RECT	A53 Gr. B	Typical
29	M29	N55	N65			PL4x1/2	Beam	RECT	A36 Gr.36	Typical
30	M30	N56	N66			PL4x1/2	Beam	RECT	A36 Gr.36	Typical
31	M31	N65	N53			HSS2.5x2.5x1/4	Beam	SquareTube	A36 Gr.36	Typical
32	M32	N54	N66			HSS2.5x2.5x1/4	Beam	SquareTube	A36 Gr.36	Typical
33	M33	N67	N68			SR 1.0	Beam	Pipe	A36 Gr.36	Typical

Member Primary Data (Continued)

	Label	I Joint	J Joint	K Joint	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rules
34	M34	N69	N70			SR 1.0	Beam	Pipe	A36 Gr.36	Typical
35	M35	N68	N69			SR 1.0	Beam	Pipe	A36 Gr.36	Typical
36	M48	N58	N60			Pipe 2.0	Beam	Pipe	A53 Gr. B	Typical
37	M49	N82	N84			Pipe 2.0	Beam	Pipe	A53 Gr. B	Typical
38	M50	N87	N88			Pipe 2.0	Beam	Pipe	A53 Gr. B	Typical
39	M51	N89	N91			HSS2.5x2.5x1/4	Beam	SquareTube	A36 Gr.36	Typical
40	M52	N90	N92			HSS2.5x2.5x1/4	Beam	SquareTube	A36 Gr.36	Typical
41	M53	N99	N98			Pipe 2.0	Beam	Pipe	A53 Gr. B	Typical
42	M54	N100	N98			Pipe 2.0	Beam	Pipe	A53 Gr. B	Typical
43	GAMMA	N101	N55			Pipe 1.25	Beam	Pipe	A53 Gr. B	Typical
44	M56	N102	N56			Pipe 1.25	Beam	Pipe	A53 Gr. B	Typical
45	M57	N105	N106			SR 1.25	Beam	Pipe	A36 Gr.36	Typical
46	M58	N107	N108			SR 0.75	Beam	Pipe	A36 Gr.36	Typical
47	M59	N110	N109			SR 0.75	Beam	Pipe	A36 Gr.36	Typical
48	M60	N106	N107			SR 0.75	Beam	Pipe	A36 Gr.36	Typical
49	M61	N110	N107			SR 0.75	Beam	Pipe	A36 Gr.36	Typical
50	M55A	N103A	N55			Pipe 1.25	Beam	Pipe	A53 Gr. B	Typical
51	M56A	N104A	N56			Pipe 1.25	Beam	Pipe	A53 Gr. B	Typical
52	M57A	N108A	N107A			SR 1.25	Beam	Pipe	A36 Gr.36	Typical
53	M58A	N110A	N109A			SR 0.75	Beam	Pipe	A36 Gr.36	Typical
54	M59A	N108A	N109A			SR 0.75	Beam	Pipe	A36 Gr.36	Typical

Joint Coordinates and Temperatures

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Diap...
1	N1	-1.958898	-3.875	-1.72855	0	
2	N2	-1.958898	1.375	-1.72855	0	
3	N3	-1.958898	0	-1.72855	0	
4	N4	-1.958898	-2.5	-1.72855	0	
5	N5	-1.958898	0	1.042284	0	
6	N6	-1.958898	-2.5	1.042284	0	
7	N7	-8.208896	0	1.042284	0	
8	N8	-8.208896	2.25	1.042284	0	
9	N9	-8.208896	-2.5	1.042284	0	
10	N10	-8.208896	-4.75	1.042284	0	
11	N11	-8.458896	0	1.042284	0	
12	N12	-8.458896	-2.5	1.042284	0	
13	N13	3.541104	0	1.042284	0	
14	N14	3.541104	-2.5	1.042284	0	
15	N15	-1.958898	0	0.417284	0	
16	N16	-1.958898	-2.5	0.417284	0	
17	N17	-1.958898	0	-1.2598	0	
18	N18	-1.958898	-2.5	-1.2598	0	
19	N19	-1.958898	0	0.073534	0	
20	N20	-1.958898	-2.5	0.073534	0	
21	N21	-0.927648	0	1.042284	0	
22	N22	-0.927648	-2.5	1.042284	0	
23	N23	2.491102	0	1.042284	0	
24	N24	2.491102	-2.5	1.042284	0	
25	N25	-2.990148	0	1.042284	0	
26	N26	-2.990148	-2.5	1.042284	0	
27	N27	-5.187898	0	1.042284	0	
28	N28	-5.187898	-2.5	1.042284	0	
29	N29	-7.406798	0	1.042284	0	
30	N30	-7.406798	-2.5	1.042284	0	
31	N31	-2.375563	0	1.042284	0	

Joint Coordinates and Temperatures (Continued)

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Diap...
32	N32	-2.375563	2.25	1.042284	0	
33	N33	-2.375563	-2.5	1.042284	0	
34	N34	-2.375563	-4.75	1.042284	0	
35	N39	3.291103	0	1.042284	0	
36	N41	3.291103	-2.5	1.042284	0	
37	N43A	3.29077	2.25	1.042284	0	
38	N44A	3.29077	-4.75	1.042284	0	
39	N39A	-1.958898	.75	-1.72855	0	
40	N40	-1.958898	-3.25	-1.72855	0	
41	N41A	-1.958898	.75	-3.22855	0	
42	N42	-1.958898	-3.25	-3.22855	0	
43	APXVSPP18-C-A20_TOP	-2.375563	1.25	1.042284	0	
44	APXV9TM14-ALU-120_TOP	3.29077	1.25	1.042284	0	
45	APXVSPP18-C-A20_BOT	-2.375563	-3.25	1.042284	0	
46	APXV9TM14-ALU-120_BOT	3.29077	-3.25	1.042284	0	
47	TD-RRH8X20	3.291103	-1	1.042284	0	
48	N48	-1.958898	-1.25	-3.22855	0	
49	N49	2.491102	-1.25	1.042284	0	
50	N50	-7.406798	-1.25	1.042284	0	
51	N51	-1.958898	-13.875	-1.72855	0	
52	N52	-1.958898	-8.625	-1.72855	0	
53	N53	-1.958898	-10	-1.72855	0	
54	N54	-1.958898	-12.5	-1.72855	0	
55	N55	-1.958898	-10	1.042284	0	
56	N56	-1.958898	-12.5	1.042284	0	
57	N57	-7.208896	-10	1.042284	0	
58	N58	-7.208896	-7.75	1.042284	0	
59	N59	-7.208896	-12.5	1.042284	0	
60	N60	-7.208896	-14.75	1.042284	0	
61	N65	-1.958898	-10	0.417284	0	
62	N66	-1.958898	-12.5	0.417284	0	
63	N67	-1.958898	-10	-1.2598	0	
64	N68	-1.958898	-12.5	-1.2598	0	
65	N69	-1.958898	-10	0.073534	0	
66	N70	-1.958898	-12.5	0.073534	0	
67	N81	-1.541563	-10	1.042284	0	
68	N82	-1.541563	-7.75	1.042284	0	
69	N83	-1.541563	-12.5	1.042284	0	
70	N84	-1.541563	-14.75	1.042284	0	
71	N85	4.291103	-10	1.042284	0	
72	N86	4.291103	-12.5	1.042284	0	
73	N87	4.29077	-7.75	1.042284	0	
74	N88	4.29077	-14.75	1.042284	0	
75	N89	-1.958898	-9.25	-1.72855	0	
76	N90	-1.958898	-13.25	-1.72855	0	
77	N91	-1.445867	-9.25	-3.138089	0	
78	N92	-1.445867	-13.25	-3.138089	0	
79	APXVSPP18-C-A20_TOP_G	-1.541563	-8.75	1.042284	0	
80	APXV9TM14-ALU-120_TOP_G	4.29077	-8.75	1.042284	0	
81	APXVSPP18-C-A20_BOT_G	-1.541563	-13.25	1.042284	0	
82	APXV9TM14-ALU-120_BOT_G	4.29077	-13.25	1.042284	0	
83	TD-RRH8X20_G	4.291103	-11	1.042284	0	
84	N98	-1.958898	-11.25	-3.22855	0	
85	N99	3.509852	-11.25	1.042284	0	
86	N100	-6.427648	-11.25	1.042284	0	
87	N101	4.541102	-10	1.042284	0	
88	N102	4.541102	-12.5	1.042284	0	

Joint Coordinates and Temperatures (Continued)

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Diap...
89	N105	3.509852	-10	1.042284	0	
90	N106	3.509852	-12.5	1.042284	0	
91	N107	1.312102	-10	1.042284	0	
92	N108	1.312102	-12.5	1.042284	0	
93	N109	-0.906798	-10	1.042284	0	
94	N110	-0.906798	-12.5	1.042284	0	
95	N103A	-7.458898	-10	1.042284	0	
96	N104A	-7.458898	-12.5	1.042284	0	
97	N107A	-6.427648	-10	1.042284	0	
98	N108A	-6.427648	-12.5	1.042284	0	
99	N109A	-3.008898	-10	1.042284	0	
100	N110A	-3.008898	-12.5	1.042284	0	

Joint Boundary Conditions

	Joint Label	X [k/in]	Y [k/in]	Z [k/in]	X Rot.[k-ft/rad]	Y Rot.[k-ft/rad]	Z Rot.[k-ft/rad]	Footing
1	N1							
2	N2							
3	N3							
4	N4							
5	N39A							
6	N40							
7	N41A	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction	
8	N42	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction	
9	N48	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction	
10	N51							
11	N52							
12	N53							
13	N54							
14	N89							
15	N90							
16	N91	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction	
17	N92	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction	
18	N98	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction	

Joint Loads and Enforced Displacements (BLC 1 : DL)

	Joint Label	L,D,M	Direction	Magnitude[(lb,k-ft), (in,rad), (lb*...
1	TD-RRH8X20	L	Y	-70
2	APXV9TM14-ALU-120_TOP	L	Y	-27.5
3	APXV9TM14-ALU-120_BOT	L	Y	-27.5
4	APXVSPP18-C-A20_TOP	L	Y	-28.5
5	APXVSPP18-C-A20_BOT	L	Y	-28.5
6	APXVSPP18-C-A20_TOP_G	L	Y	-28.5
7	APXV9TM14-ALU-120_TOP_G	L	Y	-27.5
8	APXVSPP18-C-A20_BOT_G	L	Y	-28.5
9	APXV9TM14-ALU-120_BOT_G	L	Y	-27.5
10	TD-RRH8X20_G	L	Y	-70

Joint Loads and Enforced Displacements (BLC 2 : WLz)

	Joint Label	L,D,M	Direction	Magnitude[(lb,k-ft), (in,rad), (lb*...
1	TD-RRH8X20	L	Z	-174.2
2	APXV9TM14-ALU-120_TOP	L	Z	-136.5
3	APXV9TM14-ALU-120_BOT	L	Z	-136.5
4	APXVSPP18-C-A20_TOP	L	Z	-173.8

Joint Loads and Enforced Displacements (BLC 2 : WLz) (Continued)

	Joint Label	L,D,M	Direction	Magnitude[(lb,k-ft), (in,rad), (lb*...
5	APXVSPP18-C-A20_BOT	L	Z	-173.8
6	APXVSPP18-C-A20_TOP_G	L	Z	-173.8
7	APXV9TM14-ALU-120_TOP_G	L	Z	-136.5
8	APXVSPP18-C-A20_BOT_G	L	Z	-173.8
9	APXV9TM14-ALU-120_BOT_G	L	Z	-136.5
10	TD-RRH8X20_G	L	Z	-174.2

Joint Loads and Enforced Displacements (BLC 3 : WLx)

	Joint Label	L,D,M	Direction	Magnitude[(lb,k-ft), (in,rad), (lb*...
1	TD-RRH8X20	L	X	-66
2	APXV9TM14-ALU-120_TOP	L	X	-77.7
3	APXV9TM14-ALU-120_BOT	L	X	-77.7
4	APXVSPP18-C-A20_TOP	L	X	-113.8
5	APXVSPP18-C-A20_BOT	L	X	-113.8
6	APXVSPP18-C-A20_TOP_G	L	X	-113.8
7	APXV9TM14-ALU-120_TOP_G	L	X	-77.7
8	APXVSPP18-C-A20_BOT_G	L	X	-113.8
9	APXV9TM14-ALU-120_BOT_G	L	X	-77.7
10	TD-RRH8X20_G	L	X	-66

Member Distributed Loads (BLC 2 : WLz)

	Member Label	Direction	Start Magnitude[lb/ft,F]	End Magnitude[lb/ft,F]	Start Location[ft,%]	End Location[ft,%]
1	M9	Z	-7.1	-7.1	0	0
2	M10	Z	-7.1	-7.1	0	0
3	M14	Z	-7.1	-7.1	0	0
4	M15	Z	-7.1	-7.1	0	0
5	M6	PZ	-4.3	-4.3	0	0
6	M7	PZ	-4.3	-4.3	0	0
7	M8	PZ	-4.3	-4.3	0	0
8	M11	PZ	-5.3	-5.3	0	0
9	M16	PZ	-5.3	-5.3	0	0
10	M12	PZ	-3.2	-3.2	0	0
11	M13	PZ	-3.2	-3.2	0	0
12	M17	PZ	-3.2	-3.2	0	0
13	M18	PZ	-3.2	-3.2	0	0
14	M19	PZ	-3.2	-3.2	0	0
15	M20	PZ	-3.2	-3.2	0	0
16	M21	PZ	-10.2	-10.2	0	0
17	M1	PZ	-11.4	-11.4	0	0
18	M26	PZ	-10.2	-10.2	0	0
19	M27	PZ	-10.2	-10.2	0	0
20	M28	PZ	-11.4	-11.4	0	0
21	M33	PZ	-4.3	-4.3	0	0
22	M34	PZ	-4.3	-4.3	0	0
23	M35	PZ	-4.3	-4.3	0	0
24	M48	PZ	-10.2	-10.2	0	0
25	M53	PZ	-10.2	-10.2	0	0
26	M54	PZ	-10.2	-10.2	0	0
27	GAMMA	Z	-7.1	-7.1	0	0
28	M56	Z	-7.1	-7.1	0	0
29	M57	PZ	-5.3	-5.3	0	0
30	M58	PZ	-3.2	-3.2	0	0
31	M59	PZ	-3.2	-3.2	0	0
32	M60	PZ	-3.2	-3.2	0	0
33	M61	PZ	-3.2	-3.2	0	0

Member Distributed Loads (BLC 2 : WLz) (Continued)

	Member Label	Direction	Start Magnitude[lb/ft,F]	End Magnitude[lb/ft,F]	Start Location[ft,%]	End Location[ft,%]
34	M55A	Z	-7.1	-7.1	0	0
35	M56A	Z	-7.1	-7.1	0	0
36	M57A	PZ	-5.3	-5.3	0	0
37	M58A	PZ	-3.2	-3.2	0	0
38	M59A	PZ	-3.2	-3.2	0	0
39	M51	PZ	-13.3	-13.3	0	0
40	M52	PZ	-13.3	-13.3	0	0

Member Distributed Loads (BLC 3 : WLx)

	Member Label	Direction	Start Magnitude[lb/ft,F]	End Magnitude[lb/ft,F]	Start Location[ft,%]	End Location[ft,%]
1	M4	X	-13.3	-13.3	0	0
2	M5	X	-13.3	-13.3	0	0
3	M24	X	-13.3	-13.3	0	0
4	M25	X	-13.3	-13.3	0	0
5	M2	X	-17.2	-17.2	0	0
6	M3	X	-17.2	-17.2	0	0
7	M6	PX	-4.3	-4.3	0	0
8	M7	PX	-4.3	-4.3	0	0
9	M8	PX	-4.3	-4.3	0	0
10	M11	PX	-5.3	-5.3	0	0
11	M16	PX	-5.3	-5.3	0	0
12	M12	PX	-3.2	-3.2	0	0
13	M13	PX	-3.2	-3.2	0	0
14	M17	PX	-3.2	-3.2	0	0
15	M18	PX	-3.2	-3.2	0	0
16	M19	PX	-3.2	-3.2	0	0
17	M20	PX	-3.2	-3.2	0	0
18	M21	PX	-10.2	-10.2	0	0
19	M22	PX	-10.2	-10.2	0	0
20	M25A	PX	-10.2	-10.2	0	0
21	M1	PX	-11.4	-11.4	0	0
22	M26	PX	-10.2	-10.2	0	0
23	M27	PX	-10.2	-10.2	0	0
24	M28	PX	-11.4	-11.4	0	0
25	M29	X	-17.2	-17.2	0	0
26	M30	X	-17.2	-17.2	0	0
27	M31	X	-13.3	-13.3	0	0
28	M32	X	-13.3	-13.3	0	0
29	M33	PX	-4.3	-4.3	0	0
30	M34	PX	-4.3	-4.3	0	0
31	M35	PX	-4.3	-4.3	0	0
32	M48	PX	-10.2	-10.2	0	0
33	M49	PX	-10.2	-10.2	0	0
34	M50	PX	-10.2	-10.2	0	0
35	M51	PX	-13.3	-13.3	0	0
36	M52	PX	-13.3	-13.3	0	0
37	M53	PX	-10.2	-10.2	0	0
38	M54	PX	-10.2	-10.2	0	0
39	M57	PX	-5.3	-5.3	0	0
40	M58	PX	-3.2	-3.2	0	0
41	M59	PX	-3.2	-3.2	0	0
42	M60	PX	-3.2	-3.2	0	0
43	M61	PX	-3.2	-3.2	0	0
44	M57A	PX	-5.3	-5.3	0	0
45	M58A	PX	-3.2	-3.2	0	0
46	M59A	PX	-3.2	-3.2	0	0

Member Area Loads

Joint A	Joint B	Joint C	Joint D	Direction	Distribution	Magnitude[ksf]
No Data to Print ...						

Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distributed	Area(Me...	Surface(P...
1	DL	DL		-1		10				
2	WLz	WLZ				10		40		
3	WLx	WLX				10		46		
4	LL1	LL					2			
5	LL2	None					2			

Load Combinations

	Description	Sol..	PDelta	SR..	BLC	Fact..	BLC	Fact..	BLC	Fact..	BLC	Fact..	BLC	Fact..	BLC	Fact..	BLC	Fact..	BLC	Fact..	BLC	Fact...
1	1.4DL	Yes	Y		DL	1.4																
2	1.2DL+1.6WLz	Yes	Y		DL	1.2	WLZ	1.6														
3	1.2DL-1.6WLz	Yes	Y		DL	1.2	WLZ	-1.6														
4	1.2DL+1.6WLx	Yes	Y		DL	1.2	W...	1.6														
5	1.2DL-1.6WLx	Yes	Y		DL	1.2	W...	-1.6														
6	1.2DL+1.6(0.75WLz+0.75WLx)	Yes	Y		DL	1.2	WLZ	1.2	W...	1.2												
7	1.2DL+1.6(0.75WLz-0.75WLx)	Yes	Y		DL	1.2	WLZ	1.2	W...	-1.2												
8	1.2DL-1.6(0.75WLz-0.75WLx)	Yes	Y		DL	1.2	WLZ	-1.2	W...	1.2												
9	1.2DL-1.6(0.75WLz+0.75WLx)	Yes	Y		DL	1.2	WLZ	-1.2	W...	-1.2												
10	1.2DL+1.5LLend	Yes	Y		DL	1.2	LL	1.5														
11	1.2DL+1.5LLmid	Yes	Y		DL	1.2	5	1.5														
12	1.2DL+1.5LL+10%1.6WLz	Yes	Y		DL	1.2	LL	1.5	WLZ	.16												
13	1.2DL+1.5LL-10%1.6WLz	Yes	Y		DL	1.2	LL	1.5	WLZ	-.16												
14	1.2DL+1.5LL+10%1.6WLx	Yes	Y		DL	1.2	LL	1.5	W...	.16												
15	1.2DL+1.5LL-10%1.6WLx	Yes	Y		DL	1.2	LL	1.5	W...	-.16												
16	1.2DL+1.5LL+10%1.6(0.75WLz+...	Yes	Y		DL	1.2	LL	1.5	WLZ	.12	W...	.12										
17	1.2DL+1.5LL+10%1.6(0.75WLz-...	Yes	Y		DL	1.2	LL	1.5	WLZ	.12	W...	-.12										
18	1.2DL+1.5LL-10%1.6(0.75WLz-0...	Yes	Y		DL	1.2	LL	1.5	WLZ	-.12	W...	.12										
19	1.2DL+1.5LL-10%1.6(0.75WLz+...	Yes	Y		DL	1.2	LL	1.5	WLZ	-.12	W...	-.12										
20	1.2DL+1.5LL+10%1.6WLz	Yes	Y		DL	1.2	5	1.5	WLZ	.16												
21	1.2DL+1.5LL-10%1.6WLz	Yes	Y		DL	1.2	5	1.5	WLZ	-.16												
22	1.2DL+1.5LL+10%1.6WLx	Yes	Y		DL	1.2	5	1.5	W...	.16												
23	1.2DL+1.5LL-10%1.6WLx	Yes	Y		DL	1.2	5	1.5	W...	-.16												
24	1.2DL+1.5LL+10%1.6(0.75WLz+...	Yes	Y		DL	1.2	5	1.5	WLZ	.12	W...	.12										
25	1.2DL+1.5LL+10%1.6(0.75WLz-...	Yes	Y		DL	1.2	5	1.5	WLZ	.12	W...	-.12										
26	1.2DL+1.5LL-10%1.6(0.75WLz-0...	Yes	Y		DL	1.2	5	1.5	WLZ	-.12	W...	.12										
27	1.2DL+1.5LL-10%1.6(0.75WLz+...	Yes	Y		DL	1.2	5	1.5	WLZ	-.12	W...	-.12										
28	DL		Y		DL	1																
29	WLz		Y		WLZ	1																
30	WLx		Y		W...	1																

Envelope Joint Reactions

	Joint		X [lb]	LC	Y [lb]	LC	Z [lb]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	N41A	max	766.712	8	512.838	13	-13.806	2	-.203	2	3.006	8	.138	18
2		min	-1039.372	7	232.012	2	-866.212	3	-.384	21	-3.446	7	-.072	7
3	N42	max	975.169	8	489.264	20	806.533	12	-.188	3	3.31	8	.141	7
4		min	-726.784	7	216.556	3	159.106	3	-.376	20	-3.027	7	-.079	8
5	N48	max	658.18	2	31.804	1	1379.56	2	.05	2	0	1	.175	12
6		min	-640.369	3	23.968	2	-1396.99	3	-.046	3	0	1	-.007	3

Envelope Joint Reactions (Continued)

	Joint		X [lb]	LC	Y [lb]	LC	Z [lb]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
7	N91	max	879.906	8	520.48	26	42.848	2	-.134	7	3.253	8	.049	8
8		min	-1271.781	7	128.959	7	-864.551	3	-.44	18	-4.13	7	-.097	7
9	N92	max	1214.238	8	502.266	17	777.076	20	-.122	8	4.053	8	.056	5
10		min	-836.017	7	118.779	8	99.431	3	-.437	17	-3.289	7	-.1	4
11	N98	max	1130.774	2	37.056	3	1321.403	2	.042	2	0	1	.236	12
12		min	-1099.543	3	18.288	2	-1361.457	3	-.074	3	0	1	.025	3
13	Totals:	max	3314.03	4	2024.798	19	4230.673	2						
14		min	-3314.03	5	1274.798	6	-4230.673	3						

Envelope AISC 13th(360-05): LRFD Steel Code Checks

	Member	Shape	Code Ch...	Loc[ft]	LC	Shear ...	Loc[ft]	Dir	LC	phi*Pnc ...	phi*Pnt [...	phi*Mn ...	phi*Mn ...	Cb	Eqn
1	M1	PIPE_4.0	.054	1.382	7	.238	4.559		7	85371.2...	93240	10.631	10.631	1....	H1-1b
2	M2	PL1/2x4	.556	0	7	.503	.625	y	15	56214.0...	64800	.675	5.4	2....	H1-1b
3	M3	PL1/2x4	.517	0	8	.502	.625	y	19	56214.0...	64800	.675	5.4	2....	H1-1b
4	M4	HSS2.5x2.5...	.537	2.146	7	.147	2.146	z	17	61191.2...	63828	4.401	4.401	1....	H1-1b
5	M5	HSS2.5x2.5...	.514	0	8	.150	0	z	18	61191.2...	63828	4.401	4.401	1....	H1-1b
6	M6	1" SR	.034	0	19	.089	2.5		15	11923.4...	25446.8...	.424	.424	2....	H1-1b
7	M7	1" SR	.285	2.5	19	.181	2.5		15	11923.4...	25446.8...	.424	.424	2....	H1-1b
8	M8	1" SR	.216	0	15	.098	0		15	9592.869	25446.8...	.424	.424	2....	H1-1b
9	M9	PIPE_1.25	.465	4.487	2	.255	4.487		2	9232.07	19687.5	.801	.801	3	H1-1b
10	M10	PIPE_1.25	.583	4.487	3	.332	4.487		3	9232.07	19687.5	.801	.801	3	H3-6
11	M11	1-1/4" SR	.715	1.25	2	.076	1.25		3	32391.5...	39760.7...	.828	.828	1....	H1-1b
12	M12	3/4" SR	.126	0	13	.026	2.5		2	8099.833	14313.8...	.179	.179	2....	H1-1b
13	M13	3/4" SR	.411	4.235	13	.015	4.235		5	3215.197	14313.8...	.179	.179	2....	H1-1a
14	M14	PIPE_1.25	.315	0	7	.270	0		2	6832.328	19687.5	.801	.801	3	H1-1b
15	M15	PIPE_1.25	.265	0	18	.251	0		3	6832.328	19687.5	.801	.801	3	H1-1b
16	M16	1-1/4" SR	.226	1.25	3	.018	0		12	32391.5...	39760.7...	.828	.828	1....	H1-1b
17	M17	3/4" SR	.046	0	2	.023	0		17	8099.833	14313.8...	.179	.179	1....	H1-1b
18	M18	3/4" SR	.050	0	6	.005	0		16	8099.833	14313.8...	.179	.179	2....	H1-1b
19	M19	3/4" SR	.052	0	7	.029	3.329		9	5205.161	14313.8...	.179	.179	1....	H1-1b
20	M20	3/4" SR	.065	0	3	.014	0		9	5161.645	14313.8...	.179	.179	2....	H1-1b
21	M21	PIPE_2.0	.046	2.395	3	.008	4.605		17	17855.0...	32130	1.872	1.872	2....	H1-1b
22	M22	PIPE_2.0	.181	2.211	3	.074	2.395		16	17855.0...	32130	1.872	1.872	3	H1-1b
23	M25A	PIPE_2.0	.199	2.395	2	.049	2.395		3	17855.0...	32130	1.872	1.872	2....	H1-1b
24	M24	HSS2.5x2.5...	.832	1.5	7	.082	1.5	z	7	62525.6...	63828	4.401	4.401	2....	H1-1b
25	M25	HSS2.5x2.5...	.800	1.5	8	.081	1.5	z	7	62525.6...	63828	4.401	4.401	2....	H1-1b
26	M26	PIPE_2.0	.060	3.084	7	.093	6.168		12	20361.9...	32130	1.872	1.872	1....	H1-1b
27	M27	PIPE_2.0	.053	3.461	6	.069	6.922		19	18087.8...	32130	1.872	1.872	1....	H1-1b
28	M28	PIPE_4.0	.146	1.243	7	.296	4.559		7	85371.2...	93240	10.631	10.631	1....	H3-6
29	M29	PL1/2x4	.689	0	17	.606	.625	y	17	56214.0...	64800	.675	5.4	2....	H1-1b
30	M30	PL1/2x4	.688	0	18	.608	.625	y	13	56214.0...	64800	.675	5.4	2....	H1-1b
31	M31	HSS2.5x2.5...	.713	2.146	7	.190	2.146	z	17	61191.2...	63828	4.401	4.401	1....	H1-1b
32	M32	HSS2.5x2.5...	.699	0	8	.195	0	z	18	61191.2...	63828	4.401	4.401	1....	H1-1b
33	M33	1" SR	.045	0	12	.120	2.5		19	11923.4...	25446.8...	.424	.424	2....	H1-1b
34	M34	1" SR	.387	2.5	19	.243	2.5		19	11923.4...	25446.8...	.424	.424	2....	H1-1b
35	M35	1" SR	.256	0	17	.132	0		17	9592.869	25446.8...	.424	.424	2....	H1-1b
36	M48	PIPE_2.0	.040	2.395	3	.016	4.605		12	17855.0...	32130	1.872	1.872	1....	H1-1b
37	M49	PIPE_2.0	.181	2.211	3	.092	2.395		12	17855.0...	32130	1.872	1.872	3	H1-1b
38	M50	PIPE_2.0	.210	2.395	2	.053	2.395		3	17855.0...	32130	1.872	1.872	2....	H1-1b
39	M51	HSS2.5x2.5...	.978	1.5	7	.103	1.5	z	15	62525.6...	63828	4.401	4.401	1....	H1-1b
40	M52	HSS2.5x2.5...	.956	1.5	8	.105	1.5	z	18	62525.6...	63828	4.401	4.401	1....	H1-1b
41	M53	PIPE_2.0	.082	3.469	2	.089	0		12	18038.58	32130	1.872	1.872	1....	H1-1b
42	M54	PIPE_2.0	.040	3.091	6	.128	6.181		15	20321.1...	32130	1.872	1.872	1....	H1-1b
43	GAMMA	PIPE_1.25	.535	6.5	15	.357	6.5		2	6832.324	19687.5	.801	.801	3	H1-1b
44	M56	PIPE_1.25	.651	1.026	3	.359	1.026		3	6832.324	19687.5	.801	.801	3	H3-6

Envelope AISC 13th(360-05): LRFD Steel Code Checks (Continued)

	Member	Shape	Code Ch...	Loc[ft]	LC	Shear ...	Loc[ft]	Dir	LC	phi*Pnc ...	phi*Pnt [...	phi*Mn ...	phi*Mn ...	Cb	Eqn
45	M57	1-1/4" SR	.828	1.25	2	.088	1.25		3	32391.5...	39760.7...	.828	.828	1....	H1-1b
46	M58	3/4" SR	.074	2.5	2	.043	0		3	8099.833	14313.8...	.179	.179	1....	H1-1b
47	M59	3/4" SR	.083	2.5	3	.021	2.5		3	8099.833	14313.8...	.179	.179	2....	H1-1b
48	M60	3/4" SR	.158	0	2	.012	0		6	5205.161	14313.8...	.179	.179	2....	H1-1b
49	M61	3/4" SR	.156	3.343	3	.033	3.343		7	5161.645	14313.8...	.179	.179	1....	H1-1b
50	M55A	PIPE_1.25	.359	5.5	7	.064	1.013		9	9232.074	19687.5	.801	.801	2....	H1-1b
51	M56A	PIPE_1.25	.321	5.5	8	.060	1.013		2	9232.074	19687.5	.801	.801	2....	H1-1b
52	M57A	1-1/4" SR	.179	1.25	9	.033	2.5		12	32391.5...	39760.7...	.828	.828	1....	H1-1b
53	M58A	3/4" SR	.086	0	19	.013	2.5		16	8099.833	14313.8...	.179	.179	2....	H1-1b
54	M59A	3/4" SR	.085	4.235	7	.025	4.235		7	3215.197	14313.8...	.179	.179	2....	H1-1b

Sprint®

PROJECT: 2.5 EQUIPMENT DEPLOYMENT

SITE NAME: S BETHANY/EMAC COMMUNICATIONS

SITE CASCADE: CT33XC610-C

SITE ADDRESS: 2 PROGRESS AVENUE SEYMOUR, CT 06483

SITE TYPE: 280'-0" SELF SUPPORT

SITE INFORMATION

PROPERTY OWNER:
ED MACCONNIE
2702 FOREST VIEW LANE
KISSIMMEE, FL 34744
PH.:(203)765-7733

SITE ADDRESS:
2 PROGRESS AVENUE
SEYMOUR, CT 06483
NEW HAVEN COUNTY

GEOGRAPHIC COORDINATES:
LATITUDE: 41.39139, (41° 23' 29.004")
LONGITUDE: -73.0533, (-73° 3' 11.8794")

ZONING JURISDICTION:
CITY OF SEYMOUR

ZONING DISTRICT:
TBD

POWER COMPANY:
CONN. LIGHT & POWER
PH.: (800) 286-2000

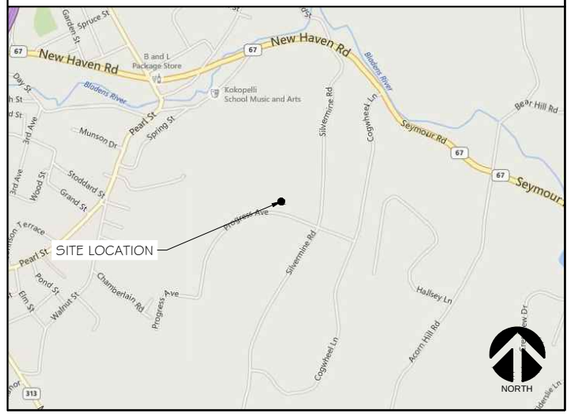
AAV PROVIDER:
AT&T
PH.: (888) 846-6502

SPRINT CONSTRUCTION MANAGER:
NAME: GARY WOOD
PHONE: (860) 940-9168
E-MAIL: gary.wood@sprint.com

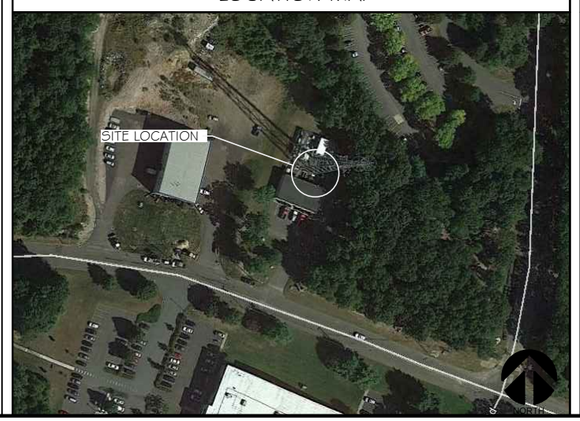
EQUIPMENT SUPPLIER:
ALCATEL-LUCENT
600-700 MOUNTAIN AVENUE
MURRAY HILL, NJ 07974
PH.: (908) 508-8080

PLANS PREPARED BY:
RAMAKER & ASSOCIATES, INC.
CONTACT: KEITH BOHNSACK, PROJECT MANAGER
PH.: (608) 643-4100
EMAIL: kbohnsack@ramaker.com

AREA MAP



LOCATION MAP



PROJECT DESCRIPTION

- INSTALL NEW 2.5 EQUIPMENT IN EXISTING BTS CABINET
  *(1) RECTIFIER SHELF AND (3) RECTIFIERS
  *(1) BASE BAND UNIT
- INSTALL NEW BATTERY STRING IN EXISTING BATTERY CABINET
- INSTALL (3) PANEL ANTENNAS
- INSTALL (3) RRH'S ON TOWER
- INSTALL (2) HYBRID CABLE AND (3) HYBRID JUMPERS
- INSTALL (27) ANTENNA / RRH JUMPERS

APPLICABLE CODES

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

1. INTERNATIONAL BUILDING CODE
2. ANSI/TIA-222 STRUCTURAL STANDARD FOR ANTENNA STRUCTURES
3. NFPA 780 - LIGHTNING PROTECTION CODE
4. NATIONAL ELECTRIC CODE

811 Know what's below. Call before you dig. www.call811.com

SHEET INDEX

SHT NO:	SHEET TITLE:	REV:	ENGINEER:
T-1	TITLE SHEET	A	JRS
SP-1	SPRINT SPECIFICATIONS	A	JRS
SP-2	SPRINT SPECIFICATIONS	A	JRS
SP-3	SPRINT SPECIFICATIONS	A	JRS
A-1	SITE PLAN	A	JRS
A-2	EQUIPMENT PLAN	A	JRS
A-3	BUILDING ELEVATION & ANTENNA DETAILS	A	JRS
A-4	RF DATA SHEET	A	JRS
A-5	FIBER PLUMBING DIAGRAM	A	JRS
A-6	CABLE COLOR CODING	A	JRS
A-7	ANTENNA & HYBRID CABLE DETAILS	A	JRS
A-8	EQUIPMENT DETAILS	A	JRS
E-1	EQUIPMENT UTILITY & GROUNDING PLAN	A	JRS
E-2	GROUNDING DETAILS	A	JRS
E-3	DC POWER DETAILS & PANEL SCHEDULES	A	JRS

Sprint®
6580 SPRINT PARKWAY
OVERLAND PARK, KANSAS 66251

RAMAKER & ASSOCIATES, INC.
1120 Dallas Street, Sauk City, WI 53583
Phone: 608-643-4100 Fax: 608-643-7999
www.Ramaker.com

Transcend Wireless
48 SPRUCE STREET
OAKLAND, NJ 07346

Certification & Seal:
I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Connecticut.

STATE OF CONNECTICUT · JAMES R. SKOWRONSKI · No. 26266 · LICENSED PROFESSIONAL ENGINEER

Signature: James R Skowronski Date: 7/29/2014

MARK	DATE	DESCRIPTION

ISSUE PHASE: FINAL DATE ISSUED: 07/29/2014

PROJECT TITLE:
S BETHANY/EMAC COMMUNICATIONS
SITE#:CT33XC610-C

PROJECT INFORMATION:
2 PROGRESS AVENUE
SEYMOUR, CT 06483
NEW HAVEN COUNTY

SHEET TITLE:
TITLE SHEET

SCALE: NONE

PROJECT NUMBER: 29016
SHEET NUMBER: T-1

DRAWN BY: TJN CHECKED BY: KAB

SECTION 01 100 - SCOPE OF WORK

THE WORK:
THESE STANDARD CONSTRUCTION SPECIFICATIONS IN CONJUNCTION WITH THE CONSTRUCTION DRAWINGS AND ASSOCIATED OUTLINE SPECIFICATIONS AND THE SITE SPECIFIC WORK ORDER, DESCRIBE THE WORK TO BE PERFORMED BY THIS CONSTRUCTION CONTRACTOR (SUPPLIER).

RELATED DOCUMENTS:
A. THE REQUIREMENTS OF EACH SECTION OF THIS SPECIFICATION APPLY TO ALL SECTIONS, INDIVIDUALLY AND COLLECTIVELY.
B. RELATED DOCUMENTS: THE CONTRACTOR SHALL COMPLY WITH THE MOST CURRENT VERSION OF THE FOLLOWING SUPPLEMENTAL REQUIREMENTS FOR INSTALLATION AND TESTING.
   1. EN-2012-001: (FIBER OPTIC, DC CABLE, AND DC CIRCUIT BREAKER TAGGING STANDARDS)
   2. TS-0200 - (TRANSMISSION ANTENNA LINE ACCEPTANCE STANDARDS)
   3. EL-0568: (FIBER TESTING POLICY)
   4. NP-312-201: (EXTERIOR GROUNDING SYSTEM TESTING)
   5. NP-760-500: ETHERNET, MICROWAVE, TESTING AND ACCEPTANCE

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

NATIONALLY RECOGNIZED CODES AND STANDARDS:
THE WORK SHALL COMPLY WITH APPLICABLE NATIONAL AND LOCAL CODES AND STANDARDS, LATEST EDITION, AND PORTIONS THEREOF, INCLUDED BUT NOT LIMITED TO THE FOLLOWING:
A. GR-63-CORE NEBS REQUIREMENTS: PHYSICAL PROTECTION
B. GR-78-CORE GENERIC REQUIREMENTS FOR THE PHYSICAL DESIGN AND MANUFACTURE OF TELECOMMUNICATIONS EQUIPMENT.
C. GR-1089 CORE, ELECTROMAGNETIC COMPATIBILITY AND ELECTRICAL SAFETY -GENERIC CRITERIA FOR NETWORK TELECOMMUNICATIONS EQUIPMENT.
D. NATIONAL FIRE PROTECTION ASSOCIATION CODES AND STANDARDS (NFPA) INCLUDING NFPA 70 (NATIONAL ELECTRICAL CODE - "NEC") AND NFPA 101 (LIFE SAFETY CODE).
E. AMERICAN SOCIETY FOR TESTING OF MATERIALS (ASTM)
F. INSTITUTE OF ELECTRONIC AND ELECTRICAL ENGINEERS (IEEE)
G. AMERICAN CONCRETE INSTITUTE (ACI)
H. AMERICAN WIRE PRODUCERS ASSOCIATION (AWPA)
I. CONCRETE REINFORCING STEEL INSTITUTE (CRSI)
J. AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO)
K. PORTLAND CEMENT ASSOCIATION (PCA)
L. NATIONAL CONCRETE MASONRY ASSOCIATION (NCMA)
M. BRICK INDUSTRY ASSOCIATION (BIA)
N. AMERICAN WELDING SOCIETY (AWS)
O. NATIONAL ROOFING CONTRACTORS ASSOCIATION (NRCA)
P. SHEET METAL AND AIR CONDITIONING CONTRACTORS' NATIONAL ASSOCIATION (SMACNA)
Q. DOOR AND HARDWARE INSTITUTE (DHI)
R. OCCUPATIONAL SAFETY AND HEALTH ACT (OSHA)
S. APPLICABLE BUILDING CODES INCLUDING UNIFORM BUILDING CODE, SOUTHERN BUILDING CODE, BOCA, AND THE INTERNATIONAL BUILDING CODE.

DEFINITIONS:
A. WORK: THE SUM OF TASKS AND RESPONSIBILITIES IDENTIFIED IN THE CONTRACT DOCUMENTS.
B. COMPANY: "SPRINT"; SPRINT NEXTEL CORPORATION AND IT'S OPERATING ENTITIES.
C. ENGINEER: SYNONYMOUS WITH ARCHITECT & ENGINEER AND "A&E". THE DESIGN PROFESSIONAL HAVING PROFESSIONAL RESPONSIBILITY FOR DESIGN OF THE PROJECT.
D. CONTRACTOR: CONSTRUCTION CONTRACTOR, SUPPLIER, CONSTRUCTION VENDOR; INDIVIDUAL OR ENTITY WHO AFTER EXECUTION OF A CONTRACT IS BOUND TO ACCOMPLISH THE WORK.
E. THIRD PARTY VENDOR OR AGENCY: A VENDOR OR AGENCY ENGAGED SEPARATELY BY THE COMPANY, A&E, OR CONTRACTOR TO PROVIDE MATERIALS OR TO ACCOMPLISH SPECIFIC TASKS RELATED TO BUT NOT INCLUDED IN THE WORK.
F. CONSTRUCTION MANAGER - ALL PROJECTS RELATED COMMUNICATION TO FLOW THROUGH SPRINT REPRESENTATIVE IN CHARGE OF PROJECT.

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

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

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

DRAWINGS REQUIRED AT JOBSITE:
THE CONSTRUCTION CONTRACTOR SHALL MAINTAIN A FULL SET OF THE CONSTRUCTION DRAWINGS FOR WIRELESS SITES AND THE STANDARD CONSTRUCTION SPECIFICATIONS FOR WIRELESS SITES AT THE JOBSITE FROM MOBILIZATION THROUGH CONSTRUCTION COMPLETION.
A. THE JOBSITE DRAWINGS SHALL BE CLEARLY MARKED DAILY IN RED PENCIL WITH ANY CHANGES IN CONSTRUCTION OVER WHAT IS DEPICTED IN THE DOCUMENTS. AT CONSTRUCTION COMPLETION, THIS JOBSITE MARKUP SET SHALL BE DELIVERED TO THE COMPANY OR COMPANY'S DESIGNATED REPRESENTATIVE TO BE FORWARDED TO THE COMPANY'S A&E VENDOR FOR PRODUCTION OF "AS-BUILT" DRAWINGS.
B. DIMENSIONS SHOWN ARE TO FINISH SURFACES UNLESS NOTED OTHERWISE. SPACING BETWEEN EQUIPMENT IS THE REQUIRED CLEARANCE. SHOULD THERE BE ANY QUESTIONS REGARDING THE CONTRACT DOCUMENTS, EXISTING CONDITIONS AND/OR DESIGN INTENT, THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING A CLARIFICATION FROM THE SPRINT CONSTRUCTION MANAGER PRIOR TO PROCEEDING WITH THE WORK.

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

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

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

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

USE OF ELECTRONIC PROJECT MANAGEMENT SYSTEMS:
CONTRACTOR WILL UTILIZE ITS BEST EFFORTS TO WORK WITH SPRINT ELECTRONIC PROJECT MANAGEMENT SYSTEMS. CONTRACTOR UNDERSTANDS THAT SUFFICIENT INTERNET ACCESS, EQUIVALENT TO "BROADBAND" OR BETTER, IS REQUIRED TO TIMELY AND EFFECTIVELY UTILIZE SPRINT DATA AND DOCUMENT MANAGEMENT SYSTEMS AND AGREES TO MAINTAIN APPROPRIATE CONNECTIONS FOR CONTRACTOR'S STAFF AND OFFICES THAT ARE COMPATIBLE WITH SPRINT DATA AND DOCUMENT MANAGEMENT SYSTEMS

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

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

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

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

SECTION 01 200 - COMPANY FURNISHED MATERIAL AND EQUIPMENT

FURNISHED MATERIALS:
COMPANY FURNISHED MATERIALS AND EQUIPMENT TO BE INSTALLED BY THE CONTRACTOR (OFIC) IS IDENTIFIED ON THE RF DATA SHEET IN THE CONSTRUCTION DOCUMENTS.

RECEIPT OF MATERIAL AND EQUIPMENT:
A. THE CONTRACTOR IS RESPONSIBLE FOR SPRINT PROVIDED MATERIAL AND EQUIPMENT AND UPON RECEIPT SHALL:
   1. ACCEPT DELIVERIES AS SHIPPED AND TAKE RECEIPT.
   2. VERIFY COMPLETENESS AND CONDITION OF ALL DELIVERIES.
   3. TAKE RESPONSIBILITY FOR EQUIPMENT AND PROVIDE INSURANCE PROTECTION AS REQUIRED IN AGREEMENT.
B. RECORD ANY DEFECTS OR DAMAGES AND WITHIN TWENTY-FOUR HOURS AFTER RECEIPT, REPORT TO SPRINT OR ITS DESIGNATED PROJECT REPRESENTATIVE OF SUCH.
C. PROVIDE SECURE AND NECESSARY WEATHER PROTECTED WAREHOUSING.
D. COORDINATE SAFE AND SECURE TRANSPORTATION OF MATERIAL AND EQUIPMENT, DELIVERING AND OFF-LOADING FROM CONTRACTOR'S WAREHOUSE TO SITE.

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

SECTION 01 300 - CELL SITE CONSTRUCTION

NOTICE TO PROCEED:
A. NO WORK SHALL COMMENCE PRIOR TO COMPANY'S ISSUANCE OF THE WORK ORDER.
B. UPON RECEIVING NOTICE TO PROCEED, CONTRACTOR SHALL FULLY PERFORM ALL WORK NECESSARY TO PROVIDE SPRINT WITH AN OPERATIONAL WIRELESS FACILITY.

GENERAL REQUIREMENTS FOR CONSTRUCTION:
A. CONTRACTOR SHALL KEEP THE SITE FREE FROM ACCUMULATING WASTE MATERIAL, DEBRIS, AND TRASH. AT THE COMPLETION OF THE WORK, CONTRACTOR SHALL REMOVE FROM THE SITE ALL REMAINING RUBBISH, IMPLEMENTS, TEMPORARY FACILITIES, AND SURPLUS MATERIALS.
B. EQUIPMENT ROOMS SHALL AT ALL TIMES BE MAINTAINED "BROOM CLEAN" AND CLEAR OF DEBRIS.
C. CONTRACTOR SHALL TAKE ALL REASONABLE PRECAUTIONS TO DISCOVER AND LOCATE ANY HAZARDOUS CONDITION.
   1. IN THE EVENT CONTRACTOR ENCOUNTERS ANY HAZARDOUS CONDITION WHICH HAS NOT BEEN ABATED OR OTHERWISE MITIGATED, CONTRACTOR AND ALL OTHER PERSONS SHALL IMMEDIATELY STOP WORK IN THE AFFECTED AREA AND NOTIFY COMPANY IN WRITING. THE WORK IN THE AFFECTED AREA SHALL NOT BE RESUMED EXCEPT BY WRITTEN NOTIFICATION BY COMPANY.
   2. CONTRACTOR AGREES TO USE CARE WHILE ON THE SITE AND SHALL NOT TAKE ANY ACTION THAT WILL OR MAY RESULT IN OR CAUSE THE HAZARDOUS CONDITION TO BE FURTHER RELEASED IN THE ENVIRONMENT, OR TO FURTHER EXPOSE INDIVIDUALS TO THE HAZARD.
D. CONTRACTOR'S ACTIVITIES SHALL BE RESTRICTED TO THE PROJECT LIMITS. SHOULD AREAS OUTSIDE THE PROJECT LIMITS BE AFFECTED BY CONTRACTOR'S ACTIVITIES, CONTRACTOR SHALL IMMEDIATELY RETURN THEM TO ORIGINAL CONDITION

FUNCTIONAL REQUIREMENTS:
A. THE ACTIVITIES DESCRIBED IN THIS PARAGRAPH REPRESENT MINIMUM ACTIONS AND PROCESSES REQUIRED TO SUCCESSFULLY COMPLETE THE WORK. CONTRACTOR SHALL TAKE ALL ACTIONS AS NECESSARY TO SUCCESSFULLY COMPLETE THE CONSTRUCTION OF A FULLY FUNCTIONING WIRELESS FACILITY AT THE SITE IN ACCORDANCE WITH COMPANY PROCESSES.
B. SUBMIT SPECIFIC DOCUMENTATION AS INDICATED HEREIN, AND OBTAIN REQUIRED APPROVALS WHILE THE WORK IS BEING PERFORMED.
C. MANAGE AND CONDUCT ALL FIELD CONSTRUCTION SERVICE RELATED ACTIVITIES
D. PROVIDE CONSTRUCTION ACTIVITIES TO THE EXTENT REQUIRED BY THE CONTRACT DOCUMENTS, INCLUDING BUT NOT LIMITED TO THE FOLLOWING:
   1. PERFORM ANY REQUIRED SITE ENVIRONMENTAL MITIGATION.
   2. PREPARE GROUND SITES; PROVIDE DE-GRUBBING; AND ROUGH AND FINAL GRADING, AND COMPOUND SURFACE TREATMENTS.
   3. MANAGE AND CONDUCT ALL ACTIVITIES FOR INSTALLATION OF UTILITIES INCLUDING ELECTRICAL AND BACKHAUL (FIBER, COPPER, OR MICROWAVE).
   4. INSTALL UNDERGROUND FACILITIES INCLUDING UNDERGROUND POWER AND COMMUNICATIONS CONDUITS, AND UNDERGROUND GROUNDING SYSTEM.
   5. INSTALL ABOVE GROUND GROUNDING SYSTEMS, CONDUIT AND BOXES.
   6. PROVIDE NEW HVAC INSTALLATIONS AND MODIFICATIONS.
   7. INSTALL "H-FRAMES", CABINETS AND PADS AND PLATFORMS AS INDICATED.
   8. INSTALL ROADS, ACCESS WAYS, CURBS AND DRAINS AS INDICATED.
   9. ACCOMPLISH REQUIRED MODIFICATION OF EXISTING FACILITIES.
   10. PROVIDE ANTENNA SUPPORT STRUCTURE FOUNDATIONS.
   11. PROVIDE SLABS AND EQUIPMENT PLATFORMS.
   12. INSTALL COMPOUND FENCING, SIGHT SHIELDING, LANDSCAPING AND ACCESS BARRIERS.
   13. PERFORM INSPECTION AND MATERIAL TESTING AS REQUIRED HEREINAFTER.
   14. CONDUCT SITE RESISTANCE TO EARTH TESTING AS REQUIRED HEREINAFTER
   15. INSTALL FIXED GENERATOR SETS AND OTHER STANDBY POWER SOLUTIONS.
   16. INSTALL TOWERS, ANTENNA SUPPORT STRUCTURES AND PLATFORMS ON EXISTING TOWERS AS REQUIRED.
   17. INSTALL CELL SITE RADIOS, MICROWAVE, GPS, COAXIAL MAINLINE, ANTENNAS, CROSS BAND COUPLERS, TOWER TOP AMPLIFIERS, LOW NOISE AMPLIFIERS AND RELATED EQUIPMENT.
   18. CONDUCT ALL REQUIRED TESTS AND INSPECTIONS
   19. PERFORM, DOCUMENT, AND CLOSE OUT ALL JURISDICTIONAL PERMITTING REQUIREMENTS AND ANY CONSTRUCTION CONTROL DOCUMENTS THAT MAY BE REQUIRED BY GOVERNMENT AGENCIES AND LANDLORDS.
   20. PERFORM ALL ADDITIONAL WORK AS IDENTIFIED IN SCOPE OF SERVICES ATTACHED TO THE SUPPLIER AGREEMENT FOR THIS PROJECT. THIS WORK MAY INCLUDE COMMISSIONING, INTEGRATION, SPECIAL WAREHOUSING, REVERSE LOGISTICS ACTIVITIES, ETC. PERFORM COMMISSIONING AND INTEGRATION ACTIVITIES PER APPLICABLE MOPS.

DELIVERABLES:
A. THE CONTRACTOR SHALL PROVIDE ALL REQUIRED TEST REPORTS AND DOCUMENTATION INCLUDED BUT NOT LIMITED TO THE FOLLOWING:
   1. PRODUCT SPECIFICATIONS FOR MATERIALS OR SPECIAL CONSTRUCTION IF REQUESTED BY SPRINT
   2. ACTUALIZE ALL CONSTRUCTION RELATED MILESTONES IN SITERRA AND COMPLETE ALL ON-LINE FORMS AND COMPLETE DOCUMENT UP-LOADS. UPLOAD ALL REQUIRED CLOSEOUT DOCUMENTS AND FINAL SITE PHOTOS
   3. SCANABLE BARCODE PHOTOGRAPHS OF TOWER TOP AND INACCESSIBLE SERIALIZED EQUIPMENT LEFT ON SITE INSIDE BASE OF MAIN RF CABINET IN A PROTECTIVE POUCH.
   4. ALL REQUIRED TEST REPORTS.
   5. REQUIRED CLOSEOUT DOCUMENTATION INCLUDING BUT NOT LIMITED TO:
      a. ALL JURISDICTIONAL PERMITTING AND OCCUPANCY INFORMATION
      b. PDF SCAN OF REDLINES PRODUCED IN THE FIELD
      c. ELECTRONIC AS-BUILT DRAWINGS IN AUTOCAD AND PDF FORMATS
      d. LIEN WAIVERS
      e. FINAL PAYMENT APPLICATION
      f. REQUIRED FINAL CONSTRUCTION PHOTOS
      g. CONSTRUCTION AND COMMISSIONING CHECKLIST COMPLETE WITH NO DEFICIENT ITEMS
      h. LISTS OF SUBCONTRACTORS
B. PROVIDE ADDITIONAL DOCUMENTATION INCLUDING, BUT NOT LIMITED TO, THE FOLLOWING. DOCUMENTATION SHALL BE FORWARDED IN ORIGINAL FORMAT AND/OR UPLOADED INTO SMS.
   1. ALL CORRESPONDENCE AND PRELIMINARY CONSTRUCTION REPORTS.
   2. PROJECT PROGRESS REPORTS.
   3. PRE-CONSTRUCTION MEETING NOTES.

SECTION 01 400 - TESTS, INSPECTIONS, SUBMITTALS, AND PROJECT CLOSEOUT

TESTS AND INSPECTIONS:
A. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL CONSTRUCTION TESTS, INSPECTIONS AND PROJECT DOCUMENTATION.
B. CONTRACTOR SHALL ACCOMPLISH TESTING INCLUDING BUT NOT LIMITED TO THE FOLLOWING:
   1. COAX SWEEPS AND FIBER TESTS PER TS-0200 (CURRENT VERSION) ANTENNA LINE ACCEPTANCE STANDARDS
   2. POST CONSTRUCTION HEIGHT VERIFICATION, AZIMUTH AND DOWNTILT USING ELECTRONIC COMMERCIAL MADE-FOR-THE-PURPOSE ANTENNA ALIGNMENT TOOL.
   3. CONCRETE BREAK TESTS
   4. SITE RESISTANCE TO EARTH TEST
   5. STRUCTURAL BACKFILL COMPACTION TESTS
   6. CONTRACTOR SHALL BE RESPONSIBLE FOR ANY AND ALL CORRECTIONS TO ANY WORK IDENTIFIED AS UNACCEPTABLE IN SITE INSPECTION ACTIVITIES AND/OR AS A RESULT OF TESTING.
   7. ADDITIONAL TESTING AS REQUIRED ELSEWHERE IN THIS SPECIFICATION.

SUBMITTALS:
A. THE WORK IN ALL ASPECTS SHALL COMPLY WITH THE CONSTRUCTION DRAWINGS AND THESE SPECIFICATIONS.
B. UPLOAD THE FOLLOWING TO SITERRA AS APPLICABLE INCLUDING BUT NOT LIMITED TO THE FOLLOWING:
   1. CONCRETE MIX-DESIGNS FOR TOWER FOUNDATIONS, ANCHORS PIERS, AND CONCRETE PAVING.
   2. CONCRETE BREAK TESTS AS SPECIFIED HEREIN.
   3. CHEMICAL GROUNDING SYSTEM .
   4. REINFORCEMENT CERTIFICATIONS
   5. STRUCTURAL BACKFILL TEST RESULTS
   6. SWEEP AND FIBER TESTS
   7. ANTENNA AZIMUTH AND DOWN-TILT VERIFICATION
   8. POST CONSTRUCTION HEIGHT VERIFICATION
   9. ADDITIONAL SUBMITTALS MAY BE REQUIRED FOR SPECIAL CONSTRUCTION OR MINOR MATERIALS
C. ALTERNATES: AT THE COMPANY'S REQUEST, ANY ALTERNATIVES TO THE MATERIALS OR METHODS SPECIFIED SHALL BE SUBMITTED TO SPRINT'S CONSTRUCTION MANAGER FOR APPROVAL PRIOR TO BEING SHIPPED TO SITE. SPRINT WILL REVIEW AND APPROVE ONLY THOSE REQUESTS MADE IN WRITING. NO VERBAL APPROVALS WILL BE CONSIDERED. SUBMITTAL FOR APPROVAL SHALL INCLUDE A STATEMENT OF COST REDUCTION PROPOSED FOR USE OF ALTERNATE PRODUCT.

TESTING BY THIRD PARTY AGENCY:
A. EMPLOY AN AGENCY OF ENGINEERS AND SCIENTISTS WHO IS REGULARLY ENGAGED IN FIELD AND LABORATORY TESTING AND ANALYSIS. AGENCY SHALL HAVE BEEN IN BUSINESS A MINIMUM OF FIVE YEARS, AND BE LICENSED AS PROFESSIONAL ENGINEERS IN THE STATE WHERE THE PROJECT IS LOCATED. AGENCY IS SUBJECT TO APPROVAL BY COMPANY.
   1. AGENCY MUST HAVE A THOROUGH UNDERSTANDING OF LOCAL AVAILABLE MATERIALS, INCLUDING THE SOIL, ROCK, AND GROUNDWATER CONDITIONS.
   2. AGENCY IS TO BE FAMILIAR WITH THE APPLICABLE REQUIREMENTS FOR THE TESTS TO BE DONE, EQUIPMENT TO BE USED, AND ASSOCIATED HEALTH AND SAFETY ISSUES.
   3. EXPERIENCE IN SOILS, CONCRETE, MASONRY, AGGREGATE, AND ASPHALT TESTING USING ASTM, AASJTO, AND OTHER METHODS IS NEEDED.
B. REQUIRED THIRD PARTY TESTS:
   1. SITE RESISTANCE TO EARTH TEST PER NP-312-201
   2. CONCRETE CYLINDER BREAK TESTS FOR TOWER PIER AND ANCHORS PER NATIONALLY RECOGNIZED STANDARDS
   3. STRUCTURAL SOILS COMPACTION TESTS PER NATIONALLY RECOGNIZED STANDARDS
   4. REBAR PLACEMENT VERIFICATION WITH REPORT
   5. TESTING TENSION STUDY FOR ROCK ANCHORS
   6. ALL THIRD PARTY TESTS AS REQUIRED BY LOCAL JURISDICTION
C. REQUIRED TESTS BY CONTRACTOR
   1. COAX SWEEP TESTS PER SPRINT STANDARD TS-0200
   2. FIBER TESTS PER SPRINT STANDARD EL-0568
   3. MICROWAVE LINK TESTS PER NP-760-500
   4. ANTENNA AZIMUTHS AND DOWN TILT USING ELECTRONIC ALIGNMENT TOOL PER ANTENNA INSTALLATION SPECIFICATION HEREIN.

Sprint
6580 SPRINT PARKWAY
OVERLAND PARK, KANSAS 66251

RAMAKER & ASSOCIATES, INC.
1120 Dallas Street, Sauk City, WI 53583
Phone: 608-643-4100 Fax: 608-643-7999
www.Ramaker.com

Transcend Wireless
48 SPRUCE STREET
OAKLAND, NJ 07346

Certification & Seal:
I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Connecticut.

STATE OF CONNECTICUT * JAMES R. SKOWRONSKI * No. 26266 LICENSED PROFESSIONAL ENGINEER

Signature: Date: 7/29/2014

MARK	DATE	DESCRIPTION

ISSUE PHASE: FINAL — DATE ISSUED: 07/29/2014

PROJECT TITLE:
S BETHANY/EMAC COMMUNICATIONS
SITE#:CT33XC610-C

PROJECT INFORMATION:
2 PROGRESS AVENUE
SEYMOUR, CT 06483
NEW HAVEN COUNTY

SHEET TITLE:
SPRINT SPECIFICATIONS

SCALE: NONE

PROJECT NUMBER: 29016
SHEET NUMBER: SP-1

DRAWN BY: TJN CHECKED BY: KAB

5. POST CONSTRUCTION HEIGHT VERIFICATION AS REQUIRED HEREWITH IN THE TOWER INSTALLATION SPECIFICATIONS.
6. ASPHALT ROADWAY COMPACTED THICKNESS, SURFACE SMOOTHNESS, AND COMPACTED DENSITY TESTING AS SPECIFIED HEREWITH IN THE ASPHALT PAVING SPECIFICATIONS.
7. FIELD QUALITY CONTROL TESTING AS SPECIFIED HEREWITH IN THE CONCRETE PAVING SPECIFICATIONS.
8. TESTING REQUIRED HEREWITH UNDER SPECIFICATIONS FOR AGGREGATE BASE FOR ROADWAYS
9. ALL OTHER TESTS REQUIRED BY LOCAL JURISDICTION

D. INSPECTIONS BY COMPANY: THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY AND ALL CORRECTIONS TO ANY WORK IDENTIFIED AS UNACCEPTABLE IN INSPECTION ACTIVITIES, FINAL ACCEPTANCE / PUNCH WALK REVIEW, AND/OR AS A RESULT OF TESTING

E. SPRINT RESERVES THE RIGHT TO INSPECT THE CONSTRUCTION SITE AT ANY TIME VIA SITE WALKS AND/OR PHOTO REVIEWS. CONTRACTOR SHALL GIVE SPRINT 24 HOURS NOTICE PRIOR TO THE COMMENCEMENT OF THE FOLLOWING CONSTRUCTION ACTIVITIES AND PHOTOGRAPHS OF THE IN-PROGRESS WORK.
1. GROUNDING SYSTEM AND BURIED UTILITIES INSTALLATION PRIOR TO EARTH CONCEALMENT DOCUMENTED WITH DIGITAL PHOTOGRAPHS BY CONTRACTOR, APPROVED BY A&E OR SPRINT REPRESENTATIVE.
2. FORMING FOR CONCRETE AND REBAR PLACEMENT PRIOR TO POUR DOCUMENTED WITH DIGITAL PHOTOGRAPHS BY CONTRACTOR, APPROVED BY A&E OR SPRINT REPRESENTATIVE.
3. COMPACTION OF BACKFILL MATERIALS, AGGREGATE BASE FOR ROADS, PADS, AND ANCHORS, ASPHALT PAVING, AND SHAFT BACKFILL FOR CONCRETE AND WOOD POLES, BY INDEPENDENT THIRD PARTY AGENCY.
4. PRE AND POST CONSTRUCTION ROOFTOP AND STRUCTURAL INSPECTIONS ON EXISTING FACILITIES. PRIOR TO CONSTRUCTION ACTIVITIES AND AFTER CONSTRUCTION IS COMPLETE, PROVIDE PHOTOGRAPHIC DOCUMENTATION OF ROOF, FLASHINGS, AND PARAPETS, BOTH BEFORE AND AFTER CONSTRUCTION IS COMPLETE.
5. TOWER ERECTION SECTION STACKING AND PLATFORM ATTACHMENT DOCUMENTED BY DIGITAL PHOTOGRAPHS BY THIRD PARTY AGENCY.
6. TOWER TOP AND INACCESSIBLE EQUIPMENT (RRUS, ANTENNAS, AND CABLING): PROVIDE PHOTOS OF THE BACKS OF ALL ANTENNAS, RRUS, COMBINERS, FILTERS, FIBER AND DC CABLING, CABLE COLOR CODING, EQUIPMENT GROUNDING AND CONNECTOR WATER PROOFING INCLUDING NAME PLATE AND SERIAL NUMBER FOR ALL SERIALIZED EQUIPMENT.

PROJECT CLOSEOUT:

A. FINAL ACCEPTANCE PUNCH WALK AND INSPECTION: AS IDENTIFIED IN THE SCOPE OF SERVICES, SPRINT WILL CONDUCT A FINAL PUNCH WALK OR FINAL DESK TOP PHOTO REVIEW (SITE MODIFICATIONS). PUNCH WALKS MUST BE SCHEDULED IN ADVANCE AS REQUIRED. AT THE PUNCH WALK / REVIEW, SPRINT MAY IDENTIFY CRITICAL DEFICIENCIES WHICH MUST BE CORRECTED PRIOR TO PUTTING SITE ON AIR. MINOR DEFICIENCIES MUST BE CORRECTED WITHIN 30 DAYS EXCEPT AS OTHERWISE REQUIRED. VERIFICATIONS OF CORRECTIONS MAY BE MADE BY COMPANY DURING A REPEAT SITE WALK OR DESK TOP PHOTO REVIEW AT COMPANY'S SOLE DISCRETION.

B. CLOSEOUT DOCUMENTATION: ALL CLOSEOUT DOCUMENTATION AND PHOTOGRAPHS SHALL BE UPLOADED PRIOR TO FINAL ACCEPTANCE. SPRINT WILL REVIEW CLOSEOUT DOCUMENTATION FOR PRESENCE AND CONTENT. CLOSEOUT DOCUMENTATION SHALL INCLUDE BUT IS NOT LIMITED TO THE FOLLOWING AS APPLICABLE:
1. COAX SWEEP TESTS:
2. FIBER TESTS:
3. JURISDICTION FINAL INSPECTION DOCUMENTATION
4. REINFORCEMENT CERTIFICATION (MILL CERTIFICATION)
5. CONCRETE MIX DESIGN AND PRODUCT DATA (TOWER FOUNDATION)
6. LIEN WAIVERS AND RELEASES.
7. POST -CONSTRUCTION HEIGHT VERIFICATION
8. JURISDICTION CERTIFICATE OF OCCUPANCY
9. ELECTRONIC ANTENNA AZIMUTH AND DOWN TILT VERIFICATION
10. STRUCTURAL BACKFILL TEST RESULTS (IF APPLICABLE)
11. CELL SITE UTILITY SETUP
12. AS-BUILT REDLINE CONSTRUCTION DRAWINGS (PDF SCAN OF FIELD MARKS)
13. AS-BUILT CONSTRUCTION DRAWINGS IN DWG AND PDF FORMATS
14. LIST OF SUB CONTRACTORS
15. APPROVED PERMITTING DOCUMENTS
16. FINAL SITE PHOTOS UP-LOADED TO SITERRA. INCLUDE THE FOLLOWING AS APPLICABLE:
    a. TOWER, ANTENNAS, RRUS, AND MAINLINE: INSPECTION AND PHOTOGRAPHS OF SECTION STACKING; INSPECTION AND PHOTOGRAPHS OF PLATFORM COMPONENT ATTACHMENT POINTS; PHOTOGRAPHS OF TOWER TOP GROUNDING; PHOTOS OF TOWER COAX/CABLE LINE COLOR CODING AT THE TOP AND AT GROUND LEVEL; INSPECTION AND PHOTOGRAPHS OF OPERATIONAL OF TOWER LIGHTING, AND PLACEMENT OF FAA REGISTRATION SIGN; PHOTOGRAPHS SHOWING ADDITIONAL GROUNDING POINTS FOR TOWERS GREATER THAN 200 FEET.; PHOTOS OF ANTENNA GROUND BAR, EQUIPMENT GROUND BAR, AND MASTER GROUND BAR; PHOTOS OF GPS ANTENNA(S); PHOTOS OF EACH SECTOR OF ANTENNAS; ONE PHOTOGRAPH LOOKING AT THE SECTOR AND ONE FROM BEHIND SHOWING THE PROJECTED COVERAGE AREA; PHOTOS OF COAX WEATHERPROOFING - TOP AND BOTTOM; PHOTOS OF COAX GROUNDING--TOP AND BOTTOM; PHOTOS OF ANTENNA AND MAST GROUNDING; PHOTOS OF COAX CABLE ENTRY INTO SHELTER; PHOTOS OF PLATFORM MECHANICAL CONNECTIONS TO TOWER/MONOPOLE.
    b. ROOF TOPS: PRE-CONSTRUCTION AND POST-CONSTRUCTION VISUAL INSPECTION AND PHOTOGRAPHS OF THE ROOF AND INTERIOR TO DETERMINE AND DOCUMENT CONDITIONS; ROOF TOP CONSTRUCTION INSPECTIONS AS REQUIRED BY THE JURISDICTION; PHOTOGRAPHS OF CABLE TRAY AND/OR ICE BRIDGE; PHOTOGRAPHS OF DOGHOUSE/CABLE EXIT FROM ROOF;
    c. SITE LAYOUT - PHOTOGRAPHS OF THE OVERALL COMPOUND, INCLUDING EQUIPMENT PLATFORM FROM ALL FOUR CORNERS.
    d. FINISHED UTILITIES: CLOSE-UP PHOTOGRAPHS OF THE PPC BREAKER PANEL; CLOSE-UP PHOTOGRAPH OF THE INSIDE OF THE TELCO PANEL AND NIU; CLOSE-UP PHOTOGRAPH OF THE POWER METER AND DISCONNECT; PHOTOS OF POWER AND TELCO ENTRANCE TO COMPANY ENCLOSURE; PHOTOGRAPHS AT METER BOX AND/OR FACILITY DISTRIBUTION PANEL.

PROJECT PHOTOGRAPHS:

A. PROVIDE PROJECT CLOSEOUT GENERAL ARRANGEMENT PHOTOS OF ALL NEW WORK. THE FOLLOWING LIST REPRESENTS MINIMUM REQUIREMENTS AND MINIMUM QUANTITY. ADDITIONAL PHOTOS MAY BE REQUIRED TO ADEQUATELY DOCUMENT THE WORK.
1. ASR AND RF MPE SIGNAGE (IF NOT IN PLACE, SUPPLIER NOTIFIES EMS FIELD REPRESENTATIVE)
2. BACK OF ANTENNAS AND RRUS (1 EACH SECTOR)
3. BACK OF ANTENNAS AND RRUS (1 EACH SECTOR) CLOSE UP SHOWING WEATHERPROOFING AND GROUNDING (AS REQUIRED). CLOSE-UP OF BACK SIDE OF EACH PERMANENT RRU SHOWING SERIAL NUMBER/BAR CODE.
4. VIEW (1 EACH SECTOR) ALONG THE AZIMUTH AND TILT OF THE ANTENNAS
5. TOP OF TOWER FROM GROUND, 1 EACH SECTOR
6. MAINLINE HYBRID CABLE ROUTE DOWN TOWER SHOWING FASTENERS AND SUPPORT
7. MAINLINE/HYBRID CABLE ROUTE ALONG ICE BRIDGE OR IN CABLE TRAY SHOWING FASTENERS AND SUPPORT
8. GROUND MOUNTED RRU RACKS (FRONT AND BACK)
9. FRONT, SIDE AND BACK ELEVATIONS OF ALL GROUND CABINETS
10. VIEW OF COMPOUND FROM A DISTANCE
11. VIEW OF EACH GROUND CABINET (POWER, RF, FIBER SPOOL, PPC POWER, PPC TELCO WITH DOOR OPEN)
12. BACKHAUL FIBER MEET-ME-POINT AND CONDUIT ROUTE (MICROWAVE INSTALLATION IF NOT FIBER)
13. AAV NETWORK INTERFACE DEVICE OR MICROWAVE RADIO INSTALLATION

DEFICIENCY CORRECTIONS:

CONTRACTOR IS RESPONSIBLE FOR ALL CORRECTIONS TO DEFICIENCIES IDENTIFIED THROUGH TESTING, REVIEW OF SUBMITTALS, INSPECTIONS AND CLOSEOUT REVIEWS.

SECTION 01 500 - PROJECT REPORTING

WEEKLY REPORTS:

A. CONTRACTOR SHALL REPORT TO SPRINT AT MINIMUM ON A WEEKLY BASIS VIA SITERRA BY UPDATING ALL APPLICABLE POST END KEEPING MILESTONES WITH ACTUAL AND FORECASTED COMPLETION DATES.

B. ADDITIONAL REQUIREMENTS FOR REPORTING MAY BE IDENTIFIED ELSEWHERE OR REQUIRED BY THE SCOPE OF SERVICES OR SPRINTS LOCAL MARKET CONSTRUCTION MANAGER. THIS INFORMATION WILL PROVIDE A BASIS FOR PROGRESS MONITORING AND PAYMENT.

PROJECT CONFERENCE CALLS:

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

FINAL PROJECT ACCEPTANCE: PRIOR TO SPRINTS FINAL PROJECT ACCEPTANCE. ALL REQUIRED MILESTONE ACTUALS MUST BE UPDATED IN SITERRA AND ALL REQUIRED REPORTING TASKS MUST BE COMPLETE.

SECTION 11 700 - ANTENNA ASSEMBLY, REMOTE RADIO UNITS AND CABLE INSTALLATION

SUMMARY:

THIS SECTION SPECIFIES INSTALLATION OF ANTENNAS, RRU'S, AND CABLE EQUIPMENT, INSTALLATION, AND TESTING OF COAXIAL FIBER CABLE.

ANTENNAS AND RRU'S:

THE NUMBER AND TYPE OF ANTENNAS AND RRU'S TO BE INSTALLED IS DETAILED ON THE CONSTRUCTION DRAWINGS.

HYBRID CABLE:

HYBRID CABLE WILL BE DC/FIBER AND FURNISHED FOR INSTALLATION AT EACH SITE. CABLE SHALL BE INSTALLED PER THE CONSTRUCTION DRAWINGS AND THE APPLICABLE MANUFACTURER'S REQUIREMENTS.

JUMPERS AND CONNECTORS:

FURNISH AND INSTALL 1/2" COAX JUMPER CABLES BETWEEN THE RRU'S AND ANTENNAS. JUMPERS SHALL BE TYPE LDF 4, FLC 12-50, CR 540, OR FXL 540. SUPER-FLEX CABLES ARE NOT ACCEPTABLE. JUMPERS BETWEEN THE RRU'S AND ANTENNAS OR TOWER TOP AMPLIFIERS SHALL CONSIST OF 1/2 INCH FOAM DIELECTRIC, OUTDOOR RATED COAXIAL CABLE, MIN. LENGTH FOR JUMPER SHALL BE 10'-0".

REMOTE ELECTRICAL TILT (RET) CABLES:

MISCELLANEOUS:

INSTALL SPLITTERS, COMBINERS, FILTERS PER RF DATA SHEET, FURNISHED BY SPRINT.

ANTENNA INSTALLATION:

THE CONTRACTOR SHALL ASSEMBLE ALL ANTENNAS ONSITE IN ACCORDANCE WITH THE INSTRUCTIONS SUPPLIED BY THE MANUFACTURER. ANTENNA HEIGHT, AZIMUTH, AND FEED ORIENTATION INFORMATION SHALL BE A DESIGNATED ON THE CONSTRUCTION DRAWINGS.

A. THE CONTRACTOR SHALL POSITION THE ANTENNA ON TOWER PIPE MOUNTS SO THAT THE BOTTOM STRUT IS LEVEL. THE PIPE MOUNTS SHALL BE PLUMB TO WITHIN 1 DEGREE.

B. ANTENNA MOUNTING REQUIREMENTS: PROVIDE ANTENNA MOUNTING HARDWARE AS INDICATED ON THE DRAWINGS.

HYBRID CABLE INSTALLATION:

A. THE CONTRACTOR SHALL ROUTE, TEST, AND INSTALL ALL CABLES AS INDICATED ON THE CONSTRUCTION DRAWINGS AND IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.

B. THE INSTALLED RADIUS OF THE CABLES SHALL NOT BE LESS THAN THE MANUFACTURER'S SPECIFICATIONS FOR BENDING RADII.

C. EXTREME CARE SHALL BE TAKEN TO AVOID DAMAGE TO THE CABLES DURING HANDLING AND INSTALLATION.

1. FASTENING MAIN HYBRID CABLES: ALL CABLES SHALL BE INSTALLED INSIDE MONOPOLE WITH CABLE SUPPORT GRIPS AS REQUIRED BY THE MANUFACTURER.
2. FASTENING INDIVIDUAL FIBER AND DC CABLES ABOVE BREAKOUT ENCLOSURE (MEDUSA), WITHIN THE MMBS CABINET AND ANY INTERMEDIATE DISTRIBUTION BOXES:
    a. FIBER: SUPPORT FIBER BUNDLES USING 1/2" VELCRO STRAPS OF THE REQUIRED LENGTH AT 18" O.C. STRAPS SHALL BE UV, OIL AND WATER RESISTANT AND SUITABLE FOR INDUSTRIAL INSTALLATIONS AS MANUFACTURED BY TEXTOL OR APPROVED EQUAL.
    b. DC: SUPPORT DC BUNDLES WITH ZIP TIES OF THE ADEQUATE LENGTH. ZIP TIES TO BE UV STABILIZED, BLACK NYLON, WITH TENSILE STRENGTH AT 12,000 PSI AS MANUFACTURED BY NELCO PRODUCTS OR EQUAL.
3. FASTENING JUMPERS: SECURE JUMPERS TO THE SIDE ARMS OR HEAD FRAMES USING STAINLESS STEEL TIE WRAPS OR STAINLESS STEEL BUTTERFLY CLIPS.
4. CABLE INSTALLATION:
    a. INSPECT CABLE PRIOR TO USE FOR SHIPPING DAMAGE, NOTIFY THE CONSTRUCTION MANAGER.
    b. CABLE ROUTING: CABLE INSTALLATION SHALL BE PLANNED TO ENSURE THAT THE LINES WILL BE PROPERLY ROUTED IN THE CABLE ENVELOP AS INDICATED ON THE DRAWINGS. AVOID TWISTING AND CROSSOVERS.
    c. HOIST CABLE USING PROPER HOISTING GRIPS. DO NOT EXCEED MANUFACTURER'S RECOMMENDED MAXIMUM BEND RADIUS.
5. GROUNDING OF TRANSMISSION LINES: ALL TRANSMISSION LINES SHALL BE GROUNDED AS INDICATED ON DRAWINGS.
6. HYBRID CABLE COLOR CODING: ALL COLOR CODING SHALL BE AS REQUIRED IN TS 0200 (CURRENT VERSION).
7. HYBRID CABLE LABELING: INDIVIDUAL HYBRID AND DC BUNDLES SHALL BE LABELED ALPHA-NUMERICALLY ACCORDING TO SPRINT CELL SITE ENGINEERING NOTICE - EN 2012-001, REV 1

WEATHERPROOFING EXTERIOR CONNECTORS AND HYBRID CABLE GROUND KITS:

A. ALL FIBER & COAX CONNECTORS AND GROUND KITS SHALL BE WEATHERPROOFED.

B. WEATHERPROOFED USING ONE OF THE FOLLOWING METHODS. ALL INSTALLATIONS MUST BE DONE IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS AND INDUSTRY BEST PRACTICES.
1. COLD SHRINK: ENCOMPASS CONNECTOR IN COLD SHRINK TUBING AND PROVIDE A DOUBLE WRAP OF 2" ELECTRICAL TAPE EXTENDING 2" BEYOND TUBING. PROVIDE 3M COLD SHRINK CXS SERIES OR EQUAL.
2. SELF-AMALGAMATING TAPE: CLEAN SURFACES. APPLY A DOUBLE WRAP OF SELF-AMALGAMATING TAPE 2" BEYOND CONNECTOR. APPLY A SECOND WRAP OF SELF-AMALGAMATING TAPE IN OPPOSITE DIRECTION. APPLY DOUBLE WRAP OF 2" WIDE ELECTRICAL TAPE EXTENDING 2" BEYOND THE SELF-AMALGAMATING TAPE.
3. 3M SLIM LOCK CLOSURE 716: SUBSTITUTIONS WILL NOT BE ALLOWED.
4. OPEN FLAME ON JOB SITE IS NOT ACCEPTABLE

SECTION 11 800 - INSTALLATION OF MULTIMODAL BASE STATIONS (MMBS) AND RELATED EQUIPMENT

SUMMARY:

A. THIS SECTION SPECIFIES MMBS CABINETS, POWER CABINETS, AND INTERNAL EQUIPMENT INCLUDING BY NOT LIMITED TO RECTIFIERS, POWER DISTRIBUTION UNITS, BASE BAND UNITS, SURGE ARRESTORS, BATTERIES, AND SIMILAR EQUIPMENT FURNISHED BY THE COMPANY FOR INSTALLATION BY THE CONTRACTOR (OFCI).

B. CONTRACTOR SHALL PROVIDE AND INSTALL ALL MISCELLANEOUS MATERIALS AND PROVIDE ALL LABOR REQUIRED FOR INSTALLATION EQUIPMENT IN EXISTING CABINET OR NEW CABINET AS SHOWN ON DRAWINGS AND AS REQUIRED BY THE APPLICABLE INSTALLATION MOPS.

C. COMPLY WITH MANUFACTURER'S INSTALLATION AND START-UP REQUIREMENTS.

DC CIRCUIT BREAKER LABELING

A. NEW DC CIRCUIT IS REQUIRED IN MMBS CABINET SHALL BE CLEARLY IDENTIFIED AS TO RRU BEING SERVICED.

SECTION 26 100 - BASIC ELECTRICAL REQUIREMENTS

SUMMARY:

THIS SECTION SPECIFIES BASIC ELECTRICAL REQUIREMENTS FOR SYSTEMS AND COMPONENTS

QUALITY ASSURANCE:

A. ALL EQUIPMENT FURNISHED UNDER DIVISION 26 SHALL CARRY UL LABELS AND LISTINGS WHERE SUCH LABELS AND LISTINGS ARE AVAILABLE IN THE INDUSTRY.

B. MANUFACTURERS OF EQUIPMENT SHALL HAVE A MINIMUM OF THREE YEARS EXPERIENCE WITH THEIR EQUIPMENT INSTALLED AND OPERATING IN THE FIELD IN A USE SIMILAR TO THE PROPOSED USE FOR THIS PROJECT.

C. MATERIALS AND EQUIPMENT: ALL MATERIALS AND EQUIPMENT SPECIFIED IN DIVISION 26 OF THE SAME TYPE SHALL BE OF THE SAME MANUFACTURER AND SHALL BE NEW, OF THE BEST QUALITY AND DESIGN, AND FREE FROM DEFECTS.

SUPPORTING DEVICES:

A. MANUFACTURED STRUCTURAL SUPPORT MATERIALS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCTS BY THE FOLLOWING:
1. ALLIED TUBE AND CONDUIT.
2. B-LINE SYSTEM.
3. UNISTRUT DIVERSIFIED PRODUCTS.
4. THOMAS & BETTS.

B. FASTENERS: TYPES, MATERIALS, AND CONSTRUCTION FEATURES AS FOLLOWS:
1. EXPANSION ANCHORS: CARBON STEEL WEDGE OR SLEEVE TYPE.
2. POWER-DRIVEN THREADED STUDS: HEAT-TREATED STEEL, DESIGNED SPECIFICALLY FOR THE INTENDED SERVICE.
3. FASTEN BY MEANS OF WOOD SCREWS ON WOOD.
4. TOGGLE BOLTS ON HOLLOW MASONRY UNITS.
5. CONCRETE INSERTS OR EXPANSION BOLTS ON CONCRETE OR SOLID MASONRY.
6. MACHINE SCREWS, WELDED THREADED STUDS, OR SPRING-TENSION CLAMPS ON STEEL.
7. EXPLOSIVE DEVICES FOR ATTACHING HANGERS TO STRUCTURE SHALL NOT BE PERMITTED.
8. DO NOT WELD CONDUIT, PIPE STRAPS, OR ITEMS OTHER THAN THREADED STUDS TO STEEL STRUCTURES.
9. IN PARTITIONS OF LIGHT STEEL CONSTRUCTION, USE SHEET METAL SCREWS.

Sprint
6580 SPRINT PARKWAY
OVERLAND PARK, KANSAS 66251

RAMAKER & ASSOCIATES, INC.
1120 Dallas Street, Sauk City, WI 53583
Phone: 608-643-4100 Fax: 608-643-7999
www.Ramaker.com

Transcend Wireless
48 SPRUCE STREET
OAKLAND, NJ 07346

Certification & Seal:

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Connecticut.

STATE OF CONNECTICUT · JAMES R. SKOWRONSKI · No. 26266 · LICENSED PROFESSIONAL ENGINEER

Signature: James R. Skowronski Date: 7/29/2014

MARK	DATE	DESCRIPTION

ISSUE PHASE: FINAL DATE ISSUED: 07/29/2014

PROJECT TITLE:
S BETHANY/EMAC COMMUNICATIONS
SITE#:CT33XC610-C

PROJECT INFORMATION:
2 PROGRESS AVENUE
SEYMOUR, CT 06483
NEW HAVEN COUNTY

SHEET TITLE:
SPRINT SPECIFICATIONS

SCALE: NONE

PROJECT NUMBER: 29016
SHEET NUMBER: SP-2

SUPPORTING DEVICES:

A. INSTALL SUPPORTING DEVICES TO FASTEN ELECTRICAL COMPONENTS SECURELY AND PERMANENTLY IN ACCORDANCE WITH NEC.

B. COORDINATE WITH THE BUILDING STRUCTURAL SYSTEM AND WITH OTHER TRADES.

C. UNLESS OTHERWISE INDICATED ON THE DRAWINGS, FASTEN ELECTRICAL ITEMS AND THEIR SUPPORTING HARDWARE SECURELY TO THE STRUCTURE IN ACCORDANCE WITH THE FOLLOWING:

1. ENSURE THAT THE LOAD APPLIED BY ANY FASTENER DOES NOT EXCEED 25 PERCENT OF THE PROOF TEST LOAD.

2. USE VIBRATION AND SHOCK-RESISTANT FASTENERS FOR ATTACHMENTS TO CONCRETE SLABS.

ELECTRICAL IDENTIFICATION:

A. UPDATE AND PROVIDE TYPED CIRCUIT BREAKER SCHEDULES IN THE MOUNTING BRACKET, INSIDE DOORS OF AC PANEL BOARDS WITH ANY CHANGES MADE TO THE AC SYSTEM.

B. BRANCH CIRCUITS FEEDING AVIATION OBSTRUCTION LIGHTING EQUIPMENT SHALL BE CLEARLY IDENTIFIED AS SUCH AT THE BRANCH CIRCUIT PANELBOARD.

SECTION 26 200 - ELECTRICAL MATERIALS AND EQUIPMENT

A. RIGID GALVANIZED STEEL (RGS) CONDUIT SHALL BE USED FOR EXTERIOR LOCATIONS ABOVE GROUND AND IN UNFINISHED INTERIOR LOCATIONS AND FOR UNDERGROUND RUNS. RIGID CONDUIT AND FITTINGS SHALL BE STEEL, COATED WITH ZINC EXTERIOR AND INTERIOR BY THE HOT DIP GALVANIZING PROCESS. CONDUIT SHALL BE PRODUCED TO ANSI SPECIFICATIONS C80.1, FEDERAL SPECIFICATION WW-C-581 AND SHALL BE LISTED WITH THE UNDERWRITERS' LABORATORIES. FITTINGS SHALL BE THREADED - SET SCREW OR COMPRESSION FITTINGS WILL NOT BE ACCEPTABLE. RGS CONDUITS SHALL BE MANUFACTURED BY ALLIED, REPUBLIC OR WHEATLAND.

B. UNDERGROUND CONDUIT IN CONCRETE SHALL BE POLYVINYLCHLORIDE (PVC) SUITABLE FOR DIRECT BURIAL AS APPLICABLE. JOINTS SHALL BE BELLED, AND FLUSH SOLVENT WELDED IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS. CONDUIT SHALL BE CARLON ELECTRICAL PRODUCTS OR APPROVED EQUAL.

C. TRANSITIONS BETWEEN PVC AND RIGID (RGS) SHALL BE MADE WITH PVC COATED METALLIC LONG SWEEP RADIUS ELBOWS.

D. EMT OR RIGID GALVANIZED STEEL CONDUIT MAY BE USED IN FINISHED SPACES CONCEALED IN WALLS AND CEILINGS. EMT SHALL BE MILD STEEL, ELECTRICALLY WELDED, ELECTRO-GALVANIZED OR HOT-DIPPED GALVANIZED AND PRODUCED TO ANSI SPECIFICATION C80.3, FEDERAL SPECIFICATION WW-C-563, AND SHALL BE UL LISTED. EMT SHALL BE MANUFACTURED BY ALLIED, REPUBLIC OR WHEATLAND, OR APPROVED EQUAL. FITTINGS SHALL BE METALLIC COMPRESSION. SET SCREW CONNECTIONS SHALL NOT BE ACCEPTABLE.

E. LIQUID TIGHT FLEXIBLE METALLIC CONDUIT SHALL BE USED FOR FINAL CONNECTION TO EQUIPMENT. FITTINGS SHALL BE METALLIC GLAND TYPE COMPRESSION FITTINGS, MAINTAINING THE INTEGRITY OF CONDUIT SYSTEM. SET SCREW CONNECTIONS SHALL NOT BE ACCEPTABLE. MAXIMUM LENGTH OF FLEXIBLE CONDUIT SHALL NOT EXCEED 6-FEET. LFMC SHALL BE PROTECTED AND SUPPORTED AS REQUIRED BY NEC. MANUFACTURERS OF FLEXIBLE CONDUITS SHALL BE CAROL, ANACONDA METAL HOSE OR UNIVERSAL METAL HOSE, OR APPROVED EQUAL.

F. MINIMUM SIZE CONDUIT SHALL BE 3/4 INCH (21MM).

HUBS AND BOXES:

A. AT ENTRANCES TO CABINETS OR OTHER EQUIPMENT NOT HAVING INTEGRAL THREADED HUBS PROVIDE METALLIC THREADED HUBS OF THE SIZE AND CONFIGURATION REQUIRED. HUB SHALL INCLUDE LOCKNUT AND NEOPRENE O-RING SEAL. PROVIDE IMPACT RESISTANT 105 DEGREE C PLASTIC BUSHINGS TO PROTECT CABLE INSULATION.

B. CABLE TERMINATION FITTINGS FOR CONDUIT

1. CABLE TERMINATORS FOR RGS CONDUITS SHALL BE TYPE CRC BY O-Z/GEDNEY OR EQUAL BY ROXTEC.

2. CABLE TERMINATORS FOR LFMC SHALL BE ETCO - CL2075; OR MADE FOR THE PURPOSE PRODUCTS BY ROXTEC.

C. EXTERIOR PULL BOXES AND PULL BOXES IN INTERIOR INDUSTRIAL AREAS SHALL BE PLATED CAST ALLOY, HEAVY DUTY, WEATHERPROOF, DUST PROOF, WITH GASKET, PLATED IRON ALLOY COVER AND STAINLESS STEEL COVER SCREWS, CROUSE-HINDS WAB SERIES OR EQUAL.

D. CONDUIT OUTLET BODIES SHALL BE PLATED CAST ALLOY WITH SIMILAR GASKET COVERS. OUTLET BODIES SHALL BE OF THE CONFIGURATION AND SIZE SUITABLE FOR THE APPLICATION. PROVIDE CROUSE-HINDS FORM 8 OR EQUAL.

E. MANUFACTURER FOR BOXES AND COVERS SHALL BE HOFFMAN, SQUARE "D", CROUSE-HINDS, COOPER, ADALET, APPLETON, O-Z GEDNEY, RACO, OR APPROVED EQUAL.

SUPPLEMENTAL GROUNDING SYSTEM:

A. FURNISH AND INSTALL A SUPPLEMENTAL GROUNDING SYSTEM TO THE EXTENT INDICATED ON THE DRAWINGS. SUPPORT SYSTEM WITH NON-MAGNETIC STAINLESS STEEL CLIPS WITH RUBBER GROMMETS. GROUNDING CONNECTORS SHALL BE TINNED COPPER WIRE, SIZES AS INDICATED ON THE DRAWINGS. PROVIDE STRANDED OR SOLID BARE OR INSULATED CONDUCTORS EXCEPT AS OTHERWISE NOTED.

B. SUPPLEMENTAL GROUNDING SYSTEM: ALL CONNECTIONS TO BE MADE WITH CAD WELDS, EXCEPT AT EQUIPMENT USE LUGS OR OTHER AVAILABLE GROUNDING MEANS AS REQUIRED BY MANUFACTURER; AT GROUND BARS USE TWO HOLE SPADES WITH NO-OX.

C. STOLEN GROUND-BARS: IN THE EVENT OF STOLEN GROUND BARS, CONTACT SPRINT CM FOR REPLACEMENT INSTRUCTION USING THREADED ROD KITS.

EXISTING STRUCTURE:

A. EXISTING EXPOSED WIRING AND ALL EXPOSED OUTLETS, RECEPTACLES, SWITCHES, DEVICES, BOXES, AND OTHER EQUIPMENT THAT ARE NOT TO BE UTILIZED IN THE COMPLETED PROJECT SHALL BE REMOVED OR DE-ENERGIZED AND CAPPED IN THE WALL, CEILING, OR FLOOR SO THAT THEY ARE CONCEALED AND SAFE. WALL, CEILING, OR FLOOR SHALL BE PATCHED TO MATCH THE ADJACENT CONSTRUCTION.

CONDUIT AND CONDUCTOR INSTALLATION:

A. CONDUITS SHALL BE FASTENED SECURELY IN PLACE WITH APPROVED NON-PERFORATED STRAPS AND HANGERS. EXPLOSIVE DEVICES FOR ATTACHING HANGERS TO STRUCTURE WILL NOT BE PERMITTED. CLOSELY FOLLOW THE LINES OF THE STRUCTURE, MAINTAIN CLOSE PROXIMITY TO THE STRUCTURE AND KEEP CONDUITS IN TIGHT ENVELOPES. CHANGES IN DIRECTION TO ROUTE AROUND OBSTACLES SHALL BE MADE WITH CONDUIT OUTLET BODIES. CONDUIT SHALL BE INSTALLED IN A NEAT AND WORKMANLIKE MANNER, PARALLEL AND PERPENDICULAR TO STRUCTURE WALL AND CEILING LINES. ALL CONDUIT SHALL BE FISHED TO CLEAR OBSTRUCTIONS. ENDS OF CONDUITS SHALL BE TEMPORARILY CAPPED TO PREVENT CONCRETE, PLASTER OR DIRT FROM ENTERING. CONDUITS SHALL BE RIGIDLY CLAMPED TO BOXES BY GALVANIZED MALLEABLE IRON BUSHING ON INSIDE AND GALVANIZED MALLEABLE IRON LOCKNUT ON OUTSIDE AND INSIDE.

B. CONDUCTORS SHALL BE PULLED IN ACCORDANCE WITH ACCEPTED GOOD PRACTICE.

Sprint

6580 SPRINT PARKWAY
OVERLAND PARK, KANSAS 66251

RAMAKER & ASSOCIATES, INC.
1120 Dallas Street, Sauk City, WI 53583
Phone: 608-643-4100 Fax: 608-643-7999
www.Ramaker.com

Transcend Wireless
48 SPRUCE STREET
OAKLAND, NJ 07346

Certification & Seal:

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Connecticut.

STATE OF CONNECTICUT ★ JAMES R. SKOWRONSKI ★ No. 26266 LICENSED PROFESSIONAL ENGINEER

Signature: Date: 7/29/2014

MARK	DATE	DESCRIPTION

ISSUE PHASE: FINAL DATE ISSUED: 07/29/2014

PROJECT TITLE:
5 BETHANY/EMAC
COMMUNICATIONS
SITE#:CT33XC610-C

PROJECT INFORMATION:
2 PROGRESS AVENUE
SEYMOUR, CT 06483
NEW HAVEN COUNTY

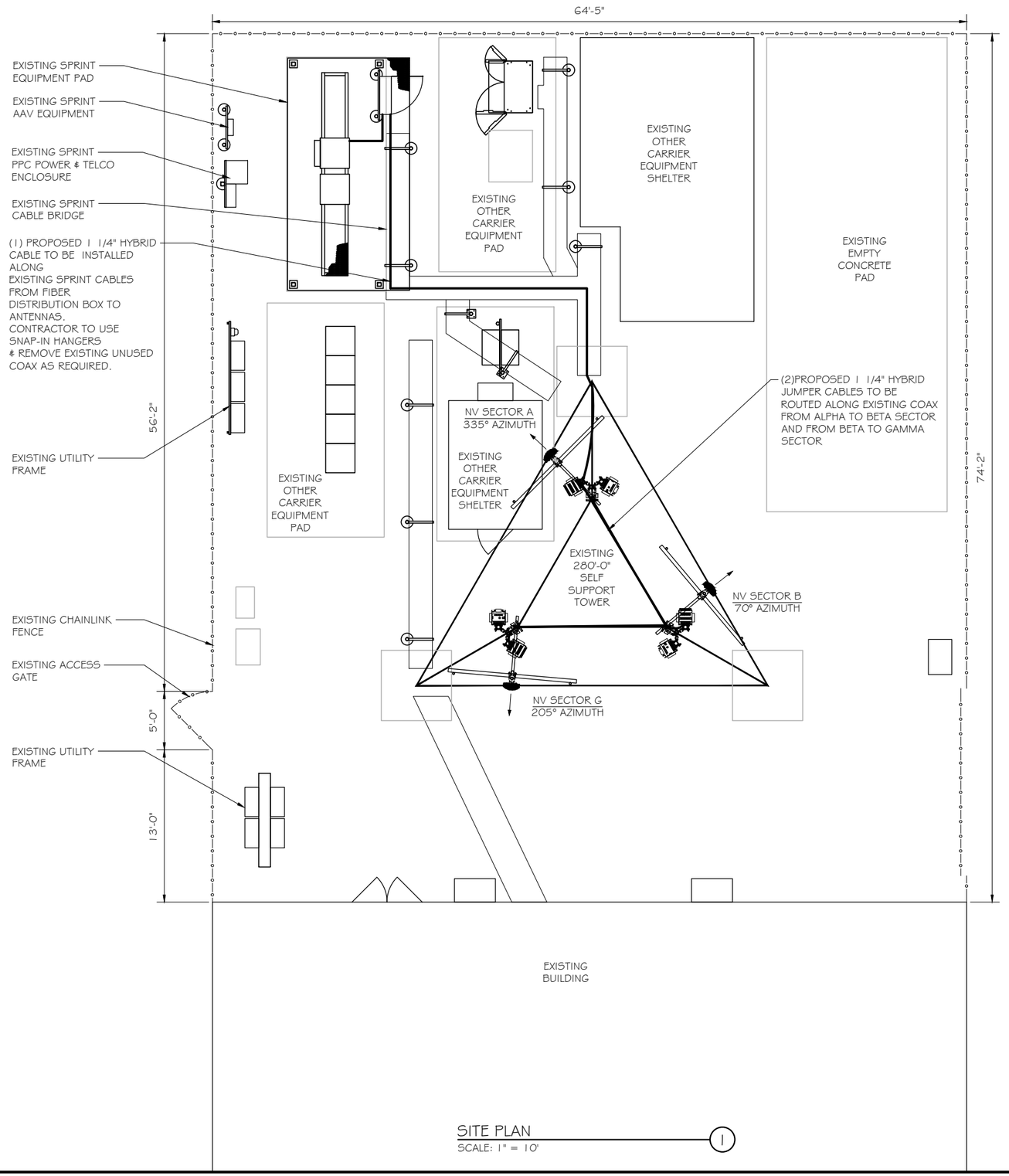
SHEET TITLE:
SPRINT SPECIFICATIONS

SCALE: NONE

PROJECT NUMBER: 29016

SHEET NUMBER: SP-3

DRAWN BY: TJN CHECKED BY: KAB



SITE PLAN
SCALE: 1" = 10'

NORTH

Sprint

6580 SPRINT PARKWAY
OVERLAND PARK, KANSAS 66251

RAMAKER & ASSOCIATES, INC.
1120 Dallas Street, Sauk City, WI 53583
Phone: 608-643-4100 Fax: 608-643-7999
www.Ramaker.com

Transcend Wireless

48 SPRUCE STREET
OAKLAND, NJ 07346

Certification & Seal:
I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Connecticut.

STATE OF CONNECTICUT
JAMES R. SKOWRONSKI
No. 26266
LICENSED
PROFESSIONAL ENGINEER

Signature: 7/29/2014 Date:

MARK	DATE	DESCRIPTION

ISSUE PHASE: FINAL
DATE ISSUED: 07/29/2014

PROJECT TITLE:
S BETHANY/EMAC COMMUNICATIONS
SITE#:CT33XC610-C

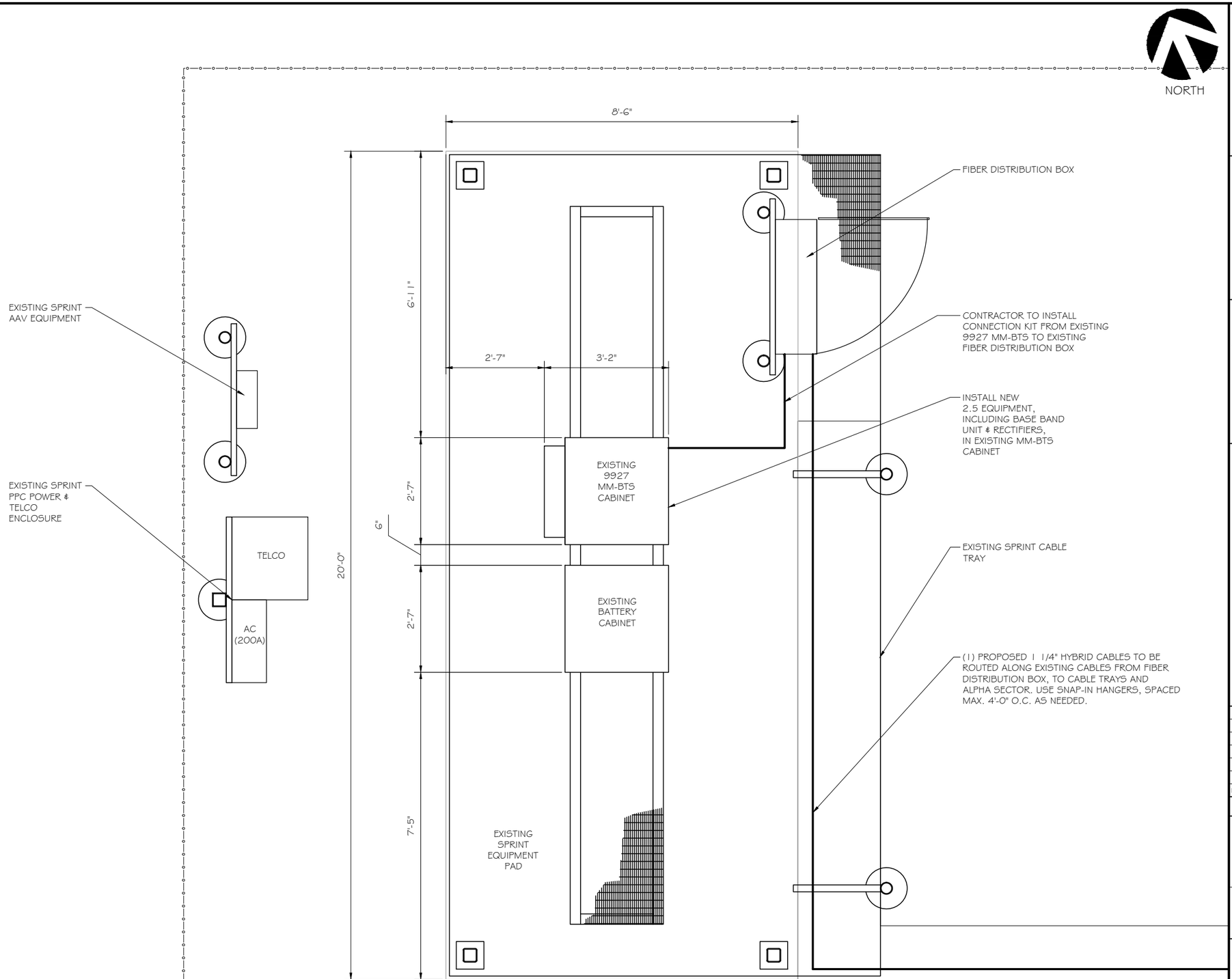
PROJECT INFORMATION:
2 PROGRESS AVENUE
SEYMOUR, CT 06483
NEW HAVEN COUNTY

SHEET TITLE:
SITE PLAN

0 5' 10' 20'
11" x 17" - 1" = 10'
22" x 34" - 1" = 5'

PROJECT NUMBER: 29016
SHEET NUMBER: A-1

I:\29000\29016\CAD\29016 Sprint 2.5 CD for CT.dwg Printed by: kgalston on Jul 29, 2014 - 2:23pm



EQUIPMENT PLAN
SCALE: 1" = 2.5'

Sprint
6580 SPRINT PARKWAY
OVERLAND PARK, KANSAS 66251

RAMAKER & ASSOCIATES, INC.
1120 Dallas Street, Sauk City, WI 53583
Phone: 608-643-4100 Fax: 608-643-7999
www.Ramaker.com

Transcend Wireless
48 SPRUCE STREET
OAKLAND, NJ 07346

Certification & Seal:
I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Connecticut.

STATE OF CONNECTICUT ★ JAMES R. SKOWRONSKI ★ No. 26266 LICENSED PROFESSIONAL ENGINEER

Signature: 7/29/2014 Date:

MARK	DATE	DESCRIPTION

ISSUE PHASE: FINAL DATE ISSUED: 07/29/2014

PROJECT TITLE:
S BETHANY/EMAC COMMUNICATIONS SITE#:CT33XC610-C

PROJECT INFORMATION:
2 PROGRESS AVENUE
SEYMOUR, CT 06483
NEW HAVEN COUNTY

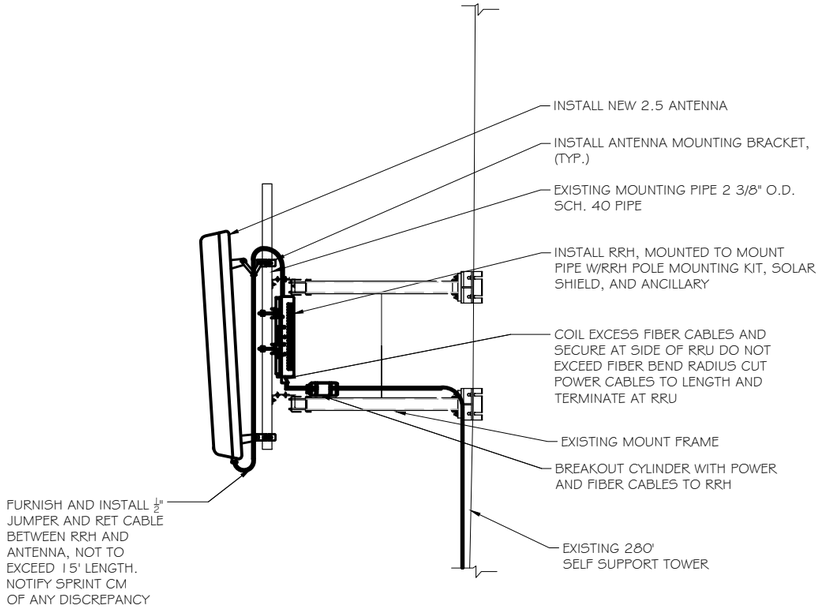
SHEET TITLE:
EQUIPMENT PLAN

0 1.25' 2.5' 5'

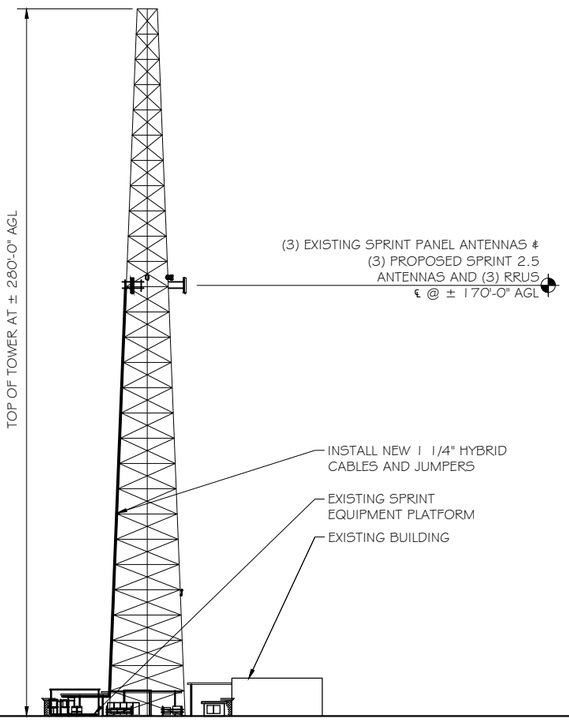
11" x 17" - 1" = 2.5'
22" x 34" - 1" = 1.25'

PROJECT NUMBER: 29016
SHEET NUMBER: A-2

DRAWN BY: TJN CHECKED BY: KAB

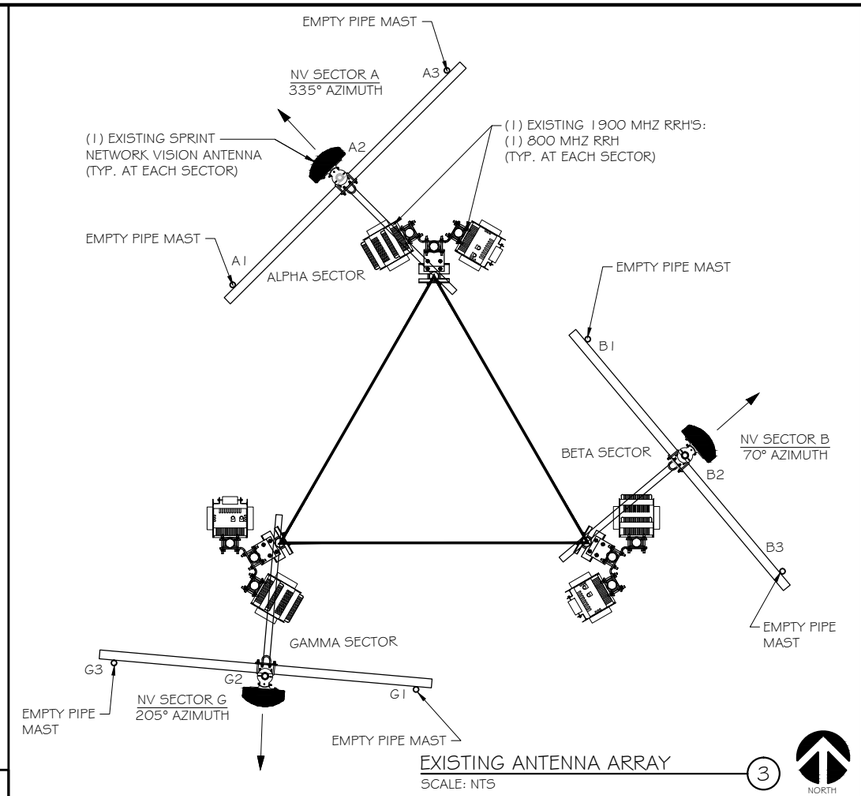


ANTENNA & RRH MOUNTING DETAILS (1)
SCALE: NTS

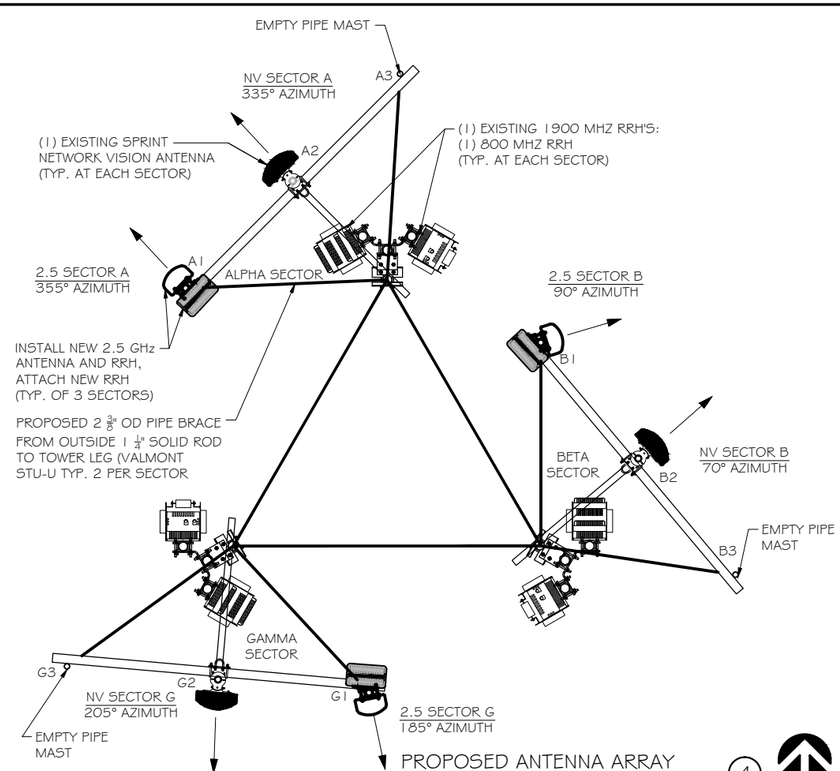


0 30' 60' 120'
11" x 17" - 1" = 60'
22" x 34" - 1" = 30'

BUILDING ELEVATION (2)
SCALE: 1" = 60'



EXISTING ANTENNA ARRAY (3)
SCALE: NTS



PROPOSED ANTENNA ARRAY (4)
SCALE: NTS

Sprint
6580 SPRINT PARKWAY
OVERLAND PARK, KANSAS 66251

RAMAKER & ASSOCIATES, INC.
1120 Dallas Street, Sauk City, WI 53583
Phone: 608-643-4100 Fax: 608-643-7999
www.Ramaker.com

Transcend Wireless
48 SPRUCE STREET
OAKLAND, NJ 07346

Certification & Seal:
I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Connecticut.

STATE OF CONNECTICUT
JAMES R. SKOWRONSKI
No. 26266
LICENSED
PROFESSIONAL ENGINEER

Signature: 7/29/2014 Date:

MARK	DATE	DESCRIPTION

ISSUE PHASE: FINAL DATE ISSUED: 07/29/2014

PROJECT TITLE:
S BETHANY/EMAC COMMUNICATIONS
SITE#:CT33XC610-C

PROJECT INFORMATION:
2 PROGRESS AVENUE
SEYMOUR, CT 06483
NEW HAVEN COUNTY

SHEET TITLE:
BUILDING ELEVATIONS & ANTENNA DETAILS

SCALE:
AS NOTED

PROJECT NUMBER: 29016
SHEET NUMBER: A-3

I:\29000\29016\CAD\29016 Sprint 2.5 CD for CT.dwg Printed by: kgalston on Jul 29, 2014 - 2:23pm

Sprint

RFDS Sheet

General Site Information

Site ID	CT33XC610	Equipment Vendor	Alcatel-Lucent
Market	Southern Connecticut	Lattitude	41.39139
Region	Northeast	Longitude	-73.0533
MLA	N/A	LL SITE ID	N/A
Structure Type	Tower		
BTS Type			

Solution ID		Siterra SR Equipment type	
		Equipment Vendor	Alcatel-Lucent

Incremental Power Draw needed by added Equipment: N/A

Base Equipment

BBU Kit	ALU BBU Kit	Top Hat	None
BBU Kit Qty	1	Top Hat Qty	N/A
		Top Hat Dimenstions	N/A
Growth Cabinet	N/A	Top Hat Weight (lbs)	N/A
Growth Cabinet Qty	N/A		
Growth Cabinet Dimensions	N/A		
Growth Cabinet Weight	N/A		

RF Path Information

RRH	TD-RRH8x20-25	
RRH Qty	3	
RRH Dimensions	26.1"x18.6"x6.7"	
RRH Weight. lbs.	70	
RRH Mount Weight. Lbs.	10	
Power and Fiber Cable	ALU Hybrid Cable	
Cable Qty	1	
Weight per foot. Lbs.	0.992	
Diameter. Inches.	1.25	
Length Ft.	250	(calculated as antenna height plus 20%)
Coax Jumper	TBD	
Coax Jumper Qty	30	
Coax Jumper Length. Feet.	8	
Coax Jumper Weight	1.7	
Coax Jumper Diameter. Inches	0.5	
AISG Cable	Commscope ATCB-B01-006	
AISG Cable Qty	3	
AISG Diameter. Inches.	0.315	
AISG Cable length.	8	
Weight of entire AISG cable. Lbs.	1.3	

Antenna Sector Information

	Sector 1	Sector 2	Sector 3
Antenna make/model	RFS APXV9TM14-ALU-I20	RFS APXV9TM14-ALU-I20	RFS APXV9TM14-ALU-I20
Antenna qty	1	1	1
Antenna Dimensions. Inches	56.3"x12.6"x6.3"	56.3"x12.6"x6.3"	56.3"x12.6"x6.3"
Antenna Weight. Lbs	55.12	55.12	55.12
Antenna Mounting Kit Weight. Lbs.	11.5	11.5	11.5
CL Height	170	170	170
Antenna Azimuth	355	90	185
Antenna Mechanical Downtilt	0	0	0
Antenna etilt	-2	-2	-2

*RFDS SHEET WAS GENERATED BY RAMAKER & ASSOCIATES FROM PLAN OF RECORD (POR) PROVIDED BY SPRINT. CONTRACTOR SHALL VERIFY AND OBTAIN FINAL RFDS FROM SPRINT CONSTRUCTION MANAGER PRIOR TO CONSTRUCTION.

NOTES:

1. GENERAL CONTRACTOR TO FIELD VERIFY AZIMUTH AND C/L HEIGHT AND MECHANICAL DOWNTILT. IF DIFFERENT THAN CALLED OUT BELOW, HALT ANTENNA WORK FOR ONE HOUR, CALL SPRINT RF ENGINEER (OR MANAGER IF RF ENGINEER DOES NOT ANSWER, BUT STILL LEAVE A MESSAGE TO RF ENGINEER) USING CONTACT INFORMATION ABOVE FOR FURTHER INSTRUCTIONS. IF SPRINT DOES NOT RESPOND WITHIN ONE HOUR, PLACE 2.5GHZ ANTENNA AT SAME C/L HEIGHT AS 1.9GHZ ANTENNA AND EMAIL CORRECT C/L HEIGHT AND AZIMUTH TO SPRINT RF ENGINEER. UPDATE AS-BUILD DRAWING WITH CORRECT C/L HEIGHT. ALSO EMAIL CORRECT 1.9GHZ AND 800MHZ ANTENNA C/L HEIGHT, AZIMUTH AND MECHANICAL DOWNTILT TO RF ENGINEER.
2. AISG TESTS TO VERIFY OPERATION IS TO BE PERFORMED AFTER FINAL INSTALLATION OF ANTENNAS AND AISG CABLES HAVE BEEN CONNECTED. VERIFY OPERATION OF ALL EXISTING SPRINT AISG EQUIPMENT INCLUDING 800MHZ, 1.9GHZ AND 2.5GHZ. TEST TO INCLUDE COMPLETE DOWNTILT, AZIMUTH (IF APPLICABLE) AND BEAMWIDTH SWINGS (IF APPLICABLE). DOCUMENT AISG TEST RESULTS IN COAX SWEEP TEST SPREADSHEET.
3. GENERAL CONTRACTOR MUST ENSURE THAT NO OBJECT IS LOCATED WITHIN 45 DEGREES OF LEFT AND RIGHT OF FRONT OF ANTENNA OR 7 DEGREES UP AND DOWN FROM CENTER OF ANTENNA. IF THIS IS NOT POSSIBLE, CONTACT RF ENGINEER FOR FURTHER INSTRUCTION. IN ADDITION, 2.5GHZ ANTENNA IS NOT TO BE PLACED IN FRONT OF ANY OTHER ANTENNA USING THE SAME 45 DEGREE RULE. THIS INCLUDES SPRINT AND NON-SPRINT ANTENNAS.
4. 2.5GHZ ANTENNA MUST BE AT LEAST 6" FROM 1.9GHZ ANTENNA, 30" FROM 800MHZ ANTENNA AND 30" FROM DUAL BAND 1.9GHZ AND 800MHZ ANTENNA.
5. GENERAL CONTRACT IS REQUIRED TO USE A DIGITAL ALIGNMENT TOOL TO SET AZIMUTH, ROLL AND DOWNTILT. AZIMUTH ACCURACY IS TO BE WITHIN 1 DEGREE. DOWNTILT AND ROLL (LEFT TO RIGHT TILT) IS TO BE WITHIN 0.1 DEGREES. IF FOR SOME REASON THIS ACCURACY CANNOT BE ACHIEVED, UPDATE AS-BUILT DRAWINGS AND EMAIL SPRINT RF ENGINEER WITH AS-BUILT SETTINGS. USE 3Z RF ALIGNMENT TOOL OR EQUIVALENT TOOL.

Sprint
6580 SPRINT PARKWAY
OVERLAND PARK, KANSAS 66251

RAMAKER & ASSOCIATES, INC.
1120 Dallas Street, Sauk City, WI 53583
Phone: 608-643-4100 Fax: 608-643-7999
www.Ramaker.com

Transcend Wireless
48 SPRUCE STREET
OAKLAND, NJ 07346

Certification & Seal:
I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Connecticut.

STATE OF CONNECTICUT · JAMES R. SKOWRONSKI · No. 26266 · LICENSED PROFESSIONAL ENGINEER

Signature: 7/29/2014 Date:

MARK	DATE	DESCRIPTION

ISSUE PHASE: FINAL DATE ISSUED: 07/29/2014

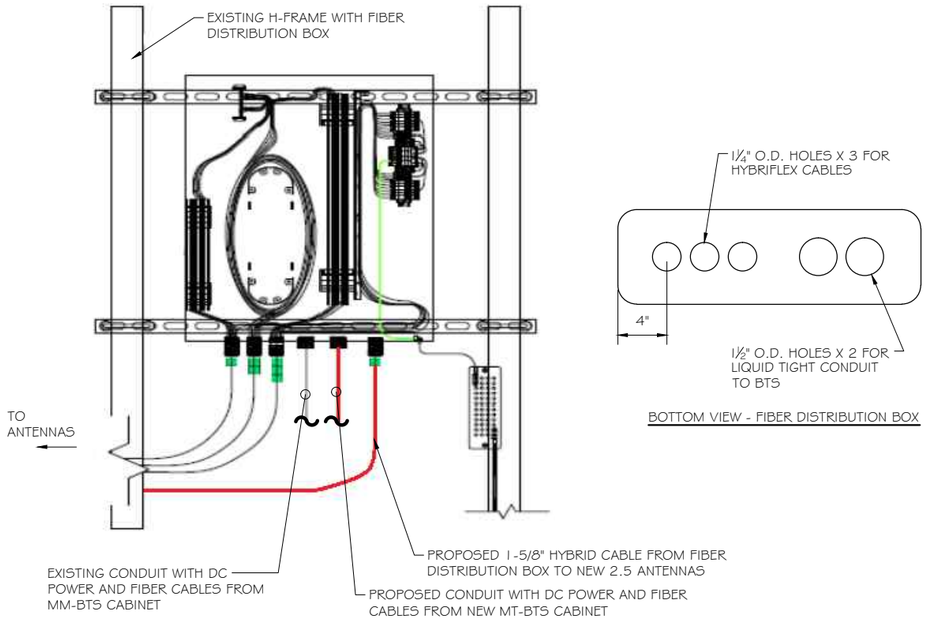
PROJECT TITLE:
S BETHANY/EMAC COMMUNICATIONS
SITE#:CT33XC610-C

PROJECT INFORMATION:
2 PROGRESS AVENUE
SEYMOUR, CT 06483
NEW HAVEN COUNTY

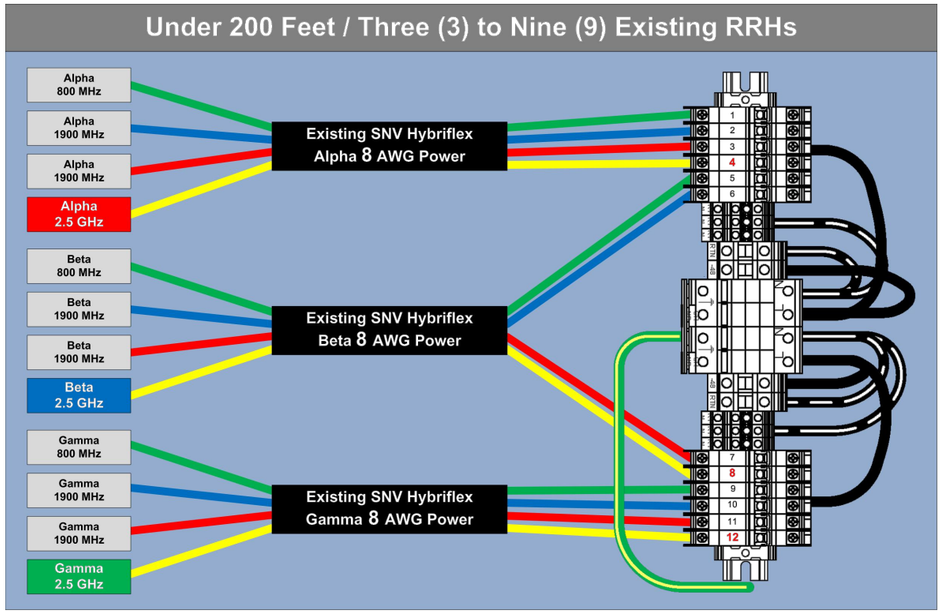
SHEET TITLE:
RF DATA SHEET

SCALE:
AS NOTED

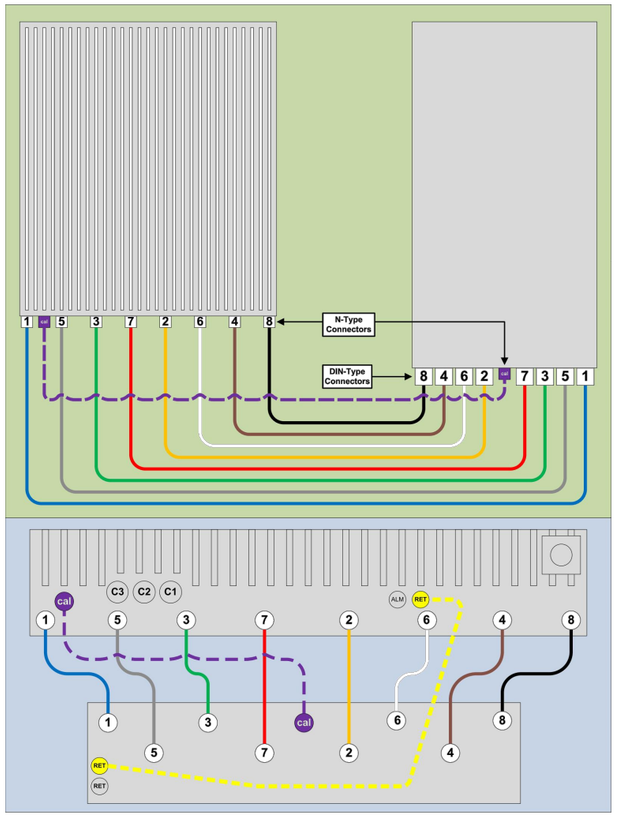
PROJECT NUMBER: 29016
SHEET NUMBER: A-4



TYPICAL FIBER DISTRIBUTION BOX DETAIL 1
SCALE: NTS

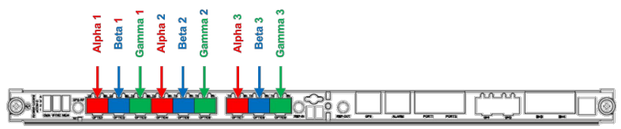


RRH TO DISTRIBUTION BOX POWER CONNECTIVITY DETAIL 2
SCALE: NTS

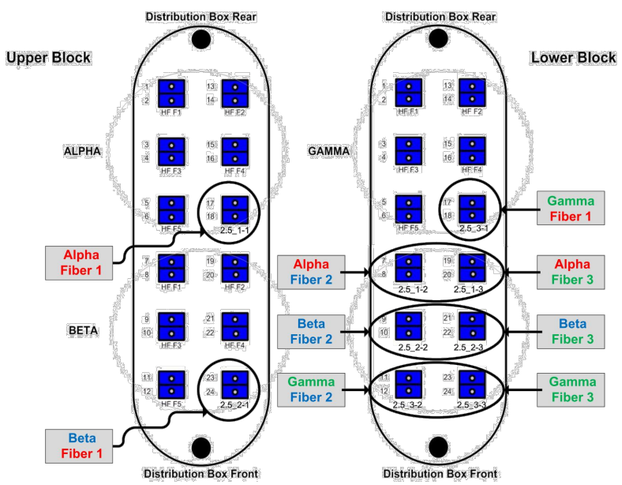


8T8R DETAIL 3
SCALE: NTS

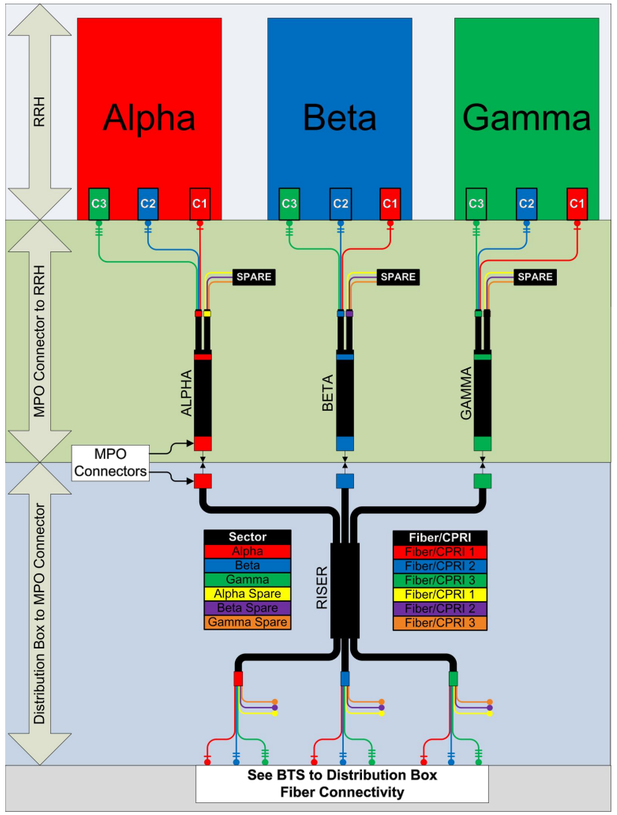
eCCM2-HR



Distribution Box Fiber Panel



BTS TO DISTRIBUTION BOX FIBER CONNECTIVITY DETAIL 4
SCALE: NTS



RRH TO DISTRIBUTION BOX FIBER CONNECTIVITY DETAIL 5
SCALE: NTS

Sprint
6580 SPRINT PARKWAY
OVERLAND PARK, KANSAS 66251

RAMAKER & ASSOCIATES, INC.
1120 Dallas Street, Sauk City, WI 53583
Phone: 608-643-4100 Fax: 608-643-7999
www.Ramaker.com

Transcend Wireless
48 SPRUCE STREET
OAKLAND, NJ 07346

Certification & Seal:
I hereby certify this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Connecticut.

Signature: 7/29/2014 Date:

MARK	DATE	DESCRIPTION

ISSUE PHASE: FINAL DATE ISSUED: 07/29/2014

PROJECT TITLE:
S BETHANY/EMAC COMMUNICATIONS
SITE#:CT33XC610-C

PROJECT INFORMATION:
2 PROGRESS AVENUE
SEYMOUR, CT 06483
NEW HAVEN COUNTY

SHEET TITLE:
FIBER PLUMBING DIAGRAM

SCALE:
AS NOTED

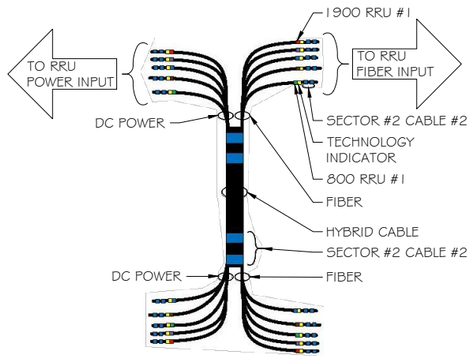
PROJECT NUMBER: 29016
SHEET NUMBER: A-5

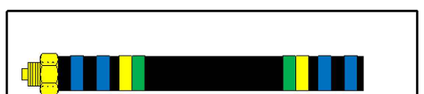
DRAWN BY: TJN CHECKED BY: KAB

2.5 FREQUENCY	INDICATOR		ID
2500 -1	YEL	WHT	GRN
2500 -2	YEL	WHT	RED
2500 -3	YEL	WHT	BRN
2500 -4	YEL	WHT	BLU
2500 -5	YEL	WHT	SLT
2500 -6	YEL	WHT	ORG
2500 -7	YEL	WHT	WHT
2500 -8	YEL	WHT	PPL

NV FREQUENCY	INDICATOR	ID
800-1	YEL	GRN
1900-1	YEL	RED
1900-2	YEL	BRN
1900-3	YEL	BLU
1900-4	YEL	SLT
800-1	YEL	ORG
RESERVED	YEL	WHT
RESERVED	YEL	PPL

Sector	Cable	First Ring	Second Ring	Third Ring
1 Alpha	1	Green	No Tape	No Tape
1	2	Blue	No Tape	No Tape
1	3	Brown	No Tape	No Tape
1	4	White	No Tape	No Tape
1	5	Red	No Tape	No Tape
1	6	Grey	No Tape	No Tape
1	7	Purple	No Tape	No Tape
1	8	Orange	No Tape	No Tape
2 Beta	1	Green	Green	No Tape
2	2	Blue	Blue	No Tape
2	3	Brown	Brown	No Tape
2	4	White	White	No Tape
2	5	Red	Red	No Tape
2	6	Grey	Grey	No Tape
2	7	Purple	Purple	No Tape
2	8	Orange	Orange	No Tape
3 Gamma	1	Green	Green	Green
3	2	Blue	Blue	Blue
3	3	Brown	Brown	Brown
3	4	White	White	White
3	5	Red	Red	Red
3	6	Grey	Grey	Grey
3	7	Purple	Purple	Purple
3	8	Orange	Orange	Orange




Example – Sector 2, Cable 2, 800mhz Radio #1


Example – Sector 3, Cable 1, 1900mhz Radio #1


Example – Sector 1, Cable 4, 800 mhz Radio #1 and 1900mhz Radio #1

COLOR CODING CHARTS
SCALE: NTS
1

CABLE MARKING NOTES

1. ALL CABLES SHALL BE MARKED WITH 2" WIDE, UV STABILIZED, UL APPROVED TAPE.
2. THE FIRST RING SHALL BE CLOSEST TO THE END OF THE CABLE AND SPACED APPROXIMATELY 2" FROM THE END CONNECTOR, WEATHERPROOFING, OR BREAKOUT UNIT. THERE SHALL BE 1" SPACE BETWEEN EACH RING.
3. A 2" GAP SHALL SEPARATE THE CABLE COLOR CODE FROM THE FREQUENCY COLOR CODE. THE 2" COLOR RINGS FOR THE FREQUENCY CODE SHALL BE PLACED NEXT TO EACH OTHER WITH NO SPACES.
4. THE 2" COLORED TAPE(S) SHALL BE WRAPPED A MINIMUM OF 3 TIMES AROUND THE INDIVIDUAL CABLES, AND THE TAPE SHALL BE KEPT IN THE SAME LOCATION AS MUCH AS POSSIBLE.
5. SITES WITH MORE THAN FOUR (4) SECTORS WILL REQUIRE ADDITIONAL RINGS FOR EACH SECTOR, FOLLOWING THE PATTERN. HIGH CAPACITY SITES WILL USE THE SECOND CABLE IDENTIFIED BY BLUE BANDS OF TAPE
6. HYBRID FIBER CABLE SHALL BE SECTOR IDENTIFIED INSIDE THE CABINET ON FREQUENCY BUNDLES, ON THE SEALTITE, ON THE MAIN LINE UPON EXIT OF SEALTITE, AND BEFORE AND AFTER THE BREAKOUT UNIT (MEDUSA), AS WELL AS BEFORE AND AFTER ANY ENTRANCE OR EXIT.
7. HFC "MAIN TRUNK" WILL NOT BE MARKED WITH THE FREQUENCY CODES, AS IT CONTAINS ALL FREQUENCIES.
8. INDIVIDUAL POWER PAIRS AND FIBER BUNDLES SHALL BE LABELED WITH BOTH THE CABLE AND FREQUENCY.

Sprint
6580 SPRINT PARKWAY
OVERLAND PARK, KANSAS 66251

RAMAKER & ASSOCIATES, INC.
1120 Dallas Street, Sauk City, WI 53583
Phone: 608-643-4100 Fax: 608-643-7999
www.Ramaker.com

Transcend Wireless
48 SPRUCE STREET
OAKLAND, NJ 07346

Certification & Seal:
I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Connecticut.

STATE OF CONNECTICUT ★ JAMES R. SKOWRONSKI ★ No. 26266 LICENSED PROFESSIONAL ENGINEER

Signature: 7/29/2014 Date:

MARK	DATE	DESCRIPTION

ISSUE PHASE: FINAL
DATE ISSUED: 07/29/2014

PROJECT TITLE:
S BETHANY/EMAC COMMUNICATIONS
SITE#:CT33XC610-C

PROJECT INFORMATION:
2 PROGRESS AVENUE
SEYMOUR, CT 06483
NEW HAVEN COUNTY

SHEET TITLE:
CABLE COLOR CODING

SCALE:
AS NOTED

PROJECT NUMBER: 29016
SHEET NUMBER: A-6

I:\29000\29016\CAD\29016 Sprint 2.5 CD for CT.dwg Printed by: kgalston on Jul 29, 2014 - 2:23pm

HYBRID CABLE DC CONDUCTOR SIZE GUIDELINE
MANUF:RFS

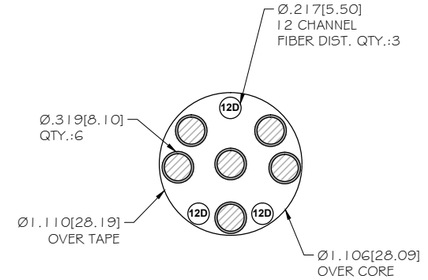
CABLE	LENGTH	DC CONDUCTOR	CABLE DIAMETER
Fiber Only	Varies	Use NV Hybriflex	5/8"
Hybriflex	<200'	8 AWG	1-1/4"
Hybriflex	225-300'	6 AWG	1-1/4"
Hybriflex	325-375'	4 AWG	1-1/4"

RFS HYBRIFLEX RISER CABLE SCHEDULE

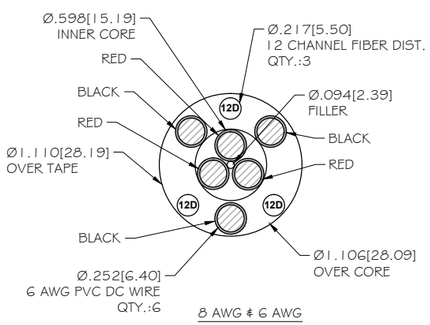
FIBER ONLY (EXISTING DC POWER)	Hybrid cable MN:HB058-M12-050F 12x multi-mode fiber pairs, Top:Outdoor protected connectors, Bottom:LC Connectors, 5/8 cable, 50 ft	50 ft
	MN:HB058-M12-075F	75 ft
	MN:HB058-M12-100F	100 ft
	MN:HB058-M12-125F	125 ft
	MN:HB058-M12-150F	150 ft
	MN:HB058-M12-175F	175 ft
	MN:HB058-M12-200F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

RFS HYBRIFLEX JUMPER CABLE SCHEDULE

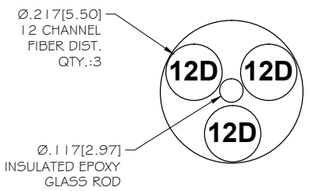
FIBER ONLY	Hybrid Jumper cable MN:HBF012-M3-5F1 5 ft, 3x multi-mode fiber pairs, Outdoor & LC connectors, 1/2 cable	5 ft
	MN:HBF012-M3-10F1	10 ft
	MN:HBF012-M3-15F1	15 ft
	SPECIAL INSTALLATION NOTE: JUMPERS FROM 2.5 RRH TO 2.5 ANTENNA SHALL NOT EXCEED 15' NOTIFY SPRINT CM OF ANY DISCREPANCY	
8 AWG POWER	Hybrid Jumper cable MN:HBF058-08U1M3-5F1 5 ft, 1x 8 AWG power pair, 3x multi-mode fiber pairs, Outdoor & LC connectors, 5/8 cable	5 ft
	MN:HBF058-08U1M3-10F1	10 ft
	MN:HBF058-08U1M3-15F1	15 ft
	SPECIAL INSTALLATION NOTE: JUMPERS FROM 2.5 RRH TO 2.5 ANTENNA SHALL NOT EXCEED 15' NOTIFY SPRINT CM OF ANY DISCREPANCY	
6 AWG POWER	Hybrid Jumper cable MN:HBF058-13U1M3-5F1 5 ft, 1x 6 AWG power pair, 3x multi-mode fiber pairs, Outdoor & LC connectors, 5/8 cable	5 ft
	MN:HBF058-13U1M3-10F1	10 ft
	MN:HBF058-13U1M3-15F1	15 ft
	SPECIAL INSTALLATION NOTE: JUMPERS FROM 2.5 RRH TO 2.5 ANTENNA SHALL NOT EXCEED 15' NOTIFY SPRINT CM OF ANY DISCREPANCY	
4 AWG POWER	Hybrid Jumper cable MN:HBF078-21U1M3-5F1 5 ft, 1x 4 AWG power pair, 3x multi-mode fiber pairs, Outdoor & LC connectors, 7/8 cable	5 ft
	MN:HBF078-21U1M3-10F1	10 ft
	MN:HBF078-21U1M3-15F1	15 ft
	SPECIAL INSTALLATION NOTE: JUMPERS FROM 2.5 RRH TO 2.5 ANTENNA SHALL NOT EXCEED 15' NOTIFY SPRINT CM OF ANY DISCREPANCY	



4 AWG



8 AWG & 6 AWG

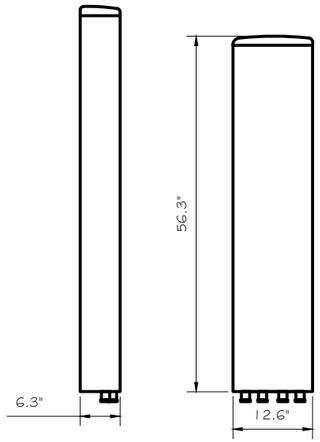


FIBER ONLY

HYBRID CABLE CROSS SECTION & DATA
SCALE: NTS

1

RFS: APXV9TM14-ALU-120



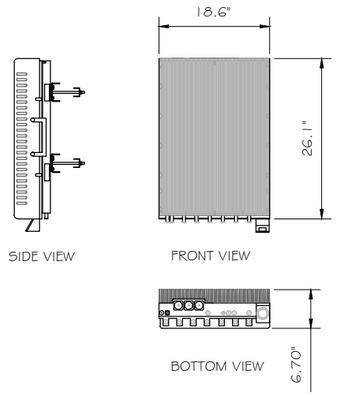
DIMENSIONS, HxWxD: 56.3" x 12.6" x 6.3"

WEIGHT, WITHOUT PRE-MOUNTED BRACKETS: 55.12 lbs.

CONNECTOR: (9) XX" MINI-DIN FEMALE/BOTTOM

2.5 ANTENNA DETAIL
SCALE: NTS

2



ALCATEL-LUCENT: TD-RRH8x20-25

HxWxD = (26.1" x 18.6" x 6.7")

WEIGHT = 70 lbs.

2.5 RRH DETAIL
SCALE: NTS

3

Sprint

6580 SPRINT PARKWAY
OVERLAND PARK, KANSAS 66251

RAMAKER & ASSOCIATES, INC.
1120 Dallas Street, Sauk City, WI 53583
Phone: 608-643-4100 Fax: 608-643-7999
www.Ramaker.com

Transcend Wireless
48 SPRUCE STREET
OAKLAND, NJ 07346

Certification & Seal:
I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Connecticut.

STATE OF CONNECTICUT ★ JAMES R. SKOWRONSKI ★ No. 26266 LICENSED PROFESSIONAL ENGINEER

Signature: Date: 7/29/2014

MARK	DATE	DESCRIPTION

ISSUE PHASE: FINAL DATE ISSUED: 07/29/2014

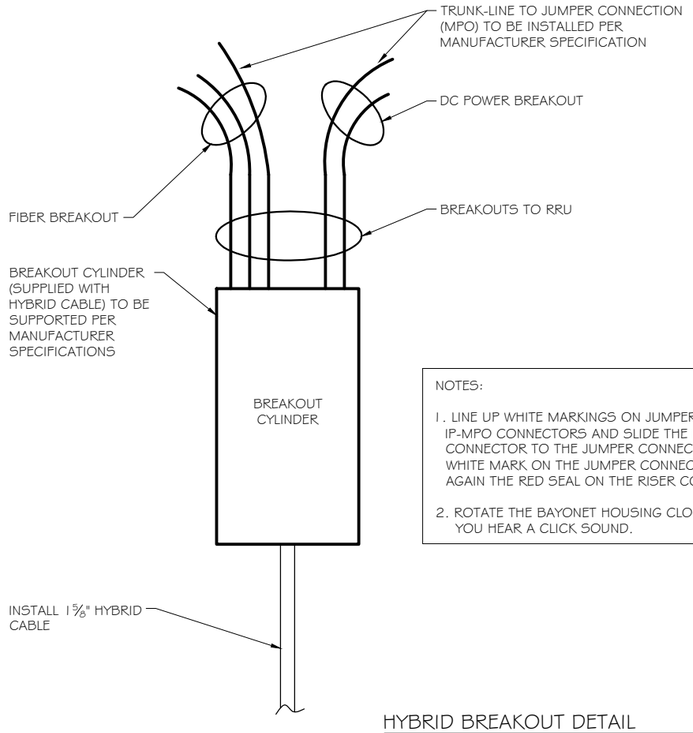
PROJECT TITLE:
5 BETHANY/EMAC
COMMUNICATIONS
SITE#:CT33XC610-C

PROJECT INFORMATION:
2 PROGRESS AVENUE
SEYMOUR, CT 06483
NEW HAVEN COUNTY

SHEET TITLE:
ANTENNA & HYBRID CABLE DETAILS

SCALE:
AS NOTED

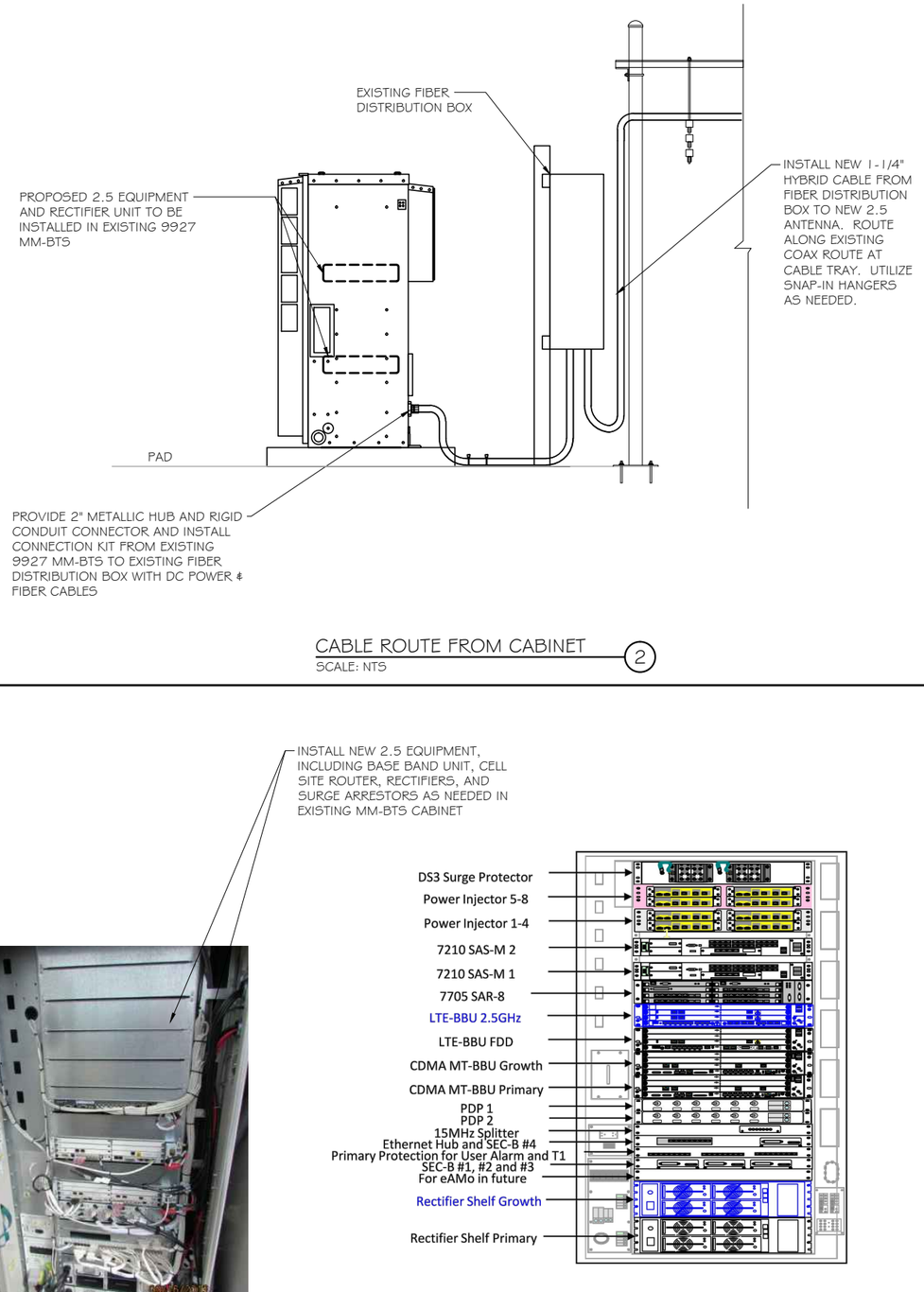
PROJECT NUMBER: 29016
SHEET NUMBER: A-7



NOTES:

1. LINE UP WHITE MARKINGS ON JUMPER AND RISER IP-MPO CONNECTORS AND SLIDE THE RISER CONNECTOR TO THE JUMPER CONNECTOR. PUSH THE WHITE MARK ON THE JUMPER CONNECTOR FLUSH AGAIN THE RED SEAL ON THE RISER CONNECTOR.
2. ROTATE THE BAYONET HOUSING CLOCKWISE UNTIL YOU HEAR A CLICK SOUND.

HYBRID BREAKOUT DETAIL (1)
SCALE: NTS



CABLE ROUTE FROM CABINET (2)
SCALE: NTS

EXISTING BBU CABINET (3)
SCALE: NTS

EXISTING MMBS CABINET (4)
SCALE: NTS

Sprint

6580 SPRINT PARKWAY
OVERLAND PARK, KANSAS 66251

RAMAKER & ASSOCIATES, INC.
1120 Dallas Street, Sauk City, WI 53583
Phone: 608-643-4100 Fax: 608-643-7999
www.Ramaker.com

Transcend Wireless
48 SPRUCE STREET
OAKLAND, NJ 07346

Certification & Seal:
I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Connecticut.

STATE OF CONNECTICUT
JAMES R. SKOWRONSKI
No. 26266
LICENSED PROFESSIONAL ENGINEER

Signature: 7/29/2014 Date:

MARK	DATE	DESCRIPTION

ISSUE PHASE: FINAL DATE ISSUED: 07/29/2014

PROJECT TITLE:
S BETHANY/EMAC
COMMUNICATIONS
SITE#:CT33XC610-C

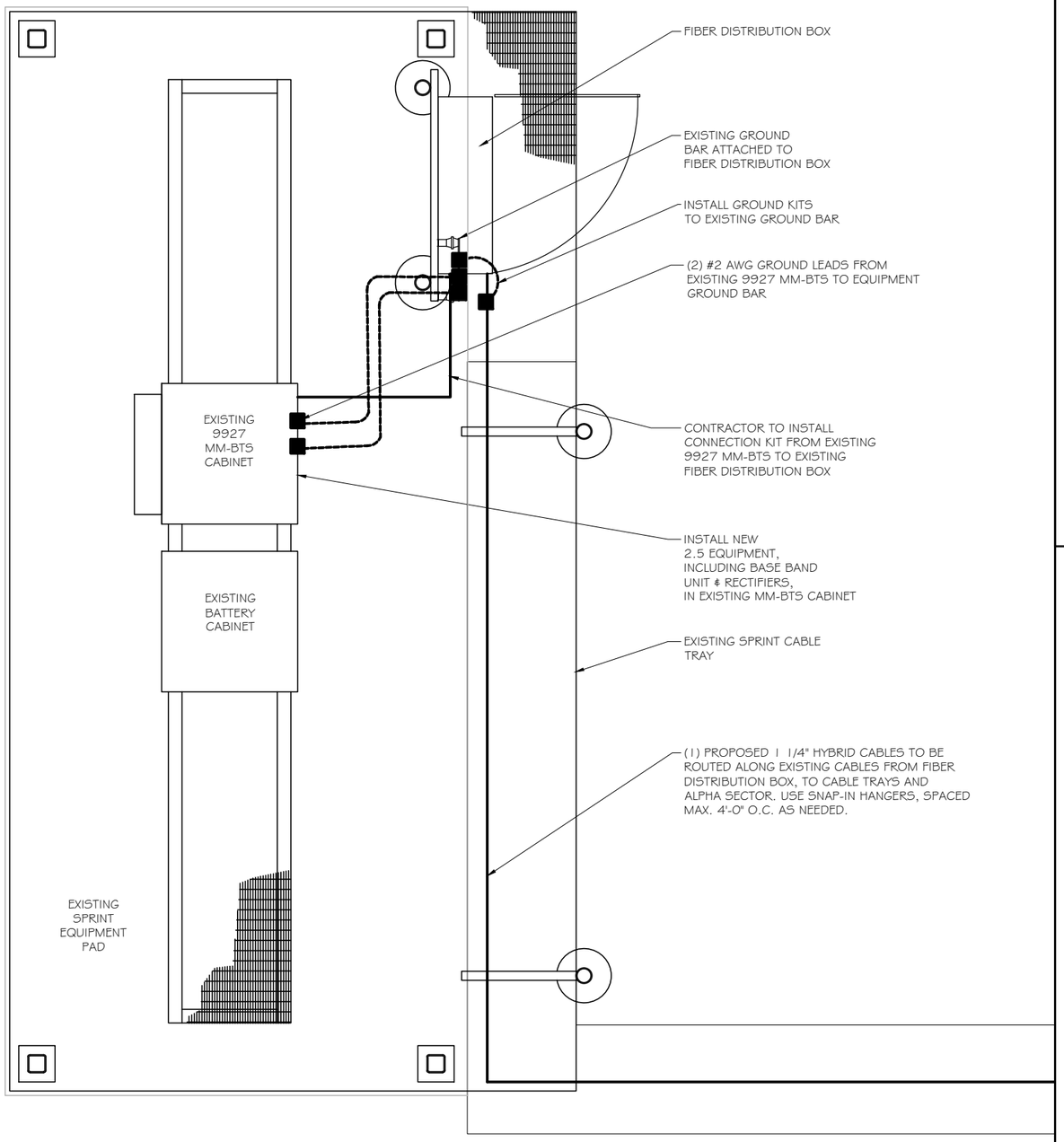
PROJECT INFORMATION:
2 PROGRESS AVENUE
SEYMOUR, CT 06483
NEW HAVEN COUNTY

SHEET TITLE:
EQUIPMENT DETAILS

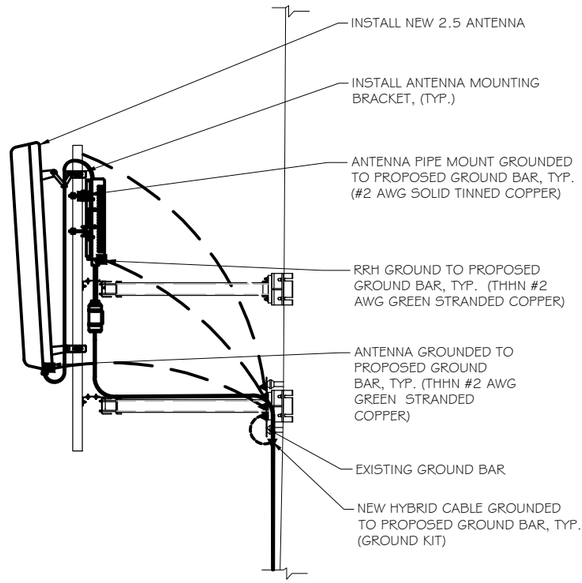
SCALE:
AS NOTED

PROJECT NUMBER: 29016
SHEET NUMBER: A-8

DRAWN BY: TJN CHECKED BY: KAB



EQUIPMENT UTILITY & GROUNDING PLAN (1)
SCALE: NTS



ANTENNA GROUNDING DETAIL (2)
SCALE: NTS

GROUNDING NOTES:

1. CONTRACTOR TO ENSURE PROPER SEQUENCING OF GROUNDING AND UNDERGROUND CONDUIT INSTALLATION TO PREVENT ANY LOSS OF CONTINUITY IN THE GROUNDING SYSTEM AND/OR DAMAGE TO THE CONDUIT.
2. ALL EXTERIOR GROUND CONDUCTORS SHALL BE #2 AWG SOLID TINNED COPPER UNLESS NOTED OTHERWISE.
3. ALL GROUND CONNECTIONS BELOW GRADE SHALL BE EXOTHERMIC (CADWELD).
4. ALL GROUND CONNECTIONS ABOVE GRADE AND/OR INTERIOR SHALL BE COMPRESSION TYPE, TWO-HOLE LUGS OR DOUBLE-CRIMP "C" TAPS.
5. CONTACT AREAS WHERE CONNECTIONS ARE MADE SHALL BE PREPARED TO A BARE BRIGHT FINISH AND COATED WITH AN ANTI-OXIDATION MATERIAL BEFORE CONNECTIONS ARE MADE.
6. MAXIMUM RESISTANCE OF THE COMPLETED GROUND SYSTEM SHALL NOT EXCEED 5 OHMS.
7. WHERE GROUNDING CONNECTIONS ARE MADE TO PAINTED METAL SURFACES, PAINT SHALL BE REMOVED TO BEAR METAL TO ENSURE PROPER CONTACT AND RESTORED/PAINTED TO ORIGINAL FINISH.
8. GROUND DEPTH SHALL BE 30" MINIMUM BELOW FINISHED GRADE, OR 6" BELOW FROST LINE, WHICHEVER IS GREATER.

LEGEND:	
– – – – – – – – – – – –	EXISTING GROUND CABLE
▬▬▬▬▬▬▬▬▬▬▬▬	PROPOSED GROUND CABLE
▲	MECHANICAL CONNECTION
■	EXOTHERMIC CONNECTION
—E—E—E—E—	PROPOSED ELECTRIC

Sprint
6580 SPRINT PARKWAY
OVERLAND PARK, KANSAS 66251

RAMAKER & ASSOCIATES, INC.
1120 Dallas Street, Sauk City, WI 53583
Phone: 608-643-4100 Fax: 608-643-7999
www.Ramaker.com

Transcend Wireless
48 SPRUCE STREET
OAKLAND, NJ 07346

Certification & Seal:
I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly licensed Professional Engineer under the laws of the State of Connecticut.

STATE OF CONNECTICUT ★ JAMES R. SKOWRONSKI ★ No. 26266 LICENSED PROFESSIONAL ENGINEER

Signature: Date: 7/29/2014

MARK	DATE	DESCRIPTION

ISSUE PHASE: FINAL
DATE ISSUED: 07/29/2014

PROJECT TITLE:
S BETHANY/EMAC COMMUNICATIONS
SITE#:CT33XC610-C

PROJECT INFORMATION:
2 PROGRESS AVENUE
SEYMOUR, CT 06483
NEW HAVEN COUNTY

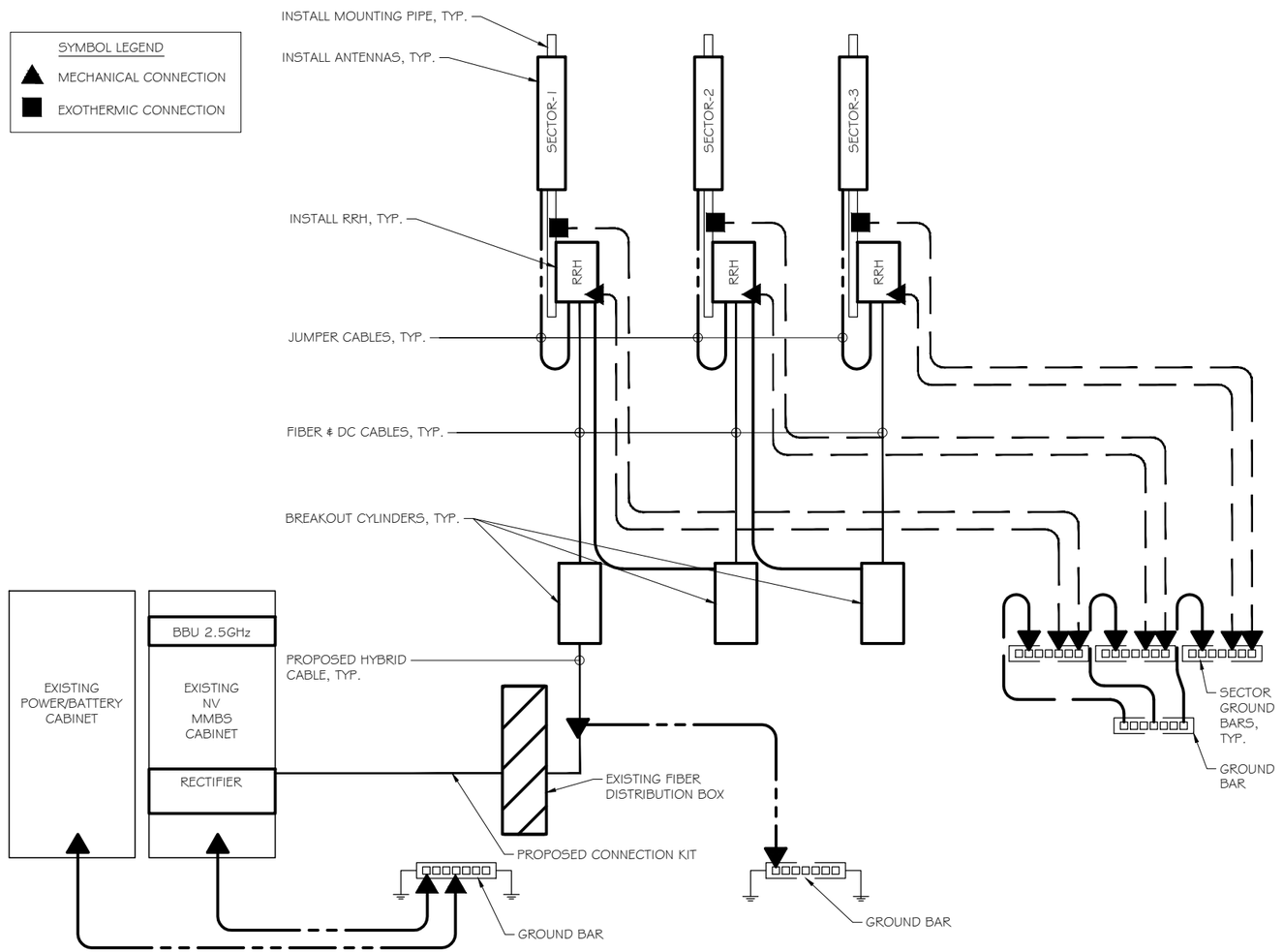
SHEET TITLE:
EQUIPMENT UTILITY & GROUNDING PLAN

SCALE:
AS NOTED

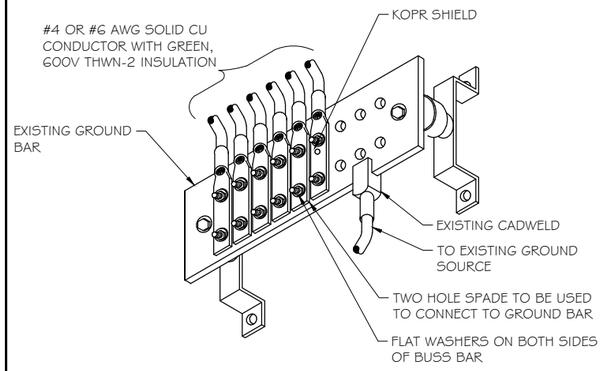
PROJECT NUMBER: 29016
SHEET NUMBER: E-1

DRAWN BY: TJN CHECKED BY: KAB

SYMBOL LEGEND
- MECHANICAL CONNECTION
- EXOTHERMIC CONNECTION



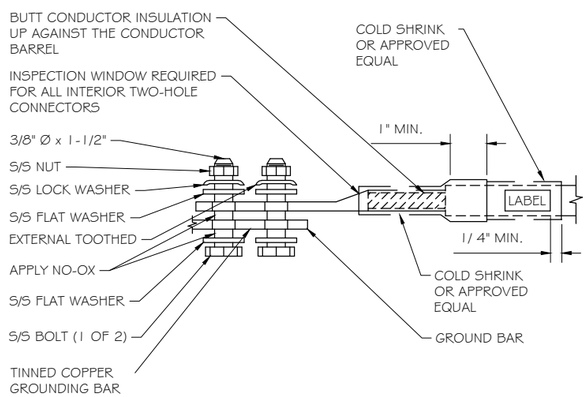
GROUNDING RISER DIAGRAM (1)
SCALE: NTS



NOTES:
1. APPLY NO-OX TO LUG AND GROUND BAR CONTACT SURFACE. DO NOT COAT INLINE LUG.

2. IF STOLEN GROUND BARS ARE ENCOUNTERED, CONTACT SPRINT CM FOR REPLACEMENT THREADED ROD KIT.

GROUNDING CONDUCTOR INSTALLATION (2)
SCALE: NTS



TWO-HOLE LUG (3)
SCALE: NTS

Sprint
6580 SPRINT PARKWAY
OVERLAND PARK, KANSAS 66251

RAMAKER & ASSOCIATES, INC.
1120 Dallas Street, Sauk City, WI 53583
Phone: 608-643-4100 Fax: 608-643-7999
www.Ramaker.com

Transcend Wireless
48 SPRUCE STREET
OAKLAND, NJ 07346

Certification & Seal:
I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly licensed Professional Engineer under the laws of the State of Connecticut.

STATE OF CONNECTICUT
JAMES R. SKOWRONSKI
No. 26266
LICENSED PROFESSIONAL ENGINEER

Signature: 7/29/2014 Date:

MARK	DATE	DESCRIPTION

ISSUE PHASE: FINAL DATE ISSUED: 07/29/2014

PROJECT TITLE:
S BETHANY/EMAC COMMUNICATIONS SITE#:CT33XC610-C

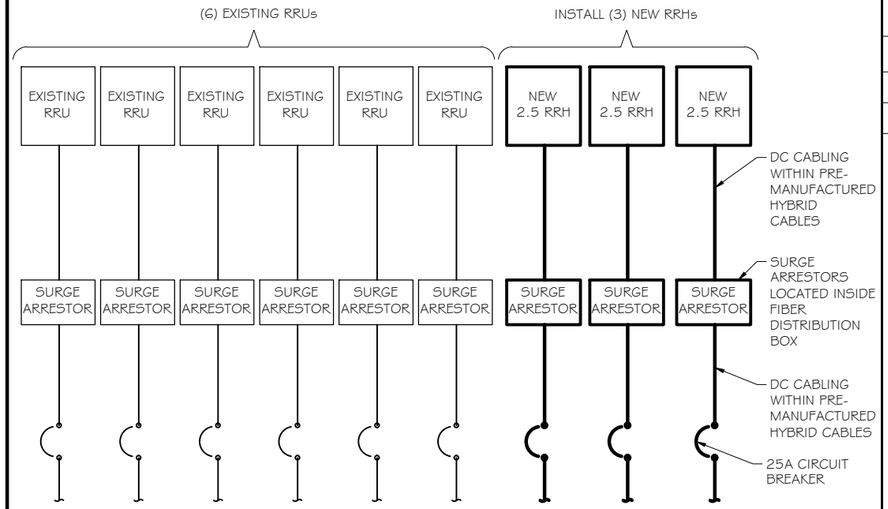
PROJECT INFORMATION:
2 PROGRESS AVENUE
SEYMOUR, CT 06483
NEW HAVEN COUNTY

SHEET TITLE:
GROUNDING DETAILS

SCALE:
AS NOTED

PROJECT NUMBER: 29016
SHEET NUMBER: E-2

I:\29000\29016\CAD\29016 Sprint 2.5 CD for CT.dwg Printed by: kgalston on Jul 29, 2014 - 2:24pm



DC ONE-LINE DIAGRAM (1)
SCALE: NTS

A/C PANEL SCHEDULE

VOLTAGE:	240V/120		PANEL STATUS:	EXISTING		N TO GROUND BOND:	YES
MAIN BREAKER:	200 AMP		MODEL NUMBER:	TBD		INTERNAL TVSS:	YES
MOUNT:	TOWER		PHASE:	1		WIRE:	3
ENCLOSURE TYPE:	NEMA 3R		BUSS RATING:	200 AMP		GROUND BAR:	YES
			NEUTRAL BAR:	YES			

CKT	DESCRIPTION	BREAKER AMPS	BREAKER POLES	BREAKER STATUS	PHASE A VA	PHASE B VA	BREAKER STATUS	BREAKER POLES	BREAKER AMPS	DESCRIPTION	CKT
1	MMBTS	100	2	ON			ON	2	60	AC SURGE SUPPRESION	7
2											8
3	BLANK (UNUSED)	-	-	-			-	-	-	BLANK (UNUSED)	9
4	BLANK (UNUSED)	-	-	-			-	-	-	BLANK (UNUSED)	10
5	BLANK (UNUSED)	-	-	-			ON	1	15	PLUGS	11
6	FAN	10	1	ON			-	-	-	BLANK (UNUSED)	12

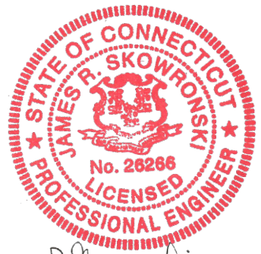
AC PANEL SCHEDULE (2)
SCALE: NTS

Sprint
6580 SPRINT PARKWAY
OVERLAND PARK, KANSAS 66251

RAMAKER & ASSOCIATES, INC.
1120 Dallas Street, Sauk City, WI 53583
Phone: 608-643-4100 Fax: 608-643-7999
www.Ramaker.com

Transcend Wireless
48 SPRUCE STREET
OAKLAND, NJ 07346

Certification & Seal:
I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Connecticut.



Signature: Date:

MARK	DATE	DESCRIPTION

ISSUE PHASE: FINAL DATE ISSUED: 07/29/2014

PROJECT TITLE:
S BETHANY/EMAC COMMUNICATIONS SITE#:CT33XC610-C

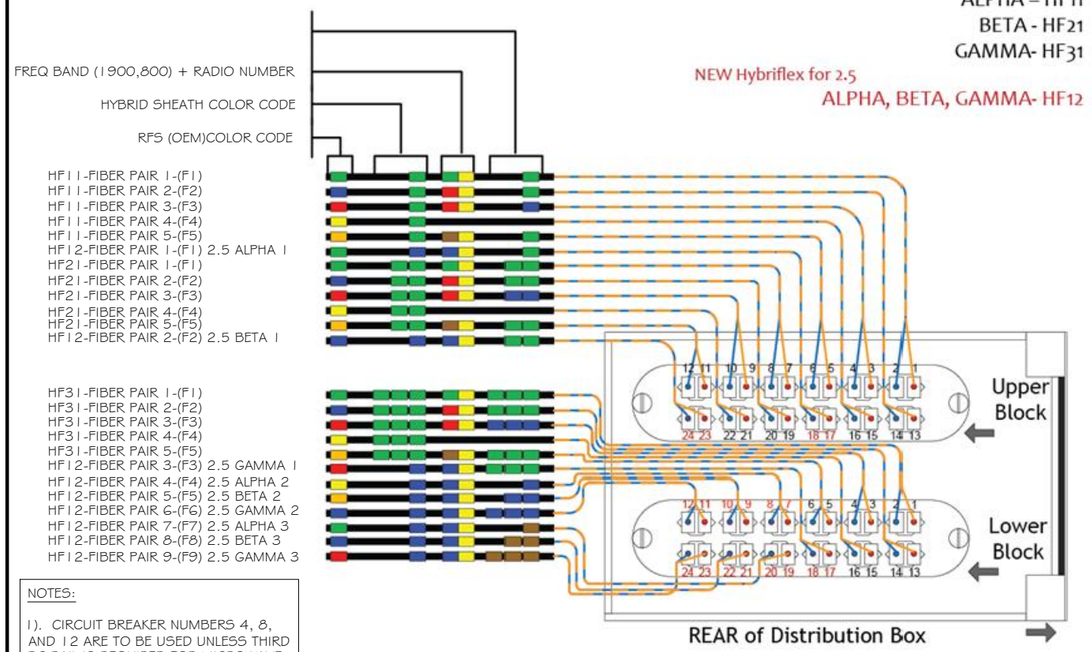
PROJECT INFORMATION:
2 PROGRESS AVENUE
SEYMOUR, CT 06483
NEW HAVEN COUNTY

SHEET TITLE:
DC POWER DETAILS & PANEL SCHEDULES

SCALE:
AS NOTED

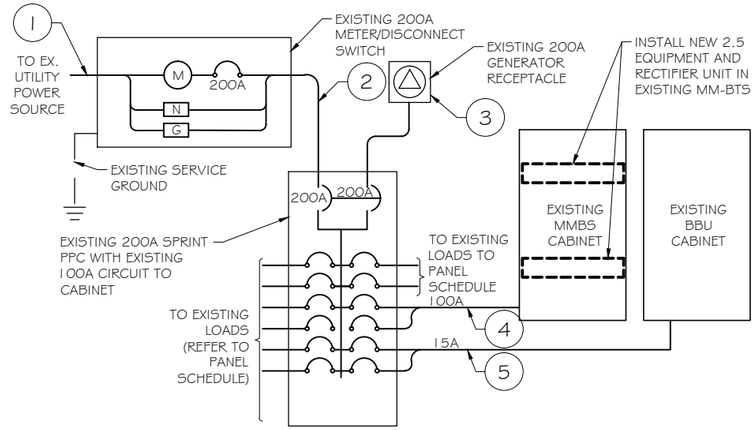
PROJECT NUMBER: 29016
SHEET NUMBER: E-3

Each sector has separate Hybriflex cable .
Hybriflex cable naming as follows:
ALPHA – HF11
BETA - HF21
GAMMA- HF31
NEW Hybriflex for 2.5
ALPHA, BETA, GAMMA- HF12



NOTES:
1). CIRCUIT BREAKER NUMBERS 4, 8, AND 12 ARE TO BE USED UNLESS THIRD DC RAIL IS REQUIRED FOR MICROWAVE.
2). USE DC POWER LOOP.
3). ALL UNUSED DC FEEDERS TO BE TERMINATED WITH WIRE NUTS AND TAPED.
4). REMOVE ALL DEBRIS FROM INTERIOR OF FIBER DISTRIBUTION BOX WHEN COMPLETE.

TYPICAL HYBRID DISTRIBUTION (3)
SCALE: NTS



CIRCUIT SCHEDULE			
NO.	FROM	TO	CONFIGURATION
1	UTILITY SOURCE	METER/ DISCONNECT	EXISTING
2	METER/ DISCONNECT	TRANSFER & LOAD CENTER	EXISTING
3	TRANSFER & LOAD CENTER	GENERATOR RECEPTACLE	EXISTING
4	TRANSFER & LOAD CENTER	EX. MMBS CABINET	(3) #2 AWG, (1) #8 GND IN 1½" CONDUIT
5	TRANSFER & LOAD CENTER	EX. BBU CABINET	(2) #12 AWG, (1) #12 GND IN ¾" CONDUIT

ELECTRICAL ONE-LINE DIAGRAM (4)
SCALE: NTS

I:\29000\29016\CAD\29016 Sprint 2.5 CD for CT.dwg Printed by: kgalston on Jul 29, 2014 - 2:24pm