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

September 9th, 2014

Hand Delivered

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

CC to Property Owner
Town of Mansfield
4 South Eagleville Road, Storrs, CT 06268

RE: Sprint Spectrum L.P. notice of intent to modify an existing telecommunications facility located at 1725 Stafford Road, Mansfield, CT 06268. Known to Sprint Spectrum L.P. as site CT33XC557.

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: CT33XC557

TCP / Mansfield

1725 Stafford Road
Mansfield, CT 06268

September 8, 2014

EBI Project Number: 62144518

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

EBI Consulting
environmental | engineering | due diligence

September 8, 2014

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

Re: Radio Frequency Maximum Permissible Exposure (MPE) Assessment for Site:
CT33XC557 - TCP / Mansfield

Site Total: 31.87% - MPE% in full compliance

EBI Consulting was directed to analyze the proposed upgrades to the existing Sprint facility located at **1725 Stafford Road, Mansfield, 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 **1725 Stafford Road, Mansfield, 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) 2 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 **130 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	CT33XC557 - TCP / Mansfield
Site Addresss	1725 Stafford Road, Mansfield, CT, 06268
Site Type	Monopole

Sector 1

Antenna Number	Antenna Make	Antenna Model	Radio Type	Frequency Band	Technology	Power Out Per Channel (Watts)	Number of Channels	Composite Power	Antenna Gain (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	2	40	5.9	130	124	1/2 "	0.5	0	138.69	0.32%
1a	RFS	APXVSPP18-C-A20	RRH	850 MHz	CDMA / LTE	20	1	20	3.4	130	124	1/2 "	0.5	0	39.00	0.16%
1B	RFS	APXVTMM14-C-120	RRH	2500 MHz	CDMA / LTE	20	2	40	5.9	130	124	1/2 "	0.5	0	138.69	0.57%
														Sector total Power Density Value:		1.06%

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	2	40	5.9	130	124	1/2 "	0.5	0	138.69	0.32%
2a	RFS	APXVSPP18-C-A20	RRH	850 MHz	CDMA / LTE	20	1	20	3.4	130	124	1/2 "	0.5	0	39.00	0.16%
2B	RFS	APXVTMM14-C-120	RRH	2500 MHz	CDMA / LTE	20	2	40	5.9	130	124	1/2 "	0.5	0	138.69	0.57%
														Sector total Power Density Value:		1.06%

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	2	40	5.9	130	124	1/2 "	0.5	0	138.69	0.32%
3a	RFS	APXVSPP18-C-A20	RRH	850 MHz	CDMA / LTE	20	1	20	3.4	130	124	1/2 "	0.5	0	39.00	0.16%
3B	RFS	APXVTMM14-C-120	RRH	2500 MHz	CDMA / LTE	20	2	40	5.9	130	124	1/2 "	0.5	0	138.69	0.57%
														Sector total Power Density Value:		1.06%

Site Composite MPE %	
Carrier	MPE %
Sprint	3.17%
Town	3.73%
T-Mobile	1.99%
AT&T	15.28%
Verizon Wireless	7.70%
Total Site MPE %	**31.87%**

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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.

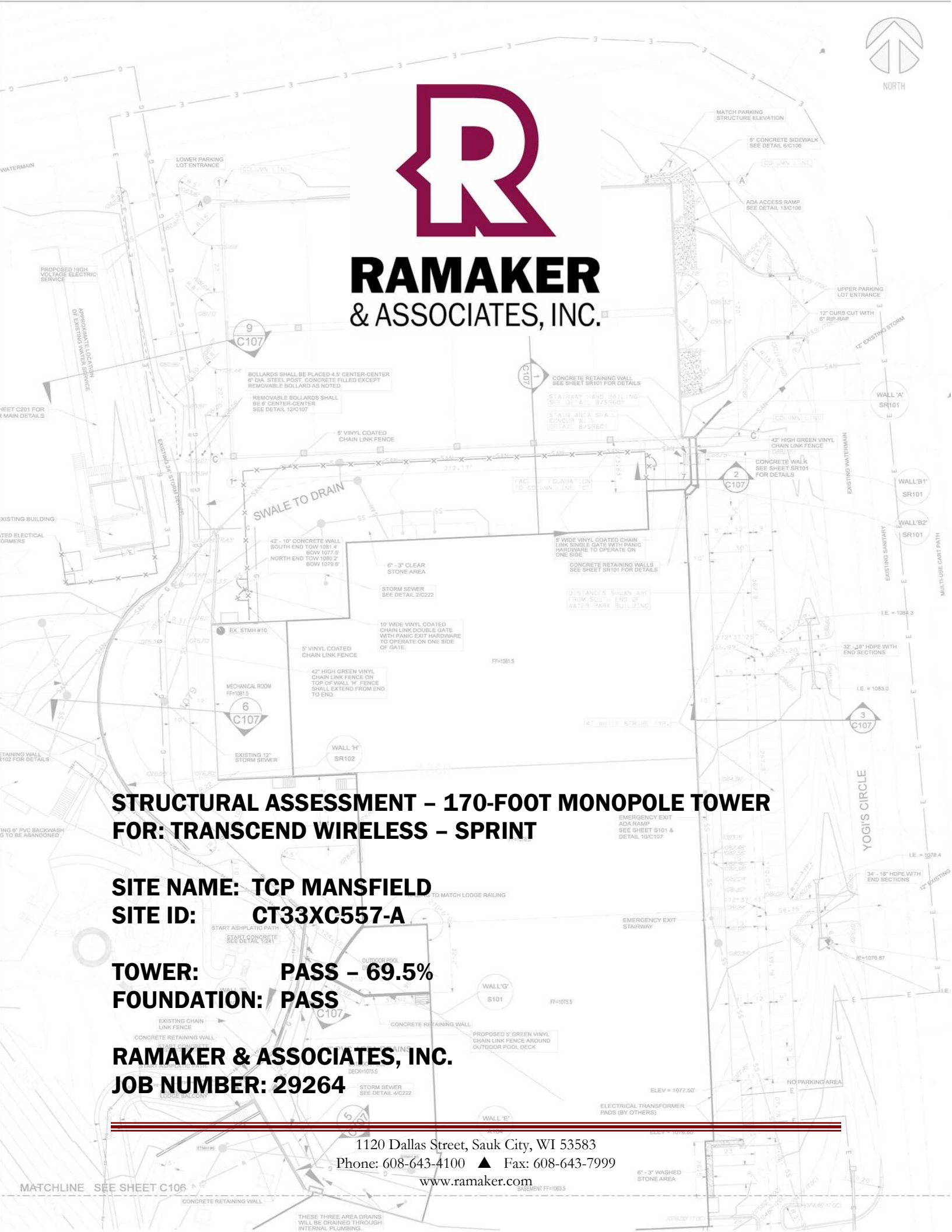
The anticipated Maximum Composite contributions from the Sprint facility are **3.17% (1.06% from sector 1, 1.06% from sector 2 and 1.06% from sector 3)** of the allowable FCC established general public limit considering all three sectors simultaneously sampled at the ground level.

The anticipated composite MPE value for this site assuming all carriers present is **31.87%** 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



RAMAKER
& ASSOCIATES, INC.

STRUCTURAL ASSESSMENT – 170-FOOT MONOPOLE TOWER
FOR: TRANSCEND WIRELESS – SPRINT

SITE NAME: TCP MANSFIELD
SITE ID: CT33XC557-A

TOWER: PASS – 69.5%
FOUNDATION: PASS

RAMAKER & ASSOCIATES, INC.
JOB NUMBER: 29264

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

STRUCTURAL ASSESSMENT

SITE:	TCP Mansfield (CT33XC557-A) 1725 Stafford Road Mansfield, Tolland County, Connecticut 06268
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:	29264
DATE OF REPORT ISSUANCE:	July 8, 2014

Jonathan Styx
Engineering Technician

07/08/14
Date

James R. Skowronski, P.E.
Supervising Engineer

07/08/14
Date

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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-RRH8x20 RRH's on the existing low profile platform at a centerline elevation of 130-feet AGL. The proposed antennas shall be fed with the proposed MN:HB058-M12-050F hybrid cable.

Results of our tower analysis show that the tower will be stressed to a maximum of 69.5 percent of capacity under proposed loading conditions. Foundation drawings were not available for this analysis. However, all proposed model foundation reactions are less than the known 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 ALL PREVIOUSLY PROPOSED AND REQUIRED MODIFICATIONS ARE COMPLETE PRIOR TO INSTALLATION OF PROPOSED EQUIPMENT**. See the associated construction drawings by RAMAKER for proposed modifications.

In summary, the tower and foundation 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:

- A previous structural analysis by RAMAKER, project number 23013, dated September 24, 2012.

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
170	(6) Decibel DB844H80E-XY	Low Profile Platform	(12) 1-5/8	Verizon	Existing
	(3) 6' x 8" Panel Antennas				
	(3) 6' x 1' Panel Antennas				
160	(1) 5' x 1' Panel Antennas	(3) T-Arms	(3) 1-5/8	Metro PCS	Existing
152	(3) Ericsson RRUS-11	(1) Collar Mount	(12) 1-5/8	AT&T	Existing
	(1) Raycap DC6-48-60-18-8F				
150	(6) Powerwave 7770.00	Low Profile Platform			
	(1) 8' x 1' Panel Antenna				
	(2) 6' x 1' Panel Antennas				
	(6) Powerwave LGP219nn				
	(6) Powerwave LGP214nn				
140	(3) EMS Wireless RR90-17-02DPL2	Low Profile Platform	(3) 1-5/8	T-Mobil	Existing
	(3) TMA's				
130	(3) RFS APXVSPP18-C-A20	Low Profile Platform	(6) 1-5/8	Sprint	Existing
	(3) Alcatel-Lucent 1900 MHz RRH				
	(3) Alcatel-Lucent 800 MHz RRH				
	(3) RFS APXV9TM14-ALU-I20		**(1) Hybrid**		**Proposed**
	(3) Alcatel-Lucent TD-RRH 8x20				

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 Tolland 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
Section 1	51.0
Section 2	69.5
Section 3	69.0
Section 4	64.7
Base Plate	51.7
RATING =	69.5

4.2 BASE REACTIONS

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

Load Type	Original Design	Proposed Model
Axial (k)	-	48.2
Shear (k)	45.0	31.6
Moment (k-ft)	5555.0	3764.2

Foundation drawings were not available for this analysis. However, all proposed model foundation reactions are less than the known 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 ALL PREVIOUSLY PROPOSED AND REQUIRED MODIFICATIONS ARE COMPLETE PRIOR TO INSTALLATION OF PROPOSED EQUIPMENT**. See the associated construction drawings by RAMAKER for proposed modifications.

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

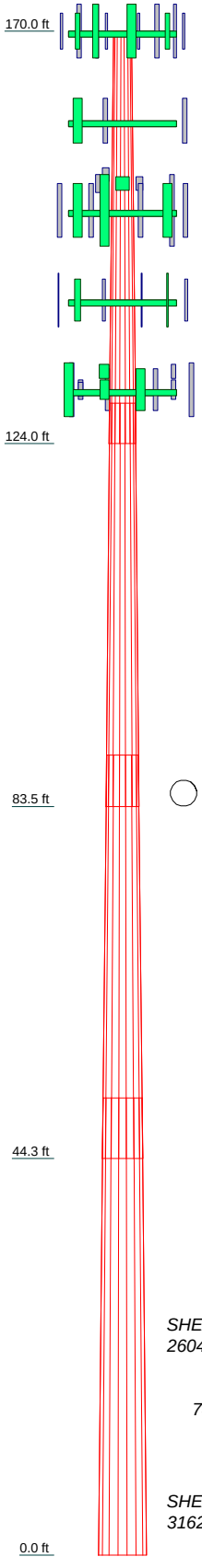
1. 2003 International Building Code.

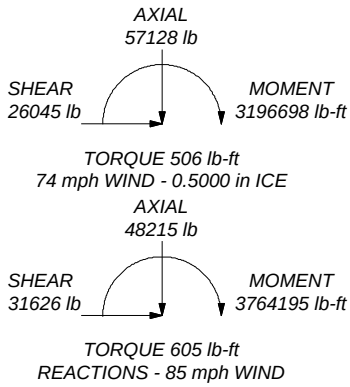
2. Telecommunications Industries Association, Structural Standards for Steel Antenna Towers and Antenna Supporting Structures, TIA Standard TIA/EIA-222-F 1996, Washington, D.C.

APPENDIX A

TOWER FIGURES

Section	Length (ft)	Number of Sides	Thickness (in)	Socket Length (ft)	Top Dia (in)	Bot Dia (in)	Grade	Weight (lb)
1	46.00	18	0.2500	4.50	24.0000	35.3600	A572-65	3655.4
2	45.00	18	0.3125	5.75	33.7487	44.8700		5922.9
3	45.00	18	0.3750	6.75	42.8239	53.9400		8749.6
4	51.00	18	0.4375		51.5226	64.1200		13828.7
								32156.6





DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
(2) DB844H80E-XY w/Mount Pipe (Verizon)	170	(2) LGP219nn (ATT)	150
(2) DB844H80E-XY w/Mount Pipe (Verizon)	170	(2) LGP214nn (ATT)	150
(2) DB844H80E-XY w/Mount Pipe (Verizon)	170	(2) LGP214nn (ATT)	150
6' x 8" Panel Antenna w/Mount Pipe (Verizon)	170	(2) LGP214nn (ATT)	150
6' x 8" Panel Antenna w/Mount Pipe (Verizon)	170	PiROD 13' Low Profile Platform (Mount)	150
6' x 8" Panel Antenna w/Mount Pipe (Verizon)	170	RR90-17-02DPL2 w/Mount Pipe (T-Mobil)	140
6' x 1' Panel Antenna w/Mount Pipe (Verizon)	170	RR90-17-02DPL2 w/Mount Pipe (T-Mobil)	140
6' x 1' Panel Antenna w/Mount Pipe (Verizon)	170	RR90-17-02DPL2 w/Mount Pipe (T-Mobil)	140
6' x 1' Panel Antenna w/Mount Pipe (Verizon)	170	TMA (T-Mobil)	140
PiROD 13' Low Profile Platform (Mount)	170	TMA (T-Mobil)	140
5' x 1' Panel Antenna w/Mount Pipe (Metro PCS)	160	TMA (T-Mobil)	140
5' x 1' Panel Antenna w/Mount Pipe (Metro PCS)	160	6' x 2" Pipe Mount (Mount)	140
5' x 1' Panel Antenna w/Mount Pipe (Metro PCS)	160	6' x 2" Pipe Mount (Mount)	140
EEI (3) 12' Universal T-Arms (Mount)	160	6' x 2" Pipe Mount (Mount)	140
Tri-Antenna Mount (ATT)	152	PiROD 13' Low Profile Platform (Mount)	140
RRUS-11 (ATT)	152	APXVSPP18-C-A20 w/Mount Pipe (Sprint)	130
RRUS-11 (ATT)	152	APXV9ERR18-C-A20 w/Mount Pipe (Sprint)	130
RRUS-11 (ATT)	152	APXV9ERR18-C-A20 w/Mount Pipe (Sprint)	130
DC6-48-60-18-8F (ATT)	152	1900MHz 4x40W RRH (Sprint)	130
DBXNH-8585B-R2M w/Mount Pipe (ATT)	150	1900MHz 4x40W RRH (Sprint)	130
SBNH-1D6565C w/Mount Pipe (ATT)	150	1900MHz 4x40W RRH (Sprint)	130
SBNH-1D6565C w/Mount Pipe (ATT)	150	800MHz 2x50W RRH (Sprint)	130
(2) 7770.00 w/Mount Pipe (ATT)	150	800MHz 2x50W RRH (Sprint)	130
(2) 7770.00 w/Mount Pipe (ATT)	150	800MHz 2x50W RRH (Sprint)	130
(2) 7770.00 w/Mount Pipe (ATT)	150	PiROD 13' Low Profile Platform (Mount)	130
(2) LGP219nn (ATT)	150	APXV9TM14-ALU-120 (Sprint)	130
(2) LGP219nn (ATT)	150	APXV9TM14-ALU-120 (Sprint)	130
		APXV9TM14-ALU-120 (Sprint)	130
		TD-RRH 8x20 (Sprint)	130
		TD-RRH 8x20 (Sprint)	130
		TD-RRH 8x20 (Sprint)	130

MATERIAL STRENGTH

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

TOWER DESIGN NOTES

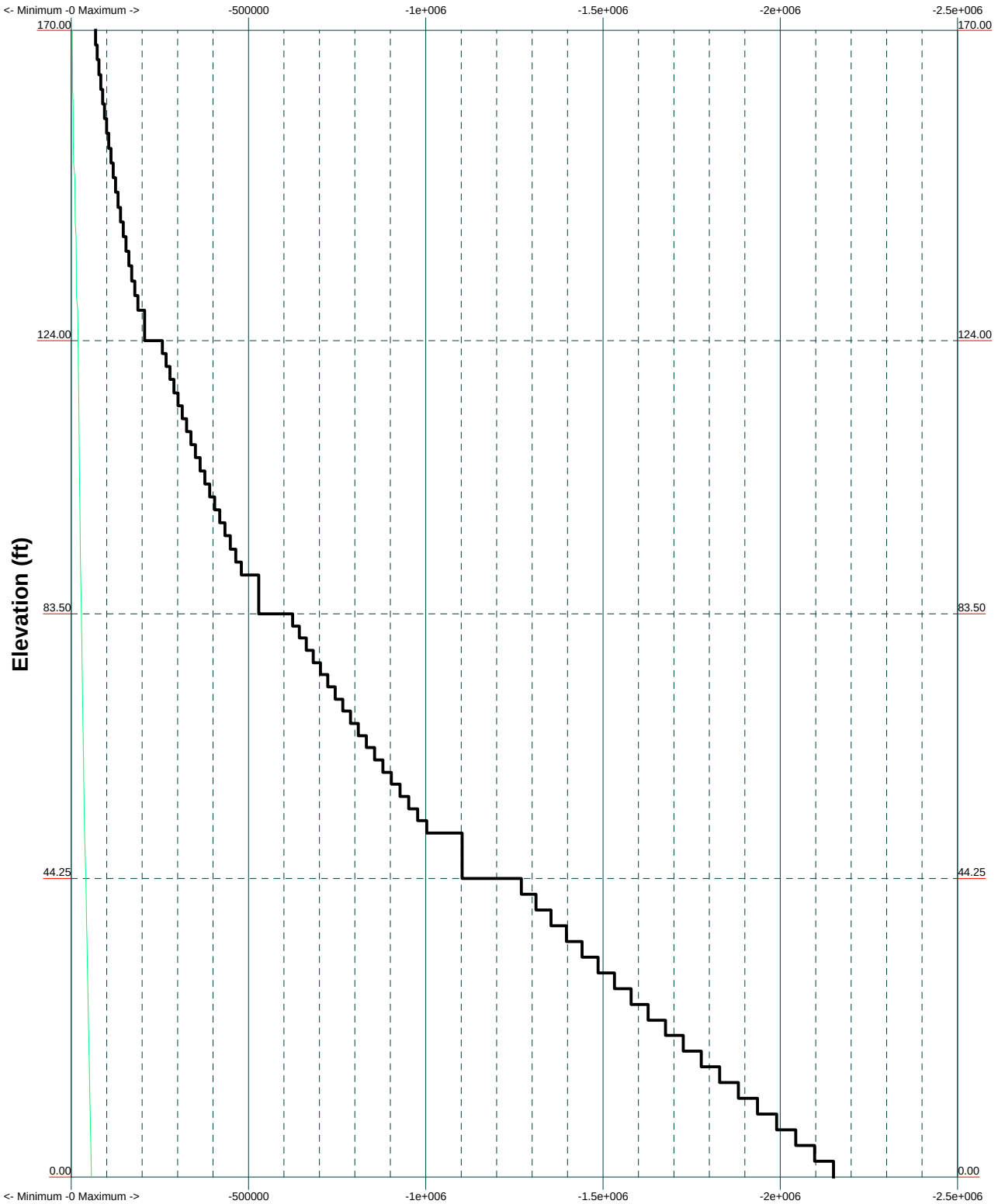
1. Tower is located in Tolland County, Connecticut.
2. Tower designed for a 85 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 74 mph basic wind with 0.50 in ice.
4. Deflections are based upon a 60 mph wind.
5. TOWER RATING: 69.5%

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

Job: TCP/Mansfield (CT33XC557)			
Project: 29264			
Client: Sprint	Drawn by: JDS	App'd:	
Code: TIA/EIA-222-F	Date: 06/30/14	Scale: NTS	
Path: I:\29200\29264\Structural\tnx\29264.eri		Dwg No. E-1	

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

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



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Phone: (608) 643-4100
FAX: (608) 643-7999

Job: ***TCP/Mansfield (CT33XC557)***			
Project: ***29264***			
Client: Sprint	Drawn by: JDS	App'd:	
Code: TIA/EIA-222-F	Date: 06/30/14	Scale: NTS	
Path: I:\29200\29264\Structural\tnx\29264.eri		Dwg No. E-3	

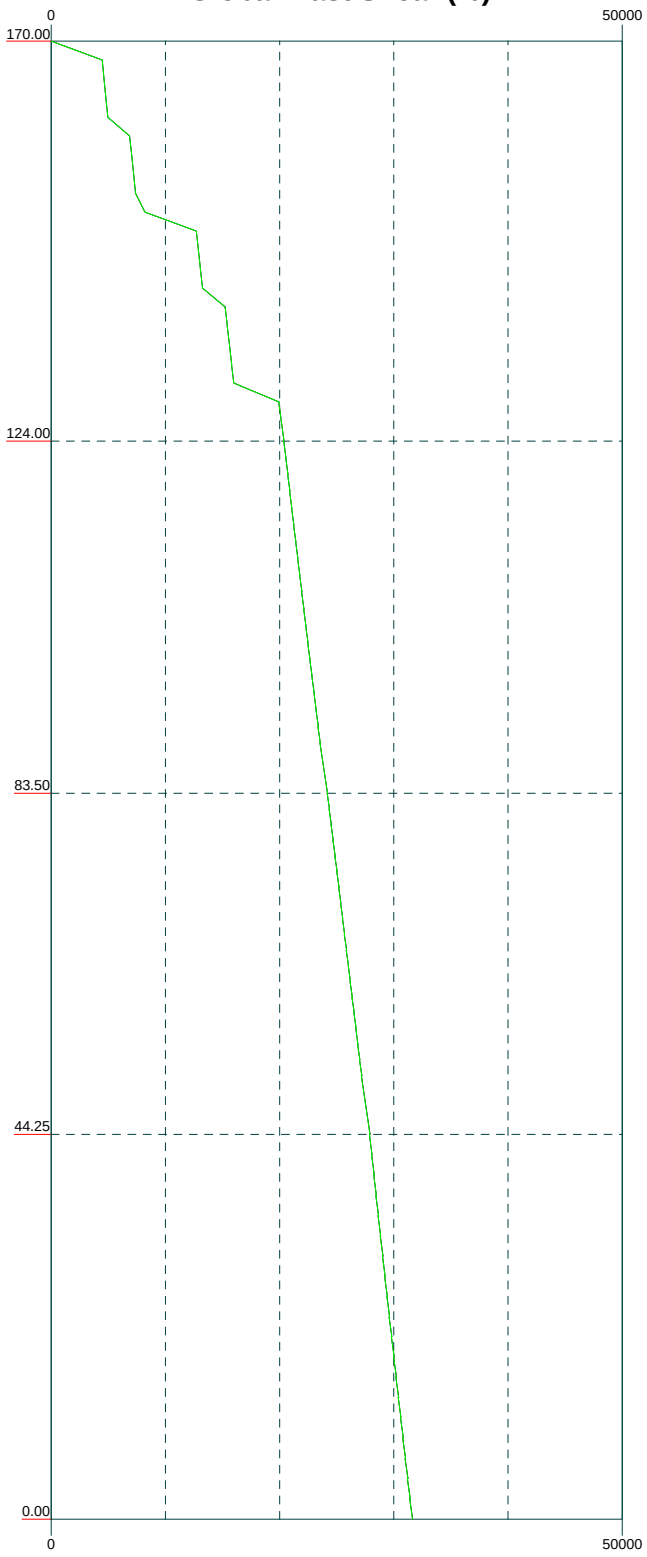
TIA/EIA-222-F - 85 mph/74 mph 0.5000 in Ice

Vx Vz

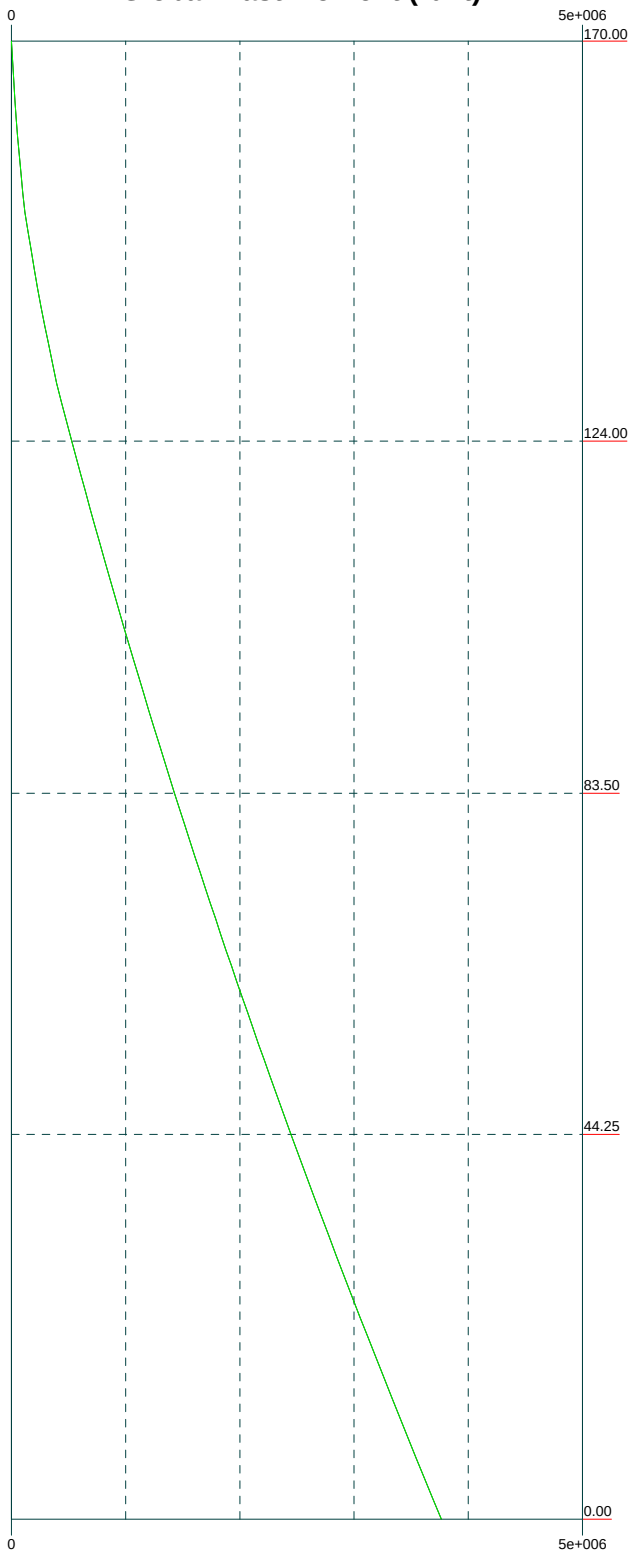
Maximum Values

Mx Mz

Global Mast Shear (lb)



Global Mast Moment (lb-ft)

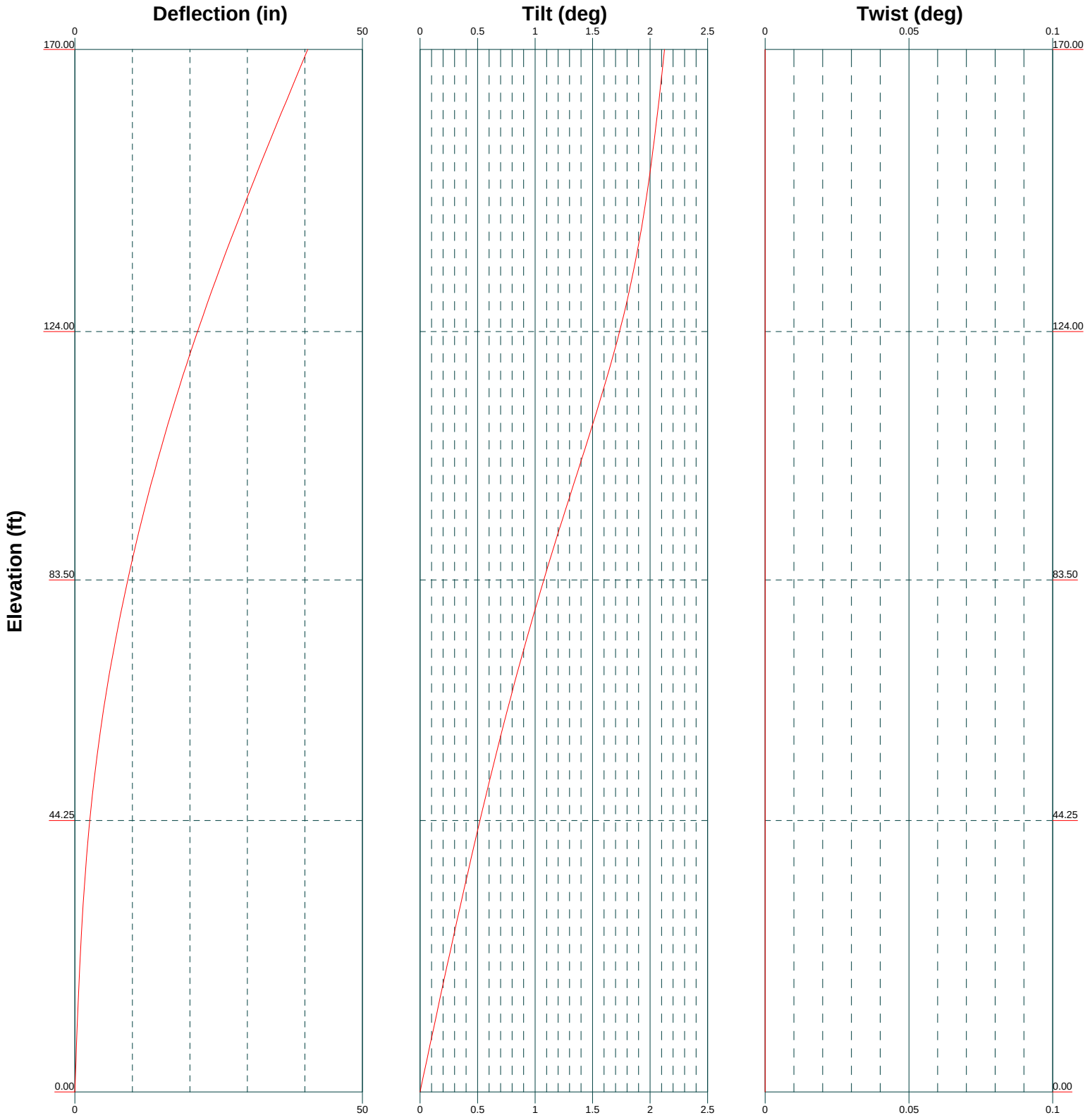


Ramaker & Associates
1120 Dallas St.
Sauk City, WI 53583
Phone: (608) 643-4100
FAX: (608) 643-7999

Job: *TCP/Mansfield (CT33XC557)*			
Project: *29264*			
Client: Sprint	Drawn by: JDS	App'd:	
Code: TIA/EIA-222-F	Date: 06/30/14	Scale: NTS	
Path: I:\29200\29264\Structural\tnx\29264.eri		Dwg No. E-4	

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

Maximum Values



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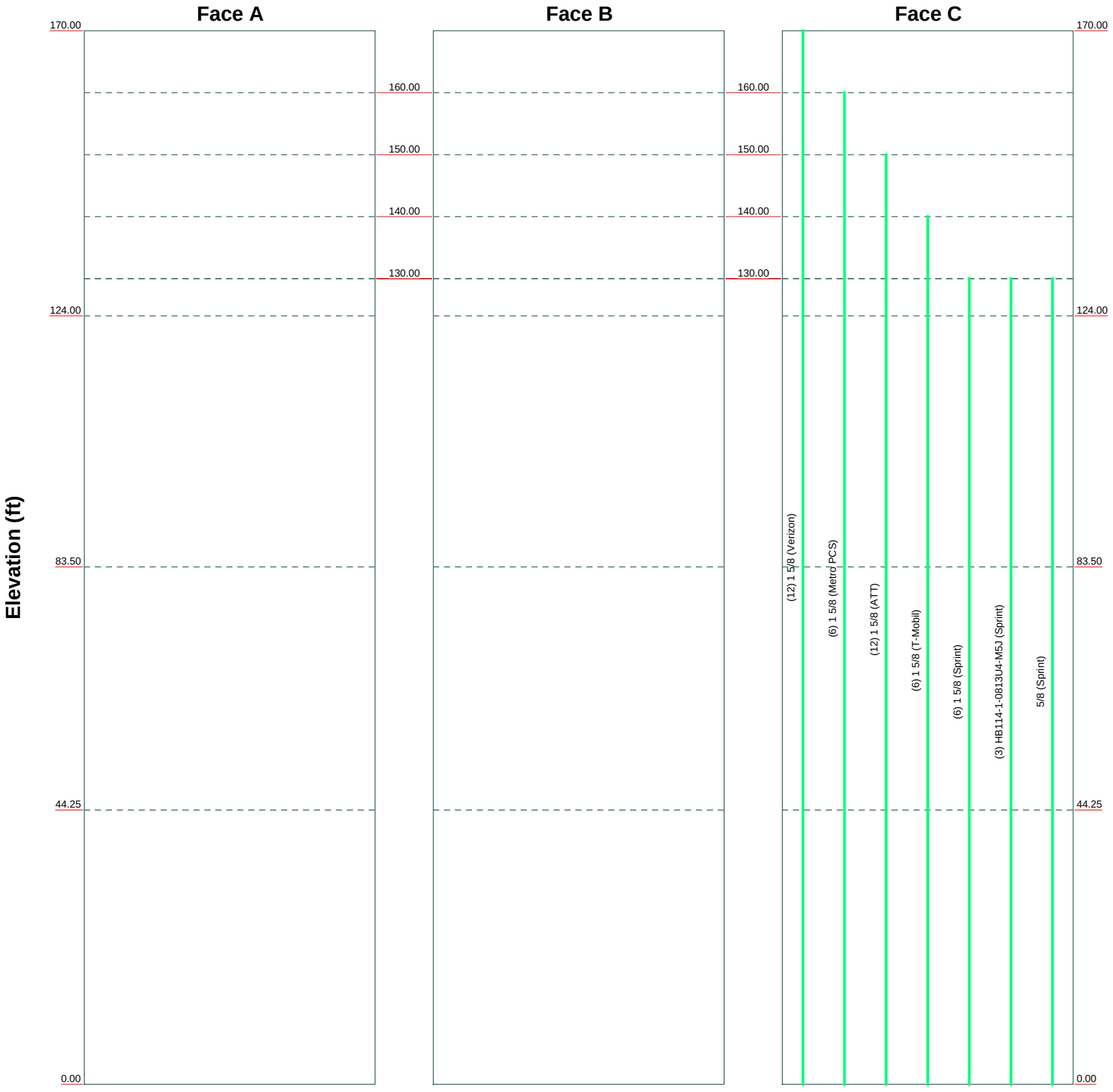
Job: ***TCP/Mansfield (CT33XC557)***			
Project: ***29264***			
Client: Sprint	Drawn by: JDS	App'd:	
Code: TIA/EIA-222-F	Date: 06/30/14	Scale: NTS	
Path: I:\29200\29264\Structural\tnx\29264.eri		Dwg No. E-5	

Feed Line Distribution Chart
0' - 170'

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



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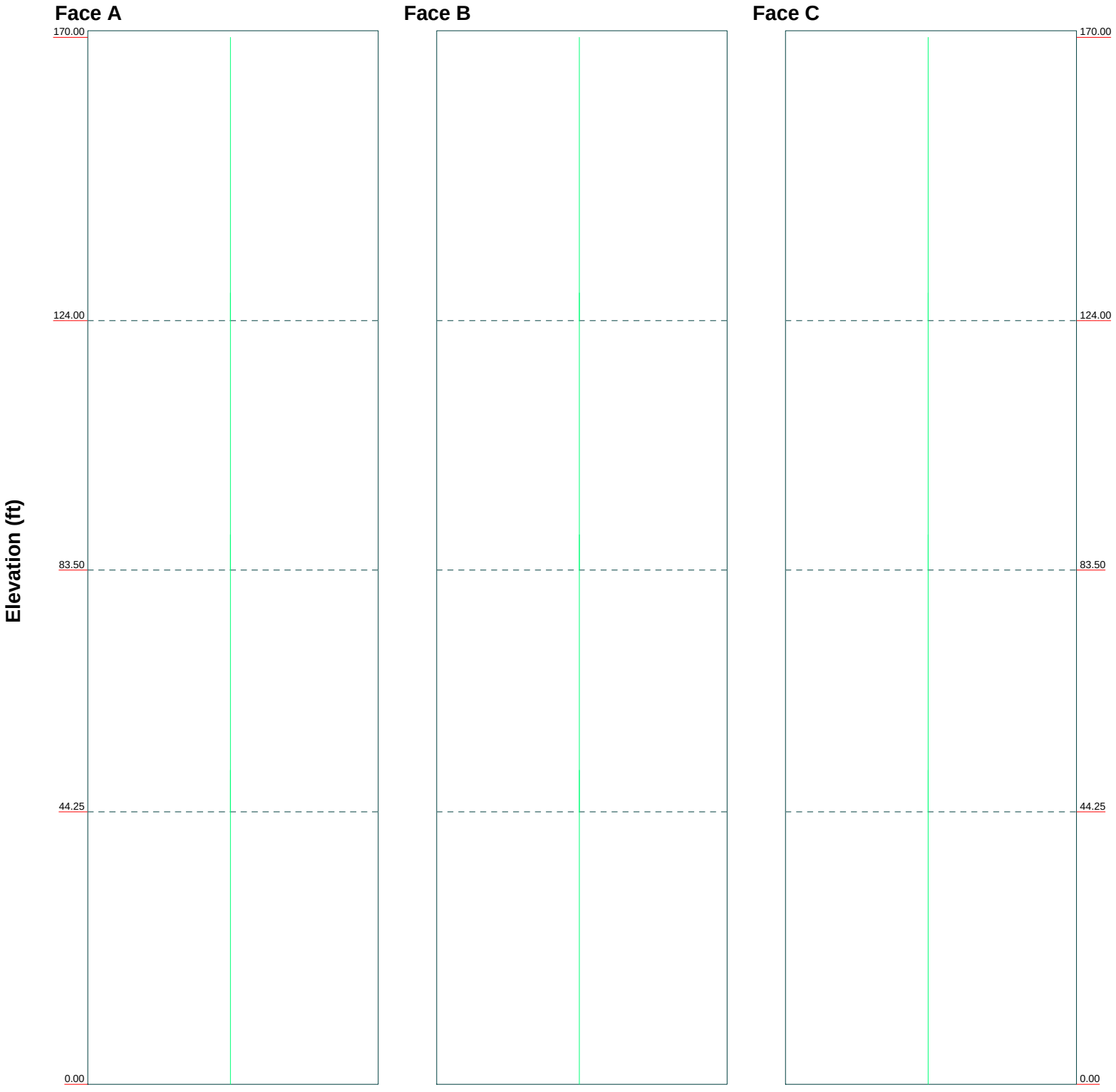
Phone: (608) 643-4100
FAX: (608) 643-7999

Job: ***TCP/Mansfield (CT33XC557)***			
Project: ***29264***			
Client: Sprint	Drawn by: JDS	App'd:	
Code: TIA/EIA-222-F	Date: 06/30/14	Scale: NTS	
Path: I:\29200\29264\Structural\tnx\29264.eri		Dwg No. E-7	

Stress Distribution Chart
0' - 170'

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



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Phone: (608) 643-4100
FAX: (608) 643-7999

Job: *TCP/Mansfield (CT33XC557)*			
Project: *29264*			
Client: Sprint	Drawn by: JDS	App'd:	
Code: TIA/EIA-222-F	Date: 06/30/14	Scale: NTS	
Path: I:\29200\29264\Structural\tnx\29264.eri		Dwg No. E-8	

APPENDIX B

TOWER CALCULATIONS

Tower Input Data

There is a pole section.
This tower is designed using the TIA/EIA-222-F standard.
The following design criteria apply:

- Tower is located in Tolland 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 pole design is 1.333.
- Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Tapered Pole Section Geometry

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L1	170.00-124.00	46.00	4.50	18	24.0000	35.3600	0.2500	1.0000	A572-65 (65 ksi)
L2	124.00-83.50	45.00	5.75	18	33.7487	44.8700	0.3125	1.2500	A572-65 (65 ksi)
L3	83.50-44.25	45.00	6.75	18	42.8239	53.9400	0.3750	1.5000	A572-65 (65 ksi)
L4	44.25-0.00	51.00		18	51.5226	64.1200	0.4375	1.7500	A572-65 (65 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	24.3702	18.8456	1342.9976	8.4313	12.1920	110.1540	2687.7623	9.4246	3.7840	15.136
	35.9055	27.8598	4338.8723	12.4641	17.9629	241.5466	8683.4538	13.9325	5.7834	23.133
L2	35.3986	33.1645	4684.3029	11.8698	17.1443	273.2274	9374.7695	16.5854	5.3898	17.247
	45.5622	44.1955	11085.5397	15.8179	22.7940	486.3367	22185.6660	22.1019	7.3471	23.511
L3	44.9269	50.5249	11502.0785	15.0694	21.7546	528.7203	23019.2917	25.2672	6.8770	18.339
	54.7721	63.7557	23111.0123	19.0156	27.4015	843.4208	46252.4346	31.8839	8.8334	23.556
L4	54.0104	70.9380	23388.6396	18.1352	26.1735	893.6008	46808.0545	35.4758	8.2980	18.967
	65.1092	88.4311	45308.8191	22.6073	32.5730	1390.9948	90677.2566	44.2240	10.5151	24.035

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
L1 170.00-124.00				1	1	1		
L2 124.00-83.50				1	1	1		
L3 83.50-44.25				1	1	1		
L4 44.25-0.00				1	1	1		

Monopole Base Plate Data

Base Plate Data	
Base plate is square	√
Base plate is grouted	
Anchor bolt grade	A687
Anchor bolt size	2.2500 in
Number of bolts	20
Embedment length	60.0000 in
f'_c	4 ksi
Grout space	2.0000 in
Base plate grade	A572-55
Base plate thickness	3.2500 in
Bolt circle diameter	72.0000 in
Outer diameter	70.0000 in
Inner diameter	55.0000 in
Corner clipped	14.0000 in
Base plate type	Plain Plate

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
1 5/8 (Verizon)	C	No	Inside Pole	170.00 - 0.00	12	No Ice	0.00	1.04
						1/2" Ice	0.00	1.04
1 5/8 (Metro PCS)	C	No	Inside Pole	160.00 - 0.00	6	No Ice	0.00	1.04
						1/2" Ice	0.00	1.04
1 5/8 (ATT)	C	No	Inside Pole	150.00 - 0.00	12	No Ice	0.00	1.04
						1/2" Ice	0.00	1.04
1 5/8 (T-Mobil)	C	No	Inside Pole	140.00 - 0.00	6	No Ice	0.00	1.04
						1/2" Ice	0.00	1.04
1 5/8 (Sprint)	C	No	Inside Pole	130.00 - 0.00	6	No Ice	0.00	1.04
						1/2" Ice	0.00	1.04
HB114-1-0813U4-M5J (Sprint)	C	No	Inside Pole	130.00 - 0.00	3	No Ice	0.00	1.20
						1/2" Ice	0.00	1.20
5/8 (Sprint)	C	No	Inside Pole	130.00 - 0.00	1	No Ice	0.00	0.40
						1/2" Ice	0.00	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

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
L1	170.00-124.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	1284.48
L2	124.00-83.50	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	1931.04
L3	83.50-44.25	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	1871.44
L4	44.25-0.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	2109.84

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
L1	170.00-124.00	A	0.500	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	1284.48
L2	124.00-83.50	A	0.500	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	1931.04
L3	83.50-44.25	A	0.500	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	1871.44
L4	44.25-0.00	A	0.500	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	2109.84

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	170.00-124.00	0.0000	0.0000	0.0000	0.0000
L2	124.00-83.50	0.0000	0.0000	0.0000	0.0000
L3	83.50-44.25	0.0000	0.0000	0.0000	0.0000
L4	44.25-0.00	0.0000	0.0000	0.0000	0.0000

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
(2) DB844H80E-XY w/Mount Pipe	A	From Face	4.00 0.00	0.0000	170.00	No Ice 1/2" Ice	3.58 4.20	5.63 6.73	35.55 80.31
(Verizon)			0.00						
(2) DB844H80E-XY w/Mount Pipe	B	From Face	4.00 0.00	0.0000	170.00	No Ice 1/2" Ice	3.58 4.20	5.63 6.73	35.55 80.31
(Verizon)			0.00						
(2) DB844H80E-XY w/Mount Pipe	C	From Face	4.00 0.00	0.0000	170.00	No Ice 1/2" Ice	3.58 4.20	5.63 6.73	35.55 80.31
(Verizon)			0.00						
6' x 8" Panel Antenna w/Mount Pipe	A	From Face	4.00 3.00	0.0000	170.00	No Ice 1/2" Ice	6.10 6.67	6.36 7.54	65.55 121.08
(Verizon)			0.00						
6' x 8" Panel Antenna w/Mount Pipe	B	From Face	4.00 3.00	0.0000	170.00	No Ice 1/2" Ice	6.10 6.67	6.36 7.54	65.55 121.08
(Verizon)			0.00						
6' x 8" Panel Antenna w/Mount Pipe	C	From Face	4.00 3.00	0.0000	170.00	No Ice 1/2" Ice	6.10 6.67	6.36 7.54	65.55 121.08
(Verizon)			0.00						
6' x 1' Panel Antenna w/Mount Pipe	A	From Face	4.00 -1.00	0.0000	170.00	No Ice 1/2" Ice	8.40 8.95	6.13 7.07	61.90 125.07
(Verizon)			0.00						
6' x 1' Panel Antenna w/Mount Pipe	B	From Face	4.00 -1.00	0.0000	170.00	No Ice 1/2" Ice	8.40 8.95	6.13 7.07	61.90 125.07
(Verizon)			0.00						
6' x 1' Panel Antenna w/Mount Pipe	C	From Face	4.00 -1.00	0.0000	170.00	No Ice 1/2" Ice	8.40 8.95	6.13 7.07	61.90 125.07
(Verizon)			0.00						
PiROD 13' Low Profile Platform (Mount)	C	None		0.0000	170.00	No Ice 1/2" Ice	15.70 20.10	15.70 20.10	1300.00 1765.00
**********									
5' x 1' Panel Antenna w/Mount Pipe	A	From Face	4.00 5.00	0.0000	160.00	No Ice 1/2" Ice	7.00 7.47	4.94 5.62	53.25 106.42
(Metro PCS)			0.00						
5' x 1' Panel Antenna w/Mount Pipe	B	From Face	4.00 5.00	0.0000	160.00	No Ice 1/2" Ice	7.00 7.47	4.94 5.62	53.25 106.42
(Metro PCS)			0.00						
5' x 1' Panel Antenna w/Mount Pipe	C	From Face	4.00 5.00	0.0000	160.00	No Ice 1/2" Ice	7.00 7.47	4.94 5.62	53.25 106.42
(Metro PCS)			0.00						
EEI (3) 12' Universal T-Arms (Mount)	C	None		0.0000	160.00	No Ice 1/2" Ice	16.66 21.00	16.66 21.00	550.00 710.00
**********									
Tri-Antenna Mount (ATT)	A	None		0.0000	152.00	No Ice 1/2" Ice	5.00 6.00	5.00 6.00	270.00 290.00
RRUS-11 (ATT)	A	From Face	1.00 0.00 2.00	0.0000	152.00	No Ice 1/2" Ice	2.94 3.17	1.25 1.41	55.00 74.32
RRUS-11 (ATT)	B	From Face	1.00 0.00 1.00	0.0000	152.00	No Ice 1/2" Ice	2.94 3.17	1.25 1.41	55.00 74.32
RRUS-11 (ATT)	C	From Face	1.00 0.00 1.00	0.0000	152.00	No Ice 1/2" Ice	2.94 3.17	1.25 1.41	55.00 74.32
DC6-48-60-18-8F (ATT)	A	From Face	2.00 0.00 1.00	0.0000	152.00	No Ice 1/2" Ice	1.47 1.67	1.47 1.67	33.00 50.72
**********									

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
DBXNH-8585B-R2M w/Mount Pipe	A	From Face	4.00 2.00 0.00	0.0000	150.00	No Ice 1/2" Ice	8.38 8.93	6.83 7.79	68.09 134.37
(ATT)									
SBNH-1D6565C w/Mount Pipe	B	From Face	4.00 2.00 0.00	0.0000	150.00	No Ice 1/2" Ice	11.41 12.03	10.00 11.42	107.17 197.75
(ATT)									
SBNH-1D6565C w/Mount Pipe	C	From Face	4.00 2.00 0.00	0.0000	150.00	No Ice 1/2" Ice	11.41 12.03	10.00 11.42	107.17 197.75
(ATT)									
(2) 7770.00 w/Mount Pipe	A	From Face	4.00 0.00 0.00	0.0000	150.00	No Ice 1/2" Ice	6.98 7.87	5.06 6.33	59.85 112.68
(ATT)									
(2) 7770.00 w/Mount Pipe	B	From Face	4.00 0.00 0.00	0.0000	150.00	No Ice 1/2" Ice	6.98 7.87	5.06 6.33	59.85 112.68
(ATT)									
(2) 7770.00 w/Mount Pipe	C	From Face	4.00 0.00 0.00	0.0000	150.00	No Ice 1/2" Ice	6.98 7.87	5.06 6.33	59.85 112.68
(ATT)									
(2) LGP219nn	A	From Face	4.00 0.00 0.00	0.0000	150.00	No Ice 1/2" Ice	0.27 0.34	0.18 0.25	11.00 13.41
(ATT)									
(2) LGP219nn	B	From Face	4.00 0.00 0.00	0.0000	150.00	No Ice 1/2" Ice	0.27 0.34	0.18 0.25	11.00 13.41
(ATT)									
(2) LGP219nn	C	From Face	4.00 0.00 0.00	0.0000	150.00	No Ice 1/2" Ice	0.27 0.34	0.18 0.25	11.00 13.41
(ATT)									
(2) LGP214nn	A	From Face	4.00 0.00 0.00	0.0000	150.00	No Ice 1/2" Ice	1.30 1.45	0.23 0.31	14.10 21.30
(ATT)									
(2) LGP214nn	B	From Face	4.00 0.00 0.00	0.0000	150.00	No Ice 1/2" Ice	1.30 1.45	0.23 0.31	14.10 21.30
(ATT)									
(2) LGP214nn	C	From Face	4.00 0.00 0.00	0.0000	150.00	No Ice 1/2" Ice	1.30 1.45	0.23 0.31	14.10 21.30
(ATT)									
PiROD 13' Low Profile Platform	C	None		0.0000	150.00	No Ice 1/2" Ice	15.70 20.10	15.70 20.10	1300.00 1765.00
(Mount)									
**********									
RR90-17-02DPL2 w/Mount Pipe	A	From Face	4.00 5.00 0.00	0.0000	140.00	No Ice 1/2" Ice	4.91 5.57	3.64 4.70	43.55 84.46
(T-Mobil)									
RR90-17-02DPL2 w/Mount Pipe	B	From Face	4.00 5.00 0.00	0.0000	140.00	No Ice 1/2" Ice	4.91 5.57	3.64 4.70	43.55 84.46
(T-Mobil)									
RR90-17-02DPL2 w/Mount Pipe	C	From Face	4.00 5.00 0.00	0.0000	140.00	No Ice 1/2" Ice	4.91 5.57	3.64 4.70	43.55 84.46
(T-Mobil)									
TMA	A	From Face	4.00 5.00 0.00	0.0000	140.00	No Ice 1/2" Ice	1.40 1.56	0.70 0.82	5.00 15.34
(T-Mobil)									
TMA	B	From Face	4.00 5.00 0.00	0.0000	140.00	No Ice 1/2" Ice	1.40 1.56	0.70 0.82	5.00 15.34
(T-Mobil)									
TMA	C	From Face	4.00 5.00 0.00	0.0000	140.00	No Ice 1/2" Ice	1.40 1.56	0.70 0.82	5.00 15.34
(T-Mobil)									

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
6' x 2" Pipe Mount	A	From Face	4.00	0.0000	140.00	No Ice	1.43	1.43	21.90
(Mount)			-5.00			1/2" Ice	1.92	1.92	32.73
			0.00						
6' x 2" Pipe Mount	B	From Face	4.00	0.0000	140.00	No Ice	1.43	1.43	21.90
(Mount)			-5.00			1/2" Ice	1.92	1.92	32.73
			0.00						
6' x 2" Pipe Mount	C	From Face	4.00	0.0000	140.00	No Ice	1.43	1.43	21.90
(Mount)			-5.00			1/2" Ice	1.92	1.92	32.73
			0.00						
PiROD 13' Low Profile Platform	C	None		0.0000	140.00	No Ice	15.70	15.70	1300.00
(Mount)						1/2" Ice	20.10	20.10	1765.00
**********									
APXVSPP18-C-A20 w/Mount	A	From Face	4.00	0.0000	130.00	No Ice	8.56	6.95	82.55
Pipe			-2.00			1/2" Ice	9.21	8.13	147.99
(Sprint)			0.00						
APXV9ERR18-C-A20 w/Mount	B	From Face	4.00	0.0000	130.00	No Ice	8.56	6.95	33.05
Pipe			6.00			1/2" Ice	9.21	8.13	98.49
(Sprint)			0.00						
APXV9ERR18-C-A20 w/Mount	C	From Face	4.00	0.0000	130.00	No Ice	8.56	6.95	33.05
Pipe			6.00			1/2" Ice	9.21	8.13	98.49
(Sprint)			0.00						
1900MHz 4x40W RRH	A	From Face	4.00	0.0000	130.00	No Ice	2.71	2.61	60.00
(Sprint)			0.00			1/2" Ice	2.95	2.84	83.12
			0.00						
1900MHz 4x40W RRH	B	From Face	4.00	0.0000	130.00	No Ice	2.71	2.61	60.00
(Sprint)			2.00			1/2" Ice	2.95	2.84	83.12
			0.00						
1900MHz 4x40W RRH	C	From Face	4.00	0.0000	130.00	No Ice	2.71	2.61	60.00
(Sprint)			2.00			1/2" Ice	2.95	2.84	83.12
			0.00						
800MHz 2x50W RRH	A	From Face	4.00	0.0000	130.00	No Ice	2.40	2.25	64.00
(Sprint)			0.00			1/2" Ice	2.61	2.46	86.12
			0.00						
800MHz 2x50W RRH	B	From Face	4.00	0.0000	130.00	No Ice	2.40	2.25	64.00
(Sprint)			2.00			1/2" Ice	2.61	2.46	86.12
			2.00						
800MHz 2x50W RRH	C	From Face	4.00	0.0000	130.00	No Ice	2.40	2.25	64.00
(Sprint)			2.00			1/2" Ice	2.61	2.46	86.12
			2.00						
PiROD 13' Low Profile Platform	C	None		0.0000	130.00	No Ice	15.70	15.70	1300.00
(Mount)						1/2" Ice	20.10	20.10	1765.00
****									
APXV9TM14-ALU-120	A	From Face	4.00	0.0000	130.00	No Ice	6.90	3.61	55.12
(Sprint)			6.00			1/2" Ice	7.35	3.97	94.65
			0.00						
APXV9TM14-ALU-120	B	From Face	4.00	0.0000	130.00	No Ice	6.90	3.61	55.12
(Sprint)			-2.00			1/2" Ice	7.35	3.97	94.65
			0.00						
APXV9TM14-ALU-120	C	From Face	4.00	0.0000	130.00	No Ice	6.90	3.61	55.12
(Sprint)			-2.00			1/2" Ice	7.35	3.97	94.65
			0.00						
TD-RRH 8x20	A	From Face	4.00	0.0000	130.00	No Ice	4.32	1.41	66.13
(Sprint)			6.00			1/2" Ice	4.60	1.61	90.06
			1.50						
TD-RRH 8x20	B	From Face	4.00	0.0000	130.00	No Ice	4.32	1.41	66.13
(Sprint)			-2.00			1/2" Ice	4.60	1.61	90.06
			1.50						

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
TD-RRH 8x20 (Sprint)	C	From Face	4.00 -2.00 1.50	0.0000	130.00	No Ice 1/2" Ice	4.32 4.60	1.41 1.61	66.13 90.06

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	32156.56					
Bracing Weight	0.00					
Total Member Self-Weight	32156.56			-327.64	6.61	
Total Weight	48214.64			-327.64	6.61	
Wind 0 deg - No Ice		-2.87	-31621.17	-3662317.97	467.65	604.63
Wind 30 deg - No Ice		15809.76	-27383.30	-3171473.77	-1830855.47	569.97
Wind 60 deg - No Ice		27386.17	-15808.10	-1830923.53	-3171600.57	382.58
Wind 90 deg - No Ice		31624.49	2.87	133.41	-3662516.09	92.68
Wind 120 deg - No Ice		27389.04	15813.07	1831066.80	-3172061.62	-222.05
Wind 150 deg - No Ice		15814.73	27386.17	3171279.54	-1831654.02	-477.29
Wind 180 deg - No Ice		2.87	31621.17	3661662.69	-454.44	-604.63
Wind 210 deg - No Ice		-15809.76	27383.30	3170818.49	1830868.68	-569.97
Wind 240 deg - No Ice		-27386.17	15808.10	1830268.25	3171613.79	-382.58
Wind 270 deg - No Ice		-31624.49	-2.87	-788.68	3662529.31	-92.68
Wind 300 deg - No Ice		-27389.04	-15813.07	-1831722.08	3172074.83	222.05
Wind 330 deg - No Ice		-15814.73	-27386.17	-3171934.82	1831667.24	477.29
Member Ice	4682.55					
Total Weight Ice	57127.79			-158.34	23.41	
Wind 0 deg - Ice		-8.44	-26030.43	-3080598.15	1313.36	503.08
Wind 30 deg - Ice		13012.78	-22538.79	-2667252.50	-1539824.12	492.44
Wind 60 deg - Ice		22547.23	-13007.90	-1539261.12	-2668360.69	349.85
Wind 90 deg - Ice		26040.18	8.44	1131.61	-3081905.90	113.52
Wind 120 deg - Ice		22555.68	13022.53	1541178.69	-2669650.64	-153.23
Wind 150 deg - Ice		13027.40	22547.23	2668225.76	-1542058.38	-378.92
Wind 180 deg - Ice		8.44	26030.43	3080281.46	-1266.54	-503.08
Wind 210 deg - Ice		-13012.78	22538.79	2666935.81	1539870.94	-492.44
Wind 240 deg - Ice		-22547.23	13007.90	1538944.43	2668407.51	-349.85
Wind 270 deg - Ice		-26040.18	-8.44	-1448.30	3081952.73	-113.52
Wind 300 deg - Ice		-22555.68	-13022.53	-1541495.38	2669697.47	153.23
Wind 330 deg - Ice		-13027.40	-22547.23	-2668542.45	1542105.20	378.92
Total Weight	48214.64			-327.64	6.61	
Wind 0 deg - Service		-1.43	-15755.88	-1824987.18	236.33	301.27
Wind 30 deg - Service		7877.53	-13644.27	-1580414.29	-912256.85	284.00
Wind 60 deg - Service		13645.71	-7876.70	-912458.46	-1580309.77	190.63
Wind 90 deg - Service		15757.53	1.43	-97.92	-1824918.20	46.18
Wind 120 deg - Service		13647.14	7879.18	912201.08	-1580539.50	-110.64
Wind 150 deg - Service		7880.00	13645.71	1579988.74	-912654.74	-237.82
Wind 180 deg - Service		1.43	15755.88	1824331.90	-223.12	-301.27
Wind 210 deg - Service		-7877.53	13644.27	1579759.02	912270.06	-284.00
Wind 240 deg - Service		-13645.71	7876.70	911803.18	1580322.99	-190.63
Wind 270 deg - Service		-15757.53	-1.43	-557.36	1824931.42	-46.18

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 300 deg - Service		-13647.14	-7879.18	-912856.36	1580552.71	110.64
Wind 330 deg - Service		-7880.00	-13645.71	-1580644.02	912667.96	237.82

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
L1	170 - 124	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-18244.96	23.41	158.34

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force lb	Major Axis Moment lb-ft	Minor Axis Moment lb-ft
			Max. Mx	11	-12018.75	437124.65	429.50
			Max. My	2	-12018.88	124.63	437339.25
			Max. Vy	11	-19936.83	437124.65	429.50
			Max. Vx	2	-19933.56	124.63	437339.25
			Max. Torque	10			639.97
L2	124 - 83.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-26467.82	23.41	158.34
			Max. Mx	11	-19569.87	1290536.06	551.22
			Max. My	2	-19570.02	227.20	1290621.18
			Max. Vy	11	-23567.34	1290536.06	551.22
			Max. Vx	2	-23564.01	227.20	1290621.18
			Max. Torque	2			-606.64
L3	83.5 - 44.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-37587.04	23.41	158.34
			Max. Mx	11	-29928.17	2262539.32	668.44
			Max. My	2	-29928.26	335.87	2262496.79
			Max. Vy	11	-27195.47	2262539.32	668.44
			Max. Vx	2	-27192.13	335.87	2262496.79
			Max. Torque	2			-605.55
L4	44.25 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-57127.79	23.41	158.34
			Max. Mx	11	-48199.34	3763746.72	819.86
			Max. My	2	-48199.34	485.15	3763534.07
			Max. Vy	11	-31647.81	3763746.72	819.86
			Max. Vx	2	-31644.49	485.15	3763534.07
			Max. Torque	2			-604.87

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical lb	Horizontal, X lb	Horizontal, Z lb
Pole	Max. Vert	24	57127.79	26040.19	8.44
	Max. H_x	11	48214.64	31624.49	2.87
	Max. H_z	2	48214.64	2.87	31621.17
	Max. M_x	2	3763534.07	2.87	31621.17
	Max. M_z	5	3763733.45	-31624.49	-2.87
	Max. Torsion	8	604.30	-2.87	-31621.17
	Min. Vert	1	48214.64	0.00	0.00
	Min. H_x	5	48214.64	-31624.49	-2.87
	Min. H_z	8	48214.64	-2.87	-31621.17
	Min. M_x	8	-3762849.49	-2.87	-31621.17
	Min. M_z	11	-3763746.72	31624.49	2.87
	Min. Torsion	2	-604.61	2.87	31621.17

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	48214.64	0.00	0.00	-327.64	6.61	0.00
Dead+Wind 0 deg - No Ice	48214.64	-2.87	-31621.17	-3763534.07	485.24	604.61
Dead+Wind 30 deg - No Ice	48214.64	15809.76	-27383.30	-3259129.50	-1881451.11	574.74

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 60 deg - No Ice	48214.64	27386.17	-15808.10	-1881530.68	-3259252.65	390.86
Dead+Wind 90 deg - No Ice	48214.64	31624.49	2.87	131.62	-3763733.45	102.39
Dead+Wind 120 deg - No Ice	48214.64	27389.04	15813.07	1881666.58	-3259728.65	-213.41
Dead+Wind 150 deg - No Ice	48214.64	15814.73	27386.17	3258918.40	-1882275.95	-472.04
Dead+Wind 180 deg - No Ice	48214.64	2.87	31621.17	3762849.49	-466.25	-604.30
Dead+Wind 210 deg - No Ice	48214.64	-15809.76	27383.30	3258441.51	1881470.28	-574.73
Dead+Wind 240 deg - No Ice	48214.64	-27386.17	15808.10	1880840.85	3259268.95	-391.19
Dead+Wind 270 deg - No Ice	48214.64	-31624.49	-2.87	-819.87	3763746.72	-102.70
Dead+Wind 300 deg - No Ice	48214.64	-27389.04	-15813.07	-1882351.44	3259741.76	213.43
Dead+Wind 330 deg - No Ice	48214.64	-15814.73	-27386.17	-3259601.42	1882291.92	472.34
Dead+Ice+Temp	57127.79	0.00	0.00	-158.34	23.41	0.00
Dead+Wind 0 deg+Ice+Temp	57127.79	-8.44	-26030.44	-3194437.90	1369.71	506.20
Dead+Wind 30 deg+Ice+Temp	57127.79	13012.78	-22538.80	-2765818.00	-1596721.26	499.39
Dead+Wind 60 deg+Ice+Temp	57127.79	22547.24	-13007.91	-1596142.18	-2766965.16	358.73
Dead+Wind 90 deg+Ice+Temp	57127.79	26040.19	8.44	1173.93	-3195794.41	122.10
Dead+Wind 120 deg+Ice+Temp	57127.79	22555.68	13022.53	1598129.40	-2768306.10	-147.12
Dead+Wind 150 deg+Ice+Temp	57127.79	13027.40	22547.24	2766822.58	-1599046.13	-376.97
Dead+Wind 180 deg+Ice+Temp	57127.79	8.44	26030.44	3194103.28	-1315.33	-505.88
Dead+Wind 210 deg+Ice+Temp	57127.79	-13012.78	22538.80	2765480.25	1596775.31	-499.36
Dead+Wind 240 deg+Ice+Temp	57127.79	-22547.24	13007.91	1595803.15	2767016.34	-359.07
Dead+Wind 270 deg+Ice+Temp	57127.79	-26040.19	-8.44	-1511.11	3195843.05	-122.42
Dead+Wind 300 deg+Ice+Temp	57127.79	-22555.68	-13022.53	-1598463.46	2768355.07	147.15
Dead+Wind 330 deg+Ice+Temp	57127.79	-13027.40	-22547.24	-2767155.35	1599097.97	377.26
Dead+Wind 0 deg - Service	48214.64	-1.43	-15755.88	-1876516.66	244.67	302.65
Dead+Wind 30 deg - Service	48214.64	7877.53	-13644.27	-1625040.94	-938011.60	287.83
Dead+Wind 60 deg - Service	48214.64	13645.71	-7876.70	-938225.50	-1624924.85	195.87
Dead+Wind 90 deg - Service	48214.64	15757.53	1.43	-107.08	-1876439.89	51.47
Dead+Wind 120 deg - Service	48214.64	13647.14	7879.18	937947.91	-1625162.31	-106.68
Dead+Wind 150 deg - Service	48214.64	7880.00	13645.71	1624590.07	-938422.79	-236.27
Dead+Wind 180 deg - Service	48214.64	1.43	15755.88	1875828.96	-229.79	-302.57
Dead+Wind 210 deg - Service	48214.64	-7877.53	13644.28	1624350.50	938025.45	-287.81
Dead+Wind 240 deg - Service	48214.64	-13645.71	7876.70	937537.56	1624940.94	-195.96
Dead+Wind 270 deg - Service	48214.64	-15757.53	-1.43	-581.54	1876453.34	-51.55
Dead+Wind 300 deg - Service	48214.64	-13647.14	-7879.18	-938636.74	1625177.60	106.69
Dead+Wind 330 deg - Service	48214.64	-7880.01	-13645.71	-1625275.49	938435.85	236.34

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	-48214.64	0.00	0.00	48214.64	0.00	0.000%
2	-2.87	-48214.64	-31621.17	2.87	48214.64	31621.17	0.000%
3	15809.76	-48214.64	-27383.30	-15809.76	48214.64	27383.30	0.000%
4	27386.17	-48214.64	-15808.10	-27386.17	48214.64	15808.10	0.000%
5	31624.49	-48214.64	2.87	-31624.49	48214.64	-2.87	0.000%
6	27389.04	-48214.64	15813.07	-27389.04	48214.64	-15813.07	0.000%
7	15814.73	-48214.64	27386.17	-15814.73	48214.64	-27386.17	0.000%
8	2.87	-48214.64	31621.17	-2.87	48214.64	-31621.17	0.000%
9	-15809.76	-48214.64	27383.30	15809.76	48214.64	-27383.30	0.000%
10	-27386.17	-48214.64	15808.10	27386.17	48214.64	-15808.10	0.000%
11	-31624.49	-48214.64	-2.87	31624.49	48214.64	2.87	0.000%
12	-27389.04	-48214.64	-15813.07	27389.04	48214.64	15813.07	0.000%
13	-15814.73	-48214.64	-27386.17	15814.73	48214.64	27386.17	0.000%
14	0.00	-57127.79	0.00	0.00	57127.79	0.00	0.000%
15	-8.44	-57127.79	-26030.43	8.44	57127.79	26030.44	0.000%
16	13012.78	-57127.79	-22538.79	-13012.78	57127.79	22538.80	0.000%
17	22547.23	-57127.79	-13007.90	-22547.24	57127.79	13007.91	0.000%

Load Comb.	Sum of Applied Forces PX lb	PY lb	PZ lb	Sum of Reactions PX lb	PY lb	PZ lb	% Error
18	26040.18	-57127.79	8.44	-26040.19	57127.79	-8.44	0.000%
19	22555.68	-57127.79	13022.53	-22555.68	57127.79	-13022.53	0.000%
20	13027.40	-57127.79	22547.23	-13027.40	57127.79	-22547.24	0.000%
21	8.44	-57127.79	26030.43	-8.44	57127.79	-26030.44	0.000%
22	-13012.78	-57127.79	22538.79	13012.78	57127.79	-22538.80	0.000%
23	-22547.23	-57127.79	13007.90	22547.24	57127.79	-13007.91	0.000%
24	-26040.18	-57127.79	-8.44	26040.19	57127.79	8.44	0.000%
25	-22555.68	-57127.79	-13022.53	22555.68	57127.79	13022.53	0.000%
26	-13027.40	-57127.79	-22547.23	13027.40	57127.79	22547.24	0.000%
27	-1.43	-48214.64	-15755.88	1.43	48214.64	15755.88	0.000%
28	7877.53	-48214.64	-13644.27	-7877.53	48214.64	13644.27	0.000%
29	13645.71	-48214.64	-7876.70	-13645.71	48214.64	7876.70	0.000%
30	15757.53	-48214.64	1.43	-15757.53	48214.64	-1.43	0.000%
31	13647.14	-48214.64	7879.18	-13647.14	48214.64	-7879.18	0.000%
32	7880.00	-48214.64	13645.71	-7880.00	48214.64	-13645.71	0.000%
33	1.43	-48214.64	15755.88	-1.43	48214.64	-15755.88	0.000%
34	-7877.53	-48214.64	13644.27	7877.53	48214.64	-13644.28	0.000%
35	-13645.71	-48214.64	7876.70	13645.71	48214.64	-7876.70	0.000%
36	-15757.53	-48214.64	-1.43	15757.53	48214.64	1.43	0.000%
37	-13647.14	-48214.64	-7879.18	13647.14	48214.64	7879.18	0.000%
38	-7880.00	-48214.64	-13645.71	7880.01	48214.64	13645.71	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	0.00015452
3	Yes	5	0.00000001	0.00019545
4	Yes	5	0.00000001	0.00019161
5	Yes	4	0.00000001	0.00010008
6	Yes	5	0.00000001	0.00019257
7	Yes	5	0.00000001	0.00019490
8	Yes	4	0.00000001	0.00015761
9	Yes	5	0.00000001	0.00019088
10	Yes	5	0.00000001	0.00019471
11	Yes	4	0.00000001	0.00009894
12	Yes	5	0.00000001	0.00019398
13	Yes	5	0.00000001	0.00019167
14	Yes	4	0.00000001	0.00000001
15	Yes	5	0.00000001	0.00015669
16	Yes	5	0.00000001	0.00040652
17	Yes	5	0.00000001	0.00040221
18	Yes	5	0.00000001	0.00015662
19	Yes	5	0.00000001	0.00040415
20	Yes	5	0.00000001	0.00040643
21	Yes	5	0.00000001	0.00015670
22	Yes	5	0.00000001	0.00040150
23	Yes	5	0.00000001	0.00040582
24	Yes	5	0.00000001	0.00015661
25	Yes	5	0.00000001	0.00040538
26	Yes	5	0.00000001	0.00040310
27	Yes	4	0.00000001	0.00007164
28	Yes	5	0.00000001	0.00003638
29	Yes	4	0.00000001	0.00098852
30	Yes	4	0.00000001	0.00006050

31	Yes	4	0.00000001	0.00099585
32	Yes	5	0.00000001	0.00003617
33	Yes	4	0.00000001	0.00007194
34	Yes	4	0.00000001	0.00098182
35	Yes	5	0.00000001	0.00003612
36	Yes	4	0.00000001	0.00006040
37	Yes	5	0.00000001	0.00003589
38	Yes	4	0.00000001	0.00098870

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	170 - 124	40.487	38	2.1232	0.0017
L2	128.5 - 83.5	22.993	38	1.7926	0.0010
L3	89.25 - 44.25	10.599	38	1.1675	0.0004
L4	51 - 0	3.360	38	0.6078	0.0002

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
170.00	(2) DB844H80E-XY w/Mount Pipe	38	40.487	2.1232	0.0017	31779
160.00	5' x 1' Panel Antenna w/Mount Pipe	38	36.067	2.0646	0.0015	15889
152.00	Tri-Antenna Mount	38	32.582	2.0126	0.0014	8827
150.00	DBXNH-8585B-R2M w/Mount Pipe	38	31.723	1.9983	0.0013	7944
140.00	RR90-17-02DPL2 w/Mount Pipe	38	27.530	1.9163	0.0012	5295
130.00	APXVSPP18-C-A20 w/Mount Pipe	38	23.564	1.8110	0.0010	3998

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	170 - 124	81.122	5	4.2554	0.0033
L2	128.5 - 83.5	46.082	11	3.5929	0.0020
L3	89.25 - 44.25	21.250	12	2.3408	0.0008
L4	51 - 0	6.738	12	1.2189	0.0003

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
170.00	(2) DB844H80E-XY w/Mount Pipe	5	81.122	4.2554	0.0033	15987

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
160.00	5' x 1' Panel Antenna w/Mount Pipe	5	72.269	4.1380	0.0030	7993
152.00	Tri-Antenna Mount	11	65.289	4.0336	0.0027	4439
150.00	DBXNH-8585B-R2M w/Mount Pipe	11	63.568	4.0050	0.0026	3995
140.00	RR90-17-02DPL2 w/Mount Pipe	11	55.170	3.8407	0.0023	2661
130.00	APXVSPP18-C-A20 w/Mount Pipe	11	47.225	3.6296	0.0021	2008

Base Plate Design Data

Plate Thickness in	Number of Anchor Bolts	Anchor Bolt Size in	Actual / Allowable Ratio Bolt Tension lb	Actual / Allowable Ratio Bolt Compression lb	Actual / Allowable Ratio Plate Stress ksi	Actual / Allowable Ratio Stiffener Stress ksi	Controlling Condition	Ratio
3.2500	20	2.2500	123063.20 196815.87 0.63	127883.13 326714.35 0.39	28.417 41.250 0.69		Plate	0.69 ✔

Compression Checks

Pole Design Data

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 $\frac{P}{P_a}$
L1	170 - 124 (1)	TP35.36x24x0.25	46.00	170.00	169.0	5.227	26.9780	-12018.40	141020.00	0.085
L2	124 - 83.5 (2)	TP44.87x33.7487x0.3125	45.00	170.00	133.2	8.415	42.7860	-19569.70	360029.00	0.054
L3	83.5 - 44.25 (3)	TP53.94x42.8239x0.375	45.00	170.00	110.7	12.180	61.7711	-29928.00	752363.00	0.040
L4	44.25 - 0 (4)	TP64.12x51.5226x0.4375	51.00	170.00	90.2	18.240	88.4311	-48199.30	1613020.00	0.030

Pole Bending Design Data

Section No.	Elevation ft	Size	Actual M_x lb-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y lb-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
L1	170 - 124 (1)	TP35.36x24x0.25	437408.33	23.180	39.000	0.594	0.00	0.000	39.000	0.000
L2	124 - 83.5 (2)	TP44.87x33.7487x0.3125	1290825.00	33.991	39.000	0.872	0.00	0.000	39.000	0.000
L3	83.5 - 44.25 (3)	TP53.94x42.8239x0.375	2262900.00	34.306	39.000	0.880	0.00	0.000	39.000	0.000
L4	44.25 - 0 (4)	TP64.12x51.5226x0.4375	3764191.67	32.473	39.000	0.833	0.00	0.000	39.000	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V lb	Actual f_v ksi	Allow. F_v ksi	Ratio $\frac{f_v}{F_v}$	Actual T lb-ft	Actual f_{vt} ksi	Allow. F_{vt} ksi	Ratio $\frac{f_{vt}}{F_{vt}}$
L1	170 - 124 (1)	TP35.36x24x0.25	19937.20	0.739	26.000	0.057	474.02	0.012	26.000	0.000
L2	124 - 83.5 (2)	TP44.87x33.7487x0.3125	23567.50	0.551	26.000	0.042	473.18	0.006	26.000	0.000
L3	83.5 - 44.25 (3)	TP53.94x42.8239x0.375	27197.10	0.440	26.000	0.034	213.54	0.002	26.000	0.000
L4	44.25 - 0 (4)	TP64.12x51.5226x0.4375	31649.50	0.358	26.000	0.028	213.43	0.001	26.000	0.000

Pole Interaction Design Data

Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	170 - 124 (1)	0.085	0.594	0.000	0.057	0.000	0.680 ✔	1.333	H1-3+VT ✔
L2	124 - 83.5 (2)	0.054	0.872	0.000	0.042	0.000	0.926 ✔	1.333	H1-3+VT ✔
L3	83.5 - 44.25 (3)	0.040	0.880	0.000	0.034	0.000	0.920 ✔	1.333	H1-3+VT ✔
L4	44.25 - 0 (4)	0.030	0.833	0.000	0.028	0.000	0.863 ✔	1.333	H1-3+VT ✔

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	SF*P_{allow} lb	% Capacity	Pass Fail
L1	170 - 124	Pole	TP35.36x24x0.25	1	-12018.40	187979.65	51.0	Pass
L2	124 - 83.5	Pole	TP44.87x33.7487x0.3125	2	-19569.70	479918.64	69.5	Pass
L3	83.5 - 44.25	Pole	TP53.94x42.8239x0.375	3	-29928.00	1002899.84	69.0	Pass
L4	44.25 - 0	Pole	TP64.12x51.5226x0.4375	4	-48199.30	2150155.57	64.7	Pass
							Summary	
						Pole (L2)	69.5	Pass
						Base Plate	51.7	Pass
						RATING =	**69.5**	**Pass**

APPENDIX C

MOUNT CALCULATIONS

WINDSPEED BY LOCATION

Applied Technology Council

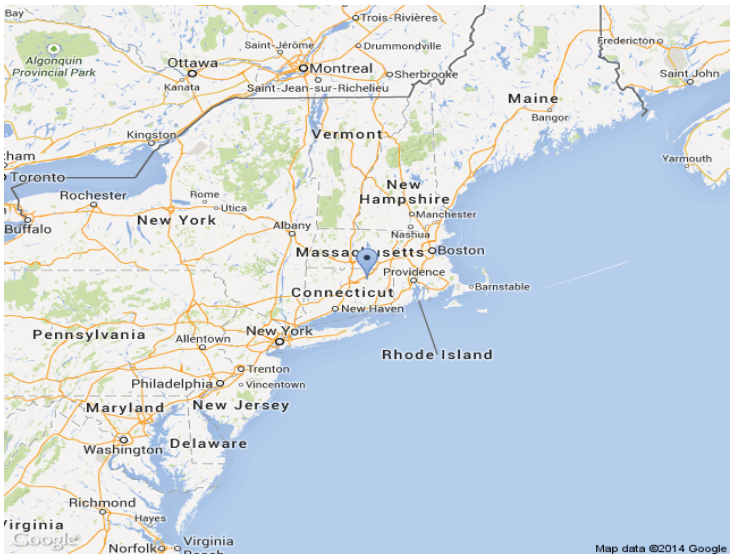
Search Results

Latitude: 41.8360
Longitude: -72.3078

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

Risk Category I: 115
Risk Category II: 126
Risk Category III-IV: 135
MRI 10 Year:** 77
MRI 25 Year:** 87
MRI 50 Year:** 94
MRI 100 Year:** 101

ASCE 7-05: 101
ASCE 7-93: 82



*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:	29264
Project:	TCP/Mansfield (CT33XC557-A)
By:	JMO
Date:	7/8/2014

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:	C		Exposure Category
V:	101	mph	Basic Wind Speed (Annex B)
z:	130	ft	Height above ground level to the center of the antenna
I:	1.00		Importance Factor (Table 2-3)
K_z:	1.34		Velocity Pressure Coefficient (2.6.5.2)
K_{zt}:	1		Topographic Factor (2.6.6.4)
K_d:	0.95		Wind Direction Probability Factor (Table 2-2)
q_z =	**33.2**	**psf**	

G_h:	1.00	Appurtenances and their Connections

Mount & Antenna Wind Loads

Appurtenance	Height	Depth	h/D	Shape	C_a	A_f	**$F = q_z G_h C_a A_a$**	
2L2-1/2X2-1/2X3/16 x 14 ft	168.0 in	2.5 in	67.2	Flat	2.000	2.92 sf	**193.6 lb**	13.8 plf
HSS4X4X3/16 x 2.58 ft	31.0 in	4.0 in	7.7	Flat	1.425	0.86 sf	**40.7 lb**	15.8 plf
Pipe2STD x 8 ft	96.0 in	2.4 in	40.3	Round	1.200	1.59 sf	**63.2 lb**	7.9 plf
Pipe2STD x 6 ft	72.0 in	2.4 in	30.3	Round	1.200	1.19 sf	**47.4 lb**	7.9 plf
L2-1/2X2-1/2X3/16 x 7 ft	84.0 in	2.5 in	33.6	Flat	2.000	1.46 sf	**96.8 lb**	13.8 plf
APXV9TM14-ALU-120	56.3 in	6.3 in	8.9	Flat	1.465	2.46 sf	**119.7 lb**	
TD-RRH8x20	26.1 in	6.7 in	3.9	Flat	1.262	1.21 sf	**50.9 lb**	
APXVSPP18-C-A20	72.0 in	7.0 in	10.3	Flat	1.509	3.50 sf	**175.5 lb**	
1900MHz 4x45W RRH	25.1 in	10.7 in	2.3	Flat	1.200	1.86 sf	**74.2 lb**	
800MHz 2x50W RRH	19.0 in	12.2 in	1.6	Flat	1.200	1.61 sf	**64.1 lb**	
APXV9ERR18-C-A20	72.0 in	7.9 in	9.1	Flat	1.470	3.95 sf	**192.7 lb**	

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Wind Load on Antennas TIA-222

2.6.9.6 Velocity Pressure

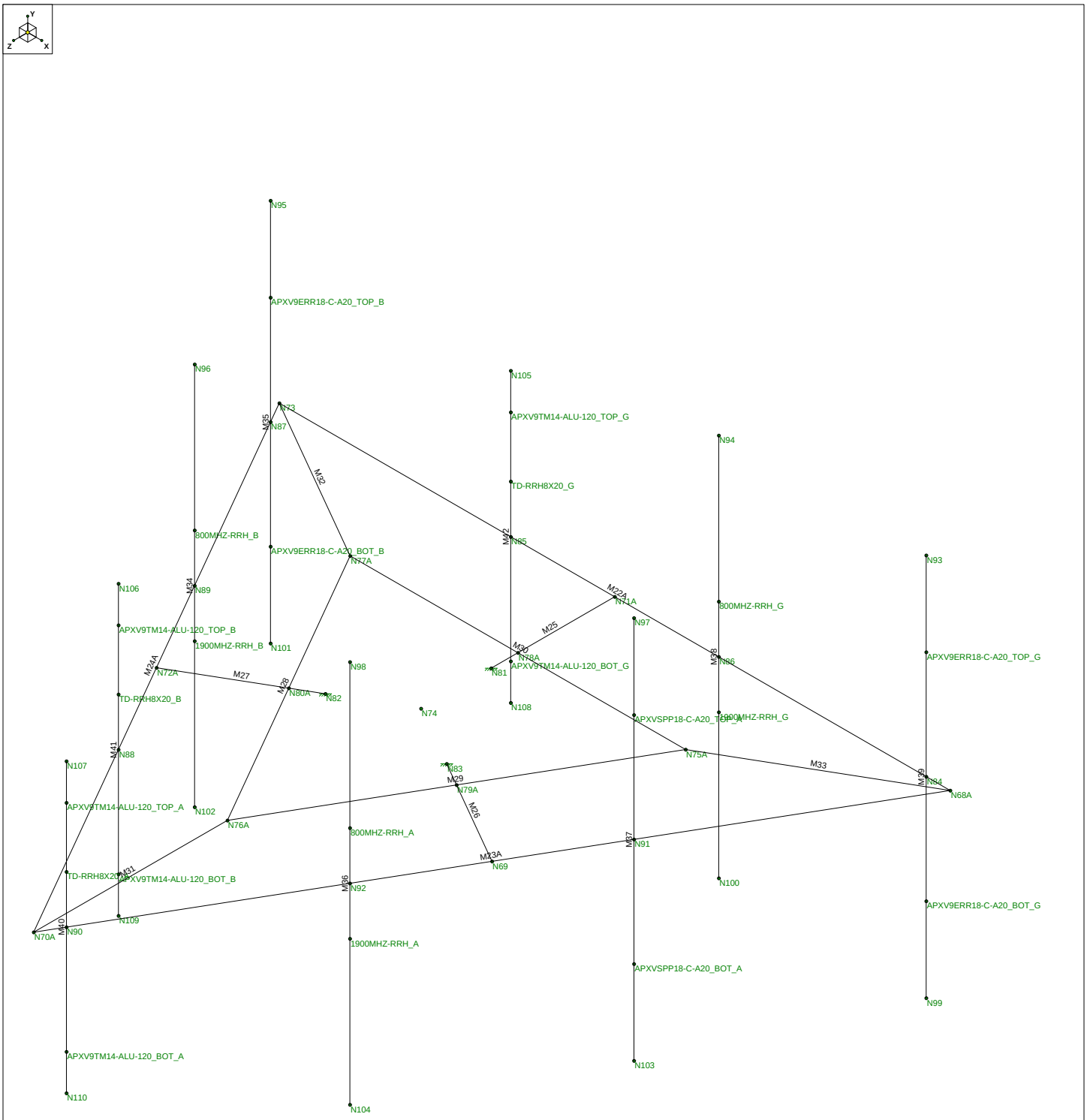
$q_z = 0.00256\ K_z\ K_{zt}\ K_d\ V^2\ I$

Occupancy:	II		Classification of Structures (Table 2-1)
Exposure:	C		Exposure Category
V:	101	mph	Basic Wind Speed (Annex B)
z:	130	ft	Height above ground level to the center of the antenna
I:	1.00		Importance Factor (Table 2-3)
K_z:	1.34		Velocity Pressure Coefficient (2.6.5.2)
K_{zt}:	1		Topographic Factor (2.6.6.4)
K_d:	0.95		Wind Direction Probability Factor (Table 2-2)
q_z =	**33.2**	**psf**	

G_h:	1.00	Appurtenances and their Connections

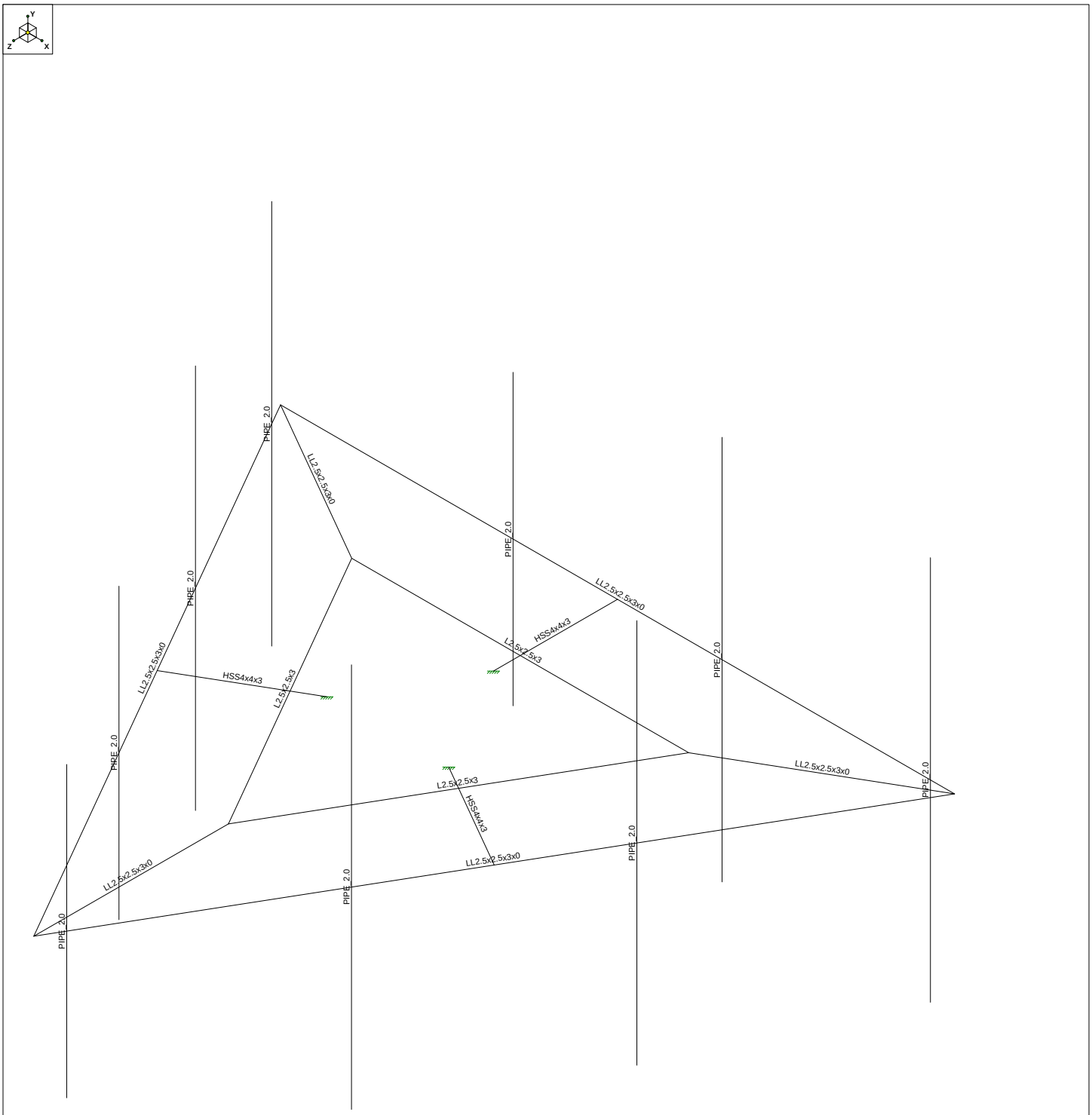
Mount & Antenna Wind Loads

Appurtenance	Height	Width	h/D	Shape	C_a	A_f	**$F = q_z G_h C_a A_a$**	
2L2-1/2X2-1/2X3/16 x 14 ft	168.0 in	5.0 in	33.6	Flat	2.000	5.83 sf	**387.1 lb**	27.7 plf
HSS4X4X3/16 x 2.58 ft	31.0 in	4.0 in	7.7	Flat	1.425	0.86 sf	**40.7 lb**	15.8 plf
Pipe2STD x 8 ft	96.0 in	2.4 in	40.3	Round	1.200	1.59 sf	**63.2 lb**	7.9 plf
Pipe2STD x 6 ft	72.0 in	2.4 in	30.3	Round	1.200	1.19 sf	**47.4 lb**	7.9 plf
L2-1/2X2-1/2X3/16 x 7 ft	84.0 in	2.5 in	33.6	Flat	2.000	1.46 sf	**96.8 lb**	13.8 plf
APXV9TM14-ALU-120	56.3 in	12.6 in	4.5	Flat	1.287	4.93 sf	**210.5 lb**	
TD-RRH8x20	26.1 in	18.6 in	1.4	Flat	1.200	3.37 sf	**134.2 lb**	
APXVSPP18-C-A20	72.0 in	11.9 in	6.1	Flat	1.358	5.95 sf	**267.9 lb**	
1900MHz 4x45W RRH	25.1 in	11.1 in	2.3	Flat	1.200	1.93 sf	**77.0 lb**	
800MHz 2x50W RRH	19.0 in	13.0 in	1.5	Flat	1.200	1.72 sf	**68.3 lb**	
APXV9ERR18-C-A20	72.0 in	11.9 in	6.1	Flat	1.358	5.95 sf	**268.1 lb**	



Envelope Only Solution

Ramaker & Associates	TCP/Mansfield (CT33XC557-A)	SK - 1
JMO		July 8, 2014 at 11:50 AM
29264		29264 Platform.r3d



Envelope Only Solution

Ramaker & Associates	TCP/Mansfield (CT33XC557-A)	SK - 2
JMO		July 8, 2014 at 11:51 AM
29264		29264 Platform.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	65	1.1
3	A992	29000	11154	.3	.65	.49	50	1.1	65	1.1
4	A500 Gr.42	29000	11154	.3	.65	.49	42	1.4	58	1.3
5	A500 Gr.46	29000	11154	.3	.65	.49	46	1.4	58	1.3
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	face horiz	LL2.5x2.5x...	Beam	Single Angle	A36 Gr.36	Typical	1.8	1.91	1.07	.023
2	standoff	HSS4x4x3	Beam	SquareTube	A36 Gr.36	Typical	2.58	6.21	6.21	10
3	pipe mount	PIPE_2.0	Beam	Pipe	A53 Gr. B	Typical	1.02	.627	.627	1.25
4	new pipe mount	PIPE_2.0	Beam	Pipe	A53 Gr. B	Typical	1.02	.627	.627	1.25
5	corner horiz	LL2.5x2.5x...	Beam	Double Angle (No ...	A36 Gr.36	Typical	1.8	1.91	1.07	.023
6	inner face	L2.5x2.5x3	Beam	Double Angle (No ...	A36 Gr.36	Typical	.901	.535	.535	.011

Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rules
1	M22A	N73	N68A		270	face horiz	Beam	Single Angle	A36 Gr.36	Typical
2	M23A	N68A	N70A		270	face horiz	Beam	Single Angle	A36 Gr.36	Typical
3	M24A	N70A	N73		270	face horiz	Beam	Single Angle	A36 Gr.36	Typical
4	M25	N71A	N81			standoff	Beam	SquareTube	A36 Gr.36	Typical
5	M26	N69	N83			standoff	Beam	SquareTube	A36 Gr.36	Typical
6	M27	N72A	N82			standoff	Beam	SquareTube	A36 Gr.36	Typical
7	M28	N77A	N76A			inner face	Beam	Double Angle (...	A36 Gr.36	Typical
8	M29	N76A	N75A			inner face	Beam	Double Angle (...	A36 Gr.36	Typical
9	M30	N75A	N77A			inner face	Beam	Double Angle (...	A36 Gr.36	Typical
10	M31	N76A	N70A		180	corner horiz	Beam	Double Angle (...	A36 Gr.36	Typical
11	M32	N77A	N73		180	corner horiz	Beam	Double Angle (...	A36 Gr.36	Typical
12	M33	N75A	N68A		180	corner horiz	Beam	Double Angle (...	A36 Gr.36	Typical
13	M34	N96	N102			pipe mount	Beam	Pipe	A53 Gr. B	Typical
14	M35	N95	N101			pipe mount	Beam	Pipe	A53 Gr. B	Typical
15	M36	N98	N104			pipe mount	Beam	Pipe	A53 Gr. B	Typical
16	M37	N97	N103			pipe mount	Beam	Pipe	A53 Gr. B	Typical
17	M38	N94	N100			pipe mount	Beam	Pipe	A53 Gr. B	Typical
18	M39	N93	N99			pipe mount	Beam	Pipe	A53 Gr. B	Typical
19	M40	N107	N110			new pipe mount	Beam	Pipe	A53 Gr. B	Typical
20	M41	N106	N109			new pipe mount	Beam	Pipe	A53 Gr. B	Typical
21	M42	N105	N108			new pipe mount	Beam	Pipe	A53 Gr. B	Typical

Joint Coordinates and Temperatures

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Diap...
1	APXV9ERR18-C-A20_TOP_G	6.5	2.25	-4.041452	0	
2	APXV9ERR18-C-A20_TOP_B	-6.75	2.25	-3.608439	0	
3	APXVSPP18-C-A20_TOP_A	4.585	2.25	0.141451	0	
4	APXV9ERR18-C-A20_BOT_G	6.5	-2.25	-4.041452	0	
5	APXV9ERR18-C-A20_BOT_B	-6.75	-2.25	-3.608439	0	
6	APXVSPP18-C-A20_BOT_A	4.585	-2.25	0.141451	0	
7	800MHZ-RRH_G	2.17	1	-4.041452	0	
8	800MHZ-RRH_B	-4.585	1	0.141451	0	
9	800MHZ-RRH_A	2.415	1	3.900001	0	

Joint Coordinates and Temperatures (Continued)

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Diap...
10	1900MHZ-RRH_G	2.17	-1	-4.041452	0	
11	1900MHZ-RRH_B	-4.585	-1	0.141451	0	
12	1900MHZ-RRH_A	2.415	-1	3.900001	0	
13	APXV9TM14-ALU-120_TOP_G	-2.17	2.25	-4.041452	0	
14	APXV9TM14-ALU-120_TOP_B	-2.415	2.25	3.900001	0	
15	APXV9TM14-ALU-120_TOP_A	.25	2.25	7.649891	0	
16	APXV9TM14-ALU-120_BOT_G	-2.17	-2.25	-4.041452	0	
17	APXV9TM14-ALU-120_BOT_B	-2.415	-2.25	3.900001	0	
18	APXV9TM14-ALU-120_BOT_A	.25	-2.25	7.649891	0	
19	TD-RRH8X20_G	-2.17	1	-4.041452	0	
20	TD-RRH8X20_B	-2.415	1	3.900001	0	
21	TD-RRH8X20_A	.25	1	7.649891	0	
22	N68A	7.	0	-4.041452	0	
23	N69	3.5	0	2.020726	0	
24	N70A	0.	0	8.082904	0	
25	N71A	0.	0	-4.041452	0	
26	N72A	-3.5	0	2.020726	0	
27	N73	-7	0	-4.041452	0	
28	N74	0	0	0	0	
29	N75A	3.5	0	-2.020639	0	
30	N76A	0.	0	4.041538	0	
31	N77A	-3.5	0	-2.020639	0	
32	N78A	0.	0	-2.020639	0	
33	N79A	1.750037	0	1.010385	0	
34	N80A	-1.750037	0	1.010385	0	
35	N81	0.	0	-1.461452	0	
36	N82	-1.265655	0	0.730726	0	
37	N83	1.265655	0	0.730726	0	
38	N84	6.5	0	-4.041452	0	
39	N85	-2.17	0	-4.041452	0	
40	N86	2.17	0	-4.041452	0	
41	N87	-6.75	0	-3.608439	0	
42	N88	-2.415	0	3.900001	0	
43	N89	-4.585	0	0.141451	0	
44	N90	0.25	0	7.649891	0	
45	N91	4.585	0	0.141451	0	
46	N92	2.415	0	3.900001	0	
47	N93	6.5	4	-4.041452	0	
48	N94	2.17	4	-4.041452	0	
49	N95	-6.75	4	-3.608439	0	
50	N96	-4.585	4	0.141451	0	
51	N97	4.585	4	0.141451	0	
52	N98	2.415	4	3.900001	0	
53	N99	6.5	-4	-4.041452	0	
54	N100	2.17	-4	-4.041452	0	
55	N101	-6.75	-4	-3.608439	0	
56	N102	-4.585	-4	0.141451	0	
57	N103	4.585	-4	0.141451	0	
58	N104	2.415	-4	3.900001	0	
59	N105	-2.17	3	-4.041452	0	
60	N106	-2.415	3	3.900001	0	
61	N107	0.25	3	7.649891	0	
62	N108	-2.17	-3	-4.041452	0	
63	N109	-2.415	-3	3.900001	0	
64	N110	0.25	-3	7.649891	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	N81	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction	
2	N82	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction	
3	N83	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction	

Joint Loads and Enforced Displacements (BLC 1 : DL)

	Joint Label	L,D,M	Direction	Magnitude[(lb,lb-ft), (in,rad), (lb*...
1	TD-RRH8X20_G	L	Y	-70
2	TD-RRH8X20_B	L	Y	-70
3	TD-RRH8X20_A	L	Y	-70
4	APXV9TM14-ALU-120_TOP_G	L	Y	-27.5
5	APXV9TM14-ALU-120_TOP_B	L	Y	-27.5
6	APXV9TM14-ALU-120_TOP_A	L	Y	-27.5
7	APXV9TM14-ALU-120_BOT_G	L	Y	-27.5
8	APXV9TM14-ALU-120_BOT_B	L	Y	-27.5
9	APXV9TM14-ALU-120_BOT_A	L	Y	-27.5
10	APXV9ERR18-C-A20_TOP_G	L	Y	-31
11	APXV9ERR18-C-A20_TOP_B	L	Y	-31
12	APXV9ERR18-C-A20_BOT_G	L	Y	-31
13	APXV9ERR18-C-A20_BOT_B	L	Y	-31
14	APXVSPP18-C-A20_TOP_A	L	Y	-28.5
15	APXVSPP18-C-A20_BOT_A	L	Y	-28.5
16	800MHZ-RRH_G	L	Y	-64
17	800MHZ-RRH_B	L	Y	-64
18	800MHZ-RRH_A	L	Y	-64
19	1900MHZ-RRH_G	L	Y	-60
20	1900MHZ-RRH_B	L	Y	-60
21	1900MHZ-RRH_A	L	Y	-60

Joint Loads and Enforced Displacements (BLC 2 : WLz)

	Joint Label	L,D,M	Direction	Magnitude[(lb,lb-ft), (in,rad), (lb*...
1	TD-RRH8X20_G	L	Z	-134.2
2	TD-RRH8X20_B	L	Z	-134.2
3	TD-RRH8X20_A	L	Z	-134.2
4	APXV9TM14-ALU-120_TOP_G	L	Z	-105.2
5	APXV9TM14-ALU-120_TOP_B	L	Z	-105.2
6	APXV9TM14-ALU-120_TOP_A	L	Z	-105.2
7	APXV9TM14-ALU-120_BOT_G	L	Z	-105.2
8	APXV9TM14-ALU-120_BOT_B	L	Z	-105.2
9	APXV9TM14-ALU-120_BOT_A	L	Z	-105.2
10	APXV9ERR18-C-A20_TOP_G	L	Z	-134
11	APXV9ERR18-C-A20_TOP_B	L	Z	-134
12	APXVSPP18-C-A20_TOP_A	L	Z	-134
13	APXV9ERR18-C-A20_BOT_G	L	Z	-134
14	APXV9ERR18-C-A20_BOT_B	L	Z	-134
15	APXVSPP18-C-A20_BOT_A	L	Z	-134
16	800MHZ-RRH_G	L	Z	-68.3
17	800MHZ-RRH_B	L	Z	-68.3
18	800MHZ-RRH_A	L	Z	-68.3
19	1900MHZ-RRH_G	L	Z	-77
20	1900MHZ-RRH_B	L	Z	-77
21	1900MHZ-RRH_A	L	Z	-77

Joint Loads and Enforced Displacements (BLC 3 : WLx)

Joint Label	L,D,M	Direction	Magnitude[(lb,lb-ft), (in,rad), (lb*...

Joint Loads and Enforced Displacements (BLC 3 : WLx) (Continued)

	Joint Label	L,D,M	Direction	Magnitude[(lb,lb-ft), (in,rad), (lb*...
1	TD-RRH8X20_G	L	X	-134.2
2	TD-RRH8X20_B	L	X	-134.2
3	TD-RRH8X20_A	L	X	-134.2
4	APXV9TM14-ALU-120_TOP_G	L	X	-105.2
5	APXV9TM14-ALU-120_TOP_B	L	X	-105.2
6	APXV9TM14-ALU-120_TOP_A	L	X	-105.2
7	APXV9TM14-ALU-120_BOT_G	L	X	-105.2
8	APXV9TM14-ALU-120_BOT_B	L	X	-105.2
9	APXV9TM14-ALU-120_BOT_A	L	X	-105.2
10	APXV9ERR18-C-A20_TOP_G	L	X	-134
11	APXV9ERR18-C-A20_TOP_B	L	X	-134
12	APXVSPP18-C-A20_TOP_A	L	X	-134
13	APXV9ERR18-C-A20_BOT_G	L	X	-134
14	APXV9ERR18-C-A20_BOT_B	L	X	-134
15	APXVSPP18-C-A20_BOT_A	L	X	-134
16	800MHZ-RRH_G	L	X	-68.3
17	800MHZ-RRH_B	L	X	-68.3
18	800MHZ-RRH_A	L	X	-68.3
19	1900MHZ-RRH_G	L	X	-77
20	1900MHZ-RRH_B	L	X	-77
21	1900MHZ-RRH_A	L	X	-77

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	M22A	PZ	-27.7	-27.7	0	0
2	M23A	PZ	-27.7	-27.7	0	0
3	M24A	PZ	-27.7	-27.7	0	0
4	M25	PZ	-15.8	-15.8	0	0
5	M26	PZ	-15.8	-15.8	0	0
6	M27	PZ	-15.8	-15.8	0	0
7	M28	PZ	-13.8	-13.8	0	0
8	M29	PZ	-13.8	-13.8	0	0
9	M30	PZ	-13.8	-13.8	0	0
10	M31	PZ	-13.8	-13.8	0	0
11	M32	PZ	-13.8	-13.8	0	0
12	M33	PZ	-13.8	-13.8	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	M22A	PX	-27.7	-27.7	0	0
2	M23A	PX	-27.7	-27.7	0	0
3	M24A	PX	-27.7	-27.7	0	0
4	M25	PX	-15.8	-15.8	0	0
5	M26	PX	-15.8	-15.8	0	0
6	M27	PX	-15.8	-15.8	0	0
7	M28	PX	-13.8	-13.8	0	0
8	M29	PX	-13.8	-13.8	0	0
9	M30	PX	-13.8	-13.8	0	0
10	M31	PX	-13.8	-13.8	0	0
11	M32	PX	-13.8	-13.8	0	0
12	M33	PX	-13.8	-13.8	0	0

Member Distributed Loads (BLC 6 : BLC 1 Transient Area Loads)

Member Label	Direction	Start Magnitude[lb/ft,F]	End Magnitude[lb/ft,F]	Start Location[ft,%]	End Location[ft,%]

Member Distributed Loads (BLC 6 : BLC 1 Transient Area Loads) (Continued)

	Member Label	Direction	Start Magnitude[lb/ft,F]	End Magnitude[lb/ft,F]	Start Location[ft,%]	End Location[ft,%]
1	M24A	Y	-.871	-3.313	0	2.333
2	M24A	Y	-3.313	-5.009	2.333	4.667
3	M24A	Y	-5.009	-5.485	4.667	7
4	M24A	Y	-5.485	-5.01	7	9.333
5	M24A	Y	-5.01	-3.315	9.333	11.667
6	M24A	Y	-3.315	-.874	11.667	14
7	M28	Y	-6.168	-4.814	0	1.4
8	M28	Y	-4.814	-4.849	1.4	2.8
9	M28	Y	-4.849	-4.849	2.8	4.2
10	M28	Y	-4.849	-4.813	4.2	5.6
11	M28	Y	-4.813	-6.164	5.6	7
12	M31	Y	-3.834	-6.52	0	.808
13	M31	Y	-6.52	-5.991	.808	1.617
14	M31	Y	-5.991	-3.881	1.617	2.425
15	M31	Y	-3.881	-2.279	2.425	3.233
16	M31	Y	-2.279	-.205	3.233	4.041
17	M32	Y	-3.834	-6.52	0	.808
18	M32	Y	-6.52	-5.991	.808	1.617
19	M32	Y	-5.991	-3.881	1.617	2.425
20	M32	Y	-3.881	-2.279	2.425	3.233
21	M32	Y	-2.279	-.205	3.233	4.041
22	M22A	Y	-.443	-3.313	0	2
23	M22A	Y	-3.313	-5.052	2	4
24	M22A	Y	-5.052	-4.832	4	6
25	M22A	Y	-4.832	-4.833	6	8
26	M22A	Y	-4.833	-5.054	8	10
27	M22A	Y	-5.054	-3.314	10	12
28	M22A	Y	-3.314	-.441	12	14
29	M30	Y	-6.169	-4.814	0	1.4
30	M30	Y	-4.814	-4.849	1.4	2.8
31	M30	Y	-4.849	-4.849	2.8	4.2
32	M30	Y	-4.849	-4.813	4.2	5.6
33	M30	Y	-4.813	-6.164	5.6	7
34	M33	Y	-6.212	-6.646	0	.808
35	M33	Y	-6.646	-5.354	.808	1.617
36	M33	Y	-5.354	-3.678	1.617	2.425
37	M33	Y	-3.678	-2.156	2.425	3.233
38	M33	Y	-2.156	-.093	3.233	4.041
39	M23A	Y	-.896	-3.24	0	2.333
40	M23A	Y	-3.24	-5.062	2.333	4.667
41	M23A	Y	-5.062	-5.596	4.667	7
42	M23A	Y	-5.596	-5.006	7	9.333
43	M23A	Y	-5.006	-3.311	9.333	11.667
44	M23A	Y	-3.311	-.87	11.667	14
45	M29	Y	-6.171	-4.817	0	1.4
46	M29	Y	-4.817	-4.849	1.4	2.8
47	M29	Y	-4.849	-4.782	2.8	4.2
48	M29	Y	-4.782	-4.654	4.2	5.6
49	M29	Y	-4.654	-5.953	5.6	7

Member Distributed Loads (BLC 7 : BLC 4 Transient Area Loads)

	Member Label	Direction	Start Magnitude[lb/ft,F]	End Magnitude[lb/ft,F]	Start Location[ft,%]	End Location[ft,%]
1	M24A	Y	-4.355	-16.565	0	2.333
2	M24A	Y	-16.565	-25.046	2.333	4.667
3	M24A	Y	-25.046	-27.424	4.667	7
4	M24A	Y	-27.424	-25.049	7	9.333

Member Distributed Loads (BLC 7 : BLC 4 Transient Area Loads) (Continued)

	Member Label	Direction	Start Magnitude[lb/ft,F]	End Magnitude[lb/ft,F]	Start Location[ft,%]	End Location[ft,%]
5	M24A	Y	-25.049	-16.573	9.333	11.667
6	M24A	Y	-16.573	-4.371	11.667	14
7	M28	Y	-30.841	-24.07	0	1.4
8	M28	Y	-24.07	-24.243	1.4	2.8
9	M28	Y	-24.243	-24.243	2.8	4.2
10	M28	Y	-24.243	-24.064	4.2	5.6
11	M28	Y	-24.064	-30.82	5.6	7
12	M31	Y	-19.17	-32.598	0	.808
13	M31	Y	-32.598	-29.954	.808	1.617
14	M31	Y	-29.954	-19.406	1.617	2.425
15	M31	Y	-19.406	-11.394	2.425	3.233
16	M31	Y	-11.394	-1.026	3.233	4.041
17	M32	Y	-19.17	-32.598	0	.808
18	M32	Y	-32.598	-29.954	.808	1.617
19	M32	Y	-29.954	-19.406	1.617	2.425
20	M32	Y	-19.406	-11.394	2.425	3.233
21	M32	Y	-11.394	-1.026	3.233	4.041
22	M22A	Y	-2.214	-16.564	0	2
23	M22A	Y	-16.564	-25.26	2	4
24	M22A	Y	-25.26	-24.16	4	6
25	M22A	Y	-24.16	-24.164	6	8
26	M22A	Y	-24.164	-25.271	8	10
27	M22A	Y	-25.271	-16.571	10	12
28	M22A	Y	-16.571	-2.205	12	14
29	M30	Y	-30.843	-24.072	0	1.4
30	M30	Y	-24.072	-24.245	1.4	2.8
31	M30	Y	-24.245	-24.245	2.8	4.2
32	M30	Y	-24.245	-24.065	4.2	5.6
33	M30	Y	-24.065	-30.822	5.6	7
34	M33	Y	-31.06	-33.23	0	.808
35	M33	Y	-33.23	-26.768	.808	1.617
36	M33	Y	-26.768	-18.389	1.617	2.425
37	M33	Y	-18.389	-10.782	2.425	3.233
38	M33	Y	-10.782	-.463	3.233	4.041
39	M23A	Y	-4.479	-16.202	0	2.333
40	M23A	Y	-16.202	-25.308	2.333	4.667
41	M23A	Y	-25.308	-27.979	4.667	7
42	M23A	Y	-27.979	-25.029	7	9.333
43	M23A	Y	-25.029	-16.553	9.333	11.667
44	M23A	Y	-16.553	-4.351	11.667	14
45	M29	Y	-30.854	-24.084	0	1.4
46	M29	Y	-24.084	-24.246	1.4	2.8
47	M29	Y	-24.246	-23.91	2.8	4.2
48	M29	Y	-23.91	-23.272	4.2	5.6
49	M29	Y	-23.272	-29.765	5.6	7

Member Area Loads (BLC 1 : DL)

	Joint A	Joint B	Joint C	Joint D	Direction	Distribution	Magnitude[psf]
1	N73	N70A	N76A	N77A	Y	Perp to A-B	-5
2	N68A	N73	N77A	N75A	Y	Perp to A-B	-5
3	N70A	N68A	N75A	N76A	Y	Perp to A-B	-5

Member Area Loads (BLC 4 : LL1)

	Joint A	Joint B	Joint C	Joint D	Direction	Distribution	Magnitude[psf]
1	N73	N70A	N76A	N77A	Y	Perp to A-B	-25

Member Area Loads (BLC 4 : LL1) (Continued)

	Joint A	Joint B	Joint C	Joint D	Direction	Distribution	Magnitude[psf]
2	N68A	N73	N77A	N75A	Y	Perp to A-B	-25
3	N70A	N68A	N75A	N76A	Y	Perp to A-B	-25

Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distributed	Area(Me...	Surface(P...
1	DL	DL		-1		21			3	
2	WLz	WLZ				21		12		
3	WLx	WLX				21		12		
4	LL1	LL							3	
5	LL2	None					2			
6	BLC 1 Transient Area L...	None						49		
7	BLC 4 Transient Area L...	None						49		

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 [lb-ft]	LC	MY [lb-ft]	LC	MZ [lb-ft]	LC
1	N81	max	2137.799	4	1551.756	17	1090.291	2	3184.865	25	671.951	5	45.032	9
2		min	-2138.416	5	742.984	8	-999.811	3	1539.073	3	-659.789	4	-1158.044	24
3	N82	max	1857.85	6	1619.972	14	2456.725	6	-316.677	25	1844.8	6	-1244.244	5
4		min	-1763.8	9	760.865	5	-2505.448	9	-1807.322	18	-1809.57	9	-2780.99	14

Envelope Joint Reactions (Continued)

	Joint		X [lb]	LC	Y [lb]	LC	Z [lb]	LC	MX [lb-ft]	LC	MY [lb-ft]	LC	MZ [lb-ft]	LC
5	N83	max	1669.324	8	1552.583	15	2353.166	7	-902.527	6	1663.565	8	2555.519	17
6		min	-1763.07	7	678.617	22	-2393.914	8	-1844.226	19	-1703.135	7	1180.786	26
7	Totals:	max	5289.246	4	4714.005	18	5455.529	2						
8		min	-5289.246	5	2327.023	2	-5455.529	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	M22A	LL2.5x2.5x...	.794	7	3	.714	7	y	2	31220.0...	58320	3300.48	1593.491	1....	H1-1b
2	M23A	LL2.5x2.5x...	.744	7	6	.906	14	y	6	31220.0...	58320	3300.48	1593.491	1....	H1-1b
3	M24A	LL2.5x2.5x...	.783	7	7	.733	7	y	8	31220.0...	58320	3300.48	1593.491	1....	H1-1b
4	M25	HSS4x4x3	.338	2.58	23	.198	2.58	y	24	81857.7...	83592	9909	9909	1....	H1-1b
5	M26	HSS4x4x3	.351	2.58	7	.167	2.58	z	8	81857.7...	83592	9909	9909	1....	H1-1b
6	M27	HSS4x4x3	.388	2.58	6	.173	2.58	z	9	81857.7...	83592	9909	9909	1....	H1-1b
7	M28	L2.5x2.5x3	.610	3.5	16	.034	3.5	y	18	6701.934	29192.4	872.574	1586.266	1....	H2-1
8	M29	L2.5x2.5x3	.609	3.5	18	.035	3.5	y	19	6701.934	29192.4	872.574	1590.803	1....	H2-1
9	M30	L2.5x2.5x3	.552	3.5	18	.032	3.5	y	16	6701.934	29192.4	872.574	1591.218	1....	H2-1
10	M31	LL2.5x2.5x...	.179	4.041	4	.015	0	z	5	46322.5...	58320	3300.48	2549.586	1....	H1-1b
11	M32	LL2.5x2.5x...	.176	0	27	.009	0	z	7	46322.2...	58320	3300.48	2549.586	2....	H1-1b
12	M33	LL2.5x2.5x...	.137	4.041	3	.010	0	z	3	46322.2...	58320	3300.48	2549.586	1....	H1-1b
13	M34	PIPE_2.0	.073	4	6	.014	4		6	14916.0...	32130	1871.625	1871.625	1....	H1-1b
14	M35	PIPE_2.0	.276	4	6	.024	1.75		6	14916.0...	32130	1871.625	1871.625	1....	H1-1b
15	M36	PIPE_2.0	.074	4	9	.014	4		9	14916.0...	32130	1871.625	1871.625	1....	H1-1b
16	M37	PIPE_2.0	.276	4	7	.024	1.75		7	14916.0...	32130	1871.625	1871.625	1....	H1-1b
17	M38	PIPE_2.0	.073	4	7	.014	4		7	14916.0...	32130	1871.625	1871.625	1....	H1-1b
18	M39	PIPE_2.0	.275	4	7	.024	1.75		7	14916.0...	32130	1871.625	1871.625	1....	H1-1b
19	M40	PIPE_2.0	.346	3	9	.043	2		9	20866.7...	32130	1871.625	1871.625	1....	H1-1b
20	M41	PIPE_2.0	.359	3	8	.045	2		8	20866.7...	32130	1871.625	1871.625	1....	H1-1b
21	M42	PIPE_2.0	.350	3	6	.044	2		6	20866.7...	32130	1871.625	1871.625	1....	H1-1b

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PROJECT: 2.5 EQUIPMENT DEPLOYMENT

SITE NAME: TCP/MANSFIELD

SITE CASCADE: CT33XC557-A

SITE ADDRESS: 1725 STAFFORD ROAD
MANSFIELD, CT 06268

SITE TYPE: 170'-0" MONOPOLE

SITE INFORMATION

PROPERTY OWNER:
TOWN OF MANSFIELD
4 SOUTH EAGLEVILLE ROAD
STORRS, CT 06268

SITE ADDRESS:
1725 STAFFORD ROAD
MANSFIELD, CT 06268
TOLLAND COUNTY

GEOGRAPHIC COORDINATES:
LATITUDE: 41.835953° (41° 50' 09.43" N)
LONGITUDE: -72.307847° (72° 18' 28.25" W)

ZONING JURISDICTION:
TOWN OF MANSFIELD

ZONING DISTRICT:
RAR-90 - RURAL AGRICULTURAL RESIDENCE

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

AAV PROVIDER:
AT&T
PH.: (888) 944-0447

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 9929 ALU GROWTH CABINET
- INSTALL (2) NEW BATTERY STRINGS IN EXISTING BATTERY CABINET
- INSTALL (3) PANEL ANTENNAS
- INSTALL (3) RRH'S ON TOWER
- INSTALL (1) FIBER CABLE AND (2) FIBER SECTOR 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

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SHEET INDEX

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E-2	GROUNDING DETAILS	A	JRS
E-3	DC POWER DETAILS & PANEL SCHEDULES	A	JRS

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Phone: 608-643-4100 Fax: 608-643-7999
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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: 7/08/2014 Date:

MARK	DATE	DESCRIPTION
A	7/08/14	FINAL CONSTRUCTION DRAWINGS

ISSUE PHASE: FINAL
DATE ISSUED: 07/08/2014

PROJECT TITLE:
TCP/MANSFIELD
SITE#:CT33XC557-A

PROJECT INFORMATION:
1725 STAFFORD ROAD
MANSFIELD, CT 06268
TOLLAND COUNTY

SHEET TITLE:
TITLE SHEET

SCALE: NONE

PROJECT NUMBER: 29264
SHEET NUMBER: T-1

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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.

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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. 28286 LICENSED PROFESSIONAL ENGINEER

James R Skowronski 7/08/2014
Signature: Date:

MARK	DATE	DESCRIPTION
A	7/08/14	FINAL CONSTRUCTION DRAWINGS

ISSUE PHASE: FINAL DATE ISSUED: 07/08/2014

PROJECT TITLE:
TCP/MANSFIELD
SITE#:CT33XC557-A

PROJECT INFORMATION:
1725 STAFFORD ROAD
MANSFIELD, CT 06268
TOLLAND COUNTY

SHEET TITLE:
SPRINT SPECIFICATIONS

SCALE: NONE

PROJECT NUMBER: 29264
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 REFRESENTS 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.

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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. 26286
LICENSED PROFESSIONAL ENGINEER

Signature: 7/08/2014 Date:

MARK	DATE	DESCRIPTION
A	7/08/14	FINAL CONSTRUCTION DRAWINGS

ISSUE PHASE: FINAL DATE ISSUED: 07/08/2014

PROJECT TITLE:
TCP/MANSFIELD
SITE#:CT33XC557-A

PROJECT INFORMATION:
1725 STAFFORD ROAD
MANSFIELD, CT 06268
TOLLAND COUNTY

SHEET TITLE:
SPRINT SPECIFICATIONS

SCALE: NONE

PROJECT NUMBER: 29264
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.

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

Signature: 7/08/2014 Date:

MARK	DATE	DESCRIPTION
A	7/08/14	FINAL CONSTRUCTION DRAWINGS

ISSUE PHASE: FINAL
DATE ISSUED: 07/08/2014

PROJECT TITLE:
TCP/MANSFIELD
SITE#:CT33XC557-A

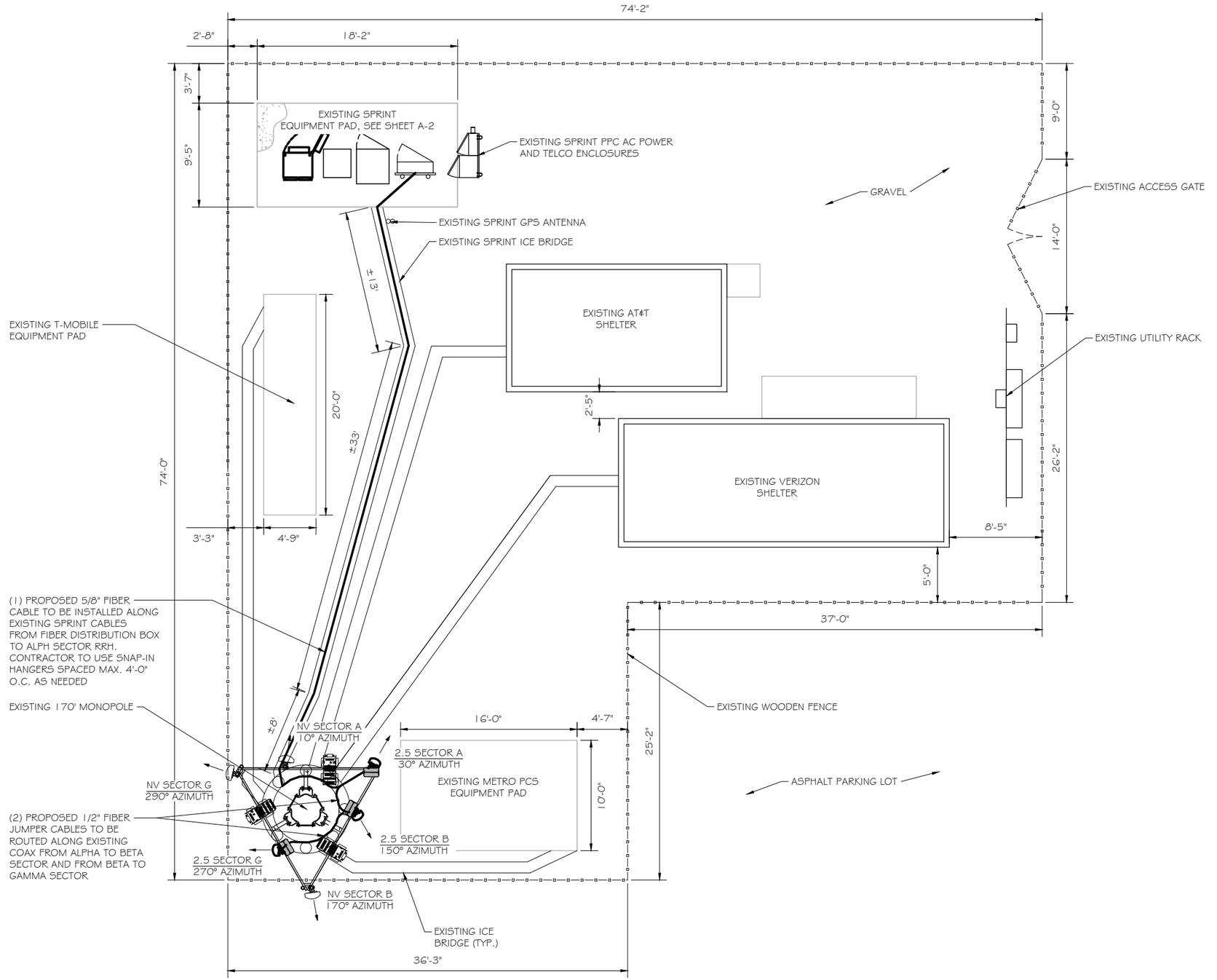
PROJECT INFORMATION:
1725 STAFFORD ROAD
MANSFIELD, CT 06268
TOLLAND COUNTY

SHEET TITLE:
SPRINT SPECIFICATIONS

SCALE: NONE

PROJECT NUMBER: 29264
SHEET NUMBER: SP-3

DRAWN BY: TJN CHECKED BY: KAB



NORTH

SITE PLAN
SCALE: 1" = 10'
1

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STATE OF CONNECTICUT ★ JAMES R. SKOWRONSKI ★ No. 26286 LICENSED PROFESSIONAL ENGINEER

Signature: 7/08/2014 Date:

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A	7/08/14	FINAL CONSTRUCTION DRAWINGS

ISSUE PHASE: FINAL
DATE ISSUED: 07/08/2014

PROJECT TITLE:
TCP/MANSFIELD
SITE#:CT33XC557-A

PROJECT INFORMATION:
1725 STAFFORD ROAD
MANSFIELD, CT 06268
TOLLAND COUNTY

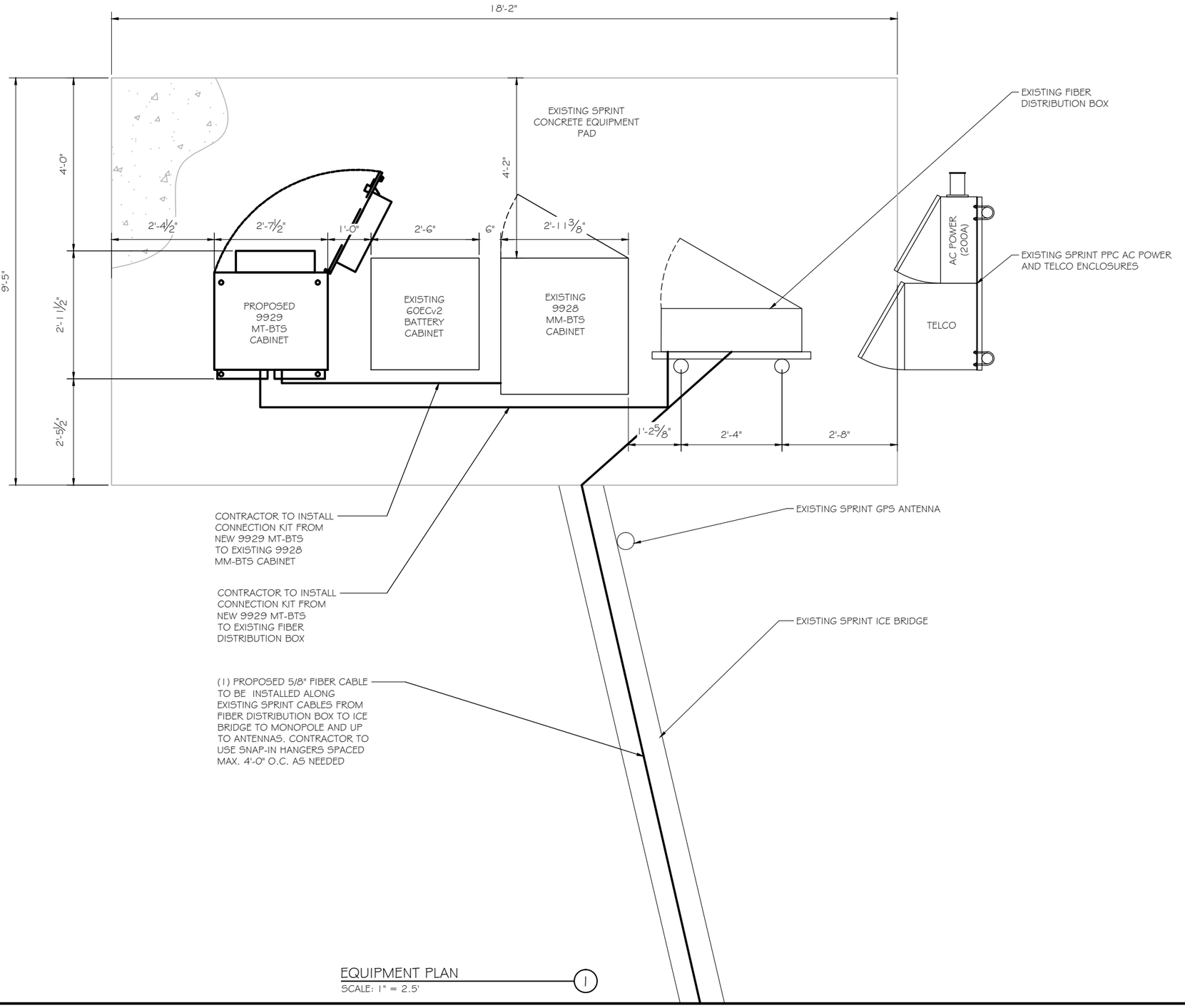
SHEET TITLE:
SITE PLAN

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

PROJECT NUMBER: 29264
SHEET NUMBER: A-1

I:\29200\29264\CAD\29264 Sprint 2.5 CD for CT.dwg Printed by: tnelson on Jul 08, 2014 - 12:42pm

NORTH



EQUIPMENT PLAN (1)
SCALE: 1" = 2.5'

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ISSUE PHASE: FINAL
DATE ISSUED: 07/08/2014

PROJECT TITLE:
TCP/MANSFIELD
SITE#:CT33XC557-A

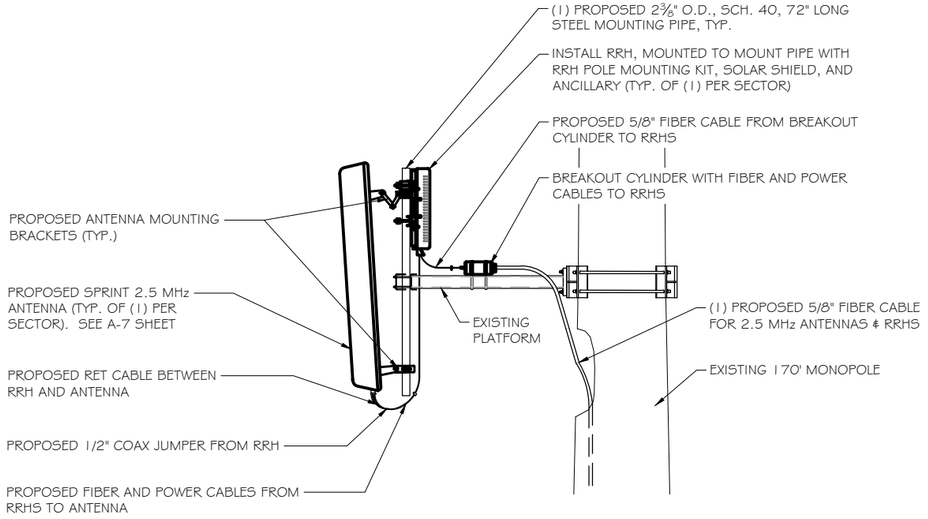
PROJECT INFORMATION:
1725 STAFFORD ROAD
MANSFIELD, CT 06268
TOLLAND COUNTY

SHEET TITLE:
EQUIPMENT PLAN

0 1.25' 2.5' 5'
11" x 17" - 1" = 2.5'
22" x 34" - 1" = 1.25'

PROJECT NUMBER: 29264
SHEET NUMBER: A-2

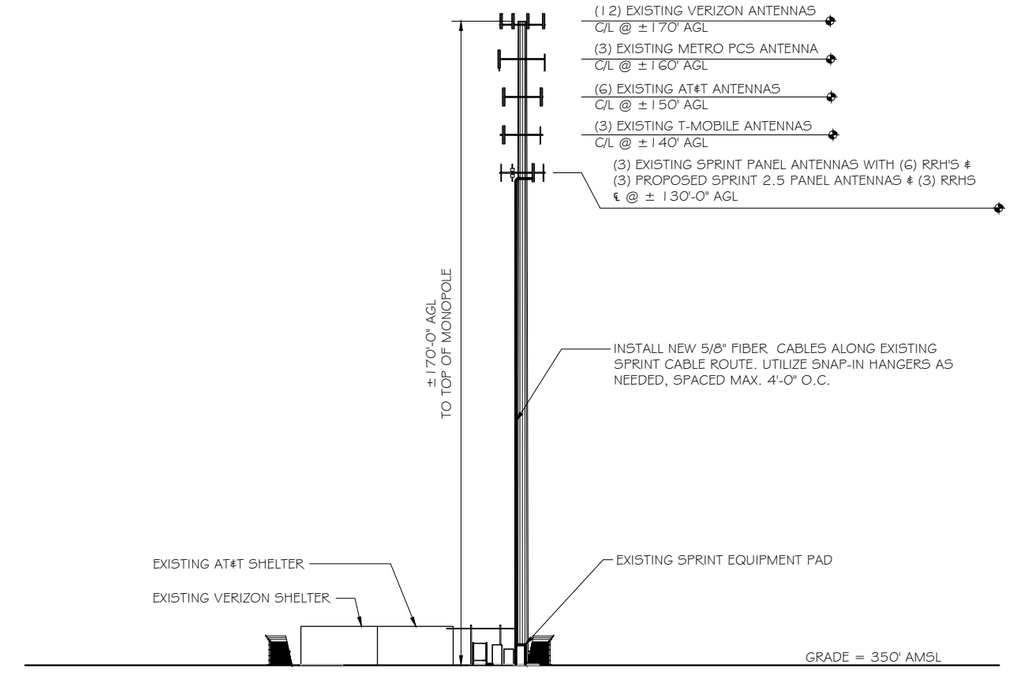
DRAWN BY: TJN CHECKED BY: KAB



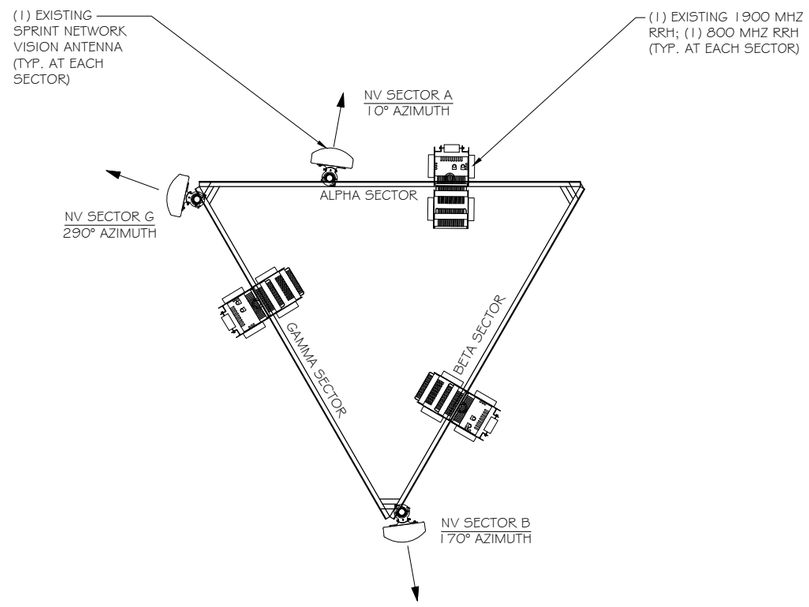
NOTE:

CONTRACTOR TO ENSURE THAT EXISTING AND PROPOSED ANTENNAS AND NV RRH'S ARE CENTERED VERTICALLY ON EXISTING MOUNT PLATFORM AND THAT ALL PREVIOUSLY PROPOSED STRUCTURAL MODIFICATIONS HAVE BEEN COMPLETED PER PLAN.

ANTENNA & RRH MOUNTING DETAILS (1)
SCALE: NTS

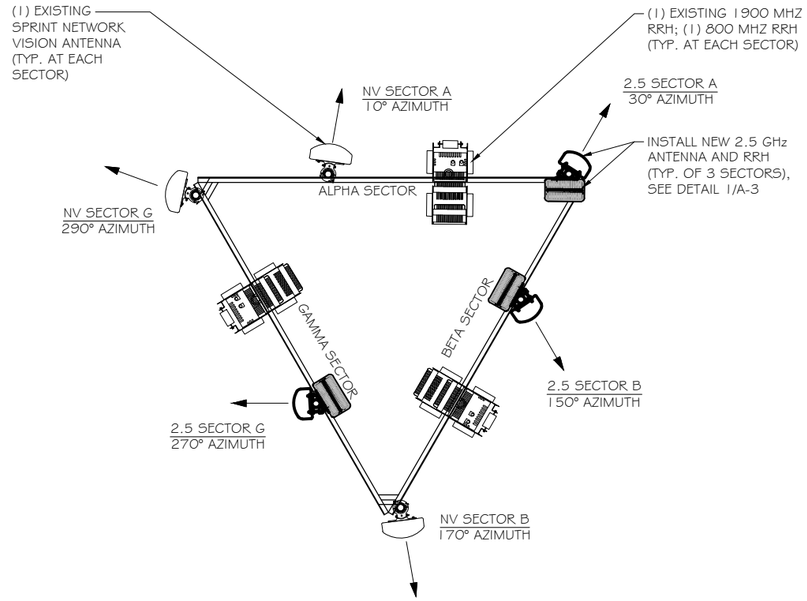


BUILDING ELEVATION (2)
SCALE: 1" = 40'



NORTH

EXISTING ANTENNA ARRAY (3)
SCALE: NTS



NORTH

PROPOSED ANTENNA ARRAY (4)
SCALE: NTS

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ISSUE PHASE: FINAL DATE ISSUED: 07/08/2014

PROJECT TITLE:
TCP/MANSFIELD
SITE#:CT33XC557-A

PROJECT INFORMATION:
1725 STAFFORD ROAD
MANSFIELD, CT 06268
TOLLAND COUNTY

SHEET TITLE:
BUILDING ELEVATIONS & ANTENNA DETAILS

SCALE:
AS NOTED

PROJECT NUMBER: 29264
SHEET NUMBER: A-3

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RFDS Sheet

General Site Information

Site ID	CT33XC557	Equipment Vendor	Alcatel-Lucent
Market	Northern Connecticut	Lattitude	41.835953
Region	Northeast	Longitude	-72.307847
MLA	N/A	LL SITE ID	N/A
Structure Type	MONOPOLE		
BTS Type			

Solution ID		Siterra SR Equipment type	
		Equipment Vendor	Alcatel-Lucent

Incremental Power Draw needed by added Equipment: 40

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	YES	Top Hat Weight (lbs)	N/A
Growth Cabinet Qty	1		
Growth Cabinet Dimensions	63.65" X 31.5" X 35.5"		
Growth Cabinet Weight	1600		

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 Fiber only	
Cable Qty	1	
Weight per foot. Lbs.	0.242	
Diameter. Inches.	0.73	
Length Ft.	205	(calculated as antenna height plus 20%)
Coax Jumper	10'	
Coax Jumper Qty	27	
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	130	130	130
Antenna Azimuth	30	150	270
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.

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

Signature: James R. Skowronski Date: 7/08/2014

MARK	DATE	DESCRIPTION
A	7/08/14	FINAL CONSTRUCTION DRAWINGS

ISSUE PHASE: FINAL
DATE ISSUED: 07/08/2014

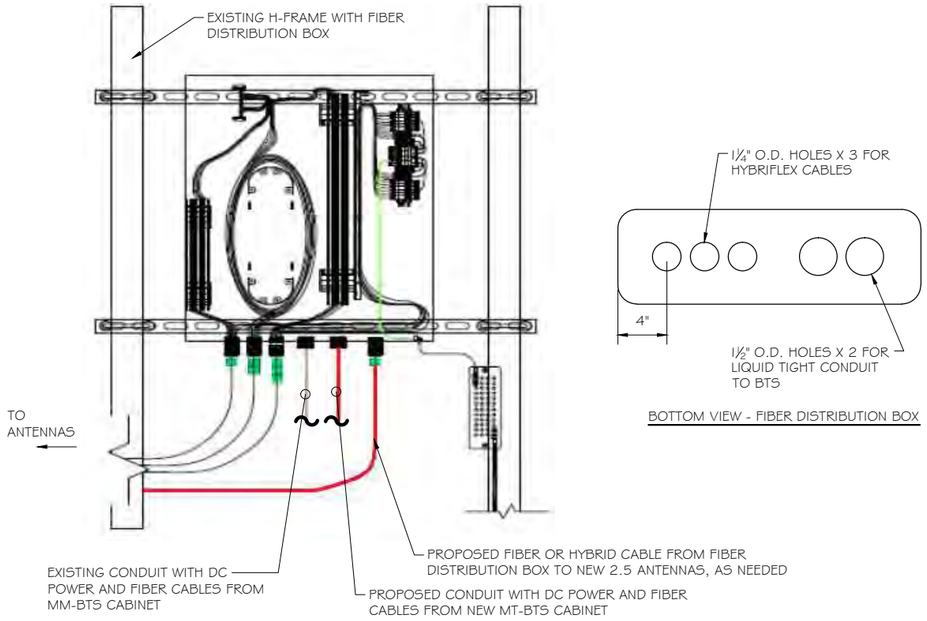
PROJECT TITLE:
TCP/MANSFIELD
SITE#:CT33XC557-A

PROJECT INFORMATION:
1725 STAFFORD ROAD
MANSFIELD, CT 06268
TOLLAND COUNTY

SHEET TITLE:
RF DATA SHEET

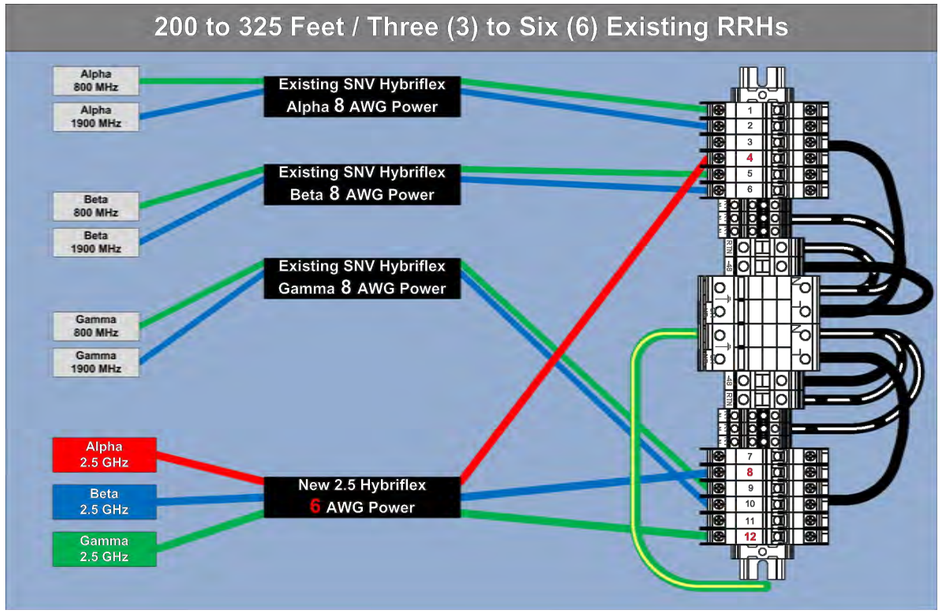
SCALE:
AS NOTED

PROJECT NUMBER: 29264
SHEET NUMBER: A-4

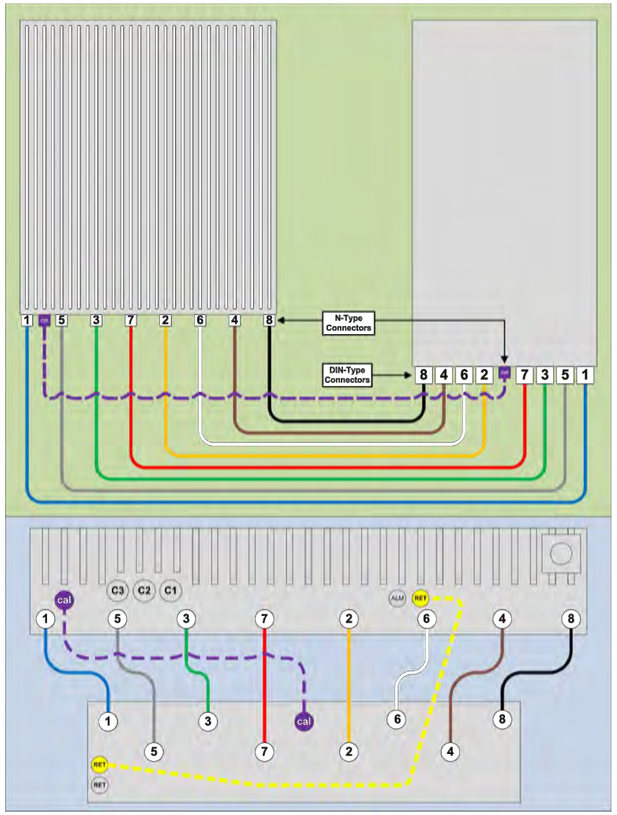


TYPICAL FIBER DISTRIBUTION BOX DETAIL (1)
SCALE: NTS

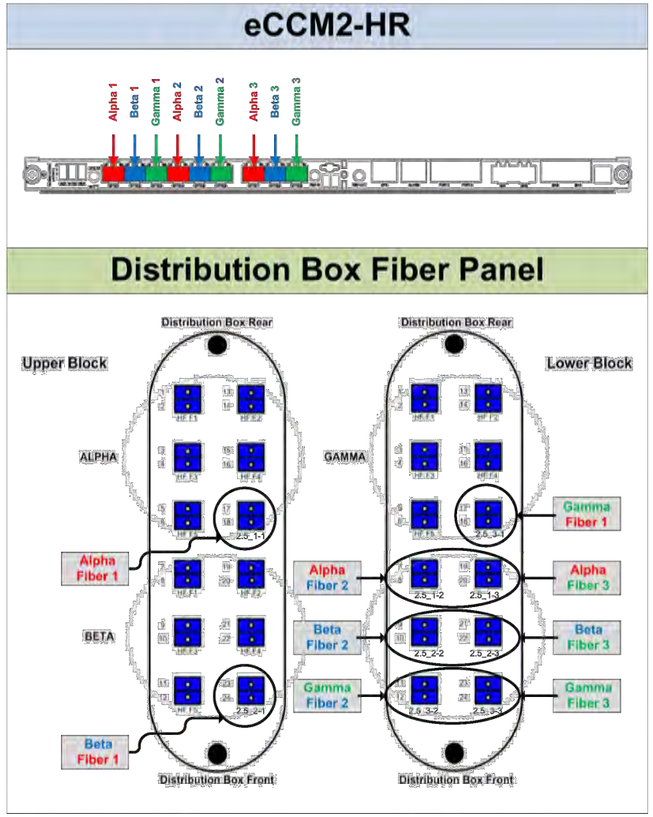
BOTTOM VIEW - FIBER DISTRIBUTION BOX



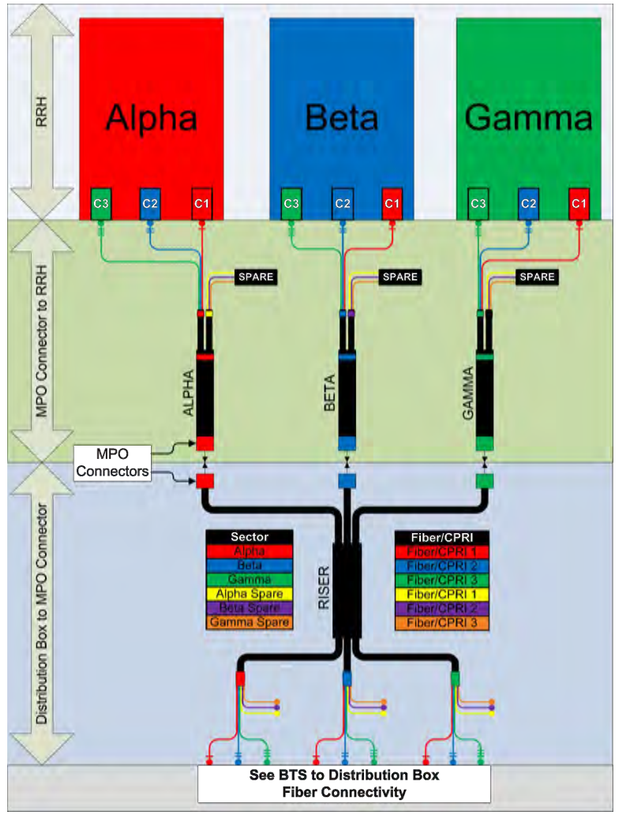
RRH TO DISTRIBUTION BOX POWER CONNECTIVITY DETAIL (2)
SCALE: NTS



8T8R DETAIL (3)
SCALE: NTS



BTS TO DISTRIBUTION BOX FIBER CONNECTIVITY DETAIL (4)
SCALE: NTS



RRH TO DISTRIBUTION BOX FIBER CONNECTIVITY DETAIL (5)
SCALE: NTS

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PROJECT TITLE:
TCP/MANSFIELD
SITE#:CT33XC557-A

PROJECT INFORMATION:
1725 STAFFORD ROAD
MANSFIELD, CT 06268
TOLLAND COUNTY

SHEET TITLE:
FIBER PLUMBING DIAGRAM

SCALE:
AS NOTED

PROJECT NUMBER: 29264
SHEET NUMBER: A-5

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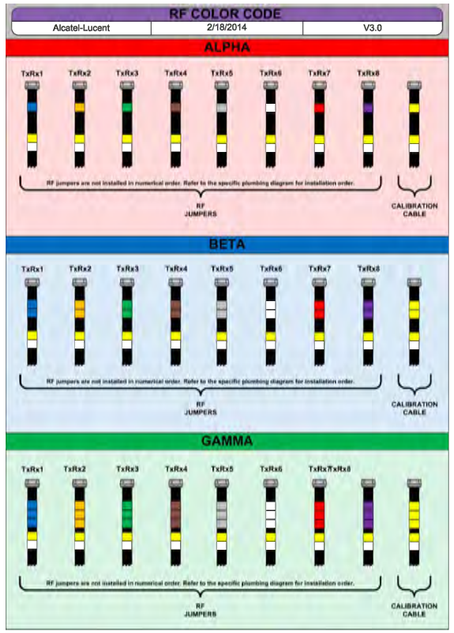

SECTOR COLOR CODING AND BANDING (1)
SCALE: NTS

2.5 Coaxial Cable Color Code (Radio#1)

Sector	Cable	Start at Connector Side	Wrap2	Wrap3	Wrap4	Wrap5
1 Alpha	1	Blue			Yellow	White
1	2	Orange			Yellow	White
1	3	Green			Yellow	White
1	4	Brown			Yellow	White
1	5	Slate			Yellow	White
1	6	White			Yellow	White
1	7	Red			Yellow	White
1	8	Violet			Yellow	White
1	Calibration Cable	Yellow			Yellow	White
2 Beta	1	Blue	Blue		Yellow	White
2	2	Orange	Orange		Yellow	White
2	3	Green	Green		Yellow	White
2	4	Brown	Brown		Yellow	White
2	5	Slate	Slate		Yellow	White
2	6	White	White		Yellow	White
2	7	Red	Red		Yellow	White
2	8	Violet	Violet		Yellow	White
2	Calibration Cable	Yellow	Yellow		Yellow	White
3 Gamma	1	Blue	Blue	Blue	Yellow	White
3	2	Orange	Orange	Orange	Yellow	White
3	3	Green	Green	Green	Yellow	White
3	4	Brown	Brown	Brown	Yellow	White
3	5	Slate	Slate	Slate	Yellow	White
3	6	White	White	White	Yellow	White
3	7	Red	Red	Red	Yellow	White
3	8	Violet	Violet	Violet	Yellow	White
3	Calibration Cable	Yellow	Yellow	Yellow	Yellow	White

2.5 Coaxial Cable Color Code (Radio#2)

Sector	Cable	Start at Connector Side	Wrap2	Wrap3	Wrap4	Wrap5
1 Alpha	1	Blue			Yellow	Violet
1	2	Orange			Yellow	Violet
1	3	Green			Yellow	Violet
1	4	Brown			Yellow	Violet
1	5	Slate			Yellow	Violet
1	6	White			Yellow	Violet
1	7	Red			Yellow	Violet
1	8	Violet			Yellow	Violet
1	Calibration Cable	Yellow			Yellow	Violet
2 Beta	1	Blue	Blue		Yellow	Violet
2	2	Orange	Orange		Yellow	Violet
2	3	Green	Green		Yellow	Violet
2	4	Brown	Brown		Yellow	Violet
2	5	Slate	Slate		Yellow	Violet
2	6	White	White		Yellow	Violet
2	7	Red	Red		Yellow	Violet
2	8	Violet	Violet		Yellow	Violet
2	Calibration Cable	Yellow	Yellow		Yellow	Violet
3 Gamma	1	Blue	Blue	Blue	Yellow	Violet
3	2	Orange	Orange	Orange	Yellow	Violet
3	3	Green	Green	Green	Yellow	Violet
3	4	Brown	Brown	Brown	Yellow	Violet
3	5	Slate	Slate	Slate	Yellow	Violet
3	6	White	White	White	Yellow	Violet
3	7	Red	Red	Red	Yellow	Violet
3	8	Violet	Violet	Violet	Yellow	Violet
3	Calibration Cable	Yellow	Yellow	Yellow	Yellow	Violet

2.5 COAXIAL CABLE COLOR CODE (2)
SCALE: NTS

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.

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STATE OF CONNECTICUT ★ JAMES R. SKOWRONSKI ★ No. 26286 LICENSED PROFESSIONAL ENGINEER

Signature: Date: 7/08/2014

MARK	DATE	DESCRIPTION
A	7/08/14	FINAL CONSTRUCTION DRAWINGS

ISSUE PHASE: FINAL
DATE ISSUED: 07/08/2014

PROJECT TITLE:
TCP/MANSFIELD
SITE#:CT33XC557-A

PROJECT INFORMATION:
1725 STAFFORD ROAD
MANSFIELD, CT 06268
TOLLAND COUNTY

SHEET TITLE:
CABLE COLOR CODING

SCALE:
AS NOTED

PROJECT NUMBER: 29264
SHEET NUMBER: A-6

I:\29200\29264\CAD\29264 Sprint 2.5 CD for CT.dwg Printed by: tnelson on Jul 08, 2014 - 12:42pm

HYBRID CABLE DC CONDUCTOR SIZE GUIDELINE
MANUF:RFS

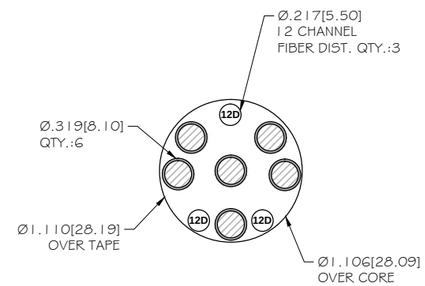
CABLE	LENGTH	DC CONDUCTOR	CABLE DIAMETER
Fiber Only	Varies	Use NV Hybriflex	5/8"
Hybriflex	<200'	8 AWG	1-1/4"
Hybriflex	225-300'	6 AWG	1-1/4"
Hybriflex	325-375'	4 AWG	1-1/4"

RFS HYBRIFLEX RISER CABLE SCHEDULE

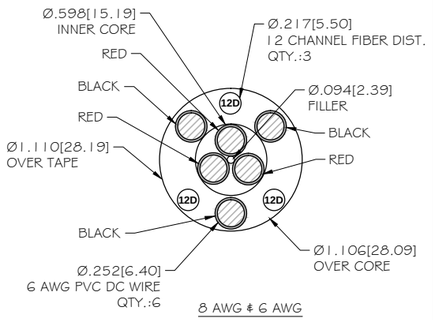
FIBER ONLY (EXISTING DC POWER)	Hybrid cable MN:HB058-M12-050F 12x multi-mode fiber pairs, Top:Outdoor protected connectors, Bottom:LC Connectors, 5/8 cable, 50 ft	50 ft
	MN:HB058-M12-075F	75 ft
	MN:HB058-M12-100F	100 ft
	MN:HB058-M12-125F	125 ft
	MN:HB058-M12-150F	150 ft
	MN:HB058-M12-175F	175 ft
	*MN:HB058-M12-200F	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

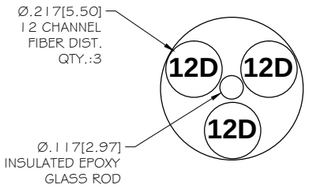
FIBER ONLY	Hybrid Jumper cable MN:HBF012-M3-5F1 5 ft, 3x multi-mode fiber pairs, Outdoor & LC connectors, 1/2 cable	5 ft
	*MN:HBF012-M3-10F1	10 ft
	MN:HBF012-M3-15F1	15 ft
	SPECIAL INSTALLATION NOTE: JUMPERS FROM 2.5 RRH TO 2.5 ANTENNA SHALL NOT EXCEED 15' NOTIFY SPRINT CM OF ANY DISCREPANCY	
8 AWG POWER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

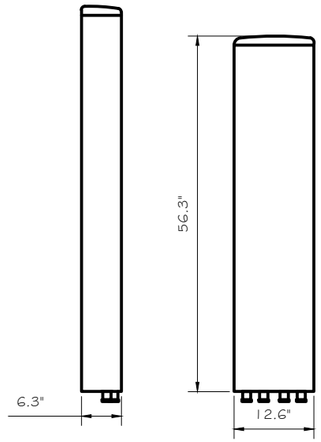


FIBER ONLY

HYBRID CABLE CROSS SECTION & DATA
SCALE: NTS

(1)

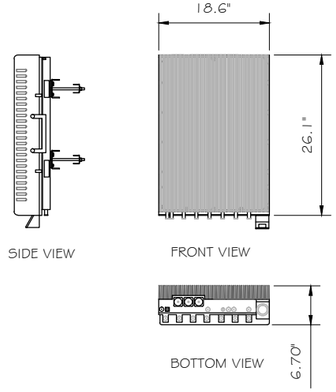
RFS: APXV9TM14-ALU-120



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)

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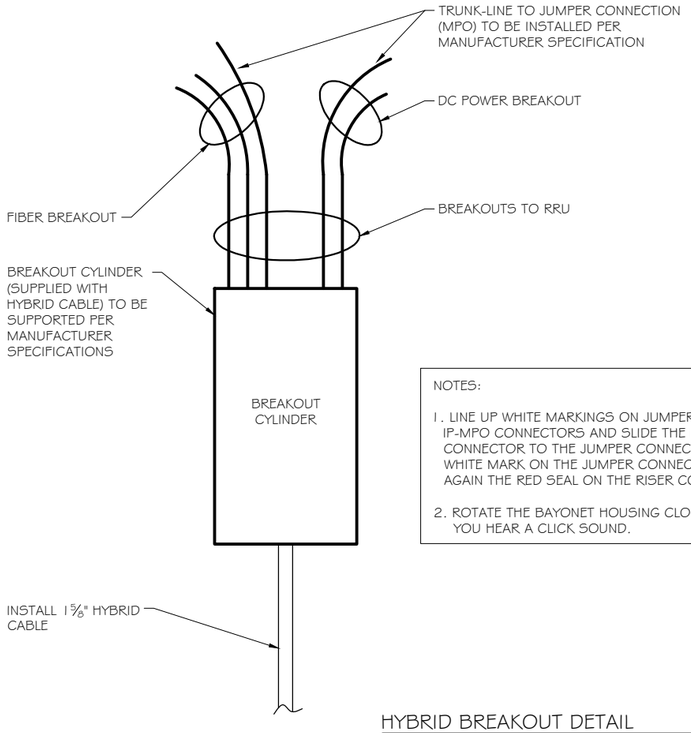
MANSFIELD, CT 06268
TOLLAND COUNTY

SHEET TITLE:
ANTENNA & HYBRID CABLE DETAILS

SCALE:
AS NOTED

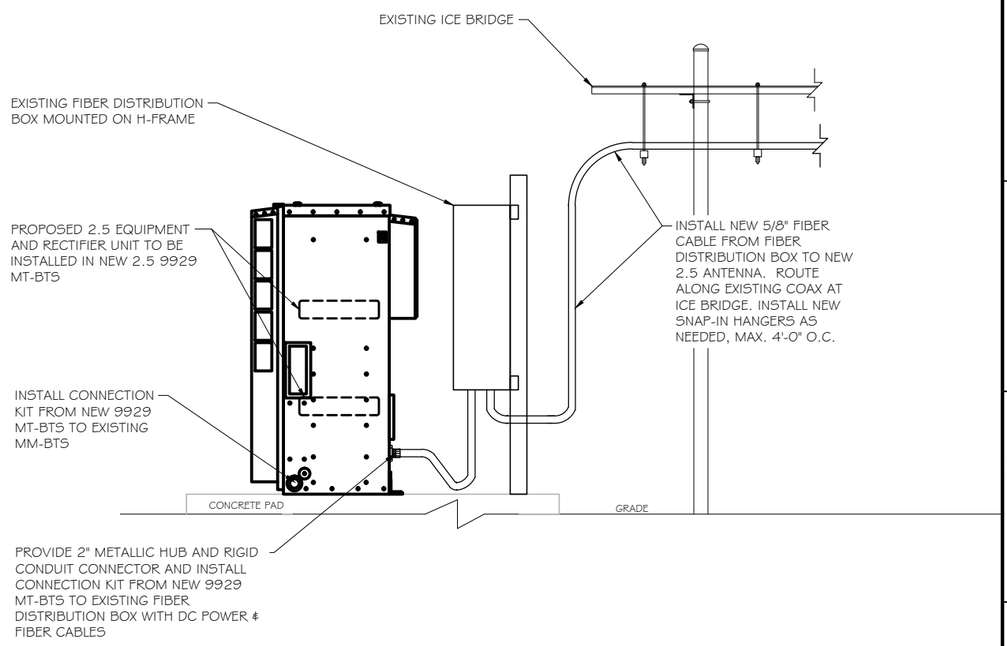
PROJECT NUMBER: 29264
SHEET NUMBER: A-7



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.

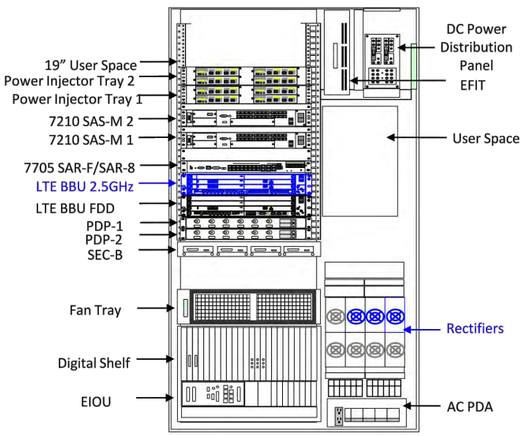
HYBRID BREAKOUT DETAIL ①
SCALE: NTS



CABLE ROUTE FROM CABINET ②
SCALE: NTS

EXISTING BBU CABINET ③
SCALE: NTS

EXISTING MMBS CABINET ④
SCALE: NTS



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TCP/MANSFIELD
SITE#:CT33XC557-A

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1725 STAFFORD ROAD
MANSFIELD, CT 06268
TOLLAND COUNTY

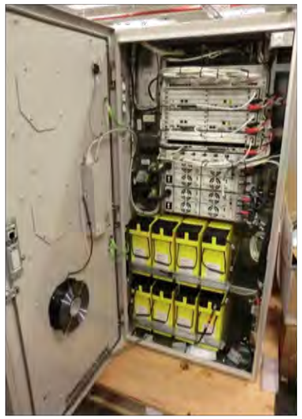
SHEET TITLE:
EQUIPMENT DETAILS

SCALE:
AS NOTED

PROJECT NUMBER: 29264
SHEET NUMBER: A-8

ALCATEL-LUCENT
9929 MULTI TECHNOLOGY BTS
OUTDOOR CABINET

In order to help network operators to improve TCO for distributed radio based sites with extended battery backup requirements, Alcatel-Lucent proposes the 9929 Multi Technology Outdoor Cabinet for CDMA/LTE/WCDMA multi-standard configurations



9929 MT-BTS OUTDOOR CABINET

- The 9929 MT-BTS cabinet is designed to provide, in a single footprint, a full site support with a capability to host 3G and 4G Telecom equipment with internal power and battery support.
- The 9929 MT-BTS Outdoor Cabinet offers 17.5 U of user space capable of hosting 19" rack based telecom equipment and rectification. The 9929 MT-BTS supports distributed RF deployment scenarios with the hosting of Digital base band unit and transport equipment.
- The 9929 MT-BTS cabinet can host up of 2 strings of batteries.
- The 9929 MT-BTS is AC powered and can deliver up to 10.5kW of -48V DC power thanks to its internal N+1 redundant rectifier.
- The 19" modules could have either front-back or side-side cooling. The cabinet uses direct air-cooling (fresh air filter) technology on front door to provide 8000 W of cooling capacity. A wide temperature operating range (-40°C to +50°C full operation) allows the deployment of this cabinet in various locations.
- The 9929 MT-BTS cabinet is compliant with Zone 4 earthquake regulations.
- As an matter of example the following configuration is supported by the cabinet:
  - ✓ Distributed configuration: AC configuration with up to 10.5kW DC Power, up to 3 baseband units, 2U service aggregation router, 2U of microwave transport equipment, up to 2 battery of 190AH.

FEATURES

- Can host BBU(s) for CDMA/WCDMA/LTE
- Supports standard 19" Telecom equipment
- Uses Direct Air Cooling (no air conditioning) with fan speed control based upon temperature
- Support of up to two 190 Ah or up to two 145AH battery strings that can provide backup for 8 hours for up to 2375 W, or 4 hour backup for up to 4150
- Convenience AC outlet (2)

TECHNICAL SPECIFICATIONS

INTERFACE:
¬ CPRI (up to 9 RRH modules)
¬ Backhaul (Gigabit Ethernet or T1)
¬ External user alarms (up to 32 user alarms)
¬ AC Power input
¬ DC Power input for RRH (up to 9 RRH's)

PHYSICAL DIMENSIONS
¬ Height: 1617 mm (63.65 in)
¬ Width: 800 mm (31.5 in)
¬ Depth: 900 mm (35.5 in)

WEIGHT
¬ 197 kg (434 lbs) unloaded
¬ Up to 725 kg (1600 lbs) fully loaded

POWER
Power supply:
¬ -48 VDC
¬ 230V AC (single phase or 3 phases)
Rectifier:
¬ up to 10.5kW DC -48V output power
¬ Rectifier redundancy N+1

SUPPORTED TELECOM EQUIPMENT
¬ LTE 9926 BBU
¬ CDMA 9926 BBU
¬ WDMA 9926 BBU
¬ SAR Aggregation router
¬ Microwave Indoor Unit

OPERATING ENVIRONMENT
¬ Outdoor temperature range: -40°C to +50°C
¬ Direct Air Cooling
¬ Enclosure:
¬ IP55 (International Protection rating)
¬ Zone 4 Earthquake

STANDARDS COMPLIANCY
¬ UL 60950-1 / CAN/CSA C22.2 No. 60950-1-07
¬ UL 50/50E CSA C22.2 No. 94.1- 07/94.2-07
¬ EN50272-2
¬ EIA-310-D

EMC& ENVIRONNEMENTAL CONDITIONS
¬ FCC Part 15 class B
¬ GR-63-CORE,
¬ GR-487-CORE,
¬ GR-1089-CORE

AT THE SPEED OF IDEAS™

PROPOSED 9929 MT-BTS OUTDOOR CABINET (1)
SCALE: NTS

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TCP/MANSFIELD
SITE#:CT33XC557-A

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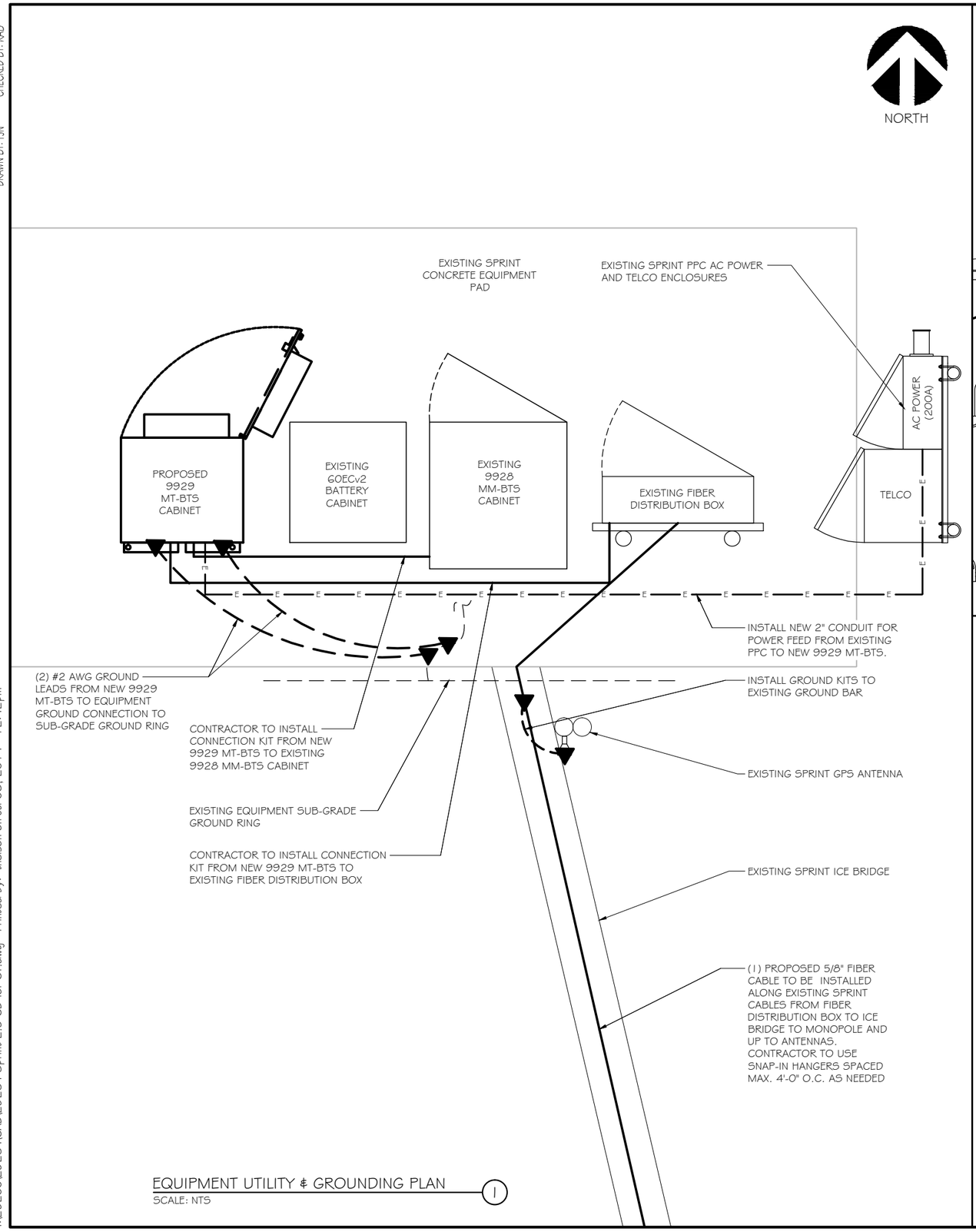
1725 STAFFORD ROAD
MANSFIELD, CT 06268
TOLLAND COUNTY

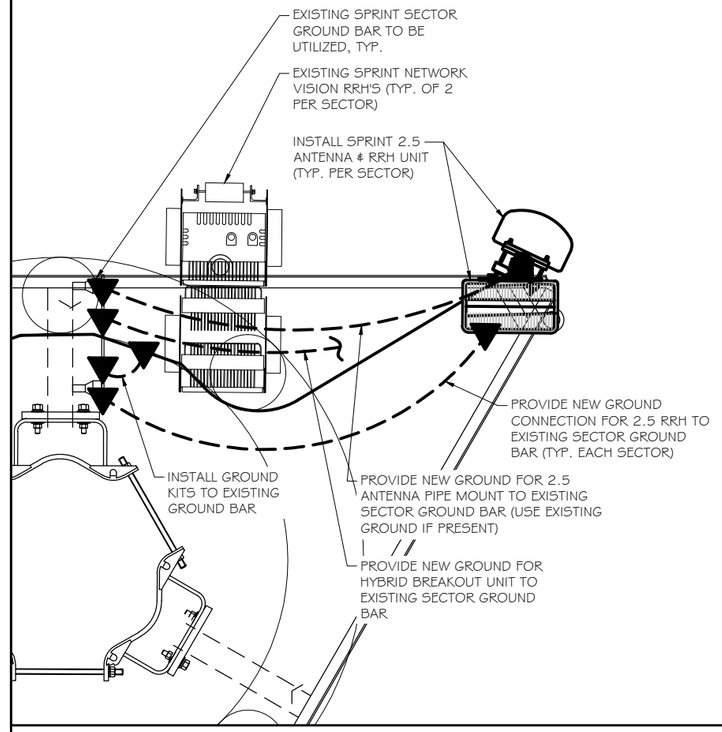
SHEET TITLE:
CABINET DETAILS

SCALE:
AS NOTED

PROJECT NUMBER: 29264
SHEET NUMBER: A-9



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

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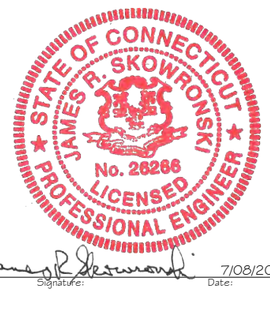

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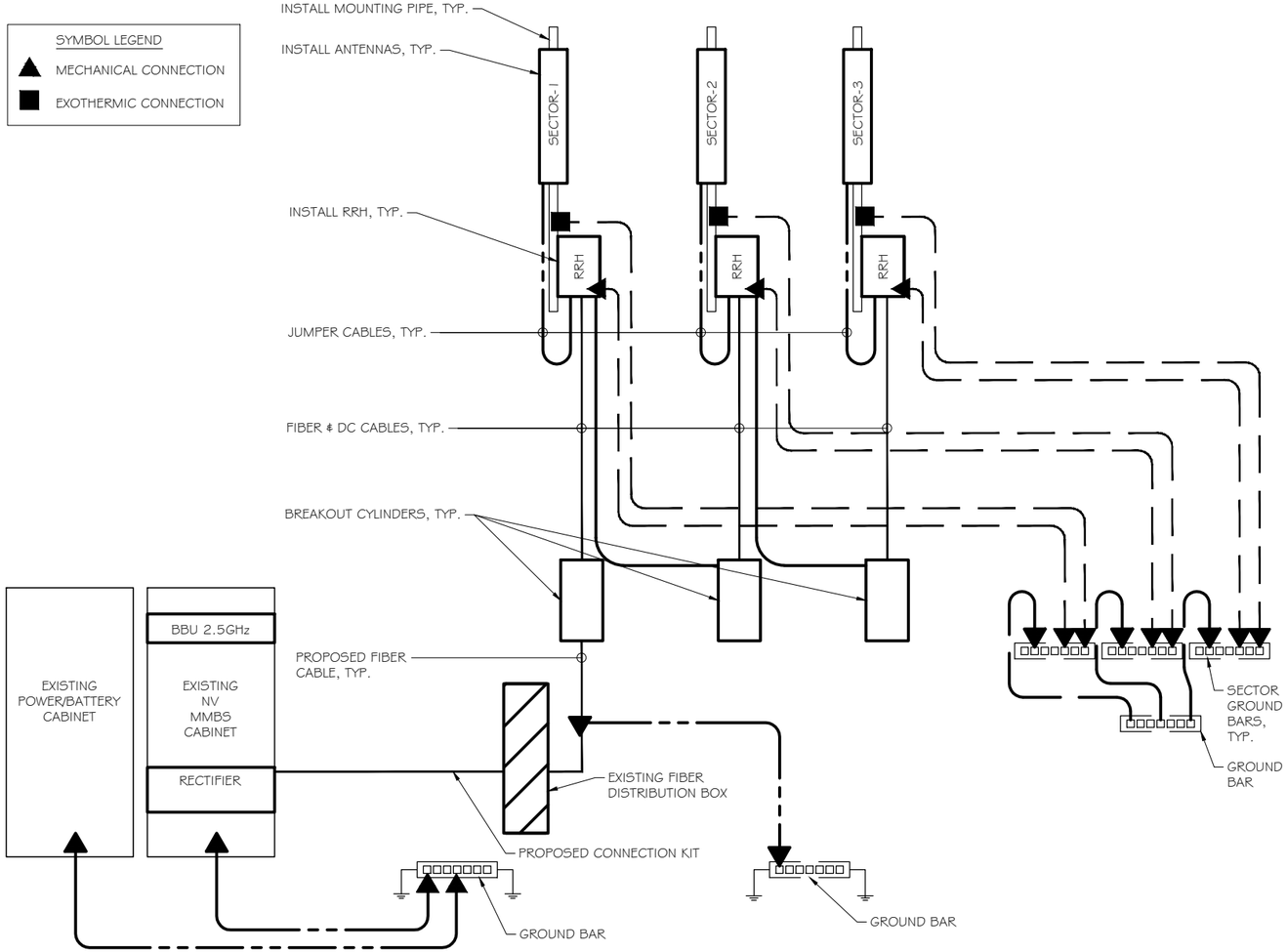
TOLLAND COUNTY

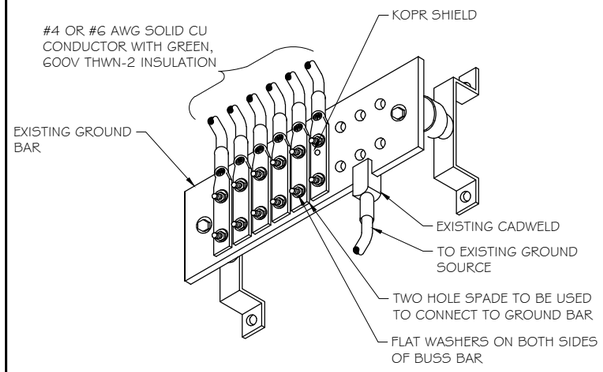
SHEET TITLE:
EQUIPMENT UTILITY & GROUNDING PLAN

SCALE:
AS NOTED

PROJECT NUMBER: 29264
SHEET NUMBER: E-1



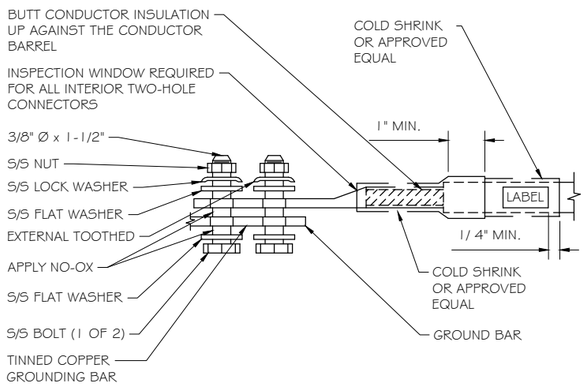
GROUNDING RISER DIAGRAM (1)
SCALE: NTS



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

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SHEET TITLE:
GROUNDING DETAILS

SCALE:
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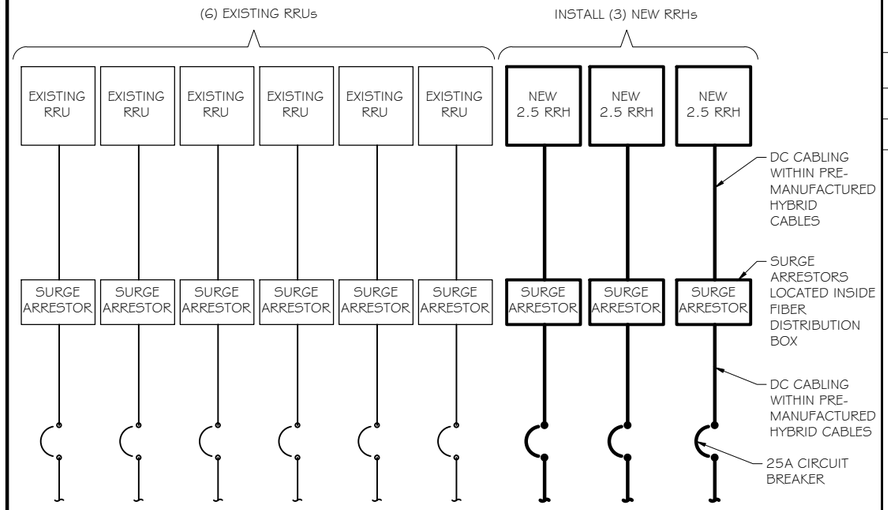
PROJECT NUMBER: 29264
SHEET NUMBER: E-2



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:	NORTHERN TECHNOLOGIES	INTERNAL TVSS:	YES
MOUNT:	GROUND	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	SURGE SUPPRESSION	60	2	ON			OFF	1	10	TELCO FAN	13
2							ON	1	15	TELCO GFI	14
3	**NEW 2.5 CABINET**	**40**	**2**	**ON**			ON	2	80	PCS CABINET	15
4											16
5	BLANK (UNUSED)	-	-	-			ON	2	100	PCS CABINET	17
6	BLANK (UNUSED)	-	-	-							18
7	BLANK (UNUSED)	-	-	-			-	-	-	BLANK (UNUSED)	19
8	BLANK (UNUSED)	-	-	-			-	-	-	BLANK (UNUSED)	20
9	BLANK (UNUSED)	-	-	-			-	-	-	BLANK (UNUSED)	21
10	BLANK (UNUSED)	-	-	-			-	-	-	BLANK (UNUSED)	22
11	BLANK (UNUSED)	-	-	-			-	-	-	BLANK (UNUSED)	23
12	BLANK (UNUSED)	-	-	-			-	-	-	BLANK (UNUSED)	24

AC PANEL SCHEDULE (2)
SCALE: NTS

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MARK	DATE	DESCRIPTION
A	7/08/14	FINAL CONSTRUCTION DRAWINGS

ISSUE PHASE: FINAL
DATE ISSUED: 07/08/2014

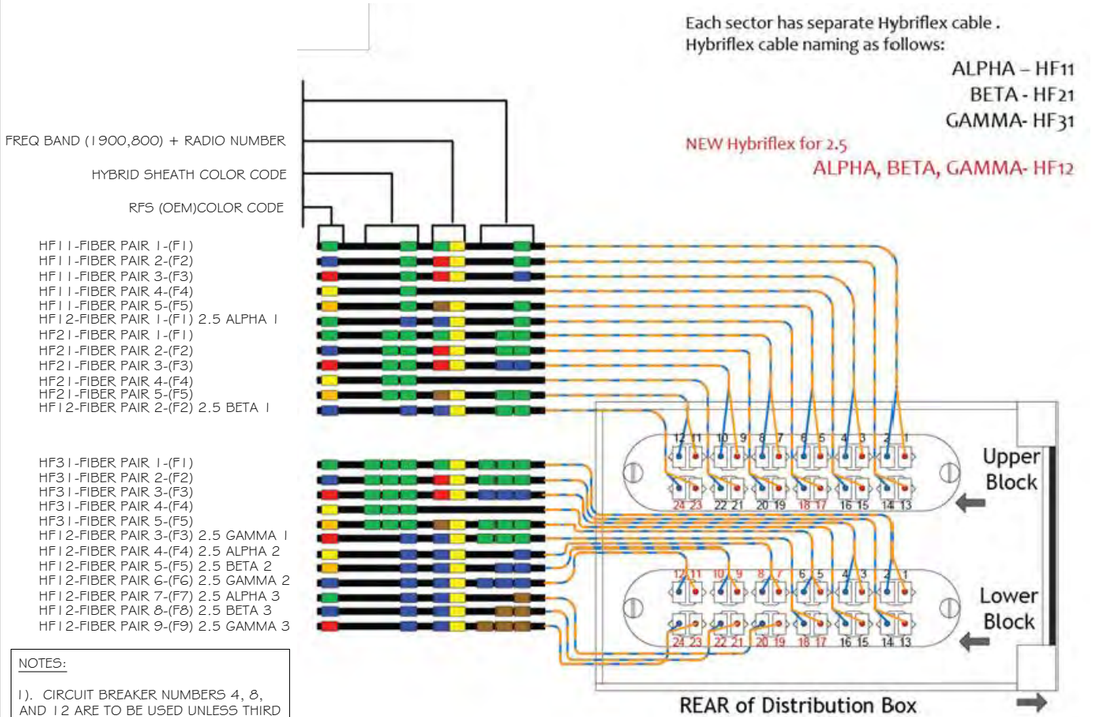
PROJECT TITLE:
TCP/MANSFIELD
SITE#:CT33XC557-A

PROJECT INFORMATION:
1725 STAFFORD ROAD
MANSFIELD, CT 06268
TOLLAND COUNTY

SHEET TITLE:
DC POWER DETAILS & PANEL SCHEDULES

SCALE:
AS NOTED

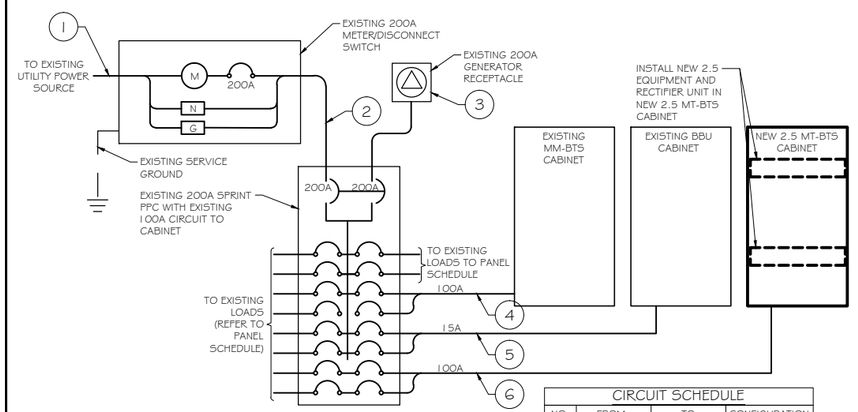
PROJECT NUMBER: 29264
SHEET NUMBER: E-3



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 FIBER 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 1¼" CONDUIT
5	TRANSFER & LOAD CENTER	EX. BBU CABINET	(2) #12 AWG, (1) #12 GND IN ¾" CONDUIT
6	**TRANSFER & LOAD CENTER**	**NEW 2.5 MMBS CABINET**	**(3) #2 AWG, (1) #8 GND IN 1¼" CONDUIT**

ELECTRICAL ONE-LINE DIAGRAM (4)
SCALE: NTS