February 28,2018

Dear Customer:

The following is the proof-of-delivery for tracking number 771533238989.

Delivery Information:

Status:	Delivered	**Delivered to:**	Residence
Signed for by:	C.FLYNN	**Delivery location:**	505 PROUD EAGLE LANE LAS VEGAS, NV 89114
Service type:	FedEx Express Saver	**Delivery date:**	Feb 26, 2018 14:10
Special Handling:	Deliver Weekday Residential Delivery Direct Signature Required		

Shipping Information:

Tracking number:	771533238989	**Ship date:**	Feb 21, 2018
		Weight:	2.0 lbs/0.9 kg

Recipient:
Paul Flynn
497 Old Post Road Holdings, LLC
505 Proud Eagle Lane
LAS VEGAS, NV 89114 US

Shipper:
Paul Sagristano
CCC
4 Davis Road West
Suite 5
OLD LYME, CT 06371 US

Reference
CT03XC212 to Owner

Thank you for choosing FedEx.

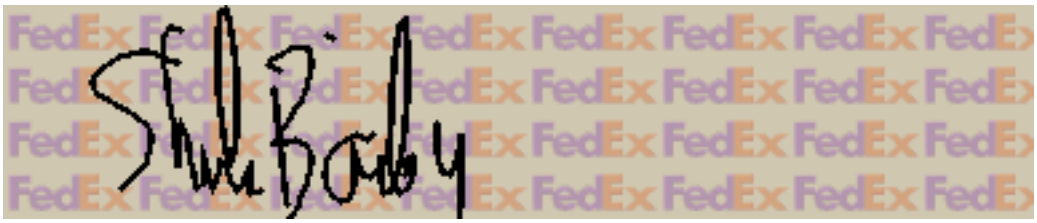
February 26,2018

Dear Customer:

The following is the proof-of-delivery for tracking number **771533158360**.

Delivery Information:

Status:	Delivered	**Delivered to:**	Receptionist/Front Desk
Signed for by:	S.BAILEY	**Delivery location:**	21 TOLLAND GRN TOLLAND, CT 06084
Service type:	FedEx Express Saver	**Delivery date:**	Feb 26, 2018 11:32
Special Handling:	Deliver Weekday Direct Signature Required		



Shipping Information:

Tracking number:	771533158360	**Ship date:**	Feb 21, 2018
		Weight:	0.5 lbs/0.2 kg

Recipient:
Steven R. Werbner, Town Manager
Town of Tolland
21 Tolland Green
Level 5
TOLLAND, CT 06084 US
Reference

Shipper:
Paul Sagristano
CCC
4 Davis Road West
Suite 5
OLD LYME, CT 06371 US
CT03XC212 - CSC to Town Mgr.

Thank you for choosing FedEx.

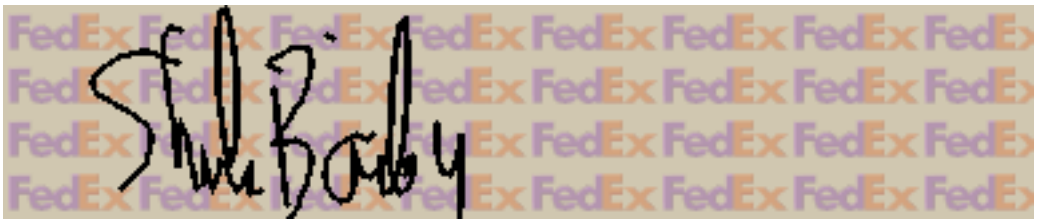
February 26,2018

Dear Customer:

The following is the proof-of-delivery for tracking number **771533158360**.

Delivery Information:

Status:	Delivered	**Delivered to:**	Receptionist/Front Desk
Signed for by:	S.BAILEY	**Delivery location:**	21 TOLLAND GRN TOLLAND, CT 06084
Service type:	FedEx Express Saver	**Delivery date:**	Feb 26, 2018 11:32
Special Handling:	Deliver Weekday Direct Signature Required		



Shipping Information:

Tracking number:	771533158360	**Ship date:**	Feb 21, 2018
		Weight:	0.5 lbs/0.2 kg

Recipient:
Steven R. Werbner, Town Manager
Town of Tolland
21 Tolland Green
Level 5
TOLLAND, CT 06084 US
Reference

Shipper:
Paul Sagristano
CCC
4 Davis Road West
Suite 5
OLD LYME, CT 06371 US
CT03XC212 - CSC to Town Mgr.

Thank you for choosing FedEx.

1280 Route 46 West, Suite 9, Parsippany NJ, 07054

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

Re: Notice of Exempt Modification Application
497 Old Post Road, Tolland, CT 06084

February 21, 2018

Dear Ms. Bachman:

Sprint Spectrum Realty Company, L.P. ("Sprint"), is submitting to the Connecticut Siting Council for a Notice of Exempt Modification for Proposed Modifications to an Existing Wireless Telecommunications Site at the 147' level of the Tower. Sprint proposes to install 3 new panel antennas (1 per sector) and add 6 remote radio units (RRH/2 per sector) at 147' tower level as well as 1 new hybrid cable, 30 Antenna-RRH jumper cables, new 2.5 MHz equipment in existing radio cabinet and new battery strings in existing battery cabinet. Sprint further proposes tower modifications of sector frame reinforcement at each arm due to a failing structural analysis of the antenna/rrh mounts

The earliest CT Siting Council submission I could find was issued to Sprint/Nextel on July 19, 1999. The original Building permit for the actual tower construction was issued by the Town is unavailable. The attached construction and structural documents enclosed reflect the current reality of all the installations on the Tower.

If you have any questions, please feel free to contact me.

Thank you,

By: *Paul F. Sagristano*

Paul F. Sagristano
Cherundolo Consulting
917.841.0247
psagristano@lrivassoc.com

4 Davis Road West, Suite 5 – Old Lyme, CT 06371

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

Re: Notice of Exempt Modification Application
497 Old Post Road, Tolland, CT 06084

Lat: N 41.86073
Long: W72.40337

February 21, 2018

Dear Ms. Bachman:

Sprint Spectrum Realty Company, L.P. ("Sprint"), is submitting to the Connecticut Siting Council for a Notice of Exempt Modification for Proposed Modifications to an Existing Wireless Telecommunications Site at the 147' level of the Tower. Sprint proposes to install 3 new panel antennas (1 per sector) and add 6 remote radio units (RRH/2 per sector) at 147' tower level as well as 1 new hybrid cable, 30 Antenna-RRH jumper cables, new 2.5 MHz equipment in existing radio cabinet and new battery strings in existing battery cabinet. Sprint further proposes tower modifications of sector frame reinforcement at each arm due to a failing structural analysis of the antenna/rrh mounts Sprint is performing a new high-performance upgrade for cellular mobile communications. It is designed to increase the capacity and speed of mobile telephone networks.

The original zoning approval from the Town of Tolland was issued on July 19, 1999. The original Building permit for the Tower construction was not available.
.
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 with proposed modifications to accommodate the revised antenna configuration.

Existing Facility

The Tolland facility is located at 497 Old Post Road, Tolland CT, the Site coordinates are: N41.86073, W72.40337. The existing facility consists of a 150' Guyed Tower. Sprint currently operates wireless communications equipment on a platform on a concrete slab at the facility and has 3 antennas and 6 jRemote Radio Heads (RRH's) at a centerline of 147' feet on the tower.

Please accept this letter as notification to the Council, pursuant to R.C.S.A. Section 16-50j-73, for 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 is being sent to Steven R. Werbner, Town manager for the Town of Tolland , as well as Ms. Heidi Samokar, Planning Director for the Town and Paul Flynn, the Managing Member of Old Post Road Holdings, LLC.

Statutory Considerations

The planned modifications to the facility fall within the activities explicitly provided for in R.C.S.A. 16-50j-72(b)(2)

1. The height of the overall structure will be unaffected.

2. The proposed changes will not require an extension of the property boundaries.

3. The proposed additions will not increase the noise level at the existing facility by

six decibels or more, or to levels that exceed state and/or local criteria

4. 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 Federal Communications Commission safety standard.

5. The proposed modifications will not cause a change or alteration in the physical or environmental characteristics of the site.

6. The existing structure and its foundation can support the proposed loading.

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

Respectfully submitted,

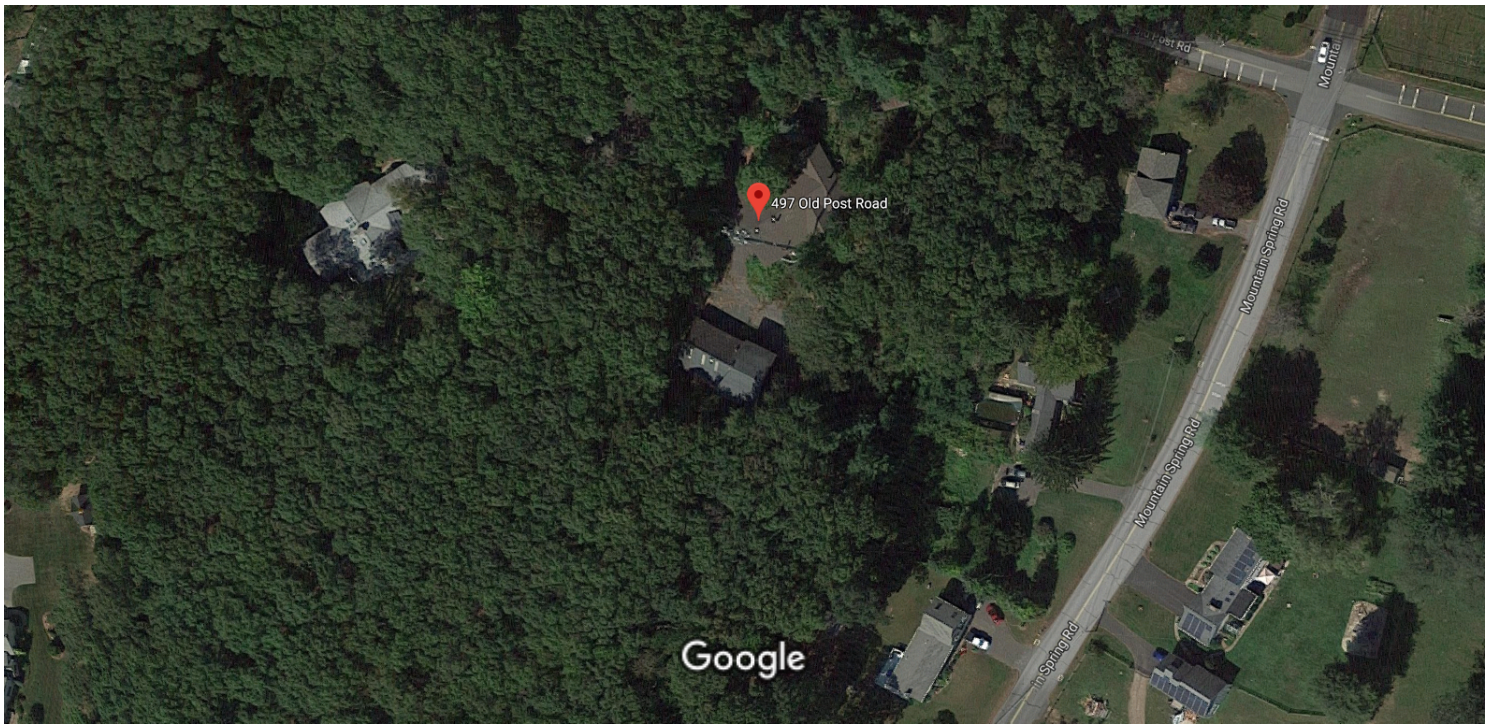
Paul F. Sagristano

Paul F. Sagristano
Charles Cherundolo Consulting
917-841-0247
psagristano@lrivassoc.com

PFS/mtf

Additional Recipients:
Seven R. Werbner – Town Manager for Tolland – Via Fed Ex
Heidi SAmokar, Town Planner – Via Fed Ex
Paul Flynn, Managing Member for the tower owner – Via Fed Ex

Google Maps 497 Old Post Rd



Imagery ©2018 Google, Map data ©2018 Google 50 ft

497 OLD POST ROAD

Location	497 OLD POST ROAD	**Mblu**	20/ K/ 30/00 /
Acct#	1186	**Owner**	OLD POST ROAD HOLDINGS LLC
Assessment	$600,900	**Appraisal**	$858,500
PID	3167	**Building Count**	1

Current Value

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2014	$211,400	$647,100	$858,500
Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2014	$147,900	$453,000	$600,900

Owner of Record

Owner	OLD POST ROAD HOLDINGS LLC	**Sale Price**	$825,000
Co-Owner		**Certificate**	
Address	505 PROUD EAGLE LN LAS VEGAS, NV 89144	**Book & Page**	642/ 286
		Sale Date	12/06/1999
		Instrument	00

Ownership History

Ownership History					
Owner	**Sale Price**	**Certificate**	**Book & Page**	**Instrument**	**Sale Date**
OLD POST ROAD HOLDINGS LLC	$825,000		642/ 286	00	12/06/1999

Building Information

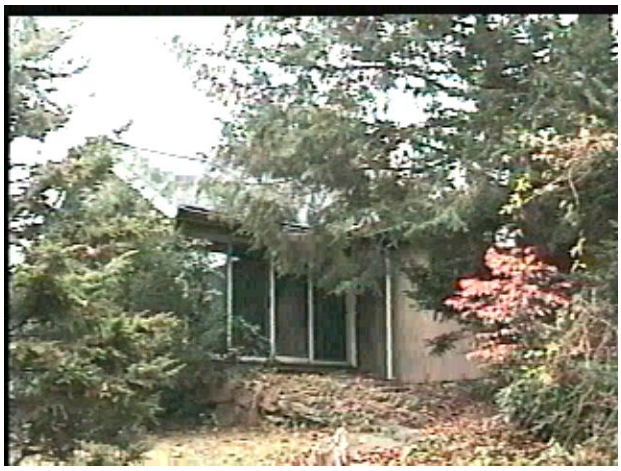
Building 1 : Section 1

Year Built:	1966
Living Area:	2,841
Replacement Cost:	$262,927
Building Percent Good:	65
Replacement Cost Less Depreciation:	$170,900

Building Attributes

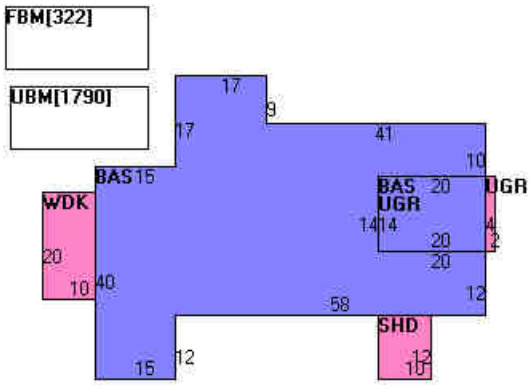
Field	Description
Style	Ranch
Model	Residential
Grade:	Average +20
Stories:	1 Story
Occupancy	1
Exterior Wall 1	Wood on Sheath
Exterior Wall 2	Aluminum Sidng
Roof Structure:	Gable/Hip
Roof Cover	Asphalt
Interior Wall 1	Drywall/Sheet
Interior Wall 2	
Interior Flr 1	Carpet
Interior Flr 2	
Heat Fuel	Electric
Heat Type:	Electr Basebrd
AC Type:	Central
Total Bedrooms:	3 Bedrooms
Total Bthrms:	2
Total Half Baths:	0
Total Xtra Fixtrs:	2
Total Rooms:	7 Rooms
Bath Style:	Modern
Kitchen Style:	Average
Func Code	
Econ Code	
Solar Type	

Building Photo



(http://images.vgsi.com/photos/TollandCTPhotos//\00\00\01/91.

Building Layout



Building Sub-Areas (sq ft)			Legend
Code	Description	Gross Area	Living Area
BAS	Main Floor	2,841	2,841
FBM	Bsmt Finished	322	0
SHD	Shed-Attached	120	0
UBM	Basement	1,790	0
UGR	Garage Under	308	0
WDK	Wood Deck	200	0
		5,581	2,841

Extra Features

Extra Features				Legend
Code	Description	Size	Value	Bldg #
FPL3	FIREPLACE 2 ST	1 UNITS	$2,600	1

Land

Land Use

Use Code	200R
Description	Commercial
Zone	RDD
Neighborhood	R35
Alt Land Appr	No
Category	

Land Line Valuation

Size (Acres)	0.84
Frontage	165
Depth	
Assessed Value	$453,000
Appraised Value	$647,100

Outbuildings

Outbuildings						Legend
Code	**Description**	**Sub Code**	**Sub Description**	**Size**	**Value**	**Bldg #**
FGR	GARAGE	1F	1Story Frame	1200 S.F.	$15,600	1
PAT	PATIO	M	Masonry	140 S.F.	$200	1
SHD	SHED	1F	1 Stry Frame	288 S.F.	$2,900	1
SHD	SHED	1F	1 Stry Frame	196 S.F.	$2,000	1
SPL	POOL	GV	In Ground Vinyl	629 S.F.	$1,500	1
FGR	GARAGE	2F	2 Stry Frame	510 S.F.	$15,700	1

Valuation History

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2015	$211,400	$647,100	$858,500
2014	$211,400	$647,100	$858,500
2013	$236,200	$312,500	$548,700

Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2015	$147,900	$453,000	$600,900
2014	$147,900	$453,000	$600,900
2013	$165,300	$218,800	$384,100

EBI Consulting
environmental | engineering | due diligence

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

SPRINT Existing Facility

Site ID: CT03XC212

Banm Tower
497 Old Post Road
Tolland, CT 06084

December 20, 2017

EBI Project Number: 6217005752

Site Compliance Summary	
Compliance Status:	COMPLIANT
Site total MPE% of FCC general population allowable limit:	12.96 %

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

EBI Consulting
environmental | engineering | due diligence

December 20, 2017

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

Emissions Analysis for Site: **CT03XC212 – Banm Tower**

EBI Consulting was directed to analyze the proposed SPRINT facility located at **497 Old Post Road, Tolland, CT**, for the purpose of determining whether the emissions from the Proposed SPRINT Antenna Installation located on this property are within specified federal limits.

All information used in this report was analyzed as a percentage of current Maximum Permissible Exposure (% MPE) as listed in the FCC OET Bulletin 65 Edition 97-01and ANSI/IEEE Std C95.1. The FCC regulates Maximum Permissible Exposure in units of microwatts per square centimeter (μW/cm2). The number of $\mu W/cm^2$ calculated at each sample point is called the power density. The exposure limit for power density varies depending upon the frequencies being utilized. Wireless Carriers and Paging Services use different frequency bands each with different exposure limits, therefore it is necessary to report results and limits in terms of percent MPE rather than power density.

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

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

General population exposure to radio frequencies is regulated and enforced in units of microwatts per square centimeter ($\mu W/cm^2$). The general population exposure limits for the 850 MHz Band is approximately 567 $\mu W/cm^2$. The general population exposure limit for the 1900 MHz (PCS) and 2500 MHz (BRS) bands is 1000 $\mu W/cm^2$. Because each carrier will be using different frequency bands, and each frequency band has different exposure limits, it is necessary to report percent of MPE rather than power density.

Occupational/controlled exposure limits apply to situations in which persons are exposed as a consequence of their employment and in which those persons who are exposed have been made fully aware of the potential for exposure and can exercise control over their exposure. Occupational/controlled exposure limits also apply where exposure is of a transient nature as a result of incidental passage through a location where exposure levels may be above general population/uncontrolled limits (see below), as long as the exposed person has been made fully aware of the potential for exposure and can exercise control over his or her exposure by leaving the area or by some other appropriate means.

Additional details can be found in FCC OET 65.

CALCULATIONS

Calculations were done for the proposed SPRINT Wireless antenna facility located at **497 Old Post Road, Tolland, CT**, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since SPRINT is proposing highly focused directional panel antennas, which project most of the emitted energy out toward the horizon, all calculations were performed assuming a lobe representing the maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was focused at the base of the tower. For this report the sample point is the top of a 6-foot person standing at the base of the tower.

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

1) 1 CDMA channels (850 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 20 Watts per Channel.

2) 2 LTE channels (850 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 20 Watts per Channel.

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

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

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

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

7) For the following calculations, the sample point was the top of a 6-foot person standing at the base of the tower. The maximum gain of the antenna per the antenna manufactures supplied specifications minus 10 dB was used in this direction. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

8) The antennas used in this modeling are the **RFS APXVSPP18-C-A20 and the Commscope DT465B-2XR** for transmission in the 850 MHz, 1900 MHz (PCS) and 2500 MHz (BRS) frequency bands. This is based on feedback from the carrier with regards to anticipated antenna selection. Maximum gain values for all antennas are listed in the Inventory and Power Data table below. The maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was used for all calculations. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

9) The antenna mounting height centerlines of the proposed antennas are **147 feet** above ground level (AGL) for **Sector A**, **147 feet** above ground level (AGL) for **Sector B** and **147 feet** above ground level (AGL) for Sector C.

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

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

SPRINT Site Inventory and Power Data by Antenna

Sector:	A	Sector:	B	Sector:	C
Antenna #:	**1**	Antenna #:	**1**	Antenna #:	**1**
Make / Model:	RFS APXVSPP18-C-A20	Make / Model:	RFS APXVSPP18-C-A20	Make / Model:	RFS APXVSPP18-C-A20
Gain:	13.4 / 15.9 dBd	Gain:	13.4 / 15.9 dBd	Gain:	13.4 / 15.9 dBd
Height (AGL):	**147 feet**	Height (AGL):	**147 feet**	Height (AGL):	**147 feet**
Frequency Bands	850 MHz / 1900 MHz (PCS)	Frequency Bands	850 MHz / 1900 MHz (PCS)	Frequency Bands	850 MHz / 1900 MHz (PCS)
Channel Count	10	Channel Count	10	Channel Count	10
Total TX Power(W):	220 Watts	Total TX Power(W):	220 Watts	Total TX Power(W):	220 Watts
ERP (W):	7,537.38	ERP (W):	7,537.38	ERP (W):	7,537.38
Antenna A1 MPE%	**1.54 %**	Antenna B1 MPE%	**1.54 %**	Antenna C1 MPE%	**1.54 %**
Antenna #:	**2**	Antenna #:	**2**	Antenna #:	**2**
Make / Model:	Commscope DT465B-2XR	Make / Model:	Commscope DT465B-2XR	Make / Model:	Commscope DT465B-2XR
Gain:	15.05 dBd	Gain:	15.05 dBd	Gain:	15.05 dBd
Height (AGL):	**147 feet**	Height (AGL):	**147 feet**	Height (AGL):	**147 feet**
Frequency Bands	2500 MHz (BRS)	Frequency Bands	2500 MHz (BRS)	Frequency Bands	2500 MHz (BRS)
Channel Count	8	Channel Count	8	Channel Count	8
Total TX Power(W):	160 Watts	Total TX Power(W):	160 Watts	Total TX Power(W):	160 Watts
ERP (W):	5,118.23	ERP (W):	5,118.23	ERP (W):	5,118.23
Antenna A2 MPE%	**0.93 %**	Antenna B2 MPE%	**0.93 %**	Antenna C2 MPE%	**0.93 %**

Site Composite MPE%	
Carrier	**MPE%**
SPRINT – Max per sector	**2.47 %**
NE Paging	0.06 %
Hamden Cmmcns	0.36 %
Conn Radio Rocky Hill	0.53 %
Airtouch	0.07 %
Verizon Wireless	4.58 %
AT&T	4.89 %
Site Total MPE %:	**12.96 %**

SPRINT Sector A Total:	2.47 %
SPRINT Sector B Total:	2.47 %
SPRINT Sector C Total:	2.47 %
Site Total:	12.96 %

SPRINT _ Frequency Band / Technology (All Sectors)	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density ($\mu W/cm^2$)	Frequency (MHz)	Allowable MPE ($\mu W/cm^2$)	Calculated % MPE
Sprint 850 MHz CDMA	1	437.55	147	0.79	850 MHz	567	0.14%
Sprint 850 MHz LTE	2	437.55	147	1.58	850 MHz	567	0.28%
Sprint 1900 MHz (PCS) CDMA	5	622.47	147	5.63	1900 MHz (PCS)	1000	0.56%
Sprint 1900 MHz (PCS) LTE	2	1,556.18	147	5.63	1900 MHz (PCS)	1000	0.56%
Sprint 2500 MHz (BRS) LTE	8	639.78	147	9.26	2500 MHz (BRS)	1000	0.93%
						Total:	**2.47%**

Summary

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

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

SPRINT Sector	Power Density Value (%)
Sector A:	2.47 %
Sector B:	2.47 %
Sector C:	2.47 %
SPRINT Maximum Total (per sector):	2.47 %
Site Total:	12.96 %
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **12.96 %** of the allowable FCC established general population limit sampled at the ground level. This is based upon values listed in the Connecticut Siting Council database for existing carrier emissions.

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

RAMAKER & ASSOCIATES, INC.

December 7, 2017

Tom Jupin
Charles Cherundolo Consulting, Inc.
1280 Rt. 46 West
Parsippany, NJ 07054

Ramaker & Associates, Inc.
855 Community Drive
Sauk City, WI 53583

SUBJECT: **STRUCTURAL ASSESSMENT**
150-FOOT GUYED TOWER

CARRIER: **SPRINT**

SITE: **BANM TOWER (CT03XC212-E)**
497 OLD POST ROAD
TOLLAND, TOLLAND COUNTY, CONNECTICUT 06084
RAMAKER & ASSOCIATES PROJECT NUMBER: 23002

RESULTS:			
	TOWER:	**72.9%**	**PASS**
	FOUNDATION:		**PASS**

Dear Tom Jupin:

Ramaker & Associates, Inc. (RAMAKER) respectfully submits this structural assessment for the above-mentioned site. The purpose of this report is to determine the structural integrity of the existing structure with the existing and proposed loading. Engineering recommendations regarding the analysis results are provided in the following pages.

RAMAKER developed a finite element model of the tower using tnxTower analysis software. 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.

If you have any questions or comments, please do not hesitate to contact our office.

Sincerely,

RAMAKER & ASSOCIATES, INC.

Ryan J. Nelson
Project Engineer

James R. Skowronski, P.E.
Supervising Engineer

STATE OF CONNECTICUT
JAMES R. SKOWRONSKI
26266
LICENSED
PROFESSIONAL ENGINEER

ANALYSIS CRITERIA

State Building Code	2016 CT State Building Code
Adopted Building Code	2012 IBC
Referenced Standard	TIA-222-G
Risk Category	II
Ultimate Design Wind Speed, V_{ult}	125 mph (3 sec. gust)
Nominal Design Wind Speed, V_{asd}	97 mph (3 sec. gust)
Design Wind Speed w/ Ice	50 mph (3 sec. gust)
Ice Thickness	1 inch
Exposure Category	B
Topographic Category	1
Crest Height	N/A

SUPPORTING DOCUMENTATION

- Tower drawings by PiRod, Eng. file number A-115329, dated January 13, 1999
- Structural analysis by RAMAKER, job number 23002, dated August 20, 2014
- Structural analysis by Destek Engineering, LLC, job number 1629004, dated March 24, 2016
- Construction drawings by RAMAKER, project number 23002
- Site visit(s) conducted by RAMAKER
- Other pertinent data procured or assumed by RAMAKER during site due diligence activities

TOWER LOADING

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

Elevation	Appurtenance	Mount	Coax	Owner	Status
150	(1) 4' Lightning Rod	Leg Mounted	--	Tower	Existing
	(1) 6' Omni	Pipe Mount	(1) 7/8	Town	
147	(1) 20' Omni	(1) Delta Mount	(1) 7/8	Town	Existing
	(3) RFS APXVSPP18-C-A20		(3) 1-1/4 Hybrid **(1) 1-1/4 Hybrid**	Sprint	Existing
	(3) ALU 1900MHz RRH				
	(3) ALU 800MHz RRH				
	(3) Commscope DT465B-2XR				**Proposed**
	(3) Alcatel-Lucent 800MHz 2x50W				
	(3) ALU TD-RRH8x20-25				
126	(2) Andrew SBNH-1D6565C	(3) Frame Mount	(9) 7/8 (2) 1-1/4 (1) Fiber (2) Power	AT&T	Existing
	(1) CCI HPA-65R-BUU-H6				
	(2) CCI HPA-65R-BUU-H8				
	(4) Kathrein 860-10025				
	(2) CCI DTMABP7819VG12A				
	(3) Ericsson RRUS-11				
	(3) Ericsson RRUS-11 w/A2				
	(3) Clearcomm CCDP-665-1W				
	(12) Powerwave CM1007-DBPXBC				
	(3) Raycap DC6-48-60-18-8F				
95	(1) 8' Dipole	Torque Arm	(1) 7/8	Town	Existing
50	(1) GPS Antenna	3' Standoff	(1) 1/2	--	Existing

TOWER RESULTS

The maximum tower member stress capacities under the loading conditions previously described are as follows:

Component Type	Percent Capacity	Pass/Fail
Leg	56.2	Pass
Diagonal	72.9	Pass
Horizontal	57.3	Pass
Torque Arm	27.7	Pass
Guy Line	55.9	Pass
Bolt	48.7	Pass
RATING	**72.9**	**PASS**

Results of the analysis show that the existing tower will be stressed to a maximum of 72.9 percent of capacity. Therefore, the existing tower will pass the TIA-222-G analysis requirements under proposed loading conditions.

FOUNDATION REACTIONS

The maximum tower reactions are as follows:

Load Type	ASD Design	Modified ASD	Proposed Model
Axial (k)	115.3	155.7	132.8
Shear (k)	2.6	3.5	0.7
Anchor Uplift (k)	69.6	94.0	41.2
Anchor Lateral (k)	36.6	49.4	18.3

The TIA-222-G code in Section 15.5.1 allows the original ASD design reactions to be multiplied by 1.35 when comparing them with reactions determined using the TIA-222-G code.

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

LIMITATIONS

The recommendations contained within this report were developed using the supporting documentation as previously described. All recommendations pertain only to the proposed antenna installation activities 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:

- Missing, corroding, and/or deteriorating members
- Improper manufacturing and/or construction
- 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:

- Replacing or strengthening bracing members
- Reinforcing or extending vertical members
- Installing or removing antenna mounting gates or side arms
- Changing loading configurations

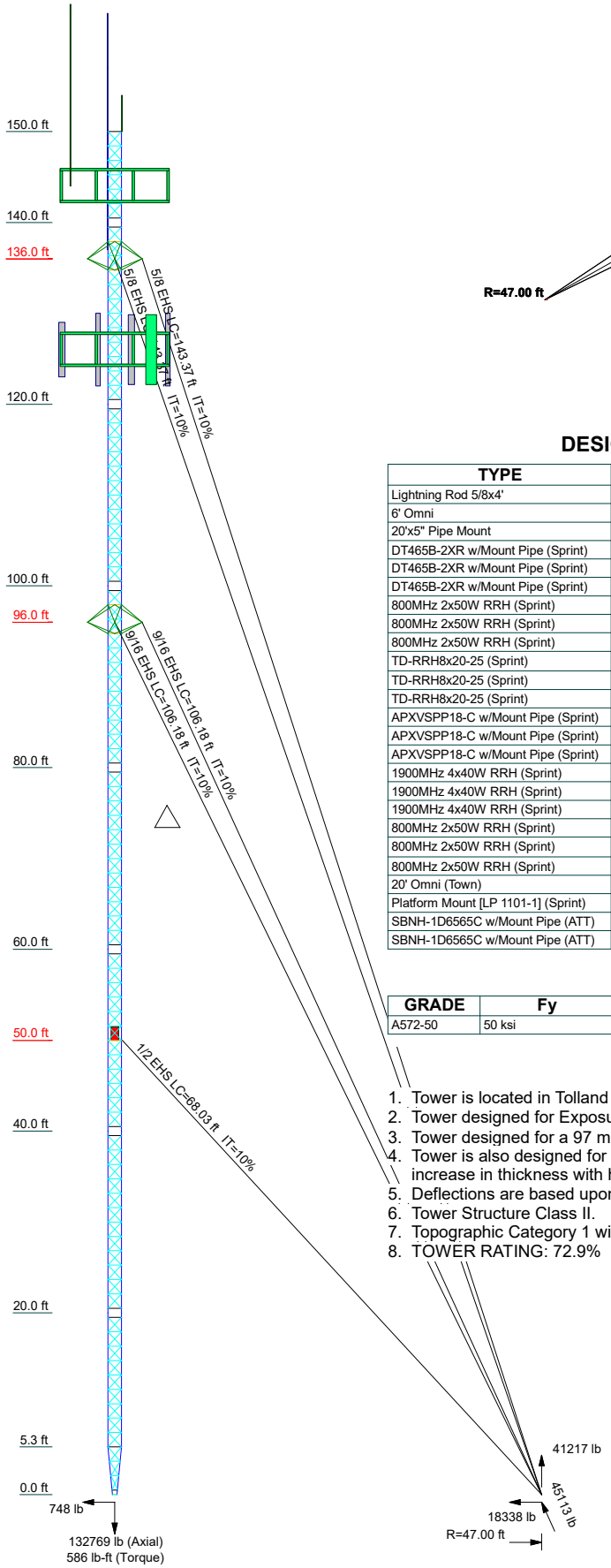
The tower owner is responsible for verifying that the existing loading on the structure is consistent with the loading applied to the structure within this report. If there is any information contrary to that contained herein, or if there are any defects arising from the original design, material, fabrication and erection deficiencies, this report should be disregarded and RAMAKER should be contacted immediately. RAMAKER is not liable for any representation, recommendation, or conclusion not expressly stated herein.

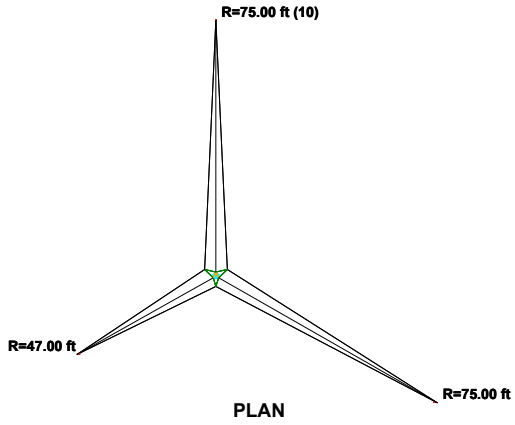
This analysis pertains only to the tower structure, and no analyses or conclusions were made regarding the antenna and equipment mounting structure(s). Analysis and certification of the antenna and equipment mounting structure(s) is performed and submitted separately.

ATTACHMENTS

- Analysis Figures
- Analysis Calculations

Section	T9	T8	T7	T6	T5	T4	T3	T2	T1
Legs					SR 1 3/4				
Leg Grade					A572-50				
Diagonals					SR 5/8				
Diagonal Grade					A36				
Top Girts	N.A.				SR 3/4				
Bottom Girts					SR 3/4				
Horizontals					SR 3/4				
Top Guy Pull-Offs			N.A.	SR 5/8	N.A.	SR 5/8	N.A.	SR 5/8	N.A.
Bot Guy Pull-Offs			N.A.			SR 5/8	N.A.	SR 5/8	N.A.
Face Width (ft)	0.5				96 @ 1.58333				1.5
# Panels @ (ft)									
Weight (lb)	177.7	516.7	693.4	695.8	693.4	942.7	693.4	942.7	352.3





DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
Lightning Rod 5/8x4'	150	HPA-65R-BUU-H6 w/Mount Pipe (ATT)	126
6' Omni	150	HPA-65R-BUU-H8 w/Mount Pipe (ATT)	126
20'x5" Pipe Mount	150	HPA-65R-BUU-H8 w/Mount Pipe (ATT)	126
DT465B-2XR w/Mount Pipe (Sprint)	147	(2) 860-10025 (ATT)	126
DT465B-2XR w/Mount Pipe (Sprint)	147	(2) 860-10025 (ATT)	126
DT465B-2XR w/Mount Pipe (Sprint)	147	DTMABP7819VG12A (ATT)	126
800MHz 2x50W RRH (Sprint)	147	DTMABP7819VG12A (ATT)	126
800MHz 2x50W RRH (Sprint)	147	RRUS-11 (ATT)	126
800MHz 2x50W RRH (Sprint)	147	RRUS-11 (ATT)	126
TD-RRH8x20-25 (Sprint)	147	RRUS-11 (ATT)	126
TD-RRH8x20-25 (Sprint)	147	RRUS-11 + RRUS-A2 (ATT)	126
TD-RRH8x20-25 (Sprint)	147	RRUS-11 + RRUS-A2 (ATT)	126
APXVSPP18-C w/Mount Pipe (Sprint)	147	RRUS-11 + RRUS-A2 (ATT)	126
APXVSPP18-C w/Mount Pipe (Sprint)	147	CCDP-665-1W (ATT)	126
APXVSPP18-C w/Mount Pipe (Sprint)	147	CCDP-665-1W (ATT)	126
1900MHz 4x40W RRH (Sprint)	147	CCDP-665-1W (ATT)	126
1900MHz 4x40W RRH (Sprint)	147	(4) CM1007-DBPXBC-xxx (ATT)	126
1900MHz 4x40W RRH (Sprint)	147	(4) CM1007-DBPXBC-xxx (ATT)	126
800MHz 2x50W RRH (Sprint)	147	(4) CM1007-DBPXBC-xxx (ATT)	126
800MHz 2x50W RRH (Sprint)	147	(3) DC6-48-60-18-8F (ATT)	126
800MHz 2x50W RRH (Sprint)	147	Sector Mount [SM 701-3] (ATT)	126
20' Omni (Town)	144	8' Dipole	95
Platform Mount [LP 1101-1] (Sprint)	144	GPS	50
SBNH-1D6565C w/Mount Pipe (ATT)	126	3' Standoff	50
SBNH-1D6565C w/Mount Pipe (ATT)	126		

MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower is located in Tolland County, Connecticut.
2. Tower designed for Exposure B to the TIA-222-G Standard.
3. Tower designed for a 97 mph basic wind in accordance with the TIA-222-G Standard.
4. Tower is also designed for a 50 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Structure Class II.
7. Topographic Category 1 with Crest Height of 0.00 ft
8. TOWER RATING: 72.9%

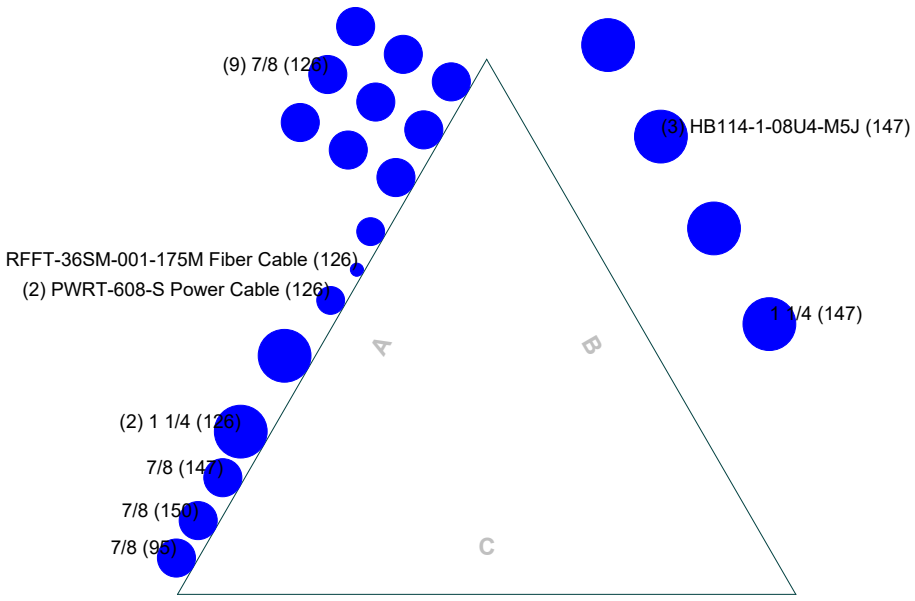
ALL REACTIONS ARE FACTORED

Ramaker & Associates, Inc.
855 Community Dr.
Sauk City, WI 53583
Phone: (608) 643-4100
FAX: (608) 643-7999

Job:	***BANM Tower (CT03XC212)***		
Project:	***23002***		
Client: CCCI / Sprint	Drawn by: RJN	App'd:	
Code: TIA-222-G	Date: 12/07/17	Scale: NTS	
Path: I:\23000\23002\Structural\Risa\23002 rev7.eri		Dwg No. E-1	

Feed Line Plan

Round Flat App In Face App Out Face



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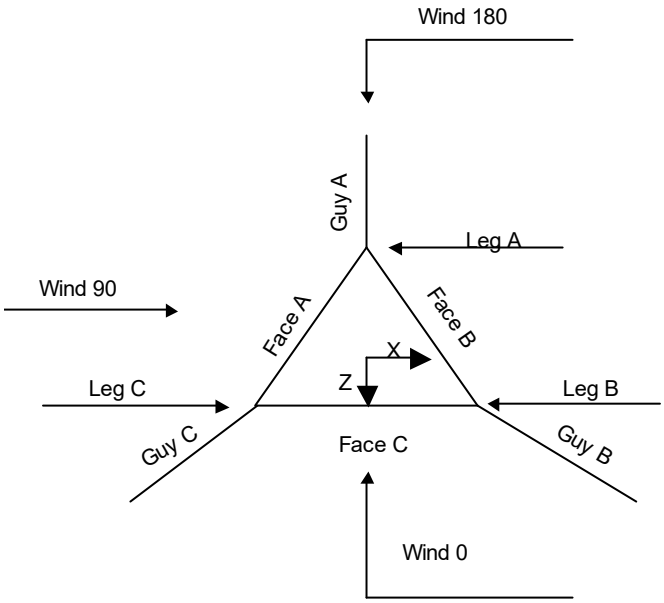
Job: ***BANM Tower (CT03XC212)***			
Project: ***23002***			
Client: CCCI / Sprint	Drawn by: RJN	App'd:	
Code: TIA-222-G	Date: 12/07/17	Scale: NTS	
Path: I:\23000\23002\Structural\Risa\23002 rev7.eri		Dwg No. E-7	

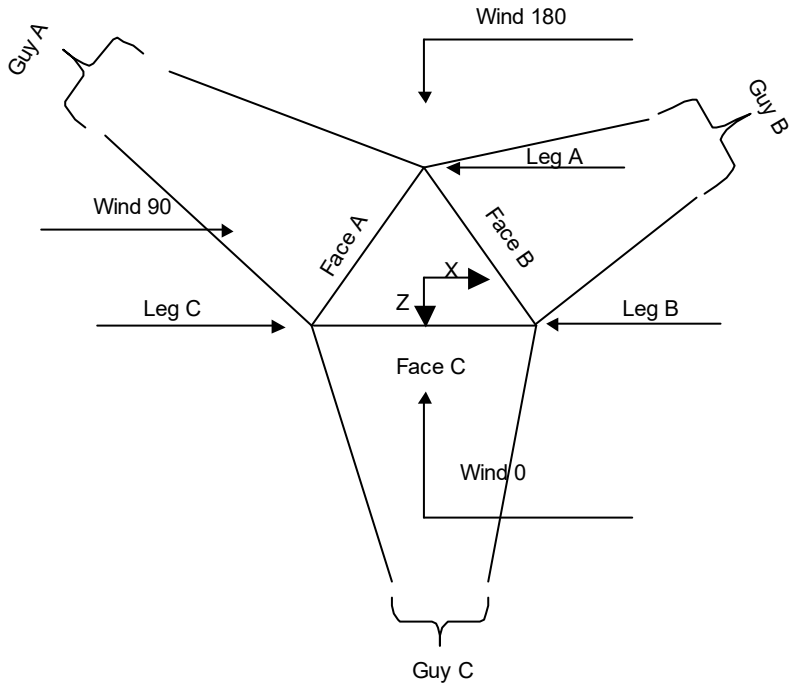
Tower Input Data

The main tower is a 3x guyed tower with an overall height of 150.00 ft above the ground line.
The base of the tower is set at an elevation of 0.00 ft above the ground line.
The face width of the tower is 1.50 ft at the top and 0.50 ft at the base.
This tower is designed using the TIA-222-G standard.
The following design criteria apply:

Tower is located in Tolland County, Connecticut.
ASCE 7-10 Wind Data is used (wind speeds converted to nominal values).
Basic wind speed of 97 mph.
Structure Class II.
Exposure Category B.
Topographic Category 1.
Crest Height 0.00 ft.
Nominal ice thickness of 1.0000 in.
Ice thickness is considered to increase with height.
Ice density of 56 pcf.
A wind speed of 50 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 60 mph.
Pressures are calculated at each section.
Safety factor used in guy design is 1.
Stress ratio used in tower member design is 1.
Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.



Corner & Starmount Guyed Tower



Face Guyed

Tower Section Geometry

Tower Section	Tower Elevation ft	Assembly Database	Description	Section Width ft	Number of Sections	Section Length ft
T1	150.00-140.00			1.50	1	10.00
T2	140.00-120.00			1.50	1	20.00
T3	120.00-100.00			1.50	1	20.00
T4	100.00-80.00			1.50	1	20.00
T5	80.00-60.00			1.50	1	20.00
T6	60.00-40.00			1.50	1	20.00
T7	40.00-20.00			1.50	1	20.00
T8	20.00-5.25			1.50	1	14.75
T9	5.25-0.00			1.50	1	5.25

Tower Section Geometry *(cont'd)*

Tower Section	Tower Elevation ft	Diagonal Spacing ft	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset in	Bottom Girt Offset in
T1	150.00-140.00	1.58	X Brace	No	Steps	0.0000	6.0000
T2	140.00-120.00	1.58	X Brace	No	Steps	6.0000	6.0000
T3	120.00-100.00	1.58	X Brace	No	Steps	6.0000	6.0000
T4	100.00-80.00	1.58	X Brace	No	Steps	6.0000	6.0000
T5	80.00-60.00	1.58	X Brace	No	Steps	6.0000	6.0000
T6	60.00-40.00	1.58	X Brace	No	Steps	6.0000	6.0000
T7	40.00-20.00	1.58	X Brace	No	Steps	6.0000	6.0000
T8	20.00-5.25	1.58	X Brace	No	Steps	6.0000	0.0000
T9	5.25-0.00	1.58	X Brace	No	Yes	0.0000	6.0000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T1 150.00-140.00	Solid Round	1 3/4	A572-50 (50 ksi)	Solid Round	5/8	A36 (36 ksi)
T2 140.00-120.00	Solid Round	1 3/4	A572-50 (50 ksi)	Solid Round	5/8	A36 (36 ksi)
T3 120.00-100.00	Solid Round	1 3/4	A572-50 (50 ksi)	Solid Round	5/8	A36 (36 ksi)
T4 100.00-80.00	Solid Round	1 3/4	A572-50 (50 ksi)	Solid Round	5/8	A36 (36 ksi)
T5 80.00-60.00	Solid Round	1 3/4	A572-50 (50 ksi)	Solid Round	5/8	A36 (36 ksi)
T6 60.00-40.00	Solid Round	1 3/4	A572-50 (50 ksi)	Solid Round	5/8	A36 (36 ksi)
T7 40.00-20.00	Solid Round	1 3/4	A572-50 (50 ksi)	Solid Round	5/8	A36 (36 ksi)
T8 20.00-5.25	Solid Round	1 3/4	A572-50 (50 ksi)	Solid Round	5/8	A36 (36 ksi)
T9 5.25-0.00	Solid Round	1 3/4	A572-50 (50 ksi)	Solid Round	5/8	A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Top Girt Type	Top Girt Size	Top Girt Grade	Bottom Girt Type	Bottom Girt Size	Bottom Girt Grade
T1 150.00-140.00	Solid Round	3/4	A572-50 (50 ksi)	Solid Round	3/4	A572-50 (50 ksi)
T2 140.00-120.00	Solid Round	3/4	A572-50 (50 ksi)	Solid Round	3/4	A572-50 (50 ksi)
T3 120.00-100.00	Solid Round	3/4	A572-50 (50 ksi)	Solid Round	3/4	A572-50 (50 ksi)
T4 100.00-80.00	Solid Round	3/4	A572-50 (50 ksi)	Solid Round	3/4	A572-50 (50 ksi)
T5 80.00-60.00	Solid Round	3/4	A572-50 (50 ksi)	Solid Round	3/4	A572-50 (50 ksi)
T6 60.00-40.00	Solid Round	3/4	A572-50 (50 ksi)	Solid Round	3/4	A572-50 (50 ksi)
T7 40.00-20.00	Solid Round	3/4	A572-50	Solid Round	3/4	A572-50

Tower Elevation ft	Top Girt Type	Top Girt Size	Top Girt Grade	Bottom Girt Type	Bottom Girt Size	Bottom Girt Grade
T8 20.00-5.25	Solid Round	3/4	(50 ksi) A572-50 (50 ksi)	Solid Round	3/4	(50 ksi) A572-50 (50 ksi)
T9 5.25-0.00	Solid Round		A572-50 (50 ksi)	Solid Round	3/4	A572-50 (50 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	No. of Mid Girts	Mid Girt Type	Mid Girt Size	Mid Girt Grade	Horizontal Type	Horizontal Size	Horizontal Grade
T1 150.00-140.00	None	Flat Bar		A36 (36 ksi)	Solid Round	3/4	A572-50 (50 ksi)
T2 140.00-120.00	None	Flat Bar		A36 (36 ksi)	Solid Round	3/4	A572-50 (50 ksi)
T3 120.00-100.00	None	Flat Bar		A36 (36 ksi)	Solid Round	3/4	A572-50 (50 ksi)
T4 100.00-80.00	None	Flat Bar		A36 (36 ksi)	Solid Round	3/4	A572-50 (50 ksi)
T5 80.00-60.00	None	Flat Bar		A36 (36 ksi)	Solid Round	3/4	A572-50 (50 ksi)
T6 60.00-40.00	None	Flat Bar		A36 (36 ksi)	Solid Round	3/4	A572-50 (50 ksi)
T7 40.00-20.00	None	Flat Bar		A36 (36 ksi)	Solid Round	3/4	A572-50 (50 ksi)
T8 20.00-5.25	None	Flat Bar		A36 (36 ksi)	Solid Round	3/4	A572-50 (50 ksi)
T9 5.25-0.00	None	Flat Bar		A36 (36 ksi)	Solid Round	3/4	A572-50 (50 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
T1 150.00-140.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T2 140.00-120.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T3 120.00-100.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T4 100.00-80.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T5 80.00-60.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T6 60.00-40.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T7 40.00-20.00	0.00	0.0000	A36	1	1	1	36.0000	36.0000	36.0000

Tower Elevation ft	Gusset Area (per face) ft²	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
T8 20.00-5.25	0.00	0.0000	(36 ksi) A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T9 5.25-0.00	0.00	0.0000	(36 ksi) A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Calc K Single Angles	Calc K Solid Rounds	K Factors[1] Legs	X Brace Diags X Y	K Brace Diags X Y	Single Diags X Y	Girts X Y	Horiz. X Y	Sec. Horiz. X Y	Inner Brace X Y
T1 150.00-140.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T2 140.00-120.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T3 120.00-100.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T4 100.00-80.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T5 80.00-60.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T6 60.00-40.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T7 40.00-20.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T8 20.00-5.25	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T9 5.25-0.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1

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

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Net Width Deduct in	Leg U	Diagonal Net Width Deduct in	Diagonal U	Top Girt Net Width Deduct in	Top Girt U	Bottom Girt Net Width Deduct in	Bottom Girt U	Mid Girt Net Width Deduct in	Mid Girt U	Long Horizontal Net Width Deduct in	Long Horizontal U	Short Horizontal Net Width Deduct in	Short Horizontal U
T1 150.00-140.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T2 140.00-120.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T3 120.00-100.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T4 100.00-80.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75

Tower Elevation ft	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U
T5 80.00-60.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T6 60.00-40.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T7 40.00-20.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T8 20.00-5.25	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T9 5.25-0.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Connection Type	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
		Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.
T1 150.00-140.00	Sleeve DS	0.6250 A325N	4	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T2 140.00-120.00	Sleeve DS	0.6250 A325N	4	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T3 120.00-100.00	Sleeve DS	0.6250 A325N	4	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T4 100.00-80.00	Sleeve DS	0.6250 A325N	4	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T5 80.00-60.00	Sleeve DS	0.6250 A325N	4	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T6 60.00-40.00	Sleeve DS	0.6250 A325N	4	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T7 40.00-20.00	Sleeve DS	0.6250 A325N	4	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T8 20.00-5.25	Sleeve DS	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T9 5.25-0.00	Sleeve DS	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0

Guy Data

Guy Elevation ft	Guy Grade		Guy Size	Initial Tension lb	%	Guy Modulus ksi	Guy Weight plf	L_u ft	Anchor Radius ft	Anchor Azimuth Adj. °	Anchor Elevation ft	End Fitting Efficiency %
136	EHS	A	5/8	4240.00	10%	21000	0.813	145.66	75.00	0.0000	10.00	100%
		B	5/8	4240.00	10%	21000	0.813	154.38	75.00	0.0000	0.00	100%
		C	5/8	4240.00	10%	21000	0.813	143.24	47.00	0.0000	0.00	100%
96	EHS	A	9/16	3500.00	10%	21000	0.671	112.92	75.00	0.0000	10.00	100%
		B	9/16	3500.00	10%	21000	0.671	120.70	75.00	0.0000	0.00	100%
		C	9/16	3500.00	10%	21000	0.671	106.09	47.00	0.0000	0.00	100%
50	EHS	A	1/2	2690.00	10%	21000	0.517	84.17	75.00	0.0000	10.00	100%
		B	1/2	2690.00	10%	21000	0.517	89.34	75.00	0.0000	0.00	100%
		C	1/2	2690.00	10%	21000	0.517	67.97	47.00	0.0000	0.00	100%

Guy Data *(cont'd)*

Guy Elevation ft	Mount Type	Torque-Arm Spread ft	Torque-Arm Leg Angle °	Torque-Arm Style	Torque-Arm Grade	Torque-Arm Type	Torque-Arm Size
136	Torque Arm	6.00	20.0000	Wing	A36 (36 ksi)	Pipe	P2.5x.203
96	Torque Arm	6.00	20.0000	Wing	A36 (36 ksi)	Pipe	P2.5x.203
50	Corner						

Guy Data *(cont'd)*

Guy Elevation ft	Diagonal Grade	Diagonal Type	Upper Diagonal Size	Lower Diagonal Size	Is Strap.	Pull-Off Grade	Pull-Off Type	Pull-Off Size
136.00	A572-50 (50 ksi)	Solid Round			No	A36 (36 ksi)	Solid Round	5/8
96.00	A572-50 (50 ksi)	Solid Round			No	A36 (36 ksi)	Solid Round	5/8
50.00	A572-50 (50 ksi)	Solid Round			No	A36 (36 ksi)	Solid Round	5/8

Guy Data *(cont'd)*

Guy Elevation ft	Cable Weight A lb	Cable Weight B lb	Cable Weight C lb	Cable Weight D lb	Tower Intercept A ft	Tower Intercept B ft	Tower Intercept C ft	Tower Intercept D ft
136	118.42	125.51	116.46		2.01 2.4 sec/pulse	2.26 2.6 sec/pulse	1.94 2.4 sec/pulse	
96	75.77	80.99	71.19		1.21 1.9 sec/pulse	1.38 2.0 sec/pulse	1.07 1.8 sec/pulse	
50	43.51	46.19	35.14		0.68 1.4 sec/pulse	0.76 1.5 sec/pulse	0.44 1.1 sec/pulse	

Guy Data *(cont'd)*

Guy Elevation ft	Calc K Single Angles	Calc K Solid Rounds	Torque Arm K_x	Torque Arm K_y	Pull Off K_x	Pull Off K_y	Diagonal K_x	Diagonal K_y
136	No	Yes	1	1	1	1	1	1
96	No	Yes	1	1	1	1	1	1
50	No	No			1	1	1	1

Guy Data *(cont'd)*

Guy Elevation ft	Torque-Arm Bolt Size in	Torque-Arm Number	Torque-Arm Net Width Deduct in	Torque-Arm U	Pull Off Bolt Size in	Pull Off Number	Pull Off Net Width Deduct in	Pull Off U	Diagonal Bolt Size in	Diagonal Number	Diagonal Net Width Deduct in	Diagonal U
136	0.0000 A325N	0	0.0000	1	0.6250 A325N	0	0.0000	0.75	0.6250 A325N	0	0.0000	0.75
96	0.0000 A325N	0	0.0000	1	0.6250 A325N	0	0.0000	0.75	0.6250 A325N	0	0.0000	0.75
50	0.6250 A325N	0	0.0000	0.75	0.6250 A325N	0	0.0000	0.75	0.6250 A325N	0	0.0000	0.75

Guy Pressures

Guy Elevation ft	Guy Location	z ft	q_z psf	q_z Ice psf	Ice Thickness in
136	A	73.00	18	5	2.1653
	B	68.00	18	5	2.1500
	C	68.00	18	5	2.1500
96	A	53.00	17	4	2.0970
	B	48.00	16	4	2.0764
	C	48.00	16	4	2.0764
50	A	30.00	14	4	1.9810
	B	25.00	14	4	1.9452
	C	25.00	14	4	1.9452

Guy-Mast Forces (Excluding Wind) - No Ice

Guy Elevation ft	Guy Location	Chord Angle °	Guy Tension Top Bottom lb	F_x lb	F_y lb	F_z lb	M_x lb-ft	M_y lb-ft	M_z lb-ft
136	A	59.8015	4342.35 4240.00	-88.30	3767.98	-2156.50	-6526.34	6622.44	-11303.95
	A	59.8015	4342.35 4240.00	88.30	3767.98	-2156.50	-6526.34	-6622.44	11303.95
	B	61.6671	4350.47 4240.00	1805.47	3843.41	946.10	13313.96	6254.33	0.00
	B	61.6671	4350.47 4240.00	1722.08	3843.41	1090.53	-6656.98	-6254.33	-11530.22
	C	71.5522	4350.47 4240.00	-1129.50	4132.73	755.90	-7158.10	4224.04	12398.19
	C	71.5522	4350.47 4240.00	-1219.38	4132.73	600.23	14316.20	-4224.04	0.00
			Sum:	**1178.67**	23488.24	**-920.24**	**762.40**	-0.00	**867.97**
96	A	49.5469	3557.66 3500.00	-93.67	2723.08	-2287.57	-4716.51	7024.95	-8169.24
	A	49.5469	3557.66 3500.00	93.67	2723.08	-2287.57	-4716.51	-7024.95	8169.24

Guy Elevation	Guy Location	Chord Angle	Guy Tension Top / Bottom	F_x	F_y	F_z	M_x	M_y	M_z
ft		°	lb	lb	lb	lb	lb-ft	lb-ft	lb-ft
	B	52.6257	3564.36 3500.00	1899.05	2847.45	995.14	9863.85	6578.51	0.00
	B	52.6257	3564.36 3500.00	1811.34	2847.45	1147.06	-4931.93	-6578.51	-8542.35
	C	64.7057	3564.36 3500.00	-1254.19	3229.12	839.34	-5592.99	4690.33	9687.35
	C	64.7057	3564.36 3500.00	-1353.98	3229.12	666.49	11185.98	-4690.33	0.00
			Sum:	**1102.22**	17599.29	**-927.12**	**1091.89**	-0.00	**1145.00**
50	A	28.3497	2710.66 2690.00	0.00	1303.99	-2376.40	-1129.29	0.00	0.00
	B	33.9979	2715.83 2690.00	1940.59	1534.44	1120.40	664.43	0.00	-1150.83
	C	47.3029	2715.83 2690.00	-1587.32	2004.07	916.44	867.79	-0.00	1503.05
			Sum:	**353.28**	4842.50	**-339.57**	**402.93**	0.00	**352.22**

Guy-Mast Forces (Excluding Wind) - Ice

Guy Elevation	Guy Location	Chord Angle	Guy Tension Top / Bottom	F_x	F_y	F_z	M_x	M_y	M_z
ft		°	lb	lb	lb	lb	lb-ft	lb-ft	lb-ft
136	A	59.8015	7793.15 6761.86	-149.38	6884.85	-3648.26	-11924.91	11203.51	-20654.55
	A	59.8015	7793.15 6761.86	149.38	6884.85	-3648.26	-11924.91	-11203.51	20654.55
	B	61.6671	7808.37 6707.77	3042.70	7012.16	1594.43	24290.84	10540.22	0.00
	B	61.6671	7808.37 6707.77	2902.16	7012.16	1837.84	-12145.42	-10540.22	-21036.49
	C	71.5522	7093.82 5993.07	-1716.12	6786.63	1148.47	-11754.78	6417.82	20359.88
	C	71.5522	7093.82 5993.07	-1852.67	6786.63	911.96	23509.56	-6417.82	0.00
			Sum:	**2376.08**	41367.27	**-1803.81**	**50.39**	-0.00	**-676.61**
96	A	49.5469	6494.26 5851.33	-163.54	5118.13	-3994.16	-8864.87	12265.75	-15354.40
	A	49.5469	6494.26 5851.33	163.54	5118.13	-3994.16	-8864.87	-12265.75	15354.40
	B	52.6257	6499.80 5793.58	3298.08	5327.59	1728.25	18455.32	11424.89	0.00
	B	52.6257	6499.80 5793.58	3145.75	5327.59	1992.10	-9227.66	-11424.89	-15982.77
	C	64.7057	5835.80 5129.47	-1943.22	5346.90	1300.46	-9261.09	7267.13	16040.69
	C	64.7057	5835.80 5129.47	-2097.84	5346.90	1032.65	18522.19	-7267.13	0.00
			Sum:	**2402.77**	31585.24	**-1934.87**	**759.02**	-0.00	**57.91**
50	A	28.3497	5081.99 4821.45	0.00	2624.85	-4351.64	-2273.18	0.00	0.00
	B	33.9979	5062.21 4746.19	3515.90	3023.89	2029.91	1309.38	0.00	-2267.92
	C	47.3029	4475.16 4159.08	-2532.74	3387.34	1462.28	1466.76	-0.00	2540.50

Guy Elevation	Guy Location	Chord Angle	Guy Tension Top Bottom lb	F_x	F_y	F_z	M_x	M_y	M_z
ft		°		lb	lb	lb	lb-ft	lb-ft	lb-ft
			Sum:	**983.16**	9036.07	**-859.46**	**502.96**	0.00	**272.59**

Guy-Mast Forces (Excluding Wind) - Service

Guy Elevation	Guy Location	Chord Angle	Guy Tension Top Bottom lb	F_x	F_y	F_z	M_x	M_y	M_z
ft		°		lb	lb	lb	lb-ft	lb-ft	lb-ft
136	A	59.8015	4342.35 4240.00	-88.30	3767.98	-2156.50	-6526.34	6622.44	-11303.95
	A	59.8015	4342.35 4240.00	88.30	3767.98	-2156.50	-6526.34	-6622.44	11303.95
	B	61.6671	4350.47 4240.00	1805.47	3843.41	946.10	13313.96	6254.33	0.00
	B	61.6671	4350.47 4240.00	1722.08	3843.41	1090.53	-6656.98	-6254.33	-11530.22
	C	71.5522	4350.47 4240.00	-1129.50	4132.73	755.90	-7158.10	4224.04	12398.19
	C	71.5522	4350.47 4240.00	-1219.38	4132.73	600.23	14316.20	-4224.04	0.00
			Sum:	**1178.67**	23488.24	**-920.24**	**762.40**	-0.00	**867.97**
96	A	49.5469	3557.66 3500.00	-93.67	2723.08	-2287.57	-4716.51	7024.95	-8169.24
	A	49.5469	3557.66 3500.00	93.67	2723.08	-2287.57	-4716.51	-7024.95	8169.24
	B	52.6257	3564.36 3500.00	1899.05	2847.45	995.14	9863.85	6578.51	0.00
	B	52.6257	3564.36 3500.00	1811.34	2847.45	1147.06	-4931.93	-6578.51	-8542.35
	C	64.7057	3564.36 3500.00	-1254.19	3229.12	839.34	-5592.99	4690.33	9687.35
	C	64.7057	3564.36 3500.00	-1353.98	3229.12	666.49	11185.98	-4690.33	0.00
			Sum:	**1102.22**	17599.29	**-927.12**	**1091.89**	-0.00	**1145.00**
50	A	28.3497	2710.66 2690.00	0.00	1303.99	-2376.40	-1129.29	0.00	0.00
	B	33.9979	2715.83 2690.00	1940.59	1534.44	1120.40	664.43	0.00	-1150.83
	C	47.3029	2715.83 2690.00	-1587.32	2004.07	916.44	867.79	-0.00	1503.05
			Sum:	**353.28**	4842.50	**-339.57**	**402.93**	0.00	**352.22**

Guy-Tensioning Information

Guy Elevation		H	V	Temperature At Time Of Tensioning: 0 F Initial Tension	0 F Intercept	20 F Initial Tension	20 F Intercept	40 F Initial Tension	40 F Intercept	60 F Initial Tension	60 F Intercept	80 F Initial Tension	80 F Intercept	100 F Initial Tension	100 F Intercept	120 F Initial Tension	120 F Intercept
ft		ft	ft	lb	ft	lb	ft	lb	ft	lb	ft	lb	ft	lb	ft	lb	ft
136	A	73.33	126.00	4721	1.81	4561	1.87	4400	1.94	4240	2.01	4080	2.09	3921	2.17	3762	2.26
	B	73.33	136.00	4668	2.05	4525	2.12	4383	2.18	4240	2.26	4098	2.34	3956	2.42	3814	2.51
	C	45.37	136.00	4432	1.86	4368	1.89	4304	1.91	4240	1.94	4176	1.97	4112	2.00	4048	2.04
96	A	73.33	86.00	4161	1.02	3940	1.08	3720	1.14	3500	1.21	3281	1.29	3063	1.39	2847	1.49

Guy Elevation ft		H ft	V ft	Temperature At Time Of Tensioning: 0 F Initial Tension lb	0 F Intercept ft	20 F Initial Tension lb	20 F Intercept ft	40 F Initial Tension lb	40 F Intercept ft	60 F Initial Tension lb	60 F Intercept ft	80 F Initial Tension lb	80 F Intercept ft	100 F Initial Tension lb	100 F Intercept ft	120 F Initial Tension lb	120 F Intercept ft
	B	73.33	96.00	4079	1.19	3885	1.25	3692	1.31	3500	1.38	3308	1.46	3117	1.55	2927	1.65
	C	45.37	96.00	3789	0.99	3693	1.01	3596	1.04	3500	1.07	3404	1.10	3308	1.13	3212	1.17
50	A	74.13	40.00	3629	0.50	3315	0.55	3002	0.61	2690	0.68	2380	0.77	2074	0.88	1774	1.03
	B	74.13	50.00	3523	0.58	3244	0.63	2967	0.69	2690	0.76	2415	0.85	2143	0.96	1874	1.09
	C	46.13	50.00	3251	0.37	3064	0.39	2877	0.41	2690	0.44	2503	0.48	2317	0.51	2132	0.56

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
**********												
Safety Line 3/8 (150)	C	No	Ar (CaAa)	150.00 - 6.00	2.0000	0	1	1	0.3750	0.3750		0.22
**********												
7/8 (150)	A	No	Ar (CaAa)	150.00 - 0.00	0.0000	-0.38	1	1	0.5000	1.1100		0.54
**********												
7/8 (147)	A	No	Ar (CaAa)	147.00 - 0.00	0.0000	-0.3	1	1	0.5000	1.1100		0.54
**********												
HB114-1-08U4-M5J (147)	B	No	Ar (CaAa)	147.00 - 0.00	2.5000	-0.25	3	3	1.5400	1.5400		1.08
1 1/4 (147)	B	No	Ar (CaAa)	147.00 - 0.00	2.5000	0.1	1	1	1.5500	1.5500		0.66
**********												
7/8 (126)	A	No	Ar (CaAa)	126.00 - 0.00	0.0000	0.35	9	3	0.5000	1.1100		0.54
1 1/4 (126)	A	No	Ar (CaAa)	126.00 - 0.00	0.0000	-0.15	2	2	1.0000	1.5500		0.66
RFFT-36SM-001-175M Fiber Cable (126)	A	No	Ar (CaAa)	126.00 - 0.00	0.0000	0.1	1	1	0.4000	0.4000		0.09
PWRT-608-S Power Cable (126)	A	No	Ar (CaAa)	126.00 - 0.00	0.0000	0.1	2	2	1.5000 0.8200	0.8200		0.62
**********												
7/8 (95)	A	No	Ar (CaAa)	95.00 - 0.00	0.0000	-0.45	1	1	0.5000	1.1100		0.54
**********												
1/2 (50)	A	No	Ar (CaAa)	50.00 - 6.00	0.0000	-0.1	1	1	0.5800	0.5800		0.25
**********												

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
**********							

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight lb
T1	150.00-140.00	A	0.000	0.000	1.887	0.000	9.18
		B	0.000	0.000	4.319	0.000	27.30
		C	0.000	0.000	0.375	0.000	2.20
T2	140.00-120.00	A	0.000	0.000	13.518	0.000	66.67
		B	0.000	0.000	12.340	0.000	78.00
		C	0.000	0.000	0.750	0.000	4.40
T3	120.00-100.00	A	0.000	0.000	34.700	0.000	171.82
		B	0.000	0.000	12.340	0.000	78.00
		C	0.000	0.000	0.750	0.000	4.40
T4	100.00-80.00	A	0.000	0.000	36.365	0.000	179.92
		B	0.000	0.000	12.340	0.000	78.00
		C	0.000	0.000	0.750	0.000	4.40
T5	80.00-60.00	A	0.000	0.000	36.920	0.000	182.62
		B	0.000	0.000	12.340	0.000	78.00
		C	0.000	0.000	0.750	0.000	4.40
T6	60.00-40.00	A	0.000	0.000	37.500	0.000	185.12
		B	0.000	0.000	12.340	0.000	78.00
		C	0.000	0.000	0.750	0.000	4.40
T7	40.00-20.00	A	0.000	0.000	38.080	0.000	187.62
		B	0.000	0.000	12.340	0.000	78.00
		C	0.000	0.000	0.750	0.000	4.40
T8	20.00-5.25	A	0.000	0.000	28.041	0.000	138.18
		B	0.000	0.000	9.101	0.000	57.52
		C	0.000	0.000	0.525	0.000	3.08
T9	5.25-0.00	A	0.000	0.000	9.691	0.000	47.94
		B	0.000	0.000	3.239	0.000	20.48
		C	0.000	0.000	0.000	0.000	0.00

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight lb
T1	150.00-140.00	A	2.319	0.000	0.000	9.772	0.000	174.34
		B		0.000	0.000	16.405	0.000	274.03
		C		0.000	0.000	5.013	0.000	78.53
T2	140.00-120.00	A	2.294	0.000	0.000	50.294	0.000	819.68
		B		0.000	0.000	46.603	0.000	772.96
		C		0.000	0.000	9.926	0.000	153.99
T3	120.00-100.00	A	2.256	0.000	0.000	113.215	0.000	1753.83
		B		0.000	0.000	46.196	0.000	758.00
		C		0.000	0.000	9.774	0.000	149.42
T4	100.00-80.00	A	2.211	0.000	0.000	120.034	0.000	1852.58
		B		0.000	0.000	45.717	0.000	740.53
		C		0.000	0.000	9.594	0.000	144.12
T5	80.00-60.00	A	2.156	0.000	0.000	120.770	0.000	1839.82
		B		0.000	0.000	45.130	0.000	719.42
		C		0.000	0.000	9.375	0.000	137.76
T6	60.00-40.00	A	2.085	0.000	0.000	122.882	0.000	1833.33
		B		0.000	0.000	44.368	0.000	692.41
		C		0.000	0.000	9.089	0.000	129.71
T7	40.00-20.00	A	1.981	0.000	0.000	123.378	0.000	1783.16
		B		0.000	0.000	43.261	0.000	653.99
		C		0.000	0.000	8.674	0.000	118.45
T8	20.00-5.25	A	1.817	0.000	0.000	85.715	0.000	1176.60
		B		0.000	0.000	30.616	0.000	439.09
		C		0.000	0.000	5.612	0.000	71.19

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
T9	5.25-0.00	A	1.553	0.000	0.000	25.851	0.000	326.68
		B		0.000	0.000	10.163	0.000	132.99
		C		0.000	0.000	0.000	0.000	0.00

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
T1	150.00-140.00	0.5749	-1.2348	0.0000	0.0000
T2	140.00-120.00	0.1324	-2.4156	0.0000	0.0000
T3	120.00-100.00	-1.0249	-3.4250	0.0000	0.0000
T4	100.00-80.00	-1.2298	-3.2350	0.0000	0.0000
T5	80.00-60.00	-1.2945	-3.1703	0.0000	0.0000
T6	60.00-40.00	-1.3330	-3.1543	0.0000	0.0000
T7	40.00-20.00	-1.3698	-3.1360	-0.0948	-0.0632
T8	20.00-5.25	-1.3634	-3.1360	-0.1737	-0.1304
T9	5.25-0.00	-0.9199	-2.5271	0.0000	0.0000

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T1	2	Safety Line 3/8	140.00 - 150.00	0.6000	0.0000
T1	4	7/8	140.00 - 150.00	0.6000	0.0000
T1	6	7/8	140.00 - 147.00	0.6000	0.0000
T1	8	HB114-1-08U4-M5J	140.00 - 147.00	0.6000	0.0000
T1	10	1 1/4	140.00 - 147.00	0.6000	0.0000
T2	2	Safety Line 3/8	120.00 - 140.00	0.6000	0.0000
T2	4	7/8	120.00 - 140.00	0.6000	0.0000
T2	6	7/8	120.00 - 140.00	0.6000	0.0000
T2	8	HB114-1-08U4-M5J	120.00 - 140.00	0.6000	0.0000
T2	10	1 1/4	120.00 - 140.00	0.6000	0.0000
T2	12	7/8	120.00 - 126.00	0.6000	0.0000
T2	13	1 1/4	120.00 - 126.00	0.6000	0.0000
T2	14	RFFT-36SM-001-175M Fiber Cable	120.00 - 126.00	0.6000	0.0000
T2	15	PWRT-608-S Power Cable	120.00 - 126.00	0.6000	0.0000
T3	2	Safety Line 3/8	100.00 - 120.00	0.6000	0.0000
T3	4	7/8	100.00 - 120.00	0.6000	0.0000
T3	6	7/8	100.00 - 120.00	0.6000	0.0000
T3	8	HB114-1-08U4-M5J	100.00 - 120.00	0.6000	0.0000
T3	10	1 1/4	100.00 - 120.00	0.6000	0.0000
T3	12	7/8	100.00 - 120.00	0.6000	0.0000
T3	13	1 1/4	100.00 - 120.00	0.6000	0.0000
T3	14	RFFT-36SM-001-175M Fiber Cable	100.00 - 120.00	0.6000	0.0000
T3	15	PWRT-608-S Power Cable	100.00 - 120.00	0.6000	0.0000
T4	2	Safety Line 3/8	80.00 - 100.00	0.6000	0.0000
T4	4	7/8	80.00 - 100.00	0.6000	0.0000
T4	6	7/8	80.00 - 100.00	0.6000	0.0000
T4	8	HB114-1-08U4-M5J	80.00 - 100.00	0.6000	0.0000
T4	10	1 1/4	80.00 - 100.00	0.6000	0.0000
T4	12	7/8	80.00 - 100.00	0.6000	0.0000
T4	13	1 1/4	80.00 - 100.00	0.6000	0.0000
T4	14	RFFT-36SM-001-175M Fiber Cable	80.00 - 100.00	0.6000	0.0000
T4	15	PWRT-608-S Power Cable	80.00 - 100.00	0.6000	0.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T4	17	7/8	80.00 - 95.00	0.6000	0.0000
T5	2	Safety Line 3/8	60.00 - 80.00	0.6000	0.0000
T5	4	7/8	60.00 - 80.00	0.6000	0.0000
T5	6	7/8	60.00 - 80.00	0.6000	0.0000
T5	8	HB114-1-08U4-M5J	60.00 - 80.00	0.6000	0.0000
T5	10	1 1/4	60.00 - 80.00	0.6000	0.0000
T5	12	7/8	60.00 - 80.00	0.6000	0.0000
T5	13	1 1/4	60.00 - 80.00	0.6000	0.0000
T5	14	RFFT-36SM-001-175M Fiber Cable	60.00 - 80.00	0.6000	0.0000
T5	15	PWRT-608-S Power Cable	60.00 - 80.00	0.6000	0.0000
T5	17	7/8	60.00 - 80.00	0.6000	0.0000
T6	2	Safety Line 3/8	40.00 - 60.00	0.6000	0.0000
T6	4	7/8	40.00 - 60.00	0.6000	0.0000
T6	6	7/8	40.00 - 60.00	0.6000	0.0000
T6	8	HB114-1-08U4-M5J	40.00 - 60.00	0.6000	0.0000
T6	10	1 1/4	40.00 - 60.00	0.6000	0.0000
T6	12	7/8	40.00 - 60.00	0.6000	0.0000
T6	13	1 1/4	40.00 - 60.00	0.6000	0.0000
T6	14	RFFT-36SM-001-175M Fiber Cable	40.00 - 60.00	0.6000	0.0000
T6	15	PWRT-608-S Power Cable	40.00 - 60.00	0.6000	0.0000
T6	17	7/8	40.00 - 60.00	0.6000	0.0000
T6	19	1/2	40.00 - 50.00	0.6000	0.0000
T7	2	Safety Line 3/8	20.00 - 40.00	0.6000	0.0342
T7	4	7/8	20.00 - 40.00	0.6000	0.0342
T7	6	7/8	20.00 - 40.00	0.6000	0.0342
T7	8	HB114-1-08U4-M5J	20.00 - 40.00	0.6000	0.0342
T7	10	1 1/4	20.00 - 40.00	0.6000	0.0342
T7	12	7/8	20.00 - 40.00	0.6000	0.0342
T7	13	1 1/4	20.00 - 40.00	0.6000	0.0342
T7	14	RFFT-36SM-001-175M Fiber Cable	20.00 - 40.00	0.6000	0.0342
T7	15	PWRT-608-S Power Cable	20.00 - 40.00	0.6000	0.0342
T7	17	7/8	20.00 - 40.00	0.6000	0.0342
T7	19	1/2	20.00 - 40.00	0.6000	0.0342
T8	2	Safety Line 3/8	6.00 - 20.00	0.6000	0.0675
T8	4	7/8	5.25 - 20.00	0.6000	0.0675
T8	6	7/8	5.25 - 20.00	0.6000	0.0675
T8	8	HB114-1-08U4-M5J	5.25 - 20.00	0.6000	0.0675
T8	10	1 1/4	5.25 - 20.00	0.6000	0.0675
T8	12	7/8	5.25 - 20.00	0.6000	0.0675
T8	13	1 1/4	5.25 - 20.00	0.6000	0.0675
T8	14	RFFT-36SM-001-175M Fiber Cable	5.25 - 20.00	0.6000	0.0675
T8	15	PWRT-608-S Power Cable	5.25 - 20.00	0.6000	0.0675
T8	17	7/8	5.25 - 20.00	0.6000	0.0675
T8	19	1/2	6.00 - 20.00	0.6000	0.0675
T9	4	7/8	0.00 - 5.25	0.6000	0.0000
T9	6	7/8	0.00 - 5.25	0.6000	0.0000
T9	8	HB114-1-08U4-M5J	0.00 - 5.25	0.6000	0.0000
T9	10	1 1/4	0.00 - 5.25	0.6000	0.0000
T9	12	7/8	0.00 - 5.25	0.6000	0.0000
T9	13	1 1/4	0.00 - 5.25	0.6000	0.0000
T9	14	RFFT-36SM-001-175M Fiber Cable	0.00 - 5.25	0.6000	0.0000
T9	15	PWRT-608-S Power Cable	0.00 - 5.25	0.6000	0.0000
T9	17	7/8	0.00 - 5.25	0.6000	0.0000

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
**********									
Lightning Rod 5/8x4'	B	From Leg	0.00 0.00 2.00	0.0000	150.00	No Ice 1/2" Ice 1" Ice	0.25 0.66 0.97	0.25 0.66 0.97	10.00 12.82 18.29
**********									
6' Omni	A	From Face	0.50 0.00 10.00	0.0000	150.00	No Ice 1/2" Ice 1" Ice	1.69 2.36 2.87	1.69 2.36 2.87	37.30 53.11 73.84
20'x5" Pipe Mount	A	From Face	0.50 0.00 -3.00	0.0000	150.00	No Ice 1/2" Ice 1" Ice	7.53 13.05 15.13	7.53 13.05 15.13	292.00 366.38 453.69
**********									
20' Omni (Town)	C	From Leg	3.00 3.00 10.00	0.0000	144.00	No Ice 1/2" Ice 1" Ice	5.00 7.03 9.07	5.00 7.03 9.07	55.00 91.96 141.55
DT465B-2XR w/Mount Pipe (Sprint)	A	From Leg	3.00 -6.00 2.00	0.0000	147.00	No Ice 1/2" Ice 1" Ice	9.34 9.91 10.44	7.64 8.82 9.72	83.55 160.05 244.71
DT465B-2XR w/Mount Pipe (Sprint)	B	From Leg	3.00 6.00 2.00	0.0000	147.00	No Ice 1/2" Ice 1" Ice	9.34 9.91 10.44	7.64 8.82 9.72	83.55 160.05 244.71
DT465B-2XR w/Mount Pipe (Sprint)	C	From Leg	3.00 6.00 2.00	0.0000	147.00	No Ice 1/2" Ice 1" Ice	9.34 9.91 10.44	7.64 8.82 9.72	83.55 160.05 244.71
800MHz 2x50W RRH (Sprint)	A	From Leg	4.00 -1.00 2.50	0.0000	147.00	No Ice 1/2" Ice 1" Ice	2.06 2.24 2.43	1.93 2.11 2.29	64.00 86.12 111.30
800MHz 2x50W RRH (Sprint)	B	From Leg	4.00 -1.00 2.50	0.0000	147.00	No Ice 1/2" Ice 1" Ice	2.06 2.24 2.43	1.93 2.11 2.29	64.00 86.12 111.30
800MHz 2x50W RRH (Sprint)	C	From Leg	4.00 -1.00 2.50	0.0000	147.00	No Ice 1/2" Ice 1" Ice	2.06 2.24 2.43	1.93 2.11 2.29	64.00 86.12 111.30
TD-RRH8x20-25 (Sprint)	B	From Leg	2.00 -1.00 2.00	0.0000	147.00	No Ice 1/2" Ice 1" Ice	4.03 4.28 4.54	1.53 1.70 1.89	76.20 103.25 133.82
TD-RRH8x20-25 (Sprint)	C	From Leg	4.00 -1.00 2.00	0.0000	147.00	No Ice 1/2" Ice 1" Ice	4.03 4.28 4.54	1.53 1.70 1.89	76.20 103.25 133.82
TD-RRH8x20-25 (Sprint)	C	From Leg	4.00 1.00 2.00	0.0000	147.00	No Ice 1/2" Ice 1" Ice	4.03 4.28 4.54	1.53 1.70 1.89	76.20 103.25 133.82
APXVSPP18-C w/Mount Pipe (Sprint)	A	From Face	3.00 6.00 0.00	0.0000	147.00	No Ice 1/2" Ice 1" Ice	8.31 8.87 9.40	6.95 8.13 9.03	82.55 150.82 227.06
APXVSPP18-C w/Mount Pipe (Sprint)	B	From Face	3.00 -6.00 0.00	0.0000	147.00	No Ice 1/2" Ice 1" Ice	8.31 8.87 9.40	6.95 8.13 9.03	82.55 150.82 227.06
APXVSPP18-C w/Mount Pipe (Sprint)	C	From Face	3.00 -6.00 0.00	0.0000	147.00	No Ice 1/2" Ice 1" Ice	8.31 8.87 9.40	6.95 8.13 9.03	82.55 150.82 227.06
1900MHz 4x40W RRH (Sprint)	B	From Leg	4.00 -1.00 2.50	0.0000	147.00	No Ice 1/2" Ice 1" Ice	2.32 2.53 2.74	2.24 2.44 2.65	59.50 82.62 108.98
1900MHz 4x40W RRH (Sprint)	A	From Leg	4.00 -1.00 2.50	0.0000	147.00	No Ice 1/2" Ice 1" Ice	2.32 2.53 2.74	2.24 2.44 2.65	59.50 82.62 108.98

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
1900MHz 4x40W RRH (Sprint)	A	From Leg	2.00 1.00 2.50	0.0000	147.00	No Ice 1/2" Ice 1" Ice	2.32 2.53 2.74	2.24 2.44 2.65	59.50 82.62 108.98
800MHz 2x50W RRH (Sprint)	B	From Leg	4.00 1.00 2.50	0.0000	147.00	No Ice 1/2" Ice 1" Ice	2.06 2.24 2.43	1.93 2.11 2.29	64.00 86.12 111.30
800MHz 2x50W RRH (Sprint)	A	From Leg	4.00 -1.00 2.50	0.0000	147.00	No Ice 1/2" Ice 1" Ice	2.06 2.24 2.43	1.93 2.11 2.29	64.00 86.12 111.30
800MHz 2x50W RRH (Sprint)	A	From Leg	2.00 1.00 2.50	0.0000	147.00	No Ice 1/2" Ice 1" Ice	2.06 2.24 2.43	1.93 2.11 2.29	64.00 86.12 111.30
Platform Mount [LP 1101-1] (Sprint)	C	None		0.0000	144.00	No Ice 1/2" Ice 1" Ice	28.30 36.60 44.90	28.30 36.60 44.90	1617.00 2033.00 2449.00
**********									
SBNH-1D6565C w/Mount Pipe (ATT)	A	From Face	4.00 4.00 0.00	0.0000	126.00	No Ice 1/2" Ice 1" Ice	11.67 12.39 13.12	9.83 11.35 12.90	93.65 183.22 282.75
SBNH-1D6565C w/Mount Pipe (ATT)	B	From Face	4.00 4.00 0.00	0.0000	126.00	No Ice 1/2" Ice 1" Ice	11.67 12.39 13.12	9.83 11.35 12.90	93.65 183.22 282.75
HPA-65R-BUU-H6 w/Mount Pipe (ATT)	A	From Face	4.00 -4.00 0.00	0.0000	126.00	No Ice 1/2" Ice 1" Ice	9.96 10.63 11.27	7.39 8.67 9.81	77.10 155.53 242.33
HPA-65R-BUU-H8 w/Mount Pipe (ATT)	B	From Face	4.00 -4.00 0.00	0.0000	126.00	No Ice 1/2" Ice 1" Ice	13.05 13.66 14.27	9.42 10.82 12.07	97.20 192.07 296.65
HPA-65R-BUU-H8 w/Mount Pipe (ATT)	C	From Face	4.00 -4.00 0.00	0.0000	126.00	No Ice 1/2" Ice 1" Ice	13.05 13.66 14.27	9.42 10.82 12.07	97.20 192.07 296.65
(2) 860-10025 (ATT)	A	From Face	4.00 0.00 0.00	0.0000	126.00	No Ice 1/2" Ice 1" Ice	0.12 0.17 0.23	0.10 0.15 0.20	1.16 2.52 4.75
(2) 860-10025 (ATT)	B	From Face	4.00 0.00 0.00	0.0000	126.00	No Ice 1/2" Ice 1" Ice	0.12 0.17 0.23	0.10 0.15 0.20	1.16 2.52 4.75
DTMABP7819VG12A (ATT)	B	From Face	3.00 0.00 0.00	0.0000	126.00	No Ice 1/2" Ice 1" Ice	0.98 1.10 1.23	0.35 0.44 0.53	20.00 27.30 36.45
DTMABP7819VG12A (ATT)	C	From Face	3.00 0.00 0.00	0.0000	126.00	No Ice 1/2" Ice 1" Ice	0.98 1.10 1.23	0.35 0.44 0.53	20.00 27.30 36.45
RRUS-11 (ATT)	A	From Face	3.00 0.00 0.00	0.0000	126.00	No Ice 1/2" Ice 1" Ice	2.78 2.99 3.21	1.19 1.33 1.49	50.71 71.49 95.32
RRUS-11 (ATT)	B	From Face	3.00 0.00 0.00	0.0000	126.00	No Ice 1/2" Ice 1" Ice	2.78 2.99 3.21	1.19 1.33 1.49	50.71 71.49 95.32
RRUS-11 (ATT)	C	From Face	3.00 0.00 0.00	0.0000	126.00	No Ice 1/2" Ice 1" Ice	2.78 2.99 3.21	1.19 1.33 1.49	50.71 71.49 95.32
RRUS-11 + RRUS-A2 (ATT)	A	From Face	3.00 0.00 0.00	0.0000	126.00	No Ice 1/2" Ice 1" Ice	2.78 2.99 3.21	1.72 1.89 2.07	72.70 97.52 125.58
RRUS-11 + RRUS-A2 (ATT)	B	From Face	3.00 0.00	0.0000	126.00	No Ice 1/2" Ice	2.78 2.99	1.72 1.89	72.70 97.52

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
			0.00			1" Ice	3.21	2.07	125.58
RRUS-11 + RRUS-A2	C	From Face	3.00	0.0000	126.00	No Ice	2.78	1.72	72.70
(ATT)			0.00			1/2" Ice	2.99	1.89	97.52
			0.00			1" Ice	3.21	2.07	125.58
CCDP-665-1W	A	From Face	3.00	0.0000	126.00	No Ice	0.79	0.27	15.00
(ATT)			0.00			1/2" Ice	0.90	0.35	20.79
			0.00			1" Ice	1.02	0.43	28.25
CCDP-665-1W	B	From Face	3.00	0.0000	126.00	No Ice	0.79	0.27	15.00
(ATT)			0.00			1/2" Ice	0.90	0.35	20.79
			0.00			1" Ice	1.02	0.43	28.25
CCDP-665-1W	C	From Face	3.00	0.0000	126.00	No Ice	0.79	0.27	15.00
(ATT)			0.00			1/2" Ice	0.90	0.35	20.79
			0.00			1" Ice	1.02	0.43	28.25
(4) CM1007-DBPXBC-xxx	A	From Face	0.00	0.0000	126.00	No Ice	0.37	0.25	6.50
(ATT)			0.00			1/2" Ice	0.45	0.32	9.99
			0.00			1" Ice	0.54	0.39	14.78
(4) CM1007-DBPXBC-xxx	B	From Face	0.00	0.0000	126.00	No Ice	0.37	0.25	6.50
(ATT)			0.00			1/2" Ice	0.45	0.32	9.99
			0.00			1" Ice	0.54	0.39	14.78
(4) CM1007-DBPXBC-xxx	C	From Face	0.00	0.0000	126.00	No Ice	0.37	0.25	6.50
(ATT)			0.00			1/2" Ice	0.45	0.32	9.99
			0.00			1" Ice	0.54	0.39	14.78
(3) DC6-48-60-18-8F	C	None		0.0000	126.00	No Ice	0.92	0.92	32.80
(ATT)						1/2" Ice	1.46	1.46	50.52
						1" Ice	1.64	1.64	70.72
Sector Mount [SM 701-3]	C	None		0.0000	126.00	No Ice	19.73	19.73	825.00
(ATT)						1/2" Ice	27.41	27.41	1165.99
						1" Ice	35.09	35.09	1506.98
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**********									
8' Dipole	C	From Face	5.00	0.0000	95.00	No Ice	4.80	4.80	45.00
			0.00			1/2" Ice	6.40	6.40	89.00
			4.00			1" Ice	8.00	8.00	133.00
**********									
GPS	A	From Leg	3.00	0.0000	50.00	No Ice	1.00	1.00	10.00
			0.00			1/2" Ice	1.50	1.50	15.00
			0.00			1" Ice	2.00	2.00	20.00
3' Standoff	A	From Leg	1.50	0.0000	50.00	No Ice	2.00	2.00	38.00
			0.00			1/2" Ice	3.70	3.70	67.00
			0.00			1" Ice	5.40	5.40	96.00
**********									

Force Totals (Does not include forces on guys)

Load Case	Vertical Forces lb	Sum of Forces X lb	Sum of Forces Z lb	Sum of Torques lb-ft
Leg Weight	3683.88			
Bracing Weight	2024.17			
Total Member Self-Weight	5708.05			
Guy Weight	1301.51			
Total Weight	14097.38			
Wind 0 deg - No Ice		26.67	-7716.75	-650.00

Load Case	Vertical Forces lb	Sum of Forces X lb	Sum of Forces Z lb	Sum of Torques lb-ft
Wind 30 deg - No Ice		3832.69	-6554.75	-2112.86
Wind 60 deg - No Ice		6844.15	-3933.95	-3096.32
Wind 90 deg - No Ice		7928.76	-26.67	-3206.29
Wind 120 deg - No Ice		6667.70	3801.29	-2408.25
Wind 150 deg - No Ice		3702.99	6383.43	-1002.42
Wind 180 deg - No Ice		-26.67	7607.56	641.83
Wind 210 deg - No Ice		-3832.69	6554.75	2112.86
Wind 240 deg - No Ice		-6749.58	3879.36	3069.05
Wind 270 deg - No Ice		-7928.76	26.67	3206.29
Wind 300 deg - No Ice		-6667.70	-3801.29	2408.25
Wind 330 deg - No Ice		-3702.99	-6383.43	1002.42
Member Ice	15702.32			
Guy Ice	12483.68			
Total Weight Ice	71612.71			
Wind 0 deg - Ice		6.96	-4549.29	-321.18
Wind 30 deg - Ice		2281.93	-3937.74	-683.64
Wind 60 deg - Ice		3950.99	-2280.68	-863.08
Wind 90 deg - Ice		4558.19	-6.96	-811.17
Wind 120 deg - Ice		3939.54	2266.02	-541.90
Wind 150 deg - Ice		2269.53	3930.21	-127.48
Wind 180 deg - Ice		-6.96	4541.62	321.09
Wind 210 deg - Ice		-2281.93	3937.74	683.64
Wind 240 deg - Ice		-3947.07	2278.41	863.02
Wind 270 deg - Ice		-4558.19	6.96	811.17
Wind 300 deg - Ice		-3939.54	-2266.02	541.90
Wind 330 deg - Ice		-2269.53	-3930.21	127.48
Total Weight	14097.38			
Wind 0 deg - Service		10.20	-2952.52	-248.70
Wind 30 deg - Service		1466.44	-2507.93	-808.41
Wind 60 deg - Service		2618.65	-1505.18	-1184.69
Wind 90 deg - Service		3033.64	-10.20	-1226.77
Wind 120 deg - Service		2551.15	1454.42	-921.42
Wind 150 deg - Service		1416.81	2442.38	-383.54
Wind 180 deg - Service		-10.20	2910.75	245.57
Wind 210 deg - Service		-1466.44	2507.93	808.41
Wind 240 deg - Service		-2582.47	1484.29	1174.26
Wind 270 deg - Service		-3033.64	10.20	1226.77
Wind 300 deg - Service		-2551.15	-1454.42	921.42
Wind 330 deg - Service		-1416.81	-2442.38	383.54

Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.6 Wind 0 deg - No Ice+1.0 Guy
3	1.2 Dead+1.6 Wind 30 deg - No Ice+1.0 Guy
4	1.2 Dead+1.6 Wind 60 deg - No Ice+1.0 Guy
5	1.2 Dead+1.6 Wind 90 deg - No Ice+1.0 Guy
6	1.2 Dead+1.6 Wind 120 deg - No Ice+1.0 Guy
7	1.2 Dead+1.6 Wind 150 deg - No Ice+1.0 Guy
8	1.2 Dead+1.6 Wind 180 deg - No Ice+1.0 Guy
9	1.2 Dead+1.6 Wind 210 deg - No Ice+1.0 Guy
10	1.2 Dead+1.6 Wind 240 deg - No Ice+1.0 Guy

Comb. No.	Description
11	1.2 Dead+1.6 Wind 270 deg - No Ice+1.0 Guy
12	1.2 Dead+1.6 Wind 300 deg - No Ice+1.0 Guy
13	1.2 Dead+1.6 Wind 330 deg - No Ice+1.0 Guy
14	1.2 Dead+1.0 Ice+1.0 Temp+Guy
15	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp+1.0 Guy
16	1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp+1.0 Guy
17	1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp+1.0 Guy
18	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp+1.0 Guy
19	1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp+1.0 Guy
20	1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp+1.0 Guy
21	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp+1.0 Guy
22	1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp+1.0 Guy
23	1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp+1.0 Guy
24	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp+1.0 Guy
25	1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp+1.0 Guy
26	1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp+1.0 Guy
27	Dead+Wind 0 deg - Service+Guy
28	Dead+Wind 30 deg - Service+Guy
29	Dead+Wind 60 deg - Service+Guy
30	Dead+Wind 90 deg - Service+Guy
31	Dead+Wind 120 deg - Service+Guy
32	Dead+Wind 150 deg - Service+Guy
33	Dead+Wind 180 deg - Service+Guy
34	Dead+Wind 210 deg - Service+Guy
35	Dead+Wind 240 deg - Service+Guy
36	Dead+Wind 270 deg - Service+Guy
37	Dead+Wind 300 deg - Service+Guy
38	Dead+Wind 330 deg - Service+Guy

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial lb	Major Axis Moment lb-ft	Minor Axis Moment lb-ft
T1	150 - 140	Leg	Max Tension	12	20539.60	-395.20	-551.43
			Max. Compression	2	-23133.82	8.01	41.19
			Max. Mx	4	-13388.03	1213.51	-261.32
			Max. My	9	-19766.95	6.72	1064.08
			Max. Vy	4	2393.96	17.11	26.52
			Max. Vx	9	2144.67	39.18	-7.78
		Diagonal	Max Tension	4	5043.63	0.00	0.00
			Max. Compression	10	-5032.74	0.00	0.00
			Max. Mx	16	1525.60	-2.23	-0.47
			Max. My	10	-5027.18	-0.15	7.70
			Max. Vy	16	5.67	-2.23	-0.47
			Max. Vx	10	-7.07	-0.15	7.70
		Horizontal	Max Tension	8	283.40	0.00	0.00
			Max. Compression	2	-222.20	0.00	0.00
			Max. Mx	15	75.12	2.95	0.00
			Max. My	5	6.38	0.00	-0.00
			Max. Vy	15	-7.87	0.00	0.00
			Max. Vx	5	0.00	0.00	0.00
		Top Girt	Max Tension	6	85.63	0.00	0.00
			Max. Compression	12	-72.19	0.00	0.00
			Max. Mx	21	18.11	2.95	0.00
			Max. My	5	-2.53	0.00	-0.00
			Max. Vy	21	7.87	0.00	0.00
			Max. Vx	5	0.00	0.00	0.00
		Bottom Girt	Max Tension	8	1045.61	0.00	0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial lb	Major Axis Moment lb-ft	Minor Axis Moment lb-ft
			Max. Compression	2	-1088.27	0.00	0.00
			Max. Mx	15	-354.33	2.95	0.00
			Max. My	5	1.91	0.00	-0.00
			Max. Vy	15	-7.87	0.00	0.00
			Max. Vx	5	0.00	0.00	0.00
T2	140 - 120	Leg	Max Tension	12	23158.70	450.06	579.16
			Max. Compression	10	-32007.74	77.60	-27.75
			Max. Mx	4	-13399.68	-1181.26	313.96
			Max. My	9	-19775.33	70.01	-1080.30
			Max. Vy	4	2398.37	-1181.26	313.96
			Max. Vx	9	2146.25	70.01	-1080.30
		Diagonal	Max Tension	3	4907.46	0.00	0.00
			Max. Compression	9	-4624.67	0.00	0.00
			Max. Mx	18	315.14	-3.40	-0.03
			Max. My	4	-4569.40	0.58	-8.17
			Max. Vy	18	6.68	-3.40	-0.03
			Max. Vx	4	7.50	0.58	-8.17
		Horizontal	Max Tension	16	1348.76	0.00	0.00
			Max. Compression	1	0.00	0.00	0.00
			Max. Mx	26	1258.94	2.91	0.00
			Max. My	5	861.49	0.00	-0.00
			Max. Vy	26	-7.75	0.00	0.00
			Max. Vx	5	0.00	0.00	0.00
		Top Girt	Max Tension	10	557.18	0.00	0.00
			Max. Compression	4	-816.34	0.00	0.00
			Max. Mx	14	-124.09	2.91	0.00
			Max. My	5	-188.50	0.00	-0.00
			Max. Vy	14	-7.75	0.00	0.00
			Max. Vx	5	0.00	0.00	0.00
		Bottom Girt	Max Tension	21	669.93	0.00	0.00
			Max. Compression	6	-243.87	0.00	0.00
			Max. Mx	22	661.41	2.91	0.00
			Max. My	5	469.11	0.00	-0.00
			Max. Vy	22	-7.75	0.00	0.00
			Max. Vx	5	0.00	0.00	0.00
		Guy A	Bottom Tension	8	9389.30		
			Top Tension	8	9491.21		
			Top Cable Vert	8	8252.24		
			Top Cable Norm	8	4688.67		
			Top Cable Tan	8	0.52		
			Bot Cable Vert	8	-8047.87		
			Bot Cable Norm	8	4836.38		
			Bot Cable Tan	8	7.57		
		Guy B	Bottom Tension	11	10675.21		
			Top Tension	11	10785.01		
			Top Cable Vert	11	9534.38		
			Top Cable Norm	11	5040.86		
			Top Cable Tan	11	42.20		
			Bot Cable Vert	11	-9332.02		
			Bot Cable Norm	11	5183.43		
			Bot Cable Tan	11	74.33		
		Guy C	Bottom Tension	5	14114.50		
			Top Tension	5	14223.52		
			Top Cable Vert	5	13501.82		
			Top Cable Norm	5	4473.18		
			Top Cable Tan	5	15.01		
			Bot Cable Vert	5	-13332.29		
			Bot Cable Norm	5	4632.35		
			Bot Cable Tan	5	103.36		
		Top Guy Pull-Off	Max Tension	4	5252.68	0.00	0.00
			Max. Compression	10	-2080.85	0.00	0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial lb	Major Axis Moment lb-ft	Minor Axis Moment lb-ft
			Max. Mx	14	1719.25	2.65	0.00
			Max. My	5	1554.08	0.00	-0.00
			Max. Vy	14	-7.07	0.00	0.00
			Max. Vx	5	0.00	0.00	0.00
		Bottom Guy Pull-Off	Max Tension	8	2631.93	0.00	0.00
			Max. Compression	10	-3740.43	0.00	0.00
			Max. Mx	21	523.86	2.65	0.00
			Max. My	5	-783.99	0.00	-0.00
			Max. Vy	21	-7.07	0.00	0.00
			Max. Vx	5	0.00	0.00	0.00
		Torque Arm Top	Max Tension	2	13364.46	0.00	0.00
			Max. Compression	1	0.00	0.00	0.00
			Max. Mx	16	8015.47	30.77	0.00
			Max. My	4	10477.88	0.00	-0.15
			Max. Vy	16	-33.60	0.00	0.00
			Max. Vx	4	0.17	0.00	0.00
		Torque Arm Bottom	Max Tension	13	3505.41	0.00	0.00
			Max. Compression	3	-13967.54	0.00	0.00
			Max. Mx	17	-3965.62	28.22	0.00
			Max. My	4	-13860.70	0.00	0.09
			Max. Vy	17	-33.56	0.00	0.00
			Max. Vx	4	-0.10	0.00	0.00
T3	120 - 100	Leg	Max Tension	4	15144.64	209.93	-431.21
			Max. Compression	2	-48401.12	-3.77	69.91
			Max. Mx	5	-12856.45	676.93	65.66
			Max. My	3	12367.06	200.20	-458.84
			Max. Vy	5	1390.04	-16.88	10.16
			Max. Vx	3	-971.52	-22.95	26.07
		Diagonal	Max Tension	4	2459.26	0.00	0.00
			Max. Compression	6	-2627.55	0.00	0.00
			Max. Mx	15	304.62	-3.85	0.22
			Max. My	5	-2515.88	1.27	-2.16
			Max. Vy	15	7.00	-3.85	0.22
			Max. Vx	5	-1.99	1.27	-2.16
		Horizontal	Max Tension	21	1513.76	0.00	0.00
			Max. Compression	2	-6.80	0.00	0.00
			Max. Mx	22	1278.55	2.84	0.00
			Max. My	5	960.91	0.00	-0.00
			Max. Vy	22	-7.57	0.00	0.00
			Max. Vx	5	0.00	0.00	0.00
		Top Girt	Max Tension	2	747.23	0.00	0.00
			Max. Compression	3	-249.44	0.00	0.00
			Max. Mx	22	502.88	2.84	0.00
			Max. My	5	459.25	0.00	-0.00
			Max. Vy	22	-7.57	0.00	0.00
			Max. Vx	5	0.00	0.00	0.00
		Bottom Girt	Max Tension	3	1013.90	0.00	0.00
			Max. Compression	6	-665.77	0.00	0.00
			Max. Mx	17	721.32	2.84	0.00
			Max. My	5	495.73	0.00	-0.00
			Max. Vy	17	7.57	0.00	0.00
			Max. Vx	5	0.00	0.00	0.00
T4	100 - 80	Leg	Max Tension	4	17369.87	-274.89	459.16
			Max. Compression	2	-53019.77	-7.41	6.14
			Max. Mx	5	-12871.93	-712.43	-45.69
			Max. My	3	14181.22	-246.99	513.66
			Max. Vy	5	1393.38	-712.43	-45.69
			Max. Vx	3	-976.84	-246.99	513.66
		Diagonal	Max Tension	4	2097.17	0.00	0.00
			Max. Compression	6	-3023.47	0.00	0.00
			Max. Mx	16	-1384.48	-4.58	0.67

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial lb	Major Axis Moment lb-ft	Minor Axis Moment lb-ft
			Max. My	4	-2646.90	1.05	-2.77
			Max. Vy	16	7.56	-4.58	0.67
			Max. Vx	4	2.54	0.00	0.00
		Horizontal	Max Tension	21	2357.73	0.00	0.00
			Max. Compression	1	0.00	0.00	0.00
			Max. Mx	24	1753.09	2.76	0.00
			Max. My	5	1216.18	0.00	-0.00
			Max. Vy	24	-7.35	0.00	0.00
			Max. Vx	5	0.00	0.00	0.00
		Top Girt	Max Tension	19	660.54	0.00	0.00
			Max. Compression	1	0.00	0.00	0.00
			Max. Mx	17	386.05	2.76	0.00
			Max. My	5	307.77	0.00	-0.00
			Max. Vy	17	7.35	0.00	0.00
			Max. Vx	5	0.00	0.00	0.00
		Bottom Girt	Max Tension	15	1132.06	0.00	0.00
			Max. Compression	1	0.00	0.00	0.00
			Max. Mx	26	423.27	2.76	0.00
			Max. My	5	689.65	0.00	-0.00
			Max. Vy	26	7.35	0.00	0.00
			Max. Vx	5	0.00	0.00	0.00
		Guy A	Bottom Tension	21	5189.36		
			Top Tension	9	5461.06		
			Top Cable Vert	21	4367.56		
			Top Cable Norm	21	3278.34		
			Top Cable Tan	21	9.80		
			Bot Cable Vert	9	-3905.53		
			Bot Cable Norm	9	3416.89		
			Bot Cable Tan	9	34.11		
		Guy B	Bottom Tension	11	5645.79		
			Top Tension	11	5710.04		
			Top Cable Vert	11	4576.67		
			Top Cable Norm	11	3414.31		
			Top Cable Tan	11	33.45		
			Bot Cable Vert	11	-4442.70		
			Bot Cable Norm	11	3483.68		
			Bot Cable Tan	11	36.11		
		Guy C	Bottom Tension	17	8042.49		
			Top Tension	5	8173.10		
			Top Cable Vert	17	7483.66		
			Top Cable Norm	17	3285.49		
			Top Cable Tan	17	4.29		
			Bot Cable Vert	5	-7237.76		
			Bot Cable Norm	5	3506.40		
			Bot Cable Tan	5	41.69		
		Top Guy Pull-Off	Max Tension	4	4046.29	0.00	0.00
			Max. Compression	6	-1126.83	0.00	0.00
			Max. Mx	23	2392.48	2.51	0.00
			Max. My	5	1786.08	0.00	-0.00
			Max. Vy	23	6.69	0.00	0.00
			Max. Vx	5	0.00	0.00	0.00
		Bottom Guy Pull-Off	Max Tension	8	2243.34	0.00	0.00
			Max. Compression	6	-2410.84	0.00	0.00
			Max. Mx	22	-270.41	2.51	0.00
			Max. My	5	459.58	0.00	-0.00
			Max. Vy	22	6.69	0.00	0.00
			Max. Vx	5	0.00	0.00	0.00
		Torque Arm Top	Max Tension	19	8013.74	0.00	0.00
			Max. Compression	1	0.00	0.00	0.00
			Max. Mx	17	5848.15	29.66	0.00
			Max. My	5	3367.26	0.00	-0.06

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial lb	Major Axis Moment lb-ft	Minor Axis Moment lb-ft
			Max. Vy	17	-32.38	0.00	0.00
			Max. Vx	5	0.06	0.00	0.00
		Torque Arm Bottom	Max Tension	2	2395.77	0.00	0.00
			Max. Compression	3	-8735.92	0.00	0.00
			Max. Mx	17	-2565.29	27.23	0.00
			Max. My	5	-7483.78	0.00	0.02
			Max. Vy	17	-32.38	0.00	0.00
			Max. Vx	5	-0.03	0.00	0.00
T5	80 - 60	Leg	Max Tension	1	0.00	0.00	0.00
			Max. Compression	17	-39154.41	35.95	-70.95
			Max. Mx	11	-16429.26	-212.15	48.66
			Max. My	3	-10822.00	12.30	-211.59
			Max. Vy	11	431.86	2.77	29.14
			Max. Vx	3	389.62	-4.67	-17.54
		Diagonal	Max Tension	10	649.61	0.00	0.00
			Max. Compression	19	-1952.13	0.00	0.00
			Max. Mx	17	-558.92	-4.57	-0.55
			Max. My	10	-1134.90	1.59	-0.90
			Max. Vy	17	7.41	-4.57	-0.55
			Max. Vx	10	-0.83	0.00	0.00
		Horizontal	Max Tension	16	2365.18	0.00	0.00
			Max. Compression	1	0.00	0.00	0.00
			Max. Mx	24	2266.28	2.66	0.00
			Max. My	5	1460.56	0.00	-0.00
			Max. Vy	24	-7.09	0.00	0.00
			Max. Vx	5	0.00	0.00	0.00
		Top Girt	Max Tension	21	1195.40	0.00	0.00
			Max. Compression	6	-54.01	0.00	0.00
			Max. Mx	26	338.17	2.66	0.00
			Max. My	5	748.95	0.00	-0.00
			Max. Vy	26	7.09	0.00	0.00
			Max. Vx	5	0.00	0.00	0.00
		Bottom Girt	Max Tension	21	1167.70	0.00	0.00
			Max. Compression	1	0.00	0.00	0.00
			Max. Mx	14	462.20	2.66	0.00
			Max. My	18	349.03	0.00	0.00
			Max. Vy	14	7.09	0.00	0.00
			Max. Vx	18	0.00	0.00	0.00
T6	60 - 40	Leg	Max Tension	1	0.00	0.00	0.00
			Max. Compression	15	-44091.59	-4.87	-2.04
			Max. Mx	5	-22743.24	-183.95	-10.38
			Max. My	2	-20839.47	-2.30	188.04
			Max. Vy	5	-364.63	-183.95	-10.38
			Max. Vx	8	-313.83	-6.10	-113.11
		Diagonal	Max Tension	9	631.95	0.00	0.00
			Max. Compression	24	-2250.71	0.00	0.00
			Max. Mx	16	-440.70	-5.04	-0.66
			Max. My	18	-670.11	-4.91	-0.74
			Max. Vy	16	7.68	-5.04	-0.66
			Max. Vx	18	0.68	-4.91	-0.74
		Horizontal	Max Tension	16	2707.91	0.00	0.00
			Max. Compression	1	0.00	0.00	0.00
			Max. Mx	19	2644.10	2.54	0.00
			Max. My	18	2374.26	0.00	-0.00
			Max. Vy	19	-6.77	0.00	0.00
			Max. Vx	18	0.00	0.00	0.00
		Top Girt	Max Tension	15	1160.18	0.00	0.00
			Max. Compression	1	0.00	0.00	0.00
			Max. Mx	14	368.26	2.54	0.00
			Max. My	18	440.85	0.00	0.00
			Max. Vy	14	-6.77	0.00	0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial lb	Major Axis Moment lb-ft	Minor Axis Moment lb-ft
			Max. Vx	18	-0.00	0.00	0.00
		Bottom Girt	Max Tension	15	1427.08	0.00	0.00
			Max. Compression	1	0.00	0.00	0.00
			Max. Mx	25	531.63	2.54	0.00
			Max. My	18	547.45	0.00	0.00
			Max. Vy	25	-6.77	0.00	0.00
			Max. Vx	18	-0.00	0.00	0.00
		Guy A	Bottom Tension	21	4373.54		
			Top Tension	21	4633.81		
			Top Cable Vert	21	2422.10		
			Top Cable Norm	21	3950.40		
			Top Cable Tan	21	2.87		
			Bot Cable Vert	21	-1849.09		
			Bot Cable Norm	21	3963.42		
			Bot Cable Tan	21	2.87		
		Guy B	Bottom Tension	25	4575.33		
			Top Tension	25	4891.06		
			Top Cable Vert	25	2942.46		
			Top Cable Norm	25	3906.96		
			Top Cable Tan	25	3.30		
			Bot Cable Vert	25	-2344.21		
			Bot Cable Norm	25	3929.16		
			Bot Cable Tan	25	3.30		
		Guy C	Bottom Tension	17	5771.98		
			Top Tension	17	6087.55		
			Top Cable Vert	17	4584.32		
			Top Cable Norm	17	4005.28		
			Top Cable Tan	17	0.72		
			Bot Cable Vert	17	-4118.85		
			Bot Cable Norm	17	4043.62		
			Bot Cable Tan	17	0.72		
		Top Guy Pull-Off	Max Tension	15	3740.23	0.00	0.00
			Max. Compression	1	0.00	0.00	0.00
			Max. Mx	24	2714.86	2.29	0.00
			Max. My	18	2716.72	0.00	0.00
			Max. Vy	24	-6.12	0.00	0.00
			Max. Vx	18	-0.00	0.00	0.00
T7	40 - 20	Leg	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-46878.52	-28.80	-82.05
			Max. Mx	5	-24169.50	187.53	-9.88
			Max. My	8	-23672.51	5.99	196.53
			Max. Vy	5	-364.42	-1.75	-37.09
			Max. Vx	8	-306.85	-0.26	43.43
		Diagonal	Max Tension	21	516.33	0.00	0.00
			Max. Compression	17	-2246.02	0.00	0.00
			Max. Mx	21	-590.02	-5.23	-0.69
			Max. My	5	-599.79	-2.45	-0.90
			Max. Vy	21	7.64	-5.23	-0.69
			Max. Vx	5	0.83	-2.45	-0.90
		Horizontal	Max Tension	15	2928.11	0.00	0.00
			Max. Compression	1	0.00	0.00	0.00
			Max. Mx	24	2730.93	2.37	0.00
			Max. My	5	1584.38	0.00	-0.00
			Max. Vy	24	-6.31	0.00	0.00
			Max. Vx	5	0.00	0.00	0.00
		Top Girt	Max Tension	21	1329.18	0.00	0.00
			Max. Compression	1	0.00	0.00	0.00
			Max. Mx	25	420.95	2.37	0.00
			Max. My	18	381.87	0.00	0.00
			Max. Vy	25	-6.31	0.00	0.00
			Max. Vx	18	-0.00	0.00	0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial lb	Major Axis Moment lb-ft	Minor Axis Moment lb-ft
		Bottom Girt	Max Tension	15	1430.23	0.00	0.00
			Max. Compression	1	0.00	0.00	0.00
			Max. Mx	24	1342.49	2.37	0.00
			Max. My	5	773.78	0.00	-0.00
			Max. Vy	24	-6.31	0.00	0.00
			Max. Vx	5	0.00	0.00	0.00
T8	20 - 5.25	Leg	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-46872.52	-13.05	-77.11
			Max. Mx	5	-23884.75	-91.25	40.69
			Max. My	15	-37919.10	-6.94	-109.31
			Max. Vy	5	189.30	-91.24	40.69
			Max. Vx	4	-165.79	51.70	36.32
		Diagonal	Max Tension	10	640.17	0.00	0.00
			Max. Compression	15	-2210.90	0.00	0.00
			Max. Mx	21	355.72	-4.71	-0.36
			Max. My	5	-684.97	-2.11	-0.86
			Max. Vy	21	6.82	-4.71	-0.36
			Max. Vx	5	0.79	-2.11	-0.86
		Horizontal	Max Tension	15	2930.65	0.00	0.00
			Max. Compression	1	0.00	0.00	0.00
			Max. Mx	26	2712.43	2.11	0.00
			Max. My	5	1510.37	0.00	-0.00
			Max. Vy	26	5.63	0.00	0.00
			Max. Vx	5	0.00	0.00	0.00
		Top Girt	Max Tension	15	1445.74	0.00	0.00
			Max. Compression	1	0.00	0.00	0.00
			Max. Mx	24	1327.85	2.11	0.00
			Max. My	5	764.82	0.00	-0.00
			Max. Vy	24	5.63	0.00	0.00
			Max. Vx	5	0.00	0.00	0.00
		Bottom Girt	Max Tension	16	5014.14	0.00	0.00
			Max. Compression	1	0.00	0.00	0.00
			Max. Mx	14	4183.52	2.11	0.00
			Max. My	5	2742.42	0.00	-0.00
			Max. Vy	14	5.63	0.00	0.00
			Max. Vx	5	0.00	0.00	0.00
T9	5.25 - 0	Leg	Max Tension	1	0.00	0.00	0.00
			Max. Compression	17	-44756.59	-63.79	-25.81
			Max. Mx	2	-23802.13	-177.01	-75.10
			Max. My	5	-24718.77	-51.79	-403.54
			Max. Vy	2	414.60	-177.01	-75.10
			Max. Vx	5	807.49	-51.79	-403.54
		Diagonal	Max Tension	1	0.00	0.00	0.00
			Max. Compression	19	-3953.17	0.00	0.00
			Max. Mx	25	-1973.64	-2.63	0.56
			Max. My	4	-3441.03	0.68	-3.58
			Max. Vy	25	4.29	-2.63	0.56
			Max. Vx	4	-5.12	0.00	0.00
		Horizontal	Max Tension	18	3136.50	0.00	0.00
			Max. Compression	1	0.00	0.00	0.00
			Max. Mx	14	2770.91	1.11	0.00
			Max. My	5	1578.15	0.00	-0.00
			Max. Vy	14	3.70	0.00	0.00
			Max. Vx	5	0.00	0.00	0.00
		Bottom Girt	Max Tension	17	1769.79	0.00	0.00
			Max. Compression	1	0.00	0.00	0.00
			Max. Mx	14	1684.74	0.27	0.00
			Max. My	5	969.67	0.00	-0.00
			Max. Vy	14	1.84	0.00	0.00
			Max. Vx	5	0.00	0.00	0.00
		Base Beam	Max Tension	1	0.00	0.00	0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial lb	Major Axis Moment lb-ft	Minor Axis Moment lb-ft
			Max. Compression	17	-4742.11	-62.08	8.05
			Max. Mx	17	-44516.76	-12912.96	21.55
			Max. My	5	-24584.80	-7148.81	276.73
			Max. Vy	17	-44516.76	-12912.96	21.55
			Max. Vx	5	794.27	-7148.81	276.73

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical lb	Horizontal, X lb	Horizontal, Z lb
Guy C @ 47 ft Elev 0 ft Azimuth 240 deg	Max. Vert	10	-7304.86	-2878.20	1652.61
	Max. H_x	10	-7304.86	-2878.20	1652.61
	Max. H_z	4	-41217.21	-15860.27	9205.76
	Min. Vert	4	-41217.21	-15860.27	9205.76
	Min. H_x	4	-41217.21	-15860.27	9205.76
	Min. H_z	10	-7304.86	-2878.20	1652.61
Guy B @ 75 ft Elev 0 ft Azimuth 120 deg	Max. Vert	6	-2634.15	1800.78	1038.36
	Max. H_x	12	-27600.16	16861.20	9775.46
	Max. H_z	12	-27600.16	16861.20	9775.46
	Min. Vert	12	-27600.16	16861.20	9775.46
	Min. H_x	6	-2634.15	1800.78	1038.36
	Min. H_z	6	-2634.15	1800.78	1038.36
Guy A @ 75 ft Elev 10 ft Azimuth 0 deg	Max. Vert	2	-1945.07	-1.72	-1810.82
	Max. H_x	24	-14375.52	537.22	-13752.76
	Max. H_z	2	-1945.07	-1.72	-1810.82
	Min. Vert	8	-25492.98	-7.24	-19862.00
	Min. H_x	18	-13373.03	-598.91	-13115.34
	Min. H_z	8	-25492.98	-7.24	-19862.00
Mast	Max. Vert	17	132769.26	57.89	-39.50
	Max. H_x	11	67740.31	743.63	-25.47
	Max. H_z	2	73535.56	54.61	707.88
	Max. M_x	1	0.00	47.36	1.74
	Max. M_z	1	0.00	47.36	1.74
	Max. Torsion	4	585.88	-526.54	319.87
	Min. Vert	28	57560.69	-40.87	125.79
	Min. H_x	5	73694.73	-654.59	-48.99
	Min. H_z	8	66086.55	22.90	-726.81
	Min. M_x	1	0.00	47.36	1.74
	Min. M_z	1	0.00	47.36	1.74
	Min. Torsion	11	-530.70	743.63	-25.47

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

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 Only	58000.59	-47.36	-1.74	0.00	0.00	-2.20
1.2 Dead+1.6 Wind 0 deg - No Ice+1.0 Guy	73535.56	-54.61	-707.88	0.00	0.00	-162.85
1.2 Dead+1.6 Wind 30 deg - No Ice+1.0 Guy	73648.42	275.02	-611.87	0.00	0.00	-376.51
1.2 Dead+1.6 Wind 60 deg - No Ice+1.0 Guy	69745.45	526.54	-319.87	0.00	0.00	-585.88
1.2 Dead+1.6 Wind 90 deg - No Ice+1.0 Guy	73694.73	654.59	48.99	0.00	0.00	-582.84
1.2 Dead+1.6 Wind 120 deg - No Ice+1.0 Guy	73426.11	569.29	387.16	0.00	0.00	-381.39
1.2 Dead+1.6 Wind 150 deg - No Ice+1.0 Guy	69188.05	334.23	650.19	0.00	0.00	-91.38
1.2 Dead+1.6 Wind 180 deg - No Ice+1.0 Guy	66086.55	-22.90	726.81	0.00	0.00	175.21
1.2 Dead+1.6 Wind 210 deg - No Ice+1.0 Guy	67728.78	-396.00	634.57	0.00	0.00	376.24
1.2 Dead+1.6 Wind 240 deg - No Ice+1.0 Guy	69175.82	-633.05	368.50	0.00	0.00	523.56
1.2 Dead+1.6 Wind 270 deg - No Ice+1.0 Guy	67740.31	-743.63	25.47	0.00	0.00	530.70
1.2 Dead+1.6 Wind 300 deg - No Ice+1.0 Guy	65648.22	-637.22	-352.01	0.00	0.00	343.22
1.2 Dead+1.6 Wind 330 deg - No Ice+1.0 Guy	69226.11	-392.44	-628.76	0.00	0.00	88.65
1.2 Dead+1.0 Ice+1.0 Temp+Guy	129360.91	-184.72	133.13	0.00	0.00	-3.33
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp+1.0 Guy	132047.87	-195.06	-122.23	0.00	0.00	-13.09
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp+1.0 Guy	132728.93	-115.73	-81.65	0.00	0.00	-26.02
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp+1.0 Guy	132769.26	-57.89	39.50	0.00	0.00	-49.82
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp+1.0 Guy	132112.46	8.22	180.37	0.00	0.00	-60.44
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp+1.0 Guy	131056.99	14.05	277.62	0.00	0.00	-37.91
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp+1.0 Guy	130081.61	-39.12	327.51	0.00	0.00	-4.88
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp+1.0 Guy	129600.25	-126.29	342.55	0.00	0.00	17.90
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp+1.0 Guy	129385.32	-218.01	299.64	0.00	0.00	32.03
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp+1.0 Guy	129306.39	-300.79	202.58	0.00	0.00	42.28
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp+1.0 Guy	129632.39	-342.50	80.59	0.00	0.00	40.10
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp+1.0 Guy	130133.08	-331.48	-25.19	0.00	0.00	20.44
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp+1.0 Guy	130937.16	-276.10	-103.27	0.00	0.00	-2.63
Dead+Wind 0 deg - Service+Guy	57698.73	-47.00	-145.61	0.00	0.00	-41.60
Dead+Wind 30 deg - Service+Guy	57560.69	40.87	-125.79	0.00	0.00	-90.47
Dead+Wind 60 deg - Service+Guy	57566.74	102.54	-62.39	0.00	0.00	-126.13
Dead+Wind 90 deg - Service+Guy	57676.53	126.26	22.31	0.00	0.00	-122.61
Dead+Wind 120 deg - Service+Guy	57901.36	98.92	108.10	0.00	0.00	-80.01
Dead+Wind 150 deg - Service+Guy	58212.34	46.78	178.20	0.00	0.00	-19.71
Dead+Wind 180 deg - Service+Guy	58522.48	-28.87	198.04	0.00	0.00	41.99
Dead+Wind 210 deg - Service+Guy	58727.24	-106.65	168.87	0.00	0.00	91.71
Dead+Wind 240 deg - Service+Guy	58753.78	-165.60	92.39	0.00	0.00	124.76
Dead+Wind 270 deg - Service+Guy	58600.60	-201.92	2.58	0.00	0.00	124.34
Dead+Wind 300 deg - Service+Guy	58306.78	-188.21	-80.03	0.00	0.00	81.55

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 330 deg - Service+Guy	57967.93	-133.53	-135.91	0.00	0.00	21.27

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	-14097.15	-0.00	11.49	14097.18	18.93	0.157%
2	105.51	-16673.66	-14271.28	-101.23	16673.75	14281.29	0.050%
3	7444.40	-16594.81	-12643.47	-7436.41	16594.81	12650.83	0.049%
4	12760.37	-16535.01	-7329.00	-12750.35	16534.82	7318.32	0.066%
5	14734.59	-16583.52	-95.54	-14736.70	16583.51	82.00	0.062%
6	12479.16	-16653.32	7044.80	-12484.29	16653.40	-7054.40	0.050%
7	7246.29	-16645.03	12491.41	-7254.62	16645.14	-12499.49	0.053%
8	-105.51	-16638.99	14439.23	93.41	16639.08	-14445.28	0.061%
9	-7444.40	-16717.84	12643.47	7451.88	16717.93	-12648.07	0.039%
10	-12614.92	-16777.64	7245.02	12621.91	16777.73	-7253.40	0.049%
11	-14734.59	-16729.14	95.54	14739.90	16729.19	-102.59	0.040%
12	-12624.61	-16659.33	-7128.78	12624.48	16659.43	7142.92	0.064%
13	-7246.29	-16667.62	-12491.41	7248.10	16667.70	12500.17	0.041%
14	-0.00	-74169.53	-0.00	29.73	74169.41	-14.18	0.044%
15	93.01	-74192.57	-7144.49	-67.06	74192.83	7184.10	0.064%
16	3723.75	-74084.93	-6273.42	-3685.21	74084.91	6297.74	0.061%
17	6397.59	-74003.65	-3677.46	-6340.86	74003.18	3660.59	0.080%
18	7327.77	-74071.99	-79.06	-7304.68	74071.74	30.08	0.073%
19	6263.67	-74168.99	3492.75	-6268.24	74169.12	-3541.20	0.065%
20	3541.97	-74156.58	6116.70	-3556.97	74156.79	-6148.37	0.047%
21	-93.01	-74146.48	7144.49	67.36	74146.55	-7171.63	0.050%
22	-3723.75	-74254.12	6273.42	3688.34	74254.11	-6285.41	0.050%
23	-6397.59	-74335.40	3677.46	6375.55	74335.27	-3660.51	0.037%
24	-7327.77	-74267.06	79.06	7324.57	74267.09	-36.52	0.057%
25	-6263.67	-74170.06	-3492.75	6275.74	74170.30	3536.59	0.061%
26	-3541.97	-74182.47	-6116.70	3562.68	74182.81	6161.74	0.067%
27	25.23	-14101.30	-3412.73	-16.49	14101.28	3408.71	0.066%
28	1780.20	-14082.44	-3023.47	-1774.77	14082.42	3017.77	0.054%
29	3051.42	-14068.14	-1752.60	-3046.53	14068.13	1748.66	0.043%
30	3523.52	-14079.74	-22.85	-3517.06	14079.72	20.23	0.048%
31	2984.18	-14096.43	1684.64	-2977.10	14096.42	-1690.13	0.062%
32	1732.82	-14094.45	2987.10	-1729.38	14094.47	-2997.65	0.076%
33	-25.23	-14093.01	3452.89	20.15	14093.03	-3463.46	0.081%
34	-1780.20	-14111.86	3023.47	1768.23	14111.85	-3027.08	0.086%
35	-3016.64	-14126.16	1732.52	3006.35	14126.12	-1726.17	0.083%
36	-3523.52	-14114.56	22.85	3521.09	14114.55	-10.04	0.090%
37	-3018.96	-14097.87	-1704.73	3026.04	14097.90	1714.98	0.086%
38	-1732.82	-14099.85	-2987.10	1744.34	14099.87	2989.57	0.081%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	15	0.00000001	0.00001313
2	Yes	25	0.00000001	0.00006054
3	Yes	25	0.00000001	0.00005508
4	Yes	19	0.00000001	0.00005891
5	Yes	24	0.00000001	0.00006731

6	Yes	24	0.00000001	0.00006602
7	Yes	21	0.00000001	0.00008241
8	Yes	16	0.00000001	0.00006364
9	Yes	17	0.00000001	0.00005369
10	Yes	17	0.00000001	0.00009989
11	Yes	17	0.00000001	0.00006102
12	Yes	16	0.00000001	0.00006949
13	Yes	22	0.00000001	0.00007909
14	Yes	17	0.00000001	0.00007640
15	Yes	20	0.00000001	0.00006708
16	Yes	20	0.00000001	0.00006374
17	Yes	19	0.00000001	0.00007910
18	Yes	19	0.00000001	0.00007088
19	Yes	19	0.00000001	0.00007072
20	Yes	19	0.00000001	0.00006072
21	Yes	18	0.00000001	0.00008727
22	Yes	17	0.00000001	0.00008727
23	Yes	17	0.00000001	0.00006678
24	Yes	17	0.00000001	0.00009492
25	Yes	18	0.00000001	0.00009380
26	Yes	19	0.00000001	0.00008598
27	Yes	12	0.00000001	0.00007206
28	Yes	12	0.00000001	0.00006575
29	Yes	12	0.00000001	0.00006510
30	Yes	12	0.00000001	0.00006601
31	Yes	12	0.00000001	0.00007189
32	Yes	12	0.00000001	0.00008182
33	Yes	12	0.00000001	0.00008391
34	Yes	12	0.00000001	0.00008622
35	Yes	12	0.00000001	0.00008621
36	Yes	12	0.00000001	0.00008947
37	Yes	12	0.00000001	0.00008778
38	Yes	12	0.00000001	0.00008420

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	150 - 140	2.746	29	0.1610	0.3541
T2	140 - 120	2.422	29	0.1376	0.2103
T3	120 - 100	1.844	29	0.1646	0.1355
T4	100 - 80	1.158	29	0.1237	0.0470
T5	80 - 60	0.781	29	0.0782	0.0658
T6	60 - 40	0.478	29	0.0616	0.1046
T7	40 - 20	0.307	29	0.0340	0.1090
T8	20 - 5.25	0.193	29	0.0364	0.0819
T9	5.25 - 0	0.058	30	0.0502	0.0520

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
150.00	Lightning Rod 5/8x4'	29	2.746	0.1610	0.3541	13360
147.00	DT465B-2XR w/Mount Pipe	29	2.646	0.1547	0.3064	13360
144.00	20' Omni	29	2.548	0.1479	0.2614	11152

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
136.00	Guy	29	2.306	0.1372	0.1776	7962
126.00	SBNH-1D6565C w/Mount Pipe	29	2.028	0.1566	0.1488	8093
96.00	Guy	29	1.057	0.1120	0.0411	10807
95.00	8' Dipole	29	1.035	0.1092	0.0407	11657
50.00	Guy	29	0.376	0.0429	0.1114	26176

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	150 - 140	13.638	5	1.1428	2.1693
T2	140 - 120	11.293	5	1.0613	1.5658
T3	120 - 100	7.197	5	0.9916	0.9444
T4	100 - 80	3.402	5	0.6854	0.3736
T5	80 - 60	2.199	17	0.2649	0.3973
T6	60 - 40	1.388	17	0.1629	0.5335
T7	40 - 20	0.886	16	0.1144	0.5257
T8	20 - 5.25	0.681	4	0.1059	0.3859
T9	5.25 - 0	0.214	4	0.1831	0.2432

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
150.00	Lightning Rod 5/8x4'	5	13.638	1.1428	2.1693	4892
147.00	DT465B-2XR w/Mount Pipe	5	12.919	1.1150	1.9729	4892
144.00	20' Omni	5	12.209	1.0892	1.7856	4084
136.00	Guy	5	10.427	1.0433	1.3939	3252
126.00	SBNH-1D6565C w/Mount Pipe	5	8.400	1.0164	1.1014	10902
96.00	Guy	17	3.009	0.5958	0.3284	1875
95.00	8' Dipole	17	2.948	0.5729	0.3228	1965
50.00	Guy	17	1.101	0.1330	0.5488	13942

Bolt Design Data

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt lb	Allowable Load lb	Ratio Load / Allowable	Allowable Ratio	Criteria
T1	150	Leg	A325N	0.6250	4	5783.46	24850.50	0.233 ✔	1	Bolt DS
T2	140	Leg	A325N	0.6250	4	6005.41	24850.50	0.242 ✔	1	Bolt DS
T3	120	Leg	A325N	0.6250	4	12100.30	24850.50	0.487 ✔	1	Bolt DS
T4	100	Leg	A325N	0.6250	4	9303.83	24850.50	0.374 ✔	1	Bolt DS
T5	80	Leg	A325N	0.6250	4	9788.60	24850.50	0.394 ✔	1	Bolt DS
T6	60	Leg	A325N	0.6250	4	11022.90	24850.50	0.444 ✔	1	Bolt DS
T7	40	Leg	A325N	0.6250	4	11719.60	24850.50	0.472 ✔	1	Bolt DS

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt lb	Allowable Load lb	Ratio Load / Allowable	Allowable Ratio	Criteria

Guy Design Data

Section No.	Elevation ft	Size	Initial Tension lb	Breaking Load lb	Actual T_u lb	Allowable ϕT_n lb	Required S.F.	Actual S.F.
T2	136.00 (A) (720)	5/8 EHS	4240.00	42399.99	9338.55	25440.00	1.000	2.724 ✔
	136.00 (A) (721)	5/8 EHS	4240.00	42399.99	9491.21	25440.00	1.000	2.680 ✔
	136.00 (B) (714)	5/8 EHS	4240.00	42399.99	9491.34	25440.00	1.000	2.680 ✔
	136.00 (B) (715)	5/8 EHS	4240.00	42399.99	10785.00	25440.00	1.000	2.359 ✔
	136.00 (C) (704)	5/8 EHS	4240.00	42399.99	14223.50	25440.00	1.000	1.789 ✔
	136.00 (C) (705)	5/8 EHS	4240.00	42399.99	13185.10	25440.00	1.000	1.929 ✔
T4	96.00 (A) (742)	9/16 EHS	3500.00	35000.04	5461.06	21000.00	1.000	3.845 ✔
	96.00 (A) (743)	9/16 EHS	3500.00	35000.04	5442.01	21000.00	1.000	3.859 ✔
	96.00 (B) (736)	9/16 EHS	3500.00	35000.04	5636.32	21000.00	1.000	3.726 ✔
	96.00 (B) (737)	9/16 EHS	3500.00	35000.04	5710.04	21000.00	1.000	3.678 ✔
	96.00 (C) (726)	9/16 EHS	3500.00	35000.04	8173.10	21000.00	1.000	2.569 ✔
	96.00 (C) (727)	9/16 EHS	3500.00	35000.04	8133.66	21000.00	1.000	2.582 ✔
T6	50.00 (A) (752)	1/2 EHS	2690.00	26900.04	4633.81	16140.00	1.000	3.483 ✔
	50.00 (B) (751)	1/2 EHS	2690.00	26900.04	4891.06	16140.00	1.000	3.300 ✔
	50.00 (C) (748)	1/2 EHS	2690.00	26900.04	6087.55	16140.00	1.000	2.651 ✔

Compression Checks

Leg Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $P_u / \phi P_n$
T1	150 - 140	1 3/4	10.00	1.58	43.4 K=1.00	2.4053	-23133.80	94294.90	0.245 [1] ✔
T2	140 - 120	1 3/4	20.00	1.58	43.4 K=1.00	2.4053	-32007.70	94294.90	0.339 [1] ✔
T3	120 - 100	1 3/4	20.00	1.58	43.4 K=1.00	2.4053	-48401.10	94294.90	0.513 [1] ✔
T4	100 - 80	1 3/4	20.00	1.58	43.4 K=1.00	2.4053	-53019.80	94294.90	0.562 [1] ✔
T5	80 - 60	1 3/4	20.00	1.58	43.4 K=1.00	2.4053	-39154.40	94294.90	0.415 [1] ✔
T6	60 - 40	1 3/4	20.00	1.58	43.4	2.4053	-44091.60	94294.90	0.468 [1]

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
					K=1.00				✔
T7	40 - 20	1 3/4	20.00	1.58	43.4 K=1.00	2.4053	-46878.50	94294.90	0.497 [1] ✔
T8	20 - 5.25	1 3/4	14.75	1.58	43.4 K=1.00	2.4053	-46872.50	94294.90	0.497 [1] ✔
T9	5.25 - 0	1 3/4	5.28	1.59	43.7 K=1.00	2.4053	-44756.60	94137.80	0.475 [1] ✔

[1] P_u / ϕP_n controls

Diagonal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T1	150 - 140	5/8	2.18	0.98	83.2 K=1.10	0.3068	-5032.74	6906.26	0.729 [1] ✔
T2	140 - 120	5/8	2.18	0.98	83.2 K=1.10	0.3068	-4624.67	6906.26	0.670 [1] ✔
T3	120 - 100	5/8	2.18	0.98	83.2 K=1.10	0.3068	-2627.55	6906.26	0.380 [1] ✔
T4	100 - 80	5/8	2.18	0.98	83.2 K=1.10	0.3068	-3023.47	6906.26	0.438 [1] ✔
T5	80 - 60	5/8	2.18	0.98	83.2 K=1.10	0.3068	-1952.13	6906.26	0.283 [1] ✔
T6	60 - 40	5/8	2.18	0.98	83.2 K=1.10	0.3068	-2250.71	6906.26	0.326 [1] ✔
T7	40 - 20	5/8	2.18	0.98	83.2 K=1.10	0.3068	-2246.02	6906.26	0.325 [1] ✔
T8	20 - 5.25	5/8	2.18	0.98	83.2 K=1.10	0.3068	-2210.90	6906.26	0.320 [1] ✔
T9	5.25 - 0	5/8	1.75	0.88	74.6 K=1.10	0.3068	-3953.17	7415.02	0.533 [1] ✔

[1] P_u / ϕP_n controls

Horizontal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T1	150 - 140	3/4	1.50	1.35	89.6 K=1.03	0.4418	-222.20	11059.80	0.020 [1] ✔
T3	120 - 100	3/4	1.50	1.35	89.6 K=1.03	0.4418	-6.80	11059.80	0.001 [1] ✔

[1] P_u / ϕP_n controls

Top Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T1	150 - 140	3/4	1.50	1.35	89.6 K=1.03	0.4418	-72.19	11059.80	0.007 [1] ✓
T2	140 - 120	3/4	1.50	1.35	89.6 K=1.03	0.4418	-816.34	11059.80	0.074 [1] ✓
T3	120 - 100	3/4	1.50	1.35	89.6 K=1.03	0.4418	-249.44	11059.80	0.023 [1] ✓
T5	80 - 60	3/4	1.50	1.35	89.6 K=1.03	0.4418	-54.01	11059.80	0.005 [1] ✓

[1] P_u / ϕP_n controls

Bottom Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T1	150 - 140	3/4	1.50	1.35	89.6 K=1.03	0.4418	-1088.27	11059.80	0.098 [1] ✓
T2	140 - 120	3/4	1.50	1.35	89.6 K=1.03	0.4418	-243.87	11059.80	0.022 [1] ✓
T3	120 - 100	3/4	1.50	1.35	89.6 K=1.03	0.4418	-665.77	11059.80	0.060 [1] ✓

[1] P_u / ϕP_n controls

Top Guy Pull-Off Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T2	140 - 120	5/8	1.50	1.35	89.4 K=0.86	0.3068	-2080.85	6523.80	0.319 [1] ✓
T4	100 - 80	5/8	1.50	1.35	89.4 K=0.86	0.3068	-1126.83	6523.80	0.173 [1] ✓

[1] P_u / ϕP_n controls

Bottom Guy Pull-Off Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T2	140 - 120	5/8	1.50	1.35	89.4 K=0.86	0.3068	-3740.43	6523.80	0.573 [1] ✔
T4	100 - 80	5/8	1.50	1.35	89.4 K=0.86	0.3068	-2410.84	6523.80	0.370 [1] ✔

[1] $P_u / \phi P_n$ controls

Torque-Arm Bottom Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T2	140 - 120 (710)	P2.5x.203	3.36	3.28	41.6 K=1.00	1.7040	-13967.50	50402.20	0.277 [1] ✔
T2	140 - 120 (711)	P2.5x.203	3.36	3.28	41.6 K=1.00	1.7040	-10902.00	50402.20	0.216 [1] ✔
T2	140 - 120 (718)	P2.5x.203	3.36	3.28	41.6 K=1.00	1.7040	-11226.60	50402.20	0.223 [1] ✔
T2	140 - 120 (719)	P2.5x.203	3.36	3.28	41.6 K=1.00	1.7040	-13785.20	50402.20	0.274 [1] ✔
T2	140 - 120 (724)	P2.5x.203	3.36	3.28	41.6 K=1.00	1.7040	-11488.60	50402.20	0.228 [1] ✔
T2	140 - 120 (725)	P2.5x.203	3.36	3.28	41.6 K=1.00	1.7040	-10849.60	50402.20	0.215 [1] ✔
T4	100 - 80 (732)	P2.5x.203	3.36	3.28	41.6 K=1.00	1.7040	-8735.92	50402.20	0.173 [1] ✔
T4	100 - 80 (733)	P2.5x.203	3.36	3.28	41.6 K=1.00	1.7040	-5682.17	50402.20	0.113 [1] ✔
T4	100 - 80 (740)	P2.5x.203	3.36	3.28	41.6 K=1.00	1.7040	-6031.79	50402.20	0.120 [1] ✔
T4	100 - 80 (741)	P2.5x.203	3.36	3.28	41.6 K=1.00	1.7040	-8563.50	50402.20	0.170 [1] ✔
T4	100 - 80 (746)	P2.5x.203	3.36	3.28	41.6 K=1.00	1.7040	-5772.05	50402.20	0.115 [1] ✔
T4	100 - 80 (747)	P2.5x.203	3.36	3.28	41.6 K=1.00	1.7040	-5354.07	50402.20	0.106 [1] ✔

[1] $P_u / \phi P_n$ controls

Tension Checks

Leg Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T1	150 - 140	1 3/4	10.00	1.58	43.4	1.2339	20539.60	60150.90	0.341 [1] [#] ✓
T2	140 - 120	1 3/4	20.00	1.58	43.4	2.4053	23158.70	108238.00	0.214 [1] [#] ✓
T3	120 - 100	1 3/4	20.00	1.58	43.4	1.2339	15144.60	60150.90	0.252 [1] [#] ✓
T4	100 - 80	1 3/4	20.00	1.58	43.4	2.4053	17369.90	108238.00	0.160 [1] [#] ✓

[1] $P_u / \phi P_n$ controls
[#] Based on net area of leg in section below

Diagonal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T1	150 - 140	5/8	2.18	0.98	75.6	0.3068	5043.63	9940.20	0.507 [1] ✓
T2	140 - 120	5/8	2.18	0.98	75.6	0.3068	4907.46	9940.20	0.494 [1] ✓
T3	120 - 100	5/8	2.18	0.98	75.6	0.3068	2459.26	9940.20	0.247 [1] ✓
T4	100 - 80	5/8	2.18	0.98	75.6	0.3068	2097.17	9940.20	0.211 [1] ✓
T5	80 - 60	5/8	2.18	0.98	75.6	0.3068	649.61	9940.20	0.065 [1] ✓
T6	60 - 40	5/8	2.18	0.98	75.6	0.3068	631.95	9940.20	0.064 [1] ✓
T7	40 - 20	5/8	2.18	0.98	75.6	0.3068	516.33	9940.20	0.052 [1] ✓
T8	20 - 5.25	5/8	2.18	0.98	75.6	0.3068	640.17	9940.20	0.064 [1] ✓

[1] $P_u / \phi P_n$ controls

Horizontal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T1	150 - 140	3/4	1.50	1.35	86.7	0.4418	283.40	19880.40	0.014 [1] ✓
T2	140 - 120	3/4	1.50	1.35	86.7	0.4418	1348.76	19880.40	0.068 [1] ✓
T3	120 - 100	3/4	1.50	1.35	86.7	0.4418	1513.76	19880.40	0.076 [1]

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T4	100 - 80	3/4	1.50	1.35	86.7	0.4418	2357.73	19880.40	0.119 [1]
T5	80 - 60	3/4	1.50	1.35	86.7	0.4418	2365.18	19880.40	0.119 [1]
T6	60 - 40	3/4	1.50	1.35	86.7	0.4418	2707.91	19880.40	0.136 [1]
T7	40 - 20	3/4	1.50	1.35	86.7	0.4418	2928.11	19880.40	0.147 [1]
T8	20 - 5.25	3/4	1.50	1.35	86.7	0.4418	2930.65	19880.40	0.147 [1]
T9	5.25 - 0	3/4	0.90	0.75	48.1	0.4418	3136.50	19880.40	0.158 [1]

[1] P_u / ϕP_n controls

Top Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T1	150 - 140	3/4	1.50	1.35	86.7	0.4418	85.63	19880.40	0.004 [1]
T2	140 - 120	3/4	1.50	1.35	86.7	0.4418	557.18	19880.40	0.028 [1]
T3	120 - 100	3/4	1.50	1.35	86.7	0.4418	747.23	19880.40	0.038 [1]
T4	100 - 80	3/4	1.50	1.35	86.7	0.4418	660.54	19880.40	0.033 [1]
T5	80 - 60	3/4	1.50	1.35	86.7	0.4418	1195.40	19880.40	0.060 [1]
T6	60 - 40	3/4	1.50	1.35	86.7	0.4418	1160.18	19880.40	0.058 [1]
T7	40 - 20	3/4	1.50	1.35	86.7	0.4418	1329.18	19880.40	0.067 [1]
T8	20 - 5.25	3/4	1.50	1.35	86.7	0.4418	1445.74	19880.40	0.073 [1]

[1] P_u / ϕP_n controls

Bottom Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T1	150 - 140	3/4	1.50	1.35	86.7	0.4418	1045.61	19880.40	0.053 [1]

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T2	140 - 120	3/4	1.50	1.35	86.7	0.4418	669.93	19880.40	0.034 [1]
T3	120 - 100	3/4	1.50	1.35	86.7	0.4418	1013.90	19880.40	0.051 [1]
T4	100 - 80	3/4	1.50	1.35	86.7	0.4418	1132.06	19880.40	0.057 [1]
T5	80 - 60	3/4	1.50	1.35	86.7	0.4418	1167.70	19880.40	0.059 [1]
T6	60 - 40	3/4	1.50	1.35	86.7	0.4418	1427.08	19880.40	0.072 [1]
T7	40 - 20	3/4	1.50	1.35	86.7	0.4418	1430.23	19880.40	0.072 [1]
T8	20 - 5.25	3/4	1.50	1.35	86.7	0.4418	5014.14	19880.40	0.252 [1]
T9	5.25 - 0	3/4	0.60	0.45	28.8	0.4418	1769.79	19880.40	0.089 [1]

[1] $P_u / \phi P_n$ controls

Top Guy Pull-Off Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T2	140 - 120	5/8	1.50	1.35	104.0	0.3068	5252.68	9940.20	0.528 [1]
T4	100 - 80	5/8	1.50	1.35	104.0	0.3068	4046.29	9940.20	0.407 [1]
T6	60 - 40	5/8	1.50	1.35	104.0	0.3068	3740.23	9940.20	0.376 [1]

[1] $P_u / \phi P_n$ controls

Bottom Guy Pull-Off Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T2	140 - 120	5/8	1.50	1.35	104.0	0.3068	2631.93	9940.20	0.265 [1]
T4	100 - 80	5/8	1.50	1.35	104.0	0.3068	2243.34	9940.20	0.226 [1]

[1] $P_u / \phi P_n$ controls

Torque-Arm Top Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T2	140 - 120 (706)	P2.5x.203	3.66	3.58	45.3	1.7040	12062.90	55211.20	0.218 [1] ✓
T2	140 - 120 (707)	P2.5x.203	3.66	3.58	45.3	1.7040	10332.20	55211.20	0.187 [1] ✓
T2	140 - 120 (716)	P2.5x.203	3.66	3.58	45.3	1.7040	9552.82	55211.20	0.173 [1] ✓
T2	140 - 120 (717)	P2.5x.203	3.66	3.58	45.3	1.7040	13364.50	55211.20	0.242 [1] ✓
T2	140 - 120 (722)	P2.5x.203	3.66	3.58	45.3	1.7040	8754.68	55211.20	0.159 [1] ✓
T2	140 - 120 (723)	P2.5x.203	3.66	3.58	45.3	1.7040	10648.10	55211.20	0.193 [1] ✓
T4	100 - 80 (728)	P2.5x.203	3.66	3.58	45.3	1.7040	8013.75	55211.20	0.145 [1] ✓
T4	100 - 80 (729)	P2.5x.203	3.66	3.58	45.3	1.7040	5985.69	55211.20	0.108 [1] ✓
T4	100 - 80 (738)	P2.5x.203	3.66	3.58	45.3	1.7040	6319.53	55211.20	0.114 [1] ✓
T4	100 - 80 (739)	P2.5x.203	3.66	3.58	45.3	1.7040	7895.34	55211.20	0.143 [1] ✓
T4	100 - 80 (744)	P2.5x.203	3.66	3.58	45.3	1.7040	5987.42	55211.20	0.108 [1] ✓
T4	100 - 80 (745)	P2.5x.203	3.66	3.58	45.3	1.7040	5394.36	55211.20	0.098 [1] ✓

[1] P_u / ϕP_n controls

Torque-Arm Bottom Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T2	140 - 120 (710)	P2.5x.203	3.36	3.28	41.6	1.7040	2126.99	55211.20	0.039 [1] ✓
T2	140 - 120 (711)	P2.5x.203	3.36	3.28	41.6	1.7040	2024.56	55211.20	0.037 [1] ✓
T2	140 - 120 (718)	P2.5x.203	3.36	3.28	41.6	1.7040	2263.78	55211.20	0.041 [1] ✓
T2	140 - 120 (719)	P2.5x.203	3.36	3.28	41.6	1.7040	2359.11	55211.20	0.043 [1] ✓
T2	140 - 120 (724)	P2.5x.203	3.36	3.28	41.6	1.7040	3312.23	55211.20	0.060 [1] ✓
T2	140 - 120 (725)	P2.5x.203	3.36	3.28	41.6	1.7040	3505.41	55211.20	0.063 [1] ✓
T4	100 - 80 (732)	P2.5x.203	3.36	3.28	41.6	1.7040	696.37	55211.20	0.013 [1] ✓
T4	100 - 80 (733)	P2.5x.203	3.36	3.28	41.6	1.7040	2395.77	55211.20	0.043 [1] ✓

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T4	100 - 80 (740)	P2.5x.203	3.36	3.28	41.6	1.7040	2210.85	55211.20	0.040 [1]
T4	100 - 80 (741)	P2.5x.203	3.36	3.28	41.6	1.7040	618.46	55211.20	0.011 [1]
T4	100 - 80 (746)	P2.5x.203	3.36	3.28	41.6	1.7040	2170.30	55211.20	0.039 [1]
T4	100 - 80 (747)	P2.5x.203	3.36	3.28	41.6	1.7040	2379.74	55211.20	0.043 [1]

[1] P_u / ϕP_n controls

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	ϕP_{allow} lb	% Capacity	Pass Fail
T1	150 - 140	Leg	1 3/4	2	20539.60	60150.90	34.1	Pass
		Diagonal	5/8	15	-5032.74	6906.26	72.9	Pass
		Horizontal	3/4	23	-222.20	11059.80	2.0	Pass
		Top Girt	3/4	6	-72.19	11059.80	0.7	Pass
		Bottom Girt	3/4	7	-1088.27	11059.80	9.8	Pass
T2	140 - 120	Leg	1 3/4	51	-32007.70	94294.90	33.9	Pass
		Diagonal	5/8	142	-4624.67	6906.26	67.0	Pass
		Horizontal	3/4	66	1348.76	19880.40	6.8	Pass
		Top Girt	3/4	55	-816.34	11059.80	7.4	Pass
		Bottom Girt	3/4	57	669.93	19880.40	3.4	Pass
		Guy A@136	5/8	721	9491.21	25440.00	37.3	Pass
		Guy B@136	5/8	715	10785.00	25440.00	42.4	Pass
		Guy C@136	5/8	704	14223.50	25440.00	55.9	Pass
		Top Guy Pull-Off@136	5/8	708	5252.68	9940.20	52.8	Pass
		Bottom Guy Pull-Off@136	5/8	712	-3740.43	6523.80	57.3	Pass
		Torque Arm Top@136	P2.5x.203	717	13364.50	55211.20	24.2	Pass
		Torque Arm Bottom@136	P2.5x.203	710	-13967.50	50402.20	27.7	Pass
T3	120 - 100	Leg	1 3/4	145	-48401.10	94294.90	51.3	Pass
		Diagonal	5/8	154	-2627.55	6906.26	38.0	Pass
		Horizontal	3/4	158	1513.76	19880.40	7.6	Pass
		Top Girt	3/4	146	747.23	19880.40	3.8	Pass
		Bottom Girt	3/4	151	-665.77	11059.80	6.0	Pass
T4	100 - 80	Leg	1 3/4	237	-53019.80	94294.90	56.2	Pass
		Diagonal	5/8	323	-3023.47	6906.26	43.8	Pass
		Horizontal	3/4	250	2357.73	19880.40	11.9	Pass
		Top Girt	3/4	240	660.54	19880.40	3.3	Pass
		Bottom Girt	3/4	241	1132.06	19880.40	5.7	Pass
		Guy A@96	9/16	742	5461.06	21000.00	26.0	Pass
		Guy B@96	9/16	737	5710.04	21000.00	27.2	Pass
		Guy C@96	9/16	726	8173.10	21000.00	38.9	Pass
		Top Guy Pull-Off@96	5/8	730	4046.29	9940.20	40.7	Pass
		Bottom Guy Pull-Off@96	5/8	735	-2410.84	6523.80	37.0	Pass
		Torque Arm Top@96	P2.5x.203	728	8013.75	55211.20	14.5	Pass
		Torque Arm Bottom@96	P2.5x.203	732	-8735.92	50402.20	17.3	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	ϕP_{allow} lb	% Capacity	Pass Fail
T5	80 - 60	Leg	1 3/4	328	-39154.40	94294.90	41.5	Pass
		Diagonal	5/8	337	-1952.13	6906.26	28.3	Pass
		Horizontal	3/4	342	2365.18	19880.40	11.9	Pass
		Top Girt	3/4	330	1195.40	19880.40	6.0	Pass
		Bottom Girt	3/4	333	1167.70	19880.40	5.9	Pass
T6	60 - 40	Leg	1 3/4	420	-44091.60	94294.90	46.8	Pass
		Diagonal	5/8	429	-2250.71	6906.26	32.6	Pass
		Horizontal	3/4	434	2707.91	19880.40	13.6	Pass
		Top Girt	3/4	422	1160.18	19880.40	5.8	Pass
		Bottom Girt	3/4	425	1427.08	19880.40	7.2	Pass
		Guy A@50	1/2	752	4633.81	16140.00	28.7	Pass
		Guy B@50	1/2	751	4891.06	16140.00	30.3	Pass
		Guy C@50	1/2	748	6087.55	16140.00	37.7	Pass
		Top Guy Pull-Off@50	5/8	469	3740.23	9940.20	37.6	Pass
T7	40 - 20	Leg	1 3/4	512	-46878.50	94294.90	49.7	Pass
		Diagonal	5/8	597	-2246.02	6906.26	32.5	Pass
		Horizontal	3/4	526	2928.11	19880.40	14.7	Pass
		Top Girt	3/4	514	1329.18	19880.40	6.7	Pass
		Bottom Girt	3/4	517	1430.23	19880.40	7.2	Pass
T8	20 - 5.25	Leg	1 3/4	604	-46872.50	94294.90	49.7	Pass
		Diagonal	5/8	668	-2210.90	6906.26	32.0	Pass
		Horizontal	3/4	667	2930.65	19880.40	14.7	Pass
		Top Girt	3/4	606	1445.74	19880.40	7.3	Pass
		Bottom Girt	3/4	609	5014.14	19880.40	25.2	Pass
T9	5.25 - 0	Leg	1 3/4	674	-44756.60	94137.80	47.5	Pass
		Diagonal	5/8	682	-3953.17	7415.02	53.3	Pass
		Horizontal	3/4	688	3136.50	19880.40	15.8	Pass
		Bottom Girt	3/4	678	1769.79	19880.40	8.9	Pass
							Summary	
						Leg (T4)	56.2	Pass
						Diagonal (T1)	72.9	Pass
						Horizontal (T9)	15.8	Pass
						Top Girt (T2)	7.4	Pass
						Bottom Girt (T8)	25.2	Pass
						Guy A (T2)	37.3	Pass
						Guy B (T2)	42.4	Pass
						Guy C (T2)	55.9	Pass
						Top Guy Pull-Off (T2)	52.8	Pass
						Bottom Guy Pull-Off (T2)	57.3	Pass
						Torque Arm Top (T2)	24.2	Pass
						Torque Arm Bottom (T2)	27.7	Pass
						Bolt Checks	48.7	Pass
						RATING =	**72.9**	**Pass**

RAMAKER & ASSOCIATES, INC.

December 7, 2017

Tom Jupin
Charles Cherundolo Consulting, Inc.
1280 Rt. 46 West
Parsippany, NJ 07054

Ramaker & Associates, Inc.
855 Community Drive
Sauk City, WI 53583

SUBJECT: **MOUNT ASSESSMENT**

CARRIER: **SPRINT**

SITE: **BANM TOWER (CT03XC212-E)**
497 OLD POST ROAD
TOLLAND, TOLLAND COUNTY, CONNECTICUT 06084
RAMAKER & ASSOCIATES PROJECT NUMBER: 23002

RESULTS: **MOUNT:** **PASS WITH MODIFICATIONS**

Dear Tom Jupin:

Ramaker & Associates, Inc. (RAMAKER) respectfully submits this mount assessment for the above-mentioned site. The purpose of this report is to determine the structural integrity of the mounting structure with the proposed loading configurations. Engineering recommendations regarding the analysis results are provided in the following pages.

RAMAKER developed a finite element model of the mount(s) using RISA analysis software. 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 mount loading occur.

If you have any questions or comments, please do not hesitate to contact our office.

Sincerely,

RAMAKER & ASSOCIATES, INC.

Ryan J. Nelson
Project Engineer

James R. Skowronski, P.E.
Supervising Engineer

STATE OF CONNECTICUT
JAMES R. SKOWRONSKI
26266
LICENSED
PROFESSIONAL ENGINEER

ANALYSIS CRITERIA

State Building Code	2016 CT State Building Code
Adopted Building Code	2012 IBC
Referenced Standard	TIA-222-G
Risk Category	II
Ultimate Design Wind Speed, V_{ult}	120 mph (3 sec. gust)
Nominal Design Wind Speed, V_{asd}	93 mph (3 sec. gust)
Design Wind Speed w/ Ice	50 mph (3 sec. gust)
Ice Thickness	3/4 inch
Exposure Category	B
Topographic Category	1
Crest Height	N/A

SUPPORTING DOCUMENTATION

- Mount analysis by RAMAKER, project number 23002, dated August 29, 2017
- Construction drawings by RAMAKER, project number 23002
- Site visit(s) conducted by RAMAKER
- Other pertinent data procured or assumed by RAMAKER during site due diligence activities

MOUNT LOADING

RAMAKER understands that the loading to be used for this analysis will consist of the antennas and equipment configurations as shown in the following chart(s):

Antenna Mount – Alpha and Beta Sectors				
Elevation	**Position**	**Appurtenance**	**Mount Type**	**Status**
147	1	(1) RFS APXVSPP18-C-A20	Delta Mount	Existing
		(1) Alcatel-Lucent 1900MHz RRH		
		(1) Alcatel-Lucent 800MHz RRH		
	2	**(1) Commscope DT465B-2XR**		**Proposed**
		(1) Alcatel-Lucent 800MHz 2x50W RRH		
		(1) Alcatel-Lucent TD-RRH 8x20		

Antenna Mount – Gamma Sector				
Elevation	**Position**	**Appurtenance**	**Mount Type**	**Status**
147	1	**(1) Commscope DT465B-2XR**	Delta Mount	**Proposed**
		(1) Alcatel-Lucent 800MHz 2x50W RRH		
		(1) Alcatel-Lucent TD-RRH 8x20		
	2	(1) RFS APXVSPP18-C-A20		Existing
		(1) Alcatel-Lucent 1900MHz RRH		
		(1) Alcatel-Lucent 800MHz RRH		
	--	(1) 20' Omni		

MOUNT RESULTS

By engineering calculation and inspection, the ***modified*** antenna and equipment mounting structure(s) are capable of supporting the proposed loading configurations without causing an overstress condition in the antenna and equipment mounting structure(s), ***provided the proposed structural modifications are completed prior to antenna and equipment installation. See associated RAMAKER construction drawings for required modifications.***

LIMITATIONS

The recommendations contained within this report were developed using the supporting documentation as previously described. All recommendations pertain only to the proposed antenna installation activities 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:

- Missing, corroding, and/or deteriorating members
- Improper manufacturing and/or construction
- Improper maintenance
- Member grades less than assumed grades show below:

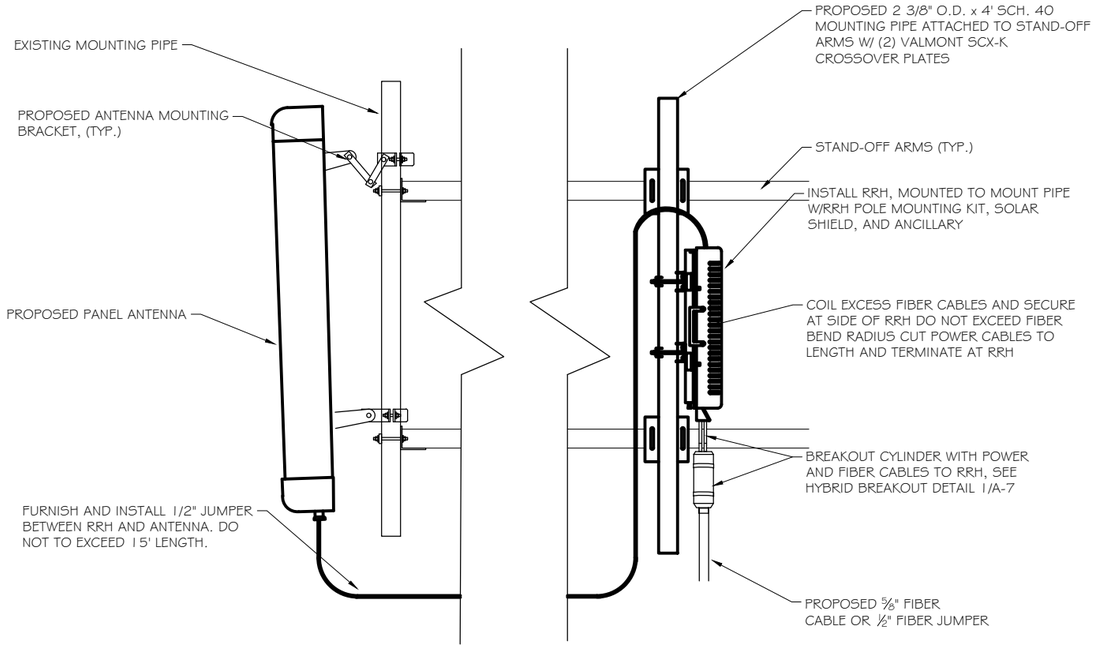
Assumed Steel Member Grades	
Angles	ASTM A36, 36 ksi
Pipes	ASTM A53 Gr. B, 35 ksi

RAMAKER is not responsible for verifying that the loading on the structure is consistent with the loading applied to the structure within this report. If there is any information contrary to that contained herein, or if there are any defects arising from the original design, material, fabrication and erection deficiencies, this report should be disregarded and RAMAKER should be contacted immediately. RAMAKER is not liable for any representation, recommendation, or conclusion not expressly stated herein.

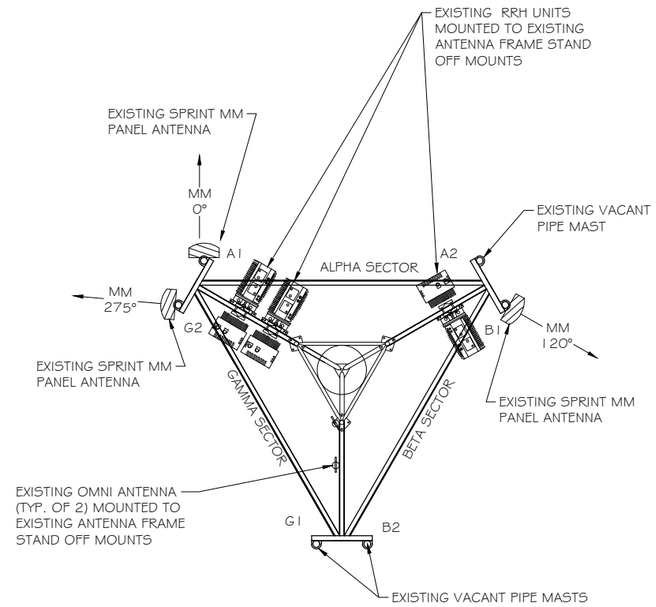
This analysis pertains only to the mounting structure, and no analyses or conclusions were made regarding the supporting structure. Analysis and certification of the supporting structure is performed and submitted separately.

ATTACHMENTS

- Analysis Figures
- Analysis Calculations

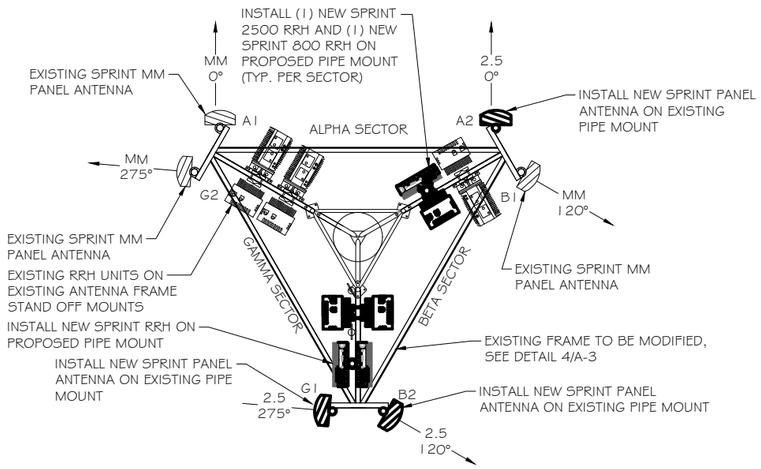


ANTENNA & RRH MOUNTING DETAILS (1)
SCALE: NTS



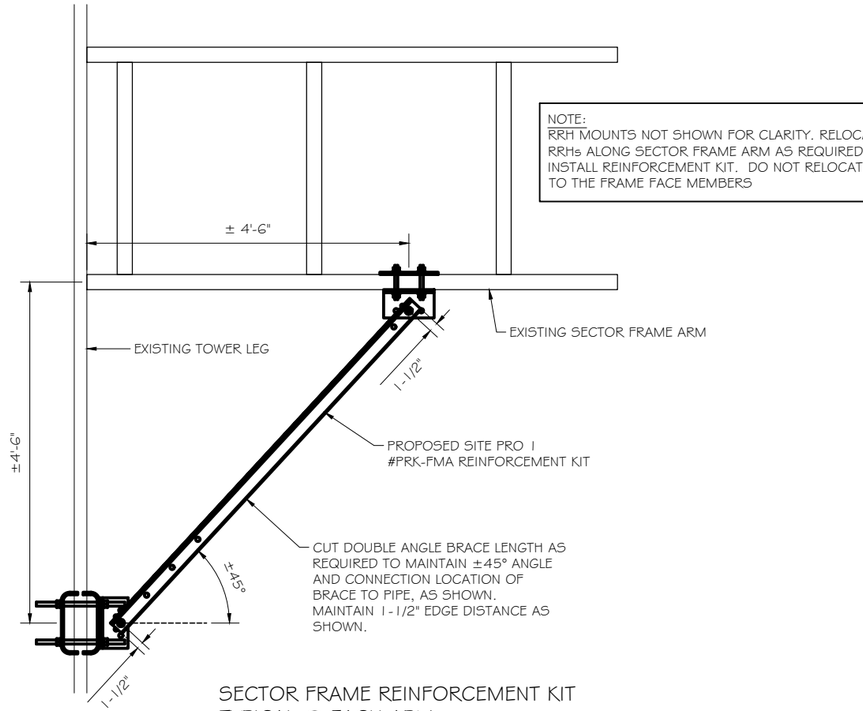
NORTH

EXISTING ANTENNA ARRAY (2)
SCALE: NTS



NORTH

PROPOSED ANTENNA ARRAY (3)
SCALE: NTS



SECTOR FRAME REINFORCEMENT KIT
TYPICAL @ EACH ARM (4)
SCALE: NTS

Sprint

1 INTERNATIONAL BLVD, SUITE 800
MAHWAH, NJ 07495

RAMAKER & ASSOCIATES, INC.

700-76 BROADWAY, SUITE 182
WESTWOOD, NJ 07675
www.Ramaker.com

Charles Cherundolo Consulting, Inc.

713 Clover Lane, Moscow, PA 18444
Phone: 570-840-5084 Fax: 570-842-5592

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 · 26266 · LICENSED PROFESSIONAL ENGINEER

Signature: Date: 12/14/2017

MARK	DATE	DESCRIPTION
A	12/14/17	REVISED PER NEW RFDS

ISSUE PHASE: FINAL — DATE ISSUED: 11/29/2017

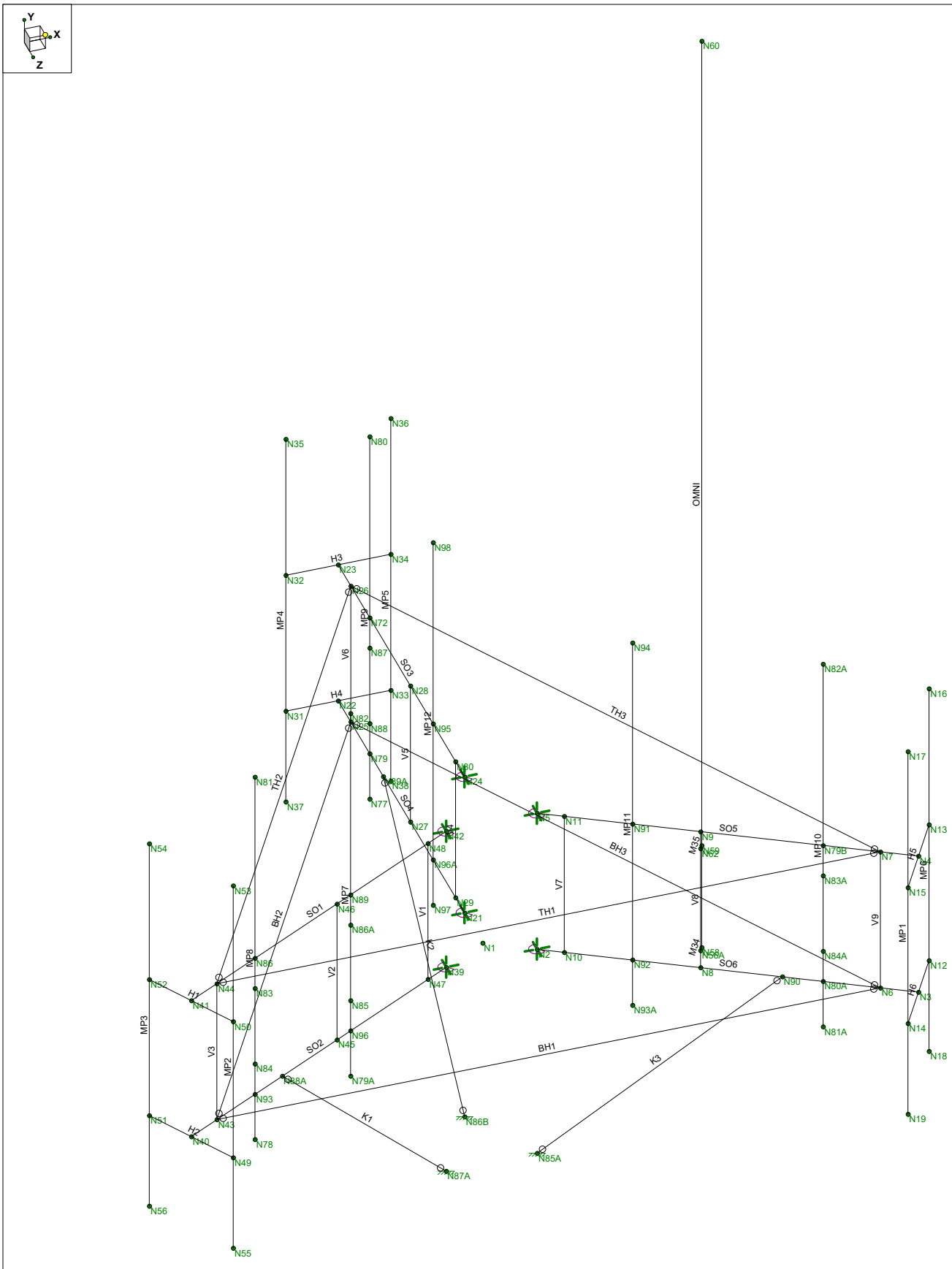
PROJECT TITLE:
BANM TOWER
CT03XC212

PROJECT INFORMATION:
497 OLD POST ROAD
TOLLAND. CT. 06084
TOLLAND COUNTY

SHEET TITLE:
ANTENNA DETAILS

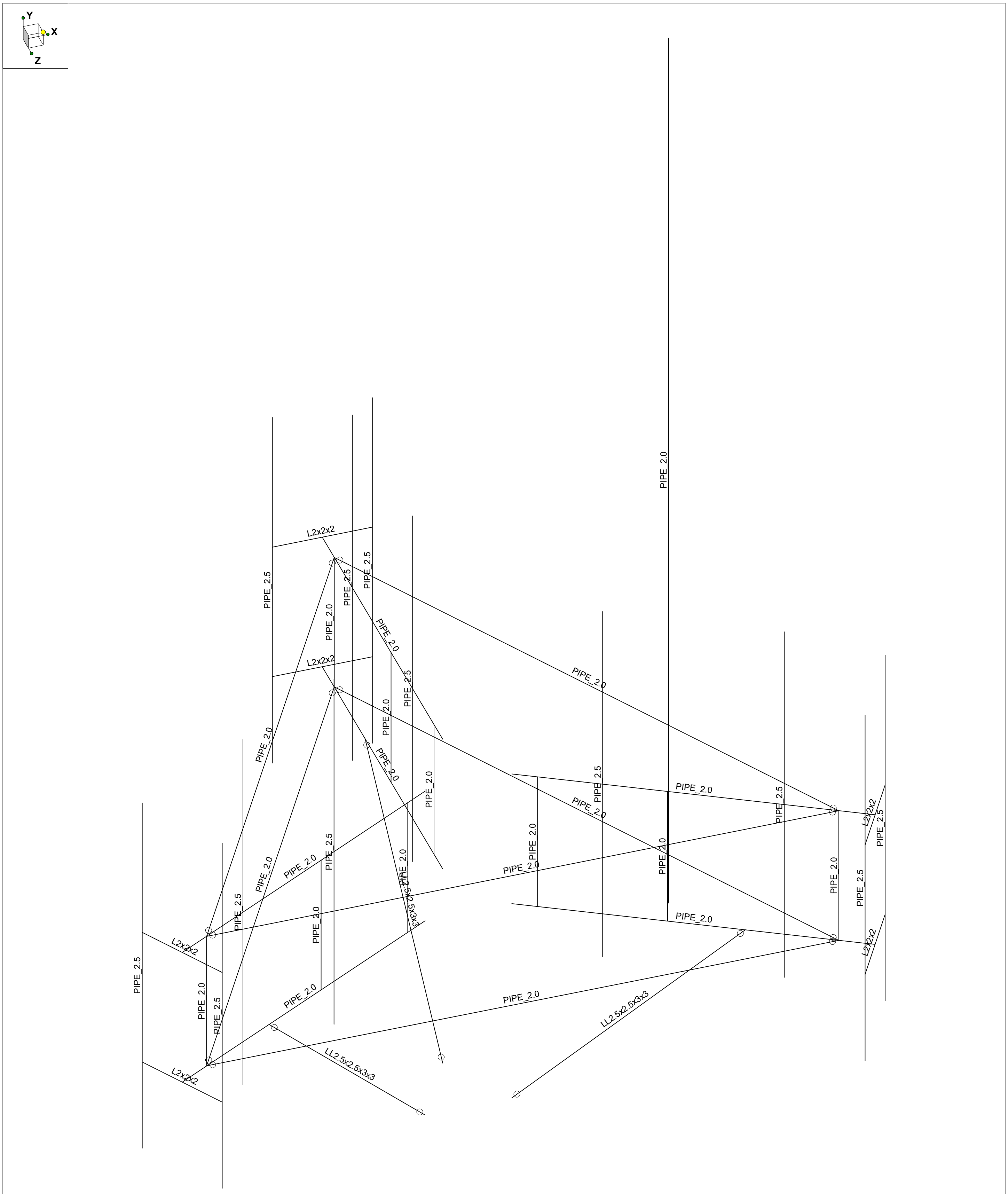
SCALE: NONE

PROJECT NUMBER: 23002
SHEET NUMBER: A-3



Envelope Only Solution

Ramaker & Associates	CT03XC212	SK - 1
JDM		Dec 7, 2017 at 2:01 PM
23002		23002 Delta Frame Rev3_Mod.r3d



Envelope Only Solution

Ramaker & Associates	CT03XC212	SK - 2
JDM		Dec 7, 2017 at 2:02 PM
23002		23002 Delta Frame Rev3_Mod.r3d

Hot Rolled Steel Properties

	Label	E [ksi]	G [ksi]	Nu	Therm (\1...	Density[k/...	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 Rules	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	vert mount pipe	PIPE_2.0	Beam	Pipe	A53 Gr. B	Typical	1.02	.627	.627	1.25
2	arm	PIPE_2.0	Beam	Pipe	A53 Gr. B	Typical	1.02	.627	.627	1.25
3	horizontal face	PIPE_2.0	Beam	Pipe	A53 Gr. B	Typical	1.02	.627	.627	1.25
4	PIPE_2.5	PIPE_2.5	Beam	Pipe	A53 Gr. B	Typical	1.61	1.45	1.45	2.89
5	single angle	L2x2x2	Beam	Single Angle	A36 Gr.36	Typical	.491	.189	.189	.003
6	LL2.5x2.5x3/16	LL2.5x2.5x3x3	Beam	Double Angle (3/...	A36 Gr.36	Typical	1.8	2.46	1.07	.023

Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rules
1	BH1	N6	N43			horizontal face	Beam	Pipe	A53 Gr. B	Typical
2	BH2	N43	N25			horizontal face	Beam	Pipe	A53 Gr. B	Typical
3	BH3	N6	N25			horizontal face	Beam	Pipe	A53 Gr. B	Typical
4	H1	N52	N50			single angle	Beam	Single Angle	A36 Gr.36	Typical
5	H2	N51	N49			single angle	Beam	Single Angle	A36 Gr.36	Typical
6	H3	N34	N32			single angle	Beam	Single Angle	A36 Gr.36	Typical
7	H4	N33	N31			single angle	Beam	Single Angle	A36 Gr.36	Typical
8	H5	N15	N13			single angle	Beam	Single Angle	A36 Gr.36	Typical
9	H6	N14	N12			single angle	Beam	Single Angle	A36 Gr.36	Typical
10	M34	N58	N56A			RIGID	None	None	RIGID	Typical
11	M35	N59	N62			RIGID	None	None	RIGID	Typical
12	MP1	N17	N19			PIPE_2.5	Beam	Pipe	A53 Gr. B	Typical
13	MP2	N53	N55			PIPE_2.5	Beam	Pipe	A53 Gr. B	Typical
14	MP3	N54	N56			PIPE_2.5	Beam	Pipe	A53 Gr. B	Typical
15	MP4	N35	N37			PIPE_2.5	Beam	Pipe	A53 Gr. B	Typical
16	MP5	N36	N38			PIPE_2.5	Beam	Pipe	A53 Gr. B	Typical
17	MP6	N16	N18			PIPE_2.5	Beam	Pipe	A53 Gr. B	Typical
18	MP7	N79A	N82			PIPE_2.5	Beam	Pipe	A53 Gr. B	Typical
19	MP8	N81	N78			PIPE_2.5	Beam	Pipe	A53 Gr. B	Typical
20	MP9	N80	N77			PIPE_2.5	Beam	Pipe	A53 Gr. B	Typical
21	MP10	N82A	N81A			PIPE_2.5	Beam	Pipe	A53 Gr. B	Typical
22	OMNI	N58	N60			vert mount pipe	Beam	Pipe	A53 Gr. B	Typical
23	SO1	N41	N42			arm	Beam	Pipe	A53 Gr. B	Typical
24	SO2	N40	N39			arm	Beam	Pipe	A53 Gr. B	Typical
25	SO3	N23	N24			arm	Beam	Pipe	A53 Gr. B	Typical
26	SO4	N22	N21			arm	Beam	Pipe	A53 Gr. B	Typical
27	SO5	N4	N5			arm	Beam	Pipe	A53 Gr. B	Typical
28	SO6	N3	N2			arm	Beam	Pipe	A53 Gr. B	Typical
29	TH1	N7	N44			horizontal face	Beam	Pipe	A53 Gr. B	Typical
30	TH2	N44	N26			horizontal face	Beam	Pipe	A53 Gr. B	Typical
31	TH3	N7	N26			horizontal face	Beam	Pipe	A53 Gr. B	Typical
32	V1	N47	N48			vert mount pipe	Beam	Pipe	A53 Gr. B	Typical
33	V2	N45	N46			vert mount pipe	Beam	Pipe	A53 Gr. B	Typical
34	V3	N43	N44			vert mount pipe	Beam	Pipe	A53 Gr. B	Typical
35	V4	N29	N30			vert mount pipe	Beam	Pipe	A53 Gr. B	Typical

Member Primary Data (Continued)

	Label	I Joint	J Joint	K Joint	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rules
36	V5	N27	N28			vert mount pipe	Beam	Pipe	A53 Gr. B	Typical
37	V6	N25	N26			vert mount pipe	Beam	Pipe	A53 Gr. B	Typical
38	V7	N10	N11			vert mount pipe	Beam	Pipe	A53 Gr. B	Typical
39	V8	N8	N9			vert mount pipe	Beam	Pipe	A53 Gr. B	Typical
40	V9	N6	N7			vert mount pipe	Beam	Pipe	A53 Gr. B	Typical
41	K1	N87A	N88A			LL2.5x2.5x3/16	Beam	Double Angle ...	A36 Gr.36	Typical
42	K2	N86B	N89A			LL2.5x2.5x3/16	Beam	Double Angle ...	A36 Gr.36	Typical
43	K3	N85A	N90			LL2.5x2.5x3/16	Beam	Double Angle ...	A36 Gr.36	Typical
44	MP11	N94	N93A			PIPE_2.5	Beam	Pipe	A53 Gr. B	Typical
45	MP12	N98	N97			PIPE_2.5	Beam	Pipe	A53 Gr. B	Typical

Basic Load Cases

	BLC Description	Category	X ...	Y Gravity	Z ...	Joint	Point	Distributed	Area(Mem...	Surface(Pl...
1	Dead Load	None		-1			24			
2	Antenna Wind 0	None					48			
3	Antenna Wind 30	None					48			
4	Antenna Wind 45	None					48			
5	Antenna Wind 60	None					48			
6	Antenna Wind 90	None					48			
7	Antenna Wind 120	None					48			
8	Antenna Wind 135	None					48			
9	Antenna Wind 150	None					48			
10	Antenna Wind 180	None					48			
11	Antenna Wind 210	None					48			
12	Antenna Wind 225	None					48			
13	Antenna Wind 240	None					48			
14	Antenna Wind 270	None					48			
15	Antenna Wind 300	None					48			
16	Antenna Wind 315	None					48			
17	Antenna Wind 330	None					48			
18	Antenna Ice Dead Load	None					24			
19	Antenna Wind w/Ice 0	None					48			
20	Antenna Wind w/Ice 30	None					48			
21	Antenna Wind w/Ice 45	None					48			
22	Antenna Wind w/Ice 60	None					48			
23	Antenna Wind w/Ice 90	None					48			
24	Antenna Wind w/Ice 120	None					48			
25	Antenna Wind w/Ice 135	None					48			
26	Antenna Wind w/Ice 150	None					48			
27	Antenna Wind w/Ice 180	None					48			
28	Antenna Wind w/Ice 210	None					48			
29	Antenna Wind w/Ice 225	None					48			
30	Antenna Wind w/Ice 240	None					48			
31	Antenna Wind w/Ice 270	None					48			
32	Antenna Wind w/Ice 300	None					48			
33	Antenna Wind w/Ice 315	None					48			
34	Antenna Wind w/Ice 330	None					48			
35	Member Wind 0	None						86		
36	Member Wind 30	None						86		
37	Member Wind 45	None						86		
38	Member Wind 60	None						86		
39	Member Wind 90	None						86		
40	Member Wind 120	None						86		
41	Member Wind 135	None						86		
42	Member Wind 150	None						86		

Basic Load Cases (Continued)

	BLC Description	Category	X ...	Y Gravity	Z ...	Joint	Point	Distributed	Area(Mem...	Surface(Pl...
43	Member Wind 180	None						86		
44	Member Wind 210	None						86		
45	Member Wind 225	None						86		
46	Member Wind 240	None						86		
47	Member Wind 270	None						86		
48	Member Wind 300	None						86		
49	Member Wind 315	None						86		
50	Member Wind 330	None						86		
51	Member Ice Dead Load	None						43		
52	Member Wind w/Ice 0	None						86		
53	Member Wind w/Ice 30	None						86		
54	Member Wind w/Ice 45	None						86		
55	Member Wind w/Ice 60	None						86		
56	Member Wind w/Ice 90	None						86		
57	Member Wind w/Ice 120	None						86		
58	Member Wind w/Ice 135	None						86		
59	Member Wind w/Ice 150	None						86		
60	Member Wind w/Ice 180	None						86		
61	Member Wind w/Ice 210	None						86		
62	Member Wind w/Ice 225	None						86		
63	Member Wind w/Ice 240	None						86		
64	Member Wind w/Ice 270	None						86		
65	Member Wind w/Ice 300	None						86		
66	Member Wind w/Ice 315	None						86		
67	Member Wind w/Ice 330	None						86		
68	Live Load - Area	None								
69	Live Load - Point 1	None					3			
70	Live Load - Point 2	None					1			
71	Live Load - Point 3	None					1			
72	Railing Dist. LL z	None								
73	Railing Dist. LL x	None								
74	Railing Point LL z	None								
75	Railing Point LL x	None								

Load Combinations

	Description	S...	PD...	SRSS	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
1	1.4D	Yes	Y		1	1.4																				
2	0.9D + 1.6 (0-Wind)	Yes	Y		1	.9	2	1.6	35	1.6																
3	0.9D + 1.6 (30-Wind)	Yes	Y		1	.9	3	1.6	36	1.6																
4	0.9D + 1.6 (45-Wind)	Yes	Y		1	.9	4	1.6	37	1.6																
5	0.9D + 1.6 (60-Wind)	Yes	Y		1	.9	5	1.6	38	1.6																
6	0.9D + 1.6 (90-Wind)	Yes	Y		1	.9	6	1.6	39	1.6																
7	0.9D + 1.6 (120-Wind)	Yes	Y		1	.9	7	1.6	40	1.6																
8	0.9D + 1.6 (135-Wind)	Yes	Y		1	.9	8	1.6	41	1.6																
9	0.9D + 1.6 (150-Wind)	Yes	Y		1	.9	9	1.6	42	1.6																
10	0.9D + 1.6 (180-Wind)	Yes	Y		1	.9	10	1.6	43	1.6																
11	0.9D + 1.6 (210-Wind)	Yes	Y		1	.9	11	1.6	44	1.6																
12	0.9D + 1.6 (225-Wind)	Yes	Y		1	.9	12	1.6	45	1.6																
13	0.9D + 1.6 (240-Wind)	Yes	Y		1	.9	13	1.6	46	1.6																
14	0.9D + 1.6 (270-Wind)	Yes	Y		1	.9	14	1.6	47	1.6																
15	0.9D + 1.6 (300-Wind)	Yes	Y		1	.9	15	1.6	48	1.6																
16	0.9D + 1.6 (315-Wind)	Yes	Y		1	.9	16	1.6	49	1.6																
17	0.9D + 1.6 (330-Wind)	Yes	Y		1	.9	17	1.6	50	1.6																
18	1.2D + 1.6 (0-Wind)	Yes	Y		1	1.2	2	1.6	35	1.6																
19	1.2D + 1.6 (30-Wind)	Yes	Y		1	1.2	3	1.6	36	1.6																

Load Combinations (Continued)

	Description	S...	PD...	SRSS	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
20	1.2D + 1.6 (45-Wind)	Yes	Y		1	1.2	4	1.6	37	1.6																
21	1.2D + 1.6 (60-Wind)	Yes	Y		1	1.2	5	1.6	38	1.6																
22	1.2D + 1.6 (90-Wind)	Yes	Y		1	1.2	6	1.6	39	1.6																
23	1.2D + 1.6 (120-Wind)	Yes	Y		1	1.2	7	1.6	40	1.6																
24	1.2D + 1.6 (135-Wind)	Yes	Y		1	1.2	8	1.6	41	1.6																
25	1.2D + 1.6 (150-Wind)	Yes	Y		1	1.2	9	1.6	42	1.6																
26	1.2D + 1.6 (180-Wind)	Yes	Y		1	1.2	10	1.6	43	1.6																
27	1.2D + 1.6 (210-Wind)	Yes	Y		1	1.2	11	1.6	44	1.6																
28	1.2D + 1.6 (225-Wind)	Yes	Y		1	1.2	12	1.6	45	1.6																
29	1.2D + 1.6 (240-Wind)	Yes	Y		1	1.2	13	1.6	46	1.6																
30	1.2D + 1.6 (270-Wind)	Yes	Y		1	1.2	14	1.6	47	1.6																
31	1.2D + 1.6 (300-Wind)	Yes	Y		1	1.2	15	1.6	48	1.6																
32	1.2D + 1.6 (315-Wind)	Yes	Y		1	1.2	16	1.6	49	1.6																
33	1.2D + 1.6 (330-Wind)	Yes	Y		1	1.2	17	1.6	50	1.6																
34	1.2D + 1.0Di + 1.0 (0-Wi...	Yes	Y		1	1.2	18	1	51	1	19	1	52	1												
35	1.2D + 1.0Di + 1.0 (30-W...	Yes	Y		1	1.2	18	1	51	1	20	1	53	1												
36	1.2D + 1.0Di + 1.0 (45-W...	Yes	Y		1	1.2	18	1	51	1	21	1	54	1												
37	1.2D + 1.0Di + 1.0 (60-W...	Yes	Y		1	1.2	18	1	51	1	22	1	55	1												
38	1.2D + 1.0Di + 1.0 (90-W...	Yes	Y		1	1.2	18	1	51	1	23	1	56	1												
39	1.2D + 1.0Di + 1.0 (120-...	Yes	Y		1	1.2	18	1	51	1	24	1	57	1												
40	1.2D + 1.0Di + 1.0 (135-...	Yes	Y		1	1.2	18	1	51	1	25	1	58	1												
41	1.2D + 1.0Di + 1.0 (150-...	Yes	Y		1	1.2	18	1	51	1	26	1	59	1												
42	1.2D + 1.0Di + 1.0 (180-...	Yes	Y		1	1.2	18	1	51	1	27	1	60	1												
43	1.2D + 1.0Di + 1.0 (210-...	Yes	Y		1	1.2	18	1	51	1	28	1	61	1												
44	1.2D + 1.0Di + 1.0 (225-...	Yes	Y		1	1.2	18	1	51	1	29	1	62	1												
45	1.2D + 1.0Di + 1.0 (240-...	Yes	Y		1	1.2	18	1	51	1	30	1	63	1												
46	1.2D + 1.0Di + 1.0 (270-...	Yes	Y		1	1.2	18	1	51	1	31	1	64	1												
47	1.2D + 1.0Di + 1.0 (300-...	Yes	Y		1	1.2	18	1	51	1	32	1	65	1												
48	1.2D + 1.0Di + 1.0 (315-...	Yes	Y		1	1.2	18	1	51	1	33	1	66	1												
49	1.2D + 1.0Di + 1.0 (330-...	Yes	Y		1	1.2	18	1	51	1	34	1	67	1												
50	1.0D + 1.5LL + 1.5 Railin...	Yes	Y		1	1	68	1.5	72	1.5																
51	1.0D + 1.5LL + 1.5 Railin...	Yes	Y		1	1	68	1.5	73	1.5																
52	1.0D + 1.5LL + 1.5 Railin...	Yes	Y		1	1	68	1.5	74	1.5																
53	1.0D + 1.5LL + 1.5 Railin...	Yes	Y		1	1	68	1.5	75	1.5																
54	1.0D + 1.5LL + 1.5 Railin...	Yes	Y		1	1	69	1.5	72	1.5																
55	1.0D + 1.5LL + 1.5 Railin...	Yes	Y		1	1	69	1.5	73	1.5																
56	1.0D + 1.5LL + 1.5 Railin...	Yes	Y		1	1	69	1.5	74	1.5																
57	1.0D + 1.5LL + 1.5 Railin...	Yes	Y		1	1	69	1.5	75	1.5																
58	1.0D + 1.5LL + 1.5 Railin...	Yes	Y		1	1	70	1.5	72	1.5																
59	1.0D + 1.5LL + 1.5 Railin...	Yes	Y		1	1	70	1.5	73	1.5																
60	1.0D + 1.5LL + 1.5 Railin...	Yes	Y		1	1	70	1.5	74	1.5																
61	1.0D + 1.5LL + 1.5 Railin...	Yes	Y		1	1	70	1.5	75	1.5																
62	1.0D + 1.5LL + 1.5 Railin...	Yes	Y		1	1	71	1.5	72	1.5																
63	1.0D + 1.5LL + 1.5 Railin...	Yes	Y		1	1	71	1.5	73	1.5																
64	1.0D + 1.5LL + 1.5 Railin...	Yes	Y		1	1	71	1.5	74	1.5																
65	1.0D + 1.5LL + 1.5 Railin...	Yes	Y		1	1	71	1.5	75	1.5																
66	Serviceability (0-Wind)	Yes	Y		1	1	2	.342	35	.342																
67	Serviceability (30-Wind)	Yes	Y		1	1	3	.342	36	.342																
68	Serviceability (45-Wind)	Yes	Y		1	1	4	.342	37	.342																
69	Serviceability (60-Wind)	Yes	Y		1	1	5	.342	38	.342																
70	Serviceability (90-Wind)	Yes	Y		1	1	6	.342	39	.342																
71	Serviceability (120-Wind)	Yes	Y		1	1	7	.342	40	.342																
72	Serviceability (135-Wind)	Yes	Y		1	1	8	.342	41	.342																
73	Serviceability (150-Wind)	Yes	Y		1	1	9	.342	42	.342																
74	Serviceability (180-Wind)	Yes	Y		1	1	10	.342	43	.342																
75	Serviceability (210-Wind)	Yes	Y		1	1	11	.342	44	.342																
76	Serviceability (225-Wind)	Yes	Y		1	1	12	.342	45	.342																

Load Combinations (Continued)

	Description	S...	PD...	SRSS	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
77	Serviceability (240-Wind)	Yes	Y		1	1	13	.342	46	.342																
78	Serviceability (270-Wind)	Yes	Y		1	1	14	.342	47	.342																
79	Serviceability (300-Wind)	Yes	Y		1	1	15	.342	48	.342																
80	Serviceability (315-Wind)	Yes	Y		1	1	16	.342	49	.342																
81	Serviceability (330-Wind)	Yes	Y		1	1	17	.342	50	.342																

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	N2	max	570.635	16	250.614	48	354.507	14	0	1	529.755	27	0	1
2		min	-1142.193	41	53.152	7	-736.533	38	0	1	-530.168	19	0	1
3	N5	max	1726.802	15	238.514	47	1066.093	16	0	1	546.22	27	0	1
4		min	-1994.536	23	42.641	7	-1144.625	23	0	1	-547.333	19	0	1
5	N21	max	197.152	19	213.755	42	1262.667	18	0	1	508.137	27	0	1
6		min	-110.05	22	26.476	17	-835.739	10	0	1	-510.518	19	0	1
7	N24	max	325.213	14	183.428	34	2130.918	18	0	1	503.935	27	0	1
8		min	-322.227	6	39.795	54	-1842.277	10	0	1	-506.248	19	0	1
9	N39	max	1179.32	28	127.971	62	378.466	5	0	1	510.122	27	0	1
10		min	-634.209	4	-28.697	13	-694.397	30	0	1	-508.648	19	0	1
11	N42	max	1929.259	29	127.989	45	1068.393	3	0	1	501.558	27	0	1
12		min	-1658.468	5	14.063	5	-990.389	29	0	1	-501.943	19	0	1
13	N85A	max	2674.213	35	3130.558	39	1596.932	43	13.756	27	15.885	27	7.942	27
14		min	490.327	16	591.383	15	260.494	14	-13.759	19	-15.888	19	-7.944	19
15	N86B	max	103.392	43	2826.509	34	-537.036	10	0	1	16.396	27	16.373	19
16		min	-103.568	35	553.433	9	-2751.038	34	0	1	-16.373	19	-16.396	27
17	N87A	max	-462.53	3	2907.627	45	1498.206	35	14.23	19	16.405	27	8.202	27
18		min	-2501.214	43	574.294	5	243.263	11	-14.207	27	-16.432	19	-8.216	19
19	Totals:	max	5042.379	14	9896.742	45	5042.401	2						
20		min	-5042.381	6	2117.371	5	-5042.414	10						

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

	Member	Shape	Code Ch...	Loc[ft]	LC	Shear ...	Loc[ft]	Dir	LC	phi*Pnc [...	phi*Pnt [l...	phi*Mn y...	phi*Mn z...	Cb	Eqn
1	BH1	PIPE_2.0	.200	6.322	34	.021	12.644		38	6152.873	32130	1871.625	1871.625	1....	H1-1b
2	BH2	PIPE_2.0	.201	6.322	39	.021	12.644		38	6152.873	32130	1871.625	1871.625	1....	H1-1b
3	BH3	PIPE_2.0	.200	6.322	45	.021	12.644		38	6152.873	32130	1871.625	1871.625	1....	H1-1b
4	H1	L2x2x2	.566	1	19	.083	1	y	40	12102.955	15908.4	402.563	826.722	1....	H2-1
5	H2	L2x2x2	.409	0	34	.087	1	y	48	12102.955	15908.4	396.008	844.628	2....	H2-1
6	H3	L2x2x2	.608	1	25	.088	1	y	39	12102.955	15908.4	402.563	829.922	1....	H2-1
7	H4	L2x2x2	.438	2	45	.092	1	y	46	12102.955	15908.4	396.008	844.628	2....	H2-1
8	H5	L2x2x2	.607	1	30	.089	1	y	34	12102.955	15908.4	402.563	828.111	1....	H2-1
9	H6	L2x2x2	.440	0	44	.093	1	y	36	12102.955	15908.4	396.008	844.628	1....	H2-1
10	MP1	PIPE_2.5	.119	3	18	.020	3		8	30038.461	50715	3596.25	3596.25	2....	H1-1b
11	MP2	PIPE_2.5	.108	3	18	.018	3		12	30038.461	50715	3596.25	3596.25	2....	H1-1b
12	MP3	PIPE_2.5	.106	3	31	.017	3		9	30038.461	50715	3596.25	3596.25	1....	H1-1b
13	MP4	PIPE_2.5	.118	3	31	.020	3		6	30038.461	50715	3596.25	3596.25	1....	H1-1b
14	MP5	PIPE_2.5	.106	3	21	.019	3		14	30038.461	50715	3596.25	3596.25	1....	H1-1b
15	MP6	PIPE_2.5	.118	3	21	.020	3		11	30038.461	50715	3596.25	3596.25	1....	H1-1b
16	MP7	PIPE_2.5	.125	4	33	.026	4		22	30038.461	50715	3596.25	3596.25	1....	H1-1b
17	MP8	PIPE_2.5	.335	7	37	.059	4.667		49	30038.461	50715	3596.25	3596.25	1....	H1-1b
18	MP9	PIPE_2.5	.348	7	42	.058	4.667		38	30038.461	50715	3596.25	3596.25	1....	H1-1b
19	MP10	PIPE_2.5	.362	7	39	.081	4.667		43	30038.461	50715	3596.25	3596.25	1....	H1-1b
20	SO1	PIPE_2.0	.437	1.75	36	.131	1.75		49	17855.085	32130	1871.625	1871.625	1....	H1-1b
21	SO2	PIPE_2.0	.480	1.75	37	.229	2.479		49	17855.085	32130	1871.625	1871.625	2....	H1-1b
22	SO3	PIPE_2.0	.443	1.75	42	.129	1.75		38	17855.085	32130	1871.625	1871.625	1....	H1-1b
23	SO4	PIPE_2.0	.499	1.75	42	.231	2.479		38	17855.085	32130	1871.625	1871.625	1....	H1-1b

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

	Member	Shape	Code Ch...	Loc[ft]	LC	Shear ...	Loc[ft]	Dir	LC	phi*Pnc [...	phi*Pnt [l...	phi*Mn y...	phi*Mn z...	Cb	Eqn
24	SO5	PIPE_2.0	.464	1.75	40	.166	1.75		43	17855.085	32130	1871.625	1871.625	1....	H1-1b
25	SO6	PIPE_2.0	.516	1.75	43	.250	1.75		35	17855.085	32130	1871.625	1871.625	1....	H1-1b
26	TH1	PIPE_2.0	.205	6.322	34	.021	12.644		38	6152.873	32130	1871.625	1871.625	1....	H1-1b
27	TH2	PIPE_2.0	.204	6.322	39	.021	12.644		38	6152.873	32130	1871.625	1871.625	1....	H1-1b
28	TH3	PIPE_2.0	.204	6.322	45	.021	12.644		38	6152.873	32130	1871.625	1871.625	1....	H1-1b
29	V1	PIPE_2.0	.083	3	62	.057	3		8	30698.041	32130	1871.625	1871.625	2....	H1-1b
30	V2	PIPE_2.0	.045	0	41	.016	3		25	30698.041	32130	1871.625	1871.625	1....	H1-1b
31	V3	PIPE_2.0	.381	3	45	.055	3		49	30698.041	32130	1871.625	1871.625	2....	H1-1b
32	V4	PIPE_2.0	.074	0	41	.035	3		14	30698.041	32130	1871.625	1871.625	2....	H1-1b
33	V5	PIPE_2.0	.050	0	34	.025	0		22	30698.041	32130	1871.625	1871.625	2....	H1-1b
34	V6	PIPE_2.0	.393	3	34	.055	3		38	30698.041	32130	1871.625	1871.625	2....	H1-1b
35	V7	PIPE_2.0	.101	3	34	.069	3		3	30698.041	32130	1871.625	1871.625	2....	H1-1b
36	V8	PIPE_2.0	.198	2.625	24	.057	3		30	30698.041	32130	1871.625	1871.625	2....	H1-1b
37	V9	PIPE_2.0	.405	3	39	.070	3		35	30698.041	32130	1871.625	1871.625	2....	H1-1b
38	K1	LL2.5x2.5x3...	.118	0	45	.099	6.364	y	27	34504.096	58320	3954.307	2549.586	1	H1-1b*
39	K2	LL2.5x2.5x3...	.114	0	34	.099	0	y	19	34504.096	58320	3954.307	2549.586	1	H1-1b*
40	K3	LL2.5x2.5x3...	.127	0	39	.098	0	z	19	34504.096	58320	3954.307	2549.586	1	H1-1b*
41	MP11	PIPE_2.5	.034	7	44	.052	7		12	30038.461	50715	3596.25	3596.25	2....	H1-1b
42	MP12	PIPE_2.5	.096	4	30	.019	4		14	30038.461	50715	3596.25	3596.25	1....	H1-1b

RAMAKER & ASSOCIATES, INC.
855 Community Drive, Sauk City, WI 53583
Phone: 608-643-4100 Fax: 608-643-7999

Job: BANM Tower (CT03XC212)
Project: 23002
By: RJN
Date: 12/7/17

Wind Load on Antennas TIA-222-G

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

$F = q_z\ G_h\ C_a\ A_a$

Occupancy:	II		Classification of Structures (Table 2-1)
Exposure:	B		Exposure Category
V:	97	mph	Basic Wind Speed (Annex B)
z:	147	ft	Height above ground level to the center of the antenna
I:	1.00		Importance Factor (Table 2-3)
K_z:	1.10		Velocity Pressure Coefficient (2.6.5.2)
K_{zt}:	1.00		Topographic Factor (2.6.6.4)
K_d:	0.95		Wind Direction Probability Factor (Table 2-2)
q_z:	25.2	psf	Velocity Pressure at Height z
G_h:	1.00		Strength Design of Appurtenances and their Connections

Mount & Antenna Wind Loads

Appurtenance	Height	Width	h/D	Shape	C_a	A_f	Force	Force
	in	*in*				*sq ft*	*lb*	*plf*
APXVSPP18-C	72.0	11.9	6.1	Flat	1.358	5.95	203.8	
DT465B-2XR	71.9	13.8	5.2	Flat	1.320	6.89	229.7	
1900MHz 4x40W RRH	25.1	11.1	2.3	Flat	1.200	1.93	58.6	
800MHz 2x50W RRH	19.0	13.0	1.5	Flat	1.200	1.72	52.0	
TD-RRH8x20	26.1	18.6	1.4	Flat	1.200	3.37	102.1	
20' Omni	240.0	2.5	96.0	Round	1.200	4.17	126.2	6.3
Pipe2STD x 12.6 ft	151.2	2.4	63.7	Round	1.200	2.49	75.5	6.0
Pipe2STD x 7 ft	84.0	2.4	35.4	Round	1.200	1.39	42.0	6.0
Pipe2STD x 5 ft	60.0	2.4	25.3	Round	1.200	0.99	30.0	6.0
Pipe2STD x 3 ft	36.0	2.4	15.2	Round	0.981	0.59	14.7	4.9
Pipe2-1/2STD x 8 ft	96.0	2.9	33.4	Round	1.200	1.92	58.1	7.3
L2X2X1/8 x 2 ft	24.0	2.0	12.0	Flat	1.567	0.33	13.2	6.6
Pipe1STD x 20 ft	240.0	1.3	182.5	Round	1.200	2.19	66.4	3.3
L2-1/2X2-1/2X3/16 x 6.4 ft	76.8	2.5	30.7	Flat	2.000	1.33	67.3	10.5

RAMAKER & ASSOCIATES, INC.
855 Community Drive, Sauk City, WI 53583
Phone: 608-643-4100 Fax: 608-643-7999

Job: BANM Tower (CT03XC212)
Project: 23002
By: RJN
Date: 12/7/17

Wind Load on Antennas TIA-222-G

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

$F = q_z\ G_h\ C_a\ A_a$

Occupancy:	II		Classification of Structures (Table 2-1)
Exposure:	B		Exposure Category
V:	97	mph	Basic Wind Speed (Annex B)
z:	147	ft	Height above ground level to the center of the antenna
I:	1.00		Importance Factor (Table 2-3)
K_z:	1.10		Velocity Pressure Coefficient (2.6.5.2)
K_{zt}:	1.00		Topographic Factor (2.6.6.4)
K_d:	0.95		Wind Direction Probability Factor (Table 2-2)
q_z:	25.2	psf	Velocity Pressure at Height z
G_h:	1.00		Strength Design of Appurtenances and their Connections

Mount & Antenna Wind Loads

Appurtenance	Height	Depth	h/D	Shape	C_a	A_f	Force	Force
	in	*in*				*sq ft*	*lb*	*plf*
APXVSPP18-C	72.0	7.0	10.3	Flat	1.509	3.50	133.5	
DT465B-2XR	71.9	8.2	8.8	Flat	1.459	4.09	150.8	
1900MHz 4x40W RRH	25.1	10.7	2.3	Flat	1.200	1.86	56.4	
800MHz 2x50W RRH	19.0	12.2	1.6	Flat	1.200	1.61	48.8	
TD-RRH8x20	26.1	6.7	3.9	Flat	1.262	1.21	38.7	
20' Omni	240.0	2.5	96.0	Round	1.200	4.17	126.2	6.3
Pipe2STD x 12.6 ft	151.2	2.4	63.7	Round	1.200	2.49	75.5	6.0
Pipe2STD x 7 ft	84.0	2.4	35.4	Round	1.200	1.39	42.0	6.0
Pipe2STD x 5 ft	60.0	2.4	25.3	Round	1.200	0.99	30.0	6.0
Pipe2STD x 3 ft	36.0	2.4	15.2	Round	0.981	0.59	14.7	4.9
Pipe2-1/2STD x 8 ft	96.0	2.9	33.4	Round	1.200	1.92	58.1	7.3
L2X2X1/8 x 2 ft	24.0	2.0	12.0	Flat	1.567	0.33	13.2	6.6
Pipe1STD x 20 ft	240.0	1.3	182.5	Round	1.200	2.19	66.4	3.3
L2-1/2X2-1/2X3/16 x 6.4 ft	76.8	2.5	30.7	Flat	2.000	1.33	67.3	10.5

RAMAKER & ASSOCIATES, INC.
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Job: BANM Tower (CT03XC212)
Project: 23002
By: RJN
Date: 12/7/17

Ice Wind Load on Antennas TIA-222-G

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

$F = q_z\ G_h\ C_a\ A_a$

Occupancy:	II		Classification of Structures (Table 2-1)
Exposure:	B		Exposure Category
V_i:	50	mph	Basic Wind Speed (Annex B)
z:	147	ft	Height above ground level to the center of the antenna
I:	1.00		Importance Factor (Table 2-3)
K_z:	1.10		Velocity Pressure Coefficient (2.6.5.2)
K_{zt}:	1.00		Topographic Factor (2.6.6.4)
K_d:	0.95		Wind Direction Probability Factor (Table 2-2)
q_z:	6.71	psf	Velocity Pressure at Height z
G_h:	1.00		Strength Design of Appurtenances and their Connections
K_{iz}:	1.16		Height Escalation Factor for Ice Thickness
t_{iz}:	2.32	in	Factored Thickness of Radial Glaze Ice at Height z

Mount & Antenna Ice Wind Loads

Appurtenance	Height	Width	h/D	Shape	C_a	A_f	Force	Force
	in	*in*				*sq ft*	*lb*	*plf*
APXVSPP18-C	76.7	16.5	4.6	Flat	1.295	8.80	76.4	
DT465B-2XR	76.5	18.4	4.1	Flat	1.273	9.80	83.7	
1900MHz 4x40W RRH	29.7	15.7	1.9	Flat	1.200	3.25	26.2	
800MHz 2x50W RRH	23.6	17.6	1.3	Flat	1.200	2.90	23.3	
TD-RRH8x20	30.7	23.2	1.3	Flat	1.200	4.96	39.9	
20' Omni	244.6	7.1	34.2	Round	1.200	12.14	97.7	4.8
Pipe2STD x 12.6 ft	155.8	7.0	22.2	Round	1.138	7.60	58.0	4.5
Pipe2STD x 7 ft	88.6	7.0	12.6	Round	0.925	4.32	26.8	3.6
Pipe2STD x 5 ft	64.6	7.0	9.2	Round	0.849	3.15	17.9	3.3
Pipe2STD x 3 ft	40.6	7.0	5.8	Round	0.773	1.98	10.3	3.0
Pipe2-1/2STD x 8 ft	100.6	7.5	13.4	Round	0.942	5.26	33.2	4.0
L2X2X1/8 x 2 ft	28.6	6.6	4.3	Flat	1.280	1.32	11.4	4.8
Pipe1STD x 20 ft	244.6	6.0	41.1	Round	1.200	10.12	81.5	4.0
L2-1/2X2-1/2X3/16 x 6.4 ft	81.4	7.1	11.4	Flat	1.547	4.04	41.9	6.2

RAMAKER & ASSOCIATES, INC.
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Job: BANM Tower (CT03XC212)
Project: 23002
By: RJN
Date: 12/7/17

Ice Wind Load on Antennas TIA-222-G

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

$F = q_z\ G_h\ C_a\ A_a$

Occupancy:	II		Classification of Structures (Table 2-1)
Exposure:	B		Exposure Category
V_i:	50	mph	Basic Wind Speed (Annex B)
z:	147	ft	Height above ground level to the center of the antenna
I:	1.00		Importance Factor (Table 2-3)
K_z:	1.10		Velocity Pressure Coefficient (2.6.5.2)
K_{zt}:	1.00		Topographic Factor (2.6.6.4)
K_d:	0.95		Wind Direction Probability Factor (Table 2-2)
q_z:	6.71	psf	Velocity Pressure at Height z
G_h:	1.00		Strength Design of Appurtenances and their Connections
K_{iz}:	1.16		Height Escalation Factor for Ice Thickness
t_{iz}:	2.32	in	Factored Thickness of Radial Glaze Ice at Height z

Mount & Antenna Ice Wind Loads

Appurtenance	Height	Depth	h/D	Shape	C_a	A_f	Force	Force
	in	*in*				*sq ft*	*lb*	*plf*
APXVSPP18-C	76.7	11.7	6.6	Flat	1.381	6.20	57.5	
DT465B-2XR	76.5	12.8	6.0	Flat	1.354	6.83	62.0	
1900MHz 4x40W RRH	29.7	15.3	1.9	Flat	1.200	3.17	25.5	
800MHz 2x50W RRH	23.6	16.8	1.4	Flat	1.200	2.77	22.3	
TD-RRH8x20	30.7	11.3	2.7	Flat	1.209	2.42	19.6	
20' Omni	244.6	7.1	34.2	Round	1.200	12.14	97.7	4.8
Pipe2STD x 12.6 ft	155.8	7.0	22.2	Round	1.138	7.60	58.0	4.5
Pipe2STD x 7 ft	88.6	7.0	12.6	Round	0.925	4.32	26.8	3.6
Pipe2STD x 5 ft	64.6	7.0	9.2	Round	0.849	3.15	17.9	3.3
Pipe2STD x 3 ft	40.6	7.0	5.8	Round	0.773	1.98	10.3	3.0
Pipe2-1/2STD x 8 ft	100.6	7.5	13.4	Round	0.942	5.26	33.2	4.0
L2X2X1/8 x 2 ft	28.6	6.6	4.3	Flat	1.280	1.32	11.4	4.8
Pipe1STD x 20 ft	244.6	6.0	41.1	Round	1.200	10.12	81.5	4.0
L2-1/2X2-1/2X3/16 x 6.4 ft	81.4	7.1	11.4	Flat	1.547	4.04	41.9	6.2

RAMAKER & ASSOCIATES, INC.
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Phone: 608-643-4100 Fax: 608-643-7999

Job: BANM Tower (CT03XC212)
Project: 23002
By: RJN
Date: 12/7/17

Ice Load on Antennas TIA-222-G

Ice Weight:	56	pcf	Ice Density
t_i:	1.00		Design Ice Thickness
Occupancy:	II		Classification of Structures (Table 2-1)
Exposure:	B		Exposure Category
V_i:	50	mph	Basic Wind Speed (Annex B)
z:	147	ft	Height above ground level to the center of the antenna
I:	1.00		Importance Factor (Table 2-3)
K_{iz}:	1.16		Height Escalation Factor for Ice Thickness
K_{zt}:	1.00		Topographic Factor (2.6.6.4)
t_{iz}:	2.32	in	Factored Thickness of Radial Glaze Ice at Height z

Platform Grating: None
Ice Load: psf

Mount & Antenna Ice Wind Loads

Appurtenance	Height	Width	Depth	Diam.	Area	Perim.	Ice Weight	
	in	*in*	*in*	*in*	*sq in*	*in*	*lb*	*plf*
APXVSPP18-C	76.7	16.5	11.7	13.80	117.63	47.08	274.5	
DT465B-2XR	76.5	18.4	12.8	16.05	134.05	53.29	312.4	
1900MHz 4x40W RRH	29.7	15.7	15.3	15.41	129.37	52.87	105.2	
800MHz 2x50W RRH	23.6	17.6	16.8	17.83	147.01	59.69	90.5	
TD-RRH8x20	30.7	23.2	11.3	19.77	161.18	59.89	136.3	
20' Omni	244.6	7.1	7.1	2.50	35.18	15.15	273.6	13.7
Pipe2STD x 12.6 ft	155.8	7.0	7.0	2.38	34.27	14.76	167.9	13.3
Pipe2STD x 7 ft	88.6	7.0	7.0	2.38	34.27	14.76	93.3	13.3
Pipe2STD x 5 ft	64.6	7.0	7.0	2.38	34.27	14.76	66.6	13.3
Pipe2STD x 3 ft	40.6	7.0	7.0	2.38	34.27	14.76	40.0	13.3
Pipe2-1/2STD x 8 ft	100.6	7.5	7.5	2.88	37.92	16.33	118.0	14.7
L2X2X1/8 x 2 ft	28.6	6.6	6.6	2.83	37.58	17.29	29.2	14.6
Pipe1STD x 20 ft	244.6	6.0	6.0	1.32	26.54	11.43	206.4	10.3
L2-1/2X2-1/2X3/16 x 6.4 ft	81.4	7.1	7.1	3.54	42.74	19.29	106.4	16.6

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PROJECT: DO MACRO UPGRADE

SITE NAME: BANM TOWER

SITE CASCADE: CT03XC212-E

SITE ADDRESS: 497 OLD POST ROAD
TOLLAND, CT 06084

SITE TYPE: 150'-0' GUYED TOWER

SITE INFORMATION

PROPERTY OWNER:
OLD POST ROAD HOLDINGS, LLC
4564 BERSAGLIO STREET
LAS VEGAS, NV 89135

SITE ADDRESS:
497 OLD POST ROAD
TOLLAND, CT 06084
TOLLAND COUNTY

GEOGRAPHIC COORDINATES:
LATITUDE: 41.86073° (41° 51' 38.6274" N)
LONGITUDE: -72.40337° (72° 24' 12.1314" W)

ZONING JURISDICTION:
CONNECTICUT SITTING COUNCIL

ZONING DISTRICT:
R2-A RESIDENCE

POWER COMPANY:
CONNECTICUT LIGHT AND POWER
PH.: (800) 286-2000

AAV PROVIDER:
AT&T
PH.: (800) 288-2020

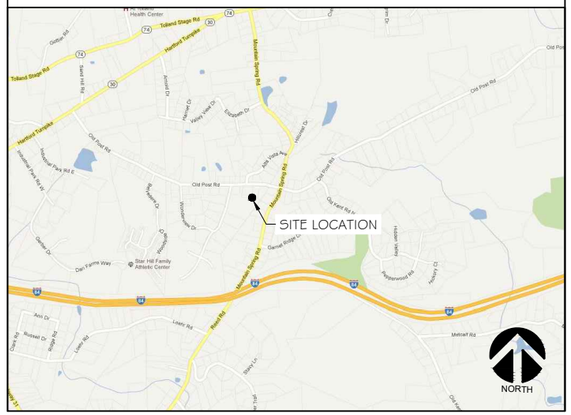
SPRINT CONSTRUCTION MANAGER:
NAME: MIKE DELIA
PHONE: (781) 316-6348
E-MAIL: michael.delia@sprint.com

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

SITE ACQUISITION:
CHARLES CHERUNDOLO CONSULTING, INC.
1280 RT. 46 WEST
PARSIPPANY, NJ 07054
CONTACT: TOM JUPIN, PMP, PROJECT MANAGER
CELL: (973) 819-9033
EMAIL: tom.jupin@cherundoloconsulting.com

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

AREA MAP



LOCATION MAP

PROJECT DESCRIPTION

- INSTALL NEW 2.5 EQUIPMENT IN EXISTING BTS CABINET
  *(1) RECTIFIER SHELF AND (3) RECTIFIERS
  *(1) BASE BAND UNIT
- INSTALL \ NEW BATTERY STRING(S) IN EXISTING BATTERY CABINET
- INSTALL (3) PANEL ANTENNAS
- INSTALL (6) RRH'S ON TOWER
- INSTALL (1) HYBRID CABLE

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

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

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1 INTERNATIONAL BLVD, SUITE 800
MAHWAH, NJ 07495

RAMAKER & ASSOCIATES, INC.
700-76 BROADWAY, SUITE 182
WESTWOOD, NJ 07675
www.Ramaker.com

Charles Cherundolo Consulting, Inc.
713 Clover Lane, Moscow, PA 18444
Phone: 570-840-5084 Fax: 570-842-5592

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 · 26266 · LICENSED PROFESSIONAL ENGINEER

Signature: 12/14/2017 Date:

MARK	DATE	DESCRIPTION
A	12/14/17	REVISED PER NEW RFDS

ISSUE PHASE: FINAL DATE ISSUED: 11/29/2017

PROJECT TITLE:
BANM TOWER
CT03XC212

PROJECT INFORMATION:
497 OLD POST ROAD
TOLLAND. CT. 06084
TOLLAND COUNTY

SHEET TITLE:
TITLE SHEET

SCALE: NONE

PROJECT NUMBER: 23002
SHEET NUMBER: T-1

DRAWN BY: TWS CHECKED BY: KAB

C:\Users\rhegge\appdata\local\temp\AcPublish_635\23002 Sprint Macro Upgrade CD.dwg Printed by: rhegge on Dec 14, 2017 - 3:57pm

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 · 26266 · LICENSED PROFESSIONAL ENGINEER

Signature: Date: 12/14/2017

MARK	DATE	DESCRIPTION
A	12/14/17	REVISED PER NEW RFDS

ISSUE PHASE: FINAL DATE ISSUED: 11/29/2017

PROJECT TITLE:
BANM TOWER
CT03XC212

PROJECT INFORMATION:
497 OLD POST ROAD
TOLLAND. CT. 06084
TOLLAND COUNTY

SHEET TITLE:
SPRINT SPECIFICATIONS

SCALE: NONE

PROJECT NUMBER: 23002
SHEET NUMBER: SP-1

DRAWN BY: TWS CHECKED BY: KAB

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

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

E. SPRINT RESERVES THE RIGHT TO INSPECT THE CONSTRUCTION SITE AT ANY TIME VIA SITE WALKS AND/OR PHOTO REVIEWS. CONTRACTOR SHALL GIVE SPRINT 24 HOURS NOTICE PRIOR TO THE COMMENCEMENT OF THE FOLLOWING CONSTRUCTION ACTIVITIES AND PHOTOGRAPHS OF THE IN-PROGRESS WORK.

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

PROJECT CLOSEOUT:

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

B. CLOSEOUT DOCUMENTATION: ALL CLOSEOUT DOCUMENTATION AND PHOTOGRAPHS SHALL BE UPLOADED PRIOR TO FINAL ACCEPTANCE. SPRINT WILL REVIEW CLOSEOUT DOCUMENTATION FOR PRESENCE AND CONTENT. CLOSEOUT DOCUMENTATION SHALL INCLUDE BUT IS NOT LIMITED TO THE FOLLOWING AS APPLICABLE:

1. COAX SWEEP TESTS:
2. FIBER TESTS:
3. JURISDICTION FINAL INSPECTION DOCUMENTATION
4. REINFORCEMENT CERTIFICATION (MILL CERTIFICATION)
5. CONCRETE MIX DESIGN AND PRODUCT DATA (TOWER FOUNDATION)
6. LIEN WAIVERS AND RELEASES.
7. POST -CONSTRUCTION HEIGHT VERIFICATION
8. JURISDICTION CERTIFICATE OF OCCUPANCY
9. ELECTRONIC ANTENNA AZIMUTH AND DOWN TILT VERIFICATION
10. STRUCTURAL BACKFILL TEST RESULTS (IF APPLICABLE)
11. CELL SITE UTILITY SETUP
12. AS-BUILT REDLINE CONSTRUCTION DRAWINGS (PDF SCAN OF FIELD MARKS)
13. AS-BUILT CONSTRUCTION DRAWINGS IN DWG AND PDF FORMATS
14. LIST OF SUB CONTRACTORS
15. APPROVED PERMITTING DOCUMENTS
16. FINAL SITE PHOTOS UP-LOADED TO SITERRA. INCLUDE THE FOLLOWING AS APPLICABLE:
    a. TOWER, ANTENNAS, RRUS, AND MAINLINE: INSPECTION AND PHOTOGRAPHS OF SECTION STACKING; INSPECTION AND PHOTOGRAPHS OF PLATFORM COMPONENT ATTACHMENT POINTS; PHOTOGRAPHS OF TOWER TOP GROUNDING; PHOTOS OF TOWER COAX/CABLE LINE COLOR CODING AT THE TOP AND AT GROUND LEVEL; INSPECTION AND PHOTOGRAPHS OF OPERATIONAL OF TOWER LIGHTING, AND PLACEMENT OF FAA REGISTRATION SIGN; PHOTOGRAPHS SHOWING ADDITIONAL GROUNDING POINTS FOR TOWERS GREATER THAN 200 FEET.; PHOTOS OF ANTENNA GROUND BAR, EQUIPMENT GROUND BAR, AND MASTER GROUND BAR; PHOTOS OF GPS ANTENNA(S); PHOTOS OF EACH SECTOR OF ANTENNAS; ONE PHOTOGRAPH LOOKING AT THE SECTOR AND ONE FROM BEHIND SHOWING THE PROJECTED COVERAGE AREA; PHOTOS OF COAX WEATHERPROOFING - TOP AND BOTTOM; PHOTOS OF COAX GROUNDING--TOP AND BOTTOM; PHOTOS OF ANTENNA AND MAST GROUNDING; PHOTOS OF COAX CABLE ENTRY INTO SHELTER; PHOTOS OF PLATFORM MECHANICAL CONNECTIONS TO TOWER/MONOPOLE.
    b. ROOF TOPS: PRE-CONSTRUCTION AND POST-CONSTRUCTION VISUAL INSPECTION AND PHOTOGRAPHS OF THE ROOF AND INTERIOR TO DETERMINE AND DOCUMENT CONDITIONS; ROOF TOP CONSTRUCTION INSPECTIONS AS REQUIRED BY THE JURISDICTION; PHOTOGRAPHS OF CABLE TRAY AND/OR ICE BRIDGE; PHOTOGRAPHS OF DOGHOUSE/CABLE EXIT FROM ROOF;
    c. SITE LAYOUT - PHOTOGRAPHS OF THE OVERALL COMPOUND, INCLUDING EQUIPMENT PLATFORM FROM ALL FOUR CORNERS.
    d. FINISHED UTILITIES: CLOSE-UP PHOTOGRAPHS OF THE PPC BREAKER PANEL; CLOSE-UP PHOTOGRAPH OF THE INSIDE OF THE TELCO PANEL AND NIU; CLOSE-UP PHOTOGRAPH OF THE POWER METER AND DISCONNECT; PHOTOS OF POWER AND TELCO ENTRANCE TO COMPANY ENCLOSURE; PHOTOGRAPHS AT METER BOX AND/OR FACILITY DISTRIBUTION PANEL.

PROJECT PHOTOGRAPHS:

A. PROVIDE PROJECT CLOSEOUT GENERAL ARRANGEMENT PHOTOS OF ALL NEW WORK. THE FOLLOWING LIST REPRESENTS MINIMUM REQUIREMENTS AND MINIMUM QUANTITY. ADDITIONAL PHOTOS MAY BE REQUIRED TO ADEQUATELY DOCUMENT THE WORK.

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

DEFICIENCY CORRECTIONS:

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

SECTION 01 500 - PROJECT REPORTING

WEEKLY REPORTS:

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

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

PROJECT CONFERENCE CALLS:

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

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

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

SUMMARY:

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

ANTENNAS AND RRU'S:

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

HYBRID CABLE:

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

JUMPERS AND CONNECTORS:

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

REMOTE ELECTRICAL TILT (RET) CABLES:

MISCELLANEOUS:

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

ANTENNA INSTALLATION:

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

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

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

HYBRID CABLE INSTALLATION:

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

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

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

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

WEATHERPROOFING EXTERIOR CONNECTORS AND HYBRID CABLE GROUND KITS:

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

B. WEATHERPROOFED USING ONE OF THE FOLLOWING METHODS. ALL INSTALLATIONS MUST BE DONE IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS AND INDUSTRY BEST PRACTICES.

1. COLD SHRINK: ENCOMPASS CONNECTOR IN COLD SHRINK TUBING AND PROVIDE A DOUBLE WRAP OF 2" ELECTRICAL TAPE EXTENDING 2" BEYOND TUBING. PROVIDE 3M COLD SHRINK CXS SERIES OR EQUAL.
2. SELF-AMALGAMATING TAPE: CLEAN SURFACES. APPLY A DOUBLE WRAP OF SELF-AMALGAMATING TAPE 2" BEYOND CONNECTOR. APPLY A SECOND WRAP OF SELF-AMALGAMATING TAPE IN OPPOSITE DIRECTION. APPLY DOUBLE WRAP OF 2" WIDE ELECTRICAL TAPE EXTENDING 2" BEYOND THE SELF-AMALGAMATING TAPE.
3. 3M SLIM LOCK CLOSURE 716: SUBSTITUTIONS WILL NOT BE ALLOWED.
4. OPEN FLAME ON JOB SITE IS NOT ACCEPTABLE

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

SUMMARY:

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

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

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

DC CIRCUIT BREAKER LABELING

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

SECTION 26 100 - BASIC ELECTRICAL REQUIREMENTS

SUMMARY:

THIS SECTION SPECIFIES BASIC ELECTRICAL REQUIREMENTS FOR SYSTEMS AND COMPONENTS

QUALITY ASSURANCE:

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

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

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

SUPPORTING DEVICES:

A. MANUFACTURED STRUCTURAL SUPPORT MATERIALS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCTS BY THE FOLLOWING:

1. ALLIED TUBE AND CONDUIT.
2. B-LINE SYSTEM.
3. UNISTRUT DIVERSIFIED PRODUCTS.
4. THOMAS & BETTS.

B. FASTENERS: TYPES, MATERIALS, AND CONSTRUCTION FEATURES AS FOLLOWS:

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

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Certification & Seal:

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STATE OF CONNECTICUT
JAMES R. SKOWRONSKI
26266
LICENSED PROFESSIONAL ENGINEER

Signature: Date: 12/14/2017

MARK	DATE	DESCRIPTION
A	12/14/17	REVISED PER NEW RFDS

ISSUE PHASE: FINAL DATE ISSUED: 11/29/2017

PROJECT TITLE:

BANM TOWER
CT03XC212

PROJECT INFORMATION:
497 OLD POST ROAD
TOLLAND. CT. 06084
TOLLAND COUNTY

SHEET TITLE:

SPRINT SPECIFICATIONS

SCALE: NONE

PROJECT NUMBER: 23002

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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Certification & Seal:
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STATE OF CONNECTICUT
JAMES R. SKOWRONSKI
26266
LICENSED
PROFESSIONAL ENGINEER

Signature: Date: 12/14/2017

MARK	DATE	DESCRIPTION
A	12/14/17	REVISED PER NEW RFDS

ISSUE PHASE: FINAL
DATE ISSUED: 11/29/2017

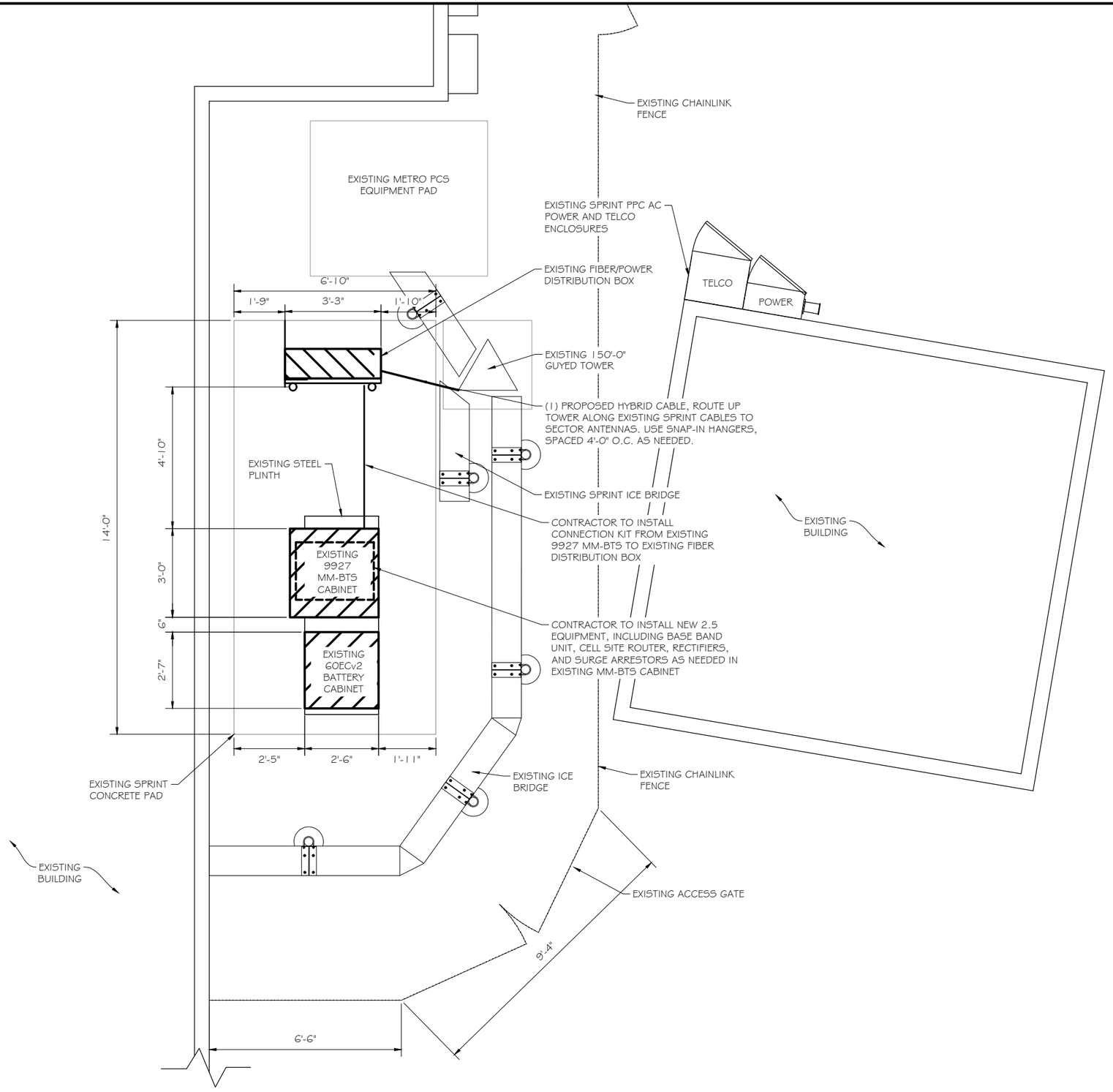
PROJECT TITLE:
BANM TOWER
CT03XC212

PROJECT INFORMATION:
497 OLD POST ROAD
TOLLAND. CT. 06084
TOLLAND COUNTY

SHEET TITLE:
SPRINT SPECIFICATIONS

SCALE: NONE

PROJECT NUMBER: 23002
SHEET NUMBER: SP-3



SITE PLAN
SCALE: 1" = 3.75'

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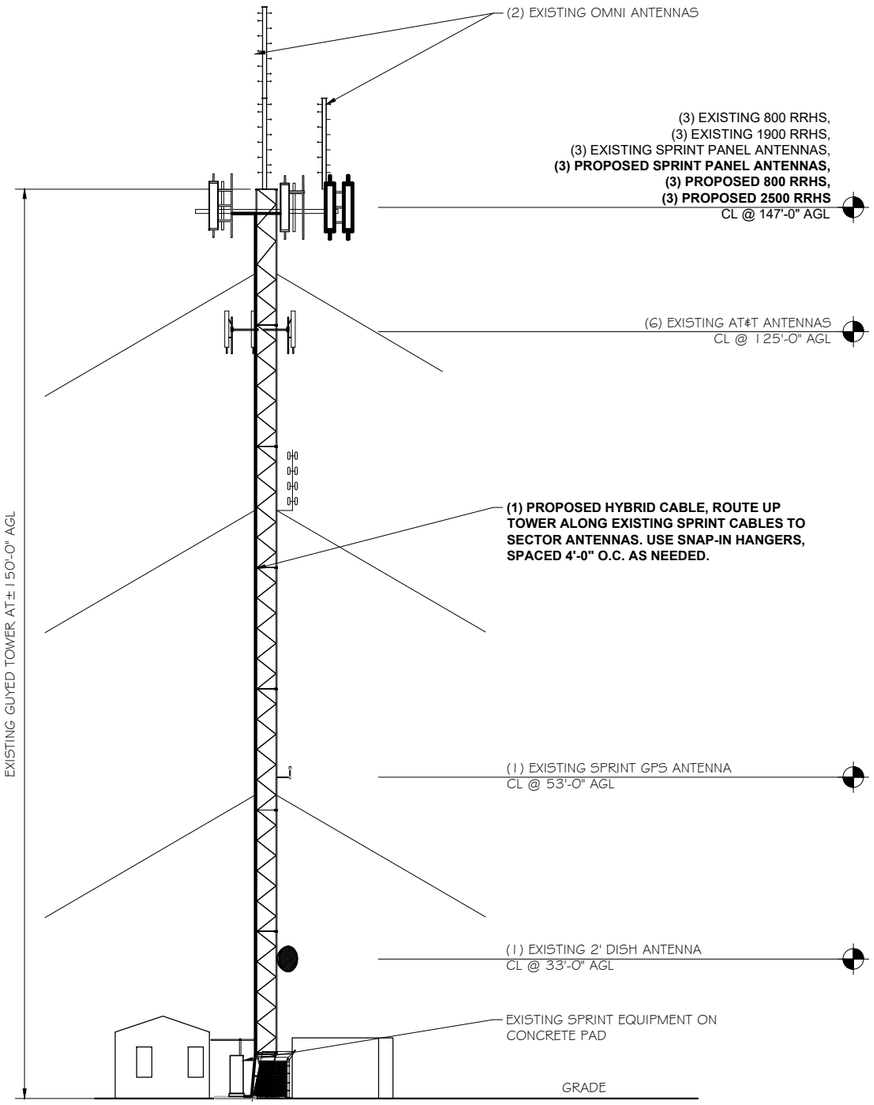
PROJECT TITLE:
BANM TOWER
CT03XC212

PROJECT INFORMATION:
497 OLD POST ROAD
TOLLAND. CT. 06084
TOLLAND COUNTY

SHEET TITLE:
SITE PLAN

0 1.875' 3.75' 7.5'
11" x 17" - 1" = 3.75'
22" x 34" - 1" = 1.875'

PROJECT NUMBER: 23002
SHEET NUMBER: A-1



BUILDING ELEVATION (1)
SCALE: 1" = 25'

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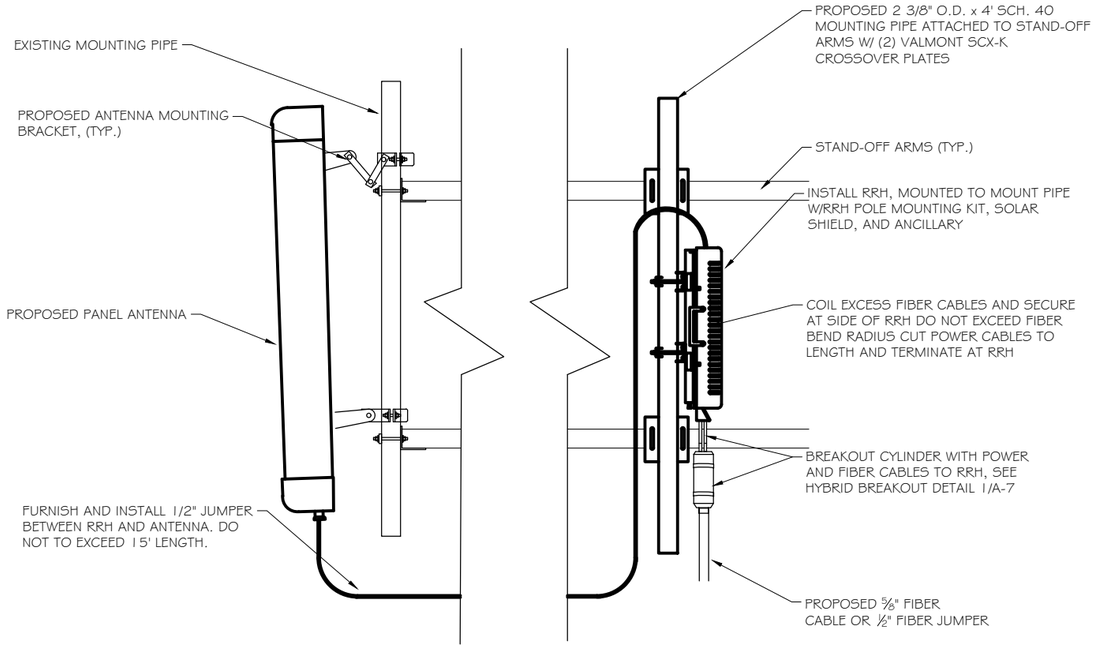
BANM TOWER
CT03XC212

PROJECT INFORMATION:
497 OLD POST ROAD
TOLLAND. CT. 06084
TOLLAND COUNTY

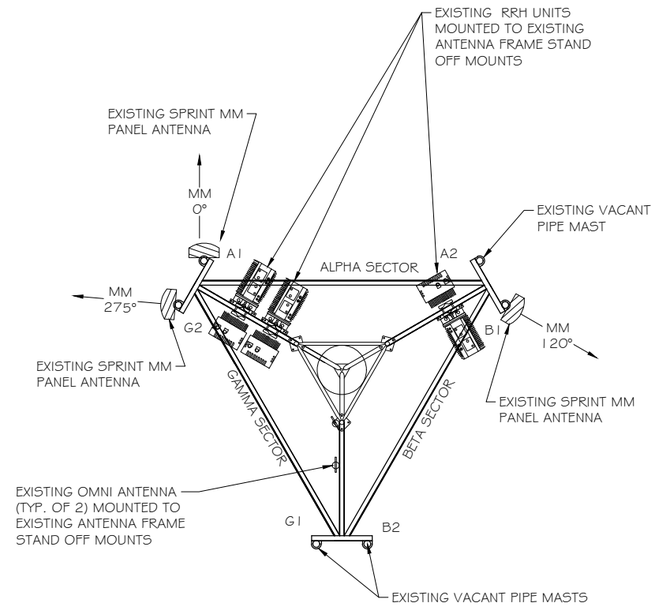
SHEET TITLE:
ELEVATION

0 12.5' 25' 50'
11" x 17" - 1" = 25'
22" x 34" - 1" = 12.5'

PROJECT NUMBER: 23002
SHEET NUMBER: A-2

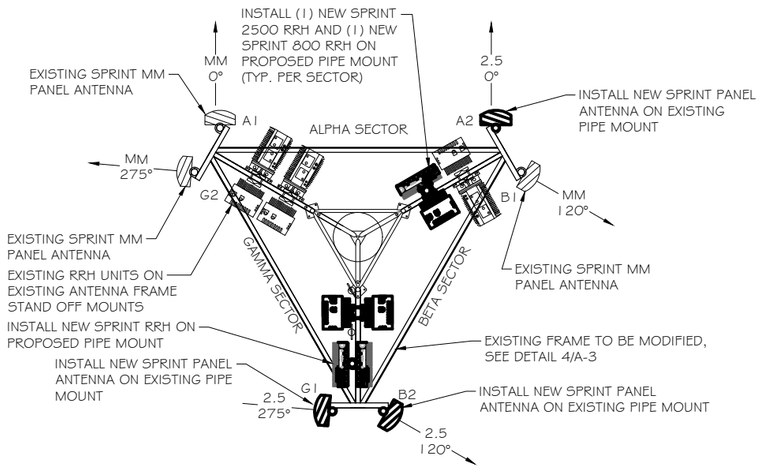


ANTENNA & RRH MOUNTING DETAILS (1)
SCALE: NTS



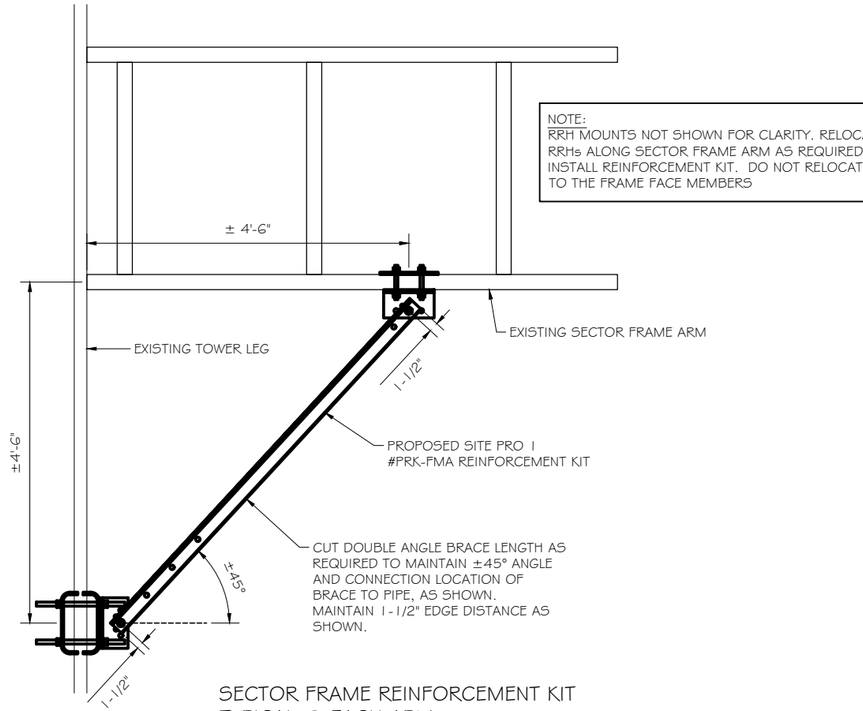
NORTH

EXISTING ANTENNA ARRAY (2)
SCALE: NTS



NORTH

PROPOSED ANTENNA ARRAY (3)
SCALE: NTS



SECTOR FRAME REINFORCEMENT KIT
TYPICAL @ EACH ARM (4)
SCALE: NTS

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STATE OF CONNECTICUT · JAMES R. SKOWRONSKI · 26266 · LICENSED PROFESSIONAL ENGINEER

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ISSUE PHASE: FINAL — DATE ISSUED: 11/29/2017

PROJECT TITLE:
BANM TOWER
CT03XC212

PROJECT INFORMATION:
497 OLD POST ROAD
TOLLAND. CT. 06084
TOLLAND COUNTY

SHEET TITLE:
ANTENNA DETAILS

SCALE: NONE

PROJECT NUMBER: 23002
SHEET NUMBER: A-3

800/1900/2.5 EQUIPMENT SCHEDULE

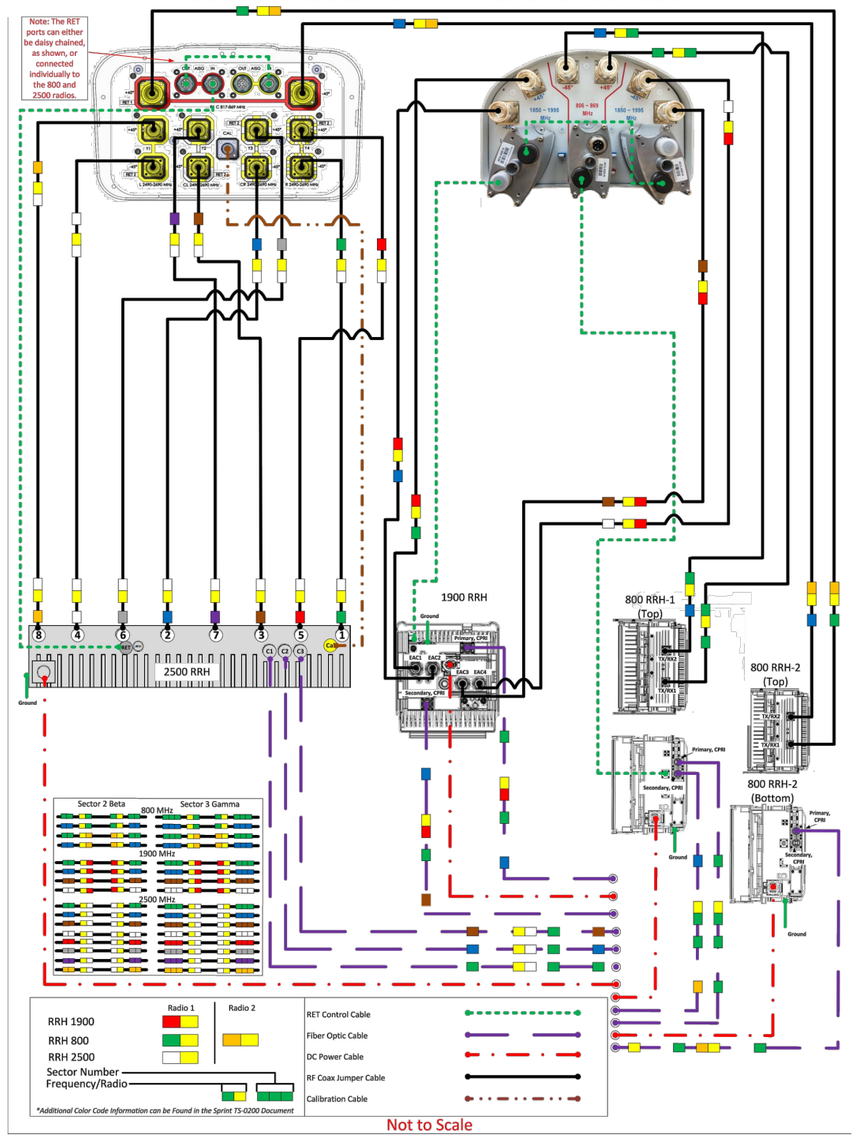
SECTOR	POSITION	ANTENNA MAKE/MODEL	AZIMUTH	CENTERLINE	RRH	CABLE TYPE	CABLE LENGTH	JUMPER TYPE
ALPHA	1	EXISTING PANEL ANTENNA	0°	147'-0"	(1) EXISTING RRH 800 MHz 2x50W (1) EXISTING RRH 1900 4X45 65 MHz	EXISTING	180'	EXISTING
	2	**PROPOSED ANTENNA (DT465B-2XR)**	**0°**	**147'-0"**	**(1) PROPOSED RRH 800 MHz 2x50W** **(1) PROPOSED 2.5 (TD-RRH8x20-25)**	**(1) PROPOSED HYBRIFLEX**	**180'**	**8' HYBRID**
BETA	1	EXISTING PANEL ANTENNA	120°	147'-0"	(1) EXISTING RRH 800 MHz 2x50W (1) EXISTING RRH 1900 4X45 65 MHz	EXISTING	180'	EXISTING
	2	**PROPOSED ANTENNA (DT465B-2XR)**	**120°**	**147'-0"**	**(1) PROPOSED RRH 800 MHz 2x50W** **(1) PROPOSED 2.5 (TD-RRH8x20-25)**	**SHARED W/ALPHA**	**180'**	**8' HYBRID**
GAMMA	1	EXISTING PANEL ANTENNA	275°	147'-0"	(1) EXISTING RRH 800 MHz 2x50W (1) EXISTING RRH 1900 4X45 65 MHz	EXISTING	180'	EXISTING
	2	**PROPOSED ANTENNA (DT465B-2XR)**	**275°**	**147'-0"**	**(1) PROPOSED RRH 800 MHz 2x50W** **(1) PROPOSED 2.5 (TD-RRH8x20-25)**	**SHARED W/ALPHA**	**180'**	**8' HYBRID**

EQUIPMENT & CABLE SCHEDULE (1)
SCALE: NTS

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.

ALU 211 DT465B-2XR & APXVSPP18-C-A20 wo Filters



ANTENNA COLOR CODING CHART (3)
SCALE: NTS

Sprint
1 INTERNATIONAL BLVD, SUITE 800
MAHWAH, NJ 07495

RAMAKER & ASSOCIATES, INC.
700-76 BROADWAY, SUITE 182
WESTWOOD, NJ 07675
www.Ramaker.com

Charles Cherundolo Consulting, Inc.
713 Clover Lane, Moscow, PA 18444
Phone: 570-840-5084 Fax: 570-842-5592

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 · 26266 · LICENSED PROFESSIONAL ENGINEER

Signature: 12/14/2017 Date:

MARK	DATE	DESCRIPTION
A	12/14/17	REVISED PER NEW RFDS

ISSUE PHASE: FINAL
DATE ISSUED: 11/29/2017

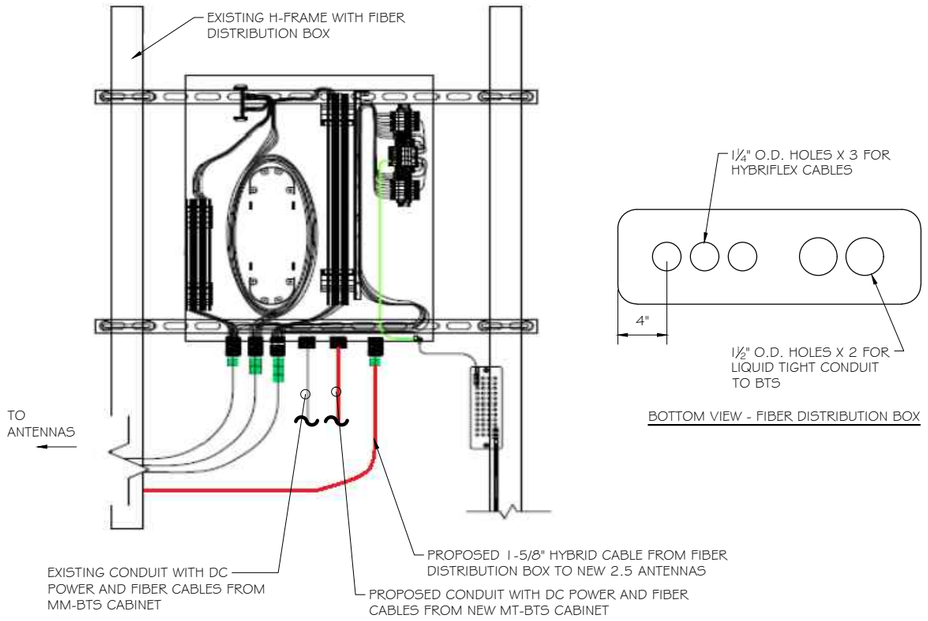
PROJECT TITLE:
BANM TOWER
CT03XC212

PROJECT INFORMATION:
497 OLD POST ROAD
TOLLAND. CT. 06084
TOLLAND COUNTY

SHEET TITLE:
RF DATA SHEET

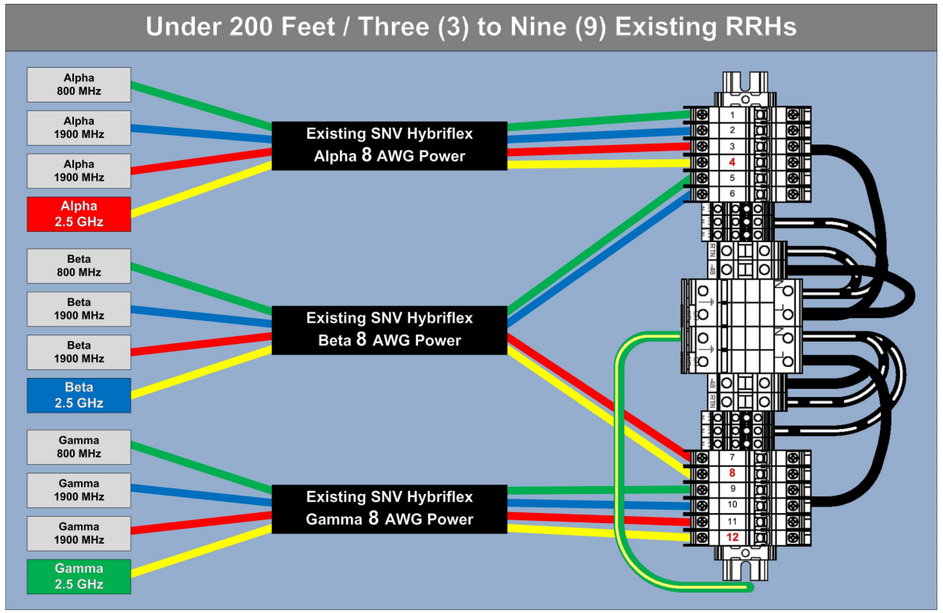
SCALE: NONE

PROJECT NUMBER: 23002
SHEET NUMBER: A-4



BOTTOM VIEW - FIBER DISTRIBUTION BOX

TYPICAL FIBER DISTRIBUTION BOX DETAIL (1)
SCALE: NTS



RRH TO DISTRIBUTION BOX POWER CONNECTIVITY DETAIL (2)
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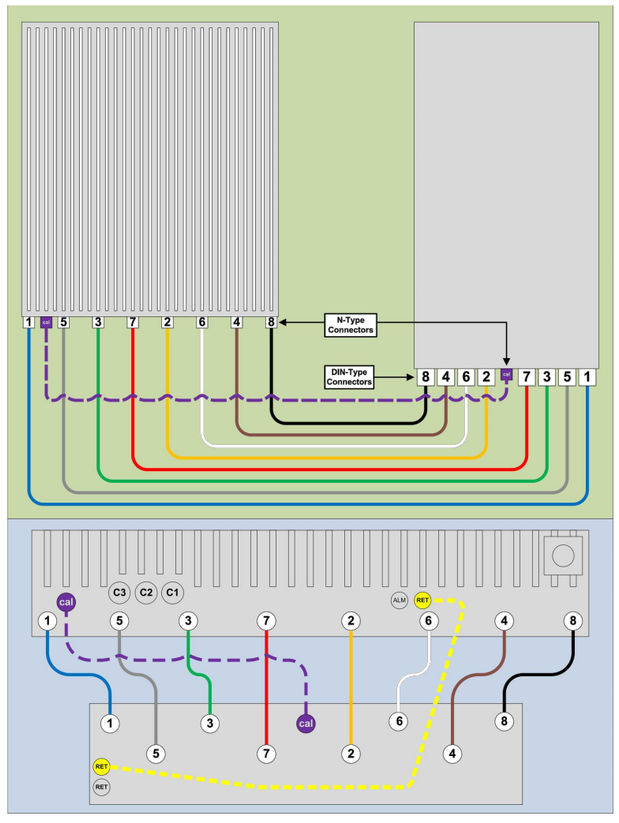
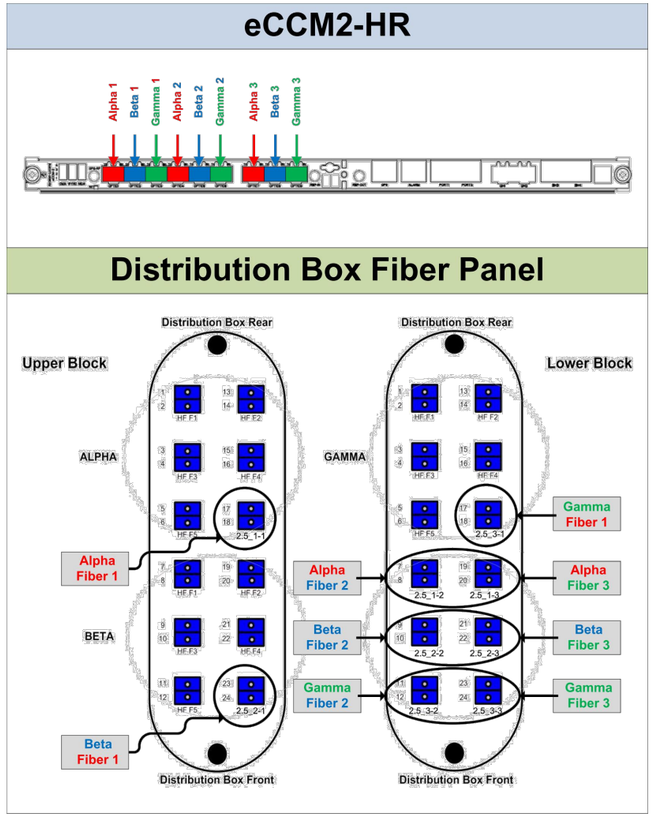


8T8R DETAIL (3)
SCALE: NTS



BTS TO DISTRIBUTION BOX FIBER CONNECTIVITY DETAIL (4)
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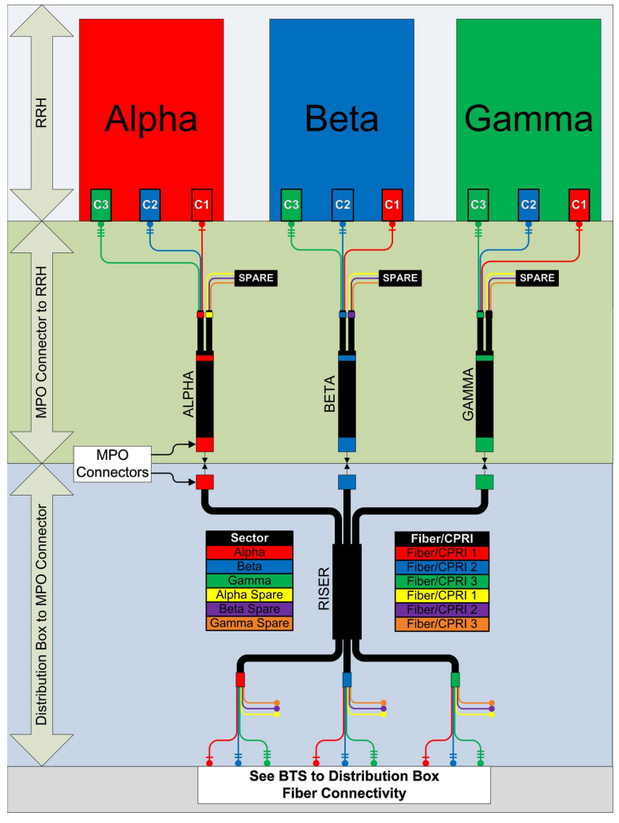

RRH TO DISTRIBUTION BOX FIBER CONNECTIVITY DETAIL (5)
SCALE: NTS

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1 INTERNATIONAL BLVD, SUITE 800
MAHWAH, NJ 07495

RAMAKER & ASSOCIATES, INC.
700-76 BROADWAY, SUITE 182
WESTWOOD, NJ 07675
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Certification & Seal:
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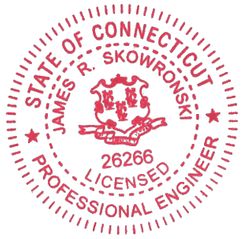


Signature: 12/14/2017 Date:

MARK	DATE	DESCRIPTION
A	12/14/17	REVISED PER NEW RFDS

ISSUE PHASE: FINAL — DATE ISSUED: 11/29/2017

PROJECT TITLE:
BANM TOWER
CT03XC212

PROJECT INFORMATION:
497 OLD POST ROAD
TOLLAND. CT. 06084
TOLLAND COUNTY

SHEET TITLE:
FIBER PLUMBING DIAGRAM

SCALE: NONE

PROJECT NUMBER: 23002
SHEET NUMBER: A-5

RRH-1 800

Sector #	Radio Port #	First Ring	Second Ring	Third Ring	Space	Sector #	Frequency-Radio #
1	1	Green	No tape	No tape		Yellow	Green
1	2	Blue	No tape	No tape		Yellow	Green

Sector #	Cable #	First Ring	Second Ring	Third Ring	Space	Sector #	Frequency-Radio #
2	1	Green	Green	No tape		Yellow	Green
2	2	Blue	Blue	No tape		Yellow	Green

Sector #	Radio Port #	First Ring	Second Ring	Third Ring	Space	Sector #	Frequency-Radio #
3	1	Green	Green	Green		Yellow	Green
3	2	Blue	Blue	Blue		Yellow	Green

RRH-2 800

Sector #	Radio Port #	First Ring	Second Ring	Third Ring	Space	Sector #	Frequency-Radio #
1	1	Green	No tape	No tape		Yellow	Orange
1	2	Blue	No tape	No tape		Yellow	Orange

Sector #	Radio Port #	First Ring	Second Ring	Third Ring	Space	Sector #	Frequency-Radio #
2	1	Green	Green	No tape		Yellow	Orange
2	2	Blue	Blue	No tape		Yellow	Orange

Sector #	Radio Port #	First Ring	Second Ring	Third Ring	Space	Sector #	Frequency-Radio #
3	1	Green	Green	Green		Yellow	Orange
3	2	Blue	Blue	Blue		Yellow	Orange

RRH-1 1900

Sector #	Radio Port #	First Ring	Second Ring	Third Ring	Space	Sector #	Frequency-Radio #
1	1	Green	No tape	No tape		Yellow	Red
1	2	Blue	No tape	No tape		Yellow	Red
1	3	Brown	No tape	No tape		Yellow	Red
1	4	White	No tape	No tape		Yellow	Red

Sector #	Radio Port #	First Ring	Second Ring	Third Ring	Space	Sector #	Frequency-Radio #
2	1	Green	Green	No tape		Yellow	Red
2	2	Blue	Blue	No tape		Yellow	Red
2	3	Brown	Brown	No tape		Yellow	Red
2	4	White	White	No tape		Yellow	Red

Sector #	Radio Port #	First Ring	Second Ring	Third Ring	Space	Sector #	Frequency-Radio #
3	1	Green	Green	Green		Yellow	Red
3	2	Blue	Blue	Blue		Yellow	Red
3	3	Brown	Brown	Brown		Yellow	Red
3	4	White	White	White		Yellow	Red

RRH-2 1900

Sector #	Radio Port #	First Ring	Second Ring	Third Ring	Space	Sector #	Frequency-Radio #
1	1	Green	No tape	No tape		Yellow	Brown
1	2	Blue	No tape	No tape		Yellow	Brown
1	3	Brown	No tape	No tape		Yellow	Brown
1	4	White	No tape	No tape		Yellow	Brown

Sector #	Radio Port #	First Ring	Second Ring	Third Ring	Space	Sector #	Frequency-Radio #
2	1	Green	Green	No tape		Yellow	Brown
2	2	Blue	Blue	No tape		Yellow	Brown
2	3	Brown	Brown	No tape		Yellow	Brown
2	4	White	White	No tape		Yellow	Brown

Sector #	Radio Port #	First Ring	Second Ring	Third Ring	Space	Sector #	Frequency-Radio #
3	1	Green	Green	Green		Yellow	Brown
3	2	Blue	Blue	Blue		Yellow	Brown
3	3	Brown	Brown	Brown		Yellow	Brown
3	4	White	White	White		Yellow	Brown

RRH-3 1900

Sector #	Radio Port #	First Ring	Second Ring	Third Ring	Space	Sector #	Frequency-Radio #
1	1	Green	No tape	No tape		Yellow	Blue
1	2	Blue	No tape	No tape		Yellow	Blue
1	3	Brown	No tape	No tape		Yellow	Blue
1	4	White	No tape	No tape		Yellow	Blue

Sector #	Radio Port #	First Ring	Second Ring	Third Ring	Space	Sector #	Frequency-Radio #
2	1	Green	Green	No tape		Yellow	Blue
2	2	Blue	Blue	No tape		Yellow	Blue
2	3	Brown	Brown	No tape		Yellow	Blue
2	4	White	White	No tape		Yellow	Blue

Sector #	Radio Port #	First Ring	Second Ring	Third Ring	Space	Sector #	Frequency-Radio #
3	1	Green	Green	Green		Yellow	Blue
3	2	Blue	Blue	Blue		Yellow	Blue
3	3	Brown	Brown	Brown		Yellow	Blue
3	4	White	White	White		Yellow	Blue

RRH-1 2500

Sector #	Radio Port #	First Ring	Second Ring	Third Ring	Space	Sector #	Frequency-Radio #
1	1	Green	No tape	No tape		Yellow	White
1	2	Blue	No tape	No tape		Yellow	White
1	3	Brown	No tape	No tape		Yellow	White
1	4	White	No tape	No tape		Yellow	White
1	5	Red	No tape	No tape		Yellow	White
1	6	Gray	No tape	No tape		Yellow	White
1	7	Purple	No tape	No tape		Yellow	White
1	8	Orange	No tape	No tape		Yellow	White

Sector #	Radio Port #	First Ring	Second Ring	Third Ring	Space	Sector #	Frequency-Radio #
2	1	Green	Green	No tape		Yellow	White
2	2	Blue	Blue	No tape		Yellow	White
2	3	Brown	Brown	No tape		Yellow	White
2	4	White	White	No tape		Yellow	White
2	5	Red	Red	No tape		Yellow	White
2	6	Gray	Gray	No tape		Yellow	White
2	7	Purple	Purple	No tape		Yellow	White
2	8	Orange	Orange	No tape		Yellow	White

Sector #	Radio Port #	First Ring	Second Ring	Third Ring	Space	Sector #	Frequency-Radio #
3	1	Green	Green	Green		Yellow	White
3	2	Blue	Blue	Blue		Yellow	White
3	3	Brown	Brown	Brown		Yellow	White
3	4	White	White	White		Yellow	White
3	5	Red	Red	Red		Yellow	White
3	6	Gray	Gray	Gray		Yellow	White
3	7	Purple	Purple	Purple		Yellow	White
3	8	Orange	Orange	Orange		Yellow	White

RRH-2 2500

Sector #	Radio Port #	First Ring	Second Ring	Third Ring	Space	Sector #	Frequency-Radio #
1	1	Green	No tape	No tape		Yellow	Purple
1	2	Blue	No tape	No tape		Yellow	Purple
1	3	Brown	No tape	No tape		Yellow	Purple
1	4	White	No tape	No tape		Yellow	Purple
1	5	Red	No tape	No tape		Yellow	Purple
1	6	Gray	No tape	No tape		Yellow	Purple
1	7	Purple	No tape	No tape		Yellow	Purple
1	8	Orange	No tape	No tape		Yellow	Purple

Sector #	Radio Port #	First Ring	Second Ring	Third Ring	Space	Sector #	Frequency-Radio #
2	1	Green	Green	No tape		Yellow	Purple
2	2	Blue	Blue	No tape		Yellow	Purple
2	3	Brown	Brown	No tape		Yellow	Purple
2	4	White	White	No tape		Yellow	Purple
2	5	Red	Red	No tape		Yellow	Purple
2	6	Gray	Gray	No tape		Yellow	Purple
2	7	Purple	Purple	No tape		Yellow	Purple
2	8	Orange	Orange	No tape		Yellow	Purple

Sector #	Radio Port #	First Ring	Second Ring	Third Ring	Space	Sector #	Frequency-Radio #
3	1	Green	Green	Green		Yellow	Purple
3	2	Blue	Blue	Blue		Yellow	Purple
3	3	Brown	Brown	Brown		Yellow	Purple
3	4	White	White	White		Yellow	Purple
3	5	Red	Red	Red		Yellow	Purple
3	6	Gray	Gray	Gray		Yellow	Purple
3	7	Purple	Purple	Purple		Yellow	Purple
3	8	Orange	Orange	Orange		Yellow	Purple

RRH-3 2500

Sector #	Radio Port #	First Ring	Second Ring	Third Ring	Space	Sector #	Frequency-Radio #
1	1	Green	No tape	No tape		Yellow	Gray
1	2	Blue	No tape	No tape		Yellow	Gray
1	3	Brown	No tape	No tape		Yellow	Gray
1	4	White	No tape	No tape		Yellow	Gray
1	5	Red	No tape	No tape		Yellow	Gray
1	6	Gray	No tape	No tape		Yellow	Gray
1	7	Purple	No tape	No tape		Yellow	Gray
1	8	Orange	No tape	No tape		Yellow	Gray

Sector #	Radio Port #	First Ring	Second Ring	Third Ring	Space	Sector #	Frequency-Radio #
2	1	Green	Green	No tape		Yellow	Gray
2	2	Blue	Blue	No tape		Yellow	Gray
2	3	Brown	Brown	No tape		Yellow	Gray
2	4	White	White	No tape		Yellow	Gray
2	5	Red	Red	No tape		Yellow	Gray
2	6	Gray	Gray	No tape		Yellow	Gray
2	7	Purple	Purple	No tape		Yellow	Gray
2	8	Orange	Orange	No tape		Yellow	Gray

Sector #	Radio Port #	First Ring	Second Ring	Third Ring	Space	Sector #	Frequency-Radio #
3	1	Green	Green	Green		Yellow	Gray
3	2	Blue	Blue	Blue		Yellow	Gray
3	3	Brown	Brown	Brown		Yellow	Gray
3	4	White	White	White		Yellow	Gray
3	5	Red	Red	Red		Yellow	Gray
3	6	Gray	Gray	Gray		Yellow	Gray
3	7	Purple	Purple	Purple		Yellow	Gray
3	8	Orange	Orange	Orange		Yellow	Gray

JUMPER COLOR CODING (1)
SCALE: NTS

Sprint
1 INTERNATIONAL BLVD, SUITE 800
MAHWAH, NJ 07495

RAMAKER & ASSOCIATES, INC.
700-76 BROADWAY, SUITE 182
WESTWOOD, NJ 07675
www.Ramaker.com

Charles Cherundolo Consulting, Inc.
713 Clover Lane, Moscow, PA 18444
Phone: 570-840-5084 Fax: 570-842-5592

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 · 26266 · LICENSED PROFESSIONAL ENGINEER

Signature: 12/14/2017 Date:

MARK	DATE	DESCRIPTION
A	12/14/17	REVISED PER NEW RFDS

ISSUE PHASE: FINAL — DATE ISSUED: 11/29/2017

PROJECT TITLE:
BANM TOWER
CT03XC212

PROJECT INFORMATION:
497 OLD POST ROAD
TOLLAND. CT. 06084
TOLLAND COUNTY

SHEET TITLE:
CABLE COLOR CODING

SCALE: NONE

PROJECT NUMBER: 23002
SHEET NUMBER: A-6

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"

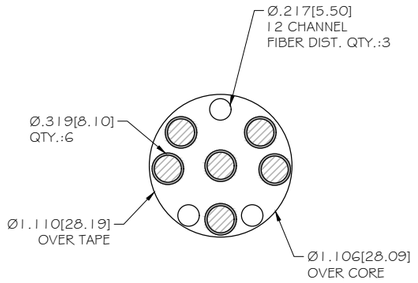
RFS HYBRIFLEX RISER CABLE SCHEDULE

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

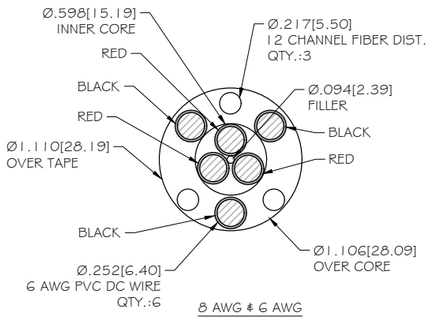
RFS HYBRIFLEX JUMPER CABLE SCHEDULE

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	

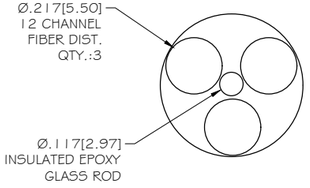
*NOTE: SPRINT CM TO CONFIRM HYBRID/FIBER RISER CABLE & HYBRID/FIBER JUMPER CABLE MODEL NUMBERS BEFORE PREPARING BOM.



4 AWG



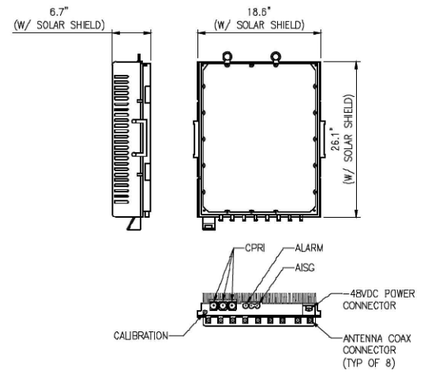
8 AWG & 6 AWG



FIBER ONLY

MECHANICAL	
DIMENSION (HxWxD)	71.9" x 13.8" x 8.2"
WEIGHT	58 lbs

ANTENNA MODEL: COMMSCOPE #DT465B-2XR - ANTENNA SPECS



2500MHZ REMOTE RADIO HEAD
ALCATEL-LUCENTL #TD-RRH8x20
WEIGHT WITH SOLAR SHIELD: 70LBS

MECHANICAL	
DIMENSION (HxWxD)	26.1"x18.6"x6.7"
WEIGHT	70 lbs

RRH MODEL: ALU #TD-RRH8X20-25 - RADIO SPECS

800MHz 2X50W Remote Radio Head (RRH)

Simultaneous CDMA & LTE Multi technology RRH 862-869 MHz
- Any combination of CDMA and LTE carriers supported by 100W RF Power

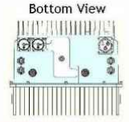
2 CPRI-like Optical Connections for daisy chaining
Software Switchable External Filter for use before Public Safety is cleared

Dimensions:	w/o Filter	w/ Filter
Height:	480 mm (19")	480 mm (19")
Width:	330 mm (13")	330 mm (13")
Depth:	218 mm (8.6")	310 (12.2")
Weight:	24 kg (53 lbs)	29 kg (64 lbs)
	49 liters, <29kg	

Power Supply: -48 VDC
Power Consumption: <400W Typical
Operating Temp range -40°C to +55°C
Option to mount on Ground at tower base

Front/Top View

Bottom View



Alcatel-Lucent's 800 RRH satisfies Sprint's requirements.

MECHANICAL	
DIMENSION (HxWxD)	19" x 13" x 12.2"
WEIGHT	64 lbs

RRH MODEL: ALU #800 MHz 2x50W - RADIO SPECS

HYBRID CABLE CROSS SECTION & DATA (1)
SCALE: NTS

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1 INTERNATIONAL BLVD, SUITE 800
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WESTWOOD, NJ 07675
www.Ramaker.com

Charles Cherundolo Consulting, Inc.
713 Clover Lane, Moscow, PA 18444
Phone: 570-840-5084 Fax: 570-842-5592

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STATE OF CONNECTICUT · JAMES R. SKOWRONSKI · 26266 · LICENSED PROFESSIONAL ENGINEER

Signature: Date: 12/14/2017

MARK	DATE	DESCRIPTION
A	12/14/17	REVISED PER NEW RFDS

ISSUE PHASE: FINAL
DATE ISSUED: 11/29/2017

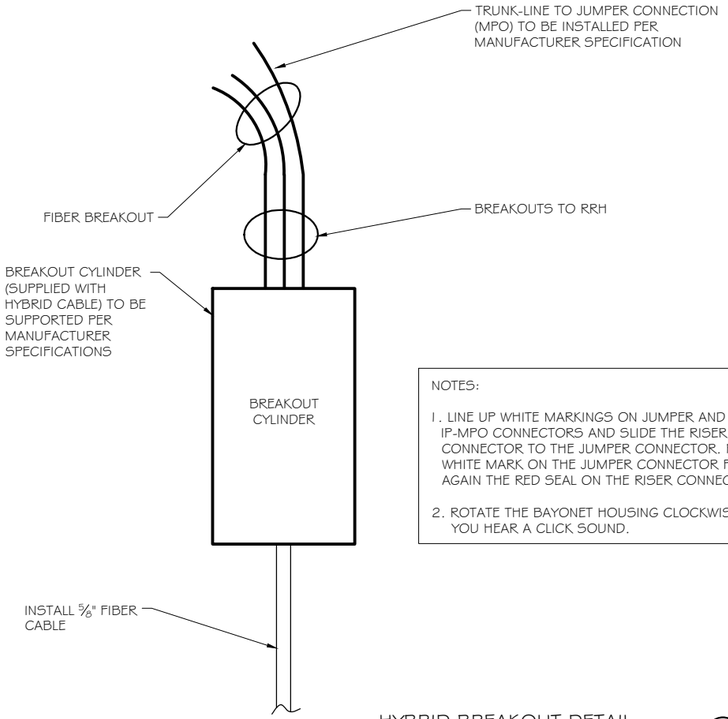
PROJECT TITLE:
BANM TOWER
CT03XC212

PROJECT INFORMATION:
497 OLD POST ROAD
TOLLAND. CT. 06084
TOLLAND COUNTY

SHEET TITLE:
ANTENNA & HYBRID CABLE DETAILS

SCALE: NONE

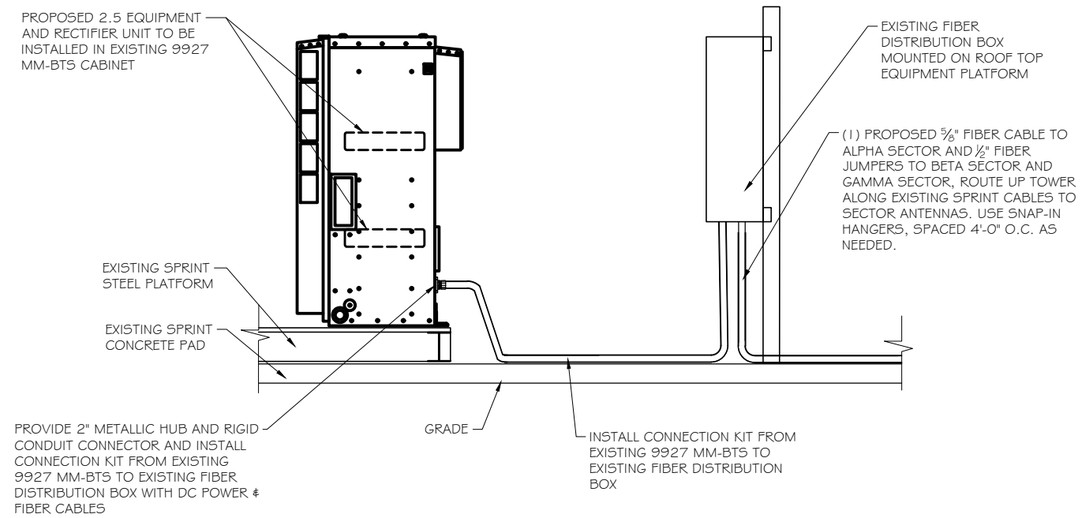
PROJECT NUMBER: 23002
SHEET NUMBER: A-7



NOTES:

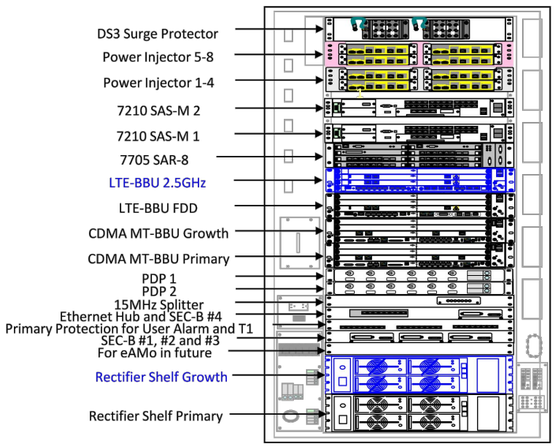
1. LINE UP WHITE MARKINGS ON JUMPER AND RISER IP-MPO CONNECTORS AND SLIDE THE RISER CONNECTOR TO THE JUMPER CONNECTOR. PUSH THE WHITE MARK ON THE JUMPER CONNECTOR FLUSH AGAIN THE RED SEAL ON THE RISER CONNECTOR.
2. ROTATE THE BAYONET HOUSING CLOCKWISE UNTIL YOU HEAR A CLICK SOUND.

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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PROJECT TITLE:

BANM TOWER
CT03XC212

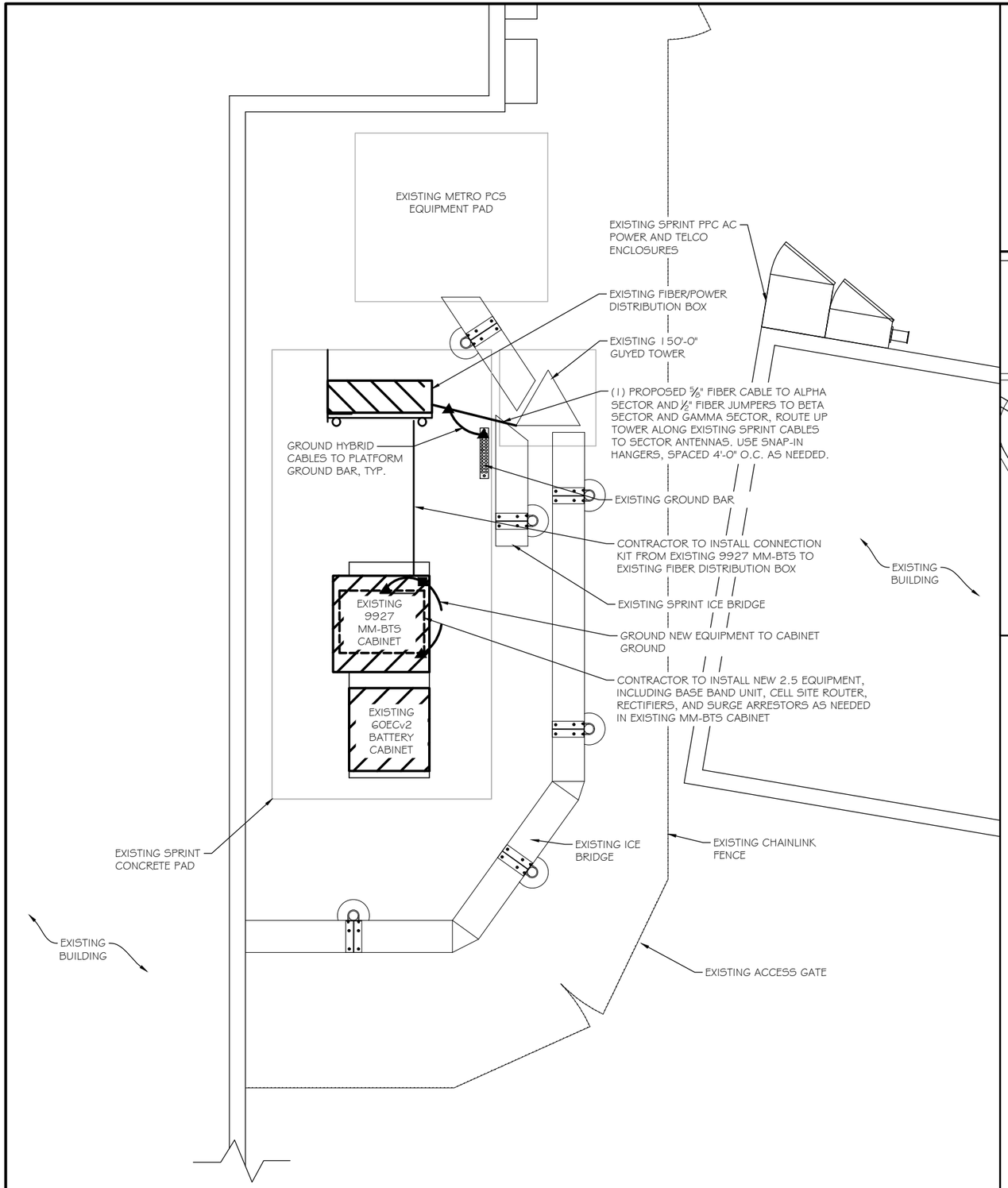
PROJECT INFORMATION:
497 OLD POST ROAD
TOLLAND. CT. 06084
TOLLAND COUNTY

SHEET TITLE:

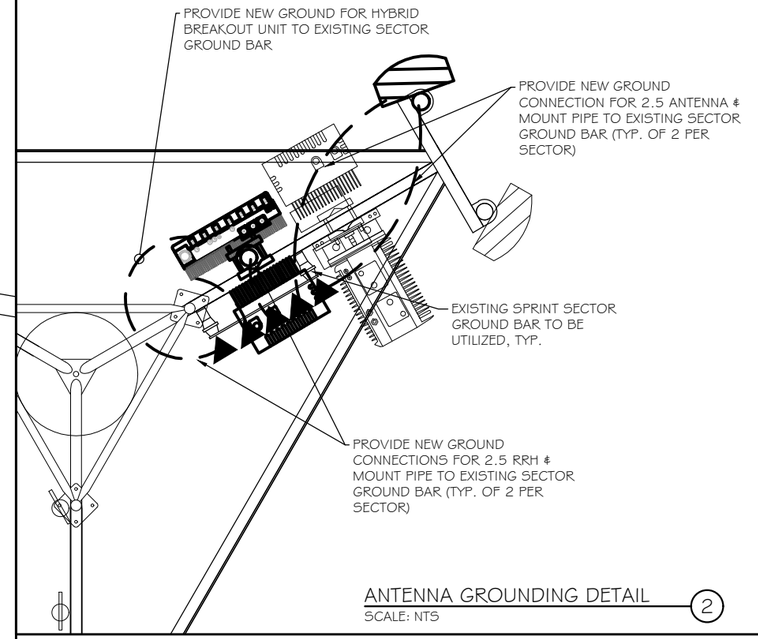
EQUIPMENT DETAILS

SCALE: NONE

PROJECT NUMBER: 23002
SHEET NUMBER: A-8



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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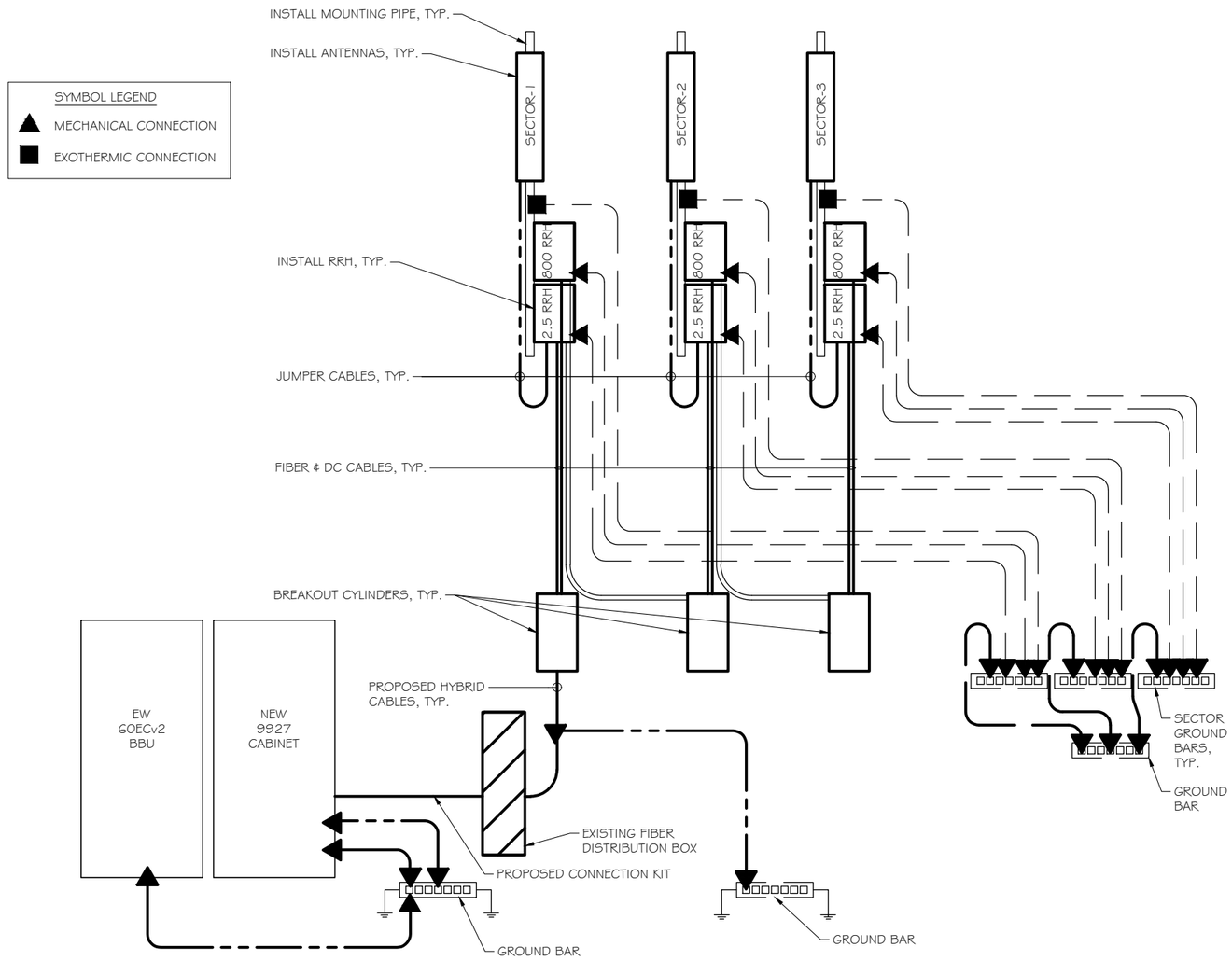
BANM TOWER
CT03XC212

PROJECT INFORMATION:
497 OLD POST ROAD
TOLLAND. CT. 06084
TOLLAND COUNTY

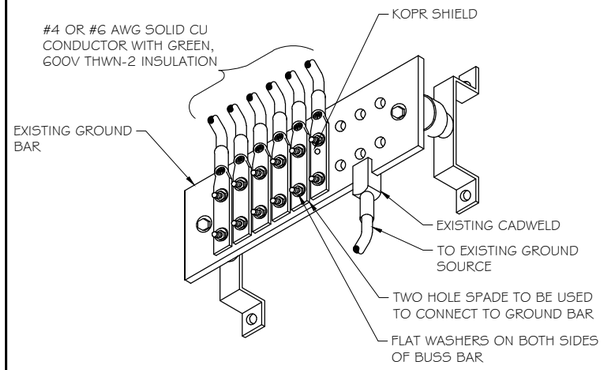
SHEET TITLE:
EQUIPMENT UTILITY & GROUNDING PLAN

SCALE: NONE

PROJECT NUMBER: 23002
SHEET NUMBER: E-1



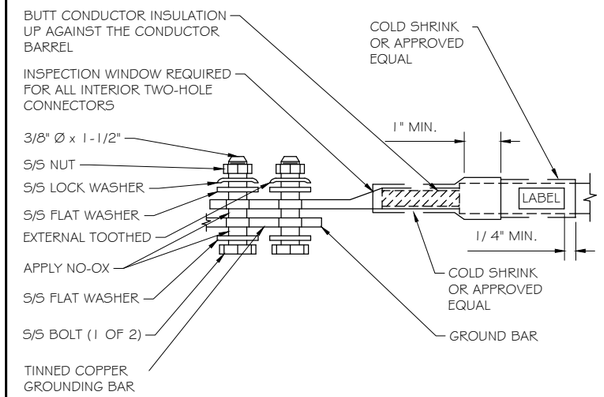
GROUNDING RISER DIAGRAM (1)
SCALE: NTS



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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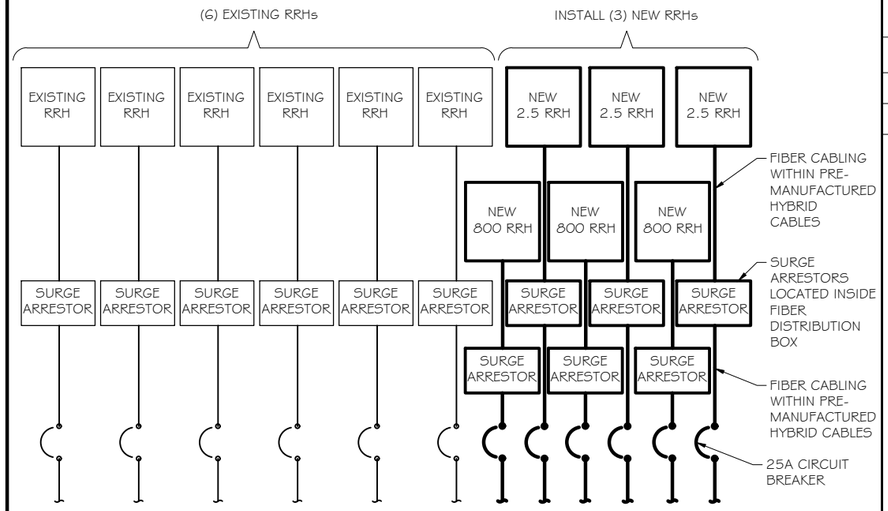
BANM TOWER
CT03XC212

PROJECT INFORMATION:
497 OLD POST ROAD
TOLLAND. CT. 06084
TOLLAND COUNTY

SHEET TITLE:
GROUNDING DETAILS

SCALE: NONE

PROJECT NUMBER: 23002
SHEET NUMBER: E-2



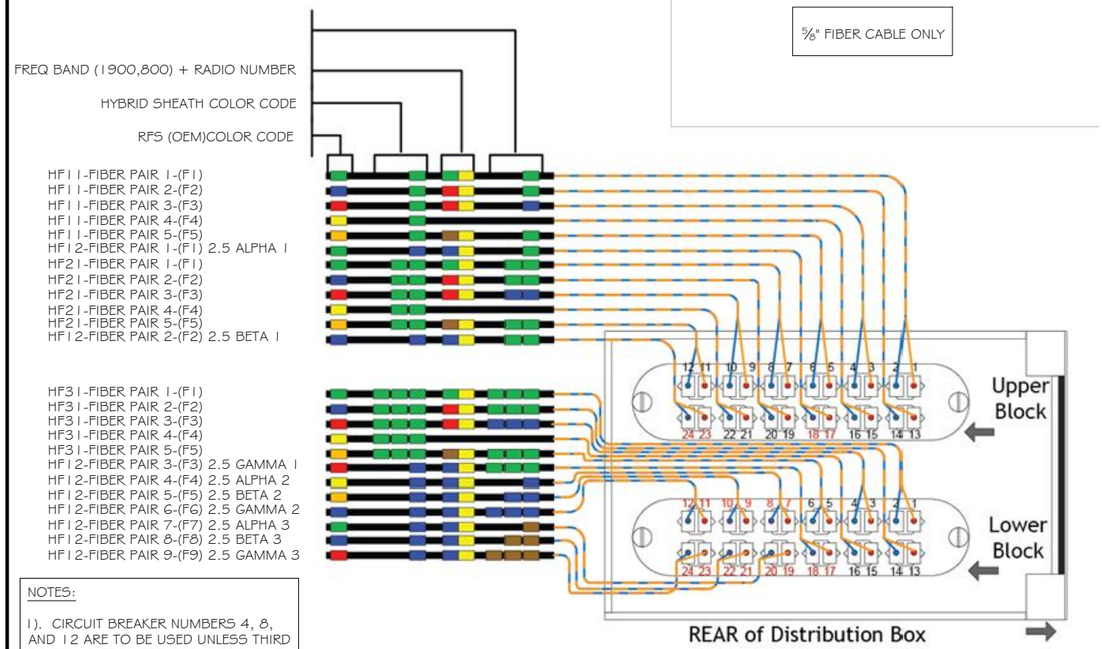
DC ONE-LINE DIAGRAM (1)
SCALE: NTS

A/C PANEL SCHEDULE

VOLTAGE:	240V/120		PANEL STATUS:	EXISTING		N TO GROUND BOND:	YES
MAIN BREAKER:	200 AMP		MODEL NUMBER:	TBD		INTERNAL TVSS:	YES
MOUNT:	OUTDOOR		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	MBTS	100	2	ON			ON	2	60	SURGE PROTECTION	7
2											8
3	BLANK (UNUSED)	-	-	-			OFF	2	60	TOWER LIGHTS	9
4	BLANK (UNUSED)	-	-	-							10
5	GEN. CHARGER	20	1	OFF			ON	1	20	GFI TELCO	11
6	FAN	10	1	ON			-	-	-	BLANK (UNUSED)	12

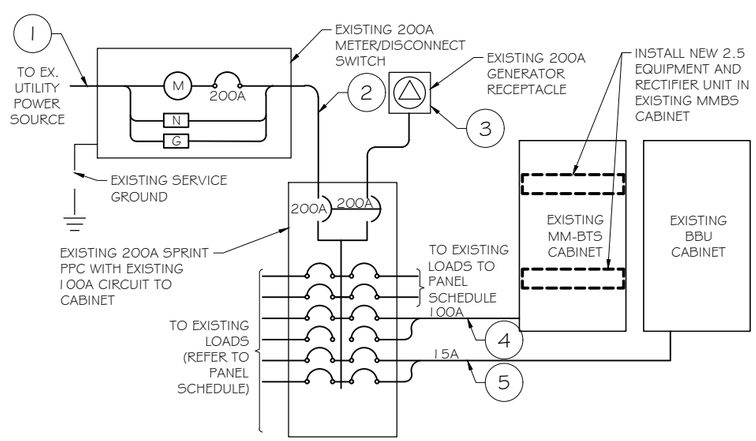
AC PANEL SCHEDULE (2)
SCALE: NTS



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 1½" CONDUIT
5	TRANSFER & LOAD CENTER	EX. BBU CABINET	(2) #12 AWG, (1) #12 GND IN ¾" CONDUIT

ELECTRICAL ONE-LINE DIAGRAM (4)
SCALE: NTS

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PROJECT INFORMATION:
497 OLD POST ROAD
TOLLAND. CT. 06084
TOLLAND COUNTY

SHEET TITLE:
DC POWER DETAILS & PANEL SCHEDULES

SCALE: NONE

PROJECT NUMBER: 23002
SHEET NUMBER: E-3