STATE OF CONNECTICUT
CONNECTICUT SITING COUNCIL
Ten Franklin Square, New Britain, CT 06051
Phone: (860) 827-2935 Fax: (860) 827-2950
E-Mail: siting.council@ct.gov
www.ct.gov/csc

October 15, 2012

Jennifer Palumbo
Real Estate Consultant
Sprint
48 Spruce Street
Oakland, NJ 07436

RE: **EM-SPRINT-107-120925** – Sprint Spectrum L.P. notice of intent to modify an existing telecommunications facility located at 700 Grassy Hill Road, Orange, Connecticut.

Dear Ms. Palumbo:

The Connecticut Siting Council (Council) hereby acknowledges your notice to modify this existing telecommunications facility, pursuant to Section 16-50j-73 of the Regulations of Connecticut State Agencies with the following conditions:

- Any deviation from the proposed modification as specified in this notice and supporting materials with Council shall render this acknowledgement invalid;
- Any material changes to this modification as proposed shall require the filing of a new notice with the Council;
- Not less than 45 days after completion of construction, the Council shall be notified in writing that construction has been completed;
- The validity of this action shall expire one year from the date of this letter; and
- The applicant may file a request for an extension of time beyond the one year deadline provided that such request is submitted to the Council not less than 60 days prior to the expiration;

The proposed modifications including the placement of all necessary equipment and shelters within the tower compound are to be implemented as specified here and in your notice dated September 19, 2012. The modifications are in compliance with the exception criteria in Section 16-50j-72 (b) of the Regulations of Connecticut State Agencies as changes to an existing facility site that would not increase tower height, extend the boundaries of the tower site, increase noise levels at the tower site boundary by six decibels, and increase the total radio frequencies electromagnetic radiation power density measured at the tower site boundary to or above the standard adopted by the State Department of Environmental Protection pursuant to General Statutes § 22a-162. This facility has also been carefully modeled to ensure that radio frequency emissions are conservatively below State and federal standards applicable to the frequencies now used on this tower.

This decision is under the exclusive jurisdiction of the Council. Please be advised that the validity of this action shall expire one year from the date of this letter. Any additional change to this facility will require explicit notice to this agency pursuant to Regulations of Connecticut State Agencies Section 16-50j-73. Such notice shall include all relevant information regarding the proposed change with cumulative worst-case modeling of radio frequency exposure at the closest point of uncontrolled access to the tower base, consistent with Federal Communications Commission, Office of Engineering and Technology, Bulletin 65. Thank you for your attention and cooperation.

Very truly yours,

LRoberts
Linda Roberts
Executive Director

LR/CDM/laf

c: The Honorable James M. Zeoli, First Selectman, Town of Orange
Paul Dinice, Zoning Enforcement Officer, Town of Orange
Crown Castle USA, Inc.

STATE OF CONNECTICUT
CONNECTICUT SITING COUNCIL
Ten Franklin Square, New Britain, CT 06051
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www.ct.gov/csc

September 27, 2012

The Honorable James M. Zeoli
First Selectman
Town of Orange Town Hall
617 Orange Center Road
Orange, CT 06477-2423

RE: **EM-SPRINT-107-120925** – Sprint Spectrum L.P. notice of intent to modify an existing telecommunications facility located at 700 Grassy Hill Road, Orange, Connecticut.

Dear First Selectman Zeoli:

The Connecticut Siting Council (Council) received this request to modify an existing telecommunications facility, pursuant to Regulations of Connecticut State Agencies Section 16-50j-72.

If you have any questions or comments regarding this proposal, please call me or inform the Council by October 11, 2012.

Thank you for your cooperation and consideration.

Very truly yours,

LRoberts

Linda Roberts
Executive Director

LR/laf

Enclosure: Notice of Intent

c: Paul Dinice, Zoning Enforcement Officer, Town of Orange

EM-SPRINT-107-120925

~ORIGINAL~

Sprint

Together with Nextel

48 Spruce Street
Oakland, NJ 07436
Phone: (845) 499-4712
Jennifer Palumbo

September 19, 2012

Hand Delivered

RECEIVED
SEP 25 2012
CONNECTICUT
SITING COUNCIL

Ms. Linda Roberts
Executive Director
Connecticut Siting Council
10 Franklin Square
New Britain, CT 06051

RE: Sprint Spectrum L.P. notice of intent to modify an existing telecommunications facility located at 700 Grassy Hill Road, Orange, CT 06477. Known to Sprint Spectrum L.P. as site CT23XC313.

Dear Ms. Roberts:

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

CDMA employs Spread-Spectrum technology and special coding scheme to allow multiple users to be multiplexed over the same physical channel. LTE is a new high-performance air interface for cellular mobile communications. It is designed to increase the capacity and speed of mobile telephone networks.

As part of the project the new multi-mode 800/1900 antenna will replace existing antennas. These antennas will provide more flexibility for optimization by allowing fast and easy electrical tilt adjustment from remote location and will enable the transmission of multiple technologies from a single antenna. As Sprint Nextel's network evolves to meet the demands of its customers, it is essential for Sprint Nextel to install modern

equipment and antennas in order to provide reliable wireless voice and data services. The proposed equipment will include multi-mode radios that will allow Sprint Nextel to transmit at different frequencies using different technologies, including LTE technology. Likewise, the proposed antennas are quad-pole multi-band high gain antennas that will allow Sprint to operate using its multiple frequency bands and technologies, including LTE technology. The proposed equipment and antennas will improve the reliability, coverage and capacity of Sprint Nextel's voice and data networks across Sprint Nextel's various FCC licensed frequency bands and significantly increase the data speeds of Sprint Nextel's network by utilizing the latest LTE technology. Without the proposed modifications Sprint Nextel will be unable to provide reliable wireless voice and data service using the latest technologies.

Sprint Spectrum L.P. will have an interim (testing) period during the modification/installation prior to the final configuration. This antenna configuration is shown on the attached drawings of the planned modifications. Also included is the power density calculation reflecting the change in Sprint's operations at the site and documentation of the structural sufficiency of the tower to accommodate the revised antenna configuration.

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

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

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

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

Sincerely,

Jennifer Palumbo
Real Estate Consultant

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: CT23XC313

Orange / Rogers Property
700 Grassy Hill Road
Orange, CT 06477

August 28, 2012

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

EBI Consulting
environmental | engineering | due diligence

August 28, 2012

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

Re: Emissions Values for Site **CT23XC313 – Orange / Rogers Property**

EBI Consulting was directed to analyze the proposed upgrades to the existing Sprint facility located at 700 Grassy Hill Road, Orange, CT, for the purpose of determining whether the emissions from the proposed Sprint equipment upgrades on this property are within specified federal limits.

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

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

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

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

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

Additional details can be found in FCC OET 65.

CALCULATIONS

Calculations were done for the proposed upgrades to the existing Sprint Wireless antenna facility located at 700 Grassy Hill Road, Orange, CT, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. All calculations were performed assuming the main lobe of the antenna was focused at the base of the tower to present a worst case scenario. Actual values seen from this site will be dramatically less than those shown in this report. For this report the sample point is the top of a 6 foot person standing at the base of the tower.

For all calculations, all emissions were calculated using the following assumptions:

1) 2 CDMA Carriers (1900 MHz) were considered for each sector of the proposed installation.
2) 1 CDMA Carrier (850 MHz) was considered for each sector of the proposed installation
3) 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.
4) For the following calculations the sample point was the top of a six foot person standing at the base of the tower. The actual gain in this direction was used per the manufactures supplied specifications.
5) The antenna used in this modeling is the RFS APXVSPP18-C-A20. This is based on feedback from the carrier with regards to anticipated antenna selection. This antenna has a 15.9 dBd gain value at its main lobe at 1900 MHz and 13.4 dBd at its main lobe for 850 MHz. All calculations were performed assuming the main lobe of the antenna was focused at the base of the tower to present a worst case scenario.

6) The antenna mounting height centerline of the proposed antennas is **130 feet** above ground level (AGL)
7) Emissions values for additional carriers were taken from the Connecticut Siting Council active database. Values in this database are provided by the individual carriers themselves.

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

Site ID	CT23XC313 - Orange / Rogers Property
Site Addresss	700 Grassy Hill Road, Orange, CT 06477
Site Type	Monopole

Sector 1

Antenna Number	Antenna Make	Antenna Model	Radio Type	Frequency Band	Technology	Power Out Per Channel (Watts)	Number of Channels	Composite Power	Antenna Gain in direction of sample point (dBd)	Antenna Height (ft)	analysis height	Cable Size	Cable Loss (dB)	Additional Loss	ERP	Power Density Value	Power Density Percentage
1a	RFS	APXVSPP18-C-A20	RRH	1900 MHz	CDMA / LTE	20	2	40	15.9	130	124	1/2 "	0.5	0	1386.9474	32.42818	3.24282%
1a	RFS	APXVSPP18-C-A20	RRH	850 MHz	CDMA / LTE	20	1	20	13.4	130	124	1/2 "	0.5	0	389.96892	9.117853	1.60809%
														Sector total Power Density Value:			4.851%

Sector 2

Antenna Number	Antenna Make	Antenna Model	Radio Type	Frequency Band	Technology	Power Out Per Channel (Watts)	Number of Channels	Composite Power	Antenna Gain in direction of sample point (dBd)	Antenna Height (ft)	analysis height	Cable Size	Cable Loss (dB)	Additional Loss	ERP	Power Density Value	Power Density Percentage
2a	RFS	APXVSPP18-C-A20	RRH	1900 MHz	CDMA / LTE	20	2	40	15.9	130	124	1/2 "	0.5	0	1386.9474	32.42818	3.24282%
2a	RFS	APXVSPP18-C-A20	RRH	850 MHz	CDMA / LTE	20	1	20	13.4	130	124	1/2 "	0.5	0	389.96892	9.117853	1.60809%
														Sector total Power Density Value:			4.851%

Sector 3

Antenna Number	Antenna Make	Antenna Model	Radio Type	Frequency Band	Technology	Power Out Per Channel (Watts)	Number of Channels	Composite Power	Antenna Gain in direction of sample point (dBd)	Antenna Height (ft)	analysis height	Cable Size	Cable Loss (dB)	Additional Loss	ERP	Power Density Value	Power Density Percentage
3a	RFS	APXVSPP18-C-A20	RRH	1900 MHz	CDMA / LTE	20	2	40	15.9	130	124	1/2 "	0.5	0	1386.9474	32.42818	3.24282%
3a	RFS	APXVSPP18-C-A20	RRH	850 MHz	CDMA / LTE	20	1	20	13.4	130	124	1/2 "	0.5	0	389.96892	9.117853	1.60809%
														Sector total Power Density Value:			4.851%

Site Composite MPE %	
Carrier	MPE %
Sprint	14.553%
AT&T	14.590%
Pocket	6.810%
Verizon Wireless	22.870%
Clearwire	1.130%
T-mobile	6.690%
Total Site MPE %	**66.643%**

EBI Consulting
environmental | engineering | due diligence

Summary

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

The anticipated Maximum Composite contributions from the Sprint facility are **14.553% (4.851% from each sector)** of the allowable FCC established general public limit considering all three sectors simultaneously sampled at the ground level.

The anticipated composite MPE value for this site assuming all carriers present is **66.643%** of the allowable FCC established general public limit sampled at the ground level. This is based upon values listed in the Connecticut Siting Council database for existing carrier emissions

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

Scott Heffernan
RF Engineering Director

EBI Consulting
21 B Street
Burlington, MA 01803

Date: **June 06, 2012**

James Williams
Crown Castle
3530 Toringdon Way, Suite 300
Charlotte, NC 28277
(704) 405-6521

Vertical Structures, Inc.
309 Spangler Drive, Suite E
Richmond, KY 40475
(859) 624-8360
ncoomes@verticalstructures.com

Subject: **Structural Analysis Report**

Carrier Designation:	***Sprint PCS* Co-Locate – Interim Load**	
	Carrier Site Number:	CT23XC313
	Carrier Site Name:	N/A
Crown Castle Designation:	**Crown Castle BU Number:**	881541
	Crown Castle Site Name:	Rogers Property
	Crown Castle JDE Job Number:	189140
	Crown Castle Work Order Number:	498950
	Crown Castle Application Number:	151615 Rev. 3
Engineering Firm Designation:	**Vertical Structures, Inc. Project Number:**	2012-004-039a
Site Data:	**Grassy Hill Road, Orange, CT, New Haven County** **Latitude *41° 17' 7.75"*, Longitude *-73° 2' 33.27"*** **139.5 Foot - Monopole Tower**	

Dear James Williams,

Vertical Structures, Inc. is pleased to submit this **"Structural Analysis Report"** to determine the structural integrity of the above mentioned tower. This analysis has been performed in accordance with the Crown Castle Structural 'Statement of Work' and the terms of Crown Castle Purchase Order Number 468141.

The purpose of the analysis is to determine acceptability of the tower stress level. Based on our analysis we have determined the tower stress level for the structure and foundation, under the following load case, to be:

LC7: Existing + Reserved + Proposed Equipment **Sufficient Capacity**
Note: See Table I and Table II for the proposed and existing/reserved loading, respectively.

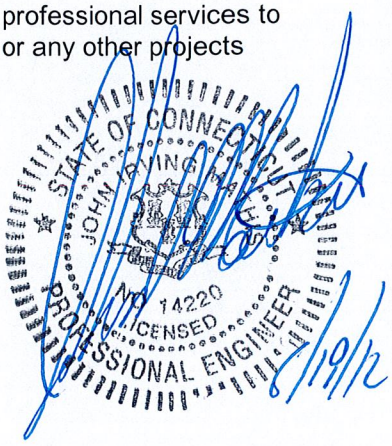
The analysis has been performed in accordance with the TIA/EIA-222-F standard and the 2005 Connecticut State Building Code based upon a wind speed of 85 mph fastest mile.

All modifications and equipment proposed in this report shall be installed in accordance with the attached drawings for the determined available structural capacity to be effective.

We at *Vertical Structures, Inc.* appreciate the opportunity of providing our continuing professional services to you and Crown Castle. If you have any questions or need further assistance on this or any other projects please give us a call.

Respectfully submitted by:

Nathan Coomes, P.E.
Project Engineer



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1) INTRODUCTION

This tower is a 139.5 ft Monopole tower designed by EEI in 2004. The tower was originally designed for a wind speed of 90 mph per TIA/EIA-222-F.

2) ANALYSIS CRITERIA

The structural analysis was performed for this tower in accordance with the requirements of TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a fastest mile wind speed of 85 mph with no ice and 50 mph under service loads. Also, per Crown Castle's direction and in accordance with ASCE-7-05 we have considered a fastest mile wind speed of 38 mph with an escalating 0.75 inch ice thickness.

Table 1 - Proposed Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
130.0	130.0	3	alcatel lucent	800 External Notch Filter	3	1 1/4	
		9	celwave	ACU-A20-N Diplexer			
		3	celwave	APXVSPP18-C-A20 w/ Mount Pipe			
128.0	128.0	1		Side Arm Mount [SO 102-3]			
		3	alcatel lucent	1900MHz RRH (65MHz) TMA			
		3	alcatel lucent	800MHZ RRH TMA			

Table 2 - Existing and Reserved Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
136.0	140.0	3	ericsson	RRUS-11 BTS	2 1 6	3/8 5/8 1 5/8	1
		3	kathrein	800 10121 w/ mount pipe			
		6	powerwave technologies	LGP21401 TMA			
		3	powerwave technologies	P65-16-XLH-RR w/ Mount Pipe			
		1	raycap	DC6-48-60-18-8F			
	136.0	1		T-Arm Mount [TA 702-3]			
130.0	134.0	1	andrew	VHLP2-11	3 3 6	5/16 1/2 1 1/4	1
	132.0	3	argus technologies	LLPX310R w/ Mount Pipe			
		1	dragonwave	A-ANT-23G-2-C			
		3	samsung telecommunications	FDD_R6_RRH TMA			
	130.0	1		12' (4" Tube) T-Arm (3)			
		6	css	CSS-XS4-65-R w/ Mount Pipe			
124.0	124.0				6	1 5/8	1
118.0	118.0	1		T-Arm Mount [TA 602-3]			1
		6	celwave	FD9R6004/2C-3L Diplexer			2
		6	decibel	DB846F65ZAXY w/Mount Pipe	12	1 5/8	1
		3	powerwave technologies	P65.16.XL.2 w/ Mount Pipe			
		3	rymsa	MG D3-800Tx w/ Mount Pipe			
108.0	109.0	3	ems wireless	RR90-17-02DP w/ Mount Pipe	12	1 5/8	1
		6	ericsson	KRY 112 71 TMA			
		3	rfs	APXV18-206516S-C-A20 w/ Mount Pipe			
		3	rfs	ATMAA1412D-1A20 TMA			
	108.0	1		T-Arm Mount [TA 602-3]			
100.0	100.0	3	celwave	APXV18-206517-C w/Mount Pipe	6	1 5/8	1
75.0	77.0	1	lucent	KS24019-L112A	1	1/2	1
	75.0	1		Side Arm Mount [SO 701-1]			

Notes:
1) Existing Equipment
2) Reserved Equipment

Table 3 - Design Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
140	140	12	dapa	48000		
		1	eei	Low Profile Platform		
130	130	12	dapa	48000		
		1	eei	Low Profile Platform		
120	120	12	dapa	48000		
		1	eei	Low Profile Platform		
110	110	12	dapa	48000		
		1	eei	Low Profile Platform		
100	100	12	dapa	48000		
		1	eei	Low Profile Platform		
75	75	1		GPS		

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
Online Application	Sprint PCS Co-Locate Revision #3	151615	CCI iSite
Tower Drawing	EEI Drawing No. GS55077	2207700	CCI iSite
Foundation Drawing	EEI Drawing No. 12364-140	2208511	CCI iSite
Geotechnical Report	Clarence Welti Assoc., Inc. Report Dated 'February 16, 2004'	2245154	CCI iSite

3.1) Analysis Method

tnxTower (version 6.0.4.0), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A. Crown Castle's CCIplate 1.5 analysis tool was used to evaluate the anchor bolts, base plate, and any flange splices.

3.2) Assumptions

1) Tower and structures were built in accordance with the manufacturer's specifications.
2) The tower and structures have been maintained in accordance with the manufacturer's specification.
3) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.
4) When applicable, transmission cables are considered as structural components for calculating wind loads as allowed by TIA/EIA-222-F.

This analysis may be affected if any assumptions are not valid or have been made in error. Vertical Structures, Inc. should be notified to determine the effect on the structural integrity of the tower.

4) ANALYSIS RESULTS

Table 5 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (lb)	SF*P_allow (lb)	% Capacity	Pass / Fail
L1	139.5 - 93.04	Pole	TP26.99x15.5x0.25	1	-7777.10	1063078.12	85.8	Pass
L2	93.04 - 46.38	Pole	TP37.91x25.5205x0.375	2	-16730.90	2242999.02	83.8	Pass
L3	46.38 - 0	Pole	TP48.5x35.874x0.375	3	-25566.90	2719293.23	89.8	Pass
							Summary	
						Pole (L3)	89.8	Pass
						Rating =	89.8	Pass

Table 6 - Tower Component Stresses vs. Capacity – LC7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	69.4	Pass
1	Base Plate	0	94.1	Pass
1	Base Foundation Soil Interaction	0	80.1	Pass

Structure Rating (max from all components) =	94.1%

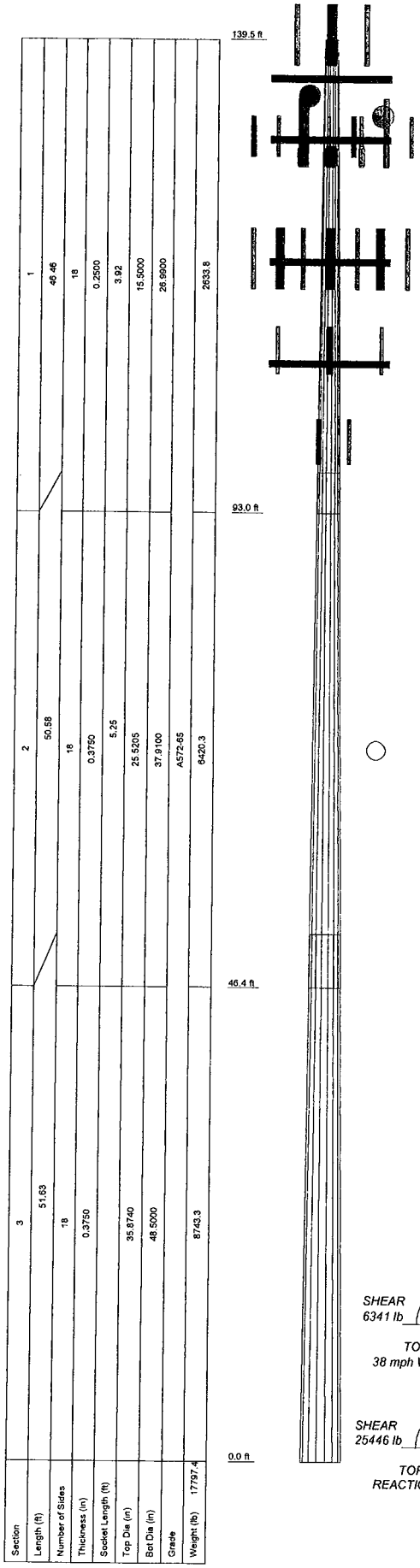
Notes:
1) See additional documentation in "Appendix C – Additional Calculations" for calculations supporting the % capacity.
2) Capacities up to 105% are considered acceptable based on analysis methods used.

4.1) Recommendations

N/A

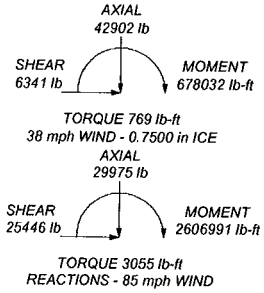
APPENDIX A

TNXTOWER OUTPUT



Section	1	2	3
Length (ft)	46.46	50.58	51.63
Number of Sides	18	18	18
Thickness (in)	0.2500	0.3750	0.3750
Socket Length (ft)	3.92	5.25	
Top Dia (in)	15.5000	25.5205	35.8740
Bot Dia (in)	26.9900	37.9100	48.5000
Grade		A572-65	
Weight (lb)	2633.8	6420.3	8743.3

Total Weight: 17797.4



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
T-Arm Mount [TA 702-3]	136	800MHZ RRH TMA (Sprint PCS)	128
800 10121 w/ mount pipe	136	800MHZ RRH TMA (Sprint PCS)	128
800 10121 w/ mount pipe	136	800MHZ RRH TMA (Sprint PCS)	128
800 10121 w/ mount pipe	136	Side Arm Mount [SO 102-3] (Sprint PCS)	128
P65-16-XLH-RR w/ Mount Pipe	136	1900MHz RRH (65MHz) TMA (Sprint PCS)	128
P65-16-XLH-RR w/ Mount Pipe	136	(2) DB846F65ZAXY w/Mount Pipe	118
P65-16-XLH-RR w/ Mount Pipe	136	(2) DB846F65ZAXY w/Mount Pipe	118
RRUS-11 BTS	136	MG D3-800Tx w/ Mount Pipe	118
RRUS-11 BTS	136	MG D3-800Tx w/ Mount Pipe	118
RRUS-11 BTS	136	MG D3-800Tx w/ Mount Pipe	118
DC6-48-60-18-8F	136	P65.16.XL.2 w/ Mount Pipe	118
(2) LGP21401 TMA (VSI)	136	P65.16.XL.2 w/ Mount Pipe	118
(2) LGP21401 TMA (VSI)	136	P65.16.XL.2 w/ Mount Pipe	118
(2) LGP21401 TMA (VSI)	136	(2) FD9R6004/2C-3L Diplexer	118
12' (4" Tube) T-Arm (3) (Sprint PCS)	130	(2) FD9R6004/2C-3L Diplexer	118
APXVSPP18-C-A20 w/ Mount Pipe (Sprint PCS)	130	(2) FD9R6004/2C-3L Diplexer	118
APXVSPP18-C-A20 w/ Mount Pipe (Sprint PCS)	130	T-Arm Mount [TA 602-3]	118
APXVSPP18-C-A20 w/ Mount Pipe (Sprint PCS)	130	(2) DB846F65ZAXY w/Mount Pipe	118
800 External Notch Filter (Sprint PCS)	130	RR90-17-02DP w/ Mount Pipe	108
800 External Notch Filter (Sprint PCS)	130	RR90-17-02DP w/ Mount Pipe	108
800 External Notch Filter (Sprint PCS)	130	APXV18-206516S-C-A20 w/ Mount Pipe	108
(3) ACU-A20-N Diplexer (Sprint PCS)	130	APXV18-206516S-C-A20 w/ Mount Pipe	108
(3) ACU-A20-N Diplexer (Sprint PCS)	130	APXV18-206516S-C-A20 w/ Mount Pipe	108
(3) ACU-A20-N Diplexer (Sprint PCS)	130	(2) KRY 112 71 TMA	108
(2) CSS-XS4-65-R w/ Mount Pipe (VSI) (Sprint PCS)	130	(2) KRY 112 71 TMA	108
(2) CSS-XS4-65-R w/ Mount Pipe (VSI) (Sprint PCS)	130	(2) KRY 112 71 TMA	108
(2) CSS-XS4-65-R w/ Mount Pipe (VSI) (Sprint PCS)	130	ATMAA1412D-1A20 TMA	108
LLPX310R w/ Mount Pipe	130	ATMAA1412D-1A20 TMA	108
LLPX310R w/ Mount Pipe	130	ATMAA1412D-1A20 TMA	108
LLPX310R w/ Mount Pipe	130	(2) 7'x2" Antenna Mount Pipe	108
FDD_R6_RRH TMA	130	(2) 7'x2" Antenna Mount Pipe	108
FDD_R6_RRH TMA	130	(2) 7'x2" Antenna Mount Pipe	108
FDD_R6_RRH TMA	130	T-Arm Mount [TA 602-3]	108
6'x4" Pipe Mount	130	RR90-17-02DP w/ Mount Pipe	108
6'x4" Pipe Mount	130	APXV18-206517-C w/Mount Pipe	100
A-ANT-23G-2-C (VSI)	130	APXV18-206517-C w/Mount Pipe	100
VHLP2-11	130	APXV18-206517-C w/Mount Pipe	100
1900MHz RRH (65MHz) TMA (Sprint PCS)	128	Side Arm Mount [SO 701-1]	75
1900MHz RRH (65MHz) TMA (Sprint PCS)	128	KS24019-L112A	75

MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower is located in New Haven County, Connecticut.
2. Tower designed for a 85 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 38 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 89.8%

Vertical Structures, Inc.
309 Spangler Drive, Suite E
Richmond, KY 40475
Phone: (859) 624-8360
FAX: (859) 624-8369

Job:	Rogers Property, CT BU#881541
Project:	Vertical Structures Job No. 2012-004-039a
Client: Crown Castle	Drawn by: ncoomes / App'd:
Code: TIA/EIA-222-F	Date: 06/06/12 / Scale: NTS
Path:	Dwg No. E-1

Tower Input Data

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

Tower is located in New Haven County, Connecticut.
Basic wind speed of 85 mph.
Nominal ice thickness of 0.7500 in.
Ice thickness is considered to increase with height.
Ice density of 56 pcf.
A wind speed of 38 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 50 mph.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in pole design is 1.333.
Local bending stresses due to climbing loads, feedline supports, and appurtenance mounts are not considered.

Options

Consider Moments - Legs	Distribute Leg Loads As Uniform	Treat Feedline Bundles As Cylinder
Consider Moments - Horizontals	Assume Legs Pinned	Use ASCE 10 X-Brace Ly Rules
Consider Moments - Diagonals	√ Assume Rigid Index Plate	√ Calculate Redundant Bracing Forces
Use Moment Magnification	√ Use Clear Spans For Wind Area	Ignore Redundant Members in FEA
√ Use Code Stress Ratios	√ Use Clear Spans For KL/r	√ SR Leg Bolts Resist Compression
√ Use Code Safety Factors - Guys	Retension Guys To Initial Tension	√ All Leg Panels Have Same Allowable
√ Escalate Ice	√ Bypass Mast Stability Checks	Offset Girt At Foundation
Always Use Max Kz	√ Use Azimuth Dish Coefficients	√ Consider Feedline Torque
Use Special Wind Profile	√ Project Wind Area of Appurt.	Include Angle Block Shear Check
√ Include Bolts In Member Capacity	√ Autocalc Torque Arm Areas	Poles
√ Leg Bolts Are At Top Of Section	√ SR Members Have Cut Ends	Include Shear-Torsion Interaction
√ Secondary Horizontal Braces Leg	Sort Capacity Reports By Component	Always Use Sub-Critical Flow
Use Diamond Inner Bracing (4 Sided)	√ Triangulate Diamond Inner Bracing	Use Top Mounted Sockets
Add IBC .6D+W Combination		

Tapered Pole Section Geometry

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L1	139.50-93.04	46.46	3.92	18	15.5000	26.9900	0.2500	1.0000	A572-65 (65 ksi)
L2	93.04-46.38	50.58	5.25	18	25.5205	37.9100	0.3750	1.5000	A572-65 (65 ksi)
L3	46.38-0.00	51.63		18	35.8740	48.5000	0.3750	1.5000	A572-65 (65 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	15.7391	12.1009	355.5445	5.4138	7.8740	45.1542	711.5567	6.0516	2.2880	9.152
	27.4064	21.2182	1916.7638	9.4927	13.7109	139.7983	3836.0497	10.6111	4.3102	17.241
L2	26.8892	29.9295	2390.8862	8.9267	12.9644	184.4188	4784.9184	14.9676	3.8316	10.218
	38.4948	44.6760	7952.1562	13.3249	19.2583	412.9214	15914.7760	22.3423	6.0122	16.032
L3	37.7311	42.2527	6727.0540	12.6022	18.2240	369.1315	13462.9597	21.1304	5.6538	15.077
	49.2482	57.2808	16760.5346	17.0844	24.6380	680.2717	33543.1232	28.6458	7.8760	21.003

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in
L1 139.50-93.04				1	1	1		
L2 93.04-46.38				1	1	1		
L3 46.38-0.00				1	1	1		

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
LDF7-50A (1-5/8 FOAM)	B	No	Inside Pole	139.50 - 0.00	6	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
						1" Ice	0.00	0.82
						2" Ice	0.00	0.82
						4" Ice	0.00	0.82
FB-L98-002-XXX (3/8")	B	No	Inside Pole	139.50 - 0.00	2	No Ice	0.00	0.10
						1/2" Ice	0.00	0.10
						1" Ice	0.00	0.10
						2" Ice	0.00	0.10
						4" Ice	0.00	0.10
WR-VG86ST-BRD (Power Cable)	B	No	Inside Pole	139.50 - 0.00	1	No Ice	0.00	0.15
						1/2" Ice	0.00	0.15
						1" Ice	0.00	0.15
						2" Ice	0.00	0.15
						4" Ice	0.00	0.15
LDF4-50A (1/2 FOAM)	B	No	Inside Pole	132.00 - 0.00	1	No Ice	0.00	0.15
						1/2" Ice	0.00	0.15
						1" Ice	0.00	0.15
						2" Ice	0.00	0.15
						4" Ice	0.00	0.15
LDF4-50A (1/2 FOAM)	B	No	CaAa (Out Of Face)	132.00 - 0.00	2	No Ice	0.00	0.15
						1/2" Ice	0.00	0.84
						1" Ice	0.00	2.14
						2" Ice	0.00	6.58
						4" Ice	0.00	22.78
9207(5/16")	B	No	Inside Pole	132.00 - 0.00	3	No Ice	0.00	0.06
						1/2" Ice	0.00	0.06
						1" Ice	0.00	0.06
						2" Ice	0.00	0.06
						4" Ice	0.00	0.06
2" Rigid Conduit	B	No	CaAa (Out Of Face)	132.00 - 0.00	2	No Ice	0.10	2.80
						1/2" Ice	0.15	4.33

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
						1" Ice	0.20	6.47
						2" Ice	0.30	12.57
						4" Ice	0.50	32.12
LDF6-50A (1-1/4 FOAM) (Sprint PCS)	B	No	Inside Pole	130.00 - 0.00	6	No Ice	0.00	0.66
						1/2" Ice	0.00	0.66
						1" Ice	0.00	0.66
						2" Ice	0.00	0.66
						4" Ice	0.00	0.66
HB114-1-0813U4-M5J (1-1/4") (Sprint PCS)	B	No	CaAa (Out Of Face)	130.00 - 0.00	3	No Ice	0.05	0.66
						1/2" Ice	0.08	1.91
						1" Ice	0.12	3.76
						2" Ice	0.18	9.31
						4" Ice	0.32	27.73
LDF7-50A (1-5/8 FOAM)	B	No	Inside Pole	124.00 - 0.00	6	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
						1" Ice	0.00	0.82
						2" Ice	0.00	0.82
						4" Ice	0.00	0.82
561 (1-5/8 AIR)	B	No	Inside Pole	118.00 - 0.00	12	No Ice	0.00	1.35
						1/2" Ice	0.00	1.35
						1" Ice	0.00	1.35
						2" Ice	0.00	1.35
						4" Ice	0.00	1.35
LDF7-50A (1-5/8 FOAM)	B	No	Inside Pole	109.00 - 0.00	12	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
						1" Ice	0.00	0.82
						2" Ice	0.00	0.82
						4" Ice	0.00	0.82
LDF7-50A (1-5/8 FOAM)	B	No	Inside Pole	100.00 - 0.00	6	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
						1" Ice	0.00	0.82
						2" Ice	0.00	0.82
						4" Ice	0.00	0.82
LDF4-50A (1/2 FOAM)	B	No	Inside Pole	77.00 - 0.00	1	No Ice	0.00	0.15
						1/2" Ice	0.00	0.15
						1" Ice	0.00	0.15
						2" Ice	0.00	0.15
						4" Ice	0.00	0.15

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
L1	139.50-93.04	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	13.483	1455.07
		C	0.000	0.000	0.000	0.000	0.00
L2	93.04-46.38	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	16.517	2492.50
		C	0.000	0.000	0.000	0.000	0.00
L3	46.38-0.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	16.418	2479.94
		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 ft²	A_F ft²	C_AA_A In Face ft²	C_AA_A Out Face ft²	Weight lb
L1	139.50-93.04	A	0.871	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	26.707	2117.43
		C		0.000	0.000	0.000	0.000	0.00
L2	93.04-46.38	A	0.819	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	32.771	3304.61
		C		0.000	0.000	0.000	0.000	0.00
L3	46.38-0.00	A	0.750	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	31.619	3227.70
		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
L1	139.50-93.04	0.3396	0.1961	0.5568	0.3215
L2	93.04-46.38	0.4062	0.2345	0.6934	0.4003
L3	46.38-0.00	0.4184	0.2415	0.7204	0.4159

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft²	C_AA_A Side ft²	Weight lb
T-Arm Mount [TA 702-3]	A	None		0.0000	136.00	No Ice	5.64	5.64	339.00
						1/2" Ice	6.55	6.55	429.00
						1" Ice	7.46	7.46	519.00
						2" Ice	9.28	9.28	699.00
						4" Ice	12.92	12.92	1059.00
800 10121 w/ mount pipe	A	From Centroid-Face	4.00 0.00 4.00	10.0000	136.00	No Ice	5.80	4.71	66.00
						1/2" Ice	6.34	5.56	112.31
						1" Ice	6.86	6.28	168.51
						2" Ice	7.94	7.81	302.82
						4" Ice	10.23	11.23	689.84
800 10121 w/ mount pipe	B	From Centroid-Face	4.00 0.00 4.00	0.0000	136.00	No Ice	5.80	4.71	66.00
						1/2" Ice	6.34	5.56	112.31
						1" Ice	6.86	6.28	168.51
						2" Ice	7.94	7.81	302.82
						4" Ice	10.23	11.23	689.84
800 10121 w/ mount pipe	C	From Centroid-Face	4.00 0.00 4.00	-10.0000	136.00	No Ice	5.80	4.71	66.00
						1/2" Ice	6.34	5.56	112.31
						1" Ice	6.86	6.28	168.51
						2" Ice	7.94	7.81	302.82
						4" Ice	10.23	11.23	689.84
P65-16-XLH-RR w/ Mount Pipe	A	From Centroid-Face	4.00 0.00 4.00	30.0000	136.00	No Ice	8.88	6.60	82.20
						1/2" Ice	9.63	7.88	147.36
						1" Ice	10.36	9.00	225.21

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
						2" Ice	11.75	10.93	408.26
						4" Ice	14.66	15.02	921.60
P65-16-XLH-RR w/ Mount Pipe	B	From Centroid-Face	4.00 0.00 4.00	30.0000	136.00	No Ice	8.88	6.60	82.20
						1/2" Ice	9.63	7.88	147.36
						1" Ice	10.36	9.00	225.21
						2" Ice	11.75	10.93	408.26
						4" Ice	14.66	15.02	921.60
P65-16-XLH-RR w/ Mount Pipe	C	From Centroid-Face	4.00 0.00 4.00	30.0000	136.00	No Ice	8.88	6.60	82.20
						1/2" Ice	9.63	7.88	147.36
						1" Ice	10.36	9.00	225.21
						2" Ice	11.75	10.93	408.26
						4" Ice	14.66	15.02	921.60
RRUS-11 BTS	A	From Centroid-Face	4.00 0.00 4.00	30.0000	136.00	No Ice	4.42	1.19	55.00
						1/2" Ice	4.71	1.35	80.77
						1" Ice	5.00	1.53	109.98
						2" Ice	5.61	1.90	179.45
						4" Ice	6.94	2.75	368.09
RRUS-11 BTS	B	From Centroid-Face	4.00 0.00 4.00	30.0000	136.00	No Ice	4.42	1.19	55.00
						1/2" Ice	4.71	1.35	80.77
						1" Ice	5.00	1.53	109.98
						2" Ice	5.61	1.90	179.45
						4" Ice	6.94	2.75	368.09
RRUS-11 BTS	C	From Centroid-Face	4.00 0.00 4.00	30.0000	136.00	No Ice	4.42	1.19	55.00
						1/2" Ice	4.71	1.35	80.77
						1" Ice	5.00	1.53	109.98
						2" Ice	5.61	1.90	179.45
						4" Ice	6.94	2.75	368.09
DC6-48-60-18-8F	C	From Centroid-Face	4.00 0.00 4.00	30.0000	136.00	No Ice	2.57	4.32	18.90
						1/2" Ice	2.80	4.60	50.21
						1" Ice	3.04	4.88	85.17
						2" Ice	3.54	5.49	166.87
						4" Ice	4.66	6.80	382.77
(2) LGP21401 TMA (VSI)	A	From Centroid-Face	4.00 0.00 4.00	10.0000	136.00	No Ice	1.29	0.36	14.10
						1/2" Ice	1.45	0.48	21.26
						1" Ice	1.61	0.60	30.32
						2" Ice	1.97	0.87	54.89
						4" Ice	2.79	1.52	135.29
(2) LGP21401 TMA (VSI)	B	From Centroid-Face	4.00 0.00 4.00	0.0000	136.00	No Ice	1.29	0.36	14.10
						1/2" Ice	1.45	0.48	21.26
						1" Ice	1.61	0.60	30.32
						2" Ice	1.97	0.87	54.89
						4" Ice	2.79	1.52	135.29
(2) LGP21401 TMA (VSI)	C	From Centroid-Face	4.00 0.00 4.00	-10.0000	136.00	No Ice	1.29	0.36	14.10
						1/2" Ice	1.45	0.48	21.26
						1" Ice	1.61	0.60	30.32
						2" Ice	1.97	0.87	54.89
						4" Ice	2.79	1.52	135.29
**									
12' (4" Tube) T-Arm (3) (Sprint PCS)	C	None		0.0000	130.00	No Ice	13.50	13.50	600.00
						1/2" Ice	16.71	16.71	750.00
						1" Ice	19.92	19.92	900.00
						2" Ice	26.34	26.34	1200.00
						4" Ice	39.18	39.18	1800.00
APXVSPP18-C-A20 w/ Mount Pipe (Sprint PCS)	A	From Centroid-Face	4.75 2.75 0.00	10.0000	130.00	No Ice	8.50	6.95	82.55
						1/2" Ice	9.15	8.13	147.74
						1" Ice	9.77	9.02	224.90
						2" Ice	11.03	10.84	405.88

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
APXVSPP18-C-A20 w/ Mount Pipe (Sprint PCS)	B	From Centroid-Face	4.75 2.75 0.00	20.0000	130.00	4" Ice No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	13.68 8.50 9.15 9.77 11.03 13.68	14.85 6.95 8.13 9.02 10.84 14.85	908.85 82.55 147.74 224.90 405.88 908.85
APXVSPP18-C-A20 w/ Mount Pipe (Sprint PCS)	C	From Centroid-Face	4.75 2.75 0.00	-20.0000	130.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.50 9.15 9.77 11.03 13.68	6.95 8.13 9.02 10.84 14.85	82.55 147.74 224.90 405.88 908.85
800 External Notch Filter (Sprint PCS)	A	From Centroid-Face	4.75 2.75 0.00	10.0000	130.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.77 0.89 1.02 1.30 1.97	0.37 0.46 0.56 0.79 1.34	11.00 16.81 24.26 44.81 114.01
800 External Notch Filter (Sprint PCS)	B	From Centroid-Face	4.75 2.75 0.00	20.0000	130.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.77 0.89 1.02 1.30 1.97	0.37 0.46 0.56 0.79 1.34	11.00 16.81 24.26 44.81 114.01
800 External Notch Filter (Sprint PCS)	C	From Centroid-Face	4.75 2.75 0.00	-20.0000	130.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.77 0.89 1.02 1.30 1.97	0.37 0.46 0.56 0.79 1.34	11.00 16.81 24.26 44.81 114.01
(3) ACU-A20-N Diplexer (Sprint PCS)	A	From Centroid-Face	4.75 2.75 0.00	10.0000	130.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.14 0.19 0.25 0.40 0.80	0.08 0.12 0.17 0.30 0.67	1.04 2.32 4.41 11.80 44.85
(3) ACU-A20-N Diplexer (Sprint PCS)	B	From Centroid-Face	4.75 2.75 0.00	20.0000	130.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.14 0.19 0.25 0.40 0.80	0.08 0.12 0.17 0.30 0.67	1.04 2.32 4.41 11.80 44.85
(3) ACU-A20-N Diplexer (Sprint PCS)	C	From Centroid-Face	4.75 2.75 0.00	-20.0000	130.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.14 0.19 0.25 0.40 0.80	0.08 0.12 0.17 0.30 0.67	1.04 2.32 4.41 11.80 44.85
(2) CSS-XS4-65-R w/ Mount Pipe (VSI) (Sprint PCS)	A	From Centroid-Face	4.75 2.75 0.00	30.0000	130.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.38 3.78 4.21 5.11 7.02	3.32 3.92 4.54 5.83 8.81	19.60 50.48 89.72 186.96 483.81
(2) CSS-XS4-65-R w/ Mount Pipe (VSI) (Sprint PCS)	B	From Centroid-Face	4.75 2.75 0.00	30.0000	130.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.38 3.78 4.21 5.11 7.02	3.32 3.92 4.54 5.83 8.81	19.60 50.48 89.72 186.96 483.81
(2) CSS-XS4-65-R w/ Mount Pipe (VSI) (Sprint PCS)	C	From Centroid-Face	4.75 2.75 0.00	30.0000	130.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.38 3.78 4.21 5.11 7.02	3.32 3.92 4.54 5.83 8.81	19.60 50.48 89.72 186.96 483.81
LLPX310R w/ Mount Pipe	A	From	4.75	40.0000	130.00	No Ice	5.43	3.38	50.56

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft	Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
		Centroid-Face	2.75	2.00			1/2" Ice	5.99	4.15	89.99
							1" Ice	6.51	4.80	138.53
							2" Ice	7.57	6.19	255.15
							4" Ice	9.86	9.25	597.35
LLPX310R w/ Mount Pipe	B	From Centroid-Face	4.75	2.75 2.00	10.0000	130.00	No Ice	5.43	3.38	50.56
							1/2" Ice	5.99	4.15	89.99
							1" Ice	6.51	4.80	138.53
							2" Ice	7.57	6.19	255.15
							4" Ice	9.86	9.25	597.35
LLPX310R w/ Mount Pipe	C	From Centroid-Face	4.75	2.75 2.00	0.0000	130.00	No Ice	5.43	3.38	50.56
							1/2" Ice	5.99	4.15	89.99
							1" Ice	6.51	4.80	138.53
							2" Ice	7.57	6.19	255.15
							4" Ice	9.86	9.25	597.35
FDD_R6_RRH TMA	A	From Centroid-Face	4.75	2.75 2.00	40.0000	130.00	No Ice	1.79	0.78	33.00
							1/2" Ice	1.97	0.92	44.50
							1" Ice	2.16	1.07	58.31
							2" Ice	2.57	1.39	93.60
							4" Ice	3.49	2.14	200.35
FDD_R6_RRH TMA	B	From Centroid-Face	4.75	2.75 2.00	10.0000	130.00	No Ice	1.79	0.78	33.00
							1/2" Ice	1.97	0.92	44.50
							1" Ice	2.16	1.07	58.31
							2" Ice	2.57	1.39	93.60
							4" Ice	3.49	2.14	200.35
FDD_R6_RRH TMA	C	From Centroid-Face	4.75	2.75 2.00	0.0000	130.00	No Ice	1.79	0.78	33.00
							1/2" Ice	1.97	0.92	44.50
							1" Ice	2.16	1.07	58.31
							2" Ice	2.57	1.39	93.60
							4" Ice	3.49	2.14	200.35
6'x4" Pipe Mount	B	From Centroid-Face	4.75	2.75 0.00	0.0000	130.00	No Ice	2.25	2.25	65.00
							1/2" Ice	2.62	2.62	84.10
							1" Ice	3.00	3.00	107.47
							2" Ice	3.78	3.78	167.65
							4" Ice	5.56	5.56	346.05
6'x4" Pipe Mount	C	From Centroid-Face	4.75	2.75 0.00	0.0000	130.00	No Ice	2.25	2.25	65.00
							1/2" Ice	2.62	2.62	84.10
							1" Ice	3.00	3.00	107.47
							2" Ice	3.78	3.78	167.65
							4" Ice	5.56	5.56	346.05
**										
Side Arm Mount [SO 102-3] (Sprint PCS)	C	None			0.0000	128.00	No Ice	3.00	3.00	81.00
							1/2" Ice	3.48	3.48	111.00
							1" Ice	3.96	3.96	141.00
							2" Ice	4.92	4.92	201.00
							4" Ice	6.84	6.84	321.00
1900MHz RRH (65MHz) TMA (Sprint PCS)	A	From Centroid-Face	3.50	0.00 0.00	10.0000	128.00	No Ice	2.77	2.70	60.00
							1/2" Ice	3.01	2.94	83.90
							1" Ice	3.26	3.18	111.08
							2" Ice	3.78	3.70	176.02
							4" Ice	4.93	4.85	353.75
1900MHz RRH (65MHz) TMA (Sprint PCS)	B	From Centroid-Face	3.50	0.00 0.00	20.0000	128.00	No Ice	2.77	2.70	60.00
							1/2" Ice	3.01	2.94	83.90
							1" Ice	3.26	3.18	111.08
							2" Ice	3.78	3.70	176.02
							4" Ice	4.93	4.85	353.75
1900MHz RRH (65MHz) TMA	C	From Centroid-	3.50	0.00	-20.0000	128.00	No Ice	2.77	2.70	60.00
							1/2" Ice	3.01	2.94	83.90

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
(Sprint PCS)		Face	0.00			1" Ice	3.26	3.18	111.08
						2" Ice	3.78	3.70	176.02
						4" Ice	4.93	4.85	353.75
800MHZ RRH TMA (Sprint PCS)	A	From Centroid-Face	3.50 0.00 0.00	10.0000	128.00	No Ice	2.49	2.07	53.00
						1/2" Ice	2.71	2.27	74.19
						1" Ice	2.93	2.48	98.39
						2" Ice	3.41	2.93	156.61
						4" Ice	4.46	3.93	317.77
800MHZ RRH TMA (Sprint PCS)	B	From Centroid-Face	3.50 0.00 0.00	20.0000	128.00	No Ice	2.49	2.07	53.00
						1/2" Ice	2.71	2.27	74.19
						1" Ice	2.93	2.48	98.39
						2" Ice	3.41	2.93	156.61
						4" Ice	4.46	3.93	317.77
800MHZ RRH TMA (Sprint PCS)	C	From Centroid-Face	3.50 0.00 0.00	-20.0000	128.00	No Ice	2.49	2.07	53.00
						1/2" Ice	2.71	2.27	74.19
						1" Ice	2.93	2.48	98.39
						2" Ice	3.41	2.93	156.61
						4" Ice	4.46	3.93	317.77
**									
T-Arm Mount [TA 602-3]	C	None		0.0000	118.00	No Ice	11.59	11.59	774.30
						1/2" Ice	15.44	15.44	990.35
						1" Ice	19.29	19.29	1206.41
						2" Ice	26.99	26.99	1638.52
						4" Ice	42.39	42.39	2502.73
(2) DB846F65ZAXY w/Mount Pipe	A	From Centroid-Face	6.00 0.00 0.00	-40.0000	118.00	No Ice	7.27	7.82	46.55
						1/2" Ice	7.88	9.01	111.10
						1" Ice	8.48	9.91	187.61
						2" Ice	9.72	11.81	367.24
						4" Ice	12.33	15.98	867.25
(2) DB846F65ZAXY w/Mount Pipe	B	From Centroid-Face	6.00 0.00 0.00	-20.0000	118.00	No Ice	7.27	7.82	46.55
						1/2" Ice	7.88	9.01	111.10
						1" Ice	8.48	9.91	187.61
						2" Ice	9.72	11.81	367.24
						4" Ice	12.33	15.98	867.25
(2) DB846F65ZAXY w/Mount Pipe	C	From Centroid-Face	6.00 0.00 0.00	0.0000	118.00	No Ice	7.27	7.82	46.55
						1/2" Ice	7.88	9.01	111.10
						1" Ice	8.48	9.91	187.61
						2" Ice	9.72	11.81	367.24
						4" Ice	12.33	15.98	867.25
MG D3-800Tx w/ Mount Pipe	A	From Centroid-Face	6.00 0.00 0.00	-20.0000	118.00	No Ice	3.71	3.56	36.90
						1/2" Ice	4.19	4.39	69.87
						1" Ice	4.63	5.09	112.21
						2" Ice	5.65	6.54	217.21
						4" Ice	7.82	9.69	539.32
MG D3-800Tx w/ Mount Pipe	B	From Centroid-Face	6.00 0.00 0.00	-20.0000	118.00	No Ice	3.71	3.56	36.90
						1/2" Ice	4.19	4.39	69.87
						1" Ice	4.63	5.09	112.21
						2" Ice	5.65	6.54	217.21
						4" Ice	7.82	9.69	539.32
MG D3-800Tx w/ Mount Pipe	C	From Centroid-Face	6.00 0.00 0.00	-10.0000	118.00	No Ice	3.71	3.56	36.90
						1/2" Ice	4.19	4.39	69.87
						1" Ice	4.63	5.09	112.21
						2" Ice	5.65	6.54	217.21
						4" Ice	7.82	9.69	539.32
P65.16.XL.2 w/ Mount Pipe	A	From Centroid-Face	6.00 0.00 0.00	-20.0000	118.00	No Ice	8.88	6.02	62.20
						1/2" Ice	9.63	7.29	124.60
						1" Ice	10.36	8.41	199.63

Description	Face or Leg	Offset Type	Offsets: Horz Lateral / Vert	Azimuth Adjustment	Placement		C_AA_A Front	C_AA_A Side	Weight
			ft / ft / ft	°	ft		ft^2	ft^2	lb
P65.16.XL.2 w/ Mount Pipe	B	From Centroid-Face	6.00 / 0.00 / 0.00	-20.0000	118.00	2" Ice	11.75	10.32	376.85
						4" Ice	14.66	14.36	877.75
						No Ice	8.88	6.02	62.20
						1/2" Ice	9.63	7.29	124.60
						1" Ice	10.36	8.41	199.63
						2" Ice	11.75	10.32	376.85
						4" Ice	14.66	14.36	877.75
P65.16.XL.2 w/ Mount Pipe	C	From Centroid-Face	6.00 / 0.00 / 0.00	-20.0000	118.00	No Ice	8.88	6.02	62.20
						1/2" Ice	9.63	7.29	124.60
						1" Ice	10.36	8.41	199.63
						2" Ice	11.75	10.32	376.85
						4" Ice	14.66	14.36	877.75
(2) FD9R6004/2C-3L Diplexer	A	From Centroid-Face	6.00 / 0.00 / 0.00	-40.0000	118.00	No Ice	0.37	0.08	3.10
						1/2" Ice	0.45	0.14	5.40
						1" Ice	0.54	0.20	8.79
						2" Ice	0.75	0.34	19.61
						4" Ice	1.28	0.74	62.87
(2) FD9R6004/2C-3L Diplexer	B	From Centroid-Face	6.00 / 0.00 / 0.00	-20.0000	118.00	No Ice	0.37	0.08	3.10
						1/2" Ice	0.45	0.14	5.40
						1" Ice	0.54	0.20	8.79
						2" Ice	0.75	0.34	19.61
						4" Ice	1.28	0.74	62.87
(2) FD9R6004/2C-3L Diplexer	C	From Centroid-Face	6.00 / 0.00 / 0.00	0.0000	118.00	No Ice	0.37	0.08	3.10
						1/2" Ice	0.45	0.14	5.40
						1" Ice	0.54	0.20	8.79
						2" Ice	0.75	0.34	19.61
						4" Ice	1.28	0.74	62.87
**									
T-Arm Mount [TA 602-3]	C	None		0.0000	108.00	No Ice	11.59	11.59	774.30
						1/2" Ice	15.44	15.44	990.35
						1" Ice	19.29	19.29	1206.41
						2" Ice	26.99	26.99	1638.52
						4" Ice	42.39	42.39	2502.73
RR90-17-02DP w/ Mount Pipe	A	From Centroid-Face	6.00 / 0.00 / 1.00	0.0000	108.00	No Ice	4.59	3.32	34.18
						1/2" Ice	5.09	4.09	69.33
						1" Ice	5.58	4.78	113.86
						2" Ice	6.59	6.23	223.79
						4" Ice	8.73	9.31	556.77
RR90-17-02DP w/ Mount Pipe	B	From Centroid-Face	6.00 / 0.00 / 1.00	0.0000	108.00	No Ice	4.59	3.32	34.18
						1/2" Ice	5.09	4.09	69.33
						1" Ice	5.58	4.78	113.86
						2" Ice	6.59	6.23	223.79
						4" Ice	8.73	9.31	556.77
RR90-17-02DP w/ Mount Pipe	C	From Centroid-Face	6.00 / 0.00 / 1.00	0.0000	108.00	No Ice	4.59	3.32	34.18
						1/2" Ice	5.09	4.09	69.33
						1" Ice	5.58	4.78	113.86
						2" Ice	6.59	6.23	223.79
						4" Ice	8.73	9.31	556.77
APXV18-206516S-C-A20 w/ Mount Pipe	A	From Centroid-Face	6.00 / 0.00 / 1.00	0.0000	108.00	No Ice	3.76	3.20	36.95
						1/2" Ice	4.14	3.83	68.28
						1" Ice	4.57	4.47	108.25
						2" Ice	5.47	5.81	207.80
						4" Ice	7.40	8.74	512.65
APXV18-206516S-C-A20 w/ Mount Pipe	B	From Centroid-Face	6.00 / 0.00 / 1.00	0.0000	108.00	No Ice	3.76	3.20	36.95
						1/2" Ice	4.14	3.83	68.28
						1" Ice	4.57	4.47	108.25
						2" Ice	5.47	5.81	207.80

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
APXV18-206516S-C-A20 w/ Mount Pipe	C	From Centroid-Face	6.00 0.00 1.00	0.0000	108.00	4" Ice No Ice 1/2" Ice 1" Ice 2" Ice	7.40 3.76 4.14 4.57 5.47	8.74 3.20 3.83 4.47 5.81	512.65 36.95 68.28 108.25 207.80
(2) KRY 112 71 TMA	A	From Centroid-Face	6.00 0.00 1.00	0.0000	108.00	4" Ice No Ice 1/2" Ice 1" Ice 2" Ice	7.40 0.68 0.80 0.93 1.22	8.74 0.45 0.56 0.68 0.94	512.65 13.20 18.38 25.16 44.33
(2) KRY 112 71 TMA	B	From Centroid-Face	6.00 0.00 1.00	0.0000	108.00	4" Ice No Ice 1/2" Ice 1" Ice 2" Ice	1.90 0.68 0.80 0.93 1.22	1.57 0.45 0.56 0.68 0.94	110.52 13.20 18.38 25.16 44.33
(2) KRY 112 71 TMA	C	From Centroid-Face	6.00 0.00 1.00	0.0000	108.00	4" Ice No Ice 1/2" Ice 1" Ice 2" Ice	1.90 0.68 0.80 0.93 1.22	1.57 0.45 0.56 0.68 0.94	110.52 13.20 18.38 25.16 44.33
ATMAA1412D-1A20 TMA	A	From Centroid-Face	6.00 0.00 1.00	0.0000	108.00	4" Ice No Ice 1/2" Ice 1" Ice 2" Ice	1.90 1.17 1.31 1.47 1.81	1.57 0.47 0.57 0.69 0.95	110.52 13.00 20.62 30.11 55.52
ATMAA1412D-1A20 TMA	B	From Centroid-Face	6.00 0.00 1.00	0.0000	108.00	4" Ice No Ice 1/2" Ice 1" Ice 2" Ice	2.58 1.17 1.31 1.47 1.81	1.57 0.47 0.57 0.69 0.95	137.44 13.00 20.62 30.11 55.52
ATMAA1412D-1A20 TMA	C	From Centroid-Face	6.00 0.00 1.00	0.0000	108.00	4" Ice No Ice 1/2" Ice 1" Ice 2" Ice	2.58 1.17 1.31 1.47 1.81	1.57 0.47 0.57 0.69 0.95	137.44 13.00 20.62 30.11 55.52
(2) 7'x2" Antenna Mount Pipe	A	From Centroid-Face	6.00 0.00 0.00	0.0000	108.00	4" Ice No Ice 1/2" Ice 1" Ice 2" Ice	2.58 1.66 2.39 2.83 3.71	1.57 1.66 2.39 2.83 3.71	137.44 26.00 38.58 55.84 104.97
(2) 7'x2" Antenna Mount Pipe	B	From Centroid-Face	6.00 0.00 0.00	0.0000	108.00	4" Ice No Ice 1/2" Ice 1" Ice 2" Ice	5.58 1.66 2.39 2.83 3.71	5.58 1.66 2.39 2.83 3.71	266.00 26.00 38.58 55.84 104.97
(2) 7'x2" Antenna Mount Pipe	C	From Centroid-Face	6.00 0.00 0.00	0.0000	108.00	4" Ice No Ice 1/2" Ice 1" Ice 2" Ice	5.58 1.66 2.39 2.83 3.71	5.58 1.66 2.39 2.83 3.71	266.00 26.00 38.58 55.84 104.97
**						4" Ice	5.58	5.58	266.00
APXV18-206517-C w/Mount Pipe	A	From Centroid-Face	1.75 1.00 0.00	30.0000	100.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.95 4.42 4.90 5.93 8.12	3.43 4.25 4.95 6.40 9.51	48.30 81.62 124.33 230.17 554.31

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
APXV18-206517-C w/Mount Pipe	B	From Centroid-Face	1.75 1.00 0.00	30.0000	100.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.95 4.42 4.90 5.93 8.12	3.43 4.25 4.95 6.40 9.51	48.30 81.62 124.33 230.17 554.31
APXV18-206517-C w/Mount Pipe **	C	From Centroid-Face	1.75 1.00 0.00	30.0000	100.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.95 4.42 4.90 5.93 8.12	3.43 4.25 4.95 6.40 9.51	48.30 81.62 124.33 230.17 554.31
Side Arm Mount [SO 701-1]	C	From Centroid-Leg	2.75 0.00 0.00	0.0000	75.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.85 1.14 1.43 2.01 3.17	1.67 2.34 3.01 4.35 7.03	65.00 79.00 93.00 121.00 177.00
KS24019-L112A	C	From Centroid-Leg	4.25 0.00 2.00	0.0000	75.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.10 0.18 0.26 0.42 0.74	0.10 0.18 0.26 0.42 0.74	5.00 6.50 8.00 11.00 17.00

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight lb
A-ANT-23G-2-C (VSI)	B	Paraboloid w/Shroud (HP)	From Centroid -Face	4.75 2.25 2.00	10.0000		130.00	2.17	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.72 4.01 4.30 4.88 6.04	12.30 32.88 53.46 94.62 176.94
VHLP2-11	C	Paraboloid w/Shroud (HP)	From Centroid -Face	4.75 2.25 4.00	-30.0000		130.00	2.17	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.72 4.01 4.30 4.88 6.04	31.00 51.56 72.12 113.24 195.48

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
L1	139.5 - 93.04 (1)	TP26.99x15.5x0.25	46.46	0.00	0.0	39.000	20.4489	-7777.10	797508.00	0.010
L2	93.04 - 46.38 (2)	TP37.91x25.5205x0.375	50.58	0.00	0.0	39.000	43.1454	-16730.90	1682670.00	0.010
L3	46.38 - 0 (3)	TP48.5x35.874x0.375	51.63	0.00	0.0	39.000	52.3071	-25566.90	2039980.00	0.013

Pole Bending Design Data

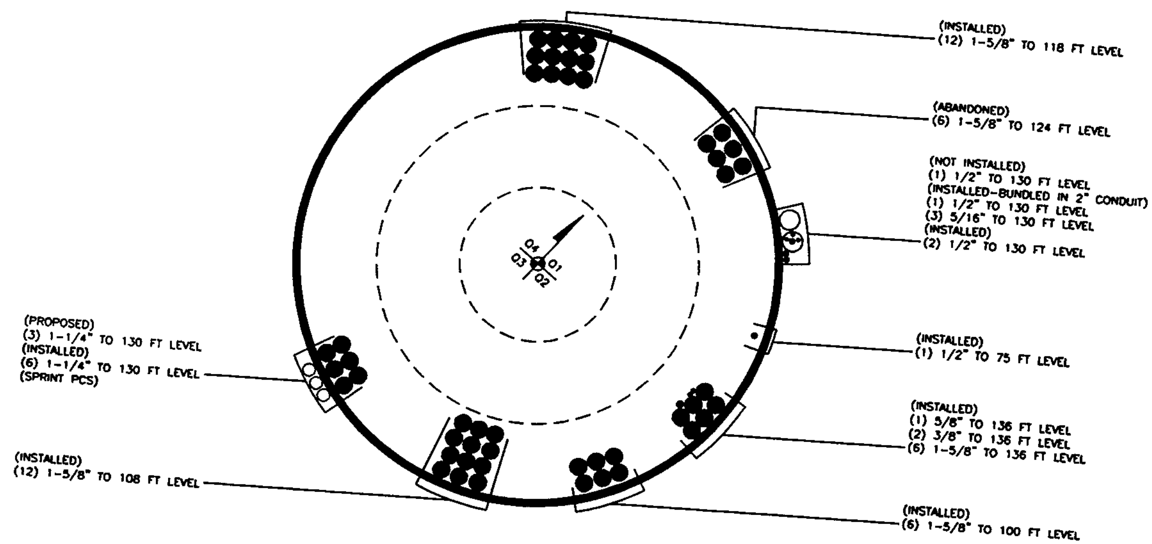
Section No.	Elevation ft	Size	Actual M_x lb-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y lb-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
L1	139.5 - 93.04 (1)	TP26.99x15.5x0.25	478506.67	-44.238	39.000	1.134	0.00	0.000	39.000	0.000
L2	93.04 - 46.38 (2)	TP37.91x25.5205x0.375	1385283.33	-43.180	39.000	1.107	0.00	0.000	39.000	0.000
L3	46.38 - 0 (3)	TP48.5x35.874x0.375	2182650.00	-46.206	39.000	1.185	0.00	0.000	39.000	0.000

Pole Interaction Design Data

Section No.	Elevation ft	Size	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	139.5 - 93.04 (1)	TP26.99x15.5x0.25	0.010	1.134	0.000	1.144 ✔	1.333	H1-3 ✔
L2	93.04 - 46.38 (2)	TP37.91x25.5205x0.375	0.010	1.107	0.000	1.117 ✔	1.333	H1-3 ✔
L3	46.38 - 0 (3)	TP48.5x35.874x0.375	0.013	1.185	0.000	1.197 ✔	1.333	H1-3 ✔

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	$SF*P_{allow}$ lb	% Capacity	Pass Fail
L1	139.5 - 93.04	Pole	TP26.99x15.5x0.25	1	-7777.10	1063078.12	85.8	Pass
L2	93.04 - 46.38	Pole	TP37.91x25.5205x0.375	2	-16730.90	2242999.02	83.8	Pass
L3	46.38 - 0	Pole	TP48.5x35.874x0.375	3	-25566.90	2719293.23	89.8	Pass
							Summary	
						Pole (L3)	89.8	Pass
						RATING =	**89.8**	**Pass**



BUSINESS UNIT: 881541 TOWER ID: C_BASELEVEL

6	20/08/08	APPLICATION ADDED PER WORK ORDER # 228434	ACC
7	24/04/09	AS-BUILT INFORMATION ADDED PER WORK ORDER # 258882	ZMR
8	27/07/09	AS-BUILT INFORMATION ADDED PER WORK ORDER # 263600	SAC
9	31/07/09	UPDATED PER WORK ORDER # 266883	LMR
10	26/08/09	APPLICATION ADDED PER WORK ORDER # 281173	ACC
11	02/03/11	AS-BUILT INFORMATION ADDED PER WORK ORDER # 363446	ACC
12	14/04/11	APPLICATION ADDED PER WORK ORDER # 402398	RJK
13	30/11/11	AS-BUILT INFORMATION ADDED PER WORK ORDER # 448808	KJM
14	30/05/12	APPLICATION ADDED PER WORK ORDER # 498849	AE

DRAWN BY: VSG
CHECKED BY: GPK
DRAWING DATE: 25/02/08

SITE NUMBER:
SITE NAME:

SITE NAME
ROGERS PROPERTY

BUSINESS UNIT NUMBER
881541

SITE ADDRESS
NEW HAVEN, CT 06477
NEW HAVEN
UNITED STATES COUNTY
USA

SHEET TITLE
BASE LEVEL

SHEET NUMBER
A1-0

PORT INFORMATION			
ELEV.	SIZE	LOCATION	STATUS
10'-0"	10"x30"	E & W	-
7'-0"	10"x30"	S	-
3'-3"	10"x30"	E & W	-

SCALE: 1" = 1'-0" | 1

BASE LEVEL DRAWING

PLOT DATE: 5/30/2012 FILE NAME: 881541_BASELEVEL.DWG
DWPLATES\TYPICAL BLOCKS FOR TEMPLATES\TITLE BLOCK STD-VER 3.1.dwg

Stiffened or Unstiffened, Ungrouted, Circular Base Plate - Any Rod Material

TIA Rev F

Site Data

BU#: *881541*
Site Name: *Rogers Property, CT*
App #: *151615, Rev. 3*

Pole Manufacturer:	*Other*

Reactions		
Moment:	2606.991	ft-kips
Axial:	29.975	kips
Shear:	25.446	kips

Anchor Rod Data		
Qty:	16	
Diam:	2.25	in
Rod Material:	A615-J	
Strength (Fu):	100	ksi
Yield (Fy):	75	ksi
Bolt Circle:	57	in

Plate Data		
Diam:	63	in
Thick:	2	in
Grade:	60	ksi
Single-Rod B-eff:	9.62	in

Stiffener Data (Welding at both sides)		
Config:	0	*
Weld Type:		
Groove Depth:		in **
Groove Angle:		degrees
Fillet H. Weld:		<-- Disregard
Fillet V. Weld:		in
Width:		in
Height:		in
Thick:		in
Notch:		in
Grade:		ksi
Weld str.:		ksi

Pole Data		
Diam:	48.5	in
Thick:	0.375	in
Grade:	65	ksi
# of Sides:	18	"0" IF Round
Fu	80	ksi
Reinf. Fillet Weld	0	"0" if None

Stress Increase Factor		
ASIF:	1.333	

If No stiffeners, Criteria:	AISC ASD	<-Only Applcable to Unstiffened Cases

Anchor Rod Results

		Rigid
Maximum Rod Tension:	135.3 Kips	Service, ASD
Allowable Tension:	195.0 Kips	Fty*ASIF
Anchor Rod Stress Ratio:	69.4% Pass	

Base Plate Results Flexural Check

		Rigid
Base Plate Stress:	56.4 ksi	Service ASD
Allowable Plate Stress:	60.0 ksi	0.75*Fy*ASIF
Base Plate Stress Ratio:	94.1% Pass	Y.L. Length: 29.95

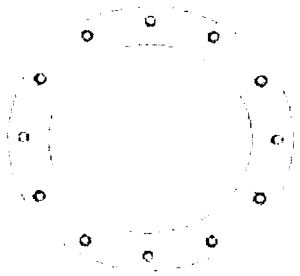
n/a

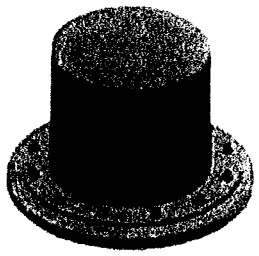
Stiffener Results

Horizontal Weld :	n/a
Vertical Weld:	n/a
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	n/a
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	n/a
Plate Comp. (AISC Bracket):	n/a

Pole Results

Pole Punching Shear Check: n/a





* 0 = none, 1 = every bolt, 2 = every 2 bolts, 3 = 2 per bolt

** Note: for complete joint penetration groove welds the groove depth must be exactly 1/2 the stiffener thickness for calculation purposes

VERTICAL STRUCTURES, INC.

Overturning Calculation for Rectangular Mat Foundations (Eccentrically Loaded)

Customer:	Crown Castle
Site Name:	Rogers Property, CT BU#881541
Job Number:	2012-004-039a
Tower Model:	140' EEI Monopole
Date:	6/6/2012

Soil Ultimate Bearing	8	ksf
Unit wt soil	0.125	kcf
Unit wt concrete	0.15	kcf
Mat Length (long dimension)	23	ft
Mat Width (short dimension)	23	ft
Mat Thickness	3	ft
Depth of Soil Over Mat	4	ft
Has Pedestals? (Y or N)	Y	
Pedestal Round or Square? (R or S)	S	
Number of Pedestals	1	
Pedestal Height	5	ft
Pedestal Diameter or Width	7	ft

Applied Shear	25.446	kip
Applied Axial Force	29.975	kip
Applied Moment	2606.991	k-ft

Load Eccentricity on Pad

distance from long axis =	3.5	ft
distance from short axis =	3.5	ft

wt. Concrete =	274.800	kip		
wt. Soil =	240.000	kip		
Shear Moment =	203.568	k-ft		
P*e =	104.913	k-ft	104.913	k-ft
	(about long axis)		(about short axis)	
Allowable Bearing =	4	ksf		
Mat Width / 6 =	3.83	ft	3.83	ft
e =	5.35	ft	5.35	ft
I =	18.44	ft	18.44	ft
Bearing =	1.44	ksf	2.57	ksf
	BEARING ADEQUATE			
x =	2.961	ft	2.961	ft
Resisting Moment =	5458.446	k-ft	5458.446	k-ft
SF =	1.872		1.872	
	OVERTURNING ADEQUATE			

Date: **June 06, 2012**

James Williams
Crown Castle
3530 Toringdon Way, Suite 300
Charlotte, NC 28277
(704) 405-6521

Vertical Structures, Inc.
309 Spangler Drive, Suite E
Richmond, KY 40475
(859) 624-8360
ncoomes@verticalstructures.com

Subject: **Structural Analysis Report**

Carrier Designation:	***Sprint PCS* Change-Out**	
	Carrier Site Number:	CT23XC313
	Carrier Site Name:	N/A
Crown Castle Designation:	**Crown Castle BU Number:**	881541
	Crown Castle Site Name:	Rogers Property
	Crown Castle JDE Job Number:	189140
	Crown Castle Work Order Number:	498950
	Crown Castle Application Number:	151615 Rev. 3
Engineering Firm Designation:	**Vertical Structures, Inc. Project Number:**	2012-004-039b
Site Data:	**Grassy Hill Road, Orange, CT, New Haven County** **Latitude *41° 17' 7.75"*, Longitude *-73° 2' 33.27"*** **139.5 Foot - Monopole Tower**	

Dear James Williams,

Vertical Structures, Inc. is pleased to submit this **"Structural Analysis Report"** to determine the structural integrity of the above mentioned tower. This analysis has been performed in accordance with the Crown Castle Structural 'Statement of Work' and the terms of Crown Castle Purchase Order Number 468141.

The purpose of the analysis is to determine acceptability of the tower stress level. Based on our analysis we have determined the tower stress level for the structure and foundation, under the following load case, to be:

LC7: Existing + Reserved + Proposed Equipment **Sufficient Capacity**
Note: See Table I and Table II for the proposed and existing/reserved loading, respectively.

The analysis has been performed in accordance with the TIA/EIA-222-F standard and the 2005 Connecticut State Building Code based upon a wind speed of 85 mph fastest mile.

All modifications and equipment proposed in this report shall be installed in accordance with the attached drawings for the determined available structural capacity to be effective.

We at *Vertical Structures, Inc.* appreciate the opportunity of providing our continuing professional services to you and Crown Castle. If you have any questions or need further assistance on this or any other projects please give us a call.

Respectfully submitted by:

Nathan Coomes, P.E.
Project Engineer

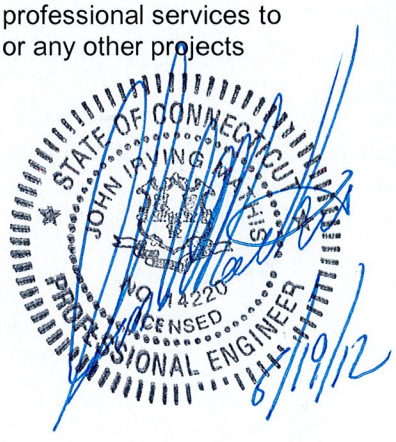


TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 139.5 ft Monopole tower designed by EEI in 2004. The tower was originally designed for a wind speed of 90 mph per TIA/EIA-222-F.

2) ANALYSIS CRITERIA

The structural analysis was performed for this tower in accordance with the requirements of TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a fastest mile wind speed of 85 mph with no ice and 50 mph under service loads. Also, per Crown Castle's direction and in accordance with ASCE-7-05 we have considered a fastest mile wind speed of 38 mph with an escalating 0.75 inch ice thickness.

Table 1 - Proposed Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
130.0	130.0	3	alcatel lucent	800 External Notch Filter	3	1 1/4	
		9	celwave	ACU-A20-N Diplexer			
		3	celwave	APXVSPP18-C-A20 w/ Mount Pipe			
128.0	128.0	1		Side Arm Mount [SO 102-3]			
		3	alcatel lucent	1900MHz RRH (65MHz) TMA			
		3	alcatel lucent	800MHZ RRH TMA			

Table 2 - Existing and Reserved Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
136.0	140.0	3	ericsson	RRUS-11 BTS	2 1 6	3/8 5/8 1 5/8	1
		3	kathrein	800 10121 w/ mount pipe			
		6	powerwave technologies	LGP21401 TMA			
		3	powerwave technologies	P65-16-XLH-RR w/ Mount Pipe			
		1	raycap	DC6-48-60-18-8F			
	136.0	1		T-Arm Mount [TA 702-3]			
130.0	134.0	1	andrew	VHLP2-11	3 3	5/16 1/2	1
	132.0	3	argus technologies	LLPX310R w/ Mount Pipe			
		1	dragonwave	A-ANT-23G-2-C			
		3	samsung telecommunications	FDD_R6_RRH TMA			
	130.0	1		12' (4" Tube) T-Arm (3)			
		6	css	CSS-XS4-65-R w/ Mount Pipe	6	1 1/4	3
124.0	124.0				6	1 5/8	1
118.0	118.0	1		T-Arm Mount [TA 602-3]			1
		6	celwave	FD9R6004/2C-3L Diplexer			2
		6	decibel	DB846F65ZAXY w/Mount Pipe	12	1 5/8	1
		3	powerwave technologies	P65.16.XL.2 w/ Mount Pipe			
		3	rymsa	MG D3-800Tx w/ Mount Pipe			
108.0	109.0	3	ems wireless	RR90-17-02DP w/ Mount Pipe	12	1 5/8	1
		6	ericsson	KRY 112 71 TMA			
		3	rfs	APXV18-206516S-C-A20 w/ Mount Pipe			
		3	rfs	ATMAA1412D-1A20 TMA			
	108.0	1		T-Arm Mount [TA 602-3]			
100.0	100.0	3	celwave	APXV18-206517-C w/Mount Pipe	6	1 5/8	1
75.0	77.0	1	lucent	KS24019-L112A	1	1/2	1
	75.0	1		Side Arm Mount [SO 701-1]			

Notes:
1) Existing Equipment
2) Reserved Equipment
3) Equipment to be Removed

Table 3 - Design Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
140	140	12	dapa	48000		
		1	eei	Low Profile Platform		
130	130	12	dapa	48000		
		1	eei	Low Profile Platform		
120	120	12	dapa	48000		
		1	eei	Low Profile Platform		
110	110	12	dapa	48000		
		1	eei	Low Profile Platform		
100	100	12	dapa	48000		
		1	eei	Low Profile Platform		
75	75	1		GPS		

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
Online Application	Sprint PCS Change-Out Revision #3	151615	CCI iSite
Tower Drawing	EEI Drawing No. GS55077	2207700	CCI iSite
Foundation Drawing	EEI Drawing No. 12364-140	2208511	CCI iSite
Geotechnical Report	Clarence Welti Assoc., Inc. Report Dated 'February 16, 2004'	2245154	CCI iSite

3.1) Analysis Method

tnxTower (version 6.0.4.0), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A. Crown Castle's CCIplate 1.5 analysis tool was used to evaluate the anchor bolts, base plate, and any flange splices.

3.2) Assumptions

1) Tower and structures were built in accordance with the manufacturer's specifications.
2) The tower and structures have been maintained in accordance with the manufacturer's specification.
3) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.
4) When applicable, transmission cables are considered as structural components for calculating wind loads as allowed by TIA/EIA-222-F.

This analysis may be affected if any assumptions are not valid or have been made in error. Vertical Structures, Inc. should be notified to determine the effect on the structural integrity of the tower.

4) ANALYSIS RESULTS

Table 5 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (lb)	SF*P_allow (lb)	% Capacity	Pass / Fail
L1	139.5 - 93.04	Pole	TP26.99x15.5x0.25	1	-7768.21	1063078.12	83.0	Pass
L2	93.04 - 46.38	Pole	TP37.91x25.5205x0.375	2	-16504.80	2242999.02	81.5	Pass
L3	46.38 - 0	Pole	TP48.5x35.874x0.375	3	-25775.00	2756230.66	87.5	Pass
							Summary	
						Pole (L3)	87.5	Pass
						Rating =	87.5	Pass

Table 6 - Tower Component Stresses vs. Capacity – LC7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	67.7	Pass
1	Base Plate	0	91.8	Pass
1	Base Foundation Soil Interaction	0	78.3	Pass

Structure Rating (max from all components) =	91.8%

Notes:
1) See additional documentation in "Appendix C – Additional Calculations" for calculations supporting the % capacity.
2) Capacities up to 105% are considered acceptable based on analysis methods used.

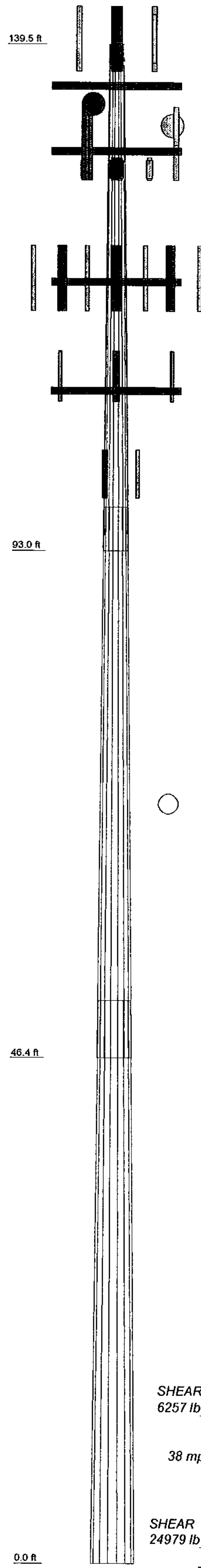
4.1) Recommendations

N/A

APPENDIX A

TNXTOWER OUTPUT

Section	1	2	3	
Length (ft)	46.46	50.58	51.63	
Number of Sides	18	18	18	
Thickness (in)	0.2500	0.3750	0.3750	
Socket Length (ft)	3.92	5.25		
Top Dia (in)	15.5000	25.5205	35.8740	
Bot Dia (in)	26.9900	37.9100	48.5000	
Grade		A572-65		
Weight (lb)	2633.8	6420.3	8743.3	17797.4



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
T-Arm Mount [TA 702-3]	136	800MHZ RRH TMA (Sprint PCS)	128
800 10121 w/ mount pipe	136	800MHZ RRH TMA (Sprint PCS)	128
800 10121 w/ mount pipe	136	800MHZ RRH TMA (Sprint PCS)	128
800 10121 w/ mount pipe	136	Side Arm Mount [SO 102-3] (Sprint PCS)	128
P65-16-XLH-RR w/ Mount Pipe	136		
P65-16-XLH-RR w/ Mount Pipe	136	1900MHz RRH (65MHz) TMA (Sprint PCS)	128
P65-16-XLH-RR w/ Mount Pipe	136		
RRUS-11 BTS	136	(2) DB846F65ZAXY w/Mount Pipe	118
RRUS-11 BTS	136	(2) DB846F65ZAXY w/Mount Pipe	118
RRUS-11 BTS	136	MG D3-800Tx w/ Mount Pipe	118
DC6-48-60-18-8F	136	MG D3-800Tx w/ Mount Pipe	118
(2) LGP21401 TMA (VSI)	136	MG D3-800Tx w/ Mount Pipe	118
(2) LGP21401 TMA (VSI)	136	P65.16.XL.2 w/ Mount Pipe	118
(2) LGP21401 TMA (VSI)	136	P65.16.XL.2 w/ Mount Pipe	118
12' (4" Tube) T-Arm (3) (Sprint PCS)	130	P65.16.XL.2 w/ Mount Pipe	118
APXVSPP18-C-A20 w/ Mount Pipe (Sprint PCS)	130	(2) FD9R6004/2C-3L Diplexer	118
		(2) FD9R6004/2C-3L Diplexer	118
APXVSPP18-C-A20 w/ Mount Pipe (Sprint PCS)	130	(2) FD9R6004/2C-3L Diplexer	118
		T-Arm Mount [TA 602-3]	118
APXVSPP18-C-A20 w/ Mount Pipe (Sprint PCS)	130	(2) DB846F65ZAXY w/Mount Pipe	118
		RR90-17-02DP w/ Mount Pipe	108
800 External Notch Filter (Sprint PCS)	130	RR90-17-02DP w/ Mount Pipe	108
800 External Notch Filter (Sprint PCS)	130	APXV18-206516S-C-A20 w/ Mount Pipe	108
800 External Notch Filter (Sprint PCS)	130		
(3) ACU-A20-N Diplexer (Sprint PCS)	130	APXV18-206516S-C-A20 w/ Mount Pipe	108
(3) ACU-A20-N Diplexer (Sprint PCS)	130		
(3) ACU-A20-N Diplexer (Sprint PCS)	130	APXV18-206516S-C-A20 w/ Mount Pipe	108
(2) 7'x2" Mount Pipe	130		
(2) 7'x2" Mount Pipe	130	(2) KRY 112 71 TMA	108
(2) 7'x2" Mount Pipe	130	(2) KRY 112 71 TMA	108
LLPX310R w/ Mount Pipe	130	(2) KRY 112 71 TMA	108
LLPX310R w/ Mount Pipe	130	ATMAA1412D-1A20 TMA	108
LLPX310R w/ Mount Pipe	130	ATMAA1412D-1A20 TMA	108
FDD_R6_RRH TMA	130	ATMAA1412D-1A20 TMA	108
FDD_R6_RRH TMA	130	(2) 7'x2" Antenna Mount Pipe	108
FDD_R6_RRH TMA	130	(2) 7'x2" Antenna Mount Pipe	108
6'x4" Pipe Mount	130	(2) 7'x2" Antenna Mount Pipe	108
6'x4" Pipe Mount	130	T-Arm Mount [TA 602-3]	108
A-ANT-23G-2-C (VSI)	130	RR90-17-02DP w/ Mount Pipe	108
VHLP2-11	130	APXV18-206517-C w/Mount Pipe	100
1900MHz RRH (65MHz) TMA (Sprint PCS)	128	APXV18-206517-C w/Mount Pipe	100
		APXV18-206517-C w/Mount Pipe	100
1900MHz RRH (65MHz) TMA (Sprint PCS)	128	Side Arm Mount [SO 701-1]	75
		KS24019-L112A	75

MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower is located in New Haven County, Connecticut.
2. Tower designed for a 85 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 38 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 87.5%

AXIAL 42214 lb
SHEAR 6257 lb
MOMENT 665512 lb-ft
TORQUE 769 lb-ft
38 mph WIND - 0.7500 in ICE

AXIAL 29498 lb
SHEAR 24979 lb
MOMENT 2543299 lb-ft
TORQUE 3059 lb-ft
REACTIONS - 85 mph WIND

Vertical Structures, Inc.
309 Spangler Drive, Suite E
Richmond, KY 40475
Phone: (859) 624-8360
FAX: (859) 624-8369

Job: Rogers Property, CT BU#881541			
Project: Vertical Structures Job No. 2012-004-039b			
Client: Crown Castle	Drawn by: ncoomes	App'd:	
Code: TIA/EIA-222-F	Date: 06/06/12	Scale: NTS	
Path:		Dwg No. E-1	

Tower Input Data

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

Tower is located in New Haven County, Connecticut.
Basic wind speed of 85 mph.
Nominal ice thickness of 0.7500 in.
Ice thickness is considered to increase with height.
Ice density of 56 pcf.
A wind speed of 38 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 50 mph.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in pole design is 1.333.
Local bending stresses due to climbing loads, feedline supports, and appurtenance mounts are not considered.

Options

Consider Moments - Legs	Distribute Leg Loads As Uniform	Treat Feedline Bundles As Cylinder
Consider Moments - Horizontals	Assume Legs Pinned	Use ASCE 10 X-Brace Ly Rules
Consider Moments - Diagonals	√ Assume Rigid Index Plate	√ Calculate Redundant Bracing Forces
Use Moment Magnification	√ Use Clear Spans For Wind Area	Ignore Redundant Members in FEA
√ Use Code Stress Ratios	√ Use Clear Spans For KL/r	√ SR Leg Bolts Resist Compression
√ Use Code Safety Factors - Guys	Retension Guys To Initial Tension	√ All Leg Panels Have Same Allowable
√ Escalate Ice	√ Bypass Mast Stability Checks	Offset Girt At Foundation
Always Use Max Kz	√ Use Azimuth Dish Coefficients	√ Consider Feedline Torque
Use Special Wind Profile	√ Project Wind Area of Appurt.	Include Angle Block Shear Check
√ Include Bolts In Member Capacity	√ Autocalc Torque Arm Areas	Poles
√ Leg Bolts Are At Top Of Section	√ SR Members Have Cut Ends	Include Shear-Torsion Interaction
√ Secondary Horizontal Braces Leg	Sort Capacity Reports By Component	Always Use Sub-Critical Flow
Use Diamond Inner Bracing (4 Sided)	√ Triangulate Diamond Inner Bracing	Use Top Mounted Sockets
Add IBC .6D+W Combination		

Tapered Pole Section Geometry

Section	*Elevation*	*Section Length*	*Splice Length*	*Number of Sides*	*Top Diameter*	*Bottom Diameter*	*Wall Thickness*	*Bend Radius*	*Pole Grade*
	ft	*ft*	*ft*		*in*	*in*	*in*	*in*	
L1	139.50-93.04	46.46	3.92	18	15.5000	26.9900	0.2500	1.0000	A572-65 (65 ksi)
L2	93.04-46.38	50.58	5.25	18	25.5205	37.9100	0.3750	1.5000	A572-65 (65 ksi)
L3	46.38-0.00	51.63		18	35.8740	48.5000	0.3750	1.5000	A572-65 (65 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	15.7391	12.1009	355.5445	5.4138	7.8740	45.1542	711.5567	6.0516	2.2880	9.152
	27.4064	21.2182	1916.7638	9.4927	13.7109	139.7983	3836.0497	10.6111	4.3102	17.241
L2	26.8892	29.9295	2390.8862	8.9267	12.9644	184.4188	4784.9184	14.9676	3.8316	10.218
	38.4948	44.6760	7952.1562	13.3249	19.2583	412.9214	15914.7760	22.3423	6.0122	16.032
L3	37.7311	42.2527	6727.0540	12.6022	18.2240	369.1315	13462.9597	21.1304	5.6538	15.077
	49.2482	57.2808	16760.5346	17.0844	24.6380	680.2717	33543.1232	28.6458	7.8760	21.003

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in
L1 139.50-93.04				1	1	1		
L2 93.04-46.38				1	1	1		
L3 46.38-0.00				1	1	1		

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
LDF7-50A (1-5/8 FOAM)	B	No	Inside Pole	139.50 - 0.00	6	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
						1" Ice	0.00	0.82
						2" Ice	0.00	0.82
						4" Ice	0.00	0.82
FB-L98-002-XXX (3/8")	B	No	Inside Pole	139.50 - 0.00	2	No Ice	0.00	0.10
						1/2" Ice	0.00	0.10
						1" Ice	0.00	0.10
						2" Ice	0.00	0.10
						4" Ice	0.00	0.10
WR-VG86ST-BRD (Power Cable)	B	No	Inside Pole	139.50 - 0.00	1	No Ice	0.00	0.15
						1/2" Ice	0.00	0.15
						1" Ice	0.00	0.15
						2" Ice	0.00	0.15
						4" Ice	0.00	0.15
LDF4-50A (1/2 FOAM)	B	No	Inside Pole	132.00 - 0.00	1	No Ice	0.00	0.15
						1/2" Ice	0.00	0.15
						1" Ice	0.00	0.15
						2" Ice	0.00	0.15
						4" Ice	0.00	0.15
LDF4-50A (1/2 FOAM)	B	No	CaAa (Out Of Face)	132.00 - 0.00	2	No Ice	0.00	0.15
						1/2" Ice	0.00	0.84
						1" Ice	0.00	2.14
						2" Ice	0.00	6.58
						4" Ice	0.00	22.78
9207(5/16")	B	No	Inside Pole	132.00 - 0.00	3	No Ice	0.00	0.06
						1/2" Ice	0.00	0.06
						1" Ice	0.00	0.06
						2" Ice	0.00	0.06
						4" Ice	0.00	0.06
2" Rigid Conduit	B	No	CaAa (Out Of Face)	132.00 - 0.00	2	No Ice	0.10	2.80
						1/2" Ice	0.15	4.33

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
						1" Ice	0.20	6.47
						2" Ice	0.30	12.57
						4" Ice	0.50	32.12
HB114-1-0813U4-M5J (1-1/4") (Sprint PCS)	B	No	CaAa (Out Of Face)	130.00 - 0.00	3	No Ice	0.05	0.66
						1/2" Ice	0.08	1.91
						1" Ice	0.12	3.76
						2" Ice	0.18	9.31
						4" Ice	0.32	27.73
LDF7-50A (1-5/8 FOAM)	B	No	Inside Pole	124.00 - 0.00	6	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
						1" Ice	0.00	0.82
						2" Ice	0.00	0.82
						4" Ice	0.00	0.82
561 (1-5/8 AIR)	B	No	Inside Pole	118.00 - 0.00	12	No Ice	0.00	1.35
						1/2" Ice	0.00	1.35
						1" Ice	0.00	1.35
						2" Ice	0.00	1.35
						4" Ice	0.00	1.35
LDF7-50A (1-5/8 FOAM)	B	No	Inside Pole	109.00 - 0.00	12	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
						1" Ice	0.00	0.82
						2" Ice	0.00	0.82
						4" Ice	0.00	0.82
LDF7-50A (1-5/8 FOAM)	B	No	Inside Pole	100.00 - 0.00	6	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
						1" Ice	0.00	0.82
						2" Ice	0.00	0.82
						4" Ice	0.00	0.82
LDF4-50A (1/2 FOAM)	B	No	Inside Pole	77.00 - 0.00	1	No Ice	0.00	0.15
						1/2" Ice	0.00	0.15
						1" Ice	0.00	0.15
						2" Ice	0.00	0.15
						4" Ice	0.00	0.15

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
L1	139.50-93.04	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	13.483	1308.71
		C	0.000	0.000	0.000	0.000	0.00
L2	93.04-46.38	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	16.517	2307.73
		C	0.000	0.000	0.000	0.000	0.00
L3	46.38-0.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	16.418	2296.27
		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
L1	139.50-93.04	A	0.871	0.000	0.000	0.000	0.000	0.00

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
		B		0.000	0.000	0.000	26.707	1971.06
		C		0.000	0.000	0.000	0.000	0.00
L2	93.04-46.38	A	0.819	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	32.771	3119.84
		C		0.000	0.000	0.000	0.000	0.00
L3	46.38-0.00	A	0.750	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	31.619	3044.03
		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
L1	139.50-93.04	0.3396	0.1961	0.5568	0.3215
L2	93.04-46.38	0.4062	0.2345	0.6934	0.4003
L3	46.38-0.00	0.4184	0.2415	0.7204	0.4159

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
T-Arm Mount [TA 702-3]	A	None		0.0000	136.00	No Ice	5.64	5.64	339.00
						1/2" Ice	6.55	6.55	429.00
						1" Ice	7.46	7.46	519.00
						2" Ice	9.28	9.28	699.00
						4" Ice	12.92	12.92	1059.00
800 10121 w/ mount pipe	A	From Centroid-Face	4.00 0.00 4.00	10.0000	136.00	No Ice	5.80	4.71	66.00
						1/2" Ice	6.34	5.56	112.31
						1" Ice	6.86	6.28	168.51
						2" Ice	7.94	7.81	302.82
						4" Ice	10.23	11.23	689.84
800 10121 w/ mount pipe	B	From Centroid-Face	4.00 0.00 4.00	0.0000	136.00	No Ice	5.80	4.71	66.00
						1/2" Ice	6.34	5.56	112.31
						1" Ice	6.86	6.28	168.51
						2" Ice	7.94	7.81	302.82
						4" Ice	10.23	11.23	689.84
800 10121 w/ mount pipe	C	From Centroid-Face	4.00 0.00 4.00	-10.0000	136.00	No Ice	5.80	4.71	66.00
						1/2" Ice	6.34	5.56	112.31
						1" Ice	6.86	6.28	168.51
						2" Ice	7.94	7.81	302.82
						4" Ice	10.23	11.23	689.84
P65-16-XLH-RR w/ Mount Pipe	A	From Centroid-Face	4.00 0.00 4.00	30.0000	136.00	No Ice	8.88	6.60	82.20
						1/2" Ice	9.63	7.88	147.36
						1" Ice	10.36	9.00	225.21
						2" Ice	11.75	10.93	408.26
						4" Ice	14.66	15.02	921.60

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
P65-16-XLH-RR w/ Mount Pipe	B	From Centroid-Face	4.00 0.00 4.00	30.0000	136.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.88 9.63 10.36 11.75 14.66	6.60 7.88 9.00 10.93 15.02	82.20 147.36 225.21 408.26 921.60
P65-16-XLH-RR w/ Mount Pipe	C	From Centroid-Face	4.00 0.00 4.00	30.0000	136.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.88 9.63 10.36 11.75 14.66	6.60 7.88 9.00 10.93 15.02	82.20 147.36 225.21 408.26 921.60
RRUS-11 BTS	A	From Centroid-Face	4.00 0.00 4.00	30.0000	136.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.42 4.71 5.00 5.61 6.94	1.19 1.35 1.53 1.90 2.75	55.00 80.77 109.98 179.45 368.09
RRUS-11 BTS	B	From Centroid-Face	4.00 0.00 4.00	30.0000	136.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.42 4.71 5.00 5.61 6.94	1.19 1.35 1.53 1.90 2.75	55.00 80.77 109.98 179.45 368.09
RRUS-11 BTS	C	From Centroid-Face	4.00 0.00 4.00	30.0000	136.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.42 4.71 5.00 5.61 6.94	1.19 1.35 1.53 1.90 2.75	55.00 80.77 109.98 179.45 368.09
DC6-48-60-18-8F	C	From Centroid-Face	4.00 0.00 4.00	30.0000	136.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.57 2.80 3.04 3.54 4.66	4.32 4.60 4.88 5.49 6.80	18.90 50.21 85.17 166.87 382.77
(2) LGP21401 TMA (VSI)	A	From Centroid-Face	4.00 0.00 4.00	10.0000	136.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.29 1.45 1.61 1.97 2.79	0.36 0.48 0.60 0.87 1.52	14.10 21.26 30.32 54.89 135.29
(2) LGP21401 TMA (VSI)	B	From Centroid-Face	4.00 0.00 4.00	0.0000	136.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.29 1.45 1.61 1.97 2.79	0.36 0.48 0.60 0.87 1.52	14.10 21.26 30.32 54.89 135.29
(2) LGP21401 TMA (VSI)	C	From Centroid-Face	4.00 0.00 4.00	-10.0000	136.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.29 1.45 1.61 1.97 2.79	0.36 0.48 0.60 0.87 1.52	14.10 21.26 30.32 54.89 135.29
**									
12' (4" Tube) T-Arm (3) (Sprint PCS)	C	None		0.0000	130.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	13.50 16.71 19.92 26.34 39.18	13.50 16.71 19.92 26.34 39.18	600.00 750.00 900.00 1200.00 1800.00
APXVSPP18-C-A20 w/ Mount Pipe (Sprint PCS)	A	From Centroid-Face	4.75 2.75 0.00	10.0000	130.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.50 9.15 9.77 11.03 13.68	6.95 8.13 9.02 10.84 14.85	82.55 147.74 224.90 405.88 908.85
APXVSPP18-C-A20 w/	B	From	4.75	20.0000	130.00	No Ice	8.50	6.95	82.55

tnxTower	Job	Page
	Rogers Property, CT BU#881541	6 of 12
Vertical Structures, Inc. 309 Spangler Drive, Suite E Richmond, KY 40475 Phone: (859) 624-8360 FAX: (859) 624-8369	**Project** Vertical Structures Job No. 2012-004-039b	**Date** 16:39:08 06/06/12
	Client Crown Castle	**Designed by** ncoomes

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
Mount Pipe (Sprint PCS)		Centroid-Face	2.75 0.00			1/2" Ice	9.15	8.13	147.74
						1" Ice	9.77	9.02	224.90
						2" Ice	11.03	10.84	405.88
						4" Ice	13.68	14.85	908.85
APXVSPP18-C-A20 w/ Mount Pipe (Sprint PCS)	C	From Centroid-Face	4.75 2.75 0.00	-20.0000	130.00	No Ice	8.50	6.95	82.55
						1/2" Ice	9.15	8.13	147.74
						1" Ice	9.77	9.02	224.90
						2" Ice	11.03	10.84	405.88
						4" Ice	13.68	14.85	908.85
800 External Notch Filter (Sprint PCS)	A	From Centroid-Face	4.75 2.75 0.00	10.0000	130.00	No Ice	0.77	0.37	11.00
						1/2" Ice	0.89	0.46	16.81
						1" Ice	1.02	0.56	24.26
						2" Ice	1.30	0.79	44.81
						4" Ice	1.97	1.34	114.01
800 External Notch Filter (Sprint PCS)	B	From Centroid-Face	4.75 2.75 0.00	20.0000	130.00	No Ice	0.77	0.37	11.00
						1/2" Ice	0.89	0.46	16.81
						1" Ice	1.02	0.56	24.26
						2" Ice	1.30	0.79	44.81
						4" Ice	1.97	1.34	114.01
800 External Notch Filter (Sprint PCS)	C	From Centroid-Face	4.75 2.75 0.00	-20.0000	130.00	No Ice	0.77	0.37	11.00
						1/2" Ice	0.89	0.46	16.81
						1" Ice	1.02	0.56	24.26
						2" Ice	1.30	0.79	44.81
						4" Ice	1.97	1.34	114.01
(3) ACU-A20-N Diplexer (Sprint PCS)	A	From Centroid-Face	4.75 2.75 0.00	10.0000	130.00	No Ice	0.14	0.08	1.04
						1/2" Ice	0.19	0.12	2.32
						1" Ice	0.25	0.17	4.41
						2" Ice	0.40	0.30	11.80
						4" Ice	0.80	0.67	44.85
(3) ACU-A20-N Diplexer (Sprint PCS)	B	From Centroid-Face	4.75 2.75 0.00	20.0000	130.00	No Ice	0.14	0.08	1.04
						1/2" Ice	0.19	0.12	2.32
						1" Ice	0.25	0.17	4.41
						2" Ice	0.40	0.30	11.80
						4" Ice	0.80	0.67	44.85
(3) ACU-A20-N Diplexer (Sprint PCS)	C	From Centroid-Face	4.75 2.75 0.00	-20.0000	130.00	No Ice	0.14	0.08	1.04
						1/2" Ice	0.19	0.12	2.32
						1" Ice	0.25	0.17	4.41
						2" Ice	0.40	0.30	11.80
						4" Ice	0.80	0.67	44.85
(2) 7'x2" Mount Pipe	A	From Centroid-Face	4.75 2.75 0.00	0.0000	130.00	No Ice	1.66	1.66	26.00
						1/2" Ice	2.39	2.39	38.58
						1" Ice	2.83	2.83	55.84
						2" Ice	3.71	3.71	104.97
						4" Ice	5.58	5.58	266.00
(2) 7'x2" Mount Pipe	B	From Centroid-Face	4.75 2.75 0.00	0.0000	130.00	No Ice	1.66	1.66	26.00
						1/2" Ice	2.39	2.39	38.58
						1" Ice	2.83	2.83	55.84
						2" Ice	3.71	3.71	104.97
						4" Ice	5.58	5.58	266.00
(2) 7'x2" Mount Pipe	C	From Centroid-Face	4.75 2.75 0.00	0.0000	130.00	No Ice	1.66	1.66	26.00
						1/2" Ice	2.39	2.39	38.58
						1" Ice	2.83	2.83	55.84
						2" Ice	3.71	3.71	104.97
						4" Ice	5.58	5.58	266.00
LLPX310R w/ Mount Pipe	A	From Centroid-Face	4.75 2.75 2.00	40.0000	130.00	No Ice	5.43	3.38	50.56
						1/2" Ice	5.99	4.15	89.99
						1" Ice	6.51	4.80	138.53

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
						2" Ice	7.57	6.19	255.15
						4" Ice	9.86	9.25	597.35
LLPX310R w/ Mount Pipe	B	From Centroid-Face	4.75 2.75 2.00	10.0000	130.00	No Ice	5.43	3.38	50.56
						1/2" Ice	5.99	4.15	89.99
						1" Ice	6.51	4.80	138.53
						2" Ice	7.57	6.19	255.15
						4" Ice	9.86	9.25	597.35
LLPX310R w/ Mount Pipe	C	From Centroid-Face	4.75 2.75 2.00	0.0000	130.00	No Ice	5.43	3.38	50.56
						1/2" Ice	5.99	4.15	89.99
						1" Ice	6.51	4.80	138.53
						2" Ice	7.57	6.19	255.15
						4" Ice	9.86	9.25	597.35
FDD_R6_RRH TMA	A	From Centroid-Face	4.75 2.75 2.00	40.0000	130.00	No Ice	1.79	0.78	33.00
						1/2" Ice	1.97	0.92	44.50
						1" Ice	2.16	1.07	58.31
						2" Ice	2.57	1.39	93.60
						4" Ice	3.49	2.14	200.35
FDD_R6_RRH TMA	B	From Centroid-Face	4.75 2.75 2.00	10.0000	130.00	No Ice	1.79	0.78	33.00
						1/2" Ice	1.97	0.92	44.50
						1" Ice	2.16	1.07	58.31
						2" Ice	2.57	1.39	93.60
						4" Ice	3.49	2.14	200.35
FDD_R6_RRH TMA	C	From Centroid-Face	4.75 2.75 2.00	0.0000	130.00	No Ice	1.79	0.78	33.00
						1/2" Ice	1.97	0.92	44.50
						1" Ice	2.16	1.07	58.31
						2" Ice	2.57	1.39	93.60
						4" Ice	3.49	2.14	200.35
6'x4" Pipe Mount	B	From Centroid-Face	4.75 2.75 0.00	0.0000	130.00	No Ice	2.25	2.25	65.00
						1/2" Ice	2.62	2.62	84.10
						1" Ice	3.00	3.00	107.47
						2" Ice	3.78	3.78	167.65
						4" Ice	5.56	5.56	346.05
6'x4" Pipe Mount	C	From Centroid-Face	4.75 2.75 0.00	0.0000	130.00	No Ice	2.25	2.25	65.00
						1/2" Ice	2.62	2.62	84.10
						1" Ice	3.00	3.00	107.47
						2" Ice	3.78	3.78	167.65
						4" Ice	5.56	5.56	346.05
**									
Side Arm Mount [SO 102-3] (Sprint PCS)	C	None		0.0000	128.00	No Ice	3.00	3.00	81.00
						1/2" Ice	3.48	3.48	111.00
						1" Ice	3.96	3.96	141.00
						2" Ice	4.92	4.92	201.00
						4" Ice	6.84	6.84	321.00
1900MHz RRH (65MHz) TMA (Sprint PCS)	A	From Centroid-Face	3.50 0.00 0.00	10.0000	128.00	No Ice	2.77	2.70	60.00
						1/2" Ice	3.01	2.94	83.90
						1" Ice	3.26	3.18	111.08
						2" Ice	3.78	3.70	176.02
						4" Ice	4.93	4.85	353.75
1900MHz RRH (65MHz) TMA (Sprint PCS)	B	From Centroid-Face	3.50 0.00 0.00	20.0000	128.00	No Ice	2.77	2.70	60.00
						1/2" Ice	3.01	2.94	83.90
						1" Ice	3.26	3.18	111.08
						2" Ice	3.78	3.70	176.02
						4" Ice	4.93	4.85	353.75
1900MHz RRH (65MHz) TMA (Sprint PCS)	C	From Centroid-Face	3.50 0.00 0.00	-20.0000	128.00	No Ice	2.77	2.70	60.00
						1/2" Ice	3.01	2.94	83.90
						1" Ice	3.26	3.18	111.08
						2" Ice	3.78	3.70	176.02

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
						4" Ice	4.93	4.85	353.75
800MHZ RRH TMA (Sprint PCS)	A	From Centroid-Face	3.50 0.00 0.00	10.0000	128.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.49 2.71 2.93 3.41 4.46	2.07 2.27 2.48 2.93 3.93	53.00 74.19 98.39 156.61 317.77
800MHZ RRH TMA (Sprint PCS)	B	From Centroid-Face	3.50 0.00 0.00	20.0000	128.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.49 2.71 2.93 3.41 4.46	2.07 2.27 2.48 2.93 3.93	53.00 74.19 98.39 156.61 317.77
800MHZ RRH TMA (Sprint PCS)	C	From Centroid-Face	3.50 0.00 0.00	-20.0000	128.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.49 2.71 2.93 3.41 4.46	2.07 2.27 2.48 2.93 3.93	53.00 74.19 98.39 156.61 317.77
**									
T-Arm Mount [TA 602-3]	C	None		0.0000	118.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	11.59 15.44 19.29 26.99 42.39	11.59 15.44 19.29 26.99 42.39	774.30 990.35 1206.41 1638.52 2502.73
(2) DB846F65ZAXY w/Mount Pipe	A	From Centroid-Face	6.00 0.00 0.00	-40.0000	118.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.27 7.88 8.48 9.72 12.33	7.82 9.01 9.91 11.81 15.98	46.55 111.10 187.61 367.24 867.25
(2) DB846F65ZAXY w/Mount Pipe	B	From Centroid-Face	6.00 0.00 0.00	-20.0000	118.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.27 7.88 8.48 9.72 12.33	7.82 9.01 9.91 11.81 15.98	46.55 111.10 187.61 367.24 867.25
(2) DB846F65ZAXY w/Mount Pipe	C	From Centroid-Face	6.00 0.00 0.00	0.0000	118.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.27 7.88 8.48 9.72 12.33	7.82 9.01 9.91 11.81 15.98	46.55 111.10 187.61 367.24 867.25
MG D3-800Tx w/ Mount Pipe	A	From Centroid-Face	6.00 0.00 0.00	-20.0000	118.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.71 4.19 4.63 5.65 7.82	3.56 4.39 5.09 6.54 9.69	36.90 69.87 112.21 217.21 539.32
MG D3-800Tx w/ Mount Pipe	B	From Centroid-Face	6.00 0.00 0.00	-20.0000	118.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.71 4.19 4.63 5.65 7.82	3.56 4.39 5.09 6.54 9.69	36.90 69.87 112.21 217.21 539.32
MG D3-800Tx w/ Mount Pipe	C	From Centroid-Face	6.00 0.00 0.00	-10.0000	118.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.71 4.19 4.63 5.65 7.82	3.56 4.39 5.09 6.54 9.69	36.90 69.87 112.21 217.21 539.32
P65.16.XL.2 w/ Mount Pipe	A	From Centroid-Face	6.00 0.00 0.00	-20.0000	118.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.88 9.63 10.36 11.75 14.66	6.02 7.29 8.41 10.32 14.36	62.20 124.60 199.63 376.85 877.75

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
P65.16.XL.2 w/ Mount Pipe	B	From Centroid-Face	6.00 0.00 0.00	-20.0000	118.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.88 9.63 10.36 11.75 14.66	6.02 7.29 8.41 10.32 14.36	62.20 124.60 199.63 376.85 877.75
P65.16.XL.2 w/ Mount Pipe	C	From Centroid-Face	6.00 0.00 0.00	-20.0000	118.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.88 9.63 10.36 11.75 14.66	6.02 7.29 8.41 10.32 14.36	62.20 124.60 199.63 376.85 877.75
(2) FD9R6004/2C-3L Diplexer	A	From Centroid-Face	6.00 0.00 0.00	-40.0000	118.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.37 0.45 0.54 0.75 1.28	0.08 0.14 0.20 0.34 0.74	3.10 5.40 8.79 19.61 62.87
(2) FD9R6004/2C-3L Diplexer	B	From Centroid-Face	6.00 0.00 0.00	-20.0000	118.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.37 0.45 0.54 0.75 1.28	0.08 0.14 0.20 0.34 0.74	3.10 5.40 8.79 19.61 62.87
(2) FD9R6004/2C-3L Diplexer	C	From Centroid-Face	6.00 0.00 0.00	0.0000	118.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.37 0.45 0.54 0.75 1.28	0.08 0.14 0.20 0.34 0.74	3.10 5.40 8.79 19.61 62.87
**									
T-Arm Mount [TA 602-3]	C	None		0.0000	108.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	11.59 15.44 19.29 26.99 42.39	11.59 15.44 19.29 26.99 42.39	774.30 990.35 1206.41 1638.52 2502.73
RR90-17-02DP w/ Mount Pipe	A	From Centroid-Face	6.00 0.00 1.00	0.0000	108.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.59 5.09 5.58 6.59 8.73	3.32 4.09 4.78 6.23 9.31	34.18 69.33 113.86 223.79 556.77
RR90-17-02DP w/ Mount Pipe	B	From Centroid-Face	6.00 0.00 1.00	0.0000	108.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.59 5.09 5.58 6.59 8.73	3.32 4.09 4.78 6.23 9.31	34.18 69.33 113.86 223.79 556.77
RR90-17-02DP w/ Mount Pipe	C	From Centroid-Face	6.00 0.00 1.00	0.0000	108.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.59 5.09 5.58 6.59 8.73	3.32 4.09 4.78 6.23 9.31	34.18 69.33 113.86 223.79 556.77
APXV18-206516S-C-A20 w/ Mount Pipe	A	From Centroid-Face	6.00 0.00 1.00	0.0000	108.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.76 4.14 4.57 5.47 7.40	3.20 3.83 4.47 5.81 8.74	36.95 68.28 108.25 207.80 512.65
APXV18-206516S-C-A20 w/ Mount Pipe	B	From Centroid-Face	6.00 0.00 1.00	0.0000	108.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.76 4.14 4.57 5.47 7.40	3.20 3.83 4.47 5.81 8.74	36.95 68.28 108.25 207.80 512.65
APXV18-206516S-C-A20 w/	C	From	6.00	0.0000	108.00	No Ice	3.76	3.20	36.95

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
Mount Pipe		Centroid-Face	0.00 1.00			1/2" Ice 1" Ice 2" Ice 4" Ice	4.14 4.57 5.47 7.40	3.83 4.47 5.81 8.74	68.28 108.25 207.80 512.65
(2) KRY 112 71 TMA	A	From Centroid-Face	6.00 0.00 1.00	0.0000	108.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.68 0.80 0.93 1.22 1.90	0.45 0.56 0.68 0.94 1.57	13.20 18.38 25.16 44.33 110.52
(2) KRY 112 71 TMA	B	From Centroid-Face	6.00 0.00 1.00	0.0000	108.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.68 0.80 0.93 1.22 1.90	0.45 0.56 0.68 0.94 1.57	13.20 18.38 25.16 44.33 110.52
(2) KRY 112 71 TMA	C	From Centroid-Face	6.00 0.00 1.00	0.0000	108.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.68 0.80 0.93 1.22 1.90	0.45 0.56 0.68 0.94 1.57	13.20 18.38 25.16 44.33 110.52
ATMAA1412D-1A20 TMA	A	From Centroid-Face	6.00 0.00 1.00	0.0000	108.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.17 1.31 1.47 1.81 2.58	0.47 0.57 0.69 0.95 1.57	13.00 20.62 30.11 55.52 137.44
ATMAA1412D-1A20 TMA	B	From Centroid-Face	6.00 0.00 1.00	0.0000	108.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.17 1.31 1.47 1.81 2.58	0.47 0.57 0.69 0.95 1.57	13.00 20.62 30.11 55.52 137.44
ATMAA1412D-1A20 TMA	C	From Centroid-Face	6.00 0.00 1.00	0.0000	108.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.17 1.31 1.47 1.81 2.58	0.47 0.57 0.69 0.95 1.57	13.00 20.62 30.11 55.52 137.44
(2) 7'x2" Antenna Mount Pipe	A	From Centroid-Face	6.00 0.00 0.00	0.0000	108.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.66 2.39 2.83 3.71 5.58	1.66 2.39 2.83 3.71 5.58	26.00 38.58 55.84 104.97 266.00
(2) 7'x2" Antenna Mount Pipe	B	From Centroid-Face	6.00 0.00 0.00	0.0000	108.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.66 2.39 2.83 3.71 5.58	1.66 2.39 2.83 3.71 5.58	26.00 38.58 55.84 104.97 266.00
(2) 7'x2" Antenna Mount Pipe	C	From Centroid-Face	6.00 0.00 0.00	0.0000	108.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.66 2.39 2.83 3.71 5.58	1.66 2.39 2.83 3.71 5.58	26.00 38.58 55.84 104.97 266.00
**									
APXV18-206517-C w/Mount Pipe	A	From Centroid-Face	1.75 1.00 0.00	30.0000	100.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.95 4.42 4.90 5.93 8.12	3.43 4.25 4.95 6.40 9.51	48.30 81.62 124.33 230.17 554.31
APXV18-206517-C w/Mount Pipe	B	From Centroid-	1.75 1.00	30.0000	100.00	No Ice 1/2" Ice	3.95 4.42	3.43 4.25	48.30 81.62

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
		Face	0.00			1" Ice	4.90	4.95	124.33
						2" Ice	5.93	6.40	230.17
						4" Ice	8.12	9.51	554.31
APXV18-206517-C w/Mount Pipe	C	From Centroid-Face	1.75 1.00 0.00	30.0000	100.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.95 4.42 4.90 5.93 8.12	3.43 4.25 4.95 6.40 9.51	48.30 81.62 124.33 230.17 554.31
**									
Side Arm Mount [SO 701-1]	C	From Centroid-Leg	2.75 0.00 0.00	0.0000	75.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.85 1.14 1.43 2.01 3.17	1.67 2.34 3.01 4.35 7.03	65.00 79.00 93.00 121.00 177.00
KS24019-L112A	C	From Centroid-Leg	4.25 0.00 2.00	0.0000	75.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.10 0.18 0.26 0.42 0.74	0.10 0.18 0.26 0.42 0.74	5.00 6.50 8.00 11.00 17.00

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight lb
A-ANT-23G-2-C (VSI)	B	Paraboloid w/Shroud (HP)	From Centroid -Face	4.75 2.25 2.00	10.0000		130.00	2.17	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.72 4.01 4.30 4.88 6.04	12.30 32.88 53.46 94.62 176.94
VHLP2-11	C	Paraboloid w/Shroud (HP)	From Centroid -Face	4.75 2.25 4.00	-30.0000		130.00	2.17	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.72 4.01 4.30 4.88 6.04	31.00 51.56 72.12 113.24 195.48

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
L1	139.5 - 93.04 (1)	TP26.99x15.5x0.25	46.46	0.00	0.0	39.000	20.4489	-7768.21	797508.00	0.010
L2	93.04 - 46.38 (2)	TP37.91x25.5205x0.375	50.58	0.00	0.0	39.000	43.1454	-16504.80	1682670.00	0.010
L3	46.38 - 0 (3)	TP48.5x35.874x0.375	51.63	0.00	0.0	39.000	53.0176	-25775.00	2067690.00	0.012

Pole Bending Design Data

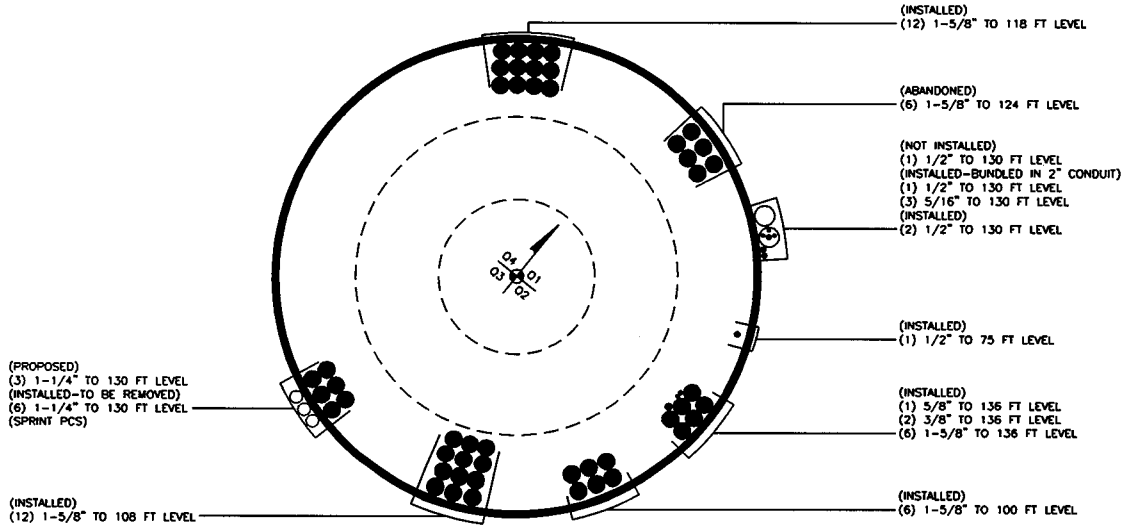
Section No.	Elevation ft	Size	Actual M_x lb-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y lb-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
L1	139.5 - 93.04 (1)	TP26.99x15.5x0.25	462485.83	-42.757	39.000	1.096	0.00	0.000	39.000	0.000
L2	93.04 - 46.38 (2)	TP37.91x25.5205x0.375	1346683.33	-41.977	39.000	1.076	0.00	0.000	39.000	0.000
L3	46.38 - 0 (3)	TP48.5x35.874x0.375	2185275.00	-45.025	39.000	1.154	0.00	0.000	39.000	0.000

Pole Interaction Design Data

Section No.	Elevation ft	Size	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	139.5 - 93.04 (1)	TP26.99x15.5x0.25	0.010	1.096	0.000	1.106 ✔	1.333	H1-3 ✔
L2	93.04 - 46.38 (2)	TP37.91x25.5205x0.375	0.010	1.076	0.000	1.086 ✔	1.333	H1-3 ✔
L3	46.38 - 0 (3)	TP48.5x35.874x0.375	0.012	1.154	0.000	1.167 ✔	1.333	H1-3 ✔

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	$SF*P_{allow}$ lb	% Capacity	Pass Fail
L1	139.5 - 93.04	Pole	TP26.99x15.5x0.25	1	-7768.21	1063078.12	83.0	Pass
L2	93.04 - 46.38	Pole	TP37.91x25.5205x0.375	2	-16504.80	2242999.02	81.5	Pass
L3	46.38 - 0	Pole	TP48.5x35.874x0.375	3	-25775.00	2756230.66	87.5	Pass
							Summary	
						Pole (L3)	87.5	Pass
						RATING =	**87.5**	**Pass**



BUSINESS UNIT: 881541 TOWER ID: C_BASELEVEL

PORT INFORMATION			
ELEV.	SIZE	LOCATION	STATUS
10'-0"	10"x30"	E & W	.
7'-0"	10"x30"	S	.
3'-3"	10"x30"	E & W	.

20/08/08	APPLICATION ADDED PER WORK ORDER # 276434	ACC	
24/04/09	AS-BUILT INFORMATION ADDED PER WORK ORDER	JHB	
27/07/09	AS-BUILT INFORMATION ADDED PER WORK ORDER	SAC	
31/07/09	UPDATED PER WORK ORDER # 286883	LM	
26/08/09	APPLICATION ADDED PER WORK ORDER # 291173	ACC	
02/03/11	AS-BUILT INFORMATION ADDED PER WORK ORDER	ACC	
14/04/11	APPLICATION ADDED PER WORK ORDER # 402586	ACC	
30/11/11	AS-BUILT INFORMATION ADDED PER WORK ORDER	BJA	
30/05/12	APPLICATION ADDED PER WORK ORDER # 449949	AM	

DRAWN BY: VSG
CHECKED BY: GPK
DRAWING DATE: 25/02/08

SITE NUMBER:
SITE NAME:

SITE NAME

ROGERS PROPERTY

BUSINESS UNIT NUMBER

881541

SITE ADDRESS

NEW HAVEN, CT 06477
NEW HAVEN
UNITED STATES COUNTY
USA

SHEET TITLE

BASE LEVEL

SHEET NUMBER

A1-0

BASE LEVEL DRAWING

SCALE: 1" = 1'-0" | 1

PLOT DATE: 5/30/2012 FILE NAME: 881541 BASELEVEL.DWG

Xref R:\TEMPLATES\TYPICAL BLOCKS FOR TEMPLATES\TITLE BLOCK STD-NEW S.1.dwg

Stiffened or Unstiffened, Ungrouted, Circular Base Plate - Any Rod Material

TIA Rev F

Site Data

BU#: *881541*
Site Name: *Rogers Property, CT*
App #: *151615, Rev. 3*

Pole Manufacturer:	*Other*

Reactions		
Moment:	2543.299	ft-kips
Axial:	29.498	kips
Shear:	24.979	kips

Anchor Rod Data		
Qty:	16	
Diam:	2.25	in
Rod Material:	A615-J	
Strength (Fu):	100	ksi
Yield (Fy):	75	ksi
Bolt Circle:	57	in

Plate Data		
Diam:	63	in
Thick:	2	in
Grade:	60	ksi
Single-Rod B-eff:	9.62	in

Stiffener Data (Welding at both sides)		
Config:	0	*
Weld Type:		
Groove Depth:		in **
Groove Angle:		degrees
Fillet H. Weld:		<-- Disregard
Fillet V. Weld:		in
Width:		in
Height:		in
Thick:		in
Notch:		in
Grade:		ksi
Weld str.:		ksi

Pole Data		
Diam:	48.5	in
Thick:	0.375	in
Grade:	65	ksi
# of Sides:	18	"0" IF Round
Fu	80	ksi
Reinf. Fillet Weld	0	"0" if None

Stress Increase Factor		
ASIF:	1.333	

If No stiffeners, Criteria:	AISC ASD	<-Only Applcable to Unstiffened Cases

Anchor Rod Results

		Rigid
Maximum Rod Tension:	132.0 Kips	Service, ASD
Allowable Tension:	195.0 Kips	Fty*ASIF
Anchor Rod Stress Ratio:	67.7% **Pass**	

Base Plate Results Flexural Check

		Rigid
Base Plate Stress:	55.0 ksi	Service ASD
Allowable Plate Stress:	60.0 ksi	0.75*Fy*ASIF
Base Plate Stress Ratio:	91.8% Pass	Y.L. Length: 29.95

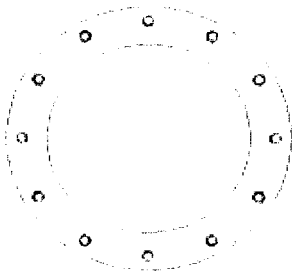
n/a

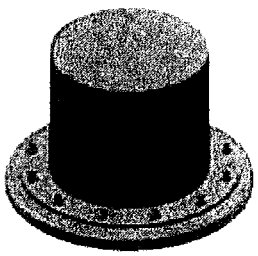
Stiffener Results

Horizontal Weld :	n/a
Vertical Weld:	n/a
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	n/a
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	n/a
Plate Comp. (AISC Bracket):	n/a

Pole Results

Pole Punching Shear Check: n/a





* 0 = none, 1 = every bolt, 2 = every 2 bolts, 3 = 2 per bolt

** Note: for complete joint penetration groove welds the groove depth must be exactly 1/2 the stiffener thickness for calculation purposes

VERTICAL STRUCTURES, INC.

Overturning Calculation for Rectangular Mat Foundations (Eccentrically Loaded)

Customer:	Crown Castle
Site Name:	Rogers Property, CT BU#881541
Job Number:	2012-004-039b
Tower Model:	140' EEI Monopole
Date:	6/6/2012

Soil Ultimate Bearing	8	ksf
Unit wt soil	0.125	kcf
Unit wt concrete	0.15	kcf
Mat Length (long dimension)	23	ft
Mat Width (short dimension)	23	ft
Mat Thickness	3	ft
Depth of Soil Over Mat	4	ft
Has Pedestals? (Y or N)	Y	
Pedestal Round or Square? (R or S)	S	
Number of Pedestals	1	
Pedestal Height	5	ft
Pedestal Diameter or Width	7	ft
Applied Shear	24.979	kip
Applied Axial Force	29.498	kip
Applied Moment	2543.299	k-ft

Load Eccentricity on Pad

distance from long axis =	3.5	ft
distance from short axis =	3.5	ft

wt. Concrete =	274.800	kip		
wt. Soil =	240.000	kip		
Shear Moment =	199.832	k-ft		
P*e =	103.243	k-ft	103.243	k-ft
	(about long axis)		(about short axis)	
Allowable Bearing =	4	ksf		
Mat Width / 6 =	3.83	ft	3.83	ft
e =	5.23	ft	5.23	ft
I =	18.81	ft	18.81	ft
Bearing =	1.41	ksf	2.52	ksf
	BEARING ADEQUATE			
x =	2.958	ft	2.958	ft
Resisting Moment =	5454.372	k-ft	5454.372	k-ft
SF =	1.916		1.916	
	OVERTURNING ADEQUATE			

Know what's **below.**
Call before you dig.

APPROVALS				
		APPROVED	APPROVED AS NOTED	DISAPPROVED REVISE
SPRINT REPRESENTATIVES	DATE	☐	☐	☐
SPRINT RF ENGINEER	DATE	☐	☐	☐
SITE OWNER	DATE	☐	☐	☐
	DATE	☐	☐	☐

Sprint®

SITE ID: CT23XC313
SITE NAME: ORANGE / ROGER'S PROPERTY

THE STRUCTURAL ENGINEERING CONCERNING THE STRUCTURAL STABILITY OF THE TOWER/POLE, FOUNDATION, ANTENNAS, MOUNTS AND ALL ASSOCIATED ANCILLARY RADIO EQUIPMENT IS BEING COMPLETED BY OTHERS. KMB DESIGN GROUP, LLC HAS NOT BEEN REQUESTED TO PERFORM ANY STRUCTURAL ANALYSIS SERVICES TO VERIFY THAT THE TOWER/POLE AND/OR FOUNDATION IS CAPABLE OF SUPPORTING THE PROPOSED EQUIPMENT DEPICTED WITHIN THESE SIGNED AND SEALED DRAWINGS. FURTHERMORE KMB DESIGN GROUP, LLC HAS NOT BEEN REQUESTED TO PHYSICALLY CONFIRM THE EXISTING MOUNT CONFIGURATION AND PERFORM A STRUCTURAL ANALYSIS TO VERIFY THAT THE EXISTING, INTERIM AND PROPOSED ANTENNAS, MOUNTS AND ALL ASSOCIATED ANCILLARY RADIO EQUIPMENT CAN BE SAFELY SUPPORTED. SIGNED AND SEALED DRAWINGS REVISED TO STATE "ISSUED FOR CONSTRUCTION" SHALL BE PROVIDED TO THE PROFESSIONAL ENGINEERS RESPONSIBLE FOR THE STRUCTURAL ANALYSIS OF THE TOWER/POLE, ANTENNAS, MOUNTS AND ALL ASSOCIATED ANCILLARY RADIO EQUIPMENT. KMB DESIGN GROUP, LLC SHALL BE NOTIFIED SHOULD THE STRUCTURAL ANALYSIS RESULT IN SOME ELEMENTS NOT BEING STRUCTURALLY CAPABLE OF SUPPORTING THE PROPOSED DESIGN DEPICTED. THE CONTRACTOR SHALL NOT COMMENCE CONSTRUCTION WITHOUT OBTAINING (A) A SIGNED AND SEALED COPY OF THE PLANS "ISSUED FOR CONSTRUCTION"; (B) STRUCTURAL ANALYSIS REPORT STATING THAT THE TOWER/POLE/FOUNDATION IS CAPABLE OF SUPPORTING THE PROPOSED LOADING REFERENCING THE SIGNED AND SEALED PLANS BY KMB DESIGN GROUP, LLC; (C) SPRINT PLATFORM ANALYSIS STATING THAT THE SPRINT PLATFORM IS CAPABLE OF SUPPORTING THE PROPOSED DESIGN AS REFERENCED WITHIN THE SIGNED AND SEALED PLANS BY KMB DESIGN GROUP, LLC.

NETWORK VISION CONSTRUCTION DRAWINGS

AERIAL VIEW
SCALE: NTS

LOCATION MAP
SCALE: NTS

DRAWING INDEX

DWG #	DRAWING TITLES
A01	COVER SHEET
C01	GENERAL NOTES 1 OF 2
C01A	GENERAL NOTES 2 OF 2
C02	COMPOUND PLAN
C02A	ELEVATION
C03	EQUIPMENT PLANS
C03A	EQUIPMENT & ANTENNA SPECIFICATIONS
C04	EXISTING ANTENNA PLAN (ALL SECTORS)
C04A	INTERIM ANTENNA PLAN (ALL SECTORS)
C04B	FINAL ANTENNA PLAN (ALL SECTORS)
C04C	RRH PLANS & DETAILS (ALL SECTORS)
C05	SITE DETAILS
C06	RF SCHEDULE
C06A	RF DATA SHEET
C07	AAV DRAWINGS - COVER SHEET
C07A	AAV DRAWINGS - SITE PHOTOS
C07B	AAV DRAWINGS - KEY & EQUIPMENT PLAN
C07C	AAV DRAWINGS - DETAILS
E01	ELECTRICAL NOTES
E02	ELECTRIC & GROUNDING DETAILS

CODES & STANDARDS

These documents are in compliance & all construction to be in accordance with the following codes & standards as applicable:

State Building Code: 2005 Connecticut Supplement

2003 International Building Code
2003 International Residential Code
2003 International Existing Building Code
2003 International Mechanic Code
2003 International Plumbing Code
2003 International Energy Conservation Code (re-adopted with changes)
ICC/ANSI A117.1-2003 Assessible and Usable Buildings and Facilities

2005 National Electrical Code (NFPA-70)

DRIVING DIRECTIONS

1. DEPART 1 INTERNATIONAL BLVD, MAHWAH, NJ 07495
2. HEAD TOWARD MEADOW AVE ON 1ST ST.
3. TURN LEFT ONTO RAMAPO AVE.
4. BEAR RIGHT ONTO CHESTNUT ST.
5. TURN RIGHT ONTO LAFAYETTE AVE (RT-59).
6. TURN LEFT ONTO N AIRMONT RD.
7. TURN RIGHT AND TAKE RAMP ONTO NEW YORK STATE THRUWAY SOUTH (I-287 E, I-87 S) (PARTIAL TOLL ROAD).
8. KEEP LEFT ONTO CROSS WESTCHESTER EXPY (I-287 E) AT EXIT #8 TOWARD WHITE PLAINS/RYE.
9. TAKE EXIT #9S-N/HUTCHINSON PKWY/WHITESTONE BR/MERRITT PKWY ONTO WESTCHESTER AVE (CR-62 E).
10. TAKE EXIT #9N/HUTCHINSON PKWY NORTH/MERRITT PKWY ONTO HUTCHINSON RIVER PKY N.
11. CONTINUE ON MERRITT PKY (CT-15 N).
12. TAKE EXIT #56/CT-121/ORANGE.
13. TURN LEFT ONTO GRASSY HILL RD (CT-121).

SITE INFORMATION

BLOCK: 6
LOT: 1
MAP: 60
ZONING CLASSIFICATION: R-1
ZONING JURISDICTION: TBD

PROJECT INFORMATION:

SITE ADDRESS:
700 GRASSY HILL ROAD
ORANGE, CT 06477
NEW HAVEN COUNTY

COORDINATES:
LATITUDE: 41° 17' 07.75"
LONGITUDE: 73° 02' 33.27"
DATUM : NAD 83

STRUCTURE HEIGHT:
±140'-0" (TOP OF EXISTING MONOPOLE)

PROJECT DIRECTORY:

PROPERTY OWNER:
JULIA ROGERS SCHEN, ELLEN ROGERS SAYLOR, & HARRIET ROGERS WOOD
(401) 745-5728

APPLICANT:
SPRINT-NEXTEL
6200 SPRINT PARKWAY
OVERLAND PARK, KS 66251

ENGINEER:
KMB DESIGN GROUP, LLC
1800 ROUTE 34, SUITE 209
WALL, NJ 07719
KEITH DRENNAN - PROJECT MANAGER
(732) 280-5623

POWER COMPANY:
THE UNITED ILLUMINATING
157 CHURCH STREET
NEW HAVEN, CT 06510
1-800-7-CALL-UI

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Stephen A. Bray
PROFESSIONAL ENGINEER
STATE OF CONNECTICUT
STEPHEN A. BRAY
LICENSED
PROFESSIONAL ENGINEER

CT LICENSE: 26657 8/8/12

PROJECT NUMBER:
332.1481

SITE INFORMATION:
700 GRASSY HILL ROAD
ORANGE, CT 06477
NEW HAVEN COUNTY

CT23XC313

PROJECT TYPE:
NETWORK VISION

DRAWN BY:	CHECKED BY:	DATE:
JLS		03-14-12

SHEET TITLE:
COVER SHEET

SHEET NUMBER: A01
REV.: 0

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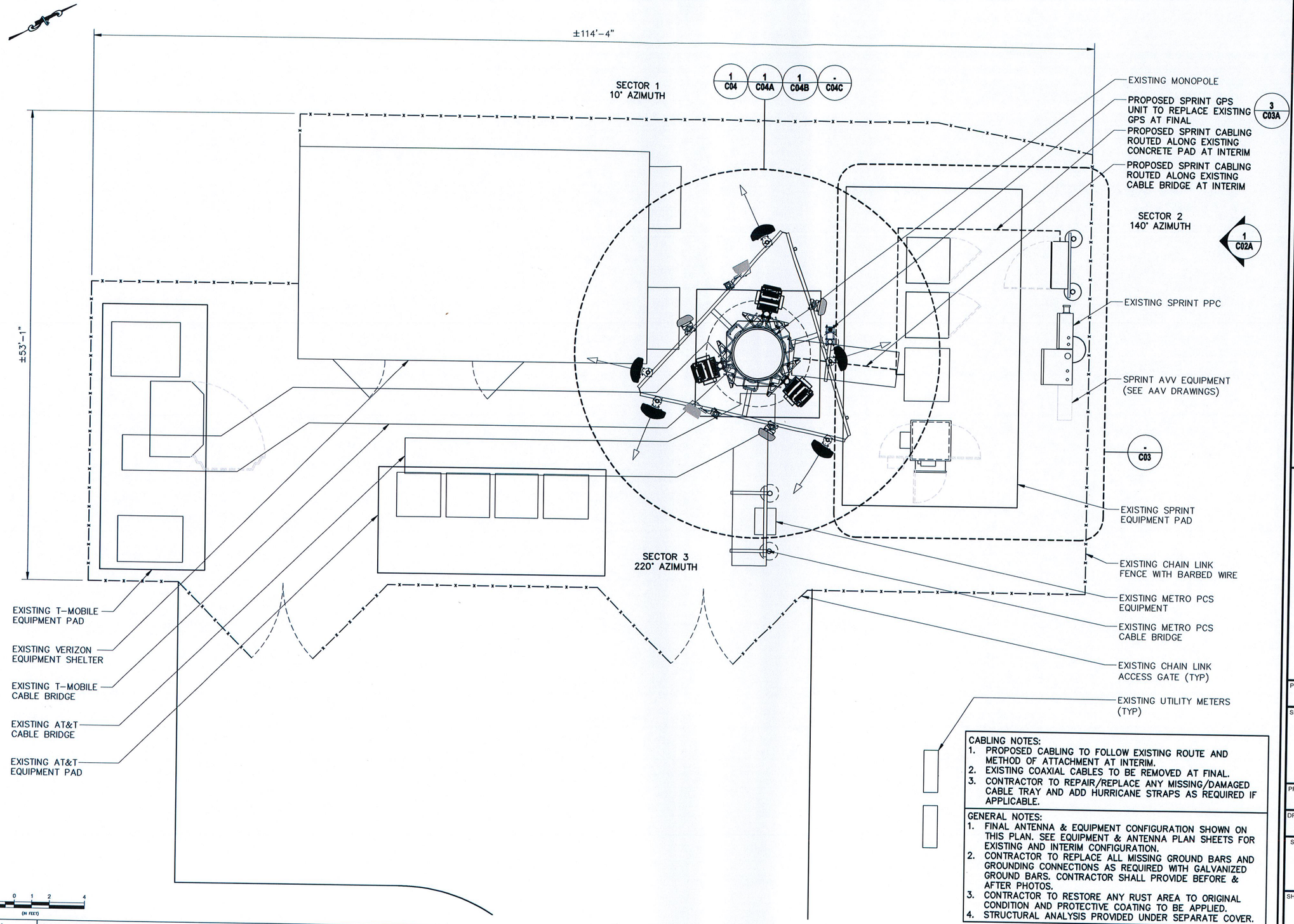

CABLING NOTES:
1. PROPOSED CABLING TO FOLLOW EXISTING ROUTE AND METHOD OF ATTACHMENT AT INTERIM.
2. EXISTING COAXIAL CABLES TO BE REMOVED AT FINAL.
3. CONTRACTOR TO REPAIR/REPLACE ANY MISSING/DAMAGED CABLE TRAY AND ADD HURRICANE STRAPS AS REQUIRED IF APPLICABLE.

GENERAL NOTES:
1. FINAL ANTENNA & EQUIPMENT CONFIGURATION SHOWN ON THIS PLAN. SEE EQUIPMENT & ANTENNA PLAN SHEETS FOR EXISTING AND INTERIM CONFIGURATION.
2. CONTRACTOR TO REPLACE ALL MISSING GROUND BARS AND GROUNDING CONNECTIONS AS REQUIRED WITH GALVANIZED GROUND BARS. CONTRACTOR SHALL PROVIDE BEFORE & AFTER PHOTOS.
3. CONTRACTOR TO RESTORE ANY RUST AREA TO ORIGINAL CONDITION AND PROTECTIVE COATING TO BE APPLIED.
4. STRUCTURAL ANALYSIS PROVIDED UNDER SEPARATE COVER.

1 **COMPOUND PLAN**

11x17 SCALE: 3/16" = 1'-0" | 24x36 SCALE: 3/8" = 1'-0"

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Stephen A. Bray
PROFESSIONAL ENGINEER
STATE OF CONNECTICUT STEPHEN A. BRAY No. 26657 LICENSED PROFESSIONAL ENGINEER

CT LICENSE: 26657 8/8/12

PROJECT NUMBER: **332.1481**

SITE INFORMATION:
700 GRASSY HILL ROAD
ORANGE, CT 06477
NEW HAVEN COUNTY

CT23XC313

PROJECT TYPE: NETWORK VISION

DRAWN BY:	CHECKED BY:	DATE:
JLS		03-14-12

SHEET TITLE: COMPOUND PLAN

SHEET NUMBER: C02 | REV.: 0

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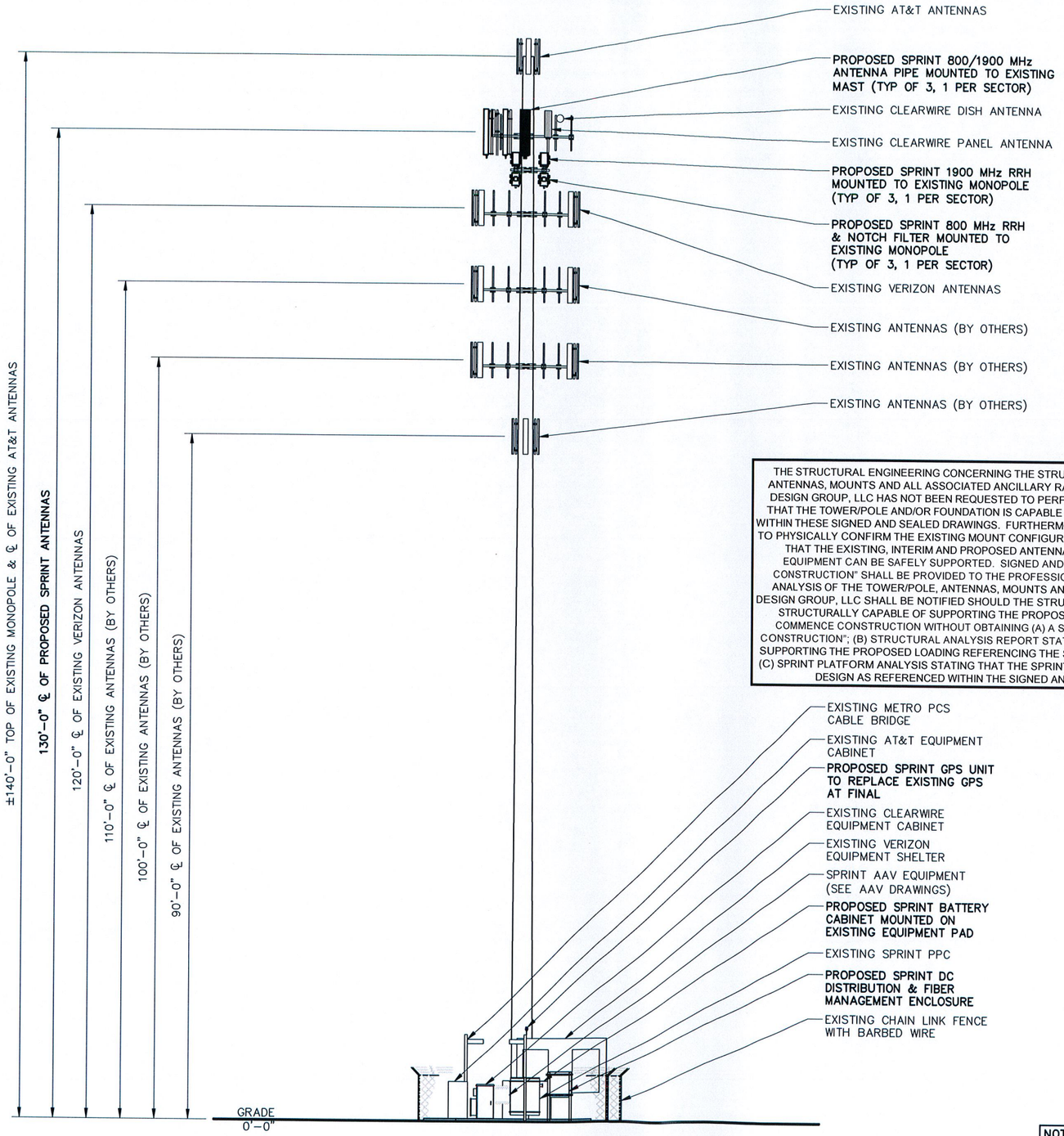

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NOTES:
1. FINAL ANTENNA & EQUIPMENT CONFIGURATION SHOWN ON THIS PLAN. SEE EQUIPMENT & ANTENNA PLAN SHEETS FOR EXISTING AND INTERIM CONFIGURATION.

4 0 2 4 8 16
(IN FEET)

1 NORTHEAST ELEVATION

11x17 SCALE: 1/16" = 1'-0" | 24x36 SCALE: 1/8" = 1'-0"

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Stephen A. Bray
PROFESSIONAL ENGINEER

STATE OF CONNECTICUT · STEPHEN A. BRAY · No. 26657 · LICENSED PROFESSIONAL ENGINEER

CT LICENSE: 26657 8/8/12

PROJECT NUMBER: 332.1481

SITE INFORMATION:
700 GRASSY HILL ROAD
ORANGE, CT 06477
NEW HAVEN COUNTY

CT23XC313

PROJECT TYPE: NETWORK VISION

DRAWN BY:	CHECKED BY:	DATE:
JLS		03-14-12

SHEET TITLE: ELEVATION

SHEET NUMBER: C02A | REV.: 0

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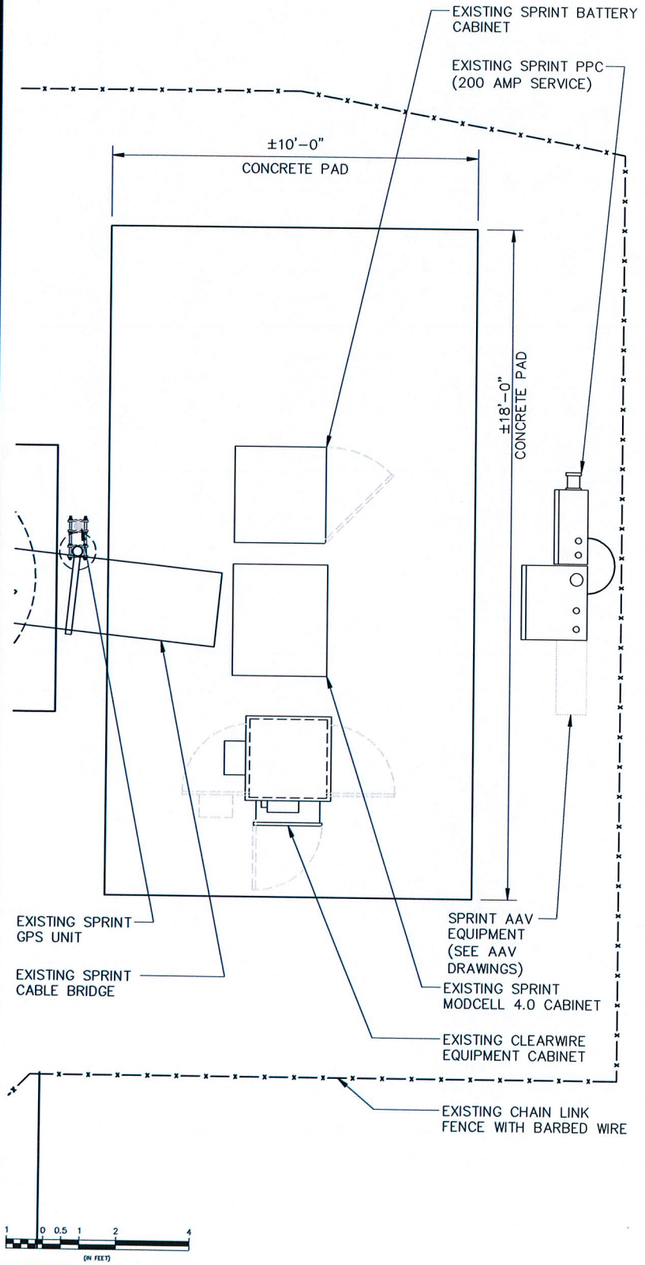
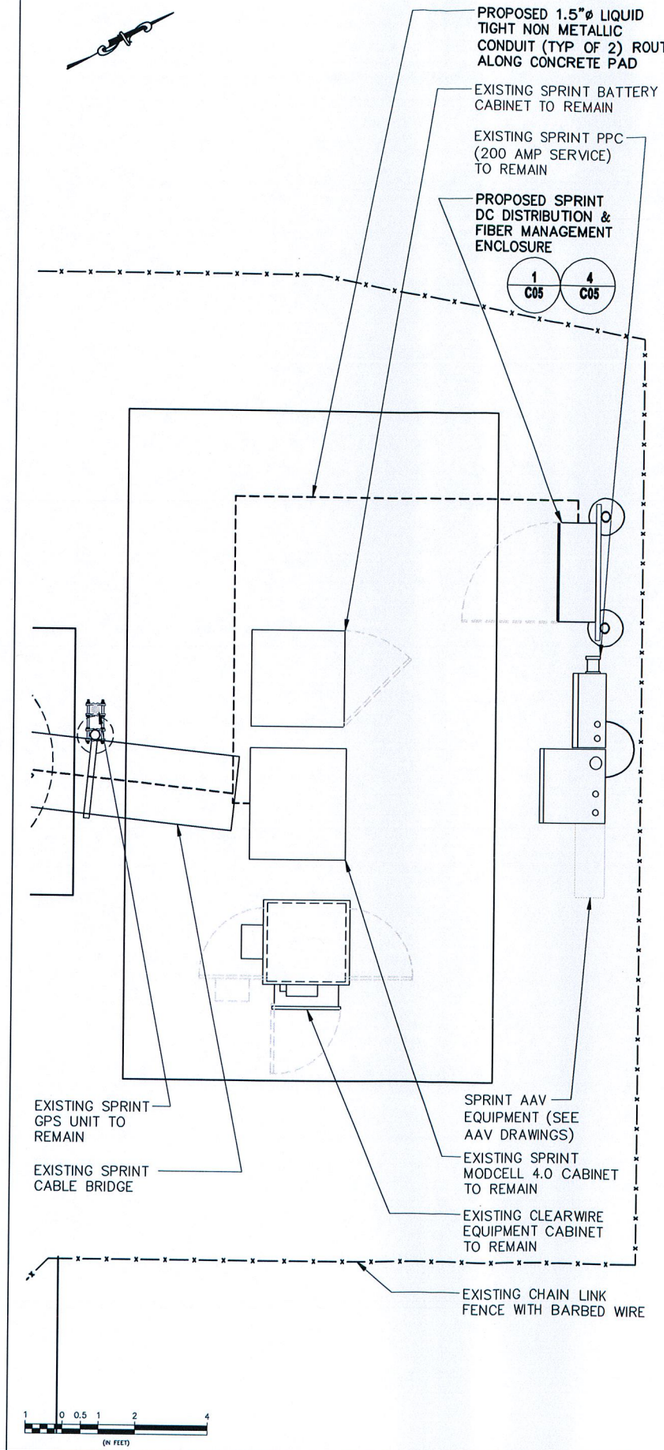


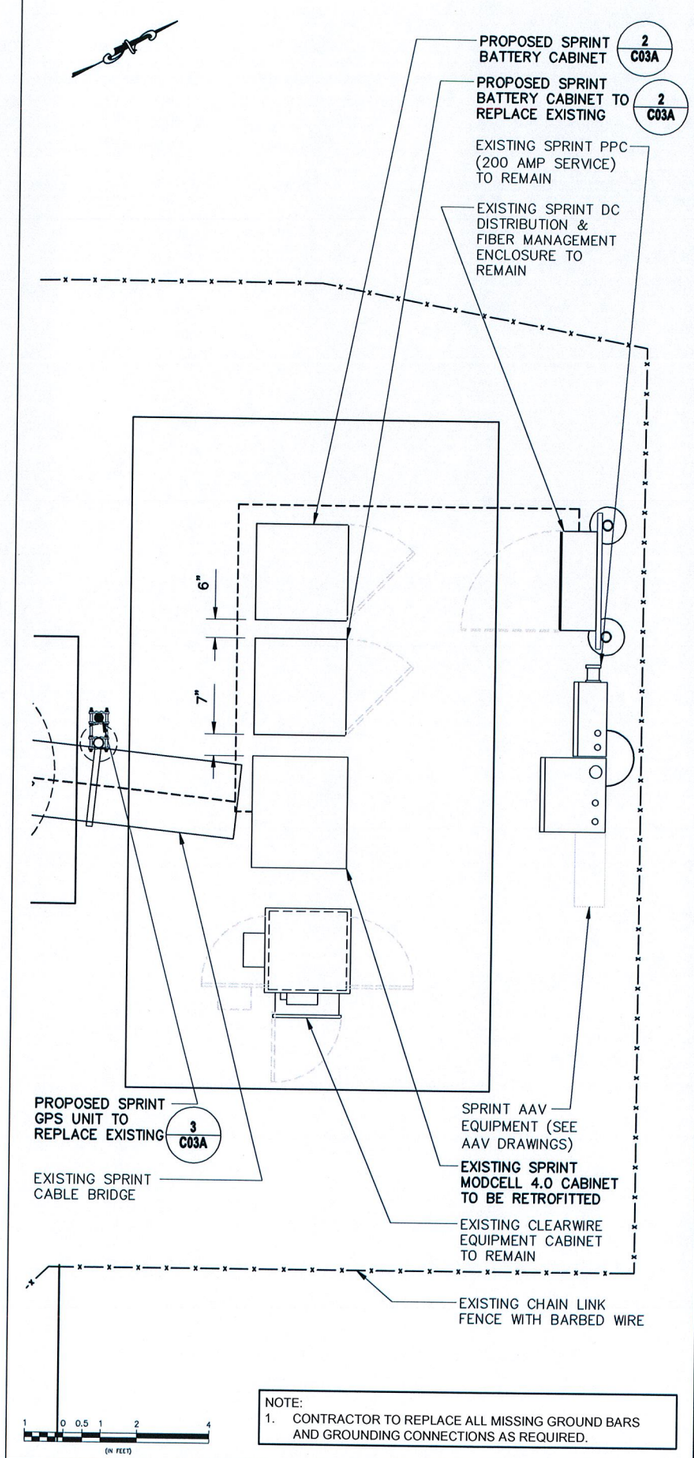
1 EXISTING EQUIPMENT PLAN

11x17 SCALE: 1/4" = 1'-0" | 24x36 SCALE: 1/2" = 1'-0"



2 INTERIM EQUIPMENT PLAN

11x17 SCALE: 1/4" = 1'-0" | 24x36 SCALE: 1/2" = 1'-0"



NOTE:
1. CONTRACTOR TO REPLACE ALL MISSING GROUND BARS AND GROUNDING CONNECTIONS AS REQUIRED.

3 FINAL EQUIPMENT PLAN

11x17 SCALE: 1/4" = 1'-0" | 24x36 SCALE: 1/2" = 1'-0"

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STATE OF CONNECTICUT · STEPHEN A. BRAY · No. 26657 · LICENSED PROFESSIONAL ENGINEER

CT LICENSE: 26657 8/8/12

PROJECT NUMBER: 332.1481

SITE INFORMATION:
700 GRASSY HILL ROAD
ORANGE, CT 06477
NEW HAVEN COUNTY

CT23XC313

PROJECT TYPE: NETWORK VISION

DRAWN BY:	CHECKED BY:	DATE:
JLS		03-14-12

SHEET TITLE: EQUIPMENT PLANS

SHEET NUMBER: C03 REV.: 0

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DETAIL NOT USED

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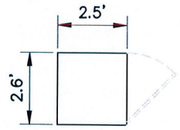
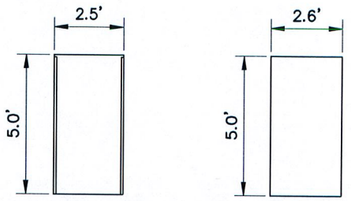
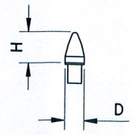


AVAYA 60ECv2
BATTERY CABINET
CABINET WEIGHT: 1625 lbs
FOOTPRINT: 6.5 SF



2 **BATTERY CABINET SPECIFICATION**

11x17 SCALE: 3/16" = 1'-0" | 24x36 SCALE: 3/8" = 1'-0"



MANUF.: PCTEL
MODEL #: GPS-TMG-HR-26NCM
HEIGHT: 5.0"
DIAMETER: 3.2"
WEIGHT: 0.6 lbs

3 **GPS UNIT SPECIFICATIONS**

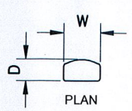
11x17 SCALE: 1/4" = 1'-0" | 24x36 SCALE: 1/2" = 1'-0"

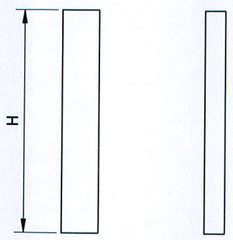
DETAIL NOT USED

4

DETAIL NOT USED

DETAIL NOT USED

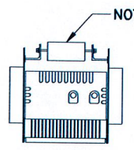




MANUF.: RFS
MODEL: APXVSPP18-C-A20
LENGTH 72.0"
WIDTH: 11.8"
DEPTH: 7.0"
WEIGHT: 64.5 lbs
AREA: 5.9 SF

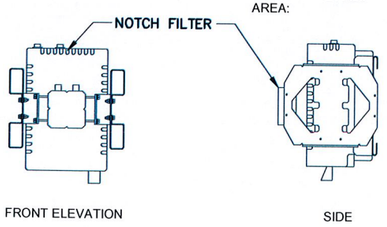
DETAIL NOT USED

5



MANUF.: ANDREW
MODEL #: 800 MHZ 2x50W
HEIGHT: 19.7"
WIDTH: 13"
DEPTH: 10.8"
WEIGHT: ±53 lbs
AREA:

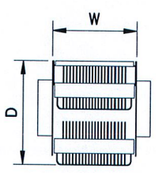
MANUF.: -
MODEL #: 800 MHZ 2x50W
HEIGHT: 8.9"
WIDTH: 9.8"
DEPTH: 4.3"
WEIGHT: ±11 lbs
AREA:



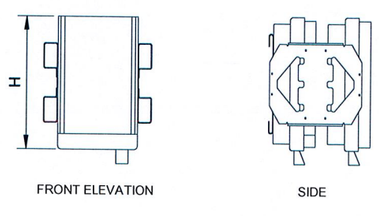
9 **RRH SPECIFICATIONS - 800 MHz**

11x17 SCALE: 1/2" = 1'-0" | 24x36 SCALE: 1" = 1'-0"

6



MANUF.: PANASONIC
MODEL #: 1900 MHz 2x40W
HEIGHT: 19.7"
WIDTH: 13"
DEPTH: 16"
WEIGHT: ±90 lbs
AREA:



10 **RRH SPECIFICATIONS - 1900 MHz**

11x17 SCALE: 1/2" = 1'-0" | 24x36 SCALE: 1" = 1'-0"

7 **ANTENNA SPECIFICATIONS - 800/1900 MHz**

SCALE: NTS

DETAIL NOT USED

8

11

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SHEET TITLE:
EQUIPMENT & ANTENNA SPECIFICATIONS

SHEET NUMBER:	REV.:
C03A	0

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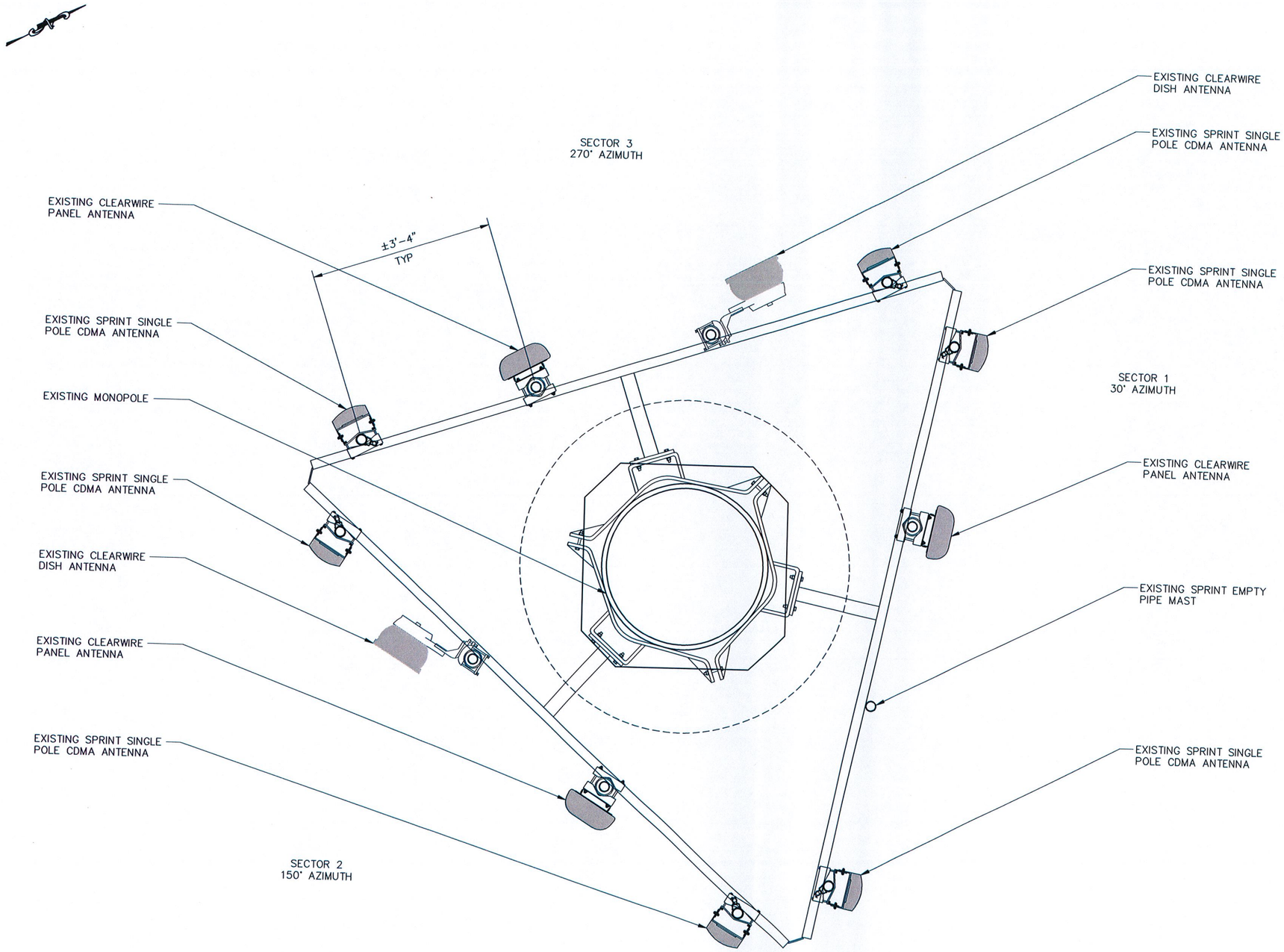

1 0 1 2
(IN FEET)

1 EXISTING ANTENNA PLAN @ ±130'-0" AGL (ALL SECTORS)

11x17 SCALE: 1/2" = 1'-0" | 24x36 SCALE: 1" = 1'-0"

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STATE OF CONNECTICUT STEPHEN A. BRAY No. 26657 LICENSED PROFESSIONAL ENGINEER
CT LICENSE: 26657 8/8/12

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ORANGE, CT 06477
NEW HAVEN COUNTY
CT23XC313

PROJECT TYPE: NETWORK VISION

DRAWN BY:	CHECKED BY:	DATE:
JLS		03-14-12

SHEET TITLE: EXISTING ANTENNA PLAN (ALL SECTORS)

SHEET NUMBER: C04 REV.: 0

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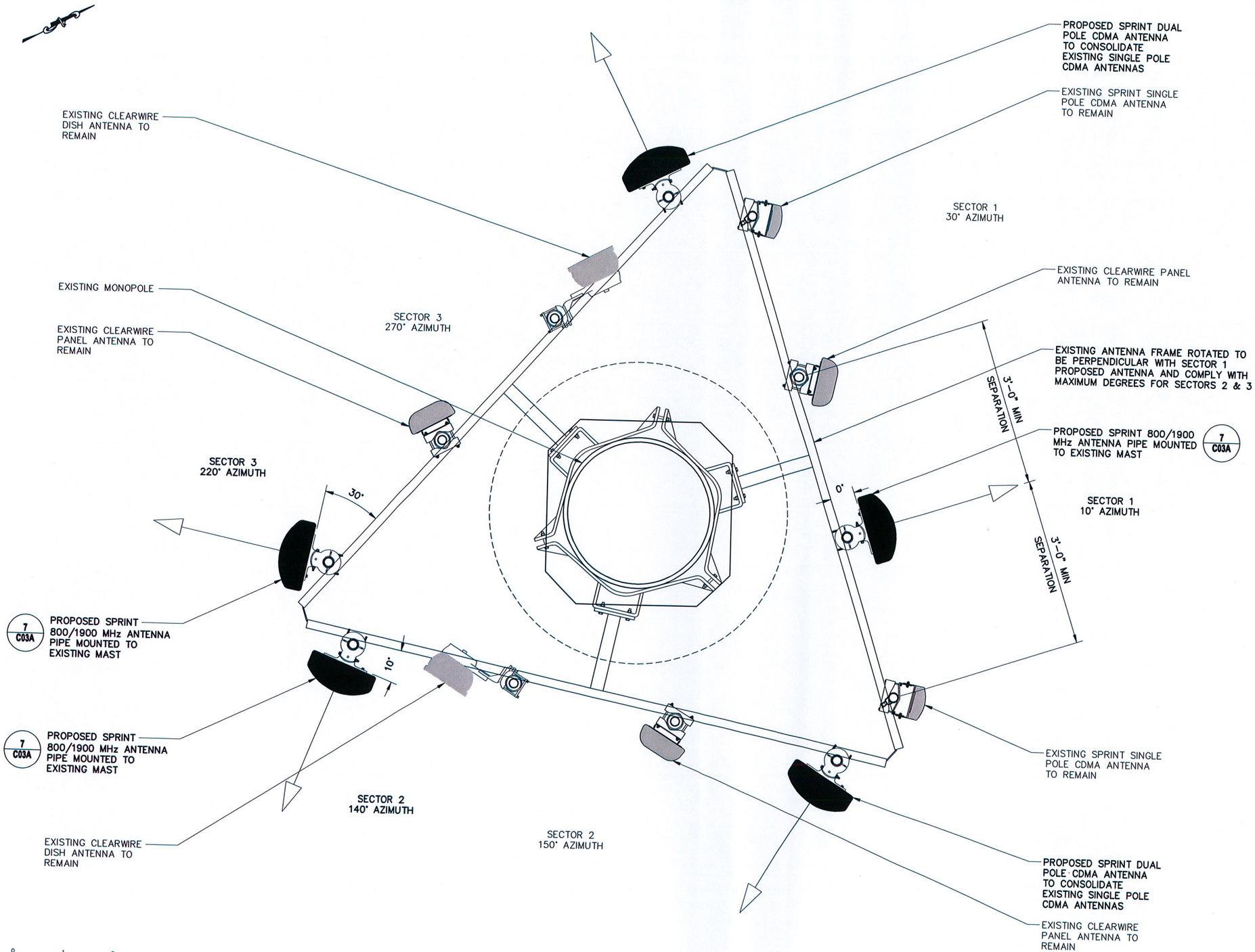

NOTE:
SEE DETAIL 1/C04C FOR RRH MOUNT DETAILS.

1 INTERIM ANTENNA PLAN @ ±130'-0" AGL (ALL SECTORS)

11x17 SCALE: 1/2" = 1'-0" | 24x36 SCALE: 1" = 1'-0"

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CT LICENSE: 26657 8/8/12

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NEW HAVEN COUNTY

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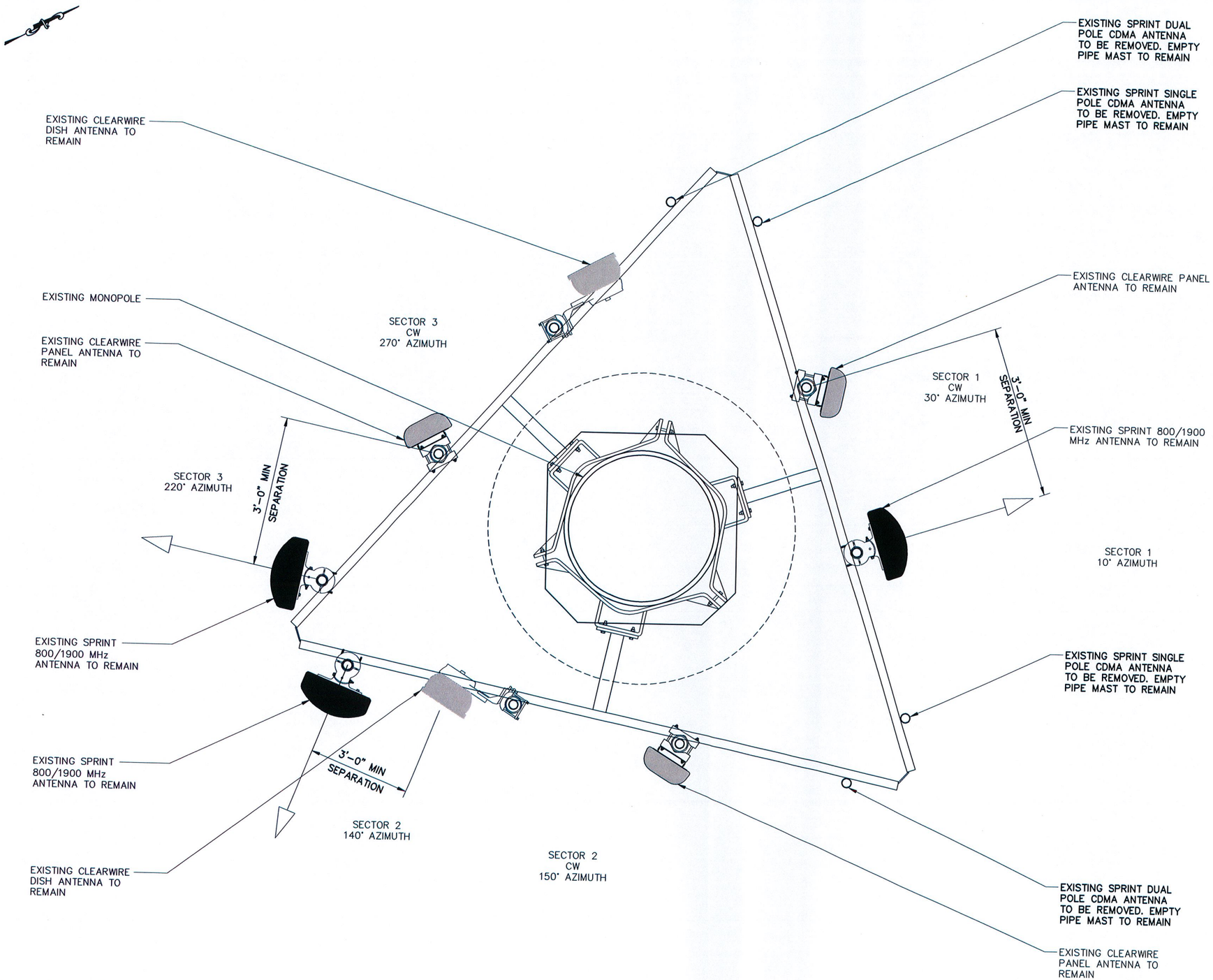
PROJECT TYPE: NETWORK VISION

DRAWN BY:	CHECKED BY:	DATE:
JLS		03-14-12

SHEET TITLE: INTERIM ANTENNA PLAN (ALL SECTORS)

SHEET NUMBER: C04A | REV.: 0

K:\332_Sprint_332.1000_Alcatel-Lucent\332.1481_CT23XC313_700 Grassy Hill Road\332.1481_CAD\332.1481_Construction\332.1481.C04A.dwg, 8/8/2012 9:05:00 AM, jford



NOTE:
SEE DETAIL 2/C04C FOR RRH MOUNT DETAILS.

1 **FINAL ANTENNA PLAN @ ±130'-0" AGL (ALL SECTORS)**

11x17 SCALE: 1/2" = 1'-0" | 24x36 SCALE: 1" = 1'-0"

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REV.	DATE	REVISION DESCRIPTION	DRAWN BY	CHKD. BY
0	08-06-12	ISSUED FOR CONSTRUCTION	JRF	KCD

KMB DESIGN GROUP
kmbdg.com
1800 ROUTE 34, SUITE 209
WALL, NJ 07719
(732) 280-5623

Stephen A. Bray
PROFESSIONAL ENGINEER
STATE OF CONNECTICUT STEPHEN A. BRAY No. 26657 LICENSED PROFESSIONAL ENGINEER

CT LICENSE: 26657 8/8/12

PROJECT NUMBER: **332.1481**

SITE INFORMATION:
700 GRASSY HILL ROAD
ORANGE, CT 06477
NEW HAVEN COUNTY

CT23XC313

PROJECT TYPE: NETWORK VISION

DRAWN BY:	CHECKED BY:	DATE:
JLS		03-14-12

SHEET TITLE: FINAL ANTENNA PLAN (ALL SECTORS)

SHEET NUMBER: C04B | REV.: 0

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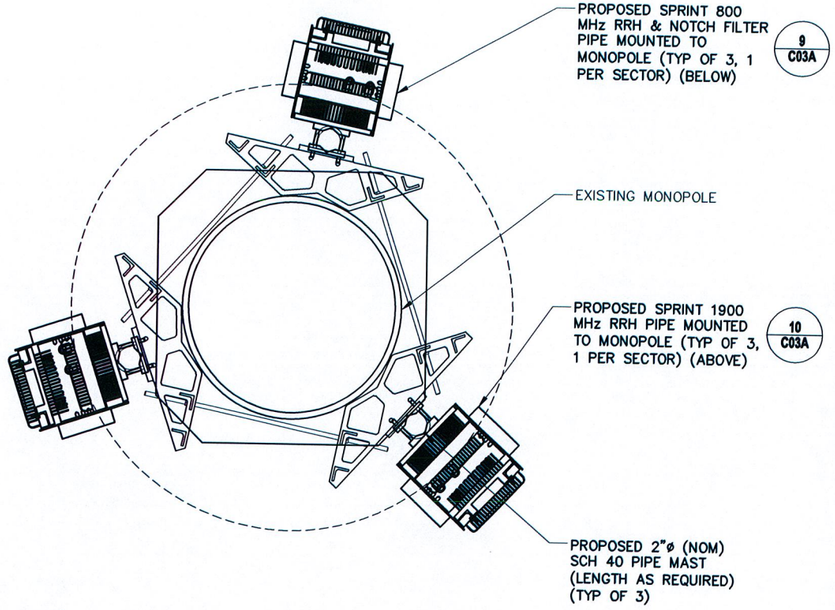
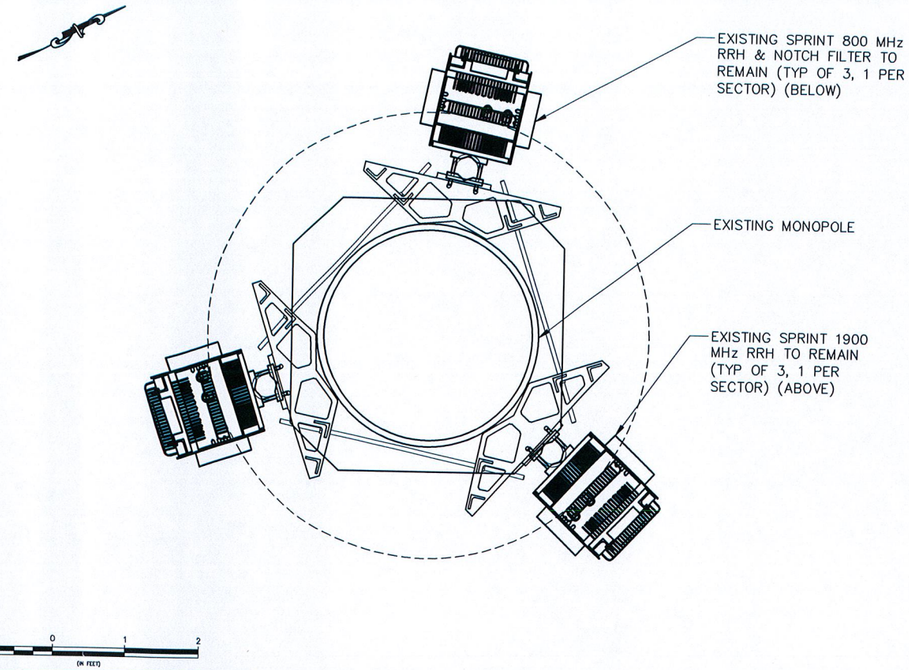


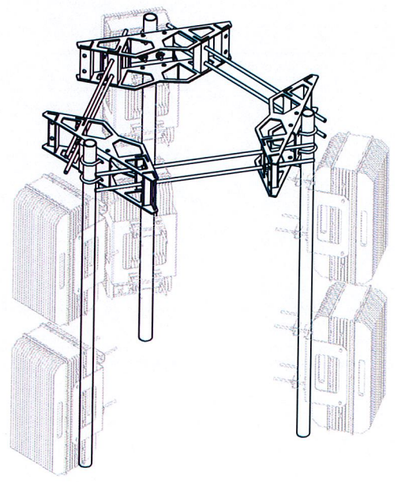
1 **INTERIM RRH PLAN @ ±125'-0" AGL (ALL SECTORS)**

11x17 SCALE: 1/2" = 1'-0" | 24x36 SCALE: 1" = 1'-0"



2 **FINAL RRH PLAN @ ±125'-0" AGL (ALL SECTORS)**

11x17 SCALE: 1/2" = 1'-0" | 24x36 SCALE: 1" = 1'-0"



NOTE:
PROPOSED RRHs MAY NOT MATCH RRH SHOWN. REFER TO SPECIFICATION SHEET FOR CORRECT RRH MODEL NUMBER.

THREE SECTOR DUAL RADIO RING MOUNT BY COMMSCOPE, PART # MC-551050-3 OR AN APPROVED EQUAL
KIT INCLUDES:
RING MOUNT, THREADED ROD, HARDWARE AND (6) 2-3/8" U-BOLTS

3 **RRH MOUNT DETAIL**

SCALE: NTS

THE STRUCTURAL ENGINEERING CONCERNING THE STRUCTURAL STABILITY OF THE TOWER/POLE, FOUNDATION, ANTENNAS, MOUNTS AND ALL ASSOCIATED ANCILLARY RADIO EQUIPMENT IS BEING COMPLETED BY OTHERS. KMB DESIGN GROUP, LLC HAS NOT BEEN REQUESTED TO PERFORM ANY STRUCTURAL ANALYSIS SERVICES TO VERIFY THAT THE TOWER/POLE AND/OR FOUNDATION IS CAPABLE OF SUPPORTING THE PROPOSED EQUIPMENT DEPICTED WITHIN THESE SIGNED AND SEALED DRAWINGS. FURTHERMORE KMB DESIGN GROUP, LLC HAS NOT BEEN REQUESTED TO PHYSICALLY CONFIRM THE EXISTING MOUNT CONFIGURATION AND PERFORM A STRUCTURAL ANALYSIS TO VERIFY THAT THE EXISTING, INTERIM AND PROPOSED ANTENNAS, MOUNTS AND ALL ASSOCIATED ANCILLARY RADIO EQUIPMENT CAN BE SAFELY SUPPORTED. SIGNED AND SEALED DRAWINGS REVISED TO STATE "ISSUED FOR CONSTRUCTION" SHALL BE PROVIDED TO THE PROFESSIONAL ENGINEERS RESPONSIBLE FOR THE STRUCTURAL ANALYSIS OF THE TOWER/POLE, ANTENNAS, MOUNTS AND ALL ASSOCIATED ANCILLARY RADIO EQUIPMENT. KMB DESIGN GROUP, LLC SHALL BE NOTIFIED SHOULD THE STRUCTURAL ANALYSIS RESULT IN SOME ELEMENTS NOT BEING STRUCTURALLY CAPABLE OF SUPPORTING THE PROPOSED DESIGN DEPICTED. THE CONTRACTOR SHALL NOT COMMENCE CONSTRUCTION WITHOUT OBTAINING (A) A SIGNED AND SEALED COPY OF THE PLANS "ISSUED FOR CONSTRUCTION"; (B) STRUCTURAL ANALYSIS REPORT STATING THAT THE TOWER/POLE/FOUNDATION IS CAPABLE OF SUPPORTING THE PROPOSED LOADING REFERENCING THE SIGNED AND SEALED PLANS BY KMB DESIGN GROUP, LLC; (C) SPRINT PLATFORM ANALYSIS STATING THAT THE SPRINT PLATFORM IS CAPABLE OF SUPPORTING THE PROPOSED DESIGN AS REFERENCED WITHIN THE SIGNED AND SEALED PLANS BY KMB DESIGN GROUP, LLC.

NOTE:
1. CONTRACTOR TO REPLACE ALL MISSING GROUND BARS AND GROUNDING CONNECTIONS AS REQUIRED WITH GALVANIZED GROUND BARS. CONTRACTOR SHALL PROVIDE BEFORE & AFTER PHOTOS.

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NEW HAVEN COUNTY

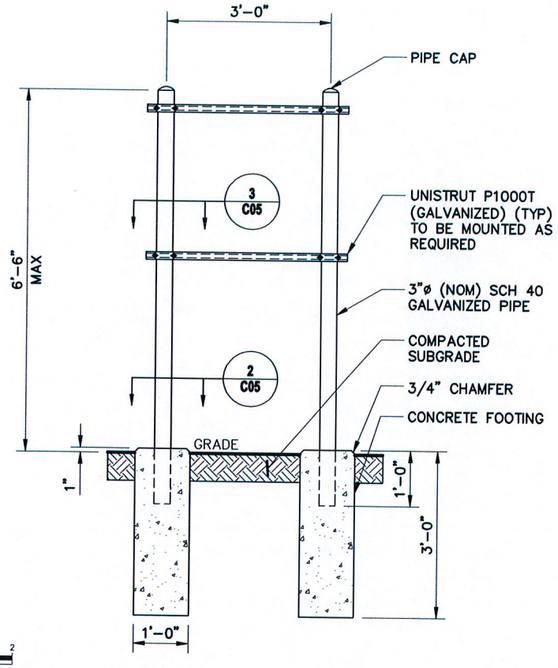
CT23XC313

PROJECT TYPE: NETWORK VISION

DRAWN BY:	CHECKED BY:	DATE:
JLS		03-14-12

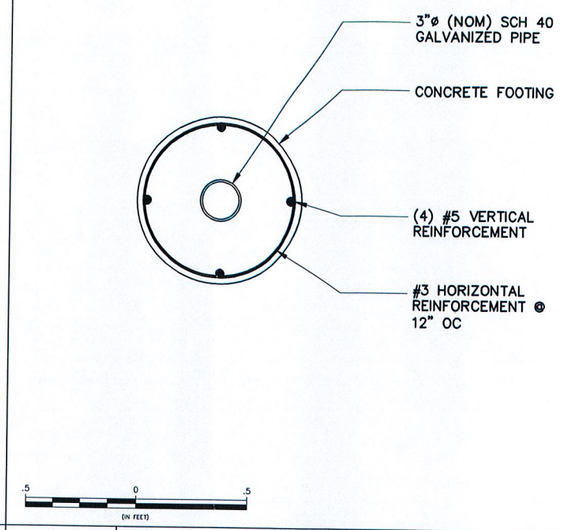
SHEET TITLE: RRH PLANS & DETAILS (ALL SECTORS)

SHEET NUMBER:	REV.:
C04C	0



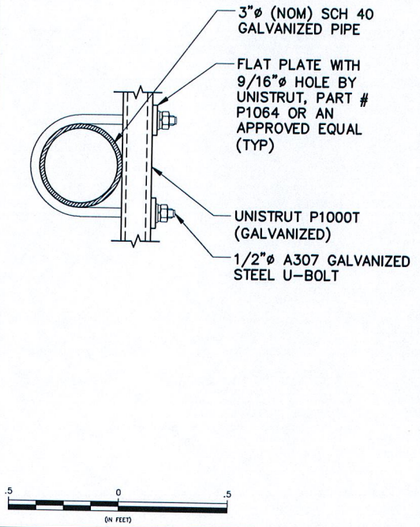
1 UNISTRUT FRAME DETAIL

11x17 SCALE: 3/8" = 1'-0" | 24x36 SCALE: 3/4" = 1'-0"



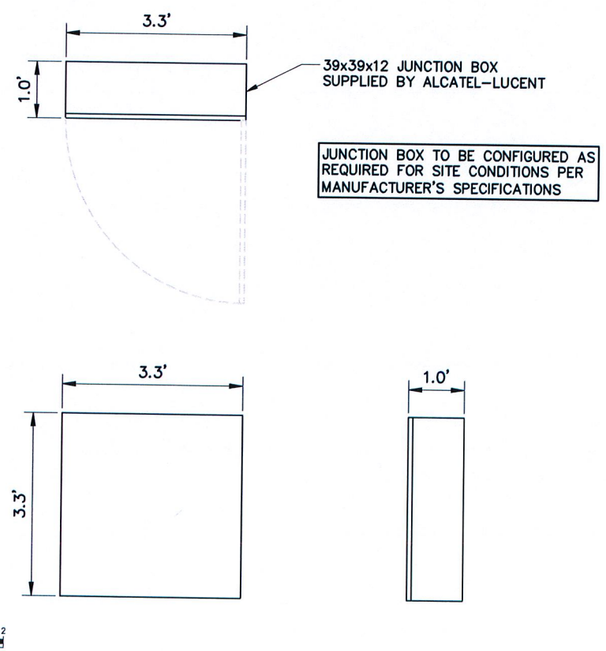
2 CONCRETE PIER DETAIL

11x17 SCALE: 1 1/2" = 1'-0" | 24x36 SCALE: 3" = 1'-0"



3 UNISTRUT CONNECTION DETAIL

11x17 SCALE: 1 1/2" = 1'-0" | 24x36 SCALE: 3" = 1'-0"



4 DC DISTRIBUTION & FIBER MGMT ENCLOSURE DETAIL

11x17 SCALE: 3/8" = 1'-0" | 24x36 SCALE: 3/4" = 1'-0"

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SHEET TITLE: SITE DETAILS

SHEET NUMBER:	REV.:
C05	0

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