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Hartford, CT 06103-3597
Main (860) 275-8200
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kbaldwin@rc.com
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ORIGINAL

September 30, 2008

Michael Perrone
Siting Analyst
Connecticut Siting Council
10 Franklin Square
New Britain, CT 06051

RECEIVED
OCT - 1 2008

CONNECTICUT
SITING COUNCIL

Re: **Cellco Partnership d/b/a Verizon Wireless
Exempt Modification Approval**

Dear Mr. Perrone:

Enclosed you will find a structural opinion letter confirming that the Verizon Wireless antenna installation was completed in accordance with the requirements of the Structural Analysis submitted as a part of the referenced exempt modification filings. The attached report relates specifically to the following Siting Council filing.

1. EM-VER-033-080616
Cromwell SE – 201 Main Street, Cromwell, CT

If you have any questions regarding any of these materials, please do not hesitate to contact me or Rachel Mayo.

Sincerely,


Kenneth C. Baldwin



Law Offices

BOSTON

HARTFORD

NEW LONDON

STAMFORD

WHITE PLAINS

NEW YORK CITY

SARASOTA

www.rc.com

Enclosures

Copy to:

Sandy M. Carter
Brian Ragozzine
Mark Gauger

HART1-1491069-1



August 19, 2008

Marco Morales
Crown Castle USA
1200 MacArthur Blvd. Suite 200
Mahwah, NJ 07430
(201) 236-9032

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

Subject: Post Rework Audit/Inspection SUPPLEMENTAL

Crown Castle Designation Crown Castle BU Number: 876364
Crown Castle Site Name: Cromwell/First Line Emergenc

Engineering Firm Designation Vertical Structures Project Number: 2008-004-036

Site Data 201 Main Street, Cromwell, CT, Middlesex County
Latitude 41°-35'-0.11", Longitude -72°-38'-59.14".
125' EEI Monopole Tower

Dear Mr. Morales,

Vertical Structures is pleased to present this supplemental report on the results of the post rework audit/inspection performed on the aforementioned tower. This report has been prepared in accordance with the terms of Crown Castle Purchase Order Number 277863. The purpose of the post rework audit/inspection is to verify that all required modifications have been performed in accordance with the documents in Table 1.

Table 1 – Rework Documents

Document	Remarks	Reference	Source
Rework Drawings	Vertical Structures, Inc. Job No. 2007-004-138 (Original Release)	N/A	Appendix A

As of the first inspection, required modifications had not been completed in accordance with the documents in Table 1. Noted discrepancies were as follows:

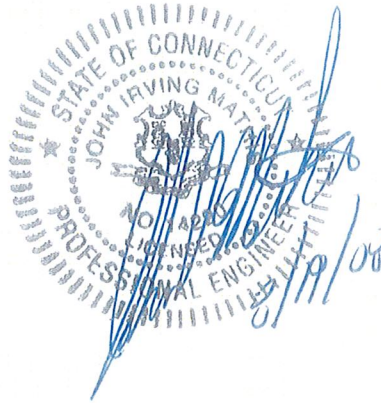
- Five (5) R-2 bars per level are installed to the sides of the rebar cage, but the drawings call for six (6) R-2 bars per level. (Pictures #0073 - #0079.)
- The concrete has not been poured. (Pictures #0072 - #0079.)
- There are sixteen (16) all-thread dowels drilled into the existing foundation. (Pictures #0073 - #0079.)

After engineering review, it has been determined that the first and third items listed above are okay. It has also been verified that the foundation rework is complete.

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

Respectfully submitted,

John Mathis, P.E.
Director/Engineering



APPENDIX A

125'

85'

40'

0'

TABLE OF CONTENTS	
SHEET NO.	DESCRIPTION
SHEET 1	MASTER DRAWING INCLUDING NOTES
SHEET 2	REPLACE GUSSET WELDS (0')
TF2007004138--T1	FOUNDATION REWORK
TF2007004138--T2	FOUNDATION REWORK

STRUCTURAL MODIFICATIONS:

THIS DRAWING DEPICTS THE REWORK REQUIRED TO REMEDY THE DEFICIENCIES FOUND IN THE CROWNELL/ FIRST LINE EMERGENG, CT TOWER PER THE REPORT PUBLISHED BY VERTICAL STRUCTURES ON 8-15-07, JOB# 2007-004-065.

- A. REINFORCE THE BASE PLATE.
- B. REINFORCE THE FOUNDATION.

MATERIAL SPECIFICATION NOTES:

- ALL MATERIAL AND HARDWARE CAN BE PURCHASED FROM VERTICAL STRUCTURES, INC.
- FABRICATION DETAILS FOR ANY PARTS NOT PURCHASED FROM VERTICAL STRUCTURES, INC. MUST BE APPROVED BY VERTICAL STRUCTURES, INC. BEFORE USE. REVIEW MAY INCLUDE RECEIPT OF MILL CERTIFICATIONS WHEN NECESSARY.
- NO FIELD FABRICATION OF TOWER REWORK MATERIAL IS ALLOWED. ALL STEEL TO BE SHOP FABRICATED.
- IT IS THE RESPONSIBILITY OF THE MATERIAL SUPPLIER TO GUARANTEE PROPER FITUP. ALL DIMENSIONS USED IN FABRICATION DETAILS MUST BE FIELD VERIFIED.

WELDING SPECIFICATION NOTES:

- SURFACES TO BE CLEARED OF GALVANIZATION BEFORE FIELD WELDING ANY MATERIAL.
 - ALL CUTTING AND WELDING ACTIVITIES SHALL BE CONDUCTED IN ACCORDANCE WITH CCUSA POLICY *CUTTING AND WELDING SAFETY PLAN* (DOC# ENG-PLN-10015) ON AN ONGOING BASIS THROUGHOUT THE ENTIRE LIFE OF THE PROJECT. PRIOR TO BIDDING REWORK, CONTRACTOR MUST HAVE IN THEIR POSSESSION AND HAVE READ THIS DOCUMENT. CONSULT CROWN CASTLE FOR COPIES OF THIS DOCUMENT.
- ADDITIONAL WELDING NOTE:
A. WELDER TO USE E70XX RODS.

TECHNICAL SPECIFICATION NOTES:

- CONTRACTOR: CALL VERTICAL STRUCTURES AT (859) 624-8360 TO MAKE SURE YOU HAVE THE LATEST REVISION OF THIS DRAWING. CONTACT THE ENGINEER CONCERNING ANY CHANGES OR MODIFICATIONS THAT MAY BE REQUIRED DUE TO THE EXISTING CONDITIONS.
- ALL BOLTS 1/2" OR LESS TO BE INSTALLED WITH H OR 2H NUTS. ALL BOLTS GREATER THAN 1/2" TO BE INSTALLED WITH 2H NUTS. LOCKING MECHANISM FOR BOLTS TO BE PALNUTS OR LOCKWASHERS.
- ALL U-BOLTS TO BE INSTALLED WITH 2H NUTS AND LOCKWASHERS. ANY HARDWARE REMOVED FROM THE EXISTING TOWER MUST BE REPLACED WITH NEW HARDWARE OF EQUAL SIZE AND QUALITY UNLESS NOTED OTHERWISE.
- AFTER FIELD MODIFICATIONS OF ANY STEEL MEMBERS, COAT EXPOSED STEEL SURFACES WITH TWO COATS OF SHERWIN WILLIAMS PART #143-0295 ZINC GLAD COATING, CONTAINING 97% ZINC DUST TO RESTORE THE GALVANIZED PROTECTION ON THE MEMBERS. IF REQUIRED, PAINT ALL AREAS AFFECTED OR NEW STEEL WITH MATCHING TOWER PAINT.
- FINISHING SPECIFICATIONS -- ALL MATERIAL TO BE HOT DIPPED GALVANIZED IN ACCORDANCE WITH THE FOLLOWING SPECIFICATIONS:
A. HARDWARE -- ASTM A153.
B. HARDWARE -- ASTM A475
C. GUY WIRE -- ASTM A475
- ELEVATIONS SHOWN ARE NOMINAL AND NOT EXACT.

CONTRACT ADMINISTRATION NOTES:

- PER CROWN POLICY, ALL MODIFICATIONS DEPICTED ON THESE DRAWINGS MUST BE INSPECTED BY VERTICAL STRUCTURES, INC. TO EXECUTE THIS SERVICE. VERTICAL STRUCTURES WILL REQUIRE A WRITTEN PURCHASE ORDER AND ONE CALENDAR WEEK PRIOR NOTICE OF AN INSPECTION. THE CONTRACTOR SHALL ALSO GIVE VERIFICATION 24 HOURS IN ADVANCE OF A SCHEDULED REQUEST FOR INSPECTION. IT IS THE CONTRACTOR'S RESPONSIBILITY TO ASSURE THAT THESE REQUIREMENTS ARE MET.
- INSPECTIONS OF ABOVE GRADE MODIFICATIONS SHALL BE PERFORMED AT THE CONCLUSION OF THE WORK. BELOW GRADE OR HIDDEN INSTALLATIONS SUCH AS REBAR OR ANCHORS SHALL BE INSPECTED PRIOR TO THE PLACEMENT OF CONCRETE. VERTICAL STRUCTURES WILL PROVIDE AN ENGINEERING REVIEW OF PART FABRICATION DETAIL DRAWINGS PRIOR TO MATERIAL FABRICATION AT THE DISCRETION OF VERTICAL STRUCTURES. VERTICAL STRUCTURES WILL REQUIRE A PURCHASE ORDER AND A COMPLETE DRAWING PACKAGE TO PERFORM THIS WORK. VERTICAL STRUCTURES WILL SUBMIT A REPORT TO THE CONTRACTOR WITHIN TWO BUSINESS DAYS AFTER RECEIPT OF THE DRAWINGS AND PURCHASE ORDER.

A	ORIGINAL RELEASE	10-9-07	SWH
REV:	DESCRIPTION	DATE	BY

VERTICAL STRUCTURES, INC.
 P.O. Box 1486
 Richmond, KY 40478
 Phone: (859) 624-8360
 Fax: (859) 624-8369
 Email: engineering@verticalstructures.com

FOR

CROWN CASTLE

CROWN CASTLE
BU # 876364

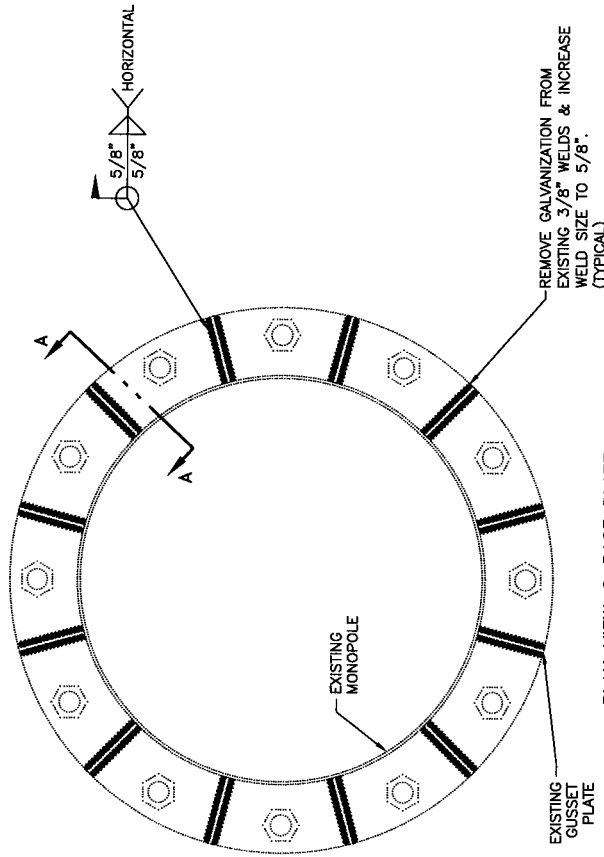
DRAWN BY:	S. HARRIS
DATE:	10-9-07
CHK'D BY:	
DATE:	
ENGR:	

2007 MODIFICATIONS
 TOWER REWORK FOR A
 125' EEI MONOPOLE TOWER
 SITE: CROWNELL, CT

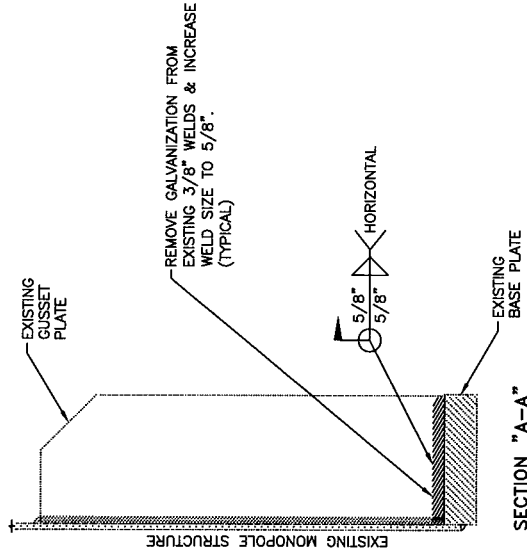
SHEET 1 of 2	B	TA2007004138--T1	SCALE: NONE
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0'-0': REPLACE HORIZONTAL GUSSET PLATE WELDS PER SHEET 2.
 REINFORCE THE FOUNDATION PER SHEETS TF2007004138-T1 & T2.

NOTE:
 1. AFTER FIELD WELDING OF ANY STEEL MEMBERS, COAT EXPOSED STEEL AND WELD SURFACES WITH TWO COATS OF SHERWIN WILLIAMS PART #143-0255 ZINC CLAD COATING, CONTAINING 97% ZINC DUST TO RESTORE THE GALVANIZED PROTECTION.



PLAN VIEW @ BASE PLATE
 STEP BOLTS, SAFETY CLIMB PORTS, AND REINFORCEMENT NOT DRAWN FOR CLARITY



SECTION "A-A"

DO NOT GRIND WELDS FROM MORE THAN ONE GUSSET BEFORE REPLACING WELD.

REV.	DESCRIPTION	DATE	SWH	BY
A	ORIGINAL RELEASE	10-9-07		

FOR

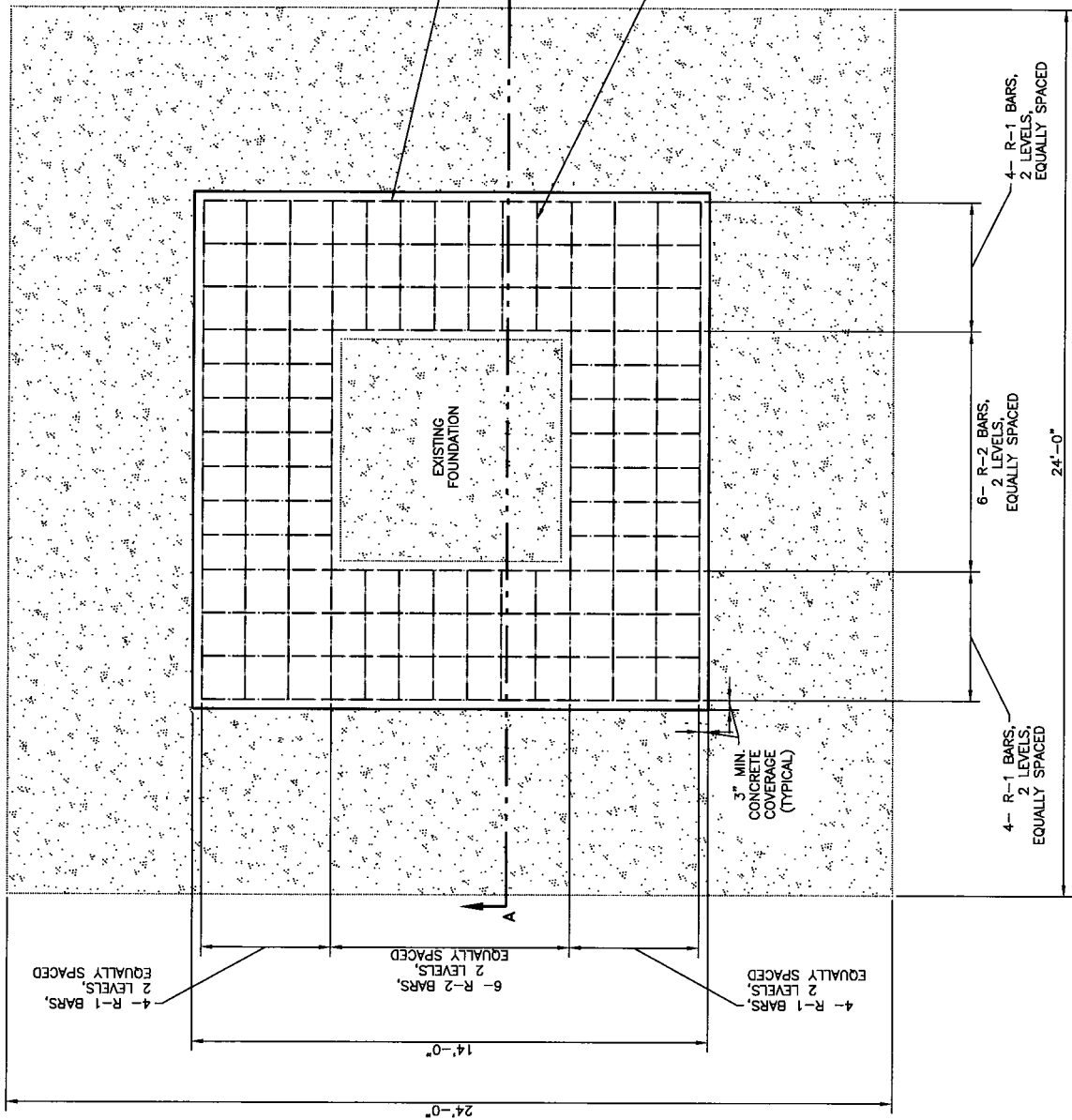
VERTICAL STRUCTURES INC.
 P.O. Box 1486
 Richmond, KY 40476
 Phone: (606) 624-6380
 Fax: (606) 624-6381
 Email: engineering@verticalstructures.com

CROWN CASTLE	
2007 MODIFICATIONS TOWER REWORK FOR A 125' EEI MONOPOLE TOWER SITE: CROMWELL, CT	
SHEET 2 of 2	B TA2007004138-T2
SCALE:	NONE

CROWN CASTLE BU# 876364	
DRAWN BY:	S. HARRIS
DATE:	10-9-07
CHK'D BY:	
DATE:	
ENGR:	

BILL OF MATERIALS	
REF.	DESCRIPTION
-	CONCRETE (CU. YARDS)
R-1	#6 REBAR X 13'-6"
R-2	#5 REBAR X 3'-6"

- NOTES:
- ALL CONCRETE SHALL CONFORM TO ACI 318 BUILDING REQUIREMENTS FOR REINFORCED CONCRETE.
 - REBAR: REINFORCING BARS SHALL CONFORM TO ASTM A615 SPECIFICATIONS, GRADE 60.
 - CONCRETE TO HAVE A MINIMUM OF 6 SACKS OF CEMENT PER CUBIC YARD AND HAVE 3000 P.S.I. MINIMUM COMPRESSION AT 28 DAYS.
 - BACKFILL IS TO BE MADE IN LIFTS NOT TO EXCEED 18 INCHES. EACH LIFT IS TO BE TAMPED BY HAND OR WITH HELD VIBRATORY COMPACTOR SUFFICIENTLY TO REMOVE LARGE VOIDS AND REDUCE SETTLEMENT. EXCAVATED AREA TO HAVE MINIMUM OF 6 INCH MOUND ABOVE NATURAL GROUND SURFACE WHEN COMPLETED. NO FROZEN MATERIALS, LARGE ROCKS OR ORGANIC MATERIAL IS TO BE USED FOR BACKFILL. EXISTING FOUNDATION SHOULD BE CLEANED OF GREASE, DIRT, & LOOSE DEBRIS PRIOR TO PLACING THE NEW CONCRETE.



A	ORIGINAL RELEASE	10-9-07	ISWH
REV.	DESCRIPTION	DATE	BY

P.O. Box 1498
Richmond, KY 40476
Phone: (603) 824-4980
Fax: (603) 824-4989
Email: engineering@verticalstructures.com

VERTICAL STRUCTURES, INC.

CROWN CASTLE

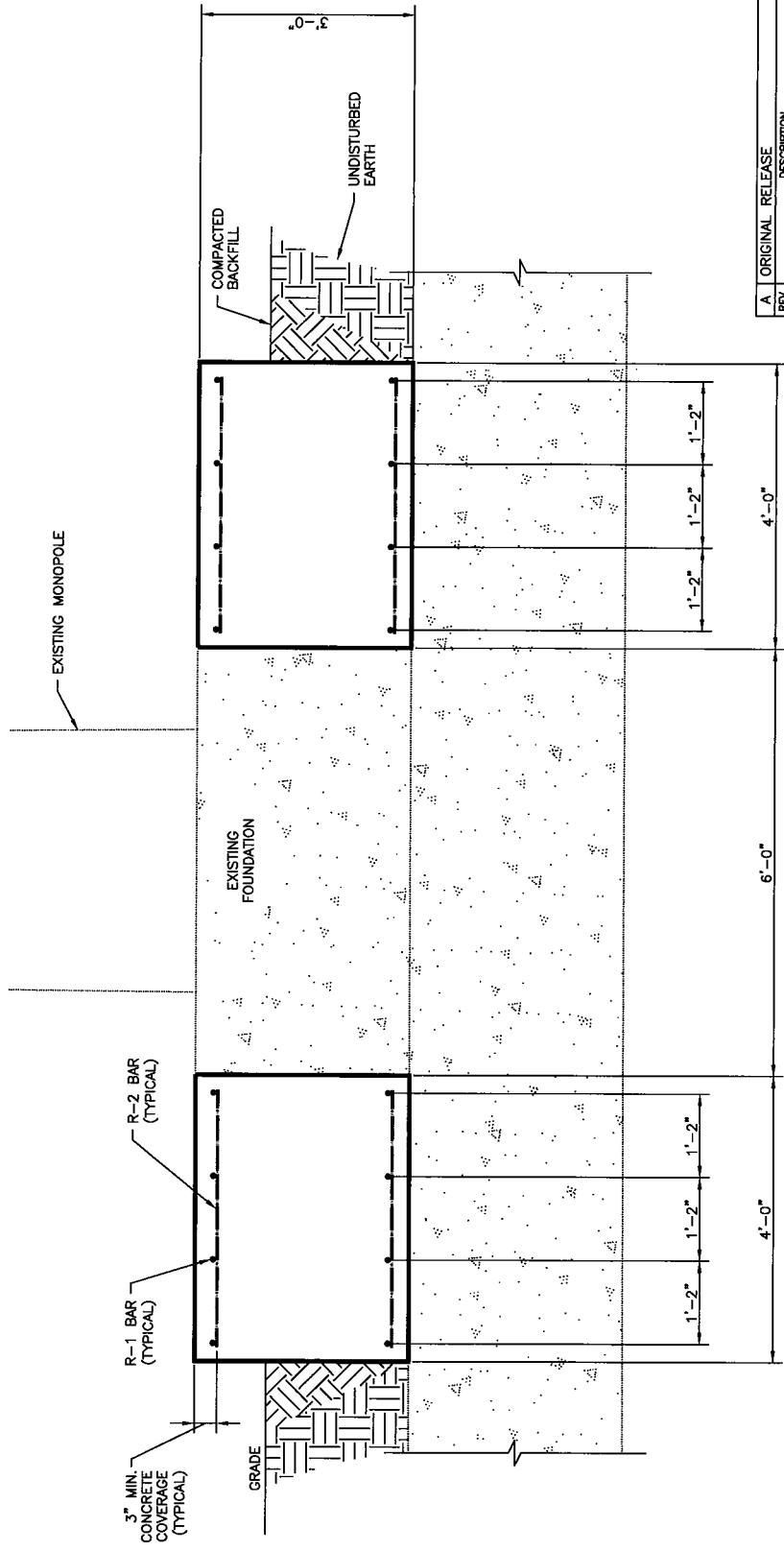
FOR

2007 TOWER MODIFICATIONS
FOUNDATION REWORK FOR A
125' EEI MONOPOLE TOWER
SITE: CROMWELL, CT

CROWN CASTLE BU# 876364	
DRAFTSPERSON:	DATE
S. HARRIS	10-9-07
CHK'D BY:	DATE
ENGR:	DATE

PLAN VIEW

SHEET 1 of 2	B	TF2007004138-T1	SCALE: NONE
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SECTION "A-A"

REV.	DESCRIPTION	DATE	BY
A	ORIGINAL RELEASE	10-9-07	ISWH

VERTICAL STRUCTURES INC.
 P.O. Box 148
 Richmond, KY 40478
 Phone: (859) 824-4880
 Fax: (859) 824-9389
 Email: engineering@verticalstructures.com

CROWN CASTLE
 2007 TOWER MODIFICATIONS
 FOUNDATION REWORK FOR A
 125' EEI MONOPOLE TOWER
 SITE: CROMWELL, CT

CROWN CASTLE BU# 876364	
DRAFTER/PERSON:	DATE
S. HARRIS	10-9-07
CHK'D BY:	DATE
ENGR:	DATE

SHEET 2 OF 2 B TF:2007004138-T2 SCALE: NONE



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

Internet: ct.gov/csc

Daniel F. Caruso
Chairman

July 29, 2008

Kenneth C. Baldwin, Esq.
Robinson & Cole LLP
280 Trumbull Street
Hartford, CT 06103-3597

RE: **EM-VER-033-080616** – Cellco Partnership d/b/a Verizon Wireless notice of intent to modify an existing telecommunications facility located at 201 Main Street, Cromwell, Connecticut.

Dear Attorney Baldwin:

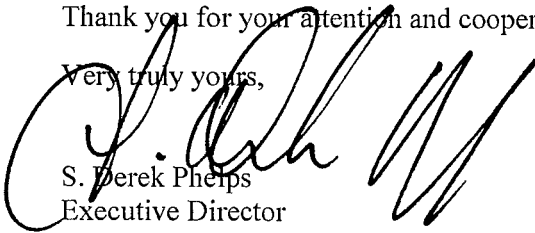
The Connecticut Siting Council (Council) hereby acknowledges your notice to modify this existing telecommunications facility, pursuant to Section 16-50j-73 of the Regulations of Connecticut State Agencies, with the condition that the modifications detailed in Vertical Structures Job No. 2007-004-138 are implemented prior to the antenna installation and that a signed letter from a Professional Engineer is submitted to the Council to certify that the modifications have been properly completed.

The proposed modifications are to be implemented as specified here and in your notice dated June 16, 2008, including the placement of all necessary equipment and shelters within the tower compound. 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. Any deviation from this format may result in the Council implementing enforcement proceedings pursuant to General Statutes § 16-50u including, without limitation, imposition of expenses resulting from such failure and of civil penalties in an amount not less than one thousand dollars per day for each day of construction or operation in material violation.

Thank you for your attention and cooperation.

Very truly yours,


S. Derek Pheips
Executive Director

SDP/MP/cm

c: The Honorable Jeremy J. Shingleton, First Selectman, Town of Cromwell
Frederic Curtin, Zoning Enforcement Officer, Town of Cromwell
Crown Castle International

KENNETH C. BALDWIN

280 Trumbull Street
Hartford, CT 06103-3597
Main (860) 275-8200
Fax (860) 275-8299
kbaldwin@rc.com
Direct (860) 275-8345

EM-VER-033-080616

June 16, 2008

Via Hand Delivery

ORIGINAL

RECEIVED
JUN 16 2008

CONNECTICUT
SITING COUNCIL

S. Derek Phelps
Executive Director
Connecticut Siting Council
10 Franklin Square
New Britain, CT 06051

Re: **Notice of Exempt Modification – Antenna Swap
201 Main Street, Cromwell, Connecticut**

Dear Mr. Phelps:

Cellco Partnership d/b/a Verizon Wireless (“Cellco”) currently maintains a wireless telecommunications facility at the above referenced location. The Council approved Cellco’s use of this facility on April 12, 2001. Cellco intends to modify its installation by attaching two (2) tower mounted amplifiers (TMAs) to the mounting mast behind its existing antennas. Cellco’s existing antennas are located at the 105-foot level on the existing 125-foot monopole tower. The tower is owned by the Crown Castle International (“Crown”). Attached behind Tab 1 are the specifications as well as a mounting detail for the TMAs.

Please accept this letter as notification pursuant to R.C.S.A. § 16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.C.S.A. § 16-50j-73, a copy of this letter is being sent to Jeremy J. Shingleton, First Selectman of the Town of Cromwell. Pursuant to a Council directive, a copy of this letter is also being sent to S&S Partners, Inc., the owner of the property on which the facility is located.

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

1. The proposed modifications will not result in the increase in the overall height of the existing structure. Cellco’s TMAs will not extend above the top of Cellco’s existing antennas.



Law Offices

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HART1-1471763-1

S. Derek Phelps
June 16, 2008
Page 2

2. The proposed modifications will not involve any ground-mounted equipment and, therefore, will not require the extension of the site boundaries.

3. The proposed modifications will not increase noise levels at the facility by six decibels or more.

4. The operation of the TMAs will not increase radio frequency (RF) power density levels at the facility to a level at or above the Federal Communications Commission (FCC) adopted safety standard. A cumulative power density table for the facility, including the TMAs, is included behind Tab 2.

Also attached is a Structural Analysis Report confirming that the tower can support the proposed modifications. (See Tab 3).

For the foregoing reasons, Cellco respectfully submits that the proposed modifications to the above-referenced telecommunications facility constitutes an exempt modification under R.C.S.A. § 16-50j-72(b)(2).

Sincerely,



Kenneth C. Baldwin

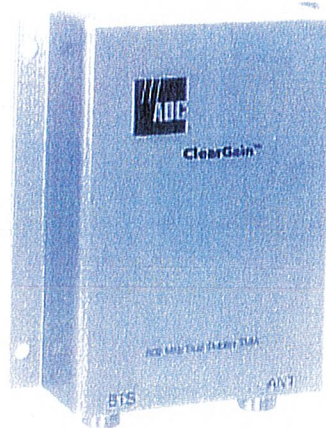
Enclosures

Copy to:

Jeremy J. Shingleton, Cromwell First Selectman
S&S Partners, Inc.
Sandy M. Carter



ClearGain® Tower-Mounted Amplifiers Americas



As mobile usage continues to increase, service providers are faced with the challenge of optimizing and expanding their wireless networks to provide new and existing services. ADC's ClearGain® Tower-Mounted Amplifiers (TMAs) minimize the cost of network expansion and improve quality of service, allowing service providers to increase profitability from new and existing services.

The ClearGain TMAs improve signal quality by boosting the uplink signal of a mobile system to increase receiver performance and improve overall coverage.

Features:

- Provides amplification of the Band
- Highly advanced LNA amplifies RX signal for improved receiver performance and increase in coverage
- Dual duplex feature reduces the number of feeder cable runs by providing simultaneous operation of TX and RX with low TX loss
- Full Band feature provides amplification of the entire band
- Advanced filtering maintains the lowest possible noise figure for improved quality of service
- Slim, stackable design conserves tower space and reduces tower-related costs
- Seamless aluminum sleeve construction protects components from the elements
- Modular system is fully compatible with all base stations
- Power and alarming for up to six masthead units is provided from a single unit at the base station





ClearGain® Tower-Mounted Amplifiers Americas

Introduction

Unacceptable network quality is one of the main reasons for mobile subscriber churn. With industry churn at their current rates, a service provider's entire customer base could be lost in as few as three years. The cost of acquiring new subscribers to replace the existing customer base can be enormous. Improvements in quality of service can directly impact a service provider's profitability through the cost savings associated with increased subscriber retention and the additional revenue gained from increased billable minutes of use resulting from improved signal quality.

While subscribers are willing to pay a premium for data services, improved quality of service is necessary to provide new data services. Due to the tradeoff between bit rate and bandwidth inherent to data services, improved signal quality is required to achieve the same level of performance at even higher data rates. ADC's ClearGain Tower-Mounted Amplifiers help provide this improvement in signal quality.

TMA's improve signal quality by boosting the uplink (RX) signal of a mobile system immediately after the antenna. This compensates for the loss in signal strength that occurs when the signal is passed through the coaxial feeder cable to the base transceiver station (BTS) at the base of the tower. ClearGain TMA's perform this amplification with the lowest possible noise contribution, resulting in a substantial increase in receiver performance and an improvement in overall coverage. These improvements in quality of service allow mobile subscribers to place more calls, make longer calls, and successfully complete calls in an expanded geographic area, resulting in increased revenue.

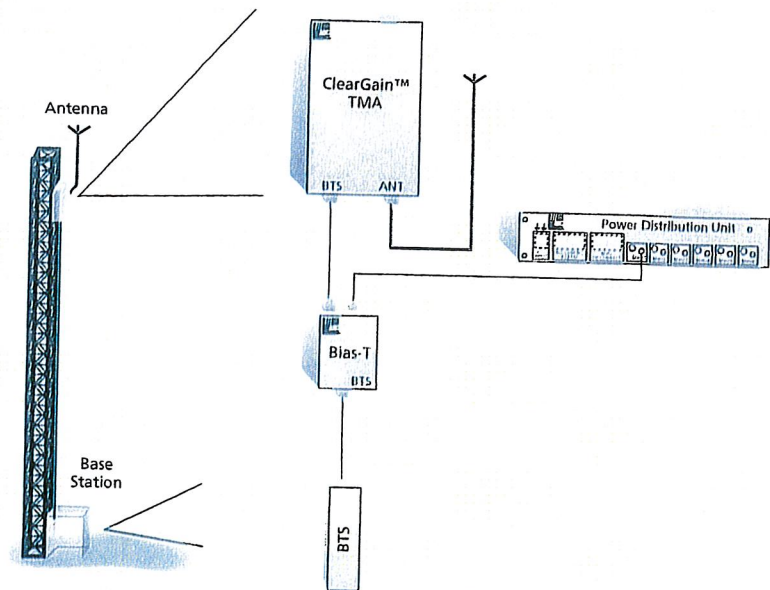
System Overview

The ClearGain TMA system is modular, consisting of a Masthead Unit (MHU), a Power Distribution Unit (PDU) and a Bias-T Unit. This system provides full compatibility with all base stations. The ClearGain MHU offers dual duplex operation and incorporates a highly advanced fixed-gain, low-noise amplifier (LNA) and high-performance filters for added reliability. The MHU amplifies each band to maximize signal quality and optimize coverage.

The ClearGain MHU features a slim, lightweight design. This allows two ClearGain TMA's to be mounted with one set of brackets thereby, conserving valuable and costly tower space and reducing clutter on the tower. The TMA is protected with a strong, aluminum sleeve construction designed to ensure superior weather protection and resistance to corrosion, resulting in increased reliability.

In the ClearGain TMA system, DC power is supplied to the MHU from a ClearGain PDU. The PDU also provides alarming and monitoring of the feeder cable and up to six MHUs from a single unit. The flexible design of the ClearGain PDU allows it to be rack- or wall-mounted on the side of a BTS cabinet.

An external Bias-T Unit is used in conjunction with the ClearGain PDU. The Bias-T inserts DC power onto the coaxial cable and extracts alarm and monitoring signals from the coaxial cable.

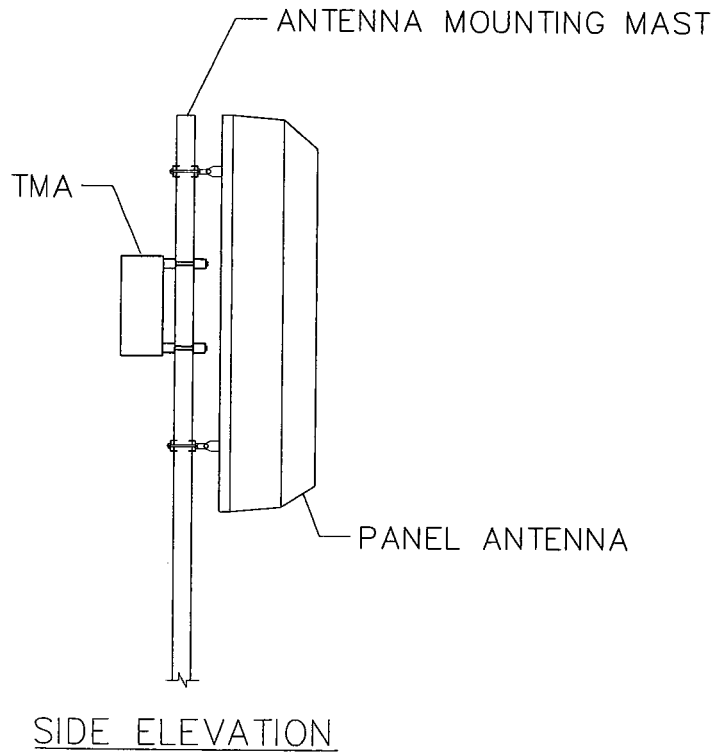
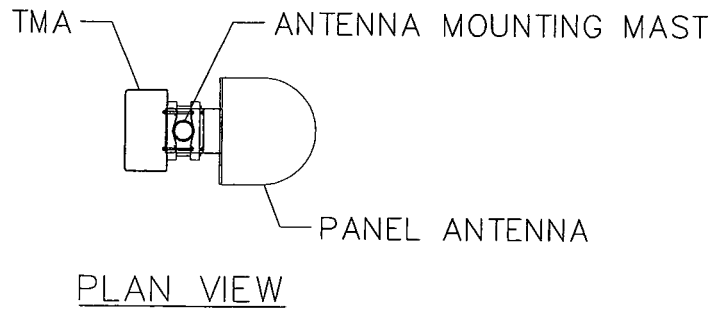




ClearGain® Tower-Mounted Amplifiers Americas

Dual Band 800/1900 MHz Full Band Typical Specifications

ELECTRICAL	
Nominal Impedance of RF Inputs and Outputs:	50 Ohm
Frequency Range	
TX: 800:	869-894 MHz
1900:	1930-1990 MHz
RX: 800:	824-849 MHz
1900:	1850-1910 MHz
Filter Bandwidth:	25/60 MHz
Passband (RX)	
Gain:	12 dB
Noise Figure:	
800:	1.5 dB
1900:	1.6 dB
Dynamic Range	
Input at 1 dB Gain Compression:	+0 dBm
IIP3:	+13 dBm
Max. Input Power:	+10 dBm
851 MHz Rejection:	<30 dB
1915 MHz Rejection:	<15 dB
1916 MHz Rejection:	<30 dB
Bypass Insertion Loss:	2.0 dB
Isolation in TX Path:	80 dB
Insertion Loss of TX Path (TX to Antenna):	4 dB
Passband Return Loss:	
TX Band:	>18 dB
RX Band:	>18 dB
Intermodulation:	-120 dBm
Max. Input Power (RMS Power):	
800:	500 W
1900:	250 W
Tx Filter Rejection in RX Path:	40 dB
POWER	
Operational Voltage:	7 to 20 Vdc
Operational Current:	280 ± 10 mA
Alarm Current Level:	350-520 mA
PHYSICAL	
Dimensions (HxWxD):	357 mm x 287 mm x 149 mm
Weight:	10.5 kg (22.5 lbs.)
Color:	Silver
Housing:	Aluminum
CONNECTORS	
Antenna Connector:	7/16 DIN female
BTS Connector:	7/16 DIN female
ENVIRONMENTAL	
Operating Temperature:	-40° to +60 °C
Lightning Protection:	IEC 61000-4-5
Vibration:	
Storage:	ETS3019-1-1
Transport:	ETS3019-1-2
Operation:	ETS3019-1-3
REGULATORY	
EMC:	ETS300 342-2
APPROVALS	
FCC:	Part 15, Class A
UL:	1950
QUALITY	
MTBF:	900,000 hours



TYPICAL TOWER MOUNTED AMPLIFIER (TMA) - MOUNTING DETAIL
NOT TO SCALE

	General	Power	Density				
Site Name: Cromwell SE							
Tower Height: Verizon @ 105 Ft.							
Operator	channels	ERP watt/ch	distance (feet)	S (mW/cm ²)	f (MHz)	Smax	Percent MPE
*Sprint			125	0.0309	1962.5	1.0000	3.09%
*Nextel	12	100	95	0.0478	851	0.5673	8.43%
*Cingular GSM	3	655	115	0.0534	1900	1.0000	5.34%
*Cingular UMTS	1	500	115	0.0136	880	0.5867	2.32%
Verizon	9	200	105	0.058704749	880	0.5867	10.01%
**Verizon	3	485	105	0.047453005	1900	1.0000	4.75%
* Source: Siting Council						Total %MPE	33.93%
** Including Tower Mounted Amplifiers (TMAs)							



May 21, 2008

Tara Brewer
Crown Castle USA
9105 Monroe Road, Suite 150
Charlotte, NC 28270
(704) 321-3812

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

Subject: Structural Analysis Report

Carrier Designation Verizon Wireless Co-Locate
Carrier Site Number: N/A
Carrier Site Name: N/A

Crown Castle Designation Crown Castle BU Number: 876364
Crown Castle Site Name: Cromwell/First Line Emergency
Crown Castle JDE Job Number: 106038

Engineering Firm Designation Vertical Structures Project Number: 2008-004-084

Site Data 201 Main Street, Cromwell, CT, Middlesex County
Latitude 41°-35'-0.11", Longitude -72°-38'-59.14"
125' EEI Monopole Tower

Dear Ms. Brewer,

Vertical Structures is pleased to submit this structural analysis report to determine the structural integrity of the aforementioned 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 287825, and Application Number 64299, Revision 2. The purpose of the analysis is to determine the suitability of the tower for the following load case:

Load Case 1 (LC1): Proposed Equipment (Table 1) + Existing/Reserved Equipment (Table 2)

Based on our analysis we have determined the tower superstructure and foundation are sufficient for LC1, provided the modifications detailed in Vertical Structures Job No. 2007-004-138 have been completed. This analysis has been performed in accordance with the TIA/EIA-222-F standard and local code requirements based upon an 80 MPH basic "fastest mile" wind speed, equivalent to a 100 MPH basic "3-second gust" wind speed per IBC Table 1609.3.1.

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

Respectfully submitted,


Andy Cronin
Project Engineer

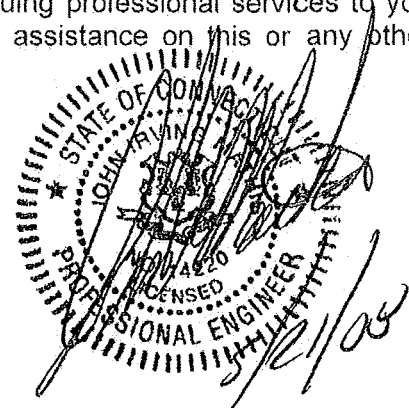


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1.) INTRODUCTION

The 125' tall monopole tower was designed and manufactured by EEI for Sprint PCS in 2000. The tower consists of three (3) 18-sided tapered polygonal tubes joined via slip joint connections and is founded on a 24' square by 3' thick mat bearing 6' below grade. The tower has been reworked to accommodate additional loading. For the purpose of this analysis, the modifications detailed in Vertical Structures Job No. 2007-004-138 are considered complete.

2.) ANALYSIS CRITERIA

The Cromwell/First Line Emergency tower was analyzed in accordance with the current EIA-222-F publication, "Structural Standards for Steel Antenna Towers and Antenna Supporting Structures." The proposed, existing and reserved antennas, cables and mounts considered in this analysis are listed in Tables 1 and 2. Applied forces in this study were derived from an 80 MPH basic "fastest mile" wind speed with no ice and a reduced 69 MPH basic "fastest mile" wind speed with a 1/2" of radial ice accumulation. The tower was originally designed for a 90 MPH basic "fastest mile" wind speed with no ice and a reduced 78 MPH basic "fastest mile" wind speed with a 1/2" of radial ice accumulation. The original design loads are unavailable. All cables are assumed to be routed in accordance with the drawing in Appendix B.

Table 1 – Proposed Antenna and Cable Information

Mount Center Line Elevation (feet)	Number Of Antenna	Antenna Manufacturer	Antenna Model	Mount Manufacturer	Mount Model	Number Of Feed Lines	Feed Line Size (inches)
105	2	ADC	Dual Band 800/1900 TMA				

Table 2 – Existing and Reserved Antenna and Cable Information

Mount Center Line Elevation (feet)	Number Of Antenna	Antenna Manufacturer	Antenna Model	Mount Manufacturer	Mount Model	Number Of Feed Lines	Feed Line Size (inches)
125	6	Decibel	DB980H90A-M	EEI	10'-8" L.P. Platform	6	1 5/8
	9*	EMS Wireless	FV65-14-00NA2			9*	1 5/8
115	6**	Powerwave Technologies	7770.00		(3**) 4' T-Arms	6 + 6**	1 1/4
	6**		LGP21401 TMA				
105	6	Decibel	DB844H90		12' L.P. Platform	12	1 5/8
	6	Decibel	DB948F85T2E-M				
95	12	Decibel	DB844H65E-XY		12' L.P. Platform	12	1 5/8

*Indicates MLA loading. MLA loading controls and is used in this analysis.

**Indicates reserved equipment.

3.) ANALYSIS PROCEDURE

Table 3 – Documents Provided

Document	Remarks	Reference	Source
Online Application	Verizon Wireless Co-Locate Revision #2	64299	CCI iSite
Tower Drawing	EEI Drawing No. GS52064	1771100	CCI iSite
Foundation Drawing	EEI Drawing No. S6464-125	1613633	CCI iSite
Geotechnical Report	Dr. Clarence Welti Report Dated "August 2, 1999"	1614540	CCI iSite
Rework Information	Vertical Structures Job No. 2007-004-104	1956332	CCI iSite
Rework Drawings	Vertical Structures Job No. 2007-004-138	2133336	CCI iSite

3.1) Analysis Methods

RISA Tower (Version 5.1), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various dead, live, wind, and ice load cases. All loads were computed in accordance with the ANSI/TIA/EIA-222-F or the local building code requirements. Selected output from the analysis is included in Appendix A.

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 manufacturer's specifications.
3. The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and any referenced drawings.
4. When applicable, transmission cables are considered to be structural components for calculating wind loads, as allowed by TIA/EIA-222-F.

If any of these assumptions are not valid or have been made in error, this analysis may be affected, and Vertical Structures should be allowed to review any new information to determine its effect on the structural integrity of the tower.

4.) ANALYSIS RESULTS

Table 4 – Tower Component Stresses vs. Modified Capacity (LC1)

Section Capacity Table									
<i>Section No.</i>	<i>Elevation ft</i>	<i>Component Type</i>	<i>Size</i>	<i>Critical Element</i>	<i>P lb</i>	<i>SF*P_{allow} lb</i>	<i>% Capacity</i>	<i>Pass Fail</i>	
L1	124.771 - 84.9115	Pole	TP27.0855x18.5x0.1875	1	-8139.66	806298.34	75.8	Pass	
L2	84.9115 - 40.3411	Pole	TP36.1854x25.8736x0.25	2	-13951.90	1438293.61	99.1	Pass	
L3	40.3411 - 0	Pole	TP44.25x34.6164x0.3125	3	-22539.80	2265620.03	90.4	Pass	
							Summary		
							Pole (L2)	99.1	Pass
							RATING =	99.1	Pass

Notes	Component	% Capacity	Pass/Fail
Additional Component Analysis Summary:			
1	Anchor Bolts (Tension)	78.0	Pass
1	Base Plate and Gussets (Bending)	88.2	Pass
1	Foundation (Compared to Allowable Loads)	94.7	Pass
Structure Rating =		99.1	Pass

1) Indicates calculations supporting % capacity are included in Appendix C.

APPENDIX A

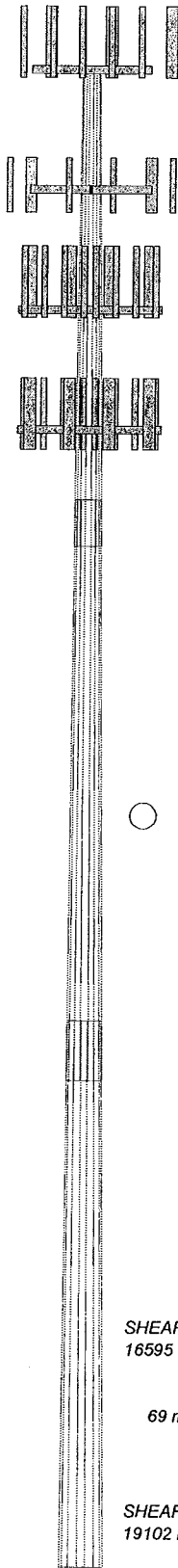
Section	1	2	3
Length (ft)	39.86	48.46	45.36
Number of Sides	18	18	18
Thickness (in)	0.1875	0.2500	0.3125
Lap Splice (ft)		5.02	
Top Dia (in)	18.5000	25.8736	34.6164
Bot Dia (in)	27.0855	36.1854	44.2500
Grade		A572-65	
Weight (lb)	1824.7	4027.1	5989.8

124.8 ft

84.9 ft

40.3 ft

0.0 ft



DESIGNED APPURTENANCE LOADING

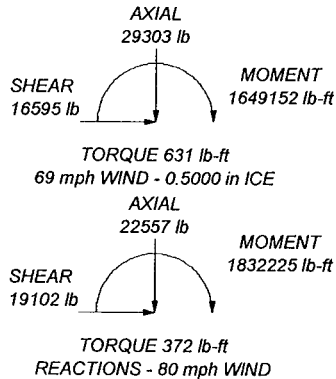
TYPE	ELEVATION	TYPE	ELEVATION
EEL 10'-8" Low-Profile Platform	125	(2) DB948F85T2E-M w/Mount Pipe (Verizon Wireless)	105
EEL Monopole Platform Ladder (VSI)	125	(2) DB844H90 w/Mount Pipe (Verizon Wireless)	105
6' x 2" Antenna Mount Pipe (VSI)	125	(2) DB948F85T2E-M w/Mount Pipe (Verizon Wireless)	105
6' x 2" Antenna Mount Pipe (VSI)	125	(2) DB844H90 w/Mount Pipe (Verizon Wireless)	105
(3) FV65-14-00NA2 w/Mount Pipe	125	(2) DB948F85T2E-M w/Mount Pipe (Verizon Wireless)	105
(3) FV65-14-00NA2 w/Mount Pipe	125	(2) DB844H90 w/Mount Pipe (Verizon Wireless)	105
(3) FV65-14-00NA2 w/Mount Pipe	125	(2) DB948F85T2E-M w/Mount Pipe (Verizon Wireless)	105
4' T-Arm Mount	115	(2) DB 800/1900 Full Band Masthead (VSI) (Verizon Wireless)	105
(2) 7770.00 w/ mount pipe	115	12' Low Profile Platform (VSI)	95
(2) LGP21401 TMA (VSI)	115	(4) DB844H65E-XY w/ Mount Pipe (VSI)	95
4' T-Arm Mount	115	(4) DB844H65E-XY w/ Mount Pipe (VSI)	95
(2) 7770.00 w/ mount pipe	115	(4) DB844H65E-XY w/ Mount Pipe (VSI)	95
(2) LGP21401 TMA (VSI)	115	(4) DB844H65E-XY w/ Mount Pipe (VSI)	95
4' T-Arm Mount	115		
(2) 7770.00 w/ mount pipe	115		
(2) LGP21401 TMA (VSI)	115		
12' L.P. Platform (VSI) (Verizon Wireless)	105		
(2) DB844H90 w/Mount Pipe (Verizon Wireless)	105		

MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower is located in Middlesex County, Connecticut.
2. Tower designed for a 80 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 69 mph basic wind with 0.50 in ice.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 99.1%



Vertical Structures, Inc. 309 Spangler Drive, Suite E Richmond, Kentucky 40475 Phone: (859) 624-8360 FAX: (859) 624-8369	Job: Cromwell/First Line Emergency, CT BU#87636
	Project: Vertical Structures Job No. 2008-004-084
	Client: Crown Castle Drawn by: Andy Cronin App'd:
	Code: TIA/EIA-222-F Date: 05/21/08 Scale: NTS
	Path: W:\1\acm\2008-004-084-Cromwell-First Line Emergency\ISA\87636.dwg Dwg No. E-1

RISATower <i>Vertical Structures, Inc.</i> 309 Spangler Drive, Suite E Richmond, Kentucky 40475 Phone: (859) 624-8360 FAX: (859) 624-8369	Job Cromwell/First Line Emergency, CT BU#876364	Page 1 of 6
	Project Vertical Structures Job No. 2008-004-084	Date 16:39:54 05/21/08
	Client Crown Castle	Designed by Andy Cronin

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 Middlesex County, Connecticut.
Basic wind speed of 80 mph.
Nominal ice thickness of 0.5000 in.
Ice density of 56 pcf.
A wind speed of 69 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

- | | | |
|--|--|--|
| <ul style="list-style-type: none"> Consider Moments - Legs Consider Moments - Horizontals Consider Moments - Diagonals Use Moment Magnification √ Use Code Stress Ratios √ Use Code Safety Factors - Guys Escalate Ice Always Use Max Kz Use Special Wind Profile √ Include Bolts In Member Capacity √ Leg Bolts Are At Top Of Section √ Secondary Horizontal Braces Leg Use Diamond Inner Bracing (4 Sided) Add IBC .6D+W Combination | <ul style="list-style-type: none"> Distribute Leg Loads As Uniform Assume Legs Pinned √ Assume Rigid Index Plate √ Use Clear Spans For Wind Area √ Use Clear Spans For KL/r √ Retension Guys To Initial Tension √ Bypass Mast Stability Checks √ Use Azimuth Dish Coefficients √ Project Wind Area of Appurt. √ Autocalc Torque Arm Areas √ SR Members Have Cut Ends Sort Capacity Reports By Component √ Triangulate Diamond Inner Bracing | <ul style="list-style-type: none"> Treat Feedline Bundles As Cylinder Use ASCE 10 X-Brace Ly Rules √ Calculate Redundant Bracing Forces Ignore Redundant Members in FEA √ SR Leg Bolts Resist Compression √ All Leg Panels Have Same Allowable Offset Girt At Foundation √ Consider Feedline Torque Include Angle Block Shear Check Poles Include Shear-Torsion Interaction Always Use Sub-Critical Flow Use Top Mounted Sockets |
|--|--|--|

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	124.77-84.91	39.86	3.89	18	18.5000	27.0855	0.1875	0.7500	A572-65 (65 ksi)
L2	84.91-40.34	48.46	5.02	18	25.8736	36.1854	0.2500	1.0000	A572-65 (65 ksi)
L3	40.34-0.00	45.36		18	34.6164	44.2500	0.3125	1.2500	A572-65 (65 ksi)

RISATower Vertical Structures, Inc. 309 Spangler Drive, Suite E Richmond, Kentucky 40475 Phone: (859) 624-8360 FAX: (859) 624-8369	Job Cromwell/First Line Emergency, CT BU#876364	Page 2 of 6
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	Client Crown Castle	Designed by Andy Cronin

Tapered Pole Properties

Section	Tip Dia. in	Area in ²	I in ⁴	r in	C in	I/C in ³	J in ⁴	I/Q in ²	w in	w/t
L1	18.7854	10.8982	461.7305	6.5009	9.3980	49.1307	924.0685	5.4501	2.9260	15.605
	27.5033	16.0077	1463.2065	9.5488	13.7594	106.3421	2928.3383	8.0054	4.4370	23.664
L2	27.1123	20.3323	1686.5721	9.0964	13.1438	128.3170	3375.3635	10.1681	4.1138	16.455
	36.7436	28.5147	4652.1299	12.7571	18.3822	253.0782	9310.3812	14.2601	5.9286	23.715
L3	36.2336	34.0252	5058.5228	12.1779	17.5851	287.6593	10123.7017	17.0158	5.5425	17.736
	44.9326	43.5805	10629.1961	15.5978	22.4790	472.8500	21272.3785	21.7944	7.2380	23.162

Tower Elevation	Gusset Area (per face)	Gusset Thickness	Gusset Grade	Adjust. Factor A _f	Adjust. Factor A _r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontal in
ft	ft ²	in					in	in
L1 124.77-84.91				1	1	1		
L2 84.91-40.34				1	1	1		
L3 40.34-0.00				1	1	1		

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C _A A _A ft ² /ft	Weight plf
LDF7-50A (1-5/8 FOAM)	C	No	Inside Pole	124.77 - 4.00	9	No Ice 1/2" Ice	0.00 0.00	0.82 0.82
LDF6-50A (1-1/4 FOAM)	C	No	Inside Pole	115.00 - 4.00	12	No Ice 1/2" Ice	0.00 0.00	0.66 0.66
LDF7-50A (1-5/8 FOAM)	C	No	Inside Pole	107.00 - 4.00	12	No Ice 1/2" Ice	0.00 0.00	0.82 0.82
(Verizon Wireless) LDF7-50A (1-5/8 FOAM)	C	No	Inside Pole	96.00 - 4.00	12	No Ice 1/2" Ice	0.00 0.00	0.82 0.82

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A _R ft ²	A _F ft ²	C _A A _A In Face ft ²	C _A A _A Out Face ft ²	Weight lb
L1	124.77-84.91	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	858.93
L2	84.91-40.34	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	1559.07
L3	40.34-0.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	1271.21

Feed Line/Linear Appurtenances Section Areas - With Ice

RISA Tower Vertical Structures, Inc. 309 Spangler Drive, Suite E Richmond, Kentucky 40475 Phone: (859) 624-8360 FAX: (859) 624-8369	Job Cromwell/First Line Emergency, CT BU#876364	Page 3 of 6
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Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A _R ft ²	A _F ft ²	C _A A _A In Face ft ²	C _A A _A Out Face ft ²	Weight lb
L1	124.77-84.91	A	0.500	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	858.93
L2	84.91-40.34	A	0.500	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	1559.07
L3	40.34-0.00	A	0.500	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	1271.21

Feed Line Center of Pressure

Section	Elevation ft	CP _X in	CP _Z in	CP _X Ice in	CP _Z Ice in
L1	124.77-84.91	0.0000	0.0000	0.0000	0.0000
L2	84.91-40.34	0.0000	0.0000	0.0000	0.0000
L3	40.34-0.00	0.0000	0.0000	0.0000	0.0000

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft	C _A A _A Front ft ²	C _A A _A Side ft ²	Weight lb
EEI 10'-8" Low-Profile Platform	C	None		0.0000	125.00	No Ice 22.50 1/2" Ice 28.10	22.50 28.10	1500.00 2250.00
EEI Monopole Platform Ladder (VSI)	A	From Centroid-Face	3.00 0.00 -3.00	0.0000	125.00	No Ice 5.00 1/2" Ice 8.00	5.50 9.00	60.00 90.00
6' x 2" Antenna Mount Pipe (VSI)	A	From Centroid-Leg	2.82 1.63 0.00	0.0000	125.00	No Ice 1.43 1/2" Ice 1.92	1.43 1.92	23.00 33.83
6' x 2" Antenna Mount Pipe (VSI)	B	From Centroid-Leg	2.82 1.63 0.00	0.0000	125.00	No Ice 1.43 1/2" Ice 1.92	1.43 1.92	23.00 33.83
6' x 2" Antenna Mount Pipe (VSI)	C	From Centroid-Leg	2.82 1.63 0.00	0.0000	125.00	No Ice 1.43 1/2" Ice 1.92	1.43 1.92	23.00 33.83
(3) FV65-14-00NA2 w/Mount Pipe	A	From Centroid-Leg	2.82 1.63 2.00	30.0000	125.00	No Ice 8.64 1/2" Ice 9.29	6.95 8.13	55.55 121.25
(3) FV65-14-00NA2 w/Mount Pipe	B	From Centroid-Leg	2.82 1.63 2.00	30.0000	125.00	No Ice 8.64 1/2" Ice 9.29	6.95 8.13	55.55 121.25
(3) FV65-14-00NA2 w/Mount Pipe	C	From Centroid-Leg	2.82 1.63 2.00	30.0000	125.00	No Ice 8.64 1/2" Ice 9.29	6.95 8.13	55.55 121.25

**

RISA Tower Vertical Structures, Inc. 309 Spangler Drive, Suite E Richmond, Kentucky 40475 Phone: (859) 624-8360 FAX: (859) 624-8369	Job	Cromwell/First Line Emergency, CT BU#876364	Page	4 of 6
	Project	Vertical Structures Job No. 2008-004-084	Date	16:39:54 05/21/08
	Client	Crown Castle	Designed by	Andy Cronin

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C _A A _A		Weight	
			Horz Lateral	Vert			Front	Side		
			ft	ft	°	ft	ft ²	ft ²	lb	
4' T-Arm Mount	A	From	3.00		0.0000	115.00	No Ice	2.80	1.10	120.00
		Centroid-Leg	0.00	0.00			1/2" Ice	3.30	1.30	180.00
(2) 7770.00 w/ mount pipe	A	From	5.00		0.0000	115.00	No Ice	6.22	4.35	56.90
		Centroid-Leg	0.00	0.00			1/2" Ice	6.77	5.20	102.99
(2) LGP21401 TMA (VSI)	A	From	5.00		0.0000	115.00	No Ice	1.29	0.36	14.10
		Centroid-Leg	0.00	0.00			1/2" Ice	1.45	0.48	21.26
4' T-Arm Mount	B	From	3.00		0.0000	115.00	No Ice	2.80	1.10	120.00
		Centroid-Leg	0.00	0.00			1/2" Ice	3.30	1.30	180.00
(2) 7770.00 w/ mount pipe	B	From	5.00		23.0000	115.00	No Ice	6.22	4.35	56.90
		Centroid-Leg	0.00	0.00			1/2" Ice	6.77	5.20	102.99
(2) LGP21401 TMA (VSI)	B	From	5.00		23.0000	115.00	No Ice	1.29	0.36	14.10
		Centroid-Leg	0.00	0.00			1/2" Ice	1.45	0.48	21.26
4' T-Arm Mount	C	From	3.00		0.0000	115.00	No Ice	2.80	1.10	120.00
		Centroid-Leg	0.00	0.00			1/2" Ice	3.30	1.30	180.00
(2) 7770.00 w/ mount pipe	C	From	5.00		23.0000	115.00	No Ice	6.22	4.35	56.90
		Centroid-Leg	0.00	0.00			1/2" Ice	6.77	5.20	102.99
(2) LGP21401 TMA (VSI)	C	From	5.00		23.0000	115.00	No Ice	1.29	0.36	14.10
		Centroid-Leg	0.00	0.00			1/2" Ice	1.45	0.48	21.26
**										
12' L.P. Platform (VSI) (Verizon Wireless)	C	None			0.0000	105.00	No Ice	24.00	24.00	1750.00
							1/2" Ice	28.30	28.30	2150.00
(2) DB844H90 w/Mount Pipe (Verizon Wireless)	A	From	3.50		0.0000	105.00	No Ice	3.58	5.63	35.55
		Centroid-Leg	0.00	2.00			1/2" Ice	4.20	6.73	77.48
(2) DB948F85T2E-M w/Mount Pipe (Verizon Wireless)	A	From	3.50		0.0000	105.00	No Ice	2.62	4.92	34.05
		Centroid-Leg	0.00	2.00			1/2" Ice	3.23	6.01	68.79
(2) DB844H90 w/Mount Pipe (Verizon Wireless)	B	From	3.50		0.0000	105.00	No Ice	3.58	5.63	35.55
		Centroid-Leg	0.00	2.00			1/2" Ice	4.20	6.73	77.48
(2) DB948F85T2E-M w/Mount Pipe (Verizon Wireless)	B	From	3.50		0.0000	105.00	No Ice	2.62	4.92	34.05
		Centroid-Leg	0.00	2.00			1/2" Ice	3.23	6.01	68.79
(2) DB844H90 w/Mount Pipe (Verizon Wireless)	C	From	3.50		0.0000	105.00	No Ice	3.58	5.63	35.55
		Centroid-Leg	0.00	2.00			1/2" Ice	4.20	6.73	77.48
(2) DB948F85T2E-M w/Mount Pipe (Verizon Wireless)	C	From	3.50		0.0000	105.00	No Ice	2.62	4.92	34.05
		Centroid-Leg	0.00	2.00			1/2" Ice	3.23	6.01	68.79
(2) DB 800/1900 Full Band Masthead (VSI) (Verizon Wireless)	C	From	3.50		0.0000	105.00	No Ice	1.54	0.80	28.70
		Centroid-Leg	0.00	2.00			1/2" Ice	1.71	0.94	39.71
**										
12' Low Profile Platform (VSI)	C	None			0.0000	95.00	No Ice	15.30	15.30	1340.00
							1/2" Ice	17.00	17.00	2000.00
(4) DB844H65E-XY w/ Mount Pipe (VSI)	A	From	3.50		0.0000	95.00	No Ice	6.89	5.86	45.55
		Centroid-Face	0.00	1.00			1/2" Ice	11.04	6.96	115.63

RISA Tower Vertical Structures, Inc. 309 Spangler Drive, Suite E Richmond, Kentucky 40475 Phone: (859) 624-8360 FAX: (859) 624-8369	Job Cromwell/First Line Emergency, CT BU#876364	Page 5 of 6
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	Client Crown Castle	Designed by Andy Cronin

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C _A A ₁ Front	C _A A ₁ Side	Weight	
			Horz Lateral	Vert						
			ft	ft	°	ft	ft ²	ft ²	lb	
(4) DB844H65E-XY w/ Mount Pipe (VSI)	B	From Centroid-Face	3.50	0.00	0.0000	95.00	No Ice	6.89	5.86	45.55
			1.00	0.00			1/2" Ice	11.04	6.96	115.63
(4) DB844H65E-XY w/ Mount Pipe (VSI)	C	From Centroid-Face	3.50	0.00	0.0000	95.00	No Ice	6.89	5.86	45.55
			1.00	0.00			1/2" Ice	11.04	6.96	115.63

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L _u ft	K/r	F _a ksi	A in ²	Actual P lb	Allow. P _a lb	Ratio P/P _a
L1	124.771 - 84.9115 (1)	TP27.0855x18.5x0.1875	39.86	0.00	0.0	39.000	15.5096	-8139.66	604875.00	0.013
L2	84.9115 - 40.3411 (2)	TP36.1854x25.8736x0.25	48.46	0.00	0.0	39.000	27.6665	-13951.90	1078990.00	0.013
L3	40.3411 - 0 (3)	TP44.25x34.6164x0.3125	45.36	0.00	0.0	39.000	43.5805	-22539.80	1699640.00	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 f _{bx} /F _{bx}	Actual M _y lb-ft	Actual f _{by} ksi	Allow. F _{by} ksi	Ratio f _{by} /F _{by}
L1	124.771 - 84.9115 (1)	TP27.0855x18.5x0.1875	323290.00	-38.871	39.000	0.997	0.00	0.000	39.000	0.000
L2	84.9115 - 40.3411 (2)	TP36.1854x25.8736x0.25	1013125.00	-51.040	39.000	1.309	0.00	0.000	39.000	0.000
L3	40.3411 - 0 (3)	TP44.25x34.6164x0.3125	1832225.00	-46.498	39.000	1.192	0.00	0.000	39.000	0.000

Pole Interaction Design Data

Section No.	Elevation ft	Size	Ratio P/P _a	Ratio f _{bx} /F _{bx}	Ratio f _{by} /F _{by}	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	124.771 - 84.9115 (1)	TP27.0855x18.5x0.1875	0.013	0.997	0.000	1.010 ✓	1.333	H1-3 ✓
L2	84.9115 -	TP36.1854x25.8736x0.25	0.013	1.309	0.000	1.322 ✓	1.333	H1-3 ✓

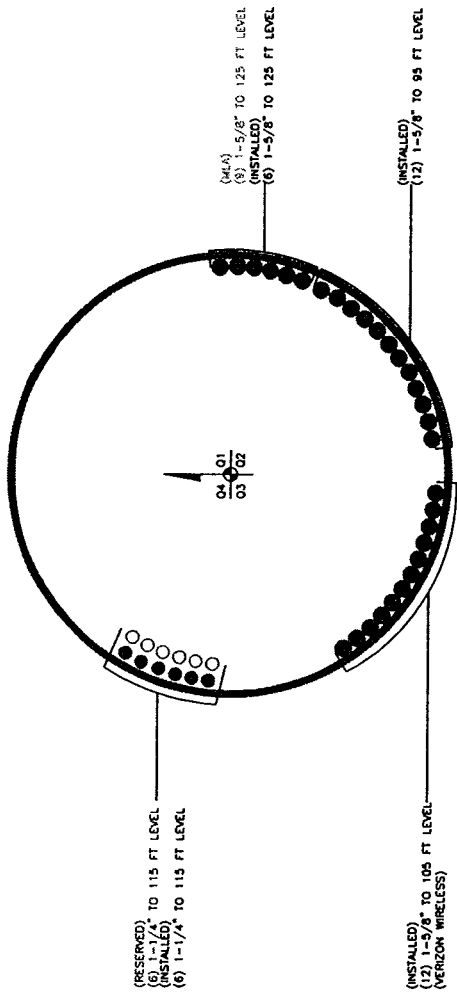
RISATower Vertical Structures, Inc. 309 Spangler Drive, Suite E Richmond, Kentucky 40475 Phone: (859) 624-8360 FAX: (859) 624-8369	Job	Cromwell/First Line Emergency, CT BU#876364	Page	6 of 6
	Project	Vertical Structures Job No. 2008-004-084	Date	16:39:54 05/21/08
	Client	Crown Castle	Designed by	Andy Cronin

Section No.	Elevation ft	Size	Ratio	Ratio	Ratio	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
			$\frac{P}{P_a}$	$\frac{f_{bx}}{F_{bx}}$	$\frac{f_{by}}{F_{by}}$			
L3	40.3411 (2) 40.3411 - 0 (3)	TP44.25x34.6164x0.3125	0.013	1.192	0.000	1.206 ✓	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	124.771 - 84.9115	Pole	TP27.0855x18.5x0.1875	1	-8139.66	806298.34	75.8	Pass	
L2	84.9115 - 40.3411	Pole	TP36.1854x25.8736x0.25	2	-13951.90	1438293.61	99.1	Pass	
L3	40.3411 - 0	Pole	TP44.25x34.6164x0.3125	3	-22539.80	2265620.03	90.4	Pass	
							Summary		
							Pole (L2)	99.1	Pass
							RATING =	99.1	Pass

APPENDIX B



: SCALE :

BASE LEVEL DRAWING

Sheet: 1 of 1 of 1

LEGEND: FEEDLINES
 ● SOLID BLUE CIRCLE DENOTES EXISTING FEEDLINE
 ○ OPEN RED CIRCLE DENOTES PROPOSED FEEDLINE
 ○ OPEN BLUE CIRCLE DENOTES RESERVED FEEDLINE
 X BLUE "X" DENOTES LOCATION NOT GIVEN
 NOTE: ASSUME FEEDLINE ATTACHMENT HEIGHT TO TOWER STEEL AT 8'-FEET ABOVE FINISHED GRADE UNLESS OTHERWISE SPECIFIED

BUSINESS UNIT: 876364 TOWER ID: C_BASELEVEL

DRAWN BY: JAY
 CHECKED BY: JAY
 DRAWING DATE: 200908
 SITE NUMBER:
 SITE NAME:
 CONTRACT / PRINT LINE NUMBER:
 BUSINESS UNIT NUMBER:
 SITE ADDRESS:
 JOB NAME:
 PROJECT: CT 876364
 CONTRACT: 000000
 COUNTY:
 STATE:
 SHEET TITLE:
 SHEET NUMBER:
 SHEET NUMBER:

A1-0

APPENDIX C



ANCHOR BOLT CALCULATIONS

Customer: Crown Castle
Site Name: Cromwell/First Line Emergency, CT BU#876364
Job Number: 2008-004-084
Tower Model: 125' EEI Monopole Tower
Date: 5/21/2008

<i>Input Information:</i>	<i>Existing Bolts</i>	
# Bolts, n	12	
Bolt Diameter, d	2.25	in
Bolt Circle Diameter, D	53	in
Bolt Ultimate Tensile Stress, F_u	100	ksi
Applied Vertical Load P	22.56	kips
Applied Shear S	19.10	kips
Applied Moment M	21986.70	kip-in
Steel Grade	A615 Gr 75	

Bolt Cross-Sectional Area, A	3.976	in ² (each)
Bolt Group Moment of Inertia, I	16753.2055	in ⁴
Maximum Tensile Stress (outer bolt), σ_y	34.31	ksi
Maximum Shear Stress (any bolt), τ_{xy}	0.400	ksi
Maximum Allowable Stress (per bolt), Ft	44.00	ksi
% Capacity	78.0%	

The Bolt Group is Adequate for Loading

Maximum Allowable Stress (per bolt), Ft

$$0.43F_u - 1.8f_v \leq 0.33F_u$$

This equation is for threaded parts, A449 bolts over 1 1/2" dia. (threads included in shear plane) Manual of Steel Construction ASD, 9th Edition, pg. 5-74, Table J3.3



MODIFIED GUSSET PLATE AND WELD CALCULATIONS

Customer:	Crown Castle
Site Name:	Cromwell/First Line Emergency, CT BU#876364
Job Number:	2008-004-084
Tower Model:	125' EEI Monopole Tower
Date:	5/21/2008

Anchor Bolt Load	136.40	kips
Weld Size at Bottom of Gusset Plate	0.625	in
Length of Bottom Weld Along Gusset Plate	6.25	in
Gusset Plate Thickness	0.75	in
Distance From Pole Edge to Center of Horizontal Weld	3.875	in
Length of Vertical Weld Along Gusset Plate	21.25	in
Weld Size Along Vertical Face of Gusset Plate	0.375	in
Gusset Plate Yield Strength	50	ksi
Nominal Tensile Strength of Weld Metal	70	ksi
Base Plate Yield Strength	60	ksi
Number of Gusset Plates Between Each Anchor Bolt	1	
<hr/>		
Stress in Bottom Weld Along Gusset Plate	24.70	ksi
Allowable Bottom Weld Stress	28.00	ksi
% Capacity	88.2%	

Bottom Weld Along Gusset Plate is Adequate for Loading

Tension Stress Along Gusset Plate	29.10	ksi
Allowable Tension Stress Along Bottom of Gusset Plate	40.00	ksi
% Capacity	72.7%	

Bottom of Gusset Plate is Adequate for Loading

Bending Moment on Gusset Plate	528.55536	kip-in
Stress in Vertical Weld Along Top of Gusset Plate	17.94	ksi
Allowable Stress in Vertical Weld Along Top of Gusset Plate	28.00	ksi
% Capacity	64.1%	

Top Weld Along Gusset Plate is Adequate for Loading

Bending Stress Along Top of Gusset Plate	9.36	ksi
Allowable Bending Stress Along Top of Gusset Plate	40.00	ksi
Shear Stress Along Top of Gusset Plate	8.56	ksi
Allowable Shear Stress Along Top of Gusset Plate	26.67	ksi
% Capacity	32.1%	

Top of Gusset Plate is Adequate for Loading



BASE PLATE CALCULATIONS

Customer: Crown Castle
Site Name: Cromwell/First Line Emergency, CT BU#876364
Job Number: 2008-004-084
Tower Model: 125' EEI Monopole Tower
Date: 5/21/2008

FOR BASE PLATES WITH GUSSET PLATE STIFFENERS

Reference: Roark's Formulas for Stress & Strain, Fifth Edition, Table 26, pg. 396, section 10a

Length of Side Perpendicular to Free Edge	7	in
Length of Side Parallel to Free Edge	13.125	in
Roark's Coefficient Beta ³	1.444	
Maximum Tensile Force Per Bolt	136.40	kips
Base Plate Yield Strength	60	ksi
Base Plate Thickness	1.75	in

Applied Base Plate Flexural Stress	34.30	ksi
Allowable Base Plate Flexural Stress	60	ksi

% Capacity 57.2%

Base Plate is Adequate for Applied Loading



Modified Overturning Calculation for Square Mat Foundations

Customer:	Crown Castle
Site Name:	Cromwell/First Line Emergency, CT BU#876364
Job Number:	2008-004-084
Tower Model:	125' EEI Monopole Tower
Date:	5/21/2008

Soil Ultimate Bearing	8	ksf
Unit wt soil	0.0626	kcf
Unit wt concrete	0.0876	kcf

Mat Width	24	ft
Mat Thickness	3	ft
Depth of Soil Over Mat	2	ft
Has Pedestals? (Y or N)	Y	
Pedestal Round or Square? (R or S)	S	
Number of Pedestals	1	
Pedestal Height	3	ft
Pedestal Diameter or Width	14	ft

Applied Shear	19.10	kip
Applied Axial Force	22.56	kip
Applied Moment	1832.23	k-ft

wt. Concrete =	202.882	kip
wt. Soil =	47.576	kip
x =	1.422	ft
Shear Moment =	114.612	k-ft

Allowable Bearing =	4	ksf
Bearing =	0.884	ksf
Resisting Moment =	3082.0685	k-ft
SF =	1.583	

BEARING ADEQUATE

OVERTURNING ADEQUATE