

ORIGINAL

December 12, 2008

Mr. S. Derek Phelps
Executive Director
Connecticut Siting Council
Ten Franklin Square
New Britain, Connecticut 06051

RECEIVED
DEC 15 2008

CONNECTICUT
SITING COUNCIL

Re: MetroPCS Notices of Exempt Modifications
75 Roberts Road, Groton, Connecticut
93 Roxbury Road, East Lyme, Connecticut
86 Voluntown Road, Stonington, Connecticut

Dear Mr. Phelps:

On behalf of our client, MetroPCS, enclosed please find exempt modification notices for the three existing tower facility locations referenced along with checks totaling \$1500. Each notice contains plans, signed and sealed structural information and MPE calculations related to these respective Crown and SBA towers and MetroPCS' exempt modifications. Two sites will require some structural improvements which are fully detailed in the PE signed and sealed reports and plans that accompany the notices. I'll follow up with you and Council staff next week regarding acknowledgements as the client is looking to move forward with these projects before year end. Best wishes for a happy and healthy holiday season.

Very truly yours,


Christopher B. Fisher
Encs.
cc: Kellie Dunn, MetroPCS

ORIGINAL

NOTICE OF INTENT TO MODIFY AN
EXISTING TELECOMMUNICATIONS FACILITY AT
75 ROBERTS ROAD, GROTON, CONNECTICUT

RECEIVED
DEC 15 2008

CONNECTICUT
SITING COUNCIL

Pursuant to the Public Utility Environmental Standards Act, Connecticut General Statutes § 16-50g et. seq. ("PUESA"), and Sections 16-50j-72(b) and 16-50j-73 of the Regulations of Connecticut State Agencies adopted pursuant to the PUESA, MetroPCS ("MetroPCS") hereby notifies the Connecticut Siting Council of its intent to modify an existing facility located at 75 Roberts Road, Groton, Connecticut (the "Roberts Road Facility"), owned by Crown Castle (the "Tower Owner"). MetroPCS and the Tower Owner have agreed to share the use of the Roberts Road Facility, as detailed below.

The Roberts Road Facility

The Roberts Road Facility is located on the north side of Interstate 95 off of Roberts Road on an approximate 2.018 acre parcel of land owned by Phillip Strickland. The site coordinates are Latitude 41° 21' 36.8" and Longitude 72° 2' 55.1".

The Roberts Road Facility obtained initial approval locally. The facility consists of an approximately one hundred forty five (145) foot monopole (the "Tower") and associated equipment currently being used and/or approved for use for wireless communications by Sprint, T-Mobile, AT&T and Verizon. A chain link fence surrounds the Tower compound.

MetroPCS' Wireless Facility

As shown on the enclosed plans prepared by Chappell Engineering Associates, LLC, including a compound plan, tower elevation and antenna/equipment detail of the Roberts Road Facility, MetroPCS proposes shared use of the Facility by placing antennas on the Tower and equipment cabinets needed to provide wireless services within the existing fenced compound. MetroPCS will install up to six (6) Kathrein Model 800-10504 panel antennas, or their functional equivalents, at the approximately 102 foot level of the Tower, a GPS antenna and associated equipment including a battery cabinet, a ppc cabinet, a modcell cabinet and space for a future battery cabinet and future modcell cabinet on a 16' by 10' concrete pad within the existing fenced compound. As evidenced in the structural analysis report prepared by Vertical Structures, Inc., annexed hereto, MetroPCS has confirmed that the tower superstructure and foundation are sufficient for the proposed wireless facility with minor modifications detailed on the plan in Appendix D to the structural report are completed.

MetroPCS' Wireless Facility Constitutes An Exempt Modification

The proposed addition of MetroPCS' antennas and equipment to the Roberts Road Facility constitutes an exempt "modification" of an existing facility as defined in Connecticut General Statutes Section 16-50i(d) and Council regulations promulgated pursuant thereto. The addition of MetroPCS' antennas and equipment to the Tower will not result in an increase of the Tower's height nor extend the site boundaries. Further, there will be no increase in noise levels by six (6)

decibels or more at the Tower site's boundary. In addition, MetroPCS' facility will not increase the cumulative radio frequency electromagnetic radiation power density at the Tower site's boundary to or above the standard adopted by the Connecticut Department of Environmental Protection as set forth in Section 22a-162 of the Connecticut General Statutes and MPE limits established by the Federal Communications Commission.

The power density for existing conditions is fully documented in the last filing with the Connecticut Siting Council for the Roberts Road Facility as 31.74% of the MPE limits. Calculations for MetroPCS' proposed facility are as follows:

Carrier	Centerline Height	Frequency (MHz)	Number of Channels	Power Per Channel (Watts)	Power Density	Standard Limits	Percent of Limit
MetroPCS	102'	2140	3	727	0.0252	1.4267	1.76%

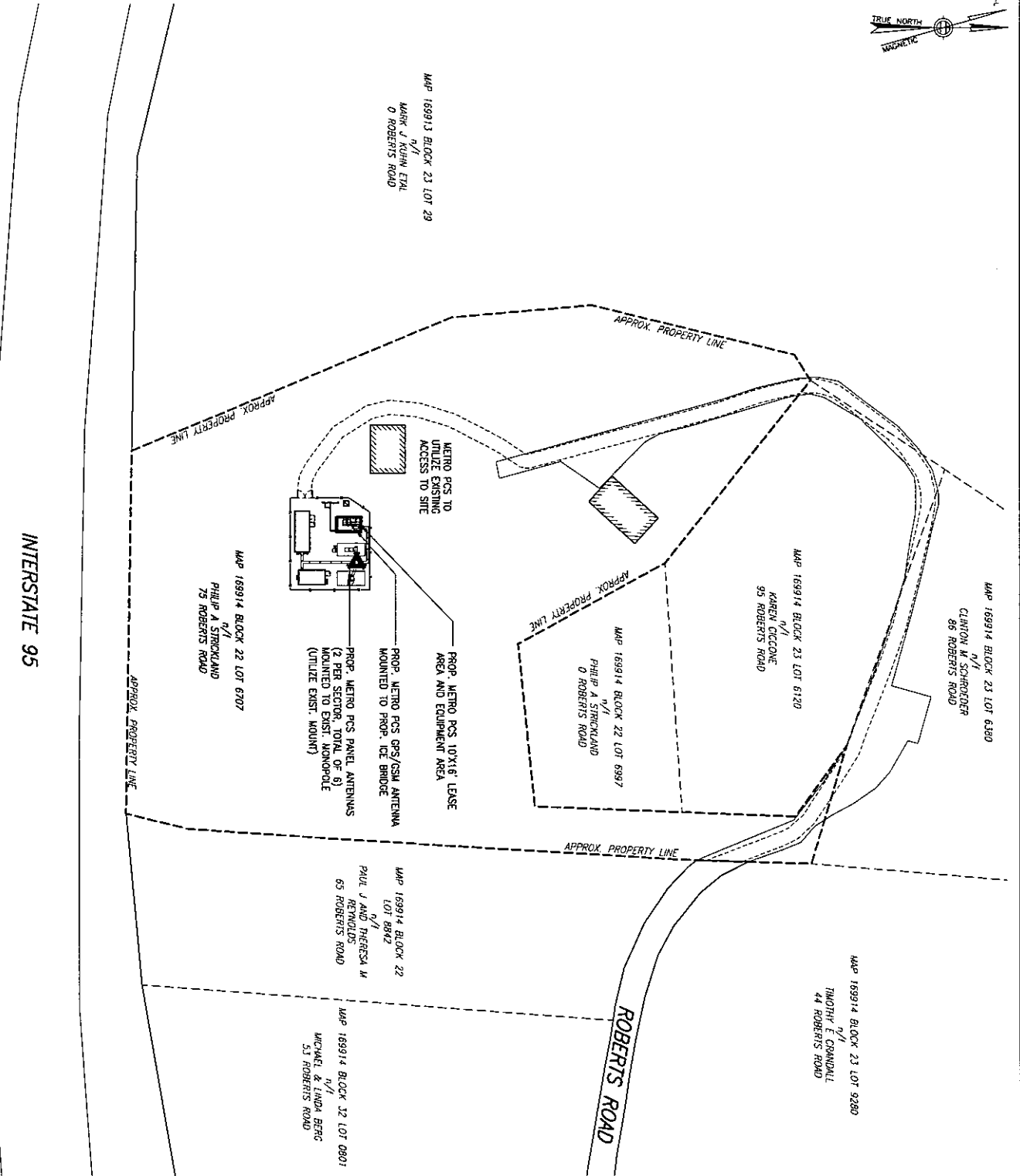
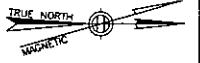
When combining the cumulative "worse case" power density levels for the existing facility with MetroPCS' proposed facility, it would result in a total power density of 33.50% which is well within applicable standards.

For all the foregoing reasons, the addition of MetroPCS' wireless facility to the Tower constitutes an exempt modification which will not have a substantially adverse environmental effect.

Conclusion

Accordingly, MetroPCS requests that the Connecticut Siting Council acknowledge that its proposed modification to the Roberts Road Facility meets the Council's exemption criteria.

cc: Mark R. Oefinger, Town Manager, Town of Groton
Kellie Dunn, MetroPCS



SITE PLAN
SCALE: 1" = 100'-0"
C-1

metro PCS.
Unlimit Yourself.

285 BALLECK ROAD
CHENNAI, INDIA 600042
TEL (91) 244-7200
FAX (91) 244-7240



CHAPPELL
ENGINEERING
ASSOCIATES, LLC
Civil/Structural/Land Surveying

201 BOSTON POST ROAD WEST
SOUTH BOSTON, MA 01762
TEL (508) 441-1400
www.chappell-engineering.com

NO.	DATE	REVISIONS	BY	CHK	APPROV
1	12/10/08	ISSUE FINAL		CHC	AMT
2	11/21/08	CONV. STAMP COUNCIL PLANS	BAK	AMT	
3			BT	CHC	APPROV

NOT TO SCALE
RESERVED BY: AMT
DRAWN BY: BAK
APPROVALS

SITE OWNER
DATE

CONSTRUCTION MANAGER
DATE

RF ENGINEER
DATE

SITE ACQUISITION
DATE

THE ABOVE PARTIES HEREBY APPROVE AND ACCEPT THESE DOCUMENTS AND AUTHORIZE THE CONTRACTOR TO PROCEED WITH THE CONSTRUCTION DESCRIBED HEREIN. ALL CONSTRUCTION DOCUMENTS ARE SUBJECT TO REVIEW BY THE LOCAL BUILDING DEPARTMENT AND ANY CHANGES OR MODIFICATIONS THEREAFTER.

SITE ID
NLD00004B

SITE NAME
CROWN
ROBERTS ROAD GROTON

SITE ADDRESS
75 ROBERTS ROAD
GROTON, CT
06340

METRO PCS LEASE AREA
EQUIPMENT: 10'-0"x16'-0"=160.0 S.F.

TOTAL: = 160.0 S				
PROJECT NO.	DRAWING NAME	DATE	SHEET NO.	REV
736.185	C-1	12/10/08	1 OF 4	

metro PCS

Unlimit Yourself.

285 BULFORD ROAD
CHANDLER, AL 36824
TEL (205) 344-7000
FAX (205) 344-7240



CHAPPELL
ENGINEERING
ASSOCIATES, LLC
Civil, Structural, Land Surveying

201 BOSTON POST ROAD WEST
SHELTON, CT 06484
TEL (203) 461-7400
www.chappellengineering.com

1	12/10/08	CSPR FINAL	CHK: JMT	JMT
0	11/21/08	COMM. STAKE CONVEY. PLANS	RK: JMT	JMT
N/A	DATE	REVISIONS	BY: CHK	APPROV
NOT TO SCALE		DESIGNED BY: JMT	DRAWN BY: RK	
APPROVALS				

SITE OWNER _____ DATE _____

CONSTRUCTION MANAGER _____ DATE _____

RF ENGINEER _____ DATE _____

SITE ACQUISITION _____ DATE _____

THE ABOVE PARTIES HEREBY APPROVE AND ACCEPT THESE DOCUMENTS AND AUTHORIZE THE CONTRACTOR TO PROCEED WITH THE CONSTRUCTION DESCRIBED HEREIN. ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE LOCAL, STATE AND FEDERAL REQUIREMENTS AND ANY CHANGES OR MODIFICATIONS THEREAFTER.

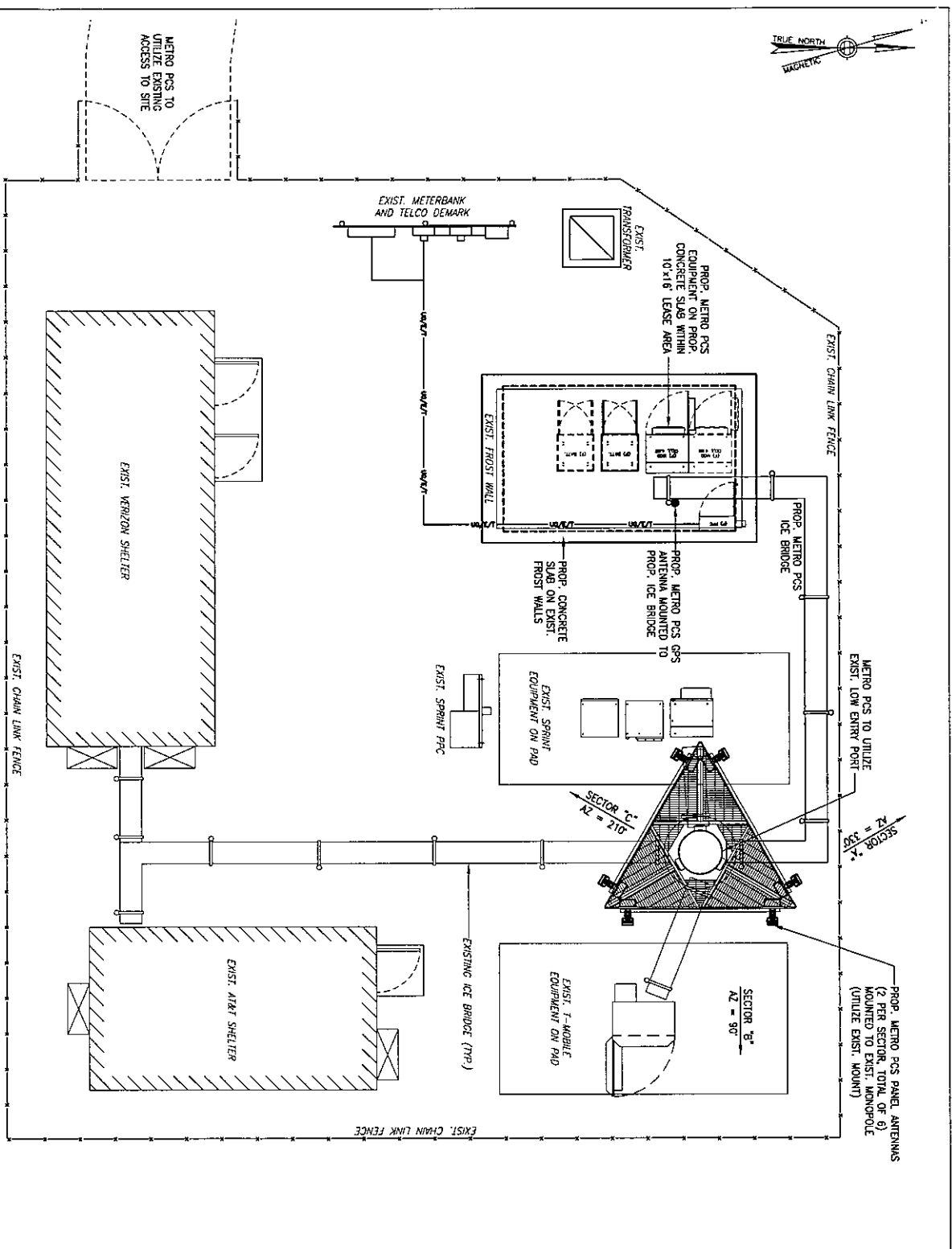
SITE ID
NLD0004B

SITE NAME
CROWN
ROBERTS ROAD GROTON

SITE ADDRESS
75 ROBERTS ROAD
GROTON, CT
06340

METRO PCS LEASE AREA
EQUIPMENT: 10'-0"x16'-0"=160.0 S.F.

TOTAL: = 160.0 S.F.	
PROJECT NO.	DRAWING NAME
736.185	C-2
DATE	SHEET NO.
12/10/08	2 OF 4
	REV
	1



COMPOUND PLAN
SCALE: 1" = 10'-0"

1
C-2

285 BULLOCK ROAD
THIRD FLOOR
CHELSEA, MA 01824
TEL (978) 244-7000
FAX (978) 244-7240



Civil Structural Land Surveying

201 BROTON POST ROAD WEST
SUITE 201
WILDERBOUGH, MA 01752
TEL (508) 481-7400
www.chappellengineering.com

NO.	DATE	DESCRIPTION	BY	CHK	APP'D
1	12/10/08	ISSUE FINAL			
2	11/27/08	ISSUE FINAL			
3	11/27/08	ISSUE FINAL			
4	11/27/08	ISSUE FINAL			
5	11/27/08	ISSUE FINAL			
6	11/27/08	ISSUE FINAL			
7	11/27/08	ISSUE FINAL			
8	11/27/08	ISSUE FINAL			
9	11/27/08	ISSUE FINAL			
10	11/27/08	ISSUE FINAL			

NOT TO SCALE DESIGNED BY: JUT DRAWN BY: RAK

SITE OWNER DATE

CONSTRUCTION MANAGER DATE

RF ENGINEER DATE

SITE ACQUISITION DATE

THE ABOVE PARTIES HEREBY APPROVE AND ACCEPT THESE DOCUMENTS AND WARRANT THE CONSTRUCTION TO PROCEED WITH THE SAME. ANY CHANGES OR MODIFICATIONS THEY MAY WISH TO MAKE ARE SUBJECT TO REVIEW BY THE LOCAL BUILDING DEPARTMENT AND ANY CHANGES OR MODIFICATIONS THEY MAY WISH TO MAKE.

SITE ID
NLD000048

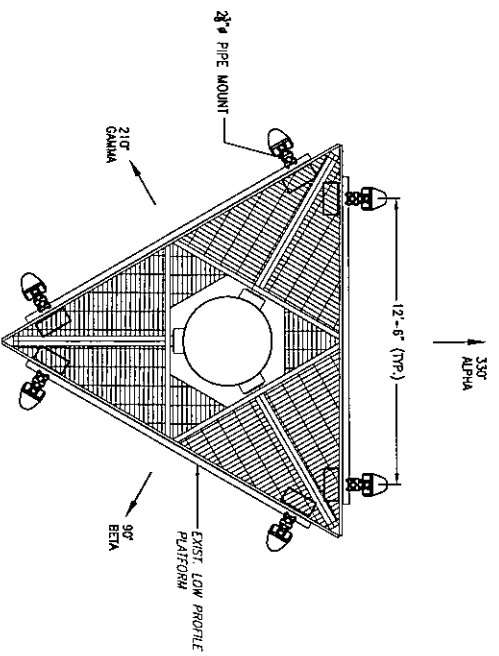
SITE NAME
CROWN
ROBERTS ROAD GROTON

SITE ADDRESS
75 ROBERTS ROAD
GROTON, CT
06340

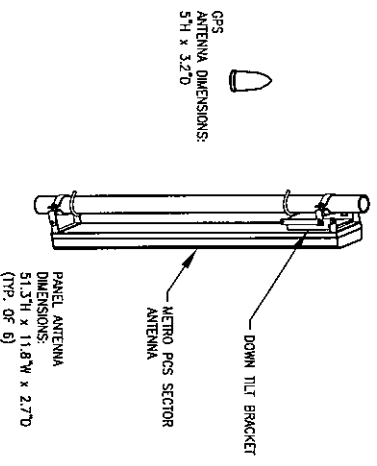
METRO PCS LEASE AREA

EQUIPMENT: 10'-0"x16'-0"=160.0 S.F.

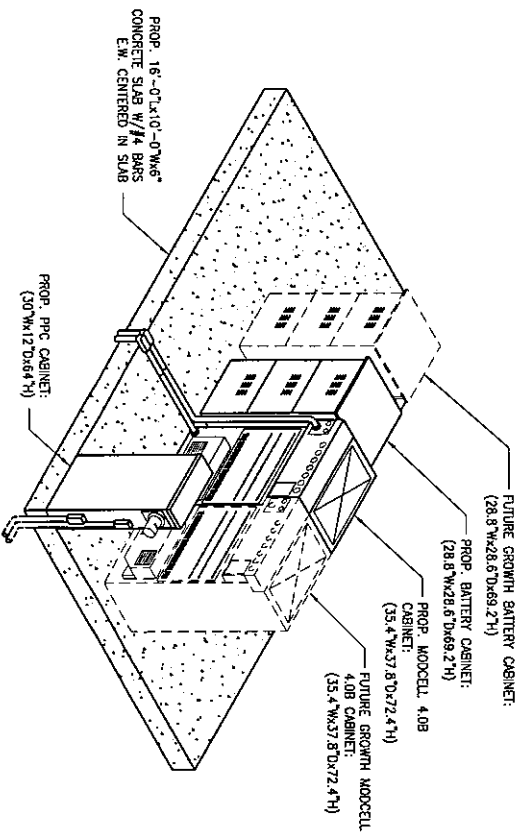
PROJECT NO.	DRAWING NAME	DATE	SHEET NO.	REV
726.185	C-4	12/10/08	4 OF 4	1



ANTENNA DETAIL
SCALE: NOT TO SCALE



GPS & PANEL ANTENNA DETAIL
SCALE: NOT TO SCALE



EQUIPMENT DETAIL
SCALE: NOT TO SCALE



December 3, 2008

Danielle Gardner
Crown Castle USA
3530 Toringdon Way, Suite 300
Charlotte, NC 28277
(704) 405-6615

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

Subject: Structural Analysis Report

<i>Carrier Designation</i>	Metro PCS Co-Locate Carrier Site Number: NLD00048 Carrier Site Name: Crown 881533
<i>Crown Castle Designation</i>	Crown Castle BU Number: 881533 Crown Castle Site Name: Groton Tower Crown Castle JDE Job Number: 111686
<i>Engineering Firm Designation</i>	Vertical Structures Project Number: 2008-004-155
<i>Site Data</i>	75 Roberts Road, Groton, CT, New London County Latitude 41°-21'-36.8", Longitude -72°-2'-55.1" 145' EEI Monopole Tower

Dear Ms. Gardner,

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 311749, and Application Number 70345, 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 Appendix D are completed. This analysis has been performed in accordance with the TIA/EIA-222-F standard and local code requirements based upon an 85 MPH basic "fastest mile" wind speed, equivalent to a 100 MPH basic "3-second gust" wind speed per 2006 IBC Equation 16-34.

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,

Jordan Kays
Project Engineer

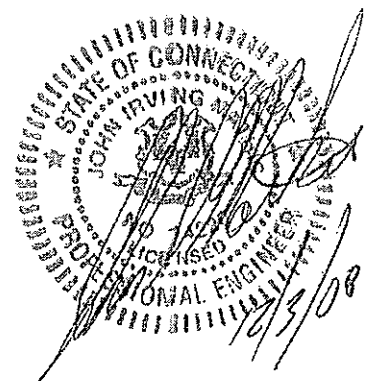


TABLE OF CONTENTS

1.) INTRODUCTION

2.) ANALYSIS CRITERIA

Table 1 – Proposed Antenna and Cable Information

Table 2 – Existing and Reserved Antenna and Cable Information

Table 3 – Design Antenna and Cable Information

3.) ANALYSIS PROCEDURE

Table 4 – Documents Provided

3.1) Analysis Methods

3.2) Assumptions

4.) ANALYSIS RESULTS

Table 5 – Tower Component Stresses vs. Modified Capacity (LC1)

4.1) Required Modifications

5.) APPENDIX A

RISA Tower Output

6.) APPENDIX B

Feedline Routing Drawing

7.) APPENDIX C

Additional Calculations

8.) APPENDIX D

Required Modification Drawings

1.) INTRODUCTION

The 145' tall monopole tower was designed and manufactured by EEI for Candid Communications in 2001. The existing structure consists of four (4) 18-sided tapered polygonal tubes joined via slip joint connections and is founded on a 30' square by 5' thick mat bearing 5' below grade. The tower was reworked in 2007 to accommodate additional loading. For the purpose of this analysis, the modifications detailed in Appendix D are considered complete.

2.) ANALYSIS CRITERIA

The Groton Tower monopole 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 85 MPH basic "fastest mile" wind speed with no ice and a reduced 74 MPH basic "fastest mile" wind speed with a 1/2" of radial ice accumulation. The tower was originally designed for an 85 MPH basic "fastest mile" wind speed with no ice and a reduced 74 MPH basic "fastest mile" wind speed with a 1/2" of radial ice accumulation. The original design loads are listed in Table 3. 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)
102	6	Kathrein	800 10504			12 1	7/8 3/8

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)
145	6	Powerwave Technologies	7770.00	EEI	10'-8" L.P. Platform	12	1 5/8
	6		LGP13519 Diplexer				
	6	ADC	DB 800/1900 FB TMA				
135	6	Antel	LPA-80063/4CF	EEI	10'-8" L.P. Platform	12	1 5/8
	6	Antel	LPA-185063/8CF				
125	6	EMS Wireless	RR90-17-02DPL2	EEI	10'-8" L.P. Platform	12	1 5/8
	6		TMA				
113	6	Decibel	DB980H65T2E-M		12' L.P. Platform	6	1 5/8
102					12' L.P. Platform		
51	1	Lucent	KS24019-L112A		(1) 3' Sidearm	1	1/2

Table 3 – Design 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)
145	12	Allgon	7120.16	EEI	L.P. Platform		
135	12	Allgon	7120.16	EEI	L.P. Platform		
125	9	Allgon	7120.16	EEI	L.P. Platform		
115	12	Allgon	7120.16	EEI	L.P. Platform		
105	12	Allgon	7120.16	EEI	L.P. Platform		
95	12	Allgon	7120.16	EEI	L.P. Platform		

3.) ANALYSIS PROCEDURE

Table 4 – Documents Provided

Document	Remarks	Reference	Source
Online Application	Metro PCS Co-Locate Revision #2	70345	CCI iSite
Tower Drawing	EEI Job No. 8409-P01	1405782	CCI iSite
Foundation Drawing	URS Corporation Project No. F301877.01/F04	1405796	CCI iSite
Geotechnical Report	Dr. Clarence Welti Report Dated, "March 13, 2000"	1406209	CCI iSite
Rework Drawings	Walker Engineering Job No. 0705-0147VRE	2048224	CCI iSite
Rework Drawings	Vertical Structures Job No. 2008-004-155	N/A	Appendix D

3.1) Analysis Methods

RISA Tower (Version 5.2), 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 5 – 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	144.5 - 117.54	Pole	TP26.88x21x0.1875	1	-6658.16	799404.07	44.2	Pass
L2	117.54 - 87.1667	Pole	TP33x25.6508x0.25	2	-14226.80	1309732.43	80.7	Pass
L3	87.1667 - 42.0834	Pole	TP42.2x31.4998x0.375	3	-23248.50	2510398.81	79.2	Pass
L4	42.0834 - 0	Pole	TP50.5x40.1954x0.4375	4	-36721.20	3614029.45	77.2	Pass
							Summary	
							Pole (L2)	80.7 Pass
							RATING =	80.7 Pass

Notes	Component	% Capacity	Pass/Fail
Additional Component Analysis Summary:			
1	Anchor Bolts (Tension)	80.9	Pass
1	Base Plate, Gussets, & Welds	98.5	Pass
	Foundation (Compared to Design Loads)	84.6	Pass
Structure Rating =		98.5	Pass

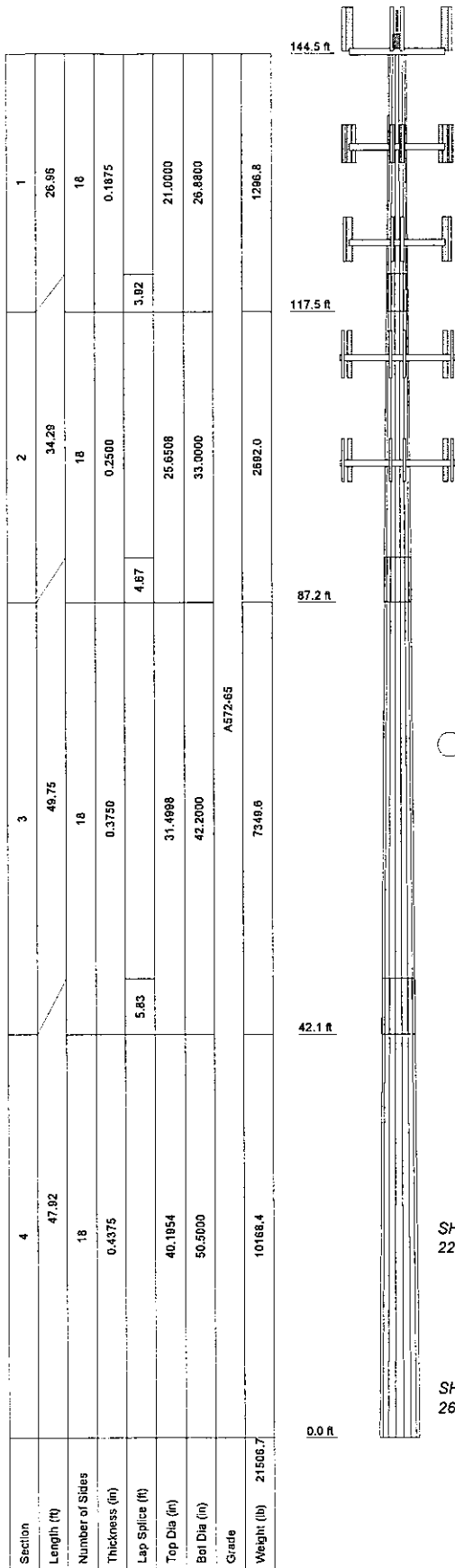
1) Indicates calculations supporting % capacity are included in Appendix C.

4.1) Required Modifications

Modification (A) is required to remedy the deficiencies identified in Vertical Structures Job No. 2008-004-142. Required modification drawings are provided in Appendix D.

(A) Reinforce the base plate gussets.

APPENDIX A



DESIGNED APPURTENANCE LOADING

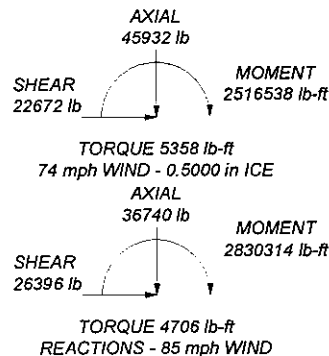
TYPE	ELEVATION	TYPE	ELEVATION
Lightning Rod 5/8x4'	147	(2) LPA-185063/8CF w/ Mount Pipe	135
Flash Beacon Lighting	145	EEI 10'-8" Low-Profile Platform	125
EEI 10'-8" Low-Profile Platform	145	EEI Monopole Platform Ladder (VSI)	125
EEI Monopole Platform Ladder (VSI)	145	(2) RR90-17-02DPL2 w/Mount Pipe	125
(2) 7770.00 w/ mount pipe	145	(2) RR90-17-02DPL2 w/Mount Pipe	125
(2) 7770.00 w/ mount pipe	145	(2) RR90-17-02DPL2 w/Mount Pipe	125
(2) 7770.00 w/ mount pipe	145	(2) Generic TMA	125
(2) DB 800/1900 Full Band Masthead (VSI)	145	(2) Generic TMA	125
(2) DB 800/1900 Full Band Masthead (VSI)	145	(2) Generic TMA	125
(2) DB 800/1900 Full Band Masthead (VSI)	145	12' L.P. Platform	113
(2) DB 800/1900 Full Band Masthead (VSI)	145	Monopole Transition Ladder (VSI)	113
(2) LGP13519 Diplexer	145	(2) DB980H65T2E-M w/Mount Pipe	113
(2) LGP13519 Diplexer	145	(2) DB980H65T2E-M w/Mount Pipe	113
(2) LGP13519 Diplexer	145	(2) DB980H65T2E-M w/Mount Pipe	113
(2) 7"x2" Antenna Mount Pipe	145	(2) 6' x 2" Antenna Mount Pipe (VSI)	113
(2) 7"x2" Antenna Mount Pipe	145	(2) 6' x 2" Antenna Mount Pipe (VSI)	113
(2) 7"x2" Antenna Mount Pipe	145	(2) 6' x 2" Antenna Mount Pipe (VSI)	113
(2) 7"x2" Antenna Mount Pipe	145	12' L.P. Platform (Metro PCS)	102
EEI 10'-8" Low-Profile Platform	135	Monopole Transition Ladder (VSI)	102
EEI Monopole Platform Ladder (VSI)	135	(Metro PCS)	
(2) LPA-80063/4CF w/ Mount Pipe (VSI)	135	(2) 800 10504 w/ Mount Pipe (Metro PCS)	102
(2) LPA-80063/4CF w/ Mount Pipe (VSI)	135	(2) 800 10504 w/ Mount Pipe (Metro PCS)	102
(2) LPA-80063/4CF w/ Mount Pipe (VSI)	135	(2) 800 10504 w/ Mount Pipe (Metro PCS)	102
(2) LPA-80063/4CF w/ Mount Pipe (VSI)	135	(2) 800 10504 w/ Mount Pipe (Metro PCS)	102
(2) LPA-185063/8CF w/ Mount Pipe	135	3' Sidearm (2" single pipe) (VSI)	51
(2) LPA-185063/8CF w/ Mount Pipe	135	KS24019-L112A	51

MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower is located in New London County, Connecticut.
2. Tower designed for a 85 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 74 mph basic wind with 0.50 in ice.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 80.7%



Vertical Structures 309 Spangler Drive, Suite E Richmond, KY 40475 Phone: (859) 624-8360 FAX: (859) 624-8369		Job: Groton Tower, CT BU#881533 Project: Vertical Structures Job No. 2008-004-155 Client: Crown Castle Code: TIA/EIA-222-F Path: \\nas1\projects\Open Jobs\Groton Tower, CT 004-155\Revised Drawings\VR18A881533.dwg		Drawn by: Jordan Kays Date: 12/03/08 Scale: NTS Dwg No. E-1
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RISATower Vertical Structures 309 Spangler Drive, Suite E Richmond, KY 40475 Phone: (859) 624-8360 FAX: (859) 624-8369	Job	Groton Tower, CT BU#881533	Page	1 of 7
	Project	Vertical Structures Job No. 2008-004-155	Date	14:01:17 12/03/08
	Client	Crown Castle	Designed by	Jordan Kays

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 London County, Connecticut.

Basic wind speed of 85 mph.

Nominal ice thickness of 0.5000 in.

Ice density of 56 pcf.

A wind speed of 74 mph is used in combination with ice.

Temperature drop of 50 °F.

Deflections calculated using a wind speed of 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	Retention 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	144.50-117.54	26.96	3.92	18	21.0000	26.8800	0.1875	0.7500	A572-65 (65 ksi)
L2	117.54-87.17	34.29	4.67	18	25.6508	33.0000	0.2500	1.0000	A572-65 (65 ksi)
L3	87.17-42.08	49.75	5.83	18	31.4998	42.2000	0.3750	1.5000	A572-65 (65 ksi)
L4	42.08-0.00	47.92		18	40.1954	50.5000	0.4375	1.7500	A572-65 (65 ksi)

RISATower Vertical Structures 309 Spangler Drive, Suite E Richmond, KY 40475 Phone: (859) 624-8360 FAX: (859) 624-8369	Job	Groton Tower, CT BU#881533	Page	2 of 7
	Project	Vertical Structures Job No. 2008-004-155	Date	14:01:17 12/03/08
	Client	Crown Castle	Designed by	Jordan Kays

Tapered Pole Properties

Section	Tip Dia. in	Area in ²	<i>I</i> in ⁴	<i>r</i> in	<i>C</i> in	<i>I/C</i> in ³	<i>J</i> in ⁴	<i>It/Q</i> in ²	<i>w</i> in	<i>w/t</i>
L1	21.3240	12.3860	677.8263	7.3884	10.6680	63.5383	1356.5444	6.1942	3.3660	17.952
	27.2947	15.8854	1429.9255	9.4758	13.6550	104.7178	2861.7325	7.9442	4.4009	23.471
L2	26.8989	20.1555	1642.9514	9.0173	13.0306	126.0842	3288.0647	10.0797	4.0745	16.298
	33.5091	25.9871	3521.4238	11.6262	16.7640	210.0587	7047.4812	12.9960	5.3680	21.472
L3	33.0049	37.0463	4534.1466	11.0493	16.0019	283.3505	9074.2594	18.5267	4.8840	13.024
	42.8510	49.7822	11002.3002	14.8479	21.4376	513.2244	22019.0774	24.8958	6.7672	18.046
L4	42.0893	55.2088	11025.3407	14.1140	20.4193	539.9483	22065.1889	27.6096	6.3044	14.41
	51.2790	69.5180	22012.0267	17.7722	25.6540	858.0349	44053.0173	34.7656	8.1180	18.555

Tower Elevation	Gusset Area (per face)	Gusset Thickness	Gusset Grade	Adjust. Factor <i>A_f</i>	Adjust. Factor <i>A_r</i>	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals	Double Angle Stitch Bolt Spacing Horizontals
ft	ft ²	in					in	in
L1 144.50- 117.54				1	1	1		
L2 117.54- 87.17				1	1	1		
L3 87.17-42.08				1	1	1		
L4 42.08-0.00				1	1	1		

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		<i>C_sA_s</i> ft ² /ft	Weight plf
LDF7-50A (1-5/8 FOAM)	A	No	Inside Pole	144.50 - 5.00	12	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
LDF7-50A (1-5/8 FOAM)	B	No	Inside Pole	135.00 - 5.00	12	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
LDF7-50A (1-5/8 FOAM)	C	No	Inside Pole	125.00 - 5.00	12	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
LDF7-50A (1-5/8 FOAM)	A	No	Inside Pole	113.00 - 5.00	6	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
FXL 780 PE (7/8) (Metro PCS)	B	No	Inside Pole	102.00 - 5.00	12	No Ice	0.00	0.25
						1/2" Ice	0.00	0.25
FSJ2-50 (3/8 FOAM) (Metro PCS)	B	No	Inside Pole	102.00 - 5.00	1	No Ice	0.00	0.08
						1/2" Ice	0.00	0.08
LDF4-50A (1/2 FOAM)	C	No	CaAa (Out Of Face)	52.00 - 5.00	1	No Ice	0.06	0.15
						1/2" Ice	0.16	0.84

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	<i>A_R</i> ft ²	<i>A_F</i> ft ²	<i>C_sA_s</i> In Face ft ²	<i>C_sA_s</i> Out Face ft ²	Weight lb
L1	144.50-117.54	A	0.000	0.000	0.000	0.000	265.29
		B	0.000	0.000	0.000	0.000	171.81
		C	0.000	0.000	0.000	0.000	73.41
L2	117.54-87.17	A	0.000	0.000	0.000	0.000	425.97

RISATower Vertical Structures 309 Spangler Drive, Suite E Richmond, KY 40475 Phone: (859) 624-8360 FAX: (859) 624-8369	Job	Groton Tower, CT BU#881533	Page	3 of 7
	Project	Vertical Structures Job No. 2008-004-155	Date	14:01:17 12/03/08
	Client	Crown Castle	Designed by	Jordan Kays

Tower Section	Tower Elevation ft	Face	A_R ft ²	A_F ft ²	$C_d A_A$ In Face ft ²	$C_d A_A$ Out Face ft ²	Weight lb
L3	87.17-42.08	B	0.000	0.000	0.000	0.000	344.56
		C	0.000	0.000	0.000	0.000	298.87
		A	0.000	0.000	0.000	0.000	665.43
		B	0.000	0.000	0.000	0.000	582.48
L4	42.08-0.00	C	0.000	0.000	0.000	0.625	445.11
		A	0.000	0.000	0.000	0.000	547.35
		B	0.000	0.000	0.000	0.000	479.12
		C	0.000	0.000	0.000	2.336	370.46

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	$C_d A_A$ In Face ft ²	$C_d A_A$ Out Face ft ²	Weight lb
L1	144.50-117.54	A	0.500	0.000	0.000	0.000	0.000	265.29
		B		0.000	0.000	0.000	0.000	171.81
		C		0.000	0.000	0.000	0.000	73.41
L2	117.54-87.17	A	0.500	0.000	0.000	0.000	0.000	425.97
		B		0.000	0.000	0.000	0.000	344.56
		C		0.000	0.000	0.000	0.000	298.87
L3	87.17-42.08	A	0.500	0.000	0.000	0.000	0.000	665.43
		B		0.000	0.000	0.000	0.000	582.48
		C		0.000	0.000	0.000	1.616	451.95
L4	42.08-0.00	A	0.500	0.000	0.000	0.000	0.000	547.35
		B		0.000	0.000	0.000	0.000	479.12
		C		0.000	0.000	0.000	6.044	396.06

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	144.50-117.54	0.0000	0.0000	0.0000	0.0000
L2	117.54-87.17	0.0000	0.0000	0.0000	0.0000
L3	87.17-42.08	-0.0197	0.0114	-0.0494	0.0285
L4	42.08-0.00	-0.0703	0.0406	-0.1741	0.1005

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft	$C_d A_A$ Front ft ²	$C_d A_A$ Side ft ²	Weight lb
Lightning Rod 5/8x4'	C	None		0.0000	147.00	No Ice 1/2" Ice	0.25 0.66	31.00 33.82
Flash Beacon Lighting	C	None		0.0000	145.00	No Ice	2.70	50.00

RISATower Vertical Structures 309 Spangler Drive, Suite E Richmond, KY 40475 Phone: (859) 624-8360 FAX: (859) 624-8369	Job	Groton Tower, CT BU#881533	Page	4 of 7
	Project	Vertical Structures Job No. 2008-004-155	Date	14:01:17 12/03/08
	Client	Crown Castle	Designed by	Jordan Kays

Description	Face or Leg	Offset Type	Offsets: Hor- Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft	C _v A ₁ Front ft ²	C _v A ₁ Side ft ²	Weight lb	
						1/2" Ice	3.10	3.10	70.00
**									
EEI 10'-8" Low-Profile Platform	C	None		0.0000	145.00	No Ice	22.50	22.50	1500.00
EEI Monopole Platform Ladder (VSI)	C	From Centroid-Face	3.50 0.00 -3.00	0.0000	145.00	1/2" Ice	28.10	28.10	2250.00
						No Ice	5.00	5.50	60.00
						1/2" Ice	8.00	9.00	90.00
(2) 7770.00 w/ mount pipe	A	From Centroid-Leg	3.50 0.00 2.00	-7.0000	145.00	No Ice	6.22	4.35	56.90
						1/2" Ice	6.77	5.20	102.99
(2) 7770.00 w/ mount pipe	B	From Centroid-Leg	3.50 0.00 2.00	-7.0000	145.00	No Ice	6.22	4.35	56.90
						1/2" Ice	6.77	5.20	102.99
(2) 7770.00 w/ mount pipe	C	From Centroid-Leg	3.50 0.00 2.00	-7.0000	145.00	No Ice	6.22	4.35	56.90
						1/2" Ice	6.77	5.20	102.99
(2) DB 800/1900 Full Band Masthead (VSI)	A	From Centroid-Leg	3.50 0.00 2.00	-7.0000	145.00	No Ice	1.54	0.80	28.70
						1/2" Ice	1.71	0.94	39.71
(2) DB 800/1900 Full Band Masthead (VSI)	B	From Centroid-Leg	3.50 0.00 2.00	-7.0000	145.00	No Ice	1.54	0.80	28.70
						1/2" Ice	1.71	0.94	39.71
(2) DB 800/1900 Full Band Masthead (VSI)	C	From Centroid-Leg	3.50 0.00 2.00	-7.0000	145.00	No Ice	1.54	0.80	28.70
						1/2" Ice	1.71	0.94	39.71
(2) LGP13519 Diplexer	A	From Centroid-Leg	3.50 0.00 2.00	-7.0000	145.00	No Ice	0.27	0.18	5.50
						1/2" Ice	0.34	0.25	7.92
(2) LGP13519 Diplexer	B	From Centroid-Leg	3.50 0.00 2.00	-7.0000	145.00	No Ice	0.27	0.18	5.50
						1/2" Ice	0.34	0.25	7.92
(2) LGP13519 Diplexer	C	From Centroid-Leg	3.50 0.00 2.00	-7.0000	145.00	No Ice	0.27	0.18	5.50
						1/2" Ice	0.34	0.25	7.92
(2) 7'x2" Antenna Mount Pipe	A	From Centroid-Leg	3.50 0.00 0.00	0.0000	145.00	No Ice	1.66	1.66	26.00
						1/2" Ice	2.39	2.39	38.58
(2) 7'x2" Antenna Mount Pipe	B	From Centroid-Leg	3.50 0.00 0.00	0.0000	145.00	No Ice	1.66	1.66	26.00
						1/2" Ice	2.39	2.39	38.58
(2) 7'x2" Antenna Mount Pipe	C	From Centroid-Leg	3.50 0.00 0.00	0.0000	145.00	No Ice	1.66	1.66	26.00
						1/2" Ice	2.39	2.39	38.58
**									
EEI 10'-8" Low-Profile Platform	C	None		0.0000	135.00	No Ice	22.50	22.50	1500.00
EEI Monopole Platform Ladder (VSI)	C	From Centroid-Face	3.50 0.00 -3.00	0.0000	135.00	1/2" Ice	28.10	28.10	2250.00
						No Ice	5.00	5.50	60.00
						1/2" Ice	8.00	9.00	90.00
(2) LPA-80063/4CF w/ Mount Pipe (VSI)	A	From Centroid-Leg	3.50 0.00 0.00	0.0000	135.00	No Ice	7.02	6.95	34.60
						1/2" Ice	7.43	7.59	96.28
(2) LPA-80063/4CF w/ Mount Pipe (VSI)	B	From Centroid-Leg	3.50 0.00 0.00	0.0000	135.00	No Ice	7.02	6.95	34.60
						1/2" Ice	7.43	7.59	96.28
(2) LPA-80063/4CF w/ Mount Pipe (VSI)	C	From Centroid-Leg	3.50 0.00 0.00	0.0000	135.00	No Ice	7.02	6.95	34.60
						1/2" Ice	7.43	7.59	96.28

RISATower Vertical Structures 309 Spangler Drive, Suite E Richmond, KY 40475 Phone: (859) 624-8360 FAX: (859) 624-8369	Job	Groton Tower, CT BU#881533	Page	5 of 7
	Project	Vertical Structures Job No. 2008-004-155	Date	14:01:17 12/03/08
	Client	Crown Castle	Designed by	Jordan Kays

Description	Face or Leg	Offset Type	Offsets: Hor- Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C _d A _d Front ft ²	C _d A _d Side ft ²	Weight lb
(2) LPA-185063/8CF w/ Mount Pipe	A	Leg From Centroid- Leg	0.00 3.50 0.00 0.00	0.0000	135.00	No Ice 1/2" Ice	3.29 3.70	3.92 4.53	27.25 60.68
(2) LPA-185063/8CF w/ Mount Pipe	B	From Centroid- Leg	3.50 0.00 0.00	0.0000	135.00	No Ice 1/2" Ice	3.29 3.70	3.92 4.53	27.25 60.68
(2) LPA-185063/8CF w/ Mount Pipe	C	From Centroid- Leg	3.50 0.00 0.00	0.0000	135.00	No Ice 1/2" Ice	3.29 3.70	3.92 4.53	27.25 60.68
**									
EEI 10'-8" Low-Profile Platform	C	None		0.0000	125.00	No Ice 1/2" Ice	22.50 28.10	22.50 28.10	1500.00 2250.00
EEI Monopole Platform Ladder (VSI)	C	From Centroid- Face	3.50 0.00 -3.00	0.0000	125.00	No Ice 1/2" Ice	5.00 8.00	5.50 9.00	60.00 90.00
(2) RR90-17-02DPL2 w/Mount Pipe	A	From Centroid- Leg	3.50 0.00 0.00	0.0000	125.00	No Ice 1/2" Ice	4.91 5.57	3.64 4.70	43.55 81.64
(2) RR90-17-02DPL2 w/Mount Pipe	B	From Centroid- Leg	3.50 0.00 0.00	0.0000	125.00	No Ice 1/2" Ice	4.91 5.57	3.64 4.70	43.55 81.64
(2) RR90-17-02DPL2 w/Mount Pipe	C	From Centroid- Leg	3.50 0.00 0.00	0.0000	125.00	No Ice 1/2" Ice	4.91 5.57	3.64 4.70	43.55 81.64
(2) Generic TMA	A	From Centroid- Leg	3.50 0.00 0.00	0.0000	125.00	No Ice 1/2" Ice	1.09 1.24	0.54 0.67	25.00 32.36
(2) Generic TMA	B	From Centroid- Leg	3.50 0.00 0.00	0.0000	125.00	No Ice 1/2" Ice	1.09 1.24	0.54 0.67	25.00 32.36
(2) Generic TMA	C	From Centroid- Leg	3.50 0.00 0.00	0.0000	125.00	No Ice 1/2" Ice	1.09 1.24	0.54 0.67	25.00 32.36
**									
12' L.P. Platform	C	None		0.0000	113.00	No Ice 1/2" Ice	25.00 29.00	25.00 29.00	1700.00 2530.00
Monopole Transition Ladder (VSI)	C	From Centroid- Face	3.75 0.00 -3.00	0.0000	113.00	No Ice 1/2" Ice	6.00 8.00	6.00 8.00	160.00 240.00
(2) DB980H65T2E-M w/Mount Pipe	A	From Centroid- Leg	3.75 0.00 0.00	0.0000	113.00	No Ice 1/2" Ice	4.27 4.86	3.86 4.95	34.05 69.84
(2) DB980H65T2E-M w/Mount Pipe	B	From Centroid- Leg	3.75 0.00 0.00	0.0000	113.00	No Ice 1/2" Ice	4.27 4.86	3.86 4.95	34.05 69.84
(2) DB980H65T2E-M w/Mount Pipe	C	From Centroid- Leg	3.75 0.00 0.00	0.0000	113.00	No Ice 1/2" Ice	4.27 4.86	3.86 4.95	34.05 69.84
(2) 6' x 2" Antenna Mount Pipe (VSI)	A	From Centroid- Leg	3.75 0.00 0.00	0.0000	113.00	No Ice 1/2" Ice	1.43 1.92	1.43 1.92	23.00 33.83
(2) 6' x 2" Antenna Mount Pipe (VSI)	B	From Centroid- Leg	3.75 0.00 0.00	0.0000	113.00	No Ice 1/2" Ice	1.43 1.92	1.43 1.92	23.00 33.83
(2) 6' x 2" Antenna Mount Pipe (VSI)	C	From Centroid- Leg	3.75 0.00 0.00	0.0000	113.00	No Ice 1/2" Ice	1.43 1.92	1.43 1.92	23.00 33.83

RISATower Vertical Structures 309 Spangler Drive, Suite E Richmond, KY 40475 Phone: (859) 624-8360 FAX: (859) 624-8369	Job	Groton Tower, CT BU#881533	Page	6 of 7
	Project	Vertical Structures Job No. 2008-004-155	Date	14:01:17 12/03/08
	Client	Crown Castle	Designed by	Jordan Kays

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
		Leg	0.00					
**								
12' L.P. Platform (Metro PCS)	C	None		0.0000	102.00	No Ice 25.00 1/2" Ice 29.00	25.00 29.00	1700.00 2530.00
Monopole Transition Ladder (VSI)	C	From Centroid-	3.75 0.00	0.0000	102.00	No Ice 6.00 1/2" Ice 8.00	6.00 8.00	160.00 240.00
(Metro PCS)		Face	-3.00					
(2) 800 10504 w/ Mount Pipe (Metro PCS)	A	From Centroid-	3.75 0.00	0.0000	102.00	No Ice 3.47 1/2" Ice 3.84	3.05 3.68	35.85 65.14
		Leg	0.00					
(2) 800 10504 w/ Mount Pipe (Metro PCS)	B	From Centroid-	3.75 0.00	0.0000	102.00	No Ice 3.47 1/2" Ice 3.84	3.05 3.68	35.85 65.14
		Leg	0.00					
(2) 800 10504 w/ Mount Pipe (Metro PCS)	C	From Centroid-	3.75 0.00	0.0000	102.00	No Ice 3.47 1/2" Ice 3.84	3.05 3.68	35.85 65.14
		Leg	0.00					
**								
3' Sidearm (2" single pipe) (VSI)	C	From Centroid-	3.25 0.00	0.0000	51.00	No Ice 0.50 1/2" Ice 1.00	0.71 1.01	35.00 45.00
		Leg	0.00					
KS24019-L112A	C	From Centroid-	4.75 0.00	0.0000	51.00	No Ice 0.10 1/2" Ice 0.18	0.10 0.18	5.00 6.50
		Leg	1.00					

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L _u ft	KI/r	F _a ksi	A in ²	Actual P lb	Allow. P _a lb	Ratio P P _a
L1	144.5 - 117.54 (1)	TP26.88x21x0.1875	26.96	0.00	0.0	39.000	15.3770	-6658.16	599703.00	0.011
L2	117.54 - 87.1667 (2)	TP33x25.6508x0.25	34.29	0.00	0.0	39.000	25.1935	-14226.80	982545.00	0.014
L3	87.1667 - 42.0834 (3)	TP42.2x31.4998x0.375	49.75	0.00	0.0	39.000	48.2889	-23248.50	1883270.00	0.012
L4	42.0834 - 0 (4)	TP50.5x40.1954x0.4375	47.92	0.00	0.0	39.000	69.5180	-36721.20	2711200.00	0.014

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}
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RISA Tower Vertical Structures 309 Spangler Drive, Suite E Richmond, KY 40475 Phone: (859) 624-8360 FAX: (859) 624-8369	Job	Groton Tower, CT BU#881533	Page	7 of 7
	Project	Vertical Structures Job No. 2008-004-155	Date	14:01:17 12/03/08
	Client	Crown Castle	Designed by	Jordan Kays

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	144.5 - 117.54 (1)	TP26.88x21x0.1875	184321.67	-22.547	39.000	0.578	0.00	0.000	39.000	0.000
L2	117.54 - 87.1667 (2)	TP33x25.6508x0.25	680852.50	-41.394	39.000	1.061	0.00	0.000	39.000	0.000
L3	87.1667 - 42.0834 (3)	TP42.2x31.4998x0.375	1637433.33	-40.702	39.000	1.044	0.00	0.000	39.000	0.000
L4	42.0834 - 0 (4)	TP50.5x40.1954x0.4375	2830316.67	-39.583	39.000	1.015	0.00	0.000	39.000	0.000

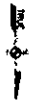
Pole Interaction Design Data

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	144.5 - 117.54 (1)	TP26.88x21x0.1875	0.011	0.578	0.000	0.589 ✓	1.333	H1-3 ✓
L2	117.54 - 87.1667 (2)	TP33x25.6508x0.25	0.014	1.061	0.000	1.076 ✓	1.333	H1-3 ✓
L3	87.1667 - 42.0834 (3)	TP42.2x31.4998x0.375	0.012	1.044	0.000	1.056 ✓	1.333	H1-3 ✓
L4	42.0834 - 0 (4)	TP50.5x40.1954x0.4375	0.014	1.015	0.000	1.028 ✓	1.333	H1-3 ✓

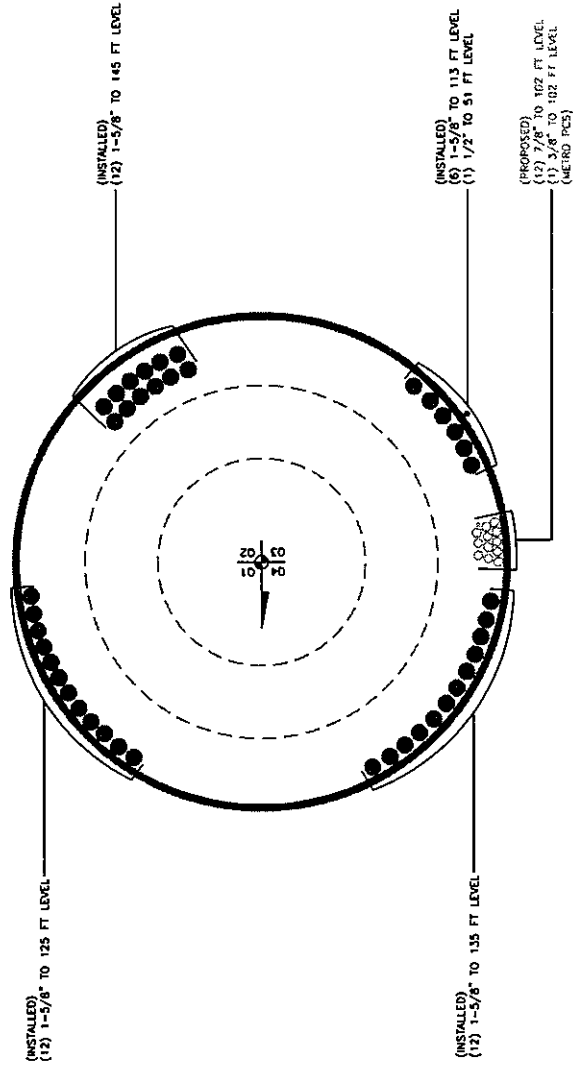
Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	SF* P_{allow} lb	% Capacity	Pass Fail
L1	144.5 - 117.54	Pole	TP26.88x21x0.1875	1	-6658.16	799404.07	44.2	Pass
L2	117.54 - 87.1667	Pole	TP33x25.6508x0.25	2	-14226.80	1309732.43	80.7	Pass
L3	87.1667 - 42.0834	Pole	TP42.2x31.4998x0.375	3	-23248.50	2510398.81	79.2	Pass
L4	42.0834 - 0	Pole	TP50.5x40.1954x0.4375	4	-36721.20	3614029.45	77.2	Pass
							Summary	
							Pole (L2)	80.7 Pass
							RATING =	80.7 Pass

APPENDIX B



CROWN REGION ADDRESS
USA



SCALE :

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 6- FEET ABOVE FINISHED GRADE UNLESS OTHERWISE SPECIFIED	

BUSINESS UNIT: 881533 TOWER ID: C-BASELEVEL

BASE LEVEL DRAWING

SCALE: 1" = 1'-0"

1

DATE: 10/10/10
DRAWN BY: MCP
CHECKED BY: MCP
DRAWING DATE: 10/10/10

SITE NUMBER:	
SITE NAME:	
BUSINESS UNIT NUMBER:	881533
SITE ADDRESS:	CT LONDON COUNTY USA
SHEET TITLE:	BASE LEVEL
SHEET NUMBER:	

A1-0

APPENDIX C



BASE PLATE CALCULATIONS

Customer: Crown Castle
Site Name: Groton Tower, CT BU#881533
Job Number: 2008-004-155
Tower Model: 145' EEI Monopole Tower
Date: 12/3/2008

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	6.75	in
Length of Side Parallel to Free Edge	10.83	in
Roark's Coefficient β^3	1.176	
Maximum Compressive Force Per Bolt	146.21052	kips
Base Plate Yield Strength	60	ksi
Base Plate Thickness	2	in

Applied Base Plate Flexural Stress	26.79	ksi
Allowable Base Plate Flexural Stress	60	ksi

% Capacity **44.7%**

Base Plate is Adequate for Applied Loading



GUSSET PLATE AND WELDS CALCULATIONS @ BASE

Customer:	Crown Castle
Site Name:	Groton Tower, CT BU#881533
Job Number:	2008-004-155
Tower Model:	145' EEI Monopole Tower
Date:	12/3/2008

Compressive Anchor Bolt Load	146.21052	kip
Weld Size at Bottom of Gusset Plate	0.625	in
Length of Bottom Weld Along Gusset Plate	6	in
Gusset Plate Thickness	0.75	in
Distance From Pole Edge to Center of Horizontal Weld	3.75	in
Length of Vertical Weld Along Gusset Plate	26.25	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 Flange Bolt	1	

Stress in Bottom Weld Along Gusset Plate	27.57	ksi
Allowable Bottom Weld Stress	28.00	ksi
% Capacity	98.5%	

Bottom Weld Along Gusset Plate is Adequate for Loading

Tension Stress Along Gusset Plate	32.49	ksi
Allowable Tension Stress Along Bottom of Gusset Plate	40.00	ksi
% Capacity	81.2%	

Bottom of Gusset Plate is Adequate for Loading

Bending Moment on Gusset Plate	548.28945	kip-in
Stress in Vertical Weld Along Top of Gusset Plate	13.84	ksi
Allowable Stress in Vertical Weld Along Top of Gusset Plate	28.00	ksi
% Capacity	49.4%	

Top Weld Along Gusset Plate is Adequate for Loading

Bending Stress Along Top of Gusset Plate	6.37	ksi
Allowable Bending Stress Along Top of Gusset Plate	40.00	ksi
Shear Stress Along Top of Gusset Plate	7.43	ksi
Allowable Shear Stress Along Top of Gusset Plate	26.67	ksi
% Capacity	15.9%	

Top of Gusset Plate is Adequate for Loading



GUSSET PLATE AND WELDS CALCULATIONS @ BASE **(GUSSETS LOCATED UNDER PORTHOLES)**

Customer:	Crown Castle
Site Name:	Groton Tower, CT BU#881533
Job Number:	2008-004-155
Tower Model:	145' EEI Monopole Tower
Date:	12/3/2008

Compressive Anchor Bolt Load	146.21052	kips
Weld Size at Bottom of Gusset Plate	0.625	in
Length of Bottom Weld Along Gusset Plate	6	in
Gusset Plate Thickness	0.75	in
Distance From Pole Edge to Center of Horizontal Weld	3.75	in
Length of Vertical Weld Along Gusset Plate	17.75	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 Flange Bolt	1	

Stress in Bottom Weld Along Gusset Plate	27.57	ksi
Allowable Bottom Weld Stress	28.00	ksi
% Capacity	98.5%	

Bottom Weld Along Gusset Plate is Adequate for Loading

Tension Stress Along Gusset Plate	32.49	ksi
Allowable Tension Stress Along Bottom of Gusset Plate	40.00	ksi
% Capacity	81.2%	

Bottom of Gusset Plate is Adequate for Loading

Bending Moment on Gusset Plate	548.28945	kip-in
Stress in Vertical Weld Along Top of Gusset Plate	25.08	ksi
Allowable Stress in Vertical Weld Along Top of Gusset Plate	28.00	ksi
% Capacity	89.6%	

Top Weld Along Gusset Plate is Adequate for Loading

Bending Stress Along Top of Gusset Plate	13.92	ksi
Allowable Bending Stress Along Top of Gusset Plate	40.00	ksi
Shear Stress Along Top of Gusset Plate	10.98	ksi
Allowable Shear Stress Along Top of Gusset Plate	26.67	ksi
% Capacity	34.8%	

Top of Gusset Plate is Adequate for Loading

APPENDIX D

TABLE OF CONTENTS	
SHEET NO.	DESCRIPTION
SHEET 1	MASTER DRAWING INCLUDING NOTES
SHEET 2	GUSSET PLATE WELD INSTALLATION (0')

STRUCTURAL MODIFICATIONS:

THIS DRAWING DEPICTS THE REWORK REQUIRED TO REMEDY THE DEFICIENCIES FOUND IN THE GROTON TOWER, CT TOWER PER THE REPORT PUBLISHED BY VERTICAL STRUCTURES ON 11-5-08, JOB# 2008-004-142.

- A. REINFORCE THE BASE PLATE GUSSETS.

WELDING SPECIFICATION NOTES:

1. SURFACES TO BE CLEARED OF GALVANIZATION BEFORE FIELD WELDING ANY MATERIAL.
2. 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:

1. CONTRACTOR: CALL VERTICAL STRUCTURES AT (859) 624-8360 TO MAKE SURE YOU HAVE THE LATEST REVISION OF THIS DRAWING.
2. CONTACT THE ENGINEER CONCERNING ANY CHANGES OR MODIFICATIONS THAT MAY BE REQUIRED DUE TO THE EXISTING CONDITIONS.
3. ALL BOLTS 1/2" OR LESS TO BE INSTALLED WITH H OR 2H NUTS.
4. ALL BOLTS GREATER THAN 1/2" TO BE INSTALLED WITH 2H NUTS.
5. LOCKING MECHANISM FOR BOLTS TO BE PLUNTS OR LOCKWASHERS.
6. ALL BOLTS MUST BE INSTALLED WITH H NUTS AND LOCKWASHERS.
7. ALL HARDWARE REMOVED FROM THE EXISTING TOWER MUST BE REPLACED WITH NEW HARDWARE OF EQUAL SIZE AND QUALITY UNLESS NOTED OTHERWISE.
8. NOTED OTHERWISE: MODIFICATIONS OF ANY STEEL MEMBERS, COAT EXPOSED STEEL SURFACES WITH TWO COATS OF SHERWIN WILLIAMS PART #143-0285 ZINC CLAD COATING, CONTAINING 97% ZINC DUST TO RESTORE THE GALVANIZED PROTECTION ON THE MEMBERS. IF REQUIRED, PAINT ALL AREAS AFFECTED OR NEW STEEL WITH FINISHING TOWER PAINT.
9. FINISHING SPECIFICATIONS - ALL MATERIAL TO BE HOT DIPPED GALVANIZED IN ACCORDANCE WITH THE FOLLOWING SPECIFICATIONS:
 - A. FABRICATED MATERIAL - ASTM A123.
 - B. HARDWARE - ASTM A153.
 - C. GUY WIRE - ASTM A475.
10. ELEVATIONS SHOWN ARE NOMINAL AND NOT EXACT.

CONTRACT ADMINISTRATION NOTES:

1. PER CROWN POLICY, ALL MODIFICATIONS DEPICTED ON THESE DRAWINGS MUST BE INSPECTED BY A CROWN APPROVED ENGINEERING VENDOR. 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.
2. 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.

A	ORIGINAL RELEASE	11-25-08	MJM
REV.	DESCRIPTION	DATE	BY
			
P.O. Box 1408 Richmond, KY 40476 Phone: (859) 624-8360 Fax: (859) 624-8363 Email: eng@verticalstructures.com			

FOR

CROWN CASTLE

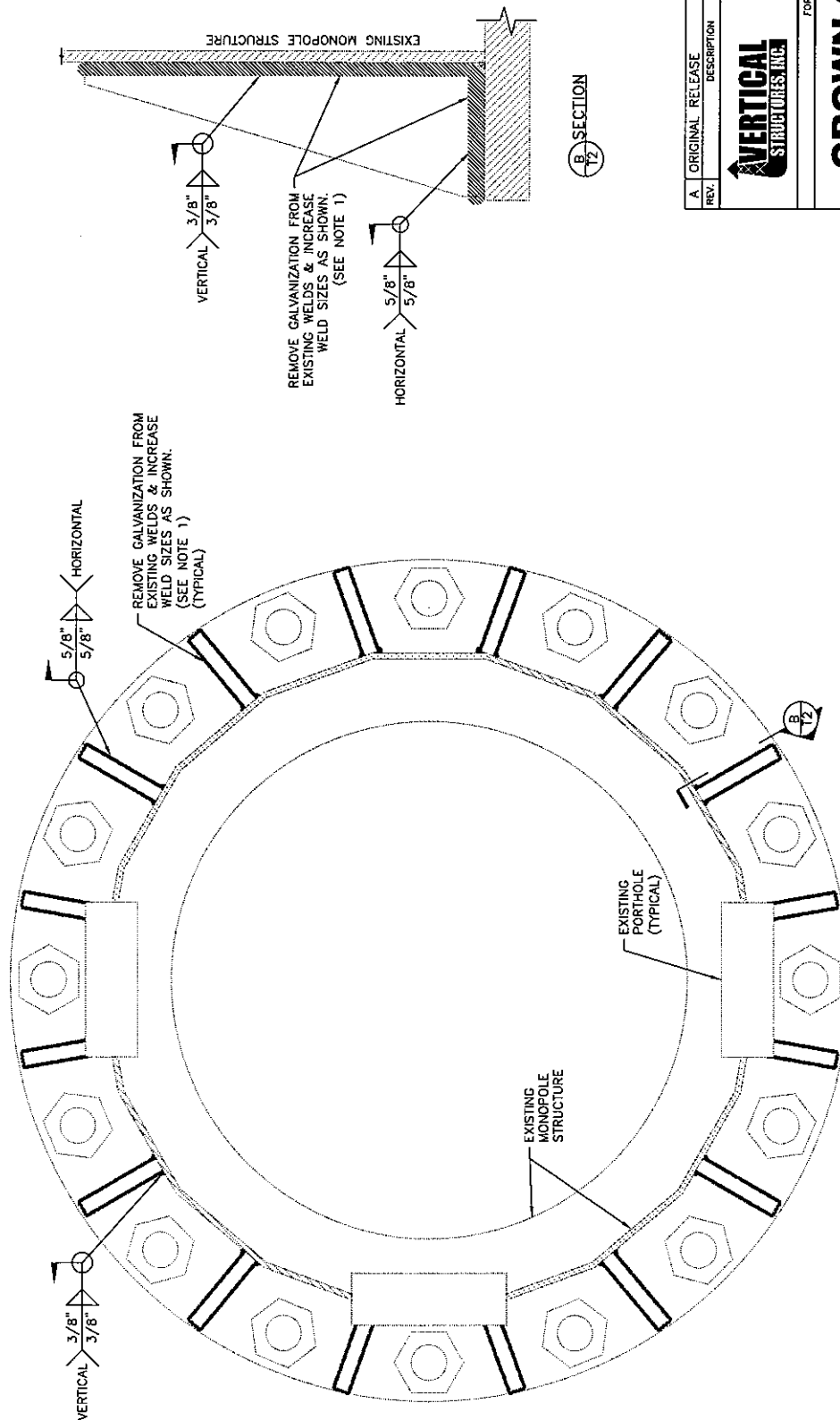
CROWN CASTLE BU# 881533	
DRAFTSPERSON: M. MORRISON	DATE 11-25-08
CHK'D BY: SWB	DATE
ENGR: JK	DATE

2008 MODIFICATIONS
TOWER REWORK FOR A
145' EEI MONOPOLE
SITE: GROTON TOWER, CT

SHEET 1 of 2	B	TA2008004155-T1	SCALE: NONE
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0' 145' 118' 87' 42' 0' INCREASE GUSSET PLATE WELDS PER SHEET 2.

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.



(A) PLAN VIEW @ BASE PLATE
(2) STIFFENERS AND SAFETY CLIMB ARE NOT SHOWN FOR CLARITY

CROWN CASTLE BU# 881533	
DRAFTSPERSON: M. MORRISON	DATE 11-25-08
CHK'D BY: SWB	DATE
ENGR: JK	DATE

CROWN CASTLE

2008 MODIFICATIONS
TOWER REWORK FOR A
145' EEI MONOPOLE
SITE: GROTON TOWER, CT

SHEET 2 OF 2 B TA2008004155-12 SCALE: NONE

REV.	DESCRIPTION	DATE	BY
A	ORIGINAL RELEASE	11-25-08	MJM

VERTICAL
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