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

August 30, 2010

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

RE: **EM-VER-089-100224A** - Cellco Partnership d/b/a Verizon Wireless notice of intent to modify an existing telecommunications facility located at 167 Lester Street, New Britain, Connecticut. Modification.

Dear Attorney Baldwin:

In addition to the Connecticut Siting Council (Council) acknowledgement dated April 5, 2010 (filing dated February 24, 2010), 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.

The proposed modifications are to be implemented as specified here and in your notice dated August 11, 2010, 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,

Linda Roberts
Executive Director

LR/CDM/laf

c: The Honorable Timothy T. Stewart, Mayor, City of New Britain
Frank M. Wiatr, Director of License Permit & Inspection/ Chief Bldg. Official, City of New Britain
Crown Castle USA, Inc.

ROBINSON & COLE LLP

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

August 11, 2010

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

Re: **EM-VER-089-100224A – Cellco Partnership d/b/a Verizon Wireless**
167 Lester Street, New Britain, Connecticut

Dear Mr. Perrone:

On April 5, 2010, the Siting Council acknowledged receipt of Cellco's notice of intent to modify the above-referenced telecommunications facility. This modification involved the removal of six (6) existing PCS antennas and the installation of three (3) newer model PCS antennas and three (3) LTE antennas.

In addition to these antenna modifications, Cellco now intends to install six (6) antenna cable diplexers on its antenna mounting platform. Attached to this letter is a Structural Analysis Report verifying that the tower can support the previously approved antenna modifications and the installation of the diplexers.

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

Sincerely,

Kenneth C. Baldwin

Attachment
Copy to:
Sandy M. Carter
Brian Ragozzine
Mark Gauger

Date: **August 03, 2010**

Eva Morales
Crown Castle
3530 Toringdon Way, Suite 300
Charlotte, NC 28277

Crown Castle
2000 Corporate Drive
Canonsburg, PA 15317
724-416-2000

Subject: **Structural Analysis Report**

Carrier Designation:	***Verizon Wireless* Co-Locate**	
	Carrier Site Number:	119668
	Carrier Site Name:	New Britain 3
Crown Castle Designation:	**Crown Castle BU Number:**	803175
	Crown Castle Site Name:	CT NEW BRITAIN 3 CAC 803175
	Crown Castle JDE Job Number:	138647
	Crown Castle Work Order Number:	350105
Engineering Firm Designation:	**Crown Castle Project Number:**	350105
Site Data:	**Lester Road, New Britain, Hartford County, CT**	
	Latitude *41° 41' 11.8"*, Longitude *-72° 45' 27.8"*	
	188 Foot - Monopole Tower	

Dear Eva Morales,

Crown Castle is pleased to submit this **"Structural Analysis Report"** to determine the structural integrity of the above mentioned tower. This analysis has been performed in accordance with the Crown Castle Structural 'Statement of Work' and the terms of Crown Castle Purchase Order Number 350105, in accordance with application 104326, revision 1.

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

LC1: Existing + Reserved + Proposed Equipment **Sufficient Capacity**
Note: See Table I and Table II for the proposed and existing/reserved loading, respectively.

The analysis has been performed in accordance with the TIA/EIA-222-F standard and local code requirements based upon a wind speed of 80 mph fastest mile.

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

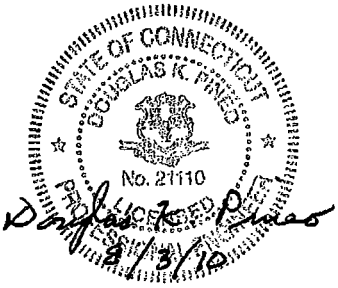
We at *Crown Castle* appreciate the opportunity of providing our continuing professional services to you and Crown Castle. If you have any questions or need further assistance on this or any other projects please give us a call.

Structural analysis prepared by: Jeffrey Fesko, E.I.T. / MRC

Respectfully submitted by:

Douglas K. Pineo

Douglas K. Pineo, P.E.
Manager Structural Design



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1) INTRODUCTION

This tower is a 188 ft Monopole tower designed by SUMMIT in December of 2000. The tower was originally designed for a wind speed of 85 mph per TIA/EIA-222-F.

2) ANALYSIS CRITERIA

The structural analysis was performed for this tower in accordance with the requirements of TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a fastest mile wind speed of 80 mph with no ice, 37.6 mph with 1 inch ice thickness and 50 mph under service loads.

Table 1 - Proposed Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
147	147	3	andrew	LNX-6512DS-T4M w/ Mount Pipe	-	-	-
		3	antel	BXA-185090/8CFx2 w/ Mount Pipe			
		6	rfs celwave	FD9R6004/2C-3L			

Table 2 - Existing and Reserved Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
188	190	3	powerwave technologies	7770.00 w/ Mount Pipe	6	1-5/8	1
		6	powerwave technologies	LGP21401			
	188	1	tower mounts	Platform Mount [LP 713-1]			
162	163	6	ems wireless	RR90-17-02DP w/ Mount Pipe	18	1-5/8	1
		3	rfs celwave	APXV18-206516S-C-A20 w/ Mount Pipe			
		2	rfs celwave	ATMAA1412D-1A20			
		4	rfs celwave	ATMPP1412D-1CWA			
	162	1	tower mounts	Platform Mount [LP 601-1]			
147	147	6	antel	WPA-80090/4CF w/ Mount Pipe	12	1-5/8	1
		6	decibel	DB948F85T2E-M w/ Mount Pipe	-	-	2
		1	tower mounts	Platform Mount [LP 601-1]			1

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

Table 3 - Design Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
190	190	12	Unknown	1-ft x 5-ft x 3-in Panel Antenna	-	-
177	177	12	Unknown	1-ft x 5-ft x 3-in Panel Antenna	-	-
162	162	12	Unknown	1-ft x 5-ft x 3-in Panel Antenna	-	-
147	147	12	Unknown	1-ft x 5-ft x 3-in Panel Antenna	-	-

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	Clough, Harbour & Associates LLP	679661	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	Tower Engineering Professionals/Summit Manufacturing, LLC	679660	CCISITES
4-TOWER MANUFACTURER DRAWINGS	Summit Manufacturing, LLC	679659	CCISITES

3.1) Analysis Method

RISATower (version 5.4.2.0), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A.

3.2) Assumptions

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

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

4) ANALYSIS RESULTS

Table 5 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	188 - 137	Pole	TP32.711x22x0.25	1	-9.505	1302.250	44.0	Pass
L2	137 - 90.25	Pole	TP42.03x31.318x0.313	2	-17.324	2094.290	64.8	Pass
L3	90.25 - 44.5	Pole	TP51.014x40.302x0.375	3	-28.189	3048.944	66.1	Pass
L4	44.5 - 0	Pole	TP59.61x48.899x0.5	4	-46.534	4876.780	55.3	Pass
							Summary	
						Pole (L3)	66.1	Pass
						Rating =	66.1	Pass

Table 6 - Tower Component Stresses vs. Capacity - LC1

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	58.0	Pass
1	Base Plate	0	58.7	Pass
1	Base Foundation Soil Interaction	0	55.8	Pass

Structure Rating (max from all components) =	66.1%

Notes:
1) See additional documentation in "Appendix C – Additional Calculations" for calculations supporting the % capacity consumed.

4.1) Recommendations

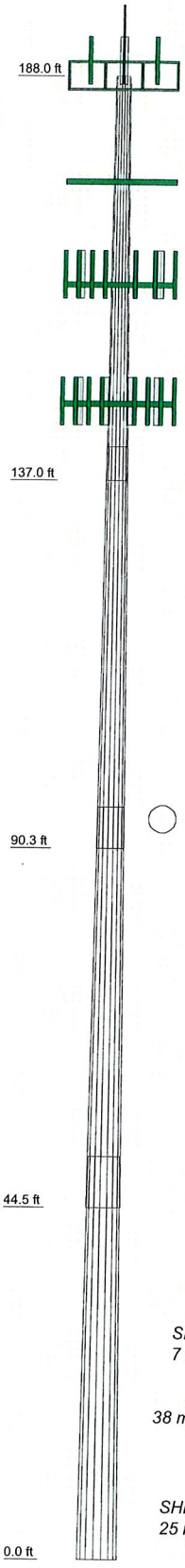
The tower and its foundation have sufficient capacity to carry the existing, reserved, and proposed loads. No modifications are required at this time.

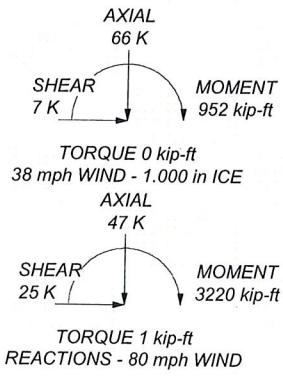
APPENDIX A

RISA TOWER OUTPUT

Section	1	2	3	4
Length (ft)	51.000	51.000	51.000	51.000
Number of Sides	18	18	18	18
Thickness (in)	0.250	0.313	0.375	0.500
Socket Length (ft)	4.250	5.250	6.500	
Top Dia (in)	22.000	31.318	40.302	48.899
Bot Dia (in)	32.711	42.030	51.014	59.610
Grade	A607-65			
Weight (K)	3.7	6.3	9.4	14.8

34.1





DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
Lighting Rod 3/4" x 7'	192	(2) ATMAA1412D-1A20	162
7770.00 w/ Mount Pipe	188	(3) RR90-17-02DP w/ Mount Pipe	162
(2) LGP21401	188	APXV18-206516S-C-A20 w/ Mount Pipe	162
7770.00 w/ Mount Pipe	188		
(2) LGP21401	188	(3) ATMPP1412D-1CWA	162
7770.00 w/ Mount Pipe	188	Platform Mount [LP 601-1]	162
(2) LGP21401	188	(2) WPA-80090/4CF w/ Mount Pipe	147
(3) 6' x 2" Mount Pipe	188	LNX-6512DS-T4M w/ Mount Pipe	147
(3) 6' x 2" Mount Pipe	188	BXA-185090/8CFx2 w/ Mount Pipe	147
(3) 6' x 2" Mount Pipe	188	(2) FD9R6004/2C-3L	147
Platform Mount [LP 713-1]	188	(2) WPA-80090/4CF w/ Mount Pipe	147
(2) 6' x 2" Mount Pipe	175	LNX-6512DS-T4M w/ Mount Pipe	147
(2) 6' x 2" Mount Pipe	175	BXA-185090/8CFx2 w/ Mount Pipe	147
(2) 6' x 2" Mount Pipe	175	(2) FD9R6004/2C-3L	147
Platform Mount [LP 601-1]	175	(2) WPA-80090/4CF w/ Mount Pipe	147
RR90-17-02DP w/ Mount Pipe	162	LNX-6512DS-T4M w/ Mount Pipe	147
APXV18-206516S-C-A20 w/ Mount Pipe	162	BXA-185090/8CFx2 w/ Mount Pipe	147
		(2) FD9R6004/2C-3L	147
ATMPP1412D-1CWA	162	Platform Mount [LP 601-1]	147
(2) RR90-17-02DP w/ Mount Pipe	162		
APXV18-206516S-C-A20 w/ Mount Pipe	162		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A607-65	65 ksi	80 ksi			

TOWER DESIGN NOTES

1. Tower is located in Hartford 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 38 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 66.1%

CROWN CASTLE
Shaping the Wireless World

Crown Castle
2000 Corporate Drive
Canonsburg, PA 15317
Phone: 724-416-2000
FAX:

Job: **BU#803175**			
Project:			
Client: Crown Castle	Drawn by: JFesko	App'd:	
Code: TIA/EIA-222-F	Date: 08/02/10	Scale: NTS	
Path: R:\SA Models - Letters\Work Area\JFesko\803175\803175.eri		Dwg No. E-1	

RISATower	Job	Page
	BU#803175	1 of 13
Crown Castle 2000 Corporate Drive Canonsburg, PA 15317 Phone: 724-416-2000 FAX:	Project	Date 13:08:01 08/02/10
	Client Crown Castle	Designed by JFesko

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 Hartford County, Connecticut.
Basic wind speed of 80 mph.
Nominal ice thickness of 1.000 in.
Ice thickness is considered to increase with height.
Ice density of 56 pcf.
A wind speed of 38 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 50 mph.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in pole design is 1.333.
Local bending stresses due to climbing loads, feedline supports, and appurtenance mounts are not considered.

Options

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

Tapered Pole Section Geometry

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L1	188.000-137.000	51.000	4.250	18	22.000	32.711	0.250	1.000	A607-65 (65 ksi)
L2	137.000-90.250	51.000	5.250	18	31.318	42.030	0.313	1.250	A607-65 (65 ksi)
L3	90.250-44.500	51.000	6.500	18	40.302	51.014	0.375	1.500	A607-65 (65 ksi)
L4	44.500-0.000	51.000		18	48.899	59.610	0.500	2.000	A607-65 (65 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	22.339	17.259	1031.483	7.721	11.176	92.294	2064.324	8.631	3.432	13.728
	33.216	25.758	3429.020	11.524	16.617	206.354	6862.553	12.881	5.317	21.269
L2	32.708	30.754	3735.323	11.007	15.910	234.782	7475.560	15.380	4.962	15.879
	42.678	41.379	9098.069	14.810	21.351	426.114	18208.109	20.693	6.847	21.911
L3	42.044	47.524	9571.647	14.174	20.474	467.512	19155.889	23.766	6.433	17.155
	51.801	60.273	19526.797	17.977	25.915	753.491	39079.287	30.142	8.318	22.183
L4	51.039	76.809	22730.963	17.182	24.841	915.074	45491.836	38.412	7.726	15.452
	60.530	93.808	41409.240	20.984	30.282	1367.459	82872.966	46.913	9.611	19.223

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in
L1 188.000-137.000				1	1	1		
L2 137.000-90.250				1	1	1		
L3 90.250-44.500				1	1	1		
L4 44.500-0.000				1	1	1		

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
LDF7-50A(1-5/8")	B	No	Inside Pole	188.000 - 5.000	6	No Ice	0.000	0.820
						1/2" Ice	0.000	0.820
						1" Ice	0.000	0.820
						2" Ice	0.000	0.820
						4" Ice	0.000	0.820
***								
561(1-5/8")	C	No	Inside Pole	162.000 - 5.000	18	No Ice	0.000	1.350
						1/2" Ice	0.000	1.350
						1" Ice	0.000	1.350
						2" Ice	0.000	1.350
						4" Ice	0.000	1.350
***								
LDF7-50A(1-5/8")	B	No	Inside Pole	147.000 - 5.000	12	No Ice	0.000	0.820
						1/2" Ice	0.000	0.820
						1" Ice	0.000	0.820
						2" Ice	0.000	0.820
						4" Ice	0.000	0.820

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	188.000-137.000	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.349
		C	0.000	0.000	0.000	0.000	0.608
L2	137.000-90.250	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.690
		C	0.000	0.000	0.000	0.000	1.136
L3	90.250-44.500	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.675
		C	0.000	0.000	0.000	0.000	1.112
L4	44.500-0.000	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.583
		C	0.000	0.000	0.000	0.000	0.960

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	188.000-137.000	A	1.210	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.349
		C		0.000	0.000	0.000	0.000	0.608
L2	137.000-90.250	A	1.159	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.690
		C		0.000	0.000	0.000	0.000	1.136
L3	90.250-44.500	A	1.089	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.675
		C		0.000	0.000	0.000	0.000	1.112
L4	44.500-0.000	A	1.000	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.583
		C		0.000	0.000	0.000	0.000	0.960

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	188.000-137.000	0.000	0.000	0.000	0.000
L2	137.000-90.250	0.000	0.000	0.000	0.000
L3	90.250-44.500	0.000	0.000	0.000	0.000
L4	44.500-0.000	0.000	0.000	0.000	0.000

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
Lighting Rod 3/4" x 7'	C	None		0.000	192.000	No Ice	0.525	0.525	0.030
						1/2" Ice	1.240	1.240	0.035
						1" Ice	1.971	1.971	0.045
						2" Ice	3.066	3.066	0.079
						4" Ice	4.909	4.909	0.208
***									
7770.00 w/ Mount Pipe	A	From Leg	4.000 0.000 2.000	0.000	188.000	No Ice	6.119	4.254	0.055
						1/2" Ice	6.626	5.014	0.101
						1" Ice	7.128	5.711	0.155
						2" Ice	8.164	7.155	0.287
						4" Ice	10.360	10.412	0.665
(2) LGP21401	A	From Leg	4.000 0.000 2.000	0.000	188.000	No Ice	1.288	0.233	0.014
						1/2" Ice	1.445	0.313	0.021
						1" Ice	1.611	0.403	0.030
						2" Ice	1.969	0.608	0.055
						4" Ice	2.788	1.121	0.135
7770.00 w/ Mount Pipe	B	From Leg	4.000 0.000 2.000	0.000	188.000	No Ice	6.119	4.254	0.055
						1/2" Ice	6.626	5.014	0.101
						1" Ice	7.128	5.711	0.155
						2" Ice	8.164	7.155	0.287
						4" Ice	10.360	10.412	0.665
(2) LGP21401	B	From Leg	4.000 0.000 2.000	0.000	188.000	No Ice	1.288	0.233	0.014
						1/2" Ice	1.445	0.313	0.021
						1" Ice	1.611	0.403	0.030
						2" Ice	1.969	0.608	0.055
						4" Ice	2.788	1.121	0.135
7770.00 w/ Mount Pipe	C	From Leg	4.000 0.000 2.000	0.000	188.000	No Ice	6.119	4.254	0.055
						1/2" Ice	6.626	5.014	0.101
						1" Ice	7.128	5.711	0.155
						2" Ice	8.164	7.155	0.287
						4" Ice	10.360	10.412	0.665
(2) LGP21401	C	From Leg	4.000 0.000 2.000	0.000	188.000	No Ice	1.288	0.233	0.014
						1/2" Ice	1.445	0.313	0.021
						1" Ice	1.611	0.403	0.030
						2" Ice	1.969	0.608	0.055
						4" Ice	2.788	1.121	0.135
(3) 6' x 2" Mount Pipe	A	From Leg	4.000 0.000 0.000	0.000	188.000	No Ice	1.425	1.425	0.022
						1/2" Ice	1.925	1.925	0.033
						1" Ice	2.294	2.294	0.048
						2" Ice	3.060	3.060	0.090
						4" Ice	4.702	4.702	0.231
(3) 6' x 2" Mount Pipe	B	From Leg	4.000 0.000 0.000	0.000	188.000	No Ice	1.425	1.425	0.022
						1/2" Ice	1.925	1.925	0.033
						1" Ice	2.294	2.294	0.048
						2" Ice	3.060	3.060	0.090
						4" Ice	4.702	4.702	0.231
(3) 6' x 2" Mount Pipe	C	From Leg	4.000 0.000 0.000	0.000	188.000	No Ice	1.425	1.425	0.022
						1/2" Ice	1.925	1.925	0.033
						1" Ice	2.294	2.294	0.048
						2" Ice	3.060	3.060	0.090
						4" Ice	4.702	4.702	0.231
Platform Mount [LP 713-1]	C	None		0.000	188.000	No Ice	31.270	31.270	1.510
						1/2" Ice	39.680	39.680	1.929
						1" Ice	48.090	48.090	2.348
						2" Ice	64.910	64.910	3.186
						4" Ice	98.550	98.550	4.862
***									

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft Vert ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
(2) 6' x 2" Mount Pipe	A	From Leg	4.000 0.000 0.000	0.000	175.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.425 1.925 2.294 3.060 4.702	1.425 1.925 2.294 3.060 4.702	0.022 0.033 0.048 0.090 0.231
(2) 6' x 2" Mount Pipe	B	From Leg	4.000 0.000 0.000	0.000	175.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.425 1.925 2.294 3.060 4.702	1.425 1.925 2.294 3.060 4.702	0.022 0.033 0.048 0.090 0.231
(2) 6' x 2" Mount Pipe	C	From Leg	4.000 0.000 0.000	0.000	175.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.425 1.925 2.294 3.060 4.702	1.425 1.925 2.294 3.060 4.702	0.022 0.033 0.048 0.090 0.231
Platform Mount [LP 601-1]	C	None		0.000	175.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	28.470 33.590 38.710 48.950 69.430	28.470 33.590 38.710 48.950 69.430	1.122 1.514 1.905 2.689 4.255
***									
RR90-17-02DP w/ Mount Pipe	A	From Leg	4.000 0.000 1.000	0.000	162.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.593 5.088 5.578 6.588 8.731	3.319 4.089 4.784 6.225 9.308	0.034 0.069 0.114 0.224 0.557
APXV18-206516S-C-A20 w/ Mount Pipe	A	From Leg	4.000 0.000 1.000	0.000	162.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.859 4.274 4.727 5.686 7.727	3.296 4.004 4.672 6.056 9.038	0.039 0.071 0.112 0.214 0.528
ATMPP1412D-1CWA	A	From Leg	4.000 0.000 1.000	0.000	162.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.167 1.317 1.476 1.820 2.610	0.416 0.530 0.652 0.923 1.569	0.013 0.020 0.028 0.052 0.131
(2) RR90-17-02DP w/ Mount Pipe	B	From Leg	4.000 0.000 1.000	0.000	162.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.593 5.088 5.578 6.588 8.731	3.319 4.089 4.784 6.225 9.308	0.034 0.069 0.114 0.224 0.557
APXV18-206516S-C-A20 w/ Mount Pipe	B	From Leg	4.000 0.000 1.000	0.000	162.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.859 4.274 4.727 5.686 7.727	3.296 4.004 4.672 6.056 9.038	0.039 0.071 0.112 0.214 0.528
(2) ATMAA1412D-1A20	B	From Leg	4.000 0.000 1.000	0.000	162.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.167 1.314 1.469 1.806 2.584	0.467 0.575 0.691 0.951 1.573	0.013 0.021 0.030 0.056 0.137
(3) RR90-17-02DP w/ Mount Pipe	C	From Leg	4.000 0.000 1.000	0.000	162.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.593 5.088 5.578 6.588 8.731	3.319 4.089 4.784 6.225 9.308	0.034 0.069 0.114 0.224 0.557
APXV18-206516S-C-A20 w/	C	From Leg	4.000	0.000	162.000	No Ice	3.859	3.296	0.039

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
Mount Pipe			0.000 1.000			1/2" Ice	4.274	4.004	0.071
						1" Ice	4.727	4.672	0.112
						2" Ice	5.686	6.056	0.214
						4" Ice	7.727	9.038	0.528
(3) ATMPP1412D-1CWA	C	From Leg	4.000 0.000 1.000	0.000	162.000	No Ice	1.167	0.416	0.013
						1/2" Ice	1.317	0.530	0.020
						1" Ice	1.476	0.652	0.028
						2" Ice	1.820	0.923	0.052
						4" Ice	2.610	1.569	0.131
Platform Mount [LP 601-1]	C	None		0.000	162.000	No Ice	28.470	28.470	1.122
						1/2" Ice	33.590	33.590	1.514
						1" Ice	38.710	38.710	1.905
						2" Ice	48.950	48.950	2.689
						4" Ice	69.430	69.430	4.255
***									
(2) WPA-80090/4CF w/ Mount Pipe	A	From Leg	4.000 0.000 0.000	0.000	147.000	No Ice	3.970	3.885	0.030
						1/2" Ice	4.395	4.489	0.066
						1" Ice	4.830	5.116	0.110
						2" Ice	5.731	6.502	0.218
						4" Ice	7.672	9.541	0.538
LNX-6512DS-T4M w/ Mount Pipe	A	From Leg	4.000 0.000 0.000	0.000	147.000	No Ice	5.791	4.501	0.038
						1/2" Ice	6.245	5.170	0.084
						1" Ice	6.709	5.852	0.139
						2" Ice	7.667	7.269	0.268
						4" Ice	9.720	10.366	0.636
BXA-185090/8CFx2 w/ Mount Pipe	A	From Leg	4.000 0.000 0.000	0.000	147.000	No Ice	3.157	3.330	0.029
						1/2" Ice	3.531	3.942	0.059
						1" Ice	3.941	4.563	0.098
						2" Ice	4.827	5.855	0.193
						4" Ice	6.734	8.841	0.486
(2) FD9R6004/2C-3L	A	From Leg	4.000 0.000 0.000	0.000	147.000	No Ice	0.367	0.085	0.003
						1/2" Ice	0.451	0.136	0.005
						1" Ice	0.543	0.196	0.009
						2" Ice	0.755	0.343	0.020
						4" Ice	1.281	0.740	0.063
(2) WPA-80090/4CF w/ Mount Pipe	B	From Leg	4.000 0.000 0.000	0.000	147.000	No Ice	3.970	3.885	0.030
						1/2" Ice	4.395	4.489	0.066
						1" Ice	4.830	5.116	0.110
						2" Ice	5.731	6.502	0.218
						4" Ice	7.672	9.541	0.538
LNX-6512DS-T4M w/ Mount Pipe	B	From Leg	4.000 0.000 0.000	0.000	147.000	No Ice	5.791	4.501	0.038
						1/2" Ice	6.245	5.170	0.084
						1" Ice	6.709	5.852	0.139
						2" Ice	7.667	7.269	0.268
						4" Ice	9.720	10.366	0.636
BXA-185090/8CFx2 w/ Mount Pipe	B	From Leg	4.000 0.000 0.000	0.000	147.000	No Ice	3.157	3.330	0.029
						1/2" Ice	3.531	3.942	0.059
						1" Ice	3.941	4.563	0.098
						2" Ice	4.827	5.855	0.193
						4" Ice	6.734	8.841	0.486
(2) FD9R6004/2C-3L	B	From Leg	4.000 0.000 0.000	0.000	147.000	No Ice	0.367	0.085	0.003
						1/2" Ice	0.451	0.136	0.005
						1" Ice	0.543	0.196	0.009
						2" Ice	0.755	0.343	0.020
						4" Ice	1.281	0.740	0.063
(2) WPA-80090/4CF w/ Mount Pipe	C	From Leg	4.000 0.000	0.000	147.000	No Ice	3.970	3.885	0.030
						1/2" Ice	4.395	4.489	0.066

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.000			1" Ice	4.830	5.116	0.110
						2" Ice	5.731	6.502	0.218
						4" Ice	7.672	9.541	0.538
LNX-6512DS-T4M w/ Mount Pipe	C	From Leg	4.000 0.000 0.000	0.000	147.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.791 6.245 6.709 7.667 9.720	4.501 5.170 5.852 7.269 10.366	0.038 0.084 0.139 0.268 0.636
BXA-185090/8CFx2 w/ Mount Pipe	C	From Leg	4.000 0.000 0.000	0.000	147.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.157 3.531 3.941 4.827 6.734	3.330 3.942 4.563 5.855 8.841	0.029 0.059 0.098 0.193 0.486
(2) FD9R6004/2C-3L	C	From Leg	4.000 0.000 0.000	0.000	147.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.367 0.451 0.543 0.755 1.281	0.085 0.136 0.196 0.343 0.740	0.003 0.005 0.009 0.020 0.063
Platform Mount [LP 601-1]	C	None		0.000	147.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	28.470 33.590 38.710 48.950 69.430	28.470 33.590 38.710 48.950 69.430	1.122 1.514 1.905 2.689 4.255

Load Combinations

Comb. No.	Description
1	Dead Only
2	Dead+Wind 0 deg - No Ice
3	Dead+Wind 30 deg - No Ice
4	Dead+Wind 60 deg - No Ice
5	Dead+Wind 90 deg - No Ice
6	Dead+Wind 120 deg - No Ice
7	Dead+Wind 150 deg - No Ice
8	Dead+Wind 180 deg - No Ice
9	Dead+Wind 210 deg - No Ice
10	Dead+Wind 240 deg - No Ice
11	Dead+Wind 270 deg - No Ice
12	Dead+Wind 300 deg - No Ice
13	Dead+Wind 330 deg - No Ice
14	Dead+Ice+Temp
15	Dead+Wind 0 deg+Ice+Temp
16	Dead+Wind 30 deg+Ice+Temp
17	Dead+Wind 60 deg+Ice+Temp
18	Dead+Wind 90 deg+Ice+Temp
19	Dead+Wind 120 deg+Ice+Temp
20	Dead+Wind 150 deg+Ice+Temp
21	Dead+Wind 180 deg+Ice+Temp
22	Dead+Wind 210 deg+Ice+Temp
23	Dead+Wind 240 deg+Ice+Temp

Comb. No.	Description
24	Dead+Wind 270 deg+Ice+Temp
25	Dead+Wind 300 deg+Ice+Temp
26	Dead+Wind 330 deg+Ice+Temp
27	Dead+Wind 0 deg - Service
28	Dead+Wind 30 deg - Service
29	Dead+Wind 60 deg - Service
30	Dead+Wind 90 deg - Service
31	Dead+Wind 120 deg - Service
32	Dead+Wind 150 deg - Service
33	Dead+Wind 180 deg - Service
34	Dead+Wind 210 deg - Service
35	Dead+Wind 240 deg - Service
36	Dead+Wind 270 deg - Service
37	Dead+Wind 300 deg - Service
38	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	188 - 137	Pole	Max Tension	14	0.000	-0.000	0.000
			Max. Compression	14	-19.797	0.775	-1.386
			Max. Mx	11	-9.505	365.416	-1.239
			Max. My	8	-9.523	1.107	-362.596
			Max. Vy	11	-14.646	365.416	-1.239
			Max. Vx	8	14.510	1.107	-362.596
			Max. Torque	6			-1.437
L2	137 - 90.25	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-30.082	0.775	-1.386
			Max. Mx	11	-17.324	1118.253	-3.213
			Max. My	8	-17.336	3.061	-1109.205
			Max. Vy	11	-18.282	1118.253	-3.213
			Max. Vx	8	18.146	3.061	-1109.205
			Max. Torque	6			-1.436
L3	90.25 - 44.5	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-43.705	0.775	-1.386
			Max. Mx	11	-28.189	2012.040	-5.096
			Max. My	8	-28.195	4.937	-1996.953
			Max. Vy	11	-21.818	2012.040	-5.096
			Max. Vx	8	21.683	4.937	-1996.953
			Max. Torque	6			-1.432
L4	44.5 - 0	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-65.556	0.775	-1.386
			Max. Mx	11	-46.534	3219.636	-7.191
			Max. My	8	-46.534	7.031	-3197.767
			Max. Vy	11	-25.492	3219.636	-7.191
			Max. Vx	8	25.361	7.031	-3197.767
			Max. Torque	6			-1.430

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	24	65.556	6.919	-0.007
	Max. H_x	11	46.546	25.470	-0.040
	Max. H_z	2	46.546	-0.040	25.340
	Max. M_x	2	3196.995	-0.040	25.340
	Max. M_z	5	3219.190	-25.470	0.040
	Max. Torsion	12	1.424	22.038	12.635
	Min. Vert	1	46.546	0.000	0.000
	Min. H_x	5	46.546	-25.470	0.040
	Min. H_z	8	46.546	0.040	-25.340
	Min. M_x	8	-3197.767	0.040	-25.340
	Min. M_z	11	-3219.636	25.470	-0.040
	Min. Torsion	6	-1.430	-22.038	-12.635

Tower Mast Reaction Summary

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	46.546	0.000	0.000	0.363	0.209	0.000
Dead+Wind 0 deg - No Ice	46.546	0.040	-25.340	-3196.995	-6.593	-0.695
Dead+Wind 30 deg - No Ice	46.546	12.770	-21.965	-2772.019	-1615.398	0.020
Dead+Wind 60 deg - No Ice	46.546	22.078	-12.705	-1604.188	-2791.281	0.731
Dead+Wind 90 deg - No Ice	46.546	25.470	-0.040	-6.433	-3219.190	1.248
Dead+Wind 120 deg - No Ice	46.546	22.038	12.635	1593.163	-2784.497	1.430
Dead+Wind 150 deg - No Ice	46.546	12.700	21.925	2765.998	-1603.618	1.226
Dead+Wind 180 deg - No Ice	46.546	-0.040	25.340	3197.767	7.031	0.692
Dead+Wind 210 deg - No Ice	46.546	-12.770	21.965	2772.792	1615.844	-0.025
Dead+Wind 240 deg - No Ice	46.546	-22.078	12.705	1604.953	2791.731	-0.734
Dead+Wind 270 deg - No Ice	46.546	-25.470	0.040	7.191	3219.636	-1.245
Dead+Wind 300 deg - No Ice	46.546	-22.038	-12.635	-1592.405	2784.935	-1.424
Dead+Wind 330 deg - No Ice	46.546	-12.700	-21.925	-2765.232	1604.052	-1.223
Dead+Ice+Temp	65.556	-0.000	0.000	1.386	0.775	0.000
Dead+Wind 0 deg+Ice+Temp	65.556	0.007	-6.897	-945.499	-0.347	-0.237
Dead+Wind 30 deg+Ice+Temp	65.556	3.465	-5.976	-819.218	-475.594	0.003
Dead+Wind 60 deg+Ice+Temp	65.556	5.995	-3.454	-473.026	-823.181	0.243
Dead+Wind 90 deg+Ice+Temp	65.556	6.919	-0.007	0.315	-949.972	0.417
Dead+Wind 120 deg+Ice+Temp	65.556	5.988	3.442	473.975	-821.994	0.480
Dead+Wind 150 deg+Ice+Temp	65.556	3.453	5.969	821.038	-473.538	0.414
Dead+Wind 180 deg+Ice+Temp	65.556	-0.007	6.897	948.506	2.028	0.237
Dead+Wind 210 deg+Ice+Temp	65.556	-3.465	5.976	822.225	477.276	-0.004
Dead+Wind 240 deg+Ice+Temp	65.556	-5.995	3.454	476.032	824.863	-0.243
Dead+Wind 270 deg+Ice+Temp	65.556	-6.919	0.007	2.690	951.654	-0.417
Dead+Wind 300 deg+Ice+Temp	65.556	-5.988	-3.442	-470.970	823.675	-0.480
Dead+Wind 330 deg+Ice+Temp	65.556	-3.453	-5.969	-818.032	475.218	-0.414
Dead+Wind 0 deg - Service	46.546	0.016	-9.898	-1249.565	-2.439	-0.273
Dead+Wind 30 deg - Service	46.546	4.988	-8.580	-1083.434	-631.374	0.008
Dead+Wind 60 deg - Service	46.546	8.624	-4.963	-626.894	-1091.072	0.288
Dead+Wind 90 deg - Service	46.546	9.949	-0.016	-2.275	-1258.359	0.491
Dead+Wind 120 deg - Service	46.546	8.609	4.936	623.059	-1088.411	0.562
Dead+Wind 150 deg - Service	46.546	4.961	8.564	1081.550	-626.763	0.482
Dead+Wind 180 deg - Service	46.546	-0.016	9.898	1250.344	2.887	0.273
Dead+Wind 210 deg - Service	46.546	-4.988	8.580	1084.212	631.824	-0.009
Dead+Wind 240 deg - Service	46.546	-8.624	4.963	627.671	1091.523	-0.289
Dead+Wind 270 deg - Service	46.546	-9.949	0.016	3.052	1258.809	-0.490
Dead+Wind 300 deg - Service	46.546	-8.609	-4.936	-622.282	1088.860	-0.561
Dead+Wind 330 deg - Service	46.546	-4.961	-8.564	-1080.772	627.211	-0.481

Solution Summary

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
1	0.000	-46.546	0.000	0.000	46.546	0.000	0.000%
2	0.040	-46.546	-25.340	-0.040	46.546	25.340	0.000%
3	12.770	-46.546	-21.965	-12.770	46.546	21.965	0.000%
4	22.078	-46.546	-12.705	-22.078	46.546	12.705	0.000%
5	25.470	-46.546	-0.040	-25.470	46.546	0.040	0.000%
6	22.038	-46.546	12.635	-22.038	46.546	-12.635	0.000%
7	12.700	-46.546	21.925	-12.700	46.546	-21.925	0.000%
8	-0.040	-46.546	25.340	0.040	46.546	-25.340	0.000%
9	-12.770	-46.546	21.965	12.770	46.546	-21.965	0.000%
10	-22.078	-46.546	12.705	22.078	46.546	-12.705	0.000%
11	-25.470	-46.546	0.040	25.470	46.546	-0.040	0.000%
12	-22.038	-46.546	-12.635	22.038	46.546	12.635	0.000%
13	-12.700	-46.546	-21.925	12.700	46.546	21.925	0.000%
14	0.000	-65.556	0.000	0.000	65.556	-0.000	0.000%
15	0.007	-65.556	-6.897	-0.007	65.556	6.897	0.000%
16	3.465	-65.556	-5.976	-3.465	65.556	5.976	0.000%
17	5.995	-65.556	-3.454	-5.995	65.556	3.454	0.000%
18	6.919	-65.556	-0.007	-6.919	65.556	0.007	0.000%
19	5.988	-65.556	3.442	-5.988	65.556	-3.442	0.000%
20	3.453	-65.556	5.969	-3.453	65.556	-5.969	0.000%
21	-0.007	-65.556	6.897	0.007	65.556	-6.897	0.000%
22	-3.465	-65.556	5.976	3.465	65.556	-5.976	0.000%
23	-5.995	-65.556	3.454	5.995	65.556	-3.454	0.000%
24	-6.919	-65.556	0.007	6.919	65.556	-0.007	0.000%
25	-5.988	-65.556	-3.442	5.988	65.556	3.442	0.000%
26	-3.453	-65.556	-5.969	3.453	65.556	5.969	0.000%
27	0.016	-46.546	-9.898	-0.016	46.546	9.898	0.000%
28	4.988	-46.546	-8.580	-4.988	46.546	8.580	0.000%
29	8.624	-46.546	-4.963	-8.624	46.546	4.963	0.000%
30	9.949	-46.546	-0.016	-9.949	46.546	0.016	0.000%
31	8.609	-46.546	4.936	-8.609	46.546	-4.936	0.000%
32	4.961	-46.546	8.564	-4.961	46.546	-8.564	0.000%
33	-0.016	-46.546	9.898	0.016	46.546	-9.898	0.000%
34	-4.988	-46.546	8.580	4.988	46.546	-8.580	0.000%
35	-8.624	-46.546	4.963	8.624	46.546	-4.963	0.000%
36	-9.949	-46.546	0.016	9.949	46.546	-0.016	0.000%
37	-8.609	-46.546	-4.936	8.609	46.546	4.936	0.000%
38	-4.961	-46.546	-8.564	4.961	46.546	8.564	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	4	0.00000001	0.00026226
3	Yes	5	0.00000001	0.00036788
4	Yes	5	0.00000001	0.00036261
5	Yes	4	0.00000001	0.00043325
6	Yes	5	0.00000001	0.00037722
7	Yes	5	0.00000001	0.00035436
8	Yes	4	0.00000001	0.00034008

9	Yes	5	0.00000001	0.00036808
10	Yes	5	0.00000001	0.00037536
11	Yes	4	0.00000001	0.00052273
12	Yes	5	0.00000001	0.00035326
13	Yes	5	0.00000001	0.00037415
14	Yes	4	0.00000001	0.00000513
15	Yes	5	0.00000001	0.00017024
16	Yes	5	0.00000001	0.00020968
17	Yes	5	0.00000001	0.00020936
18	Yes	5	0.00000001	0.00017142
19	Yes	5	0.00000001	0.00021240
20	Yes	5	0.00000001	0.00020947
21	Yes	5	0.00000001	0.00017151
22	Yes	5	0.00000001	0.00021213
23	Yes	5	0.00000001	0.00021323
24	Yes	5	0.00000001	0.00017214
25	Yes	5	0.00000001	0.00020896
26	Yes	5	0.00000001	0.00021110
27	Yes	4	0.00000001	0.00006888
28	Yes	4	0.00000001	0.00070283
29	Yes	4	0.00000001	0.00068135
30	Yes	4	0.00000001	0.00009891
31	Yes	4	0.00000001	0.00075015
32	Yes	4	0.00000001	0.00065816
33	Yes	4	0.00000001	0.00007385
34	Yes	4	0.00000001	0.00070509
35	Yes	4	0.00000001	0.00073446
36	Yes	4	0.00000001	0.00010524
37	Yes	4	0.00000001	0.00065318
38	Yes	4	0.00000001	0.00073743

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	188 - 137	39.264	35	1.894	0.004
L2	141.25 - 90.25	21.753	35	1.585	0.003
L3	95.5 - 44.5	9.216	35	0.984	0.001
L4	51 - 0	2.449	35	0.444	0.000

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
192.000	Lighting Rod 3/4" x 7'	35	39.264	1.894	0.004	43564
188.000	7770.00 w/ Mount Pipe	35	39.264	1.894	0.004	43564
175.000	(2) 6' x 2" Mount Pipe	35	34.154	1.829	0.004	16755
162.000	RR90-17-02DP w/ Mount Pipe	35	29.164	1.754	0.003	8377
147.000	(2) WPA-80090/4CF w/ Mount Pipe	35	23.717	1.640	0.003	5311

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	188 - 137	100.237	11	4.836	0.011
L2	141.25 - 90.25	55.566	11	4.049	0.007
L3	95.5 - 44.5	23.555	10	2.515	0.002
L4	51 - 0	6.263	10	1.136	0.001

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
192.000	Lighting Rod 3/4" x 7'	11	100.237	4.836	0.011	17287
188.000	7770.00 w/ Mount Pipe	11	100.237	4.836	0.011	17287
175.000	(2) 6' x 2" Mount Pipe	11	87.202	4.672	0.010	6647
162.000	RR90-17-02DP w/ Mount Pipe	11	74.475	4.480	0.008	3321
147.000	(2) WPA-80090/4CF w/ Mount Pipe	11	60.577	4.189	0.007	2103

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
L1	188 - 137 (1)	TP32.711x22x0.25	51.000	0.000	0.0	39.000	25.049	-9.505	976.932	0.010
L2	137 - 90.25 (2)	TP42.03x31.318x0.313	51.000	0.000	0.0	39.000	40.285	-17.324	1571.110	0.011
L3	90.25 - 44.5 (3)	TP51.014x40.302x0.375	51.000	0.000	0.0	39.000	58.648	-28.189	2287.280	0.012
L4	44.5 - 0 (4)	TP59.61x48.899x0.5	51.000	0.000	0.0	39.000	93.808	-46.534	3658.500	0.013

Pole Bending Design Data

Section No.	Elevation ft	Size	Actual M_x kip-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y kip-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
L1	188 - 137 (1)	TP32.711x22x0.25	365.626	22.486	39.000	0.577	0.000	0.000	39.000	0.000
L2	137 - 90.25 (2)	TP42.03x31.318x0.313	1118.575	33.241	39.000	0.852	0.000	0.000	39.000	0.000
L3	90.25 - 44.5 (3)	TP51.014x40.302x0.375	2012.475	33.858	39.000	0.868	0.000	0.000	39.000	0.000
L4	44.5 - 0 (4)	TP59.61x48.899x0.5	3220.192	28.259	39.000	0.725	0.000	0.000	39.000	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V K	Actual f_v ksi	Allow. F_v ksi	Ratio $\frac{f_v}{F_v}$	Actual T kip-ft	Actual f_{vt} ksi	Allow. F_{vt} ksi	Ratio $\frac{f_{vt}}{F_{vt}}$
L1	188 - 137 (1)	TP32.711x22x0.25	14.649	0.585	26.000	0.045	0.737	0.022	26.000	0.001
L2	137 - 90.25 (2)	TP42.03x31.318x0.313	18.285	0.454	26.000	0.035	0.736	0.011	26.000	0.000
L3	90.25 - 44.5 (3)	TP51.014x40.302x0.375	21.820	0.372	26.000	0.029	0.735	0.006	26.000	0.000
L4	44.5 - 0 (4)	TP59.61x48.899x0.5	25.494	0.272	26.000	0.021	0.734	0.003	26.000	0.000

Pole Interaction Design Data

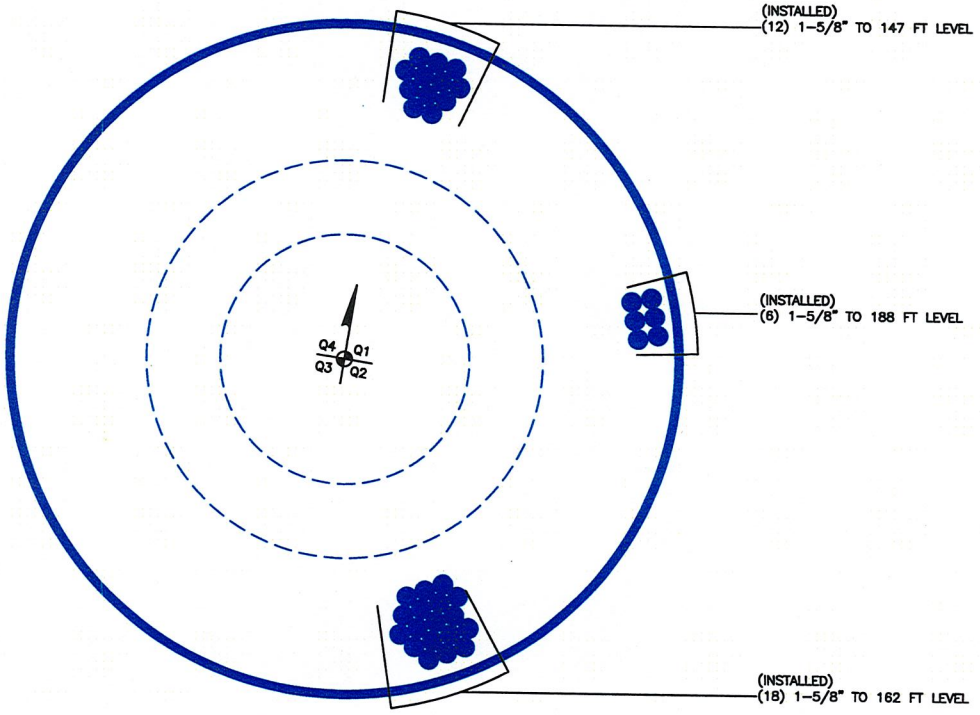
Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	188 - 137 (1)	0.010	0.577	0.000	0.045	0.001	0.587 ✓	1.333	H1-3+VT ✓
L2	137 - 90.25 (2)	0.011	0.852	0.000	0.035	0.000	0.864 ✓	1.333	H1-3+VT ✓
L3	90.25 - 44.5 (3)	0.012	0.868	0.000	0.029	0.000	0.881 ✓	1.333	H1-3+VT ✓
L4	44.5 - 0 (4)	0.013	0.725	0.000	0.021	0.000	0.737 ✓	1.333	H1-3+VT ✓

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
L1	188 - 137	Pole	TP32.711x22x0.25	1	-9.505	1302.250	44.0	Pass
L2	137 - 90.25	Pole	TP42.03x31.318x0.313	2	-17.324	2094.290	64.8	Pass
L3	90.25 - 44.5	Pole	TP51.014x40.302x0.375	3	-28.189	3048.944	66.1	Pass
L4	44.5 - 0	Pole	TP59.61x48.899x0.5	4	-46.534	4876.780	55.3	Pass
						Summary		
						Pole (L3)	66.1	Pass
						RATING =	**66.1**	**Pass**

APPENDIX B

BASE LEVEL DRAWING



BUSINESS UNIT: 803175 TOWER ID: C_BASELEVEL

APPENDIX C

ADDITIONAL CALCULATIONS

Maximum Allowable Moment of a Circular Pier

Axial Load (Negative for Compression) = -47.00 kips

Pier Properties

Concrete:

Pier Diameter = 8.0 ft

Concrete Area = 7238.2 in^2

Reinforcement:

Clear Cover = 4.00 in

Cage Diameter = 7.22 ft

Bar Size = 11

Bar Diameter = 1.41 in

Bar Area = 1.56 in^2

Number of Bars = 36

Material Properties

Concrete compressive strength = 3000 psi

Reinforcement yield strength = 60000 psi

Modulus of elasticity = 29000 ksi

Reinforcement yield strain = 0.00207

Limiting compressive strain = 0.003

Seismic Properties

Seismic Zone = 2

Minimum Area of Steel

Required area of steel = 36.19 in^2

Provided area of steel = 56.16 in^2 **OK**

Axial Loading

Load factor = 1.3

Reduction factor = 0.9

Factored axial load = -67.8889 kips

Neutral Axis

Distance from extreme edge to neutral axis =	17.62	in
Equivalent compression zone factor =	0.85	
Distance from extreme edge to equivalent compression zone factor =	14.98	in
Distance from centroid to neutral axis =	30.38	in

Compression Zone

Area of steel in compression zone =	14.04	in^2
Angle from centroid of pier to intersection of equivalent compression zone and edge of pier =	46.53	deg
Area of concrete in compression =	720.83	in^2
Force in concrete = 0.85 * f'c * Acc =	1838.11	kips
Total reinforcement forces =	-1770.23	kips
Factored axial load =	-67.89	kips
Force in concrete =	-1838.11	kips
Sum of the forces in concrete =	0.00	kips **OK**

Maximum Moment

First moment of the concrete area in compression about the centoid =	28185.08	in^3
Distance between centroid of concrete in compression and centroid of pier =	39.10	in
Moment of concrete in compression =	71871.94	in-kips
Total reinforcement moment =	60765.99	in-kips
Nominal moment strength of column =	132637.93	in-kips
Factored moment strength of column =	91826.26	in-kips

Maximum Allowable Moment = 7652.19 ft-kips

Individual Bars

Bar #	Angle from first bar (deg)	Distance to centroid (in)	Distance to neutral axis (in)	Distance to equivalent comp. zone (in)	Strain	Area of steel in compression (in^2)	Stress (ksi)	Axial force (kips)
1	0.00	0.00	-30.38	-33.02	-0.0051716	0.00	-60.00	-93.60
2	10.00	7.52	-22.86	-25.50	-0.0038917	0.00	-60.00	-93.60
3	20.00	14.81	-15.57	-18.21	-0.0026507	0.00	-60.00	-93.60
4	30.00	21.65	-8.73	-11.37	-0.0014863	0.00	-43.10	-67.24
5	40.00	27.83	-2.55	-5.19	-0.0004339	0.00	-12.58	-19.63
6	50.00	33.17	2.79	0.14	0.0004746	1.56	13.76	17.49
7	60.00	37.49	7.12	4.47	0.0012115	1.56	35.13	50.83
8	70.00	40.68	10.31	7.66	0.0017545	1.56	50.88	75.40
9	80.00	42.64	12.26	9.62	0.002087	1.56	60.00	89.62
10	90.00	43.30	12.92	10.27	0.002199	1.56	60.00	89.62
11	100.00	42.64	12.26	9.62	0.002087	1.56	60.00	89.62
12	110.00	40.68	10.31	7.66	0.0017545	1.56	50.88	75.40
13	120.00	37.49	7.12	4.47	0.0012115	1.56	35.13	50.83
14	130.00	33.17	2.79	0.14	0.0004746	1.56	13.76	17.49
15	140.00	27.83	-2.55	-5.19	-0.0004339	0.00	-12.58	-19.63
16	150.00	21.65	-8.73	-11.37	-0.0014863	0.00	-43.10	-67.24
17	160.00	14.81	-15.57	-18.21	-0.0026507	0.00	-60.00	-93.60
18	170.00	7.52	-22.86	-25.50	-0.0038917	0.00	-60.00	-93.60
19	180.00	0.00	-30.38	-33.02	-0.0051716	0.00	-60.00	-93.60
20	190.00	-7.52	-37.90	-40.54	-0.0064515	0.00	-60.00	-93.60
21	200.00	-14.81	-45.19	-47.83	-0.0076925	0.00	-60.00	-93.60
22	210.00	-21.65	-52.03	-54.67	-0.0088569	0.00	-60.00	-93.60
23	220.00	-27.83	-58.21	-60.85	-0.0099093	0.00	-60.00	-93.60
24	230.00	-33.17	-63.54	-66.19	-0.0108178	0.00	-60.00	-93.60
25	240.00	-37.49	-67.87	-70.52	-0.0115547	0.00	-60.00	-93.60
26	250.00	-40.68	-71.06	-73.71	-0.0120977	0.00	-60.00	-93.60
27	260.00	-42.64	-73.02	-75.66	-0.0124302	0.00	-60.00	-93.60
28	270.00	-43.30	-73.67	-76.32	-0.0125422	0.00	-60.00	-93.60
29	280.00	-42.64	-73.02	-75.66	-0.0124302	0.00	-60.00	-93.60
30	290.00	-40.68	-71.06	-73.71	-0.0120977	0.00	-60.00	-93.60
31	300.00	-37.49	-67.87	-70.52	-0.0115547	0.00	-60.00	-93.60
32	310.00	-33.17	-63.54	-66.19	-0.0108178	0.00	-60.00	-93.60
33	320.00	-27.83	-58.21	-60.85	-0.0099093	0.00	-60.00	-93.60
34	330.00	-21.65	-52.03	-54.67	-0.0088569	0.00	-60.00	-93.60
35	340.00	-14.81	-45.19	-47.83	-0.0076925	0.00	-60.00	-93.60
36	350.00	-7.52	-37.90	-40.54	-0.0064515	0.00	-60.00	-93.60

Square, Unstiffened Base Plate, Any Rod Material - Rev. F

Assumptions: Rod groups at corners. Total # rods divisible by 4. Maximum total # of rods = 48.
Rod Spacing = Straight Center-to-Center distance between any (2) adjacent rods (same corner)

Site Data

BU#: *803175*
Site Name: *CT NEW BRITAIN 3 C*
App #: *104326, rev.1*

Reactions		
Moment:	3220	ft-kips
Axial:	47	kips
Shear:	25	kips

Connection Type:	*Butt*

Anchor Rod Data		
Qty:	20	
Diam:	2.25	in
Rod Material:	A615-J	
Grade(Fy):	75	ksi
Bolt Circle:	67	in
Anchor Spacing:	6.125	in

Plate Data		
W=Side:	66	in
Thick:	3	in
Grade:	50	ksi
B effective	33.73	in

Pole Data		
Diam:	59.61	in
Thick:	0.5	in
Grade:	65	ksi

Stress Increase Factor		
ASIF:	1.333	

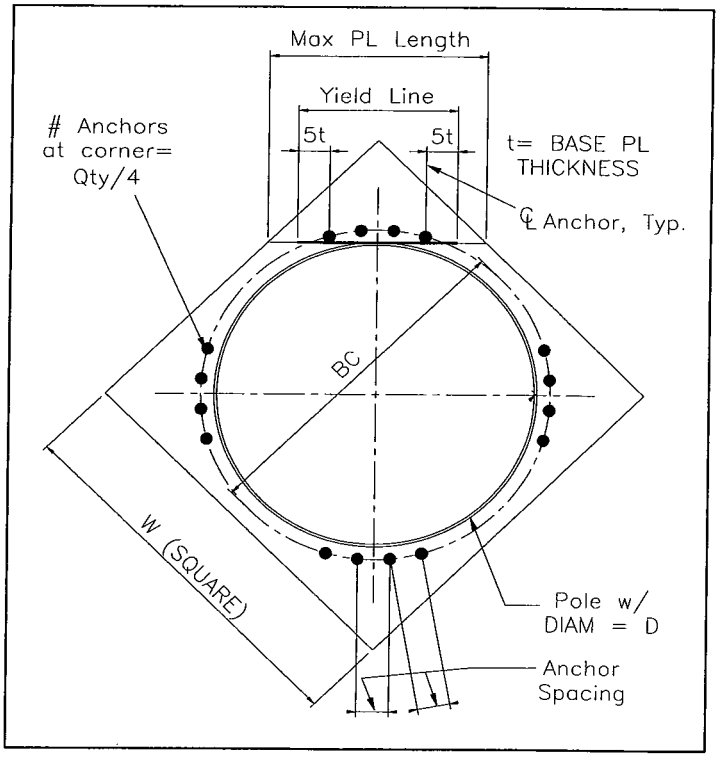
Anchor Rod Results

Maximum Rod Tension:	113.0 Kips
Allowable Tension:	195.0 Kips
Anchor Rod Stress Ratio:	58.0% **Pass**

Base Plate Results

Base Plate Stress:	29.4 ksi
Allowable Plate Stress:	50.0 ksi
Base Plate Stress Ratio:	58.7% **Pass**

PL Ref. Data
Yield Line (in): 33.73
Max PL Length: 33.73



Monopole Pier and Pad Foundation

BU # : 803175
Site Name: CT NEW BRITAIN 3 CAC 803175
App. Number: 104326, rev.1

CROWN CASTLE

Design Reactions		
Shear, **S**:	25	kips
Moment, **M**:	3220	ft-kips
Tower Height, **H**:	188	ft
Tower Weight, **Wt**:	47	kips
Base Diameter, **BD**:	4.9675	ft

Foundation Dimensions		
Depth, **D**:	7	ft
Pad Width, **W**:	26	ft
Neglected Depth, **N**:	3.5	ft
Thickness, **T**:	3.00	ft
Pier Diameter, **Pd**:	8.00	ft
Ext. Above Grade, **E**:	0.50	ft
Clear Cover, **Cc**:	4.0	in

Soil Properties		
Soil Unit Weight, **γ**:	0.120	kcf
Bearing Capacity, **Bc**:	6.0	ksf
Angle of Friction, **Φ**:	0	deg
Cohesion, **Co**:	1.250	ksf
Passive Pressure, **Pp**:	0.000	kcf
Base Friction, **μ**:	0.20	

Material Properties		
Rebar Yield Strength, **Fy**:	60000	psi
Concrete Strength, **F'c**:	3000	psi
Concrete Unit Weight, **δc**:	0.150	kcf
Seismic Zone, **z**:	2	

Rebar Properties		
Pier Rebar Size, **Sp**:	11	
Pier Rebar Quanity, **mp**:	36	24
Pad Rebar Size, **Spad**:	11	
Pad Rebar Quanity, **mpad**:	33	13
Pier Tie Size, **St**:	5	4
Tie Quanity, **mt**:	12	7

Design Checks	Capacity/ Availability	Demand/ Limits	Check	Capacity
Req'd Pier Diam.(ft)	8	6.4675	OK	
Overturning (ft-kips)	6105.16	3407.50	OK	55.8%
Shear Capacity (kips)	68.55	25.00	OK	36.5%
Bearing (ksf)	6.00	2.19	OK	36.5%
Pad Shear - 1-way (kips)	1069.60	562.91	OK	52.6%
Pad Shear - 2-way (kips)	2741.93	882.88	OK	32.2%
Pier Rebar Area (in^2)	56.16	36.19	OK	
Pad Rebar Area (in^2)	51.48	19.11	OK	
Pier Moment Capacity (k-ft)	7740.77	3332.50	OK	43.1%
Pier Bar Spacing (in)	6.27	18 > s > 2	OK	
Pad Bar Spacing (in)	8.05	18 > s > 2	OK	
Pier Development Length (in)	50	38.82	OK	
Pad Development Length (in)	32	38.82	Hooks!	
Hook Development Length (in)	152.00	21.62	OK	
Rebar Hook Length (in)	108.00	23.97	OK	

Modification Checks	Capacity/ Availability	Demand/ Limits	Check
Sleeve Rebar Area (in2):	15.8	0.00	Not Used
Sleeve Moment Capacity (k-ft):	7740.77	3332.50	Not Run
Sleeve Rebar Spacing (in):	N/a	18 > s > 2	Not Used
Sleeve Tie Spacing (in):	N/A	4.5 > s > 4.5	Not Used
Minimum Extra Thickness (in):	0	0	Not Used
Pad Rebar Area-short (in2):	0.44	0.00	Not Used
Pad Rebar Area-long (in2):	0.44	0.00	Not Used
Pad Rebar Spacing-short (in):	100.8333333	18 > s > 2	Not Used
Pad Rebar Spacing-long (in):	100.8333333	18 > s > 2	Not Used
End Cap Width (ft):	0	0	Not Used
End Cap Rebar Area (in2):	3.16	0	Not Used
Rebar Spacing (in):	-3.67	18 > s > 2	Not Used
Tie Spacing (in):	21.21	304 > s > 4.5	Not Used
Dowel Area (in2):	2.2	0.00	Not Used
Dowel Embedment (in):	9	6	Not Used
Cone Shear Strength (kips):	24.68	23.76	Not Used
Dowel Edge Dist (in):	12.00	4.78	Not Used
Dowel Spacing (in):	72.00	18.00	Not Used
Dowel Edge Dist (vert) (in):	18.00	4.78	Not Used
Dowel Devel. Length (in):	-4.00	15.38	Not Used

Modifications					
Pier Sleeve, ds:	0	in	**End Cap Width, Wec:**	0	ft
Revised Pier Diameter, dx:	8	ft	**Revised Width, Wx:**	26	ft
PS Rebar Size, Ss:	8		**EC Rebar Size, Sec:**	8	per side, top & bottom
Rebar Quanity, ms:	20	0	**Rebar Quanity, mec:**	4	0
Tie Size, Sst:	3		**EC Tie Size, Sect:**	4	per side
Tie Quanity, mst:	9	14	**Tie Quanity, mect:**	15	0
Pad Thickness, Te:	0	in	**EC Dowel Size, Secd:**	6	per side
Revised Pier Thickness, Tx:	3.00	ft	**Dowel Quanity, mecd:**	5	0
Rebar Size, Se:	3		**Rows of Dowels, Nd:**	1	
Rebar Quanity (long), me:	4	0	**Dowel Depth, decd:**	9	in
Rebar Quanity (short), mex:	4	0	**Edge Distance, eecd:**	12	in
Dowel Size, Sed:	3				
Dowel Quanity, med:	0	0			

ROBINSON & COLE LLP

ORIGINAL

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December 13, 2010

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

Re: **Notice of Completion of Construction Activity**
EM-VER-167-100111 – 1116 Johnson Road, Woodbridge, Connecticut
EM-VER-089-100224A – 167 Lester Street, New Britain, Connecticut
EM-VER-052-100201 – 130 Birdseye Road, Farmington, Connecticut
EM-VER-084-100111 – 528 Wheelers Farm Road, Milford, Connecticut
EM-VER-084-100115 – 18 Research Parkway, Milford, Connecticut
EM-VER-107-100107 – Grassy Hill Road, Orange, Connecticut

Dear Ms. Roberts:

The purpose of this letter is to notify you that construction activity associated with the above-referenced facility modifications has been completed.

If you have any questions or need any additional information regarding any of these facilities, please do not hesitate to contact me.

Sincerely,

Kenneth C. Baldwin

KCB/kmd
Copy to:
Sandy M. Carter

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

April 5, 2010

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

RE: **EM-VER-089-100224A** - Cellco Partnership d/b/a Verizon Wireless notice of intent to modify an existing telecommunications facility located at 167 Lester Street, New Britain, 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 following conditions:

- The coax shall be installed per Appendix B of the structural analysis report dated January 13, 2010 and sealed by J. Russell Hill, P.E.; and

- Not more than 45 days after completion of construction, the Council shall be notified in writing that the coax was installed as specified.

The proposed modifications are to be implemented as specified here and in your notice dated February 24, 2010, 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 Phelps
Executive Director

SDP/MP/laf

c: The Honorable Timothy T. Stewart, Mayor, City of New Britain
Frank M. Wiatr, Director of License Permit & Inspection/ Chief Bldg. Official, City of New Britain
Crown Castle USA, Inc.

ROBINSON & COLE

EM-VER-089-100224A

ORIGINAL

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

February 24, 2010

Via Hand Delivery

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

Re: **Notice of Exempt Modification – Antenna Swap**
167 Lester Street, New Britain, Connecticut

Dear Mr. Phelps:

Cellco Partnership d/b/a Verizon Wireless ("Cellco") currently maintains wireless telecommunications antennas at the 147-foot level on the existing 188-foot tower at the above-referenced address. The tower and underlying property are owned by Crown Castle. The Council approved Cellco's use of the existing tower in 2001 (TS-VER-089-010418). Cellco now intends to modify its installation by replacing six (6) of its PCS antennas with three (3) model BXA-185090/8CF_2 PCS antennas and three (3) model LNX-6512DS-T4M LTE antennas, all at the same 147-foot level on the tower. Attached behind Tab 1 are the specifications for the proposed replacement antennas.

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 Timothy T. Stewart, Mayor for the City of New Britain.

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 any increase in the height of the existing tower. Cellco's antennas will be located at the same 147-foot level on the existing 188-foot tower.

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

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

4. The operation of the replacement antennas 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 Cellco's modified facility is included behind Tab 2.

Also attached is a Structural Analysis Report confirming that the tower and foundation can support Cellco's proposed antennas modification. (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:
Timothy T. Stewart, New Britain Mayor
Sandy M. Carter

Slant +/- 45° Dual Polarized, Panel 90° / 16.5 dBi

BXA-185090/8CF __ 2°

When ordering replace "___" with connector type.

Mechanical specifications

Length	1225 mm	48.2 in
Width	154 mm	6.1 in
Depth	105 mm	4.1 in
Depth with t-bracket	133 mm	5.2 in
[4] Weight	5.0 kg	11.0 lbs
Wind Area		
Fore/Aft	0.19 m^2	2.0 ft^2
Side	0.13 m^2	1.4 ft^2
Rated Wind Velocity (Safety factor 2.0)	>322 km/hr	>200 mph
Wind Load @ 100 mph (161 km/hr)		
Fore/Aft	283 N	64.0 lbs
Side	211 N	47.5 lbs

Antenna consisting of aluminum alloy with brass feedlines covered by a UV safe fiberglass radome.

Mounting and Downtilting

Mounting brackets attach to a pipe diameter of Ø50-102 mm (2.0-4.0 in).

Mounting bracket kit #26799997
Downtilt bracket kit #26799999

The downtilt bracket kit includes the mounting bracket kit.

Electrical specifications

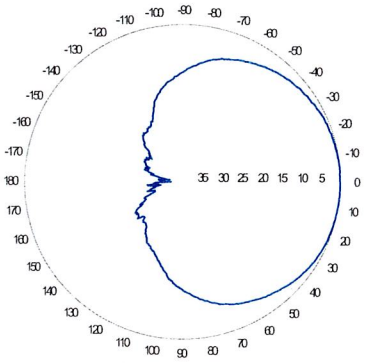
Frequency Range	1850-1990 MHz
Impedance	50Ω
[3] Connector(s)	NE or E-DIN 2 ports / center
[1] VSWR	≤ 1.4:1
Polarization	Slant ± 45°
[1] Isolation Between Ports	< -30 dB
[1] Gain	16.5 dBi
[2] Power Rating	250 W
[1] Half Power Angle	
H-Plane	90°
E-Plane	7°
[1] Electrical Downtilt	2°
[1] Null Fill	5%
Lightning Protection	Direct Ground

Patented Dipole Design: U.S. Patent No. 6,597,324 B2

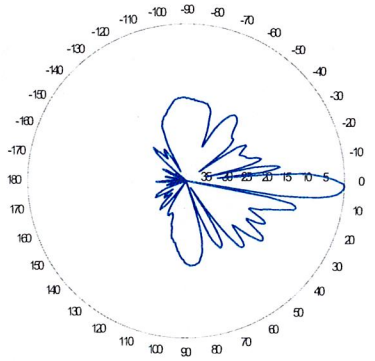
1) Typical values.
2) Power rating limited by connector only.
3) NE indicates an elongated N connector. E-DIN indicates an elongated DIN connector.
4) The antenna weight listed above does not include the bracket weight.

Improvements to mechanical and/or electrical performance of the antenna may be made without notice.

Radiation pattern[1]



Horizontal



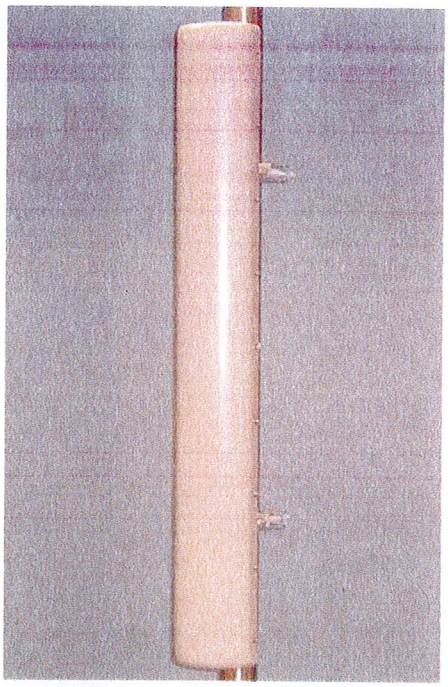
Vertical

Radiation patterns for all antennas are measured with the antenna mounted on a fiberglass pole.

Mounting on a metal pole will typically improve the Front-to-Back ratio.

CF Denotes a Center-Fed Connector.

1850-1990 MHz



Amphenol Antel's Exclusive 3T (True Transmission Line Technology) Antenna Design:

- Watercut brass feedline assembly for consistent performance.
- Unique feedline design eliminates the need for conventional solder joints in the signal path.
- A non-collinear system with access to every radiating element for broad band-width and superior performance.
- Air as insulation for virtually no internal signal loss.

This Amphenol Antel antenna is under a five-year limited warranty for repair or replacement.

Antenna available with center-fed connectors only.

Amphenol Antel, Inc. 1300 Capital Drive Rockford, Illinois 61109 USA Tel. (815) 399-0001
Toll-Free (888) 417-9562 Fax. (815) 399-0156 antel@antelinc.com www.antelinc.com

Amphenol Antel, Inc.
The Antenna Technology Company

Revision Date: 7/11/07

Product Specifications

ANDREW®
A CommScope Company

LNX-6512DS-T4M

DualPol® Antenna, 698–896 MHz, 65° horizontal beamwidth, fixed electrical tilt

- Continuous wideband operation
- Great solution to maximize network coverage and capacity
- Excellent gain, VSWR, front-to-back ratio, and PIM specifications for robust network performance
- Patented DualPol® technology
- Ideal choice for site collocations and tough zoning restrictions

CHARACTERISTICS

General Specifications

Antenna Type	DualPol®
Brand	DualPol®
Operating Frequency Band	698 – 896 MHz

Electrical Specifications

Frequency Band, MHz	**698–806**	**806–896**
Beamwidth, Horizontal, degrees	65	65
Gain, dBd	12.4	13.3
Gain, dBi	14.5	15.4
Beamwidth, Vertical, degrees	18.7	16.2
Beam Tilt, degrees	4	4
Upper Sidelobe Suppression (USLS), typical, dB	20	20
Front-to-Back Ratio at 180°, dB	30	32
Isolation, dB	30	30
VSWR | Return Loss, db	1.35:1 | 16.5	1.35:1 | 16.5
Intermodulation Products, 3rd Order, 2 x 20 W, dBc	-150	-150
Input Power, maximum, watts	500	500
Polarization	±45°	±45°
Impedance, ohms	50	50
Lightning Protection	dc Ground	dc Ground

Product Specifications

LNX-6512DS-T4M

ANDREW®
A CommScope Company

Mechanical Specifications

Color	Light gray
Connector Interface	7-16 DIN Female
Connector Location	Bottom
Connector Quantity	2
Wind Loading, maximum	379.8 N @ 150 km/h 85.4 lbf @ 150 km/h
Wind Speed, maximum	241.0 km/h | 149.8 mph

Dimensions

Depth	181.0 mm | 7.1 in
Length	1232.0 mm | 48.5 in
Width	301.0 mm | 11.9 in
Net Weight	12.3 kg | 27.1 lb

Regulatory Compliance/Certifications

Agency
RoHS 2002/95/EC
China RoHS SJ/T 11364-2006

Classification
Compliant by Exemption
Above Maximum Concentration Value (MCV)

INCLUDED PRODUCTS

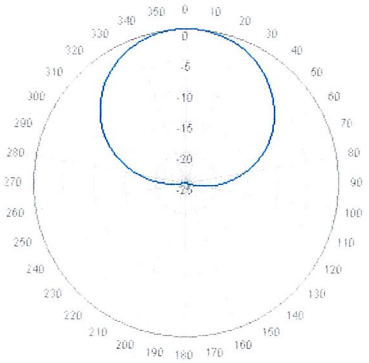
MTG-L-STD
Downtilt Mounting Kit for panel Antennas

Product Specifications

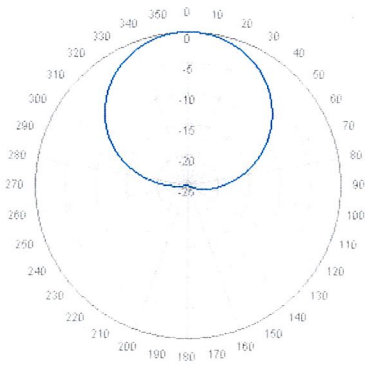
LNX-6512DS-T4M

ANDREW®
A CommScope Company

Horizontal Pattern

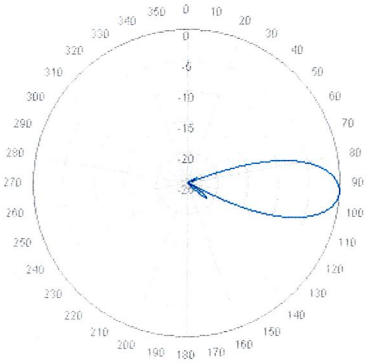


Freq: 750, Tilt:4

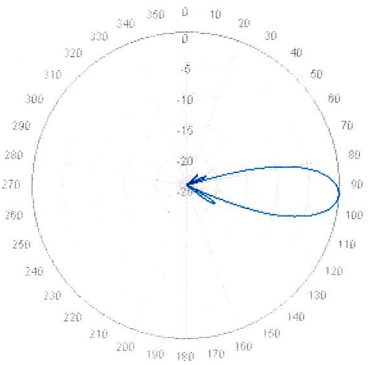


Freq: 850, Tilt:4

Vertical Pattern



Freq: 750, Tilt:4



Freq: 850, Tilt:4

	General	Power	Density					
Site Name: New Britain 3								
Tower Height: Verizon @ 147Ft.								
CARRIER	# OF CHAN.	WATTS ERP	HEIGHT	CALC. POWER DENS	FREQ.	MAX. PERMISS. EXP.	FRACTION MPE	Total
*Cingular GSM	5	427	186	0.0222	1900	1.0000	2.22%	
*Cingular UMTS	1	500	186	0.0052	880	0.5867	0.89%	
*T-Mobile GSM	8	109	163	0.0118	1945	1.0000	1.18%	
*T-Mobile UMTS	2	615	163	0.0166	2100	1.0000	1.66%	
Verizon	**7**	**330**	**147**	**0.0384**	**970**	**1.0000**	**3.84%**	
Verizon	**9**	**238**	**147**	**0.0356**	**869**	**0.5793**	**6.15%**	
Verizon	**1**	**720**	**147**	**0.0120**	**757**	**0.4973**	**2.41%**	
								18.35%
* Source: Siting Council								

Date: **January 13, 2010**

Mitzi Parker
Crown Castle USA Inc.
3530 Toringdon Way, Suite 300
Charlotte, NC 28277

Tower Engineering Professionals, Inc.
3707 Junction Blvd.
Raleigh, NC 27603
(919) 661-6351
mnichols@tepgroup.net

Subject: **Structural Analysis Report**

Carrier Designation:	***Verizon* Co-Locate**	
	Carrier Site Number:	2010441937
	Carrier Site Name:	New Britain 3
Crown Castle Designation:	**Crown Castle BU Number:**	803175
	Crown Castle Site Name:	CT New Britain 3 CAC
	Crown Castle JDE Job Number:	129137
	Crown Castle Work Order Number:	311952
Engineering Firm Designation:	**TEP Project Number:**	100063
Site Data:	**Lester Road, New Britain, Hartford County, CT 06050** **Latitude *41° 41' 11.8"*, Longitude *-72° 45' 27.8"*** **188 Foot - Monopole Tower**	

Dear Ms. Parker,

Tower Engineering Professionals, Inc. is pleased to submit this **"Structural Analysis Report"** to determine the structural integrity of the above mentioned tower. This analysis has been performed in accordance with the Crown Castle Structural 'Statement of Work' and the terms of Crown Castle Purchase Order Number 358450, in accordance with application 93078, revision 1.

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

LC1: Existing + Reserved + Proposed Equipment **Sufficient Capacity**
Note: See Table I and Table II for the proposed and existing/reserved loading, respectively.

The analysis has been performed in accordance with the TIA/EIA-222-F standard and 2006 International Building Code based upon a wind speed of 80 mph fastest mile.

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

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

Respectfully submitted by:

J. Russell Hill, P.E.

STATE OF CONNECTICUT
J. RUSSELL HILL
#13532
LICENSED
PROFESSIONAL ENGINEER

1/13/2010

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 188 ft Monopole tower designed by Summit in December of 2000. The tower was originally designed for a wind speed of 85 mph per TIA/EIA-222-F.

2) ANALYSIS CRITERIA

The structural analysis was performed for this tower in accordance with the requirements of TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a fastest mile wind speed of 80 mph with no ice, 69.3 mph with 0.5 inch ice thickness and 50 mph under service loads.

Table 1 - Proposed Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
147	147	3	Andrew	LNX-6512DS-T4M	-	-	-
		3	Antel	BXA-185090/8CFx2			

Table 2 - Existing and Reserved Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
188	190	3	Powerwave	7770.00	6	1 5/8	1
		6	Powerwave	LGP21401 (TMA)			
		6	EMS Wireless	RR90-17-02DP			
162	163	3	RFS/Celwave	APXV18-206516S-C-A20	18	1 5/8	1
		3	RFS/Celwave	ATMAA1412D-1A20 (TMA)			
		3	RFS/Celwave	ATMPP1412D-1CWA (TMA)			
147	147	6	Antel	WPA-80090/4CF	12	1 5/8	1
		6	Decibel	DB948F85T2E-M	1	1/2	2

Notes:
1) Existing equipment
2) Existing equipment to be removed

Table 3 - Design Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
190	190	12	Unknown	1-ft x 5-ft x 3-in Panel	Unknown	Unknown
177	177	12	Unknown	1-ft x 5-ft x 3-in Panel	Unknown	Unknown
162	162	12	Unknown	1-ft x 5-ft x 3-in Panel	Unknown	Unknown
147	147	12	Unknown	1-ft x 5-ft x 3-in Panel	Unknown	Unknown

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
Manufacturer Drawings	Summit Manufacturing dated December 11, 2000, Job # 12481	679659	CCI
Foundation Mapping	Tower Engineering Professionals dated January 7, 2010, TEP # 100063	679660	TEP
Geotechnical Report	Clough, Harbour & Associates dated October 26, 2000, Project # 8961.07.46	679661	CCI
Previous Structural Analysis Report	PSG Engineering dated December 11, 2008, Project # 0801H191-A060188	2357127	CCI

3.1) Analysis Method

RISATower (version 5.3.1.0), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A.

3.2) Assumptions

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

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

4) ANALYSIS RESULTS

Table 5 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (lb)	SF*P_allow (lb)	% Capacity	Pass / Fail
L1	188 - 137	Pole	TP32.711x22x0.25	1	-9204.130	1302250.302	41.2	Pass
L2	137 - 90.25	Pole	TP42.03x31.318x0.313	2	-17035.301	2094289.543	62.2	Pass
L3	90.25 - 44.5	Pole	TP51.014x40.302x0.375	3	-27926.500	3048944.113	64.2	Pass
L4	44.5 - 0	Pole	TP59.61x48.899x0.5	4	-46510.000	4876780.298	54.3	Pass
							Summary	
						Pole (L3)	64.2	Pass
						Rating =	64.2	Pass

Table 6 - Tower Component Stresses vs. Capacity - Foundation

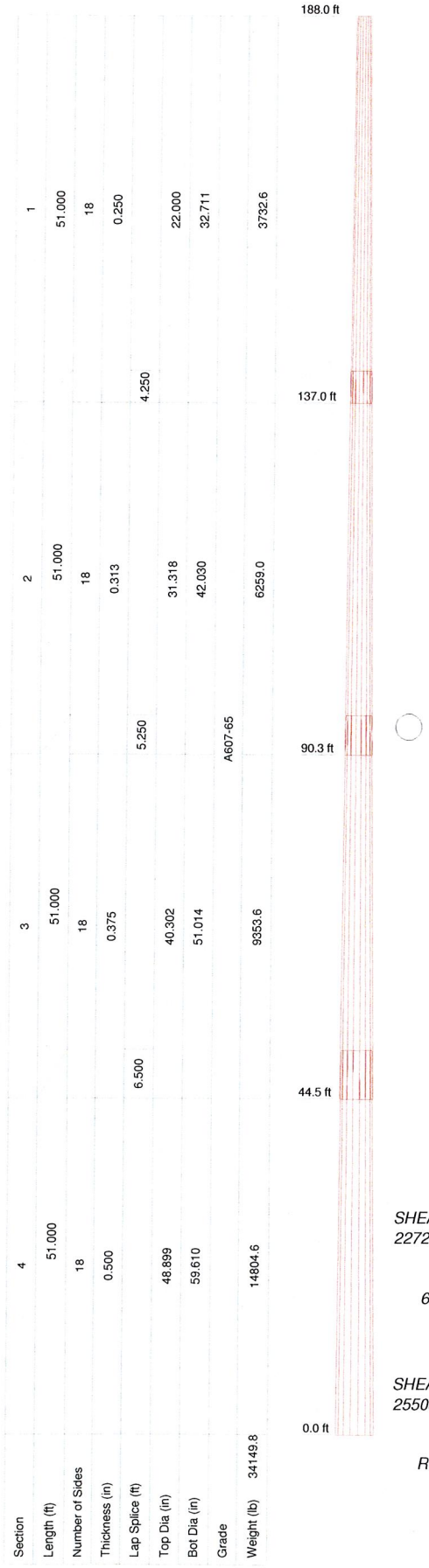
Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
	Anchor Rods	-	56.9	Pass
	Base Plate	-	57.7	Pass
	Base Foundation	-	75.2	Pass
	Structure Rating (max from all components) =			**75.2%**

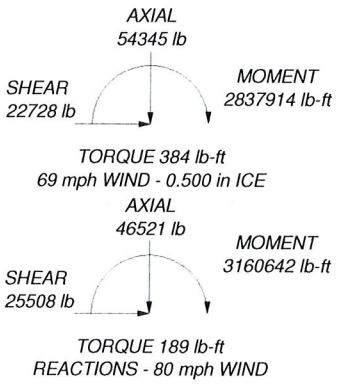
4.1) Recommendations

It should be noted that in order for the tower to pass in the current load scenario, the proposed and reserved coax must be configured as shown in Appendix B.

APPENDIX A

RISA TOWER OUTPUT





DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
7770.00 w/ Mount Pipe	188	(2) APXV18-206516S-C-A20 w/ Mount Pipe	162
7770.00 w/ Mount Pipe	188		
7770.00 w/ Mount Pipe	188	APXV18-206516S-C-A20 w/ Mount Pipe	162
(2) LGP21401	188		
(2) LGP21401	188	ATMAA1412D-1A20	162
(2) LGP21401	188	ATMAA1412D-1A20	162
Platform Mount [LP 602-1]	188	ATMAA1412D-1A20	162
2.4-in x 6-ft Mount Pipe	177	Platform Mount [LP 601-1]	162
2.4-in x 6-ft Mount Pipe	177	(2) WPA-80090/4CF w/ Mount Pipe	147
2.4-in x 6-ft Mount Pipe	177	(2) WPA-80090/4CF w/ Mount Pipe	147
2.4-in x 6-ft Mount Pipe	177	(2) WPA-80090/4CF w/ Mount Pipe	147
2.4-in x 6-ft Mount Pipe	177	LNX-6512DS-T4M w/ Mount Pipe	147
2.4-in x 6-ft Mount Pipe	177	LNX-6512DS-T4M w/ Mount Pipe	147
Platform Mount [LP 601-1]	177	LNX-6512DS-T4M w/ Mount Pipe	147
RR90-17-02DP w/ Mount Pipe	162	BXA-185090/8CFx2 w/ Mount Pipe	147
(3) RR90-17-02DP w/ Mount Pipe	162	BXA-185090/8CFx2 w/ Mount Pipe	147
(2) RR90-17-02DP w/ Mount Pipe	162	BXA-185090/8CFx2 w/ Mount Pipe	147
ATMPP1412D-1CWA	162	Platform Mount [LP 601-1]	147
(2) ATMPP1412D-1CWA	162		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A607-65	65 ksi	80 ksi			

TOWER DESIGN NOTES

1. Tower is located in Hartford 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: 64.2%

Tower Engineering Professionals, Inc.
3707 Junction Blvd.
Raleigh, NC 27603
Phone: (919) 661-6351
FAX: (919) 661-6350

Job: *CT New Britain 3 CAC BU # 803175*		
Project: *TEP # 100063*		
Client: CCI	Drawn by: Matt Nichols, EI	App'd:
Code: TIA/EIA-222-F	Date: 01/13/10	Scale: NTS
Path: H:\2010\0063_CT New Britain 3 CAC\Structural\RISA\LC1\803175.eri		Dwg No. E-1

Tower Input Data

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

Tower is located in Hartford County, Connecticut.
Basic wind speed of 80 mph.
Nominal ice thickness of 0.500 in.
Ice density of 56 pcf.
A wind speed of 69 mph is used in combination with ice.
Deflections calculated using a wind speed of 50 mph.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in pole design is 1.333.
Local bending stresses due to climbing loads, feedline supports, and appurtenance mounts are not considered.

Options

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

Tapered Pole Section Geometry

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L1	188.000-137.000	51.000	4.250	18	22.000	32.711	0.250	1.000	A607-65 (65 ksi)
L2	137.000-90.250	51.000	5.250	18	31.318	42.030	0.313	1.250	A607-65 (65 ksi)
L3	90.250-44.500	51.000	6.500	18	40.302	51.014	0.375	1.500	A607-65 (65 ksi)
L4	44.500-0.000	51.000		18	48.899	59.610	0.500	2.000	A607-65 (65 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/ft
L1	22.339	17.259	1031.483	7.721	11.176	92.294	2064.324	8.631	3.432	13.728
	33.216	25.758	3429.020	11.524	16.617	206.354	6862.553	12.881	5.317	21.269
L2	32.708	30.754	3735.323	11.007	15.910	234.782	7475.561	15.380	4.962	15.879
	42.678	41.379	9098.069	14.810	21.351	426.114	18208.109	20.693	6.847	21.911
L3	42.044	47.524	9571.647	14.174	20.474	467.512	19155.889	23.766	6.433	17.155
	51.801	60.273	19526.797	17.977	25.915	753.491	39079.287	30.142	8.318	22.183
L4	51.039	76.809	22730.963	17.182	24.841	915.074	45491.836	38.412	7.726	15.452
	60.530	93.808	41409.240	20.984	30.282	1367.459	82872.966	46.913	9.611	19.223

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in
L1 188.000-137.000				1	1	1		
L2 137.000-90.250				1	1	1		
L3 90.250-44.500				1	1	1		
L4 44.500-0.000				1	1	1		

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#		C_AA_A ft^2/ft	Weight plf
Step Pegs (5/8" SR) 7-in. w/30" step	A	No	CaAa (Out Of Face)	188.000 - 0.000	0.000	0	1	No Ice	0.029	0.487
								1/2" Ice	0.129	0.971
Safety Line 3/8	A	No	CaAa (Out Of Face)	188.000 - 0.000	0.000	0	1	No Ice	0.037	0.220
								1/2" Ice	0.137	0.750
3/16-in AM Detuner Wire	A	No	CaAa (Out Of Face)	135.000 - 8.000	12.000	0	1	No Ice	0.019	0.096
								1/2" Ice	0.119	0.516
3/16-in AM Detuner Wire	B	No	CaAa (Out Of Face)	135.000 - 8.000	12.000	0	1	No Ice	0.019	0.096
								1/2" Ice	0.119	0.516
3/16-in AM Detuner Wire	C	No	CaAa (Out Of Face)	135.000 - 8.000	12.000	0	1	No Ice	0.019	0.096
								1/2" Ice	0.119	0.516
LDF7-50A(1-5/8")	A	No	Inside Pole	147.000 - 0.000	0.000	0	12	No Ice	0.000	0.820
								1/2" Ice	0.000	0.820
LDF4P-50A (1/2 FOAM)	A	No	Inside Pole	147.000 - 0.000	0.000	0	1	No Ice	0.000	0.150
								1/2" Ice	0.000	0.150
LDF7-50A(1-5/8")	B	No	Inside Pole	188.000 - 0.000	0.000	0	6	No Ice	0.000	0.820
								1/2" Ice	0.000	0.820
561(1-5/8")	C	No	Inside Pole	162.000 - 0.000	0.000	0	18	No Ice	0.000	1.350
								1/2" Ice	0.000	1.350

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight lb
L1	188.000-137.000	A	0.000	0.000	0.000	3.402	135.957
		B	0.000	0.000	0.000	0.000	250.920
		C	0.000	0.000	0.000	0.000	607.500
L2	137.000-90.250	A	0.000	0.000	0.000	3.957	504.375
		B	0.000	0.000	0.000	0.839	234.300
		C	0.000	0.000	0.000	0.839	1140.315
L3	90.250-44.500	A	0.000	0.000	0.000	3.909	493.774
		B	0.000	0.000	0.000	0.858	229.476
		C	0.000	0.000	0.000	0.858	1116.111
L4	44.500-0.000	A	0.000	0.000	0.000	3.653	479.516
		B	0.000	0.000	0.000	0.684	222.439
		C	0.000	0.000	0.000	0.684	1084.849

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight lb
L1	188.000-137.000	A	0.500	0.000	0.000	0.000	13.602	187.661
		B		0.000	0.000	0.000	0.000	250.920
		C		0.000	0.000	0.000	0.000	607.500
L2	137.000-90.250	A	0.500	0.000	0.000	0.000	17.782	570.564
		B		0.000	0.000	0.000	5.314	253.094
		C		0.000	0.000	0.000	5.314	1159.109
L3	90.250-44.500	A	0.500	0.000	0.000	0.000	17.634	559.369
		B		0.000	0.000	0.000	5.433	248.690
		C		0.000	0.000	0.000	5.433	1135.325
L4	44.500-0.000	A	0.500	0.000	0.000	0.000	16.203	539.959
		B		0.000	0.000	0.000	4.334	237.768
		C		0.000	0.000	0.000	4.334	1100.178

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	188.000-137.000	0.000	-0.097	0.000	-0.347
L2	137.000-90.250	0.000	-0.096	0.000	-0.327
L3	90.250-44.500	0.000	-0.097	0.000	-0.338
L4	44.500-0.000	0.000	-0.098	0.000	-0.351

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
7770.00 w/ Mount Pipe	A	From Leg	4.000 6.000 2.000	0.000	188.000	No Ice 1/2" Ice	6.119 6.626	4.254 5.014	55.379 100.554
7770.00 w/ Mount Pipe	B	From Leg	4.000 6.000 2.000	0.000	188.000	No Ice 1/2" Ice	6.119 6.626	4.254 5.014	55.379 100.554
7770.00 w/ Mount Pipe	C	From Leg	4.000 6.000 2.000	0.000	188.000	No Ice 1/2" Ice	6.119 6.626	4.254 5.014	55.379 100.554
(2) LGP21401	A	From Leg	4.000 6.000 2.000	0.000	188.000	No Ice 1/2" Ice	1.288 1.445	0.233 0.313	14.100 21.263
(2) LGP21401	B	From Leg	4.000 6.000 2.000	0.000	188.000	No Ice 1/2" Ice	1.288 1.445	0.233 0.313	14.100 21.263
(2) LGP21401	C	From Leg	4.000 6.000 2.000	0.000	188.000	No Ice 1/2" Ice	1.288 1.445	0.233 0.313	14.100 21.263
Platform Mount [LP 602-1]	C	None		0.000	188.000	No Ice 1/2" Ice	32.030 38.710	32.030 38.710	1343.300 1800.090
2.4-in x 6-ft Mount Pipe	A	From Leg	4.000 -6.000 0.000	0.000	177.000	No Ice 1/2" Ice	1.440 1.933	1.440 1.933	21.960 32.883
2.4-in x 6-ft Mount Pipe	A	From Leg	4.000 6.000 0.000	0.000	177.000	No Ice 1/2" Ice	1.440 1.933	1.440 1.933	21.960 32.883
2.4-in x 6-ft Mount Pipe	B	From Leg	4.000 -6.000 0.000	0.000	177.000	No Ice 1/2" Ice	1.440 1.933	1.440 1.933	21.960 32.883
2.4-in x 6-ft Mount Pipe	B	From Leg	4.000 6.000 0.000	0.000	177.000	No Ice 1/2" Ice	1.440 1.933	1.440 1.933	21.960 32.883
2.4-in x 6-ft Mount Pipe	C	From Leg	4.000 -6.000 0.000	0.000	177.000	No Ice 1/2" Ice	1.440 1.933	1.440 1.933	21.960 32.883
2.4-in x 6-ft Mount Pipe	C	From Leg	4.000 6.000 0.000	0.000	177.000	No Ice 1/2" Ice	1.440 1.933	1.440 1.933	21.960 32.883
Platform Mount [LP 601-1]	C	None		0.000	177.000	No Ice 1/2" Ice	28.470 33.590	28.470 33.590	1122.000 1513.656
RR90-17-02DP w/ Mount Pipe	A	From Leg	4.000 0.000 1.000	0.000	162.000	No Ice 1/2" Ice	4.593 5.088	3.319 4.089	34.183 69.326
(3) RR90-17-02DP w/ Mount Pipe	B	From Leg	4.000 0.000 1.000	0.000	162.000	No Ice 1/2" Ice	4.593 5.088	3.319 4.089	34.183 69.326
(2) RR90-17-02DP w/ Mount Pipe	C	From Leg	4.000 0.000 1.000	0.000	162.000	No Ice 1/2" Ice	4.593 5.088	3.319 4.089	34.183 69.326
ATMPP1412D-1CWA	A	From Leg	4.000 0.000 1.000	0.000	162.000	No Ice 1/2" Ice	1.167 1.317	0.416 0.530	12.500 19.513
(2) ATMPP1412D-1CWA	C	From Leg	4.000 0.000 1.000	0.000	162.000	No Ice 1/2" Ice	1.167 1.317	0.416 0.530	12.500 19.513
(2) APXV18-206516S-C-A20 w/ Mount Pipe	A	From Leg	4.000 0.000	0.000	162.000	No Ice 1/2" Ice	3.859 4.274	3.296 4.004	38.501 70.771

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
			1.000						
APXV18-206516S-C-A20 w/ Mount Pipe	C	From Leg	4.000 0.000 1.000	0.000	162.000	No Ice 1/2" Ice	3.859 4.274	3.296 4.004	38.501 70.771
ATMAA1412D-1A20	A	From Leg	4.000 0.000 1.000	0.000	162.000	No Ice 1/2" Ice	1.167 1.314	0.467 0.575	13.000 20.616
ATMAA1412D-1A20	B	From Leg	4.000 0.000 1.000	0.000	162.000	No Ice 1/2" Ice	1.167 1.314	0.467 0.575	13.000 20.616
ATMAA1412D-1A20	C	From Leg	4.000 0.000 1.000	0.000	162.000	No Ice 1/2" Ice	1.167 1.314	0.467 0.575	13.000 20.616
Platform Mount [LP 601-1]	C	None		0.000	162.000	No Ice 1/2" Ice	28.470 33.590	28.470 33.590	1122.000 1513.656
(2) WPA-80090/4CF w/ Mount Pipe	A	From Leg	4.000 0.000 0.000	0.000	147.000	No Ice 1/2" Ice	3.970 4.395	3.885 4.489	30.068 65.921
(2) WPA-80090/4CF w/ Mount Pipe	B	From Leg	4.000 0.000 0.000	0.000	147.000	No Ice 1/2" Ice	3.970 4.395	3.885 4.489	30.068 65.921
(2) WPA-80090/4CF w/ Mount Pipe	C	From Leg	4.000 0.000 0.000	0.000	147.000	No Ice 1/2" Ice	3.970 4.395	3.885 4.489	30.068 65.921
LNX-6512DS-T4M w/ Mount Pipe	A	From Leg	4.000 6.000 0.000	0.000	147.000	No Ice 1/2" Ice	5.791 6.245	4.501 5.170	38.250 84.001
LNX-6512DS-T4M w/ Mount Pipe	B	From Leg	4.000 6.000 0.000	0.000	147.000	No Ice 1/2" Ice	5.791 6.245	4.501 5.170	38.250 84.001
LNX-6512DS-T4M w/ Mount Pipe	C	From Leg	4.000 6.000 0.000	0.000	147.000	No Ice 1/2" Ice	5.791 6.245	4.501 5.170	38.250 84.001
BXA-185090/8CFx2 w/ Mount Pipe	A	From Leg	4.000 -6.000 0.000	0.000	147.000	No Ice 1/2" Ice	3.157 3.531	3.330 3.942	29.311 59.270
BXA-185090/8CFx2 w/ Mount Pipe	B	From Leg	4.000 -6.000 0.000	0.000	147.000	No Ice 1/2" Ice	3.157 3.531	3.330 3.942	29.311 59.270
BXA-185090/8CFx2 w/ Mount Pipe	C	From Leg	4.000 -6.000 0.000	0.000	147.000	No Ice 1/2" Ice	3.157 3.531	3.330 3.942	29.311 59.270
Platform Mount [LP 601-1]	C	None		0.000	147.000	No Ice 1/2" Ice	28.470 33.590	28.470 33.590	1122.000 1513.656

Load Combinations

Comb. No.	Description
1	Dead Only
2	Dead+Wind 0 deg - No Ice

Comb. No.	Description
3	Dead+Wind 30 deg - No Ice
4	Dead+Wind 60 deg - No Ice
5	Dead+Wind 90 deg - No Ice
6	Dead+Wind 120 deg - No Ice
7	Dead+Wind 150 deg - No Ice
8	Dead+Wind 180 deg - No Ice
9	Dead+Wind 210 deg - No Ice
10	Dead+Wind 240 deg - No Ice
11	Dead+Wind 270 deg - No Ice
12	Dead+Wind 300 deg - No Ice
13	Dead+Wind 330 deg - No Ice
14	Dead+Ice
15	Dead+Wind 0 deg+Ice
16	Dead+Wind 30 deg+Ice
17	Dead+Wind 60 deg+Ice
18	Dead+Wind 90 deg+Ice
19	Dead+Wind 120 deg+Ice
20	Dead+Wind 150 deg+Ice
21	Dead+Wind 180 deg+Ice
22	Dead+Wind 210 deg+Ice
23	Dead+Wind 240 deg+Ice
24	Dead+Wind 270 deg+Ice
25	Dead+Wind 300 deg+Ice
26	Dead+Wind 330 deg+Ice
27	Dead+Wind 0 deg - Service
28	Dead+Wind 30 deg - Service
29	Dead+Wind 60 deg - Service
30	Dead+Wind 90 deg - Service
31	Dead+Wind 120 deg - Service
32	Dead+Wind 150 deg - Service
33	Dead+Wind 180 deg - Service
34	Dead+Wind 210 deg - Service
35	Dead+Wind 240 deg - Service
36	Dead+Wind 270 deg - Service
37	Dead+Wind 300 deg - Service
38	Dead+Wind 330 deg - Service

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	188 - 137	37.877	36	1.808	0.000
L2	141.25 - 90.25	21.100	36	1.526	0.000
L3	95.5 - 44.5	8.983	36	0.955	0.000
L4	51 - 0	2.396	36	0.434	0.000

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
188.000	7770.00 w/ Mount Pipe	36	37.877	1.808	0.000	46923
177.000	2.4-in x 6-ft Mount Pipe	36	33.736	1.758	0.000	21328
162.000	RR90-17-02DP w/ Mount Pipe	36	28.212	1.680	0.000	9022

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
147.000	(2) WPA-80090/4CF w/ Mount Pipe	36	22.987	1.576	0.000	5720

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	188 - 137	96.762	11	4.619	0.001
L2	141.25 - 90.25	53.927	11	3.901	0.001
L3	95.5 - 44.5	22.967	11	2.443	0.000
L4	51 - 0	6.128	10	1.110	0.000

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
188.000	7770.00 w/ Mount Pipe	11	96.762	4.619	0.001	18575
177.000	2.4-in x 6-ft Mount Pipe	11	86.190	4.495	0.001	8442
162.000	RR90-17-02DP w/ Mount Pipe	11	72.086	4.297	0.001	3569
147.000	(2) WPA-80090/4CF w/ Mount Pipe	11	58.745	4.030	0.001	2261

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
L1	188 - 137 (1)	TP32.711x22x0.25	51.000	0.000	0.0	39.000	25.049	-9204.130	976932.000	0.009
L2	137 - 90.25 (2)	TP42.03x31.318x0.313	51.000	0.000	0.0	39.000	40.285	-17035.301	1571110.000	0.011
L3	90.25 - 44.5 (3)	TP51.014x40.302x0.375	51.000	0.000	0.0	39.000	58.648	-27926.500	2287280.000	0.012
L4	44.5 - 0 (4)	TP59.61x48.899x0.5	51.000	0.000	0.0	39.000	93.808	-46510.000	3658500.000	0.013

Pole Bending Design Data

Section No.	Elevation ft	Size	Actual M_x lb-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y lb-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
L1	188 - 137 (1)	TP32.711x22x0.25	341962.500	21.031	39.000	0.539	0.000	0.000	39.000	0.000
L2	137 - 90.25 (2)	TP42.03x31.318x0.313	1073200.000	31.892	39.000	0.818	0.000	0.000	39.000	0.000
L3	90.25 - 44.5 (3)	TP51.014x40.302x0.375	1955816.667	32.905	39.000	0.844	0.000	0.000	39.000	0.000
L4	44.5 - 0 (4)	TP59.61x48.899x0.5	3160641.667	27.736	39.000	0.711	0.000	0.000	39.000	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V lb	Actual f_v ksi	Allow. F_v ksi	Ratio $\frac{f_v}{F_v}$	Actual T lb-ft	Actual f_{vt} ksi	Allow. F_{vt} ksi	Ratio $\frac{f_{vt}}{F_{vt}}$
L1	188 - 137 (1)	TP32.711x22x0.25	14069.800	0.562	26.000	0.043	89.474	0.003	26.000	0.000
L2	137 - 90.25 (2)	TP42.03x31.318x0.313	17928.000	0.445	26.000	0.034	115.396	0.002	26.000	0.000
L3	90.25 - 44.5 (3)	TP51.014x40.302x0.375	21670.000	0.369	26.000	0.028	142.697	0.001	26.000	0.000
L4	44.5 - 0 (4)	TP59.61x48.899x0.5	25528.699	0.272	26.000	0.021	174.571	0.001	26.000	0.000

Pole Interaction Design Data

Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	188 - 137 (1)	0.009	0.539	0.000	0.043	0.000	0.549 ✓	1.333	H1-3+VT ✓
L2	137 - 90.25 (2)	0.011	0.818	0.000	0.034	0.000	0.829 ✓	1.333	H1-3+VT ✓
L3	90.25 - 44.5 (3)	0.012	0.844	0.000	0.028	0.000	0.856 ✓	1.333	H1-3+VT ✓
L4	44.5 - 0 (4)	0.013	0.711	0.000	0.021	0.000	0.724 ✓	1.333	H1-3+VT ✓

Section Capacity Table

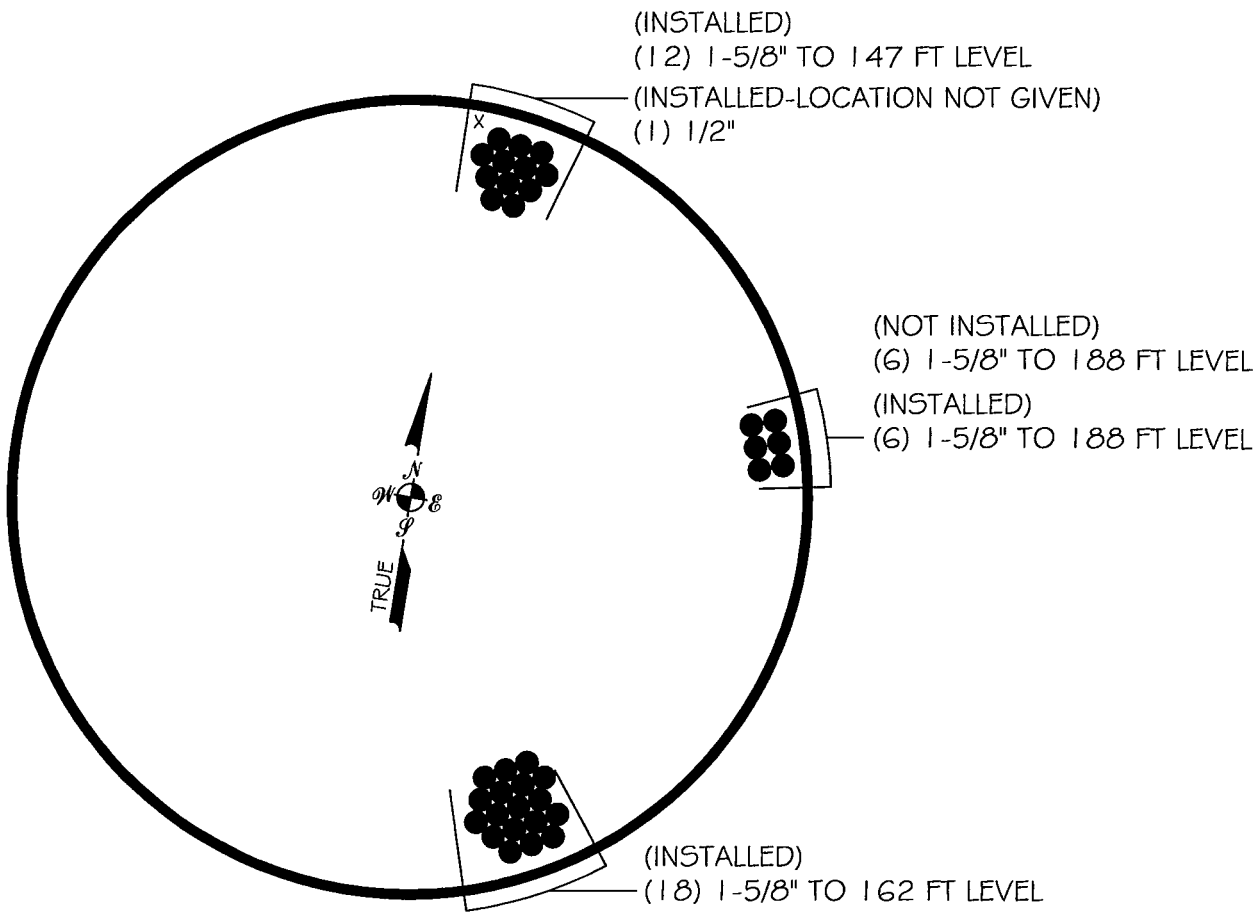
Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	$SF*P_{allow}$ lb	% Capacity	Pass Fail
L1	188 - 137	Pole	TP32.711x22x0.25	1	-9204.130	1302250.302	41.2	Pass
L2	137 - 90.25	Pole	TP42.03x31.318x0.313	2	-17035.301	2094289.54	62.2	Pass

RISATower	Job	Page
	CT New Britain 3 CAC BU # 803175	9 of 9
Tower Engineering Professionals, Inc. 3707 Junction Blvd. Raleigh, NC 27603 Phone: (919) 661-6351 FAX: (919) 661-6350	Project TEP # 100063	Date 15:06:35 01/13/10
	Client CCI	Designed by Matt Nichols, EI

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	$SF*P_{allow}$ lb	% Capacity	Pass Fail
L3	90.25 - 44.5	Pole	TP51.014x40.302x0.375	3	-27926.500	3048944.11	64.2	Pass
L4	44.5 - 0	Pole	TP59.61x48.899x0.5	4	-46510.000	3 4876780.29 8	54.3	Pass
						Summary		
						Pole (L3)	64.2	Pass
						RATING =	**64.2**	**Pass**

APPENDIX B

BASE LEVEL DRAWING



COAX PLAN

PREPARED BY:	PREPARED FOR:	PROJECT INFORMATION:	
TOWER ENGINEERING PROFESSIONALS 3703 JUNCTION BOULEVARD RALEIGH, NC 27603-5263 (919) 661-6351	CROWN CASTLE INTERNATIONAL Crown Castle USA Inc. 3530 TORINGDON WAY, SUITE 300 CHARLOTTE, NC 28277	**CT NEW BRITAIN 3 CAC** **SITE # 803175** LESTER ROAD NEW BRITAIN, CT 06050 (HARTFORD COUNTY)	REVISION: 0 TEP JOB #: 100063 SHEET NUMBER: **M-1**

APPENDIX C

ADDITIONAL CALCULATIONS

Square, Unstiffened Base Plate, Any Rod Material - Rev. F

Assumptions: Rod groups at corners. Total # rods divisible by 4. Maximum total # of rods = 48.
Rod Spacing = Straight Center-to-Center distance between any (2) adjacent rods (same corner)

Site Data

BU#: *803175*
Site Name: *CT New Britain 3 CAC*
App #: *93078*

Reactions		
Moment:	3160.642	ft-kips
Axial:	46.521	kips
Shear:	25.508	kips

Connection Type: *Butt*

Anchor Rod Data		
Qty:	20	
Diam:	2.25	in
Rod Material:	A615-J	
Grade(Fy):	75	ksi
Bolt Circle:	67	in
Anchor Spacing:	6.125	in

Plate Data		
W=Side:	66	in
Thick:	3	in
Grade:	50	ksi
B effective	33.73	in

Pole Data		
Diam:	59.61	in
Thick:	0.5	in
Grade:	65	ksi

Stress Increase Factor		
ASIF:	1.333	

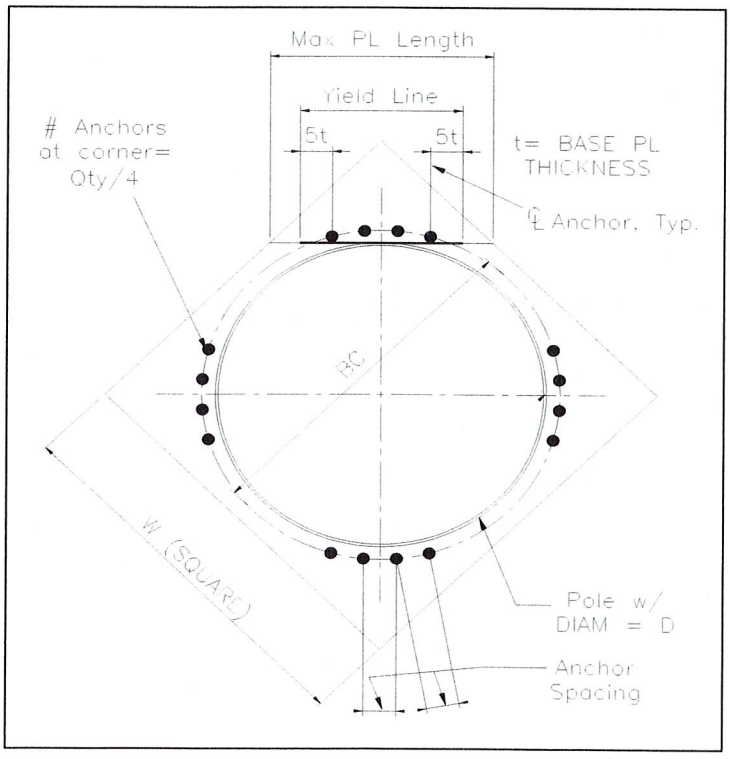
Anchor Rod Results

Maximum Rod Tension:	110.9 Kips
Allowable Tension:	195.0 Kips
Anchor Rod Stress Ratio:	56.9% **Pass**

Base Plate Results

Base Plate Stress:	28.8 ksi
Allowable Plate Stress:	50.0 ksi
Base Plate Stress Ratio:	57.7% **Pass**

PL Ref. Data
Yield Line (in):
33.73
Max PL Length:
33.73



JOB:	BU # 803175 - TEP # 100063		
SHEET #:	1	OF	2
CALCULATED BY:	MAN	DATE	1/13/2010
CHECKED BY:	CGP	DATE	1/13/2010

Pad and Pier Foundation for Monopole

Q_a, ALLOWABLE SOIL PRESS. (ksf)	6
SAFETY FACTOR IN Q_a	2
SOIL DENSITY (pcf)	110

CODE	Rev F
F'c (ksi)	3
F'y (ksi)	60

Base Reactions(x-x,y-y)

M, MOMENT (k-ft)	3160.6
P_t, TOTAL DOWNLOAD (k)	46.5
H, HORIZONTAL SHEAR (k)	25.5

Base Reactions (z-z)

M (k-ft)	3160.6
P_t (k)	46.5
H (k)	25.5

Try:	L (ft.)	B (ft.)	t (ft.)	Soil depth to top of mat (ft.)	Pier dia./width (ft.)	Pier Height, h (cu.ft.)	Pier Shape
	26	26	3	1.833	8.00	4.00	Square

W_f, WEIGHT OF FOUNDATION (k) =	342.6	Concrete Vol. (cu ft)	103.6
W_s, WEIGHT OF SOIL (k) =	123.4		

CHECK DESIGN CRITERIA

CHECK STABILITY:

Mst= P * (L/2) + (Vf+s * L/2) =	6663.0 k-ft	
Mot = M+H*(t+h) =	3339.2 k-ft	
Mst/Mot =	2.0 > 1.5	**O.K.**

Uplift Capacity = 75.2%

CHECK SOIL PRESSURE

P = P_t + W_f + W_s =	512.5 k		
e = M / P =	6.51 ft		
L/6 =	4.33 ft		
Width of Wedge, WW = 3(L/2 - e) =	19.46 ft		
x-x Axis: Qmax = P/(1/2*WW*L) =	2.03 ksf < Qa		**O.K.**
z-z Axis: e/L = 0.251 ⟹	Qmax =	2.73 ksf	**O.K.**

Bearing Capacity = 45.5%

JOB: BU # 803175 - TEP # 100063

SHEET NUMBER: 2 OF 2

CALCULATED BY: MAN DATE 1/13/2010

CHECKED BY: CGP DATE 1/13/2010

SCALE:

CHECK BEAM SHEAR

Vu = 264.2 k

φVc = 897.2 k Vc > Vu **O.K.**

CHECK PUNCHING SHEAR

v_u = 12.5 psi

φv_c = 186.2 psi Vc > Vu **O.K.**

CALCULATE REINFORCING REQUIRED

Bar dia.= 1.410 in. F'c = 3.0 ksi F'y = 60.0 ksi

d = 30.9 in.

Minimum reinforcing per face, As,min = (0.0018 * Ag)/2 = 0.39 in^2/ft (ACI 318 Sec. 10.5.4)

BOTTOM REINFORCING

Mu= 457.0 in-k/ft **Flexural steel designed for greater of Moment at pier face or 60% of Unbalanced Moment**

φMn=0.9*As*Fy*d(1-0.59*As*Fy/(b*d*F'c))

Solution: As,req = 0.28 in^2/ft **As,req < As,min, Use As,min**

Analysis Check:

Bar Spacing, c-c: 9.0

Actual As = 2.08 in^2/ft **Bottom Reinforcing O.K.**

TOP REINFORCING

Mu= 457.0 in-k/ft **Flexural steel designed for greater of Moment at pier face or 60% of Unbalanced Moment**

φMn=0.9*As*Fy*d(1-0.59*As*Fy/(b*d*F'c))

Solution: As,req = 0.28 in^2/ft **As,req < As,min, Use As,min**

Analysis Check:

Bar Spacing, c-c: 9.0

Actual As = 2.08 in^2/ft **Top Reinforcing O.K.**