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

November 18, 2009

Thomas J. Regan, Esq.
Brown Rudnick LLP
CityPlace I, 185 Asylum Street
Hartford, CT 06103

RE: **EM-CLEARWIRE-014-091023** – Clearwire Corporation notice of intent to modify an existing telecommunications facility located at 850 West Main Street, Branford, Connecticut.

Dear Attorney Regan:

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 October 23, 2009, 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 Anthony "Unk" DaRos, First Selectman, Town of Branford
Diana Ross, Inland Wetland Enforcement Officer, Town of Branford
Justine K. Gillen, Zoning Enforcement Officer, Town of Branford
Crown Castle USA, Inc.

CSC
CONNECTICUT SITING COUNCIL

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

October 30, 2009

The Honorable Anthony "Unk" DaRos
First Selectman
Town of Branford
Town Hall
1019 Main Street
P. O. Box 150
Branford, CT 06405-0150

RE: **EM-CLEARWIRE-014-091023** – Clearwire Corporation notice of intent to modify an existing telecommunications facility located at 850 West Main Street, Branford, Connecticut.

Dear First Selectman DaRos:

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

If you have any questions or comments regarding this proposal, please call me or inform the Council by November 13, 2009.

Thank you for your cooperation and consideration.

Very truly yours,

S. Derek Phelps
Executive Director

SDP/jbw

Enclosure: Notice of Intent

c: Diana Ross, Inland Wetland Enforcement Officer, Town of Branford
Justine K. Gillen, Zoning Enforcement Officer, Town of Branford

CSC
CONNECTICUT SITING COUNCIL

BROWNRUDNICK

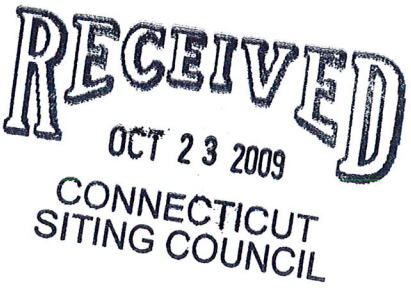
CityPlace I
185 Asylum
Street
Hartford
Connecticut
06103
tel 860.509.6500
fax 860.509.6501

THOMAS J. REGAN
Direct Dial: (860) 509-6522
tregan@brownrudnick.com

ORIGINAL

Via Hand Delivery

October 23, 2009



Daniel F. Caruso, Chairman
Connecticut Siting Council
10 Franklin Square
New Britain, CT 06051

RE: Clearwire Corporation - Exempt Modifications (13)

Dear Mr. Caruso:

On behalf of Clearwire Corporation, enclosed for filing you will find an original and five (5) copies each of thirteen (13) *"Notice to Make an Exempt Modification to an Existing Facility"*, as follows:

1. Branford @ 850 West Main Street
2. Hamden @ 2755 State Street
3. Milford @ 111 Schoolhouse Road
4. Milford @ 160 Wampus Lane
5. Milford @ 528 Wheelers Farm Road
6. Naugatuck @ 280 Elm Street
7. North Haven @ 117 Washington Street
8. Norwalk @ 50 Rockland Road
9. Orange @ 700 Grassy Hill Road
10. Trumbull @ 307 Indian Ledge Park Road
11. Waterbury @ 150 Mattatuck Heights
12. West Haven @ 85 Plainfield Avenue
13. Westport @ 515 Post Road East (f/k/a 515 Boston Post Road

I have also enclosed a copy of this transmittal letter which I would like to have date-stamped and returned to the courier delivering this package.

Also enclosed are thirteen (13) checks in the amount of $500.00 each to cover the filing fee. If you have any questions, please feel free to contact me.

Very truly yours,

BROWN RUDNICK LLP

By: _____
Thomas J. Regan

TJR/bh
Enclosures

40265787 v1 - REGANTJ - 025064/0017

cc/encls: via 1st Class Mail:

Town of Branford
Town Hall
First Selectman Anthony DaRos
1019 Main Street
Branford, CT 06405

Town of Hamden
Mayor Craig Henrici
Hamden Government Center
2750 Dixwell Avenue
Hamden, CT 06518

City of Milford
City Hall
Mayor James L. Richetelli, Jr
110 River Street
Milford, CT 06460

Borough of Naugatuck
Mayor Robert A. Mezzo
229 Church Street
Naugatuck, CT 06770

Town of Orange
Town Hall
First Selectman James Zeoli
617 Orange Center Road
Orange, CT 06477

Town of North Haven
First Selectman Janet M. McCarty
18 Church Street
North Haven, CT 06473

City of Norwalk
Mayor Richard A. Moccia
Office of Mayor
125 East Avenue
P.O. Box 5125
Norwalk, CT 06856-5125

Town of Trumbull
Town Hall
Raymond G. Baldwin, Jr., First Selectman
5866 Main Street
Trumbull, CT 06611

City of Waterbury
Chase Municipal Building
Mayor Michael J. Jarjura
236 Grand St.
Waterbury, CT 06702

City of West Haven
Mayor John M. Picard
City Hall, 3rd Floor
West Haven, CT 06516

Town of Westport
Selectman's Office
Selectman Gordon F. Joseloff
110 Myrtle Avenue, Room 310
Westport, CT 06880

EM-CLEARWIRE-014-091023

COUNCIL

ORIGINAL

In re:

Clearwire Corporation's Notice to Make an Exempt Modification to an Existing Facility at 850 West Main Street, Branford, Connecticut.	:	**EXEMPT MODIFICATION NO. _____**
	:	October 23, 2009

NOTICE OF EXEMPT MODIFICATION

Pursuant to Conn. Agencies Regs. §§ 16-50j-73 and 16-50j-72(b), Clearwire Corporation ("Clearwire") hereby gives notice to the Connecticut Siting Council ("Council") and the Town of Branford of Clearwire's intent to make an exempt modification to an existing monopole tower (the "Tower") located at 850 West Main Street in Branford, Connecticut. Specifically, Clearwire plans to add 3 WiMAX antennas, 3 Samsung Remote Radio Heads ("Remote Radio Heads") and 3 Dragonwave dishes required for backhaul. Under the Council's regulations (Conn. Agencies Regs. § 16-50j-72(b)), Clearwire's plans do not constitute a modification subject to the Council's review because Clearwire will not change the height of the tower, will not extend the boundaries of the compound, will not increase the noise levels at the site, and will not increase the total radio frequency electromagnetic radiation power density at the site to levels above applicable standards.

Clearwire is currently developing a 4G wireless broadband network to provide high-speed wireless data and VoIP service within the State of Connecticut. Clearwire's 4G service leverages the WiMAX technology to enable enhanced wireless data communications. In order to accomplish the upgrade at this site, Clearwire plans to add 3 WiMAX antennas, 3 Remote Radio Heads, 3 dishes and install additional WiMAX-related electronic equipment at the base of the Tower.

BROWN RUDNICK LLP
CITYPLACE I
185 ASYLUM STREET
HARTFORD, CT 06103
(860) 509-6500

The Tower is a 130-foot monopole tower located at 850 West Main Street in Branford, Connecticut (latitude 41° 16' 40.188" N, longitude 72° 50' 12.696" W). The Tower is owned by Crown Castle. Multiple carriers are currently located on the Tower. Presently, Sprint has 6 CDMA antennas spread over three sectors with an antenna centerline at 118 feet. Sprint's base station equipment is located adjacent to the base of the Tower. A site plan with the Tower specifications is attached.

Clearwire plans to locate 3 additional WiMAX antennas and 3 Remote Radio Heads on the Tower (one per sector). Clearwire will also add 3 Dragonwave dishes. The new antennas, Remote Radio Heads and dishes will have the same centerline as the existing antennas –118 feet. Six cables, 5/16" in diameter, will run to the new WiMAX antennas (two per panel). Additionally, 3 coax cables, ½" in diameter, will run to the new dishes (one per dish). To confirm that the Tower can support these changes, Clearwire commissioned Crown Castle USA Inc. to perform a structural analysis of the Tower (attached). According to the structural analysis dated September 21, 2009, " ...the tower stress level for the structure and foundation, under the following load case ... LC1: Existing + Reserved + Proposed Equipment [is] Sufficient Capacity" (Page 1, Structural Analysis Report).

Within the existing compound Clearwire will install one WiMAX power cabinet on the existing steel frame which is mounted on the existing 8' by 11' (approximately) concrete pad. Hence, no increase in the size of the concrete pad is necessary. Excluding brief, minor, construction-related noise during the addition of the antennas and dishes and the installation of the equipment cabinets, the proposed changes to the Tower will not increase noise levels at the site.

BROWN RUDNICK LLP
CITYPLACE I
185 ASYLUM STREET
HARTFORD, CT 06103
(860) 509-6500

The addition of the new WiMAX antennas, Remote Radio Heads and dishes will not adversely impact the health and safety of the surrounding community or the people working on the

Tower. The total radio frequency exposure measured around the Tower will be below the National Council on Radiation Protection and Measurements' ("NCRP") standard adopted by the Federal Communications Commission ("FCC"). The worst-case power density analysis for the antennas, measured at the base of the Tower, indicates that the proposed antennas will emit .000633% of the NCRP's standard for maximum permissible exposure. A cumulative power density analysis indicates that together, all of the antennas on the Tower will emit 27.32% of the NCRP's standard for maximum permissible exposure. Therefore, the power density levels will be below the FCC mandated radio frequency exposure limits in all locations around the Tower, even with extremely conservative assumptions. The power density analysis is attached.

In conclusion, Clearwire's proposed plan to add 3 WiMAX antennas, 3 Remote Radio Heads, 3 dishes and WiMAX associated base station equipment does not constitute a modification subject to the Council's jurisdiction because Clearwire will not increase the height of the Tower, will not extend the boundaries of the site, will not increase the noise levels at the site, and the total radio frequency electromagnetic radiation power density will stay within all applicable standards. *See* Conn. Agencies Regs. § 16-50j-72.

Clearwire Corporation

By: _____

Thomas J. Regan
Brown Rudnick LLP
185 Asylum Street, CityPlace I
Hartford, CT 06103-3402
Email - tregan@brownrudnick.com
Phone - 860.509.6522
Fax - 860.509.6622

BROWN RUDNICK LLP
CITYPLACE I
185 ASYLUM STREET
HARTFORD, CT 06103
(860) 509-6500

Certificate of Service

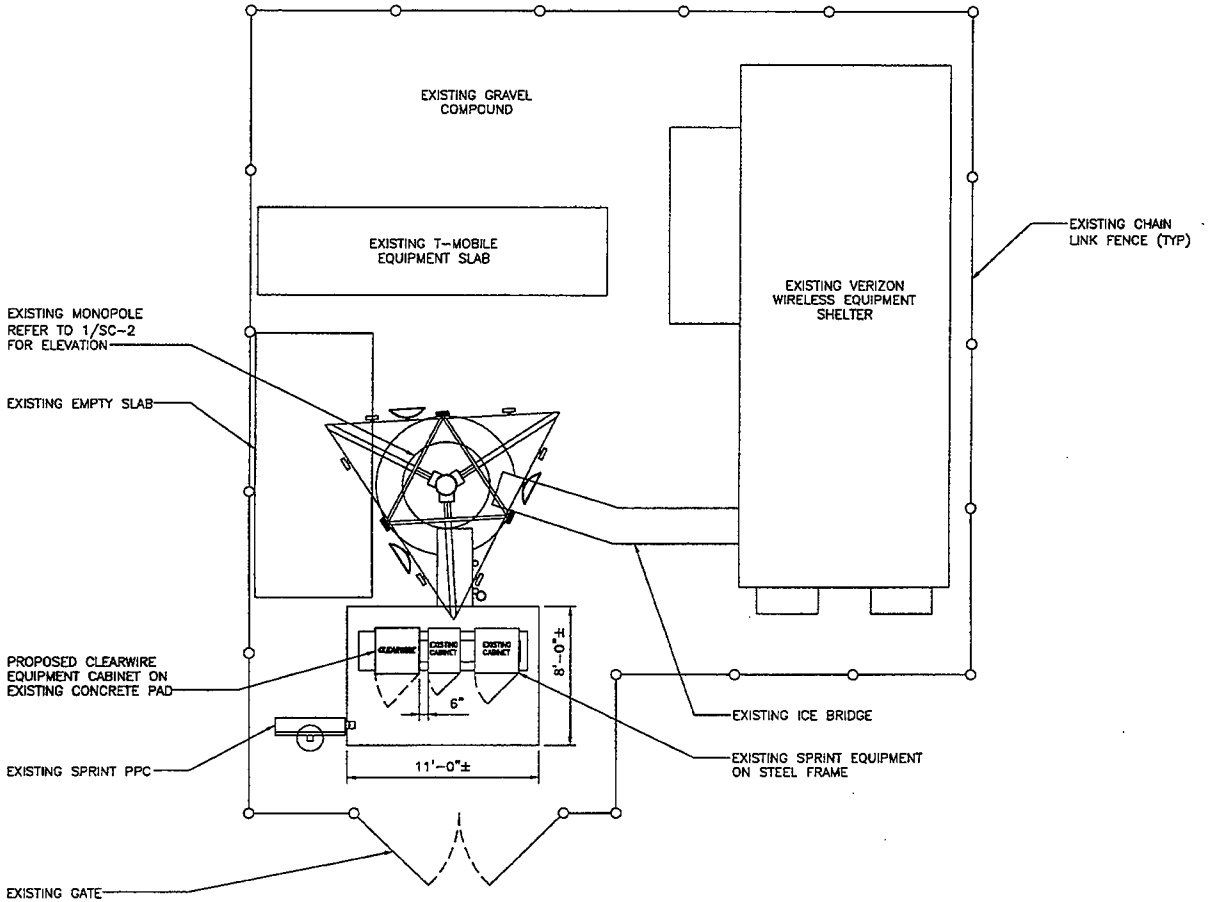
This is to certify that on this 23rd day of October, 2009, the foregoing Notice of Exempt Modification was sent, via first class mail, to the following:

Town of Branford
Town Hall
First Selectman Anthony DaRos
1019 Main Street
Branford, CT 06405

By: _____
Thomas J. Regan

40265783 v1 - 025064/0017

BROWN RUDNICK LLP
CITYPLACE I
185 ASYLUM STREET
HARTFORD, CT 06103
(860) 509-6500



1 / SC-1 SITE PLAN
SCALE: 3/32" = 1'-0"

ANTENNA AZIMUTHS:
SECTOR (1) = 30°
SECTOR (2) = 150°
SECTOR (3) = 270°

clearwire
4400 CARILLON POINT
KIRKLAND, WA 98033

TRANSCEND WIRELESS, LLC
10 INDUSTRIAL AVENUE
MAHWAH, NJ 07430

A&E FIRM
URS CORPORATION AES
500 ENTERPRISE DRIVE, SUITE 3B
ROCKY HILL, CONNECTICUT
1-(860)-529-8882

NO.	DATE	REVISIONS	BY	CHK	APP'D
2	10/20/09	FINAL	KAP	JCF	ICA
1	10/06/09	REVIEW	KAP	JCF	ICA

NOT TO SCALE | DESIGNED BY: JCF | DRAWN BY: KAP

A&E SEAL

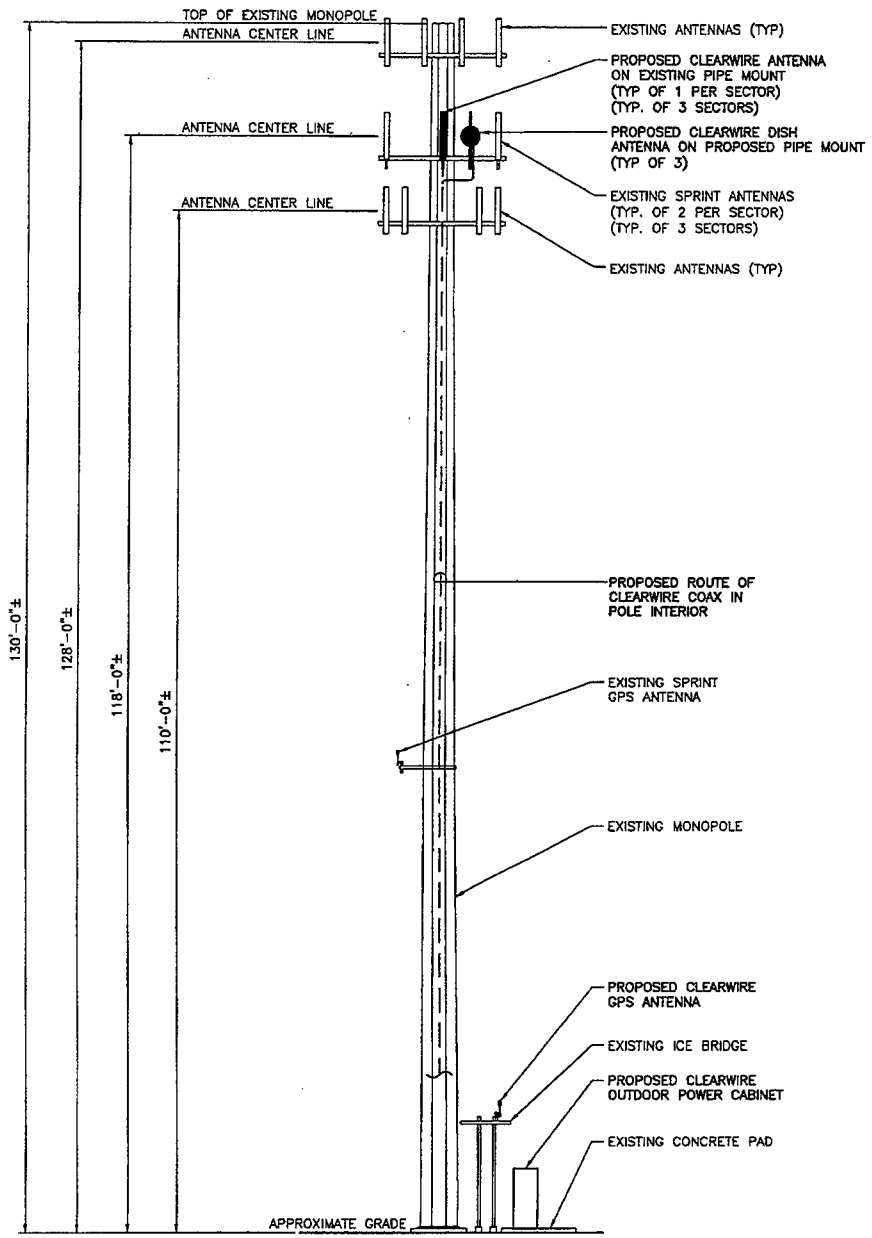
STATE OF CONNECTICUT
IGNACIO C. ARIAS
No. 8704
LICENSED ARCHITECT

BEACON HILL

CT-NHN0104

850 WEST MAIN STREET
BRANFORD, CT 06405

PROJECT NO.	DRAWING NAME	DATE	SHEET NO.	REV
TW3-015 36924371	SC-1	10/06/09	1 OF 2	0



1 / SC-2 MONOPOLE ELEVATION
SCALE: 1" = 20'-0"

ANTENNA AZIMUTHS:
SECTOR (1) = 30°
SECTOR (2) = 150°
SECTOR (3) = 270°

clearwire
4400 CARILLON POINT
KIRKLAND, WA 98033

TRANSCEND WIRELESS, LLC
10 INDUSTRIAL AVENUE
MAHWAH, NJ 07430

A&E FIRM
URS CORPORATION AES
500 ENTERPRISE DRIVE, SUITE 3B
ROCKY HILL, CONNECTICUT
1-(860)-529-8882

NO.	DATE	REVISIONS	BY	CHK	APP'D
2	10/20/09	FINAL	KAP	JCF	ICA
1	10/05/09	REVIEW	KAP	JCF	ICA

NOT TO SCALE | DESIGNED BY: JCF | DRAWN BY: KAP

A&E SEAL

STATE OF CONNECTICUT
IGNACIO C. ARTIGAS
No. 8704
LICENSED ARCHITECT

BEACON HILL

CT-NHN0104

850 WEST MAIN STREET
BRANFORD, CT 06405

PROJECT NO.	DRAWING NAME	DATE	SHEET NO.	REV
TW3-015 36924371	SC-2	10/06/09	2 OF 2	0

Date: **September 21, 2009**

Veronica Harris
Crown Castle USA Inc.
1200 McArthur Blvd
Mahwah, NJ 07430

Crown Castle USA Inc.
2000 Corporate Dr.
Canonsburg, PA 15317
(724) 416-2000

Subject: **Structural Analysis Report**

Carrier Designation:	***Clearwire Corp* Co-Locate**	
	Carrier Site Number:	CT-NHN0104
	Carrier Site Name:	N/A
Crown Castle Designation:	**Crown Castle BU Number:**	876322
	Crown Castle Site Name:	TARTAGLIA PROPERTY
	Crown Castle JDE Job Number:	124230
	Crown Castle Work Order Number:	291502
Engineering Firm Designation:	**Crown Castle USA Inc. Project Number:**	291502
Site Data:	**850 West Main Street, BRANFORD, New Haven County, CT** **Latitude *41° 16' 40.188"*, Longitude *-72° 50' 12.696"*** **130 Foot - Monopole Tower**	

Dear Veronica Harris,

Crown Castle USA 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 291502, in accordance with application 87143, revision 3.

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 85 mph fastest mile.

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

We at *Crown Castle USA 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.

Structural analysis prepared by: Christopher Volk, E.I.T.

Respectfully submitted by:

Aaron C. Poot, P.E.
Engineering Supervisor

STATE OF CONNECTICUT
AARON C. POOT
No. 25050
LICENSED PROFESSIONAL ENGINEER

9/21/09

TABLE OF CONTENTS

1) INTRODUCTION

This Monopole tower was originally designed for 120 ft height by SUMMIT in June of 1998 for a wind speed of 90 mph per TIA/EIA-222-F. The monopole was extended for 10 ft height in 2007 per drawings prepared by Tower Engineering Professionals making a total height of 130 ft.

2) ANALYSIS CRITERIA

The structural analysis was performed for this tower in accordance with the requirements of TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a fastest mile wind speed of 85 mph with no ice, 73.6 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
118	124	3	dragonwave	A-ANT-23G-2-C	3 6	1/2 5/16	-
	120	3	argus technologies	LLPX310R w/ Mount Pipe			
		3	samsung telecommunications	FDD_R6_RRH			

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
128	130	6	generic	TMA	6	1-5/8	1
		12	generic	TMA	12	1-5/8	2
		6	rfs celwave	APX16PV-16PVL-E w/ Mount Pipe			
		6	rfs celwave	APXV18-206516L-C w/ Mount Pipe	-	-	1
	128	1	tower mounts	Platform Mount [LP 305-1]			
118	122	6	decibel	DB980H90E-M w/ Mount Pipe	6	1-5/8	1
	118	1	tower mounts	Platform Mount [LP 712-1]			
110	114	1	kathrein	OG-860/1920/GPS-A	12 1	1-5/8 1/2	1
	111	6	decibel	DB844H90E-XY w/ Mount Pipe			
		6	decibel	DB948H90E-M w/ Mount Pipe			
	110	1	tower mounts	Platform Mount [LP 712-1]			
50	52	1	kathrein	OG-860/1920/GPS-A	1	5/16	1
	50	1	tower mounts	Pipe Mount [PM 501-1]			

Notes:
1) Existing Equipment
2) SLA Equipment Controlling, was used in analysis

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)
120	120	12	Decibel	DB980H	-	-
110	110	12	Generic	Panel Antennas	-	-
100	100	12	Generic	Panel Antennas	-	-
85	85	2	Generic	Whip Antennas	-	-
50	50	1	Generic	GPS Antenna	-	-

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	Goodkind & O'Dea, Inc.	1614542	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	Summit Manufacturing Inc.	1613605	CCISITES
4-TOWER MANUFACTURER DRAWINGS	Summit Manufacturing Inc.	1529811	CCISITES
4-TOWER REINFORCEMENT DESIGN/DRAWINGS/DATA	Tower Engineering Professionals	2483868	CCISITES

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. Crown Castle USA 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 (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	130 - 120.5	Pole	TP18.5x18.5x0.375	1	-2.07	597.43	11.8	Pass
L2	120.5 - 120	Pole	TP22x18.5x0.375	2	-2.09	612.65	12.8	Pass
L3	120 - 77	Pole	TP29.472x22x0.25	3	-8.74	1195.66	66.8	Pass
L4	77 - 37.75	Pole	TP36.308x28.3204x0.3125	4	-14.68	1839.26	81.2	Pass

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L5	37.75 - 0	Pole	TP42.48x34.8471x0.375	5	-23.68	2643.11	84.0	Pass
							Summary	
						Pole (L5)	84.0	Pass
						Rating =	84.0	Pass

Table 6 - Tower Component Stresses vs. Capacity - LC1

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	51.9	Pass
1	Base Plate	0	61.3	Pass
1	Base Foundation	0	40.5	Pass
1	120' Flange Bolts	120	18.9	Pass
1	120' Flange Plate	120	12.3	Pass

Structure Rating (max from all components) =	84%

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 loading. No modifications are required at this time.

Critical Deflections and Radius of Curvature - Service Wind

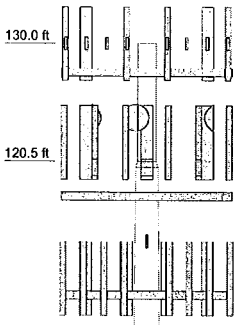
Elevation *ft*	*Appurtenance*	*Gov. Load Comb.*	*Deflection* *in*	*Tilt* *°*	*Twist* *°*	*Radius of Curvature* *ft*
124.00	A-ANT-23G-2-C	27	25.916	1.7944	0.0023	32254

APPENDIX A

RISA TOWER OUTPUT

Section	1	2	3	4	5
Length (ft)	9.50	0.50	43.00	43.00	42.25
Number of Sides	1	12	12	12	12
Thickness (in)	0.3750	0.3750	0.2500	0.3125	0.3750
Lap Splice (ft)			3.75	4.50	
Top Dia (in)	18.5000	18.5000	22.0000	28.3204	34.8471
Bot Dia (in)	18.5000	22.0000	29.4720	36.3080	42.4800
Grade	A53-B-35			A572-65	
Weight (K)	0.7	0.0	3.0	4.7	6.6

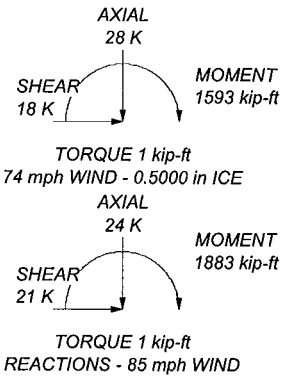
15.1



77.0 ft

37.8 ft

0.0 ft



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
(2) APX16PV-16PVL-E w/ Mount Pipe	128	FDD_R6_RRH	118
(4) TMA	128	Platform Mount [LP 712-1]	118
(2) APX16PV-16PVL-E w/ Mount Pipe	128	A-ANT-23G-2-C	118
(4) TMA	128	A-ANT-23G-2-C	118
(2) APX16PV-16PVL-E w/ Mount Pipe	128	A-ANT-23G-2-C	118
(4) TMA	128	(2) DB844H90E-XY w/ Mount Pipe	110
Platform Mount [LP 305-1]	128	(2) DB948H90E-M w/ Mount Pipe	110
(2) DB980H90E-M w/ Mount Pipe	118	(2) DB844H90E-XY w/ Mount Pipe	110
LLPX310R w/ Mount Pipe	118	(2) DB948H90E-M w/ Mount Pipe	110
FDD_R6_RRH	118	Platform Mount [LP 712-1]	110
(2) DB980H90E-M w/ Mount Pipe	118	(2) DB844H90E-XY w/ Mount Pipe	110
LLPX310R w/ Mount Pipe	118	(2) DB948H90E-M w/ Mount Pipe	110
FDD_R6_RRH	118	OG-860/1920/GPS-A	110
(2) DB980H90E-M w/ Mount Pipe	118	Pipe Mount [PM 501-1]	50
LLPX310R w/ Mount Pipe	118	OG-860/1920/GPS-A	50

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A53-B-35	35 ksi	63 ksi	A572-65	65 ksi	80 ksi

TOWER DESIGN NOTES

1. Tower is located in New Haven County, Connecticut.
2. Tower designed for a 85 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 74 mph basic wind with 0.50 in ice.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 84%

CROWN CASTLE
Shaping the Wireless World

Crown Castle USA Inc.
2000 Corporate Dr.
Canonsburg, PA 15317
Phone: (724) 416-2000
FAX: (724) 416-2254

Job: **BU# 876322**			
Project:			
Client: Crown Castle USA, Inc.	Drawn by: cvolk	App'd:	
Code: TIA/EIA-222-F	Date: 09/18/09	Scale: NTS	
Path: R:\SA Models - Letters\Work Area\CVolk\876322\876322.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 New Haven County, Connecticut.
Basic wind speed of 85 mph.
Nominal ice thickness of 0.5000 in.
Ice density of 56 pcf.
A wind speed of 74 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 50 mph.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in pole design is 1.333.
Local bending stresses due to climbing loads, feedline supports, and appurtenance mounts are not considered.

Options

Consider Moments - Legs	Distribute Leg Loads As Uniform	Treat Feedline Bundles As Cylinder
Consider Moments - Horizontals	Assume Legs Pinned	Use ASCE 10 X-Brace Ly Rules
Consider Moments - Diagonals	√ Assume Rigid Index Plate	Calculate Redundant Bracing Forces
Use Moment Magnification	√ Use Clear Spans For Wind Area	Ignore Redundant Members in FEA
√ Use Code Stress Ratios	Use Clear Spans For KL/r	SR Leg Bolts Resist Compression
√ Use Code Safety Factors - Guys	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	130.00-120.50	9.50	0.00	Round	18.5000	18.5000	0.3750		A53-B-35 (35 ksi)
L2	120.50-120.00	0.50	0.00	12	18.5000	22.0000	0.3750	1.5000	A53-B-35 (35 ksi)
L3	120.00-77.00	43.00	3.75	12	22.0000	29.4720	0.2500	1.0000	A572-65 (65 ksi)
L4	77.00-37.75	43.00	4.50	12	28.3204	36.3080	0.3125	1.2500	A572-65 (65 ksi)
L5	37.75-0.00	42.25		12	34.8471	42.4800	0.3750	1.5000	A572-65 (65 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	18.5000	21.3422	877.5217	6.4162	9.2500	94.8672	1752.6528	10.6701	0.0000	0
	18.5000	21.3422	877.5217	6.4162	9.2500	94.8672	1752.6528	10.6701	0.0000	0
L2	19.1526	21.8859	917.7135	6.4887	9.5830	95.7647	1859.5364	10.7716	3.9530	10.541
	22.7761	26.1122	1558.6243	7.7417	11.3960	136.7694	3158.1954	12.8516	4.8910	13.043
L3	22.7761	17.5087	1057.2060	7.7865	11.3960	92.7699	2142.1860	8.6173	5.2260	20.904
	30.5117	23.5237	2563.9623	10.4615	15.2665	167.9470	5195.2828	11.5777	7.2285	28.914
L4	30.0406	28.1829	2821.8387	10.0268	14.6700	192.3550	5717.8103	13.8708	6.7524	21.608
	37.5888	36.2205	5990.1331	12.8864	18.8075	318.4963	12137.6337	17.8266	8.8930	28.458
L5	36.9180	41.6250	6313.5811	12.3410	18.0508	349.7676	12793.0270	20.4866	8.3340	22.224
	43.9785	50.8418	11504.6684	15.0736	22.0046	522.8292	23311.5772	25.0228	10.3796	27.679

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 130.00-120.50				1	1	1		
L2 120.50-120.00				1	1	1		
L3 120.00-77.00				1	1	1		
L4 77.00-37.75				1	1	1		
L5 37.75-0.00				1	1	1		

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
LDF7-50A(1-5/8")	A	No	Inside Pole	128.00 - 0.00	12	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
FLC 158-50J(1-5/8")	C	No	Inside Pole	118.00 - 0.00	6	No Ice	0.00	0.92
						1/2" Ice	0.00	0.92
7983A(1/2")	C	No	Inside Pole	118.00 - 0.00	3	No Ice	0.00	0.08
						1/2" Ice	0.00	0.08
9207(5/16")	C	No	Inside Pole	118.00 - 0.00	6	No Ice	0.00	0.60
						1/2" Ice	0.00	0.60
LDF4-50A(1/2")	B	No	Inside Pole	110.00 - 0.00	1	No Ice	0.00	0.15
						1/2" Ice	0.00	0.15
LDF7-50A(1-5/8")	B	No	Inside Pole	110.00 - 0.00	12	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
860 10000(5/16")	B	No	Inside Pole	50.00 - 0.00	1	No Ice	0.00	0.04
						1/2" Ice	0.00	0.04

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	130.00-120.50	A	0.000	0.000	0.000	0.000	0.07
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.00
L2	120.50-120.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.00
L3	120.00-77.00	A	0.000	0.000	0.000	0.000	0.42
		B	0.000	0.000	0.000	0.000	0.33
		C	0.000	0.000	0.000	0.000	0.38
L4	77.00-37.75	A	0.000	0.000	0.000	0.000	0.39
		B	0.000	0.000	0.000	0.000	0.39
		C	0.000	0.000	0.000	0.000	0.37
L5	37.75-0.00	A	0.000	0.000	0.000	0.000	0.37
		B	0.000	0.000	0.000	0.000	0.38
		C	0.000	0.000	0.000	0.000	0.35

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	130.00-120.50	A	0.500	0.000	0.000	0.000	0.000	0.07
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.00
L2	120.50-120.00	A	0.500	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.00
L3	120.00-77.00	A	0.500	0.000	0.000	0.000	0.000	0.42
		B		0.000	0.000	0.000	0.000	0.33
		C		0.000	0.000	0.000	0.000	0.38
L4	77.00-37.75	A	0.500	0.000	0.000	0.000	0.000	0.39
		B		0.000	0.000	0.000	0.000	0.39
		C		0.000	0.000	0.000	0.000	0.37
L5	37.75-0.00	A	0.500	0.000	0.000	0.000	0.000	0.37
		B		0.000	0.000	0.000	0.000	0.38
		C		0.000	0.000	0.000	0.000	0.35

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	130.00-120.50	0.0000	0.0000	0.0000	0.0000
L2	120.50-120.00	0.0000	0.0000	0.0000	0.0000
L3	120.00-77.00	0.0000	0.0000	0.0000	0.0000
L4	77.00-37.75	0.0000	0.0000	0.0000	0.0000
L5	37.75-0.00	0.0000	0.0000	0.0000	0.0000

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
(2) APX16PV-16PVL-E w/ Mount Pipe	A	From Leg	4.00 0.00 2.00	0.0000	128.00	No Ice 1/2" Ice	6.94 7.44	3.29 4.00	0.06 0.10
(4) TMA	A	From Leg	4.00 0.00 2.00	0.0000	128.00	No Ice 1/2" Ice	0.68 0.80	0.45 0.56	0.01 0.02
(2) APX16PV-16PVL-E w/ Mount Pipe	B	From Leg	4.00 0.00 2.00	0.0000	128.00	No Ice 1/2" Ice	6.94 7.44	3.29 4.00	0.06 0.10
(4) TMA	B	From Leg	4.00 0.00 2.00	0.0000	128.00	No Ice 1/2" Ice	0.68 0.80	0.45 0.56	0.01 0.02
(2) APX16PV-16PVL-E w/ Mount Pipe	C	From Leg	4.00 0.00 2.00	0.0000	128.00	No Ice 1/2" Ice	6.94 7.44	3.29 4.00	0.06 0.10
(4) TMA	C	From Leg	4.00 0.00 2.00	0.0000	128.00	No Ice 1/2" Ice	0.68 0.80	0.45 0.56	0.01 0.02
Platform Mount [LP 305-1]	C	None		0.0000	128.00	No Ice 1/2" Ice	18.01 23.33	18.01 23.33	1.12 1.35
***									
(2) DB980H90E-M w/ Mount Pipe	A	From Leg	4.00 0.00 4.00	0.0000	118.00	No Ice 1/2" Ice	4.04 4.50	3.62 4.48	0.03 0.06
LLPX310R w/ Mount Pipe	A	From Leg	4.00 0.00 2.00	0.0000	118.00	No Ice 1/2" Ice	5.07 5.48	2.98 3.53	0.05 0.08
FDD_R6_RRH	A	From Leg	4.00 0.00 2.00	0.0000	118.00	No Ice 1/2" Ice	1.79 1.97	0.78 0.92	0.03 0.04
(2) DB980H90E-M w/ Mount Pipe	B	From Leg	4.00 0.00 4.00	0.0000	118.00	No Ice 1/2" Ice	4.04 4.50	3.62 4.48	0.03 0.06
LLPX310R w/ Mount Pipe	B	From Leg	4.00 0.00 2.00	0.0000	118.00	No Ice 1/2" Ice	5.07 5.48	2.98 3.53	0.05 0.08
FDD_R6_RRH	B	From Leg	4.00 0.00 2.00	0.0000	118.00	No Ice 1/2" Ice	1.79 1.97	0.78 0.92	0.03 0.04
(2) DB980H90E-M w/ Mount Pipe	C	From Leg	4.00 0.00 4.00	0.0000	118.00	No Ice 1/2" Ice	4.04 4.50	3.62 4.48	0.03 0.06
LLPX310R w/ Mount Pipe	C	From Leg	4.00 0.00 2.00	0.0000	118.00	No Ice 1/2" Ice	5.07 5.48	2.98 3.53	0.05 0.08
FDD_R6_RRH	C	From Leg	4.00 0.00 2.00	0.0000	118.00	No Ice 1/2" Ice	1.79 1.97	0.78 0.92	0.03 0.04
Platform Mount [LP 712-1]	C	None		0.0000	118.00	No Ice 1/2" Ice	24.53 29.94	24.53 29.94	1.34 1.65
***									
(2) DB844H90E-XY w/ Mount Pipe	A	From Leg	4.00 0.00 1.00	0.0000	110.00	No Ice 1/2" Ice	3.30 3.69	4.92 5.60	0.03 0.07
(2) DB948H90E-M w/ Mount Pipe	A	From Leg	4.00 0.00 1.00	0.0000	110.00	No Ice 1/2" Ice	2.03 2.39	3.67 4.28	0.03 0.05

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft²	C_AA_A Side ft²	Weight K
OG-860/1920/GPS-A	A	From Leg	4.00 0.00 4.00	0.0000	110.00	No Ice 1/2" Ice	0.33 0.43	0.40 0.51	0.00 0.01
(2) DB844H90E-XY w/ Mount Pipe	B	From Leg	4.00 0.00 1.00	0.0000	110.00	No Ice 1/2" Ice	3.30 3.69	4.92 5.60	0.03 0.07
(2) DB948H90E-M w/ Mount Pipe	B	From Leg	4.00 0.00 1.00	0.0000	110.00	No Ice 1/2" Ice	2.03 2.39	3.67 4.28	0.03 0.05
(2) DB844H90E-XY w/ Mount Pipe	C	From Leg	4.00 0.00 1.00	0.0000	110.00	No Ice 1/2" Ice	3.30 3.69	4.92 5.60	0.03 0.07
(2) DB948H90E-M w/ Mount Pipe	C	From Leg	4.00 0.00 1.00	0.0000	110.00	No Ice 1/2" Ice	2.03 2.39	3.67 4.28	0.03 0.05
Platform Mount [LP 712-1]	C	None		0.0000	110.00	No Ice 1/2" Ice	24.53 29.94	24.53 29.94	1.34 1.65
***									
OG-860/1920/GPS-A	A	From Leg	1.00 0.00 2.00	0.0000	50.00	No Ice 1/2" Ice	0.33 0.43	0.40 0.51	0.00 0.01
Pipe Mount [PM 501-1]	A	From Leg	0.50 0.00 0.00	0.0000	50.00	No Ice 1/2" Ice	3.47 4.45	1.67 2.10	0.05 0.06

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft²	Weight K
A-ANT-23G-2-C	A	Paraboloid w/o Radome	From Leg	4.00 -1.00 6.00	0.0000		118.00	2.17	No Ice 1/2" Ice	3.72 4.01	0.01 0.03
A-ANT-23G-2-C	B	Paraboloid w/o Radome	From Leg	4.00 -1.00 6.00	0.0000		118.00	2.17	No Ice 1/2" Ice	3.72 4.01	0.01 0.03
A-ANT-23G-2-C	C	Paraboloid w/o Radome	From Leg	4.00 -1.00 6.00	0.0000		118.00	2.17	No Ice 1/2" Ice	3.72 4.01	0.01 0.03
***											

Load Combinations

Comb. No.	Description
1	Dead Only

Comb. No.	Description
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
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	130 - 120.5	Pole	Max Tension	30	0.00	0.00	-0.00
			Max. Compression	14	-3.15	0.00	0.00
			Max. Mx	11	-2.08	27.37	0.46
			Max. My	2	-2.07	0.03	27.73
			Max. Vy	5	3.59	-27.37	0.48
			Max. Vx	2	-3.69	0.03	27.73
			Max. Torque	10			-0.38
L2	120.5 - 120	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-3.21	0.00	0.00
			Max. Mx	11	-2.13	29.18	0.53
			Max. My	2	-2.11	0.03	29.58
			Max. Vy	5	3.63	-29.18	0.55
			Max. Vx	2	-3.73	0.03	29.58
			Max. Torque	10			-0.38
L3	120 - 77	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-12.39	0.00	0.03

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Mx	11	-8.75	454.64	5.90
			Max. My	2	-8.74	0.01	459.00
			Max. Vy	5	13.51	-454.64	5.91
			Max. Vx	2	-13.61	0.01	459.00
			Max. Torque	10			-0.46
L4	77 - 37.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-18.81	0.00	0.16
			Max. Mx	11	-14.69	1049.32	11.26
			Max. My	2	-14.68	0.00	1058.11
			Max. Vy	5	17.39	-1049.32	11.26
			Max. Vx	2	-17.55	0.00	1058.11
			Max. Torque	10			-0.59
L5	37.75 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-28.28	0.00	0.16
			Max. Mx	11	-23.68	1867.15	16.89
			Max. My	2	-23.68	0.00	1882.65
			Max. Vy	5	21.33	-1867.15	16.89
			Max. Vx	2	-21.49	0.00	1882.65
			Max. Torque	10			-0.59

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	15	28.28	0.00	17.59
	Max. H_x	11	23.70	21.31	0.13
	Max. H_z	2	23.70	0.00	21.47
	Max. M_x	2	1882.65	0.00	21.47
	Max. M_z	5	1867.15	-21.31	0.13
	Max. Torsion	17	0.11	-15.14	8.77
	Min. Vert	1	23.70	0.00	0.00
	Min. H_x	5	23.70	-21.31	0.13
	Min. H_z	8	23.70	-0.00	-21.41
	Min. M_x	8	-1875.36	-0.00	-21.41
	Min. M_z	11	-1867.15	21.31	0.13
	Min. Torsion	10	-0.58	18.54	-10.73

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	23.70	0.00	0.00	-0.12	0.00	0.00
Dead+Wind 0 deg - No Ice	23.70	0.00	-21.47	-1882.65	0.00	0.38
Dead+Wind 30 deg - No Ice	23.70	10.77	-18.44	-1611.06	-948.09	-0.01
Dead+Wind 60 deg - No Ice	23.70	18.49	-10.71	-937.87	-1621.90	-0.10
Dead+Wind 90 deg - No Ice	23.70	21.31	-0.13	-16.89	-1867.15	-0.09
Dead+Wind 120 deg - No Ice	23.70	18.54	10.73	941.13	-1627.99	0.17
Dead+Wind 150 deg - No Ice	23.70	10.54	18.57	1627.57	-919.06	-0.01
Dead+Wind 180 deg - No Ice	23.70	0.00	21.41	1875.36	-0.00	0.11
Dead+Wind 210 deg - No Ice	23.70	-10.54	18.57	1627.57	919.05	0.27
Dead+Wind 240 deg - No Ice	23.70	-18.54	10.73	941.14	1627.99	0.58

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
Dead+Wind 270 deg - No Ice	23.70	-21.31	-0.13	-16.89	1867.15	0.35
Dead+Wind 300 deg - No Ice	23.70	-18.49	-10.71	-937.87	1621.90	0.31
Dead+Wind 330 deg - No Ice	23.70	-10.77	-18.44	-1611.06	948.09	0.27
Dead+Ice+Temp	28.28	0.00	0.00	-0.16	0.00	0.00
Dead+Wind 0 deg+Ice+Temp	28.28	0.00	-17.59	-1593.06	0.00	0.31
Dead+Wind 30 deg+Ice+Temp	28.28	8.82	-15.11	-1363.81	-801.75	-0.02
Dead+Wind 60 deg+Ice+Temp	28.28	15.14	-8.77	-793.74	-1372.13	-0.11
Dead+Wind 90 deg+Ice+Temp	28.28	17.45	-0.11	-13.88	-1579.77	-0.11
Dead+Wind 120 deg+Ice+Temp	28.28	15.18	8.79	796.27	-1377.11	0.11
Dead+Wind 150 deg+Ice+Temp	28.28	8.63	15.22	1377.17	-778.01	-0.02
Dead+Wind 180 deg+Ice+Temp	28.28	-0.00	17.55	1586.96	0.00	0.09
Dead+Wind 210 deg+Ice+Temp	28.28	-8.63	15.22	1377.17	778.01	0.23
Dead+Wind 240 deg+Ice+Temp	28.28	-15.18	8.79	796.28	1377.11	0.50
Dead+Wind 270 deg+Ice+Temp	28.28	-17.45	-0.11	-13.87	1579.77	0.32
Dead+Wind 300 deg+Ice+Temp	28.28	-15.14	-8.77	-793.73	1372.13	0.28
Dead+Wind 330 deg+Ice+Temp	28.28	-8.82	-15.11	-1363.81	801.76	0.23
Dead+Wind 0 deg - Service	23.70	-0.00	-7.43	-652.27	0.00	0.13
Dead+Wind 30 deg - Service	23.70	3.73	-6.38	-558.17	-328.43	-0.00
Dead+Wind 60 deg - Service	23.70	6.40	-3.70	-324.97	-561.85	-0.03
Dead+Wind 90 deg - Service	23.70	7.37	-0.05	-5.94	-646.80	-0.03
Dead+Wind 120 deg - Service	23.70	6.42	3.71	325.94	-563.97	0.06
Dead+Wind 150 deg - Service	23.70	3.65	6.43	563.73	-318.37	-0.00
Dead+Wind 180 deg - Service	23.70	-0.00	7.41	649.57	0.00	0.04
Dead+Wind 210 deg - Service	23.70	-3.65	6.43	563.73	318.37	0.09
Dead+Wind 240 deg - Service	23.70	-6.42	3.71	325.94	563.97	0.20
Dead+Wind 270 deg - Service	23.70	-7.37	-0.05	-5.94	646.80	0.12
Dead+Wind 300 deg - Service	23.70	-6.40	-3.70	-324.97	561.85	0.11
Dead+Wind 330 deg - Service	23.70	-3.73	-6.38	-558.17	328.43	0.09

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX	PY	PZ	PX	PY	PZ	% Error
	K	K	K	K	K	K	
1	0.00	-23.70	0.00	0.00	23.70	0.00	0.000%
2	0.00	-23.70	-21.47	0.00	23.70	21.47	0.000%
3	10.77	-23.70	-18.44	-10.77	23.70	18.44	0.000%
4	18.49	-23.70	-10.71	-18.49	23.70	10.71	0.000%
5	21.31	-23.70	-0.13	-21.31	23.70	0.13	0.000%
6	18.54	-23.70	10.73	-18.54	23.70	-10.73	0.000%
7	10.54	-23.70	18.57	-10.54	23.70	-18.57	0.000%
8	0.00	-23.70	21.41	-0.00	23.70	-21.41	0.009%
9	-10.54	-23.70	18.57	10.54	23.70	-18.57	0.000%
10	-18.54	-23.70	10.73	18.54	23.70	-10.73	0.000%
11	-21.31	-23.70	-0.13	21.31	23.70	0.13	0.000%
12	-18.49	-23.70	-10.71	18.49	23.70	10.71	0.000%
13	-10.77	-23.70	-18.44	10.77	23.70	18.44	0.000%
14	0.00	-28.28	0.00	0.00	28.28	0.00	0.000%
15	0.00	-28.28	-17.59	0.00	28.28	17.59	0.000%
16	8.82	-28.28	-15.11	-8.82	28.28	15.11	0.000%
17	15.14	-28.28	-8.77	-15.14	28.28	8.77	0.000%
18	17.45	-28.28	-0.11	-17.45	28.28	0.11	0.000%
19	15.18	-28.28	8.79	-15.18	28.28	-8.79	0.000%
20	8.63	-28.28	15.22	-8.63	28.28	-15.22	0.000%
21	0.00	-28.28	17.55	0.00	28.28	-17.55	0.007%
22	-8.63	-28.28	15.22	8.63	28.28	-15.22	0.000%
23	-15.18	-28.28	8.79	15.18	28.28	-8.79	0.000%
24	-17.45	-28.28	-0.11	17.45	28.28	0.11	0.000%

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
25	-15.14	-28.28	-8.77	15.14	28.28	8.77	0.000%
26	-8.82	-28.28	-15.11	8.82	28.28	15.11	0.000%
27	0.00	-23.70	-7.43	0.00	23.70	7.43	0.011%
28	3.73	-23.70	-6.38	-3.73	23.70	6.38	0.000%
29	6.40	-23.70	-3.70	-6.40	23.70	3.70	0.000%
30	7.37	-23.70	-0.05	-7.37	23.70	0.05	0.000%
31	6.42	-23.70	3.71	-6.42	23.70	-3.71	0.000%
32	3.65	-23.70	6.43	-3.65	23.70	-6.43	0.000%
33	0.00	-23.70	7.41	0.00	23.70	-7.41	0.001%
34	-3.65	-23.70	6.43	3.65	23.70	-6.43	0.000%
35	-6.42	-23.70	3.71	6.42	23.70	-3.71	0.000%
36	-7.37	-23.70	-0.05	7.37	23.70	0.05	0.000%
37	-6.40	-23.70	-3.70	6.40	23.70	3.70	0.000%
38	-3.73	-23.70	-6.38	3.73	23.70	6.38	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	5	0.00000001	0.00005705
3	Yes	6	0.00000001	0.00007130
4	Yes	6	0.00000001	0.00007101
5	Yes	5	0.00000001	0.00004382
6	Yes	6	0.00000001	0.00007268
7	Yes	6	0.00000001	0.00006991
8	Yes	5	0.00000001	0.00003778
9	Yes	6	0.00000001	0.00007088
10	Yes	6	0.00000001	0.00006999
11	Yes	5	0.00000001	0.00008275
12	Yes	6	0.00000001	0.00007178
13	Yes	6	0.00000001	0.00007042
14	Yes	4	0.00000001	0.00000001
15	Yes	6	0.00000001	0.00002208
16	Yes	7	0.00000001	0.00000829
17	Yes	7	0.00000001	0.00000825
18	Yes	6	0.00000001	0.00002186
19	Yes	7	0.00000001	0.00000841
20	Yes	7	0.00000001	0.00000810
21	Yes	6	0.00000001	0.00003650
22	Yes	7	0.00000001	0.00000819
23	Yes	7	0.00000001	0.00000817
24	Yes	6	0.00000001	0.00002253
25	Yes	7	0.00000001	0.00000832
26	Yes	7	0.00000001	0.00000821
27	Yes	5	0.00000001	0.00003531
28	Yes	6	0.00000001	0.00000637
29	Yes	6	0.00000001	0.00000630
30	Yes	4	0.00000001	0.00007467
31	Yes	6	0.00000001	0.00000661
32	Yes	6	0.00000001	0.00000613
33	Yes	5	0.00000001	0.00004698
34	Yes	6	0.00000001	0.00000631
35	Yes	6	0.00000001	0.00000612
36	Yes	5	0.00000001	0.00001014
37	Yes	6	0.00000001	0.00000645

38	Yes	6	0.00000001	0.00000621

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	130 - 120.5	28.178	27	1.8016	0.0025
L2	120.5 - 120	24.601	27	1.7890	0.0023
L3	120 - 77	24.414	27	1.7881	0.0022
L4	80.75 - 37.75	11.195	27	1.3186	0.0009
L5	42.25 - 0	3.048	27	0.6605	0.0003

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
128.00	(2) APX16PV-16PVL-E w/ Mount Pipe	27	27.423	1.7994	0.0024	40446
124.00	A-ANT-23G-2-C	27	25.916	1.7944	0.0023	32254
118.00	(2) DB980H90E-M w/ Mount Pipe	27	23.668	1.7829	0.0022	10271
110.00	(2) DB844H90E-XY w/ Mount Pipe	27	20.738	1.7374	0.0019	6955
50.00	OG-860/1920/GPS-A	27	4.211	0.7537	0.0004	2874

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	130 - 120.5	81.206	2	5.1946	0.0070
L2	120.5 - 120	70.905	2	5.1582	0.0065
L3	120 - 77	70.366	2	5.1556	0.0064
L4	80.75 - 37.75	32.284	2	3.8032	0.0025
L5	42.25 - 0	8.794	2	1.9058	0.0010

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
128.00	(2) APX16PV-16PVL-E w/ Mount Pipe	2	79.032	5.1880	0.0069	14243
124.00	A-ANT-23G-2-C	2	74.691	5.1737	0.0067	11359
118.00	(2) DB980H90E-M w/ Mount Pipe	2	68.217	5.1403	0.0062	3618
110.00	(2) DB844H90E-XY w/ Mount Pipe	2	59.778	5.0032	0.0054	2446
50.00	OG-860/1920/GPS-A	2	12.150	2.2426	0.0011	999

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	130 - 120.5 (1)	TP18.5x18.5x0.375	9.50	0.00	0.0	21.000	21.3422	-2.07	448.19	0.005
L2	120.5 - 120 (2)	TP22x18.5x0.375	0.50	0.00	0.0	21.000	21.8859	-2.09	459.61	0.005
L3	120 - 77 (3)	TP29.472x22x0.25	43.00	0.00	0.0	39.000	22.9991	-8.74	896.97	0.010
L4	77 - 37.75 (4)	TP36.308x28.3204x0.3125	43.00	0.00	0.0	39.000	35.3793	-14.68	1379.79	0.011
L5	37.75 - 0 (5)	TP42.48x34.8471x0.375	42.25	0.00	0.0	39.000	50.8418	-23.68	1982.83	0.012

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	130 - 120.5 (1)	TP18.5x18.5x0.375	27.73	3.508	23.100	0.152	0.00	0.000	23.100	0.000
L2	120.5 - 120 (2)	TP22x18.5x0.375	27.73	3.475	21.000	0.165	0.00	0.000	21.000	0.000
L3	120 - 77 (3)	TP29.472x22x0.25	459.05	34.320	39.000	0.880	0.00	0.000	39.000	0.000
L4	77 - 37.75 (4)	TP36.308x28.3204x0.3125	1058.11	41.793	39.000	1.072	0.00	0.000	39.000	0.000
L5	37.75 - 0 (5)	TP42.48x34.8471x0.375	1882.65	43.211	39.000	1.108	0.00	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	130 - 120.5 (1)	TP18.5x18.5x0.375	3.69	0.173	14.000	0.025	0.38	0.024	14.000	0.002
L2	120.5 - 120 (2)	TP22x18.5x0.375	3.73	0.170	14.000	0.021	0.38	0.022	14.000	0.002
L3	120 - 77 (3)	TP29.472x22x0.25	13.61	0.592	26.000	0.046	0.46	0.016	26.000	0.001
L4	77 - 37.75 (4)	TP36.308x28.3204x0.3125	17.55	0.496	26.000	0.039	0.38	0.007	26.000	0.000
L5	37.75 - 0 (5)	TP42.48x34.8471x0.375	21.49	0.423	26.000	0.033	0.38	0.004	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	130 - 120.5 (1)	0.005	0.152	0.000	0.025	0.002	0.157 ✓	1.333	H1-3+VT ✓

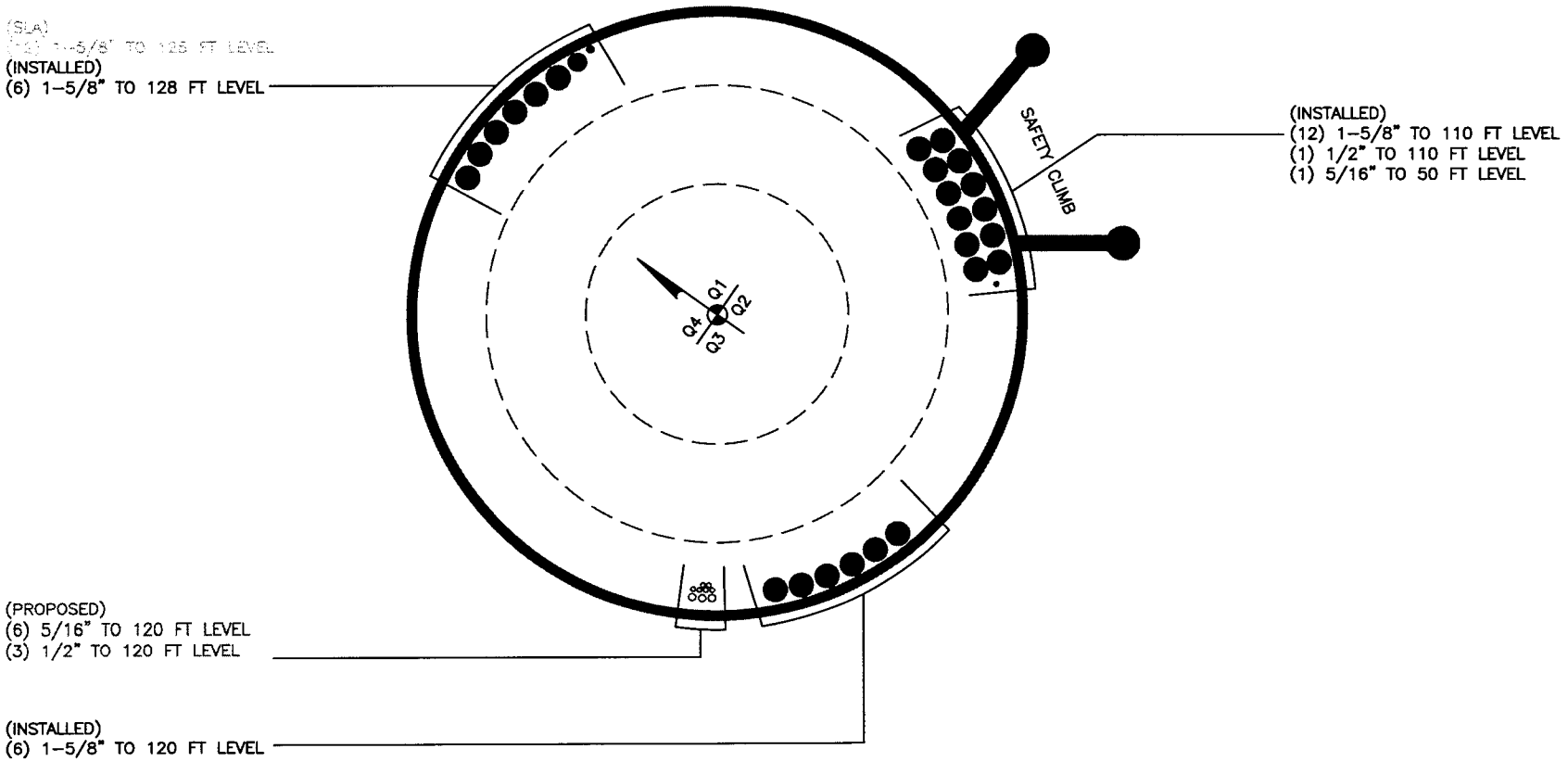
Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L2	120.5 - 120 (2)	0.005	0.165	0.000	0.021	0.002	0.170 ✓	1.333	H1-3+VT ✓
L3	120 - 77 (3)	0.010	0.880	0.000	0.046	0.001	0.890 ✓	1.333	H1-3+VT ✓
L4	77 - 37.75 (4)	0.011	1.072	0.000	0.039	0.000	1.083 ✓	1.333	H1-3+VT ✓
L5	37.75 - 0 (5)	0.012	1.108	0.000	0.033	0.000	1.120 ✓	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	130 - 120.5	Pole	TP18.5x18.5x0.375	1	-2.07	597.43	11.8	Pass
L2	120.5 - 120	Pole	TP22x18.5x0.375	2	-2.09	612.65	12.8	Pass
L3	120 - 77	Pole	TP29.472x22x0.25	3	-8.74	1195.66	66.8	Pass
L4	77 - 37.75	Pole	TP36.308x28.3204x0.3125	4	-14.68	1839.26	81.2	Pass
L5	37.75 - 0	Pole	TP42.48x34.8471x0.375	5	-23.68	2643.11	84.0	Pass
							Summary	
						Pole (L5)	84.0	Pass
						RATING =	**84.0**	**Pass**

APPENDIX B

BASE LEVEL DRAWING



BUSINESS UNIT: 876322 TOWER ID: C_BASELEVEL

APPENDIX C

ADDITIONAL CALCULATIONS

Stiffened or Unstiffened, Exterior Flange Plate - Any Bolt Material TIA Rev F

Site Data

BU#: *876322*
Site Name: *Tartaglia Property*
App #: *87143*

Connection Type:	*Butt*
Pole Manufacturer:	Other

Reactions		
Moment:	27.73	ft-kips
Axial:	2.09	kips
Shear:	3.73	kips
Elevation:	120	feet

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

Bolt Data			
Qty:	8		
Diameter (in.):	0.875	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:	75	<-- Disregard	Bolt Fty:
N/A:	55	<-- Disregard	44.00
Circle (in.):	24		

Plate Data		
Diam:	26.25	in
Thick, t:	1.25	in
Grade (Fy):	50	ksi
Strength, Fu:	65	ksi
Single-Rod B-eff:	7.26	in

Stiffener Data (Welding at Both Sides)		
Config:	0	*
Weld Type:	Fillet	
Groove Depth:	0.25	<-- Disregard
Groove Angle:	60	<-- Disregard
Fillet H. Weld:	0.3125	in
Fillet V. Weld:	0.3125	in
Width:	6	in
Height:	18	in
Thick:	0.75	in
Notch:	0.5	in
Grade:	50	ksi
Weld str.:	70	ksi

Pole Data		
Diam:	18.5	in
Thick:	0.375	in
Grade:	35	ksi
# of Sides:	0	"0" IF Round
Fu	50	ksi
Reinf. Fillet Weld	0	"0" if None

Stress Increase Factor		
ASIF:	1.333	

Flange Bolt Results

			Rigid
Bolt Tension Capacity, **B**:	35.27	kips	Service, ASD
Max Bolt directly applied T:	6.67	Kips	Fty*ASIF
Min. PL "tc" for **B** cap. **w/o** Pry:	1.161	in	
Min PL "treq" for actual **T w/ Pry**:	0.369	in	
Min PL "t1" for actual **T w/o Pry**:	0.505	in	
T allowable w/o Prying:	35.27	kips	α'<0 case
Prying Force, Q:	0.00	kips	
Total Bolt Tension=T+Q:	6.67	kips	
Non-Prying Bolt Stress Ratio, T/B:	18.9%	**Pass**	

Exterior Flange Plate Results Flexural Check

			Rigid
Compression Side Plate Stress:	6.1	ksi	Service ASD
Allowable Plate Stress:	50.0	ksi	0.75*Fy*ASIF
Compression Plate Stress Ratio:	12.3%	**Pass**	Comp. Y.L. Length:
No Prying			15.29
Tension Side Stress Ratio, (treq/t)^2:	8.7%	**Pass**	

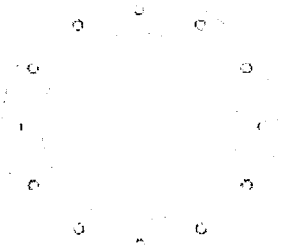
n/a

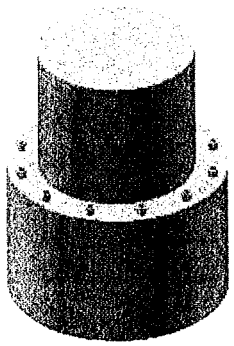
Stiffener Results

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

Pole Results

Pole Punching Shear Check: n/a





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

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

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#:	*876322*
Site Name:	*Tartaglia Property*
App #:	*87143*

Reactions		
Moment:	1883	ft-kips
Axial:	24	kips
Shear:	21	kips

Connection Type: *Butt*

Anchor Rod Data		
Qty:	16	
Diam:	2.25	in
Rod Material:	A615-J	
Grade(Fy):	75	ksi
Bolt Circle:	55	in
Anchor Spacing:	6	in

Plate Data		
W=Side:	55	in
Thick:	3.5	in
Grade:	50	ksi
B effective	35.30	in

Pole Data		
Diam:	42.48	in
Thick:	0.375	in
Grade:	65	ksi

Stress Increase Factor		
ASIF:	1.333	

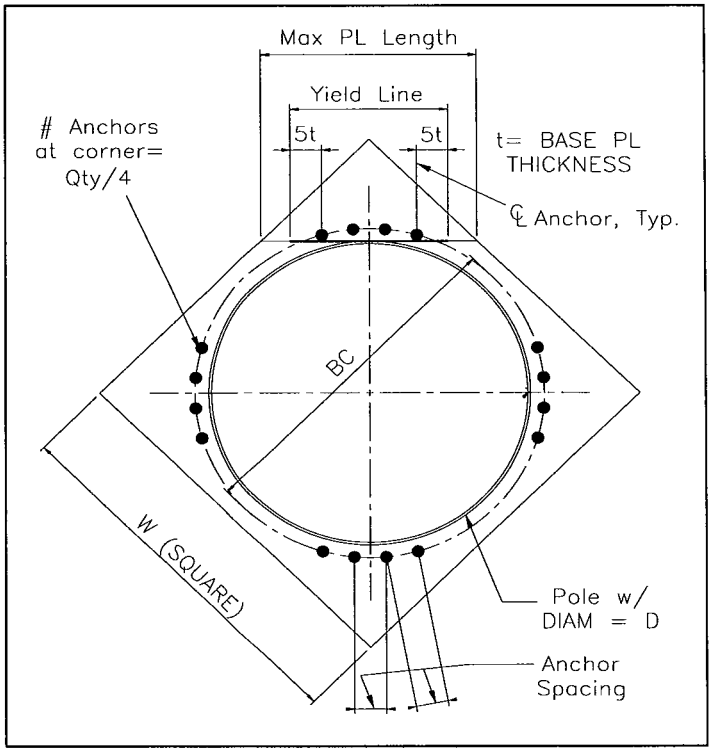
Anchor Rod Results

Maximum Rod Tension:	101.2 Kips
Allowable Tension:	195.0 Kips
Anchor Rod Stress Ratio:	51.9% **Pass**

Base Plate Results

Base Plate Stress:	30.7 ksi
Allowable Plate Stress:	50.0 ksi
Base Plate Stress Ratio:	61.3% **Pass**

PL Ref. Data
Yield Line (in):
35.30
Max PL Length:
35.30



Monopole Drilled Pier

Checks capacity of a single drilled shaft foundation for a monopole

BU#: 876322
Site Name: *Tartaglia Property*
App Number: *87143*

CROWN CASTLE

Design Reactions		
Shear, **S**:	21.00	kips
Moment, **Mt**:	1883.00	ft-kips
Tower Weight, **Wt**:	24.00	kips
Tower Height, **H**:	130	ft
Base Diameter, **BD**:	42.5	in

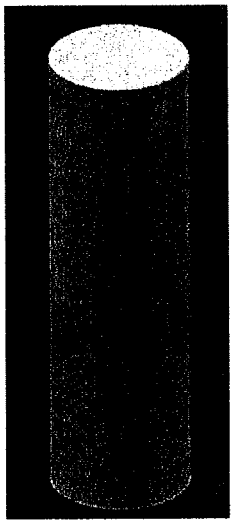
Foundation Dimensions		
Caisson Diameter, **CD**:	7.0	ft
Ext. Above Grade, **E**:	0.5	ft
Depth Below Grade, **L**:	24.0	ft
Neglected Depth, **N**:	5.0	ft
Rebar Size, **Sp**:	11	
Rebar Quantity, **mp**:	32	

Material Properties		
Rebar Tensile, **Fy**:	60000	psi
Concrete Strength, **F'c**:	3000	psi
Concrete Density, δ**x**:	150	pcf
Clear Cover, **cc**:	4	in

Soil Properties		
Soil Unit Weight, γ:	63	pcf
Allowable Bearing, **Bc**:	10.000	ksf
Seismic Zone, **z**:	1	

Caisson Analysis		
Depth to Zero Shear	6.3	ft
Max Moment	2178.69	ft-kips
Required Length	19	ft
Max Soil Moment	4651	ft-kips

Design Checks	*Capacity/ Availability*	*Demand/ Limits*	*Check*
Minimum Req'd Dia. 1 (ft):	7.00	1.75	OK
Minimum Req'd Dia. 2 (ft):	7.00	5.04	OK
Bearing (ksf):	10.00	0.62	OK
Rebar Area (in^2):	49.92	27.71	OK
Pier moment capacity (k-ft):	5778.92	2178.69	OK
Rebar spacing (in):	6.05	2 < Bs <18	OK
Development Length (in)	208.59	68.36	OK
Required Length (ft):	24.50	19.00	OK
Soil moment capacity(k-ft):	4651.00	1883.00	OK



CAISSON Version 10.00 1:15:47 PM Friday, September 18, 2009
Crown Castle USA

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*                                                                           *
*  PIER FOUNDATIONS ANALYSIS AND DESIGN - (C) 1995,2002 POWER LINE SYSTEMS, INC.*
*                                                                           *
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*** ANALYSIS IDENTIFICATION : 876322
NOTES : Tartaglia Property

*** PIER PROPERTIES CONCRETE STRENGTH (ksi) = 3.00 STEEL STRENGTH (ksi) = 60.00

DIAMETER (ft) = 7.000 DISTANCE FROM TOP OF PIER TO GROUND LEVEL (ft) = 0.50

*** SOIL PROPERTIES

LAYER	TYPE	THICKNESS (ft)	DEPTH AT TOP OF LAYER (ft)	DENSITY (pcf)	CU (psf)	KP	PHI (degrees)
1	C	5.00	0.00	120.0	0.0		
2	S	5.00	5.00	120.0		3.690	35.00
3	S	10.00	10.00	60.0		4.599	40.00
4	S	10.00	20.00	63.0		5.289	43.00

*** DESIGN (FACTORED) LOADS AT TOP OF PIER MOMENT (ft-k) = 4651.0 VERTICAL (k) = 24.0 SHEAR (k) = 51.9
ADDITIONAL SAFETY FACTOR AGAINST SOIL FAILURE = 2.00

*** CALCULATED PIER LENGTH (ft) = 24.500

*** CHECK OF SOILS PROPERTIES AND ULTIMATE RESISTING FORCES ALONG PIER

TYPE	TOP OF LAYER BELOW TOP OF PIER (ft)	THICKNESS (ft)	DENSITY (pcf)	CU (psf)	KP	FORCE (k)	ARM (ft)
C	0.50	5.00	120.0	0.0		0.00	3.00
S	5.50	5.00	120.0		3.690	348.72	8.28
S	10.50	7.49	60.0		4.599	1030.16	14.44
S	17.99	2.51	60.0		4.599	-418.50	19.26
S	20.50	4.00	63.0		5.289	-855.72	22.54

*** SHEAR AND MOMENTS ALONG PIER

DISTANCE BELOW TOP OF PIER (ft)	WITH THE ADDITIONAL SAFETY FACTOR SHEAR (k)	MOMENT (ft-k)	WITHOUT ADDITIONAL SAFETY FACTOR SHEAR (k)	MOMENT (ft-k)
0.00	104.7	9589.5	52.3	4794.7
2.45	104.7	9845.9	52.3	4923.0
4.90	104.7	10102.3	52.3	5051.2
7.35	2.7	10269.4	1.4	5134.7
9.80	-181.2	10062.1	-90.6	5031.1
12.25	-455.7	9303.8	-227.9	4651.9
14.70	-781.9	7794.8	-391.0	3897.4
17.15	-1142.9	5444.0	-571.4	2722.0
19.60	-1009.8	2588.6	-504.9	1294.3
22.05	-537.4	666.9	-268.7	333.5
24.50	-0.0	0.0	-0.0	0.0

*** TOTAL REINFORCEMENT PCT = 0.64 REINFORCEMENT AREA (in^2) = 35.47
*** USABLE AXIAL CAP. (k) = 24.0 USABLE MOMENT CAP. (ft-k) = 5202.5

*** US Standard Re-Bars (Select one of the following):

178	BARS #4	(AREA = 0.20 in^2	DIA = 0.500 in) AT SPACING (in) =	1.31
115	BARS #5	(AREA = 0.31 in^2	DIA = 0.625 in) AT SPACING (in) =	2.02
81	BARS #6	(AREA = 0.44 in^2	DIA = 0.750 in) AT SPACING (in) =	2.87
60	BARS #7	(AREA = 0.60 in^2	DIA = 0.875 in) AT SPACING (in) =	3.87
45	BARS #8	(AREA = 0.79 in^2	DIA = 1.000 in) AT SPACING (in) =	5.17
36	BARS #9	(AREA = 1.00 in^2	DIA = 1.128 in) AT SPACING (in) =	6.46
28	BARS #10	(AREA = 1.27 in^2	DIA = 1.270 in) AT SPACING (in) =	8.30
23	BARS #11	(AREA = 1.56 in^2	DIA = 1.410 in) AT SPACING (in) =	10.11
16	BARS #14	(AREA = 2.25 in^2	DIA = 1.693 in) AT SPACING (in) =	14.53

*** WEIGHT OF CAISSON (kips) = 141.431
*** PRESSURE UNDER CAISSON DUE TO INPUT DESIGN AXIAL LOAD (psf) = 623.6

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*  PIER FOUNDATIONS ANALYSIS AND DESIGN - (C) 1995,2002 POWER LINE SYSTEMS, INC.*
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*** ANALYSIS IDENTIFICATION : 876322
NOTES : Tartaglia Property

*** PIER PROPERTIES CONCRETE STRENGTH (ksi) = 3.00 STEEL STRENGTH (ksi) = 60.00

DIAMETER (ft) = 7.000 DISTANCE FROM TOP OF PIER TO GROUND LEVEL (ft) = 0.50

*** SOIL PROPERTIES

LAYER	TYPE	THICKNESS (ft)	DEPTH AT TOP OF LAYER (ft)	DENSITY (pcf)	CU (psf)	KP	PHI (degrees)
1	C	5.00	0.00	120.0	0.0		
2	S	5.00	5.00	120.0		3.690	35.00
3	S	10.00	10.00	60.0		4.599	40.00
4	S	10.00	20.00	63.0		5.289	43.00

*** DESIGN (FACTORED) LOADS AT TOP OF PIER MOMENT (ft-k) = 1883.0 VERTICAL (k) = 24.0 SHEAR (k) = 21.0
ADDITIONAL SAFETY FACTOR AGAINST SOIL FAILURE = 2.00

*** CALCULATED PIER LENGTH (ft) = 19.000

*** CHECK OF SOILS PROPERTIES AND ULTIMATE RESISTING FORCES ALONG PIER

TYPE	TOP OF LAYER BELOW TOP OF PIER (ft)	THICKNESS (ft)	DENSITY (pcf)	CU (psf)	KP	FORCE (k)	ARM (ft)
C	0.50	5.00	120.0	0.0		0.00	3.00
S	5.50	5.00	120.0		3.690	348.72	8.28
S	10.50	3.52	60.0		4.599	444.34	12.31
S	14.02	4.98	60.0		4.599	-750.08	16.59

*** SHEAR AND MOMENTS ALONG PIER

DISTANCE BELOW TOP OF PIER (ft)	WITH THE ADDITIONAL SAFETY FACTOR SHEAR (k)	WITH THE ADDITIONAL SAFETY FACTOR MOMENT (ft-k)	WITHOUT ADDITIONAL SAFETY FACTOR SHEAR (k)	WITHOUT ADDITIONAL SAFETY FACTOR MOMENT (ft-k)
0.00	43.0	4088.6	21.5	2044.3
1.90	43.0	4170.2	21.5	2085.1
3.80	43.0	4251.9	21.5	2126.0
5.70	33.5	4332.6	16.7	2166.3
7.60	-75.2	4298.3	-37.6	2149.2
9.50	-217.4	4025.7	-108.7	2012.8
11.40	-412.4	3442.1	-206.2	1721.0
13.30	-653.0	2433.3	-326.5	1216.7
15.20	-585.7	1139.4	-292.9	569.7
17.10	-303.3	291.5	-151.7	145.7
19.00	-0.0	0.0	-0.0	0.0

*** TOTAL REINFORCEMENT PCT = 0.32 REINFORCEMENT AREA (in^2) = 17.73
*** USABLE AXIAL CAP. (k) = 24.0 USABLE MOMENT CAP. (ft-k) = 2797.1

*** US Standard Re-Bars (Select one of the following):

89	BARS #4	(AREA = 0.20 in^2	DIA = 0.500 in)	AT SPACING (in) =	2.61
58	BARS #5	(AREA = 0.31 in^2	DIA = 0.625 in)	AT SPACING (in) =	4.01
41	BARS #6	(AREA = 0.44 in^2	DIA = 0.750 in)	AT SPACING (in) =	5.67
30	BARS #7	(AREA = 0.60 in^2	DIA = 0.875 in)	AT SPACING (in) =	7.75
23	BARS #8	(AREA = 0.79 in^2	DIA = 1.000 in)	AT SPACING (in) =	10.11
18	BARS #9	(AREA = 1.00 in^2	DIA = 1.128 in)	AT SPACING (in) =	12.92
14	BARS #10	(AREA = 1.27 in^2	DIA = 1.270 in)	AT SPACING (in) =	16.61
12	BARS #11	(AREA = 1.56 in^2	DIA = 1.410 in)	AT SPACING (in) =	19.37
8	BARS #14	(AREA = 2.25 in^2	DIA = 1.693 in)	AT SPACING (in) =	29.06

*** WEIGHT OF CAISSON (kips) = 109.681
*** PRESSURE UNDER CAISSON DUE TO INPUT DESIGN AXIAL LOAD (psf) = 623.6

To: CSC
From: Mark Brauer – Radio Frequency Engineer
Cc: Cameron Syme
Subject: Power Density Report for CT-NHN0104
Date: October 20, 2009

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1. Introduction:

This report is the result of Electromagnetic Field Intensities (EMF – Power Densities) study for the Clearwire broadband antenna installation on a monopole tower at 850 West Main St, Branford, CT. This study incorporates the most conservative consideration for determining the practical combined worst case power density levels that would be theoretically encountered from locations surrounding the transmitting location:

2: Discussion:

The following assumptions were used in the calculations:

1) The emissions from Clearwire transmitters are in the (2496 – 2960) Frequency Band
2) The emissions from the Clearwire Microwave dishes are in the 11 GHz Frequency Band
3) The model number for Clearwire Antenna is Argus LLPX310R
4) The model number for the Microwave dish is Andrew VHLP2-23 with 24" Diameter.
5) The Clearwire Panel antenna centerline is 120 feet.
6) The Clearwire Microwave dish centerline is 124 feet.
7) The Maximum Transmit power from any Clearwire panel antenna is 251 Watts Effective Isotropic Radiated Power (EiRP) assuming 2 channels per sector.
8) The Maximum Transmit power from any Clearwire Microwave Dish is 346 Watts Effective Isotropic Radiated Power (EiRP) assuming 1 channel per dish.
9) All antennas are simultaneously transmitting and receiving 24 hours per day.
10) The average ground level of the studied area does not change significantly with respect to the transmitting location.

Equations given in "FCC OET Bulletin 65, Edition 97-01" were used with the above information to perform the calculations.

3: Conclusion:

Based on the above worst case assumptions, the power density calculation from the Clearwire antenna installation on a monopole Tower at 850 West Main St, Branford, CT is 0.0000060 mW/cm^2. This value represents 0.000633% of the Maximum Permissible Exposure (MPE) standard of 1 milliwatt per square centimeter (mW/cm^2) set forth in the FCC/ANSI/IEEE C95-1-1991. Furthermore, the proposed antenna location for Clearwire will not interfere with existing public safety communications, AM or FM radio broadcasts, TV, Police Communications, HAM Radio communications or any other signals in the area.

The combined Power Density from all other carriers is 27.31 %. The combined Power Density for this site is 27.32% of the M.P.E. standard.