Robinson+Cole

KENNETH C. BALDWIN

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Also admitted in Massachusetts

October 28, 2014

Melanie A. Bachman
Acting Executive Director
Connecticut Siting Council
10 Franklin Square
New Britain, CT 06051

Re: **Request of Cellco Partnership d/b/a Verizon Wireless for an Order to Approve the Shared Use of an Existing Tower at 462 West Main Street, Meriden, Connecticut**

Dear Ms. Bachman:

Pursuant to Connecticut General Statutes ("C.G.S.") §16-50aa, as amended, Cellco Partnership d/b/a Verizon Wireless ("Cellco") hereby requests an order from the Connecticut Siting Council ("Council") to approve the shared use by Cellco of an existing telecommunications tower at 462 West Main Street in Meriden, Connecticut (the "Property"). The existing 100-foot tower is owned by Crown Castle ("Crown"). The underlying property is owned by Hunter Family Limited Partnership; (the "Property Owner"). Cellco requests that the Council find that the proposed shared use of the Crown tower satisfies the criteria of C.G.S § 16-50aa and issue an order approving the proposed shared use. A copy of this letter is being sent to Meriden's Mayor Manuel A. Santos and the Property Owner.

Background

The existing Crown facility consists of a 100-foot self-supporting monopole tower in the central portion of a 1.2 acre parcel at the southwest corner of West Main Street and South Vine Street in Meriden. AT&T maintains antennas at the 100-foot level on the tower; T-Mobile maintains antennas at the 90-foot level on the tower; and Sprint Nextel maintains antennas at the 80-foot level on the tower. Equipment associated with each of the carriers' antennas is located

on the ground near the base of the tower.

Cellco is licensed by the Federal Communications Commission ("FCC") to provide wireless services throughout the State of Connecticut. Cellco and Crown have agreed to the proposed shared use of the West Main Street tower pursuant to mutually acceptable terms and conditions. Likewise, the Property Owner and Cellco have agreed to the proposed installation of a new equipment shelter to the west of the tower site. Crown and the Property Owner have authorized Cellco to apply for all necessary permits and approvals that may be required to share the existing tower. (*See* Owner's authorization letters included in Attachment 1).

Cellco proposes to install twelve (12) antennas and six (6) remote radio heads (RRHs) behind its 700 MHz and 2100 MHz antennas, on a low-profile antenna platform at a height of 65 feet above ground level. Equipment associated with Cellco's antennas and a natural gas-fueled back-up generator will be located inside a new 12' x 24' shelter. Included in Attachment 2 are Cellco's project plans showing the location of all proposed site improvements.

C.G.S. § 16-50aa(c)(1) provides that, upon written request for approval of a proposed shared use, "if the council finds that the proposed shared use of the facility is technically, legally, environmentally and economically feasible and meets public safety concerns, the council shall issue an order approving such shared use." Cellco respectfully submits that the shared use of the tower satisfies these criteria.

A. Technical Feasibility. The existing Crown tower is structurally capable of supporting Cellco's proposed improvements. The proposed shared use of this tower is, therefore, technically feasible. A Structural Analysis Report verifying the structural integrity of the tower, and its ability to support Cellco's antennas and related equipment is included in Attachment 3.

B. Legal Feasibility. Under C.G.S. § 16-50aa, the Council has been authorized to issue orders approving the shared use of an existing tower such as the Crown tower. This authority complements the Council's prior-existing authority under C.G.S. § 16-50p to issue orders approving the construction of new towers that are subject to the Council's jurisdiction. In addition, § 16-50x(a) directs the Council to "give such consideration to other state laws and municipal regulations as it shall deem appropriate" in ruling on requests for the shared use of existing tower facilities. Under the statutory authority vested in the Council, an order by the Council approving the requested shared use would permit the Applicant to obtain a building permit for the proposed installations.

C. Environmental Feasibility. The proposed shared use of the Crown tower would have a minimal environmental effect, for the following reasons:

1. The proposed installation of twelve (12) antennas and six (6) remote radio heads behind the antennas at the 65-foot level on the existing 100-foot tower would have an insignificant incremental visual impact on the area around the existing tower. Cellco's shelter would be installed on a concrete pad within the limits of the existing improved tower compound. Cellco's shared use of this tower would therefore, not cause any significant change or alteration in the physical or environmental characteristics of the existing site.

2. Noise associated with the equipment shelter's air conditioning ("A/C") units was evaluated for compliance with State and/or local noise standards. According to the Noise Compliance Study included in Attachment 4 ("Study"), noise from the shelter's A/C units will not exceed State and/or local noise limits. Noise associated with Cellco's emergency back-up generator is exempt from State and local noise standards.

3. Operation of Cellco's antennas at this site would not exceed the RF emissions standards adopted by the Federal Communications Commission ("FCC"). Included in Attachment 5 of this filing are Cellco's Far Field Approximation tables that demonstrate that Cellco's proposed antennas will operate well within the FCC RF emissions safety standards.

4. Under ordinary operating conditions, the proposed installation would not require the use of any water or sanitary facilities and would not generate air emissions or discharges to water bodies or sanitary facilities. After construction is complete the proposed installations would not generate any increased traffic to the Crown facility other than periodic (monthly) maintenance visits to the cell site.

The proposed use of the Crown facility would, therefore, have a minimal environmental effect, and is environmentally feasible.

D. Economic Feasibility. As previously mentioned, Cellco has entered into agreements with Crown and the Property Owner for the shared use of the existing facility subject to mutually agreeable terms. The proposed tower sharing is, therefore, economically feasible. (*See* Attachment 1).

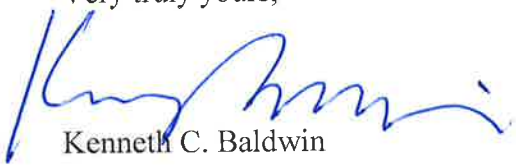
E. Public Safety Concerns. As discussed above, the tower is structurally capable of supporting Cellco's full array of twelve (12) antennas, six (6) remote radio heads and all related equipment. Cellco is not aware of any public safety concerns relative to the proposed sharing of the existing Crown tower. In fact, the provision of new and improved wireless service through shared use of the existing tower is expected to enhance the safety and welfare of area residents and members of the general public traveling through Meriden.

Conclusion

For the reasons discussed above, the proposed shared use of the existing Crown tower at 462 West Main Street satisfies the criteria stated in C.G.S. § 16-50aa and advances the General Assembly's and the Council's goal of preventing the unnecessary proliferation of towers in Connecticut. The Applicant, therefore, respectfully requests that the Council issue an order approving the proposed shared use.

Thank you for your consideration of this matter.

Very truly yours,



Kenneth C. Baldwin

Enclosures
Copy to:
Manuel A. Santos, Mayor
Hunter Family Limited Partnership
Sandy M. Carter

ATTACHMENT 1

HUNTER FAMILY LIMITED PARTNERSHIP

450 West Main Street
Meriden, CT 06451

Dianne Sargalski, Corporation Counsel **TEL: (203) 514-5166**

October 1, 2014

Sandy Carter
Verizon Wireless
99 East River Drive
East Hartford, CT 06108

RE: Cellco Partnership d/b/a Verizon Wireless
Wireless Telecommunications Facility
450 West Main Street
Meriden, CT 06451

Dear Ms. Carter:

Hunter Family Limited Partnership, the owner of the above-referenced property, hereby authorizes Cellco Partnership d/b/a Verizon Wireless and/or its agents to apply for and obtain all necessary permits and approvals from the appropriate City of Meriden boards, commissions and agencies and the CT Siting Council for its proposed wireless telecommunications facility.

Please contact us should you have any questions.

Sincerely,

Hunter Family Limited Partnership
By Hunter Family Real Estate, LLC
Its General Partner

BY: Donna M. Hunter
Donna M. Hunter
Manager

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

Crown Castle, does hereby authorize **Verizon Wireless** and its authorized contractors/agents to act as "Applicant" in the processing of all applications, permits, research and other related activities associated with the processing, planning, design review, permitting, entitlement and construction of additional equipment, antennas and site improvements for the Crown Castle existing wireless communications facility described as follows:

Customer Site Name:	**Meriden Hanover, CT**	**Crown Castle Site ID Number:**	**842869**
Site Address:	**450-478 West Main Street, Meriden, CT 06451**	**Crown Castle Site Name:**	**MERIDEN WEST CENTRAL**

This authorization is fully contingent upon **Verizon Wireless** authorized contractors/agents' compliance with the following conditions:

1. Crown Castle must review the application prior to submittal. Crown Castle must be provided all applications, narratives, drawings and attachments at least 72 hours in advance of their submittal to the locality. Use of email and electronic attachments is encouraged. A Crown Castle Zoning Subject Matter Expert (SME) will review and provide written comment to the customer within 48 hours of receipt of a complete set of application materials. If Crown Castle indicates that changes are required, submissions shall be altered in accordance with Crown Castle comments prior to submission to the locality. Verification of corrections should also be accomplished via emails and attachments.
2. In no event may **Verizon Wireless** encourage, suggest, participate in, or permit the imposition of any restrictions or additional obligations whatsoever on the tower site or Crown Castle's current or future use or ability to license space at the tower site as part of or in exchange for obtaining any approval, permit, exception or variance.
3. A copy of the final permit and/or a written summary of the zoning/entitlement decision rendered by the locality and any/all conditions placed on that decision shall be communicated in detail to Crown Castle well within the appeal period provided by the locality (typically 10-15 days).
4. All conditions of approval pertinent to the construction of the proposed project must be included in the construction drawings for the project. The conditions of approval pertinent to the construction of the project shall be copied verbatim from the zoning permit approval language, and shall be present in the drawings prior to submission for building permits and contractor bidding. Crown Castle shall verify the inclusion of appropriate conditions of approval in the construction drawing redline process.
5. Crown Castle will provide a Notice To Proceed (NTP) to construction to the customer upon receipt of the final approved zoning permit and the approved Building Permit.

By Crown Castle:

Signature:
Printed Name: R. Graham Renfro

Title: Real Estate Specialist

Date: October 2, 2014

ATTACHMENT 2

Cellco Partnership

d.b.a. verizon wireless

WIRELESS COMMUNICATIONS FACILITY

MERIDEN HANOVER

462 WEST MAIN STREET

MERIDEN, CT 06451

SITE DIRECTIONS

FROM: 99 EAST RIVER DRIVE, EAST HARTFORD, CONNECTICUT **TO:** 462 WEST MAIN STREET, MERIDEN, CONNECTICUT

1.	Head South on E River Dr toward Pitkin St	0.9 mi
2.	Stay straight to go onto E River Drive Ext.	0.3 mi
3.	Merge onto US-5 S toward I-95 S	1.1 mi
4.	Merge onto I-95 S Exit 86	16.5 mi
5.	Merge onto I-691 W Exit 18	2.5 mi
6.	Take Exit 6 toward CT-71	0.2 mi
7.	Merge onto Lewis Ave	0.8 mi
8.	Turn Right onto W Main Street	0.5 mi

GENERAL NOTES

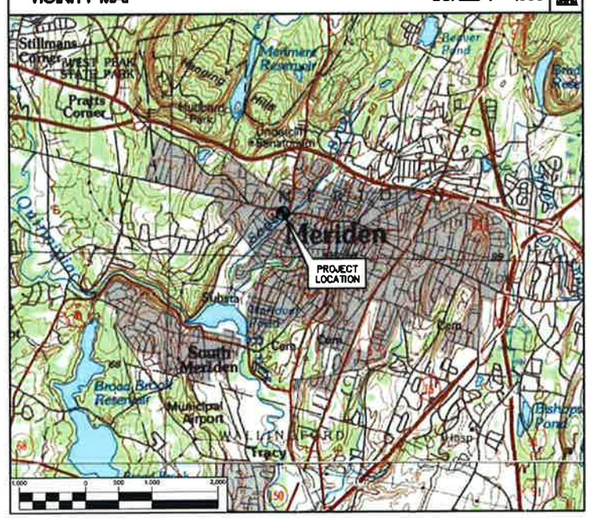
1. PROPOSED ANTENNA LOCATIONS AND HEIGHTS PROVIDED BY CELLCO PARTNERSHIP.

PROJECT SCOPE

1. THE PROPOSED SCOPE OF WORK GENERALLY INCLUDES THE INSTALLATION OF A 12'x24' WIRELESS EQUIPMENT SHELTER.
2. A TOTAL OF TWELVE (12) DIRECTIONAL PANEL ANTENNAS ARE PROPOSED TO BE MOUNTED ON AN EXISTING ±101' TALL MONOPOLE TOWER AT A CENTERLINE ELEVATION OF ±65'.

VICINITY MAP

SCALE: 1" = 1000'



PROJECT SUMMARY

SITE NAME:	MERIDEN HANOVER
SITE ADDRESS:	462 WEST MAIN STREET MERIDEN, CT 06451
LESSEE/TENANT:	CELLCO PARTNERSHIP d.b.a. VERIZON WIRELESS 99 EAST RIVER DRIVE EAST HARTFORD, CT 06108
CONTACT PERSON:	SANDY CARTER CELLCO PARTNERSHIP (860) 803-8219
TOWER COORDINATES:	LATITUDE: 41°-32'-24.24" LONGITUDE: 72°-49'-09.06" GROUND ELEVATION: 154'± A.M.S.L. COORDINATES & GROUND ELEVATION REFERENCED FROM A CINGULAR WIRELESS FAA 1-A CERTIFICATION BY MILLMAN SURVEYING, INC. (SITE NUMBER: 25975 DATED: 06/05/06)

SHEET INDEX

SHT. NO.	DESCRIPTION	REV. NO.
T-1	TITLE SHEET	0
C-1	COMPOUND PLAN AND ELEVATION	0

PROFESSIONAL ENGINEER SEAL

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
0	09/30/14	KAP	DMD	ISSUED FOR CSC-CLIENT REVIEW

Cellco Partnership d.b.a. verizon wireless

CENTEK engineering
Centered on Solutions
(203) 488-0580
(203) 488-8587 Fax
63-2 North Branford Road
Branford, CT 06405
www.CentekEng.com

Cellco Partnership d/b/a Verizon Wireless

WIRELESS COMMUNICATIONS FACILITY

MERIDEN HANOVER

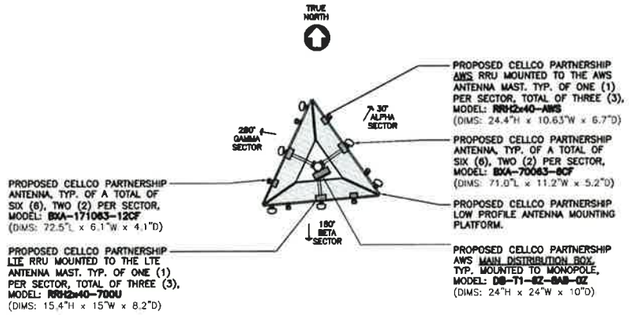
462 WEST MAIN STREET
MERIDEN, CT 06451

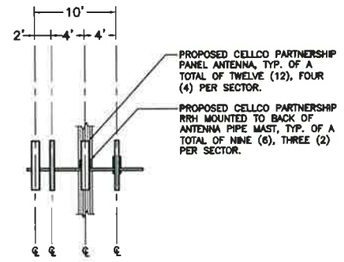
DATE:	09/29/14
SCALE:	AS NOTED
JOB NO.	13198.000

TITLE SHEET

T-1

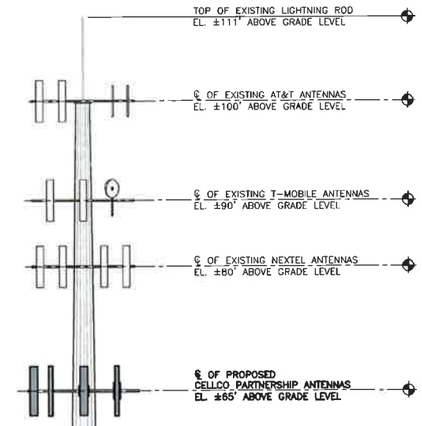
Sheet No. 1 of 2





3 C-1 ANTENNA MOUNTING CONFIGURATION

NOT TO SCALE

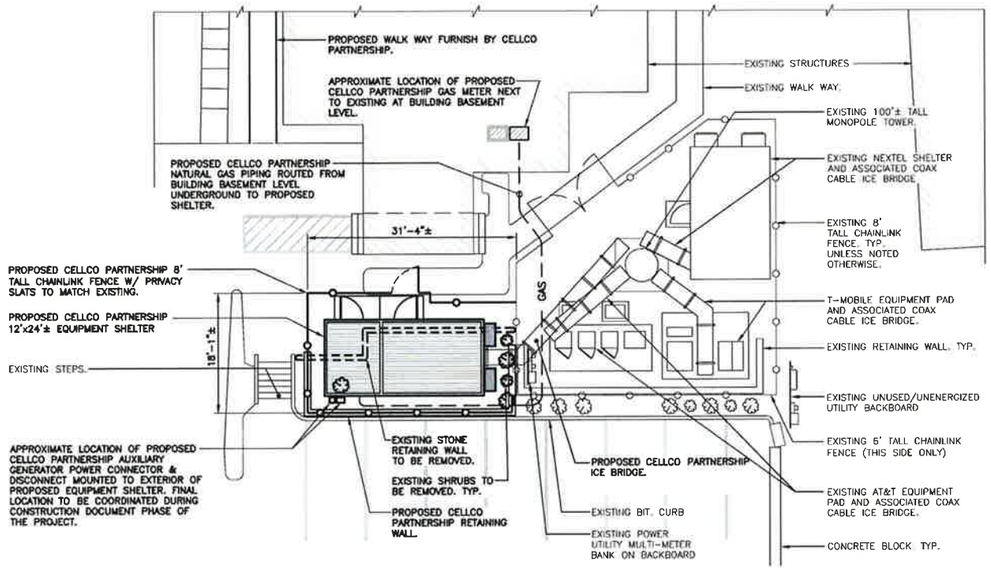


2 C-1 NORTH EAST ELEVATION

SCALE: 1" = 8'

GRAPHIC SCALE

(IN FEET)
1 inch = 8 ft.



1 C-1 COMPOUND PLAN

SCALE: 1" = 10'

APPROXIMATE NORTH

GRAPHIC SCALE

(IN FEET)
1 inch = 10 ft.

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
0	06/30/14	KAW	DMD	ISSUED FOR CSC-CLIENT REVIEW

PROFESSIONAL ENGINEER SEAL

Celtco Partnership d/b/a Verizon wireless

CENTEK engineering
Centered on Solutions
(203) 488-0580
(203) 488-8587 Fax
63-2 North Branford Road
Branford, CT 06405
www.CentekEng.com

Celtco Partnership d/b/a Verizon Wireless
WIRELESS COMMUNICATIONS FACILITY
MERIDEN HANOVER
462 WEST MAIN STREET
MERIDEN, CT 06451

DATE:	06/25/14
SCALE:	AS NOTED
JOB NO.	13199.000

COMPOUND PLAN AND ELEVATION

C-1

Sheet No. 2 of 2

ATTACHMENT 3

PAUL J. FORD AND COMPANY
STRUCTURAL ENGINEERS
250 East Broad Street • Suite 600 • Columbus, Ohio 43215-3708

Date: **July 16, 2014**

Debra Elliott
Crown Castle
3530 Toringdon Way Suite 300
Charlotte, NC 28277

Paul J Ford and Company
250 E. Broad Street Suite 600
Columbus, OH 43215
614.221.6679

Subject: **Structural Analysis Report**

Carrier Designation:	***Verizon Wireless* Co-Locate**	
	Carrier Site Number:	N/A
	Carrier Site Name:	Meriden Hanover, CT
Crown Castle Designation:	**Crown Castle BU Number:**	842869
	Crown Castle Site Name:	MERIDEN WEST CENTRAL
	Crown Castle JDE Job Number:	266423
	Crown Castle Work Order Number:	792586
	Crown Castle Application Number:	224892 Rev. 11
Engineering Firm Designation:	**Paul J Ford and Company Project Number:**	37514-1556.001.7805
Site Data:	**450-478 WEST MAIN STREET, MERIDEN, New Haven County, CT** **Latitude *41° 32' 24.24"*, Longitude *-72° 49' 9.06"*** **100 Foot - Monopole Tower**	

Dear Debra Elliott,

Paul J Ford and Company 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 668015, in accordance with application 224892, revision 11.

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

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

The structural analysis was performed for this tower in accordance with the requirements of the 2005 Connecticut Building Code and the 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, 37.6 mph with 0.75 inch ice thickness and 50 mph under service loads.

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

Respectfully submitted by:

Ryan Ferrante
Structural Designer

STATE OF CONNECTICUT
JUSTIN T. KLINE
No. 30301
LICENSED
PROFESSIONAL ENGINEER
7.17.14

tnxTower Report - version 6.1.4.1

PAUL J. FORD AND COMPANY
STRUCTURAL ENGINEERS
250 East Broad Street • Suite 600 • Columbus, Ohio 43215-3708

Date: **July 16, 2014**

Debra Elliott
Crown Castle
3530 Toringdon Way Suite 300
Charlotte, NC 28277

Paul J Ford and Company
250 E. Broad Street Suite 600
Columbus, OH 43215
614.221.6679

Subject: Structural Analysis Report

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Note: See Table I and Table II for the proposed and existing/reserved loading, respectively.

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

Respectfully submitted by:

Ryan Ferrante
Structural Designer

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 100 ft Monopole tower designed by Glen Martin Engineering in December of 2003. 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 the 2005 Connecticut Building Code and the 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, 37.6 mph with 0.75 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
65.0	65.0	3	alcatel lucent	RRH2X40-AWS	2	1-5/8	-
		3	alcatel lucent	RRH2x40 700			
		6	antel	BXA-171063/12CF w/ Mount Pipe			
		6	antel	BXA-70063/6CF w/ Mount Pipe			
		2	rfs celwave	DB-T1-6Z-8AB-0Z			
		1	tower mounts	Platform Mount [LP 303-1]			

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
100.0	115.0	1	dbspectra	DS8A12F36U-N	-	-	1
	106.0	3	decibel	DB201-A			
		4	decibel	DB432-A			
		1	kmw communications	HB-X-AW-19-65-00T w/ Mount Pipe	-	-	3
	103.0	3	ericsson	RRUS 11			
		3	ericsson	RRUS 11	-	-	2
		3	ericsson	RRUS 11	7 1 9 2	1-1/4 3/8 1/2 7/8	1
		6	kathrein	860 10025			
		6	kmw communications	AM-X-CD-16-65-00T-RET w/ Mount Pipe			
		6	powerwave technologies	LGP21401			
		1	raycap	DC6-48-60-18-8F			
	100.0	1	tower mounts	Platform Mount [LP 301-1]			
86.0	90.0	6	css	CSS-DTMA-BRS	18 1	7/8 1	1
		6	ericsson	AIR 21 w/ Mount Pipe			
		3	rfs celwave	ATMAA1412D-1A20			
		2	rfs celwave	MA0528-23AN w/ Mount Pipe			
	86.0	1	tower mounts	Platform Mount [LP 303-1]			

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
78.0	79.0	3	alcatel lucent	1900MHz RRH	-	-	1
	78.0	3	alcatel lucent	800 EXTERNAL NOTCH FILTER			
		3	alcatel lucent	TME-800MHZ RRH			
		1	tower mounts	Pipe Mount [PM 601-3]			
76.0	79.0	3	alcatel lucent	TD-RRH8x20-25	3 1	5/16 1-1/4	2
		3	rfs celwave	APXVTM14-C-120 w/ Mount Pipe			
		3	rfs celwave	APXVSPP18-C-A20 w/ Mount Pipe	3	1-1/4	1
	76.0	1	tower mounts	Platform Mount [LP 403-1]			

Notes:
1) Existing Equipment
2) Reserved Equipment
3) Equipment To Be Removed

Table 3 - Design Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
-	-	-	-	-	-	-

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	Tectonic, 08/28/2002	4529388	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	Glen Martin Engineering, 12/11/2003	4858942	CCISITES
4-TOWER MANUFACTURER DRAWINGS	Glen Martin Engineering, 06/04/2003	4713237	CCISITES

3.1) Analysis Method

tnxTower (version 6.1.4.1), 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.

This analysis may be affected if any assumptions are not valid or have been made in error. Paul J Ford and Company 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	100 - 47	Pole	TP40.72x28x0.3125	1	-15.08	2019.47	37.5	Pass
L2	47 - 0	Pole	TP51.37x38.655x0.375	2	-26.98	3171.35	55.9	Pass
							Summary	
						Pole (L2)	55.9	Pass
						Rating =	55.9	Pass

Table 6 - Tower Component Stresses vs. Capacity

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	59.5	Pass
1	Base Plate	0	28.9	Pass
1	Base Foundation Structural Steel	0	14.0	Pass
1	Base Foundation Soil Interaction	0	68.0	Pass

Structure Rating (max from all components) =	68%

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

APPENDIX A

TNXTOWER OUTPUT

Tower Input Data

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

1) Tower is located in New Haven County, Connecticut.
2) Basic wind speed of 85 mph.
3) Nominal ice thickness of 0.7500 in.
4) Ice thickness is considered to increase with height.
5) Ice density of 56.00 pcf.
6) A wind speed of 38 mph is used in combination with ice.
7) Temperature drop of 50 °F.
8) Deflections calculated using a wind speed of 50 mph.
9) A non-linear (P-delta) analysis was used.
10) Pressures are calculated at each section.
11) Stress ratio used in pole design is 1.333.
12) Local bending stresses due to climbing loads, feed line 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	Use TIA-222-G Tension Splice	
	Capacity Exemption	

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	100.0000-47.0000	53.0000	6.00	16	28.0000	40.7200	0.3125	1.2500	A572-65 (65 ksi)
L2	47.0000-0.0000	53.0000		16	38.6550	51.3700	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	28.5486	27.6010	2673.0452	9.8567	14.2800	187.1880	5386.5635	13.6472	4.9501	15.84
	41.5178	40.2812	8308.8518	14.3851	20.7672	400.0949	16743.5097	19.9169	7.4814	23.94
L2	40.8799	45.7925	8477.1936	13.6277	19.7141	430.0077	17082.7422	22.6420	6.9461	18.523
	52.3764	61.0028	20040.9868	18.1542	26.1987	764.9611	40385.4186	30.1627	9.4764	25.27

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
LDF2-50(3/8")	C	No	Inside Pole	100.0000 - 0.0000	1	No Ice	0.0000	0.08
						1/2" Ice	0.0000	0.08
						1" Ice	0.0000	0.08
						2" Ice	0.0000	0.08
						4" Ice	0.0000	0.08
LDF4-50A(1/2")	C	No	Inside Pole	100.0000 - 0.0000	9	No Ice	0.0000	0.15
						1/2" Ice	0.0000	0.15
						1" Ice	0.0000	0.15
						2" Ice	0.0000	0.15
						4" Ice	0.0000	0.15
LDF5-50A(7/8")	C	No	Inside Pole	100.0000 - 0.0000	2	No Ice	0.0000	0.33
						1/2" Ice	0.0000	0.33
						1" Ice	0.0000	0.33
						2" Ice	0.0000	0.33
						4" Ice	0.0000	0.33
LDF6-50A(1-1/4")	C	No	Inside Pole	100.0000 - 0.0000	7	No Ice	0.0000	0.66
						1/2" Ice	0.0000	0.66
						1" Ice	0.0000	0.66
						2" Ice	0.0000	0.66
						4" Ice	0.0000	0.66
LDF2-2R(1")	C	No	Inside Pole	86.0000 - 0.0000	1	No Ice	0.0000	0.30
						1/2" Ice	0.0000	0.30
						1" Ice	0.0000	0.30
						2" Ice	0.0000	0.30
						4" Ice	0.0000	0.30
LDF5-50A(7/8")	C	No	Inside Pole	86.0000 - 0.0000	18	No Ice	0.0000	0.33
						1/2" Ice	0.0000	0.33
						1" Ice	0.0000	0.33
						2" Ice	0.0000	0.33
						4" Ice	0.0000	0.33
HB114-13U3M12-XXXF(1-1/4")	C	No	Inside Pole	76.0000 - 0.0000	2	No Ice	0.0000	0.99
						1/2" Ice	0.0000	0.99
						1" Ice	0.0000	0.99
						2" Ice	0.0000	0.99
						4" Ice	0.0000	0.99
HB114-21U3M12-XXXF(1-1/4")	C	No	Inside Pole	76.0000 - 0.0000	1	No Ice	0.0000	1.22
						1/2" Ice	0.0000	1.22
						1" Ice	0.0000	1.22
						2" Ice	0.0000	1.22
						4" Ice	0.0000	1.22
ATCB-B01-006(5/16")	C	No	Inside Pole	76.0000 - 0.0000	3	No Ice	0.0000	0.07
						1/2" Ice	0.0000	0.07
						1" Ice	0.0000	0.07
						2" Ice	0.0000	0.07
						4" Ice	0.0000	0.07
HB114-13U3M12-XXXF(1-1/4")	C	No	Inside Pole	76.0000 - 0.0000	1	No Ice	0.0000	0.99
						1/2" Ice	0.0000	0.99
						1" Ice	0.0000	0.99
						2" Ice	0.0000	0.99
						4" Ice	0.0000	0.99
MLE Hybrid 9Power/18Fiber RL 2(1 5/8)	C	No	Inside Pole	65.0000 - 0.0000	2	No Ice	0.0000	1.07
						1/2" Ice	0.0000	1.07
						1" Ice	0.0000	1.07
						2" Ice	0.0000	1.07
						4" Ice	0.0000	1.07
*****								
2" (Nominal) Conduit	C	No	Inside Pole	100.0000 - 0.0000	1	No Ice	0.0000	0.72
						1/2" Ice	0.0000	0.72
						1" Ice	0.0000	0.72
						2" Ice	0.0000	0.72
						4" Ice	0.0000	0.72

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	100.0000-47.0000	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	0.80
L2	47.0000-0.0000	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	0.95

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	100.0000-47.0000	A	0.824	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	0.80
L2	47.0000-0.0000	A	0.750	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	0.95

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	100.0000-47.0000	0.0000	0.0000	0.0000	0.0000
L2	47.0000-0.0000	0.0000	0.0000	0.0000	0.0000

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 K
DS8A12F36U-N	A	From Leg	4.0000 0.00 15.00	0.00	100.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.1275 7.5950 10.0792 15.0975 25.3342	5.1275 7.5950 10.0792 15.0975 25.3342	0.07 0.11 0.16 0.32 0.82
AM-X-CD-16-65-00T-RET w/ Mount Pipe	A	From Leg	4.0000 0.00 3.00	0.00	100.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.4975 9.1490 9.7672 11.0311 13.6786	6.3042 7.4790 8.3676 10.1785 14.0237	0.07 0.14 0.21 0.38 0.87
(2) AM-X-CD-16-65-00T-RET w/ Mount Pipe	B	From Leg	4.0000 0.00 3.00	0.00	100.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.4975 9.1490 9.7672 11.0311 13.6786	6.3042 7.4790 8.3676 10.1785 14.0237	0.07 0.14 0.21 0.38 0.87
(3) AM-X-CD-16-65-00T-RET w/ Mount Pipe	C	From Leg	4.0000 0.00 3.00	0.00	100.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.4975 9.1490 9.7672 11.0311 13.6786	6.3042 7.4790 8.3676 10.1785 14.0237	0.07 0.14 0.21 0.38 0.87
DB201-A	A	From Leg	4.0000 0.00 6.00	0.00	100.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.1000 1.9800 2.8600 4.6200 8.1400	1.1000 1.9800 2.8600 4.6200 8.1400	0.03 0.03 0.04 0.06 0.09

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
DB201-A	C	From Leg	4.0000	0.00	0.00	100.0000	No Ice	1.1000	1.1000	0.03
			0.00				1/2" Ice	1.9800	1.9800	0.03
			6.00				1" Ice	2.8600	2.8600	0.04
							2" Ice	4.6200	4.6200	0.06
							4" Ice	8.1400	8.1400	0.09
DB201-A	C	From Leg	4.0000	0.00	0.00	100.0000	No Ice	1.1000	1.1000	0.03
			0.00				1/2" Ice	1.9800	1.9800	0.03
			6.00				1" Ice	2.8600	2.8600	0.04
							2" Ice	4.6200	4.6200	0.06
							4" Ice	8.1400	8.1400	0.09
(2) DB432-A	B	From Leg	4.0000	0.00	0.00	100.0000	No Ice	0.3000	0.3000	0.01
			0.00				1/2" Ice	0.5400	0.5400	0.01
			6.00				1" Ice	0.7800	0.7800	0.01
							2" Ice	1.2600	1.2600	0.01
							4" Ice	2.2200	2.2200	0.02
(2) DB432-A	A	From Leg	4.0000	0.00	0.00	100.0000	No Ice	0.3000	0.3000	0.01
			0.00				1/2" Ice	0.5400	0.5400	0.01
			6.00				1" Ice	0.7800	0.7800	0.01
							2" Ice	1.2600	1.2600	0.01
							4" Ice	2.2200	2.2200	0.02
RRUS 11	A	From Leg	4.0000	0.00	0.00	100.0000	No Ice	3.2486	1.3726	0.05
			0.00				1/2" Ice	3.4905	1.5510	0.07
			3.00				1" Ice	3.7411	1.7380	0.10
							2" Ice	4.2682	2.1381	0.15
							4" Ice	5.4260	3.0418	0.31
RRUS 11	B	From Leg	4.0000	0.00	0.00	100.0000	No Ice	3.2486	1.3726	0.05
			0.00				1/2" Ice	3.4905	1.5510	0.07
			3.00				1" Ice	3.7411	1.7380	0.10
							2" Ice	4.2682	2.1381	0.15
							4" Ice	5.4260	3.0418	0.31
RRUS 11	C	From Leg	4.0000	0.00	0.00	100.0000	No Ice	3.2486	1.3726	0.05
			0.00				1/2" Ice	3.4905	1.5510	0.07
			3.00				1" Ice	3.7411	1.7380	0.10
							2" Ice	4.2682	2.1381	0.15
							4" Ice	5.4260	3.0418	0.31
(2) 860 10025	A	From Leg	4.0000	0.00	0.00	100.0000	No Ice	0.1633	0.1361	0.00
			0.00				1/2" Ice	0.2286	0.1988	0.00
			3.00				1" Ice	0.3025	0.2701	0.01
							2" Ice	0.4762	0.4386	0.01
							4" Ice	0.9273	0.8793	0.05
(2) 860 10025	B	From Leg	4.0000	0.00	0.00	100.0000	No Ice	0.1633	0.1361	0.00
			0.00				1/2" Ice	0.2286	0.1988	0.00
			3.00				1" Ice	0.3025	0.2701	0.01
							2" Ice	0.4762	0.4386	0.01
							4" Ice	0.9273	0.8793	0.05
(2) 860 10025	C	From Leg	4.0000	0.00	0.00	100.0000	No Ice	0.1633	0.1361	0.00
			0.00				1/2" Ice	0.2286	0.1988	0.00
			3.00				1" Ice	0.3025	0.2701	0.01
							2" Ice	0.4762	0.4386	0.01
							4" Ice	0.9273	0.8793	0.05
(2) LGP21401	A	From Leg	4.0000	0.00	0.00	100.0000	No Ice	1.2880	0.3640	0.01
			0.00				1/2" Ice	1.4453	0.4785	0.02
			3.00				1" Ice	1.6112	0.6017	0.03
							2" Ice	1.9690	0.8739	0.05
							4" Ice	2.7882	1.5220	0.14
(2) LGP21401	B	From Leg	4.0000	0.00	0.00	100.0000	No Ice	1.2880	0.3640	0.01
			0.00				1/2" Ice	1.4453	0.4785	0.02
			3.00				1" Ice	1.6112	0.6017	0.03
							2" Ice	1.9690	0.8739	0.05
							4" Ice	2.7882	1.5220	0.14
(2) LGP21401	C	From Leg	4.0000	0.00	0.00	100.0000	No Ice	1.2880	0.3640	0.01
			0.00				1/2" Ice	1.4453	0.4785	0.02
			3.00				1" Ice	1.6112	0.6017	0.03
							2" Ice	1.9690	0.8739	0.05

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
						4" Ice	2.7882	1.5220	0.14
DC6-48-60-18-8F	A	From Leg	4.0000 0.00 3.00	0.00	100.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.5667 2.7978 3.0377 3.5432 4.6580	2.5667 2.7978 3.0377 3.5432 4.6580	0.02 0.04 0.07 0.13 0.30
RRUS 11	A	From Leg	4.0000 0.00 3.00	0.00	100.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.2486 3.4905 3.7411 4.2682 5.4260	1.3726 1.5510 1.7380 2.1381 3.0418	0.05 0.07 0.10 0.15 0.31
RRUS 11	B	From Leg	4.0000 0.00 3.00	0.00	100.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.2486 3.4905 3.7411 4.2682 5.4260	1.3726 1.5510 1.7380 2.1381 3.0418	0.05 0.07 0.10 0.15 0.31
RRUS 11	C	From Leg	4.0000 0.00 3.00	0.00	100.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.2486 3.4905 3.7411 4.2682 5.4260	1.3726 1.5510 1.7380 2.1381 3.0418	0.05 0.07 0.10 0.15 0.31
Platform Mount [LP 301-1]	C	None		0.00	100.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	30.1000 40.8000 51.5000 72.9000 115.7000	30.1000 40.8000 51.5000 72.9000 115.7000	1.59 2.03 2.47 3.35 5.11
***									
(3) AIR 21 w/ Mount Pipe	A	From Leg	4.0000 0.00 4.00	0.00	86.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.7708 7.2920 7.8074 8.8691 11.1158	5.7014 6.5516 7.3292 8.9381 12.3708	0.11 0.17 0.23 0.38 0.81
AIR 21 w/ Mount Pipe	B	From Leg	4.0000 0.00 4.00	0.00	86.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.7708 7.2920 7.8074 8.8691 11.1158	5.7014 6.5516 7.3292 8.9381 12.3708	0.11 0.17 0.23 0.38 0.81
(2) AIR 21 w/ Mount Pipe	C	From Leg	4.0000 0.00 4.00	0.00	86.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.7708 7.2920 7.8074 8.8691 11.1158	5.7014 6.5516 7.3292 8.9381 12.3708	0.11 0.17 0.23 0.38 0.81
(2) MA0528-23AN w/ Mount Pipe	B	From Leg	4.0000 0.00 4.00	0.00	86.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.5720 1.7969 2.0444 2.5872 3.8432	0.4745 0.6822 0.9344 1.5145 2.9117	0.01 0.02 0.04 0.07 0.21
(3) CSS-DTMA-BRS	A	From Leg	4.0000 0.00 4.00	0.00	86.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.8710 1.0135 1.1647 1.4931 2.2535	0.5801 0.7103 0.8490 1.1525 1.8631	0.03 0.03 0.04 0.06 0.14
(3) CSS-DTMA-BRS	B	From Leg	4.0000 0.00 4.00	0.00	86.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.8710 1.0135 1.1647 1.4931 2.2535	0.5801 0.7103 0.8490 1.1525 1.8631	0.03 0.03 0.04 0.06 0.14
(2) ATMAA1412D-1A20	A	From Leg	4.0000 0.00 4.00	0.00	86.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.1667 1.3136 1.4691 1.8062 2.5840	0.4667 0.5747 0.6914 0.9506 1.5728	0.01 0.02 0.03 0.06 0.14
ATMAA1412D-1A20	B	From Leg	4.0000 0.00 4.00	0.00	86.0000	No Ice 1/2" Ice 1" Ice	1.1667 1.3136 1.4691	0.4667 0.5747 0.6914	0.01 0.02 0.03

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
						2" Ice	1.8062	0.9506	0.06
						4" Ice	2.5840	1.5728	0.14
Platform Mount [LP 303-1]	C	None		0.00	86.0000	No Ice	14.6600	14.6600	1.25
						1/2" Ice	18.8700	18.8700	1.48
						1" Ice	23.0800	23.0800	1.71
						2" Ice	31.5000	31.5000	2.18
						4" Ice	48.3400	48.3400	3.10
5' x 2' Pipe Mount	C	From Leg	4.0000 0.00 0.00	0.00	86.0000	No Ice	1.0000	1.0000	0.03
						1/2" Ice	1.3932	1.3932	0.04
						1" Ice	1.7031	1.7031	0.05
						2" Ice	2.3506	2.3506	0.08
						4" Ice	3.7778	3.7778	0.20
***									
TME-800MHZ RRH	A	From Leg	1.0000 0.00 0.00	0.00	78.0000	No Ice	2.4899	2.0685	0.05
						1/2" Ice	2.7061	2.2705	0.07
						1" Ice	2.9310	2.4812	0.10
						2" Ice	3.4068	2.9284	0.16
						4" Ice	4.4620	3.9265	0.32
TME-800MHZ RRH	B	From Leg	1.0000 0.00 0.00	0.00	78.0000	No Ice	2.4899	2.0685	0.05
						1/2" Ice	2.7061	2.2705	0.07
						1" Ice	2.9310	2.4812	0.10
						2" Ice	3.4068	2.9284	0.16
						4" Ice	4.4620	3.9265	0.32
TME-800MHZ RRH	C	From Leg	1.0000 0.00 0.00	0.00	78.0000	No Ice	2.4899	2.0685	0.05
						1/2" Ice	2.7061	2.2705	0.07
						1" Ice	2.9310	2.4812	0.10
						2" Ice	3.4068	2.9284	0.16
						4" Ice	4.4620	3.9265	0.32
1900MHz RRH	A	From Leg	1.0000 0.00 1.00	0.00	78.0000	No Ice	2.9069	3.8014	0.04
						1/2" Ice	3.1446	4.0650	0.08
						1" Ice	3.3909	4.3372	0.11
						2" Ice	3.9094	4.9076	0.19
						4" Ice	5.0502	6.1520	0.41
1900MHz RRH	B	From Leg	1.0000 0.00 1.00	0.00	78.0000	No Ice	2.9069	3.8014	0.04
						1/2" Ice	3.1446	4.0650	0.08
						1" Ice	3.3909	4.3372	0.11
						2" Ice	3.9094	4.9076	0.19
						4" Ice	5.0502	6.1520	0.41
1900MHz RRH	C	From Leg	1.0000 0.00 1.00	0.00	78.0000	No Ice	2.9069	3.8014	0.04
						1/2" Ice	3.1446	4.0650	0.08
						1" Ice	3.3909	4.3372	0.11
						2" Ice	3.9094	4.9076	0.19
						4" Ice	5.0502	6.1520	0.41
800 EXTERNAL NOTCH FILTER	A	From Leg	1.0000 0.00 0.00	0.00	78.0000	No Ice	0.7701	0.3747	0.01
						1/2" Ice	0.8898	0.4647	0.02
						1" Ice	1.0181	0.5634	0.02
						2" Ice	1.3007	0.7868	0.04
						4" Ice	1.9696	1.3372	0.11
800 EXTERNAL NOTCH FILTER	B	From Leg	1.0000 0.00 0.00	0.00	78.0000	No Ice	0.7701	0.3747	0.01
						1/2" Ice	0.8898	0.4647	0.02
						1" Ice	1.0181	0.5634	0.02
						2" Ice	1.3007	0.7868	0.04
						4" Ice	1.9696	1.3372	0.11
800 EXTERNAL NOTCH FILTER	C	From Leg	1.0000 0.00 0.00	0.00	78.0000	No Ice	0.7701	0.3747	0.01
						1/2" Ice	0.8898	0.4647	0.02
						1" Ice	1.0181	0.5634	0.02
						2" Ice	1.3007	0.7868	0.04
						4" Ice	1.9696	1.3372	0.11
Pipe Mount [PM 601-3]	C	None		0.00	78.0000	No Ice	4.3900	4.3900	0.20
						1/2" Ice	5.4800	5.4800	0.24
						1" Ice	6.5700	6.5700	0.28
						2" Ice	8.7500	8.7500	0.36
						4" Ice	13.1100	13.1100	0.53
***									
APXVSPP18-C-A20 w/	A	From Leg	4.0000	0.00	76.0000	No Ice	8.4975	6.9458	0.08

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			0.00 3.00			1/2" Ice	9.1490	8.1266	0.15
						1" Ice	9.7672	9.0212	0.23
						2" Ice	11.0311	10.8440	0.41
						4" Ice	13.6786	14.8507	0.91
APXVSPP18-C-A20 w/ Mount Pipe	B	From Leg	4.0000 0.00 3.00	0.00	76.0000	No Ice	8.4975	6.9458	0.08
						1/2" Ice	9.1490	8.1266	0.15
						1" Ice	9.7672	9.0212	0.23
						2" Ice	11.0311	10.8440	0.41
						4" Ice	13.6786	14.8507	0.91
APXVSPP18-C-A20 w/ Mount Pipe	C	From Leg	4.0000 0.00 3.00	0.00	76.0000	No Ice	8.4975	6.9458	0.08
						1/2" Ice	9.1490	8.1266	0.15
						1" Ice	9.7672	9.0212	0.23
						2" Ice	11.0311	10.8440	0.41
						4" Ice	13.6786	14.8507	0.91
APXVTM14-C-120 w/ Mount Pipe	A	From Leg	4.0000 0.00 3.00	0.00	76.0000	No Ice	7.1342	4.9591	0.08
						1/2" Ice	7.6618	5.7544	0.13
						1" Ice	8.1830	6.4723	0.19
						2" Ice	9.2563	8.0099	0.34
						4" Ice	11.5262	11.4120	0.75
APXVTM14-C-120 w/ Mount Pipe	B	From Leg	4.0000 0.00 3.00	0.00	76.0000	No Ice	7.1342	4.9591	0.08
						1/2" Ice	7.6618	5.7544	0.13
						1" Ice	8.1830	6.4723	0.19
						2" Ice	9.2563	8.0099	0.34
						4" Ice	11.5262	11.4120	0.75
APXVTM14-C-120 w/ Mount Pipe	C	From Leg	4.0000 0.00 3.00	0.00	76.0000	No Ice	7.1342	4.9591	0.08
						1/2" Ice	7.6618	5.7544	0.13
						1" Ice	8.1830	6.4723	0.19
						2" Ice	9.2563	8.0099	0.34
						4" Ice	11.5262	11.4120	0.75
TD-RRH8x20-25	A	From Leg	4.0000 0.00 3.00	0.00	76.0000	No Ice	4.7198	1.7027	0.07
						1/2" Ice	5.0138	1.9196	0.10
						1" Ice	5.3165	2.1453	0.13
						2" Ice	5.9478	2.6224	0.20
						4" Ice	7.3141	3.6805	0.40
TD-RRH8x20-25	B	From Leg	4.0000 0.00 3.00	0.00	76.0000	No Ice	4.7198	1.7027	0.07
						1/2" Ice	5.0138	1.9196	0.10
						1" Ice	5.3165	2.1453	0.13
						2" Ice	5.9478	2.6224	0.20
						4" Ice	7.3141	3.6805	0.40
TD-RRH8x20-25	C	From Leg	4.0000 0.00 3.00	0.00	76.0000	No Ice	4.7198	1.7027	0.07
						1/2" Ice	5.0138	1.9196	0.10
						1" Ice	5.3165	2.1453	0.13
						2" Ice	5.9478	2.6224	0.20
						4" Ice	7.3141	3.6805	0.40
Platform Mount [LP 403-1]	C	None		0.00	76.0000	No Ice	18.8500	18.8500	1.50
						1/2" Ice	24.3000	24.3000	1.80
						1" Ice	29.7500	29.7500	2.09
						2" Ice	40.6500	40.6500	2.69
						4" Ice	62.4500	62.4500	3.87
***									
(2) BXA-70063/6CF w/ Mount Pipe	A	From Leg	4.0000 0.00 0.00	0.00	65.0000	No Ice	7.9795	5.4071	0.04
						1/2" Ice	8.6208	6.5581	0.10
						1" Ice	9.2281	7.4216	0.17
						2" Ice	10.4727	9.1985	0.33
						4" Ice	13.0817	12.9523	0.79
(2) BXA-70063/6CF w/ Mount Pipe	B	From Leg	4.0000 0.00 0.00	0.00	65.0000	No Ice	7.9795	5.4071	0.04
						1/2" Ice	8.6208	6.5581	0.10
						1" Ice	9.2281	7.4216	0.17
						2" Ice	10.4727	9.1985	0.33
						4" Ice	13.0817	12.9523	0.79
(2) BXA-70063/6CF w/ Mount Pipe	C	From Leg	4.0000 0.00 0.00	0.00	65.0000	No Ice	7.9795	5.4071	0.04
						1/2" Ice	8.6208	6.5581	0.10
						1" Ice	9.2281	7.4216	0.17
						2" Ice	10.4727	9.1985	0.33
						4" Ice	13.0817	12.9523	0.79

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
(2) BXA-171063/12CF w/ Mount Pipe	A	From Leg	4.0000 0.00 0.00	0.00	65.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.0290 5.5830 6.1033 7.1662 9.4380	5.2887 6.4594 7.3479 9.1478 12.9475	0.04 0.09 0.14 0.27 0.68
(2) BXA-171063/12CF w/ Mount Pipe	B	From Leg	4.0000 0.00 0.00	0.00	65.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.0290 5.5830 6.1033 7.1662 9.4380	5.2887 6.4594 7.3479 9.1478 12.9475	0.04 0.09 0.14 0.27 0.68
(2) BXA-171063/12CF w/ Mount Pipe	C	From Leg	4.0000 0.00 0.00	0.00	65.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.0290 5.5830 6.1033 7.1662 9.4380	5.2887 6.4594 7.3479 9.1478 12.9475	0.04 0.09 0.14 0.27 0.68
DB-T1-6Z-8AB-0Z	A	From Leg	4.0000 0.00 0.00	0.00	65.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.6000 5.9154 6.2395 6.9136 8.3654	2.3333 2.5580 2.7914 3.2840 4.3728	0.04 0.08 0.12 0.21 0.45
DB-T1-6Z-8AB-0Z	C	From Leg	4.0000 0.00 0.00	0.00	65.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.6000 5.9154 6.2395 6.9136 8.3654	2.3333 2.5580 2.7914 3.2840 4.3728	0.04 0.08 0.12 0.21 0.45
RRH2x40 700	A	From Leg	4.0000 0.00 0.00	0.00	65.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.2896 2.4929 2.7048 3.1546 4.1580	1.2058 1.3631 1.5291 1.8868 2.7061	0.05 0.07 0.09 0.13 0.27
RRH2x40 700	B	From Leg	4.0000 0.00 0.00	0.00	65.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.2896 2.4929 2.7048 3.1546 4.1580	1.2058 1.3631 1.5291 1.8868 2.7061	0.05 0.07 0.09 0.13 0.27
RRH2x40 700	C	From Leg	4.0000 0.00 0.00	0.00	65.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.2896 2.4929 2.7048 3.1546 4.1580	1.2058 1.3631 1.5291 1.8868 2.7061	0.05 0.07 0.09 0.13 0.27
RRH2X40-AWS	A	From Leg	4.0000 0.00 0.00	0.00	65.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.5217 2.7530 2.9930 3.4990 4.6146	1.5894 1.7953 2.0098 2.4648 3.4785	0.04 0.06 0.08 0.13 0.28
RRH2X40-AWS	B	From Leg	4.0000 0.00 0.00	0.00	65.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.5217 2.7530 2.9930 3.4990 4.6146	1.5894 1.7953 2.0098 2.4648 3.4785	0.04 0.06 0.08 0.13 0.28
RRH2X40-AWS	C	From Leg	4.0000 0.00 0.00	0.00	65.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.5217 2.7530 2.9930 3.4990 4.6146	1.5894 1.7953 2.0098 2.4648 3.4785	0.04 0.06 0.08 0.13 0.28
Platform Mount [LP 303-1]	C	None		0.00	65.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	14.6600 18.8700 23.0800 31.5000 48.3400	14.6600 18.8700 23.0800 31.5000 48.3400	1.25 1.48 1.71 2.18 3.10

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Tower Pressures - No Ice

G_H = 1.690

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1 100.0000-47.0000	72.5517	1.252	23.024	151.757	A	0.000	151.757	151.757	100.00	0.000	0.000
					B	0.000	151.757		100.00	0.000	0.000
					C	0.000	151.757		100.00	0.000	0.000
L2 47.0000-0.0000	22.6323	1	18.643	179.118	A	0.000	179.118	179.118	100.00	0.000	0.000
					B	0.000	179.118		100.00	0.000	0.000
					C	0.000	179.118		100.00	0.000	0.000

Tower Pressure - With Ice

G_H = 1.690

Section Elevation ft	z ft	K_Z	q_z psf	t_Z in	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1 100.0000-47.0000	72.5517	1.252	4.505	0.8244	159.039	A	0.000	159.039	159.039	100.00	0.000	0.000
						B	0.000	159.039		100.00	0.000	0.000
						C	0.000	159.039		100.00	0.000	0.000
L2 47.0000-0.0000	22.6323	1	3.648	0.7500	185.575	A	0.000	185.575	185.575	100.00	0.000	0.000
						B	0.000	185.575		100.00	0.000	0.000
						C	0.000	185.575		100.00	0.000	0.000

Tower Pressure - Service

G_H = 1.690

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1 100.0000-47.0000	72.5517	1.252	7.967	151.757	A	0.000	151.757	151.757	100.00	0.000	0.000
					B	0.000	151.757		100.00	0.000	0.000
					C	0.000	151.757		100.00	0.000	0.000
L2 47.0000-0.0000	22.6323	1	6.451	179.118	A	0.000	179.118	179.118	100.00	0.000	0.000
					B	0.000	179.118		100.00	0.000	0.000
					C	0.000	179.118		100.00	0.000	0.000

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

Comb. No.	Description
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	100 - 47	Pole	Max Tension	14	0.00	-0.00	-0.00
			Max. Compression	14	-23.84	1.90	1.86
			Max. Mx	11	-15.08	591.88	0.20
			Max. My	2	-15.08	-0.15	588.90
			Max. Vy	5	20.26	-590.33	2.04
			Max. Vx	2	-20.27	-0.15	588.90
			Max. Torque	9			-3.28
L2	47 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-37.83	1.90	1.86
			Max. Mx	11	-26.99	1822.06	-2.24
			Max. My	2	-26.99	-2.59	1819.24
			Max. Vy	5	26.24	-1820.54	4.53
			Max. Vx	2	-26.24	-2.59	1819.24
			Max. Torque	9			-3.28

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	14	37.83	-0.00	-0.00
	Max. H_x	11	27.00	26.22	-0.05
	Max. H_z	2	27.00	-0.05	26.23
	Max. M_x	2	1819.24	-0.05	26.23
	Max. M_z	5	1820.54	-26.22	0.05
	Max. Torsion	3	3.26	-13.15	22.74
	Min. Vert	11	27.00	26.22	-0.05
	Min. H_x	5	27.00	-26.22	0.05
	Min. H_z	8	27.00	0.05	-26.23
	Min. M_x	8	-1816.95	0.05	-26.23
	Min. M_z	11	-1822.06	26.22	-0.05
	Min. Torsion	9	-3.28	13.15	-22.74

Tower Mast Reaction Summary

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 Only	27.00	-0.00	-0.00	-1.12	0.78	0.00
Dead+Wind 0 deg - No Ice	27.00	0.05	-26.23	-1819.24	-2.59	-2.64
Dead+Wind 30 deg - No Ice	27.00	13.15	-22.74	-1577.35	-912.80	-3.26
Dead+Wind 60 deg - No Ice	27.00	22.73	-13.15	-913.12	-1578.22	-3.02
Dead+Wind 90 deg - No Ice	27.00	26.22	-0.05	-4.53	-1820.54	-1.97
Dead+Wind 120 deg - No Ice	27.00	22.69	13.07	904.97	-1574.83	-0.39
Dead+Wind 150 deg - No Ice	27.00	13.07	22.69	1571.68	-906.94	1.30
Dead+Wind 180 deg - No Ice	27.00	-0.05	26.23	1816.95	4.18	2.65
Dead+Wind 210 deg - No Ice	27.00	-13.15	22.74	1575.06	914.39	3.28
Dead+Wind 240 deg - No Ice	27.00	-22.73	13.15	910.83	1579.80	3.03
Dead+Wind 270 deg - No Ice	27.00	-26.22	0.05	2.24	1822.06	1.96
Dead+Wind 300 deg - No Ice	27.00	-22.69	-13.07	-907.26	1576.42	0.37
Dead+Wind 330 deg - No Ice	27.00	-13.07	-22.69	-1573.97	908.53	-1.31
Dead+Ice+Temp	37.83	0.00	0.00	-1.86	1.90	-0.00
Dead+Wind 0 deg+Ice+Temp	37.83	0.00	-6.09	-442.14	1.74	-0.70
Dead+Wind 30 deg+Ice+Temp	37.83	3.05	-5.28	-383.27	-218.41	-0.90
Dead+Wind 60 deg+Ice+Temp	37.83	5.27	-3.05	-222.20	-379.52	-0.86
Dead+Wind 90 deg+Ice+Temp	37.83	6.09	-0.00	-2.11	-438.42	-0.58
Dead+Wind 120 deg+Ice+Temp	37.83	5.27	3.04	218.03	-379.32	-0.15
Dead+Wind 150 deg+Ice+Temp	37.83	3.04	5.27	379.24	-218.06	0.32
Dead+Wind 180 deg+Ice+Temp	37.83	-0.00	6.09	438.33	2.15	0.70
Dead+Wind 210 deg+Ice+Temp	37.83	-3.05	5.28	379.45	222.31	0.90
Dead+Wind 240 deg+Ice+Temp	37.83	-5.27	3.05	218.39	383.42	0.86
Dead+Wind 270 deg+Ice+Temp	37.83	-6.09	0.00	-1.70	442.31	0.58
Dead+Wind 300 deg+Ice+Temp	37.83	-5.27	-3.04	-221.85	383.21	0.15
Dead+Wind 330 deg+Ice+Temp	37.83	-3.04	-5.27	-383.06	221.95	-0.32
Dead+Wind 0 deg - Service	27.00	0.02	-9.07	-630.31	-0.38	-0.92
Dead+Wind 30 deg - Service	27.00	4.55	-7.87	-546.61	-315.37	-1.13
Dead+Wind 60 deg - Service	27.00	7.87	-4.55	-316.74	-545.64	-1.05
Dead+Wind 90 deg - Service	27.00	9.07	-0.02	-2.32	-629.50	-0.68
Dead+Wind 120 deg - Service	27.00	7.85	4.52	312.42	-544.47	-0.13
Dead+Wind 150 deg - Service	27.00	4.52	7.85	543.15	-313.34	0.45
Dead+Wind 180 deg - Service	27.00	-0.02	9.07	628.02	1.96	0.92
Dead+Wind 210 deg - Service	27.00	-4.55	7.87	544.32	316.95	1.13
Dead+Wind 240 deg - Service	27.00	-7.87	4.55	314.45	547.23	1.05
Dead+Wind 270 deg - Service	27.00	-9.07	0.02	0.03	631.08	0.68
Dead+Wind 300 deg - Service	27.00	-7.85	-4.52	-314.72	546.05	0.13
Dead+Wind 330 deg - Service	27.00	-4.52	-7.85	-545.44	314.92	-0.45

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	-27.00	0.00	0.00	27.00	0.00	0.000%
2	0.05	-27.00	-26.23	-0.05	27.00	26.23	0.000%
3	13.15	-27.00	-22.74	-13.15	27.00	22.74	0.000%
4	22.73	-27.00	-13.15	-22.73	27.00	13.15	0.000%
5	26.22	-27.00	-0.05	-26.22	27.00	0.05	0.000%
6	22.69	-27.00	13.07	-22.69	27.00	-13.07	0.000%
7	13.07	-27.00	22.69	-13.07	27.00	-22.69	0.000%
8	-0.05	-27.00	26.23	0.05	27.00	-26.23	0.000%
9	-13.15	-27.00	22.74	13.15	27.00	-22.74	0.000%
10	-22.73	-27.00	13.15	22.73	27.00	-13.15	0.000%
11	-26.22	-27.00	0.05	26.22	27.00	-0.05	0.002%
12	-22.69	-27.00	-13.07	22.69	27.00	13.07	0.000%
13	-13.07	-27.00	-22.69	13.07	27.00	22.69	0.000%
14	0.00	-37.83	0.00	-0.00	37.83	-0.00	0.000%
15	0.00	-37.83	-6.09	-0.00	37.83	6.09	0.001%
16	3.05	-37.83	-5.28	-3.05	37.83	5.28	0.001%
17	5.27	-37.83	-3.05	-5.27	37.83	3.05	0.001%
18	6.09	-37.83	-0.00	-6.09	37.83	0.00	0.001%
19	5.27	-37.83	3.04	-5.27	37.83	-3.04	0.001%
20	3.04	-37.83	5.27	-3.04	37.83	-5.27	0.001%

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
21	-0.00	-37.83	6.09	0.00	37.83	-6.09	0.001%
22	-3.05	-37.83	5.28	3.05	37.83	-5.28	0.001%
23	-5.27	-37.83	3.05	5.27	37.83	-3.05	0.001%
24	-6.09	-37.83	0.00	6.09	37.83	-0.00	0.001%
25	-5.27	-37.83	-3.04	5.27	37.83	3.04	0.001%
26	-3.04	-37.83	-5.27	3.04	37.83	5.27	0.001%
27	0.02	-27.00	-9.07	-0.02	27.00	9.07	0.001%
28	4.55	-27.00	-7.87	-4.55	27.00	7.87	0.001%
29	7.87	-27.00	-4.55	-7.87	27.00	4.55	0.001%
30	9.07	-27.00	-0.02	-9.07	27.00	0.02	0.001%
31	7.85	-27.00	4.52	-7.85	27.00	-4.52	0.001%
32	4.52	-27.00	7.85	-4.52	27.00	-7.85	0.001%
33	-0.02	-27.00	9.07	0.02	27.00	-9.07	0.001%
34	-4.55	-27.00	7.87	4.55	27.00	-7.87	0.001%
35	-7.87	-27.00	4.55	7.87	27.00	-4.55	0.001%
36	-9.07	-27.00	0.02	9.07	27.00	-0.02	0.001%
37	-7.85	-27.00	-4.52	7.85	27.00	4.52	0.001%
38	-4.52	-27.00	-7.85	4.52	27.00	7.85	0.001%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	6	0.00000001	0.00000001
2	Yes	9	0.00000001	0.00003520
3	Yes	9	0.00000001	0.00005412
4	Yes	9	0.00000001	0.00008772
5	Yes	9	0.00000001	0.00002992
6	Yes	9	0.00000001	0.00006252
7	Yes	9	0.00000001	0.00005746
8	Yes	9	0.00000001	0.00003569
9	Yes	9	0.00000001	0.00008954
10	Yes	9	0.00000001	0.00005406
11	Yes	8	0.00000001	0.00014877
12	Yes	9	0.00000001	0.00006725
13	Yes	9	0.00000001	0.00007406
14	Yes	6	0.00000001	0.00000001
15	Yes	8	0.00000001	0.00012368
16	Yes	8	0.00000001	0.00012826
17	Yes	8	0.00000001	0.00012845
18	Yes	8	0.00000001	0.00012165
19	Yes	8	0.00000001	0.00012596
20	Yes	8	0.00000001	0.00012590
21	Yes	8	0.00000001	0.00012170
22	Yes	8	0.00000001	0.00012852
23	Yes	8	0.00000001	0.00012832
24	Yes	8	0.00000001	0.00012369
25	Yes	8	0.00000001	0.00012929
26	Yes	8	0.00000001	0.00012937
27	Yes	8	0.00000001	0.00006359
28	Yes	8	0.00000001	0.00005444
29	Yes	8	0.00000001	0.00006024
30	Yes	8	0.00000001	0.00006213
31	Yes	8	0.00000001	0.00005269
32	Yes	8	0.00000001	0.00005219
33	Yes	8	0.00000001	0.00006319
34	Yes	8	0.00000001	0.00006095
35	Yes	8	0.00000001	0.00005401
36	Yes	8	0.00000001	0.00006239
37	Yes	8	0.00000001	0.00005372
38	Yes	8	0.00000001	0.00005554

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	100 - 47	7.95	36	0.62	0.00
L2	53 - 0	2.54	36	0.42	0.00

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
100.0000	DS8A12F36U-N	36	7.95	0.62	0.00	55921
86.0000	(3) AIR 21 w/ Mount Pipe	36	6.14	0.57	0.00	19972
78.0000	TME-800MHZ RRH	36	5.15	0.54	0.00	12709
76.0000	APXVSPP18-C-A20 w/ Mount Pipe	36	4.91	0.53	0.00	11650
65.0000	(2) BXA-70063/6CF w/ Mount Pipe	36	3.68	0.49	0.00	7988

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	100 - 47	22.94	11	1.78	0.01
L2	53 - 0	7.34	10	1.22	0.00

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
100.0000	DS8A12F36U-N	11	22.94	1.78	0.01	19434
86.0000	(3) AIR 21 w/ Mount Pipe	11	17.71	1.65	0.01	6940
78.0000	TME-800MHZ RRH	11	14.85	1.56	0.01	4416
76.0000	APXVSPP18-C-A20 w/ Mount Pipe	10	14.16	1.54	0.01	4048
65.0000	(2) BXA-70063/6CF w/ Mount Pipe	10	10.61	1.40	0.01	2775

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	100 - 47 (1)	TP40.72x28x0.3125	53.0000	0.0000	0.0	39.00	38.8457	-15.08	1514.98	0.010
L2	47 - 0 (2)	TP51.37x38.655x0.375	53.0000	0.0000	0.0	39.00	61.0028	-26.98	2379.11	0.011

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	100 - 47 (1)	TP40.72x28x0.3125	591.88	19.09	39.00	0.490	0.00	0.00	39.00	0.000
L2	47 - 0 (2)	TP51.37x38.655x0.375	1823.57	28.61	39.00	0.733	0.00	0.00	39.00	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	100 - 47 (1)	TP40.72x28x0.3125	20.26	0.52	26.00	0.041	1.96	0.03	26.00	0.001
L2	47 - 0 (2)	TP51.37x38.655x0.375	26.28	0.43	26.00	0.034	3.03	0.02	26.00	0.001

Pole Interaction Design Data

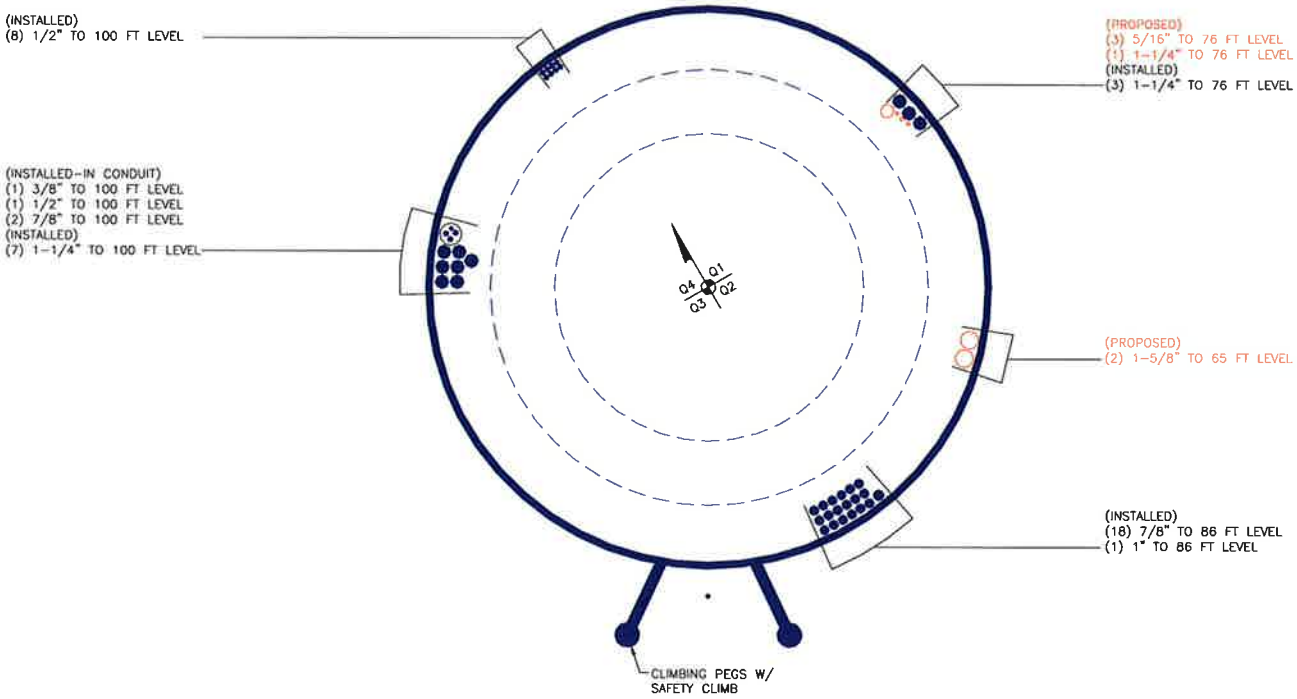
Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	100 - 47 (1)	0.010	0.490	0.000	0.041	0.001	0.500 ✔	1.333	H1-3+VT ✔
L2	47 - 0 (2)	0.011	0.733	0.000	0.034	0.001	0.745 ✔	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	100 - 47	Pole	TP40.72x28x0.3125	1	-15.08	2019.47	37.5	Pass
L2	47 - 0	Pole	TP51.37x38.655x0.375	2	-26.98	3171.35	55.9	Pass
							Summary	
						Pole (L2)	55.9	Pass
						RATING =	**55.9**	**Pass**

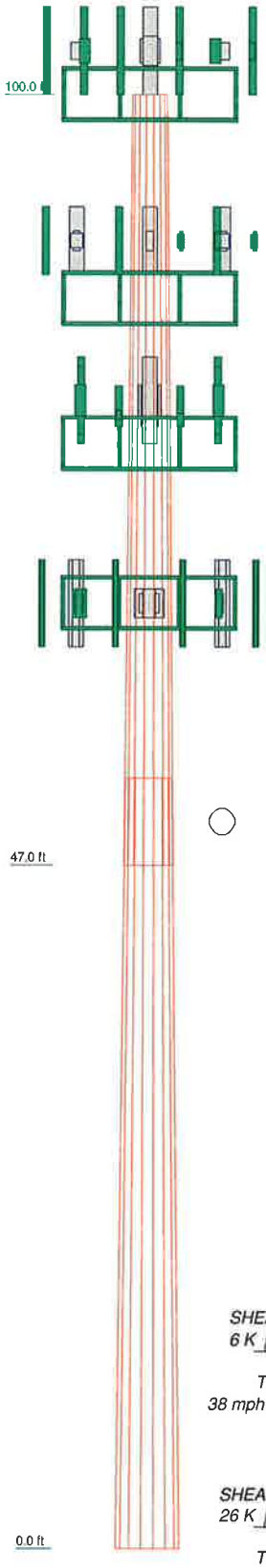
APPENDIX B

BASE LEVEL DRAWING


(INSTALLED)
(8) 1/2" TO 100 FT LEVEL
(INSTALLED-IN CONDUIT)
(1) 3/8" TO 100 FT LEVEL
(1) 1/2" TO 100 FT LEVEL
(2) 7/8" TO 100 FT LEVEL
(INSTALLED)
(7) 1-1/4" TO 100 FT LEVEL
(PROPOSED)
(3) 5/16" TO 76 FT LEVEL
(1) 1-1/4" TO 76 FT LEVEL
(INSTALLED)
(3) 1-1/4" TO 76 FT LEVEL
(PROPOSED)
(2) 1-5/8" TO 65 FT LEVEL
(INSTALLED)
(18) 7/8" TO 86 FT LEVEL
(1) 1" TO 86 FT LEVEL
CLIMBING PEGS W/
SAFETY CLIMB
Q1
Q2
Q3
Q4

APPENDIX C

ADDITIONAL CALCULATIONS



Section	1	2
Length (ft)	53.0000	53.0000
Number of Sides	16	16
Thickness (in)	0.3125	0.3750
Socket Length (ft)	6.0000	
Top Dia (in)	28.0000	38.6550
Bot Dia (in)	40.7200	51.3700
Grade	A572-65	
Weight (K)	6.1	9.6

15.8

AXIAL
38 K

SHEAR
6 K

MOMENT
443 kip-ft

TORQUE 1 kip-ft
38 mph WIND - 0.7500 in ICE

AXIAL
27 K

SHEAR
26 K

MOMENT
1824 kip-ft

TORQUE 3 kip-ft
REACTIONS - 85 mph WIND

DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
DS8A12F36U-N	100	TME-800MHZ RRH	78
AM-X-CD-16-65-00T-RET w/ Mount Pipe	100	TME-800MHZ RRH	78
		TME-800MHZ RRH	78
(2) AM-X-CD-16-65-00T-RET w/ Mount Pipe	100	1900MHz RRH	78
(3) AM-X-CD-16-65-00T-RET w/ Mount Pipe	100	1900MHz RRH	78
		1900MHz RRH	78
DB201-A	100	800 EXTERNAL NOTCH FILTER	78
DB201-A	100	800 EXTERNAL NOTCH FILTER	78
DB201-A	100	800 EXTERNAL NOTCH FILTER	78
(2) DB432-A	100	Pipe Mount [PM 601-3]	78
(2) DB432-A	100	APXVSPP18-C-A20 w/ Mount Pipe	76
RRUS 11	100	APXVSPP18-C-A20 w/ Mount Pipe	76
RRUS 11	100	APXVSPP18-C-A20 w/ Mount Pipe	76
RRUS 11	100	APXVTM14-C-120 w/ Mount Pipe	76
(2) 860 10025	100	APXVTM14-C-120 w/ Mount Pipe	76
(2) 860 10025	100	APXVTM14-C-120 w/ Mount Pipe	76
(2) 860 10025	100	TD-RRH8x20-25	76
(2) LGP21401	100	TD-RRH8x20-25	76
(2) LGP21401	100	TD-RRH8x20-25	76
(2) LGP21401	100	Platform Mount [LP 403-1]	76
DC6-48-60-18-8F	100	(2) BXA-70063/6CF w/ Mount Pipe	65
RRUS 11	100	(2) BXA-70063/6CF w/ Mount Pipe	65
RRUS 11	100	(2) BXA-70063/6CF w/ Mount Pipe	65
RRUS 11	100	(2) BXA-171063/12CF w/ Mount Pipe	65
Platform Mount [LP 301-1]	100	(2) BXA-171063/12CF w/ Mount Pipe	65
(3) AIR 21 w/ Mount Pipe	86	(2) BXA-171063/12CF w/ Mount Pipe	65
AIR 21 w/ Mount Pipe	86	DB-T1-6Z-8AB-0Z	65
(2) AIR 21 w/ Mount Pipe	86	DB-T1-6Z-8AB-0Z	65
(2) MA0528-23AN w/ Mount Pipe	86	RRH2x40 700	65
(3) CSS-DTMA-BRS	86	RRH2x40 700	65
(3) CSS-DTMA-BRS	86	RRH2x40 700	65
(2) ATMAA1412D-1A20	86	RRH2X40-AWS	65
ATMAA1412D-1A20	86	RRH2X40-AWS	65
Platform Mount [LP 303-1]	86	RRH2X40-AWS	65
5' x 2' Pipe Mount	86	Platform Mount [LP 303-1]	65

MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower is located in New Haven County, Connecticut.
2. Tower designed for a 85 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 38 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 55.9%

Paul J Ford and Company
250 E. Broad Street Suite 600
Columbus, OH 43215
Phone: 614.221.6679
FAX: 614.448.4105

Job: 100 Ft. Monopole / Meriden, CT		
Project: 37514-1556.001 / BU 842869		
Client: CCI	Drawn by: Ryan Ferrante	App'd:
Code: TIA/EIA-222-F	Date: 07/16/14	Scale: NTS
Path: T:\375_Crown_Castle\2014\37514-1556.BU_842869\WO 780586.BU 842869_SA 001\37514-1556.001.ar		Dwg No. E-1

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

TIA Rev F

Site Data

BU#: *842869*
Site Name: *Meriden West Central*
App #:

Pole Manufacturer:	*Other*

Reactions		
Moment:	1824	ft-kips
Axial:	27	kips
Shear:	26	kips

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

Anchor Rod Data		
Qty:	20	
Diam:	2.25	in
Rod Material:	Other	
Strength (Fu):	70	ksi
Yield (Fy):	55	ksi
Bolt Circle:	59	in

Plate Data		
Diam:	69	in
Thick:	3	in
Grade:	50	ksi
Single-Rod B-eff:	8.17	in

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

Pole Data		
Diam:	51.37	in
Thick:	0.375	in
Grade:	65	ksi
# of Sides:	16	"0" IF Round
Fu	80	ksi
Reinf. Fillet Weld	0	"0" if None

Stress Increase Factor	
ASIF:	1.333

Anchor Rod Results

Maximum Rod Tension:	72.8 Kips	Rigid
Allowable Tension:	122.4 Kips	Service, ASD
Anchor Rod Stress Ratio:	59.5% **Pass**	Fty*ASIF

Base Plate Results

	Flexural Check	Rigid
Base Plate Stress:	14.5 ksi	Service ASD
Allowable Plate Stress:	50.0 ksi	0.75*Fy*ASIF
Base Plate Stress Ratio:	28.9% **Pass**	Y.L. Length: 29.02

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

PJF job no. **37514-1556.001** Project name **BU 842869**

Foundation Loads:

Pole weight or tower leg compression =	27	(kips)
Horizontal load at top of pier =	26	(kips)
Overturning moment at top of pier=	1824	(ft-kips)

Design criteria:

Safety factor against overturning =	1.5	

Soil Properties:

Soil density =	110	(pcf)
Allowable soil bearing =	8	(ksf)
Depth to water table =	99	(ft)

Dimensions:

Pier shape (round or square)	S	("R" or "S")
Pier width =	8	(ft)
Pier height above grade =	1	(ft)
depth to bottom of footing =	7.5	(ft)
Footing thickness =	2.5	(ft)
Footing width =	20	(ft)
Footing length =	20	(ft)

Concrete:

Concrete strength =	4	(ksi)
Rebar strength =	60	(ksi)
ultimate load factor =	1.3	

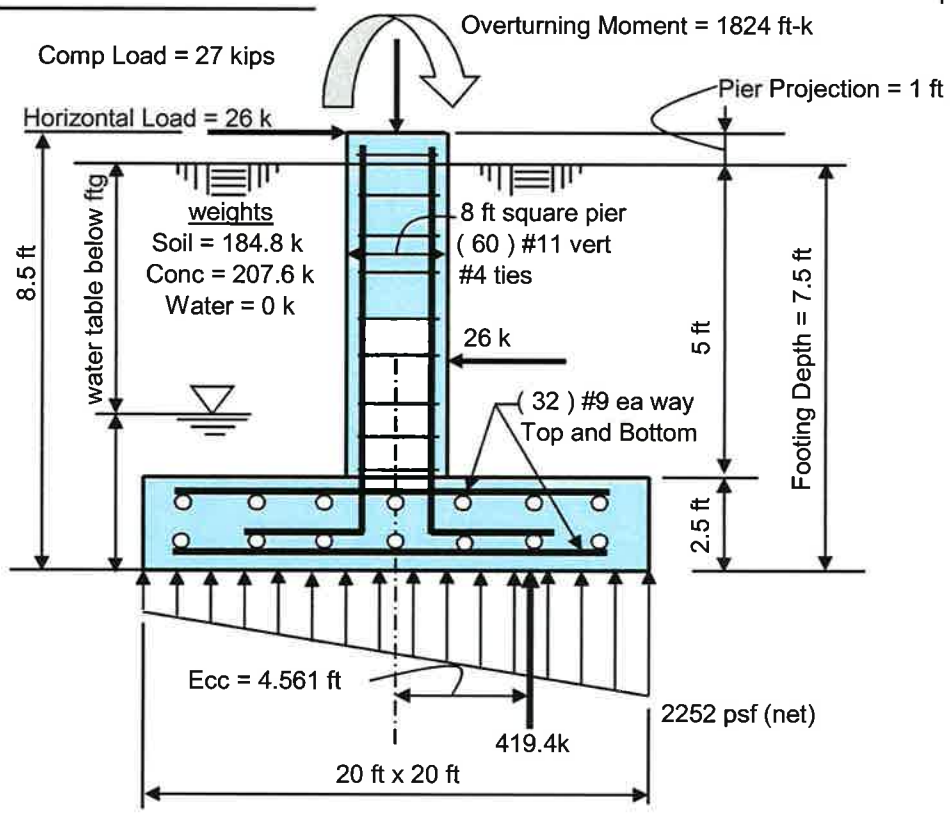
Reinforcing Steel:

	Pad	
minimum cover over rebar =	3	inches
size of pad rebar =	#9	bar
quantity of pad rebar =	32	(ea direction)

Reinforcing Steel:

	Pier	
size of vert rebar in pier=	#11	bar
vertical rebar quantity =	60	
size of pier ties =	#4	bar
minimum cover over rebar =	3	inches

Total volume of concrete = 51.3 cu yd



Summary of analysis results	
Maximum Net Soil Bearing = 2.252 ksf Allowable Net Soil Bearing = 8 ksf **Soil Bearing Stress Ratio = 0.28 Okay**	Ult Bending Shear Capacity = 126 psi Ult Bending Shear Stress = 31 psi **Bending Shear Stress Ratio = 0.25 Okay**
Ftg Overturning Resistance = 4194 ft-kips Overturning Moment = 1913 ft-kips Required Overturning Safety Factor = 1.5 Overturning Safety Factor = 2.193 **Ratio = 0.68 Okay**	Pad Bending Moment Capacity= 3476 ft-k Pad Bending Moment = 623 ft-k **Bending Moment Stress Ratio = 0.18 OK**

ATTACHMENT 4

HMB

HMB Acoustics LLC 3 Cherry Tree Lane, Avon, CT 06001 860-677-5955

October 8, 2014

Karyn Wyman
Centek Engineering, Inc.
63-2 North Branford Road
Branford, CT. 06405

Subject: Meriden Hanover - Noise Compliance Study

Dear Ms. Wyman:

The noise levels for the V-1; V-2; A-1 and A-2 wall mounted HVAC units were calculated while they were running simultaneously. The combined noise level was then projected to each property line. The resultant noise level was compared to the State of CT Noise Regulation. The Regulation allows a noise level of 62 dBA for both daytime and nighttime when measured from a Class "B" Emitter (Commercial Zone) to a Class "B" Receptor's (Commercial Zone) property line. I found that the four (4) units meet the conditions for compliance as set forth in the State of CT Noise Regulation at all property lines.

Allan Smardin
HMB Acoustics LLC

PROJECT INFORMATION:	Centek Job #:13199.000
Applicant:	Cellco Partnership d.b.a. Verizon Wireless
Applicant Site ID:	Meriden Hanover
Site Owner:	Crown Castle
Site Address:	462 West Main Street
Subject Zoning District:	Commercial
Abutting Zoning District(s):	All: Commercial

APPLICANT EQUIPMENT:

ID	Noise Emitter	Make/Model	Prop. Line. Dist. (FT)			
			North	South	East	West
V-1	Wall Mounted HVAC	Bard / W61A1-105EPXXXJ	131	158	116	225
V-2	Wall Mounted HVAC	Bard / W61A1-105EPXXXJ	138	158	200	225

EXISTING COLOCATORS:

☒ AT&T	☐ Metro PCS	☐ Other:
☐ Sprint	☒ T Mobile	☐ Other:
☒ Nextel	☐ None	☐ Other:

EXISTING COLOCATOR EQUIPMENT OWNER: NEXTEL

ID	Noise Emitter	Make/Model	Prop. Line. Dist. (FT)			
			North	South	East	West
A-1	Wall Mounted HVAC	Unknown/Unknown	104	123	177	264
A-2	Wall Mounted HVAC	Unknown/Unknown	104	123	123	257

EXISTING COLOCATOR EQUIPMENT OWNER:

ID	Noise Emitter	Make/Model	Prop. Line. Dist. (FT)			
			North	South	East	West

EXISTING COLOCATOR EQUIPMENT OWNER:

ID	Noise Emitter	Make/Model	Prop. Line. Dist. (FT)			
			North	South	East	West

EXISTING COLOCATOR EQUIPMENT OWNER:

ID	Noise Emitter	Make/Model	Prop. Line. Dist. (FT)			
			North	South	East	West

EXISTING COLOCATOR EQUIPMENT OWNER:

ID	Noise Emitter	Make/Model	Prop. Line. Dist. (FT)			
			North	South	East	West

CONCLUSION:

Daytime Regulation:	62 dBA	**Nighttime Regulation:**	62 dBA
Compliance:	☒ Yes ☐ No	**Compliance:**	☒ Yes ☐ No

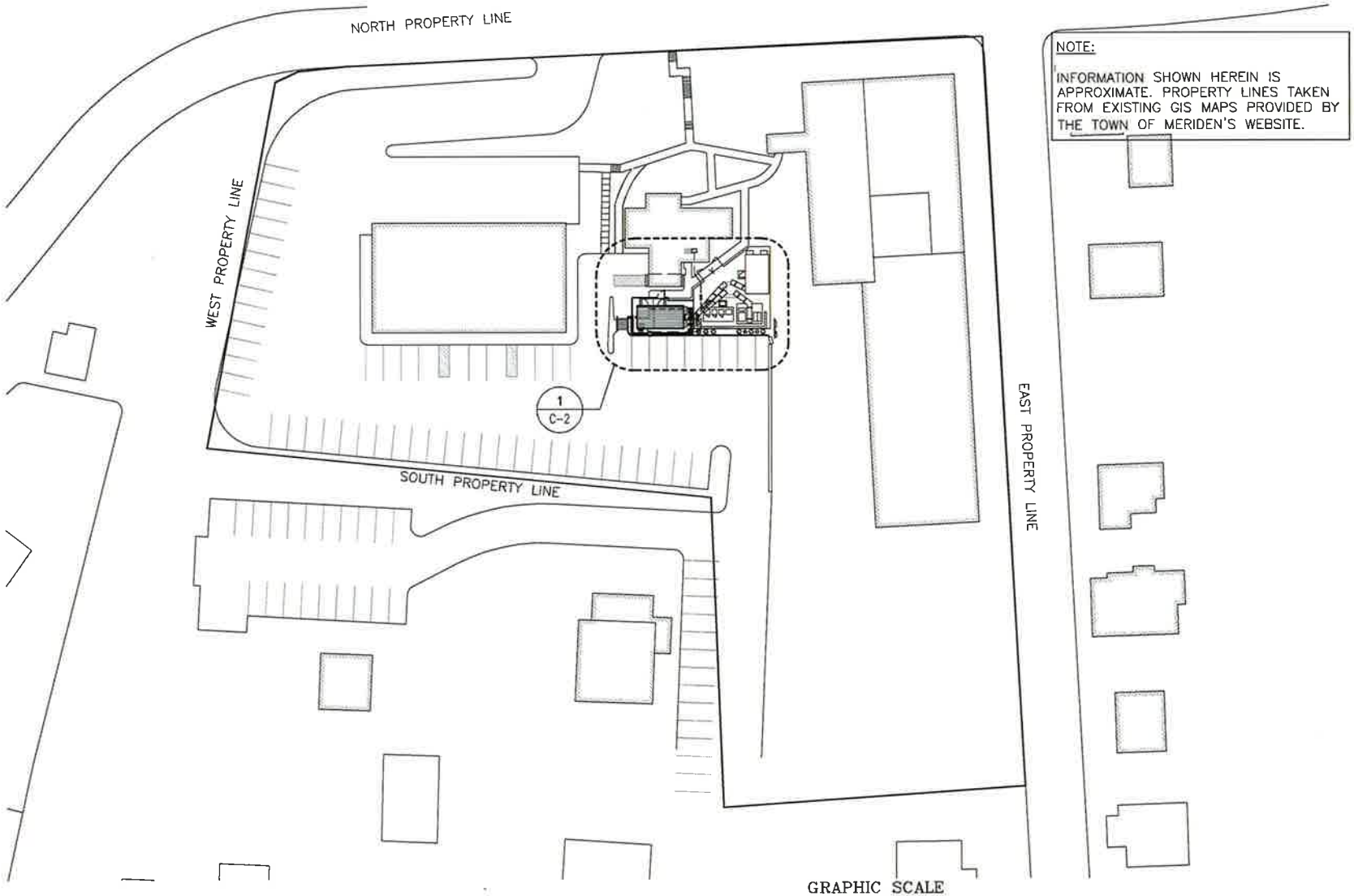
BASIS OF FINDINGS:

The combined dBA noise level from V-1 and V-2
North Propoerty line = 30; South property line = 36; East property line = 28;
West property line = 22

The combined dBA noise level from A-1 and A-2
North property line = 33; South property line = 38; East property line = 32;
West property line = 27

All (4) HVAC units running simultaneously will result in a dBA increase in all directions (N, S, E & W). The dBA levels take into account the acoustical shielding effect provided by other structures on the property.
Existing AT&T and T-Mobile pad mounted equipment is inaudible at a distance of 20 feet.

Prepared By: Alan Smardin, HMB ACOUSTICS LLC Date: 10/08/14



1 / C-1 **SITE PLAN**

SCALE: 1" = 50'

NO.	DATE	REMARKS / ISSUED FOR	BY	HOSE CARTER INFO
0	10/02/14		KMP	DESCRIPTION

PROFESSIONAL ENGINEER SEAL

CENTEK engineering
Centered on Solutions
www.CentekEng.com
(203) 488-0580
(203) 488-8587 Fax
63-2 North Branford Road, Branford, CT 06405

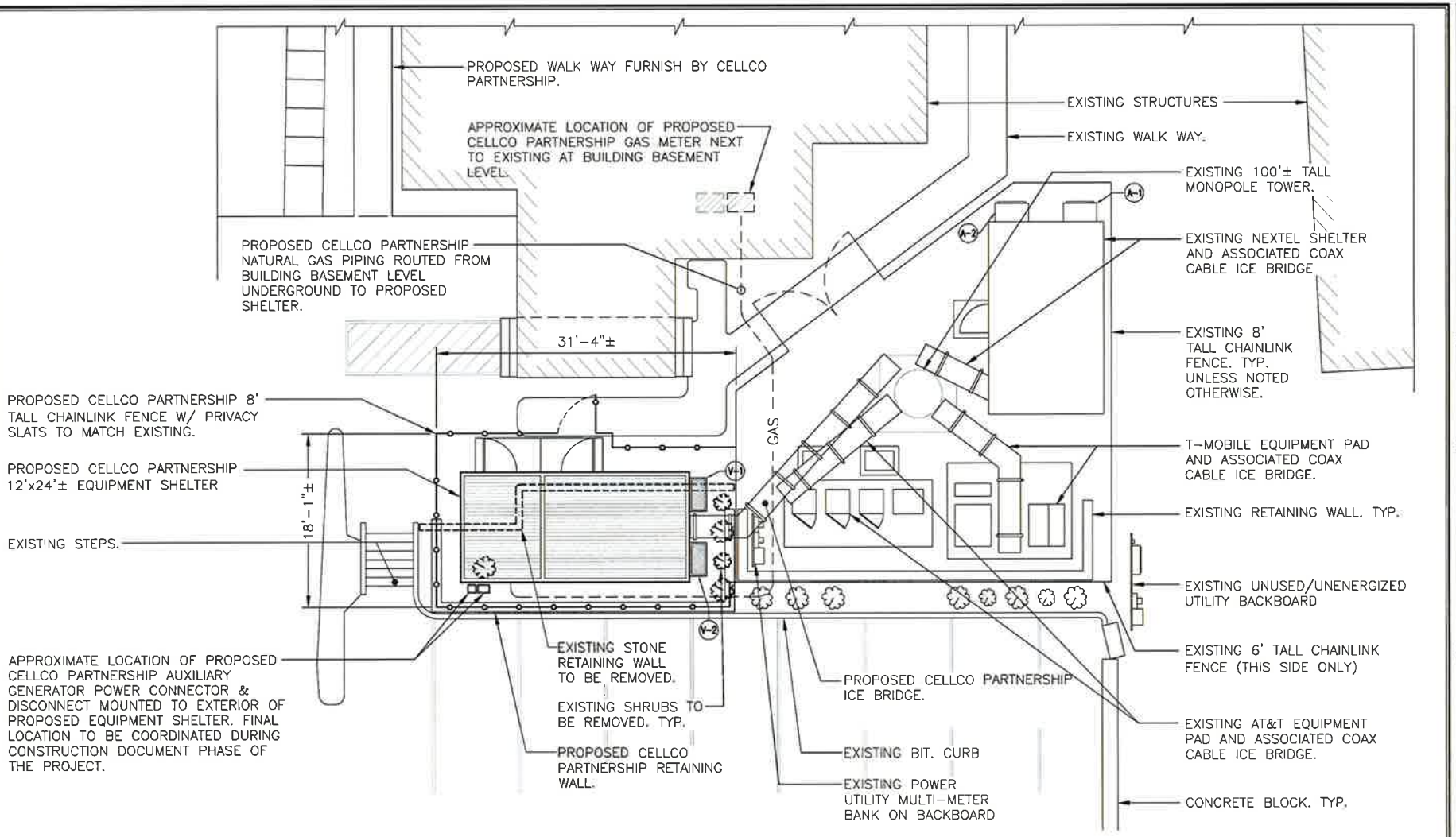
Cellco Partnership d/b/a Verizon Wireless

MERIDEN HANOVER

462 WEST MAIN STREET
MERIDEN,CT 06451

DATE:	10/02/14
SCALE:	AS SHOWN
JOB NO.	13199.000

SHEET NO. C-1



NOISE EMMITTER INFORMATION

(V-1)	WALL MOUNTED HVAC UNIT, MAKE: BARD,	MODEL: W61A1-A05EPXXXJ
(V-2)	WALL MOUNTED HVAC UNIT, MAKE: BARD,	MODEL: W61A1-A05EPXXXJ
(A-1)	WALL MOUNTED HVAC UNIT, MAKE: UNKNOWN,	MODEL: UNKNOWN
(A-2)	WALL MOUNTED HVAC UNIT, MAKE: UNKNOWN,	MODEL: UNKNOWN

1 / C-2 **COMPOUND PLAN**

SCALE: 1" = 10'

APPROXIMATE NORTH

GRAPHIC SCALE

10 0 5 10 20 40

(IN FEET)

1 inch = 10 ft.

NO.	DATE	BY	DESCRIPTION
0	10/02/14	KAM	ISSUE FOR REVIEW

PROFESSIONAL ENGINEER SEAL

CENTEK engineering
Centered on Solutions℠
www.CentekEng.com
(203) 488-0580
(203) 488-8587 Fax
63-2 North Branford Road, Branford, CT 06405

Cellco Partnership d/b/a Verizon Wireless

MERIDEN HANOVER

462 WEST MAIN STREET
MERIDEN, CT 06451

DATE: 10/02/14
SCALE: AS SHOWN
JOB NO. 13199.000

SHEET NO.
C-2

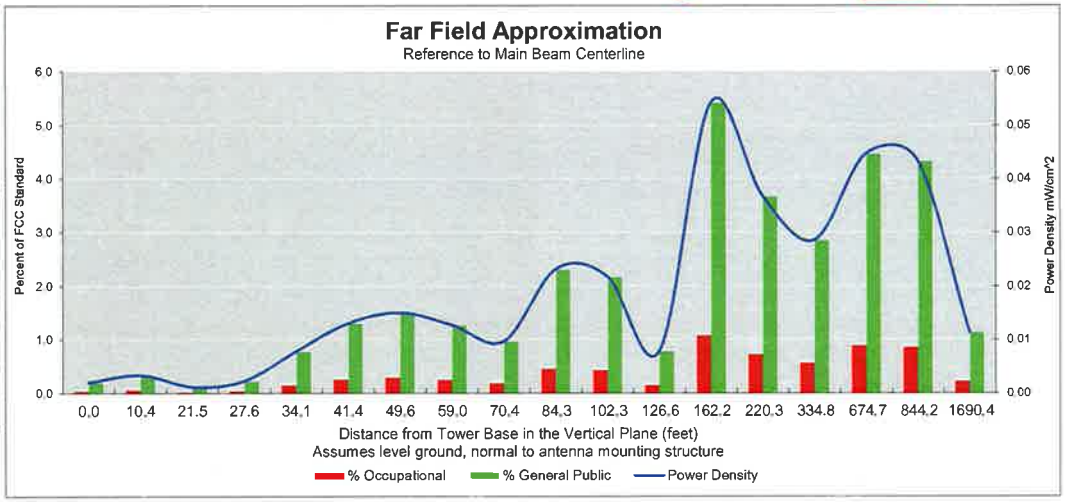
ATTACHMENT 5

Estimated Radiated Emission
Single Emitter Far Field Model
Dipole/Wire/Yagi Antenna Types

verizonwireless

Location:	**MERIDEN HANOVER CT**
Site #:	2-0168
Date:	10/01/14
Name:	Jaime Laredo
File Name:	MERIDEN HANOVER CT - FF POWER (LTE-AWS).xlsx

Operating Freq. (MHz):	**2120.0**
Antenna Height (ft):	**62.0**
Antenna Gain (dBi):	**19.1**
Antenna Size (in.):	**72.4**
Downtilt (degrees):	**0.0**
Feedline Loss (dB):	**0.0**
Power @ J4 (w):	**1831.7**



Calc Angle	90.0	80.0	70.0	65.0	60.0	55.0	50.0	45.0	40.0	35.0	30.0	25.0	20.0	15.0	10.0	5.0	4.0	2.0
Solve for r, dx to antenna	59.0	59.9	62.8	65.1	68.1	72.1	77.0	83.5	91.8	102.9	118.1	139.7	172.6	228.1	339.9	677.3	846.2	1691.4
Distance from Antenna Structure Base in Horizontal plane	0.0	10.4	21.5	27.6	34.1	41.4	49.6	59.0	70.4	84.3	102.3	126.6	162.2	220.3	334.8	674.7	844.2	1690.4
Angle from Main Beam (reference to horizontal plane)	90	80	70	65	60	55	50	45	40	35	30	25	20	15	10	5	4	2
dB down from centerline (referenced to centerline)	36.76	34.35	38.52	35.34	29.54	26.8	25.59	25.63	25.99	21.21	20.29	23.24	13.03	12.3	9.92	2	0.2	0
Reflection Coefficient (1 to 4, 2.56 typical)	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56
Power Density (mW/cm^2)	0.00	0.00	0.00	0.00	0.01	0.01	0.02	0.01	0.01	0.02	0.02	0.01	0.05	0.04	0.03	0.04	0.04	0.01
Percent of Occupational Standard	0.0	0.1	0.0	0.0	0.2	0.3	0.3	0.3	0.2	0.5	0.4	0.2	1.1	0.7	0.6	0.9	0.9	0.2
Percent of General Population Standard	0.2	0.3	0.1	0.2	0.8	1.3	1.5	1.3	1.0	2.3	2.2	0.8	5.4	3.7	2.9	4.5	4.3	1.1

Antenna Type: **BXA-171063-12CF-EDIN-0**

Max%: **5.42%**

Instructions:

1) Fill in Site Location, Site number, Date, Name of Person Responsible for Date, and enter File Name to ba saved as.
2) References to J4 refer to a point where the transmission line exits the equipment shelter and proceeds to the antenna(s). There is typically a connector located here where power measurements are made.
3) Enter Antenna Height (in feet to bottom of antenna), Antenna Gain (expressed as dBi, add 2.17 to dBd to obtain dBi), Antenna Size (vertical size in inches), Downtilt (in Degrees, enter zero if none), Feedline loss from J4 to Antenna, and J4 Power (in watts).
4) From manufacturer's plots, or data sheet, input Angle from mainbeam and dB below mainbeam centerline.
5) Enter Reflection coefficient (2.56 would be typical, 1 for free space)
6) Spreadsheet calculates actual power density, then relates as Occupational or General Population percentage of FCC Standard.
7) An odd distance may be entered in the rightmost column of the lower table.

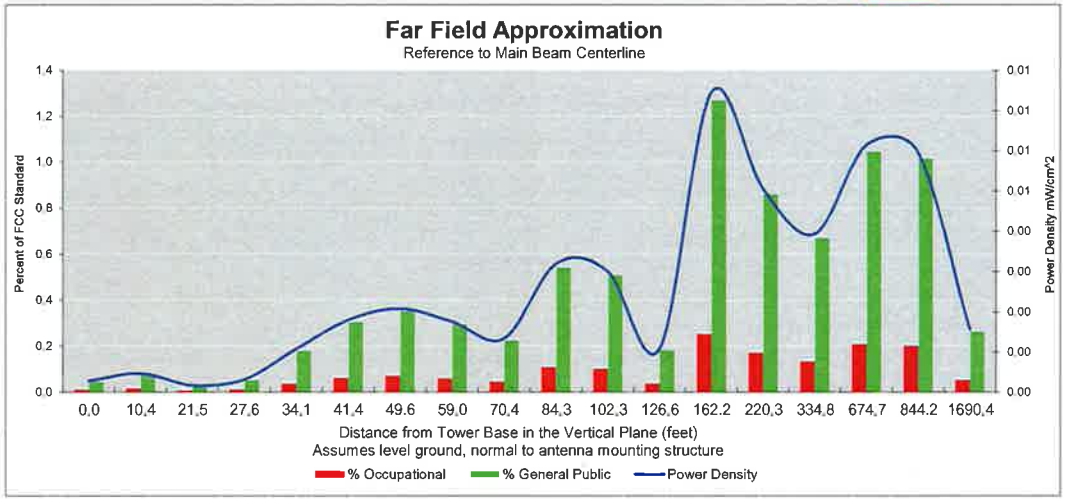
Far Field Approximation
with downtilt variation

Estimated Radiated Emission
Single Emitter Far Field Model
Dipole/Wire/Yagi Antenna Types

verizonwireless

Location:	**MERIDEN HANOVER CT**
Site #:	2-0168
Date:	10/01/14
Name:	Jaime Laredo
File Name:	MERIDEN HANOVER CT - FF POWER (Cellular).xlsx

Operating Freq. (MHz):	**878.5**
Antenna Height (ft):	**62.0**
Antenna Gain (dBi):	**16.7**
Antenna Size (in.):	**71.0**
Downtilt (degrees):	**0.0**
Feedline Loss (dB):	**0.0**
Power @ J4 (w):	**437.6**



This approximation is only valid in the far field, which begins at: *62.6 ft*

Calc Angle	90.0	80.0	70.0	65.0	60.0	55.0	50.0	45.0	40.0	35.0	30.0	25.0	20.0	15.0	10.0	5.0	4.0	2.0
Solve for r, dx to antenna	59.0	59.9	62.8	65.1	68.1	72.1	77.0	83.5	91.8	102.9	118.1	139.7	172.6	228.1	339.9	677.3	846.2	1691.4
Distance from Antenna Structure Base in Horizontal plane	0.0	10.4	21.5	27.6	34.1	41.4	49.6	59.0	70.4	84.3	102.3	126.6	162.2	220.3	334.8	674.7	844.2	1690.4
Angle from Main Beam (reference to horizontal plane)	90	80	70	65	60	55	50	45	40	35	30	25	20	15	10	5	4	2
dB down from centerline (referenced to centerline)	36.76	34.35	38.52	35.34	29.54	26.8	25.59	25.63	25.99	21.21	20.29	23.24	13.03	12.3	9.92	2	0.2	0
Reflection Coefficient (1 to 4, 2.56 typical)	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56
Power Density (mW/cm^2)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.01	0.01	0.00
Percent of Occupational Standard	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.1	0.1	0.0	0.3	0.2	0.1	0.2	0.2	0.1
Percent of General Population Standard	0.0	0.1	0.0	0.1	0.2	0.3	0.4	0.3	0.2	0.5	0.5	0.2	1.3	0.9	0.7	1.0	1.0	0.3

Antenna Type: **BXA-70063-6CF-850MHZ**

Max%: **1.27%**

Instructions:

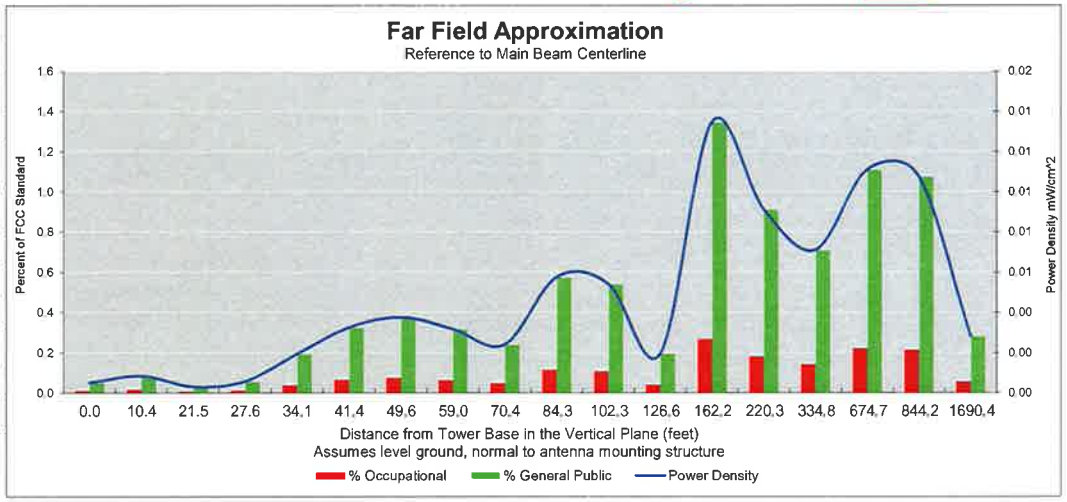
1) Fill in Site Location, Site number, Date, Name of Person Responsible for Date, and enter File Name to ba saved as.
2) References to J4 refer to a point where the transmission line exits the equipment shelter and proceeds to the antenna(s). There is typically a connector located here where power measurements are made.
3) Enter Antenna Height (in feet to bottom of antenna), Antenna Gain (expressed as dBi, add 2.17 to dBd to obtain dBi), Antenna Size (vertical size in inches), Downtilt (in Degrees, enter zero if none), Feedline loss from J4 to Antenna, and J4 Power (in watts).
4) From manufacturer's plots, or data sheet, input Angle from mainbeam and dB below mainbeam centerline.
5) Enter Reflection coefficient (2.56 would be typical, 1 for free space)
6) Spreadsheet calculates actual power density, then relates as Occupational or General Population percentage of FCC Standard.
7) An odd distance may be entered in the rightmost column of the lower table.

Estimated Radiated Emission
Single Emitter Far Field Model
Dipole/Wire/Yagi Antenna Types

verizonwireless

Location:	**MERIDEN HANOVER CT**
Site #:	2-0168
Date:	10/01/14
Name:	Jaime Laredo
File Name:	MERIDEN HANOVER CT - FF POWER (PCS).xlsx

Operating Freq. (MHz):	**1973.8**
Antenna Height (ft):	**62.0**
Antenna Gain (dBi):	**18.7**
Antenna Size (in.):	**72.4**
Downtilt (degrees):	**0.0**
Feedline Loss (dB):	**0.0**
Power @ J4 (w):	**498.7**



Calc Angle	90.0	80.0	70.0	65.0	60.0	55.0	50.0	45.0	40.0	35.0	30.0	25.0	20.0	15.0	10.0	5.0	4.0	2.0
Solve for r, dx to antenna	59.0	59.9	62.8	65.1	68.1	72.1	77.0	83.5	91.8	102.9	118.1	139.7	172.6	228.1	339.9	677.3	846.2	1691.4
Distance from Antenna Structure Base in Horizontal plane	0.0	10.4	21.5	27.6	34.1	41.4	49.6	59.0	70.4	84.3	102.3	126.6	162.2	220.3	334.8	674.7	844.2	1690.4
Angle from Main Beam (reference to horizontal plane)	90	80	70	65	60	55	50	45	40	35	30	25	20	15	10	5	4	2
dB down from centerline (referenced to centerline)	36.76	34.35	38.52	35.34	29.54	26.8	25.59	25.63	25.99	21.21	20.29	23.24	13.03	12.3	9.92	2	0.2	0
Reflection Coefficient (1 to 4, 2.56 typical)	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56
Power Density (mW/cm^2)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.01	0.01	0.01	0.01	0.01	0.00
Percent of Occupational Standard	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.1	0.1	0.0	0.3	0.2	0.1	0.2	0.2	0.1
Percent of General Population Standard	0.0	0.1	0.0	0.1	0.2	0.3	0.4	0.3	0.2	0.6	0.5	0.2	1.3	0.9	0.7	1.1	1.1	0.3

Antenna Type: **BXA-171063-12CF-EDIN-0**

Max%: **1.35%**

Instructions:

1) Fill in Site Location, Site number, Date, Name of Person Responsible for Date, and enter File Name to ba saved as.
2) References to J4 refer to a point where the transmission line exits the equipment shelter and proceeds to the antenna(s). There is typically a connector located here where power measurements are made.
3) Enter Antenna Height (in feet to bottom of antenna), Antenna Gain (expressed as dBi, add 2.17 to dBd to obtain dBi), Antenna Size (vertical size in inches), Downtilt (in Degrees, enter zero if none), Feedline loss from J4 to Antenna, and J4 Power (in watts).
4) From manufacturer's plots, or data sheet, input Angle from mainbeam and dB below mainbeam centerline.
5) Enter Reflection coefficient (2.56 would be typical, 1 for free space)
6) Spreadsheet calculates actual power density, then relates as Occupational or General Population percentage of FCC Standard.
7) An odd distance may be entered in the rightmost column of the lower table.

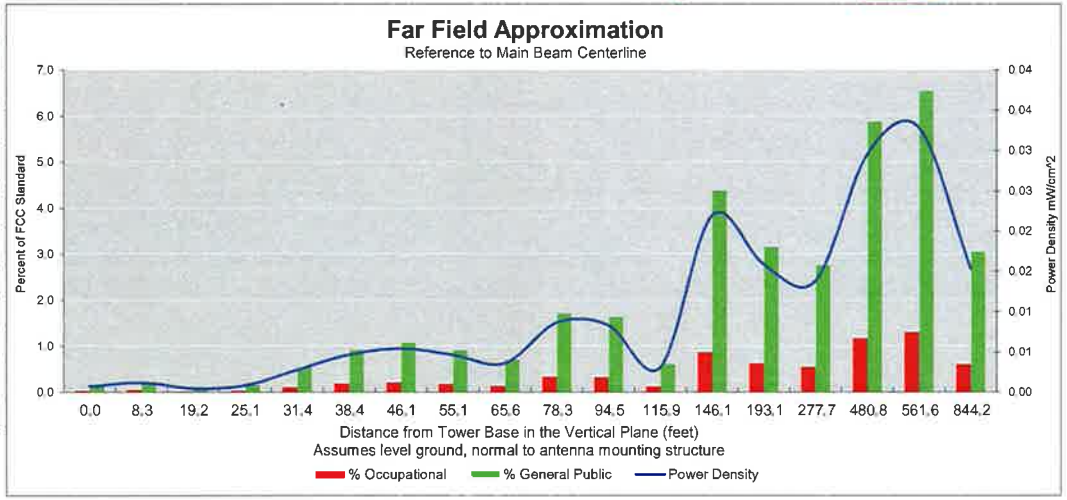
Far Field Approximation
with downtilt variation

Estimated Radiated Emission
Single Emitter Far Field Model
Dipole/Wire/Yagi Antenna Types

verizonwireless

Location:	**MERIDEN HANOVER CT**
Site #:	2-0168
Date:	10/01/14
Name:	Jaime Laredo
File Name:	MERIDEN HANOVER CT - FF POWER (LTE-700).xlsx

Operating Freq. (MHz):	**751.0**
Antenna Height (ft):	**62.0**
Antenna Gain (dBi):	**16.7**
Antenna Size (in.):	**71.0**
Downtilt (degrees):	**2.0**
Feedline Loss (dB):	**0.0**
Power @ J4 (w):	**1074.5**



Calc Angle	90.0	82.0	72.0	67.0	62.0	57.0	52.0	47.0	42.0	37.0	32.0	27.0	22.0	17.0	12.0	7.0	6.0	4.0
Solve for r, dx to antenna	59.0	59.6	62.0	64.1	66.8	70.4	74.9	80.7	88.2	98.1	111.4	130.0	157.6	201.9	283.9	484.4	564.7	846.2
Distance from Antenna Structure Base in Horizontal plane	0.0	8.3	19.2	25.1	31.4	38.4	46.1	55.1	65.6	78.3	94.5	115.9	146.1	193.1	277.7	480.8	561.6	844.2
Angle from Main Beam (reference to horizontal plane)	90	80	70	65	60	55	50	45	40	35	30	25	20	15	10	5	4	2
dB down from centerline (referenced to centerline)	36.76	34.35	38.52	35.34	29.54	26.8	25.59	25.63	25.99	21.21	20.29	23.24	13.03	12.3	9.92	2	0.2	0
Reflection Coefficient (1 to 4, 2.56 typical)	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56
Power Density (mW/cm^2)	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.01	0.01	0.00	0.02	0.02	0.01	0.03	0.03	0.02
Percent of Occupational Standard	0.0	0.0	0.0	0.0	0.1	0.2	0.2	0.2	0.1	0.3	0.3	0.1	0.9	0.6	0.6	1.2	1.3	0.6
Percent of General Population Standard	0.1	0.2	0.1	0.2	0.5	0.9	1.1	0.9	0.7	1.7	1.6	0.6	4.4	3.2	2.8	5.9	6.5	3.1

Antenna Type: **BXA-70063-6CF-2-750MHZ**

Max%: **6.55%**

Instructions:

1) Fill in Site Location, Site number, Date, Name of Person Responsible for Date, and enter File Name to ba saved as.
2) References to J4 refer to a point where the transmission line exits the equipment shelter and proceeds to the antenna(s). There is typically a connector located here where power measurements are made.
3) Enter Antenna Height (in feet to bottom of antenna), Antenna Gain (expressed as dBi, add 2.17 to dBd to obtain dBi), Antenna Size (vertical size in inches), Downtilt (in Degrees, enter zero if none), Feedline loss from J4 to Antenna, and J4 Power (in watts).
4) From manufacturer's plots, or data sheet, input Angle from mainbeam and dB below mainbeam centerline.
5) Enter Reflection coefficient (2.56 would be typical, 1 for free space)
6) Spreadsheet calculates actual power density, then relates as Occupational or General Population percentage of FCC Standard.
7) An odd distance may be entered in the rightmost column of the lower table.