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EM-POCKET-007-080918

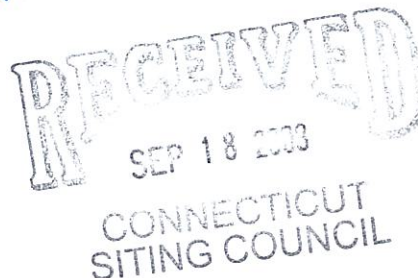
www.pullcom.com

September 17, 2008

Via Federal Express

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

ORIGINAL



Re: Notice of Exempt Modification
Berlin Fire Department Telecommunications Facility
1657 Berlin Turnpike, Berlin, Connecticut

Dear Mr. Phelps:

Youghiogheny Communications-Northeast, LLC, doing business as Pocket Communications ("Pocket"), intends to install antennas and appurtenant equipment at the existing 176-foot monopole facility owned by Berlin Fire Department and located at 1657 Berlin Turnpike, Berlin, Connecticut ("Facility"). Pocket Communications provides prepaid, flat rate wireless voice and data services to more than a quarter of a million subscribers. Pocket is licensed by the Federal Communications Commission (FCC) to provide PCS wireless telecommunications service in the State of Connecticut, which includes the area to be served by the proposed installation. This installation constitutes an exempt modification pursuant to the Public Utility Environmental Standards Act, Connecticut General Statutes Section 16-50g *et seq.* (PUESA), and Section 16-50j-72(b)(2) of the Regulations of the Connecticut State Agencies adopted pursuant to PUESA. In accordance with R.C.S.A. Section 16-50j-73, a copy of this notice has been sent to Denise McNair, Interim Town Manager, Town of Berlin.

The existing Facility consists of a 176 foot self-supporting monopole tower capable of supporting multiple carriers within a fenced compound. The coordinates for the Facility are **Lat: 41°-36'-22"** and **Long: 72°-44'-59"**. The tower is located directly behind the Berlin Fire department building on the Berlin Turnpike, in the eastern portion of Berlin, roughly 4,600 feet north of the Middletown town line. The Facility is approximately 1.3 miles south of the Berlin Turnpike's intersection with Route 9 (see Site Map, attached as Exhibit A). The tower currently supports Verizon antennas at the one hundred fourteen foot (114') level centerline AGL (above ground level), Sprint antennas at the one hundred fifty foot level (150') AGL, T-Mobile antennas at the one hundred sixty six foot level (166') and AT&T antennas at the one hundred seventy foot level (170') AGL. The Town of Berlin has whip and other antenna equipment located at the top of the tower, with the base of the antennas at the one hundred seventy six foot level (176'). There are some smaller antennas (including GPS) at the lower elevations, which are shown on

Page 2

the referenced design drawings. Pocket proposes to install three Kathrein 742-213 flush mount antennas on the tower at the one hundred twenty four foot centerline (124') AGL, and a Nortel CDMA Micro BTS 3231 cabinet, mounted to the exterior wall of the fire station and contained within a six foot by six foot (6'-0" x 6'-0") lease area. A small GPS antenna will be mounted to an ice bridge which will run from the building to the tower, approximately eight feet AGL. Utilities will be run via a proposed conduit along the outside wall of the building from existing meters and outlets, also attached to the exterior wall of the building (See Design Drawings and Equipment Specifications, attached as Exhibits B and C respectively).

For the following reasons, the proposed modifications to the Berlin Turnpike Facility meet the exempt modification criteria set forth in R.C.S.A. Section 16-50j-72(b)(2):

1. The proposed modification will not increase the height of the tower as Pocket's antennas will be installed at a center line height of approximately 124 feet.
2. The installation of Pocket's equipment and shelter will not require an extension of the site boundaries.
3. The proposed modifications will not increase the noise levels at the existing Facility by six decibels or more.
4. The operation of the additional antennas will not increase the total radio frequency (RF) power density, measured at the site boundary, to a level at or above the standard adopted by the Connecticut Department of Environmental Protection as set forth in Section 22a-162 of the Connecticut General Statutes and MPE limits established by the Federal Communications Commission. The worst-case RF power density calculations for the proposed Pocket antennas would be 36.36% of the FCC standard (see general power density calculations table, attached as Exhibit D).

Also attached, Exhibit E, is a structural analysis confirming that the tower can support the existing and proposed antennas and associated equipment.

For the foregoing reasons, Pocket respectfully submits that the proposed antenna installation and equipment at the Berlin Facility constitutes an exempt modification under R.C.S.A. Section 16-50j-72(b)(2)

Respectfully Submitted,



Carrie L. Larson

PULLMAN & COMLEY, LLC
ATTORNEYS AT LAW

Page 3

cc: Denise McNair, Interim Town Manager
Berlin Fire Department

Exhibit A

Site Map

Pocket Site HFCT0035

1657 Berlin Turnpike

Berlin, Connecticut

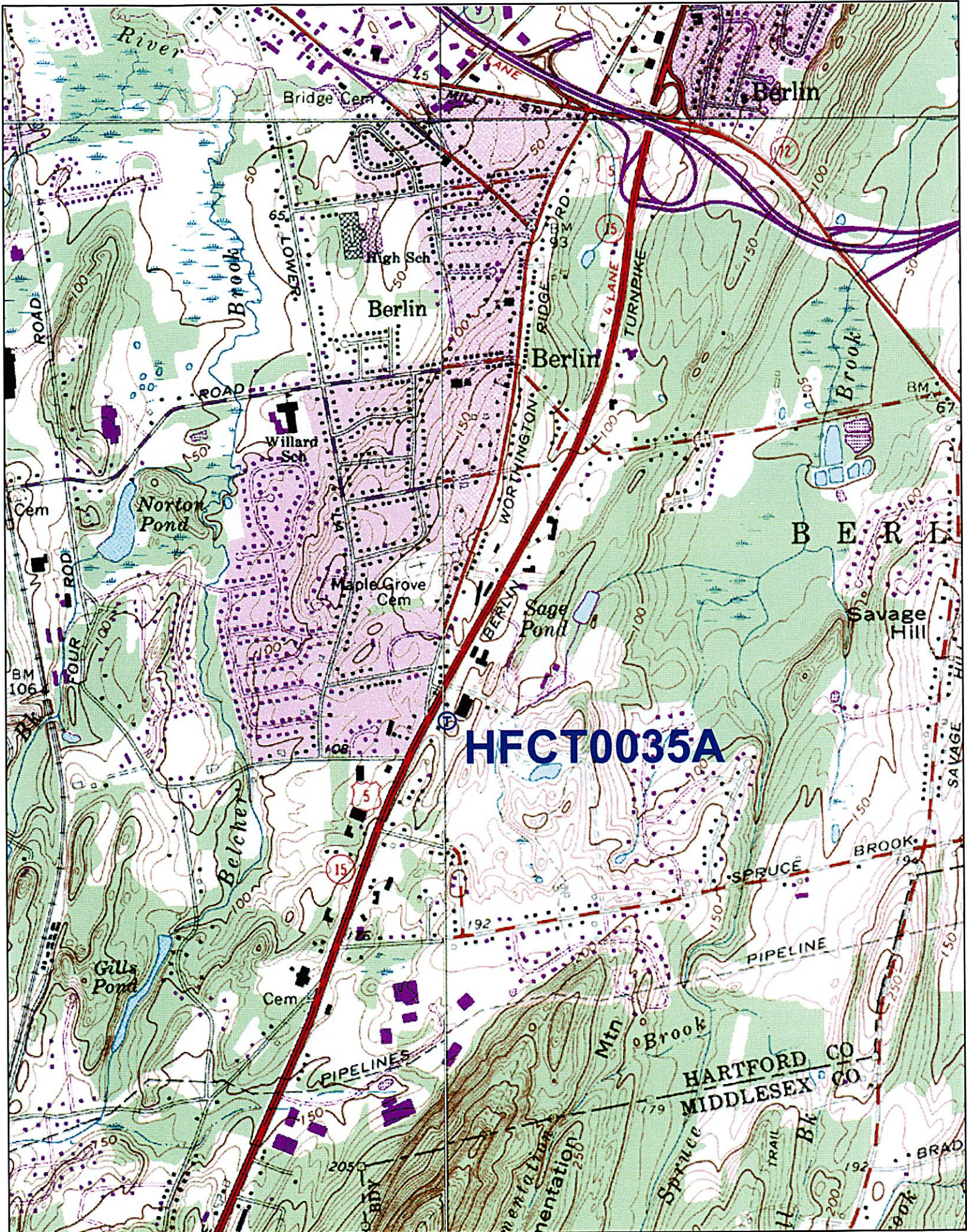


Exhibit B

Design Drawings

Pocket Site HFCT0035

1657 Berlin Turnpike

Berlin, Connecticut

CONSTRUCTION NOTES

1. FIELD VERIFICATION: CONTRACTOR SHALL FIELD VERIFY SCOPE OF WORK, POCKET COMMUNICATIONS ANTENNA MOUNT LOCATION AND ANTENNAS TO BE INSTALLED.
2. COORDINATION OF WORK: CONTRACTOR SHOULD COORDINATE RF WORK AND PROCEDURES WITH POCKET COMMUNICATIONS.
3. GRAVEL SURFACE IN AREAS OF COMPOUND THAT ARE DISTURBED DURING CONSTRUCTION SHALL BE REPLACED TO ORIGINAL CONDITION BY CONTRACTOR.

GENERAL NOTES

1. FOR THE PURPOSE OF CONSTRUCTION DRAWING, THE FOLLOWING DEFINITIONS SHALL APPLY:
(CONTRACTOR) - GENERAL CONTRACTOR
(POCKET COMMUNICATIONS) - POCKET COMMUNICATIONS
(GEM) - ORIGINAL EQUIPMENT MANUFACTURER
2. PRIOR TO THE SUBMISSION OF BIDS, THE BIDDING CONTRACTOR SHALL VISIT THE CELL SITE TO AND TO FAMILIARIZE HIMSELF WITH THE SITE AND TO CONFIRM THAT THE WORK CAN BE ACCOMPLISHED AS SHOWN ON THE CONSTRUCTION DRAWINGS. ANY DISCREPANCY FOUND SHALL BE BROUGHT TO THE ATTENTION OF CONTRACTOR.
3. ALL MATERIALS FURNISHED AND INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS, AND ORDINANCES.

4. UNLESS NOTED OTHERWISE, THE WORK SHALL INCLUDE FURNISHING MATERIALS, APPURTENANCES, AND LABOR NECESSARY TO COMPLETE ALL INSTALLATIONS AS INDICATED EQUIPMENT, ON THE DRAWINGS.
5. THE CONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE.
6. IF THE SPECIFIED EQUIPMENT CANNOT BE INSTALLED IN THE SPECIFIED LOCATION, THE CONTRACTOR SHALL PROPOSE AN ALTERNATIVE INSTALLATION FOR APPROVAL.
7. CONTRACTOR SHALL DETERMINE ACTUAL ROUTING OF CABLES WITH POWER CABLES, GROUNDING CABLES AS SHOWN ON THE POWER, GROUNDING AND TELCO PLAN DRAWING.
8. THE CONTRACTOR SHALL PROTECT EXISTING UTILITIES AND ADJACENT PROPERTIES DURING CABLES AS SHOWN ON THE ELECTRICAL PLAN.
9. CONTRACTOR SHALL LEGALLY AND PROPERLY DISPOSE OF ALL SCRAP MATERIALS SUCH AS

10. CONTRACTOR TO OBTAIN REQUIRED NOTICE TO PROCEED DOCUMENTS FROM THE TOWER OWNER BEFORE COMMENCING CONSTRUCTION.

NO.	DATE	REVISIONS
1	9/6/08	ISSUED FOR CLIENT REQUEST
2	9/7/08	REVISED PER CLIENT REQUEST
3		
4		
5		
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POCKET COMMUNICATIONS

BERLIN FIRE DEPARTMENT

SITE PLAN

THE INFORMATION CONTAINED HEREIN IS FOR THE USE OF THE CLIENT ONLY. IT IS NOT TO BE REPRODUCED OR TRANSMITTED IN ANY FORM OR BY ANY MEANS, ELECTRONIC OR MECHANICAL, INCLUDING PHOTOCOPYING, RECORDING, OR BY ANY INFORMATION STORAGE AND RETRIEVAL SYSTEM.

TRAVIS

TELECOMMUNICATIONS

1000 CONVENT ROAD, SUITE 100

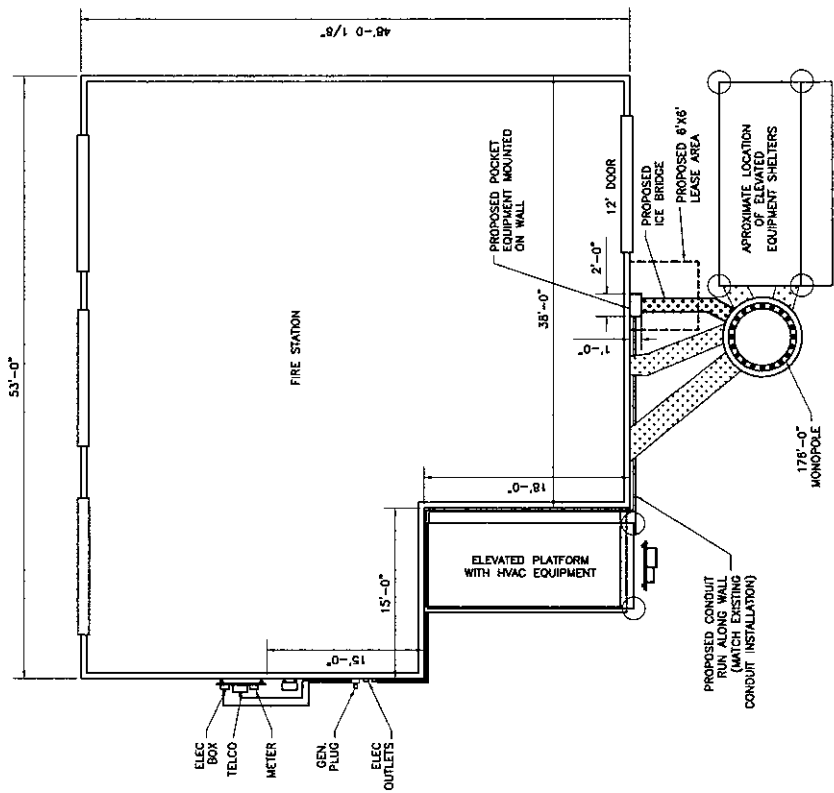
HOUSTON, TEXAS 77024

TEL: 281-416-1000

FAX: 281-416-1001

WWW.TRIVIS-TELECOM.COM

DESIGNED BY	JSW
CHECKED BY	DSL
DATE	9-10-08
PROJECT NO.	08404
SHEET NO.	02



SITE LAYOUT
22'-3/4" SCALE: 3/16"=1'-0"
11'x17" SCALE: 3/32"=1'-0"



NO.	DATE	REVISIONS
1	8/25/08	ISSUED FOR CONSTRUCTION
2	8/26/08	REVISED PER CLIENT REQUEST
3	8/26/08	REVISED PER CLIENT REQUEST
4	8/26/08	REVISED PER CLIENT REQUEST
5	8/26/08	REVISED PER CLIENT REQUEST
6	8/26/08	REVISED PER CLIENT REQUEST
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17	8/26/08	REVISED PER CLIENT REQUEST
18	8/26/08	REVISED PER CLIENT REQUEST
19	8/26/08	REVISED PER CLIENT REQUEST
20	8/26/08	REVISED PER CLIENT REQUEST

PROJECT: BERLIN FIRE DEPARTMENT COMMUNICATIONS
 TOWER, ANTENNA, H-FRAME
 POCKET COMMUNICATIONS

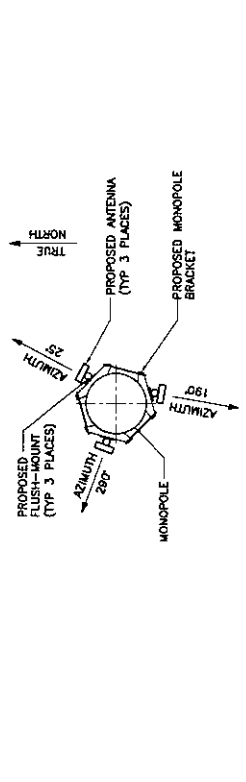
THIS DOCUMENT IS NOT TO BE REPRODUCED OR TRANSMITTED IN ANY FORM OR BY ANY MEANS, WITHOUT WRITTEN PERMISSION OF TRIVIS INC.



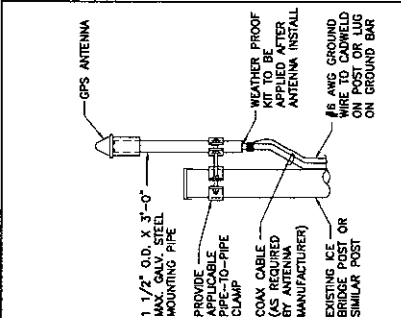
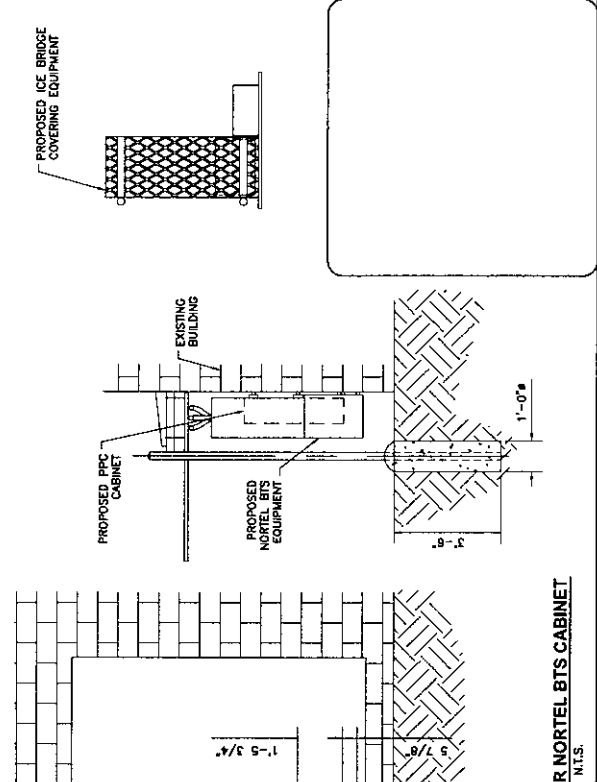
CHECKED BY: JSW
 DRAWN BY: DNL
 DATE: 8-15-08
 JOB NO: 08404
 DWG. NO: 03

ANTENNA KEY												
☐	ANTENNAS SECTOR	ANTENNA NUMBER	COAX COLOR CODE	ANTENNA VENDOR	MODEL NUMBER	AZIMUTH	C/L HEIGHT	MECHANICAL DOWNTILT	COAX SIZE	# COAX PER ANTENNA	COAX MODEL NUMBER	
	ALPHA FACE	1	A-1	(1)-RED BAND	KATHREIN	N/A	25°	124'-0"	-2°	1 5/8"	2	COMMSCOPE
	BETA FACE	1	B-1	(1)-GREEN BAND	KATHREIN	N/A	180°	124'-0"	-2°	1 5/8"	2	COMMSCOPE
	GAUSSIA FACE	1	C-1	(1)-BROWN BAND	KATHREIN	N/A	280°	124'-0"	-2°	1 5/8"	2	COMMSCOPE

ANTENNA NOTES
 1. ALL COAX SHALL BE COLOR-CODED AT (3) PLACES EACH: AT ANTENNA EXTERIOR OF SHELTER, AND THE INTERIOR OF SHELTER.
 2. (2) COLOR BANDS DENOTES TRANSMIT, RECEIVING, AND COMMON.
 3. ANTENNA CONFIGURATION IS SUBJECT TO CHANGE.
 4. VERIFY ANTENNA HEIGHT, DOWN-TILT, AND AZIMUTH WITH PROJECT MANAGER PRIOR TO CONSTRUCTION.
 5. CONTRACTOR IS SOLELY RESPONSIBLE FOR THIS COORDINATION.



TOWER NOTES
 1. FOR DETAILED TOWER INFORMATION, REFER TO TOWER ERECTION DRAWINGS BY OTHERS. THE TOWER ON THIS SHEET IS ONLY FOR GENERAL CONFIGURATION PURPOSES ONLY.
 2. ANTENNA CONFIGURATION IS SUBJECT TO CHANGE. VERIFY ANTENNA HEIGHT, DOWN-TILT, AND AZIMUTH WITH PROJECT MANAGER PRIOR TO CONSTRUCTION.



NOTES:
 1. LOCATION OF ANTENNA MUST HAVE CLEAR VIEW OF SOUTHERN SKY AND CANNOT HAVE ANY BLOCKAGES EXCEEDING 25% OF THE SURFACE AREA OF A HEMISPHERE AROUND THE GPS ANTENNA.
 2. ALL GPS ANTENNA LOCATIONS MUST BE ABLE TO RECEIVE CLEAR SIGNALS FROM A MINIMUM OF FOUR (4) SATELLITES. VERIFY WITH HANDHELD GPS BEFORE FINAL LOCATION OF GPS ANTENNA.

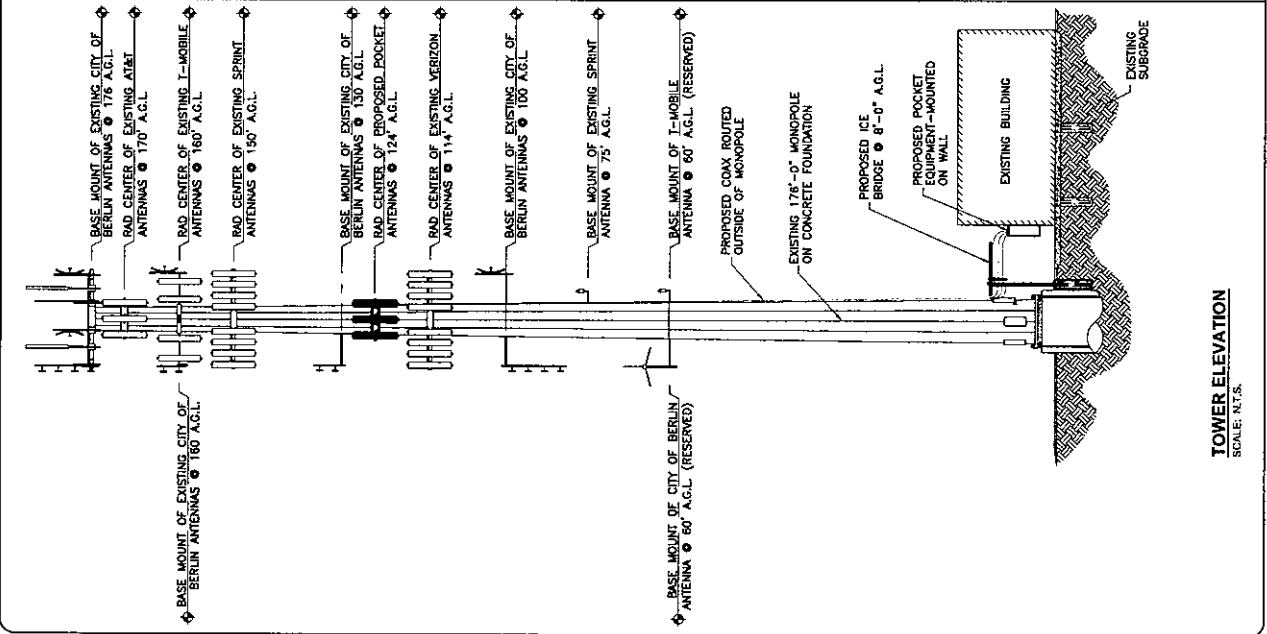
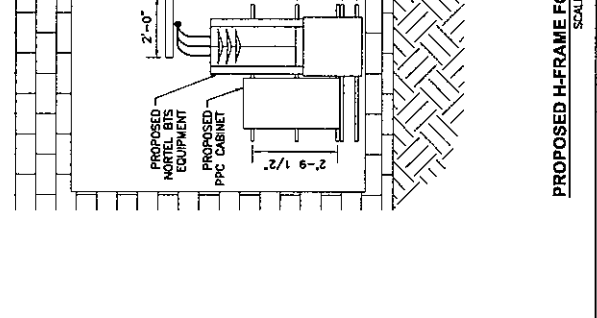


Exhibit C

Equipment Specifications

Pocket Site HFCT0035

1657 Berlin Turnpike

Berlin, Connecticut

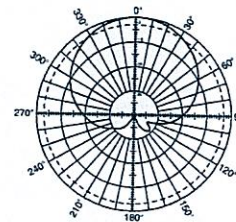
Kathrein's X-polarized adjustable electrical downtilt antennas offer the wireless carrier the ability to tailor polarization diversity sites for optimum performance. Using variable downtilt, only a few models need be procured to accommodate the needs of widely varying conditions. Remotely controlled downtilt is available as a retrofitable option.

- 0-6° downtilt range.
- UV resistant pulltruded fiberglass radome.
- DC Grounded metallic parts for impulse suppression.
- No moving electrical connections.
- Wideband vector dipole technology.
- Optional remote downtilt Control.
- Will accomodate future 3G / UMTS applications.

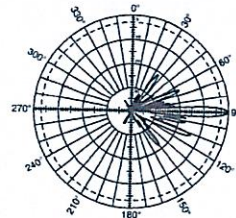
General specifications:

Frequency range	1710-2170 MHz
VSWR	< 1.5:1
Impedance	50 ohms
Intermodulation (2x20w)	IM3: <-150 dBc
Polarization	+45° and -45°
Front-to-back ratio (180°±30°)	>30 dB (co-polar) >25 dB (total power)
Maximum input power	300 watts per input (at 50°C)
Electrical downtilt continuously adjustable	0-6 degrees
Connector	2 x 7/16 DIN female
Isolation	>30 dB
Cross polar ratio	
Main direction 0°	25 dB (typical)
Sector ±60°	>10 dB
Weight	22 lb (10 kg)
Dimensions	76.5 x 6.1 x 2.7 inches (1942 x 155 x 69 mm)
Equivalent flat plate area	4.62 ft² (0.429 m²)
Wind survival rating*	120 mph (200 kph)
Shipping dimensions	87.2 x 6.8 x 3.6 inches (2214 x 172 x 92 mm)
Shipping weight	24.3 lb (11 kg)
Mounting	Fixed and tilt mount options are available for 2 to 4.6 inch (50 to 115 mm) OD masts.

See reverse for order information.



Horizontal pattern
±45°- polarization



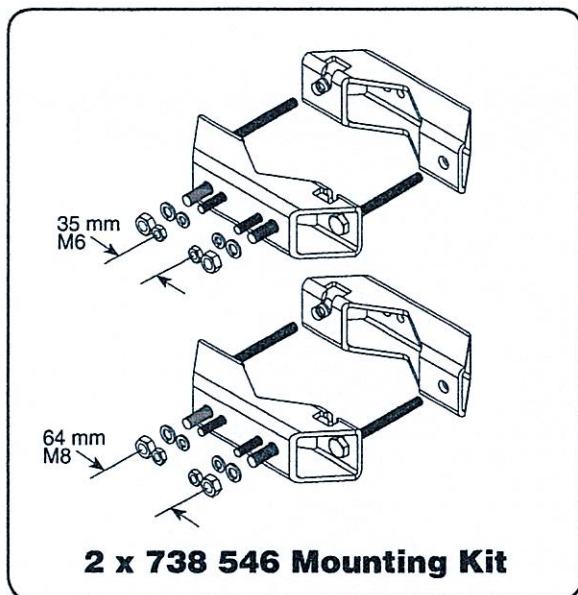
Vertical pattern
±45°- polarization



Specifications:	1710-1880 MHz	1850-1990 MHz	1920-2170 MHz
Gain	19 dBi	19.2 dBi	19.5 dBi
+45° and -45° polarization horizontal beamwidth	67° (half-power)	65° (half-power)	63° (half-power)
+45° and -45° polarization vertical beamwidth	4.7° (half-power)	4.5° (half-power)	4.3° (half-power)
Vertical Pattern-sidelobe suppression for first side-lobe above main beam	0° 2° 4° 6° T 18 17 15 15 dB	0° 2° 4° 6° T 18 18 17 15 dB	0° 2° 4° 6° T 18 18 17 15 dB

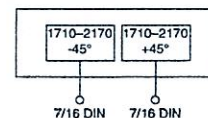
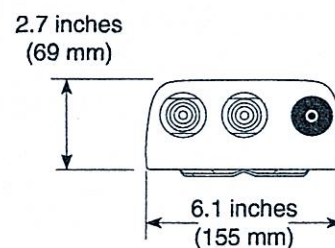
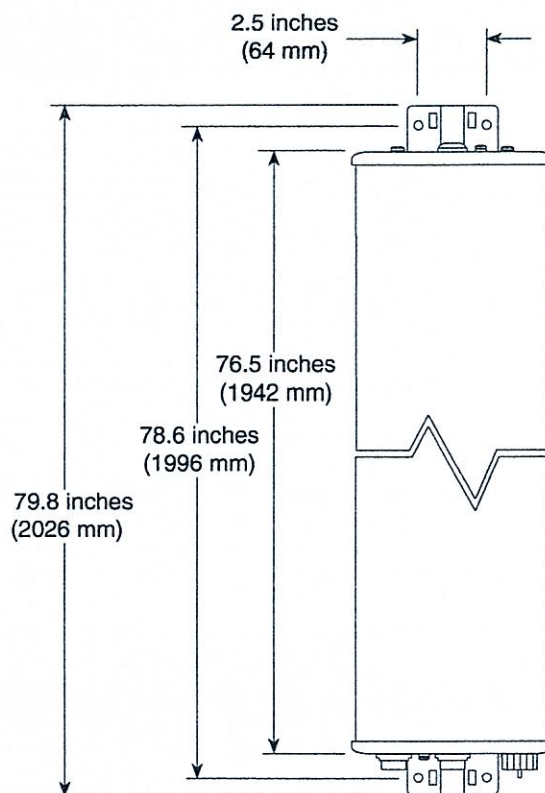


* Mechanical design is based on environmental conditions as stipulated in EIA-222-F (June 1996) and/or ETS 300 019-1-4 which include the static mechanical load imposed on an antenna by wind at maximum velocity. See the Engineering Section of the catalog for further details.



Mounting Options:

Model	Description
2 x 738 546	Mounting Kit for 2 to 4.6 inch (50 to 115 mm) OD mast.
737 978	Tilt Kit for use with the above mounting kit, 0–11 degrees downtilt angle. (requires 2 x 738 546 Mounting Kit)
742 263	Three-panel Sector Mounting Kit (120 deg. ea.) for 3.5 inch (89 mm) OD mast.



Order Information:

Model	Description
742 213	Antenna with 7/16 DIN connectors 0°–6° adjustable electrical downtilt

All specifications are subject to change without notice. The latest specifications are available at www.kathrein-scala.com.

Kathrein Inc., Scala Division Post Office Box 4580 Medford, OR 97501 (USA) Phone: (541) 779-6500 Fax: (541) 779-3991
Email: communications@kathrein.com Internet: www.kathrein-scala.com



CDMA BTS 3231 AWS 1.7/2.1 GHz (Outdoor/Indoor)

CDMA BTS 3231

Industry's Highest Capacity AWS Micro BTS

The CDMA BTS 3231 is the latest extension to Nortel Networks BTS (Base Transceiver Station) portfolio providing the ideal solution for urban, sub-urban and rural deployments. The CDMA BTS 3231 is a 3-carrier, 3-sector outdoor/indoor BTS operating at the AWS band of 1.7/2.1 GHz supporting IS-95, 1XRTT and 1xEV-DO simultaneously. BTS 3231 provides flexible deployments solutions including floor, rack, and wall mount options. The power consumption of BTS3231 is industry leading consuming only 630W for 3C3S. The BTS 3231 is also very light at 240lbs making it easy

to transport to hard to reach locations such as the top of a high rise building.

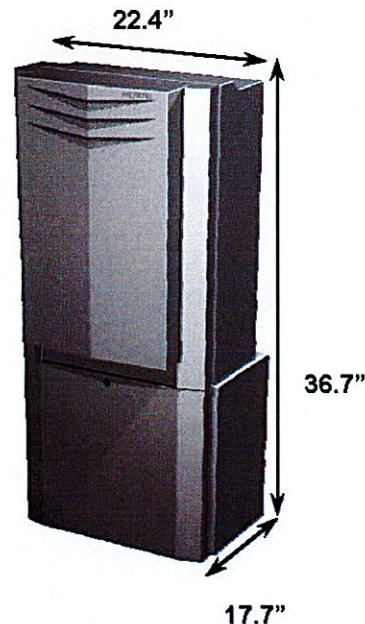


Exhibit D

Power Density Calculations

Pocket Site HFCT0035

1657 Berlin Turnpike

Berlin, Connecticut



C Squared Systems, LLC

920 Candia Road

Manchester, NH 03109

Phone: (603) 657 9702

E-mail:

support@csquaredsystems.com

Calculated Radio Frequency Emissions



HFCT0035

1657 Berlin Turnpike, Berlin, CT

(aka: 1657 Wilbur Cross Highway)

Table of Contents

1. Introduction	1
2. FCC Guidelines for Evaluating RF Radiation Exposure Limits.....	2
3. RF Exposure Prediction Methods	2
4. Calculation Results	3
5. Conclusion	4
6. Statement of Certification	5
Attachment A: References	6
Attachment B: FCC Limits For Maximum Permissible Exposure (MPE)	7

List of Tables

Table 1: Proposed Carrier Information	3
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1. Introduction

The purpose of this report is to investigate compliance with applicable FCC regulations for the proposed Pocket antennas installed on the existing tower at 1657 Berlin Turnpike (aka Wilbur Cross Highway), in Berlin, CT.

These calculations assume that the antennas are operating at 100 percent capacity, that all antenna channels are transmitting simultaneously, and that the radio transmitters are operating at full power. Obstructions (trees, buildings etc.) that would normally attenuate the signal are not taken into account. As a result, the predicted signal levels are much more conservative (higher) than the actual signal levels will be from the finished installation.

Public exposure to radio frequencies is regulated and enforced in units of microwatts per square centimeter (mW/cm^2). The number of mW/cm^2 emitted is called the power density. The general population exposure limit for the cellular band is $0.567\text{--}0.593 \text{ mW}/\text{cm}^2$, and the general population exposure limit for the PCS/AWS band is $1.0 \text{ mW}/\text{cm}^2$. Because each carrier will be using different frequency bands, and each frequency band has different exposure limits, it is necessary to report percent of MPE rather than power density.

The FCC general population / uncontrolled limits set the maximum exposure to which most people may be subjected. General population / uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or cannot exercise control over their exposure.

Higher exposure limits are permitted under the occupational / controlled exposure category, but only for persons who are exposed as a consequence of their employment and who have been made fully aware of the potential for exposure (through training), and they must be able to exercise control over their exposure. General population / uncontrolled limits are five times more stringent than the levels that are acceptable for occupational, or radio frequency trained individuals.”

The FCC describes exposure to radio frequency (RF) energy in terms of percentage of maximum permissible exposure (MPE) with 100% being the maximum allowed. Rather than the FCC presenting the user specification in terms of complex power density figures over a specified surface area, this MPE measure is particularly useful, and even more so when considering that power density limits actually vary by frequency because of the different absorptive properties of the human body at different frequencies.

MPE limits are specified as time-averaged exposure limits. This means that exposure can be averaged over 30 minutes for general population / uncontrolled exposure (or 6 minutes for occupational / controlled exposure). However, for the case of exposure of the general public, time averaging is usually not applied because of uncertainties over exact exposure conditions and difficulty in controlling time of exposure. Therefore, the typical conservative approach is to assume that any RF exposure to the general public will be continuous.

Finally, it should be noted that the MPE limits adopted by the FCC for both general population / uncontrolled exposure and for occupational / controlled exposure incorporate a substantial margin of safety and have been established to be well below levels generally accepted as having the potential to cause adverse health effects.

2. FCC Guidelines for Evaluating RF Radiation Exposure Limits

In 1985, the FCC established rules to regulate radio frequency (RF) exposure from FCC licensed antenna facilities. In 1996, the FCC updated these rules, which were further amended in August 1997 by OET Bulletin 65 Edition 97-01. These new rules include limits for Maximum Permissible Exposure (MPE) for transmitters operating between 300 kHz and 100 GHz. The FCC MPE limits are based on exposure limits recommended by the National Council on Radiation Protection and Measurements (NCRP), the exposure limits developed by the Institute of Electrical and Electronics Engineers, Inc., (IEEE) and adopted by the American National Standards Institute (ANSI).

Attachment B contains excerpts from OET Bulletin 65 and defines the Maximum Exposure Limit. As shown in these excerpts, each frequency band has different exposure limits, requiring power density to be reported as a percent of Maximum Permissible Exposure (MPE) when dealing with carriers transmitting in different frequency bands.

3. RF Exposure Prediction Methods

The emission field calculation results displayed in the following figures were generated using the following formula as outlined in FCC bulletin OET 65:

$$\text{Power Density} = \left(\frac{EIRP}{\pi \times R^2} \right) \times \text{Off Beam Loss}$$

Where:

EIRP = Effective Isotropic Radiated Power

R = Radial Distance = $\sqrt{H^2 + V^2}$

H = Horizontal Distance from antenna

V = Vertical Distance from bottom of antenna

Off Beam Loss is determined by the selected antenna patterns

4. Calculation Results

Table 1 below outlines the power assumptions used to compute the power density.

Carrier	Operating Frequency (MHz)	Antenna Height (Feet)	Number of Trans.	Effective Radiated Power (ERP) Per Transmitter (Watts)	Total ERP (Watts)
Sprint	1962.5	147.5	11	477.09	5247.99
Police Channel	809	180	1	200	200
Fire Main	154	180	1	100	100
Fire Intercity	154	100	1	30	30
Highway	156	160	1	50	50
Fire Ground	156	130	1	5	5
SP Hotline	45	180	1	80.77	80.77
RAFS	465	180	1	30	30
960 Link	960	100	1	20.5	20.5
Cingular GSM	1900	170	4	787	3148
Cingular UMTS	880	170	1	500	500
T-Mobile	1930	160	8	161	1288
Verizon	880	117	9	397	3573
Verizon	1900	117	3	233	699
Pocket	2130-2133.75	124	3	631	1893

Table 1: Proposed Carrier Information

The calculated result for the cumulative %MPE is 36.36%.

Please note that for distances of 100 feet or less, a nominal 10 dB of attenuation due to antenna pattern is assumed. Also, as noted in the introduction, obstructions (trees, buildings etc.) that would normally attenuate the signal are not taken into account. As a result, the predicted signal levels are more conservative (higher) than the actual signal levels will be from the finished installation.

5. Conclusion

The above analysis verifies that emissions from the proposed site will be well below the maximum power density levels as outlined by the FCC in the OET Bulletin 65 Ed. 97-01. Even when using conservative methods, the cumulative power density from the proposed transmit antennas at the existing facility is well below the limits for the general public. The highest expected percent of Maximum Permissible Exposure at the base of the tower is 36.36% of the FCC limit.

Please note that for distances of 100 feet or less, a nominal 10 dB of attenuation due to antenna pattern is assumed. Also, as noted in the introduction, obstructions (trees, buildings etc.) that would normally attenuate the signal are not taken into account. As a result, the predicted signal levels are more conservative (higher) than the actual signal levels will be from the finished installation.

6. Statement of Certification

I certify to the best of my knowledge that the statements in this report are true and accurate. The calculations follow guidelines set forth in ANSI/IEEE Std. C95.3, ANSI/IEE Std. C95.1 and FCC OET Bulletin 65 Edition 97-01.

A handwritten signature in black ink, appearing to read "Daniel I. Goulet", is written over a horizontal line.

Daniel I. Goulet
C Squared Systems, LLC

August 20, 2008

Date

Attachment A: References

OET Bulletin 65 - Edition 97-01 - August 1997 Federal Communications Commission Office of Engineering & Technology

ANSI C95.1-1982, American National Standard Safety Levels With Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 300 kHz to 100 GHz. IEEE-SA Standards Board

IEEE Std C95.3-1991 (Reaff 1997), IEEE Recommended Practice for the Measurement of Potentially Hazardous Electromagnetic Fields - RF and Microwave. IEEE-SA Standards Board

Attachment B: FCC Limits For Maximum Permissible Exposure (MPE)

(A) Limits for Occupational/Controlled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (E) (A/m)	Power Density (S) (mW/cm ²)	Averaging Time E ² , H ² or S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842/f	4.89/f	(900/f ²)*	6
30-300	61.4	0.163	1.0	6
300-1500	-	-	f/300	6
1500-100,000	-	-	5	6

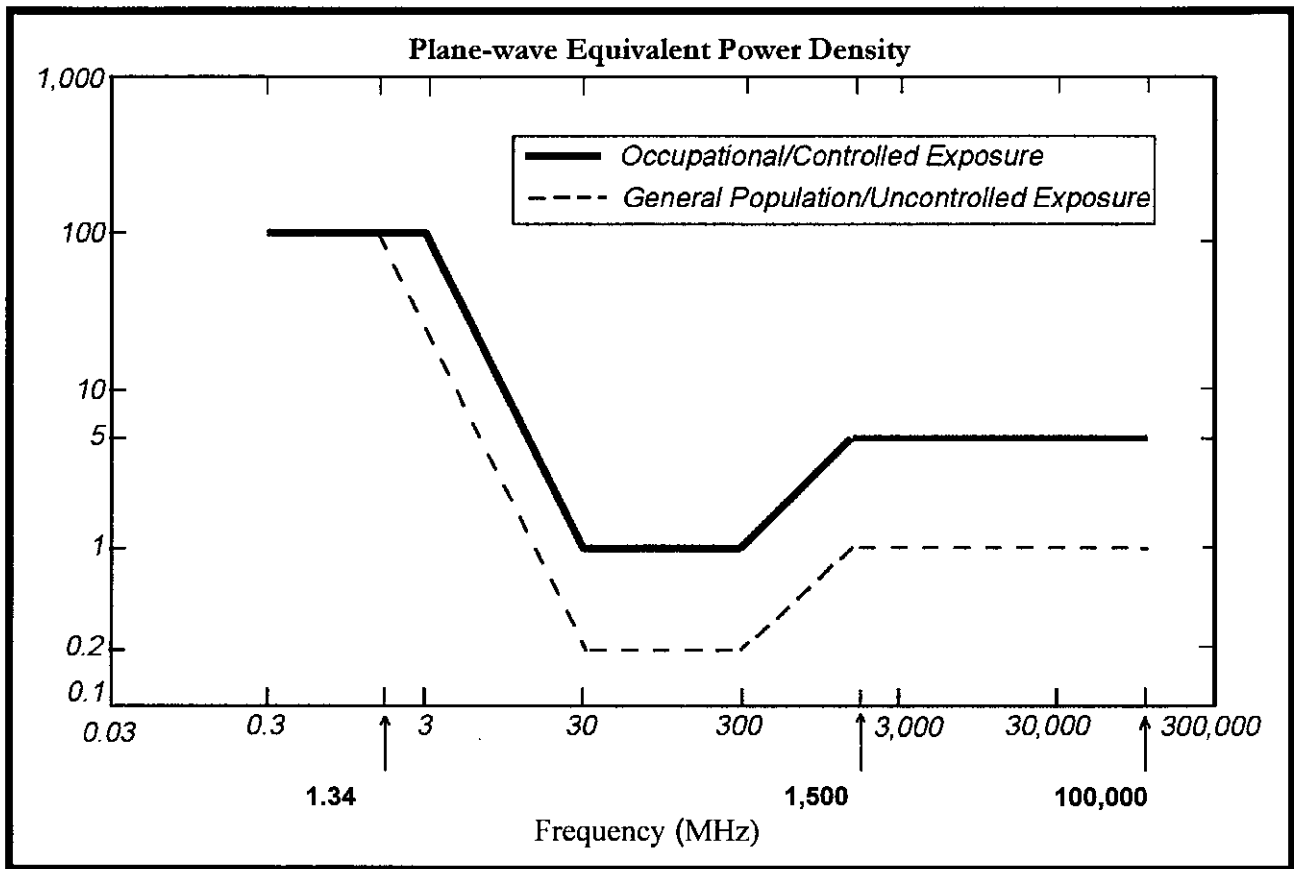
(B) Limits for General Population/Uncontrolled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (E) (A/m)	Power Density (S) (mW/cm ²)	Averaging Time E ² , H ² or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	(180/f ²)*	30
30-300	27.5	0.073	0.2	30
300-1500	-	-	f/1500	30
1500-100,000	-	-	1.0	30

f = frequency in MHz * Plane-wave equivalent power density

NOTE 1: Occupational/controlled limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Limits for occupational/controlled exposure also apply in situations when an individual is transient through a location where occupational/controlled limits apply provided he or she is made aware of the potential for exposure.

NOTE 2: General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or can not exercise control over their exposure.



• FCC Limits for Maximum Permissible Exposure (MPE)

Exhibit E

Structural Analysis

Pocket Site HFCT0035

1657 Berlin Turnpike

Berlin, Connecticut

DETAILED STRUCTURAL ANALYSIS AND EVALUATION OF AN EXISTING 176' MONOPOLE FOR PROPOSED ANTENNA ARRANGEMENT

Site I.D: CT-0035
Address: 1657 Wilbur Cross Parkway,
Berlin, CT

prepared for



POCKET WIRELESS

2810 NW Loop 410
San Antonio, Texas 06108

prepared by



URS CORPORATION
500 ENTERPRISE DRIVE, SUITE 3B
ROCKY HILL, CT 06067
TEL. 860-529-8882

36923532.00000
PWS-002

July 18, 2008

1. EXECUTIVE SUMMARY

This report summarizes the structural analysis of the existing 176' steel tapered monopole structure, located at 1657 Wilbur Cross Parkway in Berlin, CT. The analysis was conducted in accordance with the 2005 Connecticut State Building Code and the TIA/EIA-222-F standard for a wind velocity of 80 mph (fastest mile) and 69 mph (fastest mile) concurrent with 0.5" ice. The antenna loading considered in the analysis consists of all existing and proposed antennas, transmission lines, and ancillary items as outlined in the Introduction Section of this report.

The proposed Pocket Wireless installation is as follows:

Proposed Antenna and Mount	Carrier	Antenna Center Elevation
<u>Install:</u> <u>Alpha, Beta and Gamma Sectors</u> (3) Kathrein 742-213 panel antennas flush mounted and supported by:- (2) 3-way Universal Tri-Brackets (Valmont P/N (111436) (6) Single Sector Adapter Kits (Valmont P/N 206737) (3) 2 3/8" O.D support pipes (Valmont P/N (111436) with: (6) Andrew AVA7-50 1 5/8" coaxial cables supported on exterior of monopole by: Valmont coax support brackets (P/N B3254) with banding and buckles at 4'-0" o.c max.	Pocket Wireless (Proposed)	@ 124' (123' above base plate)

The results of the analysis indicate that the tower structure has the capacity to support the proposed loading conditions. **The tower and its foundation are considered structurally adequate with the wind load classification specified above and the proposed antenna loading.**

This analysis is based on:

- 1) The tower structure's theoretical capacity, not including any assessment of the condition of the tower.
- 2) Tower geometry and structural member sizes utilized in the preparation of this report obtained from manufacturers original design documents for a 176' tapered steel monopole, prepared by Engineered Endeavors, Inc., EEI Job #: 11129, signed and sealed September 16, 2002.
- 3) Site documentation and visual verification of existing appurtenances conducted from grade by URS during July 2008.
- 4) Antenna and mount configuration as specified within Section 2 and 6 of this report.

1. EXECUTIVE SUMMARY - *continued*

This report is only valid as per the assumptions and data utilized in this report for antenna inventory, mounts and associated cables. The user of this report shall field verify the assumption of the antenna and mount configuration as well as the physical condition of the tower. Notify the engineer in writing immediately if any of the information in this report is found to be other than specified.

If you should have any questions, please call.

Sincerely,

URS Corporation

Richard A. Sambor, P.E.
Senior Structural Engineer

RAS/jrm

cc: AA, DR, ICA – URS, CF/Book



2. INTRODUCTION

The subject tower is located at 1657 Wilbur Cross Parkway in Berlin, CT. The structure is an existing 176' steel tapered monopole structure, designed and manufactured by Engineered Endeavors, Inc.

The inventory is summarized in the table below:

Antenna Type	Carrier	Mount	Antenna Centerline Elevation	Cable
(2) Dipole antennas	Town (existing)	Low-Profile Platform	176'	(2) 1 5/8" (within monopole)
(2) Grid Dishes	Town (existing)	Low-Profile Platform (listed above)	176'	(2) 1 5/8" (within monopole)
(2) Omni antennas	Town (existing)	Low-Profile Platform (listed above)	176'	(2) 1 5/8" (within monopole)
(1) 4- Bay Dipole antenna	Town (reserved)	Low-Profile Platform (listed above)	176'	(1) 1 5/8" (within monopole)
(3) Powerwave 7770 panel antennas and (6) Powerwave LGP21401 TMA's	AT&T/Cingular (existing)	Cluster/Pipe Mounted	170'	(6) 1 5/8" (within monopole)
(6) EMS DR65-19-00DPQ antennas and (6) Decibel PCS 1900 TMA's	T-Mobile (existing)	(3) T-Arms	160'	(12) 1 5/8" (within monopole)
(3) EMS DR65-19-00DPQ antennas and (6) Decibel PCS 1900 TMA's	T-Mobile (reserved)	(3) T-Arms (same as above)	160'	(12) 1 5/8" (within monopole)
(1) 4- Bay Dipole antenna and (1) Grid Dish	Town (existing)	T-Arm (listed above)	160'	(2) 1 5/8" (within monopole)
(12) Dapa 48000 antennas (6 existing, 6 reserved)	Sprint/Nextel (existing and reserved)	Low-Profile Platform	150'	(12) 1 5/8" (within monopole)
(1) 2-Bay Dipole antenna	Town (existing)	6' Extension Arm	130'	(1) 1 5/8" (within monopole)
(3) Kathrein 742 213 panel antennas	Pocket Wireless (proposed)	Flush mount assembly (see section 1.0)	124'	(6) 1 5/8" (Andrew AVA7-50 exterior of monopole)
(4) Antel LPA 80063/6CF, (2)RWA80013 and (6) Antel LPA-185080/8CF_2 panel antennas	Verizon (existing)	Low-Profile Platform	114'	(12) 1 5/8" (within monopole)
(1) 4-Bay Dipole antenna	Town (existing)	6' Extension Arm	100'	(1) 1 5/8" (within monopole)
(1) Grid Dish	Town (existing)	6' Extension Arm (listed above)	100'	(1) 1 5/8" (within monopole)
(1) GPS antenna	Sprint/Nextel (existing)	Standoff Mount	75'	(1) 1/2" (within monopole)
(1) VIC-100 GPS antenna	T-Mobile (reserved)	Standoff Mount	60'	(1) 1/2" (within monopole)
(1) Scanner antenna	Town (existing)	Standoff Mount	60'	(1) 1/2" (within monopole)

Note: Base of structure established as 1.0ft above average grade.

This structural analysis of the communications tower was performed by URS Corporation (URS) for Pocket Wireless. The purpose of this analysis was to investigate the structural integrity of the existing tower with its existing and proposed antenna loads. This analysis was conducted to evaluate stress on the tower and the effect of forces to the foundation of the tower resulting from existing and proposed antenna arrangement.

3. ANALYSIS METHODOLOGY AND LOADING CONDITIONS

The structural analysis was conducted in accordance with the 2005 Connecticut State Building Code, TIA/EIA-222-F - Structural Standard for Steel Antenna Towers and Antenna Supporting Structures, and the American Institute of Steel Construction (AISC) Manual of Steel Construction - Allowable Stress Design (ASD).

The analysis was conducted using RISA Tower 5.1.1. Two load conditions were evaluated as shown below which were compared to allowable stresses according to AISC and TIA/EIA.

Load Condition 1 = 80 mph (fastest mile) Wind Load (without ice) + Tower Dead Load

Load Condition 2 = 69 mph (fastest mile) Wind Load (with ice) + Ice Load + Tower Dead Load

Please note that wind pressure is a function of velocity squared. Under Load Condition 2, a 25 percent reduction in wind pressure is allowed by code to account for the unlikelihood of the full wind pressure and ice load occurring at the same time. The same results may be achieved by utilizing a lower wind pressure without taking the 25 percent reduction, as shown above.

The TIA/EIA standard permits a one-third increase in allowable stresses for towers and monopoles less than 700 feet tall. For the purposes of this analysis, in computing the load capacity the allowable stresses of the tower members were increased by one-third.

4. FINDINGS AND EVALUATION

Combined axial and bending stresses on the monopole structure were evaluated to compare with allowable stresses in accordance with AISC. The calculated stresses under the proposed loading were **BELOW** the allowable stresses (see table below). Detailed analysis and calculations for the proposed load condition are provided in section 6 of this report. Additionally, the anchor bolts, base plate and foundation were all found to be within the allowable limits. An analysis of the foundation was not conducted since the proposed reactions were below the original design.

TABLE 1: Proposed Tower Base Reactions vs. Original Design Reactions

Base Reactions	Proposed Reactions	Original Design Reactions
Axial Load (kips)	48.5	49.6
Shear (kips)	29.3	34.94
O.T. Moment (ft-kips)	3414	4306.5

Note: Original design reactions based on TIA/EIA 222-F with a wind speed of 85mph and 0.5in ice.

TABLE 2: Proposed Tower Component Stress vs. Capacity Summary

Component (Section No.)	Controlling Component / Elevation	Stress Ratio (% capacity)	Pass/Fail	Comments:
Pole Shaft (L3)	43'-86.13'	67.7%	Pass	
Anchor Bolts	Compression	68%	Pass	
Base Plate	Bending	67%	Pass	

5. CONCLUSIONS AND RECOMMENDATIONS

The results of the analysis indicate that the tower structure has the capacity to support the proposed loading conditions. **The tower and its foundation are considered structurally adequate with the wind load classification specified above and the proposed antenna loading.**

Limitations/Assumptions:

This report is based on the following:

1. Tower inventory as listed in this report.
2. Tower is properly installed and maintained.
3. All members are as specified in the original design documents and are in good condition.
4. All required members are in place.
5. All bolts are in place and are properly tightened.
6. Tower is in plumb condition.
7. All member protective coatings are in good condition.
8. All tower members were properly designed, detailed, fabricated, and installed and have been properly maintained since erection.
9. Foundations were properly constructed to support original design loads as specified in the original design documents.
10. All coaxial cable is installed within the monopole unless specified otherwise.

URS is not responsible for any modifications completed prior to or hereafter in which URS is not or was not directly involved. Modifications include but are not limited to:

- A. Adding antennas
- B. Removing/replacing antennas
- C. Adding coaxial cables

URS hereby states that this document represents the entire report and that it assumes no liability for any factual changes that may occur after the date of this report. All representations, recommendations, and conclusions are based upon information contained and set forth herein. If you are aware of any information which conflicts with that which is contained herein, or you are aware of any defects arising from original design, material, fabrication, or erection deficiencies, you should disregard this report and immediately contact URS. URS disclaims all liability for any representation, recommendation, or conclusion not expressly stated herein.

Ongoing and Periodic Inspection and Maintenance:

After the Contractor has successfully completed the installation and the work has been accepted, the owner will be responsible for the ongoing and periodic inspection and maintenance of the tower.

The owner shall refer to TIA/EIA-222-F for recommendations for maintenance and inspection. The frequency of the inspection and maintenance intervals is to be determined by the owner based upon actual site and environmental conditions. It is recommended that a complete and thorough inspection of the entire tower structural system be performed at least yearly and more frequently as conditions warrant. According to TIA/EIA-222-F section 14.1, Note 1: It is recommended that the structure be inspected after severe wind and/or ice storms or other extreme loading conditions.

6. DRAWINGS AND DATA

RISA TOWER INPUT/OUTPUT SUMMARY

RISA TOWER DETAILED OUTPUT

RISATower URS Corporation 500 Enterprise Drive, Suite 3B Rocky Hill, CT 06067 Phone: (860) 529-8882 FAX: (860) 529-3991	Job	176' EEI Monopole, Berlin, CT	Page	1 of 22
	Project	Berlin Fire Department	Date	16:00:15 07/18/08
	Client	Pocket Wireless Site I.D CT0035	Designed by	Staff

Tower Input Data

There is a pole section.

This tower is designed using the TIA/EIA-222-F standard.

The following design criteria apply:

Tower is located in Hartford County, Connecticut.

Basic wind speed of 80 mph.

Nominal ice thickness of 0.5000 in.

Ice density of 56 pcf.

A wind speed of 69 mph is used in combination with ice.

Temperature drop of 50 °F.

Deflections calculated using a wind speed of 50 mph.

A non-linear (P-delta) analysis was used.

Pressures are calculated at each section.

Stress ratio used in pole design is 1.333.

Local bending stresses due to climbing loads, feedline supports, and appurtenance mounts are not considered.

Options

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

Tapered Pole Section Geometry

Section	Elevation	Section Length	Splice Length	Number of Sides	Top Diameter	Bottom Diameter	Wall Thickness	Bend Radius	Pole Grade
	ft	ft	ft		in	in	in	in	
L1	176.01-130.76	45.25	4.50	18	21.0000	31.8000	0.2500	1.0000	A572-65 (65 ksi)
L2	130.76-86.13	49.13	5.75	18	30.2260	41.8200	0.3125	1.2500	A572-65 (65 ksi)
L3	86.13-43.00	48.88	7.00	18	39.8381	51.3600	0.3750	1.5000	A572-65 (65 ksi)
L4	43.00-1.00	49.00		18	48.9600	60.5000	0.4375	1.7500	A572-65 (65 ksi)

RISATower URS Corporation 500 Enterprise Drive, Suite 3B Rocky Hill, CT 06067 Phone: (860) 529-8882 FAX: (860) 529-3991	Job	176' EEI Monopole, Berlin, CT	Page 2 of 22
	Project	Berlin Fire Department	Date 16:00:15 07/18/08
	Client	Pocket Wireless Site I.D CT0035	Designed by Staff

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	21.3240	16.4651	895.6507	7.3663	10.6680	83.9568	1792.4800	8.2341	3.2560	13.024
	32.2906	25.0349	3148.3461	11.2003	16.1544	194.8909	6300.8349	12.5198	5.1568	20.627
L2	31.7706	29.6704	3354.2440	10.6193	15.3548	218.4493	6712.9015	14.8380	4.7698	15.263
	42.4651	41.1703	8961.3641	14.7352	21.2446	421.8192	17934.5198	20.5890	6.8103	21.793
L3	41.8289	46.9709	9241.6271	14.0094	20.2377	456.6531	18495.4146	23.4899	6.3515	16.937
	52.1523	60.6849	19929.7987	18.0997	26.0909	763.8607	39885.8215	30.3482	8.3794	22.345
L4	51.3893	67.3795	20042.4648	17.2255	24.8717	805.8353	40111.3021	33.6962	7.8470	17.936
	61.4333	83.4043	38013.0437	21.3222	30.7340	1236.8401	76076.1060	41.7101	9.8780	22.578

Tower Elevation	Gusset Area (per face)	Gusset Thickness	Gusset Grade	Adjust. Factor A _f	Adjust. Factor A _r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in
ft	ft ²	in						
L1 176.01- 130.76				1	1	1		
L2 130.76- 86.13				1	1	1		
L3 86.13-43.00				1	1	1		
L4 43.00-1.00				1	1	1		

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C _A A _A ft ² /ft	Weight plf
1 5/8 (Town)	C	No	Inside Pole	176.00 - 21.00	7	No Ice	0.00	1.04
1 5/8 (AT&T/Cingular)	C	No	Inside Pole	171.00 - 9.00	6	1/2" Ice	0.00	1.04
1 5/8 (T-Mobile)	C	No	Inside Pole	161.00 - 9.00	24	No Ice	0.00	1.04
1 5/8 (Town)	C	No	Inside Pole	161.00 - 21.00	2	1/2" Ice	0.00	1.04
1 5/8 (Sprint/Nextel)	C	No	Inside Pole	151.00 - 9.00	12	No Ice	0.00	1.04
1 5/8 (Town)	C	No	Inside Pole	131.00 - 21.00	1	1/2" Ice	0.00	1.04
1 5/8 (Town)	C	No	Inside Pole	101.00 - 21.00	2	No Ice	0.00	1.04
1/2 (Sprint/Nextel)	C	No	Inside Pole	76.00 - 9.00	1	1/2" Ice	0.00	0.25
1/2 (Town)	C	No	Inside Pole	61.00 - 21.00	1	No Ice	0.00	0.25
1/2 (T-Mobile)	C	No	Inside Pole	61.00 - 13.00	1	1/2" Ice	0.00	0.25
1 5/8 (Verizon)	C	No	Inside Pole	111.00 - 21.00	12	No Ice	0.00	1.04
1 5/8 (Verizon)	C	No	Inside Pole	111.00 - 21.00	12	1/2" Ice	0.00	1.04
AVA7-50 (1-5/8 LOW DENSE FOAM (Pocket Wireless - proposed))	C	No	CaAa (Out Of Face)	124.00 - 4.00	1	No Ice	0.20	0.72
						1/2" Ice	0.30	2.23

RISATower URS Corporation 500 Enterprise Drive, Suite 3B Rocky Hill, CT 06067 Phone: (860) 529-8882 FAX: (860) 529-3991	Job	176' EEI Monopole, Berlin, CT	Page 3 of 22
	Project	Berlin Fire Department	Date 16:00:15 07/18/08
	Client	Pocket Wireless Site I.D CT0035	Designed by Staff

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		$C_A A_A$ ft ² /ft	Weight plf
AVA7-50 (1-5/8 LOW DENSI. FOAM) (Pocket Wireless - proposed)	C	No	CaAa (Out Of Face)	124.00 - 4.00	5	No Ice	0.00	0.72
						1/2" Ice	0.00	2.23

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft ²	A_F ft ²	$C_A A_A$ In Face ft ²	$C_A A_A$ Out Face ft ²	Weight lb
L1	176.01-130.76	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	1650.98
L2	130.76-86.13	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	7.498	2918.50
L3	86.13-43.00	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	8.540	3164.01
L4	43.00-1.00	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	7.722	2224.22

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	$C_A A_A$ In Face ft ²	$C_A A_A$ Out Face ft ²	Weight lb
L1	176.01-130.76	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	1650.98
L2	130.76-86.13	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	11.285	3262.72
L3	86.13-43.00	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	12.853	3556.05
L4	43.00-1.00	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	11.622	2578.72

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	176.01-130.76	0.0000	0.0000	0.0000	0.0000
L2	130.76-86.13	-0.2114	0.1220	-0.3023	0.1745
L3	86.13-43.00	-0.2446	0.1412	-0.3523	0.2034
L4	43.00-1.00	-0.2283	0.1318	-0.3314	0.1913

RISATower URS Corporation 500 Enterprise Drive, Suite 3B Rocky Hill, CT 06067 Phone: (860) 529-8882 FAX: (860) 529-3991	Job	176' EEI Monopole, Berlin, CT	Page	4 of 22
	Project	Berlin Fire Department	Date	16:00:15 07/18/08
	Client	Pocket Wireless Site I.D CT0035	Designed by	Staff

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft	C _{4A} Front ft ²	C _{4A} Side ft ²	Weight lb
12' Low Profile Platform (Town)	C	None		0.0000	176.00	No Ice 15.70 1/2" Ice 20.10	15.70 20.10	1300.00 1765.00
4 Bay Dipole (Town)	C	From Face	4.00 6.00 0.00	0.0000	176.00	No Ice 5.40 1/2" Ice 9.00	5.40 9.00	50.00 80.00
Omni (Town)	C	From Face	4.00 0.00 0.00	0.0000	176.00	No Ice 5.40 1/2" Ice 9.00	5.40 9.00	50.00 80.00
Grid Dish (Town)	C	From Face	4.00 -6.00 0.00	0.0000	176.00	No Ice 5.40 1/2" Ice 9.00	5.40 9.00	50.00 80.00
Dipole (Town)	B	From Face	4.00 0.00 0.00	0.0000	176.00	No Ice 5.40 1/2" Ice 9.00	5.40 9.00	50.00 80.00
Grid Dish (Town)	B	From Face	4.00 -6.00 0.00	0.0000	176.00	No Ice 5.40 1/2" Ice 9.00	5.40 9.00	50.00 80.00
Omni (Town)	A	From Face	4.00 0.00 0.00	0.0000	176.00	No Ice 5.40 1/2" Ice 9.00	5.40 9.00	50.00 80.00
4 Bay Dipole (reserved) (Town)	A	From Face	4.00 6.00 0.00	0.0000	176.00	No Ice 5.40 1/2" Ice 9.00	5.40 9.00	50.00 80.00
7770.00 w/ mount pipe (AT&T/Cingular)	A	From Face	1.00 0.00 0.00	0.0000	170.00	No Ice 5.99 1/2" Ice 6.45	4.26 4.91	63.95 110.64
7770.00 w/ mount pipe (AT&T/Cingular)	B	From Face	1.00 0.00 0.00	0.0000	170.00	No Ice 5.99 1/2" Ice 6.45	4.26 4.91	63.95 110.64
7770.00 w/ mount pipe (AT&T/Cingular)	C	From Face	1.00 0.00 0.00	0.0000	170.00	No Ice 5.99 1/2" Ice 6.45	4.26 4.91	63.95 110.64
LPG 21401 TMA (AT&T/Cingular)	A	From Face	1.00 0.00 0.00	0.0000	170.00	No Ice 0.95 1/2" Ice 1.09	0.37 0.48	17.50 23.31
LPG 21401 TMA (AT&T/Cingular)	B	From Face	1.00 0.00 0.00	0.0000	170.00	No Ice 0.95 1/2" Ice 1.09	0.37 0.48	17.50 23.31
LPG 21401 TMA (AT&T/Cingular)	C	From Face	1.00 0.00 0.00	0.0000	170.00	No Ice 0.95 1/2" Ice 1.09	0.37 0.48	17.50 23.31
Valmont T-Arm (1) (T-Mobile)	A	From Face	2.00 0.00 0.00	0.0000	160.00	No Ice 10.54 1/2" Ice 14.45	10.54 14.45	336.00 412.00
Valmont T-Arm (1) (T-Mobile)	B	From Face	2.00 0.00 0.00	0.0000	160.00	No Ice 10.54 1/2" Ice 14.45	10.54 14.45	336.00 412.00
Valmont T-Arm (1) (T-Mobile)	C	From Face	2.00 0.00 0.00	0.0000	160.00	No Ice 10.54 1/2" Ice 14.45	10.54 14.45	336.00 412.00

RISATower

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Job	176' EEI Monopole, Berlin, CT	Page	5 of 22
Project	Berlin Fire Department	Date	16:00:15 07/18/08
Client	Pocket Wireless Site I.D CT0035	Designed by	Staff

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C _A A _A Front ft ²	C _A A _A Side ft ²	Weight lb
(2) DR65-19-00DPQ (T-Mobile)	A	From Face	4.00 0.00 0.00	0.0000	160.00	No Ice 1/2" Ice	8.40 8.95	3.53 3.97	32.00 73.77
(2) DR65-19-00DPQ (T-Mobile)	B	From Face	4.00 0.00 0.00	0.0000	160.00	No Ice 1/2" Ice	8.40 8.95	3.53 3.97	32.00 73.77
(2) DR65-19-00DPQ (T-Mobile)	C	From Face	4.00 0.00 0.00	0.0000	160.00	No Ice 1/2" Ice	8.40 8.95	3.53 3.97	32.00 73.77
DR65-19-00DPQ (T-Mobile (reserved))	A	From Face	4.00 0.00 0.00	0.0000	160.00	No Ice 1/2" Ice	8.40 8.95	3.53 3.97	32.00 73.77
DR65-19-00DPQ (T-Mobile (reserved))	B	From Face	4.00 0.00 0.00	0.0000	160.00	No Ice 1/2" Ice	8.40 8.95	3.53 3.97	32.00 73.77
DR65-19-00DPQ (T-Mobile (reserved))	C	From Face	4.00 0.00 0.00	0.0000	160.00	No Ice 1/2" Ice	8.40 8.95	3.53 3.97	32.00 73.77
(2) TMA 10"x8"x3" (T-Mobile)	A	From Face	3.00 0.00 0.00	0.0000	160.00	No Ice 1/2" Ice	0.78 0.90	0.29 0.38	15.00 20.06
(2) TMA 10"x8"x3" (T-Mobile)	B	From Face	3.00 0.00 0.00	0.0000	160.00	No Ice 1/2" Ice	0.78 0.90	0.29 0.38	15.00 20.06
(2) TMA 10"x8"x3" (T-Mobile)	C	From Face	3.00 0.00 0.00	0.0000	160.00	No Ice 1/2" Ice	0.78 0.90	0.29 0.38	15.00 20.06
(2) TMA 10"x8"x3" (T-Mobile (reserved))	A	From Face	3.00 0.00 0.00	0.0000	160.00	No Ice 1/2" Ice	0.78 0.90	0.29 0.38	15.00 20.06
(2) TMA 10"x8"x3" (T-Mobile (reserved))	B	From Face	3.00 0.00 0.00	0.0000	160.00	No Ice 1/2" Ice	0.78 0.90	0.29 0.38	15.00 20.06
(2) TMA 10"x8"x3" (T-Mobile (reserved))	C	From Face	3.00 0.00 0.00	0.0000	160.00	No Ice 1/2" Ice	0.78 0.90	0.29 0.38	15.00 20.06
2 Bay Dipole (Town)	C	From Face	4.00 6.00 0.00	0.0000	160.00	No Ice 1/2" Ice	0.00 0.00	0.00 0.00	0.00 0.00
Grid Dish (Town)	C	From Face	4.00 6.00 0.00	0.0000	160.00	No Ice 1/2" Ice	5.40 9.00	5.40 9.00	50.00 80.00
Low Profile Platform (Sprint/Nextel)	C	None		0.0000	150.00	No Ice 1/2" Ice	17.30 22.10	17.30 22.10	1500.00 2030.00
(4) 48000 (Sprint/Nextel)	A	From Face	3.00 0.00 0.00	0.0000	150.00	No Ice 1/2" Ice	4.51 4.91	1.82 2.15	18.30 40.88
(4) 48000 (Sprint/Nextel)	B	From Face	3.00 0.00 0.00	0.0000	150.00	No Ice 1/2" Ice	4.51 4.91	1.82 2.15	18.30 40.88
(4) 48000 (Sprint/Nextel)	C	From Face	3.00 0.00 0.00	0.0000	150.00	No Ice 1/2" Ice	4.51 4.91	1.82 2.15	18.30 40.88
2 Bay Dipole (Town)	C	From Face	6.00 0.00 0.00	0.0000	130.00	No Ice 1/2" Ice	5.40 9.00	5.40 9.00	50.00 80.00
6' Side Mount Standoff	C	From Face	3.00	0.0000	130.00	No Ice	4.97	4.97	70.00

RISATower

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Job	176' EEI Monopole, Berlin, CT	Page	6 of 22
Project	Berlin Fire Department	Date	16:00:15 07/18/08
Client	Pocket Wireless Site I.D CT0035	Designed by	Staff

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft	C _A A _A Front ft ²	C _A A _A Side ft ²	Weight lb
(Town)			0.00 0.00		1/2" Ice	6.12	6.12	130.00
6' Side Mount Standoff (Town)	C	From Face	3.00 0.00 0.00	0.0000	100.00	No Ice 1/2" Ice	4.97 6.12	70.00 130.00
4 Bay Dipole (Town)	C	From Face	6.00 0.00 0.00	0.0000	100.00	No Ice 1/2" Ice	5.40 9.00	50.00 80.00
Grid Dish (Town)	C	From Face	6.00 0.00 0.00	0.0000	100.00	No Ice 1/2" Ice	5.40 9.00	50.00 80.00
Side Mount Standoff (Sprint/Nextel)	B	From Face	1.50 0.00 0.00	0.0000	75.00	No Ice 1/2" Ice	4.97 6.12	70.00 130.00
GPS (Sprint/Nextel)	B	From Face	3.00 0.00 0.00	0.0000	75.00	No Ice 1/2" Ice	1.00 1.50	15.00 30.00
Side Mount Standoff (T-Mobile (reserved))	B	From Face	1.50 0.00 0.00	0.0000	60.00	No Ice 1/2" Ice	4.97 6.12	70.00 130.00
GPS (T-Mobile (reserved))	B	From Face	3.00 0.00 0.00	0.0000	60.00	No Ice 1/2" Ice	1.00 1.50	15.00 30.00
Side Mount Standoff (Town (reserved))	C	From Face	1.50 0.00 0.00	0.0000	60.00	No Ice 1/2" Ice	4.97 6.12	70.00 130.00
Scanner Antenna (Town (reserved))	C	From Face	3.00 0.00 0.00	0.0000	60.00	No Ice 1/2" Ice	1.00 1.50	15.00 30.00
Andrew 12'-6" Low Profile Platform (Verizon)	C	None		0.0000	112.00	No Ice 1/2" Ice	14.45 19.00	1300.00 1690.00
LPA-80063/6CF (Verizon)	A	From Face	4.00 6.00 0.00	0.0000	114.00	No Ice 1/2" Ice	10.31 10.87	27.00 100.95
LPA-80063/6CF (Verizon)	A	From Face	4.00 -6.00 0.00	0.0000	114.00	No Ice 1/2" Ice	10.31 10.87	27.00 100.95
LPA-185080/8CFx2 (Verizon)	A	From Face	4.00 4.00 0.00	0.0000	114.00	No Ice 1/2" Ice	2.09 2.39	7.00 25.04
LPA-185080/8CFx2 (Verizon)	A	From Face	4.00 -4.00 0.00	0.0000	114.00	No Ice 1/2" Ice	2.09 2.39	7.00 25.04
LPA-80063/6CF (Verizon)	B	From Face	4.00 6.00 0.00	0.0000	114.00	No Ice 1/2" Ice	10.31 10.87	27.00 100.95
LPA-80063/6CF (Verizon)	B	From Face	4.00 -6.00 0.00	0.0000	114.00	No Ice 1/2" Ice	10.31 10.87	27.00 100.95
LPA-185080/8CFx2 (Verizon)	B	From Face	4.00 4.00 0.00	0.0000	114.00	No Ice 1/2" Ice	2.09 2.39	7.00 25.04
LPA-185080/8CFx2 (Verizon)	B	From Face	4.00 -4.00 0.00	0.0000	114.00	No Ice 1/2" Ice	2.09 2.39	7.00 25.04
RWA80013	C	From Face	4.00	0.0000	114.00	No Ice	5.44	14.00

RISATower URS Corporation 500 Enterprise Drive, Suite 3B Rocky Hill, CT 06067 Phone: (860) 529-8882 FAX: (860) 529-3991	Job	176' EEI Monopole, Berlin, CT	Page 7 of 22
	Project	Berlin Fire Department	Date 16:00:15 07/18/08
	Client	Pocket Wireless Site I.D CT0035	Designed by Staff

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C _A A _A Front ft ²	C _A A _A Side ft ²	Weight lb
(Verizon)			6.00		1/2" Ice		6.04	6.04	47.00
RWA80013	C	From Face	0.00	0.0000	114.00	No Ice	5.44	5.44	14.00
(Verizon)			-6.00		1/2" Ice		6.04	6.04	47.00
LPA-185080/8CFx2	C	From Face	0.00	0.0000	114.00	No Ice	2.09	2.79	7.00
(Verizon)			4.00		1/2" Ice		2.39	3.09	25.04
LPA-185080/8CFx2	C	From Face	0.00	0.0000	114.00	No Ice	2.09	2.79	7.00
(Verizon)			-4.00		1/2" Ice		2.39	3.09	25.04
Valmont Uni-Tri Bracket	C	None	0.00	0.0000	125.50	No Ice	1.75	1.75	290.00
(Pocket Wireless - proposed)					1/2" Ice		1.94	1.94	306.29
Valmont Uni-Tri Bracket	C	None		0.0000	122.50	No Ice	1.75	1.75	290.00
(Pocket Wireless - proposed)					1/2" Ice		1.94	1.94	306.29
742 213 w/mount pipe	A	From Face	1.00	0.0000	124.00	No Ice	5.28	4.53	47.55
(Pocket Wireless - proposed)			0.00		1/2" Ice		5.82	5.87	88.36
742 213 w/mount pipe	B	From Face	0.00	0.0000	124.00	No Ice	5.28	4.53	47.55
(Pocket Wireless - proposed)			0.00		1/2" Ice		5.82	5.87	88.36
742 213 w/mount pipe	C	From Face	0.00	0.0000	124.00	No Ice	5.28	4.53	47.55
(Pocket Wireless - proposed)			0.00		1/2" Ice		5.82	5.87	88.36

Tower Pressures - No Ice

$$G_H = 1.690$$

Section Elevation ft	z ft	K _Z	q _z psf	A _G ft ²	F a c e	A _F ft ²	A _R ft ²	A _{leg} ft ²	Leg %	C _A A _A In Face ft ²	C _A A _A Out Face ft ²
L1 176.01-130.76	152.08	1.547	25	99.550	A	0.000	99.550	99.550	100.00	0.000	0.000
					B	0.000	99.550		100.00	0.000	0.000
					C	0.000	99.550		100.00	0.000	0.000
L2 130.76-86.13	107.70	1.402	23	135.950	A	0.000	135.950	135.950	100.00	0.000	0.000
					B	0.000	135.950		100.00	0.000	0.000
					C	0.000	135.950		100.00	0.000	7.498
L3 86.13-43.00	64.29	1.21	20	166.326	A	0.000	166.326	166.326	100.00	0.000	0.000
					B	0.000	166.326		100.00	0.000	0.000
					C	0.000	166.326		100.00	0.000	8.540
L4 43.00-1.00	21.38	1	16	194.440	A	0.000	194.440	194.440	100.00	0.000	0.000
					B	0.000	194.440		100.00	0.000	0.000
					C	0.000	194.440		100.00	0.000	7.722

Tower Pressure - With Ice

RISATower URS Corporation 500 Enterprise Drive, Suite 3B Rocky Hill, CT 06067 Phone: (860) 529-8882 FAX: (860) 529-3991	Job	176' EEI Monopole, Berlin, CT	Page	8 of 22
	Project	Berlin Fire Department	Date	16:00:15 07/18/08
	Client	Pocket Wireless Site I.D CT0035	Designed by	Staff

$$G_H = 1.690$$

Section Elevation	z	K _Z	q _z	t _z	A _G	F a c e	A _F	A _R	A _{leg}	Leg %	C _A A _A In Face ft ²	C _A A _A Out Face ft ²
ft	ft		psf	in	ft ²		ft ²	ft ²	ft ²			
L1 176.01-130.76	152.08	1.547	19	0.5000	103.321	A	0.000	103.321	103.321	100.00	0.000	0.000
						B	0.000	103.321		100.00	0.000	0.000
						C	0.000	103.321		100.00	0.000	0.000
L2 130.76-86.13	107.70	1.402	17	0.5000	139.669	A	0.000	139.669	139.669	100.00	0.000	0.000
						B	0.000	139.669		100.00	0.000	0.000
						C	0.000	139.669		100.00	0.000	11.285
L3 86.13-43.00	64.29	1.21	15	0.5000	169.920	A	0.000	169.920	169.920	100.00	0.000	0.000
						B	0.000	169.920		100.00	0.000	0.000
						C	0.000	169.920		100.00	0.000	12.853
L4 43.00-1.00	21.38	1	12	0.5000	197.940	A	0.000	197.940	197.940	100.00	0.000	0.000
						B	0.000	197.940		100.00	0.000	0.000
						C	0.000	197.940		100.00	0.000	11.622

Tower Pressure - Service

$$G_H = 1.690$$

Section Elevation	z	K _Z	q _z	A _G	F a c e	A _F	A _R	A _{leg}	Leg %	C _A A _A In Face ft ²	C _A A _A Out Face ft ²
ft	ft		psf	ft ²		ft ²	ft ²	ft ²			
L1 176.01-130.76	152.08	1.547	10	99.550	A	0.000	99.550	99.550	100.00	0.000	0.000
					B	0.000	99.550		100.00	0.000	0.000
					C	0.000	99.550		100.00	0.000	0.000
L2 130.76-86.13	107.70	1.402	9	135.950	A	0.000	135.950	135.950	100.00	0.000	0.000
					B	0.000	135.950		100.00	0.000	0.000
					C	0.000	135.950		100.00	0.000	7.498
L3 86.13-43.00	64.29	1.21	8	166.326	A	0.000	166.326	166.326	100.00	0.000	0.000
					B	0.000	166.326		100.00	0.000	0.000
					C	0.000	166.326		100.00	0.000	8.540
L4 43.00-1.00	21.38	1	6	194.440	A	0.000	194.440	194.440	100.00	0.000	0.000
					B	0.000	194.440		100.00	0.000	0.000
					C	0.000	194.440		100.00	0.000	7.722

Tower Forces - No Ice - Wind Normal To Face

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
ft	lb	lb							ft ²	lb	plf	
L1 176.01-130.76	1650.98	3195.01	A	1	0.65	1	1	1	99.550	2769.59	61.21	C
			B	1	0.65	1	1	1	99.550			
			C	1	0.65	1	1	1	99.550			
L2 130.76-86.13	2918.50	5921.54	A	1	0.65	1	1	1	135.950	3714.44	83.23	C
			B	1	0.65	1	1	1	135.950			
			C	1	0.65	1	1	1	135.950			
L3 86.13-43.00	3164.01	8953.11	A	1	0.65	1	1	1	166.326	3887.67	90.14	C
			B	1	0.65	1	1	1	166.326			
			C	1	0.65	1	1	1	166.326			
L4 43.00-1.00	2224.22	12570.61	A	1	0.65	1	1	1	194.440	3713.31	88.41	C

RISATower URS Corporation 500 Enterprise Drive, Suite 3B Rocky Hill, CT 06067 Phone: (860) 529-8882 FAX: (860) 529-3991	Job	176' EEI Monopole, Berlin, CT	Page	9 of 22
	Project	Berlin Fire Department	Date	16:00:15 07/18/08
	Client	Pocket Wireless Site I.D CT0035	Designed by	Staff

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
ft	lb	lb							ft ²	lb	plf	
Sum Weight:	9957.71	30640.27	B C	1 1	0.65 0.65	1 1	1 1	1 1 OTM	194.440 194.440 1136493.5 9 lb-ft	14085.01		

Tower Forces - No Ice - Wind 45 To Face

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
ft	lb	lb							ft ²	lb	plf	
L1 176.01- 130.76	1650.98	3195.01	A B C	1 1 1	0.65 0.65 0.65	1 1 1	1 1 1	1 1 1	99.550 99.550 99.550	2769.59	61.21	C
L2 130.76- 86.13	2918.50	5921.54	A B C	1 1 1	0.65 0.65 0.65	1 1 1	1 1 1	1 1 1	135.950 135.950 135.950	3714.44	83.23	C
L3 86.13- 43.00	3164.01	8953.11	A B C	1 1 1	0.65 0.65 0.65	1 1 1	1 1 1	1 1 1	166.326 166.326 166.326	3887.67	90.14	C
L4 43.00-1.00	2224.22	12570.61	A B C	1 1 1	0.65 0.65 0.65	1 1 1	1 1 1	1 1 1	194.440 194.440 194.440	3713.31	88.41	C
Sum Weight:	9957.71	30640.27						OTM	1136493.5 9 lb-ft	14085.01		

Tower Forces - No Ice - Wind 60 To Face

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
ft	lb	lb							ft ²	lb	plf	
L1 176.01- 130.76	1650.98	3195.01	A B C	1 1 1	0.65 0.65 0.65	1 1 1	1 1 1	1 1 1	99.550 99.550 99.550	2769.59	61.21	C
L2 130.76- 86.13	2918.50	5921.54	A B C	1 1 1	0.65 0.65 0.65	1 1 1	1 1 1	1 1 1	135.950 135.950 135.950	3714.44	83.23	C
L3 86.13- 43.00	3164.01	8953.11	A B C	1 1 1	0.65 0.65 0.65	1 1 1	1 1 1	1 1 1	166.326 166.326 166.326	3887.67	90.14	C
L4 43.00-1.00	2224.22	12570.61	A B C	1 1 1	0.65 0.65 0.65	1 1 1	1 1 1	1 1 1	194.440 194.440 194.440	3713.31	88.41	C
Sum Weight:	9957.71	30640.27						OTM	1136493.5 9 lb-ft	14085.01		

Tower Forces - No Ice - Wind 90 To Face

RISATower

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Job

176' EEI Monopole, Berlin, CT

Page

10 of 22

Project

Berlin Fire Department

Date

16:00:15 07/18/08

Client

Pocket Wireless Site I.D CT0035

Designed by

Staff

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
ft	lb	lb							ft ²	lb	plf	
L1 176.01- 130.76	1650.98	3195.01	A	1	0.65	1	1	1	99.550	2769.59	61.21	C
			B	1	0.65	1	1	1	99.550			
			C	1	0.65	1	1	1	99.550			
L2 130.76- 86.13	2918.50	5921.54	A	1	0.65	1	1	1	135.950	3714.44	83.23	C
			B	1	0.65	1	1	1	135.950			
			C	1	0.65	1	1	1	135.950			
L3 86.13- 43.00	3164.01	8953.11	A	1	0.65	1	1	1	166.326	3887.67	90.14	C
			B	1	0.65	1	1	1	166.326			
			C	1	0.65	1	1	1	166.326			
L4 43.00-1.00	2224.22	12570.61	A	1	0.65	1	1	1	194.440	3713.31	88.41	C
			B	1	0.65	1	1	1	194.440			
			C	1	0.65	1	1	1	194.440			
Sum Weight:	9957.71	30640.27						OTM	1136493.5 9 lb-ft	14085.01		

Tower Forces - With Ice - Wind Normal To Face

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
ft	lb	lb							ft ²	lb	plf	
L1 176.01- 130.76	1650.98	3946.24	A	1	0.65	1	1	1	103.321	2155.87	47.64	C
			B	1	0.65	1	1	1	103.321			
			C	1	0.65	1	1	1	103.321			
L2 130.76- 86.13	3262.72	6942.16	A	1	0.65	1	1	1	139.669	2966.12	66.46	C
			B	1	0.65	1	1	1	139.669			
			C	1	0.65	1	1	1	139.669			
L3 86.13- 43.00	3556.05	10198.24	A	1	0.65	1	1	1	169.920	3081.95	71.46	C
			B	1	0.65	1	1	1	169.920			
			C	1	0.65	1	1	1	169.920			
L4 43.00-1.00	2578.72	14023.59	A	1	0.65	1	1	1	197.940	2913.21	69.36	C
			B	1	0.65	1	1	1	197.940			
			C	1	0.65	1	1	1	197.940			
Sum Weight:	11048.47	35110.23						OTM	896626.29 lb-ft	11117.15		

Tower Forces - With Ice - Wind 45 To Face

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
ft	lb	lb							ft ²	lb	plf	
L1 176.01- 130.76	1650.98	3946.24	A	1	0.65	1	1	1	103.321	2155.87	47.64	C
			B	1	0.65	1	1	1	103.321			
			C	1	0.65	1	1	1	103.321			
L2 130.76- 86.13	3262.72	6942.16	A	1	0.65	1	1	1	139.669	2966.12	66.46	C
			B	1	0.65	1	1	1	139.669			
			C	1	0.65	1	1	1	139.669			
L3 86.13- 43.00	3556.05	10198.24	A	1	0.65	1	1	1	169.920	3081.95	71.46	C
			B	1	0.65	1	1	1	169.920			

RISATower

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176' EEI Monopole, Berlin, CT

Page

11 of 22

Project

Berlin Fire Department

Date

16:00:15 07/18/08

Client

Pocket Wireless Site I.D CT0035

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Section Elevation <i>ft</i>	Add Weight <i>lb</i>	Self Weight <i>lb</i>	<i>F</i> <i>a</i> <i>c</i> <i>e</i>	<i>e</i>	<i>C_F</i>	<i>R_R</i>	<i>D_F</i>	<i>D_R</i>	<i>A_E</i> <i>ft²</i>	<i>F</i> <i>lb</i>	<i>w</i> <i>plf</i>	Ctrl. Face
L4 43.00-1.00	2578.72	14023.59	C A B C	1 1 1 1	0.65 0.65 0.65 0.65	1 1 1 1	1 1 1 1	1 1 1 1	169.920 197.940 197.940 197.940	2913.21	69.36	C
Sum Weight:	11048.47	35110.23						OTM	896626.29 lb-ft	11117.15		

Tower Forces - With Ice - Wind 60 To Face

Section Elevation <i>ft</i>	Add Weight <i>lb</i>	Self Weight <i>lb</i>	<i>F</i> <i>a</i> <i>c</i> <i>e</i>	<i>e</i>	<i>C_F</i>	<i>R_R</i>	<i>D_F</i>	<i>D_R</i>	<i>A_E</i> <i>ft²</i>	<i>F</i> <i>lb</i>	<i>w</i> <i>plf</i>	Ctrl. Face
L1 176.01-130.76	1650.98	3946.24	A B C	1 1 1	0.65 0.65 0.65	1 1 1	1 1 1	1 1 1	103.321 103.321 103.321	2155.87	47.64	C
L2 130.76-86.13	3262.72	6942.16	A B C	1 1 1	0.65 0.65 0.65	1 1 1	1 1 1	1 1 1	139.669 139.669 139.669	2966.12	66.46	C
L3 86.13-43.00	3556.05	10198.24	A B C	1 1 1	0.65 0.65 0.65	1 1 1	1 1 1	1 1 1	169.920 169.920 169.920	3081.95	71.46	C
L4 43.00-1.00	2578.72	14023.59	A B C	1 1 1	0.65 0.65 0.65	1 1 1	1 1 1	1 1 1	197.940 197.940 197.940	2913.21	69.36	C
Sum Weight:	11048.47	35110.23						OTM	896626.29 lb-ft	11117.15		

Tower Forces - With Ice - Wind 90 To Face

Section Elevation <i>ft</i>	Add Weight <i>lb</i>	Self Weight <i>lb</i>	<i>F</i> <i>a</i> <i>c</i> <i>e</i>	<i>e</i>	<i>C_F</i>	<i>R_R</i>	<i>D_F</i>	<i>D_R</i>	<i>A_E</i> <i>ft²</i>	<i>F</i> <i>lb</i>	<i>w</i> <i>plf</i>	Ctrl. Face
L1 176.01-130.76	1650.98	3946.24	A B C	1 1 1	0.65 0.65 0.65	1 1 1	1 1 1	1 1 1	103.321 103.321 103.321	2155.87	47.64	C
L2 130.76-86.13	3262.72	6942.16	A B C	1 1 1	0.65 0.65 0.65	1 1 1	1 1 1	1 1 1	139.669 139.669 139.669	2966.12	66.46	C
L3 86.13-43.00	3556.05	10198.24	A B C	1 1 1	0.65 0.65 0.65	1 1 1	1 1 1	1 1 1	169.920 169.920 169.920	3081.95	71.46	C
L4 43.00-1.00	2578.72	14023.59	A B C	1 1 1	0.65 0.65 0.65	1 1 1	1 1 1	1 1 1	197.940 197.940 197.940	2913.21	69.36	C
Sum Weight:	11048.47	35110.23						OTM	896626.29 lb-ft	11117.15		

RISATower URS Corporation 500 Enterprise Drive, Suite 3B Rocky Hill, CT 06067 Phone: (860) 529-8882 FAX: (860) 529-3991	Job	176' EEI Monopole, Berlin, CT	Page	12 of 22
	Project	Berlin Fire Department	Date	16:00:15 07/18/08
	Client	Pocket Wireless Site I.D CT0035	Designed by	Staff

Tower Forces - Service - Wind Normal To Face

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
ft	lb	lb							ft ²	lb	plf	
L1 176.01- 130.76	1650.98	3195.01	A	1	0.65	1	1	1	99.550	1081.87	23.91	C
			B	1	0.65	1	1	1	99.550			
			C	1	0.65	1	1	1	99.550			
L2 130.76- 86.13	2918.50	5921.54	A	1	0.65	1	1	1	135.950	1450.95	32.51	C
			B	1	0.65	1	1	1	135.950			
			C	1	0.65	1	1	1	135.950			
L3 86.13- 43.00	3164.01	8953.11	A	1	0.65	1	1	1	166.326	1518.62	35.21	C
			B	1	0.65	1	1	1	166.326			
			C	1	0.65	1	1	1	166.326			
L4 43.00-1.00	2224.22	12570.61	A	1	0.65	1	1	1	194.440	1450.51	34.54	C
			B	1	0.65	1	1	1	194.440			
			C	1	0.65	1	1	1	194.440			
Sum Weight:	9957.71	30640.27						OTM	443942.81 lb-ft	5501.96		

Tower Forces - Service - Wind 45 To Face

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
ft	lb	lb							ft ²	lb	plf	
L1 176.01- 130.76	1650.98	3195.01	A	1	0.65	1	1	1	99.550	1081.87	23.91	C
			B	1	0.65	1	1	1	99.550			
			C	1	0.65	1	1	1	99.550			
L2 130.76- 86.13	2918.50	5921.54	A	1	0.65	1	1	1	135.950	1450.95	32.51	C
			B	1	0.65	1	1	1	135.950			
			C	1	0.65	1	1	1	135.950			
L3 86.13- 43.00	3164.01	8953.11	A	1	0.65	1	1	1	166.326	1518.62	35.21	C
			B	1	0.65	1	1	1	166.326			
			C	1	0.65	1	1	1	166.326			
L4 43.00-1.00	2224.22	12570.61	A	1	0.65	1	1	1	194.440	1450.51	34.54	C
			B	1	0.65	1	1	1	194.440			
			C	1	0.65	1	1	1	194.440			
Sum Weight:	9957.71	30640.27						OTM	443942.81 lb-ft	5501.96		

Tower Forces - Service - Wind 60 To Face

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
ft	lb	lb							ft ²	lb	plf	
L1 176.01- 130.76	1650.98	3195.01	A	1	0.65	1	1	1	99.550	1081.87	23.91	C
			B	1	0.65	1	1	1	99.550			
			C	1	0.65	1	1	1	99.550			
L2 130.76- 86.13	2918.50	5921.54	A	1	0.65	1	1	1	135.950	1450.95	32.51	C
			B	1	0.65	1	1	1	135.950			
			C	1	0.65	1	1	1	135.950			

RISATower URS Corporation 500 Enterprise Drive, Suite 3B Rocky Hill, CT 06067 Phone: (860) 529-8882 FAX: (860) 529-3991	Job	176' EEI Monopole, Berlin, CT	Page 13 of 22
	Project	Berlin Fire Department	Date 16:00:15 07/18/08
	Client	Pocket Wireless Site I.D CT0035	Designed by Staff

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
ft	lb	lb							ft ²	lb	plf	
L3 86.13- 43.00	3164.01	8953.11	A	1	0.65	1	1	1	166.326	1518.62	35.21	C
			B	1	0.65	1	1	1	166.326			
			C	1	0.65	1	1	1	166.326			
L4 43.00-1.00	2224.22	12570.61	A	1	0.65	1	1	1	194.440	1450.51	34.54	C
			B	1	0.65	1	1	1	194.440			
			C	1	0.65	1	1	1	194.440			
Sum Weight:	9957.71	30640.27						OTM	443942.81 lb-ft	5501.96		

Tower Forces - Service - Wind 90 To Face

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
ft	lb	lb							ft ²	lb	plf	
L1 176.01- 130.76	1650.98	3195.01	A	1	0.65	1	1	1	99.550	1081.87	23.91	C
			B	1	0.65	1	1	1	99.550			
			C	1	0.65	1	1	1	99.550			
L2 130.76- 86.13	2918.50	5921.54	A	1	0.65	1	1	1	135.950	1450.95	32.51	C
			B	1	0.65	1	1	1	135.950			
			C	1	0.65	1	1	1	135.950			
L3 86.13- 43.00	3164.01	8953.11	A	1	0.65	1	1	1	166.326	1518.62	35.21	C
			B	1	0.65	1	1	1	166.326			
			C	1	0.65	1	1	1	166.326			
L4 43.00-1.00	2224.22	12570.61	A	1	0.65	1	1	1	194.440	1450.51	34.54	C
			B	1	0.65	1	1	1	194.440			
			C	1	0.65	1	1	1	194.440			
Sum Weight:	9957.71	30640.27						OTM	443942.81 lb-ft	5501.96		

Force Totals

Load Case	Vertical Forces	Sum of Forces X	Sum of Forces Z	Sum of Overturning Moments, M _x	Sum of Overturning Moments, M _z	Sum of Torques
	lb	lb	lb	lb-ft	lb-ft	lb-ft
Leg Weight	30640.27					
Bracing Weight	0.00					
Total Member Self-Weight	30640.27			2091.00	627.79	
Total Weight	48483.58			2091.00	627.79	
Wind 0 deg - No Ice		0.00	-29233.51	-3291828.88	627.79	-343.85
Wind 30 deg - No Ice		14668.14	-25316.96	-2850527.29	-1652138.47	2159.87
Wind 45 deg - No Ice		20743.88	-20671.21	-2327062.08	-2336736.67	3232.51
Wind 60 deg - No Ice		25405.96	-14616.76	-1644868.94	-2862047.35	4084.86
Wind 90 deg - No Ice		29336.28	0.00	2091.00	-3304904.73	4915.32
Wind 120 deg - No Ice		25405.96	14616.76	1649050.94	-2862047.35	4428.72
Wind 135 deg - No Ice		20743.88	20671.21	2331244.09	-2336736.67	3718.80
Wind 150 deg - No Ice		14668.14	25316.96	2854709.30	-1652138.47	2755.45
Wind 180 deg - No Ice		0.00	29233.51	3296010.88	627.79	343.85
Wind 210 deg - No Ice		-14668.14	25316.96	2854709.30	1653394.04	-2159.87
Wind 225 deg - No Ice		-20743.88	20671.21	2331244.09	2337992.24	-3232.51

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176' EEI Monopole, Berlin, CT

Page

14 of 22

Project

Berlin Fire Department

Date

16:00:15 07/18/08

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Pocket Wireless Site I.D CT0035

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Load Case	Vertical Forces lb	Sum of Forces X lb	Sum of Forces Z lb	Sum of Overturning Moments, M_x lb-ft	Sum of Overturning Moments, M_z lb-ft	Sum of Torques lb-ft
Wind 240 deg - No Ice		-25405.96	14616.76	1649050.94	2863302.92	-4084.86
Wind 270 deg - No Ice		-29336.28	0.00	2091.00	3306160.30	-4915.32
Wind 300 deg - No Ice		-25405.96	-14616.76	-1644868.94	2863302.92	-4428.72
Wind 315 deg - No Ice		-20743.88	-20671.21	-2327062.08	2337992.24	-3718.80
Wind 330 deg - No Ice		-14668.14	-25316.96	-2850527.29	1653394.04	-2755.45
Member Ice	4469.95					
Total Weight Ice	57822.46			3898.40	2151.95	
Wind 0 deg - Ice		0.00	-25410.69	-2943125.75	2151.95	-766.18
Wind 30 deg - Ice		12744.25	-22006.30	-2548299.38	-1475755.83	2510.60
Wind 45 deg - Ice		18023.08	-17968.07	-2079962.36	-2087925.27	3947.13
Wind 60 deg - Ice		22073.68	-12705.35	-1469613.68	-2557659.41	5114.67
Wind 90 deg - Ice		25488.49	0.00	3898.40	-2953663.61	6348.26
Wind 120 deg - Ice		22073.68	12705.35	1477410.48	-2557659.41	5880.85
Wind 135 deg - Ice		18023.08	17968.07	2087759.17	-2087925.27	5030.67
Wind 150 deg - Ice		12744.25	22006.30	2556096.19	-1475755.83	3837.66
Wind 180 deg - Ice		0.00	25410.69	2950922.56	2151.95	766.18
Wind 210 deg - Ice		-12744.25	22006.30	2556096.19	1480059.72	-2510.60
Wind 225 deg - Ice		-18023.08	17968.07	2087759.17	2092229.17	-3947.13
Wind 240 deg - Ice		-22073.68	12705.35	1477410.48	2561963.30	-5114.67
Wind 270 deg - Ice		-25488.49	0.00	3898.40	2957967.50	-6348.26
Wind 300 deg - Ice		-22073.68	-12705.35	-1469613.68	2561963.30	-5880.85
Wind 315 deg - Ice		-18023.08	-17968.07	-2079962.36	2092229.17	-5030.67
Wind 330 deg - Ice		-12744.25	-22006.30	-2548299.38	1480059.72	-3837.66
Total Weight	48483.58			2091.00	627.79	
Wind 0 deg - Service		0.00	-11419.34	-1285097.15	-239.44	-134.32
Wind 30 deg - Service		5729.74	-9889.44	-1112713.71	-645851.26	843.70
Wind 45 deg - Service		8103.08	-8074.69	-908235.12	-913272.43	1262.70
Wind 60 deg - Service		9924.20	-5709.67	-641753.42	-1118471.91	1595.65
Wind 90 deg - Service		11459.48	0.00	1590.31	-1291463.08	1920.05
Wind 120 deg - Service		9924.20	5709.67	644934.04	-1118471.91	1729.97
Wind 135 deg - Service		8103.08	8074.69	911415.73	-913272.43	1452.66
Wind 150 deg - Service		5729.74	9889.44	1115894.33	-645851.26	1076.35
Wind 180 deg - Service		0.00	11419.34	1288277.76	-239.44	134.32
Wind 210 deg - Service		-5729.74	9889.44	1115894.33	645372.38	-843.70
Wind 225 deg - Service		-8103.08	8074.69	911415.73	912793.55	-1262.70
Wind 240 deg - Service		-9924.20	5709.67	644934.04	1117993.03	-1595.65
Wind 270 deg - Service		-11459.48	0.00	1590.31	1290984.20	-1920.05
Wind 300 deg - Service		-9924.20	-5709.67	-641753.42	1117993.03	-1729.97
Wind 315 deg - Service		-8103.08	-8074.69	-908235.12	912793.55	-1452.66
Wind 330 deg - Service		-5729.74	-9889.44	-1112713.71	645372.38	-1076.35

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 45 deg - No Ice
5	Dead+Wind 60 deg - No Ice
6	Dead+Wind 90 deg - No Ice
7	Dead+Wind 120 deg - No Ice
8	Dead+Wind 135 deg - No Ice
9	Dead+Wind 150 deg - No Ice
10	Dead+Wind 180 deg - No Ice
11	Dead+Wind 210 deg - No Ice

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176' EEI Monopole, Berlin, CT

Page

15 of 22

Project

Berlin Fire Department

Date

16:00:15 07/18/08

Client

Pocket Wireless Site I.D CT0035

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Comb. No.	Description
12	Dead+Wind 225 deg - No Ice
13	Dead+Wind 240 deg - No Ice
14	Dead+Wind 270 deg - No Ice
15	Dead+Wind 300 deg - No Ice
16	Dead+Wind 315 deg - No Ice
17	Dead+Wind 330 deg - No Ice
18	Dead+Ice+Temp
19	Dead+Wind 0 deg+Ice+Temp
20	Dead+Wind 30 deg+Ice+Temp
21	Dead+Wind 45 deg+Ice+Temp
22	Dead+Wind 60 deg+Ice+Temp
23	Dead+Wind 90 deg+Ice+Temp
24	Dead+Wind 120 deg+Ice+Temp
25	Dead+Wind 135 deg+Ice+Temp
26	Dead+Wind 150 deg+Ice+Temp
27	Dead+Wind 180 deg+Ice+Temp
28	Dead+Wind 210 deg+Ice+Temp
29	Dead+Wind 225 deg+Ice+Temp
30	Dead+Wind 240 deg+Ice+Temp
31	Dead+Wind 270 deg+Ice+Temp
32	Dead+Wind 300 deg+Ice+Temp
33	Dead+Wind 315 deg+Ice+Temp
34	Dead+Wind 330 deg+Ice+Temp
35	Dead+Wind 0 deg - Service
36	Dead+Wind 30 deg - Service
37	Dead+Wind 45 deg - Service
38	Dead+Wind 60 deg - Service
39	Dead+Wind 90 deg - Service
40	Dead+Wind 120 deg - Service
41	Dead+Wind 135 deg - Service
42	Dead+Wind 150 deg - Service
43	Dead+Wind 180 deg - Service
44	Dead+Wind 210 deg - Service
45	Dead+Wind 225 deg - Service
46	Dead+Wind 240 deg - Service
47	Dead+Wind 270 deg - Service
48	Dead+Wind 300 deg - Service
49	Dead+Wind 315 deg - Service
50	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force lb	Major Axis Moment lb-ft	Minor Axis Moment lb-ft
L1	176.01 - 130.76	Pole	Max Tension	18	0.00	-0.00	0.00
			Max. Compression	18	-12436.06	502.00	4.44
			Max. Mx	14	-8573.39	326758.88	-73.56
			Max. My	2	-8576.77	238.74	326431.59
			Max. Vy	14	-12818.67	326758.88	-73.56
			Max. Vx	10	12817.71	238.54	-326408.54
			Max. Torque	19			1738.21
L2	130.76 - 86.13	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	18	-25625.36	1121.51	-2759.70
			Max. Mx	14	-19194.15	1077627.47	-1667.46
			Max. My	10	-19201.22	462.93	-
			Max. Vy	14	-21505.07	1077627.47	1076458.46
							-1667.46

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Page

16 of 22

Project

Berlin Fire Department

Date

16:00:15 07/18/08

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Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force lb	Major Axis Moment lb-ft	Minor Axis Moment lb-ft
L3	86.13 - 43	Pole	Max. Vx	10	21400.43	462.93	-
							1076458.46
			Max. Torque	32			6232.91
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	18	-39000.44	998.72	-3289.49
			Max. Mx	14	-31185.79	2063466.14	-1927.52
			Max. My	10	-31189.75	259.51	-
							2058324.67
			Max. Vy	14	-25677.15	2063466.14	-1927.52
			Max. Vx	10	25572.64	259.51	-
L4	43 - 1	Pole					2058324.67
			Max. Torque	32			6260.79
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	18	-57822.46	2197.18	-3981.42
			Max. Mx	14	-48469.02	3413785.92	-2165.09
			Max. My	10	-48469.12	648.37	-
							3403383.53
			Max. Vy	14	-29360.33	3413785.92	-2165.09
			Max. Vx	10	29257.50	648.37	-
							3403383.53
			Max. Torque	23			-6255.52

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical lb	Horizontal, X lb	Horizontal, Z lb
Pole	Max. Vert	31	57822.46	25488.51	0.00
	Max. H _x	14	48483.58	29336.28	-0.00
	Max. H _z	2	48483.59	0.00	29233.52
	Max. M _x	2	3399023.25	0.00	29233.52
	Max. M _z	6	3412479.72	-29336.28	-0.00
	Max. Torsion	31	6255.33	25488.51	0.00
	Min. Vert	1	48483.58	0.00	0.00
	Min. H _x	6	48483.58	-29336.28	-0.00
	Min. H _z	10	48483.59	0.00	-29233.52
	Min. M _x	10	-3403383.53	0.00	-29233.52
	Min. M _z	14	-3413785.92	29336.28	-0.00
	Min. Torsion	23	-6255.53	-25488.51	0.00

Tower Mast Reaction Summary

Load Combination	Vertical lb	Shear ₁ lb	Shear ₂ lb	Overturning Moment, M _x lb-ft	Overturning Moment, M _z lb-ft	Torque lb-ft
Dead Only	48483.58	0.00	0.00	2091.00	627.79	0.00
Dead+Wind 0 deg - No Ice	48483.59	-0.00	-29233.52	-3399023.25	648.34	-321.82
Dead+Wind 30 deg - No Ice	48483.58	14668.14	-25316.96	-2943352.77	-1705915.92	2145.08
Dead+Wind 45 deg - No Ice	48483.58	20743.88	-20671.22	-2402838.66	-2412796.29	3200.02
Dead+Wind 60 deg - No Ice	48483.58	25405.96	-14616.76	-1698428.91	-2955204.39	4036.75
Dead+Wind 90 deg - No Ice	48483.58	29336.28	0.00	2164.38	-3412479.72	4846.45
Dead+Wind 120 deg - No Ice	48483.58	25405.96	14616.76	1702765.56	-2955217.97	4357.57
Dead+Wind 135 deg - No Ice	48483.58	20743.88	20671.22	2407183.19	-2412811.98	3653.95

RISATower

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176' EEI Monopole, Berlin, CT

Page

17 of 22

Project

Berlin Fire Department

Date

16:00:15 07/18/08

Client

Pocket Wireless Site I.D CT0035

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Load Combination	Vertical lb	Shear ₁ lb	Shear ₂ lb	Overturning Moment, M ₁ lb-ft	Overturning Moment, M ₂ lb-ft	Torque lb-ft
Dead+Wind 150 deg - No Ice	48483.58	14668.14	25316.96	2947705.18	-1705929.51	2701.41
Dead+Wind 180 deg - No Ice	48483.59	-0.00	29233.52	3403383.53	648.32	321.79
Dead+Wind 210 deg - No Ice	48483.58	-14668.14	25316.96	2947709.34	1707228.50	-2144.09
Dead+Wind 225 deg - No Ice	48483.58	-20743.88	20671.22	2407187.99	2414113.37	-3198.88
Dead+Wind 240 deg - No Ice	48483.58	-25405.96	14616.76	1702769.72	2956521.77	-4035.78
Dead+Wind 270 deg - No Ice	48483.58	-29336.28	0.00	2164.36	3413785.92	-4846.38
Dead+Wind 300 deg - No Ice	48483.58	-25405.96	-14616.76	-1698433.10	2956508.20	-4358.47
Dead+Wind 315 deg - No Ice	48483.58	-20743.88	-20671.22	-2402843.49	2414097.71	-3655.05
Dead+Wind 330 deg - No Ice	48483.58	-14668.14	-25316.96	-2943356.95	1707214.94	-2702.42
Dead+Ice+Temp	57822.46	-0.00	0.00	3981.42	2197.18	0.00
Dead+Wind 0 deg+Ice+Temp	57822.46	0.00	-25410.71	-3068786.68	2239.90	-735.05
Dead+Wind 30 deg+Ice+Temp	57822.46	12744.25	-22006.32	-2657098.79	-1538743.52	2491.61
Dead+Wind 45 deg+Ice+Temp	57822.46	18023.10	-17968.08	-2168764.17	-2177039.70	3904.03
Dead+Wind 60 deg+Ice+Temp	57822.46	22073.69	-12705.35	-1532354.88	-2666822.89	5050.29
Dead+Wind 90 deg+Ice+Temp	57822.46	25488.51	-0.00	4075.74	-3079737.35	6255.53
Dead+Wind 120 deg+Ice+Temp	57822.46	22073.69	12705.35	1540518.95	-2666844.65	5784.62
Dead+Wind 135 deg+Ice+Temp	57822.46	18023.10	17968.08	2176940.83	-2177064.83	4942.65
Dead+Wind 150 deg+Ice+Temp	57822.46	12744.25	22006.32	2665288.05	-1538765.30	3763.93
Dead+Wind 180 deg+Ice+Temp	57822.46	0.00	25410.71	3076988.50	2239.84	735.03
Dead+Wind 210 deg+Ice+Temp	57822.46	-12744.25	22006.32	2665294.26	1543248.58	-2490.78
Dead+Wind 225 deg+Ice+Temp	57822.46	-18023.10	17968.08	2176948.00	2181551.70	-3903.07
Dead+Wind 240 deg+Ice+Temp	57822.46	-22073.69	12705.35	1540525.13	2671335.12	-5049.45
Dead+Wind 270 deg+Ice+Temp	57822.46	-25488.51	-0.00	4075.66	3084231.44	-6255.33
Dead+Wind 300 deg+Ice+Temp	57822.46	-22073.69	-12705.35	-1532361.20	2671313.41	-5785.16
Dead+Wind 315 deg+Ice+Temp	57822.46	-18023.10	-17968.08	-2168771.44	2181526.65	-4943.42
Dead+Wind 330 deg+Ice+Temp	57822.46	-12744.25	-22006.32	-2657105.08	1543226.89	-3764.69
Dead+Wind 0 deg - Service	48483.58	-0.00	-11419.34	-1327361.39	655.48	-128.45
Dead+Wind 30 deg - Service	48483.58	5729.74	-9889.44	-1149235.52	-666451.10	839.35
Dead+Wind 45 deg - Service	48483.58	8103.08	-8074.70	-937945.66	-942775.68	1253.48
Dead+Wind 60 deg - Service	48483.58	9924.21	-5709.67	-662587.42	-1154807.10	1582.16
Dead+Wind 90 deg - Service	48483.58	11459.49	0.00	2186.48	-1333558.63	1900.99
Dead+Wind 120 deg - Service	48483.58	9924.21	5709.67	666961.58	-1154809.18	1710.46
Dead+Wind 135 deg - Service	48483.58	8103.08	8074.70	942321.03	-942778.07	1434.94
Dead+Wind 150 deg - Service	48483.58	5729.74	9889.44	1153612.09	-666453.18	1061.65
Dead+Wind 180 deg - Service	48483.58	-0.00	11419.34	1331739.16	655.47	128.46
Dead+Wind 210 deg - Service	48483.58	-5729.74	9889.44	1153612.73	667764.48	-839.15
Dead+Wind 225 deg - Service	48483.58	-8103.08	8074.70	942321.76	944089.75	-1253.26
Dead+Wind 240 deg - Service	48483.58	-9924.21	5709.67	666962.22	1156121.22	-1581.98
Dead+Wind 270 deg - Service	48483.58	-11459.49	0.00	2186.48	1334871.04	-1900.97
Dead+Wind 300 deg - Service	48483.58	-9924.21	-5709.67	-662588.06	1156119.15	-1710.59
Dead+Wind 315 deg - Service	48483.58	-8103.08	-8074.70	-937946.40	944087.36	-1435.11
Dead+Wind 330 deg - Service	48483.58	-5729.74	-9889.44	-1149236.17	667762.42	-1061.82

Solution Summary

Load Comb.	Sum of Applied Forces				Sum of Reactions		% Error
	PX lb	PY lb	PZ lb	PX lb	PY lb	PZ lb	
1	0.00	-48483.58	0.00	0.00	48483.58	0.00	0.000%
2	0.00	-48483.58	-29233.51	0.00	48483.59	29233.52	0.000%
3	14668.14	-48483.58	-25316.96	-14668.14	48483.58	25316.96	0.000%
4	20743.88	-48483.58	-20671.21	-20743.88	48483.58	20671.22	0.000%
5	25405.96	-48483.58	-14616.76	-25405.96	48483.58	14616.76	0.000%
6	29336.28	-48483.58	0.00	-29336.28	48483.58	-0.00	0.000%
7	25405.96	-48483.58	14616.76	-25405.96	48483.58	-14616.76	0.000%
8	20743.88	-48483.58	20671.21	-20743.88	48483.58	-20671.22	0.000%
9	14668.14	-48483.58	25316.96	-14668.14	48483.58	-25316.96	0.000%
10	0.00	-48483.58	29233.51	0.00	48483.59	-29233.52	0.000%

RISATower URS Corporation 500 Enterprise Drive, Suite 3B Rocky Hill, CT 06067 Phone: (860) 529-8882 FAX: (860) 529-3991	Job	176' EEI Monopole, Berlin, CT	Page 18 of 22
	Project	Berlin Fire Department	Date 16:00:15 07/18/08
	Client	Pocket Wireless Site I.D CT0035	Designed by Staff

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX lb	PY lb	PZ lb	PX lb	PY lb	PZ lb	
11	-14668.14	-48483.58	25316.96	14668.14	48483.58	-25316.96	0.000%
12	-20743.88	-48483.58	20671.21	20743.88	48483.58	-20671.22	0.000%
13	-25405.96	-48483.58	14616.76	25405.96	48483.58	-14616.76	0.000%
14	-29336.28	-48483.58	0.00	29336.28	48483.58	-0.00	0.000%
15	-25405.96	-48483.58	-14616.76	25405.96	48483.58	14616.76	0.000%
16	-20743.88	-48483.58	-20671.21	20743.88	48483.58	20671.22	0.000%
17	-14668.14	-48483.58	-25316.96	14668.14	48483.58	25316.96	0.000%
18	0.00	-57822.46	0.00	0.00	57822.46	-0.00	0.000%
19	0.00	-57822.46	-25410.69	-0.00	57822.46	25410.71	0.000%
20	12744.25	-57822.46	-22006.30	-12744.25	57822.46	22006.32	0.000%
21	18023.08	-57822.46	-17968.07	-18023.10	57822.46	17968.08	0.000%
22	22073.68	-57822.46	-12705.35	-22073.69	57822.46	12705.35	0.000%
23	25488.49	-57822.46	0.00	-25488.51	57822.46	0.00	0.000%
24	22073.68	-57822.46	12705.35	-22073.69	57822.46	-12705.35	0.000%
25	18023.08	-57822.46	17968.07	-18023.10	57822.46	-17968.08	0.000%
26	12744.25	-57822.46	22006.30	-12744.25	57822.46	-22006.32	0.000%
27	0.00	-57822.46	25410.69	-0.00	57822.46	-25410.71	0.000%
28	-12744.25	-57822.46	22006.30	12744.25	57822.46	-22006.32	0.000%
29	-18023.08	-57822.46	17968.07	18023.10	57822.46	-17968.08	0.000%
30	-22073.68	-57822.46	12705.35	22073.69	57822.46	-12705.35	0.000%
31	-25488.49	-57822.46	0.00	25488.51	57822.46	0.00	0.000%
32	-22073.68	-57822.46	-12705.35	22073.69	57822.46	12705.35	0.000%
33	-18023.08	-57822.46	-17968.07	18023.10	57822.46	17968.08	0.000%
34	-12744.25	-57822.46	-22006.30	12744.25	57822.46	22006.32	0.000%
35	0.00	-48483.58	-11419.34	0.00	48483.58	11419.34	0.000%
36	5729.74	-48483.58	-9889.44	-5729.74	48483.58	9889.44	0.000%
37	8103.08	-48483.58	-8074.69	-8103.08	48483.58	8074.70	0.000%
38	9924.20	-48483.58	-5709.67	-9924.21	48483.58	5709.67	0.000%
39	11459.48	-48483.58	0.00	-11459.49	48483.58	-0.00	0.000%
40	9924.20	-48483.58	5709.67	-9924.21	48483.58	-5709.67	0.000%
41	8103.08	-48483.58	8074.69	-8103.08	48483.58	-8074.70	0.000%
42	5729.74	-48483.58	9889.44	-5729.74	48483.58	-9889.44	0.000%
43	0.00	-48483.58	11419.34	0.00	48483.58	-11419.34	0.000%
44	-5729.74	-48483.58	9889.44	5729.74	48483.58	-9889.44	0.000%
45	-8103.08	-48483.58	8074.69	8103.08	48483.58	-8074.70	0.000%
46	-9924.20	-48483.58	5709.67	9924.21	48483.58	-5709.67	0.000%
47	-11459.48	-48483.58	0.00	11459.49	48483.58	-0.00	0.000%
48	-9924.20	-48483.58	-5709.67	9924.21	48483.58	5709.67	0.000%
49	-8103.08	-48483.58	-8074.69	8103.08	48483.58	8074.70	0.000%
50	-5729.74	-48483.58	-9889.44	5729.74	48483.58	9889.44	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	4	0.00000001	0.00037496
3	Yes	5	0.00000001	0.00029593
4	Yes	5	0.00000001	0.00032870
5	Yes	5	0.00000001	0.00027843
6	Yes	5	0.00000001	0.00004067
7	Yes	5	0.00000001	0.00031620
8	Yes	5	0.00000001	0.00033155
9	Yes	5	0.00000001	0.00027755
10	Yes	4	0.00000001	0.00037548
11	Yes	5	0.00000001	0.00028883

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176' EEI Monopole, Berlin, CT

Page

19 of 22

Project

Berlin Fire Department

Date

16:00:15 07/18/08

Client

Pocket Wireless Site I.D CT0035

Designed by

Staff

12	Yes	5	0.00000001	0.00033013
13	Yes	5	0.00000001	0.00030838
14	Yes	5	0.00000001	0.00004068
15	Yes	5	0.00000001	0.00027292
16	Yes	5	0.00000001	0.00033069
17	Yes	5	0.00000001	0.00030953
18	Yes	4	0.00000001	0.00001013
19	Yes	5	0.00000001	0.00018969
20	Yes	5	0.00000001	0.00059824
21	Yes	5	0.00000001	0.00066910
22	Yes	5	0.00000001	0.00057055
23	Yes	5	0.00000001	0.00020946
24	Yes	5	0.00000001	0.00063836
25	Yes	5	0.00000001	0.00067723
26	Yes	5	0.00000001	0.00056984
27	Yes	5	0.00000001	0.00019017
28	Yes	5	0.00000001	0.00059001
29	Yes	5	0.00000001	0.00067444
30	Yes	5	0.00000001	0.00062372
31	Yes	5	0.00000001	0.00020971
32	Yes	5	0.00000001	0.00056302
33	Yes	5	0.00000001	0.00067523
34	Yes	5	0.00000001	0.00062557
35	Yes	4	0.00000001	0.00008690
36	Yes	4	0.00000001	0.00063186
37	Yes	4	0.00000001	0.00071122
38	Yes	4	0.00000001	0.00056299
39	Yes	4	0.00000001	0.00020418
40	Yes	4	0.00000001	0.00073297
41	Yes	4	0.00000001	0.00073367
42	Yes	4	0.00000001	0.00056092
43	Yes	4	0.00000001	0.00008733
44	Yes	4	0.00000001	0.00060418
45	Yes	4	0.00000001	0.00072107
46	Yes	4	0.00000001	0.00069495
47	Yes	4	0.00000001	0.00020450
48	Yes	4	0.00000001	0.00054741
49	Yes	4	0.00000001	0.00072834
50	Yes	4	0.00000001	0.00069750

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	176.01 - 130.76	35.796	46	1.8090	0.0050
L2	135.26 - 86.13	21.069	46	1.5497	0.0056
L3	91.88 - 43	9.266	46	0.9997	0.0031
L4	50 - 1	2.615	47	0.4892	0.0011

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
176.00	12' Low Profile Platform	46	35.792	1.8090	0.0051	39087

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176' EEI Monopole, Berlin, CT

Page

20 of 22

Project

Berlin Fire Department

Date

16:00:15 07/18/08

Client

Pocket Wireless Site I.D CT0035

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<i>Elevation</i>	<i>Appurtenance</i>	<i>Gov. Load</i>	<i>Deflection</i>	<i>Tilt</i>	<i>Twist</i>	<i>Radius of Curvature</i>
<i>ft</i>		<i>Comb.</i>	<i>in</i>	<i>°</i>	<i>°</i>	<i>ft</i>
170.00	7770.00 w/ mount pipe	46	33.524	1.7795	0.0050	32518
160.00	Valmont T-Arm (1)	46	29.780	1.7272	0.0052	12206
150.00	Low Profile Platform	46	26.134	1.6663	0.0055	7513
130.00	2 Bay Dipole	46	19.382	1.4977	0.0055	4763
125.50	Valmont Uni-Tri Bracket	46	17.993	1.4490	0.0053	4737
124.00	742 213 w/mount pipe	46	17.542	1.4319	0.0052	4729
122.50	Valmont Uni-Tri Bracket	46	17.096	1.4145	0.0052	4720
114.00	LPA-80063/6CF	46	14.680	1.3092	0.0047	4670
112.00	Andrew 12'-6" Low Profile Platform	46	14.138	1.2830	0.0045	4658
100.00	6' Side Mount Standoff	46	11.105	1.1174	0.0037	4590
75.00	Side Mount Standoff	46	6.005	0.7567	0.0021	4389
60.00	Side Mount Standoff	46	3.760	0.5746	0.0014	4259

Maximum Tower Deflections - Design Wind

<i>Section No.</i>	<i>Elevation</i>	<i>Horz. Deflection</i>	<i>Gov. Load</i>	<i>Tilt</i>	<i>Twist</i>
	<i>ft</i>	<i>in</i>	<i>Comb.</i>	<i>°</i>	<i>°</i>
L1	176.01 - 130.76	91.386	14	4.6191	0.0165
L2	135.26 - 86.13	53.816	14	3.9567	0.0184
L3	91.88 - 43	23.685	14	2.5543	0.0104
L4	50 - 1	6.686	14	1.2507	0.0037

Critical Deflections and Radius of Curvature - Design Wind

<i>Elevation</i>	<i>Appurtenance</i>	<i>Gov. Load</i>	<i>Deflection</i>	<i>Tilt</i>	<i>Twist</i>	<i>Radius of Curvature</i>
<i>ft</i>		<i>Comb.</i>	<i>in</i>	<i>°</i>	<i>°</i>	<i>ft</i>
176.00	12' Low Profile Platform	14	91.376	4.6190	0.0167	15494
170.00	7770.00 w/ mount pipe	14	85.590	4.5450	0.0166	12890
160.00	Valmont T-Arm (1)	14	76.039	4.4132	0.0173	4837
150.00	Low Profile Platform	14	66.738	4.2582	0.0182	2976
130.00	2 Bay Dipole	14	49.510	3.8212	0.0181	1883
125.50	Valmont Uni-Tri Bracket	14	45.967	3.6939	0.0175	1871
124.00	742 213 w/mount pipe	14	44.815	3.6494	0.0172	1867
122.50	Valmont Uni-Tri Bracket	14	43.678	3.6040	0.0170	1863
114.00	LPA-80063/6CF	14	37.509	3.3312	0.0153	1842
112.00	Andrew 12'-6" Low Profile Platform	14	36.126	3.2639	0.0149	1837
100.00	6' Side Mount Standoff	14	28.382	2.8442	0.0122	1807
75.00	Side Mount Standoff	14	15.353	1.9718	0.0071	1723
60.00	Side Mount Standoff	14	9.614	1.5107	0.0048	1669

Compression Checks**Pole Design Data**

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176' EEI Monopole, Berlin, CT

Page

21 of 22

Project

Berlin Fire Department

Date

16:00:15 07/18/08

Client

Pocket Wireless Site I.D CT0035

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Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	F _a ksi	A in ²	Actual P lb	Allow. P _a lb	Ratio $\frac{P}{P_a}$
L1	176.01 - 130.76 (1)	TP31.8x21x0.25	45.25	0.00	0.0	39.000	24.1827	-8573.39	943125.00	0.009
L2	130.76 - 86.13 (2)	TP41.82x30.226x0.3125	49.13	0.00	0.0	39.000	39.8244	-19195.60	1553150.00	0.012
L3	86.13 - 43 (3)	TP51.36x39.8381x0.375	48.88	0.00	0.0	39.000	58.7209	-31185.80	2290120.00	0.014
L4	43 - 1 (4)	TP60.5x48.96x0.4375	49.00	0.00	0.0	39.000	83.4043	-48469.00	3252770.00	0.015

Pole Bending Design Data

Section No.	Elevation ft	Size	Actual M _x lb-ft	Actual f _{bx} ksi	Allow. F _{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M _y lb-ft	Actual f _{by} ksi	Allow. F _{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
L1	176.01 - 130.76 (1)	TP31.8x21x0.25	326759.17	21.569	39.000	0.553	0.00	0.000	39.000	0.000
L2	130.76 - 86.13 (2)	TP41.82x30.226x0.3125	1077833.33	32.778	39.000	0.840	0.00	0.000	39.000	0.000
L3	86.13 - 43 (3)	TP51.36x39.8381x0.375	2063466.67	34.630	39.000	0.888	0.00	0.000	39.000	0.000
L4	43 - 1 (4)	TP60.5x48.96x0.4375	3413783.33	33.121	39.000	0.849	0.00	0.000	39.000	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V lb	Actual f _v ksi	Allow. F _v ksi	Ratio $\frac{f_v}{F_v}$	Actual T lb-ft	Actual f _t ksi	Allow. F _t ksi	Ratio $\frac{f_t}{F_t}$
L1	176.01 - 130.76 (1)	TP31.8x21x0.25	12818.70	0.530	26.000	0.041	180.31	0.006	26.000	0.000
L2	130.76 - 86.13 (2)	TP41.82x30.226x0.3125	21479.50	0.539	26.000	0.041	3404.65	0.051	26.000	0.002
L3	86.13 - 43 (3)	TP51.36x39.8381x0.375	25677.20	0.437	26.000	0.034	4800.73	0.039	26.000	0.002
L4	43 - 1 (4)	TP60.5x48.96x0.4375	29360.30	0.352	26.000	0.027	4846.38	0.023	26.000	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 $\frac{f_t}{F_t}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	176.01 - 130.76 (1)	0.009	0.553	0.000	0.041	0.000	0.563 ✓	1.333	H1-3+VT ✓
L2	130.76 - 86.13 (2)	0.012	0.840	0.000	0.041	0.002	0.853 ✓	1.333	H1-3+VT ✓
L3	86.13 - 43 (3)	0.014	0.888	0.000	0.034	0.002	0.902 ✓	1.333	H1-3+VT ✓
L4	43 - 1 (4)	0.015	0.849	0.000	0.027	0.001	0.864 ✓	1.333	H1-3+VT ✓

RISATower

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Job

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Page

22 of 22

Project

Berlin Fire Department

Date

16:00:15 07/18/08

Client

Pocket Wireless Site I.D CT0035

Designed by

Staff

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
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Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	SF* P_{allow} lb	% Capacity	Pass Fail
L1	176.01 - 130.76	Pole	TP31.8x21x0.25	1	-8573.39	1257185.57	42.2	Pass
L2	130.76 - 86.13	Pole	TP41.82x30.226x0.3125	2	-19195.60	2070348.86	64.0	Pass
L3	86.13 - 43	Pole	TP51.36x39.8381x0.375	3	-31185.80	3052729.83	67.7	Pass
L4	43 - 1	Pole	TP60.5x48.96x0.4375	4	-48469.00	4335942.23	64.8	Pass
							Summary	
							Pole (L3)	67.7 Pass
							RATING =	67.7 Pass

ANCHOR BOLT AND BASE PLATE ANALYSIS

ANCHOR BOLT AND BASE PLATE ANALYSIS

Input Data

Tower Reactions:

Overturing Moment:	OM := 3414ft·kips	user input
Shear Force:	Shear := 29.3·kips	user input
Axial Force:	Axial := 48.5·kips	user input

Anchor Bolt Data:

Use ASTM A615 Grade 75		user input
Number of Anchor Bolts = N	$N_w := 18$	user input
Diameter of Bolt Circle:	$D_{bc} := 70.00\text{in}$	user input
Bolt "Column" Distance:	$L_w := 3.0\text{in}$	user input
Bolt Ultimate Strength:	$F_u := 100\text{-ksi}$	user input
Bolt Yield Strength:	$F_y := 75\text{-ksi}$	user input
Bolt Modulus:	$E := 29000\text{-ksi}$	user input
Anchor Bolt Diameter	$D := 2.25\text{in}$	user input
Threads per Inch:	$n := 4.5$	user input

Base Plate Data:

Use ASTM A572 Grade 60		user input
Plate Yield Strength:	$F_{y_{bp}} := 60\text{-ksi}$	user input
Base Plate Thickness:	PlateThickness := 2.00·in	user input
Base Plate Diameter:	$D_{bp} := 76.00\text{in}$	user input
Outer Pole Diameter:	$D_{pole} := 60.50\text{in}$	user input

Geometric Layout Data:

Distance from the center of gravity of the group to bolt in question = d(i)

Radius of Bolt Circle: $R_{bc} := \frac{D_{bc}}{2}$

Distance to Bolts: $i := 1..N$

$$d_i := \begin{cases} \theta \leftarrow 2 \cdot \pi \cdot \left(\frac{i}{N} \right) \\ d \leftarrow R_{bc} \cdot \sin(\theta) \end{cases}$$

$d_1 = 11.97 \cdot \text{in}$	$d_7 = 22.50 \cdot \text{in}$
$d_2 = 22.50 \cdot \text{in}$	$d_8 = 11.97 \cdot \text{in}$
$d_3 = 30.31 \cdot \text{in}$	$d_9 = 0.00 \cdot \text{in}$
$d_4 = 34.47 \cdot \text{in}$	$d_{10} = -11.97 \cdot \text{in}$
$d_5 = 34.47 \cdot \text{in}$	$d_{11} = -22.50 \cdot \text{in}$
$d_6 = 30.31 \cdot \text{in}$	etc.

Critical Distances For Bending in Plate:

Outer Pole Radius: $R_{pole} := \frac{D_{pole}}{2}$ $R_{pole} = 30.25 \cdot \text{in}$

Moment Arms of Bolts about Neutral Axis: $MA_i := \text{if}(d_i \geq R_{pole}, d_i - R_{pole}, 0 \cdot \text{in})$

$MA_1 = 0.00 \cdot \text{in}$	$MA_7 = 0.00 \cdot \text{in}$
$MA_2 = 0.00 \cdot \text{in}$	$MA_8 = 0.00 \cdot \text{in}$
$MA_3 = 0.06 \cdot \text{in}$	$MA_9 = 0.00 \cdot \text{in}$
$MA_4 = 4.22 \cdot \text{in}$	$MA_{10} = 0.00 \cdot \text{in}$
$MA_5 = 4.22 \cdot \text{in}$	$MA_{11} = 0.00 \cdot \text{in}$
$MA_6 = 0.06 \cdot \text{in}$	etc.

Effective Width of Baseplate for Bending: $\text{EffectiveWidth} := .9 \cdot 2 \cdot \sqrt{\left(\frac{D_{bp}}{2} \right)^2 - \left(\frac{D_{pole}}{2} \right)^2}$ $\text{EffectiveWidth} = 41.40 \cdot \text{in}$

Anchor Bolt Analysis:

Polar Moment of Inertia I_p :

$$I_p := \sum_i (d_i)^2 \quad I_p = 1.103 \times 10^4 \cdot \text{in}^2$$

Gross Area of Bolt:

$$A_g := \frac{\pi}{4} \cdot D^2 \quad A_g = 3.976 \cdot \text{in}^2$$

Net Area of Bolt:

$$A_n := \frac{\pi}{4} \cdot \left(D - \frac{0.9743 \cdot \text{in}}{n} \right)^2 \quad A_n = 3.248 \cdot \text{in}^2$$

Net Diameter:

$$D_n := \frac{2 \cdot \sqrt{A_n}}{\sqrt{\pi}} \quad D_n = 2.03 \cdot \text{in}$$

Radius of Gyration of Bolt:

$$r := \frac{D_n}{4} \quad r = 0.51 \cdot \text{in}$$

Section Modulus of Bolt:

$$S_x := \frac{\pi \cdot D_n^3}{32} \quad S_x = 0.826 \cdot \text{in}^3$$

Anchor Bolt Bending Stress:

Maximum Applied Bending:

$$M_x := \left(\frac{\text{Shear}}{N} \right) \cdot l \quad M_x = 0.407 \cdot \text{ft} \cdot \text{kips}$$

$$f_{bx} := \frac{M_x}{S_x} \quad f_{bx} = 5.9 \cdot \text{ksi}$$

Allowable Bending

$$F_{bx} := 1.333 \cdot 0.60 \cdot F_y \quad F_{bx} = 60.0 \cdot \text{ksi}$$

Note: 1.333 increase allowed per TIA/EIA

Check Tensile Forces:

Maximum Tensile Force (Gross Area):

$$\text{AllowableTension} := 1.333 \cdot (0.33 \cdot A_g \cdot F_u) \quad \text{AllowableTension} = 174.9 \cdot \text{kips}$$

Note: 1.333 increase allowed per TIA/EIA

Maximum Tensile Force (Net Area):

$$F_{\text{net.area}} := 1.333 \cdot (0.60 \cdot A_n \cdot F_y) \quad F_{\text{net.area}} = 194.8 \cdot \text{kips}$$

Note: 1.333 increase allowed per TIA/EIA

Applied Tension:

$$\text{MaxTension} := \frac{OM \cdot R_{bc}}{I_p} - \frac{\text{Axial}}{N} \quad \text{MaxTension} = 127.4 \cdot \text{kips}$$

Check Stresses:

Note: Bolts supplied are "upset bolts." Use net area for checking per AISC.

$$\frac{\text{MaxTension}}{F_{\text{net.area}}} = 0.65$$

$$\text{Condition} := \text{if} \left(\frac{\text{MaxTension}}{F_{\text{net.area}}} \leq 1.00, \text{"OK"}, \text{"Overstressed"} \right)$$

Condition = "OK"

Check Compression & Combined Stresses (if required):

Check to see if a complete combined stress analysis is required:

Per ASCE Manual 72: "If the clearance between the base plate and concrete does not exceed two times the bolt diameter a bending stress analysis of the bolts is NOT normally required."

Set the clear space between the plate and bolt to zero and remove bending stresses if a combined stress analysis is not required:

$$l_w := \begin{cases} 1 & \text{if } l > 2 \cdot D_n \\ 0.00 \text{ in} & \text{otherwise} \end{cases} \quad l = 0.00 \text{ in} \quad f_{bx} := \begin{cases} f_{bx} & \text{if } l > 2 \cdot D_n \\ 0.0 \text{ ksi} & \text{otherwise} \end{cases} \quad f_{bx} = 0.0 \text{ ksi}$$

Allowable Compressive Force:

$$K_w := 0.65$$

$$C_c := \sqrt{\frac{2 \cdot \pi^2 \cdot E}{F_y}} \quad C_c = 87.36$$

$$F_a := \begin{cases} \frac{\left[1 - \frac{\left(\frac{K \cdot l}{r} \right)^2}{2 \cdot C_c^2} \right] \cdot F_y}{\frac{5}{3} + \frac{3 \cdot \left(\frac{K \cdot l}{r} \right)}{8 \cdot C_c} - \frac{\left(\frac{K \cdot l}{r} \right)^3}{8 \cdot C_c^3}} & \text{if } \frac{K \cdot l}{r} \leq C_c \\ \frac{12 \cdot \pi^2 \cdot E}{23 \cdot \left(\frac{K \cdot l}{r} \right)^2} & \text{if } \frac{K \cdot l}{r} > C_c \end{cases} \quad F_a = 45.0 \text{ ksi}$$

$$F_{aw} := 1.333 \cdot F_a \quad \text{Note: 1.333 increase allowed per TIA/EIA} \quad F_a = 60.0 \text{ ksi}$$

Applied Compressive Force:

$$\text{MaxCompression} := \frac{OM \cdot R_{bc}}{I_p} + \frac{Axial}{N} \quad \text{MaxCompression} = 132.8 \text{ kips}$$

$$f_a := \frac{\text{MaxCompression}}{A_n} \quad f_a = 40.9 \text{ ksi}$$

Check Combined Stresses:

$$\frac{f_a}{F_a} + \frac{f_{bx}}{F_{bx}} = 0.68$$

$$\text{Condition} := \text{if} \left(\frac{f_a}{F_a} + \frac{f_{bx}}{F_{bx}} \leq 1.00, \text{"OK"}, \text{"Overstressed"} \right) \quad \text{Condition} = \text{"OK"}$$

Job 176' EEI Monopole - Berlin, CT

Project No. PSW-002

Page of
Sheet 6 of 6

Description Anchor Bolt and Base Plate Analysis

Computed by Staff

Date 07/18/08

Checked by

Date

Base Plate Analysis:

Force from Bolt(s):

$$C_i := \frac{OM \cdot d_i}{I_p} + \frac{Axial}{N}$$

$$C_1 = 47.2 \cdot \text{kips}$$

$$C_7 = 86.3 \cdot \text{kips}$$

$$C_2 = 86.3 \cdot \text{kips}$$

$$C_8 = 47.2 \cdot \text{kips}$$

$$C_3 = 115.3 \cdot \text{kips}$$

$$C_9 = 2.7 \cdot \text{kips}$$

$$C_4 = 130.8 \cdot \text{kips}$$

$$C_{10} = -41.8 \cdot \text{kips}$$

$$C_5 = 130.8 \cdot \text{kips}$$

$$C_{11} = -80.9 \cdot \text{kips}$$

$$C_6 = 115.3 \cdot \text{kips}$$

etc.

Bending Stress in Plate:

$$f_{bp} := \sum_i \frac{6 \cdot C_i \cdot MA_i}{\text{EffectiveWidth} \cdot \text{PlateThickness}^2}$$

$$f_{bp} = 40.5 \cdot \text{ksi}$$

Check Stresses:

$$\frac{f_{bp}}{1.333 \cdot 0.75 F_{y_{bp}}} = 0.67$$

$$\text{Condition} := \text{if} \left(\frac{f_{bp}}{1.333 \cdot 0.75 F_{y_{bp}}} < 1.00, \text{"OK"}, \text{"Overstressed"} \right)$$

Condition = "OK"