STATE OF CONNECTICUT

CONNECTICUT SITING COUNCIL

Ten Franklin Square, New Britain, CT 06051

Phone: (860) 827-2935 Fax: (860) 827-2950

E-Mail: siting.council@ct.gov

Internet: ct.gov/csc

Daniel F. Caruso
Chairman

September 2, 2008

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

RE: **EM-VER-069-080725** – Cellco Partnership d/b/a Verizon Wireless notice of intent to modify an existing telecommunications facility located at 79 Putnam Pike, Killingly, Connecticut.

Dear Attorney Baldwin:

The Connecticut Siting Council (Council) hereby acknowledges your notice to modify this existing telecommunications facility, pursuant to Section 16-50j-73 of the Regulations of Connecticut State Agencies, with the following conditions:

- The applicant shall take steps to reduce the post-construction structural ratings (i.e. maximum stress ratios) to not more than 100 percent; and
- A signed letter from a Professional Engineer duly licensed in the State of Connecticut shall be submitted to the Council to certify that the post-construction structural ratings (i.e. maximum stress ratios) of not more than 100 percent have been achieved.

The proposed modifications are to be implemented as specified here and in your notice dated July 25, 2008, including the placement of all necessary equipment and shelters within the tower compound. The modifications are in compliance with the exception criteria in Section 16-50j-72 (b) of the Regulations of Connecticut State Agencies as changes to an existing facility site that would not increase tower height, extend the boundaries of the tower site, increase noise levels at the tower site boundary by six decibels, and increase the total radio frequencies electromagnetic radiation power density measured at the tower site boundary to or above the standard adopted by the State Department of Environmental Protection pursuant to General Statutes § 22a-162. This facility has also been carefully modeled to ensure that radio frequency emissions are conservatively below State and federal standards applicable to the frequencies now used on this tower.

This decision is under the exclusive jurisdiction of the Council. Please be advised that the validity of this action shall expire one year from the date of this letter. Any additional change to this facility will require explicit notice to this agency pursuant to Regulations of Connecticut State Agencies Section 16-50j-73. Such notice shall include all relevant information regarding the proposed change with cumulative worst-case modeling of radio frequency exposure at the closest point of uncontrolled access to the tower base, consistent with Federal Communications Commission, Office of Engineering and Technology, Bulletin 65. Any deviation from this format may result in the Council implementing enforcement proceedings pursuant to General Statutes § 16-50u including, without limitation, imposition of expenses resulting from such failure and of civil penalties in an amount not less than one thousand dollars per day for each day of construction or operation in material violation.

Thank you for your attention and cooperation.

Very truly yours,

S. Derek Phelps
Executive Director

SDP/MP/jb

c: The Honorable Janice Thurlow, Chairman Town Council, Town of Killingly
Bruce E. Benway, Town Manager, Town of Killingly
Roger Gandolf, Zoning Officer, Town of Killingly

ROBINSON & COLE LLP

KENNETH C. BALDWIN

280 Trumbull Street
Hartford, CT 06103-3597
Main (860) 275-8200
Fax (860) 275-8299
kbaldwin@rc.com
Direct (860) 275-8345

ORIGINAL

October 15, 2008

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

Re: **Cellco Partnership d/b/a Verizon Wireless**
Exempt Modification Approval

Dear Mr. Perrone:

Enclosed you will find a structural opinion letter confirming that the Verizon Wireless antenna installation was completed in accordance with the requirements of the Structural Analysis submitted as a part of the referenced exempt modification filing. The attached report relates specifically to the following Siting Council filing.

1. EM-VER-069-080725
Danielson North – 79 Putnam Pike, Killingly, CT

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

Sincerely,

Kenneth C. Baldwin

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

Structural Analysis Report

verizonwireless
We never stop working for you.®

VzW Danielson North, CT

Owner: Town of Killingly - Killingly North Site
79 Putnam Pike, Dayville, CT 06241

October 9, 2008

MEI PROJECT ID: CT01125M-08V2

MALOUF ENGINEERING INTL., INC.
STRUCTURAL CONSULTANTS

17950 PRESTON ROAD, SUITE 720 • DALLAS, TEXAS 75252-5635 • TEL. 972 -783-2578 FAX 972-783-2583
www.maloufengineering.com

TIA ASCE PROFESSIONAL MEMBER ACEC MEMBER

MALOUF ENGINEERING INTL., INC.

STRUCTURAL CONSULTANTS

October 9, 2008

Mr. Brian Ragozzine
Verizon Wireless
East Hartford, CT

STRUCTURAL ANALYSIS

Structure/Make/Model:	150 ft **Monopole**		Fred A. Nudd / HM180 / 12-Sided	
Client/Site Name/#:	**Verizon Wireless**		**Danielson North, CT**	
Owner/Site Name/#:	Town of Killingly		Killingly North	
MEI Project ID:	**CT01125M-08V2**			
Location:	79 Putnam Pike Dayville, CT 06241		Windham County FCC #N/A	
	LAT	41-50-50.47 N	LON	71-52-44.27 W

EXECUTIVE SUMMARY:

Malouf Engineering Int'l (MEI), as requested, has performed a structural analysis of the above mentioned structure to assess the impact of the changed condition as noted in Table 1.

Based on the stress analysis performed, the existing structure **is in conformance** with the ANSI/TIA **222-F** Standard for the loading considered under the criteria listed and referenced in the report sections – *tower rated at 88.6%*.

The installation of the proposed changed condition *of the Verizon Wireless (4) Antel LPA 80063/6CF Panel Antennas, (2) Antel LPA 80063/6CF_5 Panel Antennas, (6) Antel LPA185063/12CF_2 Panel Antennas onto Valmont 13ft L.P. Platform w/o Rails (p/n#852208 or equivalent) at Elev. 108.0 ft c.l fed with (12) 1-5/8" coax Lines (internal to pole)* ***is structurally acceptable***.

MEI appreciates the opportunity of providing our continuing professional services to you. If you have any questions or need further assistance on this or any other projects please contact us.

Respectfully submitted,

MALOUF ENGINEERING INT'L, INC.

Analysis performed by:

Helder Lopez, EIT
Project Engineer

Reviewed & Approved by:

E. Mark Malouf, PE
Connecticut #17715
972-783-2578 ext. 106
mmalouf@maloufengineering.com

TABLE OF CONTENTS

1. INTRODUCTION & SCOPE

A structural analysis was performed by Malouf Engineering Int'l (MEI), as requested and authorized by Mr. Douglas Culp, Verizon Wireless, to determine the acceptance of the proposed changed conditions in conformance with the ANSI/TIA-222-F Standard, "*Structural Standards for Steel Antenna Towers and Antenna Supporting Structures*".

The scope of this independent analysis is to determine the overall stability and the adequacy of structural members, foundations, and member connections, as available and stated. This analysis considers the structure to have been properly installed and maintained with no structural defects. Installation procedures and related loading are not with the scope of this analysis and should be performed and evaluated by a competent person of the erection contractor.

The different report sections detail the applicable information used in this evaluation, relating to the tower data, the appurtenances configuration and the wind and ice loading considered.

2. SOURCE OF DATA

The following information has been used in this evaluation as source data that accurately represent the existing structure and the related appurtenances:

	Source	Information	Reference
STRUCTURE			
Tower	MEI Records	Previous Structural Analysis	MEI ID: CT01125M-08V1 Dated 07/07/08
Foundation	MEI Records	Previous Structural Analysis	MEI ID: CT01125M-08V1 Dated 07/07/08
Material Grade	Available from supplied documents noted above – refer to Appendix.		
CURRENT APPURTENANCES			
	MEI Records	Previous Structural Analysis	MEI ID: CT01125M-08V1 Dated 07/07/08
CHANGED CONDITION			
	Mr. Brian Ragozzine / Verizon Wireless	E-Mail Instructions	E-mail Dated 09/30/08

Background Information:

Based on available information, the following is known regarding this structure:

DESIGNER / FABRICATOR	Fred A. Nudd Corp. / 12-sided
DESIGN CRITERIA	TIA/EIA 222-E – 85/73 Mph + 0" /0.50" Ice
PRIOR STRUCTURAL MODIFICATIONS	None Known

3. ANALYSIS CRITERIA

The structural analysis performed used the following criteria:

CODE / STANDARD	ANSI/TIA-222-F-96 Standard	
LOADING CASES	*Full Wind*:	85 Mph - with No Radial Ice
	Iced Case:	73.6 Mph + 0.50" Radial Ice
	Service:	50 Mph

Appurtenances Configuration

The following appurtenances configuration has been considered:

Table 1: Proposed Changed Condition Appurtenances

Elev (ft)	Tenant	Ant Qty	Appurtenance Model / Description	Mount Description	Lines Qty	Line size & Location
108	Verizon Wireless	4	Antel LPA-80063/6CF ants	Valmont 13' LP platform w/o Rails (p/n 852208 or equivalent)	12	1-5/8" (I)*
		2	Antel LPA-80063/6CF_5 ants			
		6	Antel LPA-185063/12CF_2 ants			

Table 2: Current and Reserved/Future Appurtenances

Elev (ft)	Tenant	Ants Qty	Appurtenance Model / Description	Mount Description	Lines Qty	Line size & Location
150		1	Lightning Rod			
	T-Mobile	6	EMS RV-90-17-02DP	(3) Sector mounts	6	1-5/8" (I)
		6	FE-1580-1-P72 TMA's			
140[4]	Sprint	12	DB980 Panels	(3) Sector mounts	12	1-5/8" (I)
130[7]	AT&T	3	7770 Panel Antennas	3-Way close-contact ring mount	6	1-5/8" (I)
		6	TMA's		1	1/2" (I)
		6	Kathrein 860-10025 RCU's			
118	Town of Killingly	2	Dapa 09210 Whips	(2) Sidearm Mounts	2	1-5/8" (I)
86[5]		1	Dapa 09210 Whip	(1) Sidearm Mount	1	1-5/8" (I)
80[6]	Sprint	1	GPS Antenna		1	1/2" (I)

Notes:

1. ** New portholes are to be installed to allow new lines to be internal*
2. *Please note appurtenances not listed above are to be removed/not present as per data supplied.*
3. (I) = internal; (E) = External; (FZ) = Within Face Zone & (OFZ) = Outside Face Zone- as per TIA-222.
4. The above antennas, mounts, and lines represent MEI's understanding of the appurtenances configuration. If different than above, the analysis is invalid. Please refer to Appendix 2 for EPA wind areas used in the calculations. Please contact MEI if any discrepancies are found.
5. Sprint PCS, existing (6) antennas and future (6) antennas
6. Town of Killingly, future / reserved loading
7. Sprint PCS, existing / reserved loading
8. AT&T reserved loading

4. ANALYSIS PROCEDURE

The subject structure is analyzed for feasibility of the installation of the proposed changed condition previously noted. The data records furnished were reviewed and a computer stress analysis was performed in accordance with the TIA-222 Standard provisions and with the agreed scope of work terms and the results of this analysis are reported.

Analysis Program

The computer program used to model the structure is a rigorous Finite Element Analysis program, RISATower (ver. 5.3.1.0), a commercially available program developed by C-Concepts, WI and now maintained by RISA Technologies. The latticed structures members are modeled using beam/truss and cable members and the pole members using tubular beam elements. The structural parameters and geometry of the members are included in the model. The dead and temperature loads and the wind loads are internally calculated by the program for the different wind directions and then applied as external loads on the structure.

Assumptions

This engineering study is based on the theoretical capacity of the members and is not a condition assessment of the structure. This analysis is based on information supplied, and therefore, its results are based on and as accurate as that supplied data. MEI has made no independent determination, nor is it required to, of its accuracy. The following assumptions were made for this structural stress analysis:

- This existing tower is assumed, for the purpose of this analysis, to have been properly maintained and to be in good condition with no structural defects and with no deterioration to its member capacities ('as-new' condition).
- The tower member sizes and configuration are considered accurate as supplied. The material grade is as per data supplied and/or as assumed and as stated.
- The appurtenances configuration is as supplied and/or as stated in the report. It is assumed to be complete and accurate. All antennas, mounts, coax and waveguides are assumed to be properly installed and supported as per manufacturer requirements.
- Some assumptions are made regarding antennas and mounts sizes and their projected areas based on best interpretation of data supplied and of best knowledge of antenna type & industry practice.
- Mounts/Platforms are considered adequate to support the loading. No actual analysis of the platform/mount itself is performed, with the analysis being limited to analyzing the structure.
- The soil parameters are as per data supplied or as assumed and stated in the calculations. Refer to the Appendix. If no data is available, the foundation system is assumed to support the structure with its new reactions.
- All welds and connections are assumed to develop at least the member capacity, unless determined otherwise and explicitly stated in this report. All guy cable assemblies, as applicable, are assumed to develop the rated breaking strength of the wire.
- All prior structural modifications, if any, are assumed to be as per data supplied/available, and to have been properly installed and to be fully effective.

If any of the above assumptions are not valid or have been made in error, this analysis results may be invalided, MEI should be contacted to review any contradictory information to determine its effect.

5. ANALYSIS RESULTS

The results of the structural stress analysis based on data available and with the previous listed criteria, indicated the following:

Table 3: Stress Analysis Results

Member Type	Maximum Stress Ratio	Controlling Elev. (ft) / Component	Pass/Fail	Comment
POLE	68.4%	19 – 0	**Pass**	
ANCHOR BOLTS	79.7%	Bolt Tension	**Pass**	
BASE PLATE	88.5%	Bending	**Pass**	
FOUNDATION	**88.6%**	**Lateral**	**Pass**	

Notes:
1. The Maximum Stress Ratio is the percentage that the maximum load in the member is relative to the allowable load as determined by Code requirements.
2. Refer to the Appendix 2 for more details on the member loads.
3. A maximum stress ratio between 100% and 105% may be considered as *Acceptable* according to industry standard practice.

6. FINDINGS & RECOMMENDATIONS

- Based on the rigorous stress analysis results, the subject structure is **rated at 88.6%** of its support capacity (controlling component: Foundation) with the proposed changed condition considered. Please refer to Table 3 and to Appendix 2 for more details of the analysis results.

- Based on the stress analysis performed, the existing structure **is in conformance** with the ANSI/TIA **222-F** Standard for the loading considered under the criteria listed and referenced in the report sections.

- ***The installation of the proposed changed condition*** *of the Verizon Wireless (4) Antel LPA 80063/6CF Panel Antennas, (2) Antel LPA 80063/6CF_5 Panel Antennas, (6) Antel LPA185063/12CF_2 Panel Antennas onto Valmont 13ft L.P. Platform w/o Rails (p/n#852208 or equivalent) at Elev. 108.0 ft c.l fed with (12) 1-5/8" coax Lines (internal to pole)* ***is structurally acceptable***.

- *New entry and exit portholes are to be installed as per attached MEI drawings to allow for the installation of the new VzW lines to be internal to the pole shaft.*

- This structure is at its maximum support capacity for the appurtenances and loading criteria considered. Therefore, No changes to the configuration considered should be made without performing a new proper evaluation.

Rigging and temporary supports required for the erection/modification shall be determined, documented, furnished and installed by the erector/contractor accounting for the loads imposed on the structure due to the proposed construction method.

7. REPORT DISCLAIMER

The engineering services rendered by **M**alouf **E**ngineering **I**nternational, Inc. *('MEI') in connection with this Structural Analysis are limited to a computer analysis of the tower structure, size and capacity of its members. MEI does not analyze the fabrication, including welding and connection capacities, except as included in this Report.*

The analysis performed and the conclusions contained herein are based on the assumption that the tower has been properly installed and maintained, including, but not limited to the following:

1. Proper alignment and plumbness.
2. Correct guy tensions, as applicable.
3. Correct bolt tightness or slip jacking of sleeved connections.
4. No significant deterioration or damage to any structural component.

Furthermore, the information and conclusions contained in this Report were determined by application of the current "state-of-the-art" engineering and analysis procedures and formulae. MALOUF ENGINEERING INTERNATIONAL, INC. Assumes no obligation to revise any of the information or conclusions contained in this Report in the event that such engineering and analysis procedures and formulae are hereafter modified or revised. In addition, under no circumstances will MALOUF ENGINEERING INTERNATIONAL, INC. Have any obligation or responsibility whatsoever for or on account of consequential or incidental damages sustained by any person, firm or organization as a result of any information or conclusions contained in the Report, and the maximum liability of MALOUF ENGINEERING INTERNATIONAL, INC., if any, pursuant to this Report shall be limited to the total funds actually received by MALOUF ENGINEERING INTERNATIONAL, INC. For preparation of this Report.

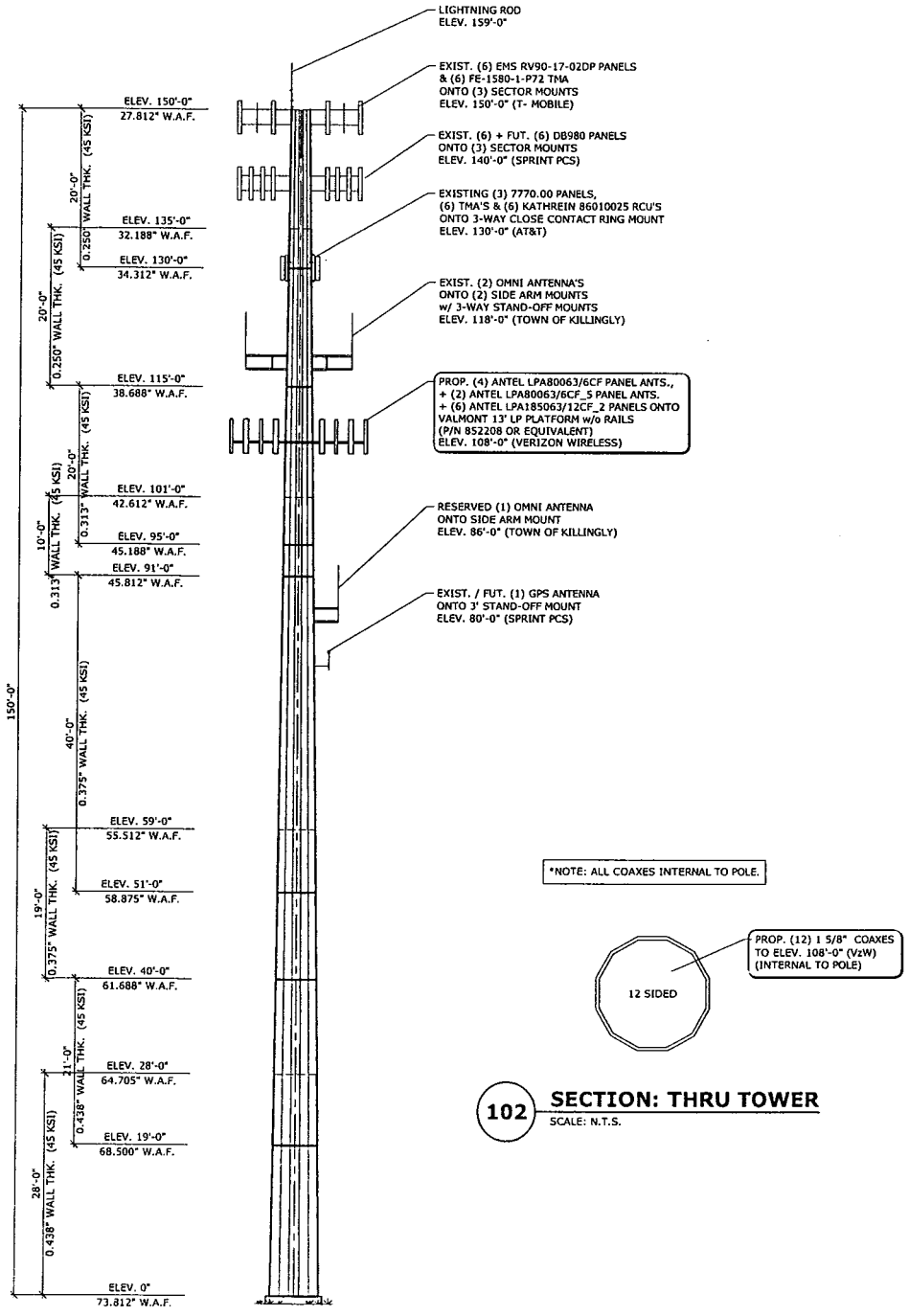
Customer has requested MALOUF ENGINEERING INTERNATIONAL, INC. To prepare and submit to Customer an engineering analysis with respect to the Subject Tower and has further requested MALOUF ENGINEERING INTERNATIONAL, INC. to make appropriate recommendations regarding suggested structural modifications and changes to the Subject Tower. In making such request of MALOUF ENGINEERING INTERNATIONAL, INC., Customer has informed MALOUF ENGINEERING INTERNATIONAL, INC. that Customer will make a determination as to whether or not to implement any of the changes or modifications which may be suggested by MALOUF ENGINEERING INTERNATIONAL, INC. and that Customer will have any such changes or modifications made by riggers, erectors and other subcontractors of Customer's choice. MALOUF ENGINEERING INTERNATIONAL, INC. shall have the right to rely upon the accuracy of the information supplied by the customer and shall not be held responsible for the Customer's misrepresentation or omission of relevant fact whether intentional or otherwise.

Customer hereby agrees and acknowledges that MALOUF ENGINEERING INTERNATIONAL, INC. shall have no liability whatsoever to Customer or to others for any work or services performed by any persons other than MALOUF ENGINEERING INTERNATIONAL, INC. in connection with the implementation of services including but not limited to any services rendered for Customer or for others by riggers, erectors or other subcontractors. Customer acknowledges and agrees that any riggers, erectors or subcontractors retained or employed by Customer shall be solely responsible to Customer and to others for the quality of work performed by them and that MALOUF ENGINEERING INTERNATIONAL, INC. shall have no liability or responsibility whatsoever as a result of any negligence or breach of contract by any such rigger, erector or subcontractor and that Customer and rigger, erector, or subcontractor will provide MALOUF ENGINEERING INTERNATIONAL, INC. with a Certificate of Insurance naming MALOUF ENGINEERING INTERNATIONAL, INC. as additional insured.

APPENDIX 1 - TOWER DRAWING

TOWER HT. & TYPE:	150' MONOPOLE
SITE NAME:	DANIELSON NORTH SITE
LOCATION:	DAYVILLE, WINDHAM COUNTY, CT 06241
MANUF. / MODEL:	FRED A. NUDD / 12 SIDED
ORIGINAL DESIGN CRITERIA:	TIA/EIA-222-E-85 MPH + 1/2" ICE
ANALYSIS CRITERIA:	TIA/EIA-222-F-85 MPH + 1/2" ICE
	—

TOWER OF KILLINGLY, KILLINGLY NORTH SITE



101 ELEV: 150' MONOPOLE

SCALE: 1" = 15'-0"

*NOTE: ALL COAXES INTERNAL TO POLE.

102 SECTION: THRU TOWER

SCALE: N.T.S.

VERIZON WIRELESS

MONOPOLE ELEVATION AND SECTION

MID PROJECT ID	SHEET NUMBER	REV.
CT01125M-08V2	S01	0

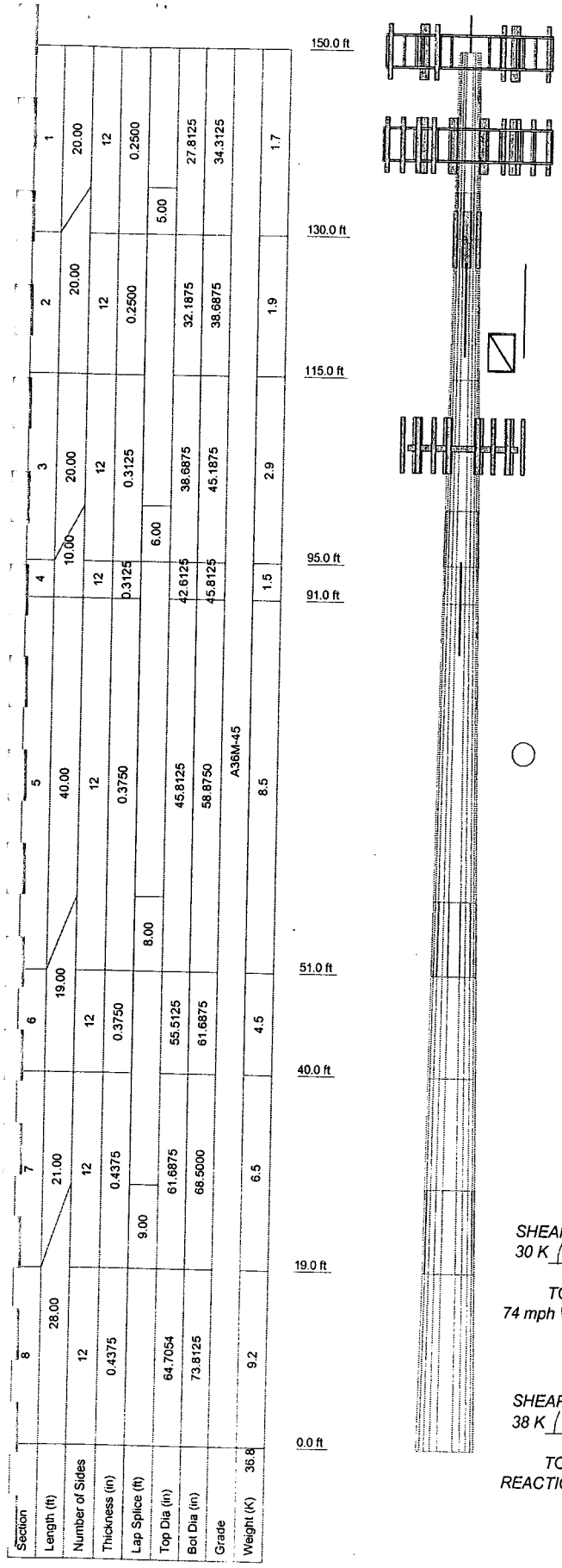
NO.	DATE	REVISIONS	DRWN	CHK'D	APP'D
0	10/08/08	ISSUED WITH ANALYSIS REPORT	HAL	MAJ	

verizonwireless

DANIELSON NORTH
WINDHAM COUNTY
79 PUTNAM PIKE
DAYVILLE, CT 06241

MALOUF ENGINEERING INTERNATIONAL, INC.
STRUCTURAL CONSULTANTS
17950 PRESTON ROAD SUITE 720
DALLAS, TEXAS 75252-5635
tel 972-788-1578 fax 972-788-1580
www.maloufengineering.com

APPENDIX 2 - ANALYSIS PRINTOUT & GRAPHICS



Section	1	2	3	4	5	6	7	8
Length (ft)	20.00	20.00	20.00	10.00	40.00	19.00	21.00	28.00
Number of Sides	12	12	12	12	12	12	12	12
Thickness (in)	0.2500	0.2500	0.3125	0.3125	0.3750	0.3750	0.4375	0.4375
Lap Splice (ft)	5.00		6.00		8.00		9.00	
Top Dia (in)	27.8125	32.1875	38.6875	42.6125	45.8125	55.5125	61.6875	64.7054
Bot Dia (in)	34.3125	38.6875	45.1875	45.8125	58.8750	61.6875	68.5000	73.8125
Grade					A36M-45			
Weight (K)	1.7	1.9	2.9	1.5	8.5	4.5	6.5	9.2

Total Weight (K) 36.8

DESIGNED APPURTENANCE LOADING

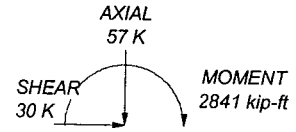
TYPE	ELEVATION	TYPE	ELEVATION
Lightning Rod (Existing)	150	09210 (Town of Killingly)	118
(2) RV90-17-02DP (T-Mobile)	150	Side Arm Mount w/ Tie Back (Town of Killingly)	118
(2) RV90-17-02DP (T-Mobile)	150	3-Way Standoff Mount (Town of Killingly)	118
(2) RV90-17-02DP (T-Mobile)	150	(2) LPA-80063/6CF (Verizon Wireless)	108
(2) FE-1580-1-P72 TMA (T-Mobile)	150	(2) LPA-185063/12CF (Verizon Wireless)	108
(2) FE-1580-1-P72 TMA (T-Mobile)	150	(2) LPA-80063/6CF_5 (Verizon Wireless)	108
(2) FE-1580-1-P72 TMA (T-Mobile)	150	(2) LPA-185063/12CF (Verizon Wireless)	108
Sector Mounts (3) (T-Mobile)	150	(2) LPA-80063/6CF (Verizon Wireless)	108
(4) DB980H105A-M (SprintPCS)	140	(2) LPA-185063/12CF (Verizon Wireless)	108
(4) DB980H105A-M (SprintPCS)	140	Valmont 13' Platform w/o Rails (Verizon Wireless)	108
(4) DB980H105A-M (SprintPCS)	140	09210 (Town of Killingly/Reser)	86
Sector Mounts (3) (SprintPCS)	140	Side Arm Mount w/ Tie Back (Town of Killingly/Reser)	86
7770.00 (ATI)	130	GPS Antenna (SprintPCS)	80
7770.00 (ATI)	130	3' Standoff (SprintPCS)	80
7770.00 (ATI)	130		
(2) TMA's (ATI)	130		
(2) TMA's (ATI)	130		
(2) TMA's (ATI)	130		
(2) Kathrein 86010025 RCU (ATI)	130		
(2) Kathrein 86010025 RCU (ATI)	130		
(2) Kathrein 86010025 RCU (ATI)	130		
Close contact Mounts (3) (ATI)	130		
09210 (Town of Killingly)	118		
Side Arm Mount w/ Tie Back (Town of Killingly)	118		

MATERIAL STRENGTH

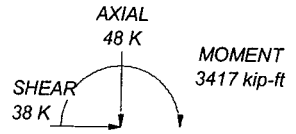
GRADE	Fy	Fu	GRADE	Fy	Fu
A36M-45	45 ksi	60 ksi			

TOWER DESIGN NOTES

1. Tower is located in Windham County, Connecticut.
2. Tower designed for a 85 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 74 mph basic wind with 0.50 in ice.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 88.5%



TORQUE 3 kip-ft
74 mph WIND - 0.5000 in ICE



TORQUE 4 kip-ft
REACTIONS - 85 mph WIND

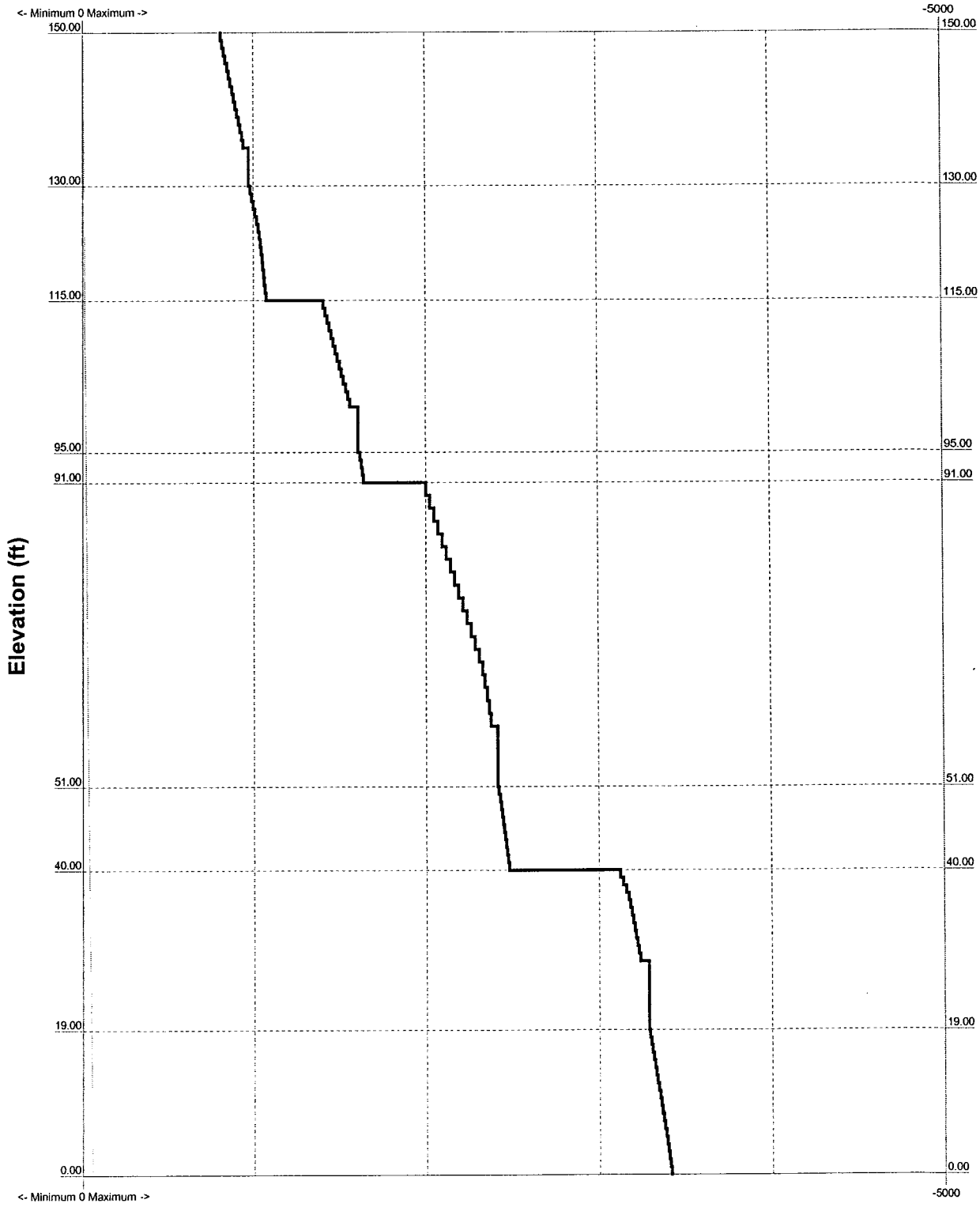
MALOUF ENGINEERING INTL., INC. STRUCTURAL CONSULTANTS
maloufengineering.com

Malouf Engineering Int'l. Inc
17950 Preston Rd., Suite 720
Dallas, Texas - 75252
Phone: (972) 783-2578
FAX: (972) 783-2583

Job: *Danielson North Site*			
Project: *CT01125M-08V2*			
Client: Verizon Wireless	Drawn by: HML	App'd:	
Code: TIA/EIA-222-F	Date: 10/08/08	Scale: NTS	
Path: C:\MEI\Projects\08Res\CT01125M-08v2\CT01125M-08V2.eri		Dwg No. E-1	

TIA/EIA-222-F - 85 mph/74 mph 0.5000 in Ice

Leg Capacity ——— **Leg Compression (K)**



MALOUF ENGINEERING INTL., INC. STRUCTURAL CONSULTANTS
maloufengineering.com

Malouf Engineering Int'l. Inc
17950 Preston Rd., Suite 720
Dallas, Texas - 75252
Phone: (972) 783-2578
FAX: (972) 783-2583

Job: *Danielson North Site*			
Project: *CT01125M-08V2*			
Client: Verizon Wireless	Drawn by: HML	App'd:	
Code: TIA/EIA-222-F	Date: 10/08/08	Scale: NTS	
Path: C:\ME\Projects\08files\CT01125M-08v2\CT01125M-08V2.er		Dwg No. E-	

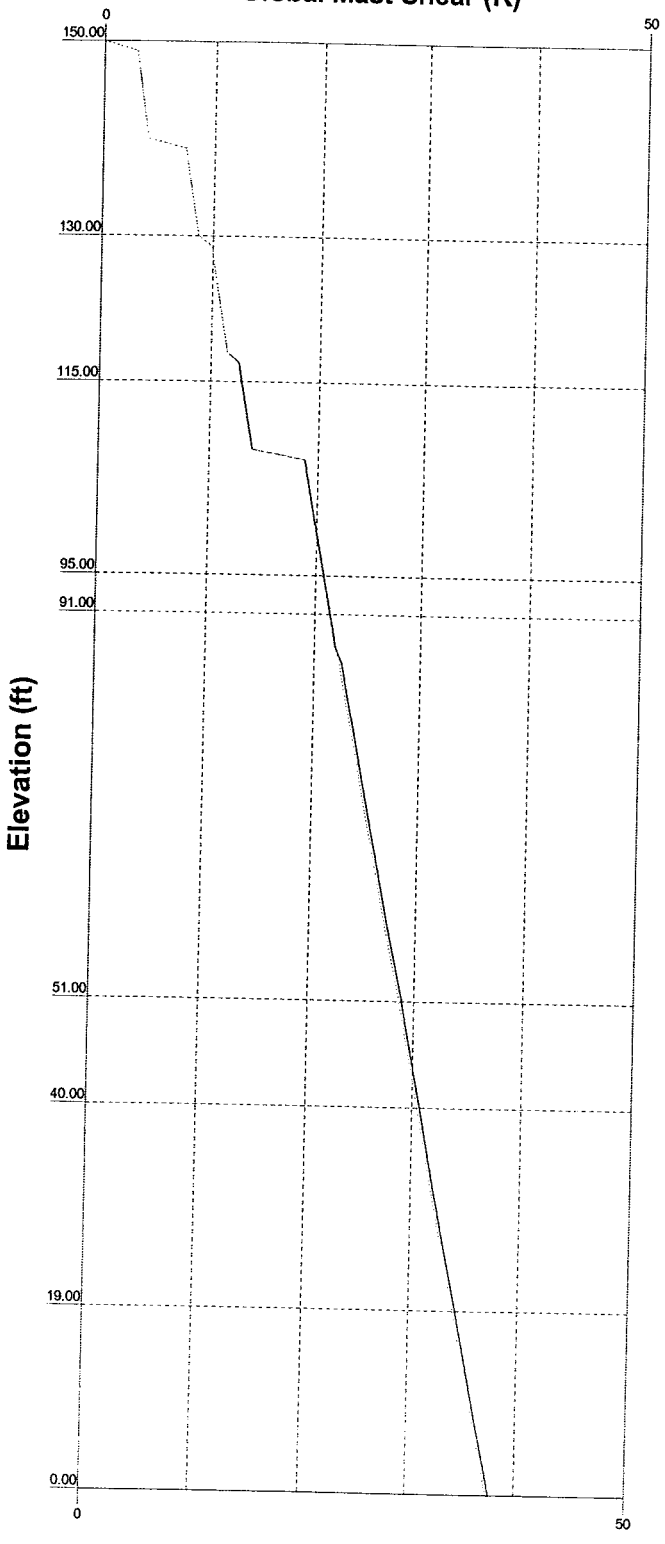
TIA/EIA-222-F - 85 mph/74 mph 0.5000 in Ice

Vx Vz

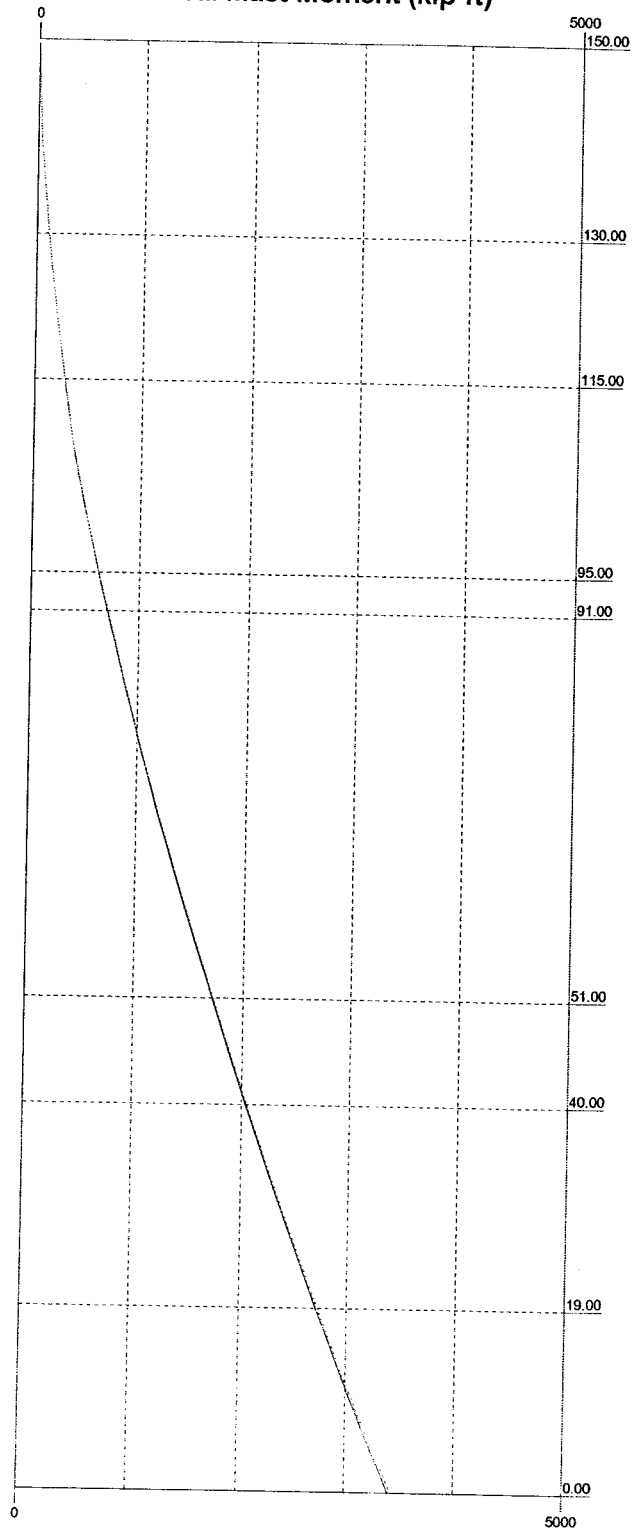
Maximum Values

Mx Mz

Global Mast Shear (K)



Global Mast Moment (kip-ft)



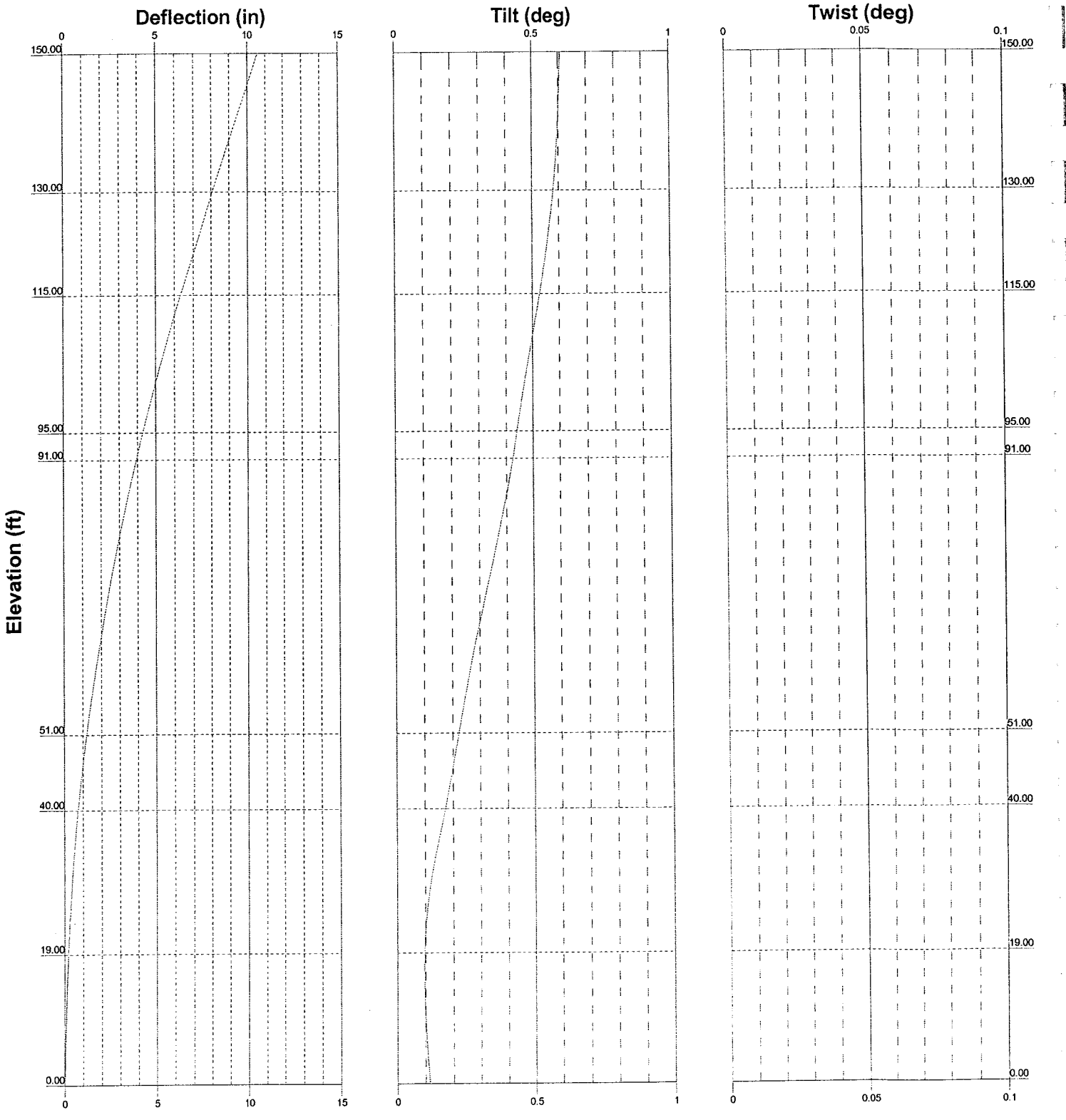
MALOUF ENGINEERING INTL. INC. STRUCTURAL CONSULTANTS
maloufengineering.com

Malouf Engineering Int'l. Inc
17950 Preston Rd., Suite 720
Dallas, Texas - 75252
Phone: (972) 783-2578
FAX: (972) 783-2583

Job: *Danielson North Site*			
Project: *CT01125M-08V2*			
Client: Verizon Wireless	Drawn by: HML	App'd:	
Code: TIA/EIA-222-F	Date: 10/08/08	Scale: NTS	
Path: C:\ME\Projects\08files\CT01125M-08v2\CT01125M-08V2.er		Dwg No. E-4	

TIA/EIA-222-F - Service - 50 mph

Maximum Values



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Path: C:\ME\Projects\08files\CT01125M-08v2\CT01125M-08V2.eri		Dwg No. E-1	

Tower Input Data

There is a pole section.
This tower is designed using the TIA/EIA-222-F standard.
The following design criteria apply:
Tower is located in Windham County, Connecticut.
Basic wind speed of 85 mph.
Nominal ice thickness of 0.5000 in.
Ice density of 56 pcf.
A wind speed of 74 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 50 mph.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in pole design is 1.333.
Local bending stresses due to climbing loads, feedline supports, and appurtenance mounts are not considered.

Options

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

Tapered Pole Section Geometry

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L1	150.00-130.00	20.00	5.00	12	27.8125	34.3125	0.2500	1.0000	A36M-45 (45 ksi)
L2	130.00-115.00	20.00	0.00	12	32.1875	38.6875	0.2500	1.0000	A36M-45 (45 ksi)
L3	115.00-95.00	20.00	6.00	12	38.6875	45.1875	0.3125	1.2500	A36M-45 (45 ksi)
L4	95.00-91.00	10.00	0.00	12	42.6125	45.8125	0.3125	1.2500	A36M-45 (45 ksi)
L5	91.00-51.00	40.00	8.00	12	45.8125	58.8750	0.3750	1.5000	A36M-45 (45 ksi)
L6	51.00-40.00	19.00	0.00	12	55.5125	61.6875	0.3750	1.5000	A36M-45 (45 ksi)
L7	40.00-19.00	21.00	9.00	12	61.6875	68.5000	0.4375	1.7500	A36M-45 (45 ksi)
L8	19.00-0.00	28.00		12	64.7054	73.8125	0.4375	1.7500	A36M-45 (45 ksi)

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
1 5/8 (T-Mobile)	C	No	Inside Pole	150.00 - 0.00	6	No Ice	0.00	1.04
						1/2" Ice	0.00	1.04
1 5/8 (SprintPCS)	C	No	Inside Pole	140.00 - 0.00	12	No Ice	0.00	1.04
						1/2" Ice	0.00	1.04
1 5/8 (AT&T)	C	No	Inside Pole	130.00 - 0.00	6	No Ice	0.00	1.04
						1/2" Ice	0.00	1.04
1/2 (AT&T)	C	No	Inside Pole	130.00 - 0.00	1	No Ice	0.00	0.25
						1/2" Ice	0.00	0.25
1 5/8 (TownOfKillingly)	C	No	Inside Pole	118.00 - 0.00	2	No Ice	0.00	1.04
						1/2" Ice	0.00	1.04
1 5/8 (Verizon Wireless)	C	No	Inside Pole	108.00 - 0.00	12	No Ice	0.00	1.04
						1/2" Ice	0.00	1.04
1 5/8 (TownOfKillingly)	C	No	Inside Pole	86.00 - 0.00	1	No Ice	0.00	1.04
						1/2" Ice	0.00	1.04
1/2 (SprintPCS)	C	No	Inside Pole	80.00 - 0.00	1	No Ice	0.00	0.25
						1/2" Ice	0.00	0.25

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
Lightning Rod (Existing)	A	From Leg	0.00 0.00 2.00	0.0000	150.00	No Ice 1/2" Ice	0.25 0.66	0.25 0.66	0.03 0.03
(2) RV90-17-02DP (T-Mobile)	A	From Leg	0.00 0.00 0.00	0.0000	150.00	No Ice 1/2" Ice	4.36 4.77	1.97 2.31	0.02 0.04
(2) RV90-17-02DP (T-Mobile)	B	From Leg	0.00 0.00 0.00	0.0000	150.00	No Ice 1/2" Ice	4.36 4.77	1.97 2.31	0.02 0.04
(2) RV90-17-02DP (T-Mobile)	C	From Leg	0.00 0.00 0.00	0.0000	150.00	No Ice 1/2" Ice	4.36 4.77	1.97 2.31	0.02 0.04
(2) FE-1580-1-P72 TMA (T-Mobile)	A	From Leg	0.00 0.00 0.00	0.0000	150.00	No Ice 1/2" Ice	1.12 1.26	0.58 0.69	0.01 0.02
(2) FE-1580-1-P72 TMA (T-Mobile)	B	From Leg	0.00 0.00 0.00	0.0000	150.00	No Ice 1/2" Ice	1.12 1.26	0.58 0.69	0.01 0.02
(2) FE-1580-1-P72 TMA (T-Mobile)	C	From Leg	0.00 0.00 0.00	0.0000	150.00	No Ice 1/2" Ice	1.12 1.26	0.58 0.69	0.01 0.02
Sector Mounts (3) (T-Mobile)	A	None		0.0000	150.00	No Ice 1/2" Ice	33.00 42.90	33.00 42.90	1.50 2.25
(4) DB980H105A-M (SprintPCS)	A	From Leg	0.00 0.00 0.00	0.0000	140.00	No Ice 1/2" Ice	3.75 4.13	2.17 2.53	0.01 0.03

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft	Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
(4) DB980H105A-M	B	From Leg	0.00		0.0000	140.00	No Ice	3.75	2.17	0.01
(SprintPCS)			0.00				1/2" Ice	4.13	2.53	0.03
			0.00							
(4) DB980H105A-M	C	From Leg	0.00		0.0000	140.00	No Ice	3.75	2.17	0.01
(SprintPCS)			0.00				1/2" Ice	4.13	2.53	0.03
			0.00							
Sector Mounts (3)	A	None			0.0000	140.00	No Ice	33.00	33.00	1.50
(SprintPCS)							1/2" Ice	42.90	42.90	2.25
7770.00	A	From Leg	0.00		0.0000	130.00	No Ice	5.88	2.93	0.04
(AT&T)			0.00				1/2" Ice	6.31	3.27	0.07
			0.00							
7770.00	B	From Leg	0.00		0.0000	130.00	No Ice	5.88	2.93	0.04
(AT&T)			0.00				1/2" Ice	6.31	3.27	0.07
			0.00							
7770.00	C	From Leg	0.00		0.0000	130.00	No Ice	5.88	2.93	0.04
(AT&T)			0.00				1/2" Ice	6.31	3.27	0.07
			0.00							
(2) TMA's	A	From Leg	0.00		0.0000	130.00	No Ice	1.28	0.31	0.01
(AT&T)			0.00				1/2" Ice	1.44	0.41	0.02
			0.00							
(2) TMA's	B	From Leg	0.00		0.0000	130.00	No Ice	1.28	0.31	0.01
(AT&T)			0.00				1/2" Ice	1.44	0.41	0.02
			0.00							
(2) TMA's	C	From Leg	0.00		0.0000	130.00	No Ice	1.28	0.31	0.01
(AT&T)			0.00				1/2" Ice	1.44	0.41	0.02
			0.00							
(2) Kathrein 86010025 RCU	A	From Leg	0.00		0.0000	130.00	No Ice	0.14	0.11	0.00
(AT&T)			0.00				1/2" Ice	0.20	0.17	0.00
			0.00							
(2) Kathrein 86010025 RCU	B	From Leg	0.00		0.0000	130.00	No Ice	0.14	0.11	0.00
(AT&T)			0.00				1/2" Ice	0.20	0.17	0.00
			0.00							
(2) Kathrein 86010025 RCU	C	From Leg	0.00		0.0000	130.00	No Ice	0.14	0.11	0.00
(AT&T)			0.00				1/2" Ice	0.20	0.17	0.00
			0.00							
Close contact Mounts (3)	C	None			0.0000	130.00	No Ice	4.25	4.25	0.12
(AT&T)							1/2" Ice	5.53	5.53	0.16
09210	A	From Leg	6.00		0.0000	118.00	No Ice	2.65	2.65	0.02
(Town of Killingly)			0.00				1/2" Ice	3.07	3.07	0.04
			4.50							
Side Arm Mount w/ Tie Back	A	From Leg	3.00		0.0000	118.00	No Ice	2.75	6.50	0.15
(Town of Killingly)			0.00				1/2" Ice	3.58	8.45	0.23
			0.00							
09210	B	From Leg	6.00		0.0000	118.00	No Ice	2.65	2.65	0.02
(Town of Killingly)			0.00				1/2" Ice	3.07	3.07	0.04
			4.50							
Side Arm Mount w/ Tie Back	B	From Leg	3.00		0.0000	118.00	No Ice	2.75	6.50	0.15
(Town of Killingly)			0.00				1/2" Ice	3.58	8.45	0.23
			0.00							
3-Way Standoff Mount	A	None			0.0000	118.00	No Ice	4.50	4.50	0.12
(Town of Killingly)							1/2" Ice	5.85	5.85	0.16
(2) LPA-80063/6CF	A	From Leg	3.00		0.0000	108.00	No Ice	10.31	9.01	0.03
(Verizon Wireless)			0.00				1/2" Ice	10.87	9.55	0.10
			0.00							
(2) LPA-185063/12CF	A	From Leg	3.00		0.0000	108.00	No Ice	4.97	4.51	0.01
(Verizon Wireless)			0.00				1/2" Ice	5.42	4.95	0.05
			0.00							

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft	Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
(2) LPA-80063/6CF_5	B	From Leg	3.00		0.0000	108.00	No Ice	10.34	9.03	0.03
(Verizon Wireless)			0.00				1/2" Ice	10.90	9.58	0.10
			0.00							
(2) LPA-185063/12CF	B	From Leg	3.00		0.0000	108.00	No Ice	4.97	4.51	0.01
(Verizon Wireless)			0.00				1/2" Ice	5.42	4.95	0.05
			0.00							
(2) LPA-80063/6CF	C	From Leg	3.00		0.0000	108.00	No Ice	10.31	9.01	0.03
(Verizon Wireless)			0.00				1/2" Ice	10.87	9.55	0.10
			0.00							
(2) LPA-185063/12CF	C	From Leg	3.00		0.0000	108.00	No Ice	4.97	4.51	0.01
(Verizon Wireless)			0.00				1/2" Ice	5.42	4.95	0.05
			0.00							
Valmont 13' Platform w/o	C	None			0.0000	108.00	No Ice	21.00	21.00	1.50
Rails							1/2" Ice	28.00	28.00	1.95
(Verizon Wireless)										
09210	A	From Leg	6.00		0.0000	86.00	No Ice	2.65	2.65	0.02
(Town of Killingly/Reser)			0.00				1/2" Ice	3.07	3.07	0.04
			4.50							
Side Arm Mount w/ Tie Back	A	From Leg	3.00		0.0000	86.00	No Ice	2.75	6.50	0.15
(Town of Killingly/Reser)			0.00				1/2" Ice	3.58	8.45	0.23
			0.00							
GPS Antenna	C	From Leg	1.00		0.0000	80.00	No Ice	0.75	0.75	0.00
(SprintPCS)			0.00				1/2" Ice	0.97	0.97	0.01
			1.00							
3' Standoff	C	From Leg	1.50		0.0000	80.00	No Ice	0.75	1.50	0.07
(SprintPCS)			0.00				1/2" Ice	1.25	2.25	0.10
			0.00							

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	14	56.50	-0.00	0.00
	Max. H_x	11	48.13	37.71	-0.06
	Max. H_z	2	48.13	-0.06	37.48
	Max. M_x	2	3393.62	-0.06	37.48
	Max. M_z	5	3415.11	-37.71	0.06
	Max. Torsion	6	3.64	-32.63	-18.69
	Min. Vert	5	48.13	-37.71	0.06
	Min. H_x	5	48.13	-37.71	0.06
	Min. H_z	8	48.13	0.06	-37.48
	Min. M_x	8	-3391.14	0.06	-37.48
	Min. M_z	11	-3414.12	37.71	-0.06
	Min. Torsion	12	-3.64	32.63	18.69

Maximum Tower Deflections - Service Wind

Section No.	Elevation	Horz. Deflection	Gov. Load Comb.	Tilt	Twist
	ft	in		°	°
L1	150 - 130	10.578	29	0.6050	0.0019
L2	135 - 115	8.692	29	0.5912	0.0019
L3	115 - 95	6.322	29	0.5266	0.0018
L4	101 - 91	4.864	29	0.4656	0.0014
L5	91 - 51	3.921	29	0.4268	0.0012
L6	59 - 40	1.618	29	0.2575	0.0005
L7	40 - 19	0.735	29	0.1722	0.0003
L8	28 - 0	0.376	29	0.1139	0.0002

Critical Deflections and Radius of Curvature - Service Wind

Elevation	Appurtenance	Gov. Load Comb.	Deflection	Tilt	Twist	Radius of Curvature
ft			in	°	°	ft
150.00	Lightning Rod	29	10.578	0.6050	0.0019	106661
140.00	(4) DB980H105A-M	29	9.316	0.5983	0.0019	53330
130.00	7770.00	29	8.076	0.5800	0.0019	23717
118.00	09210	29	6.659	0.5391	0.0018	13152
108.00	(2) LPA-80063/6CF	29	5.572	0.4955	0.0016	13956
86.00	09210	29	3.489	0.4038	0.0011	10745
80.00	GPS Antenna	29	3.008	0.3725	0.0010	11141

Base Plate Design Data

Plate Thickness	Number of Anchor Bolts	Anchor Bolt Size	Actual Allowable Ratio Bolt Tension	Actual Allowable Ratio Bolt Compression	Actual Allowable Ratio Plate Stress	Actual Allowable Ratio Stiffener Stress	Controlling Condition	Ratio
in		in	K	K	ksi	ksi		
2.0000	24	2.0000	98.49	102.52	25.552	31.870	Stiff	1.18 ✓
			93.31	154.89	27.000	27.000		
			1.06	0.66	0.95	1.18		

Pole Interaction Design Data

Section No.	Elevation	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bs}}{F_{bs}}$	Ratio $\frac{f_{bv}}{F_{bv}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
	ft								
L1	150 - 130 (1)	0.006	0.155	0.000	0.034	0.000	0.162 ✓	1.333	H1-3+VT ✓
L2	130 - 115 (2)	0.010	0.445	0.000	0.047	0.000	0.456 ✓	1.333	H1-3+VT ✓
L3	115 - 95 (3)	0.010	0.499	0.000	0.052	0.000	0.510 ✓	1.333	H1-3+VT ✓
L4	95 - 91 (4)	0.012	0.630	0.000	0.053	0.000	0.642 ✓	1.333	H1-3+VT ✓
L5	91 - 51 (5)	0.013	0.738	0.000	0.046	0.001	0.751 ✓	1.333	H1-3+VT ✓
L6	51 - 40 (6)	0.016	0.882	0.000	0.047	0.001	0.899 ✓	1.333	H1-3+VT ✓
L7	40 - 19 (7)	0.014	0.754	0.000	0.040	0.000	0.769 ✓	1.333	H1-3+VT ✓
L8	19 - 0 (8)	0.019	0.892	0.000	0.041	0.000	0.911 ✓	1.333	H1-3+VT ✓

Section Capacity Table

Section No.	Elevation	Component Type	Size	Critical Element	P	$SF*P_{allow}$	% Capacity	Pass Fail
	ft				K	K		
L1	150 - 130	Pole	TP34.3125x27.8125x0.25	1	-4.50	939.80	12.2	Pass
L2	130 - 115	Pole	TP38.6875x32.1875x0.25	2	-8.02	1072.70	34.2	Pass
L3	115 - 95	Pole	TP45.1875x38.6875x0.3125	3	-12.08	1554.57	38.3	Pass
L4	95 - 91	Pole	TP45.8125x42.6125x0.3125	4	-14.86	1632.41	48.2	Pass
L5	91 - 51	Pole	TP58.875x45.8125x0.375	5	-23.18	2378.06	56.3	Pass
L6	51 - 40	Pole	TP61.6875x55.5125x0.375	6	-30.47	2479.26	67.4	Pass
L7	40 - 19	Pole	TP68.5x61.6875x0.4375	7	-34.68	3235.36	57.7	Pass
L8	19 - 0	Pole	TP73.8125x64.7054x0.4375	8	-48.12	3408.81	68.4	Pass
							Summary	
						Pole (L8)	68.4	Pass
						Base Plate	88.5	Pass
						RATING =	88.5	Pass

FOUNDATION PRINTOUT

```
Version: FDN2-D72/AL
**********************************************************
*               FOUNDATION ANALYSIS PROGRAM              *
*                      Pier Analysis                     *
*         (c) 1999, Malouf Engineering Intl., Inc.       *
**********************************************************
```

MEI JOB NUMBER = **CT01125M-08V2**
DESCRIPTION = 150 FT MONOPOLE FOUNDATION CHECK
SITE NAME = DAYVILLE, WINDHAM CO., CT 06241
CLIENT NAME = **VERIZON WIRELESS**
CHECK CODE = TIA/EIA-222-REV. F
TIME/DATE/FILE = 17:33:28 / 10-08-2008 / CT1125-2.dat

INPUT DATA

			ORIGINAL DESIGN
LOADS			
COMPRESSION FORCE	=	48.120 KIPS	34.500 KIPS
UPLIFT FORCE	=	.000 KIPS	.000 KIPS
SHEAR FORCE	=	37.710 KIPS	35.000 KIPS
MOMENT	=	3416.780 KIP-FT	3646.100 KIP-FT

PIER DIMENSIONS AND PROPERTIES		
PIER DEPTH	=	27.750 FT
PIER DIAMETER	=	7.500 FT
EXTENSION ABOVE GRADE	=	.250 FT
FACTOR OF SAFETY VALUES		
F.O.S. BEARING PRESSURE	=	2.000
F.O.S. PASSIVE PRESSURE	=	2.000
F.O.S. CONCRETE WEIGHT	=	1.250
F.O.S. SOIL WEIGHT	=	1.500
F.O.S. SKIN FRICTION (UPLIFT)	=	2.000
F.O.S. SKIN FRICTION (DOWNLD)	=	2.000

SOIL LAYER DATA (WATER DEPTH= 15.0FT)

DESCRIPTION	THK ft	DEPTH ft	PHI deg	Cu ksf	ULT. PASS.PR kcf	ULT. SKIN FR ksf	SOIL DENS. kcf	CONCR. DENS. kcf	ULT. Q ksf
1 NEGLECT	6.5	6.5	.0	.000	.000	.000	.100	.150	.0
2 LAYER 1	5.0	11.5	.0	1.750	.935*	.613+	.105	.150	.0
3 LAYER 2	3.5	15.0	.0	2.000	1.589*	.700+	.110	.150	8.0
4 LAYER 2	12.0	27.0	.0	2.000	.511*	.700+	.048	.088	8.0
5 CORED ROCK	.8	27.8	35.0	.000	10.699*	.649+	.058	.088	8.0

* PASSIVE PRESSURE COMPUTED BASED ON ANGLE OF FRICTION AND COHESION
\+ SKIN FRICTION COMPUTED BASED ON ANGLE OF FRICTION AND COHESION (ALPHA= .35)

*** COMMENTS ***
-FOUNDATION DESIGN SPECIFICATIONS AND PARTIAL GEOTECHNICAL DATA
AS PER FRED A. NUDD CORP, PROJECT #6090, SITE #CT-11-3968 DATED 07/1998.
-NO GEOTECHNICAL REPORT WAS MADE AVAILABLE.
-GROUNDWATER AT 15 FT BELOW GRADE AS PER DESIGN NOTES
-PARTIALLY ASSUMED SOIL PARAMETERS AS PER ORIGINAL REACTIONS

RESULTS

COMPARISON WITH ORIGINAL DESIGN LOADS

ORIGINAL COMPRESSION	=	34.5 KIPS	< 48.1 KIPS	(CHECK)	R= 1.395
ORIGINAL SHEAR	=	35.0 KIPS	< 37.7 KIPS	(CHECK)	R= 1.077
ORIGINAL MOMENT	=	3646.1 K-FT	> 3416.8 K-FT	(OK)	R= .937

WT./VOL. OF SOIL ABOVE	=	.0 KIPS / .000 FT3
WT./VOL. OF CONCRETE PIER	=	150.4 KIPS / 1237.002 FT3
SKIN RESISTANCE	=	169.6 KIPS (ALLOWABLE)
TIP BEARING CAPACITY	=	176.7 KIPS (ALLOWABLE)

UPLIFT CAPACITY OF PIER	=	290.0 KIPS	> .0 KIPS	(OK)	R= .000
TOTAL DOWNLOAD CAPACITY	=	176.7 KIPS	> 48.1 KIPS	(OK)	R= .272

BROM'S METHOD FOR COHESIVE SOILS:

DEPTH OF SOIL NEGLECTED	=	6.500 FT			
AVERAGE COHESION VALUE	=	1.432 KSF			
REQUIRED PIER LENGTH	=	24.586 FT	(.390 FT DEPTH TO ZERO SHEAR)		
AVAILABLE PIER LENGTH	=	27.750 FT	> 24.586 FT	(OK)	R= .886
MAXIMUM MOMENT	=	3678.68 KIP-FT			

REINFORCEMENT CHECK (PIER FOUNDATION) L= 28.00' D= 90.0" C= 3.0" FC= 3000 PSI

FACTORED MOMENT LOAD	=	5313.64 KIP-FT
FACTORED COMPRESSION LOAD	=	83.41 KIPS (ECC=917.37")
REINFD. COMPR. CAPACITY	=	128.93 KIPS (COMPR. & MOMENT: TENSION CONTROLS)
REQUIRED STEEL AREA	=	33.77 IN2 (COMPR. AND MOMENT)
REQUIRED STEEL AREA	=	31.81 IN2 (ACI MIN.= 0.005A)
TOTAL BAR AREA PROVIDED	=	51.84 IN2 (66 x NO. 8 BARS) /FY= 60.KSI,C= 3.0"

THE TOTAL BAR AREA PROVIDED IS SUFFICIENT.
VERT. BAR CLEAR SPACING = 3.00 IN

ANALYSIS OF CIRCULAR SECTIONS WITH OPENINGS

Tower Type & Height : **150 ft. - 12-Sided / Monopole Tower**

Site : **Danielson North Site, Dayville, CT. (Windham County)**

MEI Job ID # : **CT01125M-08V2**

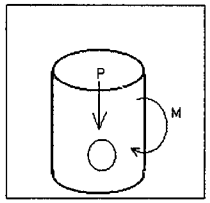
Defined Units and Constants

$psf := \frac{lb}{ft^2}$ $kip := 1000 \cdot lb$ $kips := 1000 \cdot lb$ $plf := \frac{lb}{ft}$ $ft\_lb := ft \cdot lb$ $ksi := \frac{kip}{in^2}$

$ksf := \frac{kip}{ft^2}$ $kcf := \frac{kip}{ft^3}$ $ft\_K := 1000 \cdot ft \cdot lb$ $cy := ft^3 \cdot 27$ $psi := \frac{lb}{in^2}$ $pcf := \frac{lb}{ft^3}$

INPUT LOADS @ ELEV: 11'-0"

Loads as per MEI analysis Job ID No. CT01125M-08V2



Max. Vertical load above the center of the opening: $P := 48.12 \cdot kips$

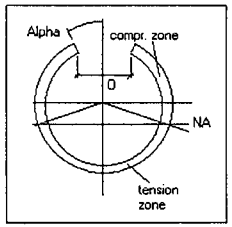
Max. Overturning Moment at level of opening: $M := 3860.00 \cdot ft\_K$

INPUT PROPERTIES

Diameter of tank at level of opening (through center of hole): $D := 70.23475 \cdot in$

Thickness of tank at level of opening: $thk := 0.4375 \cdot in$

Diameter of total openings: (with 1 portholes) $O := 11.00 \cdot in$



CALCULATIONS

$R := \frac{D}{2}$ $R = 2.926\,ft$ $R1 := R - thk$ $R1 = 2.89\,ft$

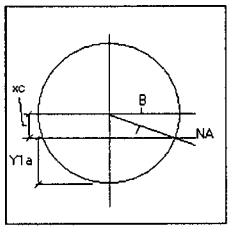
Formulae based on [1] Section 5.6 of Tubular Steel Structures - Theory & Design by M.S. Troitsky -1982 and [2] Roark's Formulas for Stress & Strain - 6th Edition

$\alpha := asin\left(\frac{0.5 \cdot O}{R1}\right)$ $\alpha = 9.125\,deg$ (1/2 angle of chord cut by opening)

$A_{ring} := \pi \cdot \left(R^2 - R1^2\right)$ $A_{ring} = 0.666\,ft^2$ (area of section with no opening)

$Area := \frac{2 \cdot \pi - 2 \cdot \alpha}{2 \cdot \pi} \cdot A_{ring}$ $Area = 0.632\,ft^2$ (area of section with opening)

$\frac{A_{ring} - Area}{A_{ring}} \cdot 100 = 5.07$ (% of area lost due to opening)



Locate Neutral Axis (Table 1-20: Ref. 2):

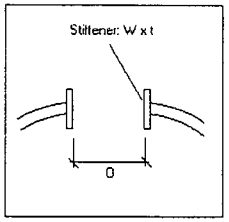
$\alpha 1 := 180 \cdot deg - \alpha$

$Y1a := (R) \cdot \left[1 - \frac{2 \cdot \sin(\alpha 1)}{3 \cdot \alpha 1} \cdot \left(1 - \frac{thk}{R} + \frac{1}{2 - \frac{thk}{R}}\right)\right]$ $Y1a = 2.772\,ft$

$xc := R - Y1a$ $xc = 0.1547\,ft$ (distance from center without opening to NA of section with opening)

Design of Stiffeners Around Opening: $RD := \frac{D}{2}$

Preliminary Area of stiffener required, one on each side:



$d := \sqrt{R1^2 - 0.25 \cdot O^2}$ $d = 2.853\,ft$

Mean diameter, Dm $D_m := D - thk$ $D_m = 69.797\,in$

Required Cross Sectional Area of Each Stiffener by Equalizing the statical Moments of the Cross Sectional Areas of the Stiffeners (5.127 Tubular Steel Structures)

$A_{req} := \frac{thk \cdot RD^2 \cdot \sin(\alpha) \cdot R}{d}$ $A_{req} = 1.874\,in^2$

Sizing the Stiffeners

Use a Stiffener Thickness Equal to: $ts := 1.000 \cdot in$

Stiffener Steel Yield Strength $Fys := 50.00 \cdot ksi$ $\sigma_{allstiff} := 0.6 \cdot Fys$ $\sigma_{allstiff} = 30.00\,ksi$ *w /o Increase*

Using a Stiffener Width Equal to: $ws := 4.00 \cdot in$ $A_{stiff} := ws \cdot ts$ $A_{stiff} = 4.000\,in^2$

The Minimum Stiffener Width recommended due to Stress Concentrations is: $w_{req} := \frac{A_{req}}{ts}$ $w_{req} = 1.874\,in$

Compressive Stress in Each Stiffener due to Axial Load: (5.129 Tubular Steel Structures)

$P_{stiff} := \frac{P \cdot \alpha}{2 \cdot \pi}$ $P_{stiff} = 1.220\,kips$

$\sigma_p := \frac{P_{stiff}}{A_{stiff}}$ $\sigma_p = 0.305\,ksi$

Compressive Stress in the Shaft's Wall due to Moment: (5.131 Tubular Steel Structures)

$\sigma_{msthaft} := \frac{4 \cdot M}{\pi \cdot D_m^2 \cdot thk}$ $\sigma_{msthaft} = 27.671\,ksi$

$A_{gshaft} := \pi \cdot D_m \cdot thk$ $A_{gshaft} = 95.933\,in^2$

Approximate Load Imposed on Each Stiffener due to Moment: (5.133 Tubular Steel Structures)

$P_w := \left(\frac{4 \cdot M}{\pi \cdot D_m^2 \cdot thk}\right) \cdot \left(\pi \cdot D_m \cdot thk\right) \left(\frac{\alpha}{360 \cdot deg}\right)$ $P_w = 67.287\,kips$

$\sigma_m := \frac{P_w}{A_{stiff}}$ $\sigma_m = 16.822\,ksi$

Combined Stiffener Stress Ratio: $\sigma_{stiff} := \frac{\sigma_p + \sigma_m}{\sigma_{allstiff}}$ $\sigma_{stiff} = 0.571$ **< 1.00 OK**

ANALYSIS OF CIRCULAR SECTIONS WITH OPENINGS

Tower Type & Height : 150 ft. - 12-Sided / Monopole Tower

Site : Danielson North Site, Dayville, CT. (Windham County)

MEI Job ID # : CT01125M-08V2

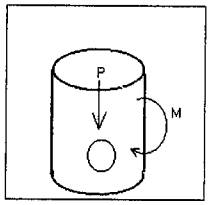
Defined Units and Constants

$psf := \frac{lb}{ft^2}$ $kip := 1000 \cdot lb$ $kips := 1000 \cdot lb$ $plf := \frac{lb}{ft}$ $ft\_lb := ft \cdot lb$ $ksi := \frac{kip}{in^2}$

$ksf := \frac{kip}{ft^2}$ $kcf := \frac{kip}{ft^3}$ $ft\_K := 1000 \cdot ft \cdot lb$ $cy := ft^3 \cdot 27$ $psi := \frac{lb}{in^2}$ $pcf := \frac{lb}{ft^3}$

INPUT LOADS @ ELEV: 110'-0"

Loads as per MEI analysis Job ID No. CT01125M-08V2



Max. Vertical load above the center of the opening: $P := 12.070 \cdot kips$

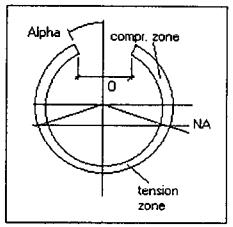
Max. Overturning Moment at level of opening: $M := 1020.00 \cdot ft\_K$

INPUT PROPERTIES

Diameter of tank at level of opening (through center of hole): $D := 40.3125 \cdot in$

Thickness of tank at level of opening: $thk := 0.3125 \cdot in$

Diameter of total openings: (with 1 porthole) $O := 6.00 \cdot in$



CALCULATIONS

$R := \frac{D}{2}$ $R = 1.68\,ft$ $R1 := R - thk$ $R1 = 1.654\,ft$

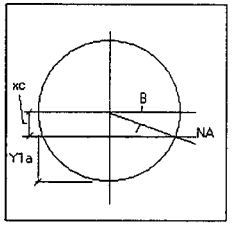
Formulae based on [1] Section 5.6 of Tubular Steel Structures - Theory & Design by M.S. Troitsky -1982 and [2] Roark's Formulas for Stress & Strain - 6th Edition

$\alpha := \asin\left(\frac{0.5 \cdot O}{R1}\right)$ $\alpha = 8.695\,deg$ *(1/2 angle of chord cut by opening)*

$A_{ring} := \pi \cdot \left(R^2 - R1^2\right)$ $A_{ring} = 0.273\,ft^2$ *(area of section with no opening)*

$Area := \frac{2 \cdot \pi - 2 \cdot \alpha}{2 \cdot \pi} \cdot A_{ring}$ $Area = 0.26\,ft^2$ *(area of section with opening)*

$\frac{A_{ring} - Area}{A_{ring}} \cdot 100 = 4.831$ *(% of area lost due to opening)*



Locate Neutral Axis (Table 1-20: Ref. 2):

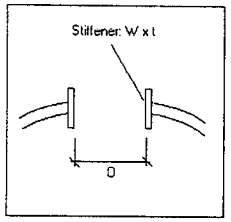
$\alpha 1 := 180 \cdot deg - \alpha$

$Y1a := (R) \cdot \left[1 - \frac{2 \cdot \sin(\alpha 1)}{3 \cdot \alpha 1} \cdot \left(1 - \frac{thk}{R} + \frac{1}{2 - \frac{thk}{R}}\right)\right]$ $Y1a = 1.595\,ft$

$xc := R - Y1a$ $xc = 0.0843\,ft$ (distance from center without opening to NA of section with opening)

Design of Stiffeners Around Opening: $RD := \frac{D}{2}$

Preliminary Area of stiffener required, one on each side:



$d := \sqrt{R1^2 - 0.25 \cdot O^2}$ $d = 1.635\,ft$

Mean diameter, Dm $D_m := D - thk$ $D_m = 40\,in$

Required Cross Sectional Area of Each Stiffener by Equalizing the statical Moments of the Cross Sectional Areas of the Stiffeners (5.127 Tubular Steel Structures)

$A_{rec} := \frac{thk \cdot RD^2 \cdot \sin(\alpha) \cdot R}{d}$ $A_{rec} = 0.734\,in^2$

Sizing the Stiffeners

Use a Stiffener Thickness Equal to: $ts := 0.500 \cdot in$

Stiffener Steel Yield Strength $Fys := 42.00 \cdot ksi$ $\sigma_{allstiff} := 0.6 \cdot Fys$ $\sigma_{allstiff} = 25.20\,ksi$ *w /o Increase*

Using a Stiffener Width Equal to: $ws := 3.00 \cdot in$ $A_{stiff} := ws \cdot ts$ $A_{stiff} = 1.500\,in^2$

The Minimum Stiffener Width recommended due to Stress Concentrations is: $w_{rec} := \frac{A_{rec}}{ts}$ $w_{rec} = 1.468\,in$

Compressive Stress in Each Stiffener due to Axial Load: (5.129 Tubular Steel Structures) $P_{stiff} := \frac{P \cdot \alpha}{2 \cdot \pi}$ $P_{stiff} = 0.292\,kips$

$\sigma_p := \frac{P_{stiff}}{A_{stiff}}$ $\sigma_p = 0.194\,ksi$

Compressive Stress in the Shaft's Wall due to Moment: (5.131 Tubular Steel Structures) $\sigma_{msfhaft} := \frac{4 \cdot M}{\pi \cdot D_m^2 \cdot thk}$ $\sigma_{msfhaft} = 31.169\,ksi$

$A_{gshaft} := \pi \cdot D_m \cdot thk$ $A_{gshaft} = 39.27\,in^2$

Approximate Load Imposed on Each Stiffener due to Moment: (5.133 Tubular Steel Structures) $P_w := \left(\frac{4 \cdot M}{\pi \cdot D_m^2 \cdot thk}\right) \cdot \left(\pi \cdot D_m \cdot thk\right) \cdot \left(\frac{\alpha}{360 \cdot deg}\right)$ $P_w = 29.564\,kips$

$\sigma_m := \frac{P_w}{A_{stiff}}$ $\sigma_m = 19.710\,ksi$

Combined Stiffener Stress Ratio: $\sigma_{stiff} := \frac{\sigma_p + \sigma_m}{\sigma_{allstiff}}$ $\sigma_{stiff} = 0.790$ **< 1.00 OK**

STATE OF CONNECTICUT

CONNECTICUT SITING COUNCIL

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

Daniel F. Caruso
Chairman

July 28, 2008

The Honorable Janice Thurlow
Chairman Town Council
Town of Killingly
Town Office Building
172 Main Street
P. O. Box 6000
Danielson, CT 06239-6000

RE: **EM-VER-069-080725** – Cellco Partnership d/b/a Verizon Wireless notice of intent to modify an existing telecommunications facility located at 79 Putnam Pike, Killingly, Connecticut.

Dear Ms. Thurlow:

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

If you have any questions or comments regarding this proposal, please call me or inform the Council by August 11, 2008.

Thank you for your cooperation and consideration.

Very truly yours,

S. Derek Phelps
Executive Director

SDP/jb

Enclosure: Notice of Intent

c: Roger Gandolf, Zoning Officer, Town of Killingly
Bruce E. Benway, Town Manager, Town of Killingly

ROBINSON & COLE LLP

KENNETH C. BALDWIN

280 Trumbull Street
Hartford, CT 06103-3597
Main (860) 275-8200
Fax (860) 275-8299
kbaldwin@rc.com
Direct (860) 275-8345

EM-VER-069-080725

ORIGINAL

July 25, 2008

Via Hand Delivery

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

Re: **Notice of Exempt Modification**
79 Putnam Pike, Killingly, Connecticut

Dear Mr. Phelps:

Cellco Partnership d/b/a Verizon Wireless ("Cellco") intends to install antennas on the existing 150-foot self-supporting monopole owned by The Town of Killingly (the "Town") at 79 Putnam Pike in Killingly, Connecticut. Please accept this letter as notification pursuant to R.C.S.A. § 16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.C.S.A. § 16-50j-73, a copy of this letter is being sent to Bruce E. Benway, Town Manager of the Town of Killingly. The Town is the owner of the property on which the tower is located.

The facility consists of a 150-foot self-supporting monopole tower capable of supporting multiple carriers within a fenced compound at 79 Putnam Pike in Killingly. The tower is currently shared by the Town with antennas at the 118-foot level; T-Mobile with antennas at the 150-foot level; Sprint with antennas located at the 140-foot level; and AT&T with antennas located at the 130-foot level on the tower. Cellco intends to install six (6) LPA-80063/6CF antennas and six (6) LPA 185063/12CF antennas at the 108-foot level on the tower. Associated equipment, including a propane fueled back-up generator, will be located within a 12' x 30' equipment shelter on the ground near the base of the tower. Cellco also intends to install a 1000 gallon propane tank within the fence compound. Attached behind Tab 1 are Project Plans for the proposed Cellco facility.

The planned modifications to the Killingly facility fall squarely within those activities explicitly provided for in R.C.S.A. § 16-50j-72(b)(2).

1. The proposed modification will not increase the overall height of the existing tower. Cellco's antennas will be mounted with their centerline at the 108-foot level on the 150-foot tower.

2. The proposed installation of associated equipment within a shelter will require an extension of the fenced compound but will not extend beyond the limits of the town property.

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

4. The operation of the antennas will not increase radio frequency (RF) power density levels at the facility to a level at or above the Federal Communications Commission (FCC) adopted safety standard. The RF power density calculations for existing and Cellco antennas would be 64.87% of the FCC standard. A cumulative power density calculations table is included behind Tab 2.

Included behind Tab 3 is a Structural Analysis Report confirming that the tower can support the existing and Cellco antennas, and associated equipment.

For the foregoing reasons, Cellco respectfully submits that the proposed antenna installation at the facility constitutes an exempt modification under R.C.S.A. § 16-50j-72(b)(2).

Sincerely,

Kenneth C. Baldwin

KCB/ct
Attachments
Copy to:
Bruce E. Benway, Killingly Town Manager
Sandy M. Carter
Michelle Kababik

Cellco Partnership

d.b.a. **verizon** wireless

WIRELESS COMMUNICATIONS FACILITY

DANIELSON NORTH
79 PUTNAM PIKE
DAYVILLE, CT 06241

SITE DIRECTIONS

FROM: 99 EAST RIVER DRIVE, EAST HARTFORD, CONNECTICUT TO: 79 PUTNAM PIKE, DAYVILLE, CONNECTICUT

1.	Start out going EAST on E RIVER DR.	0.0 MI.
2.	Merge onto I-84 E/US-6 E via the ramp on the LEFT toward BOSTON.	0.3 MI.
3.	Merge onto CT-2 E via EXIT 55 toward NORWICH/NEW LONDON.	36.5 MI.
4.	Merge onto I-395 N via EXIT 28N toward PROVIDENCE.	27.5 MI.
5.	Take the CT-101 exit, EXIT 93, toward DAYVILLE/KILLINGLY.	0.2 MI.
6.	Turn RIGHT onto CT-101/HARTFORD PIKE.	0.1 MI.
7.	Turn SHARP LEFT onto PUTNAM PIKE/CT-12.	0.4 MI.
8.	End at 79 Putnam Pike Dayville, CT 06241-1606.	

GENERAL NOTES

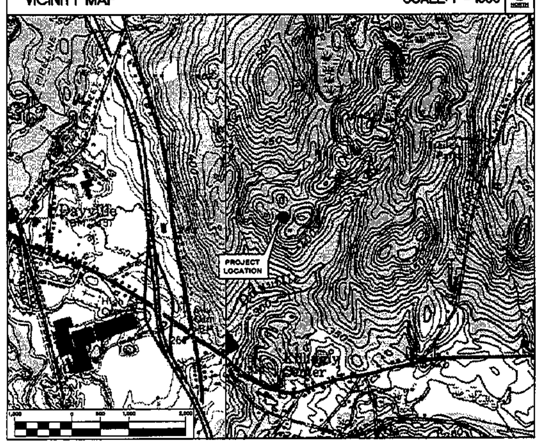
1. PROPOSED ANTENNA LOCATIONS AND HEIGHTS PROVIDED BY CELLCO PARTNERSHIP.

PROJECT SCOPE

1. THE PROPOSED SCOPE OF WORK GENERALLY INCLUDES THE INSTALLATION OF A 12'x30' PREFABRICATED WIRELESS EQUIPMENT SHELTER ON A CONCRETE FOUNDATION WITHIN THE EXISTING WIRELESS COMMUNICATIONS LEASE AREA.
2. A TOTAL OF TWELVE (12) DIRECTIONAL PANEL ANTENNAS ARE PROPOSED TO BE MOUNTED ON AN EXISTING 150' TALL MONOPOLE TOWER AT A RAD CENTER ELEVATION OF 108' ABOVE TOWER BASE PLATE.
3. ELECTRIC AND TELCO UTILITIES SHALL BE ROUTED UNDERGROUND TO THE PROPOSED EQUIPMENT SHELTER FROM AN EXISTING UTILITY BACKBOARD LOCATED WITHIN THE FENCED COMPOUND.

VICINITY MAP

SCALE: 1" = 1000'



PROJECT SUMMARY

SITE NAME:	DANIELSON NORTH
SITE ADDRESS:	79 PUTNAM PIKE DAYVILLE, CT 06241
LESSEE/ TENANT:	CELLCO PARTNERSHIP d.b.a. VERIZON WIRELESS 99 EAST RIVER DRIVE EAST HARTFORD, CT 06108
CONTACT PERSON:	SANDY CARTER CELLCO PARTNERSHIP (860) 803-8219
TOWER COORDINATES:	LATITUDE 41°-50'-50" LONGITUDE 71°-52'-16" COORDINATES ARE BASED ON CONNECTICUT SITING COUNCIL DATABASE.

SHEET INDEX

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

DESIGNED BY:	CFC
DRAWN BY:	CMS
CHK'D BY:	DMD

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
A	07/17/08	CMS	DMD	ISSUED FOR CSC REVIEW

PROFESSIONAL ENGINEER SEAL

Cellco Partnership d.b.a. verizon wireless

NATCOMM

VERIZON WIRELESS

WIRELESS COMMUNICATIONS FACILITY

DANIELSON NORTH

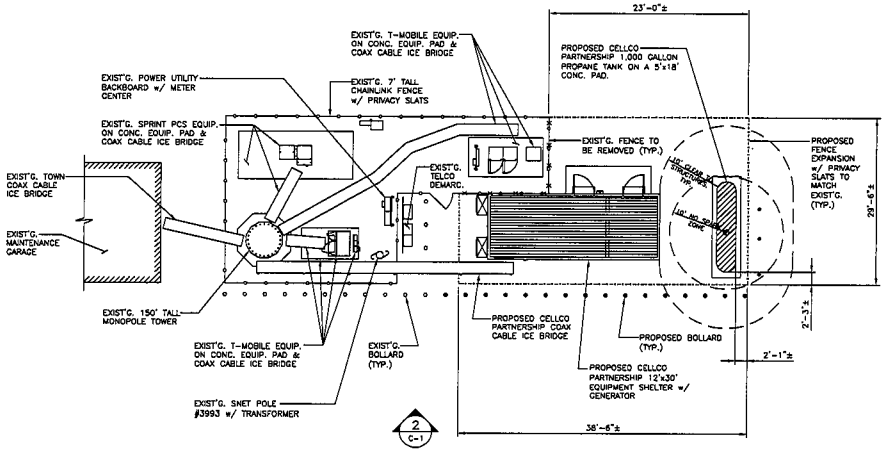
79 PUTNAM PIKE
DAYVILLE, CT 06241

DATE:	07/17/08
SCALE:	AS NOTED
JOB NO.	06147

TITLE SHEET

T-1

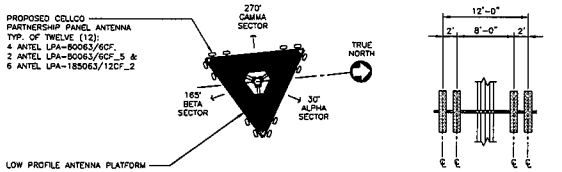
Sheet No. 1 of 2



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

TRUE NORTH

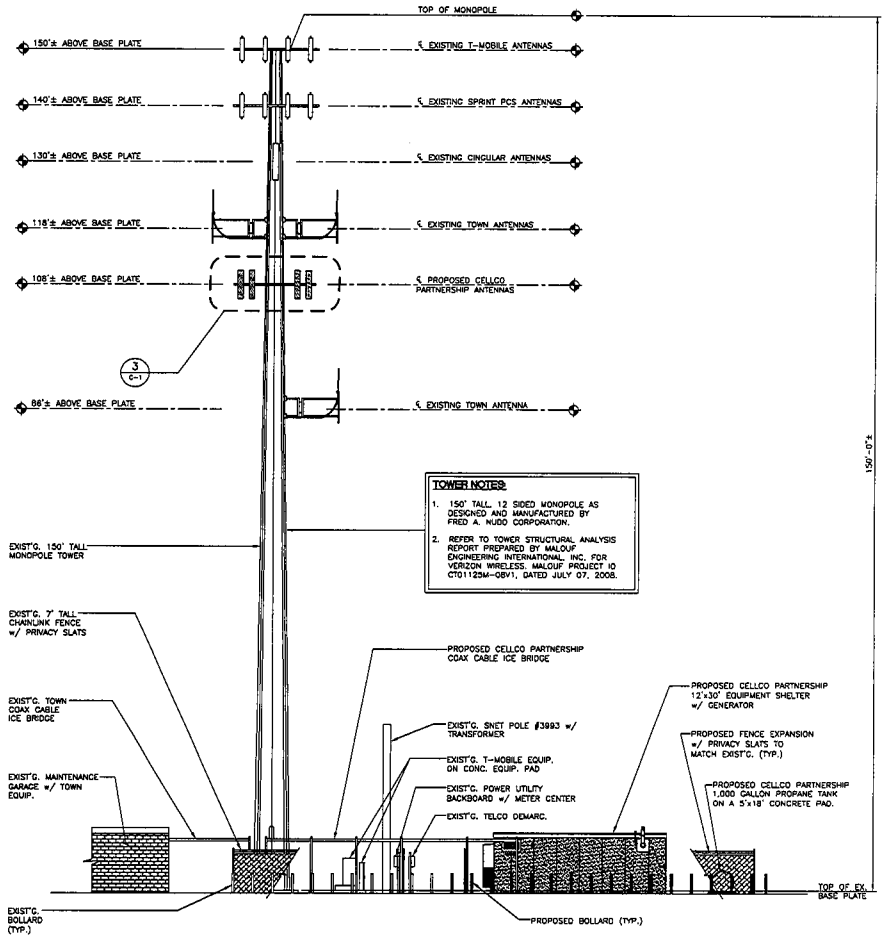
GRAPHIC SCALE
10 0 5 10 20 40
(IN FEET)
1 inch = 10 ft.



PLAN VIEW

TYPICAL SECTOR ELEVATION

3 C-1 **ANTENNA MOUNTING CONFIGURATION**
NOT TO SCALE



2 C-1 **SOUTHERN ELEVATION**
SCALE: 1" = 10'

GRAPHIC SCALE
10 0 5 10 20 40
(IN FEET)
1 inch = 10 ft.

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
A	07/17/08	CMS	DMD	ISSUED FOR CSC REVIEW

DESIGNED BY: CFC
DRAWN BY: CMS
CHK'D BY: DMD

PROFESSIONAL ENGINEER SEAL

Cellco Partnership
d.b.a. Verizon wireless

NATORNI

VERIZON WIRELESS
WIRELESS COMMUNICATIONS FACILITY
DANIELSON NORTH
79 PUTNAM PIKE
DAYVILLE, CT 06241

DATE: 07/17/08
SCALE: AS NOTED
JOB NO: 06147

COMPOUND PLAN AND ELEVATION

C-1
Sheet No. 2 of 2

	General	Power	Density					
Site Name: Danielson N								
Tower Height: Verizon @ 108Ft.								
CARRIER	**# OF CHAN.**	**WATTS ERP**	**HEIGHT**	**CALC. POWER DENS**	**FREQ.**	**MAX. PERMISS. EXP.**	**FRACTION MPE**	**Total**
*Cingular GSM	2	427	130	0.0182	1900	1.0000	1.82%	
*Cingular GSM	2	296	130	0.0126	880	0.5867	2.15%	
*AT&T	4	250	150	0.0160	1930	1.0000	1.60%	
*AT&T	4	250	140	0.0183	1962.5	1.0000	1.83%	
*AT&T	4	200	118	0.0207	155.72	0.2000	10.35%	
*AT&T	4	200	86	0.0389	155.74	0.2000	19.45%	
Verizon	**6**	**485**	**108**	**0.0897**	**880**	**1.0000**	**8.97%**	
Verizon	**9**	**393**	**108**	**0.1090**	**1900**	**0.5830**	**18.70%**	
								64.87%
* Source: Siting Council								

Structural Analysis Report

verizonwireless
We never stop working for you.®

VzW_Danielson North, CT

Owner: Town of Killingly - Killingly North Site
79 Putnam Pike, Dayville, CT 06241

July 07, 2008

MEI PROJECT ID: CT01125M-08V1

MALOUF ENGINEERING INTL., INC.
STRUCTURAL CONSULTANTS

17950 PRESTON ROAD, SUITE 720 • DALLAS, TEXAS 75252-5635 • TEL. 972 -783-2578 FAX 972-783-2583
www.maloufengineering.com

TIA PROFESSIONAL MEMBER ACEC MEMBER

MALOUF ENGINEERING INTL., INC.

STRUCTURAL CONSULTANTS

July 07, 2008

STRUCTURAL ANALYSIS

Structure:	150 ft **Monopole**		Fred A. Nudd / HM180 / 12-Sided	
Client/Site Name/#:	**Verizon Wireless**		**Danielson North, CT**	
Owner/Site Name/#:	Town of Killingly		Killingly North	
MEI Project ID:	**CT01125M-08V1**			
Location:	79 Putnam Pike Dayville, CT 06241		Windham County FCC #N/A	
	LAT	41-50-50.47 N	LON	71-52-44.27 W

EXECUTIVE SUMMARY:

Malouf Engineering Int'l (MEI), as requested, has performed a structural analysis of the above mentioned structure to assess the impact of the changed condition as noted in Table 1.

Based on the stress analysis performed, the existing structure **is marginally in conformance** with the ANSI/TIA **222-F** Standard for the loading considered under the criteria listed and referenced in the report sections – *tower rated at 104.3%.*

The installation of the proposed changed condition *of the Verizon Wireless (4) Antel LPA 80063/6CF Panel Antennas, (2) Antel LPA 80063/6CF_5 Panel Antennas, (6) (6) Antel LPA 80063/12CF_2 Panel Antennas onto Valmont 13ft L.P. Platform w/o Rails (p/n#852208 or equivalent) at Elev. 108.0 ft c.l fed with (12) 1-5/8" coax Lines (external – tightly strapped to pole)* ***is structurally acceptable.***
The tower is at maximum support capacity with the loading considered.

MEI appreciates the opportunity of providing our continuing professional services to you. If you have any questions or need further assistance on this or any other projects please contact us.

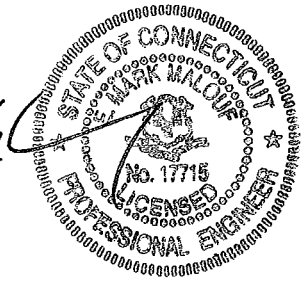
Respectfully submitted,

MALOUF ENGINEERING INT'L, INC.

Analysis performed by:

Krishna Manda, PE
Project Engineer

Reviewed & Approved by:



E. Mark Malouf, PE
Connecticut #17715
972-783-2578 ext. 106
mmalouf@maloufengineering.com

TABLE OF CONTENTS

1. INTRODUCTION & SCOPE

A structural analysis was performed by Malouf Engineering Int'l (MEI), as requested and authorized by Mr. Douglas Culp, Verizon Wireless, to determine the acceptance of the proposed changed conditions in conformance with the ANSI/TIA-222-F Standard, "*Structural Standards for Steel Antenna Towers and Antenna Supporting Structures*".

The scope of this independent analysis is to determine the overall stability and the adequacy of structural members, foundations, and member connections, as available and stated. This analysis considers the structure to have been properly installed and maintained with no structural defects. Installation procedures and related loading are not with the scope of this analysis and should be performed and evaluated by a competent person of the erection contractor.

The different report sections detail the applicable information used in this evaluation, relating to the tower data, the appurtenances configuration and the wind and ice loading considered.

2. SOURCE OF DATA

The following information has been used in this evaluation as source data that accurately represent the existing structure and the related appurtenances:

	Source	Information	Reference
STRUCTURE			
Tower	MEI Records	Previous Structural Analysis	MEI ID: CT01125M-08V0 Dated 05/12/08
Foundation	MEI Records	Previous Structural Analysis	MEI ID: CT01125M-08V0 Dated 05/12/08
Material Grade	Available from supplied documents noted above – refer to Appendix.		
CURRENT APPURTENANCES			
	MEI Records / Douglas Culp - Verizon Wireless	Previous Structural Analysis / Recent Photos	MEI ID: CT01125M-08V0 Dated 05/12/08
CHANGED CONDITION			
	Mr. Douglas Culp - Verizon Wireless	Verizon RF Sheet / E-Mail Instructions	RF Data sheet

Background Information:

Based on available information, the following is known regarding this structure:

DESIGNER / FABRICATOR	Fred A. Nudd Corp. / 12-sided
DESIGN CRITERIA	TIA/EIA 222-E – 85/73 Mph + 0" /0.50" Ice
PRIOR STRUCTURAL MODIFICATIONS	None Known

3. ANALYSIS CRITERIA

The structural analysis performed used the following criteria:

CODE / STANDARD	ANSI/TIA-222-F-96 Standard	
LOADING CASES	*Full Wind*:	85 Mph - with No Radial Ice
	Iced Case:	73.6 Mph + 0.50" Radial Ice
	Service:	50 Mph

Appurtenances Configuration

The following appurtenances configuration has been considered:

Table 1: Proposed Changed Condition Appurtenances

Elev (ft)	Tenant	Ants Qty	Appurtenance Model / Description	Mount Description	Lines Qty	Line size & Location
108	Verizon Wireless	4	Antel LPA-80063/6CF	Valmont 13' LP platform w/o Rails (p/n 852208 or equivalent)	12	1-5/8" (E) (tighly strapped to pole)
		2	Antel LPA-80063/6CF_5			
		6	Antel LPA-185063/12CF_2			

Table 2: Current and Reserved/Future Appurtenances

Elev (ft)	Tenant	Ants Qty	Appurtenance Model / Description	Mount Description	Lines Qty	Line size & Location
150		1	Lightning Rod			
150	T-Mobile	6	EMS RV-90-17-02DP	(3) Sector mounts	6	1-5/8" (I)
		6	FE-1580-1-P72 TMA's			
140[4]	Sprint	12	DB980 Panels	(3) Sector mounts	12	1-5/8" (I)
130[7]	AT&T	3	7770 Panel Antennas	3-Way close-contact ring mount	6	1-5/8" (I)
		6	TMA's		1	1/2" (I)
		6	Kathrein 860-10025 RCU's			
118	Town of Killingly	2	Dapa 09210 Whips	(2) Side arm mounts	2	1-5/8" (I)
86[5]		1	Dapa 09210 Whip	Side arm mount	1	1-5/8" (I)
80[6]	Sprint	1	GPS Antenna		1	1/2" (I)

Notes:

1. *Please note appurtenances not listed above are to be removed/not present as per data supplied.*
2. (I) = internal; (E) = External; (FZ) = Within Face Zone & (OFZ) = Outside Face Zone - as per TIA-222-G.
3. The above antennas, mounts, and lines represent MEI's understanding of the appurtenances configuration. If different than above, the analysis is invalid. Please refer to Appendix 2 for EPA wind areas used in the calculations. Please contact MEI if any discrepancies are found.
4. Sprint PCS, existing (6) antennas and future (6) antennas
5. Town of killings, future / reserved loading
6. Sprint PCS, existing / reserved loading
7. AT&T reserved loading

4. ANALYSIS PROCEDURE

The subject structure is analyzed for feasibility of the installation of the proposed changed condition previously noted. The data records furnished were reviewed and a computer stress analysis was performed in accordance with the TIA-222 Standard provisions and with the agreed scope of work terms and the results of this analysis are reported.

Analysis Program

The computer program used to model the structure is a rigorous Finite Element Analysis program, RISATower (ver. 5.2.1.0), a commercially available program developed by C-Concepts, WI and now maintained by RISA Technologies. The latticed structures members are modeled using beam/truss and cable members and the pole members using tubular beam elements. The structural parameters and geometry of the members are included in the model. The dead and temperature loads and the wind loads are internally calculated by the program for the different wind directions and then applied as external loads on the structure.

Assumptions

This engineering study is based on the theoretical capacity of the members and is not a condition assessment of the structure. This analysis is based on information supplied, and therefore, its results are based on and as accurate as that supplied data. MEI has made no independent determination, nor is it required to, of its accuracy. The following assumptions were made for this structural stress analysis:

- This existing tower is assumed, for the purpose of this analysis, to have been properly maintained and to be in good condition with no structural defects and with no deterioration to its member capacities ('as-new' condition).
- The tower member sizes and configuration are considered accurate as supplied. The material grade is as per data supplied and/or as assumed and as stated.
- The appurtenances configuration is as supplied and/or as stated in the report. It is assumed to be complete and accurate. All antennas, mounts, coax and waveguides are assumed to be properly installed and supported as per manufacturer requirements.
- Some assumptions are made regarding antennas and mounts sizes and their projected areas based on best interpretation of data supplied and of best knowledge of antenna type & industry practice.
- Mounts/Platforms are considered adequate to support the loading. No actual analysis of the platform/mount itself is performed, with the analysis being limited to analyzing the structure.
- The soil parameters are as per data supplied or as assumed and stated in the calculations. Refer to the Appendix. If no data is available, the foundation system is assumed to support the structure with its new reactions.
- All welds and connections are assumed to develop at least the member capacity, unless determined otherwise and explicitly stated in this report. All guy cable assemblies, as applicable, are assumed to develop the rated breaking strength of the wire.
- All prior structural modifications, if any, are assumed to be as per data supplied/available, and to have been properly installed and to be fully effective.

If any of the above assumptions are not valid or have been made in error, this analysis results may be invalided, MEI should be contacted to review any contradictory information to determine its effect.

5. ANALYSIS RESULTS

The results of the structural stress analysis based on data available and with the previous listed criteria, indicated the following:

Table 3: Stress Analysis Results

Member Type	Maximum Stress Ratio	Controlling Elev. (ft) / Component	Pass/Fail	Comment
POLE	70.8%	19.0 – 0ft	**Pass**	
ANCHOR BOLTS	103.8%	Bolt Tension	**Acceptable**	
BASE PLATE	**104.3%**	**Bending**	**Acceptable**	
FOUNDATION	102.3%	Lateral	**Acceptable**	

Notes:
1. The Maximum Stress Ratio is the percentage that the maximum load in the member is relative to the allowable load as determined by Code requirements.
2. Refer to the Appendix 2 for more details on the member loads.
3. A maximum stress ratio between 100% and 105% may be considered as *Acceptable* according to industry standard practice.

6. FINDINGS & RECOMMENDATIONS

- Based on the rigorous stress analysis results, the subject structure is **rated at 104.3%** of its support capacity (controlling component: Base Plate) with the proposed changed condition considered. Please refer to Table 3 and to Appendix 2 for more details of the analysis results.

- Based on the stress analysis performed, the existing structure **is marginally in conformance** with the ANSI/TIA **222-F** Standard for the loading considered under the criteria listed and referenced in the report sections.

- ***The installation of the proposed changed condition*** *of the Verizon Wireless (4) Antel LPA 80063/6CF Panel Antennas, (2) Antel LPA 80063/6CF_5 Panel Antennas, (6) (6) Antel LPA 80063/12CF_2 Panel Antennas onto Valmont 13ft L.P. Platform w/o Rails (p/n#852208 or equivalent) at Elev. 108.0 ft c.l fed with (12) 1-5/8" coax Lines (external – tightly strapped to pole)* ***is structurally acceptable***.

- This structure is at its maximum support capacity for the appurtenances and loading criteria considered. Therefore, No changes to the configuration considered should be made without performing a new proper evaluation.

Rigging and temporary supports required for the erection/modification shall be determined, documented, furnished and installed by the erector/contractor accounting for the loads imposed on the structure due to the proposed construction method.

7. REPORT DISCLAIMER

The engineering services rendered by **M**alouf **E**ngineering **I**nternational, Inc. *('MEI') in connection with this Structural Analysis are limited to a computer analysis of the tower structure, size and capacity of its members. MEI does not analyze the fabrication, including welding and connection capacities, except as included in this Report.*

The analysis performed and the conclusions contained herein are based on the assumption that the tower has been properly installed and maintained, including, but not limited to the following:

1. Proper alignment and plumbness.
2. Correct guy tensions, as applicable.
3. Correct bolt tightness or slip jacking of sleeved connections.
4. No significant deterioration or damage to any structural component.

Furthermore, the information and conclusions contained in this Report were determined by application of the current "state-of-the-art" engineering and analysis procedures and formulae. MALOUF ENGINEERING INTERNATIONAL, INC. Assumes no obligation to revise any of the information or conclusions contained in this Report in the event that such engineering and analysis procedures and formulae are hereafter modified or revised. In addition, under no circumstances will MALOUF ENGINEERING INTERNATIONAL, INC. Have any obligation or responsibility whatsoever for or on account of consequential or incidental damages sustained by any person, firm or organization as a result of any information or conclusions contained in the Report, and the maximum liability of MALOUF ENGINEERING INTERNATIONAL, INC., if any, pursuant to this Report shall be limited to the total funds actually received by MALOUF ENGINEERING INTERNATIONAL, INC. For preparation of this Report.

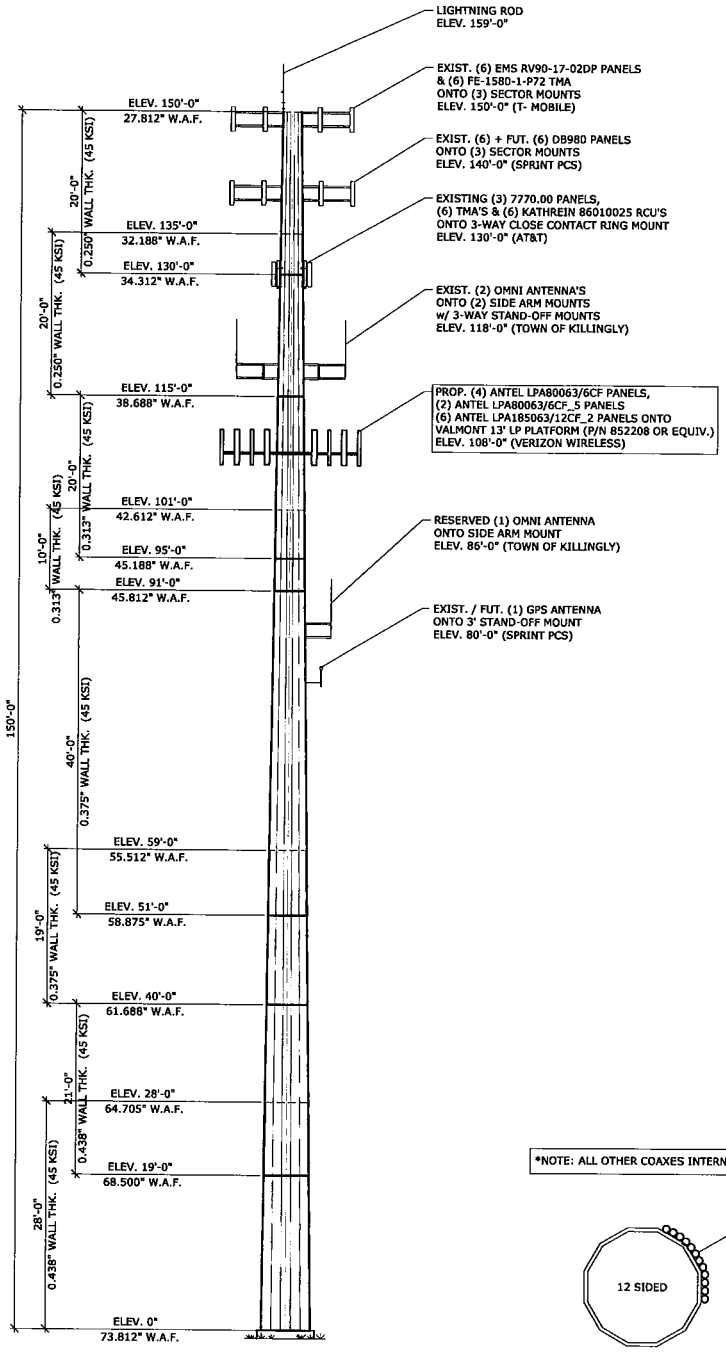
Customer has requested MALOUF ENGINEERING INTERNATIONAL, INC. To prepare and submit to Customer an engineering analysis with respect to the Subject Tower and has further requested MALOUF ENGINEERING INTERNATIONAL, INC. to make appropriate recommendations regarding suggested structural modifications and changes to the Subject Tower. In making such request of MALOUF ENGINEERING INTERNATIONAL, INC., Customer has informed MALOUF ENGINEERING INTERNATIONAL, INC. that Customer will make a determination as to whether or not to implement any of the changes or modifications which may be suggested by MALOUF ENGINEERING INTERNATIONAL, INC. and that Customer will have any such changes or modifications made by riggers, erectors and other subcontractors of Customer's choice. MALOUF ENGINEERING INTERNATIONAL, INC. shall have the right to rely upon the accuracy of the information supplied by the customer and shall not be held responsible for the Customer's misrepresentation or omission of relevant fact whether intentional or otherwise.

Customer hereby agrees and acknowledges that MALOUF ENGINEERING INTERNATIONAL, INC. shall have no liability whatsoever to Customer or to others for any work or services performed by any persons other than MALOUF ENGINEERING INTERNATIONAL, INC. in connection with the implementation of services including but not limited to any services rendered for Customer or for others by riggers, erectors or other subcontractors. Customer acknowledges and agrees that any riggers, erectors or subcontractors retained or employed by Customer shall be solely responsible to Customer and to others for the quality of work performed by them and that MALOUF ENGINEERING INTERNATIONAL, INC. shall have no liability or responsibility whatsoever as a result of any negligence or breach of contract by any such rigger, erector or subcontractor and that Customer and rigger, erector, or subcontractor will provide MALOUF ENGINEERING INTERNATIONAL, INC. with a Certificate of Insurance naming MALOUF ENGINEERING INTERNATIONAL, INC. as additional insured.

APPENDIX 1 - TOWER DRAWING

TOWER HT. & TYPE:	150' MONOPOLE
SITE NAME:	DANIELSON NORTH SITE
LOCATION:	DAYVILLE, WINDHAM COUNTY, CT 06241
MANUF. / MODEL:	FRED A. NUDD / 12 SIDED
ORIGINAL DESIGN CRITERIA:	TIA/EIA-222-E-85 MPH + 1/2" ICE
ANALYSIS CRITERIA:	TIA/EIA-222-F-85 MPH + 1/2" ICE
	—

TOWER OF KILLINGLY, KILLINGLY NORTH SITE



*NOTE: ALL OTHER COAXES INTERNAL TO POLE.

PROP. (12) 1 5/8" COAXES
TO ELEV. 108'-0" (VzW)

*NOTE: PREFERABLE TO LOCATE
PROPOSED COAXES INTERNAL TO POLE

101 ELEV: 150' MONOPOLE
SCALE: 1" = 15'-0"

102 SECTION: THRU TOWER
SCALE: N.T.S.

VERIZON WIRELESS
MONOPOLE ELEVATION AND SECTION

MEI PROJECT ID	SHEET NUMBER	REV.
CT01125M-08V1	S01	0

NO.	DATE	REVISIONS
0	05/12/08	ISSUED WITH ANALYSIS REPORT

DANIELSON NORTH
WINDHAM COUNTY
79 PUTNAM PIKE
DAYVILLE, CT 06241

verizonwireless

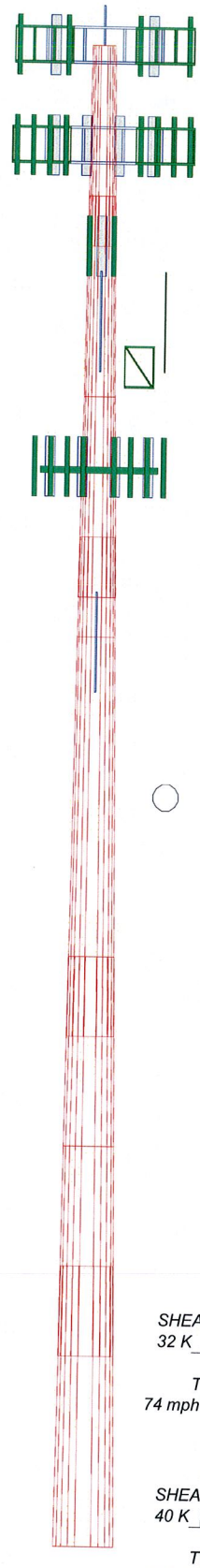
MALOUF ENGINEERING INTERNATIONAL, INC.
STRUCTURAL CONSULTANTS
17350 PRESTON ROAD SUITE 720
DALLAS, TEXAS 75252-5635
tel: 972-705-7538 fax: 972-705-7555
www.maloufengineering.com

APPENDIX 2 - ANALYSIS PRINTOUT & GRAPHICS

Section	1	2	3	4	5	6	7	8
Length (ft)	20.00	20.00	20.00	10.00	40.00	19.00	21.00	28.00
Number of Sides	12	12	12	12	12	12	12	12
Thickness (in)	0.2500	0.2500	0.3125	0.3125	0.3750	0.3750	0.4375	0.4375
Lap Splice (ft)	5.00		6.00		8.00		9.00	
Top Dia (in)	27.8125	32.1875	38.6875	42.6125	45.8125	55.5125	61.6875	64.7054
Bot Dia (in)	34.3125	38.6875	45.1875	45.8125	58.8750	61.6875	68.5000	73.8125
Grade					A36M-45			
Weight (K)	1.7	1.9	2.9	1.5	8.5	4.5	6.5	9.2

36.8

150.0 ft
130.0 ft
115.0 ft
95.0 ft
91.0 ft
51.0 ft
40.0 ft
19.0 ft
0.0 ft



AXIAL 58 K
SHEAR 32 K
MOMENT 2974 kip-ft
TORQUE 3 kip-ft
74 mph WIND - 0.5000 in ICE

AXIAL 48 K
SHEAR 40 K
MOMENT 3540 kip-ft
TORQUE 4 kip-ft
REACTIONS - 85 mph WIND

DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
Lightning Rod (Existing)	150	09210 (Town of Killingly)	118
(2) RV90-17-02DP (T-Mobile)	150	Side Arm Mount w/ Tie Back (Town of Killingly)	118
(2) RV90-17-02DP (T-Mobile)	150		
(2) RV90-17-02DP (T-Mobile)	150	3-Way Standoff Mount (Town of Killingly)	118
(2) FE-1580-1-P72 TMA (T-Mobile)	150		
(2) FE-1580-1-P72 TMA (T-Mobile)	150	(2) LPA-80063/6CF (Verizon Wireless)	108
(2) FE-1580-1-P72 TMA (T-Mobile)	150	(2) LPA-185063/12CF (Verizon Wireless)	108
Sector Mounts (3) (T-Mobile)	150		
(4) DB980H105A-M (SprintPCS)	140	(2) LPA-80063/6CF_5 (Verizon Wireless)	108
(4) DB980H105A-M (SprintPCS)	140		
(4) DB980H105A-M (SprintPCS)	140	(2) LPA-185063/12CF (Verizon Wireless)	108
Sector Mounts (3) (SprintPCS)	140	(2) LPA-80063/6CF (Verizon Wireless)	108
7770.00 (ATI)	130	(2) LPA-185063/12CF (Verizon Wireless)	108
7770.00 (ATI)	130		
7770.00 (ATI)	130	Valmont 13' Platform w/o Rails (Verizon Wireless)	108
(2) TMA's (ATI)	130		
(2) TMA's (ATI)	130	09210 (Town of Killingly/Reser)	86
(2) TMA's (ATI)	130	Side Arm Mount w/ Tie Back (Town of Killingly/Reser)	86
(2) Kathrein 86010025 RCU (ATI)	130		
(2) Kathrein 86010025 RCU (ATI)	130	GPS Antenna (SprintPCS)	80
(2) Kathrein 86010025 RCU (ATI)	130	3' Standoff (SprintPCS)	80
Close contact Mounts (3) (ATI)	130		
09210 (Town of Killingly)	118		
Side Arm Mount w/ Tie Back (Town of Killingly)	118		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A36M-45	45 ksi	60 ksi			

TOWER DESIGN NOTES

1. Tower is located in Windham County, Connecticut.
2. Tower designed for a 85 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 74 mph basic wind with 0.50 in ice.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 70.8%

MALOUF ENGINEERING INTL. INC. STRUCTURAL CONSULTANTS
Malouf Engineering Int'l Inc.
17950 Preston Road, Suite #720
Dallas, Texas 75252-5635
Phone: (972) 783-2578
FAX: (972) 783-2583

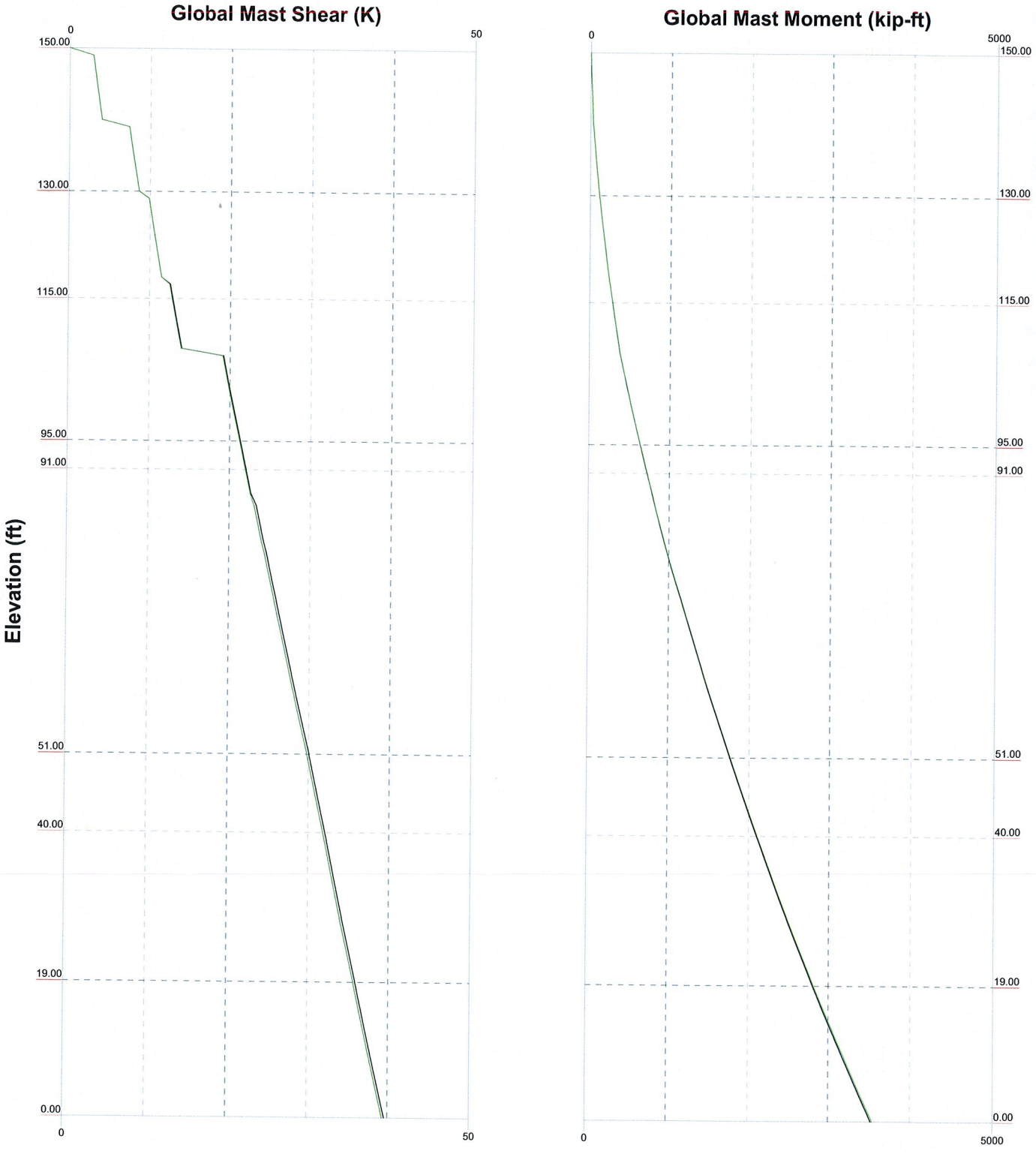
Job: **Danielson North Site**			
Project: **CT01125M-08V1**			
Client: Verizon Wireless	Drawn by: MM	App'd:	
Code: TIA/EIA-222-F	Date: 07/07/08	Scale: NTS	
Path: E:\Work\MEI\2008\CT01125M-08V1-VzWx\2-Working Data\RISA\CT01125M-08V1.eri		Dwg No. E-1	

TIA/EIA-222-F - 85 mph/74 mph 0.5000 in Ice

Vx Vz

Maximum Values

Mx Mz



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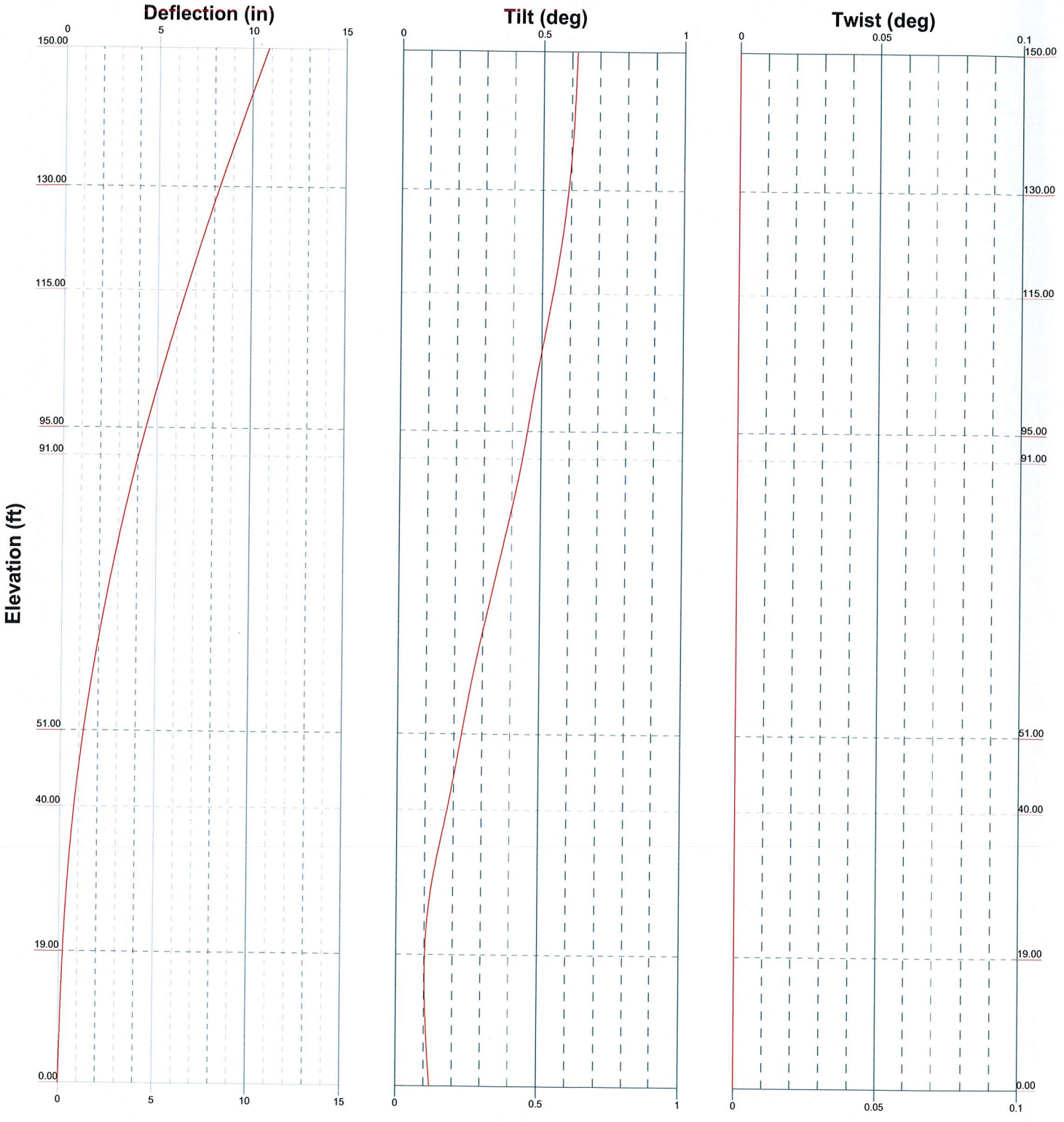
Malouf Engineering Int'l Inc.
17950 Preston Road, Suite #720
Dallas, Texas 75252-5635
Phone: (972) 783-2578
FAX: (972) 783-2583

Job: ***Danielson North Site***			
Project: ***CT01125M-08V1***			
Client: Verizon Wireless	Drawn by: MM	App'd:	
Code: TIA/EIA-222-F	Date: 07/07/08	Scale: NTS	
Path: E:\Work\ME\I2008\CT01125M-08V1-VzWx\2-Working Data\RISA\CT01125M-08V1.eri		Dwg No. E-4	

TIA/EIA-222-F - Service - 50 mph

Maximum Values



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17950 Preston Road, Suite #720
Dallas, Texas 75252-5635
Phone: (972) 783-2578
FAX: (972) 783-2583

Job: *Danielson North Site*			
Project: *CT01125M-08V1*			
Client: Verizon Wireless	Drawn by: MM	App'd:	
Code: TIA/EIA-222-F	Date: 07/07/08	Scale: NTS	
Path: E:\Work\MEI\2008\CT01125M-08V1-VzWx\2-Working Data\RISA\CT01125M-08V1.er		Dwg No. E-5	

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 Windham County, Connecticut.
Basic wind speed of 85 mph.
Nominal ice thickness of 0.5000 in.
Ice density of 56 pcf.
A wind speed of 74 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 50 mph.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in pole design is 1.333.
Local bending stresses due to climbing loads, feedline supports, and appurtenance mounts are not considered.

Options

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

Tapered Pole Section Geometry

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L1	150.00-130.00	20.00	5.00	12	27.8125	34.3125	0.2500	1.0000	A36M-45 (45 ksi)
L2	130.00-115.00	20.00	0.00	12	32.1875	38.6875	0.2500	1.0000	A36M-45 (45 ksi)
L3	115.00-95.00	20.00	6.00	12	38.6875	45.1875	0.3125	1.2500	A36M-45 (45 ksi)
L4	95.00-91.00	10.00	0.00	12	42.6125	45.8125	0.3125	1.2500	A36M-45 (45 ksi)
L5	91.00-51.00	40.00	8.00	12	45.8125	58.8750	0.3750	1.5000	A36M-45 (45 ksi)
L6	51.00-40.00	19.00	0.00	12	55.5125	61.6875	0.3750	1.5000	A36M-45 (45 ksi)
L7	40.00-19.00	21.00	9.00	12	61.6875	68.5000	0.4375	1.7500	A36M-45 (45 ksi)
L8	19.00-0.00	28.00		12	64.7054	73.8125	0.4375	1.7500	A36M-45 (45 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	28.7936	22.1878	2151.4817	9.8674	14.4069	149.3372	4359.4852	10.9202	6.7838	27.135
	35.5229	27.4203	4060.7980	12.1944	17.7739	228.4700	8228.2777	13.4954	8.5258	34.103
L2	35.0053	25.7097	3347.2225	11.4336	16.6731	200.7556	6782.3803	12.6535	7.9562	31.825
	40.0522	30.9422	5835.0856	13.7606	20.0401	291.1701	11823.4654	15.2288	9.6982	38.793
L3	40.0522	38.6148	7258.3350	13.7382	20.0401	362.1901	14707.3546	19.0051	9.5307	30.498
	46.7815	45.1555	11606.6056	16.0652	23.4071	495.8578	23518.1297	22.2241	11.2728	36.073
L4	46.1034	42.5644	9721.0448	15.1434	22.0733	440.3988	19697.4723	20.9489	10.5826	33.864
	47.4286	45.7844	12098.3469	16.2890	23.7309	509.8146	24514.5309	22.5337	11.4403	36.609
L5	47.4286	54.8658	14458.2714	16.2666	23.7309	609.2599	29296.3778	27.0033	11.2728	30.061
	60.9519	70.6388	30856.0755	20.9430	30.4973	1011.7658	62522.7744	34.7662	14.7735	39.396
L6	60.1625	66.5785	25835.3472	19.7392	28.7555	898.4497	52349.4177	32.7679	13.8724	36.993
	63.8636	74.0348	35523.8611	21.9499	31.9541	1111.7144	71980.9737	36.4377	15.5273	41.406
L7	63.8636	86.2859	41317.8922	21.9275	31.9541	1293.0378	83721.2515	42.4673	15.3598	35.108
	70.9164	95.8830	56694.8448	24.3664	35.4830	1597.8030	114879.1262	47.1907	17.1855	39.281
L8	70.0185	90.5373	47731.0885	23.0079	33.5174	1424.0700	96716.1258	44.5597	16.1685	36.957
	76.4163	103.3670	71033.6649	26.2682	38.2349	1857.8239	143933.4632	50.8741	18.6092	42.535

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
1 5/8 (T-Mobile)	C	No	Inside Pole	150.00 - 0.00	6	No Ice	0.00	1.04
						1/2" Ice	0.00	1.04
1 5/8 (SprintPCS)	C	No	Inside Pole	140.00 - 0.00	12	No Ice	0.00	1.04
						1/2" Ice	0.00	1.04
1 5/8 (AT&T)	C	No	Inside Pole	130.00 - 0.00	6	No Ice	0.00	1.04
						1/2" Ice	0.00	1.04
1/2 (AT&T)	C	No	Inside Pole	130.00 - 0.00	1	No Ice	0.00	0.25
						1/2" Ice	0.00	0.25
1 5/8 (TownOfKillingly)	C	No	Inside Pole	118.00 - 0.00	2	No Ice	0.00	1.04
						1/2" Ice	0.00	1.04
1 5/8 (Verizon Wireless)	C	No	CaAa (Out Of Face)	108.00 - 0.00	2	No Ice	0.20	1.04
						1/2" Ice	0.30	2.55
1 5/8 (Verizon Wireless)	C	No	CaAa (Out Of Face)	108.00 - 0.00	10	No Ice	0.00	1.04
						1/2" Ice	0.00	2.55
1 5/8 (TownOfKillingly)	C	No	Inside Pole	86.00 - 0.00	1	No Ice	0.00	1.04
						1/2" Ice	0.00	1.04
1/2 (SprintPCS)	C	No	Inside Pole	80.00 - 0.00	1	No Ice	0.00	0.25
						1/2" Ice	0.00	0.25

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
Lightning Rod (Existing)	A	From Leg	0.00 0.00 2.00	0.0000	150.00	No Ice 1/2" Ice	0.25 0.66	0.25 0.66	0.03 0.03

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft	Offsets: Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
(2) RV90-17-02DP	A	From Leg	0.00	0.00	0.0000	150.00	No Ice	4.36	1.97	0.02
(T-Mobile)			0.00				1/2" Ice	4.77	2.31	0.04
(2) RV90-17-02DP	B	From Leg	0.00	0.00	0.0000	150.00	No Ice	4.36	1.97	0.02
(T-Mobile)			0.00				1/2" Ice	4.77	2.31	0.04
(2) RV90-17-02DP	C	From Leg	0.00	0.00	0.0000	150.00	No Ice	4.36	1.97	0.02
(T-Mobile)			0.00				1/2" Ice	4.77	2.31	0.04
(2) FE-1580-1-P72 TMA	A	From Leg	0.00	0.00	0.0000	150.00	No Ice	1.12	0.58	0.01
(T-Mobile)			0.00				1/2" Ice	1.26	0.69	0.02
(2) FE-1580-1-P72 TMA	B	From Leg	0.00	0.00	0.0000	150.00	No Ice	1.12	0.58	0.01
(T-Mobile)			0.00				1/2" Ice	1.26	0.69	0.02
(2) FE-1580-1-P72 TMA	C	From Leg	0.00	0.00	0.0000	150.00	No Ice	1.12	0.58	0.01
(T-Mobile)			0.00				1/2" Ice	1.26	0.69	0.02
Sector Mounts (3)	A	None			0.0000	150.00	No Ice	33.00	33.00	1.50
(T-Mobile)							1/2" Ice	42.90	42.90	2.25
(4) DB980H105A-M	A	From Leg	0.00	0.00	0.0000	140.00	No Ice	3.75	2.17	0.01
(SprintPCS)			0.00				1/2" Ice	4.13	2.53	0.03
(4) DB980H105A-M	B	From Leg	0.00	0.00	0.0000	140.00	No Ice	3.75	2.17	0.01
(SprintPCS)			0.00				1/2" Ice	4.13	2.53	0.03
(4) DB980H105A-M	C	From Leg	0.00	0.00	0.0000	140.00	No Ice	3.75	2.17	0.01
(SprintPCS)			0.00				1/2" Ice	4.13	2.53	0.03
Sector Mounts (3)	A	None			0.0000	140.00	No Ice	33.00	33.00	1.50
(SprintPCS)							1/2" Ice	42.90	42.90	2.25
7770.00	A	From Leg	0.00	0.00	0.0000	130.00	No Ice	5.88	2.93	0.04
(AT&T)			0.00				1/2" Ice	6.31	3.27	0.07
7770.00	B	From Leg	0.00	0.00	0.0000	130.00	No Ice	5.88	2.93	0.04
(AT&T)			0.00				1/2" Ice	6.31	3.27	0.07
7770.00	C	From Leg	0.00	0.00	0.0000	130.00	No Ice	5.88	2.93	0.04
(AT&T)			0.00				1/2" Ice	6.31	3.27	0.07
(2) TMA's	A	From Leg	0.00	0.00	0.0000	130.00	No Ice	1.28	0.31	0.01
(AT&T)			0.00				1/2" Ice	1.44	0.41	0.02
(2) TMA's	B	From Leg	0.00	0.00	0.0000	130.00	No Ice	1.28	0.31	0.01
(AT&T)			0.00				1/2" Ice	1.44	0.41	0.02
(2) TMA's	C	From Leg	0.00	0.00	0.0000	130.00	No Ice	1.28	0.31	0.01
(AT&T)			0.00				1/2" Ice	1.44	0.41	0.02
(2) Kathrein 86010025 RCU	A	From Leg	0.00	0.00	0.0000	130.00	No Ice	0.14	0.11	0.00
(AT&T)			0.00				1/2" Ice	0.20	0.17	0.00
(2) Kathrein 86010025 RCU	B	From Leg	0.00	0.00	0.0000	130.00	No Ice	0.14	0.11	0.00
(AT&T)			0.00				1/2" Ice	0.20	0.17	0.00
(2) Kathrein 86010025 RCU	C	From Leg	0.00	0.00	0.0000	130.00	No Ice	0.14	0.11	0.00
(AT&T)			0.00				1/2" Ice	0.20	0.17	0.00

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft Vert ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00						
Close contact Mounts (3) (AT&T)	C	None		0.0000	130.00	No Ice	4.25	4.25	0.12
						1/2" Ice	5.53	5.53	0.16
09210 (Town of Killingly)	A	From Leg	6.00 0.00 4.50	0.0000	118.00	No Ice 1/2" Ice	2.65 3.07	2.65 3.07	0.02 0.04
Side Arm Mount w/ Tie Back (Town of Killingly)	A	From Leg	3.00 0.00 0.00	0.0000	118.00	No Ice 1/2" Ice	2.75 3.58	6.50 8.45	0.15 0.23
09210 (Town of Killingly)	B	From Leg	6.00 0.00 4.50	0.0000	118.00	No Ice 1/2" Ice	2.65 3.07	2.65 3.07	0.02 0.04
Side Arm Mount w/ Tie Back (Town of Killingly)	B	From Leg	3.00 0.00 0.00	0.0000	118.00	No Ice 1/2" Ice	2.75 3.58	6.50 8.45	0.15 0.23
3-Way Standoff Mount (Town of Killingly)	A	None		0.0000	118.00	No Ice 1/2" Ice	4.50 5.85	4.50 5.85	0.12 0.16
(2) LPA-80063/6CF (Verizon Wireless)	A	From Leg	3.00 0.00 0.00	0.0000	108.00	No Ice 1/2" Ice	10.31 10.87	9.01 9.55	0.03 0.10
(2) LPA-185063/12CF (Verizon Wireless)	A	From Leg	3.00 0.00 0.00	0.0000	108.00	No Ice 1/2" Ice	4.97 5.42	4.51 4.95	0.01 0.05
(2) LPA-80063/6CF_5 (Verizon Wireless)	B	From Leg	3.00 0.00 0.00	0.0000	108.00	No Ice 1/2" Ice	10.34 10.90	9.03 9.58	0.03 0.10
(2) LPA-185063/12CF (Verizon Wireless)	B	From Leg	3.00 0.00 0.00	0.0000	108.00	No Ice 1/2" Ice	4.97 5.42	4.51 4.95	0.01 0.05
(2) LPA-80063/6CF (Verizon Wireless)	C	From Leg	3.00 0.00 0.00	0.0000	108.00	No Ice 1/2" Ice	10.31 10.87	9.01 9.55	0.03 0.10
(2) LPA-185063/12CF (Verizon Wireless)	C	From Leg	3.00 0.00 0.00	0.0000	108.00	No Ice 1/2" Ice	4.97 5.42	4.51 4.95	0.01 0.05
Valmont 13' Platform w/o Rails (Verizon Wireless)	C	None		0.0000	108.00	No Ice 1/2" Ice	28.00 36.40	28.00 36.40	1.50 1.95
09210 (Town of Killingly/Reser)	A	From Leg	6.00 0.00 4.50	0.0000	86.00	No Ice 1/2" Ice	2.65 3.07	2.65 3.07	0.02 0.04
Side Arm Mount w/ Tie Back (Town of Killingly/Reser)	A	From Leg	3.00 0.00 0.00	0.0000	86.00	No Ice 1/2" Ice	2.75 3.58	6.50 8.45	0.15 0.23
GPS Antenna (SprintPCS)	C	From Leg	1.00 0.00 1.00	0.0000	80.00	No Ice 1/2" Ice	0.75 0.97	0.75 0.97	0.00 0.01
3' Standoff (SprintPCS)	C	From Leg	1.50 0.00 0.00	0.0000	80.00	No Ice 1/2" Ice	0.75 1.25	1.50 2.25	0.07 0.10

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	150 - 130	10.839	29	0.6167	0.0019
L2	135 - 115	8.916	29	0.6028	0.0019
L3	115 - 95	6.498	29	0.5382	0.0018
L4	101 - 91	5.006	29	0.4770	0.0014
L5	91 - 51	4.039	29	0.4379	0.0012
L6	59 - 40	1.671	29	0.2654	0.0005
L7	40 - 19	0.761	29	0.1779	0.0003
L8	28 - 0	0.389	29	0.1178	0.0002

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
L1	150 - 130	Pole	TP34.3125x27.8125x0.25	1	-4.49	939.80	12.2	Pass
L2	130 - 115	Pole	TP38.6875x32.1875x0.25	2	-8.01	1072.70	34.2	Pass
L3	115 - 95	Pole	TP45.1875x38.6875x0.3125	3	-12.06	1554.57	38.5	Pass
L4	95 - 91	Pole	TP45.8125x42.6125x0.3125	4	-14.83	1632.41	48.8	Pass
L5	91 - 51	Pole	TP58.875x45.8125x0.375	5	-23.15	2378.06	57.7	Pass
L6	51 - 40	Pole	TP61.6875x55.5125x0.375	6	-30.45	2479.26	69.3	Pass
L7	40 - 19	Pole	TP68.5x61.6875x0.4375	7	-34.66	3235.36	59.5	Pass
L8	19 - 0	Pole	TP73.8125x64.7054x0.4375	8	-48.12	3408.81	70.8	Pass
							Summary	
						Pole (L8)	70.8	Pass
						RATING =	**70.8**	**Pass**

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Version: FDN2-D72/AK
**********************************************************
*               FOUNDATION ANALYSIS PROGRAM              *
*                     Pier Analysis                      *
*         (c) 1999, Malouf Engineering Intl., Inc.       *
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------------------------------------------------------------------------------
MEI JOB NUMBER = CT01125M-08V1
DESCRIPTION    = 150 FT MONOPOLE FOUNDATION CHECK
SITE NAME      = DAYVILLE, WINDHAM CO., CT 06241
CLIENT NAME    = VERIZON WIRELESS
CHECK CODE     = TIA/EIA-222-REV-F
TIME/DATE/FILE = 19:51:49 / 07-07-2008 / CT01125M.dat
------------------------------------------------------------------------------

======================
 INPUT DATA
======================
*LOADS*
COMPRESSION FORCE              =    48.000 KIPS
UPLIFT FORCE                   =      .000 KIPS
SHEAR FORCE                    =    40.000 KIPS
MOMENT                         =  3540.000 KIP-FT

*PIER DIMENSIONS AND PROPERTIES*
PIER DEPTH                     =    27.750 FT
PIER DIAMETER                  =     7.500 FT
EXTENSION ABOVE GRADE          =      .250 FT

*FACTOR OF SAFETY VALUES*
F.O.S. BEARING PRESSURE        =     2.000
F.O.S. PASSIVE PRESSURE        =     2.000
F.O.S. CONCRETE WEIGHT         =     1.250
F.O.S. SOIL WEIGHT             =     1.500
F.O.S. SKIN FRICTION (UPLIFT)  =     2.000
F.O.S. SKIN FRICTION (DOWNLD)  =     2.000

*SOIL LAYER DATA*  (WATER DEPTH= 15.0FT)
------------------------------------------------------------------------------
                  |                              ULT.    ULT.   SOIL CONCR. ULT.
  DESCRIPTION     | THK DEPTH  PHI     Cu  PASS.PR SKIN FR  DENS. DENS.   Q
                  |  ft    ft  deg    ksf    kcf     ksf    kcf   kcf   ksf
                  |
1 NEGLECT         | 7.5   7.5   .0   .000   .100*   .000   .100  .150   .0
2 SILT            | 7.5  15.0 30.0   .000   .615*   .444+  .105  .150  6.0
3 SAND            |12.8  27.8 33.0   .000   .554*   .615+  .043  .088 10.0
------------------------------------------------------------------------------
* PASSIVE PRESSURE COMPUTED BASED ON ANGLE OF FRICTION AND COHESION
+ SKIN FRICTION COMPUTED BASED ON ANGLE OF FRICTION AND COHESION (ALPHA= .35)

*** COMMENTS ***
-FOUNDATION DATA AS PER FRED A. NUDD CORP., PROJECT #6090,
 SITE #CT-11-3968 DATED 07/1998.
-GEOTECHNICAL REPORT NOT MADE AVAILABLE. SOIL PARAMETERS AS PER
 DESIGN CALCULATIONS OF FRED A. NUDD CORP.

======================
 RESULTS
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WT./VOL. OF SOIL ABOVE     =       .0 KIPS /     .000 FT3
WT./VOL. OF CONCRETE PIER  =    150.4 KIPS / 1237.002 FT3

SKIN RESISTANCE            =    131.6 KIPS (ALLOWABLE)
TIP BEARING CAPACITY       =    220.9 KIPS (ALLOWABLE)

UPLIFT CAPACITY OF PIER    =    252.0 KIPS >        .0 KIPS (OK)     R=  .000
TOTAL DOWNLOAD CAPACITY    =    352.5 KIPS >      48.0 KIPS (OK)     R=  .136

BROM'S METHOD FOR GRANULAR SOILS:
DEPTH OF SOIL NEGLECTED    =     7.500 FT
AVERAGE ALLW PASSIVE PRESS=      .133 KCF
REQUIRED PIER LENGTH       =   28.396 FT  ( 5.178 FT DEPTH TO ZERO SHEAR)
AVAILABLE PIER LENGTH      =   27.750 FT   <    28.396 FT   (OK<5%) R= 1.023
MAXIMUM MOMENT             =  3988.09 KIP-FT

==============================================================================
REINFORCEMENT CHECK (PIER FOUNDATION) L= 28.00' D= 90.0"  C= 3.0" FC= 3000 PSI
==============================================================================

FACTORED MOMENT LOAD       =  5760.58 KIP-FT
FACTORED COMPRESSION LOAD  =    83.20 KIPS (ECC=997.02")
REINFD. COMPR. CAPACITY    =   118.31 KIPS (COMPR. & MOMENT: TENSION CONTROLS)

REQUIRED STEEL AREA        =  36.91 IN2 (COMPR. AND MOMENT)
REQUIRED STEEL AREA        =  31.81 IN2 (ACI MIN.= 0.005A)

TOTAL BAR AREA PROVIDED    =  51.84 IN2 (66 x NO. 8 BARS) /FY= 60.KSI,C= 3.0"
THE TOTAL BAR AREA PROVIDED IS SUFFICIENT.
VERT. BAR CLEAR SPACING    =   3.00 IN
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