

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

ORIGINAL

April 27, 2011

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

RECEIVED
APR 29 2011
CONNECTICUT
SITING COUNCIL

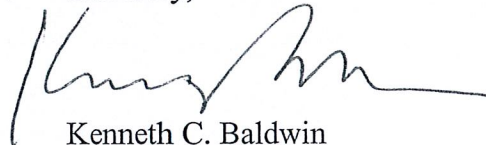
Re: **Notice of Completion of Construction Activity**
EM-VER-006-100107 – 664 Rimmon Hill Road, Beacon Falls, CT
EM-VER-025-091218 – 705 West Johnson Road, Cheshire, CT

Dear Ms. Roberts:

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

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

Sincerely,



Kenneth C. Baldwin



Law Offices

BOSTON

PROVIDENCE

HARTFORD

NEW LONDON

STAMFORD

WHITE PLAINS

NEW YORK CITY

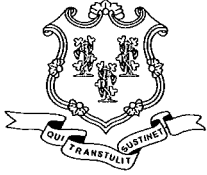
ALBANY

SARASOTA

www.rc.com

Copy to:
Sandy M. Carter

11024525-v1



STATE OF CONNECTICUT

CONNECTICUT SITING COUNCIL

Ten Franklin Square, New Britain, CT 06051

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

E-Mail: siting.council@ct.gov

www.ct.gov/csc

April 15, 2011

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

RE: **EM-VER-025-091218** - Celco Partnership d/b/a Verizon Wireless notice of intent to modify an existing telecommunications facility located at 705 West Johnson Road, Cheshire, Connecticut.

Dear Attorney Baldwin:

In addition to the Connecticut Siting Council (Council) acknowledgement dated January 20, 2010 (filing dated December 18, 2009), 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:

- Any deviation from the proposed modification as specified in this notice and supporting materials with Council shall render this acknowledgement invalid;
- Any material changes to this modification as proposed shall require the filing of a new notice with the Council;
- Not less than 45 days after completion of construction, the Council shall be notified in writing that construction has been completed;
- The validity of this action shall expire one year from the date of this letter; and
- The applicant may file a request for an extension of time beyond the one year deadline provided that such request is submitted to the Council not less than 60 days prior to the expiration;

The proposed modifications including the placement of all necessary equipment and shelters within the tower compound are to be implemented as specified here and in your notice dated March 30, 2011. 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. Thank you for your attention and cooperation.

Very truly yours,

Linda Roberts
Executive Director

LR/CDM/laf

c: The Honorable Matt Hall, Council Chairman, Town of Cheshire
Michael A. Milone, Town Manager, Town of Cheshire
William S. Voelker, AICP, Town Planner, Town of Cheshire
Robert D. Gray, Program Administrator, Third Party Attachments Transmission Projects, Northeast Utilities Service Company

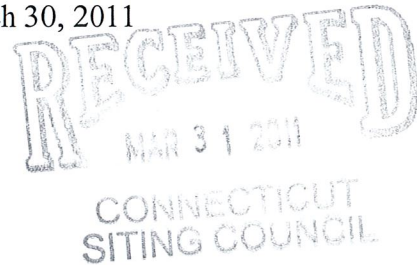


280 Trumbull Street
Hartford, CT 06103-3597
Main (860) 275-8200
Fax (860) 275-8299
kbaldwin@rc.com
Direct (860) 275-8345

ORIGINAL

March 30, 2011

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



Re: **Cellco Partnership d/b/a Verizon Wireless**
EM-VER-025-091218 – 705 West Johnson Road, Cheshire, Connecticut

Dear Mr. Perrone:

On January 20, 2010, the Siting Council acknowledged receipt of Cellco's notice of intent to modify the above-referenced telecommunications facility. This modification involved the removal of six (6) of Cellco's existing antennas, replacing them with three (3) newer model cellular antennas and three (3) LTE antennas. In addition to the antenna modifications, Cellco intends to install six (6) coax cable diplexers on its antenna mounting platform.

Attached to this letter is an updated Structural Letter for the previously approved antenna modifications including the coax diplexers and a copy of the diplexer specifications. This analysis confirms that the tower can support all of Cellco's proposed modifications.

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

Sincerely,

A handwritten signature in blue ink, appearing to read "Kenneth C. Baldwin".

Kenneth C. Baldwin



Law Offices

BOSTON

PROVIDENCE

HARTFORD

NEW LONDON

STAMFORD

WHITE PLAINS

NEW YORK CITY

ALBANY

SARASOTA

www.rc.com

Attachment

Copy to:

Sandy M. Carter
Brian Ragozzine
Mark Gauger
Robert Gray, Northeast Utilities

10984045-v1

DETAILED STRUCTURAL ANALYSIS AND EVALUATION OF AN EXISTING 140' SELF SUPPORT LATTICE TOWER FOR PROPOSED ANTENNA ARRANGEMENT

Cheshire North 2
705 West Johnson Avenue
Cheshire, CT

prepared for



Verizon Wireless
99 East River Drive
East Hartford, Connecticut 06108

prepared by



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

36922238.00000
VZ5-080

February 11, 2011

TABLE OF CONTENTS

- 1. EXECUTIVE SUMMARY**
- 2. INTRODUCTION**
- 3. ANALYSIS METHODOLOGY AND LOADING CONDITIONS**
- 4. FINDINGS AND EVALUATION**
- 5. CONCLUSIONS AND RECOMMENDATIONS**
- 6. DRAWINGS AND DATA**
 - **RISA TOWER INPUT / OUTPUT SUMMARY**
 - **RISA TOWER FEEDLINE DISTRIBUTION**
 - **RISA TOWER FEEDLINE PLAN**
 - **RISA TOWER DETAILED OUTPUT**
 - **ANCHOR BOLT ANALYSIS**
 - **FOUNDATION ANALYSIS**

1. EXECUTIVE SUMMARY

This report summarizes the structural analysis of the existing 140' self support lattice tower located at 705 West Johnson Avenue, Cheshire, CT. The analysis was conducted in accordance with the 2005 Connecticut State Building Code and the TIA/EIA-222-F standard for a wind velocity of 85 mph (fastest mile) and 85 mph (fastest mile) concurrent with 1/2" ice. The antenna loading considered in the analysis consists of all existing and proposed antennas, transmission lines, and ancillary items as outlined in the Introduction Section of this report. The proposed Verizon Wireless modification is as follows:

Proposed Antenna and Mount	Carrier	Antenna Center Elevation
<u>Remove:</u>		
(6) Antel LPA-80063/8CF mounted on (3) T-frames (two per sector)		
<u>Install:</u>		
(2) Powerwave P65-16-XL-2 (Alpha & Gamma Sectors)	Verizon Wireless	138'
(1) Antel BXA-70063-6CF (Beta Sector)		
(3) Decibel DB854DG65ESX (One per Sector)		
(6) Diplexers		
All mounted on (3) existing T-frames		

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

This analysis is based on:

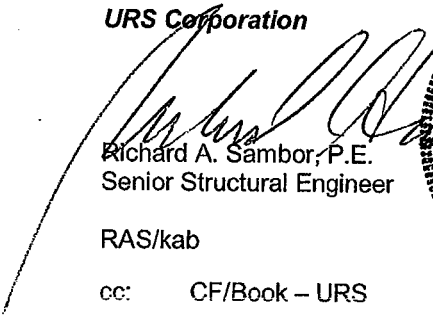
- 1) The tower structure's theoretical capacity, not including any assessment of the condition of the tower.
- 2) Tower geometry and structural member sizes taken from manufacturers design documents prepared by Central Tower, (a Dielectric company) file number CT2397, Drawing numbers CT2397-1, 2 and 3, dated 10/03/04.
- 3) Geotechnical report performed by Dr. Clarence Welti, P.E., P.C. dated September 20, 2004.
- 4) Previous structural analysis performed by URS Corporation, job number VZ1-235 / 36931060.00008, signed and sealed May 4, 2007.
- 5) Previous structural analysis performed by URS Corporation, job number PSW-024 Rev 1 / 36923998.00000, signed and sealed November 12, 2009.
- 6) Previous structural analysis performed by URS Corporation, job number VZ5-038 / 36931185.00000, signed and sealed November 23, 2009.
- 7) Antenna and mount configuration as specified within Section 2 of this report.

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

If you should have any questions, please call.

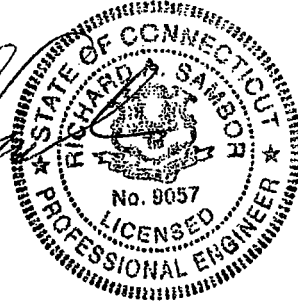
Sincerely,

URS Corporation


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

RAS/kab

cc: CF/Book – URS



3. ANALYSIS METHODOLOGY AND LOADING CONDITIONS

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

The analysis was conducted using RISA Tower 5.3.1. Two load conditions were evaluated as shown below which were compared to allowable stresses according to AISC and TIA/EIA.

Load Condition 1 = 85 mph (fastest mile) Wind Load (without ice) + Tower Dead Load

Load Condition 2 = 85 mph (fastest mile) Wind Load (with ice) + Ice Load + Tower Dead Load

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

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

4. FINDINGS AND EVALUATION

Stresses on the tower structure were evaluated to compare with allowable stresses in accordance with AISC. The calculated stresses under the proposed loading were within the allowable stresses. The anchor bolts and foundation were also within allowable limits. A summary of the results can be found in Tables 1-3. Detailed analysis and calculations for the proposed load conditions are provided in section 6 of this report.

Table 1: Proposed Tower Base Reactions

Base Reactions	Proposed Reactions
Axial Load (kips)	39
Shear per Leg (kips)	18
Total Shear (kips)	28
Uplift per Leg (kips)	182
Comp.per Leg (kips)	211
O.T. Moment (ft-kips)	2394

Table 2: Proposed Tower Component Stress vs. Capacity Summary

Component / (Section No.)	Controlling Component/ Elevation	Stress (% capacity)	Pass/Fail	Comments:
Tower Leg (T3)	Compression / 80'-100'	61.2 %	Pass	
Diagonal (T7)	Compression / 0'-20'	68.6 %	Pass	
Top Girt (T2)	Compression / 100'-120'	27.4 %	Pass	
Bottom Girt (T1)	Compression / 120'-140'	49.9 %	Pass	
Bolts (T7)	Diagonal / 0-20'	68.6 %	Pass	
Anchor Bolts	Tension	48 %	Pass	

Table 3: Foundation Summary

Foundation	Component	Stress (% capacity/FOS)	Pass/Fail	Comments:
Reinf. Concrete Pad and Pier	OTM	68.5%/2.92	Pass	Min. F.O.S of 2.0 reqd per IBC 2003 Section 3108.4.2

5. CONCLUSIONS AND RECOMMENDATIONS

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

Limitations/Assumptions:

This report is based on the following:

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

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

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

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

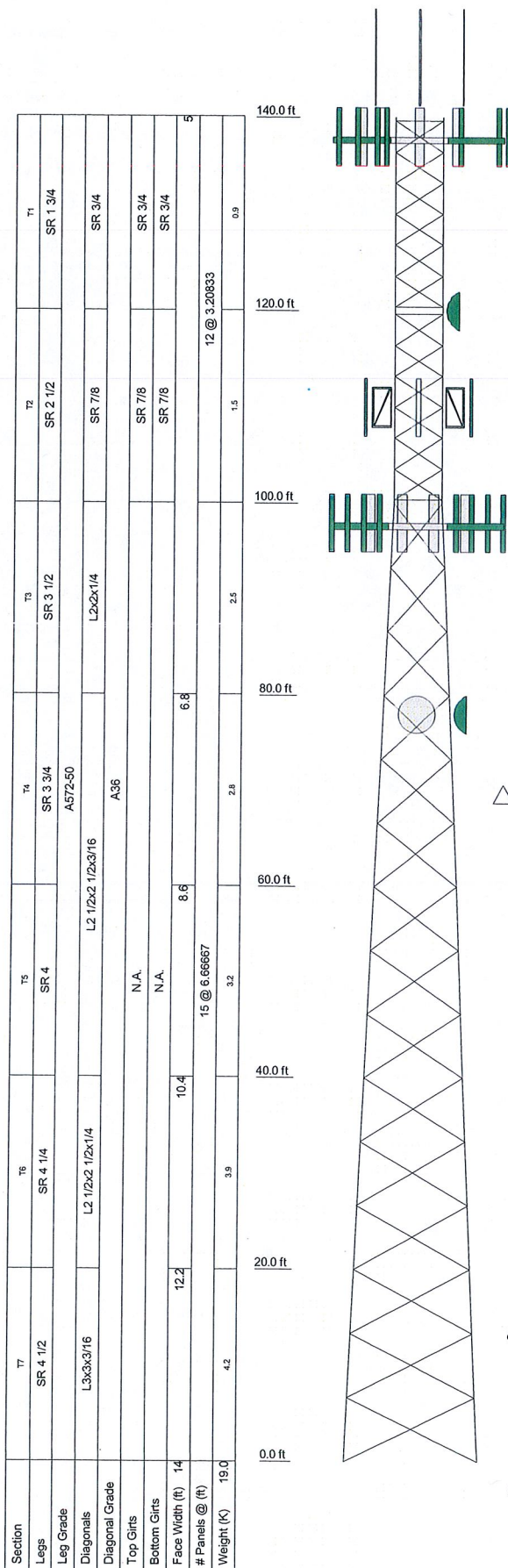
Ongoing and Periodic Inspection and Maintenance:

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

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

6. DRAWINGS AND DATA

RISA TOWER INPUT/OUTPUT SUMMARY



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
1142-2C (NU)	146.29	PL4-107 (NU)	120
1142-2C (NU)	146.29	APXV18-206517S-C w/ mounting hardware (Pocket)	110
1142-2C (NU)	146.29	APXV18-206517S-C w/ mounting hardware (Pocket)	110
LPA-185080-12CF_2 (Verizon)	138	APXV18-206517S-C w/ mounting hardware (Pocket)	110
LPA-185080-12CF_2 (Verizon)	138	3' Stand-off	110
LPA-185080-12CF_2 (Verizon)	138	3' Stand-off	110
LPA-185080-12CF_2 (Verizon)	138	3' Stand-off	110
LPA-185080-12CF_2 (Verizon)	138	3' Stand-off	110
T-Frame Sector Mount (1) (Verizon)	138	(2) ClearGain TMA (Cingular)	101
T-Frame Sector Mount (1) (Verizon)	138	(2) ClearGain TMA (Cingular)	101
T-Frame Sector Mount (1) (Verizon)	138	(2) ClearGain TMA (Cingular)	101
DB854DG65ESX w/Mount Pipe (Verizon)	138	(2) ClearGain TMA (Cingular)	98
DB854DG65ESX w/Mount Pipe (Verizon)	138	(2) ClearGain TMA (Cingular)	98
DB854DG65ESX w/Mount Pipe (Verizon)	138	T-Frame Sector Mount (1) (Cingular)	98
DB854DG65ESX w/Mount Pipe (Verizon)	138	T-Frame Sector Mount (1) (Cingular)	98
P65-16-XL-2 (Verizon)	138	(2) ClearGain TMA (Cingular)	98
BXA-70063/6CF (Verizon)	138	(4) CSS XDUI01416-80 (Cingular)	98
P65-16-XL-2 (Verizon)	138	(4) CSS XDUI01416-80 (Cingular)	98
(2) Diplexer (Verizon)	138	T-Frame Sector Mount (1) (Cingular)	98
(2) Diplexer (Verizon)	138	PL4-107 (NU)	78
(2) Diplexer (Verizon)	138	PL4-107 (NU)	78

MATERIAL STRENGTH

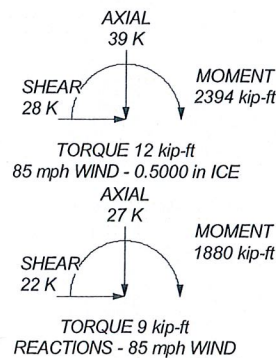
GRADE	Fy	Fu	GRADE	Fy	Fu
A572-50	50 ksi	65 ksi	A36	36 ksi	58 ksi

TOWER DESIGN NOTES

1. Tower designed for a 85 mph basic wind in accordance with the TIA/EIA-222-F Standard.
2. Tower is also designed for a 85 mph basic wind with 0.50 in ice.
3. Deflections are based upon a 85 mph wind.
4. TOWER RATING: 68.6%

MAX. CORNER REACTIONS AT BASE:

DOWN: 211 K
 UPLIFT: -182 K
 SHEAR: 18 K



URS Corporation

500 Enterprise Drive, Suite 3B
 Rocky Hill, CT 06067
 Phone: (860) 529-8882
 FAX: (860) 529-3991

Job: 140' Self-Supporting Lattice Tower

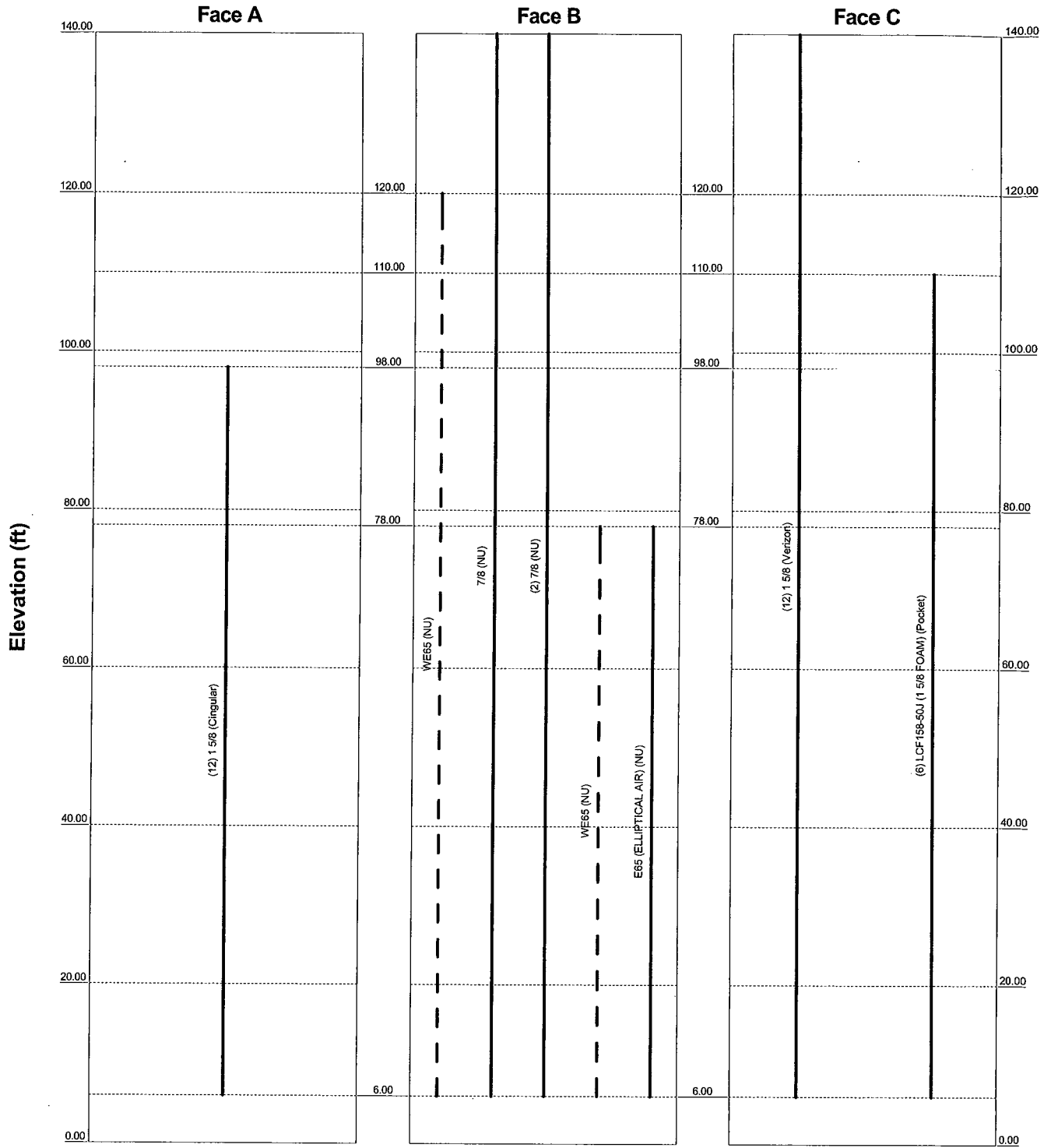
Project: 705 West Johnson Ave., Cheshire, CT
 Client: Verizon Wireless
 Code: TIA/EIA-222-F
 Path: P:\08\ERI Files\140-038 Cheshire North 2 - 85 mph.eri
 Drawn by: Kevin Barker
 Date: 02/11/11
 App'd:
 Scale: NTS
 Dwg No. E-1

RISA TOWER FEEDLINE DISTRIBUTION

Feedline Distribution Chart

0' - 140'

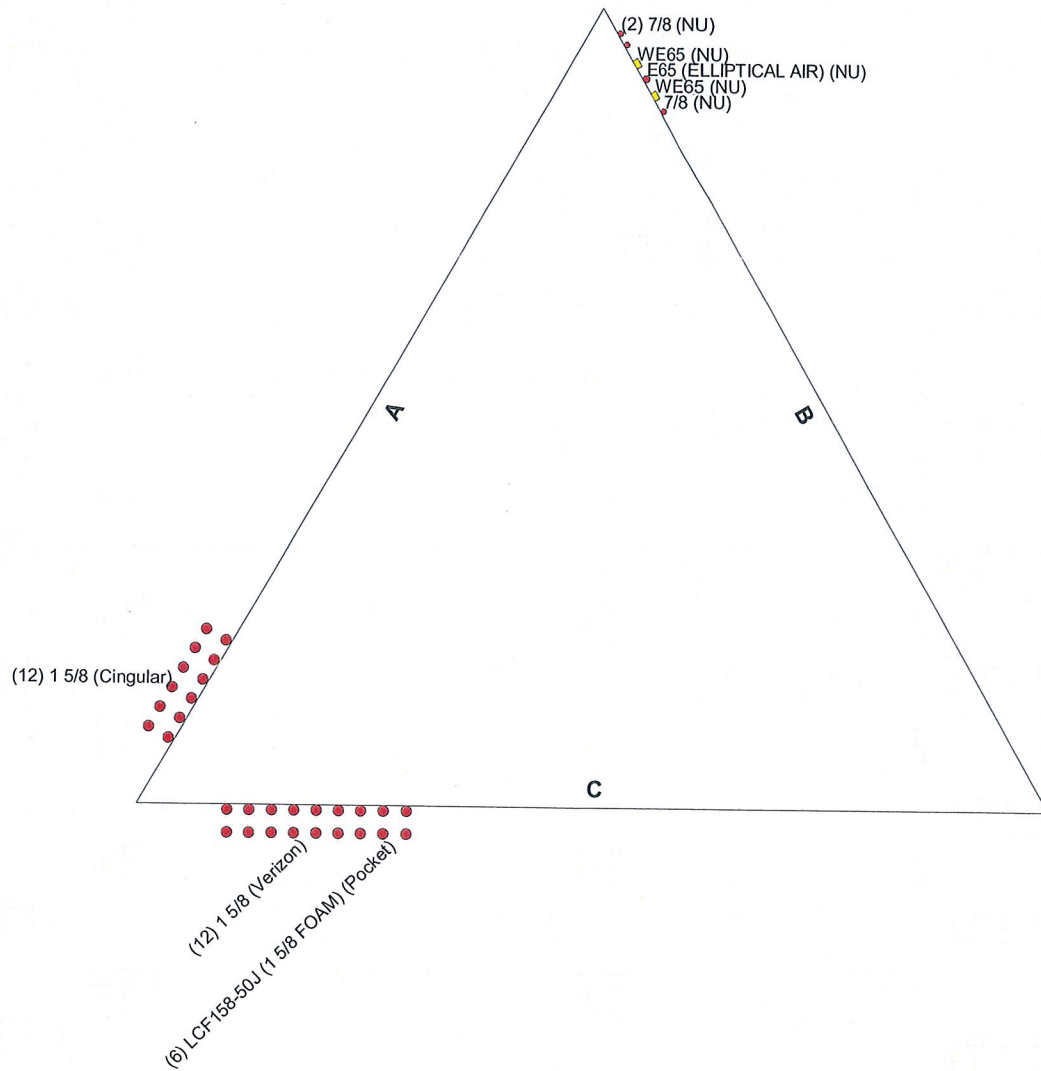
Round Flat App In Face App Out Face Truss Leg



URS Corporation		Job: 140' Self-Supporting Lattice Tower	
500 Enterprise Drive, Suite 3B		Project: 705 West Johnson Ave., Cheshire, CT	
Rocky Hill, CT 06067		Client: Verizon Wireless	Drawn by: Kevin Barker
Phone: (860) 529-8882		Code: TIA/EIA-222-F	Date: 02/11/11
FAX: (860) 529-3991		Path: P:\08\ERI Files\175-038 Cheshire North 2 - 85 mph.et	Scale: NTS
			Dwg No. E-7

RISA TOWER FEEDLINE PLAN

Feedline Plan



URS Corporation		Job: 140' Self-Supporting Lattice Tower	
500 Enterprise Drive, Suite 3B		Project: 705 West Johnson Ave., Cheshire, CT	
Rocky Hill, CT 06067		Client: Verizon Wireless	Drawn by: Kevin Barker
Phone: (860) 529-8882		Code: TIA/EIA-222-F	Date: 02/11/11
FAX: (860) 529-3991		Path: P:\08\ERI Files\WZ5-038 Cheshire North 2 - 85 mph.eri	Scale: NTS
			Dwg No. E-7

RISA TOWER DETAILED OUTPUT

RISATower URS Corporation 500 Enterprise Drive, Suite 3B Rocky Hill, CT 06067 Phone: (860) 529-8882 FAX: (860) 529-3991	Job	140' Self-Supporting Lattice Tower	Page	1 of 30
	Project	705 West Johnson Ave., Cheshire, CT	Date	08:23:45 02/11/11
	Client	Verizon Wireless	Designed by	Kevin Barker

Tower Input Data

The main tower is a 3x free standing tower with an overall height of 140.00 ft above the ground line.

The base of the tower is set at an elevation of 0.00 ft above the ground line.

The face width of the tower is 5.00 ft at the top and 14.00 ft at the base.

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

The following design criteria apply:

Basic wind speed of 85 mph.

Nominal ice thickness of 0.5000 in.

Ice density of 56 pcf.

A wind speed of 85 mph is used in combination with ice.

Temperature drop of 50 °F.

Deflections calculated using a wind speed of 85 mph.

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

Pressures are calculated at each section.

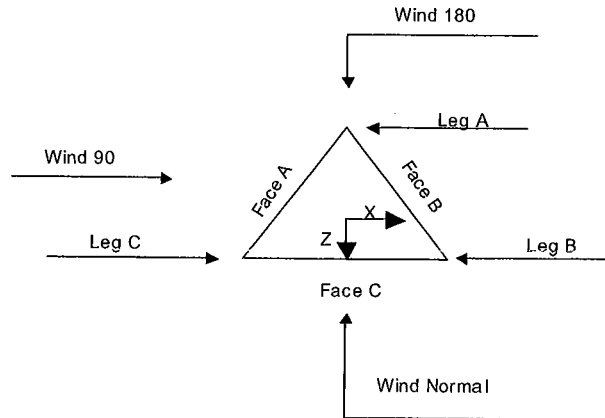
Stress ratio used in tower member design is 1.333.

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		

RISATower URS Corporation 500 Enterprise Drive, Suite 3B Rocky Hill, CT 06067 Phone: (860) 529-8882 FAX: (860) 529-3991	Job	140' Self-Supporting Lattice Tower	Page	2 of 30
	Project	705 West Johnson Ave., Cheshire, CT	Date	08:23:45 02/11/11
	Client	Verizon Wireless	Designed by	Kevin Barker



Triangular Tower

Tower Section Geometry

Tower Section	Tower Elevation	Assembly Database	Description	Section Width	Number of Sections	Section Length
	<i>ft</i>			<i>ft</i>		<i>ft</i>
T1	140.00-120.00			5.00	1	20.00
T2	120.00-100.00			5.00	1	20.00
T3	100.00-80.00			5.00	1	20.00
T4	80.00-60.00			6.80	1	20.00
T5	60.00-40.00			8.60	1	20.00
T6	40.00-20.00			10.40	1	20.00
T7	20.00-0.00			12.20	1	20.00

Tower Section Geometry (cont'd)

Tower Section	Tower Elevation	Diagonal Spacing	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset	Bottom Girt Offset
	<i>ft</i>	<i>ft</i>				<i>in</i>	<i>in</i>
T1	140.00-120.00	3.21	X Brace	No	No	4.5000	4.5000
T2	120.00-100.00	3.21	X Brace	No	No	4.5000	4.5000
T3	100.00-80.00	6.67	X Brace	No	No	0.0000	0.0000
T4	80.00-60.00	6.67	X Brace	No	No	0.0000	0.0000
T5	60.00-40.00	6.67	X Brace	No	No	0.0000	0.0000
T6	40.00-20.00	6.67	X Brace	No	No	0.0000	0.0000
T7	20.00-0.00	6.67	X Brace	No	No	0.0000	0.0000

RISATower URS Corporation 500 Enterprise Drive, Suite 3B Rocky Hill, CT 06067 Phone: (860) 529-8882 FAX: (860) 529-3991	Job	140' Self-Supporting Lattice Tower	Page	3 of 30
	Project	705 West Johnson Ave., Cheshire, CT	Date	08:23:45 02/11/11
	Client	Verizon Wireless	Designed by	Kevin Barker

Tower Section Geometry (cont'd)

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T1 140.00-120.00	Solid Round	1 3/4	A572-50 (50 ksi)	Solid Round	3/4	A36 (36 ksi)
T2 120.00-100.00	Solid Round	2 1/2	A572-50 (50 ksi)	Solid Round	7/8	A36 (36 ksi)
T3 100.00-80.00	Solid Round	3 1/2	A572-50 (50 ksi)	Single Angle	L2x2x1/4	A36 (36 ksi)
T4 80.00-60.00	Solid Round	3 3/4	A572-50 (50 ksi)	Single Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T5 60.00-40.00	Solid Round	4	A572-50 (50 ksi)	Single Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T6 40.00-20.00	Solid Round	4 1/4	A572-50 (50 ksi)	Single Angle	L2 1/2x2 1/2x1/4	A36 (36 ksi)
T7 20.00-0.00	Solid Round	4 1/2	A572-50 (50 ksi)	Single Angle	L3x3x3/16	A36 (36 ksi)

Tower Section Geometry (cont'd)

Tower Elevation ft	Top Girt Type	Top Girt Size	Top Girt Grade	Bottom Girt Type	Bottom Girt Size	Bottom Girt Grade
T1 140.00-120.00	Solid Round	3/4	A36 (36 ksi)	Solid Round	3/4	A36 (36 ksi)
T2 120.00-100.00	Solid Round	7/8	A36 (36 ksi)	Solid Round	7/8	A36 (36 ksi)

Tower Section Geometry (cont'd)

Tower Elevation ft	Gusset Area (per face) ft ²	Gusset Thickness in	Gusset Grade	Adjust. Factor A _f	Adjust. Factor A _r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontal in
T1 140.00-120.00	0.00	0.0000	A36 (36 ksi)	1.02	1	1	36.0000	36.0000
T2 120.00-100.00	0.00	0.0000	A36 (36 ksi)	1.02	1	1	36.0000	36.0000
T3 100.00-80.00	0.00	0.0000	A36 (36 ksi)	1.02	1	1	36.0000	36.0000
T4 80.00-60.00	0.00	0.0000	A36 (36 ksi)	1.02	1	1	36.0000	36.0000
T5 60.00-40.00	0.00	0.0000	A36 (36 ksi)	1.02	1	1	36.0000	36.0000
T6 40.00-20.00	0.00	0.0000	A36 (36 ksi)	1.02	1	1	36.0000	36.0000
T7 20.00-0.00	0.00	0.0000	A36 (36 ksi)	1.02	1	1	36.0000	36.0000

RISATower URS Corporation 500 Enterprise Drive, Suite 3B Rocky Hill, CT 06067 Phone: (860) 529-8882 FAX: (860) 529-3991	Job	Page
	140' Self-Supporting Lattice Tower	4 of 30
	Project	Date
	705 West Johnson Ave., Cheshire, CT	08:23:45 02/11/11
	Client	Designed by
	Verizon Wireless	Kevin Barker

Tower Section Geometry (cont'd)

Tower Elevation	Calc K Single Angles	Calc K Solid Rounds	Legs	K Factors						
				X Brace Diags	X Brace Diags	Single Diags	Girts	Horiz.	Sec. Horiz.	Inner Brace
				X Y	X Y	X Y	X Y	X Y	X Y	X Y
ft										
T1	Yes	Yes	1	1	1	1	1	1	1	1
140.00-120.00				1	1	1	1	1	1	1
T2	Yes	Yes	1	1	1	1	1	1	1	1
120.00-100.00				1	1	1	1	1	1	1
T3	Yes	Yes	1	1	1	1	1	1	1	1
100.00-80.00				1	1	1	1	1	1	1
T4	Yes	Yes	1	1	1	1	1	1	1	1
80.00-60.00				1	1	1	1	1	1	1
T5	Yes	Yes	1	1	1	1	1	1	1	1
60.00-40.00				1	1	1	1	1	1	1
T6	Yes	Yes	1	1	1	1	1	1	1	1
40.00-20.00				1	1	1	1	1	1	1
T7 20.00-0.00	Yes	Yes	1	1	1	1	1	1	1	1

¹Note: K factors are applied to member segment lengths. K-braces without inner supporting members will have the K factor in the out-of-plane direction applied to the overall length.

Tower Section Geometry (cont'd)

Tower Elevation ft	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
	Net Width	U	Net Width	U	Net Width	U	Net Width	U	Net Width	U	Net Width	U	Net Width	U
	Deduct in		Deduct in		Deduct in		Deduct in		Deduct in		Deduct in		Deduct in	
T1	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
140.00-120.00														
T2	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
120.00-100.00														
T3	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
100.00-80.00														
T4 80.00-60.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T5 60.00-40.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T6 40.00-20.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T7 20.00-0.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75

Tower Section Geometry (cont'd)

RISATower URS Corporation 500 Enterprise Drive, Suite 3B Rocky Hill, CT 06067 Phone: (860) 529-8882 FAX: (860) 529-3991	Job	140' Self-Supporting Lattice Tower	Page	5 of 30
	Project	705 West Johnson Ave., Cheshire, CT	Date	08:23:45 02/11/11
	Client	Verizon Wireless	Designed by	Kevin Barker

Tower Elevation ft	Leg Connection Type	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
		Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.
T1 140.00-120.00	Flange	0.0000	0	0.7500	1	0.7500	0	0.7500	0	0.6250	0	0.6250	0	0.6250	0
		A325N		A325N		A325N		A325N		A325N		A325N		A325N	
T2 120.00-100.00	Flange	0.0000	0	0.7500	1	0.7500	0	0.7500	0	0.6250	0	0.6250	0	0.6250	0
		A325N		A325N		A325N		A325N		A325N		A325N		A325N	
T3 100.00-80.00	Flange	0.7500	4	0.7500	1	0.7500	0	0.7500	0	0.6250	0	0.6250	0	0.6250	0
		A325N		A325N		A325N		A325N		A325N		A325N		A325N	
T4 80.00-60.00	Flange	1.1250	6	0.7500	1	0.7500	0	0.7500	0	0.6250	0	0.6250	0	0.6250	0
		A325N		A325N		A325N		A325N		A325N		A325N		A325N	
T5 60.00-40.00	Flange	1.1250	6	0.7500	1	0.7500	0	0.7500	0	0.6250	0	0.6250	0	0.6250	0
		A325N		A325N		A325N		A325N		A325N		A325N		A325N	
T6 40.00-20.00	Flange	1.2500	6	0.7500	1	0.7500	0	0.7500	0	0.6250	0	0.6250	0	0.6250	0
		A325N		A325N		A325N		A325N		A325N		A325N		A325N	
T7 20.00-0.00	Flange	1.2500	6	0.7500	1	0.7500	0	0.7500	0	0.6250	0	0.6250	0	0.6250	0
		A325N		A325N		A325N		A325N		A325N		A325N		A325N	

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
1 5/8 (Cingular)	A	Yes	Ar (CfAe)	98.00 - 6.00	0.0000	-0.36	12	6	1.9800	1.9800		1.04
1 5/8 (Verizon)	C	Yes	Ar (CfAe)	140.00 - 6.00	0.0000	0.34	12	6	1.9800	1.9800		1.04
WE65 (NU)	B	Yes	Af (CfAe)	120.00 - 6.00	0.0000	-0.39	1	1	1.5836	1.5836	5.1284	0.53
7/8 (NU)	B	Yes	Ar (CfAe)	140.00 - 6.00	0.0000	-0.37	1	1	1.1100	1.1100		0.54
7/8 (NU)	B	Yes	Ar (CfAe)	140.00 - 6.00	0.0000	-0.46	2	2	1.1100	1.1100		0.54
WE65 (NU)	B	Yes	Af (CfAe)	78.00 - 6.00	0.0000	-0.43	1	1	1.5836	1.5836	5.1284	0.53
LCF158-50J (1 5/8 FOAM Pocket)	C	Yes	Ar (CfAe)	110.00 - 6.00	0.0000	0.23	6	3	2.0100	2.0100		0.92
E65 (ELLIPTICAL AIR) (NU)	B	Yes	Ar (CfAe)	78.00 - 6.00	0.0000	-0.41	1	1	1.2000	1.2000		0.67

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A _R ft ²	A _F ft ²	C _{AA} In Face ft ²	C _{AA} Out Face ft ²	Weight K
T1	140.00-120.00	A	0.000	0.000	0.000	0.000	0.00
		B	5.550	0.000	0.000	0.000	0.03
		C	19.800	0.000	0.000	0.000	0.25
T2	120.00-100.00	A	0.000	0.000	0.000	0.000	0.00
		B	5.550	2.639	0.000	0.000	0.04

RISATower URS Corporation 500 Enterprise Drive, Suite 3B Rocky Hill, CT 06067 Phone: (860) 529-8882 FAX: (860) 529-3991	Job	140' Self-Supporting Lattice Tower	Page	6 of 30
	Project	705 West Johnson Ave., Cheshire, CT	Date	08:23:45 02/11/11
	Client	Verizon Wireless	Designed by	Kevin Barker

Tower Section	Tower Elevation ft	Face	A_R ft ²	A_F ft ²	C_{AA} In Face ft ²	C_{AA} Out Face ft ²	Weight K
T3	100.00-80.00	C	24.825	0.000	0.000	0.000	0.30
		A	17.820	0.000	0.000	0.000	0.22
		B	5.550	2.639	0.000	0.000	0.04
T4	80.00-60.00	C	29.850	0.000	0.000	0.000	0.36
		A	19.800	0.000	0.000	0.000	0.25
		B	7.350	5.015	0.000	0.000	0.06
T5	60.00-40.00	C	29.850	0.000	0.000	0.000	0.36
		A	19.800	0.000	0.000	0.000	0.25
		B	7.550	5.279	0.000	0.000	0.07
T6	40.00-20.00	C	29.850	0.000	0.000	0.000	0.36
		A	19.800	0.000	0.000	0.000	0.25
		B	7.550	5.279	0.000	0.000	0.07
T7	20.00-0.00	C	29.850	0.000	0.000	0.000	0.36
		A	13.860	0.000	0.000	0.000	0.17
		B	5.285	3.695	0.000	0.000	0.05
		C	20.895	0.000	0.000	0.000	0.25

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft ²	A_F ft ²	C_{AA} In Face ft ²	C_{AA} Out Face ft ²	Weight K
T1	140.00-120.00	A	0.500	0.000	0.000	0.000	0.000	0.00
		B		10.550	0.000	0.000	0.000	0.09
		C		29.800	0.000	0.000	0.000	0.61
T2	120.00-100.00	A	0.500	0.000	0.000	0.000	0.000	0.00
		B		10.550	3.750	0.000	0.000	0.13
		C		37.325	0.000	0.000	0.000	0.76
T3	100.00-80.00	A	0.500	26.820	0.000	0.000	0.000	0.55
		B		10.550	3.750	0.000	0.000	0.13
		C		44.850	0.000	0.000	0.000	0.91
T4	80.00-60.00	A	0.500	29.800	0.000	0.000	0.000	0.61
		B		13.850	7.126	0.000	0.000	0.19
		C		44.850	0.000	0.000	0.000	0.91
T5	60.00-40.00	A	0.500	29.800	0.000	0.000	0.000	0.61
		B		14.217	7.501	0.000	0.000	0.20
		C		44.850	0.000	0.000	0.000	0.91
T6	40.00-20.00	A	0.500	29.800	0.000	0.000	0.000	0.61
		B		14.217	7.501	0.000	0.000	0.20
		C		44.850	0.000	0.000	0.000	0.91
T7	20.00-0.00	A	0.500	20.860	0.000	0.000	0.000	0.43
		B		9.952	5.251	0.000	0.000	0.14
		C		31.395	0.000	0.000	0.000	0.64

Feed Line Shielding

Section	Elevation ft	Face	A_R ft ²	A_R Ice ft ²	A_F ft ²	A_F Ice ft ²
T1	140.00-120.00	A	0.000	0.000	0.000	0.000
		B	0.282	1.251	0.000	0.000
		C	1.006	3.533	0.000	0.000
T2	120.00-100.00	A	0.000	0.000	0.000	0.000
		B	0.485	1.887	0.000	0.000

RISATower URS Corporation 500 Enterprise Drive, Suite 3B Rocky Hill, CT 06067 Phone: (860) 529-8882 FAX: (860) 529-3991	Job	140' Self-Supporting Lattice Tower	Page	7 of 30
	Project	705 West Johnson Ave., Cheshire, CT	Date	08:23:45 02/11/11
	Client	Verizon Wireless	Designed by	Kevin Barker

Section	Elevation	Face	A_R	$A_{R_{Ice}}$	A_F	$A_{F_{Ice}}$
	ft		ft ²	ft ²	ft ²	ft ²
T3	100.00-80.00	C	1.471	4.741	0.000	0.000
		A	0.000	1.016	1.350	2.033
		B	0.000	0.563	0.621	1.126
T4	80.00-60.00	C	0.000	1.699	2.262	3.399
		A	0.000	0.988	1.640	2.469
		B	0.000	0.730	1.024	1.825
T5	60.00-40.00	C	0.000	1.486	2.473	3.716
		A	0.000	0.911	1.514	2.278
		B	0.000	0.698	0.981	1.745
T6	40.00-20.00	C	0.000	1.371	2.282	3.428
		A	0.000	0.866	1.438	2.164
		B	0.000	0.663	0.932	1.658
T7	20.00-0.00	C	0.000	1.303	2.167	3.257
		A	0.000	0.585	1.167	1.756
		B	0.000	0.448	0.756	1.345
		C	0.000	0.881	1.759	2.643

Feed Line Center of Pressure

Section	Elevation	CP_x	CP_z	$CP_{x_{Ice}}$	$CP_{z_{Ice}}$
	ft	in	in	in	in
T1	140.00-120.00	-6.5615	3.8423	-5.2447	2.4805
T2	120.00-100.00	-5.7797	3.2603	-5.0265	2.4023
T3	100.00-80.00	-9.9189	4.8555	-10.0497	4.5343
T4	80.00-60.00	-11.2749	4.0179	-11.6679	3.6494
T5	60.00-40.00	-13.0501	4.4345	-13.5914	4.0107
T6	40.00-20.00	-14.6442	4.9279	-15.3384	4.4713
T7	20.00-0.00	-11.3502	3.7957	-12.3106	3.5653

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horiz Lateral Vert	Azimuth Adjustment	Placement	$C_{AA_{Front}}$	$C_{AA_{Side}}$	Weight
			ft ft ft	°	ft	ft ²	ft ²	K
1142-2C (NU)	A	From Leg	2.50	0.0000	146.29	No Ice	2.09	0.02
			0.00			1/2" Ice	3.37	0.04
			0.00					
1142-2C (NU)	B	From Leg	2.50	0.0000	146.29	No Ice	2.09	0.02
			0.00			1/2" Ice	3.37	0.04
			0.00					
1142-2C (NU)	C	From Leg	2.50	0.0000	146.29	No Ice	2.09	0.02
			0.00			1/2" Ice	3.37	0.04
			0.00					
LPA-185080-12CF_2 (Verizon)	A	From Leg	4.50	0.0000	138.00	No Ice	3.53	0.01
			4.00			1/2" Ice	3.96	0.04
			0.00					
LPA-185080-12CF_2	A	From Leg	4.50	0.0000	138.00	No Ice	3.53	0.01

RISATower URS Corporation 500 Enterprise Drive, Suite 3B Rocky Hill, CT 06067 Phone: (860) 529-8882 FAX: (860) 529-3991	Job	140' Self-Supporting Lattice Tower	Page	8 of 30
	Project	705 West Johnson Ave., Cheshire, CT	Date	08:23:45 02/11/11
	Client	Verizon Wireless	Designed by	Kevin Barker

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft	C _{AA} Front ft ²	C _{AA} Side ft ²	Weight K
(Verizon)			-4.00 0.00			1/2" Ice 3.96	5.01	0.04
LPA-185080-12CF_2 (Verizon)	B	From Leg	4.50 4.00 0.00	0.0000	138.00	No Ice 1/2" Ice 3.96	4.57 5.01	0.01 0.04
LPA-185080-12CF_2 (Verizon)	B	From Leg	4.50 -4.00 0.00	0.0000	138.00	No Ice 1/2" Ice 3.96	4.57 5.01	0.01 0.04
LPA-185080-12CF_2 (Verizon)	C	From Leg	4.50 4.00 0.00	0.0000	138.00	No Ice 1/2" Ice 3.96	4.57 5.01	0.01 0.04
LPA-185080-12CF_2 (Verizon)	C	From Leg	4.50 -4.00 0.00	0.0000	138.00	No Ice 1/2" Ice 3.96	4.57 5.01	0.01 0.04
(4) CSS XDUE1416-80 (Cingular)	A	From Leg	4.50 0.00 0.00	0.0000	98.00	No Ice 1/2" Ice 7.59	3.50 3.86	0.02 0.06
(4) CSS XDUE1416-80 (Cingular)	B	From Leg	4.50 0.00 0.00	0.0000	98.00	No Ice 1/2" Ice 7.59	3.50 3.86	0.02 0.06
(4) CSS XDUE1416-80 (Cingular)	C	From Leg	4.50 0.00 0.00	0.0000	98.00	No Ice 1/2" Ice 7.59	3.50 3.86	0.02 0.06
(2) ClearGain TMA (Cingular)	A	From Leg	4.50 0.00 0.00	0.0000	98.00	No Ice 1/2" Ice 0.56	0.47 0.56	0.03 0.03
(2) ClearGain TMA (Cingular)	B	From Leg	4.50 0.00 0.00	0.0000	98.00	No Ice 1/2" Ice 0.56	0.47 0.56	0.03 0.03
(2) ClearGain TMA (Cingular)	C	From Leg	4.50 0.00 0.00	0.0000	98.00	No Ice 1/2" Ice 0.56	0.47 0.56	0.03 0.03
(2) ClearGain TMA (Cingular)	A	From Leg	4.50 0.00 0.00	0.0000	101.00	No Ice 1/2" Ice 0.56	0.47 0.56	0.03 0.03
(2) ClearGain TMA (Cingular)	B	From Leg	4.50 0.00 0.00	0.0000	101.00	No Ice 1/2" Ice 0.56	0.47 0.56	0.03 0.03
(2) ClearGain TMA (Cingular)	C	From Leg	4.50 0.00 0.00	0.0000	101.00	No Ice 1/2" Ice 0.56	0.47 0.56	0.03 0.03
T-Frame Sector Mount (1) (Verizon)	A	From Leg	4.00 0.00 0.00	0.0000	138.00	No Ice 1/2" Ice 18.40	13.60 18.40	0.47 0.60
T-Frame Sector Mount (1) (Verizon)	B	From Leg	4.00 0.00 0.00	0.0000	138.00	No Ice 1/2" Ice 18.40	13.60 18.40	0.47 0.60
T-Frame Sector Mount (1) (Verizon)	C	From Leg	4.00 0.00 0.00	0.0000	138.00	No Ice 1/2" Ice 18.40	13.60 18.40	0.47 0.60
T-Frame Sector Mount (1) (Cingular)	A	From Leg	4.00 0.00 0.00	0.0000	98.00	No Ice 1/2" Ice 18.40	13.60 18.40	0.47 0.60
T-Frame Sector Mount (1) (Cingular)	B	From Leg	4.00 0.00 0.00	0.0000	98.00	No Ice 1/2" Ice 18.40	13.60 18.40	0.47 0.60
T-Frame Sector Mount (1)	C	From Leg	4.00	0.0000	98.00	No Ice	13.60	0.47

RISATower URS Corporation 500 Enterprise Drive, Suite 3B Rocky Hill, CT 06067 Phone: (860) 529-8882 FAX: (860) 529-3991	Job	140' Self-Supporting Lattice Tower	Page	9 of 30
	Project	705 West Johnson Ave., Cheshire, CT	Date	08:23:45 02/11/11
	Client	Verizon Wireless	Designed by	Kevin Barker

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft	C _{AA} Front ft ²	C _{AA} Side ft ²	Weight K
(Cingular)			0.00 0.00			1/2" Ice 18.40	18.40	0.60
APXV18-206517S-C w/ mounting hardware (Pocket)	A	From Leg	3.50 0.00 0.00	0.0000	110.00	No Ice 1/2" Ice 5.08 5.53	4.46 5.39	0.05 0.09
APXV18-206517S-C w/ mounting hardware (Pocket)	B	From Leg	3.50 0.00 0.00	0.0000	110.00	No Ice 1/2" Ice 5.08 5.53	4.46 5.39	0.05 0.09
APXV18-206517S-C w/ mounting hardware (Pocket)	C	From Leg	3.50 0.00 0.00	0.0000	110.00	No Ice 1/2" Ice 5.08 5.53	4.46 5.39	0.05 0.09
3' Stand-off	A	From Leg	1.50 0.00 0.00	0.0000	110.00	No Ice 1/2" Ice 1.00 1.20	2.00 2.70	0.05 0.07
3' Stand-off	B	From Leg	1.50 0.00 0.00	0.0000	110.00	No Ice 1/2" Ice 1.00 1.20	2.00 2.70	0.05 0.07
3' Stand-off	C	From Leg	1.50 0.00 0.00	0.0000	110.00	No Ice 1/2" Ice 1.00 1.20	2.00 2.70	0.05 0.07
DB854DG65ESX w/Mount Pipe (Verizon)	A	From Leg	4.50 -6.00 0.00	0.0000	138.00	No Ice 1/2" Ice 6.59 7.30	4.41 5.45	0.04 0.09
DB854DG65ESX w/Mount Pipe (Verizon)	B	From Leg	4.50 -6.00 0.00	0.0000	138.00	No Ice 1/2" Ice 6.59 7.30	4.41 5.45	0.04 0.09
DB854DG65ESX w/Mount Pipe (Verizon)	C	From Leg	4.50 -6.00 0.00	0.0000	138.00	No Ice 1/2" Ice 6.59 7.30	4.41 5.45	0.04 0.09
P65-16-XL-2 (Verizon)	A	From Leg	4.50 0.00 0.00	0.0000	138.00	No Ice 1/2" Ice 8.54 9.13	5.99 6.89	0.08 0.14
BXA-70063/6CF (Verizon)	B	From Leg	4.50 0.00 0.00	0.0000	138.00	No Ice 1/2" Ice 5.50 6.50	2.20 3.20	0.04 0.09
P65-16-XL-2 (Verizon)	C	From Leg	4.50 0.00 0.00	0.0000	138.00	No Ice 1/2" Ice 8.54 9.13	5.99 6.89	0.08 0.14
(2) Diplexer (Verizon)	A	From Leg	4.50 0.00 0.00	0.0000	138.00	No Ice 1/2" Ice 0.52 0.62	0.14 0.20	0.02 0.02
(2) Diplexer (Verizon)	B	From Leg	4.50 0.00 0.00	0.0000	138.00	No Ice 1/2" Ice 0.52 0.62	0.14 0.20	0.02 0.02
(2) Diplexer (Verizon)	C	From Leg	4.50 0.00 0.00	0.0000	138.00	No Ice 1/2" Ice 0.52 0.62	0.14 0.20	0.02 0.02

Dishes

RISATower URS Corporation 500 Enterprise Drive, Suite 3B Rocky Hill, CT 06067 Phone: (860) 529-8882 FAX: (860) 529-3991	Job	140' Self-Supporting Lattice Tower	Page	10 of 30
	Project	705 West Johnson Ave., Cheshire, CT	Date	08:23:45 02/11/11
	Client	Verizon Wireless	Designed by	Kevin Barker

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft	Aperture Area ft ²	Weight K
PL4-107 (NU)	B	Paraboloid w/o Radome	From Leg	0.50 0.00 0.00	Worst		120.00	4.00	No Ice 1/2" Ice	12.60 13.09 0.10 0.17
PL4-107 (NU)	A	Paraboloid w/o Radome	From Leg	0.50 0.00 0.00	Worst		78.00	4.00	No Ice 1/2" Ice	12.60 13.09 0.10 0.17
PL4-107 (NU)	B	Paraboloid w/o Radome	From Leg	0.50 0.00 0.00	Worst		78.00	4.00	No Ice 1/2" Ice	12.60 13.09 0.10 0.17

Tower Pressures - No Ice

$$G_H = 1.138$$

Section Elevation ft	z ft	K _z	q _z psf	A _G ft ²	F a c e	A _F ft ²	A _R ft ²	A _{leg} ft ²	Leg %	C _A A _A In Face ft ²	C _A A _A Out Face ft ²
T1 140.00-120.00	130.00	1.48	27	102.917	A	0.000	10.766	5.833	54.18	0.000	0.000
					B	0.000	16.034		36.38	0.000	0.000
					C	0.000	29.560		19.73	0.000	0.000
T2 120.00-100.00	110.00	1.411	26	104.167	A	0.000	14.014	8.333	59.47	0.000	0.000
					B	2.639	19.078		38.37	0.000	0.000
					C	0.000	37.367		22.30	0.000	0.000
T3 100.00-80.00	90.00	1.332	25	123.839	A	7.311	29.502	11.682	31.73	0.000	0.000
					B	10.680	17.232		41.85	0.000	0.000
					C	6.400	41.532		24.37	0.000	0.000
T4 80.00-60.00	70.00	1.24	23	160.256	A	10.832	32.317	12.517	29.01	0.000	0.000
					B	16.462	19.867		34.45	0.000	0.000
					C	9.999	42.367		23.90	0.000	0.000
T5 60.00-40.00	50.00	1.126	21	196.673	A	12.776	33.151	13.351	29.07	0.000	0.000
					B	18.587	20.901		33.81	0.000	0.000
					C	12.007	43.201		24.18	0.000	0.000
T6 40.00-20.00	30.00	1	18	233.091	A	14.775	33.986	14.186	29.09	0.000	0.000
					B	20.560	21.736		33.54	0.000	0.000
					C	14.046	44.036		24.42	0.000	0.000
T7 20.00-0.00	10.00	1	18	269.508	A	20.688	28.880	15.020	30.30	0.000	0.000
					B	24.794	20.305		33.30	0.000	0.000
					C	20.096	35.915		26.82	0.000	0.000

Tower Pressure - With Ice

$$G_H = 1.138$$

Section Elevation ft	z ft	K _z	q _z psf	t _z in	A _G ft ²	F a c e	A _F ft ²	A _R ft ²	A _{leg} ft ²	Leg %	C _A A _A In Face ft ²	C _A A _A Out Face ft ²
T1 140.00-120.00	130.00	1.48	27	0.5000	104.583	A	0.000	20.676	9.167	44.34	0.000	0.000
						B	0.000	29.975		30.58	0.000	0.000
						C	0.000	46.943		19.53	0.000	0.000
T2	110.00	1.411	26	0.5000	105.833	A	0.000	23.839	11.667	48.94	0.000	0.000

RISATower URS Corporation 500 Enterprise Drive, Suite 3B Rocky Hill, CT 06067 Phone: (860) 529-8882 FAX: (860) 529-3991	Job	140' Self-Supporting Lattice Tower	Page	11 of 30
	Project	705 West Johnson Ave., Cheshire, CT	Date	08:23:45 02/11/11
	Client	Verizon Wireless	Designed by	Kevin Barker

Section Elevation	z	K _z	q _z	t _z	A _G	F a c e	A _F	A _R	A _{leg}	Leg %	C _A A _A In Face ft ²	C _A A _A Out Face ft ²
ft	ft		psf	in	ft ²		ft ²	ft ²	ft ²			
120.00-100.00						B	3.750	32.502		32.18	0.000	0.000
T3 100.00-80.00	90.00	1.332	25	0.5000	125.508	C	0.000	56.423		20.68	0.000	0.000
						A	6.629	45.070	15.020	29.05	0.000	0.000
						B	11.286	29.253		37.05	0.000	0.000
T4 80.00-60.00	70.00	1.24	23	0.5000	161.925	C	5.263	62.417		22.19	0.000	0.000
						A	10.003	49.558	15.855	26.62	0.000	0.000
						B	17.773	33.866		30.70	0.000	0.000
T5 60.00-40.00	50.00	1.126	21	0.5000	198.342	C	8.756	64.109		21.76	0.000	0.000
						A	12.011	51.182	16.689	26.41	0.000	0.000
						B	20.045	35.811		29.88	0.000	0.000
T6 40.00-20.00	30.00	1	18	0.5000	234.759	C	10.861	65.771		21.78	0.000	0.000
						A	14.049	52.816	17.524	26.21	0.000	0.000
						B	22.056	37.435		29.46	0.000	0.000
T7 20.00-0.00	10.00	1	18	0.5000	271.176	C	12.956	67.429		21.80	0.000	0.000
						A	20.099	45.775	18.358	27.87	0.000	0.000
						B	25.761	35.004		30.21	0.000	0.000
						C	19.212	56.014		24.40	0.000	0.000

Tower Pressure - Service

$$G_H = 1.138$$

Section Elevation	z	K _z	q _z	A _G	F a c e	A _F	A _R	A _{leg}	Leg %	C _A A _A In Face ft ²	C _A A _A Out Face ft ²
ft	ft		psf	ft ²		ft ²	ft ²	ft ²			
T1 140.00-120.00	130.00	1.48	27	102.917	A	0.000	10.766	5.833	54.18	0.000	0.000
					B	0.000	16.034		36.38	0.000	0.000
					C	0.000	29.560		19.73	0.000	0.000
T2 120.00-100.00	110.00	1.411	26	104.167	A	0.000	14.014	8.333	59.47	0.000	0.000
					B	2.639	19.078		38.37	0.000	0.000
					C	0.000	37.367		22.30	0.000	0.000
T3 100.00-80.00	90.00	1.332	25	123.839	A	7.311	29.502	11.682	31.73	0.000	0.000
					B	10.680	17.232		41.85	0.000	0.000
					C	6.400	41.532		24.37	0.000	0.000
T4 80.00-60.00	70.00	1.24	23	160.256	A	10.832	32.317	12.517	29.01	0.000	0.000
					B	16.462	19.867		34.45	0.000	0.000
					C	9.999	42.367		23.90	0.000	0.000
T5 60.00-40.00	50.00	1.126	21	196.673	A	12.776	33.151	13.351	29.07	0.000	0.000
					B	18.587	20.901		33.81	0.000	0.000
					C	12.007	43.201		24.18	0.000	0.000
T6 40.00-20.00	30.00	1	18	233.091	A	14.775	33.986	14.186	29.09	0.000	0.000
					B	20.560	21.736		33.54	0.000	0.000
					C	14.046	44.036		24.42	0.000	0.000
T7 20.00-0.00	10.00	1	18	269.508	A	20.688	28.880	15.020	30.30	0.000	0.000
					B	24.794	20.305		33.30	0.000	0.000
					C	20.096	35.915		26.82	0.000	0.000

Tower Forces - No Ice - Wind Normal To Face

RISATower URS Corporation 500 Enterprise Drive, Suite 3B Rocky Hill, CT 06067 Phone: (860) 529-8882 FAX: (860) 529-3991	Job	140' Self-Supporting Lattice Tower	Page	12 of 30
	Project	705 West Johnson Ave., Cheshire, CT	Date	08:23:45 02/11/11
	Client	Verizon Wireless	Designed by	Kevin Barker

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
ft	K	K							ft ²	K	plf	
T1 140.00-120.00	0.28	0.86	A	0.105	2.946	0.576	1	1	6.197	1.31	65.66	C
			B	0.156	2.75	0.582	1	1	9.338			
			C	0.287	2.331	0.612	1	1	18.093			
T2 120.00-100.00	0.35	1.50	A	0.135	2.829	0.579	1	1	8.117	1.52	75.87	C
			B	0.208	2.568	0.592	1	1	13.937			
			C	0.359	2.152	0.636	1	1	23.752			
T3 100.00-80.00	0.63	2.48	A	0.297	2.303	0.615	1	1	25.457	1.95	97.42	C
			B	0.225	2.513	0.596	1	1	20.949			
			C	0.387	2.09	0.646	1	1	33.246			
T4 80.00-60.00	0.67	2.82	A	0.269	2.381	0.607	1	1	30.447	2.12	105.94	C
			B	0.227	2.509	0.596	1	1	28.307			
			C	0.327	2.227	0.624	1	1	36.455			
T5 60.00-40.00	0.68	3.21	A	0.234	2.488	0.598	1	1	32.594	2.14	106.80	C
			B	0.201	2.593	0.591	1	1	30.931			
			C	0.281	2.349	0.61	1	1	38.368			
T6 40.00-20.00	0.68	3.86	A	0.209	2.566	0.592	1	1	34.906	2.08	104.11	C
			B	0.181	2.659	0.587	1	1	33.315			
			C	0.249	2.44	0.602	1	1	40.540			
T7 20.00-0.00	0.47	4.23	A	0.184	2.651	0.587	1	1	37.648	2.24	111.88	C
			B	0.167	2.709	0.584	1	1	36.658			
			C	0.208	2.57	0.592	1	1	41.359			
Sum Weight:	3.76	18.96						OTM	852.94 kip-ft	13.35		

Tower Forces - No Ice - Wind 45 To Face

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
ft	K	K							ft ²	K	plf	
T1 140.00-120.00	0.28	0.86	A	0.105	2.946	0.576	0.825	1	6.197	1.31	65.66	C
			B	0.156	2.75	0.582	0.825	1	9.338			
			C	0.287	2.331	0.612	0.825	1	18.093			
T2 120.00-100.00	0.35	1.50	A	0.135	2.829	0.579	0.825	1	8.117	1.52	75.87	C
			B	0.208	2.568	0.592	0.825	1	13.475			
			C	0.359	2.152	0.636	0.825	1	23.752			
T3 100.00-80.00	0.63	2.48	A	0.297	2.303	0.615	0.825	1	24.178	1.88	94.14	C
			B	0.225	2.513	0.596	0.825	1	19.080			
			C	0.387	2.09	0.646	0.825	1	32.126			
T4 80.00-60.00	0.67	2.82	A	0.269	2.381	0.607	0.825	1	28.552	2.02	100.85	C
			B	0.227	2.509	0.596	0.825	1	25.426			
			C	0.327	2.227	0.624	0.825	1	34.706			
T5 60.00-40.00	0.68	3.21	A	0.234	2.488	0.598	0.825	1	30.358	2.02	100.95	C
			B	0.201	2.593	0.591	0.825	1	27.678			
			C	0.281	2.349	0.61	0.825	1	36.267			
T6 40.00-20.00	0.68	3.86	A	0.209	2.566	0.592	0.825	1	32.320	1.96	97.80	C
			B	0.181	2.659	0.587	0.825	1	29.716			
			C	0.249	2.44	0.602	0.825	1	38.082			
T7 20.00-0.00	0.47	4.23	A	0.184	2.651	0.587	0.825	1	34.028	2.05	102.36	C
			B	0.167	2.709	0.584	0.825	1	32.319			
			C	0.208	2.57	0.592	0.825	1	37.842			
Sum Weight:	3.76	18.96						OTM	828.37 kip-ft	12.75		

RISATower URS Corporation 500 Enterprise Drive, Suite 3B Rocky Hill, CT 06067 Phone: (860) 529-8882 FAX: (860) 529-3991	Job	140' Self-Supporting Lattice Tower	Page	13 of 30
	Project	705 West Johnson Ave., Cheshire, CT	Date	08:23:45 02/11/11
	Client	Verizon Wireless	Designed by	Kevin Barker

Tower Forces - No Ice - Wind 60 To Face

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
ft	K	K							ft ²	K	plf	
T1 140.00-120.00	0.28	0.86	A	0.105	2.946	0.576	0.8	1	6.197	1.31	65.66	C
			B	0.156	2.75	0.582	0.8	1	9.338			
			C	0.287	2.331	0.612	0.8	1	18.093			
T2 120.00-100.00	0.35	1.50	A	0.135	2.829	0.579	0.8	1	8.117	1.52	75.87	C
			B	0.208	2.568	0.592	0.8	1	13.409			
			C	0.359	2.152	0.636	0.8	1	23.752			
T3 100.00-80.00	0.63	2.48	A	0.297	2.303	0.615	0.8	1	23.995	1.87	93.67	C
			B	0.225	2.513	0.596	0.8	1	18.813			
			C	0.387	2.09	0.646	0.8	1	31.966			
T4 80.00-60.00	0.67	2.82	A	0.269	2.381	0.607	0.8	1	28.281	2.00	100.13	C
			B	0.227	2.509	0.596	0.8	1	25.015			
			C	0.327	2.227	0.624	0.8	1	34.456			
T5 60.00-40.00	0.68	3.21	A	0.234	2.488	0.598	0.8	1	30.039	2.00	100.11	C
			B	0.201	2.593	0.591	0.8	1	27.213			
			C	0.281	2.349	0.61	0.8	1	35.967			
T6 40.00-20.00	0.68	3.86	A	0.209	2.566	0.592	0.8	1	31.951	1.94	96.90	C
			B	0.181	2.659	0.587	0.8	1	29.202			
			C	0.249	2.44	0.602	0.8	1	37.731			
T7 20.00-0.00	0.47	4.23	A	0.184	2.651	0.587	0.8	1	33.511	2.02	101.00	C
			B	0.167	2.709	0.584	0.8	1	31.699			
			C	0.208	2.57	0.592	0.8	1	37.340			
Sum Weight:	3.76	18.96						OTM	824.86 kip-ft	12.67		

Tower Forces - No Ice - Wind 90 To Face

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
ft	K	K							ft ²	K	plf	
T1 140.00-120.00	0.28	0.86	A	0.105	2.946	0.576	0.85	1	6.197	1.31	65.66	C
			B	0.156	2.75	0.582	0.85	1	9.338			
			C	0.287	2.331	0.612	0.85	1	18.093			
T2 120.00-100.00	0.35	1.50	A	0.135	2.829	0.579	0.85	1	8.117	1.52	75.87	C
			B	0.208	2.568	0.592	0.85	1	13.541			
			C	0.359	2.152	0.636	0.85	1	23.752			
T3 100.00-80.00	0.63	2.48	A	0.297	2.303	0.615	0.85	1	24.361	1.89	94.61	C
			B	0.225	2.513	0.596	0.85	1	19.347			
			C	0.387	2.09	0.646	0.85	1	32.286			
T4 80.00-60.00	0.67	2.82	A	0.269	2.381	0.607	0.85	1	28.822	2.03	101.58	C
			B	0.227	2.509	0.596	0.85	1	25.838			
			C	0.327	2.227	0.624	0.85	1	34.955			
T5 60.00-40.00	0.68	3.21	A	0.234	2.488	0.598	0.85	1	30.678	2.04	101.78	C
			B	0.201	2.593	0.591	0.85	1	28.143			
			C	0.281	2.349	0.61	0.85	1	36.567			
T6 40.00-20.00	0.68	3.86	A	0.209	2.566	0.592	0.85	1	32.689	1.97	98.70	C
			B	0.181	2.659	0.587	0.85	1	30.230			
			C	0.249	2.44	0.602	0.85	1	38.434			
T7 20.00-0.00	0.47	4.23	A	0.184	2.651	0.587	0.85	1	34.545	2.07	103.72	C
			B	0.167	2.709	0.584	0.85	1	32.939			
			C	0.208	2.57	0.592	0.85	1	38.345			

RISATower URS Corporation 500 Enterprise Drive, Suite 3B Rocky Hill, CT 06067 Phone: (860) 529-8882 FAX: (860) 529-3991	Job	140' Self-Supporting Lattice Tower	Page	14 of 30
	Project	705 West Johnson Ave., Cheshire, CT	Date	08:23:45 02/11/11
	Client	Verizon Wireless	Designed by	Kevin Barker

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
ft	K	K							ft ²	K	plf	
Sum Weight:	3.76	18.96						OTM	831.88 kip-ft	12.84		

Tower Forces - With Ice - Wind Normal To Face

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
ft	K	K							ft ²	K	plf	
T1 140.00-120.00	0.70	1.13	A	0.198	2.604	0.59	1	1	12.197	1.94	97.14	C
			B	0.287	2.332	0.612	1	1	18.342			
			C	0.449	1.975	0.673	1	1	31.581			
T2 120.00-100.00	0.89	1.82	A	0.225	2.514	0.596	1	1	14.205	2.23	111.43	C
			B	0.343	2.189	0.63	1	1	24.222			
			C	0.533	1.861	0.715	1	1	40.340			
T3 100.00-80.00	1.59	2.94	A	0.412	2.041	0.657	1	1	36.219	2.60	130.22	C
			B	0.323	2.237	0.623	1	1	29.517			
			C	0.539	1.854	0.718	1	1	50.097			
T4 80.00-60.00	1.71	3.40	A	0.368	2.131	0.639	1	1	41.671	2.67	133.69	C
			B	0.319	2.247	0.622	1	1	38.833			
			C	0.45	1.974	0.673	1	1	51.920			
T5 60.00-40.00	1.72	3.86	A	0.319	2.248	0.622	1	1	43.834	2.65	132.27	C
			B	0.282	2.346	0.61	1	1	41.906			
			C	0.386	2.092	0.646	1	1	53.358			
T6 40.00-20.00	1.72	4.58	A	0.285	2.337	0.611	1	1	46.340	2.55	127.71	C
			B	0.253	2.427	0.603	1	1	44.620			
			C	0.342	2.189	0.63	1	1	55.423			
T7 20.00-0.00	1.21	5.14	A	0.243	2.459	0.6	1	1	47.568	2.65	132.37	C
			B	0.224	2.518	0.596	1	1	46.609			
			C	0.277	2.358	0.609	1	1	53.339			
Sum Weight:	9.55	22.86						OTM	1154.67 kip-ft	17.30		

Tower Forces - With Ice - Wind 45 To Face

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
ft	K	K							ft ²	K	plf	
T1 140.00-120.00	0.70	1.13	A	0.198	2.604	0.59	0.825	1	12.197	1.94	97.14	C
			B	0.287	2.332	0.612	0.825	1	18.342			
			C	0.449	1.975	0.673	0.825	1	31.581			
T2 120.00-100.00	0.89	1.82	A	0.225	2.514	0.596	0.825	1	14.205	2.23	111.43	C
			B	0.343	2.189	0.63	0.825	1	23.565			
			C	0.533	1.861	0.715	0.825	1	40.340			
T3 100.00-80.00	1.59	2.94	A	0.412	2.041	0.657	0.825	1	35.059	2.56	127.83	C
			B	0.323	2.237	0.623	0.825	1	27.542			
			C	0.539	1.854	0.718	0.825	1	49.176			
T4 80.00-60.00	1.71	3.40	A	0.368	2.131	0.639	0.825	1	39.921	2.59	129.74	C
			B	0.319	2.247	0.622	0.825	1	35.722			
			C	0.45	1.974	0.673	0.825	1	50.387			

RISATower URS Corporation 500 Enterprise Drive, Suite 3B Rocky Hill, CT 06067 Phone: (860) 529-8882 FAX: (860) 529-3991	Job	140' Self-Supporting Lattice Tower	Page	15 of 30
	Project	705 West Johnson Ave., Cheshire, CT	Date	08:23:45 02/11/11
	Client	Verizon Wireless	Designed by	Kevin Barker

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
ft	K	K							ft ²	K	plf	
T5 60.00-40.00	1.72	3.86	A	0.319	2.248	0.622	0.825	1	41.732	2.55	127.56	C
			B	0.282	2.346	0.61	0.825	1	38.398			
			C	0.386	2.092	0.646	0.825	1	51.457			
T6 40.00-20.00	1.72	4.58	A	0.285	2.337	0.611	0.825	1	43.881	2.45	122.48	C
			B	0.253	2.427	0.603	0.825	1	40.761			
			C	0.342	2.189	0.63	0.825	1	53.156			
T7 20.00-0.00	1.21	5.14	A	0.243	2.459	0.6	0.825	1	44.051	2.48	124.02	C
			B	0.224	2.518	0.596	0.825	1	42.101			
			C	0.277	2.358	0.609	0.825	1	49.977			
Sum Weight:	9.55	22.86						OTM	1135.32 kip-ft	16.80		

Tower Forces - With Ice - Wind 60 To Face

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
ft	K	K							ft ²	K	plf	
T1 140.00-120.00	0.70	1.13	A	0.198	2.604	0.59	0.8	1	12.197	1.94	97.14	C
			B	0.287	2.332	0.612	0.8	1	18.342			
			C	0.449	1.975	0.673	0.8	1	31.581			
T2 120.00-100.00	0.89	1.82	A	0.225	2.514	0.596	0.8	1	14.205	2.23	111.43	C
			B	0.343	2.189	0.63	0.8	1	23.471			
			C	0.533	1.861	0.715	0.8	1	40.340			
T3 100.00-80.00	1.59	2.94	A	0.412	2.041	0.657	0.8	1	34.893	2.55	127.49	C
			B	0.323	2.237	0.623	0.8	1	27.260			
			C	0.539	1.854	0.718	0.8	1	49.044			
T4 80.00-60.00	1.71	3.40	A	0.368	2.131	0.639	0.8	1	39.671	2.58	129.18	C
			B	0.319	2.247	0.622	0.8	1	35.278			
			C	0.45	1.974	0.673	0.8	1	50.168			
T5 60.00-40.00	1.72	3.86	A	0.319	2.248	0.622	0.8	1	41.432	2.54	126.89	C
			B	0.282	2.346	0.61	0.8	1	37.897			
			C	0.386	2.092	0.646	0.8	1	51.186			
T6 40.00-20.00	1.72	4.58	A	0.285	2.337	0.611	0.8	1	43.530	2.43	121.74	C
			B	0.253	2.427	0.603	0.8	1	40.209			
			C	0.342	2.189	0.63	0.8	1	52.832			
T7 20.00-0.00	1.21	5.14	A	0.243	2.459	0.6	0.8	1	43.549	2.46	122.83	C
			B	0.224	2.518	0.596	0.8	1	41.457			
			C	0.277	2.358	0.609	0.8	1	49.496			
Sum Weight:	9.55	22.86						OTM	1132.55 kip-ft	16.73		

Tower Forces - With Ice - Wind 90 To Face

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
ft	K	K							ft ²	K	plf	
T1 140.00-120.00	0.70	1.13	A	0.198	2.604	0.59	0.85	1	12.197	1.94	97.14	C
			B	0.287	2.332	0.612	0.85	1	18.342			
			C	0.449	1.975	0.673	0.85	1	31.581			

RISATower URS Corporation 500 Enterprise Drive, Suite 3B Rocky Hill, CT 06067 Phone: (860) 529-8882 FAX: (860) 529-3991	Job	140' Self-Supporting Lattice Tower	Page	16 of 30
	Project	705 West Johnson Ave., Cheshire, CT	Date	08:23:45 02/11/11
	Client	Verizon Wireless	Designed by	Kevin Barker

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
ft	K	K							ft ²	K	plf	
T2 120.00-100.00	0.89	1.82	A	0.225	2.514	0.596	0.85	1	14.205	2.23	111.43	C
			B	0.343	2.189	0.63	0.85	1	23.659			
			C	0.533	1.861	0.715	0.85	1	40.340			
T3 100.00-80.00	1.59	2.94	A	0.412	2.041	0.657	0.85	1	35.225	2.56	128.17	C
			B	0.323	2.237	0.623	0.85	1	27.824			
			C	0.539	1.854	0.718	0.85	1	49.307			
T4 80.00-60.00	1.71	3.40	A	0.368	2.131	0.639	0.85	1	40.171	2.61	130.31	C
			B	0.319	2.247	0.622	0.85	1	36.167			
			C	0.45	1.974	0.673	0.85	1	50.606			
T5 60.00-40.00	1.72	3.86	A	0.319	2.248	0.622	0.85	1	42.033	2.56	128.23	C
			B	0.282	2.346	0.61	0.85	1	38.899			
			C	0.386	2.092	0.646	0.85	1	51.729			
T6 40.00-20.00	1.72	4.58	A	0.285	2.337	0.611	0.85	1	44.232	2.46	123.23	C
			B	0.253	2.427	0.603	0.85	1	41.312			
			C	0.342	2.189	0.63	0.85	1	53.480			
T7 20.00-0.00	1.21	5.14	A	0.243	2.459	0.6	0.85	1	44.554	2.50	125.21	C
			B	0.224	2.518	0.596	0.85	1	42.745			
			C	0.277	2.358	0.609	0.85	1	50.457			
Sum Weight:	9.55	22.86						OTM	1138.08 kip-ft	16.87		

Tower Forces - Service - Wind Normal To Face

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
ft	K	K							ft ²	K	plf	
T1 140.00-120.00	0.28	0.86	A	0.105	2.946	0.576	1	1	6.197	1.31	65.66	C
			B	0.156	2.75	0.582	1	1	9.338			
			C	0.287	2.331	0.612	1	1	18.093			
T2 120.00-100.00	0.35	1.50	A	0.135	2.829	0.579	1	1	8.117	1.52	75.87	C
			B	0.208	2.568	0.592	1	1	13.937			
			C	0.359	2.152	0.636	1	1	23.752			
T3 100.00-80.00	0.63	2.48	A	0.297	2.303	0.615	1	1	25.457	1.95	97.42	C
			B	0.225	2.513	0.596	1	1	20.949			
			C	0.387	2.09	0.646	1	1	33.246			
T4 80.00-60.00	0.67	2.82	A	0.269	2.381	0.607	1	1	30.447	2.12	105.94	C
			B	0.227	2.509	0.596	1	1	28.307			
			C	0.327	2.227	0.624	1	1	36.455			
T5 60.00-40.00	0.68	3.21	A	0.234	2.488	0.598	1	1	32.594	2.14	106.80	C
			B	0.201	2.593	0.591	1	1	30.931			
			C	0.281	2.349	0.61	1	1	38.368			
T6 40.00-20.00	0.68	3.86	A	0.209	2.566	0.592	1	1	34.906	2.08	104.11	C
			B	0.181	2.659	0.587	1	1	33.315			
			C	0.249	2.44	0.602	1	1	40.540			
T7 20.00-0.00	0.47	4.23	A	0.184	2.651	0.587	1	1	37.648	2.24	111.88	C
			B	0.167	2.709	0.584	1	1	36.658			
			C	0.208	2.57	0.592	1	1	41.359			
Sum Weight:	3.76	18.96						OTM	852.94 kip-ft	13.35		

Tower Forces - Service - Wind 45 To Face

RISATower URS Corporation 500 Enterprise Drive, Suite 3B Rocky Hill, CT 06067 Phone: (860) 529-8882 FAX: (860) 529-3991	Job	140' Self-Supporting Lattice Tower	Page	17 of 30
	Project	705 West Johnson Ave., Cheshire, CT	Date	08:23:45 02/11/11
	Client	Verizon Wireless	Designed by	Kevin Barker

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
ft	K	K							ft ²	K	plf	
T1 140.00-120.00	0.28	0.86	A	0.105	2.946	0.576	0.825	1	6.197	1.31	65.66	C
			B	0.156	2.75	0.582	0.825	1	9.338			
			C	0.287	2.331	0.612	0.825	1	18.093			
T2 120.00-100.00	0.35	1.50	A	0.135	2.829	0.579	0.825	1	8.117	1.52	75.87	C
			B	0.208	2.568	0.592	0.825	1	13.475			
			C	0.359	2.152	0.636	0.825	1	23.752			
T3 100.00-80.00	0.63	2.48	A	0.297	2.303	0.615	0.825	1	24.178	1.88	94.14	C
			B	0.225	2.513	0.596	0.825	1	19.080			
			C	0.387	2.09	0.646	0.825	1	32.126			
T4 80.00-60.00	0.67	2.82	A	0.269	2.381	0.607	0.825	1	28.552	2.02	100.85	C
			B	0.227	2.509	0.596	0.825	1	25.426			
			C	0.327	2.227	0.624	0.825	1	34.706			
T5 60.00-40.00	0.68	3.21	A	0.234	2.488	0.598	0.825	1	30.358	2.02	100.95	C
			B	0.201	2.593	0.591	0.825	1	27.678			
			C	0.281	2.349	0.61	0.825	1	36.267			
T6 40.00-20.00	0.68	3.86	A	0.209	2.566	0.592	0.825	1	32.320	1.96	97.80	C
			B	0.181	2.659	0.587	0.825	1	29.716			
			C	0.249	2.44	0.602	0.825	1	38.082			
T7 20.00-0.00	0.47	4.23	A	0.184	2.651	0.587	0.825	1	34.028	2.05	102.36	C
			B	0.167	2.709	0.584	0.825	1	32.319			
			C	0.208	2.57	0.592	0.825	1	37.842			
Sum Weight:	3.76	18.96						OTM	828.37 kip-ft	12.75		

Tower Forces - Service - Wind 60 To Face

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
ft	K	K							ft ²	K	plf	
T1 140.00-120.00	0.28	0.86	A	0.105	2.946	0.576	0.8	1	6.197	1.31	65.66	C
			B	0.156	2.75	0.582	0.8	1	9.338			
			C	0.287	2.331	0.612	0.8	1	18.093			
T2 120.00-100.00	0.35	1.50	A	0.135	2.829	0.579	0.8	1	8.117	1.52	75.87	C
			B	0.208	2.568	0.592	0.8	1	13.409			
			C	0.359	2.152	0.636	0.8	1	23.752			
T3 100.00-80.00	0.63	2.48	A	0.297	2.303	0.615	0.8	1	23.995	1.87	93.67	C
			B	0.225	2.513	0.596	0.8	1	18.813			
			C	0.387	2.09	0.646	0.8	1	31.966			
T4 80.00-60.00	0.67	2.82	A	0.269	2.381	0.607	0.8	1	28.281	2.00	100.13	C
			B	0.227	2.509	0.596	0.8	1	25.015			
			C	0.327	2.227	0.624	0.8	1	34.456			
T5 60.00-40.00	0.68	3.21	A	0.234	2.488	0.598	0.8	1	30.039	2.00	100.11	C
			B	0.201	2.593	0.591	0.8	1	27.213			
			C	0.281	2.349	0.61	0.8	1	35.967			
T6 40.00-20.00	0.68	3.86	A	0.209	2.566	0.592	0.8	1	31.951	1.94	96.90	C
			B	0.181	2.659	0.587	0.8	1	29.202			
			C	0.249	2.44	0.602	0.8	1	37.731			
T7 20.00-0.00	0.47	4.23	A	0.184	2.651	0.587	0.8	1	33.511	2.02	101.00	C
			B	0.167	2.709	0.584	0.8	1	31.699			
			C	0.208	2.57	0.592	0.8	1	37.340			
Sum Weight:	3.76	18.96						OTM	824.86 kip-ft	12.67		

RISATower URS Corporation 500 Enterprise Drive, Suite 3B Rocky Hill, CT 06067 Phone: (860) 529-8882 FAX: (860) 529-3991	Job	140' Self-Supporting Lattice Tower	Page	18 of 30
	Project	705 West Johnson Ave., Cheshire, CT	Date	08:23:45 02/11/11
	Client	Verizon Wireless	Designed by	Kevin Barker

Tower Forces - Service - Wind 90 To Face

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
ft	K	K							ft ²	K	plf	
T1 140.00-120.00	0.28	0.86	A	0.105	2.946	0.576	0.85	1	6.197	1.31	65.66	C
			B	0.156	2.75	0.582	0.85	1	9.338			
			C	0.287	2.331	0.612	0.85	1	18.093			
T2 120.00-100.00	0.35	1.50	A	0.135	2.829	0.579	0.85	1	8.117	1.52	75.87	C
			B	0.208	2.568	0.592	0.85	1	13.541			
			C	0.359	2.152	0.636	0.85	1	23.752			
T3 100.00-80.00	0.63	2.48	A	0.297	2.303	0.615	0.85	1	24.361	1.89	94.61	C
			B	0.225	2.513	0.596	0.85	1	19.347			
			C	0.387	2.09	0.646	0.85	1	32.286			
T4 80.00-60.00	0.67	2.82	A	0.269	2.381	0.607	0.85	1	28.822	2.03	101.58	C
			B	0.227	2.509	0.596	0.85	1	25.838			
			C	0.327	2.227	0.624	0.85	1	34.955			
T5 60.00-40.00	0.68	3.21	A	0.234	2.488	0.598	0.85	1	30.678	2.04	101.78	C
			B	0.201	2.593	0.591	0.85	1	28.143			
			C	0.281	2.349	0.61	0.85	1	36.567			
T6 40.00-20.00	0.68	3.86	A	0.209	2.566	0.592	0.85	1	32.689	1.97	98.70	C
			B	0.181	2.659	0.587	0.85	1	30.230			
			C	0.249	2.44	0.602	0.85	1	38.434			
T7 20.00-0.00	0.47	4.23	A	0.184	2.651	0.587	0.85	1	34.545	2.07	103.72	C
			B	0.167	2.709	0.584	0.85	1	32.939			
			C	0.208	2.57	0.592	0.85	1	38.345			
Sum Weight:	3.76	18.96						OTM	831.88 kip-ft	12.84		

Force Totals

Load Case	Vertical Forces	Sum of Forces	Sum of Forces	Sum of Overturning Moments, M _x	Sum of Overturning Moments, M _z	Sum of Torques
	K	X K	Z K	kip-ft	kip-ft	kip-ft
Leg Weight	14.44					
Bracing Weight	4.52					
Total Member Self-Weight	18.96			5.71	9.98	
Total Weight	27.27			5.71	9.98	
Wind 0 deg - No Ice		-0.01	-22.28	-1858.94	11.39	-8.71
Wind 30 deg - No Ice		10.88	-18.84	-1590.18	-911.40	-5.16
Wind 45 deg - No Ice		15.33	-15.32	-1294.43	-1291.30	-3.02
Wind 60 deg - No Ice		18.70	-10.79	-911.36	-1581.23	-0.72
Wind 90 deg - No Ice		21.77	0.01	7.11	-1835.22	3.86
Wind 120 deg - No Ice		19.31	11.15	939.25	-1606.95	7.86
Wind 135 deg - No Ice		15.34	15.33	1307.83	-1293.29	8.43
Wind 150 deg - No Ice		10.90	18.85	1603.00	-913.84	9.02
Wind 180 deg - No Ice		0.01	21.59	1842.28	8.58	8.01
Wind 210 deg - No Ice		-10.88	18.84	1601.60	931.37	5.16
Wind 225 deg - No Ice		-15.33	15.32	1305.85	1311.27	3.02
Wind 240 deg - No Ice		-19.30	11.13	936.81	1625.52	0.86
Wind 270 deg - No Ice		-21.77	-0.01	4.30	1855.19	-3.86
Wind 300 deg - No Ice		-18.71	-10.80	-913.79	1602.61	-7.29
Wind 315 deg - No Ice		-15.34	-15.33	-1296.42	1313.26	-8.43
Wind 330 deg - No Ice		-10.90	-18.85	-1591.59	933.81	-9.02

RISATower URS Corporation 500 Enterprise Drive, Suite 3B Rocky Hill, CT 06067 Phone: (860) 529-8882 FAX: (860) 529-3991	Job	Page
	140' Self-Supporting Lattice Tower	19 of 30
	Project	Date
	705 West Johnson Ave., Cheshire, CT	08:23:45 02/11/11
	Client	Designed by
	Verizon Wireless	Kevin Barker

Load Case	Vertical Forces K	Sum of Forces X K	Sum of Forces Z K	Sum of Overturning Moments, M_x kip-ft	Sum of Overturning Moments, M_z kip-ft	Sum of Torques kip-ft
Member Ice	3.90					
Total Weight Ice	39.29			13.73	24.89	
Wind 0 deg - Ice		-0.01	-27.81	-2344.13	26.91	-12.04
Wind 30 deg - Ice		13.69	-23.71	-2012.87	-1145.17	-7.79
Wind 45 deg - Ice		19.32	-19.31	-1638.43	-1628.91	-4.98
Wind 60 deg - Ice		23.61	-13.61	-1152.40	-1998.93	-1.87
Wind 90 deg - Ice		27.41	0.01	15.75	-2318.71	4.49
Wind 120 deg - Ice		24.11	13.92	1194.41	-2020.10	10.03
Wind 135 deg - Ice		19.34	19.33	1668.74	-1631.75	11.30
Wind 150 deg - Ice		13.72	23.73	2042.35	-1148.65	12.28
Wind 180 deg - Ice		0.01	27.25	2349.49	22.88	11.44
Wind 210 deg - Ice		-13.69	23.71	2040.34	1194.95	7.79
Wind 225 deg - Ice		-19.32	19.31	1665.89	1678.70	4.98
Wind 240 deg - Ice		-24.09	13.89	1190.92	2067.87	2.01
Wind 270 deg - Ice		-27.41	-0.01	11.72	2368.50	-4.49
Wind 300 deg - Ice		-23.62	-13.64	-1155.89	2050.74	-9.57
Wind 315 deg - Ice		-19.34	-19.33	-1641.27	1681.54	-11.30
Wind 330 deg - Ice		-13.72	-23.73	-2014.88	1198.44	-12.28
Total Weight	27.27			5.71	9.98	
Wind 0 deg - Service		-0.01	-22.28	-1864.85	0.99	-8.71
Wind 30 deg - Service		10.88	-18.84	-1596.10	-921.81	-5.16
Wind 45 deg - Service		15.33	-15.32	-1300.35	-1301.70	-3.02
Wind 60 deg - Service		18.70	-10.79	-917.28	-1591.64	-0.72
Wind 90 deg - Service		21.77	0.01	1.19	-1845.63	3.86
Wind 120 deg - Service		19.31	11.15	933.33	-1617.35	7.86
Wind 135 deg - Service		15.34	15.33	1301.91	-1303.69	8.43
Wind 150 deg - Service		10.90	18.85	1597.08	-924.24	9.02
Wind 180 deg - Service		0.01	21.59	1836.36	-1.82	8.01
Wind 210 deg - Service		-10.88	18.84	1595.68	920.97	5.16
Wind 225 deg - Service		-15.33	15.32	1299.93	1300.87	3.02
Wind 240 deg - Service		-19.30	11.13	930.89	1615.11	0.86
Wind 270 deg - Service		-21.77	-0.01	-1.62	1844.79	-3.86
Wind 300 deg - Service		-18.71	-10.80	-919.71	1592.20	-7.29
Wind 315 deg - Service		-15.34	-15.33	-1302.34	1302.85	-8.43
Wind 330 deg - Service		-10.90	-18.85	-1597.51	923.40	-9.02

Load Combinations

Comb. No.	Description
1	Dead Only
2	Dead+Wind 0 deg - No Ice
3	Dead+Wind 30 deg - No Ice
4	Dead+Wind 45 deg - No Ice
5	Dead+Wind 60 deg - No Ice
6	Dead+Wind 90 deg - No Ice
7	Dead+Wind 120 deg - No Ice
8	Dead+Wind 135 deg - No Ice
9	Dead+Wind 150 deg - No Ice
10	Dead+Wind 180 deg - No Ice
11	Dead+Wind 210 deg - No Ice
12	Dead+Wind 225 deg - No Ice
13	Dead+Wind 240 deg - No Ice
14	Dead+Wind 270 deg - No Ice
15	Dead+Wind 300 deg - No Ice
16	Dead+Wind 315 deg - No Ice

RISATower URS Corporation 500 Enterprise Drive, Suite 3B Rocky Hill, CT 06067 Phone: (860) 529-8882 FAX: (860) 529-3991	Job	140' Self-Supporting Lattice Tower	Page	20 of 30
	Project	705 West Johnson Ave., Cheshire, CT	Date	08:23:45 02/11/11
	Client	Verizon Wireless	Designed by	Kevin Barker

Comb. Description

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

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
T1	140 - 120	Leg	Max Tension	32	21.47	-0.39	-0.21
			Max. Compression	30	-24.60	0.42	-0.29
			Max. Mx	31	-1.05	-0.89	0.00
			Max. My	27	-1.60	0.00	0.90
			Max. Vy	31	-2.33	0.46	-0.09
		Diagonal	Max. Vx	19	-2.54	-0.06	0.51
			Max Tension	28	2.78	0.00	0.00
			Max. Compression	20	-2.79	0.00	0.00
			Max. Mx	30	0.20	-0.00	-0.00
			Max. My	20	-2.22	-0.00	-0.00
		Top Girt	Max. Vy	25	-0.00	-0.00	-0.00
			Max. Vx	20	0.00	-0.00	-0.00
			Max Tension	15	0.08	0.00	0.00
			Max. Compression	24	-0.09	0.00	0.00
			Max. Mx	18	-0.01	0.01	0.00
		Bottom Girt	Max. My	26	-0.00	0.00	-0.00
			Max. Vy	18	-0.01	0.00	0.00
			Max. Vx	26	0.00	0.00	0.00
			Max Tension	32	0.93	0.00	0.00

RISATower URS Corporation 500 Enterprise Drive, Suite 3B Rocky Hill, CT 06067 Phone: (860) 529-8882 FAX: (860) 529-3991	Job	140' Self-Supporting Lattice Tower	Page	21 of 30
	Project	705 West Johnson Ave., Cheshire, CT	Date	08:23:45 02/11/11
	Client	Verizon Wireless	Designed by	Kevin Barker

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft	
T2	120 - 100	Leg	Max. Compression	24	-0.93	0.00	0.00	
			Max. Mx	18	0.01	0.01	0.00	
			Max. My	26	0.06	0.00	-0.00	
			Max. Vy	18	-0.01	0.00	0.00	
			Max. Vx	26	0.00	0.00	0.00	
			Max Tension	27	58.51	0.01	0.20	
			Max. Compression	30	-64.20	1.61	-0.90	
			Max. Mx	24	-63.60	-1.63	-0.86	
			Max. My	19	-63.14	-0.04	1.84	
			Max. Vy	24	4.95	-1.63	-0.86	
			Max. Vx	19	-5.59	-0.04	1.84	
			Max Tension	31	4.08	0.00	0.00	
		Diagonal	Max. Compression	31	-4.13	0.00	0.00	
			Max. Mx	29	2.67	-0.00	-0.00	
			Max. My	25	-3.63	-0.00	0.00	
			Max. Vy	29	0.01	-0.00	-0.00	
			Max. Vx	25	-0.00	-0.00	0.00	
			Max Tension	24	0.99	0.00	0.00	
			Max. Compression	32	-0.97	0.00	0.00	
			Max. Mx	18	-0.00	0.01	0.00	
		Top Girt	Max. My	33	0.21	0.00	-0.00	
			Max. Vy	18	-0.01	0.00	0.00	
			Max. Vx	33	0.00	0.00	0.00	
			Max Tension	30	0.39	0.00	0.00	
			Max. Compression	27	-0.50	0.00	0.00	
			Max. Mx	18	-0.04	0.01	0.00	
			Max. My	26	-0.04	0.00	-0.00	
			Max. Vy	18	-0.01	0.00	0.00	
Bottom Girt	Max. Vx	26	0.00	0.00	0.00			
	Max Tension	32	85.08	-0.07	0.05			
	Max. Compression	30	-95.37	0.31	-0.01			
	Max. Mx	24	-68.44	1.85	-0.07			
	Max. My	23	-3.21	-0.05	-1.14			
	Max. Vy	22	-1.15	-1.78	-0.03			
	Max. Vx	34	0.92	0.03	0.66			
	Max Tension	23	4.85	0.00	0.00			
T3	100 - 80	Leg	Max. Compression	24	-4.89	0.00	0.00	
			Max. Mx	29	3.44	0.02	-0.00	
			Max. My	31	-4.72	-0.01	0.01	
			Max. Vy	32	0.01	0.02	0.00	
			Max. Vx	31	-0.00	0.00	0.00	
			Max Tension	32	114.07	-0.16	0.04	
			Max. Compression	30	-128.28	0.22	-0.01	
			Max. Mx	22	93.27	-0.37	0.01	
			Max. My	7	35.53	-0.17	-0.41	
			Max. Vy	22	-0.33	-0.37	0.01	
			Max. Vx	32	-0.38	0.14	-0.37	
			Max Tension	23	4.64	0.00	0.00	
		Diagonal	Max. Compression	23	-4.73	0.00	0.00	
			Max. Mx	30	3.63	0.03	0.00	
			Max. My	32	-4.03	0.00	0.00	
			Max. Vy	32	0.02	0.03	0.00	
			Max. Vx	32	-0.00	0.00	0.00	
			Max Tension	32	138.54	-0.10	0.02	
			Max. Compression	30	-157.17	0.12	-0.01	
			Max. Mx	22	135.32	-0.42	0.01	
		Top Girt	Max. My	34	-10.87	-0.15	0.30	
			Max. Vy	22	0.09	-0.42	0.01	
			Max. Vx	34	-0.07	-0.15	0.30	
			Max Tension	20	4.60	0.00	0.00	
			Max. Compression	20	-4.65	0.00	0.00	
			Bottom Girt	Max. Mx	30	3.63	0.03	0.00
				Max. My	32	-4.03	0.00	0.00
				Max. Vy	32	0.02	0.03	0.00
Max. Vx	32	-0.00		0.00	0.00			
Max Tension	32	138.54		-0.10	0.02			
Max. Compression	30	-157.17		0.12	-0.01			
Max. Mx	22	135.32		-0.42	0.01			
Max. My	34	-10.87		-0.15	0.30			
T4	80 - 60	Leg	Max. Vy	22	0.09	-0.42	0.01	
			Max. Vx	34	-0.07	-0.15	0.30	
			Max Tension	20	4.60	0.00	0.00	
			Max. Compression	20	-4.65	0.00	0.00	
		Diagonal	Max. Mx	30	3.63	0.03	0.00	
			Max. My	32	-4.03	0.00	0.00	
			Max. Vy	32	0.02	0.03	0.00	
			Max. Vx	32	-0.00	0.00	0.00	
T5	60 - 40	Leg	Max Tension	32	138.54	-0.10	0.02	
			Max. Compression	30	-157.17	0.12	-0.01	
			Max. Mx	22	135.32	-0.42	0.01	
			Max. My	34	-10.87	-0.15	0.30	
		Diagonal	Max. Vy	22	0.09	-0.42	0.01	
			Max. Vx	34	-0.07	-0.15	0.30	
			Max Tension	20	4.60	0.00	0.00	
			Max. Compression	20	-4.65	0.00	0.00	

RISATower URS Corporation 500 Enterprise Drive, Suite 3B Rocky Hill, CT 06067 Phone: (860) 529-8882 FAX: (860) 529-3991	Job	140' Self-Supporting Lattice Tower	Page	22 of 30
	Project	705 West Johnson Ave., Cheshire, CT	Date	08:23:45 02/11/11
	Client	Verizon Wireless	Designed by	Kevin Barker

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
T6	40 - 20	Leg	Max. Mx	32	3.32	0.03	0.00
			Max. My	33	-3.36	0.02	0.01
			Max. Vy	32	0.02	0.03	0.00
			Max. Vx	33	-0.00	0.00	0.00
			Max Tension	32	160.25	-0.62	0.02
			Max. Compression	30	-182.75	0.84	-0.00
		Diagonal	Max. Mx	24	-179.65	0.85	-0.01
			Max. My	34	-10.87	-0.15	0.30
			Max. Vy	22	-0.21	-0.63	0.01
			Max. Vx	34	0.07	-0.15	0.30
			Max Tension	20	4.87	0.00	0.00
			Max. Compression	20	-5.22	0.00	0.00
			Max. Mx	32	2.92	0.05	0.01
			Max. My	27	-4.59	0.03	-0.01
T7	20 - 0	Leg	Max. Vy	32	0.03	0.05	0.01
			Max. Vx	27	0.00	0.00	0.00
			Max Tension	32	177.76	0.97	0.02
			Max. Compression	30	-208.11	-0.00	-0.00
			Max. Mx	24	-195.17	1.45	-0.01
			Max. My	34	-16.10	1.20	0.49
		Diagonal	Max. Vy	22	-0.39	-1.34	0.00
			Max. Vx	34	0.13	1.20	0.49
			Max Tension	20	6.22	0.00	0.00
			Max. Compression	20	-5.97	0.00	0.00
			Max. Mx	32	2.29	0.08	0.01
			Max. My	27	-5.40	0.06	-0.01
			Max. Vy	32	0.03	0.08	0.01
			Max. Vx	27	0.00	0.00	0.00

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Leg C	Max. Vert	30	210.54	13.25	-7.75
	Max. H _x	30	210.54	13.25	-7.75
	Max. H _z	21	-171.40	-14.66	9.24
	Min. Vert	22	-177.81	-15.41	8.99
	Min. H _x	22	-177.81	-15.41	8.99
Leg B	Min. H _z	29	202.30	12.27	-7.82
	Max. Vert	24	207.25	-13.49	-7.29
	Max. H _x	32	-181.66	15.70	8.63
	Max. H _z	33	-175.29	15.05	8.70
	Min. Vert	32	-181.66	15.70	8.63
Leg A	Min. H _x	24	207.25	-13.49	-7.29
	Min. H _z	24	207.25	-13.49	-7.29
	Max. Vert	19	207.04	-0.52	15.31
	Max. H _x	30	-85.44	1.62	-9.78
	Max. H _z	19	207.04	-0.52	15.31
	Min. Vert	27	-181.29	0.46	-17.89
	Min. H _x	23	11.79	-1.58	-1.40
	Min. H _z	27	-181.29	0.46	-17.89

RISATower URS Corporation 500 Enterprise Drive, Suite 3B Rocky Hill, CT 06067 Phone: (860) 529-8882 FAX: (860) 529-3991	Job	140' Self-Supporting Lattice Tower	Page	23 of 30
	Project	705 West Johnson Ave., Cheshire, CT	Date	08:23:45 02/11/11
	Client	Verizon Wireless	Designed by	Kevin Barker

Tower Mast Reaction Summary

Load Combination	Vertical	Shear _x	Shear _y	Overturning Moment, M _x	Overturning Moment, M _y	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
Dead Only	27.27	0.00	0.00	5.71	9.99	0.00
Dead+ Wind 0 deg - No Ice	27.27	-0.01	-22.28	-1863.21	11.42	-8.74
Dead+ Wind 30 deg - No Ice	27.27	10.88	-18.84	-1593.85	-913.51	-5.18
Dead+ Wind 45 deg - No Ice	27.27	15.33	-15.32	-1297.42	-1294.28	-3.03
Dead+ Wind 60 deg - No Ice	27.27	18.70	-10.79	-913.46	-1584.89	-0.72
Dead+ Wind 90 deg - No Ice	27.27	21.77	0.01	7.13	-1839.46	3.87
Dead+ Wind 120 deg - No Ice	27.27	19.31	11.15	941.41	-1610.64	7.88
Dead+ Wind 135 deg - No Ice	27.27	15.34	15.33	1310.86	-1296.27	8.46
Dead+ Wind 150 deg - No Ice	27.27	10.90	18.85	1606.70	-915.94	9.05
Dead+ Wind 180 deg - No Ice	27.27	0.01	21.59	1846.53	8.60	8.04
Dead+ Wind 210 deg - No Ice	27.27	-10.88	18.84	1605.29	933.52	5.18
Dead+ Wind 225 deg - No Ice	27.27	-15.33	15.32	1308.86	1314.29	3.03
Dead+ Wind 240 deg - No Ice	27.27	-19.30	11.13	938.96	1629.24	0.85
Dead+ Wind 270 deg - No Ice	27.27	-21.77	-0.01	4.31	1859.47	-3.88
Dead+ Wind 300 deg - No Ice	27.27	-18.71	-10.80	-915.90	1606.31	-7.32
Dead+ Wind 315 deg - No Ice	27.27	-15.34	-15.33	-1299.41	1316.29	-8.46
Dead+ Wind 330 deg - No Ice	27.27	-10.90	-18.85	-1595.26	935.96	-9.05
Dead+ Ice+Temp	39.29	0.00	0.00	13.74	24.91	0.00
Dead+ Wind 0 deg+Ice+Temp	39.29	-0.01	-27.81	-2351.47	27.00	-12.12
Dead+ Wind 30 deg+Ice+Temp	39.29	13.69	-23.71	-2019.19	-1148.76	-7.83
Dead+ Wind 45 deg+Ice+Temp	39.29	19.32	-19.31	-1643.57	-1634.03	-5.00
Dead+ Wind 60 deg+Ice+Temp	39.29	23.61	-13.61	-1156.02	-2005.22	-1.87
Dead+ Wind 90 deg+Ice+Temp	39.29	27.41	0.01	15.80	-2326.00	4.53
Dead+ Wind 120 deg+Ice+Temp	39.29	24.11	13.92	1198.16	-2026.42	10.11
Dead+ Wind 135 deg+Ice+Temp	39.29	19.34	19.33	1673.99	-1636.88	11.39
Dead+ Wind 150 deg+Ice+Temp	39.29	13.72	23.73	2048.77	-1152.26	12.37
Dead+ Wind 180 deg+Ice+Temp	39.29	0.01	27.25	2356.86	22.95	11.51
Dead+ Wind 210 deg+Ice+Temp	39.29	-13.69	23.71	2046.73	1198.69	7.83
Dead+ Wind 225 deg+Ice+Temp	39.29	-19.32	19.31	1671.11	1683.94	5.00
Dead+ Wind 240 deg+Ice+Temp	39.29	-24.09	13.89	1194.69	2074.44	2.01
Dead+ Wind 270 deg+Ice+Temp	39.29	-27.41	-0.01	11.75	2375.92	-4.53
Dead+ Wind 300 deg+Ice+Temp	39.29	-23.62	-13.64	-1159.52	2057.17	-9.65
Dead+ Wind 315 deg+Ice+Temp	39.29	-19.34	-19.33	-1646.42	1686.82	-11.39
Dead+ Wind 330 deg+Ice+Temp	39.29	-13.72	-23.73	-2021.20	1202.21	-12.37
Dead+ Wind 0 deg - Service	27.27	-0.01	-22.28	-1863.21	11.42	-8.74
Dead+ Wind 30 deg - Service	27.27	10.88	-18.84	-1593.85	-913.51	-5.18
Dead+ Wind 45 deg - Service	27.27	15.33	-15.32	-1297.42	-1294.28	-3.03
Dead+ Wind 60 deg - Service	27.27	18.70	-10.79	-913.46	-1584.89	-0.72
Dead+ Wind 90 deg - Service	27.27	21.77	0.01	7.13	-1839.46	3.87
Dead+ Wind 120 deg - Service	27.27	19.31	11.15	941.41	-1610.64	7.88
Dead+ Wind 135 deg - Service	27.27	15.34	15.33	1310.86	-1296.27	8.46
Dead+ Wind 150 deg - Service	27.27	10.90	18.85	1606.70	-915.94	9.05
Dead+ Wind 180 deg - Service	27.27	0.01	21.59	1846.53	8.60	8.04
Dead+ Wind 210 deg - Service	27.27	-10.88	18.84	1605.29	933.52	5.18
Dead+ Wind 225 deg - Service	27.27	-15.33	15.32	1308.86	1314.29	3.03
Dead+ Wind 240 deg - Service	27.27	-19.30	11.13	938.96	1629.24	0.85
Dead+ Wind 270 deg - Service	27.27	-21.77	-0.01	4.31	1859.47	-3.88
Dead+ Wind 300 deg - Service	27.27	-18.71	-10.80	-915.90	1606.31	-7.32
Dead+ Wind 315 deg - Service	27.27	-15.34	-15.33	-1299.41	1316.29	-8.46
Dead+ Wind 330 deg - Service	27.27	-10.90	-18.85	-1595.26	935.96	-9.05

Solution Summary

RISATower URS Corporation 500 Enterprise Drive, Suite 3B Rocky Hill, CT 06067 Phone: (860) 529-8882 FAX: (860) 529-3991	Job	140' Self-Supporting Lattice Tower	Page	24 of 30
	Project	705 West Johnson Ave., Cheshire, CT	Date	08:23:45 02/11/11
	Client	Verizon Wireless	Designed by	Kevin Barker

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
1	0.00	-27.27	0.00	0.00	27.27	0.00	0.000%
2	-0.01	-27.27	-22.28	0.01	27.27	22.28	0.000%
3	10.88	-27.27	-18.84	-10.88	27.27	18.84	0.000%
4	15.33	-27.27	-15.32	-15.33	27.27	15.32	0.000%
5	18.70	-27.27	-10.79	-18.70	27.27	10.79	0.000%
6	21.77	-27.27	0.01	-21.77	27.27	-0.01	0.000%
7	19.31	-27.27	11.15	-19.31	27.27	-11.15	0.000%
8	15.34	-27.27	15.33	-15.34	27.27	-15.33	0.000%
9	10.90	-27.27	18.85	-10.90	27.27	-18.85	0.001%
10	0.01	-27.27	21.59	-0.01	27.27	-21.59	0.000%
11	-10.88	-27.27	18.84	10.88	27.27	-18.84	0.000%
12	-15.33	-27.27	15.32	15.33	27.27	-15.32	0.000%
13	-19.30	-27.27	11.13	19.30	27.27	-11.13	0.000%
14	-21.77	-27.27	-0.01	21.77	27.27	0.01	0.000%
15	-18.71	-27.27	-10.80	18.71	27.27	10.80	0.000%
16	-15.34	-27.27	-15.33	15.34	27.27	15.33	0.000%
17	-10.90	-27.27	-18.85	10.90	27.27	18.85	0.001%
18	0.00	-39.29	0.00	-0.00	39.29	0.00	0.000%
19	-0.01	-39.29	-27.81	0.01	39.29	27.81	0.000%
20	13.69	-39.29	-23.71	-13.69	39.29	23.71	0.000%
21	19.32	-39.29	-19.31	-19.32	39.29	19.31	0.000%
22	23.61	-39.29	-13.61	-23.61	39.29	13.61	0.000%
23	27.41	-39.29	0.01	-27.41	39.29	-0.01	0.000%
24	24.11	-39.29	13.92	-24.11	39.29	-13.92	0.000%
25	19.34	-39.29	19.33	-19.34	39.29	-19.33	0.000%
26	13.72	-39.29	23.73	-13.72	39.29	-23.73	0.000%
27	0.01	-39.29	27.25	-0.01	39.29	-27.25	0.000%
28	-13.69	-39.29	23.71	13.69	39.29	-23.71	0.000%
29	-19.32	-39.29	19.31	19.32	39.29	-19.31	0.000%
30	-24.09	-39.29	13.89	24.09	39.29	-13.89	0.000%
31	-27.41	-39.29	-0.01	27.41	39.29	0.01	0.000%
32	-23.62	-39.29	-13.64	23.62	39.29	13.64	0.000%
33	-19.34	-39.29	-19.33	19.34	39.29	19.33	0.000%
34	-13.72	-39.29	-23.73	13.72	39.29	23.73	0.000%
35	-0.01	-27.27	-22.28	0.01	27.27	22.28	0.000%
36	10.88	-27.27	-18.84	-10.88	27.27	18.84	0.000%
37	15.33	-27.27	-15.32	-15.33	27.27	15.32	0.000%
38	18.70	-27.27	-10.79	-18.70	27.27	10.79	0.000%
39	21.77	-27.27	0.01	-21.77	27.27	-0.01	0.000%
40	19.31	-27.27	11.15	-19.31	27.27	-11.15	0.000%
41	15.34	-27.27	15.33	-15.34	27.27	-15.33	0.000%
42	10.90	-27.27	18.85	-10.90	27.27	-18.85	0.001%
43	0.01	-27.27	21.59	-0.01	27.27	-21.59	0.000%
44	-10.88	-27.27	18.84	10.88	27.27	-18.84	0.000%
45	-15.33	-27.27	15.32	15.33	27.27	-15.32	0.000%
46	-19.30	-27.27	11.13	19.30	27.27	-11.13	0.000%
47	-21.77	-27.27	-0.01	21.77	27.27	0.01	0.000%
48	-18.71	-27.27	-10.80	18.71	27.27	10.80	0.000%
49	-15.34	-27.27	-15.33	15.34	27.27	15.33	0.000%
50	-10.90	-27.27	-18.85	10.90	27.27	18.85	0.001%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001

RISATower URS Corporation 500 Enterprise Drive, Suite 3B Rocky Hill, CT 06067 Phone: (860) 529-8882 FAX: (860) 529-3991	Job	140' Self-Supporting Lattice Tower	Page	25 of 30
	Project	705 West Johnson Ave., Cheshire, CT	Date	08:23:45 02/11/11
	Client	Verizon Wireless	Designed by	Kevin Barker

2	Yes	4	0.00000001	0.00000001
3	Yes	4	0.00000001	0.00000001
4	Yes	4	0.00000001	0.00000001
5	Yes	4	0.00000001	0.00000001
6	Yes	4	0.00000001	0.00000001
7	Yes	4	0.00000001	0.00000001
8	Yes	4	0.00000001	0.00000001
9	Yes	4	0.00000001	0.00000001
10	Yes	4	0.00000001	0.00000001
11	Yes	4	0.00000001	0.00000001
12	Yes	4	0.00000001	0.00000001
13	Yes	4	0.00000001	0.00000001
14	Yes	4	0.00000001	0.00000001
15	Yes	4	0.00000001	0.00000001
16	Yes	4	0.00000001	0.00000001
17	Yes	4	0.00000001	0.00000001
18	Yes	4	0.00000001	0.00000001
19	Yes	4	0.00000001	0.00000001
20	Yes	4	0.00000001	0.00000001
21	Yes	4	0.00000001	0.00000001
22	Yes	4	0.00000001	0.00000001
23	Yes	4	0.00000001	0.00000001
24	Yes	4	0.00000001	0.00000001
25	Yes	4	0.00000001	0.00000001
26	Yes	4	0.00000001	0.00000001
27	Yes	4	0.00000001	0.00000001
28	Yes	4	0.00000001	0.00000001
29	Yes	4	0.00000001	0.00000001
30	Yes	4	0.00000001	0.00000001
31	Yes	4	0.00000001	0.00000001
32	Yes	4	0.00000001	0.00000001
33	Yes	4	0.00000001	0.00000001
34	Yes	4	0.00000001	0.00000001
35	Yes	4	0.00000001	0.00000001
36	Yes	4	0.00000001	0.00000001
37	Yes	4	0.00000001	0.00000001
38	Yes	4	0.00000001	0.00000001
39	Yes	4	0.00000001	0.00000001
40	Yes	4	0.00000001	0.00000001
41	Yes	4	0.00000001	0.00000001
42	Yes	4	0.00000001	0.00000001
43	Yes	4	0.00000001	0.00000001
44	Yes	4	0.00000001	0.00000001
45	Yes	4	0.00000001	0.00000001
46	Yes	4	0.00000001	0.00000001
47	Yes	4	0.00000001	0.00000001
48	Yes	4	0.00000001	0.00000001
49	Yes	4	0.00000001	0.00000001
50	Yes	4	0.00000001	0.00000001

Maximum Tower Deflections - Service Wind

Section No.	Elevation	Horz. Deflection	Gov. Load Comb.	Tilt	Twist
	ft	in		°	°
T1	140 - 120	6.460	46	0.4268	0.0714
T2	120 - 100	4.676	46	0.3819	0.0629
T3	100 - 80	3.142	46	0.2932	0.0464
T4	80 - 60	1.993	46	0.2242	0.0311
T5	60 - 40	1.125	46	0.1584	0.0257

RISATower URS Corporation 500 Enterprise Drive, Suite 3B Rocky Hill, CT 06067 Phone: (860) 529-8882 FAX: (860) 529-3991	Job	140' Self-Supporting Lattice Tower	Page	26 of 30
	Project	705 West Johnson Ave., Cheshire, CT	Date	08:23:45 02/11/11
	Client	Verizon Wireless	Designed by	Kevin Barker

Section No.	Elevation <i>ft</i>	Horz. Deflection <i>in</i>	Gov. Load Comb.	Tilt °	Twist °
T6	40 - 20	0.520	46	0.0989	0.0173
T7	20 - 0	0.162	46	0.0460	0.0094

Critical Deflections and Radius of Curvature - Service Wind

Elevation <i>ft</i>	Appurtenance	Gov. Load Comb.	Deflection <i>in</i>	Tilt °	Twist °	Radius of Curvature <i>ft</i>
146.29	1142-2C	46	6.460	0.4268	0.0714	72902
138.00	LPA-185080-12CF_2	46	6.278	0.4236	0.0703	72902
120.00	PL4-107	46	4.676	0.3819	0.0629	18444
110.00	APXV18-206517S-C w/ mounting hardware	46	3.864	0.3392	0.0555	13424
101.00	(2) ClearGain TMA	46	3.209	0.2975	0.0474	11063
98.00	(4) CSS XDUO1416-80	46	3.010	0.2850	0.0445	11234
78.00	PL4-107	46	1.894	0.2177	0.0302	19372

Maximum Tower Deflections - Design Wind

Section No.	Elevation <i>ft</i>	Horz. Deflection <i>in</i>	Gov. Load Comb.	Tilt °	Twist °
T1	140 - 120	8.312	30	0.5522	0.0921
T2	120 - 100	6.003	30	0.4936	0.0795
T3	100 - 80	4.020	30	0.3781	0.0645
T4	80 - 60	2.542	30	0.2883	0.0467
T5	60 - 40	1.431	30	0.2031	0.0369
T6	40 - 20	0.659	30	0.1266	0.0243
T7	20 - 0	0.204	30	0.0588	0.0130

Critical Deflections and Radius of Curvature - Design Wind

Elevation <i>ft</i>	Appurtenance	Gov. Load Comb.	Deflection <i>in</i>	Tilt °	Twist °	Radius of Curvature <i>ft</i>
146.29	1142-2C	30	8.312	0.5522	0.0921	55869
138.00	LPA-185080-12CF_2	30	8.075	0.5480	0.0907	55869
120.00	PL4-107	30	6.003	0.4936	0.0795	14134
110.00	APXV18-206517S-C w/ mounting hardware	30	4.953	0.4380	0.0723	10285
101.00	(2) ClearGain TMA	30	4.108	0.3837	0.0653	8474
98.00	(4) CSS XDUO1416-80	30	3.851	0.3674	0.0628	8603
78.00	PL4-107	30	2.416	0.2799	0.0454	14825

RISATower URS Corporation 500 Enterprise Drive, Suite 3B Rocky Hill, CT 06067 Phone: (860) 529-8882 FAX: (860) 529-3991	Job	140' Self-Supporting Lattice Tower	Page	27 of 30
	Project	705 West Johnson Ave., Cheshire, CT	Date	08:23:45 02/11/11
	Client	Verizon Wireless	Designed by	Kevin Barker

Bolt Design Data

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt K	Allowable Load K	Ratio Load Allowable	Allowable Ratio	Criteria
T1	140	Diagonal	A325N	0.7500	1	2.79	9.28	0.300 ✓	1.333	Bolt Shear
T2	120	Diagonal	A325N	0.7500	1	4.13	9.28	0.445 ✓	1.333	Bolt Shear
T3	100	Leg	A325N	0.7500	4	15.84	19.43	0.815 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.7500	1	4.85	9.06	0.535 ✓	1.333	Member Bearing
T4	80	Leg	A325N	1.1250	6	15.83	43.74	0.362 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.7500	1	4.64	6.80	0.683 ✓	1.333	Member Bearing
T5	60	Leg	A325N	1.1250	6	20.45	43.74	0.468 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.7500	1	4.60	6.80	0.676 ✓	1.333	Member Bearing
T6	40	Leg	A325N	1.2500	6	24.36	54.00	0.451 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.7500	1	5.22	9.28	0.563 ✓	1.333	Bolt Shear
T7	20	Leg	A325N	1.2500	6	27.64	54.00	0.512 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.7500	1	6.22	6.80	0.914 ✓	1.333	Member Bearing

Compression Checks

Leg Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	F _a ksi	A in ²	Actual P K	Allow. P _a K	Ratio P P _a
T1	140 - 120	1 3/4	20.00	3.21	88.0 K=1.00	17.365	2.4053	-24.60	41.77	0.589 ✓
T2	120 - 100	2 1/2	20.00	3.21	61.6 K=1.00	22.442	4.9087	-64.20	110.16	0.583 ✓
T3	100 - 80	3 1/2	20.03	6.68	91.6 K=1.00	16.602	9.6211	-95.37	159.73	0.597 ✓
T4	80 - 60	3 3/4	20.03	6.68	85.4 K=1.00	17.901	11.0447	-128.28	197.71	0.649 ✓
T5	60 - 40	4	20.03	6.68	80.1 K=1.00	18.991	12.5664	-157.17	238.65	0.659 ✓
T6	40 - 20	4 1/4	20.03	6.68	75.4 K=1.00	19.917	14.1863	-182.75	282.55	0.647 ✓
T7	20 - 0	4 1/2	20.03	6.68	71.2 K=1.00	20.713	15.9043	-208.11	329.43	0.632 ✓

Diagonal Design Data (Compression)

RISATower URS Corporation 500 Enterprise Drive, Suite 3B Rocky Hill, CT 06067 Phone: (860) 529-8882 FAX: (860) 529-3991	Job	140' Self-Supporting Lattice Tower	Page	28 of 30
	Project	705 West Johnson Ave., Cheshire, CT	Date	08:23:45 02/11/11
	Client	Verizon Wireless	Designed by	Kevin Barker

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	F _a ksi	A in ²	Actual P K	Allow. P _a K	Ratio P P _a
T1	140 - 120	3/4	5.94	2.88	138.4 K=0.75	7.794	0.4418	-2.79	3.44	0.809
T2	120 - 100	7/8	5.94	2.85	117.1 K=0.75	10.692	0.6013	-4.13	6.43	0.643
T3	100 - 80	L2x2x1/4	9.31	4.52	138.6 K=1.00	7.772	0.9380	-4.55	7.29	0.625
T4	80 - 60	L2 1/2x2 1/2x3/16	10.65	5.17	125.3 K=1.00	9.506	0.9020	-4.65	8.57	0.542
T5	60 - 40	L2 1/2x2 1/2x3/16	12.10	5.89	142.7 K=1.00	7.335	0.9020	-4.54	6.62	0.687
T6	40 - 20	L2 1/2x2 1/2x1/4	13.64	6.64	162.4 K=1.00	5.664	1.1900	-5.22	6.74	0.774
T7	20 - 0	L3x3x3/16	14.70	7.16	144.2 K=1.00	7.178	1.0900	-5.97	7.82	0.764

Top Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	F _a ksi	A in ²	Actual P K	Allow. P _a K	Ratio P P _a
T1	140 - 120	3/4	5.00	4.85	217.5 K=0.70	3.158	0.4418	-0.09	1.40	0.066
T2	120 - 100	KL/R > 200 (C) - 6 7/8	5.00	4.79	184.0 K=0.70	4.411	0.6013	-0.97	2.65	0.366

Bottom Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	F _a ksi	A in ²	Actual P K	Allow. P _a K	Ratio P P _a
T1	140 - 120	3/4	5.00	4.85	217.5 K=0.70	3.158	0.4418	-0.93	1.40	0.665
T2	120 - 100	KL/R > 200 (C) - 9 7/8	5.00	4.79	184.0 K=0.70	4.411	0.6013	-0.50	2.65	0.188

Tension Checks

Leg Design Data (Tension)

RISATower

URS Corporation
 500 Enterprise Drive, Suite 3B
 Rocky Hill, CT 06067
 Phone: (860) 529-8882
 FAX: (860) 529-3991

Job

140' Self-Supporting Lattice Tower

Page

29 of 30

Project

705 West Johnson Ave., Cheshire, CT

Date

08:23:45 02/11/11

Client

Verizon Wireless

Designed by

Kevin Barker

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	F _a ksi	A in ²	Actual P K	Allow. P _a K	Ratio P P _a
T1	140 - 120	1 3/4	20.00	3.21	88.0	30.000	2.4053	21.47	72.16	0.298 ✓
T2	120 - 100	2 1/2	20.00	3.21	61.6	30.000	4.9087	58.51	147.26	0.397 ✓
T3	100 - 80	3 1/2	20.03	6.68	91.6	30.000	9.6211	85.08	288.63	0.295 ✓
T4	80 - 60	3 3/4	20.03	6.68	85.4	30.000	11.0447	114.07	331.34	0.344 ✓
T5	60 - 40	4	20.03	6.68	80.1	30.000	12.5664	138.54	376.99	0.367 ✓
T6	40 - 20	4 1/4	20.03	6.68	75.4	30.000	14.1863	160.25	425.59	0.377 ✓
T7	20 - 0	4 1/2	20.03	6.68	71.2	30.000	15.9043	177.76	477.13	0.373 ✓

Diagonal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	F _a ksi	A in ²	Actual P K	Allow. P _a K	Ratio P P _a
T1	140 - 120	3/4	5.94	2.88	184.6	21.600	0.4418	2.78	9.54	0.292 ✓
T2	120 - 100	7/8	5.94	2.85	156.2	21.600	0.6013	4.08	12.99	0.314 ✓
T3	100 - 80	L2x2x1/4	8.90	4.32	88.1	29.000	0.5394	4.85	15.64	0.310 ✓
T4	80 - 60	L2 1/2x2 1/2x3/16	10.19	4.95	78.5	29.000	0.5535	4.64	16.05	0.289 ✓
T5	60 - 40	L2 1/2x2 1/2x3/16	12.10	5.89	93.0	29.000	0.5535	4.60	16.05	0.286 ✓
T6	40 - 20	L2 1/2x2 1/2x1/4	13.12	6.39	101.9	29.000	0.7284	4.87	21.12	0.231 ✓
T7	20 - 0	L3x3x3/16	15.24	7.43	96.8	29.000	0.6945	6.22	20.14	0.309 ✓

Top Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	F _a ksi	A in ²	Actual P K	Allow. P _a K	Ratio P P _a
T1	140 - 120	3/4	5.00	4.85	310.7	21.600	0.4418	0.08	9.54	0.008 ✓
T2	120 - 100	7/8	5.00	4.79	262.9	21.600	0.6013	0.99	12.99	0.076 ✓

RISATower URS Corporation 500 Enterprise Drive, Suite 3B Rocky Hill, CT 06067 Phone: (860) 529-8882 FAX: (860) 529-3991	Job	140' Self-Supporting Lattice Tower	Page	30 of 30
	Project	705 West Johnson Ave., Cheshire, CT	Date	08:23:45 02/11/11
	Client	Verizon Wireless	Designed by	Kevin Barker

Bottom Girt Design Data (Tension)

Section No.	Elevation	Size	L	L _u	Kl/r	F _a	A	Actual P	Allow. P _a	Ratio P
	ft		ft	ft		ksi	in ²	K	K	P _a
T1	140 - 120	3/4	5.00	4.85	310.7	21.600	0.4418	0.93	9.54	0.097
T2	120 - 100	7/8	5.00	4.79	262.9	21.600	0.6013	0.39	12.99	0.030

Section Capacity Table

Section No.	Elevation	Component Type	Size	Critical Element	P K	SF*P _{allow} K	% Capacity	Pass Fail
T1	140 - 120	Leg	1 3/4	1	-24.60	55.68	44.2	Pass
T2	120 - 100	Leg	2 1/2	46	-64.20	146.85	43.7	Pass
T3	100 - 80	Leg	3 1/2	91	-95.37	212.92	44.8	Pass
							61.2 (b)	
T4	80 - 60	Leg	3 3/4	112	-128.28	263.55	48.7	Pass
T5	60 - 40	Leg	4	133	-157.17	318.12	49.4	Pass
T6	40 - 20	Leg	4 1/4	154	-182.75	376.64	48.5	Pass
T7	20 - 0	Leg	4 1/2	175	-208.11	439.13	47.4	Pass
T1	140 - 120	Diagonal	3/4	14	-2.79	4.59	60.7	Pass
T2	120 - 100	Diagonal	7/8	55	-4.13	8.57	48.2	Pass
T3	100 - 80	Diagonal	L2x2x1/4	95	-4.55	9.72	46.9	Pass
T4	80 - 60	Diagonal	L2 1/2x2 1/2x3/16	116	-4.65	11.43	40.7	Pass
							51.2 (b)	
T5	60 - 40	Diagonal	L2 1/2x2 1/2x3/16	140	-4.54	8.82	51.5	Pass
T6	40 - 20	Diagonal	L2 1/2x2 1/2x1/4	161	-5.22	8.98	58.1	Pass
T7	20 - 0	Diagonal	L3x3x3/16	188	-5.97	10.43	57.3	Pass
							68.6 (b)	
T1	140 - 120	Top Girt	3/4	6	-0.09	1.86	5.0	Pass
T2	120 - 100	Top Girt	7/8	51	-0.97	3.54	27.4	Pass
T1	140 - 120	Bottom Girt	3/4	9	-0.93	1.86	49.9	Pass
T2	120 - 100	Bottom Girt	7/8	52	-0.50	3.54	14.1	Pass
							Summary	
							Leg (T3)	Pass
							Diagonal (T7)	Pass
							Top Girt (T2)	Pass
							Bottom Girt (T1)	Pass
							Bolt Checks	Pass
							RATING = 68.6	Pass

ANCHOR BOLT ANALYSIS



Job	140' Self-Supporting Tower - Cheshire, CT	Project No.	VZ5-080	Page	of
Description	Anchor Bolt Analysis	Computed by	KAB	Sheet	1 of 3
		Checked by		Date	02/11/11
				Date	

ANCHOR BOLT ANALYSIS

Input Data

Max Pier Reactions:

Uplift:	Uplift := 182·kips	<i>user input</i>
Shear:	Shear := 18·kips	<i>user input</i>
Compression:	Compression := 211·kips	<i>user input</i>

Anchor Bolt Data:

Use ASTM A-449 Anchor Bolts

Number of Anchor Bolts = N	$N := 6$	<i>user input</i>
Bolt Ultimate Strength:	$F_u := 105\text{·ksi}$	<i>user input</i>
Bolt Yield Strength:	$F_y := 81\text{·ksi}$	<i>user input</i>
Bolt Modulus:	$E := 29000\text{·ksi}$	<i>user input</i>
Thickness of Anchor Bolts	$D := 1.25\text{in}$	<i>user input</i>
Threads per Inch:	$n := 7$	<i>user input</i>
Coefficient of Friction:	$\mu := 0.55$	<i>user input</i> (for baseplate with grout ASCE 10-97)

Anchor Bolt Area:

Gross Area of Bolt:

$$A_g := \frac{\pi}{4} \cdot D^2$$

$$A_g = 1.227 \cdot \text{in}^2$$

Net Area of Bolt:

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

$$A_n = 0.969 \cdot \text{in}^2$$

Check Tensile Forces:

Maximum Tensile Force (Gross Area):

$$\text{AllowableTension} := 1.33 \cdot (0.33 \cdot A_g \cdot F_u)$$

$$\text{AllowableTension} = 56.6 \cdot \text{kips}$$

Note: 1.33 increase allowed per TIA/EIA

Maximum Tensile Force (Net Area):

$$F_{\text{net.area}} := 1.33 \cdot (0.60 \cdot A_n \cdot F_y)$$

$$F_{\text{net.area}} = 62.6 \cdot \text{kips}$$

Note: 1.33 increase allowed per TIA/EIA

Applied Tension:

$$\text{MaxTension} := \frac{\text{Uplift}}{N}$$

$$\text{MaxTension} = 30.3 \cdot \text{kips}$$

Check Stresses:

$$\frac{\text{MaxTension}}{F_{\text{net.area}}} = 0.48$$

$$\text{Condition1} := \text{if} \left(\frac{\text{MaxTension}}{F_{\text{net.area}}} \leq 1.00, \text{"OK"}, \text{"Overstressed"} \right)$$

$$\boxed{\text{Condition1} = \text{"OK"}}$$

Check Anchor Bolt Area:

Based on the ASCE 10-97 Design of Latticed Steel Transmission Structures

Required Area:

$$A_{s1} := \frac{\text{Uplift}}{F_y} + \frac{\text{Shear}}{\mu \cdot 0.85 \cdot F_y} \quad A_{s1} = 2.7 \cdot \text{in}^2$$

$$A_{s2} := \left| \frac{\text{Shear} - (0.3 \cdot \text{Compression})}{\mu \cdot 0.85 \cdot F_y} \right| \quad A_{s2} = 1.2 \cdot \text{in}^2$$

Provided Area:

$$A_{\text{provided}} := A_n \cdot N \quad A_{\text{provided}} = 5.8 \cdot \text{in}^2$$

$$\text{Condition2} := \text{if} \left(\frac{A_{s1}}{A_{\text{provided}}} \leq 1.00, \text{"OK"}, \text{"Overstressed"} \right) \quad \frac{A_{s1}}{A_{\text{provided}}} = 0.47$$

Condition2 = "OK"

$$\text{Condition3} := \text{if} \left(\frac{A_{s2}}{A_{\text{provided}}} \leq 1.00, \text{"OK"}, \text{"Overstressed"} \right) \quad \frac{A_{s2}}{A_{\text{provided}}} = 0.21$$

Condition3 = "OK"

FOUNDATION ANALYSIS

Job 140' Self-Supporting Tower, Cheshire, CT
 Description Foundation Analysis

Project No. VZ5-080
 Computed by KAB
 Checked by _____

Page _____ of _____
 Sheet 1 of 10
 Date 02/11/11
 Date _____

PIER AND MAT FOUNDATION ANALYSIS - 3 PIERS

TOWER FORCES:

Moment Caused by Tower $M_t := 2394 \cdot \text{kip} \cdot \text{ft}$
 Shear at Base of Tower $S_t := 28 \cdot \text{kip}$
 Max Compressive Force $C_t := 211 \cdot \text{kip}$
 Max Uplift $U_t := 182 \cdot \text{kip}$
 Height of Tower $H_t := 140 \cdot \text{ft}$
 Width of Tower at Base $W_t := 14 \cdot \text{ft}$
 Weight of Tower $WT_t := 1 \cdot \text{kip}$

NOTE: Weight of Tower is incorporated into the other loads listed above and is therefore set equal to one for programming.

FOOTING DIMENSIONS:

Width of Footing $W_f := 30 \cdot \text{ft}$
 Overall Depth of Footing $D_f := 7.0 \cdot \text{ft}$
 Length of Pier $L_p := 5.0 \cdot \text{ft}$
 Extension of Pier Above Grade $L_{pag} := 0.5 \cdot \text{ft}$
 Diameter of Pier $d_p := 4.0 \cdot \text{ft}$
 Thickness of Footing $T_f := 2.5 \cdot \text{ft}$
 Reinforcement Cover: $C_{vr} := 3 \cdot \text{in}$

MATERIAL PROPERTIES:

Compressive Strength of Concrete $f_c := 4000 \cdot \text{psi}$
 Yield Strength of Steel Reinforcement $f_y := 60000 \cdot \text{psi}$
 Internal Friction Angle of Soil $\phi_s := 34 \cdot \text{deg}$
 Allowable Bearing Capacity $q_s := 3000 \cdot \text{psf}$
 Coefficient of Lateral Soil Pressure $K_p := \frac{1 + \sin(\phi_s)}{1 - \sin(\phi_s)}$

Unit Weight of Soil $\gamma_s := 60 \cdot \text{pcf}$
 Unit Weight of Concrete $\gamma_c := 87.6 \cdot \text{pcf}$
 Depth to Neglect $n := 0 \cdot \text{ft}$
 Cohesion of Clay Type Soil $c_c := 0 \cdot \text{ksf}$
 Note: Use 0 for Sandy Soil

$$K_p = 3.5371$$

What is Position of Center of Tower with respect to Center of Pad?

1=Offset
 2=Not Offset

$Pos_{tower} := 2$

STEEL REINFORCING:

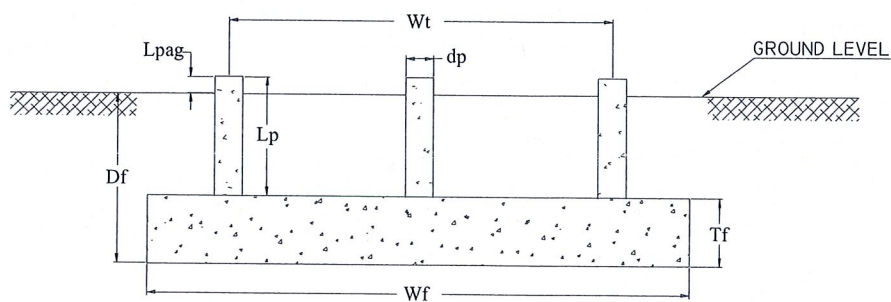
PIER REINFORCEMENT:

Bar Size $BS_{pier} := 7$ Bar Diameter $d_{bpier} := 0.875 \cdot \text{in}$
 Number of Bars $NB_{pier} := 26$ Bar Area $A_{bpier} := 0.6 \cdot \text{in}^2$

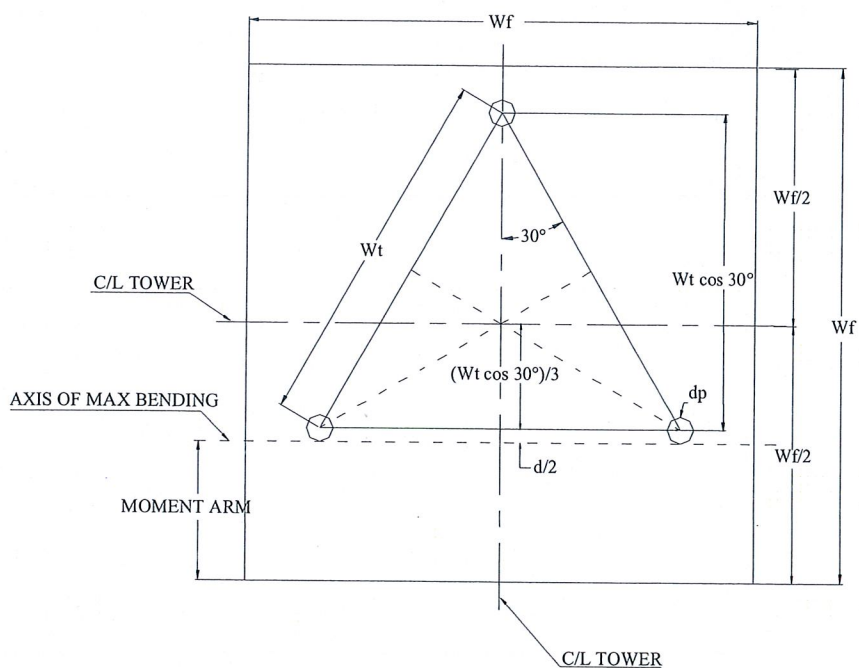
PAD REINFORCEMENT:

Bar Size $BS_{pad} := 10$ Bar Diameter $d_{bpad} := 1.270 \cdot \text{in}$
 Number of Bars $NB_{pad} := 29$ Bar Area $A_{bpad} := 1.270 \cdot \text{in}^2$

FOUNDATION OVERVIEW



ELEVATION



PLAN

STABILITY OF FOOTING

Factor of Safety Req'd: $FS_{req} := 2.0$

Passive Pressure: $P_{pn} := K_p \cdot \gamma_s \cdot n + c \cdot 2 \cdot \sqrt{K_p}$ $P_{pn} = 0 \cdot \text{ksf}$
 $P_{pt} := K_p \cdot \gamma_s \cdot (D_f - T_f) + c \cdot 2 \cdot \sqrt{K_p}$ $P_{pt} = 0.955 \cdot \text{ksf}$
 $P_{top} := \text{if}[n < (D_f - T_f), P_{pt}, P_{pn}]$ $P_{top} = 0.955 \cdot \text{ksf}$
 $P_{bot} := K_p \cdot \gamma_s \cdot D_f + c \cdot 2 \cdot \sqrt{K_p}$ $P_{bot} = 1.4856 \cdot \text{ksf}$
 $P_{ave} := \frac{P_{top} + P_{bot}}{2}$ $P_{ave} = 1.2203 \cdot \text{ksf}$

Shear: $T_{pp} := \text{if}[n < (D_f - T_f), T_f, (D_f - n)]$ $T_{pp} = 2.5 \cdot \text{ft}$
 $A_{pp} := W_f \cdot T_{pp}$ $A_{pp} = 75 \cdot \text{ft}^2$

Ultimate Shear: $S_u := P_{ave} \cdot A_{pp}$ $S_u = 91.5233 \cdot \text{kip}$

Weight of Concrete Pad: $WT_c := (W_f^2 \cdot T_f) \cdot \gamma_c$ $WT_c = 197.1 \cdot \text{kip}$

Weight of Soil above Footing: $WT_{s1} := W_f^2 \cdot (|D_f - T_f|) \cdot \gamma_s$ $WT_{s1} = 243 \cdot \text{kip}$

Weight of Soil Wedge at back face: $WT_{s2} := \left[\frac{(D_f - n)^2 \cdot \tan(\phi_s)}{2} \cdot W_f \right] \cdot \gamma_s$ $WT_{s2} = 29.7458 \cdot \text{kip}$

Distance to center of Tower Leg from Edge of Footing: $X_{t1} := \frac{W_f}{2} - \frac{W_t \cdot \cos(30 \cdot \text{deg})}{2}$ $X_{t2} := \frac{W_f}{2} - \frac{W_t \cdot \cos(30 \cdot \text{deg})}{3}$

$X_t := \text{if}(\text{Pos}_{tower} = 1, X_{t1}, X_{t2})$ $X_t = 10.9585 \cdot \text{ft}$

Additional Offset of Footing: $X_{off1} := \frac{W_f}{2} - \left(\frac{W_t \cdot \cos(30 \cdot \text{deg})}{3} + X_t \right)$ $X_{off2} := 0$

$X_{off} := \text{if}(\text{Pos}_{tower} = 1, X_{off1}, X_{off2})$ $X_{off} = 0 \cdot \text{ft}$

Resisting Moment: $M_r := (WT_c + WT_{s1}) \cdot \frac{W_f}{2} + WT_t \cdot \left(\frac{W_f}{2} - X_{off} \right) + S_u \cdot \frac{T_{pp}}{3} + WT_{s2} \cdot \left(W_f + \frac{T_{pp} \cdot \tan(\phi_s)}{3} \right)$ $M_r = 7601.864 \cdot \text{kip} \cdot \text{ft}$

Overturning Moment: $M_{ot} := M_t + S_t \cdot (L_p + T_f) + WT_t \cdot X_{off}$ $M_{ot} = 2604 \cdot \text{kip} \cdot \text{ft}$

Factor of Safety: $FS := \frac{M_r}{M_{ot}}$ $FS = 2.9193$

SafetyCheck := $\text{if}(FS > FS_{req}, \text{"Okay"}, \text{"No Good"})$ $\text{SafetyCheck} = \text{"Okay"}$

BEARING PRESSURE CHECK:

Pressure Applied:

$$\text{LOAD}_{\text{tot}} := \text{WT}_c + \text{WT}_{s1} + \text{WT}_t$$

$$\text{LOAD}_{\text{tot}} = 441.1 \cdot \text{kip}$$

$$A_{\text{mat}} := W_f^2$$

$$A_{\text{mat}} = 900 \cdot \text{ft}^2$$

$$S := \frac{W_f^3}{6}$$

$$S = 4500 \cdot \text{ft}^3$$

$$P_{\text{max}} := \frac{\text{LOAD}_{\text{tot}}}{A_{\text{mat}}} + \frac{M_{\text{ot}}}{S}$$

$$P_{\text{max}} = 1.0688 \cdot \text{ksf}$$

$$P_{\text{min}} := \frac{\text{LOAD}_{\text{tot}}}{A_{\text{mat}}} - \frac{M_{\text{ot}}}{S}$$

$$P_{\text{min}} = -0.0886 \cdot \text{ksf}$$

$$\text{MaxPressure} := \text{if}(P_{\text{max}} < q_s, \text{"Okay"}, \text{"No Good"})$$

$$\text{MaxPressure} = \text{"Okay"}$$

$$\text{MinPressure} := \text{if}[(P_{\text{min}} \geq 0) \cdot (P_{\text{min}} < q_s), \text{"Okay"}, \text{"No Good"}]$$

$$\text{MinPressure} = \text{"No Good"}$$

Distance to Resultant of Pressure Distribution:

$$X_p := \frac{\frac{P_{\text{max}}}{P_{\text{max}} - P_{\text{min}}} \cdot \frac{1}{3}}{W_f}$$

$$X_p = 9.2348 \cdot \text{ft}$$

Distance to Kern:

$$X_k := \frac{W_f}{3}$$

$$X_k = 10 \cdot \text{ft}$$

Since Resultant Force is Not in Kern, Area to which Pressure is Applied Must be Reduced.

Eccentricity:

$$e := \frac{M_{\text{ot}}}{\text{LOAD}_{\text{tot}}}$$

$$e = 5.9034$$

Adjusted Soil Pressure:

$$q_a := \frac{2 \cdot \text{LOAD}_{\text{tot}}}{3 \cdot W_f \left(\frac{W_f}{2} - e \right)}$$

$$q_a = 1.0776 \cdot \text{ksf}$$

Revised Maximum:

$$q_{\text{max}} := \text{if}(X_p < X_k, q_a, P_{\text{max}})$$

$$q_{\text{max}} = 1.0776 \cdot \text{kip}$$

$$\text{PressureCheck} := \text{if}(q_{\text{max}} < q_s, \text{"Okay"}, \text{"No Good"})$$

$$\text{PressureCheck} = \text{"Okay"}$$

Job 140' Self-Supporting Tower, Cheshire, CT
 Description Foundation Analysis

Project No. VZ5-080

Computed by KAB

Checked by _____

Page _____ of _____

Sheet 5 of 10

Date 02/11/11

Date _____

CHECK PUNCHING AND BEAM SHEAR:

Load Factor: (EIA 3.1.1) $LF := \text{if} \left[H_t \leq 700 \cdot \text{ft}, 1.3, \text{if} \left[H_t \geq 1200, 1.7, 1.3 + \left(\frac{H_t - 700}{1200 - 700} \right) \cdot 0.4 \right] \right] LF = 1.3$

Beam Shear: (Critical section located at a distance d from the face of Pier) (ACI 11.3.1.1)

$$\phi_c := .85 \quad (\text{ACI 9.3.2.3})$$

$$d := T_f - C_{vr} - .5 \cdot \text{in}$$

$$d = 26.5 \cdot \text{in}$$

Factored load:

$$FL := LF \cdot \frac{C_t}{W_f^2}$$

$$FL = 0.3048 \cdot \text{ksf}$$

$$V_{req} := \frac{FL \cdot (X_t - 0.5 \cdot d_p - d) \cdot W_f}{\phi_c}$$

$$V_{req} = 72.6111 \cdot \text{kip}$$

ACI 11.3.1.1

$$V_{Avail} := 2 \cdot \sqrt{f_c \cdot \text{psi}} \cdot W_f \cdot d$$

$$V_{Avail} = 1206.7252 \cdot \text{kip}$$

$$\text{BeamShearCheck} := \text{if}(V_{req} < V_{Avail}, \text{"Okay"}, \text{"No Good"})$$

$$\text{BeamShearCheck} = \text{"Okay"}$$

Punching Shear: (Critical Section Located at a distance of d/2 from the face of pier) (ACI 11.12.2.1)

$$b_o := (d_p + d) \cdot \pi$$

$$b_o = 19.5041 \cdot \text{ft}$$

$$V_{req} := FL \cdot \frac{W_f^2 - (d_p + d)^2 \cdot \frac{\pi}{4}}{\phi_c}$$

$$V_{req} = 311.8515 \cdot \text{kip}$$

$$V_{Avail} := 4 \cdot \sqrt{f_c \cdot \text{psi}} \cdot b_o \cdot d$$

$$V_{Avail} = 1569.0689 \cdot \text{kip}$$

$$\text{PunchingShearCheck} := \text{if}(V_{req} < V_{Avail}, \text{"Okay"}, \text{"No Good"})$$

$$\text{PunchingShearCheck} = \text{"Okay"}$$

Job 140' Self-Supporting Tower, Cheshire, CT
 Description Foundation Analysis

Project No. VZ5-080
 Computed by KAB
 Checked by _____

Page _____ of _____
 Sheet 6 of 10
 Date 02/11/11
 Date _____

TENSILE REINFORCEMENT IN PAD:

$$\phi_m := .90 \text{ per ACI 9.3.2.2}$$

Applied Moments:

$$M_{nT} := LF \cdot \left[U_t \cdot \left(W_t \cdot \sin(60 \cdot \text{deg}) - \frac{d_p}{2} \right) + S_t \cdot (D_f + L_{\text{pag}}) \right] - W_{T_t} \cdot X_{\text{off}}$$

$$M_{nS} := -1 \cdot \left[\frac{1}{2} \cdot \left(\frac{W_f}{2} + \frac{W_t}{3} \cdot \cos(30 \cdot \text{deg}) - \frac{d_p}{2} \right)^2 \cdot W_t \cdot [\gamma_s \cdot (T_{pp} - T_f)] + W_{T_{s2}} \cdot \left[\frac{W_f}{2} + \frac{W_t}{3} \cdot \cos(30 \cdot \text{deg}) - \frac{d_p}{2} + (D_f - n) \cdot \tan(\phi_s) \right] \right]$$

$$M_{nC} := -1 \cdot \left[\frac{1}{2} \cdot \left(\frac{W_f}{2} + \frac{W_t}{3} \cdot \cos(30 \cdot \text{deg}) - \frac{d_p}{2} \right)^2 \cdot W_t \cdot (\gamma_c \cdot T_f) \right]$$

Design Moment: $M_n := \frac{M_{nT} + M_{nS} + M_{nC}}{\phi_m} \quad M_n = 1750.9596 \cdot \text{kips} \cdot \text{ft}$

Required Reinforcement:

ACI 10.2.7.3 $\beta := \text{if } f_c \leq 4000 \cdot \text{psi}, .85, \text{if } f_c \geq 8000 \cdot \text{psi}, .65, .85 - \left(\frac{\frac{f_c}{\text{psi}} - 4000}{1000} \right) \cdot .05 \quad \beta = 0.85$

Effective Width: $b_{\text{eff}} := W_t \cdot \cos(30 \cdot \text{deg}) + d_p \quad b_{\text{eff}} = 193.4923 \cdot \text{in}$

$$A_s := \frac{M_n}{\phi_m \cdot f_y \cdot d} \quad A_s = 14.6831 \cdot \text{in}^2$$

$$a := \frac{A_s \cdot f_y}{\beta \cdot f_c \cdot b_{\text{eff}}} \quad a = 1.3391 \cdot \text{in}$$

$$A_s := \frac{M_n}{f_y \cdot \left(d - \frac{a}{2} \right)} \quad A_s = 13.5573 \cdot \text{in}^2$$

$$\rho := \frac{A_s}{b_{\text{eff}} \cdot d} \quad \rho = 0.0026$$

Job 140' Self-Supporting Tower, Cheshire, CT
Description Foundation Analysis

Project No. VZ5-080
Computed by KAB
Checked by _____

Page _____ of _____
Sheet 7 of 10
Date 02/11/11
Date _____

Temperature and Shrinkage: (ACI 7.12.2.1b)

$$\rho_{sh} := \text{if}(f_y \geq 60000 \cdot \text{psi}, 0.0018, 0.0020)$$

$$\rho_{sh} = 0.0018$$

Area Required:

$$A_s := \text{if}\left(\rho \geq \rho_{sh}, A_s, \rho_{sh} \cdot \frac{b_{eff}}{2} \cdot d\right)$$

$$A_s = 13.5573 \cdot \text{in}^2$$

Area Provided:

$$A_{s_{prov}} := A_{b_{pad}} \cdot NB_{pad}$$

$$A_{s_{prov}} = 36.83 \cdot \text{in}^2$$

$$\text{PadReinforcement} := \text{if}(A_{s_{prov}} > A_s, \text{"Okay"}, \text{"No Good"})$$

$$\text{PadReinforcement} = \text{"Okay"}$$

DEVELOPMENT LENGTH OF PAD REINFORCEMENT:

TENSION (ACI 12.2.3)

Bar Spacing:

$$B_{sPad} := \frac{W_f - 2 \cdot C_{vr} - NB_{pad} \cdot d_{bpad}}{NB_{pad} - 1}$$

$$B_{sPad} = 11.3275 \cdot \text{in}$$

Development Length Factors:

Reinforcement Location Factor

$$\alpha := 1.0$$

Coating Factor

$$\beta := 1.0$$

Concrete strength Factor

$$\lambda := 1.0$$

Reinforcement Size Factor

$$\gamma := 1.0$$

Spacing or Cover Dimension:

$$c := \text{if}\left(C_{vr} < \frac{B_{sPad}}{2}, C_{vr}, \frac{B_{sPad}}{2}\right) \quad c = 3 \cdot \text{in}$$

Transverse Reinforcement Index as allowed by ACI 12.2.4

$$k_{tr} := 0$$

Development Length:

$$L_{dbt} := \frac{3}{40} \cdot \frac{f_y}{\sqrt{f_c \cdot \text{psi}}} \cdot \frac{\alpha \cdot \beta \cdot \gamma \cdot \lambda}{c + k_{tr}} \cdot d_{bpad}$$

$$L_{dbt} = 38.2533 \cdot \text{in}$$

$$L_{dbmin} := 12 \cdot \text{in}$$

Minimum Development Length: $L_{dbtCheck} := \text{if}(L_{dbt} \geq L_{dbmin}, \text{"Use L.dbt"}, \text{"Use L.dbmin"})$
(ACI 12.2.1)

$$L_{dbtCheck} = \text{"Use L.dbt"}$$

Available Length in Pad:

$$L_{Pad} := \frac{W_f}{2} - \frac{W_t}{2} - C_{vr}$$

$$L_{Pad} = 93 \cdot \text{in}$$

$$L_{padTension} := \text{if}(L_{Pad} > L_{dbt}, \text{"Okay"}, \text{"No Good"})$$

$$L_{padTension} = \text{"Okay"}$$

REINFORCEMENT IN PIER:

Pier Area: $A_p := \frac{\pi \cdot d_p^2}{4}$ $A_p = 1809.5574 \cdot \text{in}^2$

(ACI 10.8.4 and 10.9.1) $A_{smin} := 0.01 \cdot 0.5 \cdot A_p$ $A_{smin} = 9.0478 \cdot \text{in}^2$

$A_{sprov} := NB_{pier} \cdot A_{bpier}$ $A_{sprov} = 15.6 \cdot \text{in}^2$

SteelAreaCheck := if($A_{sprov} > A_{smin}$, "Okay", "No Good") SteelAreaCheck = "Okay"

NOTE: Anchor Bolts are not accounted for in reinforcement calculation and will provide additional reinforcement to satisfy minimum requirement of steel.

Bar Spacing In Pier: $B_{sPier} := \frac{d_p \cdot \pi}{NB_{pier}} - d_{bpier}$ $B_{sPier} = 4.9249 \cdot \text{in}$

Diameter of Reinforcement Cage: $Diam_{cage} := d_p - 2 \cdot C_{vr}$ $Diam_{cage} = 42 \cdot \text{in}$

Maximum Moment in Pier: $M_p := (S_t \cdot L_p) \cdot LF$ $M_p = 2184 \cdot \text{kips} \cdot \text{in}$

Pier Check evaluated from outside program and results are listed below;

(defined variables)

$(f_c \ f_y \ cI \ \text{Spiral}) = (3 \ 60 \ 4 \ 0)$

The required input is column diameter in inches, number of reinforcing bars, bar size number, factored axial load in kips and moment in kip inches:

$(D \ N \ n \ P_u \ M_{xu}) := (48 \ 26 \ 7 \ 274 \ 3112)$

Clears any previous output:

$(\phi P_n \ \phi M_{xn} \ f_{sp} \ \rho) := (0 \ 0 \ 0 \ 0)$

$(\phi P_n \ \phi M_{xn} \ f_{sp} \ \rho) := \phi P_n (D, N, n, P_u, M_{xu})^T$

The Output is given as useable axial load in kips, moment capacity in kip inches, splicing stress in ksi, and reinforcement ratio:

$(\phi P_n \ \phi M_{xn} \ f_{sp} \ \rho) = (1956.4915 \ 22221.173 \ -52.403 \ 0.0086)$

Column size and reinforcement may be changed to match capacity to the applied load.

AxialLoadCheck := if($\phi P_n \geq P_u$, "Okay", "No Good")

AxialLoadCheck = "Okay"

BendingCheck := if($\phi M_{xn} \geq M_{xu}$, "Okay", "No Good")

BendingCheck = "Okay"

Job 140' Self-Supporting Tower, Cheshire, CT
 Description Foundation Analysis

Project No. VZ5-080
 Computed by KAB
 Checked by _____

Page _____ of _____
 Sheet 9 of 10
 Date 02/11/11
 Date _____

DEVELOPMENT LENGTH OF PIER REINFORCEMENT:

TENSION (ACI 12.2.3)

Spacing and Cover: $C_{vr} = 3 \cdot \text{in}$ $B_{sPier} = 4.9249 \cdot \text{in}$

Factors for development: Reinforcement Location Factor $\alpha_w := 1.0$
 Coating Factor $\beta_w := 1.0$
 Concrete strength Factor $\lambda_w := 1.0$
 Reinforcement Size Factor $\gamma_w := 1.0$

Spacing or Cover Dimension: $c_w := \text{if} \left(C_{vr} < \frac{B_{sPier}}{2}, C_{vr}, \frac{B_{sPier}}{2} \right) c = 2.4624 \cdot \text{in}$

Transverse Reinforcement: As allowed by ACI 12.2.4 $k_{tr} := 0$

$$L_{dbt} := \frac{3}{40} \cdot \frac{f_y}{\sqrt{f_c \cdot \text{psi}}} \cdot \frac{\alpha \cdot \beta \cdot \gamma \cdot \lambda}{c + k_{tr}} \cdot d_{bpier}$$

$$L_{dbt} = 22.1225 \cdot \text{in}$$

Minimum Development Length: (ACI 12.2.1)

$$L_{dbmin} := 12 \cdot \text{in}$$

$$L_{dbtCheck} := \text{if} (L_{dbt} \geq L_{dbmin}, \text{"Use } L_{dbt}\text{"}, \text{"Use } L_{dbmin}\text{"})$$

$$L_{dbtCheck} = \text{"Use } L_{dbt}\text{"}$$

COMPRESSION: (ACI 12.3.2)

$$L_{dbc1} := \frac{.02 \cdot d_{bpier} \cdot f_y}{\sqrt{f_c \cdot \text{psi}}}$$

$$L_{dbc1} = 16.602 \cdot \text{in}$$

$$L_{dbmin} := 0.0003 \cdot \frac{\text{in}^2}{\text{lb}} \cdot (d_{bpier} \cdot f_y)$$

$$L_{dbmin} = 15.75 \cdot \text{in}$$

$$L_{dbc} := \text{if} (L_{dbc1} \geq L_{dbmin}, L_{dbc1}, L_{dbmin})$$

$$L_{dbc} = 16.602 \cdot \text{in}$$

Job 140' Self-Supporting Tower, Cheshire, CTProject No. VZ5-080Page of Description Foundation AnalysisComputed by KABSheet 10 of 10Date 02/11/11Checked by Date Available Length in Pier: $L_{\text{pier}} := L_p - 3 \cdot \text{in}$ $L_{\text{pier}} = 57 \cdot \text{in}$ $L_{\text{piertension}} := \text{if}(L_{\text{pier}} > L_{\text{dbt}}, \text{"Okay"}, \text{"No Good"})$ $L_{\text{piertension}} = \text{"Okay"}$ $L_{\text{piercompression}} := \text{if}(L_{\text{pier}} > L_{\text{dbc}}, \text{"Okay"}, \text{"No Good"})$ $L_{\text{piercompression}} = \text{"Okay"}$ Available Length in Pad: $L_{\text{pad}} := T_f - 3 \cdot \text{in}$ $L_{\text{pad}} = 27 \cdot \text{in}$ $L_{\text{padtension}} := \text{if}(L_{\text{pad}} > L_{\text{dbt}}, \text{"Okay"}, \text{"No Good"})$ $L_{\text{padtension}} = \text{"Okay"}$ $L_{\text{padcompression}} := \text{if}(L_{\text{pad}} > L_{\text{dbc}}, \text{"Okay"}, \text{"No Good"})$ $L_{\text{padcompression}} = \text{"Okay"}$



ShareLite Wideband Diplexer – In-line 698-960 MHz/1710-2200 MHz, DC pass in high frequency path

Product Description

The ShareLite FD9R6004 Series of diplexers are designed to enable feeder sharing between systems in the 698-960 MHz range and in the 1710-2200 MHz range. The diplexer is equipped with in-line connector placement so it can be installed in the BTS cabinet or at the tower top. This is especially valuable in crowded sites or when the feeders are not easily accessible. Due to its wideband design, the FD9R6004 Series can accommodate many combining solutions between 698-960 MHz and 1710-2200 MHz systems such as LTE 700 MHz, Cellular 800 MHz with PCS, GSM900 with GSM1800, or GSM900 with UMTS. This diplexer features a highly selective filter. It provides a high level of isolation between ports, while keeping the insertion loss on both paths at an extremely low level. The FD9R6004 diplexers are available with various DC pass options, helpful in configurations with or without the Tower Mount Amplifiers installed.



Features/Benefits

- LTE ready design
- Extremely Low Insertion Loss
- High level of Rejection between bands – Protection against interferences
- Extremely High Power Handling Capability
- Integrated DC block/bypass versions available
- Very compact & small size design – Easy installation and reduced tower load
- In-line long-neck connectors for easy connection & waterproofing
- Exceptional reliability & environmental protection (IP 67)
- Equipped with 1 * Breathable Vent – Prevent any humidity inside the product
- Mounting hardware for Wall and Pole mount provided (P/N SEM2-1A)
- Grounding already provided through the mounting bracket
- Kit available for easy dual mount

Technical Specifications

Product Type	Diplexer/Cross Band Coupler
Frequency Band, MHz	698-2200
Configuration	Sharelite Single diplexer, outdoor, DC pass in the 1710-2170MHz path, with mounting hardware SEM2-1A
Mounting	Wall Mounting: With 4 screws (maximum 6mm diameter); Pole Mounting: With included clamp set 40-110mm (1.57-4.33)
Frequency Range Low Frequency Path, MHz	698-960
Frequency Range High Frequency Path, MHz	1710-2200
Return Loss All Ports Min/Typ, dB	19/23
Power Handling Continuous, Max, W	1250 at common port; 750 in low frequency path & 500 in high frequency path
Power Handling Peak, Max, W	15000 in low frequency path & 8000 in high frequency path
Impedance, Ohms	50
Insertion Loss 698-960 MHz Path, Typ, dB	0.07
Insertion Loss 1710-2200MHz path, Typ, dB	0.13
Rejection Between Bands Min/Typ, dB	58/64@698-960MHz; 60/70@1710-2200MHz
IMP Level at the COM Port, Typ, dBm	-112 @ 2x43
DC Pass in Low Frequency Path	No
DC Pass in High Frequency Path	Yes
Temperature Range, °C (°F)	-40 to +60 (-40 to +140)
Environmental	ETSI 300-019-2-4 Class 4.1E
Ingress Protection	IP 67
Lightning Protection	EN/IEC61000-4-5 Level 4
Connectors	In-line long-neck 7-16-Female
Weight, kg (lb)	1.2 (2.6)
Shipping Weight, kg (lb)	3.2 (7) for 2 * single units in 1 * box, 9.8 (21.6) for 6 * units = 3 * Boxes in 1 * overwrap
Application	LTE 700MHz, GSM900/3G/UMTS, GSM900/GSM1800, Cellular 800/PCS
Dimensions, H x W x D, mm (in)	147 x 164 x 37 (5.8 x 6.5 x 1.5)
Shipping Dimensions, H x W x D, mm (in)	254 x 406 x 82 (10 x 16 x 3.2) for 2 * Single Units in 1 * box, 280 x 406 x 241 (11 x 16 x 9.5) for 6 * units = 3 * Boxes in 1 * overwrap
Volume, L	0.43
Housing	Aluminum

Notes

RFS The Clear Choice ®

FD9R6004/2C-3L

Rev: --

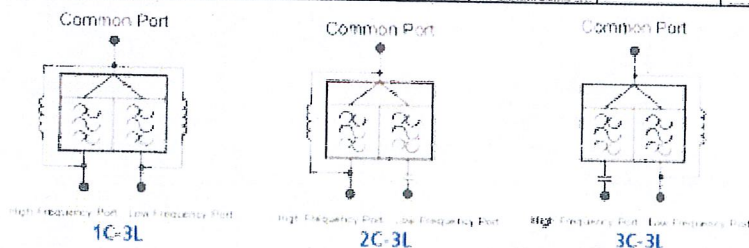
Print Date: 28.01.2011

Please visit us on the internet at <http://www.rfsworld.com/>

Radio Frequency Systems

ShareLite Wideband Diplexer – In-line 698-960 MHz/1710-2200 MHz, DC pass in high frequency path

Selection Guide Diplexer 698-960 / 1710-2200MHz					
	Model Number	Full DC Pass	DC Pass High Band	DC Pass Low Band	Mounting Hardware Included
Single	FD9R6004/1C-3L				X
	FD9R6004/2C-3L				X
	FD9R6004/3C-3L				X
Dual	KIT-FD9R6004/1C-DL				X
	KIT-FD9R6004/2C-DL				X
	KIT-FD9R6004/3C-DL				X



The FD9R6004 Series is upgradeable to a Dual Diplexer kit by means of 2 diplexers and mounting hardware kits SEM2-1A and SEM2-3

Mounting Hardware and Ground Cable Ordering Information		
Model Number	Description	
SEM2-1A	Mounting Hardware, Pole mount ø40-110mm (Included with the Single and Dual Diplexer) Wall Screws M6 (Not included with the product)	
SEM2-3	Assembly kit for 2 pcs of FT9DW/xC-3L (Can be ordered separately but included with the Dual Diplexer Kit)	
CA020-2	Ground Cable, 2m, includes lugs (Optional)	
CA030-2	Ground Cable, 2m, includes lugs (Optional)	
SEM6	Mounting Hardware for 6 Diplexers, Tower Base (Optional)	



STATE OF CONNECTICUT
CONNECTICUT SITING COUNCIL

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

January 20, 2010

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

RE: **EM-VER-025-091218** - Cellco Partnership d/b/a Verizon Wireless notice of intent to modify an existing telecommunications facility located at 705 West Johnson Road, Cheshire, Connecticut.

Dear Attorney Baldwin:

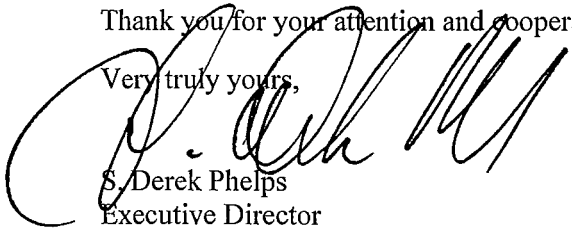
The Connecticut Siting Council (Council) hereby acknowledges your notice to modify this existing telecommunications facility, pursuant to Section 16-50j-73 of the Regulations of Connecticut State Agencies.

The proposed modifications are to be implemented as specified here and in your notice dated December 18, 2009, including the placement of all necessary equipment and shelters within the tower compound. The modifications are in compliance with the exception criteria in Section 16-50j-72 (b) of the Regulations of Connecticut State Agencies as changes to an existing facility site that would not increase tower height, extend the boundaries of the tower site, increase noise levels at the tower site boundary by six decibels, and increase the total radio frequencies electromagnetic radiation power density measured at the tower site boundary to or above the standard adopted by the State Department of Environmental Protection pursuant to General Statutes § 22a-162. This facility has also been carefully modeled to ensure that radio frequency emissions are conservatively below State and federal standards applicable to the frequencies now used on this tower.

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

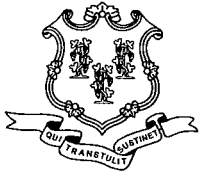
Thank you for your attention and cooperation.

Very truly yours,


S. Derek Phelps
Executive Director

SDP/MP/laf

c: The Honorable Matt Hall, Council Chairman, Town of Cheshire
Michael A. Milone, Town Manager, Town of Cheshire
William S. Voelker, AICP, Town Planner, Town of Cheshire
Daniel J. Garstka, Senior Engineer, Transmission Projects, Northeast Utilities Service Company



STATE OF CONNECTICUT

CONNECTICUT SITING COUNCIL

Ten Franklin Square, New Britain, CT 06051

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

E-Mail: siting.council@ct.gov

www.ct.gov/csc

December 21, 2009

The Honorable Matt Hall
Council Chairman
Town of Cheshire
Town Hall
84 South Main Street
Cheshire, CT 06410

RE: **EM-VER-025-091218** - Celco Partnership d/b/a Verizon Wireless notice of intent to modify an existing telecommunications facility located at 705 West Johnson Road, Cheshire, Connecticut.

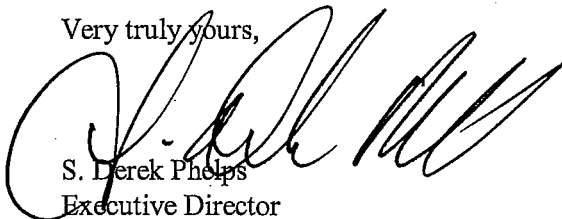
Dear Council Chairman Hall:

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 January 8, 2010.

Thank you for your cooperation and consideration.

Very truly yours,



S. Derek Phelps
Executive Director

SDP/jbw

Enclosure: Notice of Intent

c: Michael A. Milone, Town Manager, Town of Cheshire
William S. Voelker, AICP, Town Planner, Town of Cheshire

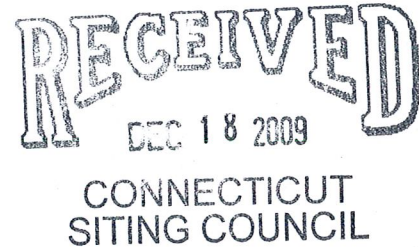
280 Trumbull Street
Hartford, CT 06103-3597
Main (860) 275-8200
Fax (860) 275-8299
kbaldwin@rc.com
Direct (860) 275-8345

ORIGINAL

December 18, 2009

Via Hand Delivery

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



Re: **Notice of Exempt Modification – Antenna Swap
705 West Johnson Road, Cheshire, Connecticut**

Dear Mr. Phelps:

Cellco Partnership d/b/a Verizon Wireless ("Cellco") currently maintains wireless telecommunications antennas at the 138-foot level on the existing 140-foot tower at the above-referenced address. The tower and underlying property are owned by Northeast Utilities. The Council approved Cellco's shared use of the existing tower in Petition No. 827. Cellco now intends to modify its installation by replacing six of its cellular antennas with three (3) model DB854G65ESX cellular antennas; one (1) BXA-70063/6CF LTE antenna and two (2) model P65-16-XL-2 LTE antennas, all at the same 138-foot level on the tower. Attached behind Tab 1 are the specifications for the proposed replacement antennas.

*Law Offices*

BOSTON

PROVIDENCE

HARTFORD

NEW LONDON

STAMFORD

WHITE PLAINS

NEW YORK CITY

ALBANY

SARASOTA

www.rc.com

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 Michael A. Milone, Town Manager of the Town of Cheshire.

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

1. The proposed modifications will not result in any increase in the overall height of the existing tower. Cellco's antennas will be located at the same 138-foot level on the existing 140-foot tower.

ROBINSON & COLE_{LLP}

S. Derek Phelps
December 18, 2009
Page 2

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

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

4. The operation of the replacement antennas will not increase radio frequency (RF) power density levels at the facility to a level at or above the Federal Communications Commission (FCC) adopted safety standard. A cumulative power density table for Cellco's modified facility is included behind Tab 2.

Also attached is a Structural Analysis Report confirming that the tower and foundation can support Cellco's proposed antennas modification. (See Tab 3).

For the foregoing reasons, Cellco respectfully submits that the proposed modifications to the above-referenced telecommunications facility constitutes an exempt modification under R.C.S.A. § 16-50j-72(b)(2).

Sincerely,



Kenneth C. Baldwin

Enclosures

Copy to:

Michael A. Milone, Cheshire Town Manager
Sandy M. Carter





DB854DG65ESX

±45° Diversity Panel Antenna

DECIBEL
Base Station Antennas

- Features air dielectric feed system for maximum array efficiency and lowest loss
- No fasteners, rivets, soldering or welding in critical element-to-transformer circuit
- Strong first upper side lobe suppression
- Excellent gain per unit length of antenna

ELECTRICAL

Frequency (MHz) :	806 - 896
Polarization :	±45°
Gain (dBd/dBi) :	13/15.1
Azimuth BW (Deg.):	65
Elevation BW (Deg.):	14
Beam Tilt (Deg.):	0
USLS* (dB) :	>18
Front-To-Back Ratio* (dB) :	30
Isolation (dB) :	>30
VSWR :	<1.33:1
PIM3 @ 2 x 20w (dBc) :	-150
Max. Input Power (Watts) :	500
Impedance (Ohms) :	50
Lightning Protection :	DC Ground
Opt. Electrical Tilt :	6, Variable

MECHANICAL

Weight :	8.3 kg (18.5 lb)
Dimensions (LxWxD) :	1,219 x 318 x 140 mm (48 x 12.5 x 5.5 in)
Max. Wind Area :	0.17 m ² (1.8 ft ²)
Max. Wind Load (@ 100 mph) :	444.8 N (100 lbf)
Max. Wind Speed :	241 km/h (150 mph)
Hardware Material :	Galvanized Steel
Connector Type :	7-16 DIN - Female (2, Bottom)
Color :	Light Gray
Standard Mounting Hardware :	DB380
Standard Downtilt Mounting Hardware :	DB5083



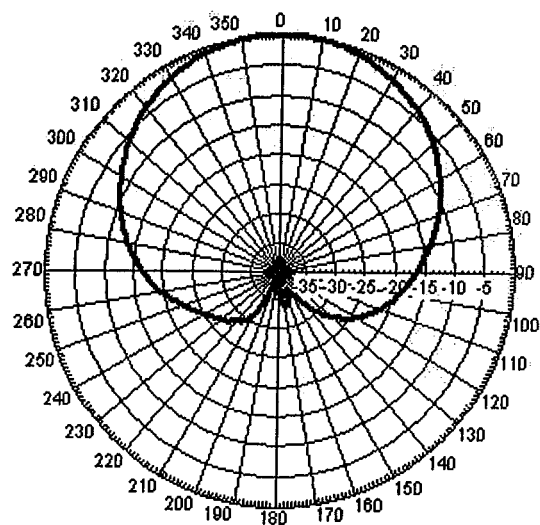


DB854DG65ESX

±45° Diversity Panel Antenna

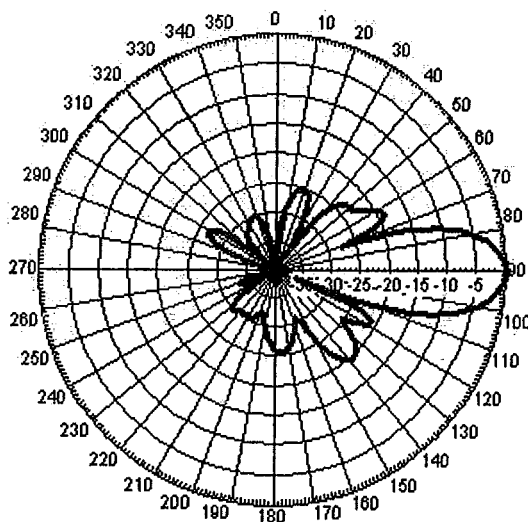
DECIBEL
Base Station Antennas

AZIMUTH PATTERN



Freq: 840 MHz, Tilt: 0

ELEVATION PATTERN



Freq: 840 MHz, Tilt: 0

Andrew Corporation
2601 Telecom Parkway
Richardson, Texas U.S.A 75082-3521
Tel: 214.631.0310

Fax: 214.631.4706
Toll Free Tel: 1.800.676.5342
Fax: 1.800.229.4706
www.andrew.com

* - Indicates Typical
5/11/2005
dbtech@andrew.com

Information correct at date of issue but may be subject to change without notice.

Slant $\pm 45^\circ$ Dual Polarized FET Panel 63° / 14.5 dBd 696-900 MHz

Mechanical specifications

Length	1804 mm	71.0 in
Width	285 mm	11.2 in
Depth	114 mm	4.5 in
Depth with z-bracket	154 mm	6.1 in
Weight ⁴⁾	7.9 kg	17.0 lbs
Wind Area Fore/Aft	0.51 m ²	5.5 ft ²
Wind Area Side	0.21 m ²	2.2 ft ²
Max Wind Survivability	>201 km/hr	>125 mph
Wind Load @ 100 mph (161 km/hr)		
Fore/Aft	753 N	169 lbf
Side	351 N	79 lbf

Antenna consisting of aluminum alloy with brass feedlines covered by a UV safe fiber-glass radome.

Mounting & Downtilting

Mounting hardware attaches to pipe diameter $\varnothing 50$ -160 mm; $\varnothing 2.0$ -6.3 in

Mounting Bracket Kit	36210002
Downtilt Bracket Kit	36114003

Electrical specifications

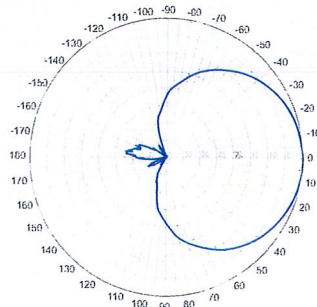
Frequency Range	696-900 MHz
Impedance	50 Ω
Connector ³⁾	NE or E-DIN Female 2 ports / Center
VSWR ¹⁾	$\leq 1.35:1$
Polarization	Slant $\pm 45^\circ$
Isolation Between Ports ¹⁾	< -25 dB
Gain ¹⁾	14.5 dBd 16.5 dBi
Power Rating ²⁾	500 W
Half Power Angle ¹⁾	
Horizontal Beamwidth	63°
Vertical Beamwidth	11°
Electrical downtilt ⁵⁾	0°
Null fill ¹⁾	5%
Lightning protection	Direct ground

Patented Dipole Design: U.S. Patent No. 6,608,600 B2

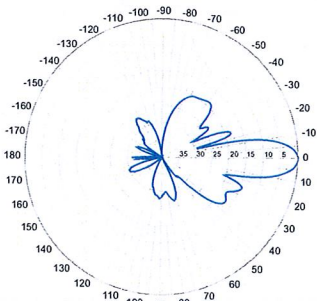
- 1) Typical values.
- 2) Power rating limited by connector only.
- 3) NE indicates an elongated N connector.
E-DIN indicates an elongated DIN connector.
- 4) Antenna weight does not include brackets.
- 5) Add'l downtilts may be available. Check website for details.

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

Radiation-pattern¹⁾
750 MHz

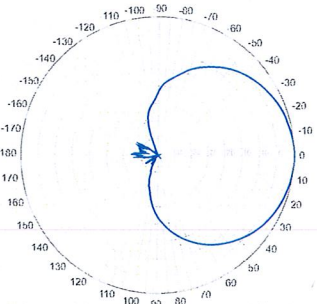


Horizontal

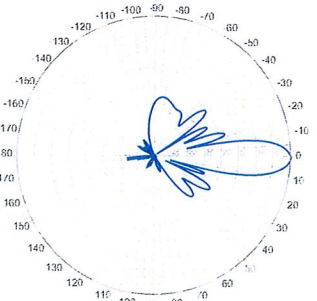


Vertical

850 MHz



Horizontal

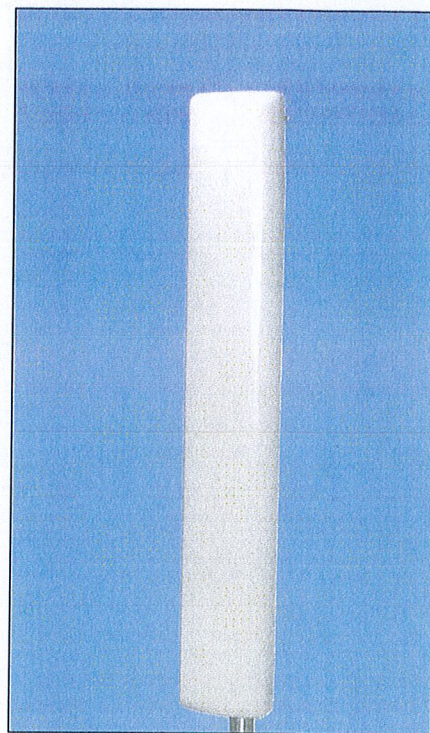


Vertical

696-900 MHz

BXA-70063/6CF

When ordering replace " " with connector type.



Featuring our Exclusive
3T Technology™
Antenna Design:

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

Warranty:

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

Revision Date: 01/08/09

P65-16-XL-2**Very Low Broadband Antennas**

POLARIZATION: Dual linear $\pm 45^\circ$
 FREQUENCY (MHz): 698-894
 HORIZONTAL BEAM WIDTH (*): 65
 GAIN (dBi/dBd): 16.0/13.9
 TILT: 2
 LENGTH: 72"

ELECTRICAL SPECIFICATIONS*

	698-894	
Frequency range (MHz)	698-806	806-894
Frequency band (MHz)	698-806	806-894
Gain (dBi/dBd)	15.5/13.4	16.0/13.9
Polarization	Dual Linear +/- 45	
Nominal Impedance (Ω)	50	
VSWR	< 1.33: 1	
Horizontal beam width, -3 dB (°)	68	65
Vertical beam width, -3 dB (°)	10.5	9.5
Side lobe suppression, vertical 1st upper (dB)	> 15	> 15
Isolation between inputs (dB)	> 30	> 30
Tracking, horizontal plane $\pm 60^\circ$ (dB)	< 2	< 2
Electrical Downtilt Range	2	
Vertical beam squint (°)	< 0.5	< 0.5
Front to back ratio (dB)	> 30	> 30
Front to back ratio, total power (dB)	> 25	> 25
Cross polar discrimination (XPD) 0° (dB)	> 15	> 15
Cross polar discrimination (XPD) $\pm 60^\circ$ (dB)	> 10	> 10
IM3, 2xTx@43dBm (dBc)	-153	
Power handling, average per input (W)	400	
Power handling, average total (W)	800	

MECHANICAL SPECIFICATIONS*

Connector	2 X 7/16 DIN Female
Connector position	Bottom
Dimensions, HxWxD, in (mm)	72" x 12" x 5" (1829 x 305 x 125)
Mounting	Pre-mounted Tilt Brackets
Weight, with brackets, lbs (kg)	44 (20)
Weight, without brackets, lbs (kg)	33 (15)
Wind load, frontal/lateral/rear side 42 m/s Cd=1.0 (N)	1380
Maximum operational wind speed, mph (m/s)	100 (45)
Survival wind speed, mph (m/s)	125 (55)
Lightning protection	DC Ground
Radome material	PVC
Packet size, HxWxD, in (mm)	82" x 16" x 10" (2082 x 400 x 255)
Radome colour	Light Grey
Shipping weight, lbs (kg)	55 (25)
RET	N/A
Brackets	7256.00, 7454.00, 2210.00

*All specifications subject to change without notice. Please contact your Powerwave representative for complete performance data.

ANTENNA PATTERNS*

For detailed patterns visit <http://www.powerwave.com/rpa/>.

Site Name: Cheshire N 2 Tower Height: Verizon @ 138'		General		Power	Density			
CARRIER	# OF CHAN.	WATTS ERP	HEIGHT	CALC. POWER DENS	FREQ.	MAX. PERMISS. EXP.	FRACTION MPE	Total
*CL&P whip	1	120	103	0.0041	low band	0.2000	2.03%	
*CL&P whip	1	120	103	0.0041	150	0.2000	2.03%	
*Cingular	2	296	98	0.0222	880	0.5867	3.78%	
*Cingular	2	427	98	0.0320	1930	1.0000	3.20%	
very strongly directional & horizontal - no significant RF to reach the ground								
*CL&P microwave			78					
*Future CL&P whip	1	250	85	0.0124	450	0.3000	4.15%	
*Pocket	3	631	110	0.0563	2130	1.0000	5.63%	
Verizon	3	420	138	0.0238	1970	1.0000	2.38%	
Verizon	9	291	138	0.0494	869	0.5793	8.54%	
Verizon	1	632	138	0.0119	757	0.4973	2.40%	
* Source: Siting Council								

DETAILED STRUCTURAL ANALYSIS AND EVALUATION OF AN EXISTING 140' SELF SUPPORT LATTICE TOWER FOR PROPOSED ANTENNA ARRANGEMENT

Cheshire North 2
705 West Johnson Avenue
Cheshire, CT

prepared for



Verizon Wireless
99 East River Drive
East Hartford, Connecticut 06108

prepared by



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

36931185.00000
VZ5-038

November 23, 2009

TABLE OF CONTENTS

- 1. EXECUTIVE SUMMARY**
- 2. INTRODUCTION**
- 3. ANALYSIS METHODOLOGY AND LOADING CONDITIONS**
- 4. FINDINGS AND EVALUATION**
- 5. CONCLUSIONS AND RECOMMENDATIONS**
- 6. DRAWINGS AND DATA**
 - **RISA TOWER INPUT / OUTPUT SUMMARY**
 - **RISA TOWER FEEDLINE DISTRIBUTION**
 - **RISA TOWER FEEDLINE PLAN**
 - **RISA TOWER DETAILED OUTPUT**
 - **ANCHOR BOLT ANALYSIS**
 - **FOUNDATION ANALYSIS**

1. EXECUTIVE SUMMARY

This report summarizes the structural analysis of the existing 140' self support lattice tower located at 705 West Johnson Avenue, Cheshire, CT. The analysis was conducted in accordance with the 2005 Connecticut State Building Code and the TIA/EIA-222-F standard for a wind velocity of 85 mph (fastest mile) and 85 mph (fastest mile) concurrent with 1/2" ice. The antenna loading considered in the analysis consists of all existing and proposed antennas, transmission lines, and ancillary items as outlined in the Introduction Section of this report. The proposed Verizon Wireless modification is as follows:

Proposed Antenna and Mount	Carrier	Antenna Center Elevation
<u>Remove:</u>		
(6) Antel LPA-80063/8CF mounted on (3) T-frames (two per sector)		
<u>Install:</u>		
(2) Powerwave P65-16-XL-2 (Alpha & Gamma Sectors) (1) Antel BXA-70063-6CF (Beta Sector) (3) Decibel DB854DG65ESX (One per Sector) All mounted on (3) existing T-frames	Verizon Wireless	138'

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

This analysis is based on:

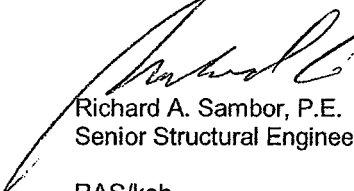
- 1) The tower structure's theoretical capacity, not including any assessment of the condition of the tower.
- 2) Tower geometry and structural member sizes taken from manufacturers design documents prepared by Central Tower, (a Dielectric company) file number CT2397, Drawing numbers CT2397-1, 2 and 3, dated 10/03/04.
- 3) Geotechnical report performed by Dr. Clarence Welti, P.E., P.C. dated September 20, 2004.
- 4) Previous structural analysis performed by URS Corporation, job number VZ1-235 / 36931060.00008, signed and sealed May 4, 2007.
- 5) Previous structural analysis performed by URS Corporation, job number PSW-024 Rev 1 / 36923998.00000, signed and sealed November 12, 2009.
- 6) Antenna and mount configuration as specified within Section 2 of this report.

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

If you should have any questions, please call.

Sincerely,

URS Corporation


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



RAS/kab

cc: DR, IA, CF/Book – URS

2. INTRODUCTION

The subject tower is located at 705 West Johnson Avenue, Cheshire, CT. The structure is a 140' self support lattice tower.

The tower geometry and structural member sizes taken from manufacturers design documents prepared by Central Tower, (a Dielectric company) file number CT2397, Drawing numbers CT2397-1, 2 and 3, dated 10/03/04.

The inventory is summarized in the table below:

Antenna Type	Carrier	Mount	Antenna Centerline Elevation	Cable
(1) Celwave PD1142 Omni antenna	Northeast Utilities (existing)	(1) Leg mount (Leg A)	*140'	(1) 7/8" coax cable
(2) Celwave PD1142 Omni antennas	Northeast Utilities (future)	(2) Leg mounts (Legs B & C)	*140'	(2) 7/8" coax cables
(6) LPA 185080-12CF2 antennas	Verizon (existing)	(3) 13' T- Frames (existing)	138'	(12) 1 5/8" coax cables (existing)
(3) DB854DG65ESX	Verizon (proposed)			
(2) P65-16-XL-2				
(1) BXA-70063/6CF				
(1) Andrew PL4-107 Microwave antenna	Northeast Utilities (future)	(1) Leg mount (6" offset from Leg B)	120'	(1) E65 elliptical coax cable
(3) RFS APXV18-206517S-C antennas	Pocket Wireless (existing)	(3) 3' Standoffs	110'	(6) 1 5/8" coax cables
(12) CSS XDUO1416-80 antennas and (12) TMA's	Cingular (existing)	(3) 10' T- Frames	98'	(12) 1 5/8" coax cables
(1) Andrew PL4-107 Microwave antennas	Northeast Utilities (future)	(1) Leg mounts (6" offset from Leg B)	78'	(1) E65 elliptical coax cable
(1) Andrew PL4-107 Microwave antennas	Northeast Utilities (existing)	(1) Leg mounts (6" offset from Leg A)	78'	(1) 90 series elliptical coax cable

*Note :Antenna centerline elevation taken as base of antenna.

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

3. ANALYSIS METHODOLOGY AND LOADING CONDITIONS

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

The analysis was conducted using RISA Tower 5.3.1. Two load conditions were evaluated as shown below which were compared to allowable stresses according to AISC and TIA/EIA.

Load Condition 1 = 85 mph (fastest mile) Wind Load (without ice) + Tower Dead Load
Load Condition 2 = 85 mph (fastest mile) Wind Load (with ice) + Ice Load + Tower Dead Load

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

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

4. FINDINGS AND EVALUATION

Stresses on the tower structure were evaluated to compare with allowable stresses in accordance with AISC. The calculated stresses under the proposed loading were within the allowable stresses. The anchor bolts and foundation were also within allowable limits. A summary of the results can be found in Tables 1-3. Detailed analysis and calculations for the proposed load conditions are provided in section 6 of this report.

Table 1: Proposed Tower Base Reactions

Base Reactions	Proposed Reactions
Axial Load (kips)	39
Shear per Leg (kips)	18
Total Shear (kips)	28
Uplift per Leg (kips)	181
Comp. per Leg (kips)	210
O.T. Moment (ft-kips)	2382

Table 2: Proposed Tower Component Stress vs. Capacity Summary

Component / (Section No.)	Controlling Component/ Elevation	Stress (% capacity)	Pass/Fail	Comments:
Tower Leg (T3)	Compression / 80'-100'	60.5 %	Pass	
Diagonal (T7)	Compression / 0'-20'	68.5 %	Pass	
Top Girt (T2)	Compression / 100'-120'	27.1 %	Pass	
Bottom Girt (T1)	Compression / 120'-140'	49.1 %	Pass	
Bolts (T7)	Diagonal / 0'-20'	68.5 %	Pass	
Anchor Bolts	Tension	48 %	Pass	

Table 3: Foundation Summary

Foundation	Component	Stress (% capacity/FOS)	Pass/Fail	Comments:
Reinf. Concrete Pad and Pier	OTM	68.3%/2.93	Pass	Min. F.O.S of 2.0 reqd per IBC 2003 Section 3108.4.2

5. CONCLUSIONS AND RECOMMENDATIONS

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

Limitations/Assumptions:

This report is based on the following:

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

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

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

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

Ongoing and Periodic Inspection and Maintenance:

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

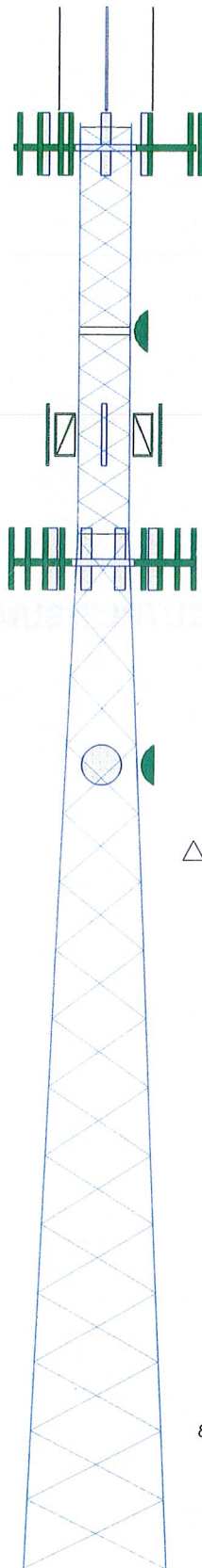
The owner shall refer to TIA/EIA-222-F for recommendations for maintenance and inspection. The frequency of the inspection and maintenance intervals is to be determined by the owner based upon actual site and environmental conditions. It is recommended that a complete and thorough inspection of the entire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

6. DRAWINGS AND DATA

RISA TOWER INPUT/OUTPUT SUMMARY

Section	T1	T2	T3	T4	T5	T6	T7		
Legs	SR 1 3/4	SR 2 1/2	SR 3 1/2	SR 3 3/4	SR 4	SR 4 1/4	SR 4 1/2		
Leg Grade				A572-50					
Diagonals	SR 3/4	SR 7/8	L2x2x1/4	L2 1/2x2 1/2x3/16	L2 1/2x2 1/2x1/4	L3x3x3/16			
Diagonal Grade				A36					
Top Girts				N.A.	N.A.				
Bottom Girts									
Face Width (ft)	SR 3/4	SR 7/8		8.6	10.4	12.2	14		
# Panels @ (ft)	12 @ 3.20833	1.5	2.5	2.8	3.2	3.9	4.2		
Weight (K)	0.9								

140.0 ft
120.0 ft
100.0 ft
80.0 ft
60.0 ft
40.0 ft
20.0 ft
0.0 ft



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
1142-2C (NU)	146.29	APXV18-206517S-C w/ mounting hardware (Pocket)	110
1142-2C (NU)	146.29		
1142-2C (NU)	146.29	APXV18-206517S-C w/ mounting hardware (Pocket)	110
LPA-185080-12CF_2 (Verizon)	138	3' Stand-off	110
LPA-185080-12CF_2 (Verizon)	138	3' Stand-off	110
LPA-185080-12CF_2 (Verizon)	138	3' Stand-off	110
LPA-185080-12CF_2 (Verizon)	138	(2) ClearGain TMA (Cingular)	101
LPA-185080-12CF_2 (Verizon)	138	(2) ClearGain TMA (Cingular)	101
LPA-185080-12CF_2 (Verizon)	138	(2) ClearGain TMA (Cingular)	101
T-Frame Sector Mount (1) (Verizon)	138	T-Frame Sector Mount (1) (Cingular)	98
T-Frame Sector Mount (1) (Verizon)	138	(4) CSS XDUE1416-80 (Cingular)	98
T-Frame Sector Mount (1) (Verizon)	138	(2) ClearGain TMA (Cingular)	98
T-Frame Sector Mount (1) (Verizon)	138	(2) ClearGain TMA (Cingular)	98
DB854DG65ESX w/Mount Pipe (Verizon)	138	(2) ClearGain TMA (Cingular)	98
DB854DG65ESX w/Mount Pipe (Verizon)	138	(4) CSS XDUE1416-80 (Cingular)	98
DB854DG65ESX w/Mount Pipe (Verizon)	138	T-Frame Sector Mount (1) (Cingular)	98
DB854DG65ESX w/Mount Pipe (Verizon)	138	T-Frame Sector Mount (1) (Cingular)	98
P65-16-XL-2 (Verizon)	138	(4) CSS XDUE1416-80 (Cingular)	98
BXA-70063/6CF (Verizon)	138	PL4-107 (NU)	78
P65-16-XL-2 (Verizon)	138	PL4-107 (NU)	78
PL4-107 (NU)	120		
APXV18-206517S-C w/ mounting hardware (Pocket)	110		

MATERIAL STRENGTH

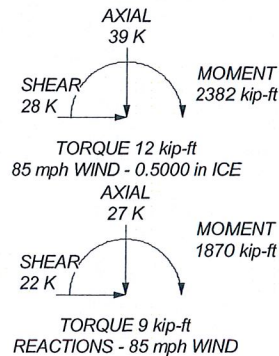
GRADE	Fy	Fu	GRADE	Fy	Fu
A572-50	50 ksi	65 ksi	A36	36 ksi	58 ksi

TOWER DESIGN NOTES

1. Tower designed for a 85 mph basic wind in accordance with the TIA/EIA-222-F Standard.
2. Tower is also designed for a 85 mph basic wind with 0.50 in ice.
3. Deflections are based upon a 85 mph wind.
4. TOWER RATING: 68.5%

MAX. CORNER REACTIONS AT BASE:

DOWN: 210 K
UPLIFT: -181 K
SHEAR: 18 K



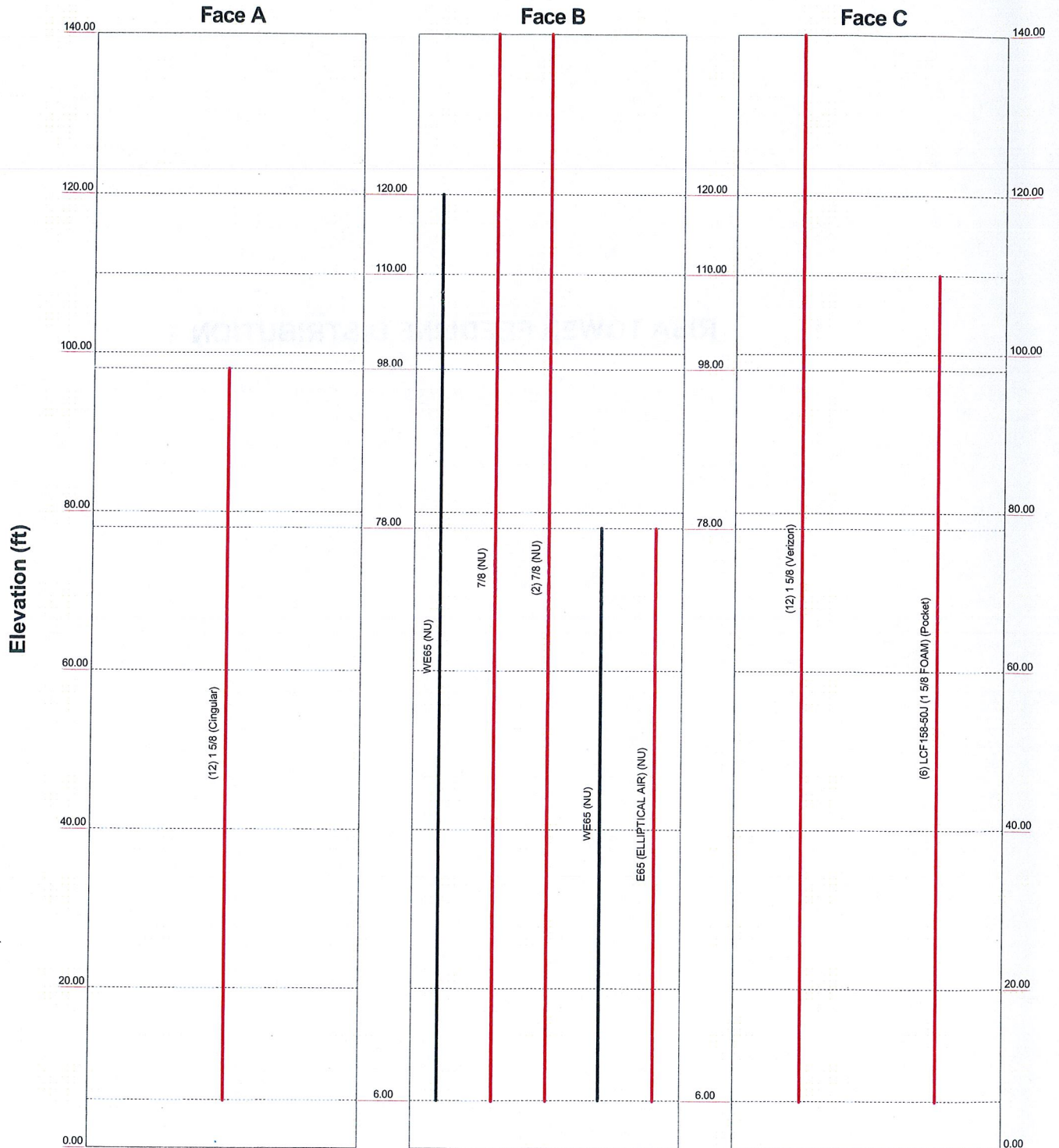
URS Corporation		Job: 140' Self-Supporting Lattice Tower	
500 Enterprise Drive, Suite 3B		Project: 705 West Johnson Ave., Cheshire, CT	
Rocky Hill, CT 06067		Client: Verizon Wireless	Drawn by: Kevin Barker
Phone: (860) 529-8882		Code: TIA/EIA-222-F	Date: 11/23/09
FAX: (860) 529-3991		Path: P:\08\ERI Files\WZ5-038 Cheshire North 2 - 85 mph.en	Scale: NTS
			Dwg No. E-1

RISA TOWER FEEDLINE DISTRIBUTION

Feedline Distribution Chart

0' - 140'

Round Flat App In Face App Out Face Truss Leg

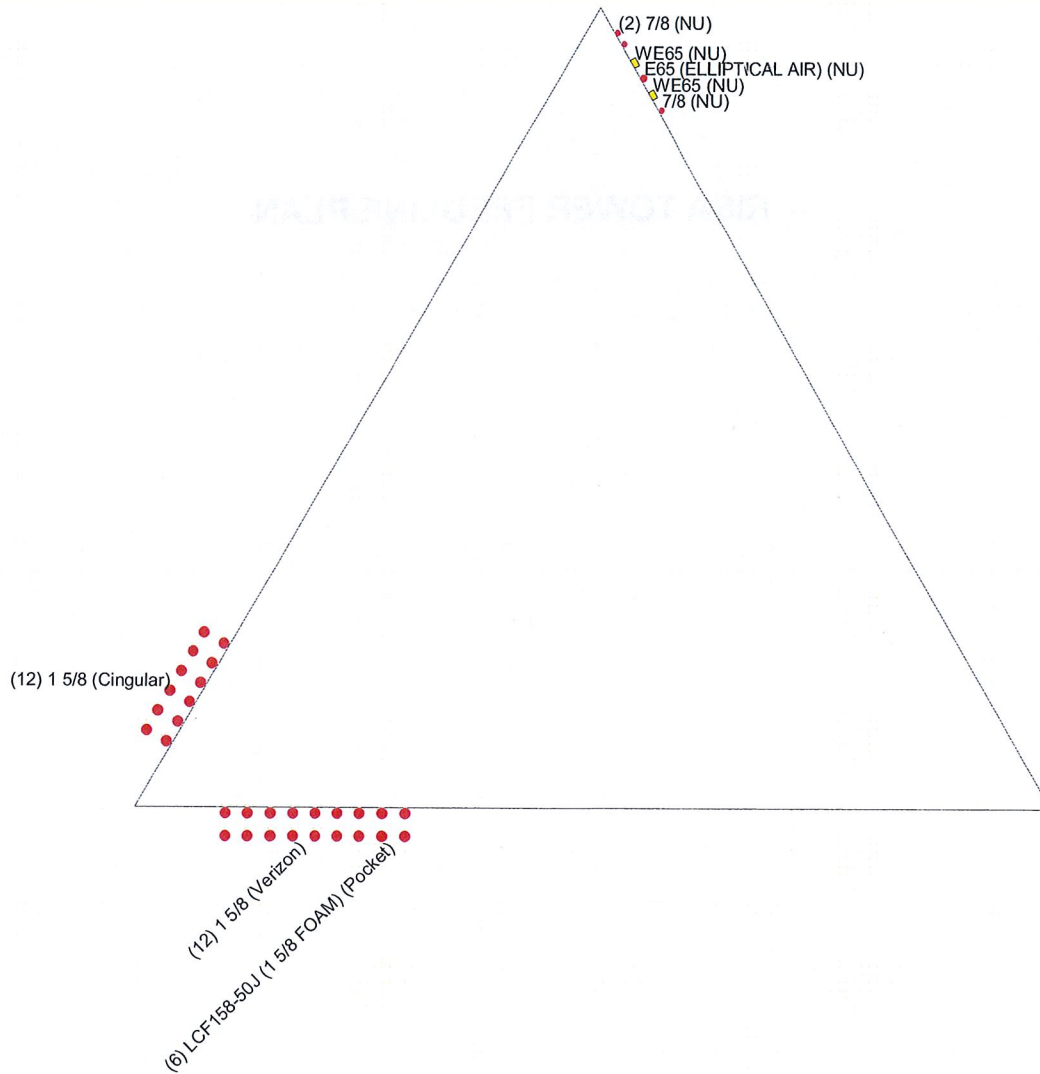


URS Corporation		Job: 140' Self-Supporting Lattice Tower	
500 Enterprise Drive, Suite 3B		Project: 705 West Johnson Ave., Cheshire, CT	
Rocky Hill, CT 06067		Client: Verizon Wireless	Drawn by: Kevin Barker
Phone: (860) 529-8882		Code: TIA/EIA-222-F	Date: 11/23/09
FAX: (860) 529-3991		Path: P:\08\ERI Files\VZ5-038 Cheshire North 2 - 85 mph.eri	Scale: NTS
			Dwg No. E-7

RISA TOWER FEEDLINE PLAN

Feedline Plan

Round Flat App In Face App Out Face



URS Corporation
500 Enterprise Drive, Suite 3B
Rocky Hill, CT 06067
Phone: (860) 529-8882
FAX: (860) 529-3991

Job: 140' Self-Supporting Lattice Tower		
Project: 705 West Johnson Ave., Cheshire, CT		
Client: Verizon Wireless	Drawn by: Kevin Barker	App'd:
Code: TIA/EIA-222-F	Date: 11/23/09	Scale: NTS
Path: P:\08\ERI Files\VZ5-038 Cheshire North 2 - 85 mph.eri		Dwg No: E-7

RISA TOWER DETAILED OUTPUT

<i>RISATower</i> URS Corporation 500 Enterprise Drive, Suite 3B Rocky Hill, CT 06067 Phone: (860) 529-8882 FAX: (860) 529-3991	Job	140' Self-Supporting Lattice Tower	Page	1 of 30
	Project	705 West Johnson Ave., Cheshire, CT	Date	10:13:25 11/23/09
	Client	Verizon Wireless	Designed by	Kevin Barker

Tower Input Data

The main tower is a 3x free standing tower with an overall height of 140.00 ft above the ground line.

The base of the tower is set at an elevation of 0.00 ft above the ground line.

The face width of the tower is 5.00 ft at the top and 14.00 ft at the base.

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

The following design criteria apply:

Basic wind speed of 85 mph.

Nominal ice thickness of 0.5000 in.

Ice density of 56 pcf.

A wind speed of 85 mph is used in combination with ice.

Temperature drop of 50 °F.

Deflections calculated using a wind speed of 85 mph.

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

Pressures are calculated at each section.

Stress ratio used in tower member 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		

RISATower

URS Corporation
500 Enterprise Drive, Suite 3B
Rocky Hill, CT 06067
Phone: (860) 529-8882
FAX: (860) 529-3991

Job

140' Self-Supporting Lattice Tower

Page

2 of 30

Project

705 West Johnson Ave., Cheshire, CT

Date

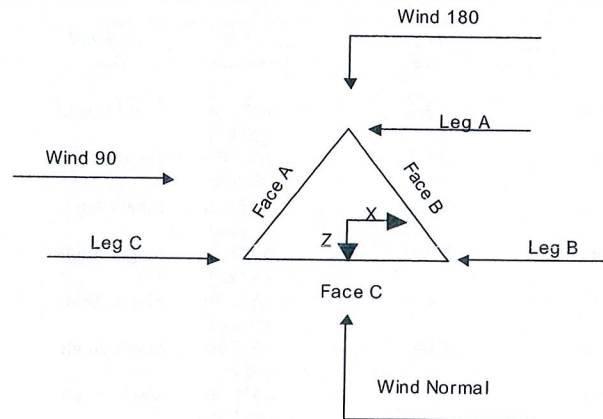
10:13:25 11/23/09

Client

Verizon Wireless

Designed by

Kevin Barker

**Triangular Tower****Tower Section Geometry**

Tower Section	Tower Elevation	Assembly Database	Description	Section Width	Number of Sections	Section Length
	ft			ft		ft
T1	140.00-120.00			5.00	1	20.00
T2	120.00-100.00			5.00	1	20.00
T3	100.00-80.00			5.00	1	20.00
T4	80.00-60.00			6.80	1	20.00
T5	60.00-40.00			8.60	1	20.00
T6	40.00-20.00			10.40	1	20.00
T7	20.00-0.00			12.20	1	20.00

Tower Section Geometry (cont'd)

Tower Section	Tower Elevation	Diagonal Spacing	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset	Bottom Girt Offset
	ft	ft				in	in
T1	140.00-120.00	3.21	X Brace	No	No	4.5000	4.5000
T2	120.00-100.00	3.21	X Brace	No	No	4.5000	4.5000
T3	100.00-80.00	6.67	X Brace	No	No	0.0000	0.0000
T4	80.00-60.00	6.67	X Brace	No	No	0.0000	0.0000
T5	60.00-40.00	6.67	X Brace	No	No	0.0000	0.0000
T6	40.00-20.00	6.67	X Brace	No	No	0.0000	0.0000
T7	20.00-0.00	6.67	X Brace	No	No	0.0000	0.0000

RISATower

URS Corporation
 500 Enterprise Drive, Suite 3B
 Rocky Hill, CT 06067
 Phone: (860) 529-8882
 FAX: (860) 529-3991

Job

140' Self-Supporting Lattice Tower

Page

3 of 30

Project

705 West Johnson Ave., Cheshire, CT

Date

10:13:25 11/23/09

Client

Verizon Wireless

Designed by

Kevin Barker

Tower Section Geometry (cont'd)

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T1 140.00-120.00	Solid Round	1 3/4	A572-50 (50 ksi)	Solid Round	3/4	A36 (36 ksi)
T2 120.00-100.00	Solid Round	2 1/2	A572-50 (50 ksi)	Solid Round	7/8	A36 (36 ksi)
T3 100.00-80.00	Solid Round	3 1/2	A572-50 (50 ksi)	Single Angle	L2x2x1/4	A36 (36 ksi)
T4 80.00-60.00	Solid Round	3 3/4	A572-50 (50 ksi)	Single Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T5 60.00-40.00	Solid Round	4	A572-50 (50 ksi)	Single Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T6 40.00-20.00	Solid Round	4 1/4	A572-50 (50 ksi)	Single Angle	L2 1/2x2 1/2x1/4	A36 (36 ksi)
T7 20.00-0.00	Solid Round	4 1/2	A572-50 (50 ksi)	Single Angle	L3x3x3/16	A36 (36 ksi)

Tower Section Geometry (cont'd)

Tower Elevation ft	Top Girt Type	Top Girt Size	Top Girt Grade	Bottom Girt Type	Bottom Girt Size	Bottom Girt Grade
T1 140.00-120.00	Solid Round	3/4	A36 (36 ksi)	Solid Round	3/4	A36 (36 ksi)
T2 120.00-100.00	Solid Round	7/8	A36 (36 ksi)	Solid Round	7/8	A36 (36 ksi)

Tower Section Geometry (cont'd)

Tower Elevation ft	Gusset Area (per face) ft ²	Gusset Thickness in	Gusset Grade	Adjust. Factor A _f	Adjust. Factor A _r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontal in
T1 140.00-120.00	0.00	0.0000	A36 (36 ksi)	1.02	1	1	36.0000	36.0000
T2 120.00-100.00	0.00	0.0000	A36 (36 ksi)	1.02	1	1	36.0000	36.0000
T3 100.00-80.00	0.00	0.0000	A36 (36 ksi)	1.02	1	1	36.0000	36.0000
T4 80.00-60.00	0.00	0.0000	A36 (36 ksi)	1.02	1	1	36.0000	36.0000
T5 60.00-40.00	0.00	0.0000	A36 (36 ksi)	1.02	1	1	36.0000	36.0000
T6 40.00-20.00	0.00	0.0000	A36 (36 ksi)	1.02	1	1	36.0000	36.0000
T7 20.00-0.00	0.00	0.0000	A36 (36 ksi)	1.02	1	1	36.0000	36.0000

RISATower URS Corporation 500 Enterprise Drive, Suite 3B Rocky Hill, CT 06067 Phone: (860) 529-8882 FAX: (860) 529-3991	Job	140' Self-Supporting Lattice Tower	Page	4 of 30
	Project	705 West Johnson Ave., Cheshire, CT	Date	10:13:25 11/23/09
	Client	Verizon Wireless	Designed by	Kevin Barker

Tower Section Geometry (cont'd)

Tower Elevation ft	Calc K Single Angles	Calc K Solid Rounds	Legs	K Factors ¹						
				X Brace Diags	K Brace Diags	Single Diags	Girts	Horiz.	Sec. Horiz.	Inner Brace
				X Y	X Y	X Y	X Y	X Y	X Y	X Y
T1 140.00-120.00	Yes	Yes	1	1	1	1	1	1	1	1
T2 120.00-100.00	Yes	Yes	1	1	1	1	1	1	1	1
T3 100.00-80.00	Yes	Yes	1	1	1	1	1	1	1	1
T4 80.00-60.00	Yes	Yes	1	1	1	1	1	1	1	1
T5 60.00-40.00	Yes	Yes	1	1	1	1	1	1	1	1
T6 40.00-20.00	Yes	Yes	1	1	1	1	1	1	1	1
T7 20.00-0.00	Yes	Yes	1	1	1	1	1	1	1	1

¹Note: K factors are applied to member segment lengths. K-braces without inner supporting members will have the K factor in the out-of-plane direction applied to the overall length.

Tower Section Geometry (cont'd)

Tower Elevation ft	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U
T1 140.00-120.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T2 120.00-100.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T3 100.00-80.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T4 80.00-60.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T5 60.00-40.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T6 40.00-20.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T7 20.00-0.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75

Tower Section Geometry (cont'd)

RISATower

URS Corporation
500 Enterprise Drive, Suite 3B
Rocky Hill, CT 06067
Phone: (860) 529-8882
FAX: (860) 529-3991

Job	140' Self-Supporting Lattice Tower	Page	5 of 30
Project	705 West Johnson Ave., Cheshire, CT	Date	10:13:25 11/23/09
Client	Verizon Wireless	Designed by	Kevin Barker

Tower Elevation ft	Leg Connection Type	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
		Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.
T1 140.00-120.00	Flange	0.0000	0	0.7500	1	0.7500	0	0.7500	0	0.6250	0	0.6250	0	0.6250	0
		A325N		A325N		A325N		A325N		A325N		A325N		A325N	
T2 120.00-100.00	Flange	0.0000	0	0.7500	1	0.7500	0	0.7500	0	0.6250	0	0.6250	0	0.6250	0
		A325N		A325N		A325N		A325N		A325N		A325N		A325N	
T3 100.00-80.00	Flange	0.7500	4	0.7500	1	0.7500	0	0.7500	0	0.6250	0	0.6250	0	0.6250	0
		A325N		A325N		A325N		A325N		A325N		A325N		A325N	
T4 80.00-60.00	Flange	1.1250	6	0.7500	1	0.7500	0	0.7500	0	0.6250	0	0.6250	0	0.6250	0
		A325N		A325N		A325N		A325N		A325N		A325N		A325N	
T5 60.00-40.00	Flange	1.1250	6	0.7500	1	0.7500	0	0.7500	0	0.6250	0	0.6250	0	0.6250	0
		A325N		A325N		A325N		A325N		A325N		A325N		A325N	
T6 40.00-20.00	Flange	1.2500	6	0.7500	1	0.7500	0	0.7500	0	0.6250	0	0.6250	0	0.6250	0
		A325N		A325N		A325N		A325N		A325N		A325N		A325N	
T7 20.00-0.00	Flange	1.2500	6	0.7500	1	0.7500	0	0.7500	0	0.6250	0	0.6250	0	0.6250	0
		A325N		A325N		A325N		A325N		A325N		A325N		A325N	

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
1 5/8 (Cingular)	A	Yes	Ar (CfAe)	98.00 - 6.00	0.0000	-0.36	12	6	1.9800	1.9800		1.04
1 5/8 (Verizon)	C	Yes	Ar (CfAe)	140.00 - 6.00	0.0000	0.34	12	6	1.9800	1.9800		1.04
WE65 (NU)	B	Yes	Af (CfAe)	120.00 - 6.00	0.0000	-0.39	1	1	1.5836	1.5836	5.1284	0.53
7/8 (NU)	B	Yes	Ar (CfAe)	140.00 - 6.00	0.0000	-0.37	1	1	1.1100	1.1100		0.54
7/8 (NU)	B	Yes	Ar (CfAe)	140.00 - 6.00	0.0000	-0.46	2	2	1.1100	1.1100		0.54
WE65 (NU)	B	Yes	Af (CfAe)	78.00 - 6.00	0.0000	-0.43	1	1	1.5836	1.5836	5.1284	0.53
LCF158-50J (1 5/8 FOAM) (Pocket)	C	Yes	Ar (CfAe)	110.00 - 6.00	0.0000	0.23	6	3	2.0100	2.0100		0.92
E65 (ELLIPTICAL AIR) (NU)	B	Yes	Ar (CfAe)	78.00 - 6.00	0.0000	-0.41	1	1	1.2000	1.2000		0.67

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A _R ft ²	A _F ft ²	C _A A _A In Face ft ²	C _A A _A Out Face ft ²	Weight K
T1	140.00-120.00	A	0.000	0.000	0.000	0.000	0.00
		B	5.550	0.000	0.000	0.000	0.03
		C	19.800	0.000	0.000	0.000	0.25
T2	120.00-100.00	A	0.000	0.000	0.000	0.000	0.00
		B	5.550	2.639	0.000	0.000	0.04

etr
ft
000
50

RISATower URS Corporation 500 Enterprise Drive, Suite 3B Rocky Hill, CT 06067 Phone: (860) 529-8882 FAX: (860) 529-3991	Job	140' Self-Supporting Lattice Tower	Page	6 of 30
	Project	705 West Johnson Ave., Cheshire, CT	Date	10:13:25 11/23/09
	Client	Verizon Wireless	Designed by	Kevin Barker

Tower Section	Tower Elevation ft	Face	A_R ft ²	A_F ft ²	$C_A A_A$ In Face ft ²	$C_A A_A$ Out Face ft ²	Weight K
T3	100.00-80.00	C	24.825	0.000	0.000	0.000	0.30
		A	17.820	0.000	0.000	0.000	0.22
		B	5.550	2.639	0.000	0.000	0.04
T4	80.00-60.00	C	29.850	0.000	0.000	0.000	0.36
		A	19.800	0.000	0.000	0.000	0.25
		B	7.350	5.015	0.000	0.000	0.06
T5	60.00-40.00	C	29.850	0.000	0.000	0.000	0.36
		A	19.800	0.000	0.000	0.000	0.25
		B	7.550	5.279	0.000	0.000	0.07
T6	40.00-20.00	C	29.850	0.000	0.000	0.000	0.36
		A	19.800	0.000	0.000	0.000	0.25
		B	7.550	5.279	0.000	0.000	0.07
T7	20.00-0.00	C	29.850	0.000	0.000	0.000	0.36
		A	13.860	0.000	0.000	0.000	0.17
		B	5.285	3.695	0.000	0.000	0.05
		C	20.895	0.000	0.000	0.000	0.25

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft ²	A_F ft ²	$C_A A_A$ In Face ft ²	$C_A A_A$ Out Face ft ²	Weight K
T1	140.00-120.00	A	0.500	0.000	0.000	0.000	0.000	0.00
		B		10.550	0.000	0.000	0.000	0.09
		C		29.800	0.000	0.000	0.000	0.61
T2	120.00-100.00	A	0.500	0.000	0.000	0.000	0.000	0.00
		B		10.550	3.750	0.000	0.000	0.13
		C		37.325	0.000	0.000	0.000	0.76
T3	100.00-80.00	A	0.500	26.820	0.000	0.000	0.000	0.55
		B		10.550	3.750	0.000	0.000	0.13
		C		44.850	0.000	0.000	0.000	0.91
T4	80.00-60.00	A	0.500	29.800	0.000	0.000	0.000	0.61
		B		13.850	7.126	0.000	0.000	0.19
		C		44.850	0.000	0.000	0.000	0.91
T5	60.00-40.00	A	0.500	29.800	0.000	0.000	0.000	0.61
		B		14.217	7.501	0.000	0.000	0.20
		C		44.850	0.000	0.000	0.000	0.91
T6	40.00-20.00	A	0.500	29.800	0.000	0.000	0.000	0.61
		B		14.217	7.501	0.000	0.000	0.20
		C		44.850	0.000	0.000	0.000	0.91
T7	20.00-0.00	A	0.500	20.860	0.000	0.000	0.000	0.43
		B		9.952	5.251	0.000	0.000	0.14
		C		31.395	0.000	0.000	0.000	0.64

Feed Line Shielding

Section	Elevation ft	Face	A_R ft ²	A_R Ice ft ²	A_F ft ²	A_F Ice ft ²
T1	140.00-120.00	A	0.000	0.000	0.000	0.000
		B	0.282	1.251	0.000	0.000
		C	1.006	3.533	0.000	0.000
T2	120.00-100.00	A	0.000	0.000	0.000	0.000
		B	0.485	1.887	0.000	0.000

RISATower URS Corporation 500 Enterprise Drive, Suite 3B Rocky Hill, CT 06067 Phone: (860) 529-8882 FAX: (860) 529-3991	Job	140' Self-Supporting Lattice Tower	Page	7 of 30
	Project	705 West Johnson Ave., Cheshire, CT	Date	10:13:25 11/23/09
	Client	Verizon Wireless	Designed by	Kevin Barker

Section	Elevation	Face	A_R	$A_{R\ Ice}$	A_F	$A_{F\ Ice}$
	ft		ft ²	ft ²	ft ²	ft ²
T3	100.00-80.00	C	1.471	4.741	0.000	0.000
		A	0.000	1.016	1.350	2.033
		B	0.000	0.563	0.621	1.126
T4	80.00-60.00	C	0.000	1.699	2.262	3.399
		A	0.000	0.988	1.640	2.469
		B	0.000	0.730	1.024	1.825
T5	60.00-40.00	C	0.000	1.486	2.473	3.716
		A	0.000	0.911	1.514	2.278
		B	0.000	0.698	0.981	1.745
T6	40.00-20.00	C	0.000	1.371	2.282	3.428
		A	0.000	0.866	1.438	2.164
		B	0.000	0.663	0.932	1.658
T7	20.00-0.00	C	0.000	1.303	2.167	3.257
		A	0.000	0.585	1.167	1.756
		B	0.000	0.448	0.756	1.345
		C	0.000	0.881	1.759	2.643

Feed Line Center of Pressure

Section	Elevation	CP_X	CP_Z	$CP_X\ Ice$	$CP_Z\ Ice$
	ft	in	in	in	in
T1	140.00-120.00	-6.5615	3.8423	-5.2447	2.4805
T2	120.00-100.00	-5.7797	3.2603	-5.0265	2.4023
T3	100.00-80.00	-9.9189	4.8555	-10.0497	4.5343
T4	80.00-60.00	-11.2749	4.0179	-11.6679	3.6494
T5	60.00-40.00	-13.0501	4.4345	-13.5914	4.0107
T6	40.00-20.00	-14.6442	4.9279	-15.3384	4.4713
T7	20.00-0.00	-11.3502	3.7957	-12.3106	3.5653

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert	Azimuth Adjustment	Placement	$C_A A_A$ Front	$C_A A_A$ Side	Weight
			ft ft ft	°	ft	ft ²	ft ²	K
1142-2C (NU)	A	From Leg	2.50	0.0000	146.29	No Ice	2.09	0.02
			0.00			1/2" Ice	3.37	0.04
			0.00					
1142-2C (NU)	B	From Leg	2.50	0.0000	146.29	No Ice	2.09	0.02
			0.00			1/2" Ice	3.37	0.04
			0.00					
1142-2C (NU)	C	From Leg	2.50	0.0000	146.29	No Ice	2.09	0.02
			0.00			1/2" Ice	3.37	0.04
			0.00					
LPA-185080-12CF_2 (Verizon)	A	From Leg	4.50	0.0000	138.00	No Ice	3.53	0.01
			4.00			1/2" Ice	3.96	0.04
			0.00					
LPA-185080-12CF_2	A	From Leg	4.50	0.0000	138.00	No Ice	3.53	0.01

RISATower

URS Corporation
 500 Enterprise Drive, Suite 3B
 Rocky Hill, CT 06067
 Phone: (860) 529-8882
 FAX: (860) 529-3991

Job

140' Self-Supporting Lattice Tower

Page

8 of 30

Project

705 West Johnson Ave., Cheshire, CT

Date

10:13:25 11/23/09

Client

Verizon Wireless

Designed by

Kevin Barker

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft	C _A A Front ft ²	C _A A Side ft ²	Weight K
(Verizon)			-4.00 0.00		1/2" Ice	3.96	5.01	0.04
LPA-185080-12CF_2 (Verizon)	B	From Leg	4.50 4.00 0.00	0.0000	138.00	No Ice 1/2" Ice	3.53 3.96	4.57 5.01 0.01 0.04
LPA-185080-12CF_2 (Verizon)	B	From Leg	4.50 -4.00 0.00	0.0000	138.00	No Ice 1/2" Ice	3.53 3.96	4.57 5.01 0.01 0.04
LPA-185080-12CF_2 (Verizon)	C	From Leg	4.50 4.00 0.00	0.0000	138.00	No Ice 1/2" Ice	3.53 3.96	4.57 5.01 0.01 0.04
LPA-185080-12CF_2 (Verizon)	C	From Leg	4.50 -4.00 0.00	0.0000	138.00	No Ice 1/2" Ice	3.53 3.96	4.57 5.01 0.01 0.04
(4) CSS XDUO1416-80 (Cingular)	A	From Leg	4.50 0.00 0.00	0.0000	98.00	No Ice 1/2" Ice	7.17 7.59	3.50 3.86 0.02 0.06
(4) CSS XDUO1416-80 (Cingular)	B	From Leg	4.50 0.00 0.00	0.0000	98.00	No Ice 1/2" Ice	7.17 7.59	3.50 3.86 0.02 0.06
(4) CSS XDUO1416-80 (Cingular)	C	From Leg	4.50 0.00 0.00	0.0000	98.00	No Ice 1/2" Ice	7.17 7.59	3.50 3.86 0.02 0.06
(2) ClearGain TMA (Cingular)	A	From Leg	4.50 0.00 0.00	0.0000	98.00	No Ice 1/2" Ice	0.47 0.56	0.47 0.56 0.03 0.03
(2) ClearGain TMA (Cingular)	B	From Leg	4.50 0.00 0.00	0.0000	98.00	No Ice 1/2" Ice	0.47 0.56	0.47 0.56 0.03 0.03
(2) ClearGain TMA (Cingular)	C	From Leg	4.50 0.00 0.00	0.0000	98.00	No Ice 1/2" Ice	0.47 0.56	0.47 0.56 0.03 0.03
(2) ClearGain TMA (Cingular)	A	From Leg	4.50 0.00 0.00	0.0000	101.00	No Ice 1/2" Ice	0.47 0.56	0.47 0.56 0.03 0.03
(2) ClearGain TMA (Cingular)	B	From Leg	4.50 0.00 0.00	0.0000	101.00	No Ice 1/2" Ice	0.47 0.56	0.47 0.56 0.03 0.03
(2) ClearGain TMA (Cingular)	C	From Leg	4.50 0.00 0.00	0.0000	101.00	No Ice 1/2" Ice	0.47 0.56	0.47 0.56 0.03 0.03
T-Frame Sector Mount (1) (Verizon)	A	From Leg	4.00 0.00 0.00	0.0000	138.00	No Ice 1/2" Ice	13.60 18.40	13.60 18.40 0.47 0.60
T-Frame Sector Mount (1) (Verizon)	B	From Leg	4.00 0.00 0.00	0.0000	138.00	No Ice 1/2" Ice	13.60 18.40	13.60 18.40 0.47 0.60
T-Frame Sector Mount (1) (Verizon)	C	From Leg	4.00 0.00 0.00	0.0000	138.00	No Ice 1/2" Ice	13.60 18.40	13.60 18.40 0.47 0.60
T-Frame Sector Mount (1) (Cingular)	A	From Leg	4.00 0.00 0.00	0.0000	98.00	No Ice 1/2" Ice	13.60 18.40	13.60 18.40 0.47 0.60
T-Frame Sector Mount (1) (Cingular)	B	From Leg	4.00 0.00 0.00	0.0000	98.00	No Ice 1/2" Ice	13.60 18.40	13.60 18.40 0.47 0.60
T-Frame Sector Mount (1)	C	From Leg	4.00	0.0000	98.00	No Ice	13.60	13.60 0.47

RISATower URS Corporation 500 Enterprise Drive, Suite 3B Rocky Hill, CT 06067 Phone: (860) 529-8882 FAX: (860) 529-3991	Job	140' Self-Supporting Lattice Tower	Page	9 of 30
	Project	705 West Johnson Ave., Cheshire, CT	Date	10:13:25 11/23/09
	Client	Verizon Wireless	Designed by	Kevin Barker

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft	C _A A _A Front ft ²	C _A A _A Side ft ²	Weight K	
(Cingular)			0.00 0.00		1/2" Ice	18.40	18.40	0.60	
APXV18-206517S-C w/ mounting hardware	A	From Leg	3.50 0.00	0.0000	110.00	No Ice 1/2" Ice	5.08 5.53	4.46 5.39	0.05 0.09
(Pocket)			0.00						
APXV18-206517S-C w/ mounting hardware	B	From Leg	3.50 0.00	0.0000	110.00	No Ice 1/2" Ice	5.08 5.53	4.46 5.39	0.05 0.09
(Pocket)			0.00						
APXV18-206517S-C w/ mounting hardware	C	From Leg	3.50 0.00	0.0000	110.00	No Ice 1/2" Ice	5.08 5.53	4.46 5.39	0.05 0.09
(Pocket)			0.00						
3' Stand-off	A	From Leg	1.50 0.00	0.0000	110.00	No Ice 1/2" Ice	1.00 1.20	2.00 2.70	0.05 0.07
			0.00						
3' Stand-off	B	From Leg	1.50 0.00	0.0000	110.00	No Ice 1/2" Ice	1.00 1.20	2.00 2.70	0.05 0.07
			0.00						
3' Stand-off	C	From Leg	1.50 0.00	0.0000	110.00	No Ice 1/2" Ice	1.00 1.20	2.00 2.70	0.05 0.07
			0.00						
DB854DG65ESX w/Mount Pipe	A	From Leg	4.50 -6.00	0.0000	138.00	No Ice 1/2" Ice	6.59 7.30	4.41 5.45	0.04 0.09
(Verizon)			0.00						
DB854DG65ESX w/Mount Pipe	B	From Leg	4.50 -6.00	0.0000	138.00	No Ice 1/2" Ice	6.59 7.30	4.41 5.45	0.04 0.09
(Verizon)			0.00						
DB854DG65ESX w/Mount Pipe	C	From Leg	4.50 -6.00	0.0000	138.00	No Ice 1/2" Ice	6.59 7.30	4.41 5.45	0.04 0.09
(Verizon)			0.00						
P65-16-XL-2	A	From Leg	4.50 0.00	0.0000	138.00	No Ice 1/2" Ice	8.52 9.11	5.66 6.71	0.06 0.12
(Verizon)			0.00						
BXA-70063/6CF	B	From Leg	4.50 0.00	0.0000	138.00	No Ice 1/2" Ice	5.50 6.50	2.20 3.20	0.04 0.09
(Verizon)			0.00						
P65-16-XL-2	C	From Leg	4.50 0.00	0.0000	138.00	No Ice 1/2" Ice	8.52 9.11	5.66 6.71	0.06 0.12
(Verizon)			0.00						

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft	Aperture Area ft ²	Weight K	
PL4-107 (NU)	B	Paraboloid w/o Radome	From Leg	0.50	Worst		120.00	4.00	No Ice	12.60	0.10
				0.00					1/2" Ice	13.09	0.17
				0.00							
PL4-107 (NU)	A	Paraboloid w/o Radome	From Leg	0.50	Worst		78.00	4.00	No Ice	12.60	0.10
				0.00					1/2" Ice	13.09	0.17

RISA Tower URS Corporation 500 Enterprise Drive, Suite 3B Rocky Hill, CT 06067 Phone: (860) 529-8882 FAX: (860) 529-3991	Job	140' Self-Supporting Lattice Tower	Page	10 of 30
	Project	705 West Johnson Ave., Cheshire, CT	Date	10:13:25 11/23/09
	Client	Verizon Wireless	Designed by	Kevin Barker

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft	Aperture Area ft²	Weight K
PL4-107 (NU)	B	Paraboloid w/o Radome	From Leg	0.00 0.50 0.00 0.00	Worst		78.00	4.00	No Ice 12.60 1/2" Ice 13.09	0.10 0.17

Tower Pressures - No Ice

$$G_H = 1.138$$

Section Elevation ft	z ft	K _Z	q _z psf	A _G ft²	F a c e	A _F ft²	A _R ft²	A _{leg} ft²	Leg %	C _A A _A In Face ft²	C _A A _A Out Face ft²
T1 140.00-120.00	130.00	1.48	27	102.917	A	0.000	10.766	5.833	54.18	0.000	0.000
					B	0.000	16.034		36.38	0.000	0.000
					C	0.000	29.560		19.73	0.000	0.000
T2 120.00-100.00	110.00	1.411	26	104.167	A	0.000	14.014	8.333	59.47	0.000	0.000
					B	2.639	19.078		38.37	0.000	0.000
					C	0.000	37.367		22.30	0.000	0.000
T3 100.00-80.00	90.00	1.332	25	123.839	A	7.311	29.502	11.682	31.73	0.000	0.000
					B	10.680	17.232		41.85	0.000	0.000
					C	6.400	41.532		24.37	0.000	0.000
T4 80.00-60.00	70.00	1.24	23	160.256	A	10.832	32.317	12.517	29.01	0.000	0.000
					B	16.462	19.867		34.45	0.000	0.000
					C	9.999	42.367		23.90	0.000	0.000
T5 60.00-40.00	50.00	1.126	21	196.673	A	12.776	33.151	13.351	29.07	0.000	0.000
					B	18.587	20.901		33.81	0.000	0.000
					C	12.007	43.201		24.18	0.000	0.000
T6 40.00-20.00	30.00	1	18	233.091	A	14.775	33.986	14.186	29.09	0.000	0.000
					B	20.560	21.736		33.54	0.000	0.000
					C	14.046	44.036		24.42	0.000	0.000
T7 20.00-0.00	10.00	1	18	269.508	A	20.688	28.880	15.020	30.30	0.000	0.000
					B	24.794	20.305		33.30	0.000	0.000
					C	20.096	35.915		26.82	0.000	0.000

Tower Pressure - With Ice

$$G_H = 1.138$$

Section Elevation ft	z ft	K _Z	q _z psf	t _z in	A _G ft²	F a c e	A _F ft²	A _R ft²	A _{leg} ft²	Leg %	C _A A _A In Face ft²	C _A A _A Out Face ft²
T1 140.00-120.00	130.00	1.48	27	0.5000	104.583	A	0.000	20.676	9.167	44.34	0.000	0.000
						B	0.000	29.975		30.58	0.000	0.000
						C	0.000	46.943		19.53	0.000	0.000
T2 120.00-100.00	110.00	1.411	26	0.5000	105.833	A	0.000	23.839	11.667	48.94	0.000	0.000
						B	3.750	32.502		32.18	0.000	0.000
						C	0.000	56.423		20.68	0.000	0.000
T3 100.00-80.00	90.00	1.332	25	0.5000	125.508	A	6.629	45.070	15.020	29.05	0.000	0.000
						B	11.286	29.253		37.05	0.000	0.000
						C	5.263	62.417		22.19	0.000	0.000

RISA Tower URS Corporation 500 Enterprise Drive, Suite 3B Rocky Hill, CT 06067 Phone: (860) 529-8882 FAX: (860) 529-3991	Job	140' Self-Supporting Lattice Tower	Page	11 of 30
	Project	705 West Johnson Ave., Cheshire, CT	Date	10:13:25 11/23/09
	Client	Verizon Wireless	Designed by	Kevin Barker

Section Elevation	z	K _Z	q _z	t _z	A _G	F a c e	A _F	A _R	A _{leg}	Leg %	C _A A _A In Face ft ²	C _A A _A Out Face ft ²
ft	ft		psf	in	ft ²		ft ²	ft ²	ft ²			
T4 80.00-60.00	70.00	1.24	23	0.5000	161.925	A	10.003	49.558	15.855	26.62	0.000	0.000
						B	17.773	33.866		30.70	0.000	0.000
						C	8.756	64.109		21.76	0.000	0.000
T5 60.00-40.00	50.00	1.126	21	0.5000	198.342	A	12.011	51.182	16.689	26.41	0.000	0.000
						B	20.045	35.811		29.88	0.000	0.000
						C	10.861	65.771		21.78	0.000	0.000
T6 40.00-20.00	30.00	1	18	0.5000	234.759	A	14.049	52.816	17.524	26.21	0.000	0.000
						B	22.056	37.435		29.46	0.000	0.000
						C	12.956	67.429		21.80	0.000	0.000
T7 20.00-0.00	10.00	1	18	0.5000	271.176	A	20.099	45.775	18.358	27.87	0.000	0.000
						B	25.761	35.004		30.21	0.000	0.000
						C	19.212	56.014		24.40	0.000	0.000

Tower Pressure - Service

$$G_H = 1.138$$

Section Elevation	z	K _Z	q _z	A _G	F a c e	A _F	A _R	A _{leg}	Leg %	C _A A _A In Face ft ²	C _A A _A Out Face ft ²
ft	ft		psf	ft ²		ft ²	ft ²	ft ²			
T1 140.00-120.00	130.00	1.48	27	102.917	A	0.000	10.766	5.833	54.18	0.000	0.000
					B	0.000	16.034		36.38	0.000	0.000
					C	0.000	29.560		19.73	0.000	0.000
T2 120.00-100.00	110.00	1.411	26	104.167	A	0.000	14.014	8.333	59.47	0.000	0.000
					B	2.639	19.078		38.37	0.000	0.000
					C	0.000	37.367		22.30	0.000	0.000
T3 100.00-80.00	90.00	1.332	25	123.839	A	7.311	29.502	11.682	31.73	0.000	0.000
					B	10.680	17.232		41.85	0.000	0.000
					C	6.400	41.532		24.37	0.000	0.000
T4 80.00-60.00	70.00	1.24	23	160.256	A	10.832	32.317	12.517	29.01	0.000	0.000
					B	16.462	19.867		34.45	0.000	0.000
					C	9.999	42.367		23.90	0.000	0.000
T5 60.00-40.00	50.00	1.126	21	196.673	A	12.776	33.151	13.351	29.07	0.000	0.000
					B	18.587	20.901		33.81	0.000	0.000
					C	12.007	43.201		24.18	0.000	0.000
T6 40.00-20.00	30.00	1	18	233.091	A	14.775	33.986	14.186	29.09	0.000	0.000
					B	20.560	21.736		33.54	0.000	0.000
					C	14.046	44.036		24.42	0.000	0.000
T7 20.00-0.00	10.00	1	18	269.508	A	20.688	28.880	15.020	30.30	0.000	0.000
					B	24.794	20.305		33.30	0.000	0.000
					C	20.096	35.915		26.82	0.000	0.000

Tower Forces - No Ice - Wind Normal To Face

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
ft	K	K							ft ²	K	plf	
T1 140.00-120.00	0.28	0.86	A	0.105	2.946	0.576	1	1	6.197	1.31	65.66	C
			B	0.156	2.75	0.582	1	1	9.338			
			C	0.287	2.331	0.612	1	1	18.093			

RISATower URS Corporation 500 Enterprise Drive, Suite 3B Rocky Hill, CT 06067 Phone: (860) 529-8882 FAX: (860) 529-3991	Job	140' Self-Supporting Lattice Tower	Page	12 of 30
	Project	705 West Johnson Ave., Cheshire, CT	Date	10:13:25 11/23/09
	Client	Verizon Wireless	Designed by	Kevin Barker

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
ft	K	K							ft ²	K	plf	
T2 120.00-100.00	0.35	1.50	A	0.135	2.829	0.579	1	1	8.117	1.52	75.87	C
			B	0.208	2.568	0.592	1	1	13.937			
			C	0.359	2.152	0.636	1	1	23.752			
T3 100.00-80.00	0.63	2.48	A	0.297	2.303	0.615	1	1	25.457	1.95	97.42	C
			B	0.225	2.513	0.596	1	1	20.949			
			C	0.387	2.09	0.646	1	1	33.246			
T4 80.00-60.00	0.67	2.82	A	0.269	2.381	0.607	1	1	30.447	2.12	105.94	C
			B	0.227	2.509	0.596	1	1	28.307			
			C	0.327	2.227	0.624	1	1	36.455			
T5 60.00-40.00	0.68	3.21	A	0.234	2.488	0.598	1	1	32.594	2.14	106.80	C
			B	0.201	2.593	0.591	1	1	30.931			
			C	0.281	2.349	0.61	1	1	38.368			
T6 40.00-20.00	0.68	3.86	A	0.209	2.566	0.592	1	1	34.906	2.08	104.11	C
			B	0.181	2.659	0.587	1	1	33.315			
			C	0.249	2.44	0.602	1	1	40.540			
T7 20.00-0.00	0.47	4.23	A	0.184	2.651	0.587	1	1	37.648	2.24	111.88	C
			B	0.167	2.709	0.584	1	1	36.658			
			C	0.208	2.57	0.592	1	1	41.359			
Sum Weight:	3.76	18.96						OTM	852.94 kip-ft	13.35		

Tower Forces - No Ice - Wind 45 To Face

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
ft	K	K							ft ²	K	plf	
T1 140.00-120.00	0.28	0.86	A	0.105	2.946	0.576	0.825	1	6.197	1.31	65.66	C
			B	0.156	2.75	0.582	0.825	1	9.338			
			C	0.287	2.331	0.612	0.825	1	18.093			
T2 120.00-100.00	0.35	1.50	A	0.135	2.829	0.579	0.825	1	8.117	1.52	75.87	C
			B	0.208	2.568	0.592	0.825	1	13.475			
			C	0.359	2.152	0.636	0.825	1	23.752			
T3 100.00-80.00	0.63	2.48	A	0.297	2.303	0.615	0.825	1	24.178	1.88	94.14	C
			B	0.225	2.513	0.596	0.825	1	19.080			
			C	0.387	2.09	0.646	0.825	1	32.126			
T4 80.00-60.00	0.67	2.82	A	0.269	2.381	0.607	0.825	1	28.552	2.02	100.85	C
			B	0.227	2.509	0.596	0.825	1	25.426			
			C	0.327	2.227	0.624	0.825	1	34.706			
T5 60.00-40.00	0.68	3.21	A	0.234	2.488	0.598	0.825	1	30.358	2.02	100.95	C
			B	0.201	2.593	0.591	0.825	1	27.678			
			C	0.281	2.349	0.61	0.825	1	36.267			
T6 40.00-20.00	0.68	3.86	A	0.209	2.566	0.592	0.825	1	32.320	1.96	97.80	C
			B	0.181	2.659	0.587	0.825	1	29.716			
			C	0.249	2.44	0.602	0.825	1	38.082			
T7 20.00-0.00	0.47	4.23	A	0.184	2.651	0.587	0.825	1	34.028	2.05	102.36	C
			B	0.167	2.709	0.584	0.825	1	32.319			
			C	0.208	2.57	0.592	0.825	1	37.842			
Sum Weight:	3.76	18.96						OTM	828.37 kip-ft	12.75		

Tower Forces - No Ice - Wind 60 To Face

RISATower

URS Corporation
 500 Enterprise Drive, Suite 3B
 Rocky Hill, CT 06067
 Phone: (860) 529-8882
 FAX: (860) 529-3991

Job

140' Self-Supporting Lattice Tower

Page

13 of 30

Project

705 West Johnson Ave., Cheshire, CT

Date

10:13:25 11/23/09

Client

Verizon Wireless

Designed by

Kevin Barker

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
ft	K	K							ft ²	K	plf	
T1 140.00- 120.00	0.28	0.86	A	0.105	2.946	0.576	0.8	1	6.197	1.31	65.66	C
			B	0.156	2.75	0.582	0.8	1	9.338			
			C	0.287	2.331	0.612	0.8	1	18.093			
T2 120.00- 100.00	0.35	1.50	A	0.135	2.829	0.579	0.8	1	8.117	1.52	75.87	C
			B	0.208	2.568	0.592	0.8	1	13.409			
			C	0.359	2.152	0.636	0.8	1	23.752			
T3 100.00- 80.00	0.63	2.48	A	0.297	2.303	0.615	0.8	1	23.995	1.87	93.67	C
			B	0.225	2.513	0.596	0.8	1	18.813			
			C	0.387	2.09	0.646	0.8	1	31.966			
T4 80.00- 60.00	0.67	2.82	A	0.269	2.381	0.607	0.8	1	28.281	2.00	100.13	C
			B	0.227	2.509	0.596	0.8	1	25.015			
			C	0.327	2.227	0.624	0.8	1	34.456			
T5 60.00- 40.00	0.68	3.21	A	0.234	2.488	0.598	0.8	1	30.039	2.00	100.11	C
			B	0.201	2.593	0.591	0.8	1	27.213			
			C	0.281	2.349	0.61	0.8	1	35.967			
T6 40.00- 20.00	0.68	3.86	A	0.209	2.566	0.592	0.8	1	31.951	1.94	96.90	C
			B	0.181	2.659	0.587	0.8	1	29.202			
			C	0.249	2.44	0.602	0.8	1	37.731			
T7 20.00-0.00	0.47	4.23	A	0.184	2.651	0.587	0.8	1	33.511	2.02	101.00	C
			B	0.167	2.709	0.584	0.8	1	31.699			
			C	0.208	2.57	0.592	0.8	1	37.340			
Sum Weight:	3.76	18.96						OTM	824.86 kip-ft	12.67		

Tower Forces - No Ice - Wind 90 To Face

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
ft	K	K							ft ²	K	plf	
T1 140.00- 120.00	0.28	0.86	A	0.105	2.946	0.576	0.85	1	6.197	1.31	65.66	C
			B	0.156	2.75	0.582	0.85	1	9.338			
			C	0.287	2.331	0.612	0.85	1	18.093			
T2 120.00- 100.00	0.35	1.50	A	0.135	2.829	0.579	0.85	1	8.117	1.52	75.87	C
			B	0.208	2.568	0.592	0.85	1	13.541			
			C	0.359	2.152	0.636	0.85	1	23.752			
T3 100.00- 80.00	0.63	2.48	A	0.297	2.303	0.615	0.85	1	24.361	1.89	94.61	C
			B	0.225	2.513	0.596	0.85	1	19.347			
			C	0.387	2.09	0.646	0.85	1	32.286			
T4 80.00- 60.00	0.67	2.82	A	0.269	2.381	0.607	0.85	1	28.822	2.03	101.58	C
			B	0.227	2.509	0.596	0.85	1	25.838			
			C	0.327	2.227	0.624	0.85	1	34.955			
T5 60.00- 40.00	0.68	3.21	A	0.234	2.488	0.598	0.85	1	30.678	2.04	101.78	C
			B	0.201	2.593	0.591	0.85	1	28.143			
			C	0.281	2.349	0.61	0.85	1	36.567			
T6 40.00- 20.00	0.68	3.86	A	0.209	2.566	0.592	0.85	1	32.689	1.97	98.70	C
			B	0.181	2.659	0.587	0.85	1	30.230			
			C	0.249	2.44	0.602	0.85	1	38.434			
T7 20.00-0.00	0.47	4.23	A	0.184	2.651	0.587	0.85	1	34.545	2.07	103.72	C
			B	0.167	2.709	0.584	0.85	1	32.939			
			C	0.208	2.57	0.592	0.85	1	38.345			
Sum Weight:	3.76	18.96						OTM	831.88 kip-ft	12.84		

RISATower URS Corporation 500 Enterprise Drive, Suite 3B Rocky Hill, CT 06067 Phone: (860) 529-8882 FAX: (860) 529-3991	Job	140' Self-Supporting Lattice Tower	Page	14 of 30
	Project	705 West Johnson Ave., Cheshire, CT	Date	10:13:25 11/23/09
	Client	Verizon Wireless	Designed by	Kevin Barker

Tower Forces - With Ice - Wind Normal To Face

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
ft	K	K							ft ²	K	plf	
T1 140.00-120.00	0.70	1.13	A	0.198	2.604	0.59	1	1	12.197	1.94	97.14	C
			B	0.287	2.332	0.612	1	1	18.342			
			C	0.449	1.975	0.673	1	1	31.581			
T2 120.00-100.00	0.89	1.82	A	0.225	2.514	0.596	1	1	14.205	2.23	111.43	C
			B	0.343	2.189	0.63	1	1	24.222			
			C	0.533	1.861	0.715	1	1	40.340			
T3 100.00-80.00	1.59	2.94	A	0.412	2.041	0.657	1	1	36.219	2.60	130.22	C
			B	0.323	2.237	0.623	1	1	29.517			
			C	0.539	1.854	0.718	1	1	50.097			
T4 80.00-60.00	1.71	3.40	A	0.368	2.131	0.639	1	1	41.671	2.67	133.69	C
			B	0.319	2.247	0.622	1	1	38.833			
			C	0.45	1.974	0.673	1	1	51.920			
T5 60.00-40.00	1.72	3.86	A	0.319	2.248	0.622	1	1	43.834	2.65	132.27	C
			B	0.282	2.346	0.61	1	1	41.906			
			C	0.386	2.092	0.646	1	1	53.358			
T6 40.00-20.00	1.72	4.58	A	0.285	2.337	0.611	1	1	46.340	2.55	127.71	C
			B	0.253	2.427	0.603	1	1	44.620			
			C	0.342	2.189	0.63	1	1	55.423			
T7 20.00-0.00	1.21	5.14	A	0.243	2.459	0.6	1	1	47.568	2.65	132.37	C
			B	0.224	2.518	0.596	1	1	46.609			
			C	0.277	2.358	0.609	1	1	53.339			
Sum Weight:	9.55	22.86						OTM	1154.67 kip-ft	17.30		

Tower Forces - With Ice - Wind 45 To Face

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
ft	K	K							ft ²	K	plf	
T1 140.00-120.00	0.70	1.13	A	0.198	2.604	0.59	0.825	1	12.197	1.94	97.14	C
			B	0.287	2.332	0.612	0.825	1	18.342			
			C	0.449	1.975	0.673	0.825	1	31.581			
T2 120.00-100.00	0.89	1.82	A	0.225	2.514	0.596	0.825	1	14.205	2.23	111.43	C
			B	0.343	2.189	0.63	0.825	1	23.565			
			C	0.533	1.861	0.715	0.825	1	40.340			
T3 100.00-80.00	1.59	2.94	A	0.412	2.041	0.657	0.825	1	35.059	2.56	127.83	C
			B	0.323	2.237	0.623	0.825	1	27.542			
			C	0.539	1.854	0.718	0.825	1	49.176			
T4 80.00-60.00	1.71	3.40	A	0.368	2.131	0.639	0.825	1	39.921	2.59	129.74	C
			B	0.319	2.247	0.622	0.825	1	35.722			
			C	0.45	1.974	0.673	0.825	1	50.387			
T5 60.00-40.00	1.72	3.86	A	0.319	2.248	0.622	0.825	1	41.732	2.55	127.56	C
			B	0.282	2.346	0.61	0.825	1	38.398			
			C	0.386	2.092	0.646	0.825	1	51.457			
T6 40.00-20.00	1.72	4.58	A	0.285	2.337	0.611	0.825	1	43.881	2.45	122.48	C
			B	0.253	2.427	0.603	0.825	1	40.761			
			C	0.342	2.189	0.63	0.825	1	53.156			
T7 20.00-0.00	1.21	5.14	A	0.243	2.459	0.6	0.825	1	44.051	2.48	124.02	C
			B	0.224	2.518	0.596	0.825	1	42.101			

RISATower URS Corporation 500 Enterprise Drive, Suite 3B Rocky Hill, CT 06067 Phone: (860) 529-8882 FAX: (860) 529-3991	Job	140' Self-Supporting Lattice Tower	Page	15 of 30
	Project	705 West Johnson Ave., Cheshire, CT	Date	10:13:25 11/23/09
	Client	Verizon Wireless	Designed by	Kevin Barker

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
ft	K	K							ft ²	K	plf	
Sum Weight:	9.55	22.86	C	0.277	2.358	0.609	0.825	1 OTM	49.977 1135.32 kip-ft	16.80		

Tower Forces - With Ice - Wind 60 To Face

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
ft	K	K							ft ²	K	plf	
T1 140.00-120.00	0.70	1.13	A	0.198	2.604	0.59	0.8	1	12.197	1.94	97.14	C
			B	0.287	2.332	0.612	0.8	1	18.342			
			C	0.449	1.975	0.673	0.8	1	31.581			
T2 120.00-100.00	0.89	1.82	A	0.225	2.514	0.596	0.8	1	14.205	2.23	111.43	C
			B	0.343	2.189	0.63	0.8	1	23.471			
			C	0.533	1.861	0.715	0.8	1	40.340			
T3 100.00-80.00	1.59	2.94	A	0.412	2.041	0.657	0.8	1	34.893	2.55	127.49	C
			B	0.323	2.237	0.623	0.8	1	27.260			
			C	0.539	1.854	0.718	0.8	1	49.044			
T4 80.00-60.00	1.71	3.40	A	0.368	2.131	0.639	0.8	1	39.671	2.58	129.18	C
			B	0.319	2.247	0.622	0.8	1	35.278			
			C	0.45	1.974	0.673	0.8	1	50.168			
T5 60.00-40.00	1.72	3.86	A	0.319	2.248	0.622	0.8	1	41.432	2.54	126.89	C
			B	0.282	2.346	0.61	0.8	1	37.897			
			C	0.386	2.092	0.646	0.8	1	51.186			
T6 40.00-20.00	1.72	4.58	A	0.285	2.337	0.611	0.8	1	43.530	2.43	121.74	C
			B	0.253	2.427	0.603	0.8	1	40.209			
			C	0.342	2.189	0.63	0.8	1	52.832			
T7 20.00-0.00	1.21	5.14	A	0.243	2.459	0.6	0.8	1	43.549	2.46	122.83	C
			B	0.224	2.518	0.596	0.8	1	41.457			
			C	0.277	2.358	0.609	0.8	1	49.496			
Sum Weight:	9.55	22.86						OTM	1132.55 kip-ft	16.73		

Tower Forces - With Ice - Wind 90 To Face

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
ft	K	K							ft ²	K	plf	
T1 140.00-120.00	0.70	1.13	A	0.198	2.604	0.59	0.85	1	12.197	1.94	97.14	C
			B	0.287	2.332	0.612	0.85	1	18.342			
			C	0.449	1.975	0.673	0.85	1	31.581			
T2 120.00-100.00	0.89	1.82	A	0.225	2.514	0.596	0.85	1	14.205	2.23	111.43	C
			B	0.343	2.189	0.63	0.85	1	23.659			
			C	0.533	1.861	0.715	0.85	1	40.340			
T3 100.00-80.00	1.59	2.94	A	0.412	2.041	0.657	0.85	1	35.225	2.56	128.17	C
			B	0.323	2.237	0.623	0.85	1	27.824			
			C	0.539	1.854	0.718	0.85	1	49.307			
T4 80.00-60.00	1.71	3.40	A	0.368	2.131	0.639	0.85	1	40.171	2.61	130.31	C
			B	0.319	2.247	0.622	0.85	1	36.167			

RISATower

URS Corporation
 500 Enterprise Drive, Suite 3B
 Rocky Hill, CT 06067
 Phone: (860) 529-8882
 FAX: (860) 529-3991

Job	140' Self-Supporting Lattice Tower	Page	16 of 30
Project	705 West Johnson Ave., Cheshire, CT	Date	10:13:25 11/23/09
Client	Verizon Wireless	Designed by	Kevin Barker

Section Elevation ft	Add Weight K	Self Weight K	F a c e	e	C _F	R _R	D _F	D _R	A _E ft ²	F K	w plf	Ctrl. Face
T5 60.00-40.00	1.72	3.86	C	0.45	1.974	0.673	0.85	1	50.606			
			A	0.319	2.248	0.622	0.85	1	42.033	2.56	128.23	C
			B	0.282	2.346	0.61	0.85	1	38.899			
T6 40.00-20.00	1.72	4.58	C	0.386	2.092	0.646	0.85	1	51.729			
			A	0.285	2.337	0.611	0.85	1	44.232	2.46	123.23	C
			B	0.253	2.427	0.603	0.85	1	41.312			
T7 20.00-0.00	1.21	5.14	C	0.342	2.189	0.63	0.85	1	53.480			
			A	0.243	2.459	0.6	0.85	1	44.554	2.50	125.21	C
			B	0.224	2.518	0.596	0.85	1	42.745			
			C	0.277	2.358	0.609	0.85	1	50.457			
Sum Weight:	9.55	22.86						OTM	1138.08 kip-ft	16.87		

Tower Forces - Service - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	F a c e	e	C _F	R _R	D _F	D _R	A _E ft ²	F K	w plf	Ctrl. Face
T1 140.00-120.00	0.28	0.86	A	0.105	2.946	0.576	1	1	6.197	1.31	65.66	C
			B	0.156	2.75	0.582	1	1	9.338			
			C	0.287	2.331	0.612	1	1	18.093			
T2 120.00-100.00	0.35	1.50	A	0.135	2.829	0.579	1	1	8.117	1.52	75.87	C
			B	0.208	2.568	0.592	1	1	13.937			
			C	0.359	2.152	0.636	1	1	23.752			
T3 100.00-80.00	0.63	2.48	A	0.297	2.303	0.615	1	1	25.457	1.95	97.42	C
			B	0.225	2.513	0.596	1	1	20.949			
			C	0.387	2.09	0.646	1	1	33.246			
T4 80.00-60.00	0.67	2.82	A	0.269	2.381	0.607	1	1	30.447	2.12	105.94	C
			B	0.227	2.509	0.596	1	1	28.307			
			C	0.327	2.227	0.624	1	1	36.455			
T5 60.00-40.00	0.68	3.21	A	0.234	2.488	0.598	1	1	32.594	2.14	106.80	C
			B	0.201	2.593	0.591	1	1	30.931			
			C	0.281	2.349	0.61	1	1	38.368			
T6 40.00-20.00	0.68	3.86	A	0.209	2.566	0.592	1	1	34.906	2.08	104.11	C
			B	0.181	2.659	0.587	1	1	33.315			
			C	0.249	2.44	0.602	1	1	40.540			
T7 20.00-0.00	0.47	4.23	A	0.184	2.651	0.587	1	1	37.648	2.24	111.88	C
			B	0.167	2.709	0.584	1	1	36.658			
			C	0.208	2.57	0.592	1	1	41.359			
Sum Weight:	3.76	18.96						OTM	852.94 kip-ft	13.35		

Tower Forces - Service - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	F a c e	e	C _F	R _R	D _F	D _R	A _E ft ²	F K	w plf	Ctrl. Face
T1 140.00-120.00	0.28	0.86	A	0.105	2.946	0.576	0.825	1	6.197	1.31	65.66	C
			B	0.156	2.75	0.582	0.825	1	9.338			

RISATower

URS Corporation
 500 Enterprise Drive, Suite 3B
 Rocky Hill, CT 06067
 Phone: (860) 529-8882
 FAX: (860) 529-3991

Job	140' Self-Supporting Lattice Tower	Page	17 of 30
Project	705 West Johnson Ave., Cheshire, CT	Date	10:13:25 11/23/09
Client	Verizon Wireless	Designed by	Kevin Barker

Section Elevation ft	Add Weight K	Self Weight K	F a c e	e	C _F	R _R	D _F	D _R	A _E ft ²	F K	w plf	Ctrl. Face
T2 120.00-100.00	0.35	1.50	C	0.287	2.331	0.612	0.825	1	18.093	1.52	75.87	C
			A	0.135	2.829	0.579	0.825	1	8.117			
			B	0.208	2.568	0.592	0.825	1	13.475			
			C	0.359	2.152	0.636	0.825	1	23.752			
T3 100.00-80.00	0.63	2.48	A	0.297	2.303	0.615	0.825	1	24.178	1.88	94.14	C
			B	0.225	2.513	0.596	0.825	1	19.080			
			C	0.387	2.09	0.646	0.825	1	32.126			
T4 80.00-60.00	0.67	2.82	A	0.269	2.381	0.607	0.825	1	28.552	2.02	100.85	C
			B	0.227	2.509	0.596	0.825	1	25.426			
			C	0.327	2.227	0.624	0.825	1	34.706			
T5 60.00-40.00	0.68	3.21	A	0.234	2.488	0.598	0.825	1	30.358	2.02	100.95	C
			B	0.201	2.593	0.591	0.825	1	27.678			
			C	0.281	2.349	0.61	0.825	1	36.267			
T6 40.00-20.00	0.68	3.86	A	0.209	2.566	0.592	0.825	1	32.320	1.96	97.80	C
			B	0.181	2.659	0.587	0.825	1	29.716			
			C	0.249	2.44	0.602	0.825	1	38.082			
T7 20.00-0.00	0.47	4.23	A	0.184	2.651	0.587	0.825	1	34.028	2.05	102.36	C
			B	0.167	2.709	0.584	0.825	1	32.319			
			C	0.208	2.57	0.592	0.825	1	37.842			
Sum Weight:	3.76	18.96						OTM	828.37 kip-ft	12.75		

Tower Forces - Service - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	F a c e	e	C _F	R _R	D _F	D _R	A _E ft ²	F K	w plf	Ctrl. Face
T1 140.00-120.00	0.28	0.86	A	0.105	2.946	0.576	0.8	1	6.197	1.31	65.66	C
			B	0.156	2.75	0.582	0.8	1	9.338			
			C	0.287	2.331	0.612	0.8	1	18.093			
T2 120.00-100.00	0.35	1.50	A	0.135	2.829	0.579	0.8	1	8.117	1.52	75.87	C
			B	0.208	2.568	0.592	0.8	1	13.409			
			C	0.359	2.152	0.636	0.8	1	23.752			
T3 100.00-80.00	0.63	2.48	A	0.297	2.303	0.615	0.8	1	23.995	1.87	93.67	C
			B	0.225	2.513	0.596	0.8	1	18.813			
			C	0.387	2.09	0.646	0.8	1	31.966			
T4 80.00-60.00	0.67	2.82	A	0.269	2.381	0.607	0.8	1	28.281	2.00	100.13	C
			B	0.227	2.509	0.596	0.8	1	25.015			
			C	0.327	2.227	0.624	0.8	1	34.456			
T5 60.00-40.00	0.68	3.21	A	0.234	2.488	0.598	0.8	1	30.039	2.00	100.11	C
			B	0.201	2.593	0.591	0.8	1	27.213			
			C	0.281	2.349	0.61	0.8	1	35.967			
T6 40.00-20.00	0.68	3.86	A	0.209	2.566	0.592	0.8	1	31.951	1.94	96.90	C
			B	0.181	2.659	0.587	0.8	1	29.202			
			C	0.249	2.44	0.602	0.8	1	37.731			
T7 20.00-0.00	0.47	4.23	A	0.184	2.651	0.587	0.8	1	33.511	2.02	101.00	C
			B	0.167	2.709	0.584	0.8	1	31.699			
			C	0.208	2.57	0.592	0.8	1	37.340			
Sum Weight:	3.76	18.96						OTM	824.86 kip-ft	12.67		

RISATower URS Corporation 500 Enterprise Drive, Suite 3B Rocky Hill, CT 06067 Phone: (860) 529-8882 FAX: (860) 529-3991	Job	140' Self-Supporting Lattice Tower	Page	18 of 30
	Project	705 West Johnson Ave., Cheshire, CT	Date	10:13:25 11/23/09
	Client	Verizon Wireless	Designed by	Kevin Barker

Tower Forces - Service - Wind 90 To Face

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
ft	K	K							ft ²	K	plf	
T1 140.00-120.00	0.28	0.86	A	0.105	2.946	0.576	0.85	1	6.197	1.31	65.66	C
			B	0.156	2.75	0.582	0.85	1	9.338			
			C	0.287	2.331	0.612	0.85	1	18.093			
T2 120.00-100.00	0.35	1.50	A	0.135	2.829	0.579	0.85	1	8.117	1.52	75.87	C
			B	0.208	2.568	0.592	0.85	1	13.541			
			C	0.359	2.152	0.636	0.85	1	23.752			
T3 100.00-80.00	0.63	2.48	A	0.297	2.303	0.615	0.85	1	24.361	1.89	94.61	C
			B	0.225	2.513	0.596	0.85	1	19.347			
			C	0.387	2.09	0.646	0.85	1	32.286			
T4 80.00-60.00	0.67	2.82	A	0.269	2.381	0.607	0.85	1	28.822	2.03	101.58	C
			B	0.227	2.509	0.596	0.85	1	25.838			
			C	0.327	2.227	0.624	0.85	1	34.955			
T5 60.00-40.00	0.68	3.21	A	0.234	2.488	0.598	0.85	1	30.678	2.04	101.78	C
			B	0.201	2.593	0.591	0.85	1	28.143			
			C	0.281	2.349	0.61	0.85	1	36.567			
T6 40.00-20.00	0.68	3.86	A	0.209	2.566	0.592	0.85	1	32.689	1.97	98.70	C
			B	0.181	2.659	0.587	0.85	1	30.230			
			C	0.249	2.44	0.602	0.85	1	38.434			
T7 20.00-0.00	0.47	4.23	A	0.184	2.651	0.587	0.85	1	34.545	2.07	103.72	C
			B	0.167	2.709	0.584	0.85	1	32.939			
			C	0.208	2.57	0.592	0.85	1	38.345			
Sum Weight:	3.76	18.96						OTM	831.88 kip-ft	12.84		

Force Totals

Load Case	Vertical Forces	Sum of Forces X	Sum of Forces Z	Sum of Overturning Moments, M _x	Sum of Overturning Moments, M _z	Sum of Torques
	K	K	K	kip-ft	kip-ft	kip-ft
Leg Weight	14.44					
Bracing Weight	4.52					
Total Member Self-Weight	18.96					
Total Weight	27.11			5.78	9.86	
Wind 0 deg - No Ice		-0.01	-22.21	-1848.99	10.69	-8.65
Wind 30 deg - No Ice		10.84	-18.78	-1581.84	-906.76	-5.09
Wind 45 deg - No Ice		15.28	-15.27	-1287.78	-1284.38	-2.95
Wind 60 deg - No Ice		18.64	-10.75	-906.84	-1572.53	-0.65
Wind 90 deg - No Ice		21.70	0.01	6.62	-1824.82	3.90
Wind 120 deg - No Ice		19.24	11.11	933.89	-1597.67	7.86
Wind 135 deg - No Ice		15.29	15.28	1300.52	-1285.57	8.41
Wind 150 deg - No Ice		10.85	18.79	1594.24	-908.21	8.98
Wind 180 deg - No Ice		0.01	21.52	1832.48	9.02	7.95
Wind 210 deg - No Ice		-10.84	18.78	1593.41	926.47	5.09
Wind 225 deg - No Ice		-15.28	15.27	1299.34	1304.10	2.95
Wind 240 deg - No Ice		-19.23	11.10	932.44	1616.55	0.79
Wind 270 deg - No Ice		-21.70	-0.01	4.95	1844.54	-3.90
Wind 300 deg - No Ice		-18.65	-10.76	-908.29	1593.08	-7.29
Wind 315 deg - No Ice		-15.29	-15.28	-1288.96	1305.28	-8.41
Wind 330 deg - No Ice		-10.85	-18.79	-1582.68	927.92	-8.98
Member Ice	3.90					
Total Weight Ice	39.13			13.84	24.71	
Wind 0 deg - Ice		-0.01	-27.73	-2332.56	26.42	-12.01

RISA Tower URS Corporation 500 Enterprise Drive, Suite 3B Rocky Hill, CT 06067 Phone: (860) 529-8882 FAX: (860) 529-3991	Job	140' Self-Supporting Lattice Tower	Page	19 of 30
	Project	705 West Johnson Ave., Cheshire, CT	Date	10:13:25 11/23/09
	Client	Verizon Wireless	Designed by	Kevin Barker

Load Case	Vertical Forces K	Sum of Forces X K	Sum of Forces Z K	Sum of Overturning Moments, M_x kip-ft	Sum of Overturning Moments, M_z kip-ft	Sum of Torques kip-ft
Wind 30 deg - Ice		13.65	-23.64	-2002.98	-1139.70	-7.75
Wind 45 deg - Ice		19.26	-19.25	-1630.43	-1620.94	-4.94
Wind 60 deg - Ice		23.53	-13.57	-1146.83	-1989.03	-1.83
Wind 90 deg - Ice		27.32	0.01	15.54	-2307.07	4.51
Wind 120 deg - Ice		24.03	13.88	1188.51	-2009.88	10.03
Wind 135 deg - Ice		19.28	19.27	1660.51	-1623.35	11.29
Wind 150 deg - Ice		13.67	23.66	2032.36	-1142.65	12.26
Wind 180 deg - Ice		0.01	27.17	2338.12	23.01	11.40
Wind 210 deg - Ice		-13.65	23.64	2030.66	1189.12	7.75
Wind 225 deg - Ice		-19.26	19.25	1658.10	1670.37	4.94
Wind 240 deg - Ice		-24.02	13.85	1185.56	2057.60	1.98
Wind 270 deg - Ice		-27.32	-0.01	12.13	2356.49	-4.51
Wind 300 deg - Ice		-23.55	-13.59	-1149.78	2040.15	-9.57
Wind 315 deg - Ice		-19.28	-19.27	-1632.84	1672.78	-11.29
Wind 330 deg - Ice		-13.67	-23.66	-2004.69	1192.08	-12.26
Total Weight	27.11			5.78	9.86	
Wind 0 deg - Service		-0.01	-22.21	-1854.91	0.29	-8.65
Wind 30 deg - Service		10.84	-18.78	-1587.76	-917.16	-5.09
Wind 45 deg - Service		15.28	-15.27	-1293.70	-1294.79	-2.95
Wind 60 deg - Service		18.64	-10.75	-912.76	-1582.93	-0.65
Wind 90 deg - Service		21.70	0.01	0.70	-1835.23	3.90
Wind 120 deg - Service		19.24	11.11	927.97	-1608.08	7.86
Wind 135 deg - Service		15.29	15.28	1294.60	-1295.97	8.41
Wind 150 deg - Service		10.85	18.79	1588.32	-918.61	8.98
Wind 180 deg - Service		0.01	21.52	1826.56	-1.38	7.95
Wind 210 deg - Service		-10.84	18.78	1587.49	916.07	5.09
Wind 225 deg - Service		-15.28	15.27	1293.42	1293.70	2.95
Wind 240 deg - Service		-19.23	11.10	926.52	1606.15	0.79
Wind 270 deg - Service		-21.70	-0.01	-0.97	1834.13	-3.90
Wind 300 deg - Service		-18.65	-10.76	-914.21	1582.67	-7.29
Wind 315 deg - Service		-15.29	-15.28	-1294.88	1294.88	-8.41
Wind 330 deg - Service		-10.85	-18.79	-1588.60	917.52	-8.98

Load Combinations

Comb. No.	Description
1	Dead Only
2	Dead+Wind 0 deg - No Ice
3	Dead+Wind 30 deg - No Ice
4	Dead+Wind 45 deg - No Ice
5	Dead+Wind 60 deg - No Ice
6	Dead+Wind 90 deg - No Ice
7	Dead+Wind 120 deg - No Ice
8	Dead+Wind 135 deg - No Ice
9	Dead+Wind 150 deg - No Ice
10	Dead+Wind 180 deg - No Ice
11	Dead+Wind 210 deg - No Ice
12	Dead+Wind 225 deg - No Ice
13	Dead+Wind 240 deg - No Ice
14	Dead+Wind 270 deg - No Ice
15	Dead+Wind 300 deg - No Ice
16	Dead+Wind 315 deg - No Ice
17	Dead+Wind 330 deg - No Ice
18	Dead+Ice+Temp
19	Dead+Wind 0 deg+Ice+Temp

RISATower URS Corporation 500 Enterprise Drive, Suite 3B Rocky Hill, CT 06067 Phone: (860) 529-8882 FAX: (860) 529-3991	Job	140' Self-Supporting Lattice Tower	Page	20 of 30
	Project	705 West Johnson Ave., Cheshire, CT	Date	10:13:25 11/23/09
	Client	Verizon Wireless	Designed by	Kevin Barker

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

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
T1	140 - 120	Leg	Max Tension	32	21.11	-0.38	-0.20
			Max. Compression	30	-24.17	0.42	-0.28
			Max. Mx	31	-0.97	-0.87	0.00
			Max. My	27	-1.52	0.00	0.88
			Max. Vy	31	-2.30	0.45	-0.08
			Max. Vx	19	-2.50	-0.06	0.50
		Diagonal	Max Tension	28	2.74	0.00	0.00
			Max. Compression	20	-2.74	0.00	0.00
			Max. Mx	30	0.20	-0.00	-0.00
			Max. My	20	-2.18	-0.00	-0.00
			Max. Vy	25	-0.00	-0.00	-0.00
			Max. Vx	20	0.00	-0.00	-0.00
		Top Girt	Max Tension	15	0.08	0.00	0.00
			Max. Compression	24	-0.09	0.00	0.00
			Max. Mx	18	-0.01	0.01	0.00
			Max. My	26	-0.00	0.00	-0.00
			Max. Vy	18	-0.01	0.00	0.00
			Max. Vx	26	0.00	0.00	0.00
		Bottom Girt	Max Tension	32	0.91	0.00	0.00
			Max. Compression	24	-0.91	0.00	0.00
			Max. Mx	18	0.01	0.01	0.00
			Max. My	33	-0.18	0.00	-0.00

RISATower URS Corporation 500 Enterprise Drive, Suite 3B Rocky Hill, CT 06067 Phone: (860) 529-8882 FAX: (860) 529-3991	Job	140' Self-Supporting Lattice Tower	Page 21 of 30
	Project	705 West Johnson Ave., Cheshire, CT	Date 10:13:25 11/23/09
	Client	Verizon Wireless	Designed by Kevin Barker

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
T2	120 - 100	Leg	Max. Vy	18	-0.01	0.00	0.00
			Max. Vx	33	0.00	0.00	0.00
			Max Tension	27	57.85	0.01	0.20
			Max. Compression	30	-63.38	1.60	-0.89
			Max. Mx	24	-62.82	-1.62	-0.86
			Max. My	19	-62.32	-0.04	1.83
		Diagonal	Max. Vy	24	4.91	-1.62	-0.86
			Max. Vx	19	-5.54	-0.04	1.83
			Max Tension	31	4.05	0.00	0.00
			Max. Compression	31	-4.10	0.00	0.00
			Max. Mx	29	2.65	-0.00	-0.00
			Max. My	25	-3.59	-0.00	0.00
		Top Girt	Max. Vy	29	0.01	-0.00	-0.00
			Max. Vx	25	-0.00	-0.00	0.00
			Max Tension	24	0.97	0.00	0.00
			Max. Compression	32	-0.96	0.00	0.00
			Max. Mx	18	-0.00	0.01	0.00
			Max. My	33	0.21	0.00	-0.00
		Bottom Girt	Max. Vy	18	-0.01	0.00	0.00
			Max. Vx	33	0.00	0.00	0.00
			Max Tension	30	0.39	0.00	0.00
			Max. Compression	27	-0.50	0.00	0.00
			Max. Mx	18	-0.04	0.01	0.00
			Max. My	26	-0.04	0.00	-0.00
T3	100 - 80	Leg	Max. Vy	18	-0.01	0.00	0.00
			Max. Vx	33	0.00	0.00	0.00
			Max Tension	27	84.28	-0.07	-0.06
			Max. Compression	30	-94.47	0.31	-0.01
			Max. Mx	24	-67.64	1.83	-0.07
			Max. My	23	-3.15	-0.05	-1.14
		Diagonal	Max. Vy	22	-1.15	-1.77	-0.03
			Max. Vx	34	0.92	0.02	0.66
			Max Tension	23	4.84	0.00	0.00
			Max. Compression	24	-4.87	0.00	0.00
			Max. Mx	29	3.44	0.02	-0.00
			Max. My	31	-4.69	-0.01	0.01
T4	80 - 60	Leg	Max. Vy	32	0.01	0.02	0.00
			Max. Vx	31	-0.00	0.00	0.00
			Max Tension	32	113.17	-0.16	0.04
			Max. Compression	30	-127.33	0.22	-0.01
			Max. Mx	22	92.50	-0.37	0.01
			Max. My	7	35.20	-0.17	-0.41
		Diagonal	Max. Vy	22	-0.33	-0.37	0.01
			Max. Vx	32	-0.38	0.14	-0.37
			Max Tension	23	4.63	0.00	0.00
			Max. Compression	23	-4.72	0.00	0.00
			Max. Mx	30	3.62	0.03	0.00
			Max. My	32	-4.03	0.00	0.00
T5	60 - 40	Leg	Max. Vy	32	0.02	0.03	0.00
			Max. Vx	32	-0.00	0.00	0.00
			Max Tension	32	137.61	-0.10	0.02
			Max. Compression	30	-156.18	0.12	-0.01
			Max. Mx	22	134.47	-0.42	0.01
			Max. My	26	-10.51	-0.15	-0.30
		Diagonal	Max. Vy	22	0.09	-0.42	0.01
			Max. Vx	34	-0.07	-0.15	0.30
			Max Tension	20	4.59	0.00	0.00
			Max. Compression	20	-4.64	0.00	0.00
			Max. Mx	32	3.32	0.03	0.00
			Max. My	33	-3.35	0.02	0.01
			Max. Vy	32	0.02	0.03	0.00

RISATower URS Corporation 500 Enterprise Drive, Suite 3B Rocky Hill, CT 06067 Phone: (860) 529-8882 FAX: (860) 529-3991	Job	140' Self-Supporting Lattice Tower	Page	22 of 30
	Project	705 West Johnson Ave., Cheshire, CT	Date	10:13:25 11/23/09
	Client	Verizon Wireless	Designed by	Kevin Barker

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
T6	40 - 20	Leg	Max. Vx	33	-0.00	0.00	0.00
			Max Tension	32	159.30	-0.62	0.02
			Max. Compression	30	-181.74	0.84	-0.00
			Max. Mx	24	-178.63	0.85	-0.01
			Max. My	26	-10.51	-0.15	-0.30
		Diagonal	Max. Vy	22	-0.21	-0.63	0.01
			Max. Vx	34	0.07	-0.15	0.30
			Max Tension	20	4.87	0.00	0.00
			Max. Compression	20	-5.21	0.00	0.00
			Max. Mx	32	2.91	0.05	0.01
			Max. My	27	-4.58	0.03	-0.01
			Max. Vy	32	0.03	0.05	0.01
			Max. Vx	27	0.00	0.00	0.00
T7	20 - 0	Leg	Max Tension	32	176.79	0.97	0.02
			Max. Compression	30	-207.09	-0.00	-0.00
			Max. Mx	24	-194.13	1.45	-0.01
			Max. My	34	-16.01	1.20	0.49
			Max. Vy	22	-0.39	-1.33	0.00
		Diagonal	Max. Vx	34	0.13	1.20	0.49
			Max Tension	20	6.21	0.00	0.00
			Max. Compression	20	-5.97	0.00	0.00
			Max. Mx	32	2.29	0.08	0.01
			Max. My	27	-5.39	0.06	-0.01
			Max. Vy	32	0.03	0.08	0.01
			Max. Vx	27	0.00	0.00	0.00

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Leg C	Max. Vert	30	209.52	13.20	-7.72
	Max. H _x	30	209.52	13.20	-7.72
	Max. H _z	21	-170.54	-14.62	9.21
	Min. Vert	22	-176.91	-15.37	8.96
	Min. H _x	22	-176.91	-15.37	8.96
Leg B	Min. H _z	29	201.31	12.22	-7.79
	Max. Vert	24	206.21	-13.44	-7.26
	Max. H _x	32	-180.69	15.65	8.60
	Max. H _z	33	-174.35	15.00	8.67
	Min. Vert	32	-180.69	15.65	8.60
Leg A	Min. H _x	24	206.21	-13.44	-7.26
	Min. H _z	24	206.21	-13.44	-7.26
	Max. Vert	19	206.02	-0.52	15.26
	Max. H _x	30	-85.04	1.62	-9.76
	Max. H _z	19	206.02	-0.52	15.26
	Min. Vert	27	-180.40	0.45	-17.84
	Min. H _x	23	11.76	-1.58	-1.40
	Min. H _z	27	-180.40	0.45	-17.84

Tower Mast Reaction Summary

RISATower URS Corporation 500 Enterprise Drive, Suite 3B Rocky Hill, CT 06067 Phone: (860) 529-8882 FAX: (860) 529-3991	Job	140' Self-Supporting Lattice Tower	Page	23 of 30
	Project	705 West Johnson Ave., Cheshire, CT	Date	10:13:25 11/23/09
	Client	Verizon Wireless	Designed by	Kevin Barker

Load Combination	Vertical K	Shear _x K	Shear _z K	Overturning Moment, M _x kip-ft	Overturning Moment, M _z kip-ft	Torque kip-ft
Dead Only	27.11	0.00	0.00	5.78	9.86	0.00
Dead+ Wind 0 deg - No Ice	27.11	-0.01	-22.21	-1853.15	10.72	-8.67
Dead+ Wind 30 deg - No Ice	27.11	10.84	-18.78	-1585.42	-908.81	-5.10
Dead+ Wind 45 deg - No Ice	27.11	15.28	-15.27	-1290.69	-1287.29	-2.96
Dead+ Wind 60 deg - No Ice	27.11	18.64	-10.75	-908.89	-1576.08	-0.65
Dead+ Wind 90 deg - No Ice	27.11	21.70	0.01	6.64	-1828.95	3.91
Dead+ Wind 120 deg - No Ice	27.11	19.24	11.11	936.00	-1601.27	7.88
Dead+ Wind 135 deg - No Ice	27.11	15.29	15.28	1303.47	-1288.47	8.44
Dead+ Wind 150 deg - No Ice	27.11	10.85	18.79	1597.85	-910.25	9.01
Dead+ Wind 180 deg - No Ice	27.11	0.01	21.52	1836.62	9.04	7.97
Dead+ Wind 210 deg - No Ice	27.11	-10.84	18.78	1597.00	928.56	5.10
Dead+ Wind 225 deg - No Ice	27.11	-15.28	15.27	1302.27	1307.04	2.96
Dead+ Wind 240 deg - No Ice	27.11	-19.23	11.10	934.54	1620.18	0.79
Dead+ Wind 270 deg - No Ice	27.11	-21.70	-0.01	4.96	1848.70	-3.91
Dead+ Wind 300 deg - No Ice	27.11	-18.65	-10.76	-910.34	1596.68	-7.32
Dead+ Wind 315 deg - No Ice	27.11	-15.29	-15.28	-1291.87	1308.23	-8.44
Dead+ Wind 330 deg - No Ice	27.11	-10.85	-18.79	-1586.25	930.02	-9.01
Dead+ Ice+Temp	39.13	0.00	0.00	13.85	24.72	-0.00
Dead+ Wind 0 deg+Ice+Temp	39.13	-0.01	-27.73	-2339.73	26.51	-12.08
Dead+ Wind 30 deg+Ice+Temp	39.13	13.65	-23.64	-2009.17	-1143.22	-7.79
Dead+ Wind 45 deg+Ice+Temp	39.13	19.26	-19.25	-1635.46	-1625.96	-4.96
Dead+ Wind 60 deg+Ice+Temp	39.13	23.53	-13.57	-1150.37	-1995.18	-1.83
Dead+ Wind 90 deg+Ice+Temp	39.13	27.32	0.01	15.60	-2314.20	4.56
Dead+ Wind 120 deg+Ice+Temp	39.13	24.03	13.88	1192.18	-2016.07	10.11
Dead+ Wind 135 deg+Ice+Temp	39.13	19.28	19.27	1665.65	-1628.37	11.38
Dead+ Wind 150 deg+Ice+Temp	39.13	13.67	23.66	2038.64	-1146.18	12.35
Dead+ Wind 180 deg+Ice+Temp	39.13	0.01	27.17	2345.34	23.07	11.48
Dead+ Wind 210 deg+Ice+Temp	39.13	-13.65	23.64	2036.92	1192.78	7.79
Dead+ Wind 225 deg+Ice+Temp	39.13	-19.26	19.25	1663.21	1675.50	4.96
Dead+ Wind 240 deg+Ice+Temp	39.13	-24.02	13.85	1189.25	2064.03	1.97
Dead+ Wind 270 deg+Ice+Temp	39.13	-27.32	-0.01	12.17	2363.74	-4.56
Dead+ Wind 300 deg+Ice+Temp	39.13	-23.55	-13.59	-1153.33	2046.45	-9.65
Dead+ Wind 315 deg+Ice+Temp	39.13	-19.28	-19.27	-1637.87	1677.94	-11.38
Dead+ Wind 330 deg+Ice+Temp	39.13	-13.67	-23.66	-2010.87	1195.76	-12.35
Dead+ Wind 0 deg - Service	27.11	-0.01	-22.21	-1853.15	10.72	-8.67
Dead+ Wind 30 deg - Service	27.11	10.84	-18.78	-1585.42	-908.81	-5.10
Dead+ Wind 45 deg - Service	27.11	15.28	-15.27	-1290.69	-1287.29	-2.96
Dead+ Wind 60 deg - Service	27.11	18.64	-10.75	-908.89	-1576.08	-0.65
Dead+ Wind 90 deg - Service	27.11	21.70	0.01	6.64	-1828.95	3.91
Dead+ Wind 120 deg - Service	27.11	19.24	11.11	936.00	-1601.27	7.88
Dead+ Wind 135 deg - Service	27.11	15.29	15.28	1303.47	-1288.47	8.44
Dead+ Wind 150 deg - Service	27.11	10.85	18.79	1597.85	-910.25	9.01
Dead+ Wind 180 deg - Service	27.11	0.01	21.52	1836.62	9.04	7.97
Dead+ Wind 210 deg - Service	27.11	-10.84	18.78	1597.00	928.56	5.10
Dead+ Wind 225 deg - Service	27.11	-15.28	15.27	1302.27	1307.04	2.96
Dead+ Wind 240 deg - Service	27.11	-19.23	11.10	934.54	1620.18	0.79
Dead+ Wind 270 deg - Service	27.11	-21.70	-0.01	4.96	1848.70	-3.91
Dead+ Wind 300 deg - Service	27.11	-18.65	-10.76	-910.34	1596.68	-7.32
Dead+ Wind 315 deg - Service	27.11	-15.29	-15.28	-1291.87	1308.23	-8.44
Dead+ Wind 330 deg - Service	27.11	-10.85	-18.79	-1586.25	930.02	-9.01

Solution Summary

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
1	0.00	-27.11	0.00	0.00	27.11	0.00	0.000%
2	-0.01	-27.11	-22.21	0.01	27.11	22.21	0.000%

RISATower URS Corporation 500 Enterprise Drive, Suite 3B Rocky Hill, CT 06067 Phone: (860) 529-8882 FAX: (860) 529-3991	Job	140' Self-Supporting Lattice Tower	Page	24 of 30
	Project	705 West Johnson Ave., Cheshire, CT	Date	10:13:25 11/23/09
	Client	Verizon Wireless	Designed by	Kevin Barker

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
3	10.84	-27.11	-18.78	-10.84	27.11	18.78	0.000%
4	15.28	-27.11	-15.27	-15.28	27.11	15.27	0.000%
5	18.64	-27.11	-10.75	-18.64	27.11	10.75	0.000%
6	21.70	-27.11	0.01	-21.70	27.11	-0.01	0.000%
7	19.24	-27.11	11.11	-19.24	27.11	-11.11	0.000%
8	15.29	-27.11	15.28	-15.29	27.11	-15.28	0.000%
9	10.85	-27.11	18.79	-10.85	27.11	-18.79	0.001%
10	0.01	-27.11	21.52	-0.01	27.11	-21.52	0.000%
11	-10.84	-27.11	18.78	10.84	27.11	-18.78	0.000%
12	-15.28	-27.11	15.27	15.28	27.11	-15.27	0.000%
13	-19.23	-27.11	11.10	19.23	27.11	-11.10	0.000%
14	-21.70	-27.11	-0.01	21.70	27.11	0.01	0.000%
15	-18.65	-27.11	-10.76	18.65	27.11	10.76	0.000%
16	-15.29	-27.11	-15.28	15.29	27.11	15.28	0.000%
17	-10.85	-27.11	-18.79	10.85	27.11	18.79	0.001%
18	0.00	-39.13	0.00	0.00	39.13	0.00	0.000%
19	-0.01	-39.13	-27.73	0.01	39.13	27.73	0.000%
20	13.65	-39.13	-23.64	-13.65	39.13	23.64	0.000%
21	19.26	-39.13	-19.25	-19.26	39.13	19.25	0.000%
22	23.53	-39.13	-13.57	-23.53	39.13	13.57	0.000%
23	27.32	-39.13	0.01	-27.32	39.13	-0.01	0.000%
24	24.03	-39.13	13.88	-24.03	39.13	-13.88	0.000%
25	19.28	-39.13	19.27	-19.28	39.13	-19.27	0.000%
26	13.67	-39.13	23.66	-13.67	39.13	-23.66	0.000%
27	0.01	-39.13	27.17	-0.01	39.13	-27.17	0.000%
28	-13.65	-39.13	23.64	13.65	39.13	-23.64	0.000%
29	-19.26	-39.13	19.25	19.26	39.13	-19.25	0.000%
30	-24.02	-39.13	13.85	24.02	39.13	-13.85	0.000%
31	-27.32	-39.13	-0.01	27.32	39.13	0.01	0.000%
32	-23.55	-39.13	-13.59	23.55	39.13	13.59	0.000%
33	-19.28	-39.13	-19.27	19.28	39.13	19.27	0.000%
34	-13.67	-39.13	-23.66	13.67	39.13	23.66	0.000%
35	-0.01	-27.11	-22.21	0.01	27.11	22.21	0.000%
36	10.84	-27.11	-18.78	-10.84	27.11	18.78	0.000%
37	15.28	-27.11	-15.27	-15.28	27.11	15.27	0.000%
38	18.64	-27.11	-10.75	-18.64	27.11	10.75	0.000%
39	21.70	-27.11	0.01	-21.70	27.11	-0.01	0.000%
40	19.24	-27.11	11.11	-19.24	27.11	-11.11	0.000%
41	15.29	-27.11	15.28	-15.29	27.11	-15.28	0.000%
42	10.85	-27.11	18.79	-10.85	27.11	-18.79	0.001%
43	0.01	-27.11	21.52	-0.01	27.11	-21.52	0.000%
44	-10.84	-27.11	18.78	10.84	27.11	-18.78	0.000%
45	-15.28	-27.11	15.27	15.28	27.11	-15.27	0.000%
46	-19.23	-27.11	11.10	19.23	27.11	-11.10	0.000%
47	-21.70	-27.11	-0.01	21.70	27.11	0.01	0.000%
48	-18.65	-27.11	-10.76	18.65	27.11	10.76	0.000%
49	-15.29	-27.11	-15.28	15.29	27.11	15.28	0.000%
50	-10.85	-27.11	-18.79	10.85	27.11	18.79	0.001%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	4	0.00000001	0.00000001
3	Yes	4	0.00000001	0.00000001

<i>RISA Tower</i> URS Corporation 500 Enterprise Drive, Suite 3B Rocky Hill, CT 06067 Phone: (860) 529-8882 FAX: (860) 529-3991	Job	140' Self-Supporting Lattice Tower	Page	25 of 30
	Project	705 West Johnson Ave., Cheshire, CT	Date	10:13:25 11/23/09
	Client	Verizon Wireless	Designed by	Kevin Barker

4	Yes	4	0.00000001	0.00000001
5	Yes	4	0.00000001	0.00000001
6	Yes	4	0.00000001	0.00000001
7	Yes	4	0.00000001	0.00000001
8	Yes	4	0.00000001	0.00000001
9	Yes	4	0.00000001	0.00000001
10	Yes	4	0.00000001	0.00000001
11	Yes	4	0.00000001	0.00000001
12	Yes	4	0.00000001	0.00000001
13	Yes	4	0.00000001	0.00000001
14	Yes	4	0.00000001	0.00000001
15	Yes	4	0.00000001	0.00000001
16	Yes	4	0.00000001	0.00000001
17	Yes	4	0.00000001	0.00000001
18	Yes	4	0.00000001	0.00000001
19	Yes	4	0.00000001	0.00000001
20	Yes	4	0.00000001	0.00000001
21	Yes	4	0.00000001	0.00000001
22	Yes	4	0.00000001	0.00000001
23	Yes	4	0.00000001	0.00000001
24	Yes	4	0.00000001	0.00000001
25	Yes	4	0.00000001	0.00000001
26	Yes	4	0.00000001	0.00000001
27	Yes	4	0.00000001	0.00000001
28	Yes	4	0.00000001	0.00000001
29	Yes	4	0.00000001	0.00000001
30	Yes	4	0.00000001	0.00000001
31	Yes	4	0.00000001	0.00000001
32	Yes	4	0.00000001	0.00000001
33	Yes	4	0.00000001	0.00000001
34	Yes	4	0.00000001	0.00000001
35	Yes	4	0.00000001	0.00000001
36	Yes	4	0.00000001	0.00000001
37	Yes	4	0.00000001	0.00000001
38	Yes	4	0.00000001	0.00000001
39	Yes	4	0.00000001	0.00000001
40	Yes	4	0.00000001	0.00000001
41	Yes	4	0.00000001	0.00000001
42	Yes	4	0.00000001	0.00000001
43	Yes	4	0.00000001	0.00000001
44	Yes	4	0.00000001	0.00000001
45	Yes	4	0.00000001	0.00000001
46	Yes	4	0.00000001	0.00000001
47	Yes	4	0.00000001	0.00000001
48	Yes	4	0.00000001	0.00000001
49	Yes	4	0.00000001	0.00000001
50	Yes	4	0.00000001	0.00000001

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	140 - 120	6.405	46	0.4221	0.0708
T2	120 - 100	4.640	46	0.3780	0.0629
T3	100 - 80	3.121	46	0.2907	0.0464
T4	80 - 60	1.981	46	0.2225	0.0308
T5	60 - 40	1.119	46	0.1573	0.0255
T6	40 - 20	0.518	46	0.0983	0.0172
T7	20 - 0	0.162	46	0.0457	0.0094

RISATower URS Corporation 500 Enterprise Drive, Suite 3B Rocky Hill, CT 06067 Phone: (860) 529-8882 FAX: (860) 529-3991	Job	140' Self-Supporting Lattice Tower	Page	26 of 30
	Project	705 West Johnson Ave., Cheshire, CT	Date	10:13:25 11/23/09
	Client	Verizon Wireless	Designed by	Kevin Barker

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
-------------	-----------------	---------------------------	-----------------------	-----------	------------

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
146.29	1142-2C	46	6.405	0.4221	0.0708	74543
138.00	LPA-185080-12CF_2	46	6.225	0.4189	0.0702	74543
120.00	PL4-107	46	4.640	0.3780	0.0629	18852
110.00	APXV18-206517S-C w/ mounting hardware	46	3.837	0.3360	0.0555	13678
101.00	(2) ClearGain TMA	46	3.188	0.2949	0.0473	11248
98.00	(4) CSS XDUO1416-80	46	2.990	0.2826	0.0445	11415
78.00	PL4-107	46	1.883	0.2161	0.0299	19575

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	140 - 120	8.248	30	0.5466	0.0914
T2	120 - 100	5.961	30	0.4891	0.0791
T3	100 - 80	3.996	30	0.3752	0.0641
T4	80 - 60	2.528	30	0.2863	0.0465
T5	60 - 40	1.424	30	0.2019	0.0368
T6	40 - 20	0.656	30	0.1259	0.0242
T7	20 - 0	0.203	30	0.0585	0.0130

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
146.29	1142-2C	30	8.248	0.5466	0.0914	56959
138.00	LPA-185080-12CF_2	30	8.013	0.5425	0.0902	56959
120.00	PL4-107	30	5.961	0.4891	0.0791	14404
110.00	APXV18-206517S-C w/ mounting hardware	30	4.921	0.4343	0.0720	10449
101.00	(2) ClearGain TMA	30	4.083	0.3807	0.0649	8594
98.00	(4) CSS XDUO1416-80	30	3.828	0.3646	0.0625	8722
78.00	PL4-107	30	2.403	0.2780	0.0452	14960

Bolt Design Data

RISATower

URS Corporation
 500 Enterprise Drive, Suite 3B
 Rocky Hill, CT 06067
 Phone: (860) 529-8882
 FAX: (860) 529-3991

Job	140' Self-Supporting Lattice Tower	Page	27 of 30
Project	705 West Johnson Ave., Cheshire, CT	Date	10:13:25 11/23/09
Client	Verizon Wireless	Designed by	Kevin Barker

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt K	Allowable Load K	Ratio Load Allowable	Allowable Ratio	Criteria
T1	140	Diagonal	A325N	0.7500	1	2.74	9.28	0.296 ✓	1.333	Bolt Shear
T2	120	Diagonal	A325N	0.7500	1	4.10	9.28	0.442 ✓	1.333	Bolt Shear
T3	100	Leg	A325N	0.7500	4	15.67	19.43	0.807 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.7500	1	4.84	9.06	0.534 ✓	1.333	Member Bearing
T4	80	Leg	A325N	1.1250	6	15.69	43.74	0.359 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.7500	1	4.63	6.80	0.682 ✓	1.333	Member Bearing
T5	60	Leg	A325N	1.1250	6	20.30	43.74	0.464 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.7500	1	4.59	6.80	0.675 ✓	1.333	Member Bearing
T6	40	Leg	A325N	1.2500	6	24.21	54.00	0.448 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.7500	1	5.21	9.28	0.562 ✓	1.333	Bolt Shear
T7	20	Leg	A325N	1.2500	6	27.48	54.00	0.509 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.7500	1	6.21	6.80	0.914 ✓	1.333	Member Bearing

Compression Checks

Leg Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L _n ft	Kl/r	F _a ksi	A in ²	Actual P K	Allow. P _a K	Ratio P P _a
T1	140 - 120	1 3/4	20.00	3.21	88.0 K=1.00	17.365	2.4053	-24.17	41.77	0.579 ✓
T2	120 - 100	2 1/2	20.00	3.21	61.6 K=1.00	22.442	4.9087	-63.38	110.16	0.575 ✓
T3	100 - 80	3 1/2	20.03	6.68	91.6 K=1.00	16.602	9.6211	-94.47	159.73	0.591 ✓
T4	80 - 60	3 3/4	20.03	6.68	85.4 K=1.00	17.901	11.0447	-127.33	197.71	0.644 ✓
T5	60 - 40	4	20.03	6.68	80.1 K=1.00	18.991	12.5664	-156.18	238.65	0.654 ✓
T6	40 - 20	4 1/4	20.03	6.68	75.4 K=1.00	19.917	14.1863	-181.74	282.55	0.643 ✓
T7	20 - 0	4 1/2	20.03	6.68	71.2 K=1.00	20.713	15.9043	-207.09	329.43	0.629 ✓

Diagonal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L _n ft	Kl/r	F _a ksi	A in ²	Actual P K	Allow. P _a K	Ratio P P _a
-------------	-----------------	------	---------	----------------------	------	-----------------------	----------------------	---------------	----------------------------	---------------------------

RISATower URS Corporation 500 Enterprise Drive, Suite 3B Rocky Hill, CT 06067 Phone: (860) 529-8882 FAX: (860) 529-3991	Job	140' Self-Supporting Lattice Tower	Page	28 of 30
	Project	705 West Johnson Ave., Cheshire, CT	Date	10:13:25 11/23/09
	Client	Verizon Wireless	Designed by	Kevin Barker

Section No.	Elevation ft	Size	L ft	L _u ft	KL/r	F _a ksi	A in ²	Actual P K	Allow. P _a K	Ratio P P _a
T1	140 - 120	3/4	5.94	2.88	138.4 K=0.75	7.794	0.4418	-2.74	3.44	0.797 ✓
T2	120 - 100	7/8	5.94	2.85	117.1 K=0.75	10.692	0.6013	-4.10	6.43	0.638 ✓
T3	100 - 80	L2x2x1/4	9.31	4.52	138.6 K=1.00	7.772	0.9380	-4.54	7.29	0.623 ✓
T4	80 - 60	L2 1/2x2 1/2x3/16	10.65	5.17	125.3 K=1.00	9.506	0.9020	-4.64	8.57	0.541 ✓
T5	60 - 40	L2 1/2x2 1/2x3/16	12.10	5.89	142.7 K=1.00	7.335	0.9020	-4.54	6.62	0.686 ✓
T6	40 - 20	L2 1/2x2 1/2x1/4	13.64	6.64	162.4 K=1.00	5.664	1.1900	-5.21	6.74	0.773 ✓
T7	20 - 0	L3x3x3/16	14.70	7.16	144.2 K=1.00	7.178	1.0900	-5.97	7.82	0.763 ✓

Top Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L _u ft	KL/r	F _a ksi	A in ²	Actual P K	Allow. P _a K	Ratio P P _a
T1	140 - 120	3/4	5.00	4.85	217.5 K=0.70	3.158	0.4418	-0.09	1.40	0.064 ✓
T2	120 - 100	KL/R > 200 (C) - 6 7/8	5.00	4.79	184.0 K=0.70	4.411	0.6013	-0.96	2.65	0.361 ✓

Bottom Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L _u ft	KL/r	F _a ksi	A in ²	Actual P K	Allow. P _a K	Ratio P P _a
T1	140 - 120	3/4	5.00	4.85	217.5 K=0.70	3.158	0.4418	-0.91	1.40	0.655 ✓
T2	120 - 100	KL/R > 200 (C) - 9 7/8	5.00	4.79	184.0 K=0.70	4.411	0.6013	-0.50	2.65	0.187 ✓

Tension Checks

Leg Design Data (Tension)

RISATower URS Corporation 500 Enterprise Drive, Suite 3B Rocky Hill, CT 06067 Phone: (860) 529-8882 FAX: (860) 529-3991	Job	140' Self-Supporting Lattice Tower	Page	29 of 30
	Project	705 West Johnson Ave., Cheshire, CT	Date	10:13:25 11/23/09
	Client	Verizon Wireless	Designed by	Kevin Barker

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	F _a ksi	A in ²	Actual P K	Allow. P _a K	Ratio P P _a
T1	140 - 120	1 3/4	20.00	3.21	88.0	30.000	2.4053	21.11	72.16	0.293
T2	120 - 100	2 1/2	20.00	3.21	61.6	30.000	4.9087	57.85	147.26	0.393
T3	100 - 80	3 1/2	20.03	6.68	91.6	30.000	9.6211	84.28	288.63	0.292
T4	80 - 60	3 3/4	20.03	6.68	85.4	30.000	11.0447	113.17	331.34	0.342
T5	60 - 40	4	20.03	6.68	80.1	30.000	12.5664	137.61	376.99	0.365
T6	40 - 20	4 1/4	20.03	6.68	75.4	30.000	14.1863	159.30	425.59	0.374
T7	20 - 0	4 1/2	20.03	6.68	71.2	30.000	15.9043	176.79	477.13	0.371

Diagonal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	F _a ksi	A in ²	Actual P K	Allow. P _a K	Ratio P P _a
T1	140 - 120	3/4	5.94	2.88	184.6	21.600	0.4418	2.74	9.54	0.287
T2	120 - 100	7/8	5.94	2.85	156.2	21.600	0.6013	4.05	12.99	0.312
T3	100 - 80	L2x2x1/4	8.90	4.32	88.1	29.000	0.5394	4.84	15.64	0.310
T4	80 - 60	L2 1/2x2 1/2x3/16	10.19	4.95	78.5	29.000	0.5535	4.63	16.05	0.289
T5	60 - 40	L2 1/2x2 1/2x3/16	12.10	5.89	93.0	29.000	0.5535	4.59	16.05	0.286
T6	40 - 20	L2 1/2x2 1/2x1/4	13.12	6.39	101.9	29.000	0.7284	4.87	21.12	0.230
T7	20 - 0	L3x3x3/16	15.24	7.43	96.8	29.000	0.6945	6.21	20.14	0.308

Top Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	F _a ksi	A in ²	Actual P K	Allow. P _a K	Ratio P P _a
T1	140 - 120	3/4	5.00	4.85	310.7	21.600	0.4418	0.08	9.54	0.008
T2	120 - 100	7/8	5.00	4.79	262.9	21.600	0.6013	0.97	12.99	0.075

RISATower URS Corporation 500 Enterprise Drive, Suite 3B Rocky Hill, CT 06067 Phone: (860) 529-8882 FAX: (860) 529-3991	Job	140' Self-Supporting Lattice Tower	Page	30 of 30
	Project	705 West Johnson Ave., Cheshire, CT	Date	10:13:25 11/23/09
	Client	Verizon Wireless	Designed by	Kevin Barker

Bottom Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	F _a ksi	A in ²	Actual P K	Allow. P _a K	Ratio P P _a
T1	140 - 120	3/4	5.00	4.85	310.7	21.600	0.4418	0.91	9.54	0.096
T2	120 - 100	7/8	5.00	4.79	262.9	21.600	0.6013	0.39	12.99	0.030

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	SF*P _{allow} K	% Capacity	Pass Fail
T1	140 - 120	Leg	1 3/4	1	-24.17	55.68	43.4	Pass
T2	120 - 100	Leg	2 1/2	46	-63.38	146.85	43.2	Pass
T3	100 - 80	Leg	3 1/2	91	-94.47	212.92	44.4	Pass
T4	80 - 60	Leg	3 3/4	112	-127.33	263.55	60.5 (b)	Pass
T5	60 - 40	Leg	4	133	-156.18	318.12	48.3	Pass
T6	40 - 20	Leg	4 1/4	154	-181.74	376.64	49.1	Pass
T7	20 - 0	Leg	4 1/2	175	-207.09	439.13	48.3	Pass
T1	140 - 120	Diagonal	3/4	14	-2.74	4.59	47.2	Pass
T2	120 - 100	Diagonal	7/8	55	-4.10	8.57	59.8	Pass
T3	100 - 80	Diagonal	L2x2x1/4	95	-4.54	9.72	47.8	Pass
T4	80 - 60	Diagonal	L2 1/2x2 1/2x3/16	116	-4.64	11.43	46.8	Pass
T5	60 - 40	Diagonal	L2 1/2x2 1/2x3/16	140	-4.54	8.82	40.6	Pass
T6	40 - 20	Diagonal	L2 1/2x2 1/2x1/4	161	-5.21	8.98	51.1 (b)	Pass
T7	20 - 0	Diagonal	L3x3x3/16	188	-5.97	10.43	58.0	Pass
T1	140 - 120	Top Girt	3/4	6	-0.09	1.86	57.2	Pass
T2	120 - 100	Top Girt	7/8	51	-0.96	3.54	68.5 (b)	Pass
T1	140 - 120	Bottom Girt	3/4	9	-0.91	1.86	4.8	Pass
T2	120 - 100	Bottom Girt	7/8	52	-0.50	3.54	27.1	Pass
							Summary	
							Leg (T3)	60.5
							Diagonal (T7)	68.5
							Top Girt (T2)	27.1
							Bottom Girt (T1)	49.1
							Bolt Checks	68.5
							RATING =	68.5

ANCHOR BOLT ANALYSIS

ANCHOR BOLT ANALYSIS

Input Data

Max Pier Reactions:

Uplift:	Uplift := 181·kips	<i>user input</i>
Shear:	Shear := 18·kips	<i>user input</i>
Compression:	Compression := 210·kips	<i>user input</i>

Anchor Bolt Data:

Use ASTM A-449 Anchor Bolts

Number of Anchor Bolts = N	$N := 6$	<i>user input</i>
Bolt Ultimate Strength:	$F_u := 105\text{-ksi}$	<i>user input</i>
Bolt Yield Strength:	$F_y := 81\text{-ksi}$	<i>user input</i>
Bolt Modulus:	$E := 29000\text{-ksi}$	<i>user input</i>
Thickness of Anchor Bolts	$D := 1.25\text{in}$	<i>user input</i>
Threads per Inch:	$n := 7$	<i>user input</i>
Coefficient of Friction:	$\mu := 0.55$	<i>user input</i> (for baseplate with grout ASCE 10-97)

Anchor Bolt Area:

Gross Area of Bolt:

$$A_g := \frac{\pi}{4} \cdot D^2$$

$$A_g = 1.227 \cdot \text{in}^2$$

Net Area of Bolt:

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

$$A_n = 0.969 \cdot \text{in}^2$$

Check Tensile Forces:

Maximum Tensile Force (Gross Area):

$$\text{AllowableTension} := 1.33 \cdot (0.33 \cdot A_g \cdot F_u)$$

$$\text{AllowableTension} = 56.6 \cdot \text{kips}$$

Note: 1.33 increase allowed per TIA/EIA

Maximum Tensile Force (Net Area):

$$F_{\text{net.area}} := 1.33 \cdot (0.60 \cdot A_n \cdot F_y)$$

$$F_{\text{net.area}} = 62.6 \cdot \text{kips}$$

Note: 1.33 increase allowed per TIA/EIA

Applied Tension:

$$\text{MaxTension} := \frac{\text{Uplift}}{N}$$

$$\text{MaxTension} = 30.2 \cdot \text{kips}$$

Check Stresses:

$$\frac{\text{MaxTension}}{F_{\text{net.area}}} = 0.48$$

$$\text{Condition1} := \text{if} \left(\frac{\text{MaxTension}}{F_{\text{net.area}}} \leq 1.00, \text{"OK"}, \text{"Overstressed"} \right)$$

$$\boxed{\text{Condition1} = \text{"OK"}}$$

Check Anchor Bolt Area:

Based on the ASCE 10-97 Design of Latticed Steel Transmission Structures

Required Area:

$$A_{s1} := \frac{\text{Uplift}}{F_y} + \frac{\text{Shear}}{\mu \cdot 0.85 \cdot F_y} \quad A_{s1} = 2.7 \cdot \text{in}^2$$

$$A_{s2} := \left| \frac{\text{Shear} - (0.3 \cdot \text{Compression})}{\mu \cdot 0.85 \cdot F_y} \right| \quad A_{s2} = 1.2 \cdot \text{in}^2$$

Provided Area:

$$A_{\text{provided}} := A_n \cdot N \quad A_{\text{provided}} = 5.8 \cdot \text{in}^2$$

$$\text{Condition2} := \text{if} \left(\frac{A_{s1}}{A_{\text{provided}}} \leq 1.00, \text{"OK"}, \text{"Overstressed"} \right) \quad \frac{A_{s1}}{A_{\text{provided}}} = 0.47$$

Condition2 = "OK"

$$\text{Condition3} := \text{if} \left(\frac{A_{s2}}{A_{\text{provided}}} \leq 1.00, \text{"OK"}, \text{"Overstressed"} \right) \quad \frac{A_{s2}}{A_{\text{provided}}} = 0.20$$

Condition3 = "OK"

FOUNDATION ANALYSIS

Job 140' Self-Supporting Tower, Cheshire, CT
 Description Foundation Analysis

Project No. VZ5-038
 Computed by KAB
 Checked by _____

Page 1 of 10
 Sheet 1 of 10
 Date 11/23/09
 Date _____

PIER AND MAT FOUNDATION ANALYSIS - 3 PIERS

TOWER FORCES:

Moment Caused by Tower $M_t := 2382 \cdot \text{kip} \cdot \text{ft}$
 Shear at Base of Tower $S_t := 28 \cdot \text{kip}$
 Max Compressive Force $C_t := 210 \cdot \text{kip}$
 Max Uplift $U_t := 181 \cdot \text{kip}$
 Height of Tower $H_t := 140 \cdot \text{ft}$
 Width of Tower at Base $W_t := 14 \cdot \text{ft}$
 Weight of Tower $W_{T_t} := 1 \cdot \text{kip}$

NOTE: Weight of Tower is incorporated into the other loads listed above and is therefore set equal to one for programming.

FOOTING DIMENSIONS:

Width of Footing $W_f := 30 \cdot \text{ft}$
 Overall Depth of Footing $D_f := 7.0 \cdot \text{ft}$
 Length of Pier $L_p := 5.0 \cdot \text{ft}$
 Extension of Pier Above Grade $L_{pag} := 0.5 \cdot \text{ft}$
 Diameter of Pier $d_p := 4.0 \cdot \text{ft}$
 Thickness of Footing $T_f := 2.5 \cdot \text{ft}$
 Reinforcement Cover: $C_{vr} := 3 \cdot \text{in}$

MATERIAL PROPERTIES:

Compressive Strength of Concrete $f_c := 4000 \cdot \text{psi}$
 Yield Strength of Steel Reinforcement $f_y := 60000 \cdot \text{psi}$
 Internal Friction Angle of Soil $\phi_s := 34 \cdot \text{deg}$
 Allowable Bearing Capacity $q_s := 3000 \cdot \text{psf}$
 Coefficient of Lateral Soil Pressure $K_p := \frac{1 + \sin(\phi_s)}{1 - \sin(\phi_s)}$

Unit Weight of Soil $\gamma_s := 60 \cdot \text{pcf}$
 Unit Weight of Concrete $\gamma_c := 87.6 \cdot \text{pcf}$
 Depth to Neglect $n := 0 \cdot \text{ft}$
 Cohesion of Clay Type Soil $c_c := 0 \cdot \text{ksf}$
 Note: Use 0 for Sandy Soil

$K_p = 3.5371$

What is Position of Center of Tower with respect to Center of Pad?

1=Offset
 2=Not Offset

$Pos_{tower} := 2$

STEEL REINFORCING:

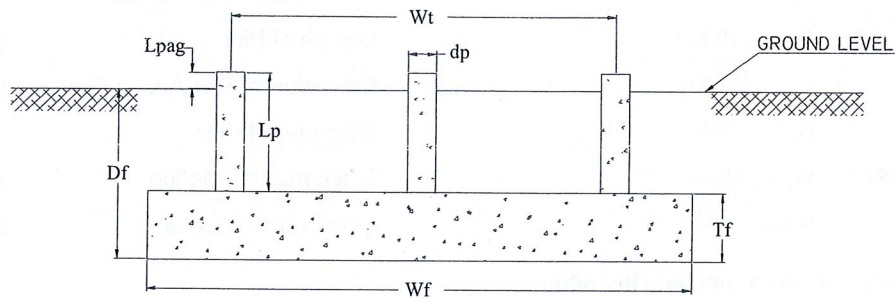
PIER REINFORCEMENT:

Bar Size $BS_{pier} := 7$ Bar Diameter $d_{bpier} := 0.875 \cdot \text{in}$
 Number of Bars $NB_{pier} := 26$ Bar Area $A_{bpier} := 0.6 \cdot \text{in}^2$

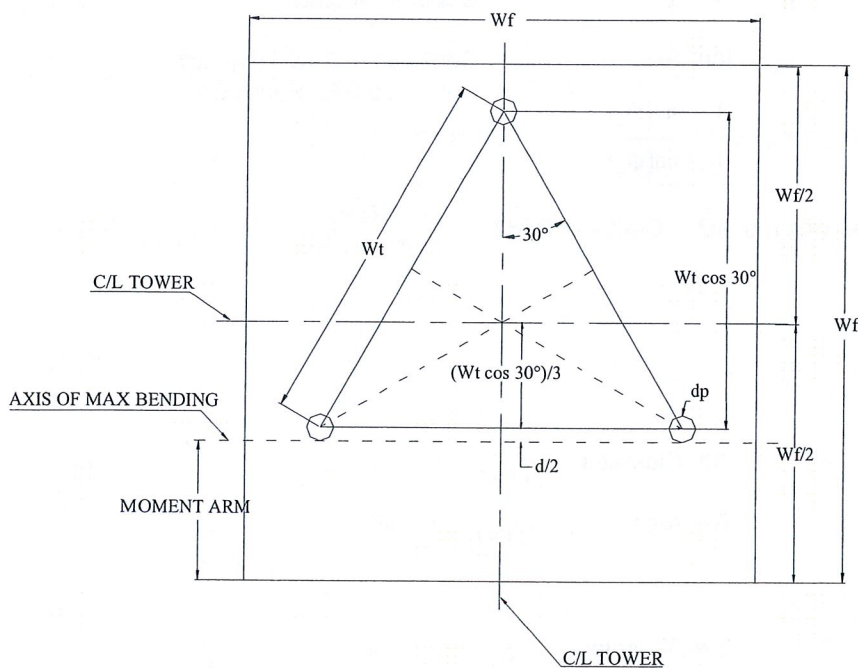
PAD REINFORCEMENT:

Bar Size $BS_{pad} := 10$ Bar Diameter $d_{bpad} := 1.270 \cdot \text{in}$
 Number of Bars $NB_{pad} := 29$ Bar Area $A_{bpad} := 1.270 \cdot \text{in}^2$

FOUNDATION OVERVIEW



ELEVATION



PLAN

STABILITY OF FOOTING

Factor of Safety Req'd: $FS_{req} := 2.0$

Passive Pressure: $P_{pn} := K_p \cdot \gamma_s \cdot n + c \cdot 2 \cdot \sqrt{K_p}$ $P_{pn} = 0 \cdot \text{ksf}$
 $P_{pt} := K_p \cdot \gamma_s \cdot (D_f - T_f) + c \cdot 2 \cdot \sqrt{K_p}$ $P_{pt} = 0.955 \cdot \text{ksf}$
 $P_{top} := \text{if}[n < (D_f - T_f), P_{pt}, P_{pn}]$ $P_{top} = 0.955 \cdot \text{ksf}$
 $P_{bot} := K_p \cdot \gamma_s \cdot D_f + c \cdot 2 \cdot \sqrt{K_p}$ $P_{bot} = 1.4856 \cdot \text{ksf}$
 $P_{ave} := \frac{P_{top} + P_{bot}}{2}$ $P_{ave} = 1.2203 \cdot \text{ksf}$

Shear: $T_{pp} := \text{if}[n < (D_f - T_f), T_f, (D_f - n)]$ $T_{pp} = 2.5 \cdot \text{ft}$
 $A_{pp} := W_f \cdot T_{pp}$ $A_{pp} = 75 \cdot \text{ft}^2$
 Ultimate Shear: $S_u := P_{ave} \cdot A_{pp}$ $S_u = 91.5233 \cdot \text{kip}$
 Weight of Concrete Pad: $WT_c := (W_f^2 \cdot T_f) \cdot \gamma_c$ $WT_c = 197.1 \cdot \text{kip}$
 Weight of Soil above Footing: $WT_{s1} := W_f^2 \cdot (|D_f - T_f|) \cdot \gamma_s$ $WT_{s1} = 243 \cdot \text{kip}$
 Weight of Soil Wedge at back face: $WT_{s2} := \left[\frac{(D_f - n)^2 \cdot \tan(\phi_s)}{2} \cdot W_f \right] \cdot \gamma_s$ $WT_{s2} = 29.7458 \cdot \text{kip}$

Distance to center of Tower Leg from Edge of Footing: $X_{t1} := \frac{W_f}{2} - \frac{W_t \cdot \cos(30 \cdot \text{deg})}{2}$ $X_{t2} := \frac{W_f}{2} - \frac{W_t \cdot \cos(30 \cdot \text{deg})}{3}$
 $X_t := \text{if}(\text{Pos}_{tower} = 1, X_{t1}, X_{t2})$ $X_t = 10.9585 \cdot \text{ft}$

Additional Offset of Footing: $X_{off1} := \frac{W_f}{2} - \left(\frac{W_t \cdot \cos(30 \cdot \text{deg})}{3} + X_t \right)$ $X_{off2} := 0$
 $X_{off} := \text{if}(\text{Pos}_{tower} = 1, X_{off1}, X_{off2})$ $X_{off} = 0 \cdot \text{ft}$

Resisting Moment: $M_r := (WT_c + WT_{s1}) \cdot \frac{W_f}{2} + WT_t \cdot \left(\frac{W_f}{2} - X_{off} \right) + S_u \cdot \frac{T_{pp}}{3} + WT_{s2} \cdot \left(W_f + \frac{T_{pp} \cdot \tan(\phi_s)}{3} \right)$
 $M_r = 7601.864 \cdot \text{kip} \cdot \text{ft}$

Overturning Moment: $M_{ot} := M_t + S_t \cdot (L_p + T_f) + WT_t \cdot X_{off}$ $M_{ot} = 2592 \cdot \text{kip} \cdot \text{ft}$

Factor of Safety: $FS := \frac{M_r}{M_{ot}}$ $FS = 2.9328$

SafetyCheck := $\text{if}(FS > FS_{req}, \text{"Okay"}, \text{"No Good"})$ $\text{SafetyCheck} = \text{"Okay"}$

BEARING PRESSURE CHECK:

Pressure Applied:

$$LOAD_{tot} := WT_c + WT_{s1} + WT_t$$

$$LOAD_{tot} = 441.1 \cdot \text{kip}$$

$$A_{mat} := W_f^2$$

$$A_{mat} = 900 \cdot \text{ft}^2$$

$$S := \frac{W_f^3}{6}$$

$$S = 4500 \cdot \text{ft}^3$$

$$P_{max} := \frac{LOAD_{tot}}{A_{mat}} + \frac{M_{ot}}{S}$$

$$P_{max} = 1.0661 \cdot \text{ksf}$$

$$P_{min} := \frac{LOAD_{tot}}{A_{mat}} - \frac{M_{ot}}{S}$$

$$P_{min} = -0.0859 \cdot \text{ksf}$$

$$MaxPressure := \text{if}(P_{max} < q_s, \text{"Okay"}, \text{"No Good"})$$

$$MaxPressure = \text{"Okay"}$$

$$MinPressure := \text{if}[(P_{min} \geq 0) \cdot (P_{min} < q_s), \text{"Okay"}, \text{"No Good"}]$$

$$MinPressure = \text{"No Good"}$$

Distance to Resultant of Pressure Distribution:

$$X_p := \frac{P_{max}}{P_{max} - P_{min}} \cdot \frac{1}{3} \cdot W_f$$

$$X_p = 9.2544 \cdot \text{ft}$$

Distance to Kern:

$$X_k := \frac{W_f}{3}$$

$$X_k = 10 \cdot \text{ft}$$

Since Resultant Force is Not in Kern, Area to which Pressure is Applied Must be Reduced.

Eccentricity:

$$e := \frac{M_{ot}}{LOAD_{tot}}$$

$$e = 5.8762$$

Adjusted Soil Pressure:

$$q_a := \frac{2 \cdot LOAD_{tot}}{3 \cdot W_f \cdot \left(\frac{W_f}{2} - e \right)}$$

$$q_a = 1.0744 \cdot \text{ksf}$$

Revised Maximum:

$$q_{max} := \text{if}(X_p < X_k, q_a, P_{max})$$

$$q_{max} = 1.0744 \cdot \text{kip}$$

$$PressureCheck := \text{if}(q_{max} < q_s, \text{"Okay"}, \text{"No Good"})$$

$$PressureCheck = \text{"Okay"}$$

(q_m)

Job 140' Self-Supporting Tower, Cheshire, CT
 Description Foundation Analysis

Project No. VZ5-038
 Computed by KAB
 Checked by _____

Page _____ of _____
 Sheet 5 of 10
 Date 11/23/09
 Date _____

CHECK PUNCHING AND BEAM SHEAR:

Load Factor: (EIA 3.1.1) $LF := \text{if} \left[H_t \leq 700\text{-ft}, 1.3, \text{if} \left[H_t \geq 1200, 1.7, 1.3 + \left(\frac{H_t - 700}{1200 - 700} \right) \cdot 0.4 \right] \right] LF = 1.3$

Beam Shear: (Critical section located at a distance d from the face of Pier) (ACI 11.3.1.1)

$$\phi_c := .85 \quad (\text{ACI 9.3.2.3})$$

$$d := T_f - C_{vr} - .5\text{-in}$$

$$d = 26.5\text{-in}$$

Factored load:

$$FL := LF \cdot \frac{C_t}{W_f^2}$$

$$FL = 0.3033\text{-ksf}$$

$$V_{req} := \frac{FL \cdot (X_t - 0.5 \cdot d_p - d) \cdot W_f}{\phi_c}$$

$$V_{req} = 72.267\text{-kip}$$

ACI 11.3.1.1

$$V_{Avail} := 2 \cdot \sqrt{f_c \cdot \text{psi}} \cdot W_f \cdot d$$

$$V_{Avail} = 1206.7252\text{-kip}$$

$$\text{BeamShearCheck} := \text{if}(V_{req} < V_{Avail}, \text{"Okay"}, \text{"No Good"})$$

$$\text{BeamShearCheck} = \text{"Okay"}$$

Punching Shear: (Critical Section Located at a distance of d/2 from the face of pier) (ACI 11.12.2.1)

$$b_o := (d_p + d) \cdot \pi$$

$$b_o = 19.5041\text{-ft}$$

$$V_{req} := FL \cdot \frac{W_f^2 - (d_p + d)^2 \cdot \frac{\pi}{4}}{\phi_c}$$

$$V_{req} = 310.3736\text{-kip}$$

$$V_{Avail} := 4 \cdot \sqrt{f_c \cdot \text{psi}} \cdot b_o \cdot d$$

$$V_{Avail} = 1569.0689\text{-kip}$$

$$\text{PunchingShearCheck} := \text{if}(V_{req} < V_{Avail}, \text{"Okay"}, \text{"No Good"})$$

$$\text{PunchingShearCheck} = \text{"Okay"}$$

TENSILE REINFORCEMENT IN PAD:

$$\phi_m := .90 \text{ per ACI 9.3.2.2}$$

Applied Moments:

$$M_{nT} := LF \cdot \left[U_t \cdot \left(W_t \cdot \sin(30 \cdot \text{deg}) - \frac{d_p}{2} \right) + S_t \cdot (D_f + L_{\text{pag}}) \right] - W_{T_t} \cdot X_{\text{off}}$$

$$M_{nS} := -1 \cdot \left[\frac{1}{2} \cdot \left(\frac{W_f}{2} + \frac{W_t}{3} \cdot \cos(30 \cdot \text{deg}) - \frac{d_p}{2} \right)^2 \cdot W_t \cdot [\gamma_s \cdot (T_{pp} - T_f)] + W_{T_{s2}} \cdot \left[\frac{W_f}{2} + \frac{W_t}{3} \cdot \cos(30 \cdot \text{deg}) - \frac{d_p}{2} + (D_f - n) \cdot \tan(\phi_s) \right] \right]$$

$$M_{nC} := -1 \cdot \left[\frac{1}{2} \cdot \left(\frac{W_f}{2} + \frac{W_t}{3} \cdot \cos(30 \cdot \text{deg}) - \frac{d_p}{2} \right)^2 \cdot W_t \cdot (\gamma_c \cdot T_f) \right]$$

Design Moment: $M_n := \frac{M_{nT} + M_{nS} + M_{nC}}{\phi_m}$ $M_n = 1736.3355 \cdot \text{kips} \cdot \text{ft}$

Required Reinforcement:

ACI 10.2.7.3 $\beta := \text{if } f_c \leq 4000 \cdot \text{psi}, .85, \text{if } f_c \geq 8000 \cdot \text{psi}, .65, .85 - \left(\frac{\frac{f_c}{\text{psi}} - 4000}{1000} \right) \cdot .05$ $\beta = 0.85$

Effective Width: $b_{\text{eff}} := W_t \cdot \cos(30 \cdot \text{deg}) + d_p$ $b_{\text{eff}} = 193.4923 \cdot \text{in}$

$$A_s := \frac{M_n}{\phi_m \cdot f_y \cdot d}$$

$A_s = 14.5605 \cdot \text{in}^2$

$$a := \frac{A_s \cdot f_y}{\beta \cdot f_c \cdot b_{\text{eff}}}$$

$a = 1.328 \cdot \text{in}$

$$A_s := \frac{M_n}{f_y \cdot \left(d - \frac{a}{2} \right)}$$

$A_s = 13.4412 \cdot \text{in}^2$

$$\rho := \frac{A_s}{b_{\text{eff}} \cdot d}$$

$\rho = 0.0026$

Job 140' Self-Supporting Tower, Cheshire, CT
Description Foundation Analysis

Project No. VZ5-038
Computed by KAB
Checked by _____

Page _____ of _____
Sheet 7 of 10
Date 11/23/09
Date _____

Temperature and Shrinkage: (ACI 7.12.2.1b)

$$\rho_{sh} := \text{if}(f_y \geq 60000 \cdot \text{psi}, 0.0018, 0.0020)$$

$$\rho_{sh} = 0.0018$$

Area Required:

$$A_s := \text{if}\left(\rho \geq \rho_{sh}, A_s, \rho_{sh} \cdot \frac{b_{eff}}{2} \cdot d\right)$$

$$A_s = 13.4412 \cdot \text{in}^2$$

Area Provided:

$$A_{s_{prov}} := A_{bpad} \cdot NB_{pad}$$

$$A_{s_{prov}} = 36.83 \cdot \text{in}^2$$

$$\text{PadReinforcement} := \text{if}(A_{s_{prov}} > A_s, \text{"Okay"}, \text{"No Good"})$$

$$\text{PadReinforcement} = \text{"Okay"}$$

DEVELOPMENT LENGTH OF PAD REINFORCEMENT:

TENSION (ACI 12.2.3)

Bar Spacing:

$$B_{sPad} := \frac{W_f - 2 \cdot C_{vr} - NB_{pad} \cdot d_{bpad}}{NB_{pad} - 1}$$

$$B_{sPad} = 11.3275 \cdot \text{in}$$

Development Length Factors:

Reinforcement Location Factor

$$\alpha := 1.0$$

Coating Factor

$$\beta := 1.0$$

Concrete strength Factor

$$\lambda := 1.0$$

Reinforcement Size Factor

$$\gamma := 1.0$$

Spacing or Cover Dimension:

$$c := \text{if}\left(C_{vr} < \frac{B_{sPad}}{2}, C_{vr}, \frac{B_{sPad}}{2}\right) \quad c = 3 \cdot \text{in}$$

Transverse Reinforcement Index as allowed by ACI 12.2.4

$$k_{tr} := 0$$

Development Length:

$$L_{dbt} := \frac{3}{40} \cdot \frac{f_y}{\sqrt{f_c \cdot \text{psi}}} \cdot \frac{\alpha \cdot \beta \cdot \gamma \cdot \lambda}{c + k_{tr}} \cdot d_{bpad}$$

$$L_{dbt} = 38.2533 \cdot \text{in}$$

$$L_{dbmin} := 12 \cdot \text{in}$$

Minimum Development Length: $L_{dbtCheck} := \text{if}(L_{dbt} \geq L_{dbmin}, \text{"Use } L_{dbt}\text{"}, \text{"Use } L_{dbmin}\text{"})$
(ACI 12.2.1)

$$L_{dbtCheck} = \text{"Use } L_{dbt}\text{"}$$

Available Length in Pad:

$$L_{Pad} := \frac{W_f}{2} - \frac{W_t}{2} - C_{vr}$$

$$L_{Pad} = 93 \cdot \text{in}$$

$$L_{padTension} := \text{if}(L_{Pad} > L_{dbt}, \text{"Okay"}, \text{"No Good"})$$

$$L_{padTension} = \text{"Okay"}$$

REINFORCEMENT IN PIER:

$$\begin{aligned} \text{Pier Area:} \quad A_p &:= \frac{\pi \cdot d_p^2}{4} & A_p &= 1809.5574 \cdot \text{in}^2 \\ (\text{ACI 10.8.4 and 10.9.1}) \quad A_{smin} &:= 0.01 \cdot 0.5 \cdot A_p & A_{smin} &= 9.0478 \cdot \text{in}^2 \\ A_{sprov} &:= NB_{pier} \cdot A_{bpier} & A_{sprov} &= 15.6 \cdot \text{in}^2 \\ \text{SteelAreaCheck} &:= \text{if}(A_{sprov} > A_{smin}, \text{"Okay"}, \text{"No Good"}) & \text{SteelAreaCheck} &= \text{"Okay"} \end{aligned}$$

NOTE: Anchor Bolts are not accounted for in reinforcement calculation and will provide additional reinforcement to satisfy minimum requirement of steel.

$$\begin{aligned} \text{Bar Spacing In Pier:} \quad B_{sPier} &:= \frac{d_p \cdot \pi}{NB_{pier}} - d_{bpier} & B_{sPier} &= 4.9249 \cdot \text{in} \\ \text{Diameter of Reinforcement Cage:} \quad \text{Diam}_{cage} &:= d_p - 2 \cdot C_{vr} & \text{Diam}_{cage} &= 42 \cdot \text{in} \\ \text{Maximum Moment in Pier:} \quad M_p &:= (S_t \cdot L_p) \cdot LF & M_p &= 2184 \cdot \text{kips} \cdot \text{in} \end{aligned}$$

Pier Check evaluated from outside program and results are listed below;

(defined variables)

$$(f_c \quad f_y \quad c_l \quad \text{Spiral}) = (3 \quad 60 \quad 4 \quad 0)$$

The required input is column diameter in inches, number of reinforcing bars, bar size number, factored axial load in kips and moment in kip inches:

$$(D \quad N \quad n \quad P_u \quad M_{xu}) := (48 \quad 26 \quad 7 \quad 270 \quad 3086)$$

Clears any previous output:

$$(\phi P_n \quad \phi M_{xn} \quad f_{sp} \quad \rho) := (0 \quad 0 \quad 0 \quad 0)$$

$$(\phi P_n \quad \phi M_{xn} \quad f_{sp} \quad \rho) := \phi P'_n (D, N, n, P_u, M_{xu})^T$$

The Output is given as useable axial load in kips, moment capacity in kip inches, splicing stress in ksi, and reinforcement ratio:

$$(\phi P_n \quad \phi M_{xn} \quad f_{sp} \quad \rho) = (1947.7766 \quad 22262.3651 \quad -52.7964 \quad 0.0086)$$

Column size and reinforcement may be changed to match capacity to the applied load.

$$\text{AxialLoadCheck} := \text{if}(\phi P_n \geq P_u, \text{"Okay"}, \text{"No Good"})$$

$$\text{AxialLoadCheck} = \text{"Okay"}$$

$$\text{BendingCheck} := \text{if}(\phi M_{xn} \geq M_{xu}, \text{"Okay"}, \text{"No Good"})$$

$$\text{BendingCheck} = \text{"Okay"}$$

Job 140' Self-Supporting Tower, Cheshire, CT
 Description Foundation Analysis

Project No. VZ5-038

Computed by KAB

Checked by _____

Page _____ of _____

Sheet 9 of 10

Date 11/23/09

Date _____

DEVELOPMENT LENGTH OF PIER REINFORCEMENT:

TENSION (ACI 12.2.3)

Spacing and Cover: $C_{vr} = 3 \cdot \text{in}$ $B_{sPier} = 4.9249 \cdot \text{in}$

Factors for development:

Reinforcement Location Factor	$\alpha := 1.0$
Coating Factor	$\beta := 1.0$
Concrete strength Factor	$\lambda := 1.0$
Reinforcement Size Factor	$\gamma := 1.0$

Spacing or Cover Dimension: $c := \text{if} \left(C_{vr} < \frac{B_{sPier}}{2}, C_{vr}, \frac{B_{sPier}}{2} \right)$ $c = 2.4624 \cdot \text{in}$

Transverse Reinforcement: As allowed by ACI 12.2.4 $k_{tr} := 0$

$$L_{dbt} := \frac{3}{40} \cdot \frac{f_y}{\sqrt{f_c \cdot \text{psi}}} \cdot \frac{\alpha \cdot \beta \cdot \gamma \cdot \lambda}{c + k_{tr}} \cdot d_{bpier} \quad L_{dbt} = 22.1225 \cdot \text{in}$$

Minimum Development Length: (ACI 12.2.1)

$$L_{dbmin} := 12 \cdot \text{in}$$

$$L_{dbtCheck} := \text{if} (L_{dbt} \geq L_{dbmin}, "Use L_{dbt}", "Use L_{dbmin}") \quad L_{dbtCheck} = "Use L_{dbt}"$$

COMPRESSION: (ACI 12.3.2)

$$L_{dbc1} := \frac{.02 \cdot d_{bpier} \cdot f_y}{\sqrt{f_c \cdot \text{psi}}} \quad L_{dbc1} = 16.602 \cdot \text{in}$$

$$L_{dbmin} := 0.0003 \cdot \frac{\text{in}^2}{\text{lb}} \cdot (d_{bpier} \cdot f_y) \quad L_{dbmin} = 15.75 \cdot \text{in}$$

$$L_{dbc} := \text{if} (L_{dbc1} \geq L_{dbmin}, L_{dbc1}, L_{dbmin}) \quad L_{dbc} = 16.602 \cdot \text{in}$$



Job 140' Self-Supporting Tower, Cheshire, CT

Project No. VZ5-038

Page of

Description Foundation Analysis

Computed by KAB

Sheet 10 of 10

Checked by

Date 11/23/09

Date

Available Length in Pier: $L_{\text{pier}} := L_p - 3 \cdot \text{in}$

$L_{\text{pier}} = 57 \cdot \text{in}$

$L_{\text{piertension}} := \text{if}(L_{\text{pier}} > L_{\text{dbt}}, \text{"Okay"}, \text{"No Good"})$

$L_{\text{piertension}} = \text{"Okay"}$

$L_{\text{piercompression}} := \text{if}(L_{\text{pier}} > L_{\text{dbc}}, \text{"Okay"}, \text{"No Good"})$

$L_{\text{piercompression}} = \text{"Okay"}$

Available Length in Pad: $L_{\text{pad}} := T_f - 3 \cdot \text{in}$

$L_{\text{pad}} = 27 \cdot \text{in}$

$L_{\text{padtension}} := \text{if}(L_{\text{pad}} > L_{\text{dbt}}, \text{"Okay"}, \text{"No Good"})$

$L_{\text{padtension}} = \text{"Okay"}$

$L_{\text{padcompression}} := \text{if}(L_{\text{pad}} > L_{\text{dbc}}, \text{"Okay"}, \text{"No Good"})$

$L_{\text{padcompression}} = \text{"Okay"}$