

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

Also admitted in Massachusetts

March 19, 2013

David Martin
Siting Analyst
Connecticut Siting Council
10 Franklin Square
New Britain, CT 06051



Re: **EM-VER-086-120410 – Cellco Partnership d/b/a Verizon Wireless**
57 Cook Road, Montville, Connecticut

Dear Mr. Martin:

On April 24, 2012, the Siting Council acknowledged receipt of Cellco's notice of intent to modify its telecommunications facility at 57 Cook Road in Montville. The modification involved the replacement of certain antennas and the installation of additional antenna cables.

As a condition of the acknowledgement, Cellco was required to provide the Council with a letter stating that the recommendations specified in the structural report were implemented. Attached is a Tower Modification Certification Letter verifying that these conditions have been satisfied. All construction associated with these modifications has now been completed.

If you have any questions please do not hesitate to contact me or Rachel Mayo.

Sincerely,



Kenneth C. Baldwin

Attachment
Copy to:

Sandy M. Carter
Brian Ragozzine
Mark Gauger



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March 12, 2013

Mr. Mark Gauger
Verizon Wireless
99 East River Drive
East Hartford, Connecticut 06108

Re: Existing Telecommunications Facility Tower Modification Certification Letter

Project: Verizon ~ Montville 4
57 Cook Road
Montville, CT

Tower Owner: Wireless Solutions, LLC
695 Norwich New London Turnpike
Montville, CT 06382

Engineer: Centek Engineering
63-2 North Branford Road, Branford, CT 06405

Centek Project No.: 12005.CO52

Dear Mr. Gauger,

We are providing this "Existing Telecommunications Facility Tower Modification Certification Letter" with regard to the antenna upgrade by Verizon Wireless at the above referenced project.

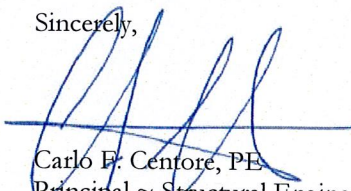
The following are the basis for substantiating compliance with the tower modification documents prepared by Centek Engineering, Inc. (Centek Project No. 11001.27):

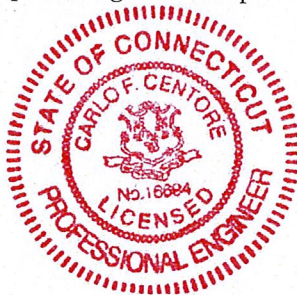
- ☐ Review of the Centek Engineering Structural Modification Drawings N-1, N-2, S-3, S-4 Rev-1 dated 12/08/2011 and drawings S-1 and S-2 Rev-2 dated 5/25/2012.
- ☐ Review of the Centek Engineering Post Modification Report (Centek Project No. 11001.CO27) dated 3/08/2013.
- ☐ Field observations by Centek Engineering personnel on 1/11/2013 of the completed modifications.

With the completed modifications, the tower and foundation do not exceed 100 percent of their post-construction structural rating.

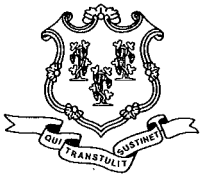
The work under this Contract has been reviewed and found, to the Engineer's best knowledge, information and belief, to be completed in general compliance with the documents referenced above.

Sincerely,


Carlo F. Centore, PE
Principal ~ Structural Engineer



CC: Rachel Mayo, Tim Parks, Jim Smith



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 24, 2012

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

RE: **EM-VER-086-120410** - Cellco Partnership d/b/a Verizon Wireless notice of intent to modify an existing telecommunications facility located at 57 Cook Road, Montville, Connecticut.

Dear Attorney Baldwin:

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

- The tower reinforcements outlined in Section 5 be completed in accordance with the recommendations made in the Structural Analysis Report and Reinforcement Design prepared by Centek Engineering, Revision #1 dated December 8, 2011 and stamped Carlo Centore; and
- Prior to antenna installation, a signed letter from a Professional Engineer duly licensed in the State of Connecticut shall be submitted to the Council to certify that the recommended modifications have been completed and the tower and foundation will not exceed 100 percent of the post-construction structural rating.
- 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 April 10, 2012. 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 Ronald K. McDaniel, Mayor, Town of Montville
Marcia Vlaun, Town Planner, Town of Montville
Wireless Solutions



STATE OF CONNECTICUT

CONNECTICUT SITING COUNCIL

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E-Mail: siting.council@ct.gov

www.ct.gov/csc

April 24, 2012

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

RE: **EM-VER-086-120410** - Cellco Partnership d/b/a Verizon Wireless notice of intent to modify an existing telecommunications facility located at 57 Cook Road, Montville, Connecticut.

Dear Attorney Baldwin:

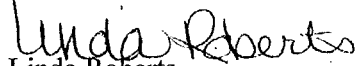
The Connecticut Siting Council (Council) hereby acknowledges your notice to modify this existing telecommunications facility, pursuant to Section 16-50j-73 of the Regulations of Connecticut State Agencies with the following conditions:

- The tower reinforcements outlined in Section 5 be completed in accordance with the recommendations made in the Structural Analysis Report and Reinforcement Design prepared by Centek Engineering, Revision #1 dated December 8, 2011 and stamped Carlo Centore; and
- Prior to antenna installation, a signed letter from a Professional Engineer duly licensed in the State of Connecticut shall be submitted to the Council to certify that the recommended modifications have been completed and the tower and foundation will not exceed 100 percent of the post-construction structural rating.
- 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 April 10, 2012. 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 Ronald K. McDaniel, Mayor, Town of Montville
Marcia Vlaun, Town Planner, Town of Montville
Wireless Solutions



STATE OF CONNECTICUT

CONNECTICUT SITING COUNCIL

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www.ct.gov/csc

April 10, 2012

The Honorable Ronald K. McDaniel
Mayor
Town of Montville
Town Hall
310 Norwich New London Turnpike
Uncasville, CT 06382

RE: **EM-VER-086-120410** - Cellco Partnership d/b/a Verizon Wireless notice of intent to modify an existing telecommunications facility located at 57 Cook Road, Montville, Connecticut.

Dear Mayor McDaniel:

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 April 24, 2012.

Thank you for your cooperation and consideration.

Very truly yours,

Linda Roberts
Executive Director

LR/jbw

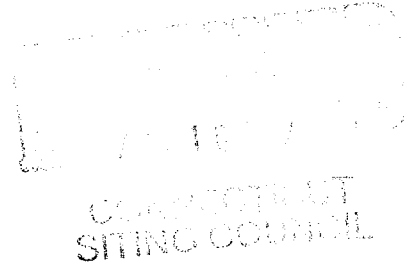
Enclosure: Notice of Intent

c: Marcia Vlaun, Town Planner, Town of Montville

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

April 10, 2012

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



Re: **Notice of Exempt Modification – Antenna Swap**
57 Cook Road, Montville, Connecticut

Dear Ms. Roberts:

Cellco Partnership d/b/a Verizon Wireless (“Cellco”) currently maintains twelve (12) wireless telecommunications antennas at the 169-foot level on the existing 190-foot tower at the above-referenced address. The tower is owned by Wireless Solutions. The Council approved Cellco’s shared use of this tower in 1998. Cellco now intends to modify its installation by replacing all of its existing antennas with six (6) model LPA-80080-4CF cellular antennas; three (3) model BXA-171085-8BF PCS antennas; and three (3) model BXA-70063-6CF LTE antennas, all at the 169-foot level on the tower. Cellco also intends to install six (6) additional coax cables. Attached behind Tab 1 are the specifications for the replacement antennas.

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 Ronald K. McDaniel, Mayor for the Town of Montville. A copy of this letter is also being sent to Robert W. and Karen A. Kingsborough, the owners of the property on which the tower is located.

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 an increase in the overall height of the existing tower. Cellco’s replacement antennas will be located at the 169-foot level on the 190-foot tower.



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Linda Roberts
April 10, 2012
Page 2

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

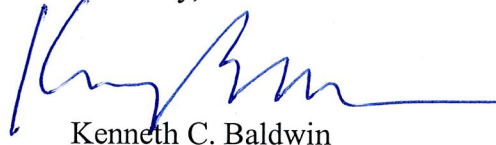
3. The proposed modifications will not increase noise levels at the facility by six decibels or more.

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 and Reinforcement Design confirming that the tower and foundation, with certain modifications, can support Cellco's proposed facility modifications. (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:

Ronald K. McDaniel, Montville Mayor
Robert W. and Karen A. Kingsborough
Sandy M. Carter

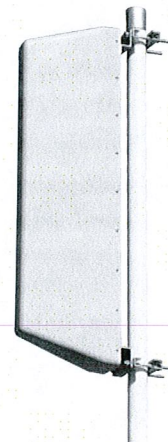


LPA-80080-4CF-EDIN-X

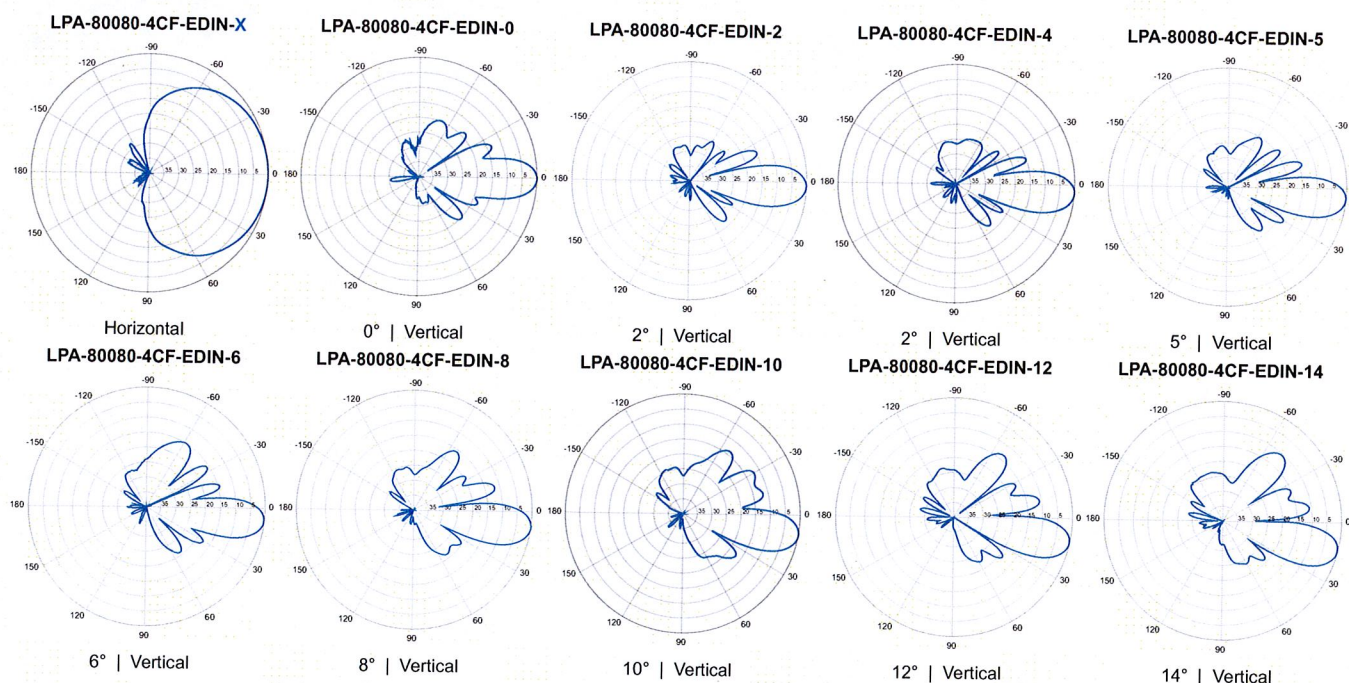
V-Pol | Log Periodic | 80° | 12.5 dBd

Replace "X" with desired electrical downtilt.

Antenna is also available with NE connector(s). Replace "EDIN" with "NE" in the model number when ordering.



Electrical Characteristics				
Frequency bands	806-960 MHz			
Polarization	Vertical			
Horizontal beamwidth	80°			
Vertical beamwidth	15°			
Gain	12.5 dBd (14.6 dBi)			
Electrical downtilt (X)	0, 2, 4, 5, 6, 8, 10, 12, 14			
Impedance	50Ω			
VSWR	≤1.4:1			
Upper sidelobe suppression (0°)	-14.2 dB			
Front-to-back ratio (+/-30°)	-34.7 dB			
Null fill	15% (-16.48 dB)			
Input power	500 W			
Lightning protection	Direct Ground			
Connector(s)	1 Port / EDIN or NE / Female / Center (Back)			
Mechanical Characteristics				
Dimensions Length x Width x Depth	1200 x 140 x 335 mm		47.2 x 5.5 x 13.2 in	
Depth of antenna with z-bracket	375 mm		14.8 in	
Weight without mounting brackets	5.4 kg		12 lbs	
Survival wind speed	> 201 km/hr		> 125 mph	
Wind area	Front: 0.17 m²	Side: 0.40 m²	Front: 1.8 ft²	Side: 4.3 ft²
Wind load @ 161 km/hr (100 mph)	Front: 254 N	Side: 574 N	Front: 57 lbf	Side: 129 lbf
Mounting Options	Part Number	Fits Pipe Diameter		Weight
2-Point Mounting & Downtilt Bracket Kit (0-20°)	21699999	50-102 mm	2.0-4.0 in	5.4 kg 12 lbs
Lock-Down Brace	If the lock-down brace is used, the maximum diameter of the mounting pipe is 88.9 mm or 3.5 in.			



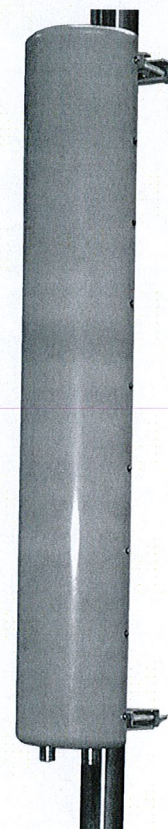
Quoted performance parameters are provided to offer typical or range values only and may vary as a result of normal manufacturing and operational conditions. Extreme operational conditions and/or stress on structural supports is beyond our control. Such conditions may result in damage to this product. Improvements to product may be made without notice.

BXA-171085-8BF-EDIN-X

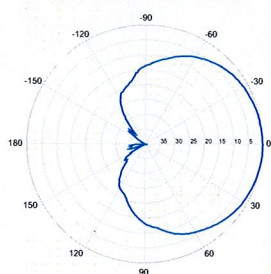
Replace "X" with desired electrical downtilt.

X-Pol | FET Panel | 85° | 16.4 dBi

Electrical Characteristics	1710-2170 MHz		
Frequency bands	1710-1880 MHz	1850-1990 MHz	1920-2170 MHz
Polarization	±45°	±45°	±45°
Horizontal beamwidth	88°	85°	80°
Vertical beamwidth	7°	7°	7°
Gain	13.5 dBd / 15.6 dBi	13.9 dBd / 16.0 dBi	14.3 dBd / 16.4 dBi
Electrical downtilt (X)	0, 2, 4		
Impedance	50Ω		
VSWR	≤1.5:1		
First upper sidelobe	< -17 dB		
Front-to-back isolation	> 30 dB		
In-band isolation	> 28 dB		
IM3 (20W carrier)	< -150 dBc		
Input power	300 W		
Lightning protection	Direct Ground		
Connector(s)	2 Ports / EDIN / Female / Bottom		
Operating temperature	-40° to +60° C / -40° to +140° F		
Mechanical Characteristics			
Dimensions Length x Width x Depth	1232 x 154 x 105 mm	48.5 x 6.1 x 4.1 in	
Depth with t-brackets	133 mm	5.2 in	
Weight without mounting brackets	4.8 kg	10.5 lbs	
Survival wind speed	296 km/hr	184 mph	
Wind area	Front: 0.19 m ² Side: 0.14 m ²	Front: 2.0 ft ² Side: 1.5 ft ²	
Wind load @ 161 km/hr (100 mph)	Front: 281 N Side: 223 N	Front: 63 lbf Side: 50 lbf	
Mounting Options	Part Number	Fits Pipe Diameter	Weight
2-Point Mounting Bracket Kit	26799997	50-102 mm 2.0-4.0 in	2.3 kg 5 lbs
2-Point Mounting & Downtilt Bracket Kit	26799999	50-102 mm 2.0-4.0 in	3.6 kg 8 lbs
Concealment Configurations	For concealment configurations, order BXA-171085-8BF-EDIN-X-FP		

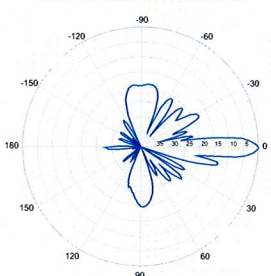


BXA-171085-8BF-EDIN-X



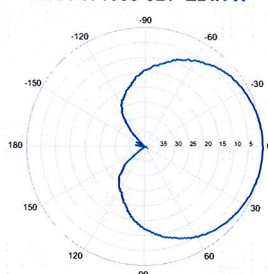
Horizontal | 1710-1880 MHz

BXA-171085-8BF-EDIN-0



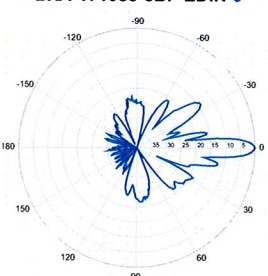
0° | Vertical | 1710-1880 MHz

BXA-171085-8BF-EDIN-X



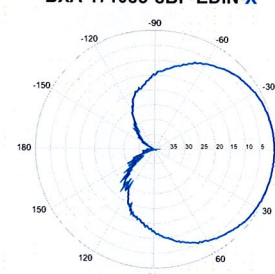
Horizontal | 1850-1990 MHz

BXA-171085-8BF-EDIN-0



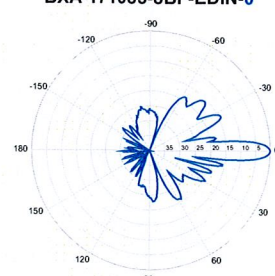
0° | Vertical | 1850-1990 MHz

BXA-171085-8BF-EDIN-X



Horizontal | 1920-2170 MHz

BXA-171085-8BF-EDIN-0



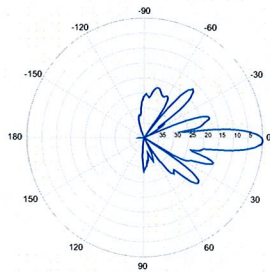
0° | Vertical | 1920-2170 MHz

Quoted performance parameters are provided to offer typical or range values only and may vary as a result of normal manufacturing and operational conditions. Extreme operational conditions and/or stress on structural supports is beyond our control. Such conditions may result in damage to this product. Improvements to product may be made without notice.

BXA-171085-8BF-EDIN-X

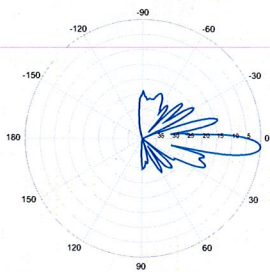
X-Pol | FET Panel | 85° | 16.4 dBi

BXA-171085-8BF-EDIN-2



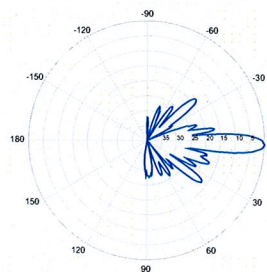
2° | Vertical | 1710-1880 MHz

BXA-171085-8BF-EDIN-4



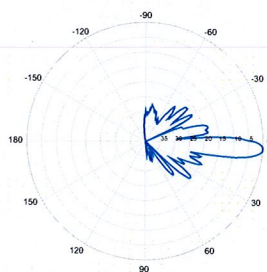
4° | Vertical | 1710-1880 MHz

BXA-171085-8BF-EDIN-2



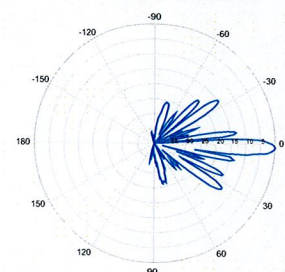
2° | Vertical | 1850-1990 MHz

BXA-171085-8BF-EDIN-4



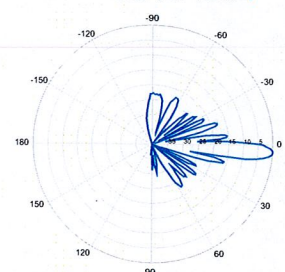
4° | Vertical | 1850-1990 MHz

BXA-171085-8BF-EDIN-2



2° | Vertical | 1920-2170 MHz

BXA-171085-8BF-EDIN-4



4° | Vertical | 1920-2170 MHz

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BXA-70063-6CF-EDIN-X

X-Pol | FET Panel | 63° | 14.5 dBd

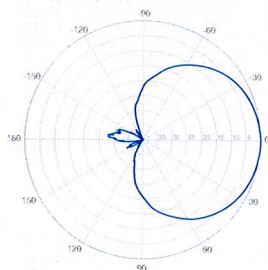
Replace "X" with desired electrical downtilt.

Antenna is also available with NE connector(s). Replace "EDIN" with "NE" in the model number when ordering.

Electrical Characteristics	696-900 MHz			
Frequency bands	696-806 MHz		806-900 MHz	
Polarization	±45°			
Horizontal beamwidth	65°		63°	
Vertical beamwidth	13°		11°	
Gain	14.0 dBd (16.1 dBi)		14.5 dBd (16.6 dBi)	
Electrical downtilt (X)	0, 2, 3, 4, 5, 6, 8, 10			
Impedance	50Ω			
VSWR	≤1.35:1			
Upper sidelobe suppression (0°)	-18.3 dB		-18.2 dB	
Front-to-back ratio (+/-30°)	-33.4 dB		-36.3 dB	
Null fill	5% (-26.02 dB)			
Isolation between ports	< -25 dB			
Input power with EDIN connectors	500 W			
Input power with NE connectors	300 W			
Lightning protection	Direct Ground			
Connector(s)	2 Ports / EDIN or NE / Female / Center (Back)			
Mechanical Characteristics				
Dimensions Length x Width x Depth	1804 x 285 x 132 mm		71.0 x 11.2 x 5.2 in	
Depth with z-brackets	172 mm		6.8 in	
Weight without mounting brackets	7.9 kg		17 lbs	
Survival wind speed	> 201 km/hr		> 125 mph	
Wind area	Front: 0.51 m² Side: 0.24 m²		Front: 5.5 ft² Side: 2.6 ft²	
Wind load @ 161 km/hr (100 mph)	Front: 759 N Side: 391 N		Front: 169 lbf Side: 89 lbf	
Mounting Options	Part Number	Fits Pipe Diameter		Weight
3-Point Mounting & Downtilt Bracket Kit	36210008	40-115 mm 1.57-4.5 in		6.9 kg 15.2 lbs
Concealment Configurations	For concealment configurations, order BXA-70063-6CF-EDIN-X-FP			

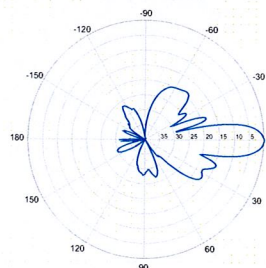


BXA-70063-6CF-EDIN-X



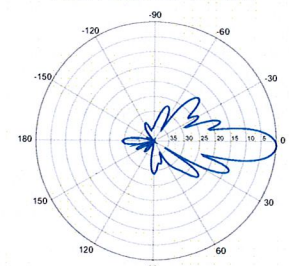
Horizontal | 750 MHz

BXA-70063-6CF-EDIN-0

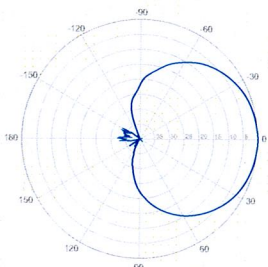


0° | Vertical | 750 MHz

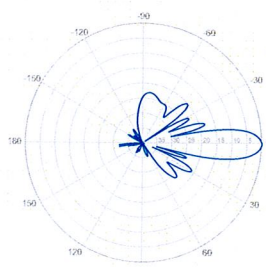
BXA-70063-6CF-EDIN-2



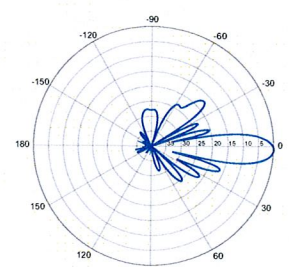
2° | Vertical | 750 MHz



Horizontal | 850 MHz



0° | Vertical | 850 MHz



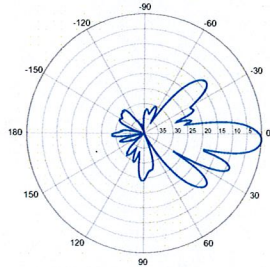
2° | Vertical | 850 MHz

Quoted performance parameters are provided to offer typical or range values only and may vary as a result of normal manufacturing and operational conditions. Extreme operational conditions and/or stress on structural supports is beyond our control. Such conditions may result in damage to this product. Improvements to product may be made without notice.

BXA-70063-6CF-EDIN-X

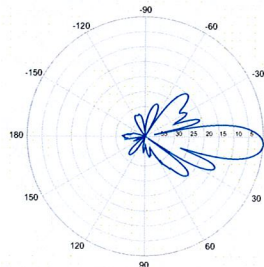
X-Pol | FET Panel | 63° | 14.5 dBd

BXA-70063-6CF-EDIN-3



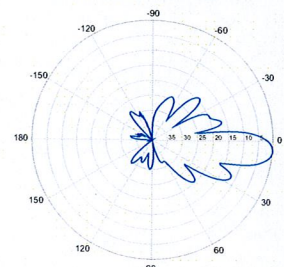
3° | Vertical | 750 MHz

BXA-70063-6CF-EDIN-4

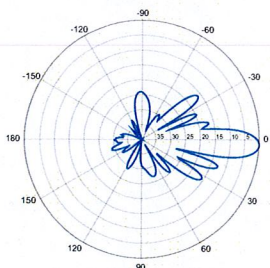


4° | Vertical | 750 MHz

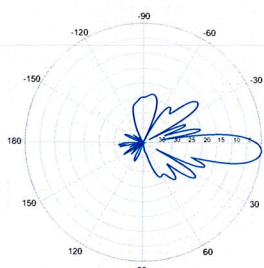
BXA-70063-6CF-EDIN-5



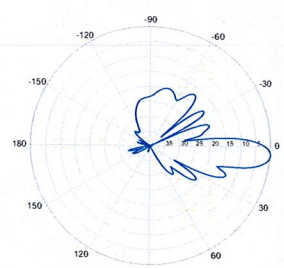
5° | Vertical | 750 MHz



3° | Vertical | 850 MHz

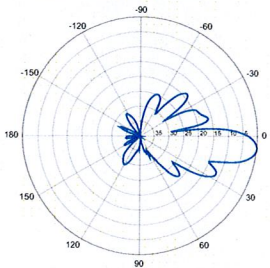


4° | Vertical | 850 MHz



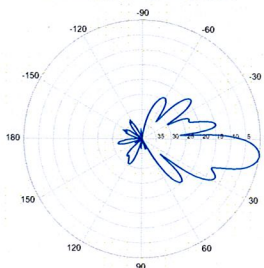
5° | Vertical | 850 MHz

BXA-70063-6CF-EDIN-6



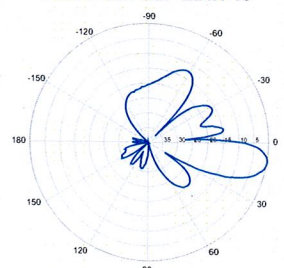
6° | Vertical | 750 MHz

BXA-70063-6CF-EDIN-8

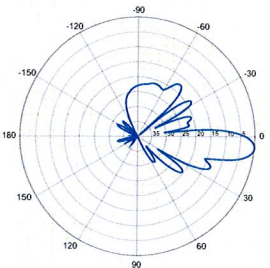


8° | Vertical | 750 MHz

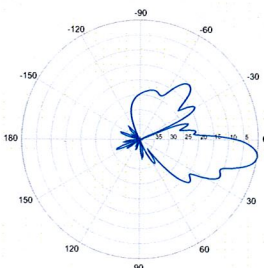
BXA-70063-6CF-EDIN-10



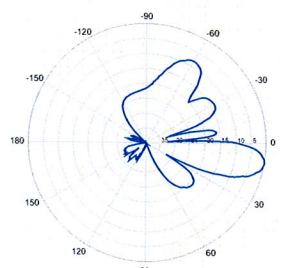
10° | Vertical | 750 MHz



6° | Vertical | 850 MHz



8° | Vertical | 850 MHz



10° | Vertical | 850 MHz

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Site Name: Montville 4		General	Power	Density					
Tower Height: Verizon @ 169ft									
CARRIER	# OF CHAN.	WATTS ERP	HEIGHT	CALC. POWER DENS	FREQ.	MAX. PERMISS. EXP.	FRACTION MPE	Total	
*Cingular UMTS	1	500	177	0.0057	880	0.5867	0.98%		
*Cingular GSM	4	296	177	0.0136	880	0.5867	2.32%		
*Cingular GSM	2	427	177	0.0098	1900	1.0000	0.98%		
*Clearwire	6	285.76	120	0.0428	2500	1.0000	4.28%		
*MetroPCS	3	443.61	130	0.0283	2140	1.0000	2.83%		
*Nextel	12	100	134	0.0240	851	0.5673	4.24%		
*Sprint	3	200	160	0.0084	1962.5	1.0000	0.84%		
*T-Mobile	8	157	192	0.0123	1935	1.0000	1.23%		
Verizon PCS	7	233	169	0.0205	1970	1.0000	2.05%		
Verizon Cellular	9	288	169	0.0326	869	0.5793	5.63%		
Verizon AWS	1	583	169	0.0073	2145	1.0000	0.73%		
Verizon 700	1	760	169	0.0096	698	0.4653	2.06%		
								28.17%	
* Source: Siting Council									

**Structural Analysis Report
and Reinforcement Design**

190-ft Existing Guyed Lattice Tower

*Proposed Verizon Wireless
LTE Antenna Installation*

Verizon Site Ref: Montville 4

*54 Cook Drive,
Montville, CT*

Centek Project No. 11001.CO27

~~Date: August 17, 2011~~

Revision #1: December 08, 2011



Prepared for:

**Verizon Wireless
99 East River Road, 9th Floor
East Hartford, CT 06108**

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Introduction

The purpose of this report is to summarize the results of the non-linear, P- Δ structural analysis of the antenna installation/modification proposed by Verizon Wireless on the existing guyed lattice tower located in Montville, Connecticut.

The host tower is a 190-ft, three face, guyed steel lattice tower originally designed and manufactured by UNR-ROHN. The tower was extended by 10-ft to its current height of 190-ft in 2002 per UHN-ROHN drawing no. C020301. The tower geometry, structure member sizes and foundation design information were all obtained from UNR-ROHN design drawing B971656, job no. 35489PH dated March, 1997 and a previous structural analysis prepared by this office Natcomm Job No. 08007.CO12, marked Revision #1, dated June 9, 2008. Subsequent tower reinforcement material information was obtained from MetroPCS construction drawings prepared by Fullerton Engineering Consultants, dated November 12, 2010.

Antenna and appurtenance information was taken from a combination of the aforementioned Centek structural analysis report, MetroPCS construction drawings dated November 12, 2010 and field documentation of the structure conducted from grade by Centek personnel during June 2011. A copy of the UNR-ROHN foundation design drawings, RF data sheet and antenna material sheets are available for reference in Section 6 of this report.

The tower consists of eleven (11) vertical sections constructed of steel pipe legs conforming to ASTM A572-50. Diagonal and horizontal lateral support bracing consists of a combination of steel angle and steel pipe construction conforming to ASTM A36 and ASTM A53-B-42. The vertical tower sections are connected by bolted flange plates with the diagonal and horizontal bracing to pipe legs consisting of bolted connections. The width of the tower face is 3.42-ft at throughout its length with the exception of a 5'-0" high tapered base section.

Verizon Wireless proposes the removal of twelve (12) existing panel antennas and the installation of twelve (12) panel antennas mounted on three (3) existing 14-ft ROHN boom gates. Removal and replacement of the existing boom gates with three (3) 15-ft Valmont T-frames is also required. Refer to the Antenna and Appurtenance Summary below for a detailed description of the proposed antenna and appurtenance configuration.

Antenna and Appurtenance Summary

The existing tower supports several communication antennas. The existing and proposed loads considered in the analysis consist of the following:

- T-MOBILE (Existing):
Antennas: Three (3) APX16PV-16PVL-X panel antennas and six (6) G20057A1 TMA's mounted on three (3) 10-ft Boom Gates with a RAD center elevation of ± 188.0 -ft above the existing tower base.
Coax Cables: Twelve (12) 1-5/8" $\varnothing$ coax cables running on a leg/face of the existing tower as specified on detail 2/S-2 within Section 5 of this report.
- UNKNOWN (Existing):
Antenna: One (1) 20' by 3" $\varnothing$ Omni-directional (whip) antenna mounted with an elevation of ± 188.75 -ft above the tower base.
Coax Cable: One (1) 7/8" coax cable running on a leg/face of the existing tower as specified on detail 2/S-2 within Section 5 of this report.

- **AT&T (Existing):**
Antennas: Six (6) Powerwave 7770 panel antennas, six (6) TMA's and three (3) diplexers mounted on three (3) 12-ft Boom Gates with a RAD center elevation of ± 178.75 -ft above the existing tower base.
Coax Cables: Twelve (12) 1-1/4" $\varnothing$ coax cables running on a leg/face of the existing tower as specified on detail 2/S-2 within Section 5 of this report.
- **UNKNOWN (Existing):**
Antenna: Two (2) FG4605 antennas mounted with an elevation of ± 170.25 -ft above the tower base.
Coax Cable: Two (2) 7/8" $\varnothing$ coax cables running on a leg/face of the existing tower as specified on detail 2/S-2 within Section 5 of this report.
- **UNKNOWN (Existing):**
Antenna: One (1) 6-ft 4-Bay Dipole antenna mounted with an elevation of ± 155.5 -ft above the tower base.
Coax Cable: One (1) 1-1/4" $\varnothing$ coax cable running on a leg/face of the existing tower as specified on detail 2/S-2 within Section 5 of this report.
- **SPRINT (Existing):**
Antennas: Six (6) Decibel DB980H90E-M panel antennas mounted on three (3) 12-ft Boom Gates with a RAD center elevation of ± 150.0 -ft above the existing tower base.
Coax Cables: **Six (6) 1-5/8" $\varnothing$ coax cables to be re-configured to Face A of the existing tower as specified in Section 5 of this report.**
- **UNKNOWN (Existing):**
Antenna: One (1) FG4607 antenna mounted with an elevation of ± 147 -ft above the tower base.
Coax Cable: One (1) 7/8" $\varnothing$ coax cable running on a leg/face of the existing tower as specified on detail 2/S-2 within Section 5 of this report.
- **NEXTEL (Existing):**
Antennas: Twelve (12) Decibel DB844H90E-XY panel antennas mounted on three (3) 12-ft Boom Gates with a RAD center elevation of ± 140.33 -ft above the existing tower base.
Coax Cables: Twelve (12) 1-1/4" $\varnothing$ coax cables running on a leg/face of the existing tower as specified on detail 2/S-2 within Section 5 of this report.
- **CLEARWIRE (Existing):**
Antennas: Three (3) Argus LLPX310R panel antennas and three (3) Samsung RRU's mounted on 6-ft T-Frames with a RAD center elevation of 120-ft above grade level.
Coax Cables: Six (6) 5/16" $\varnothing$ and three (3) 1/2" $\varnothing$ coax cables running on the exterior of the existing tower within one (1) 2" flex conduit as specified on detail 2/S-2 within Section 5 of this report.

- **UNKNOWN (EXISTING):**
Antenna: One (1) Decibel DB408 8-Bay Dipole antenna mounted on a 3' Standoff with an elevation of ± 126 -ft above the tower base.
Coax Cable: One (1) 1-1/4" $\varnothing$ coax cable running on a leg/face of the existing tower as specified on detail 2/S-2 within Section 5 of this report.
- **UNKNOWN (Existing):**
Antenna: Two (2) PD220 antennas mounted on 3'-6" Standoffs with an elevation of ± 121 -ft above the tower base.
Coax Cable: Two (2) 1-5/8" $\varnothing$ coax cables running on a leg/face of the existing tower as specified on detail 2/S-2 within Section 5 of this report.
- **UNKNOWN (Existing):**
Antenna: One (1) Folded Dipole antenna on a 6' x 3" Pipe Mount with an elevation of ± 111 -ft above the tower base.
Coax Cable: One (1) 1-1/4" $\varnothing$ coax cable running on a leg/face of the existing tower as specified on detail 2/S-2 within Section 5 of this report.
- **UNKNOWN (Existing):**
Antenna: One (1) 2' by 2" $\varnothing$ Omni-directional (whip) antenna mounted on a 2' Stand-off with an elevation of ± 106 -ft above the tower base.
Coax Cable: Two (2) 1/2" $\varnothing$ coax cables running on a leg/face of the existing tower as specified on detail 2/S-2 within Section 5 of this report.
- **METROPCS (Reserved):**
Antennas: Six (6) Kathrein 800-10504 panel antennas and six (6) RCU's and one (1) GPS antenna mounted on three (3) 12-ft T-Frames with a RAD center elevation of ± 130 -ft above the existing tower base.
Coax Cables: Twelve (12) 1-5/8" $\varnothing$ coax cables running on the face of the existing tower as specified on detail 2/S-2 within Section 5 of this report.
- **VERIZON (Existing to be Removed):**
Antennas: Six (6) ALP9212 and six (6) Decibel DB948F85T2E-M panel antennas and three (3) 14-ft ROHN Boom Gates with a RAD center elevation of ± 169.0 -ft above the existing tower base.
- **VERIZON (Existing to Remain):**
Coax Cables: Twelve (12) 1-5/8" $\varnothing$ coax cables running on the face of the existing tower as specified on detail 2/S-2 within Section 5 of this report.
- **VERIZON (Proposed):**
Antennas: Six (6) Antel LPA 80080/4CF, three (3) Antel BXA-171085-8BF and three (3) Antel BXA70063/6CF-2 panel antennas mounted on three (3) 15-ft T-Frames (Site Pro1 P/N LTF 15-472) with a RAD center elevation of ± 169 -ft above the existing tower base.
Coax Cables: Six (6) 1-5/8" $\varnothing$ coax cables running on the face of the existing tower as specified on detail 2/S-2 within Section 5 of this report.

Primary Assumptions Used in the Analysis

- The tower structure's theoretical capacity not including any assessment of the condition of the tower.
- The tower carries the horizontal and vertical loads due to the weight of antennas, ice load and wind.
- Tower is properly installed and maintained.
- Tower is in plumb condition.
- Tower loading for antennas and mounts as listed in this report.
- All bolts are appropriately tightened providing the necessary connection continuity.
- All welds are fabricated with ER-70S-6 electrodes.
- All members are assumed to be as specified in the original tower design documents.
- All members are "hot dipped" galvanized in accordance with ASTM A123 and ASTM A153 Standards.
- All member protective coatings are in good condition.
- All tower members were properly designed, detailed, fabricated, installed and have been properly maintained since erection.
- Any deviation from the analyzed antenna loading will require a new analysis for verification of structural adequacy.
- **All coax cables routed as specified on detail 2/S-2 within Section 5 of this report.**

Analysis

The existing tower was analyzed using a comprehensive computer program entitled RISA Tower. The program analyzes the tower, considering the worst case loading condition. The tower is considered as loaded by concentric forces along the tower legs, and the model assumes that the leg members are subjected to bending, axial, and shear forces.

The existing tower was analyzed for 95 mph basic wind speed (fastest mile) with no ice and 82 mph with ½ inch accumulative ice to determine stresses in members as per guidelines of TIA/EIA-222-F-96 entitled "Structural Standards for Steel Antenna Towers and Antenna Supporting Structures", the American Institute of Steel Construction (AISC) and the Manual of Steel Construction; Allowable Stress Design (ASD).

Tower Loading

Tower loading was determined by the basic wind speed as applied to projected surface areas with modification factors per TIA/EIA-222-F, gravity loads of the tower structure and its components, and the application of ½" radial ice tower structure and its components.

Basic Wind Speed:	New London v = 85 mph (fastest mile)	[Section 16 of TIA/EIA-222-F-96]
	Montville; v = 115 mph (3 second gust) equivalent to v = 95 mph (fastest mile)	[Appendix K of the 2005 CT Building Code Supplement]
	Appendix K wind speed criteria controls.	
Load Cases:	<u>Load Case 1</u> ; 95 mph wind speed w/ no ice plus gravity load – used in calculation of tower stresses and rotation. This load case typically controls the design. This load case typically controls the design of monopole towers.	[Section 2.3.16 of TIA/EIA-222-F-96]
	<u>Load Case 2</u> ; 82 mph wind speed w/ ½" radial ice plus gravity load – used in calculation of tower stresses. This load case typically controls the design of lattice towers.	[Section 2.3.16 of TIA/EIA-222-F-96]
	<u>Load Case 3</u> ; Seismic – not checked	[Section 1614.5 of State Bldg. Code 2005] does not control in the design of this structure type

Tower Capacity

Tower stresses were calculated utilizing the structural analysis software RISATower. Allowable stresses were determined based on Table 5 of the TIA/EIA code with a 1/3 increase per Section 3.1.1.1 of the same code.

Calculated stresses with the proposed tower reinforcements outlined in Section 5 of this report were found to be within allowable limits. In Load Case 1, per RISATower "Section Capacity Table", this tower was found to be at **171.2%** of its total capacity without reinforcement and **95.5%** with the proposed reinforcements.

Proposed Loading - Without Reinforcements					
Elevation	Percentage of Capacity				
	Leg	Diagonal	Bolts	Girt	Guy Wire
180' – 190'	-	-	-	-	-
160' – 180'	-	-	-	-	90.3
140' – 160'	-	-	130.3	-	-
120' – 140'	-	-	-	-	-
100' – 120'	106.1	-	-	-	111.7
80' – 100'	106.7	137.1	161.5	-	-
60' – 80'	116.8	-	171.2	-	-
40' – 60'	127.3	-	-	-	-
20' – 40'	126.3	105.3	123.3	-	-
5' – 20'	102.6	-	140.5	-	-
0' – 5'	-	-	-	-	-

Proposed Loading - With Proposed Reinforcements					
Elevation	Percentage of Capacity				
	Leg	Diagonal	Bolts	Girt	Guy Wire
180' – 190'	-	-	-	-	-
160' – 180'	-	-	-	-	95.5
140' – 160'	75.8	-	80.0	-	-
120' – 140'	-	-	-	-	-
100' – 120'	-	-	-	-	86.9
80' – 100'	-	50.9	56.8	-	-
60' – 80'	90.7	-	49.7	-	71.1
40' – 60'	88.8	-	-	-	-
20' – 40'	73.1	52.3	58.9	-	-
5' – 20'	72.7	-	57.7	-	-
0' – 5'	-	-	-	-	-

F o u n d a t i o n a n d A n c h o r s

The existing tower foundation consists of a 2.5-ft $\varnothing$ reinforced concrete pedestal with a 7.0-ft square reinforced concrete pad bearing directly on the existing sub grade. Additionally, guy wire loading is transferred to three existing (3) 9.0-ft long by 5.0-ft wide by 2.0-ft deep reinforced concrete anchor support blocks. Additionally, three (3) reinforced concrete anchor blocks are proposed at a 100-ft radius from the center of the existing tower, details of which are outlined within the construction drawings included within Section 5 of this report. The sub-grade conditions used as the basis for the foundation analysis were derived from a geo-technical study report for a proposed lattice tower within proximity of the subject guyed tower. The geo-technical report was prepared by Clarence Welti Associates, Inc., dated April 18, 2011 and is available for reference within the Section 6 of this report.

Review of the foundation and anchor design consisted of verification of applied loads obtained from the tower design calculations and code checks of allowable stresses:

- The worst case tower base and guy anchor reactions developed from the governing Load Case 2 were used in the verification of the anchorage foundations:

Tower Guy Reactions <u>without</u> Reinforcements	
Vector	Existing Guy Anchor C (Radius = 140-ft) ⁽¹⁾
Horizontal (In Plane of GW)	69.0 kips
Horizontal (Out of Plane of GW)	2.0 kips
Vertical	64.0 kips
Tower Base Reactions	
Vector	Reaction ⁽¹⁾
Horizontal Shear	7.0 kips
Axial Compression	172 kips

Tower Guy Reactions <u>with</u> Reinforcements		
Vector	Proposed Guy Anchor C (Radius = 100-ft) ⁽¹⁾	Existing Guy Anchor C (Radius = 140-ft) ⁽¹⁾
Horizontal (In Plane of GW)	40.0 kips	35.0 kips
Horizontal (Out of Plane of GW)	1.0 kips	1.0 kips
Vertical	35.0 kips	40.0 kips
Tower Base Reactions		
Vector	Reaction ⁽¹⁾	
Horizontal Shear	4.0 kips	
Axial Compression	190 kips	

Note 1: Obtained from Risa Tower Analysis Load Combination No. 2 - Guy Anchor C.

CEN TEK Engineering, Inc.
 Structural Analysis - 190-ft Guyed Lattice Tower
 Verizon Wireless LTE Antenna Installation ~ Montville 4
 Montville, CT
 Revision #1 ~ December 08, 2011

Foundation	Design Limit	IBC 2003/2005 CT State Building Code Section 3108.4.2 (FS) ⁽²⁾	Proposed Loading without Reinforcements (FS) ⁽²⁾	Result
Proposed Loading <u>without</u> Reinforcements				
Reinf. Conc. Anchor Block (C) at 140-ft radius.	Uplift	2.0	2.19	PASS
	Sliding	2.0	1.3	FAIL
Proposed Loading <u>with</u> Reinforcements				
Reinf. Conc. Anchor Block (C) at 100-ft radius.	Uplift	2.0	2.9	PASS
	Sliding	2.0	3.4	PASS
Reinf. Conc. Anchor Block (C) at 140-ft radius.	Uplift	2.0	3.5	PASS
	Sliding	2.0	2.9	PASS
		Allowable	Proposed	
Base Foundation	Bearing	6.0ksf	4.5ksf ⁽³⁾	PASS

Note 2: FS denotes 'Factor of Safety'.

Note 3: Maximum soil bearing pressure under proposed loading without reinforcements.

Conclusion

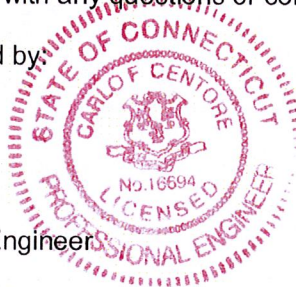
This analysis shows that with the reinforcements outlined in drawings S-1 through S-5, dated December 08, 2011, located within Section 5 of this report, the subject tower **is adequate** to support the existing and proposed modified Verizon antenna configuration.

The analysis is based, in part, on the information provided to this office by Verizon Wireless. If the existing conditions are different than the information in this report, Centek Engineering, Inc. must be contacted for resolution of any potential issues.

Please feel free to call with any questions or comments.

Respectfully Submitted by:

Carlo F. Centore, PE
 Principal Structural Engineer



Prepared by:

Jason R. Mead
 Structural Engineer

*Standard Conditions for Furnishing of
Professional Engineering Services on
Existing Structures*

All engineering services are performed on the basis that the information used is current and correct. This information may consist of, but is not necessarily limited to:

- Information supplied by the client regarding the structure itself, its foundations, the soil conditions, the antenna and feed line loading on the structure and its components, or other relevant information.
- Information from the field and/or drawings in the possession of Centek Engineering, Inc. or generated by field inspections or measurements of the structure.
- It is the responsibility of the client to ensure that the information provided to Centek Engineering, Inc. and used in the performance of our engineering services is correct and complete. In the absence of information to the contrary, we assume that all structures were constructed in accordance with the drawings and specifications and are in an un-corroded condition and have not deteriorated. It is therefore assumed that its capacity has not significantly changed from the "as new" condition.
- All services will be performed to the codes specified by the client, and we do not imply to meet any other codes or requirements unless explicitly agreed in writing. If wind and ice loads or other relevant parameters are to be different from the minimum values recommended by the codes, the client shall specify the exact requirement. In the absence of information to the contrary, all work will be performed in accordance with the latest revision of ANSI/ASCE10 & ANSI/EIA-222
- All services performed, results obtained, and recommendations made are in accordance with generally accepted engineering principles and practices. Centek Engineering, Inc. is not responsible for the conclusions, opinions and recommendations made by others based on the information we supply.

CEN TEK Engineering, Inc.

Structural Analysis - 190-ft Guyed Lattice Tower

Verizon Wireless LTE Antenna Installation ~ Montville 4

Montville, CT

Revision #1 ~ December 08, 2011

GENERAL DESCRIPTION OF STRUCTURAL ANALYSIS PROGRAM

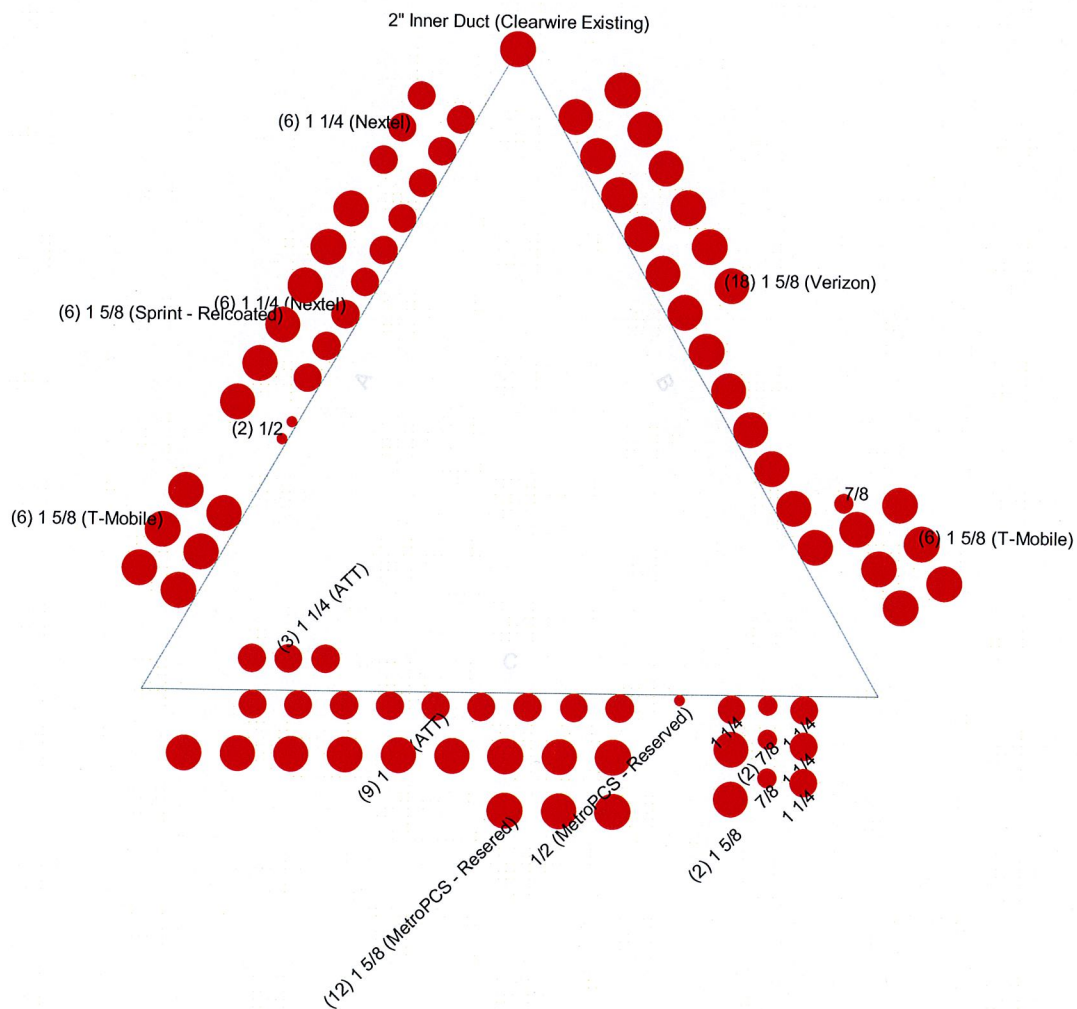
RISA Tower, is an integrated structural analysis and design software package for Designed specifically for the telecommunications industry, RISA Tower, formerly ERI Tower, automates much of the tower analysis and design required by the TIA/EIA 222 Standard.

RISA Tower Features:

- RISA Tower can analyze and design 3- and 4-sided guyed towers, 3- and 4-sided self-supporting towers and either round or tapered ground mounted poles with or without guys.
- The program analyzes towers using the TIA-222-G (2005) standard or any of the previous TIA/EIA standards back to RS-222 (1959). Steel design is checked using the AISC ASD 9th Edition or the AISC LRFD specifications.
- Linear and non-linear (P-delta) analyses can be used in determining displacements and forces in the structure. Wind pressures and forces are automatically calculated.
- Extensive graphics plots include material take-off, shear-moment, leg compression, displacement, twist, feed line, guy anchor and stress plots.
- RISA Tower contains unique features such as True Cable behavior, hog rod take-up, foundation stiffness and much more.

Feedline Plan

Round Flat App In Face App Out Face



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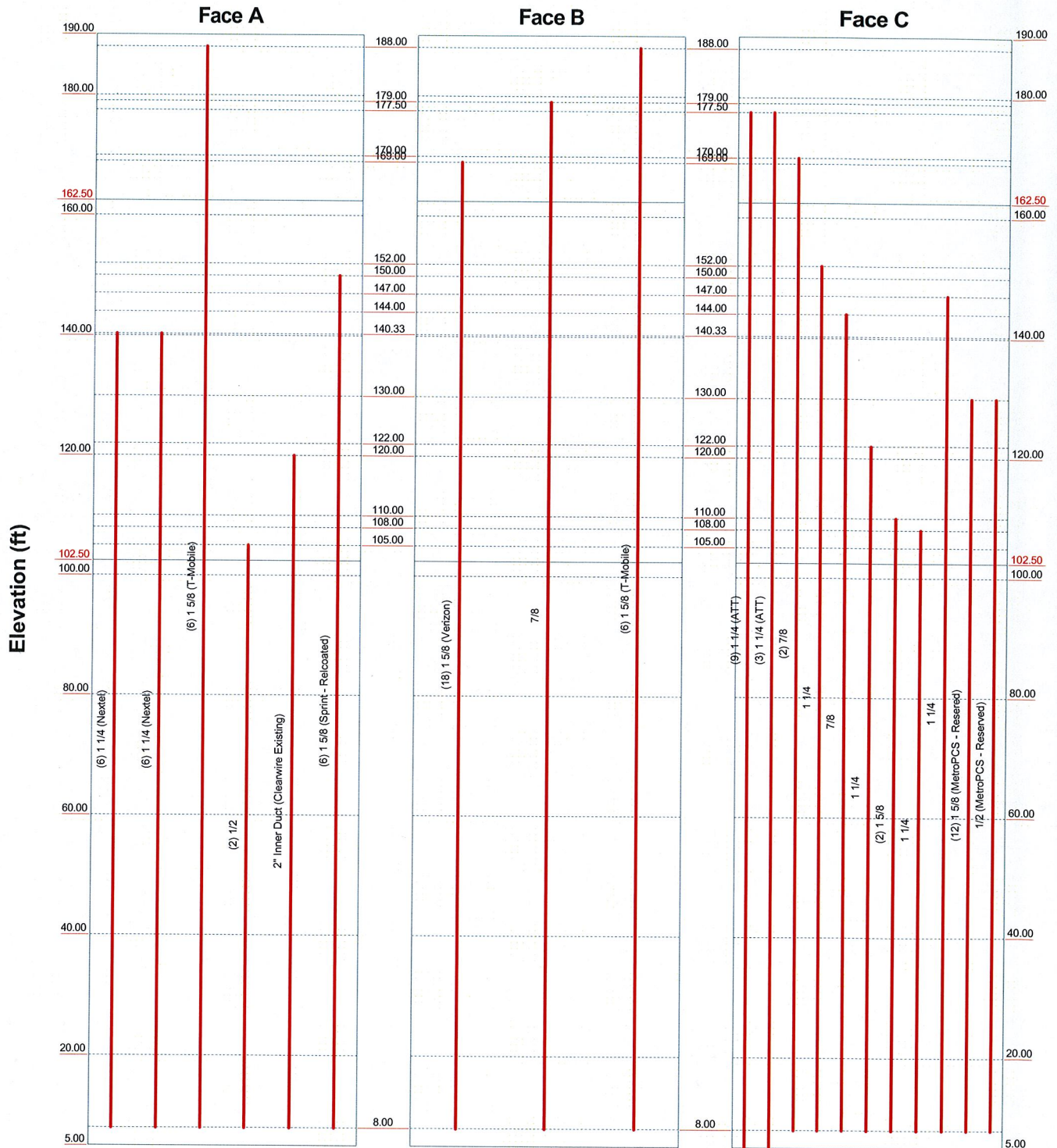
63-2 N Branford Rd
Branford, CT 06405
Phone: (203) 488-0580
FAX: (203) 488-8587

Job: 190' Guyed Rohn Model 80 - Un-reinforced ~ Rev 1		
Project: 57 Cook Road, Montville, CT		
Client: Verizon	Drawn by: Jrm	App'd:
Code: TIA/EIA-222-F	Date: 12/08/11	Scale: NTS
Path:	Dwg No. E-7	

Feedline Distribution Chart

5' - 190'

Round Flat App In Face App Out Face Truss Leg



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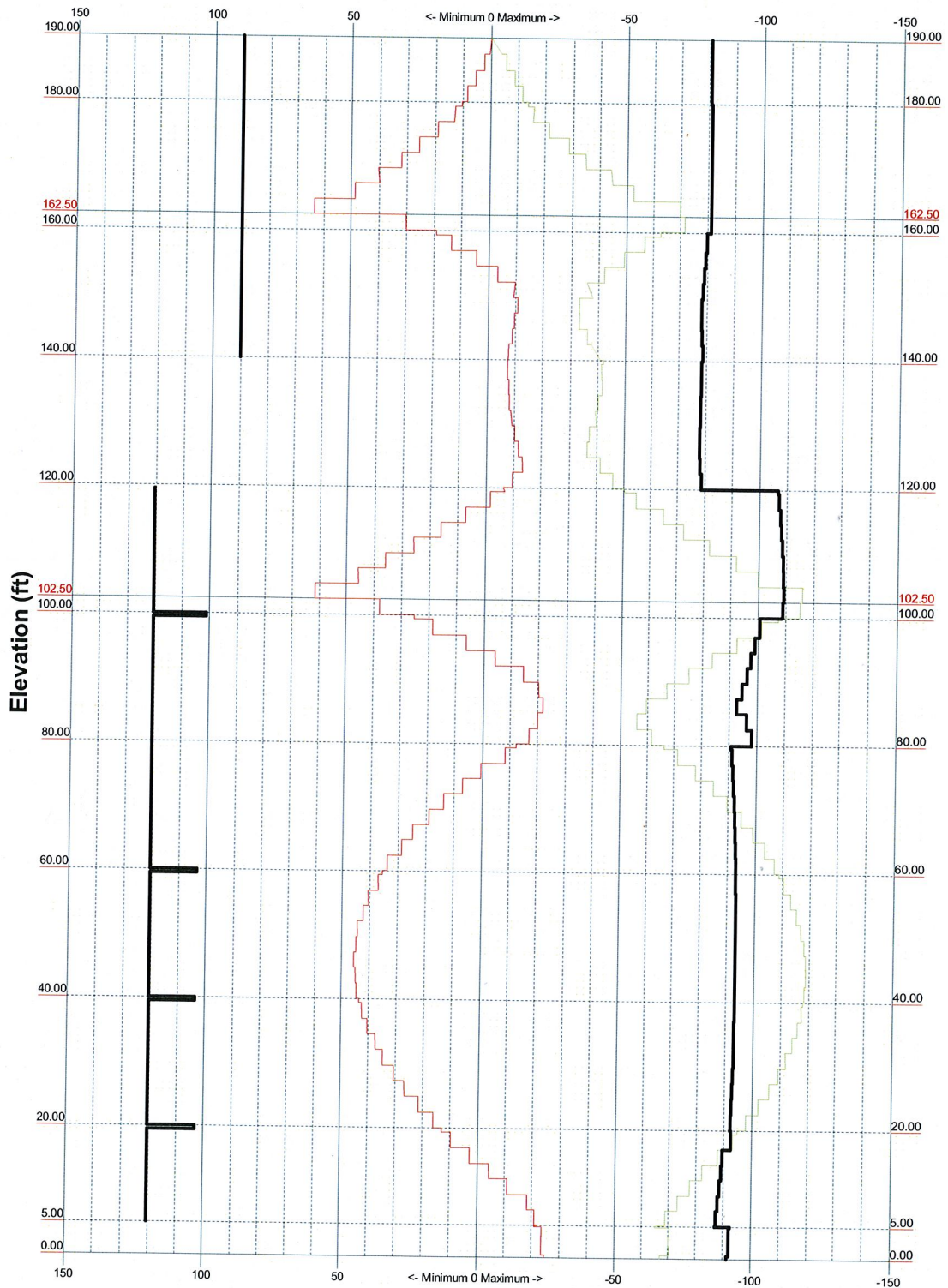
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Dwg No. E-7

TIA/EIA-222-F - 95 mph/82 mph 0.5000 in Ice

Leg Capacity ——— Leg Compression (K)



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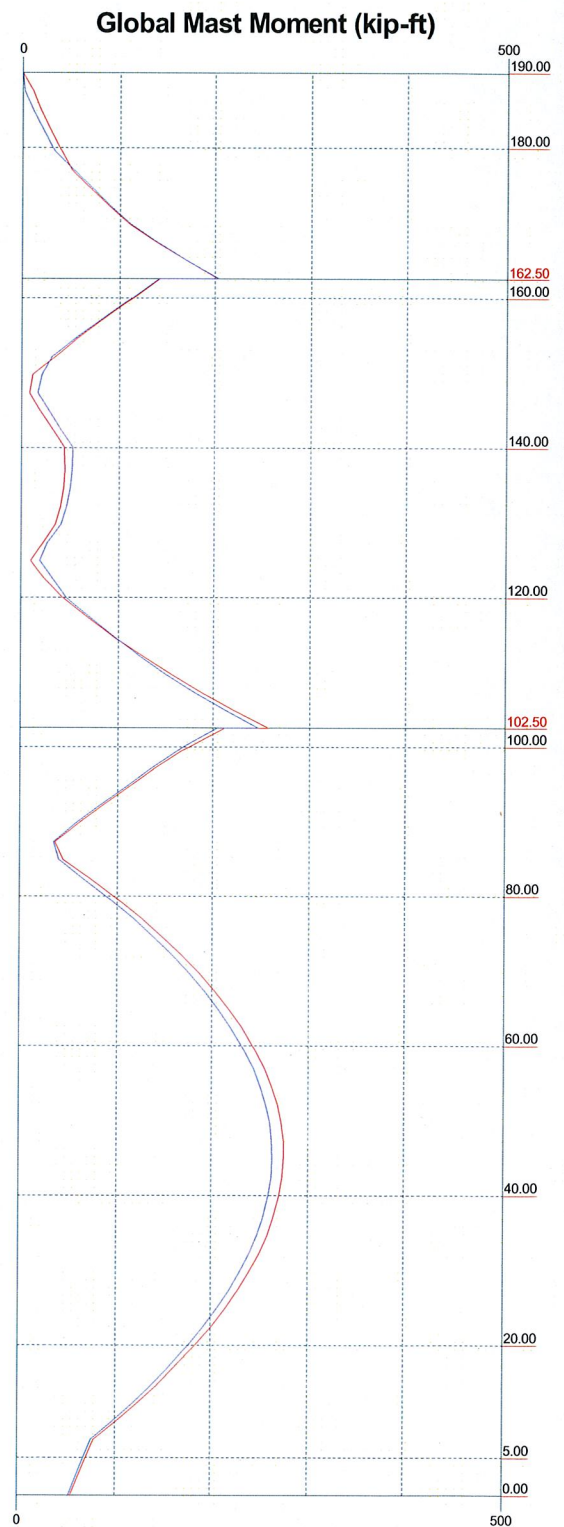
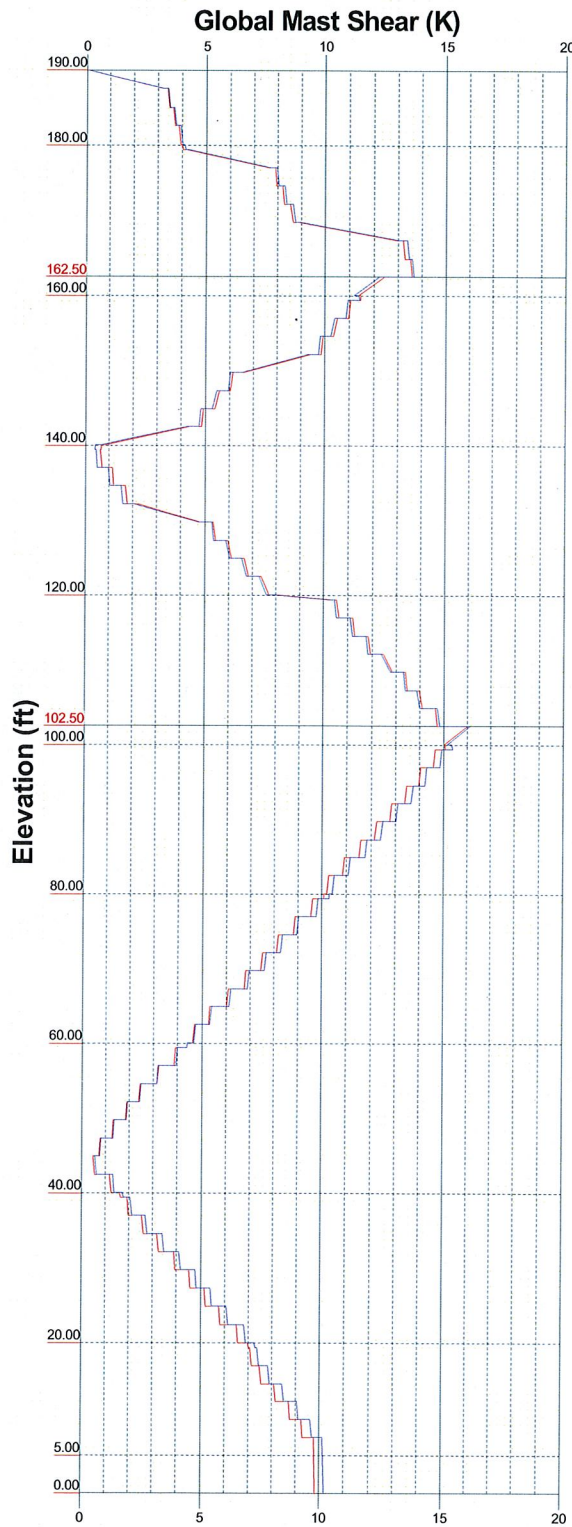
Dwg No. E-3

Vx

Vz

Mx

Mz

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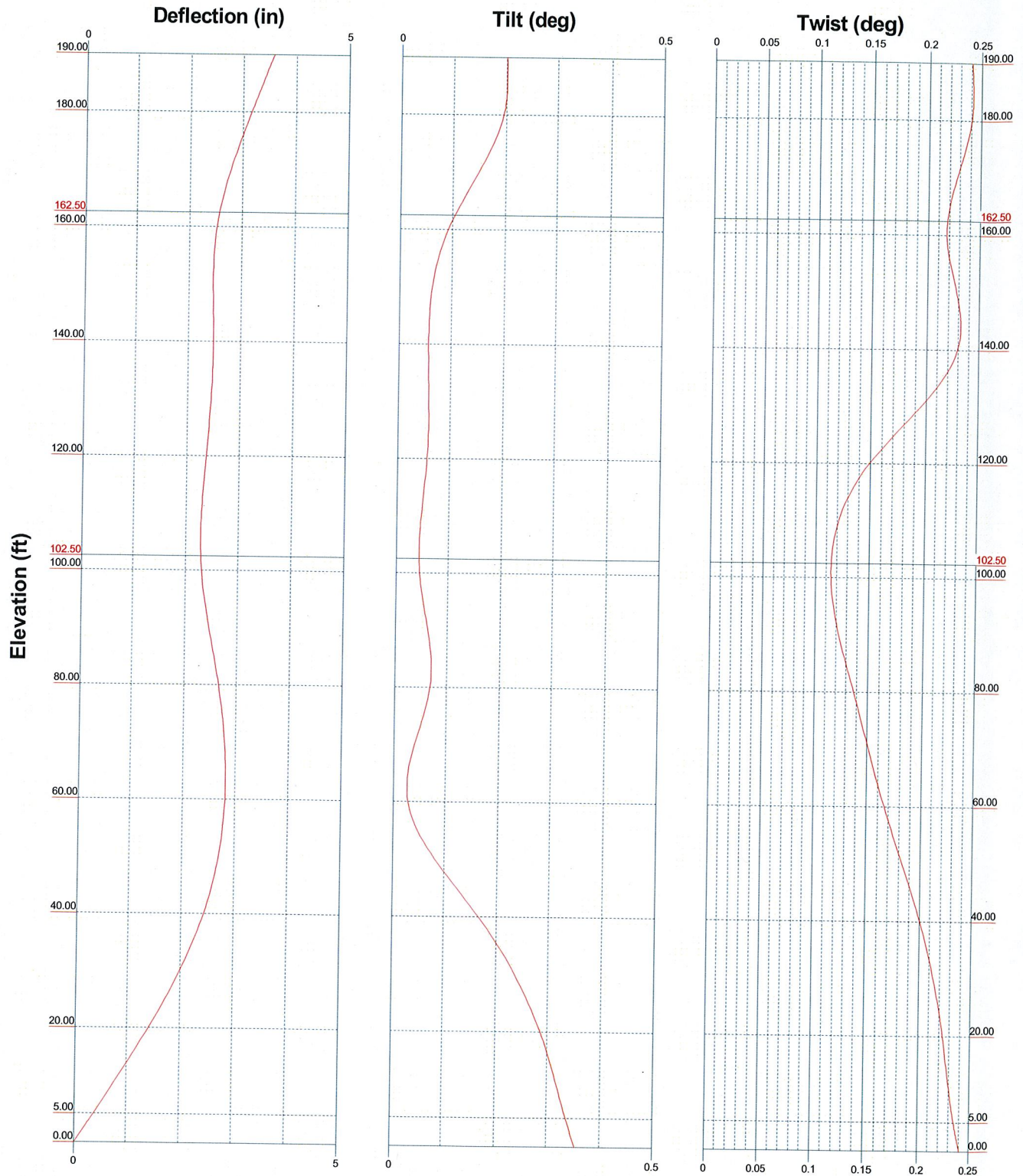
Code: TIA/EIA-222-F

Date: 12/08/11

Scale: NTS

Path:

Dwg No. E-4

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Client: Verizon

Drawn by: Jrm

App'd:

Code: TIA/EIA-222-F

Date: 12/08/11

Scale: NTS

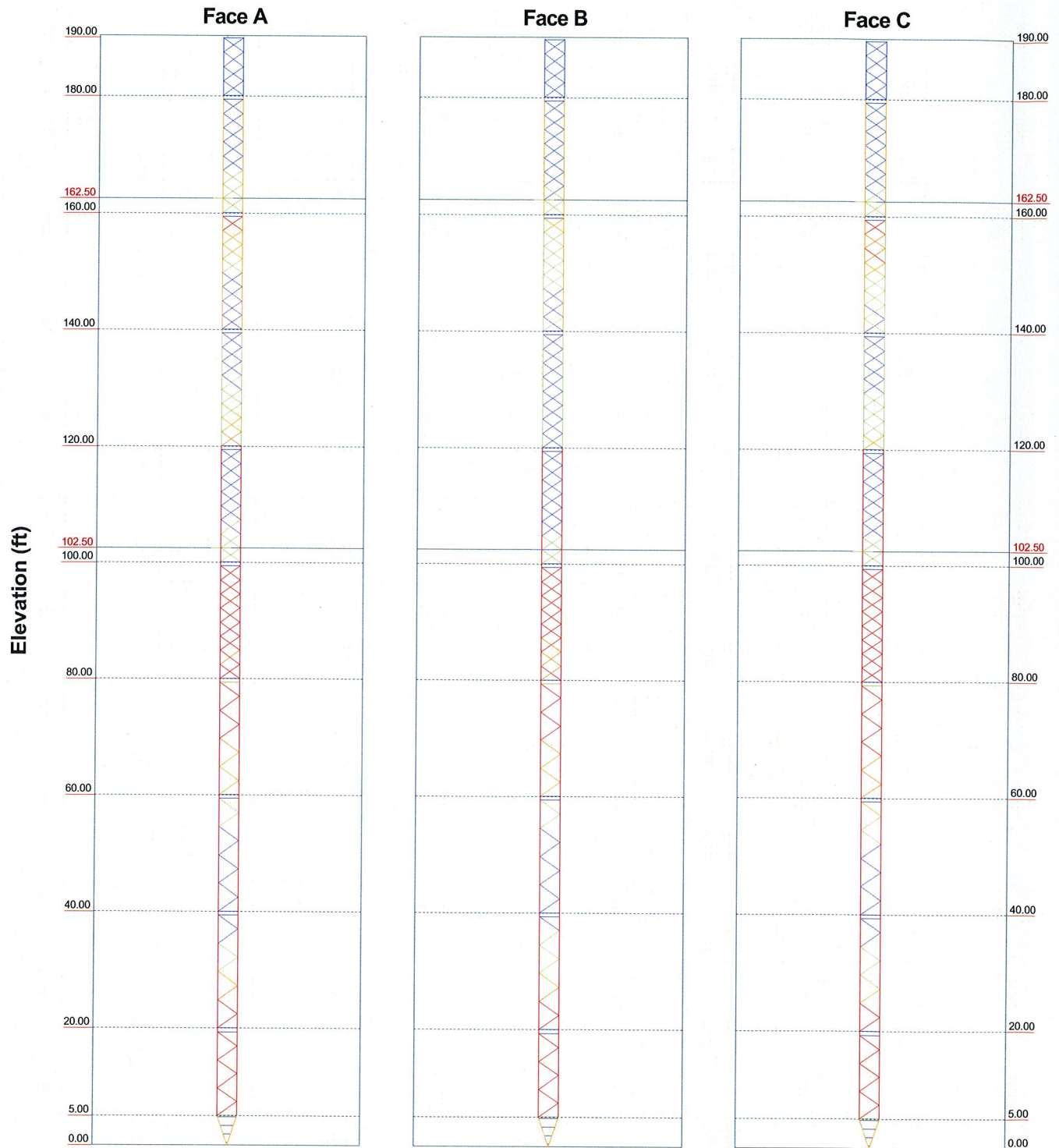
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Dwg No. E-5

Stress Distribution Chart

0' - 190'

> 100% 90%-100% 75%-90% 50%-75% < 50% Overstress



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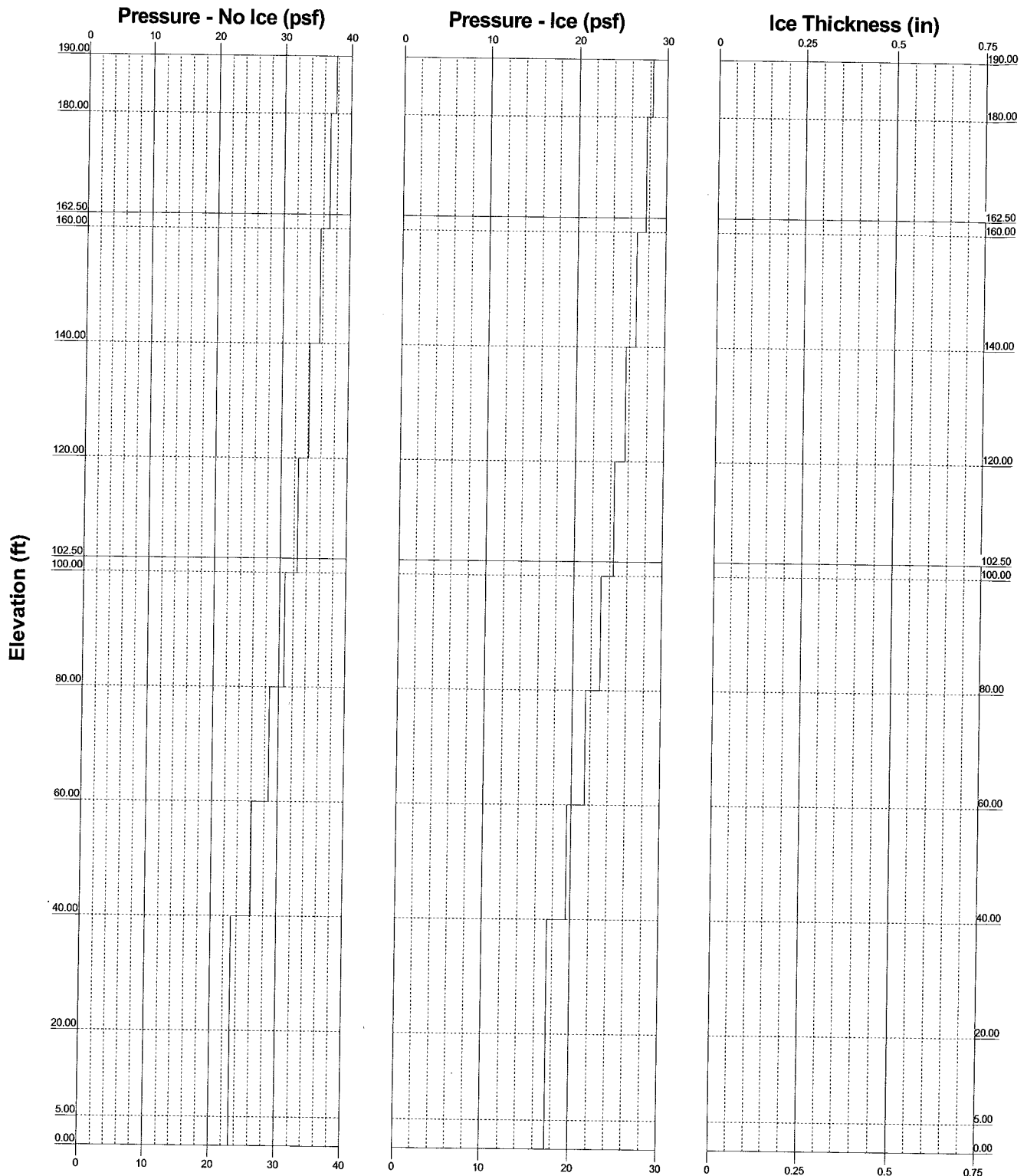
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Scale: NTS

Path:

Dwg No. E-8

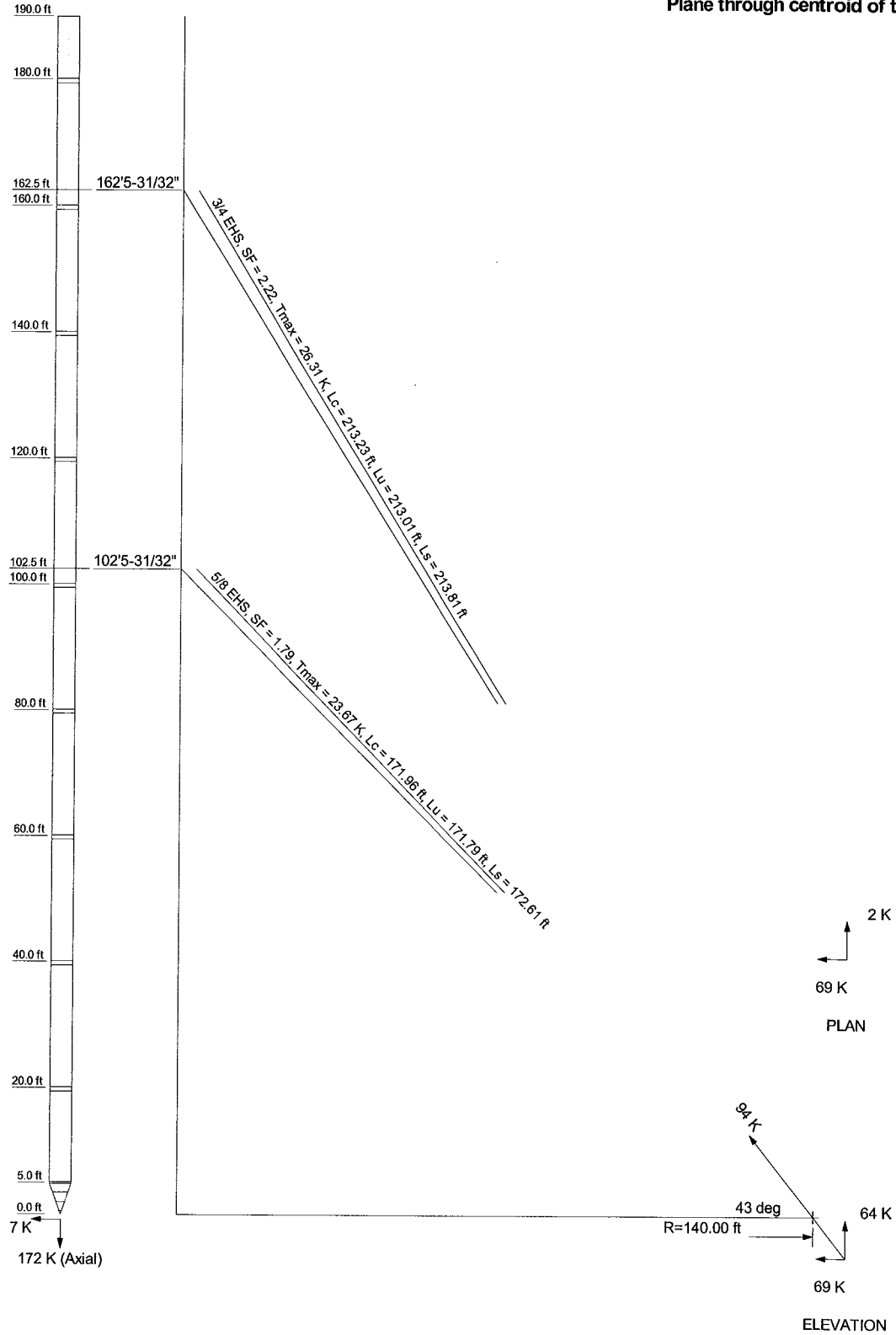
Wind Pressures and Ice Thickness
TIA/EIA-222-F - 95 mph/82 mph 0.5000 in Ice



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Branford, CT 06405		Client: Verizon	Drawn by: Jrm
Phone: (203) 488-0580		Date: 12/08/11	App'd:
FAX: (203) 488-8587		Code: TIA/EIA-222-F	Scale: NTS
		Path:	Dwg No. E-9

Guy Tensions and Tower Reactions
TIA/EIA-222-F - 95 mph/82 mph 0.5000 in Ice

Maximum Values
Anchor 'C' @ 140 ft Azimuth 240 deg Elev 0 ft
Plane through centroid of tower



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FAX: (203) 488-8587		Code: TIA/EIA-222-F	Date: 12/08/11
		Path:	Scale: NTS
			Dwg No. E-6

Job : Verizon Wireless ~ Montville 4: 190-ft Guyed Lattice Tower
Address: 54 Cook Drive Montville, CT ~ Rev 1
Description: Guy Anchor Evaluation - 2005 CSBC 3108.4.2/TIA Req

Project No. 11001.CO27
Computed by JRM
Checked by CFC

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Sheet 1 of 2
Date 12/8/11
Date

CHECK UPLIFT RESISTANCE

ANCHOR (C) AT 140.0ft RADIUS

RESULTS FROM COMPUTER ANALYSIS:

Uplift = 64 kips
Sliding = 69 kips

CONCRETE PARAMETERS:

$\gamma_{conc} = 87.6$ pcf
 $w = 5$ ft
 $h = 2$ ft
 $d = 9$ ft

 $Vol. = 90.00$ ft³
 $Wc = 7.88$ kips

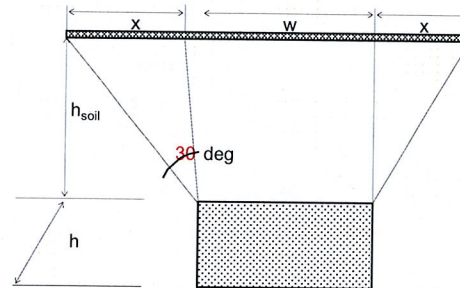
SOIL PARAMETERS:

$\gamma_{soil} = 125$ pcf
 $h_{soil} = 8$ ft
 $x = 4.62$ ft

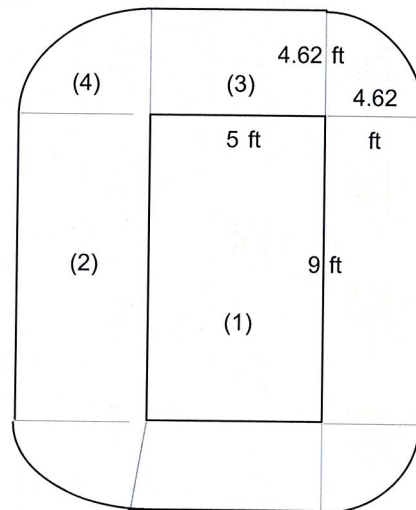
Soil Weight (Wr):

(1) = 45.00 kips
(2) = 41.57 kips
(3) = 23.09 kips
(4) = 22.34 kips

*(5) Anchor Reinf. = 0 kips
Total = 132.00 kips



Foundation Section



Foundation Plan View

CHECK UPLIFT (PER EIA/TIA-222-F STANDARD AND 2005 CT BUILDING CODE):

$$Wr / 2.0 + Wc / 2.0 > \text{UPLIFT}$$

$$(Wr + Wc) / 1.5 > \text{UPLIFT}$$

69.94 > 64 OK

93.26 > 64 OK

→ GUY ANCHORS AGAINST UPLIFT ARE ADEQUATE

Job : Verizon Wireless ~ Montville 4: 190-ft Guyed Lattice Tower
Address: 54 Cook Drive Montville, CT ~ Rev 1
Description: Guy Anchor Evaluation - 2005 CSBC 3108.4.2/TIA Req

Project No. 11001.CO33
Computed by JRM
Checked by CFC

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Sheet 2 of 2
Date 12/8/11
Date

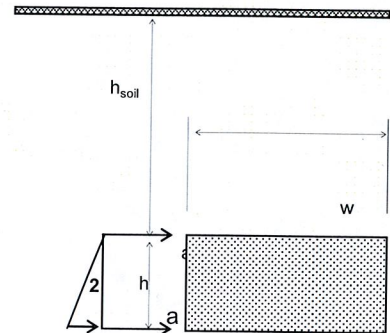
CHECK SLIDING RESISTANCE

SOIL PARAMETERS

$\gamma_{soil} = 125$ pcf
 $\gamma_{soil2} = 62.6$ pcf
 $h_{soil} = 8$ ft
 $h = 2$ ft
 $\phi = 32$ degrees

ANCHOR PARAMETERS

$w = 5.0$ ft
 $h = 2.0$ ft
 $d = 9.0$ ft



Foundation Elevation View

$$K_a = 0.31$$

$$K_p = 3.25$$

$$\Delta = 2.95$$

HORIZONTAL FORCES

$$1 = 53.05 \text{ k}$$

$$2 = 3.32 \text{ k}$$

$$\text{RESIST TO SLIDING} = 56.37 \text{ k}$$

$$\text{SOIL \& CONCRETE WEIGHT} =$$

$$W_r + W_c = 139.89 \text{ k}$$

$$\text{UPLIFT REACTIONS} =$$

$$-64 \text{ k}$$

$$\text{SUM} =$$

$$75.89 \text{ k}$$

$$\text{COEF. OF FRICTION, (0.45)} =$$

$$34.15 \text{ k}$$

$$\text{RESIST TO SLIDING} =$$

$$56.37 \text{ k}$$

$$\text{SUM} =$$

$$90.52 \text{ k}$$

SF AGAINST SLIDING

$$SF = 1.3 < 2 \quad NG$$

→ GUY ANCHORS AGAINST SLIDING NEED REINFORCEMENT

Standard Monopole Foundation:

Input Data:

Tower Data

Shear Force =	Shear := 7.0-kip	(User Input from RISATower)
Axial Force =	Axial := 173.0-kip	(User Input from RISATower)
Tower Height =	H _t := 190.0-ft	(User Input)

Footing Data:

Overall Depth of Footing =	D _f := 5.0-ft	(User Input)	(Based on foundation type CB-11 ref: ROHN standard concrete base schedule drawing C610621, dated 01.09.85)
Length of Pier =	L _p := 3.75-ft	(User Input)	
Extension of Pier Above Grade =	L _{pag} := 0.5-ft	(User Input)	
Diameter of Pier =	d _p := 2.5-ft	(User Input)	
Thickness of Footing =	T _f := 1.75-ft	(User Input)	
Width of Footing =	W _f := 7.0-ft	(User Input)	

Material Properties:

Concrete Compressive Strength =	f _c := 3000-psi	(User Input)	
Steel Reinforcement Yield Strength =	f _y := 60000-psi	(User Input)	
Internal Friction Angle of Soil =	Φ _s := 32-deg	(User Input)	
Allowable Soil Bearing Capacity =	q _s := 6000-psf	(User Input)	
Unit Weight of Soil =	γ _{soil} := 125-pcf	(User Input)	
Unit Weight of Concrete =	γ _{conc} := 150-pcf	(User Input)	
Foundation Bouyancy =	Bouyancy := 1	(User Input)	(Yes=1 / No=0)
Depth to Neglect =	n := 1.0-ft	(User Input)	
Cohesion of Clay Type Soil =	c := 0-ksf	(User Input)	(Use 0 for Sandy Soil)
Seismic Zone Factor =	Z := 2	(User Input)	(UBC-1997 Fig 23-2)
Coefficient of Friction Between Concrete =	μ := 0.45	(User Input)	

Pier Reinforcement:

Bar Size =	$BS_{\text{pier}} := 7$	(User Input)	
Bar Diameter =	$d_{\text{bpier}} := 0.875\text{-in}$	(User Input)	
Number of Bars =	$NB_{\text{pier}} := 8$	(User Input)	
Clear Cover of Reinforcement =	$Cvr_{\text{pier}} := 3\text{-in}$	(User Input)	
Reinforcement Location Factor =	$\alpha_{\text{pier}} := 1.0$	(User Input)	(ACI-2008 12.2.4)
Coating Factor =	$\beta_{\text{pier}} := 1.0$	(User Input)	(ACI-2008 12.2.4)
Concrete Strength Factor =	$\lambda_{\text{pier}} := 1.0$	(User Input)	(ACI-2008 12.2.4)
Reinforcement Size Factor =	$\gamma_{\text{pier}} := 1.0$	(User Input)	(ACI-2008 12.2.4)
Diameter of Tie =	$d_{\text{Tie}} := 4\text{-in}$	(User Input)	

Pad Reinforcement:

Bar Size =	$BS_{\text{bot}} := 6$	(User Input)	(Bottom of Pad)
Bar Diameter =	$d_{\text{bbot}} := 0.750\text{-in}$	(User Input)	(Bottom of Pad)
Number of Bars =	$NB_{\text{bot}} := 8$	(User Input)	(Bottom of Pad)
Clear Cover of Reinforcement =	$Cvr_{\text{pad}} := 3.0\text{-in}$	(User Input)	
Reinforcement Location Factor =	$\alpha_{\text{pad}} := 1.0$	(User Input)	(ACI-2008 12.2.4)
Coating Factor =	$\beta_{\text{pad}} := 1.0$	(User Input)	(ACI-2008 12.2.4)
Concrete Strength Factor =	$\lambda_{\text{pad}} := 1.0$	(User Input)	(ACI-2008 12.2.4)
Reinforcement Size Factor =	$\gamma_{\text{pad}} := 1.0$	(User Input)	(ACI-2008 12.2.4)

Calculated Factors:

Pier Reinforcement Bar Area =	$A_{\text{bpier}} := \frac{\pi \cdot d_{\text{bpier}}^2}{4} = 0.601\text{-in}^2$	
Pad Bottom Reinforcement Bar Area =	$A_{\text{bbot}} := \frac{\pi \cdot d_{\text{bbot}}^2}{4} = 0.442\text{-in}^2$	
Coefficient of Lateral Soil Pressure =	$K_p := \frac{1 + \sin(\Phi_s)}{1 - \sin(\Phi_s)} = 3.255$	
Load Factor =	$LF := \begin{cases} 1.333 & \text{if } H_t \leq 700\text{-ft} \\ 1.7 & \text{if } H_t \geq 1200\text{-ft} \\ 1.333 + \left(\frac{H_t - 700\text{ft}}{1200\text{ft} - 700\text{ft}} \right) \cdot 0.4 & \text{otherwise} \end{cases}$	= 1.333

Stability of Footing:

Adjusted Concrete Unit Weight =

$$\gamma_c := \text{if}(\text{Bouyancy} = 1, \gamma_{\text{conc}} - 62.4 \text{pcf}, \gamma_{\text{conc}}) = 87.6 \text{pcf}$$

Adjusted Soil Unit Weight =

$$\gamma_s := \text{if}(\text{Bouyancy} = 1, \gamma_{\text{soil}} - 62.4 \text{pcf}, \gamma_{\text{soil}}) = 62.6 \text{pcf}$$

Passive Pressure =

$$P_{pn} := K_p \cdot \gamma_s \cdot n + c \cdot 2 \cdot \sqrt{K_p} = 0.204 \text{ksf}$$

$$P_{pt} := K_p \cdot \gamma_s \cdot (D_f - T_f) + c \cdot 2 \cdot \sqrt{K_p} = 0.662 \text{ksf}$$

$$P_{top} := \text{if}(n < (D_f - T_f), P_{pt}, P_{pn}) = 0.662 \text{ksf}$$

$$P_{bot} := K_p \cdot \gamma_s \cdot D_f + c \cdot 2 \cdot \sqrt{K_p} = 1.019 \text{ksf}$$

$$P_{ave} := \frac{P_{top} + P_{bot}}{2} = 0.84 \text{ksf}$$

$$T_p := \text{if}(n < (D_f - T_f), T_f, (D_f - n)) = 1.75$$

$$A_p := W_f \cdot T_p = 12.25$$

Ultimate Shear =

$$S_u := P_{ave} \cdot A_p = 10.295 \text{kip}$$

Weight of Concrete =

$$W_{T_c} := \left[(W_f^2 \cdot T_f) + d_p^2 \cdot L_p \right] \cdot \gamma_c = 9.56 \text{kip}$$

Total Weight =

$$W_{T_{tot}} := W_{T_c} + \text{Axial} = 182.56 \text{kip}$$

Soil/Concrete Friction Resistance =

$$S_{l2} := \mu \cdot W_{T_{tot}} = 82.15 \text{kips}$$

Total Sliding Resistance =

$$S_{l_{tot}} := S_u + S_{l2} = 92.45 \text{kips}$$

$$\text{Sliding_Resistance_ratio} := \frac{\text{Shear} \cdot 2.0}{S_{l_{tot}}} = 0.15$$

$$\text{Sliding_Resistance_Check} := \text{if}\left(\frac{\text{Shear} \cdot 2.0}{S_{l_{tot}}}, \text{"Okay"}, \text{"No Good"}\right)$$

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

Overturning Moment =

$$M_{ot} := \text{Shear} \cdot (L_p + T_f) = 39 \text{kip-ft}$$

Factor of Safety Required =

$$FS_{req} := 2$$

Shear Capacity in Pier:

Shear Resistance of Pier =

$$S_p := \frac{P_{ave} \cdot A_p + \mu \cdot W_{T_{tot}}}{FS_{req}} = 46.22 \text{kips}$$

$$\text{Shear_Check} := \text{if}(S_p > \text{Shear}, \text{"Okay"}, \text{"No Good"})$$

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

Bearing Pressure Caused by Footing:

Area of the Mat =

$$A_{\text{mat}} := W_f^2 = 49$$

Section Modulus of Mat =

$$S := \frac{W_f^3}{6} = 57.17 \cdot \text{ft}^3$$

Maximum Pressure in Mat =

$$P_{\text{max}} := \frac{W T_{\text{tot}}}{A_{\text{mat}}} + \frac{M_{\text{ot}}}{S} = 4.399 \cdot \text{ksf}$$

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

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

Minimum Pressure in Mat =

$$P_{\text{min}} := \frac{W T_{\text{tot}}}{A_{\text{mat}}} - \frac{M_{\text{ot}}}{S} = 3.052 \cdot \text{ksf}$$

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

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

Distance to Resultant of Pressure Distribution =

$$X_p := \frac{P_{\text{max}}}{P_{\text{max}} - P_{\text{min}}} \cdot \frac{1}{3} = 7.621$$

$$\frac{W_f}{6}$$

Distance to Kern =

$$X_k := \frac{W_f}{6} = 1.167$$

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

Eccentricity =

$$e := \frac{M_{\text{ot}}}{W T_{\text{tot}}} = 0.211$$

Adjusted Soil Pressure =

$$P_a := \frac{2 \cdot W T_{\text{tot}}}{3 \cdot W_f \left(\frac{W_f}{2} - e \right)} = 5.286 \cdot \text{ksf}$$

$$q_{\text{adj}} := \text{if}(P_{\text{min}} < 0, P_a, P_{\text{max}}) = 4.399 \cdot \text{ksf}$$

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

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

Concrete Bearing Capacity:

Strength Reduction Factor =

$$\Phi_c := 0.65 \quad (\text{ACI-2008 9.3.2.2})$$

Bearing Strength Between Pier and Pad =

$$P_b := \Phi_c \cdot 0.85 \cdot f_c \cdot d_p^2 = 1491.75 \cdot \text{kips} \quad (\text{ACI-2008 10.14})$$

$$\text{Bearing_Check} := \text{if}(P_b > \text{LF} \cdot \text{Axial}, \text{"Okay"}, \text{"No Good"})$$

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

<i>RISATower</i> CEN TEK Engineering, Inc. 63-2 N Branford Rd Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job	190' Guyed Rohn Model 80 - Un-reinforced ~ Rev 1	Page	1 of 51
	Project	57 Cook Road, Montville, CT	Date	12:54:08 12/08/11
	Client	Verizon	Designed by	Jrm

Tower Input Data

The main tower is a 3x guyed tower with an overall height of 190.00 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 3.42 ft at the top and tapered at the base.

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

The following design criteria apply:

Basic wind speed of 95 mph.

Nominal ice thickness of 0.5000 in.

Ice density of 56 pcf.

A wind speed of 82 mph is used in combination with ice.

Temperature drop of 50 °F.

Deflections calculated using a wind speed of 50 mph.

Pressures are calculated at each section.

Safety factor used in guy design is 2.

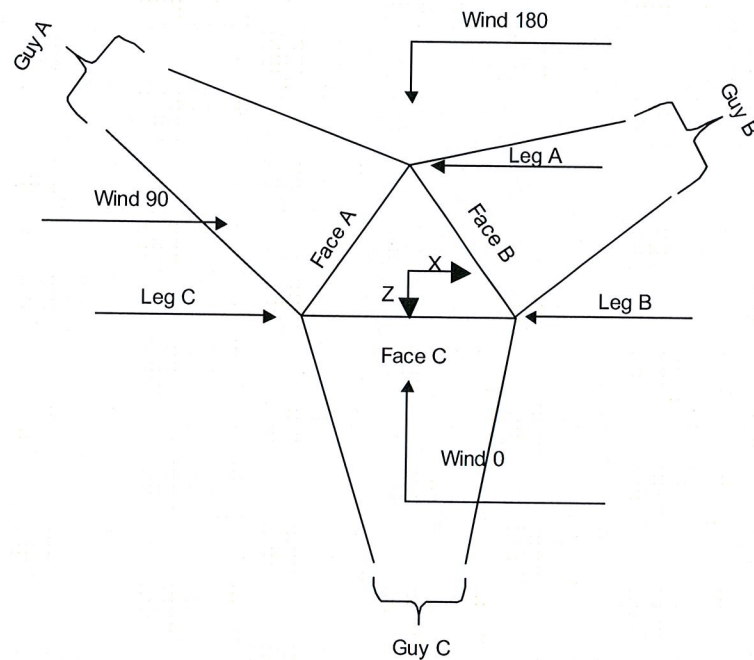
Stress ratio used in tower member design is 1.333.

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		

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Face Guyed

Tower Section Geometry

Tower Section	Tower Elevation	Assembly Database	Description	Section Width	Number of Sections	Section Length
	ft			ft		ft
T1	190.00-180.00			3.42	1	10.00
T2	180.00-160.00			3.42	1	20.00
T3	160.00-140.00			3.42	1	20.00
T4	140.00-120.00			3.42	1	20.00
T5	120.00-100.00			3.42	1	20.00
T6	100.00-80.00			3.42	1	20.00
T7	80.00-60.00			3.42	1	20.00
T8	60.00-40.00			3.42	1	20.00
T9	40.00-20.00			3.42	1	20.00
T10	20.00-5.00			3.42	1	15.00
T11	5.00-0.00			3.42	1	5.00

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Tower Section Geometry (cont'd)

Tower Section	Tower Elevation ft	Diagonal Spacing ft	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset in	Bottom Girt Offset in
T1	190.00-180.00	2.46	X Brace	No	No	1.0000	1.0000
T2	180.00-160.00	2.41	X Brace	No	No	7.3750	1.0000
T3	160.00-140.00	2.41	CX Brace	No	No	7.3750	1.0000
T4	140.00-120.00	2.41	CX Brace	No	No	7.3750	1.0000
T5	120.00-100.00	2.41	X Brace	No	Yes	7.3750	1.0000
T6	100.00-80.00	2.41	CX Brace	No	Yes	7.3750	1.0000
T7	80.00-60.00	2.41	K Brace Left	No	Yes	7.3750	1.0000
T8	60.00-40.00	2.41	K Brace Left	No	Yes	7.3750	1.0000
T9	40.00-20.00	2.41	K Brace Left	No	Yes	7.3750	1.0000
T10	20.00-5.00	2.38	K Brace Left	No	Yes	7.3750	1.0000
T11	5.00-0.00	1.44	X Brace	No	Yes	2.0000	6.0000

Tower Section Geometry (cont'd)

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T1 190.00-180.00	Pipe	P2.5x.276	A572-50 (50 ksi)	Single Angle	L2x2x1/4	A36 (36 ksi)
T2 180.00-160.00	Pipe	P2.5x.276	A572-50 (50 ksi)	Single Angle	L2x2x1/4	A36 (36 ksi)
T3 160.00-140.00	Pipe	P2.5x.276	A572-50 (50 ksi)	Pipe	ROHN TS1.5x11 ga	A53-B-42 (42 ksi)
T4 140.00-120.00	Pipe	P2.5x.276	A572-50 (50 ksi)	Pipe	ROHN TS1.5x11 ga	A53-B-42 (42 ksi)
T5 120.00-100.00	Pipe	P3x.3	A572-50 (50 ksi)	Single Angle	L2x2x1/4	A36 (36 ksi)
T6 100.00-80.00	Pipe	P3x.3	A572-50 (50 ksi)	Pipe	ROHN TS1.5x16 ga	A53-B-42 (42 ksi)
T7 80.00-60.00	Pipe	P3x.3	A572-50 (50 ksi)	Pipe	ROHN TS1.5x11 ga	A53-B-42 (42 ksi)
T8 60.00-40.00	Pipe	P3x.3	A572-50 (50 ksi)	Pipe	ROHN TS1.5x16 ga	A53-B-42 (42 ksi)
T9 40.00-20.00	Pipe	P3x.3	A572-50 (50 ksi)	Pipe	ROHN TS1.5x16 ga	A53-B-42 (42 ksi)
T10 20.00-5.00	Pipe	P3x.3	A572-50 (50 ksi)	Pipe	ROHN TS1.5x11 ga	A53-B-42 (42 ksi)
T11 5.00-0.00	Pipe	P3x.3	A572-50 (50 ksi)	Single Angle		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 190.00-180.00	Single Angle	L2x2x1/4	A36 (36 ksi)	Single Angle	L2x2x1/4	A36 (36 ksi)
T2 180.00-160.00	Single Angle	L2x2x1/4	A36 (36 ksi)	Single Angle	L2x2x1/4	A36 (36 ksi)

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Tower Elevation ft	Top Girt Type	Top Girt Size	Top Girt Grade	Bottom Girt Type	Bottom Girt Size	Bottom Girt Grade
T3 160.00-140.00	Pipe	ROHN TS1.5x11 ga	A53-B-42 (42 ksi)	Pipe	ROHN TS1.5x11 ga	A53-B-42 (42 ksi)
T4 140.00-120.00	Pipe	ROHN TS1.5x11 ga	A53-B-42 (42 ksi)	Pipe	ROHN TS1.5x11 ga	A53-B-42 (42 ksi)
T5 120.00-100.00	Single Angle	L2x2x1/4	A36 (36 ksi)	Single Angle	L2x2x1/4	A36 (36 ksi)
T6 100.00-80.00	Pipe	ROHN TS1.5x16 ga	A53-B-42 (42 ksi)	Pipe	ROHN TS1.5x16 ga	A53-B-42 (42 ksi)
T7 80.00-60.00	Pipe	ROHN TS1.5x11 ga	A53-B-42 (42 ksi)	Pipe	ROHN TS1.5x11 ga	A53-B-42 (42 ksi)
T8 60.00-40.00	Pipe	ROHN TS1.5x16 ga	A53-B-42 (42 ksi)	Pipe	ROHN TS1.5x16 ga	A53-B-42 (42 ksi)
T9 40.00-20.00	Pipe	ROHN TS1.5x16 ga	A53-B-42 (42 ksi)	Pipe	ROHN TS1.5x16 ga	A53-B-42 (42 ksi)
T10 20.00-5.00	Pipe	ROHN TS1.5x11 ga	A53-B-42 (42 ksi)	Pipe	ROHN TS1.5x11 ga	A53-B-42 (42 ksi)
T11 5.00-0.00	Single Angle	L3x3x1/2	A36 (36 ksi)	Equal Angle	L3x3x1/2	A36 (36 ksi)

Tower Section Geometry (cont'd)

Tower Elevation ft	No. of Mid Girts	Mid Girt Type	Mid Girt Size	Mid Girt Grade	Horizontal Type	Horizontal Size	Horizontal Grade
T11 5.00-0.00	2	Single Angle	L3x3x1/2	A36 (36 ksi)	Single Angle		A572-50 (50 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 Horizontals in
T1 190.00-180.00	0.28	0.3750	A36 (36 ksi)	1	1	1	36.0000	36.0000
T2 180.00-160.00	0.07	0.3750	A36 (36 ksi)	1	1	1	36.0000	36.0000
T3 160.00-140.00	0.07	0.3750	A36 (36 ksi)	1	1	1	36.0000	36.0000
T4 140.00-120.00	0.07	0.3750	A36 (36 ksi)	1	1	1	36.0000	36.0000
T5 120.00-100.00	0.07	0.3750	A36 (36 ksi)	1	1	1	36.0000	36.0000
T6 100.00-80.00	0.07	0.3750	A36 (36 ksi)	1	1	1	36.0000	36.0000
T7 80.00-60.00	0.07	0.3750	A36 (36 ksi)	1	1	1	36.0000	36.0000
T8 60.00-40.00	0.07	0.3750	A36 (36 ksi)	1	1	1	36.0000	36.0000

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Tower Elevation	Gusset Area (per face)	Gusset Thickness	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in
ft	ft ²	in						
T9 40.00-20.00	0.07	0.3750	A36 (36 ksi)	1	1	1	36.0000	36.0000
T10 20.00-5.00	0.07	0.3750	A36 (36 ksi)	1	1	1	36.0000	36.0000
T11 5.00-0.00	0.07	0.3750	A36 (36 ksi)	1	1	1	36.0000	36.0000

Tower Section Geometry (cont'd)

Tower Elevation	Calc K Single Angles	Calc K Solid Rounds	<i>K Factors¹</i>							
			Legs	X	K	Single	Girts	Horiz.	Sec. Horiz.	Inner
				Brace	Brace	Diags				
				Diags	Diags					
			X	X	X	X	X	X	X	X
ft			Y	Y	Y	Y	Y	Y	Y	Y
T1 190.00-180.00	Yes	Yes	1	1	1	1	1	1	1	1
T2 180.00-160.00	Yes	Yes	1	1	1	1	1	1	1	1
T3 160.00-140.00	Yes	Yes	1	1	1	1	1	1	1	1
T4 140.00-120.00	Yes	Yes	1	1	1	1	1	1	1	1
T5 120.00-100.00	Yes	Yes	1	1	1	1	1	1	1	1
T6 100.00-80.00	Yes	Yes	1	1	1	1	1	1	1	1
T7 80.00-60.00	Yes	Yes	1	1	1	1	1	1	1	1
T8 60.00-40.00	Yes	Yes	1	1	1	1	1	1	1	1
T9 40.00-20.00	Yes	Yes	1	1	1	1	1	1	1	1
T10 20.00-5.00	Yes	Yes	1	1	1	1	1	1	1	1
T11 5.00-0.00	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)

[illegible]

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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
T2 180.00-160.00	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 160.00-140.00	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 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
T5 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
T6 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
T7 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
T8 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
T9 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
T10 20.00-5.00	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
T11 5.00-0.00	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)

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 190.00-180.00	Flange	0.7500	4	0.6250	2	0.6250	2	0.6250	2	0.6250	0	0.6250	0	0.6250	0
T2 180.00-160.00	Flange	A325N		A325N		A325N		A325N		A325N		A325N		A325N	
T3 160.00-140.00	Flange	0.7500	4	0.6250	2	0.6250	2	0.6250	2	0.6250	0	0.6250	0	0.6250	0
T4 140.00-120.00	Flange	A325N		A325N		A325N		A325N		A325N		A325N		A325N	
T5 120.00-100.00	Flange	0.7500	4	0.5000	1	0.5000	1	0.5000	1	0.6250	0	0.6250	0	0.6250	0
T6 100.00-80.00	Flange	A325N		A325N		A325N		A325N		A325N		A325N		A325N	
T7 80.00-60.00	Flange	0.7500	4	0.5000	1	0.5000	1	0.5000	1	0.6250	0	0.6250	0	0.6250	0
T8 60.00-40.00	Flange	A325N		A325N		A325N		A325N		A325N		A325N		A325N	
T9 40.00-20.00	Flange	0.7500	4	0.5000	1	0.5000	1	0.5000	1	0.6250	0	0.6250	0	0.6250	0
T10 20.00-5.00	Flange	A325N		A325N		A325N		A325N		A325N		A325N		A325N	
T11 5.00-0.00	Flange	0.7500	4	0.5000	1	0.5000	1	0.5000	1	0.6250	0	0.6250	0	0.6250	0
		A325N		A325N		A325N		A325N		A325N		A325N		A325N	

Guy Data

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<i>Guy Elevation</i>	<i>Guy Grade</i>	<i>Guy Size</i>	<i>Initial Tension</i>	<i>%</i>	<i>Guy Modulus</i>	<i>Guy Weight</i>	<i>L_u</i>	<i>Anchor Radius</i>	<i>Anchor Azimuth Adj. °</i>	<i>Anchor Elevation</i>	<i>End Fitting Efficiency %</i>	
<i>ft</i>			<i>K</i>		<i>ksi</i>	<i>plf</i>	<i>ft</i>	<i>ft</i>		<i>ft</i>		
162.496	EHS	A	3/4	5.83	10%	19000	1.155	213.04	140.00	0.0000	0.00	100%
		B	3/4	5.83	10%	19000	1.155	213.04	140.00	0.0000	0.00	100%
		C	3/4	5.83	10%	19000	1.155	213.04	140.00	0.0000	0.00	100%
102.496	EHS	A	5/8	4.24	10%	21000	0.813	171.81	140.00	0.0000	0.00	100%
		B	5/8	4.24	10%	21000	0.813	171.81	140.00	0.0000	0.00	100%
		C	5/8	4.24	10%	21000	0.813	171.81	140.00	0.0000	0.00	100%

Guy Data(cont'd)

Guy Elevation	Mount Type	Torque-Arm Spread	Torque-Arm Leg Angle	Torque-Arm Style	Torque-Arm Grade	Torque-Arm Type	Torque-Arm Size
ft		ft	°				
162.496	Torque Arm	6.83	0.0000	Channel	A36 (36 ksi)	Channel	C15x33.9
102.496	Torque Arm	6.83	0.0000	Channel	A36 (36 ksi)	Channel	C15x33.9

Guy Data (cont'd)

Guy Elevation	Diagonal Grade	Diagonal Type	Upper Diagonal Size	Lower Diagonal Size	Is Strap.	Pull-Off Grade	Pull-Off Type	Pull-Off Size
ft								
162.50	A572-50 (50 ksi)	Solid Round				A36 (36 ksi)	Channel	
102.50	A572-50 (50 ksi)	Solid Round				A36 (36 ksi)	Channel	

Guy Data (cont'd)

Guy Elevation	Cable Weight A	Cable Weight B	Cable Weight C	Cable Weight D	Tower Intercept A	Tower Intercept B	Tower Intercept C	Tower Intercept D
ft	K	K	K	K	ft	ft	ft	ft
162.496	0.25	0.25	0.25		4.43	4.43	4.43	
					3.6 sec/pulse	3.6 sec/pulse	3.6 sec/pulse	
102.496	0.14	0.14	0.14		2.81	2.81	2.81	
					2.9 sec/pulse	2.9 sec/pulse	2.9 sec/pulse	

Guy Data (cont'd)

Torque Arm	Pull Off	Diagonal
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Guy Elevation ft	Calc K Single Angles	Calc K Solid Rounds	K _x	K _y	K _x	K _y	K _x	K _y
162.496	No	No	1	1	1	1	1	1
102.496	No	No	1	1	1	1	1	1

Guy Data (cont'd)

Guy Elevation ft	Torque-Arm				Pull Off				Diagonal			
	Bolt Size in	Number	Net Width Deduct in	U	Bolt Size in	Number	Net Width Deduct in	U	Bolt Size in	Number	Net Width Deduct in	U
162.496	0.0000	0	0.0000	1	0.6250	0	0.0000	0.75	0.6250	0	0.0000	0.75
	A325N				A325N				A325N			
102.496	0.0000	0	0.0000	1	0.6250	0	0.0000	0.75	0.6250	0	0.0000	0.75
	A325N				A325N				A325N			

Guy Pressures

Guy Elevation ft	Guy Location	z ft	q _z psf	q _z Ice psf	Ice Thickness in
162.496	A	81.25	30	22	0.5000
	B	81.25	30	22	0.5000
	C	81.25	30	22	0.5000
102.496	A	51.25	26	20	0.5000
	B	51.25	26	20	0.5000
	C	51.25	26	20	0.5000

Guy-Mast Forces (Excluding Wind) - No Ice

Guy Elevation ft	Guy Location	Chord Angle °	Guy Tension Top Bottom K	F _x K	F _y K	F _z K	M _x kip-ft	M _y kip-ft	M _z kip-ft
162.496	A	49.6461	6.02	-0.09	4.64	-3.83	-9.15	13.29	-15.84
			5.83						
			6.02	0.09	4.64	-3.83	-9.15	-13.29	15.84
	B	49.6461	6.02	3.37	4.64	1.83	18.30	13.29	0.00
			5.83						
			6.02	3.27	4.64	2.00	-9.15	-13.29	-15.84
	C	49.6461	6.02	-3.27	4.64	2.00	-9.15	13.29	15.84
			5.83						
			6.02	-3.37	4.64	1.83	18.30	-13.29	0.00
	Sum:		5.83	0.00	27.82	0.00	-0.00	0.00	0.00
			4.32	-0.09	2.62	-3.44	-5.17	11.91	-8.96
			4.24						
102.496	A	36.5884	4.32	0.09	2.62	-3.44	-5.17	-11.91	8.96
			4.32						

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Guy Elevation	Guy Location	Chord Angle	Guy Tension Top Bottom K	F_x	F_y	F_z	M_x	M_y	M_z
ft		°		K	K	K	kip-ft	kip-ft	kip-ft
			4.24						
	B	36.5884	4.32	3.02	2.62	1.64	10.34	11.91	0.00
			4.24						
	B	36.5884	4.32	2.93	2.62	1.79	-5.17	-11.91	-8.96
			4.24						
	C	36.5884	4.32	-2.93	2.62	1.79	-5.17	11.91	8.96
			4.24						
	C	36.5884	4.32	-3.02	2.62	1.64	10.34	-11.91	0.00
			4.24						
			Sum:	0.00	15.73	0.00	-0.00	0.00	0.00

Guy-Mast Forces (Excluding Wind) - Ice

Guy Elevation	Guy Location	Chord Angle	Guy Tension Top Bottom K	F_x	F_y	F_z	M_x	M_y	M_z
ft		°		K	K	K	kip-ft	kip-ft	kip-ft
162.496	A	49.6461	8.25	-0.13	6.37	-5.24	-12.57	18.15	-21.77
			7.94						
	A	49.6461	8.25	0.13	6.37	-5.24	-12.57	-18.15	21.77
			7.94						
	B	49.6461	8.25	4.60	6.37	2.51	25.14	18.15	0.00
			7.94						
	B	49.6461	8.25	4.47	6.37	2.73	-12.57	-18.15	-21.77
			7.94						
	C	49.6461	8.25	-4.47	6.37	2.73	-12.57	18.15	21.77
			7.94						
	C	49.6461	8.25	-4.60	6.37	2.51	25.14	-18.15	0.00
			7.94						
			Sum:	0.00	38.23	0.00	-0.00	0.00	0.00
102.496	A	36.5884	6.07	-0.12	3.70	-4.81	-7.30	16.68	-12.65
			5.92						
	A	36.5884	6.07	0.12	3.70	-4.81	-7.30	-16.68	12.65
			5.92						
	B	36.5884	6.07	4.23	3.70	2.30	14.61	16.68	0.00
			5.92						
	B	36.5884	6.07	4.11	3.70	2.51	-7.30	-16.68	-12.65
			5.92						
	C	36.5884	6.07	-4.11	3.70	2.51	-7.30	16.68	12.65
			5.92						
	C	36.5884	6.07	-4.23	3.70	2.30	14.61	-16.68	0.00
			5.92						
			Sum:	0.00	22.22	0.00	-0.00	0.00	0.00

Guy-Mast Forces (Excluding Wind) - Service

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Guy Elevation	Guy Location	Chord Angle	Guy Tension Top Bottom K	F _x	F _y	F _z	M _x	M _y	M _z
ft		°		K	K	K	kip-ft	kip-ft	kip-ft
162.496	A	49.6461	6.02 5.83	-0.09	4.64	-3.83	-9.15	13.29	-15.84
	A	49.6461	6.02 5.83	0.09	4.64	-3.83	-9.15	-13.29	15.84
	B	49.6461	6.02 5.83	3.37	4.64	1.83	18.30	13.29	0.00
	B	49.6461	6.02 5.83	3.27	4.64	2.00	-9.15	-13.29	-15.84
	C	49.6461	6.02 5.83	-3.27	4.64	2.00	-9.15	13.29	15.84
	C	49.6461	6.02 5.83	-3.37	4.64	1.83	18.30	-13.29	0.00
			Sum:	0.00	27.82	0.00	-0.00	0.00	0.00
	A	36.5884	4.32 4.24	-0.09	2.62	-3.44	-5.17	11.91	-8.96
	A	36.5884	4.32 4.24	0.09	2.62	-3.44	-5.17	-11.91	8.96
	B	36.5884	4.32 4.24	3.02	2.62	1.64	10.34	11.91	0.00
	B	36.5884	4.32 4.24	2.93	2.62	1.79	-5.17	-11.91	-8.96
	C	36.5884	4.32 4.24	-2.93	2.62	1.79	-5.17	11.91	8.96
102.496	C	36.5884	4.32 4.24	-3.02	2.62	1.64	10.34	-11.91	0.00
			Sum:	0.00	15.73	0.00	-0.00	0.00	0.00

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 1/4 (Nextel)	A	Yes	Ar (CfAc)	140.33 - 8.00	0.0000	0.33	6	3	0.5000 1.0000	1.5500		0.66
1 1/4 (Nextel)	A	Yes	Ar (CfAc)	140.33 - 8.00	0.0000	0.1	6	6	0.5000 1.0000	1.5500		0.66
1 5/8 (T-Mobile)	A	Yes	Ar (CfAc)	188.00 - 8.00	0.0000	-0.3	6	3	0.5000	1.9800		1.04
1/2	A	Yes	Ar (CfAc)	105.00 - 8.00	0.0000	-0.1	2	2	0.5000 0.5800	0.5800		0.25
1 5/8 (Verizon)	B	Yes	Ar (CfAc)	169.00 - 8.00	0.0000	-0.05	18	12	0.5000 1.0000	1.9800		1.04
7/8	B	Yes	Ar (CfAc)	179.00 - 8.00	3.0000	0.25	1	1	1.1100	1.1100		0.54
1 1/4 (ATT)	C	Yes	Ar (CfAc)	177.50 - 3.00	0.0000	0.1	9	9	1.0000 1.5500	1.5500		0.66
1 1/4 (ATT)	C	Yes	Ar (CfAc)	177.50 - 3.00	-1.0000	0.3	3	3	0.5000	1.5500		0.66
7/8	C	Yes	Ar (CfAc)	170.00 - 8.00	0.0000	-0.35	2	1	0.5000 0.7500	1.1100		0.54
1 1/4	C	Yes	Ar (CfAc)	152.00 - 8.00	0.0000	-0.4	1	1	1.5500	1.5500		0.66
7/8	C	Yes	Ar (CfAc)	144.00 - 8.00	4.0000	-0.35	1	1	1.1100	1.1100		0.54
1 1/4	C	Yes	Ar (CfAc)	122.00 - 8.00	2.0000	-0.4	1	1	1.5500	1.5500		0.66
1 5/8	C	Yes	Ar (CfAc)	110.00 - 8.00	2.0000	-0.3	2	1	1.9800 0.7500	1.9800		1.04

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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 1/4	C	Yes	Ar (CfAc)	108.00 - 8.00	4.0000	-0.4	1	1	1.5500	1.5500		0.66
1 5/8	B	Yes	Ar (CfAc)	188.00 - 8.00	2.5000	0.35	6	3	0.5000	1.9800		1.04
(T-Mobile)									0.7500			
1 1/4	C	Yes	Ar (CfAc)	147.00 - 8.00	0.0000	-0.3	1	1	1.5500	1.5500		0.66
2" Inner Duct	A	No	Ar (Leg)	120.00 - 8.00	0.0000	0	1	1	2.0000	2.0000		1.00
(Clearwire Existing)									1.5000			
1 5/8	C	Yes	Ar (CfAc)	130.00 - 8.00	2.5000	0.15	12	9	1.0000	1.9800		1.04
(MetroPCS - Reserved)												
1/2	C	Yes	Ar (CfAc)	130.00 - 8.00	0.0000	-0.23	1	1	0.5800	0.5800		0.25
(MetroPCS - Reserved)												
1 5/8	A	Yes	Ar (CfAc)	150.00 - 8.00	2.5000	0.05	6	6	0.5000	1.9800		1.04
(Sprint - Relcoated)									1.0000			

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	190.00-180.00	A	3.960	0.000	0.000	0.000	0.05
		B	3.960	0.000	0.000	0.000	0.05
		C	0.000	0.000	0.000	0.000	0.00
T2	180.00-160.00	A	9.900	0.000	0.000	0.000	0.12
		B	29.478	0.000	0.000	0.000	0.30
		C	28.050	0.000	0.000	0.000	0.15
T3	160.00-140.00	A	20.184	0.000	0.000	0.000	0.19
		B	51.350	0.000	0.000	0.000	0.51
		C	35.674	0.000	0.000	0.000	0.19
T4	140.00-120.00	A	52.950	0.000	0.000	0.000	0.41
		B	51.350	0.000	0.000	0.000	0.51
		C	55.458	0.000	0.000	0.000	0.35
T5	120.00-100.00	A	56.767	0.000	0.000	0.000	0.43
		B	54.683	0.000	0.000	0.000	0.51
		C	75.800	0.000	0.000	0.000	0.51
T6	100.00-80.00	A	58.217	0.000	0.000	0.000	0.44
		B	54.683	0.000	0.000	0.000	0.51
		C	79.000	0.000	0.000	0.000	0.54
T7	80.00-60.00	A	58.217	0.000	0.000	0.000	0.44
		B	54.683	0.000	0.000	0.000	0.51
		C	79.000	0.000	0.000	0.000	0.54
T8	60.00-40.00	A	58.217	0.000	0.000	0.000	0.44
		B	54.683	0.000	0.000	0.000	0.51
		C	79.000	0.000	0.000	0.000	0.54
T9	40.00-20.00	A	58.217	0.000	0.000	0.000	0.44
		B	54.683	0.000	0.000	0.000	0.51
		C	79.000	0.000	0.000	0.000	0.54
T10	20.00-5.00	A	34.930	0.000	0.000	0.000	0.26
		B	32.810	0.000	0.000	0.000	0.31
		C	52.050	0.000	0.000	0.000	0.35
T11	5.00-0.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	3.100	0.000	0.000	0.000	0.02

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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	190.00-180.00	A	0.500	1.987	3.307	0.000	0.000	0.12
		B		1.987	3.307	0.000	0.000	0.13
		C		0.000	0.000	0.000	0.000	0.00
T2	180.00-160.00	A	0.500	4.967	8.267	0.000	0.000	0.30
		B		10.543	28.727	0.000	0.000	0.76
		C		9.196	35.729	0.000	0.000	0.51
T3	160.00-140.00	A	0.500	7.590	18.995	0.000	0.000	0.47
		B		13.450	53.733	0.000	0.000	1.26
		C		16.758	40.833	0.000	0.000	0.65
T4	140.00-120.00	A	0.500	18.433	52.850	0.000	0.000	1.09
		B		13.450	53.733	0.000	0.000	1.26
		C		28.258	60.700	0.000	0.000	1.09
T5	120.00-100.00	A	0.500	24.092	53.300	0.000	0.000	1.15
		B		18.450	53.733	0.000	0.000	1.26
		C		40.067	80.567	0.000	0.000	1.55
T6	100.00-80.00	A	0.500	26.067	54.650	0.000	0.000	1.18
		B		18.450	53.733	0.000	0.000	1.26
		C		45.100	80.567	0.000	0.000	1.63
T7	80.00-60.00	A	0.500	26.067	54.650	0.000	0.000	1.18
		B		18.450	53.733	0.000	0.000	1.26
		C		45.100	80.567	0.000	0.000	1.63
T8	60.00-40.00	A	0.500	26.067	54.650	0.000	0.000	1.18
		B		18.450	53.733	0.000	0.000	1.26
		C		45.100	80.567	0.000	0.000	1.63
T9	40.00-20.00	A	0.500	26.067	54.650	0.000	0.000	1.18
		B		18.450	53.733	0.000	0.000	1.26
		C		45.100	80.567	0.000	0.000	1.63
T10	20.00-5.00	A	0.500	15.640	32.790	0.000	0.000	0.71
		B		11.070	32.240	0.000	0.000	0.76
		C		28.335	54.465	0.000	0.000	1.06
T11	5.00-0.00	A	0.500	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.850	4.083	0.000	0.000	0.05

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	190.00-180.00	A	0.000	0.523	0.782	1.046
		B	0.000	0.523	0.782	1.046
		C	0.000	0.000	0.000	0.000
T2	180.00-160.00	A	0.000	1.190	1.781	2.381
		B	0.000	3.532	5.303	7.064
		C	0.000	4.041	5.046	8.082
T3	160.00-140.00	A	2.723	5.978	0.000	0.000
		B	6.928	15.107	0.000	0.000
		C	4.813	12.950	0.000	0.000
T4	140.00-120.00	A	7.144	16.029	0.000	0.000
		B	6.928	15.107	0.000	0.000
		C	7.482	20.003	0.000	0.000
T5	120.00-100.00	A	0.000	6.511	9.612	13.022

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Section	Elevation	Face	A_R	$A_{R_{Ice}}$	A_F	$A_{F_{Ice}}$
	ft		ft ²	ft ²	ft ²	ft ²
T6	100.00-80.00	B	0.000	6.043	9.237	12.086
		C	0.000	10.850	13.636	21.701
		A	7.405	17.026	0.000	0.000
		B	6.928	15.107	0.000	0.000
T7	80.00-60.00	C	10.658	28.258	0.000	0.000
		A	4.045	9.302	0.000	0.000
		B	3.785	8.253	0.000	0.000
		C	5.823	15.438	0.000	0.000
T8	60.00-40.00	A	4.045	9.302	0.000	0.000
		B	3.785	8.253	0.000	0.000
		C	5.823	15.438	0.000	0.000
		A	4.045	9.302	0.000	0.000
T9	40.00-20.00	B	3.785	8.253	0.000	0.000
		C	5.823	15.438	0.000	0.000
		A	2.556	5.878	0.000	0.000
		B	2.392	5.215	0.000	0.000
T10	20.00-5.00	C	4.041	10.713	0.000	0.000
		A	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000
		C	0.000	0.278	0.477	0.789

Feed Line Center of Pressure

Section	Elevation	CP_X	CP_Z	$CP_{X_{Ice}}$	$CP_{Z_{Ice}}$
	ft	in	in	in	in
T1	190.00-180.00	0.2576	0.6016	0.1014	0.2367
T2	180.00-160.00	0.7897	1.7718	0.7150	1.3798
T3	160.00-140.00	1.5880	0.3471	1.4969	0.5725
T4	140.00-120.00	-0.2223	-0.0401	0.3117	0.7400
T5	120.00-100.00	-0.2432	0.8236	0.3179	1.3463
T6	100.00-80.00	-0.1503	1.0682	0.4539	1.6127
T7	80.00-60.00	-0.1610	1.1691	0.4242	1.8261
T8	60.00-40.00	-0.1610	1.1691	0.4242	1.8261
T9	40.00-20.00	-0.1610	1.1691	0.4242	1.8261
T10	20.00-5.00	-0.3255	1.4163	0.2550	1.9701
T11	5.00-0.00	-0.7643	1.4922	-0.5685	1.3217

Discrete Tower Loads

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	
APX16PV-16PVL-X w/mount pipe (T-Mobile)	A	From Leg	3.00 0.00 0.00	0.0000	188.00	No Ice 1/2" Ice	6.85 7.32	3.33 3.96	0.07 0.11
APX16PV-16PVL-X w/mount pipe	B	From Leg	3.00 0.00	0.0000	188.00	No Ice 1/2" Ice	6.85 7.32	3.33 3.96	0.07 0.11

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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
(T-Mobile)			0.00						
APX16PV-16PVL-X	C	From Leg	3.00	0.0000	188.00	No Ice	6.85	3.33	0.07
w/mount pipe			0.00			1/2" Ice	7.32	3.96	0.11
(T-Mobile)			0.00						
(2) G20057A1 TMA	A	From Leg	3.00	0.0000	188.00	No Ice	0.82	0.39	0.01
(T-Mobile)			0.00			1/2" Ice	0.95	0.49	0.02
			0.00						
(2) G20057A1 TMA	B	From Leg	3.00	0.0000	188.00	No Ice	0.82	0.39	0.01
(T-Mobile)			0.00			1/2" Ice	0.95	0.49	0.02
			0.00						
(2) G20057A1 TMA	C	From Leg	3.00	0.0000	188.00	No Ice	0.82	0.39	0.01
(T-Mobile)			0.00			1/2" Ice	0.95	0.49	0.02
			0.00						
Rohn 6'x10' Boom Gate (3)	A	From Leg	2.00	0.0000	188.00	No Ice	47.40	47.40	1.62
(T-Mobile)			0.00			1/2" Ice	56.40	56.40	2.01
			0.00						
(2) 7770.00	A	From Leg	4.75	0.0000	178.75	No Ice	5.88	2.93	0.04
(ATT)			0.00			1/2" Ice	6.31	3.27	0.07
			0.00						
(2) 7770.00	B	From Leg	4.75	0.0000	178.75	No Ice	5.88	2.93	0.04
(ATT)			0.00			1/2" Ice	6.31	3.27	0.07
			0.00						
(2) 7770.00	C	From Leg	4.75	0.0000	178.75	No Ice	5.88	2.93	0.04
(ATT)			0.00			1/2" Ice	6.31	3.27	0.07
			0.00						
(2) TMA 10"x8"x3"	A	From Leg	4.75	0.0000	178.75	No Ice	0.78	0.29	0.02
(ATT)			0.00			1/2" Ice	0.90	0.38	0.02
			0.00						
(2) TMA 10"x8"x3"	B	From Leg	4.75	0.0000	178.75	No Ice	0.78	0.29	0.02
(ATT)			0.00			1/2" Ice	0.90	0.38	0.02
			0.00						
(2) TMA 10"x8"x3"	C	From Leg	4.75	0.0000	178.75	No Ice	0.78	0.29	0.02
(ATT)			0.00			1/2" Ice	0.90	0.38	0.02
			0.00						
Diplexer	A	From Leg	4.75	0.0000	178.75	No Ice	0.35	0.12	0.01
(ATT)			0.00			1/2" Ice	0.43	0.17	0.01
			0.00						
Diplexer	B	From Leg	4.75	0.0000	178.75	No Ice	0.35	0.12	0.01
(ATT)			0.00			1/2" Ice	0.43	0.17	0.01
			0.00						
Diplexer	C	From Leg	4.75	0.0000	178.75	No Ice	0.35	0.12	0.01
(ATT)			0.00			1/2" Ice	0.43	0.17	0.01
			0.00						
Rohn 6'x12' Boom Gate (3)	C	From Leg	2.00	0.0000	177.50	No Ice	49.80	49.80	1.68
(ATT)			0.00			1/2" Ice	59.30	59.30	2.10
			0.00						
Pirot 15' T-Frame Sector	A	From Leg	2.00	0.0000	169.00	No Ice	15.00	15.00	0.50
Mount (1)			0.00			1/2" Ice	20.60	20.60	0.65
(Verizon)			0.00						
Pirot 15' T-Frame Sector	B	From Leg	2.00	0.0000	169.00	No Ice	15.00	15.00	0.50
Mount (1)			0.00			1/2" Ice	20.60	20.60	0.65
(Verizon)			0.00						
Pirot 15' T-Frame Sector	C	From Leg	2.00	0.0000	169.00	No Ice	15.00	15.00	0.50
Mount (1)			0.00			1/2" Ice	20.60	20.60	0.65
(Verizon)			0.00						
(2) DB980H90E-M	A	From Leg	3.00	0.0000	150.00	No Ice	3.80	2.19	0.01
(Sprint)			0.00			1/2" Ice	4.18	2.56	0.03

RISATower

CEN TEK Engineering, Inc.
 63-2 N Branford Rd
 Branford, CT 06405
 Phone: (203) 488-0580
 FAX: (203) 488-8587

Job

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Client

Verizon

Designed by

Jrm

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
(2) DB980H90E-M (Sprint)	B	From Leg	0.00 3.00 0.00 0.00	0.0000	150.00	No Ice 1/2" Ice	3.80 4.18	2.19 2.56	0.01 0.03
(2) DB980H90E-M (Sprint)	C	From Leg	0.00 3.00 0.00 0.00	0.0000	150.00	No Ice 1/2" Ice	3.80 4.18	2.19 2.56	0.01 0.03
Rohn 6'x12' Boom Gate (3) (Sprint)	C	From Leg	0.00 2.00 0.00 0.00	0.0000	150.50	No Ice 1/2" Ice	49.80 59.30	49.80 59.30	1.68 2.10
(4) DB844H90E-XY (Nextel)	A	From Leg	0.00 3.00 0.00 0.00	0.0000	140.33	No Ice 1/2" Ice	2.87 3.18	3.73 4.10	0.01 0.04
(4) DB844H90E-XY (Nextel)	B	From Leg	0.00 3.00 0.00 0.00	0.0000	140.33	No Ice 1/2" Ice	2.87 3.18	3.73 4.10	0.01 0.04
(4) DB844H90E-XY (Nextel)	C	From Leg	0.00 3.00 0.00 0.00	0.0000	140.33	No Ice 1/2" Ice	2.87 3.18	3.73 4.10	0.01 0.04
Rohn 6'x12' Boom Gate (3) (Nextel)	C	From Leg	0.00 1.50 0.00 0.00	0.0000	140.33	No Ice 1/2" Ice	49.80 59.30	49.80 59.30	1.68 2.10
BXA-171085-8BF (Verizon - proposed)	A	From Leg	0.00 3.00 0.00 0.00	0.0000	169.00	No Ice 1/2" Ice	2.94 3.26	2.16 2.46	0.01 0.03
BXA-171085-8BF (Verizon - proposed)	B	From Leg	0.00 3.00 0.00 0.00	0.0000	169.00	No Ice 1/2" Ice	2.94 3.26	2.16 2.46	0.01 0.03
BXA-171085-8BF (Verizon - proposed)	C	From Leg	0.00 3.00 0.00 0.00	0.0000	169.00	No Ice 1/2" Ice	2.94 3.26	2.16 2.46	0.01 0.03
BXA-70063/6CF (Verizon - proposed)	A	From Leg	0.00 3.00 0.00 0.00	0.0000	169.00	No Ice 1/2" Ice	7.73 8.27	4.16 4.60	0.02 0.06
BXA-70063/6CF (Verizon - proposed)	B	From Leg	0.00 3.00 0.00 0.00	0.0000	169.00	No Ice 1/2" Ice	7.73 8.27	4.16 4.60	0.02 0.06
BXA-70063/6CF (Verizon - proposed)	C	From Leg	0.00 3.00 0.00 0.00	0.0000	169.00	No Ice 1/2" Ice	7.73 8.27	4.16 4.60	0.02 0.06
(2) LPA-80080-4CF (Verizon - proposed)	A	From Leg	0.00 3.00 0.00 0.00	0.0000	169.00	No Ice 1/2" Ice	2.62 2.92	6.06 6.45	0.01 0.05
(2) LPA-80080-4CF (Verizon - proposed)	B	From Leg	0.00 3.00 0.00 0.00	0.0000	169.00	No Ice 1/2" Ice	2.62 2.92	6.06 6.45	0.01 0.05
(2) LPA-80080-4CF (Verizon - proposed)	C	From Leg	0.00 3.00 0.00 0.00	0.0000	169.00	No Ice 1/2" Ice	2.62 2.92	6.06 6.45	0.01 0.05
LLPX310R (Clearwire Existing)	A	From Leg	0.00 2.00 0.00 0.00	0.0000	120.00	No Ice 1/2" Ice	4.83 5.18	1.95 2.21	0.03 0.05
LLPX310R (Clearwire Existing)	B	From Leg	0.00 2.00 0.00 0.00	0.0000	120.00	No Ice 1/2" Ice	4.83 5.18	1.95 2.21	0.03 0.05
LLPX310R (Clearwire Existing)	C	From Leg	0.00 2.00 0.00 0.00	0.0000	120.00	No Ice 1/2" Ice	4.83 5.18	1.95 2.21	0.03 0.05

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	Project	Date
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	Verizon	Jrm

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
RRU (Clearwire Existing)	A	From Leg	0.00 1.00 0.00 0.00	0.0000	120.00	No Ice 1/2" Ice	1.80 2.00	0.78 0.92	0.03 0.04
RRU (Clearwire Existing)	B	From Leg	0.00 1.00 0.00 0.00	0.0000	120.00	No Ice 1/2" Ice	1.80 2.00	0.78 0.92	0.03 0.04
RRU (Clearwire Existing)	C	From Leg	0.00 1.00 0.00 0.00	0.0000	120.00	No Ice 1/2" Ice	1.80 2.00	0.78 0.92	0.03 0.04
Splice Box (Clearwire Existing)	A	From Leg	0.00 0.00 0.00	0.0000	120.00	No Ice 1/2" Ice	1.05 1.21	0.70 0.85	0.02 0.02
6-ft T-Frame (Clearwire Existing)	A	From Leg	0.00 1.00 0.00 0.00	0.0000	120.00	No Ice 1/2" Ice	13.60 17.50	13.60 17.50	0.38 0.53
6-ft T-Frame (Clearwire Existing)	B	From Leg	0.00 1.00 0.00 0.00	0.0000	120.00	No Ice 1/2" Ice	13.60 17.50	13.60 17.50	0.38 0.53
6-ft T-Frame (Clearwire Existing)	C	From Leg	0.00 1.00 0.00 0.00	0.0000	120.00	No Ice 1/2" Ice	13.60 17.50	13.60 17.50	0.38 0.53
6'x4" Pipe Mount (Clearwire Existing)	A	From Leg	0.00 2.00 0.00 0.00	0.0000	120.00	No Ice 1/2" Ice	2.09 2.46	2.09 2.46	0.05 0.07
6'x4" Pipe Mount (Clearwire Existing)	B	From Leg	0.00 2.00 0.00 0.00	0.0000	120.00	No Ice 1/2" Ice	2.09 2.46	2.09 2.46	0.05 0.07
6'x4" Pipe Mount (Clearwire Existing)	C	From Leg	0.00 2.00 0.00 0.00	0.0000	120.00	No Ice 1/2" Ice	2.09 2.46	2.09 2.46	0.05 0.07
20' x 3" Dia Omni	A	From Leg	0.00 4.75 0.00 0.00	0.0000	188.75	No Ice 1/2" Ice	6.00 8.03	6.00 8.03	0.05 0.09
2' x 2" Dia Omni	C	From Leg	0.00 4.75 0.00 0.00	0.0000	180.00	No Ice 1/2" Ice	0.30 0.43	0.30 0.43	0.02 0.02
FG4605	A	From Leg	0.00 4.75 6.00 0.00	0.0000	170.25	No Ice 1/2" Ice	0.60 1.00	0.60 1.00	0.03 0.04
FG4605	C	From Leg	0.00 4.75 6.00 0.00	0.0000	170.25	No Ice 1/2" Ice	0.60 1.00	0.60 1.00	0.03 0.04
4 Bay Dipole	A	From Leg	0.00 4.75 0.00 0.00	0.0000	155.50	No Ice 1/2" Ice	1.65 2.61	1.65 2.61	0.02 0.03
FG4607	A	From Leg	0.00 4.75 0.00 0.00	0.0000	147.00	No Ice 1/2" Ice	2.67 3.60	2.67 3.60	0.01 0.03
DB408	B	From Leg	0.00 4.75 0.00 0.00	0.0000	126.00	No Ice 1/2" Ice	1.65 2.61	1.65 2.61	0.02 0.03
3' Standoff	B	From Leg	0.00 1.50 0.00 0.00	0.0000	122.50	No Ice 1/2" Ice	3.00 4.00	3.00 4.00	0.05 0.07
PD220	A	From Leg	0.00 4.00 0.00	0.0000	121.00	No Ice 1/2" Ice	3.08 5.30	3.08 5.30	0.02 0.05

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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
3'-6" Standoff	A	From Leg	0.00 2.00 0.00 0.00	0.0000	110.00	No Ice 1/2" Ice	2.40 3.20	2.40 3.20	0.05 0.07
PD220	B	From Leg	0.00 4.00 0.00 0.00	0.0000	121.00	No Ice 1/2" Ice	3.08 5.30	3.08 5.30	0.02 0.05
3'-6" Standoff	B	From Leg	0.00 2.00 0.00 0.00	0.0000	110.00	No Ice 1/2" Ice	2.40 3.20	2.40 3.20	0.05 0.07
Folded Dipole	C	From Leg	0.00 1.50 0.00 0.00	0.0000	111.00	No Ice 1/2" Ice	1.20 2.40	1.20 2.40	0.03 0.04
6'x3" Pipe Mount	C	From Leg	0.00 1.00 0.00 0.00	0.0000	111.00	No Ice 1/2" Ice	1.77 2.13	1.77 2.13	0.03 0.05
2' Standoff	B	From Leg	0.00 1.00 0.00 0.00	0.0000	105.00	No Ice 1/2" Ice	0.60 0.80	0.60 0.80	0.01 0.02
2' x 2" Dia Omni	B	From Leg	0.00 2.00 0.00 0.00	0.0000	106.00	No Ice 1/2" Ice	0.30 0.43	0.30 0.43	0.02 0.02
(2) 800-10504 (MetroPCS - Reserved)	A	From Leg	0.00 4.00 0.00 0.00	0.0000	130.00	No Ice 1/2" Ice	3.66 4.01	2.26 2.59	0.02 0.04
(2) 800-10504 (MetroPCS - Reserved)	B	From Leg	0.00 4.00 0.00 0.00	0.0000	130.00	No Ice 1/2" Ice	3.66 4.01	2.26 2.59	0.02 0.04
(2) 800-10504 (MetroPCS - Reserved)	C	From Leg	0.00 4.00 0.00 0.00	0.0000	130.00	No Ice 1/2" Ice	3.66 4.01	2.26 2.59	0.02 0.04
(2) 860 10025 RCU (MetroPCS - Reserved)	A	From Leg	0.00 4.00 0.00 0.00	0.0000	130.00	No Ice 1/2" Ice	0.16 0.22	0.13 0.19	0.00 0.00
(2) 860 10025 RCU (MetroPCS - Reserved)	B	From Leg	0.00 4.00 0.00 0.00	0.0000	130.00	No Ice 1/2" Ice	0.16 0.22	0.13 0.19	0.00 0.00
(2) 860 10025 RCU (MetroPCS - Reserved)	C	From Leg	0.00 4.00 0.00 0.00	0.0000	130.00	No Ice 1/2" Ice	0.16 0.22	0.13 0.19	0.00 0.00
Splice Box (MetroPCS - Reserved)	A	From Leg	0.00 4.00 0.00 0.00	0.0000	130.00	No Ice 1/2" Ice	0.16 0.22	0.13 0.19	0.00 0.00
Andrew QT SF12-2-72 (MetroPCS - Reserved)	A	From Leg	0.00 2.00 0.00 0.00	0.0000	130.00	No Ice 1/2" Ice	16.30 20.60	16.30 20.60	0.39 0.55
Andrew QT SF12-2-72 (MetroPCS - Reserved)	B	From Leg	0.00 2.00 0.00 0.00	0.0000	130.00	No Ice 1/2" Ice	16.30 20.60	16.30 20.60	0.39 0.55
Andrew QT SF12-2-72 (MetroPCS - Reserved)	C	From Leg	0.00 2.00 0.00 0.00	0.0000	130.00	No Ice 1/2" Ice	16.30 20.60	16.30 20.60	0.39 0.55
GPS (MetroPCS - Reserved)	C	From Leg	0.00 4.00 0.00 0.00	0.0000	130.00	No Ice 1/2" Ice	1.00 1.50	1.00 1.50	0.01 0.01

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	Verizon	Jrm

Tower Pressures - No Ice

$$G_H = 1.117$$

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 190.00-180.00	185.00	1.636	38	36.566	A	5.776	8.752	4.792	32.98	0.000	0.000
					B	5.776	8.752		32.98	0.000	0.000
					C	6.558	4.792		42.22	0.000	0.000
T2 180.00-160.00	170.00	1.597	37	73.132	A	9.718	19.483	9.583	32.82	0.000	0.000
					B	6.196	39.061		21.18	0.000	0.000
					C	6.453	37.633		21.74	0.000	0.000
T3 160.00-140.00	150.00	1.541	36	73.132	A	0.067	35.618	9.583	26.86	0.000	0.000
					B	0.067	62.579		15.30	0.000	0.000
					C	0.067	49.018		19.52	0.000	0.000
T4 140.00-120.00	130.00	1.48	34	73.132	A	0.067	63.963	9.583	14.97	0.000	0.000
					B	0.067	62.579		15.30	0.000	0.000
					C	0.067	66.133		14.48	0.000	0.000
T5 120.00-100.00	110.00	1.411	33	74.173	A	1.699	68.433	11.667	16.64	0.000	0.000
					B	2.074	66.350		17.05	0.000	0.000
					C	0.000	87.467		13.34	0.000	0.000
T6 100.00-80.00	90.00	1.332	31	74.173	A	0.067	70.912	11.667	16.44	0.000	0.000
					B	0.067	67.855		17.18	0.000	0.000
					C	0.067	88.441		13.18	0.000	0.000
T7 80.00-60.00	70.00	1.24	29	74.173	A	0.067	70.445	11.667	16.55	0.000	0.000
					B	0.067	67.172		17.35	0.000	0.000
					C	0.067	89.451		13.03	0.000	0.000
T8 60.00-40.00	50.00	1.126	26	74.173	A	0.067	70.445	11.667	16.55	0.000	0.000
					B	0.067	67.172		17.35	0.000	0.000
					C	0.067	89.451		13.03	0.000	0.000
T9 40.00-20.00	30.00	1	23	74.173	A	0.067	70.445	11.667	16.55	0.000	0.000
					B	0.067	67.172		17.35	0.000	0.000
					C	0.067	89.451		13.03	0.000	0.000
T10 20.00-5.00	12.50	1	23	55.630	A	0.067	44.763	8.750	19.52	0.000	0.000
					B	0.067	42.808		20.41	0.000	0.000
					C	0.067	60.399		14.47	0.000	0.000
T11 5.00-0.00	2.50	1	23	10.084	A	1.598	3.135	3.135	66.24	0.000	0.000
					B	1.598	3.135		66.24	0.000	0.000
					C	1.121	6.235		42.62	0.000	0.000

Tower Pressure - With Ice

$$G_H = 1.117$$

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			
T1 190.00-180.00	185.00	1.636	28	0.5000	37.399	A	8.819	11.149	6.458	32.34	0.000	0.000
						B	8.819	11.149		32.34	0.000	0.000
						C	6.558	9.686		39.76	0.000	0.000
T2 180.00-160.00	170.00	1.597	28	0.5000	74.798	A	17.385	22.452	12.917	32.42	0.000	0.000
						B	33.161	25.686		21.95	0.000	0.000

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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			
T3 160.00-140.00	150.00	1.541	27	0.5000	74.798	C	39.146	23.831	12.917	20.51	0.000	0.000
						A	19.062	28.862		26.95	0.000	0.000
						B	53.800	25.592		16.27	0.000	0.000
T4 140.00-120.00	130.00	1.48	26	0.5000	74.798	C	40.900	31.057	12.917	17.95	0.000	0.000
						A	52.917	29.654		15.64	0.000	0.000
						B	53.800	25.592		16.27	0.000	0.000
T5 120.00-100.00	110.00	1.411	24	0.5000	75.840	C	60.767	35.504	15.000	13.42	0.000	0.000
						A	51.589	38.246		16.70	0.000	0.000
						B	52.959	33.073		17.44	0.000	0.000
T6 100.00-80.00	90.00	1.332	23	0.5000	75.840	C	70.177	49.882	15.000	12.49	0.000	0.000
						A	54.717	38.139		16.15	0.000	0.000
						B	53.800	32.442		17.39	0.000	0.000
T7 80.00-60.00	70.00	1.24	21	0.5000	75.840	C	80.634	45.941	15.000	11.85	0.000	0.000
						A	54.717	39.487		15.92	0.000	0.000
						B	53.800	32.919		17.30	0.000	0.000
T8 60.00-40.00	50.00	1.126	20	0.5000	75.840	C	80.634	52.384	15.000	11.28	0.000	0.000
						A	54.717	39.487		15.92	0.000	0.000
						B	53.800	32.919		17.30	0.000	0.000
T9 40.00-20.00	30.00	1	17	0.5000	75.840	C	80.634	52.384	15.000	11.28	0.000	0.000
						A	54.717	39.487		15.92	0.000	0.000
						B	53.800	32.919		17.30	0.000	0.000
T10 20.00-5.00	12.50	1	17	0.5000	56.880	C	80.634	52.384	11.250	11.28	0.000	0.000
						A	32.857	27.121		18.76	0.000	0.000
						B	32.307	23.213		20.26	0.000	0.000
T11 5.00-0.00	2.50	1	17	0.5000	10.524	C	54.532	34.981	4.031	12.57	0.000	0.000
						A	1.598	4.585		65.21	0.000	0.000
						B	1.598	4.585		65.21	0.000	0.000
						C	4.892	5.157		40.12	0.000	0.000

Tower Pressure - Service

$$G_H = 1.117$$

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 190.00-180.00	185.00	1.636	10	36.566	A	5.776	8.752	4.792	32.98	0.000	0.000
					B	5.776	8.752		32.98	0.000	0.000
					C	6.558	4.792		42.22	0.000	0.000
T2 180.00-160.00	170.00	1.597	10	73.132	A	9.718	19.483	9.583	32.82	0.000	0.000
					B	6.196	39.061		21.18	0.000	0.000
					C	6.453	37.633		21.74	0.000	0.000
T3 160.00-140.00	150.00	1.541	10	73.132	A	0.067	35.618	9.583	26.86	0.000	0.000
					B	0.067	62.579		15.30	0.000	0.000
					C	0.067	49.018		19.52	0.000	0.000
T4 140.00-120.00	130.00	1.48	9	73.132	A	0.067	63.963	9.583	14.97	0.000	0.000
					B	0.067	62.579		15.30	0.000	0.000
					C	0.067	66.133		14.48	0.000	0.000
T5 120.00-100.00	110.00	1.411	9	74.173	A	1.699	68.433	11.667	16.64	0.000	0.000
					B	2.074	66.350		17.05	0.000	0.000
					C	0.000	87.467		13.34	0.000	0.000
T6 100.00-80.00	90.00	1.332	9	74.173	A	0.067	70.912	11.667	16.44	0.000	0.000
					B	0.067	67.855		17.18	0.000	0.000
					C	0.067	88.441		13.18	0.000	0.000

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Section Elevation	z	K _z	q _z	A _G	F _a	A _F	A _R	A _{leg}	Leg %	C _A A _A In Face	C _A A _A Out Face
ft	ft		psf	ft ²	c	ft ²	ft ²	ft ²		ft ²	ft ²
T7 80.00-60.00	70.00	1.24	8	74.173	A	0.067	70.445	11.667	16.55	0.000	0.000
					B	0.067	67.172		17.35	0.000	0.000
					C	0.067	89.451		13.03	0.000	0.000
T8 60.00-40.00	50.00	1.126	7	74.173	A	0.067	70.445	11.667	16.55	0.000	0.000
					B	0.067	67.172		17.35	0.000	0.000
					C	0.067	89.451		13.03	0.000	0.000
T9 40.00-20.00	30.00	1	6	74.173	A	0.067	70.445	11.667	16.55	0.000	0.000
					B	0.067	67.172		17.35	0.000	0.000
					C	0.067	89.451		13.03	0.000	0.000
T10 20.00-5.00	12.50	1	6	55.630	A	0.067	44.763	8.750	19.52	0.000	0.000
					B	0.067	42.808		20.41	0.000	0.000
					C	0.067	60.399		14.47	0.000	0.000
T11 5.00-0.00	2.50	1	6	10.084	A	1.598	3.135	3.135	66.24	0.000	0.000
					B	1.598	3.135		66.24	0.000	0.000
					C	1.121	6.235		42.62	0.000	0.000

Tower Forces - No Ice - Wind Normal To Face

Section Elevation	Add Weight	Self Weight	F _a	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
ft	K	K	c						ft ²	K	plf	
T1 190.00-180.00	0.11	0.62	A	0.397	2.069	0.65	1	1	11.469	1.00	100.25	B
			B	0.397	2.069	0.65	1	1	11.469			
			C	0.31	2.269	0.619	1	1	9.525			
T2 180.00-160.00	0.58	1.17	A	0.399	2.065	0.651	1	1	22.407	2.67	133.45	B
		TA 0.69	B	0.619	1.794	0.765	1	1	36.090			
			C	0.603	1.802	0.755	1	1	34.879			
T3 160.00-140.00	0.90	0.85	A	0.488	1.916	0.691	1	1	24.694	4.40	219.91	B
			B	0.857	1.869	0.944	1	1	59.157			
			C	0.671	1.777	0.8	1	1	39.269			
T4 140.00-120.00	1.27	0.85	A	0.876	1.891	0.961	1	1	61.533	4.82	241.21	C
			B	0.857	1.869	0.944	1	1	59.157			
			C	0.905	1.932	0.988	1	1	65.400			
T5 120.00-100.00	1.45	1.32	A	0.946	1.996	1	1	1	70.133	5.40*	270.07	C
		TA 0.69	B	0.922	1.958	1	1	1	68.424			
			C	1	2.1	1	1	1	87.467			
T6 100.00-80.00	1.49	0.82	A	0.957	2.016	1	1	1	70.979	5.10*	255.02	C
			B	0.916	1.947	0.998	1	1	67.763			
			C	1	2.1	1	1	1	88.508			
T7 80.00-60.00	1.49	0.83	A	0.951	2.005	1	1	1	70.512	4.75*	237.35	C
			B	0.907	1.933	0.989	1	1	66.507			
			C	1	2.1	1	1	1	89.518			
T8 60.00-40.00	1.49	0.73	A	0.951	2.005	1	1	1	70.512	4.31*	215.60	C
			B	0.907	1.933	0.989	1	1	66.507			
			C	1	2.1	1	1	1	89.518			
T9 40.00-20.00	1.49	0.73	A	0.951	2.005	1	1	1	70.512	3.83*	191.46	C
			B	0.907	1.933	0.989	1	1	66.507			
			C	1	2.1	1	1	1	89.518			
T10 20.00-5.00	0.92	0.63	A	0.806	1.82	0.901	1	1	40.407	2.87*	191.46	C
			B	0.771	1.797	0.873	1	1	37.435			
			C	1	2.1	1	1	1	60.466			
T11 5.00-0.00	0.02	0.37	A	0.469	1.943	0.682	1	1	3.737	0.29	58.54	C
			B	0.469	1.943	0.682	1	1	3.737			
			C	0.73	1.781	0.841	1	1	6.368			
Sum Weight:	11.21	10.35			2A _g limit					39.45		

RISATower CEN TEK Engineering, Inc. 63-2 N Branford Rd Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job	190' Guyed Rohn Model 80 - Un-reinforced ~ Rev 1	Page	21 of 51
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	Client	Verizon	Designed by	Jrm

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 190.00-180.00	0.11	0.62	A	0.397	2.069	0.65	0.8	1	10.314	0.90	90.15	B
			B	0.397	2.069	0.65	0.8	1	10.314			
			C	0.31	2.269	0.619	0.8	1	8.213			
T2 180.00-160.00	0.58	1.17	A	0.399	2.065	0.651	0.8	1	20.464	2.58	128.86	B
		TA 0.69	B	0.619	1.794	0.765	0.8	1	34.850			
			C	0.603	1.802	0.755	0.8	1	33.588			
T3 160.00-140.00	0.90	0.85	A	0.488	1.916	0.691	0.8	1	24.681	4.40	219.86	B
			B	0.857	1.869	0.944	0.8	1	59.143			
			C	0.671	1.777	0.8	0.8	1	39.256			
T4 140.00-120.00	1.27	0.85	A	0.876	1.891	0.961	0.8	1	61.520	4.82	241.17	C
			B	0.857	1.869	0.944	0.8	1	59.143			
			C	0.905	1.932	0.988	0.8	1	65.387			
T5 120.00-100.00	1.45	1.32	A	0.946	1.996	1	0.8	1	69.793	5.40*	270.07	C
		TA 0.69	B	0.922	1.958	1	0.8	1	68.009			
			C	1	2.1	1	0.8	1	87.467			
T6 100.00-80.00	1.49	0.82	A	0.957	2.016	1	0.8	1	70.965	5.10*	255.02	C
			B	0.916	1.947	0.998	0.8	1	67.750			
			C	1	2.1	1	0.8	1	88.495			
T7 80.00-60.00	1.49	0.83	A	0.951	2.005	1	0.8	1	70.499	4.75*	237.35	C
			B	0.907	1.933	0.989	0.8	1	66.494			
			C	1	2.1	1	0.8	1	89.505			
T8 60.00-40.00	1.49	0.73	A	0.951	2.005	1	0.8	1	70.499	4.31*	215.60	C
			B	0.907	1.933	0.989	0.8	1	66.494			
			C	1	2.1	1	0.8	1	89.505			
T9 40.00-20.00	1.49	0.73	A	0.951	2.005	1	0.8	1	70.499	3.83*	191.46	C
			B	0.907	1.933	0.989	0.8	1	66.494			
			C	1	2.1	1	0.8	1	89.505			
T10 20.00-5.00	0.92	0.63	A	0.806	1.82	0.901	0.8	1	40.394	2.87*	191.46	C
			B	0.771	1.797	0.873	0.8	1	37.422			
			C	1	2.1	1	0.8	1	60.452			
T11 5.00-0.00	0.02	0.37	A	0.469	1.943	0.682	0.8	1	3.418	0.28	56.48	C
			B	0.469	1.943	0.682	0.8	1	3.418			
			C	0.73	1.781	0.841	0.8	1	6.144			
Sum Weight:	11.21	10.35			*2A _g limit					39.24		

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 190.00-180.00	0.11	0.62	A	0.397	2.069	0.65	0.85	1	10.602	0.93	92.68	B
			B	0.397	2.069	0.65	0.85	1	10.602			
			C	0.31	2.269	0.619	0.85	1	8.541			
T2 180.00-160.00	0.58	1.17	A	0.399	2.065	0.651	0.85	1	20.950	2.60	130.01	B
		TA 0.69	B	0.619	1.794	0.765	0.85	1	35.160			
			C	0.603	1.802	0.755	0.85	1	33.911			
T3 160.00-	0.90	0.85	A	0.488	1.916	0.691	0.85	1	24.684	4.40	219.88	B

RISATower CEN TEK Engineering, Inc. 63-2 N Branford Rd Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job	Page
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	Verizon	Jrm

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	
140.00			B	0.857	1.869	0.944	0.85	1	59.146			
			C	0.671	1.777	0.8	0.85	1	39.259			
T4 140.00-120.00	1.27	0.85	A	0.876	1.891	0.961	0.85	1	61.523	4.82	241.18	C
			B	0.857	1.869	0.944	0.85	1	59.146			
			C	0.905	1.932	0.988	0.85	1	65.390			
T5 120.00-100.00	1.45	1.32	A	0.946	1.996	1	0.85	1	69.878	5.40*	270.07	C
		TA 0.69	B	0.922	1.958	1	0.85	1	68.113			
			C	1	2.1	1	0.85	1	87.467			
T6 100.00-80.00	1.49	0.82	A	0.957	2.016	1	0.85	1	70.969	5.10*	255.02	C
			B	0.916	1.947	0.998	0.85	1	67.753			
			C	1	2.1	1	0.85	1	88.498			
T7 80.00-60.00	1.49	0.83	A	0.951	2.005	1	0.85	1	70.502	4.75*	237.35	C
			B	0.907	1.933	0.989	0.85	1	66.497			
			C	1	2.1	1	0.85	1	89.508			
T8 60.00-40.00	1.49	0.73	A	0.951	2.005	1	0.85	1	70.502	4.31*	215.60	C
			B	0.907	1.933	0.989	0.85	1	66.497			
			C	1	2.1	1	0.85	1	89.508			
T9 40.00-20.00	1.49	0.73	A	0.951	2.005	1	0.85	1	70.502	3.83*	191.46	C
			B	0.907	1.933	0.989	0.85	1	66.497			
			C	1	2.1	1	0.85	1	89.508			
T10 20.00-5.00	0.92	0.63	A	0.806	1.82	0.901	0.85	1	40.397	2.87*	191.46	C
			B	0.771	1.797	0.873	0.85	1	37.425			
			C	1	2.1	1	0.85	1	60.456			
T11 5.00-0.00	0.02	0.37	A	0.469	1.943	0.682	0.85	1	3.498	0.28	57.00	C
			B	0.469	1.943	0.682	0.85	1	3.498			
			C	0.73	1.781	0.841	0.85	1	6.200			
Sum Weight:	11.21	10.35			2A _g limit					39.30		

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 190.00-180.00	0.27	0.92	A	0.534	1.86	0.715	1	1	16.795	0.99	98.96	B
			B	0.534	1.86	0.715	1	1	16.795			
			C	0.434	2	0.666	1	1	13.011			
T2 180.00-160.00	1.58	1.72	A	0.533	1.861	0.715	1	1	33.430	3.52	175.77	C
		TA 0.88	B	0.787	1.807	0.886	1	1	55.911			
			C	0.842	1.853	0.932	1	1	61.345			
T3 160.00-140.00	2.39	1.25	A	0.641	1.784	0.779	1	1	41.555	4.46*	223.19	B
			B	1	2.1	1	1	1	79.393			
			C	0.962	2.025	1	1	1	71.957			
T4 140.00-120.00	3.45	1.25	A	1	2.1	1	1	1	82.571	4.28*	214.25	C
			B	1	2.1	1	1	1	79.393			
			C	1	2.1	1	1	1	96.271			
T5 120.00-100.00	3.97	1.90	A	1	2.1	1	1	1	89.835	4.14*	207.10	C
		TA 0.88	B	1	2.1	1	1	1	86.032			
			C	1	2.1	1	1	1	120.059			
T6 100.00-80.00	4.07	1.24	A	1	2.1	1	1	1	92.856	3.91*	195.56	C
			B	1	2.1	1	1	1	86.242			
			C	1	2.1	1	1	1	126.575			
T7 80.00-60.00	4.07	1.12	A	1	2.1	1	1	1	94.204	3.64*	182.01	C
			B	1	2.1	1	1	1	86.719			
			C	1	2.1	1	1	1	133.018			

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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	
T8 60.00-40.00	4.07	1.02	A	1	2.1	1	1	1	94.204	3.31*	165.33	C
			B	1	2.1	1	1	1	86.719			
			C	1	2.1	1	1	1	133.018			
T9 40.00-20.00	4.07	1.02	A	1	2.1	1	1	1	94.204	2.94*	146.82	C
			B	1	2.1	1	1	1	86.719			
			C	1	2.1	1	1	1	133.018			
T10 20.00-5.00	2.53	0.86	A	1	2.1	1	1	1	59.978	2.20*	146.82	C
			B	0.976	2.052	1	1	1	55.520			
			C	1	2.1	1	1	1	89.513			
T11 5.00-0.00	0.06	0.47	A	0.587	1.812	0.746	1	1	5.018	0.39	78.29	C
			B	0.587	1.812	0.746	1	1	5.018			
			C	0.955	2.012	1	1	1	10.049			
Sum Weight:	30.54	14.55			*2A _g limit					33.78		

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 190.00-180.00	0.27	0.92	A	0.534	1.86	0.715	0.8	1	15.031	0.89	88.57	B
			B	0.534	1.86	0.715	0.8	1	15.031			
			C	0.434	2	0.666	0.8	1	11.699			
T2 180.00-160.00	1.58	1.72	A	0.533	1.861	0.715	0.8	1	29.953	3.07	153.34	C
		TA 0.88	B	0.787	1.807	0.886	0.8	1	49.278			
			C	0.842	1.853	0.932	0.8	1	53.516			
T3 160.00-140.00	2.39	1.25	A	0.641	1.784	0.779	0.8	1	37.743	4.30	215.03	B
			B	1	2.1	1	0.8	1	68.633			
			C	0.962	2.025	1	0.8	1	63.777			
T4 140.00-120.00	3.45	1.25	A	1	2.1	1	0.8	1	71.987	4.28*	214.25	C
			B	1	2.1	1	0.8	1	68.633			
			C	1	2.1	1	0.8	1	84.118			
T5 120.00-100.00	3.97	1.90	A	1	2.1	1	0.8	1	79.517	4.14*	207.10	C
		TA 0.88	B	1	2.1	1	0.8	1	75.440			
			C	1	2.1	1	0.8	1	106.023			
T6 100.00-80.00	4.07	1.24	A	1	2.1	1	0.8	1	81.913	3.91*	195.56	C
			B	1	2.1	1	0.8	1	75.482			
			C	1	2.1	1	0.8	1	110.448			
T7 80.00-60.00	4.07	1.12	A	1	2.1	1	0.8	1	83.261	3.64*	182.01	C
			B	1	2.1	1	0.8	1	75.959			
			C	1	2.1	1	0.8	1	116.891			
T8 60.00-40.00	4.07	1.02	A	1	2.1	1	0.8	1	83.261	3.31*	165.33	C
			B	1	2.1	1	0.8	1	75.959			
			C	1	2.1	1	0.8	1	116.891			
T9 40.00-20.00	4.07	1.02	A	1	2.1	1	0.8	1	83.261	2.94*	146.82	C
			B	1	2.1	1	0.8	1	75.959			
			C	1	2.1	1	0.8	1	116.891			
T10 20.00-5.00	2.53	0.86	A	1	2.1	1	0.8	1	53.406	2.20*	146.82	C
			B	0.976	2.052	1	0.8	1	49.059			
			C	1	2.1	1	0.8	1	78.606			
T11 5.00-0.00	0.06	0.47	A	0.587	1.812	0.746	0.8	1	4.698	0.35	70.67	C
			B	0.587	1.812	0.746	0.8	1	4.698			
			C	0.955	2.012	1	0.8	1	9.071			
Sum Weight:	30.54	14.55			*2A _g					33.03		

RISA Tower CEN TEK Engineering, Inc. 63-2 N Branford Rd Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job	Page
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	Project	Date
	57 Cook Road, Montville, CT	12:54:08 12/08/11
	Client	Designed by
	Verizon	Jrm

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	
					limit							

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 190.00-180.00	0.27	0.92	A	0.534	1.86	0.715	0.85	1	15.472	0.91	91.16	B
			B	0.534	1.86	0.715	0.85	1	15.472			
			C	0.434	2	0.666	0.85	1	12.027			
T2 180.00-160.00	1.58	1.72	A	0.533	1.861	0.715	0.85	1	30.823	3.18	158.94	C
		TA 0.88	B	0.787	1.807	0.886	0.85	1	50.937			
			C	0.842	1.853	0.932	0.85	1	55.473			
T3 160.00-140.00	2.39	1.25	A	0.641	1.784	0.779	0.85	1	38.696	4.46*	223.19	B
			B	1	2.1	1	0.85	1	71.323			
			C	0.962	2.025	1	0.85	1	65.822			
T4 140.00-120.00	3.45	1.25	A	1	2.1	1	0.85	1	74.633	4.28*	214.25	C
			B	1	2.1	1	0.85	1	71.323			
			C	1	2.1	1	0.85	1	87.156			
T5 120.00-100.00	3.97	1.90	A	1	2.1	1	0.85	1	82.096	4.14*	207.10	C
		TA 0.88	B	1	2.1	1	0.85	1	78.088			
			C	1	2.1	1	0.85	1	109.532			
T6 100.00-80.00	4.07	1.24	A	1	2.1	1	0.85	1	84.649	3.91*	195.56	C
			B	1	2.1	1	0.85	1	78.172			
			C	1	2.1	1	0.85	1	114.480			
T7 80.00-60.00	4.07	1.12	A	1	2.1	1	0.85	1	85.996	3.64*	182.01	C
			B	1	2.1	1	0.85	1	78.649			
			C	1	2.1	1	0.85	1	120.923			
T8 60.00-40.00	4.07	1.02	A	1	2.1	1	0.85	1	85.996	3.31*	165.33	C
			B	1	2.1	1	0.85	1	78.649			
			C	1	2.1	1	0.85	1	120.923			
T9 40.00-20.00	4.07	1.02	A	1	2.1	1	0.85	1	85.996	2.94*	146.82	C
			B	1	2.1	1	0.85	1	78.649			
			C	1	2.1	1	0.85	1	120.923			
T10 20.00-5.00	2.53	0.86	A	1	2.1	1	0.85	1	55.049	2.20*	146.82	C
			B	0.976	2.052	1	0.85	1	50.674			
			C	1	2.1	1	0.85	1	81.333			
T11 5.00-0.00	0.06	0.47	A	0.587	1.812	0.746	0.85	1	4.778	0.36	72.57	C
			B	0.587	1.812	0.746	0.85	1	4.778			
			C	0.955	2.012	1	0.85	1	9.315			
Sum Weight:	30.54	14.55			*2A _g limit					33.34		

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 190.00-	0.11	0.62	A	0.397	2.069	0.65	1	1	11.469	0.28	27.77	B

RISATower CEN TEK Engineering, Inc. 63-2 N Branford Rd Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job	190' Guyed Rohn Model 80 - Un-reinforced ~ Rev 1	Page	25 of 51
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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	
180.00			B	0.397	2.069	0.65	1	1	11.469			
			C	0.31	2.269	0.619	1	1	9.525			
T2 180.00- 160.00	0.58	1.17	A	0.399	2.065	0.651	1	1	22.407	0.74	36.97	B
		TA 0.69	B	0.619	1.794	0.765	1	1	36.090			
			C	0.603	1.802	0.755	1	1	34.879			
T3 160.00- 140.00	0.90	0.85	A	0.488	1.916	0.691	1	1	24.694	1.22	60.92	B
			B	0.857	1.869	0.944	1	1	59.157			
			C	0.671	1.777	0.8	1	1	39.269			
T4 140.00- 120.00	1.27	0.85	A	0.876	1.891	0.961	1	1	61.533	1.34	66.82	C
			B	0.857	1.869	0.944	1	1	59.157			
			C	0.905	1.932	0.988	1	1	65.400			
T5 120.00- 100.00	1.45	1.32	A	0.946	1.996	1	1	1	70.133	1.50*	74.81	C
		TA 0.69	B	0.922	1.958	1	1	1	68.424			
			C	1	2.1	1	1	1	87.467			
T6 100.00- 80.00	1.49	0.82	A	0.957	2.016	1	1	1	70.979	1.41*	70.64	C
			B	0.916	1.947	0.998	1	1	67.763			
			C	1	2.1	1	1	1	88.508			
T7 80.00- 60.00	1.49	0.83	A	0.951	2.005	1	1	1	70.512	1.31*	65.75	C
			B	0.907	1.933	0.989	1	1	66.507			
			C	1	2.1	1	1	1	89.518			
T8 60.00- 40.00	1.49	0.73	A	0.951	2.005	1	1	1	70.512	1.19*	59.72	C
			B	0.907	1.933	0.989	1	1	66.507			
			C	1	2.1	1	1	1	89.518			
T9 40.00- 20.00	1.49	0.73	A	0.951	2.005	1	1	1	70.512	1.06*	53.04	C
			B	0.907	1.933	0.989	1	1	66.507			
			C	1	2.1	1	1	1	89.518			
T10 20.00- 5.00	0.92	0.63	A	0.806	1.82	0.901	1	1	40.407	0.80*	53.04	C
			B	0.771	1.797	0.873	1	1	37.435			
			C	1	2.1	1	1	1	60.466			
T11 5.00-0.00	0.02	0.37	A	0.469	1.943	0.682	1	1	3.737	0.08	16.22	C
			B	0.469	1.943	0.682	1	1	3.737			
			C	0.73	1.781	0.841	1	1	6.368			
Sum Weight:	11.21	10.35			2A _g limit					10.93		

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 190.00- 180.00	0.11	0.62	A	0.397	2.069	0.65	0.8	1	10.314	0.25	24.97	B
			B	0.397	2.069	0.65	0.8	1	10.314			
			C	0.31	2.269	0.619	0.8	1	8.213			
T2 180.00- 160.00	0.58	1.17	A	0.399	2.065	0.651	0.8	1	20.464	0.71	35.70	B
		TA 0.69	B	0.619	1.794	0.765	0.8	1	34.850			
			C	0.603	1.802	0.755	0.8	1	33.588			
T3 160.00- 140.00	0.90	0.85	A	0.488	1.916	0.691	0.8	1	24.681	1.22	60.90	B
			B	0.857	1.869	0.944	0.8	1	59.143			
			C	0.671	1.777	0.8	0.8	1	39.256			
T4 140.00- 120.00	1.27	0.85	A	0.876	1.891	0.961	0.8	1	61.520	1.34	66.80	C
			B	0.857	1.869	0.944	0.8	1	59.143			
			C	0.905	1.932	0.988	0.8	1	65.387			
T5 120.00- 100.00	1.45	1.32	A	0.946	1.996	1	0.8	1	69.793	1.50*	74.81	C
		TA 0.69	B	0.922	1.958	1	0.8	1	68.009			
			C	1	2.1	1	0.8	1	87.467			

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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	
T6 100.00-80.00	1.49	0.82	A	0.957	2.016	1	0.8	1	70.965	1.41*	70.64	C
			B	0.916	1.947	0.998	0.8	1	67.750			
			C	1	2.1	1	0.8	1	88.495			
T7 80.00-60.00	1.49	0.83	A	0.951	2.005	1	0.8	1	70.499	1.31*	65.75	C
			B	0.907	1.933	0.989	0.8	1	66.494			
			C	1	2.1	1	0.8	1	89.505			
T8 60.00-40.00	1.49	0.73	A	0.951	2.005	1	0.8	1	70.499	1.19*	59.72	C
			B	0.907	1.933	0.989	0.8	1	66.494			
			C	1	2.1	1	0.8	1	89.505			
T9 40.00-20.00	1.49	0.73	A	0.951	2.005	1	0.8	1	70.499	1.06*	53.04	C
			B	0.907	1.933	0.989	0.8	1	66.494			
			C	1	2.1	1	0.8	1	89.505			
T10 20.00-5.00	0.92	0.63	A	0.806	1.82	0.901	0.8	1	40.394	0.80*	53.04	C
			B	0.771	1.797	0.873	0.8	1	37.422			
			C	1	2.1	1	0.8	1	60.452			
T11 5.00-0.00	0.02	0.37	A	0.469	1.943	0.682	0.8	1	3.418	0.08	15.65	C
			B	0.469	1.943	0.682	0.8	1	3.418			
			C	0.73	1.781	0.841	0.8	1	6.144			
Sum Weight:	11.21	10.35			*2A _B limit					10.87		

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 190.00-180.00	0.11	0.62	A	0.397	2.069	0.65	0.85	1	10.602	0.26	25.67	B
			B	0.397	2.069	0.65	0.85	1	10.602			
			C	0.31	2.269	0.619	0.85	1	8.541			
T2 180.00-160.00	0.58	1.17 TA 0.69	A	0.399	2.065	0.651	0.85	1	20.950	0.72	36.01	B
			B	0.619	1.794	0.765	0.85	1	35.160			
			C	0.603	1.802	0.755	0.85	1	33.911			
T3 160.00-140.00	0.90	0.85	A	0.488	1.916	0.691	0.85	1	24.684	1.22	60.91	B
			B	0.857	1.869	0.944	0.85	1	59.146			
			C	0.671	1.777	0.8	0.85	1	39.259			
T4 140.00-120.00	1.27	0.85	A	0.876	1.891	0.961	0.85	1	61.523	1.34	66.81	C
			B	0.857	1.869	0.944	0.85	1	59.146			
			C	0.905	1.932	0.988	0.85	1	65.390			
T5 120.00-100.00	1.45	1.32 TA 0.69	A	0.946	1.996	1	0.85	1	69.878	1.50*	74.81	C
			B	0.922	1.958	1	0.85	1	68.113			
			C	1	2.1	1	0.85	1	87.467			
T6 100.00-80.00	1.49	0.82	A	0.957	2.016	1	0.85	1	70.969	1.41*	70.64	C
			B	0.916	1.947	0.998	0.85	1	67.753			
			C	1	2.1	1	0.85	1	88.498			
T7 80.00-60.00	1.49	0.83	A	0.951	2.005	1	0.85	1	70.502	1.31*	65.75	C
			B	0.907	1.933	0.989	0.85	1	66.497			
			C	1	2.1	1	0.85	1	89.508			
T8 60.00-40.00	1.49	0.73	A	0.951	2.005	1	0.85	1	70.502	1.19*	59.72	C
			B	0.907	1.933	0.989	0.85	1	66.497			
			C	1	2.1	1	0.85	1	89.508			
T9 40.00-20.00	1.49	0.73	A	0.951	2.005	1	0.85	1	70.502	1.06*	53.04	C
			B	0.907	1.933	0.989	0.85	1	66.497			
			C	1	2.1	1	0.85	1	89.508			
T10 20.00-5.00	0.92	0.63	A	0.806	1.82	0.901	0.85	1	40.397	0.80*	53.04	C
			B	0.771	1.797	0.873	0.85	1	37.425			

RISATower**CEN TEK Engineering, Inc.**

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 Branford, CT 06405
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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	
T11 5.00-0.00	0.02	0.37	C	1	2.1	1	0.85	1	60.456			
			A	0.469	1.943	0.682	0.85	1	3.498	0.08	15.79	C
			B	0.469	1.943	0.682	0.85	1	3.498			
			C	0.73	1.781	0.841	0.85	1	6.200			
Sum Weight:	11.21	10.35			*2A _g limit					10.89		

Force Totals (Does not include forces on guys)

Load Case	Vertical Forces K	Sum of Forces X K	Sum of Forces Z K	Sum of Torques kip-ft
Leg Weight	5.32			
Bracing Weight	4.99			
Total Member Self-Weight	10.30			
Gusset Weight	0.04			
Guy Weight	2.31			
Total Weight	36.23			
Wind 0 deg - No Ice		0.00	-63.79	-18.52
Wind 30 deg - No Ice		31.81	-55.11	-14.27
Wind 60 deg - No Ice		55.06	-31.79	-6.19
Wind 90 deg - No Ice		63.63	0.00	3.56
Wind 120 deg - No Ice		55.24	31.90	12.35
Wind 150 deg - No Ice		31.81	55.11	17.82
Wind 180 deg - No Ice		0.00	63.59	18.53
Wind 210 deg - No Ice		-31.81	55.11	14.27
Wind 240 deg - No Ice		-55.24	31.90	6.17
Wind 270 deg - No Ice		-63.63	0.00	-3.56
Wind 300 deg - No Ice		-55.06	-31.79	-12.34
Wind 330 deg - No Ice		-31.81	-55.11	-17.82
Member Ice	4.20			
Gusset Ice	0.02			
Guy Ice	1.68			
Total Weight Ice	66.20			
Wind 0 deg - Ice		0.00	-55.55	-14.98
Wind 30 deg - Ice		27.55	-47.73	-11.10
Wind 60 deg - Ice		47.45	-27.40	-4.25
Wind 90 deg - Ice		55.10	0.00	3.79
Wind 120 deg - Ice		48.10	27.78	10.81
Wind 150 deg - Ice		27.55	47.73	14.89
Wind 180 deg - Ice		0.00	54.80	15.03
Wind 210 deg - Ice		-27.55	47.73	11.10
Wind 240 deg - Ice		-48.10	27.78	4.17
Wind 270 deg - Ice		-55.10	0.00	-3.79
Wind 300 deg - Ice		-47.45	-27.40	-10.78
Wind 330 deg - Ice		-27.55	-47.73	-14.89
Total Weight	36.23			
Wind 0 deg - Service		0.00	-17.67	-5.13
Wind 30 deg - Service		8.81	-15.27	-3.95
Wind 60 deg - Service		15.25	-8.81	-1.71
Wind 90 deg - Service		17.63	0.00	0.99
Wind 120 deg - Service		15.30	8.84	3.42
Wind 150 deg - Service		8.81	15.27	4.94
Wind 180 deg - Service		0.00	17.61	5.13
Wind 210 deg - Service		-8.81	15.27	3.95

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Load Case	Vertical Forces <i>K</i>	Sum of Forces <i>X</i> <i>K</i>	Sum of Forces <i>Z</i> <i>K</i>	Sum of Torques <i>kip-ft</i>
Wind 240 deg - Service		-15.30	8.84	1.71
Wind 270 deg - Service		-17.63	0.00	-0.99
Wind 300 deg - Service		-15.25	-8.81	-3.42
Wind 330 deg - Service		-8.81	-15.27	-4.94

Load Combinations

Comb. No.	Description
1	Dead Only
2	Dead+Wind 0 deg - No Ice+Guy
3	Dead+Wind 30 deg - No Ice+Guy
4	Dead+Wind 60 deg - No Ice+Guy
5	Dead+Wind 90 deg - No Ice+Guy
6	Dead+Wind 120 deg - No Ice+Guy
7	Dead+Wind 150 deg - No Ice+Guy
8	Dead+Wind 180 deg - No Ice+Guy
9	Dead+Wind 210 deg - No Ice+Guy
10	Dead+Wind 240 deg - No Ice+Guy
11	Dead+Wind 270 deg - No Ice+Guy
12	Dead+Wind 300 deg - No Ice+Guy
13	Dead+Wind 330 deg - No Ice+Guy
14	Dead+Ice+Temp+Guy
15	Dead+Wind 0 deg+Ice+Temp+Guy
16	Dead+Wind 30 deg+Ice+Temp+Guy
17	Dead+Wind 60 deg+Ice+Temp+Guy
18	Dead+Wind 90 deg+Ice+Temp+Guy
19	Dead+Wind 120 deg+Ice+Temp+Guy
20	Dead+Wind 150 deg+Ice+Temp+Guy
21	Dead+Wind 180 deg+Ice+Temp+Guy
22	Dead+Wind 210 deg+Ice+Temp+Guy
23	Dead+Wind 240 deg+Ice+Temp+Guy
24	Dead+Wind 270 deg+Ice+Temp+Guy
25	Dead+Wind 300 deg+Ice+Temp+Guy
26	Dead+Wind 330 deg+Ice+Temp+Guy
27	Dead+Wind 0 deg - Service+Guy
28	Dead+Wind 30 deg - Service+Guy
29	Dead+Wind 60 deg - Service+Guy
30	Dead+Wind 90 deg - Service+Guy
31	Dead+Wind 120 deg - Service+Guy
32	Dead+Wind 150 deg - Service+Guy
33	Dead+Wind 180 deg - Service+Guy
34	Dead+Wind 210 deg - Service+Guy
35	Dead+Wind 240 deg - Service+Guy
36	Dead+Wind 270 deg - Service+Guy
37	Dead+Wind 300 deg - Service+Guy
38	Dead+Wind 330 deg - Service+Guy

Maximum Member Forces

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Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
T1	190 - 180	Leg	Max Tension	12	10.46	-0.10	-0.70
			Max. Compression	15	-13.59	-0.06	-0.27
			Max. Mx	11	-3.06	-0.89	0.03
			Max. My	6	-10.12	0.09	0.71
			Max. Vy	5	2.73	0.66	0.03
			Max. Vx	6	2.07	0.03	0.54
		Diagonal	Max Tension	12	3.77	0.00	0.00
			Max. Compression	6	-3.91	0.00	0.00
			Max. Mx	8	1.64	0.02	-0.00
			Max. My	11	-2.82	0.01	-0.02
			Max. Vy	15	-0.01	0.02	-0.00
			Max. Vx	11	-0.01	-0.00	-0.02
		Top Girt	Max Tension	8	0.19	0.00	0.00
			Max. Compression	10	-0.22	0.00	0.00
			Max. Mx	14	-0.03	-0.01	0.00
			Max. My	15	0.05	0.00	0.00
			Max. Vy	14	0.01	0.00	0.00
		Bottom Girt	Max. Vx	15	-0.00	0.00	0.00
			Max Tension	12	0.77	0.00	0.00
			Max. Compression	2	-0.76	0.00	0.00
			Max. Mx	14	0.05	-0.01	0.00
			Max. My	15	0.38	0.00	0.00
			Max. Vy	14	0.01	0.00	0.00
			Max. Vx	15	-0.00	0.00	0.00
			Max Tension	12	0.77	0.00	0.00
			Max. Compression	2	-0.76	0.00	0.00
			Max. Mx	14	0.05	-0.01	0.00
			Max. My	15	0.38	0.00	0.00
			Max. Vy	14	0.01	0.00	0.00
			Max. Vx	15	-0.00	0.00	0.00
T2	180 - 160	Leg	Max Tension	12	63.68	0.47	0.30
			Max. Compression	2	-71.70	-0.24	2.59
			Max. Mx	11	-4.36	2.91	-0.21
			Max. My	2	-71.70	-0.24	2.59
			Max. Vy	12	5.75	2.29	0.77
			Max. Vx	2	5.93	-0.24	2.59
		Diagonal	Max Tension	13	10.84	0.00	0.00
			Max. Compression	13	-12.48	-0.08	-0.05
			Max. Mx	13	3.34	-0.22	0.04
			Max. My	9	-5.73	-0.07	-0.10
			Max. Vy	13	-0.11	0.00	0.00
			Max. Vx	9	0.05	-0.07	-0.10
		Top Girt	Max Tension	10	0.47	0.00	0.00
			Max. Compression	8	-0.48	0.00	0.00
			Max. Mx	14	0.03	-0.01	0.00
			Max. My	15	-0.18	0.00	0.00
			Max. Vy	14	0.01	0.00	0.00
		Bottom Girt	Max. Vx	15	-0.00	0.00	0.00
			Max Tension	10	6.93	0.00	0.00
			Max. Compression	8	-5.47	0.00	0.00
			Max. Mx	14	0.42	-0.01	0.00
			Max. My	15	-1.85	0.00	0.00
			Max. Vy	14	0.01	0.00	0.00
			Max. Vx	15	-0.00	0.00	0.00
			Max Tension	9	26.12		
			Top Tension	9	26.30		
			Top Cable Vert	9	20.12		
			Top Cable Norm	9	16.94		
			Top Cable Tan	9	0.03		
		Guy A	Bot Cable Vert	9	-19.68		
			Bot Cable Norm	9	17.17		
			Bot Cable Tan	9	0.24		
			Bottom Tension	26	26.00		
			Top Tension	26	26.31		
			Top Cable Vert	26	20.23		
			Top Cable Norm	26	16.82		
			Top Cable Tan	26	0.09		
			Bottom Tension	26	26.00		
			Top Tension	26	26.31		
			Top Cable Vert	26	20.23		
			Top Cable Norm	26	16.82		
			Top Cable Tan	26	0.09		

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	Verizon	Jrm

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
T3	160 - 140	Guy C	Bot Cable Vert	26	-19.49		
			Bot Cable Norm	26	17.20		
			Bot Cable Tan	26	0.32		
			Bottom Tension	3	25.86		
			Top Tension	3	26.05		
			Top Cable Vert	3	19.93		
			Top Cable Norm	3	16.78		
			Top Cable Tan	3	0.02		
			Bot Cable Vert	3	-19.49		
			Bot Cable Norm	3	17.00		
		Torque Arm Top	Bot Cable Tan	3	0.23		
			Max Tension	9	19.07	0.00	0.00
			Max. Compression	9	-9.57	0.00	0.00
			Max. Mx	22	1.18	-68.07	-0.00
			Max. My	15	-7.47	-57.63	-0.00
		Leg	Max. Vy	22	19.99	-68.07	-0.00
			Max. Vx	15	-0.00	-57.63	-0.00
			Max Tension	12	19.09	1.81	0.61
			Max. Compression	2	-62.75	0.17	-1.59
			Max. Mx	6	-59.40	-1.95	-0.76
			Max. My	2	-62.74	-0.19	2.09
			Max. Vy	12	5.72	1.81	0.61
			Max. Vx	2	5.99	-0.19	2.09
		Diagonal	Max Tension	11	6.60	0.00	0.00
			Max. Compression	11	-7.16	0.00	0.00
			Max. Mx	23	-5.67	0.01	0.00
			Max. My	21	-0.33	0.00	-0.00
			Max. Vy	23	0.01	0.00	0.00
		Top Girt	Max. Vx	21	0.00	0.00	0.00
			Max Tension	2	0.59	0.00	0.00
			Max. Compression	1	0.00	0.00	0.00
			Max. Mx	14	0.24	0.00	0.00
			Max. My	15	0.46	0.00	-0.00
		Bottom Girt	Max. Vy	14	-0.01	0.00	0.00
			Max. Vx	15	0.00	0.00	0.00
			Max Tension	10	0.94	0.00	0.00
			Max. Compression	8	-0.27	0.00	0.00
			Max. Mx	14	0.24	0.00	0.00
			Max. My	15	0.20	0.00	-0.00
			Max. Vy	14	-0.01	0.00	0.00
			Max. Vx	15	0.00	0.00	0.00
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	23	-50.00	-0.29	0.26
T4	140 - 120	Leg	Max. Mx	5	-19.15	0.99	-0.22
			Max. My	8	-10.76	-0.31	1.03
			Max. Vy	6	3.43	0.50	0.16
			Max. Vx	8	3.48	0.13	0.59
		Diagonal	Max Tension	8	4.72	0.00	0.00
			Max. Compression	2	-5.34	0.00	0.00
			Max. Mx	23	2.47	0.01	0.00
			Max. My	21	-2.56	0.00	-0.00
			Max. Vy	23	-0.01	0.00	0.00
		Top Girt	Max. Vx	21	0.00	0.00	0.00
			Max Tension	19	0.68	0.00	0.00
			Max. Compression	4	-0.03	0.00	0.00
			Max. Mx	14	0.17	0.00	0.00
			Max. My	15	0.21	0.00	-0.00
		Bottom Girt	Max. Vy	14	-0.01	0.00	0.00
			Max. Vx	15	0.00	0.00	0.00
			Max Tension	17	1.06	0.00	0.00
			Max. Compression	6	-0.38	0.00	0.00

<i>RISA</i>Tower CEN TEK Engineering, Inc. 63-2 N Branford Rd Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job	Page
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Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
T5	120 - 100	Leg	Max. Mx	14	0.26	0.00	0.00
			Max. My	26	0.39	0.00	-0.00
			Max. Vy	14	-0.01	0.00	0.00
			Max. Vx	26	0.00	0.00	0.00
		Diagonal	Max Tension	8	61.67	-0.04	-1.04
			Max. Compression	23	-115.92	-1.09	0.46
			Max. Mx	5	-33.13	-4.60	-0.40
			Max. My	2	-97.63	0.00	4.43
			Max. Vy	6	-7.57	-3.90	-2.13
			Max. Vx	2	8.59	0.00	4.43
			Max Tension	7	11.24	-0.16	-0.04
			Max. Compression	7	-12.33	-0.06	0.04
			Max. Mx	3	2.91	0.22	0.04
			Max. My	3	-5.45	-0.05	0.09
			Max. Vy	3	-0.11	0.22	0.04
		Top Girt	Max. Vx	3	-0.04	-0.05	0.09
			Max Tension	6	1.71	0.00	0.00
			Max. Compression	4	-0.65	0.00	0.00
			Max. Mx	14	0.37	-0.01	0.00
		Bottom Girt	Max. My	26	0.57	0.00	0.00
			Max. Vy	14	0.01	0.00	0.00
			Max. Vx	26	-0.00	0.00	0.00
			Max Tension	6	5.80	0.00	0.00
		Guy A	Max. Compression	4	-3.79	0.00	0.00
			Max. Mx	14	0.68	-0.01	0.00
			Max. My	15	-0.62	0.00	-0.00
			Max. Vy	14	0.01	0.00	0.00
			Max. Vx	15	0.00	0.00	0.00
			Bottom Tension	9	23.36		
			Top Tension	9	23.44		
			Top Cable Vert	9	14.00		
			Top Cable Norm	9	18.80		
			Top Cable Tan	9	0.06		
			Bot Cable Vert	9	-13.77		
			Bot Cable Norm	9	18.87		
		Guy B	Bot Cable Tan	9	0.17		
			Bottom Tension	11	23.06		
			Top Tension	11	23.14		
			Top Cable Vert	11	13.82		
			Top Cable Norm	11	18.56		
			Top Cable Tan	11	0.06		
		Guy C	Bot Cable Vert	11	-13.59		
			Bot Cable Norm	11	18.63		
			Bot Cable Tan	11	0.16		
			Bottom Tension	3	23.59		
			Top Tension	3	23.67		
			Top Cable Vert	3	14.14		
		Torque Arm Top	Top Cable Norm	3	18.99		
			Top Cable Tan	3	0.06		
			Bot Cable Vert	3	-13.91		
			Bot Cable Norm	3	19.06		
			Bot Cable Tan	3	0.17		
			Max Tension	3	21.69	-5.48	-0.00
T6	100 - 80	Leg	Max. Compression	3	-11.20	0.00	0.00
			Max. Mx	3	-0.22	-45.21	0.00
			Max. My	26	-8.34	-37.53	-0.00
			Max. Vy	3	13.29	-45.21	0.00
			Max. Vx	26	-0.00	-37.53	-0.00
			Max Tension	8	25.33	0.05	-3.11
			Max. Compression	23	-107.26	-1.00	0.49
			Max. Mx	10	-98.76	3.27	-1.77

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Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
T7	80 - 60	Diagonal	Max. My	2	-97.62	0.01	3.72
			Max. Vy	6	-7.66	-3.27	-1.78
			Max. Vx	2	8.68	0.01	3.72
			Max Tension	5	7.10	0.00	0.00
			Max. Compression	11	-7.68	0.00	0.00
			Max. Mx	23	-4.90	0.00	0.00
		Top Girt	Max. My	25	-0.65	0.00	0.00
			Max. Vy	23	-0.00	0.00	0.00
			Max. Vx	25	0.00	0.00	0.00
			Max Tension	6	0.72	0.00	0.00
			Max. Compression	4	-0.17	0.00	0.00
			Max. Mx	14	0.21	0.00	0.00
		Bottom Girt	Max. My	19	0.20	0.00	-0.00
			Max. Vy	14	0.00	0.00	0.00
			Max. Vx	19	0.00	0.00	0.00
			Max Tension	13	1.24	0.00	0.00
			Max. Compression	7	-0.60	0.00	0.00
			Max. Mx	14	0.23	0.00	0.00
		Leg	Max. My	8	0.16	0.00	-0.00
			Max. Vy	14	0.00	0.00	0.00
			Max. Vx	8	0.00	0.00	0.00
			Max Tension	6	35.55	-0.44	-0.25
			Max. Compression	7	-108.65	0.35	0.05
			Max. Mx	11	-65.81	-1.52	-0.30
		Diagonal	Max. My	8	-56.23	0.05	1.59
			Max. Vy	5	-4.57	-1.30	-0.15
			Max. Vx	2	4.59	-0.12	1.46
			Max Tension	5	9.01	0.00	0.00
			Max. Compression	11	-9.41	0.00	0.00
			Max. Mx	19	-4.25	0.01	0.00
		Top Girt	Max. My	19	-0.86	0.00	-0.00
			Max. Vy	19	0.01	0.00	0.00
			Max. Vx	19	0.00	0.00	0.00
			Max Tension	11	3.59	0.00	0.00
			Max. Compression	5	-3.31	0.00	0.00
			Max. Mx	14	0.16	0.00	0.00
		Bottom Girt	Max. My	8	2.47	0.00	0.00
			Max. Vy	14	-0.01	0.00	0.00
			Max. Vx	8	-0.00	0.00	0.00
			Max Tension	5	1.50	0.00	0.00
			Max. Compression	10	-1.10	0.00	0.00
			Max. Mx	14	0.14	0.00	0.00
T8	60 - 40	Leg	Max. My	19	1.04	0.00	0.00
			Max. Vy	14	-0.01	0.00	0.00
			Max. Vx	19	-0.00	0.00	0.00
			Max Tension	6	45.56	0.37	0.26
			Max. Compression	7	-118.66	0.08	0.16
			Max. Mx	5	-110.27	1.06	-0.46
		Diagonal	Max. My	9	-107.80	-0.07	1.09
			Max. Vy	11	2.39	0.47	0.01
			Max. Vx	2	1.99	-0.07	0.38
			Max Tension	5	3.51	0.00	0.00
			Max. Compression	11	-4.05	0.00	0.00
			Max. Mx	18	-0.37	0.00	0.00
		Top Girt	Max. My	19	-0.66	0.00	-0.00
			Max. Vy	18	-0.00	0.00	0.00
			Max. Vx	19	0.00	0.00	0.00
			Max Tension	24	0.92	0.00	0.00
			Max. Compression	5	-0.85	0.00	0.00
			Max. Mx	14	0.11	0.00	0.00
			Max. My	19	0.65	0.00	-0.00

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Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
T9	40 - 20	Bottom Girt	Max. Vy	14	0.00	0.00	0.00
			Max. Vx	19	-0.00	0.00	0.00
			Max Tension	5	0.41	0.00	0.00
			Max. Compression	10	-0.22	0.00	0.00
			Max. Mx	14	0.12	0.00	0.00
		Leg	Max. My	19	0.12	0.00	0.00
			Max. Vy	14	0.00	0.00	0.00
			Max. Vx	19	-0.00	0.00	0.00
			Max Tension	6	43.42	0.46	0.45
			Max. Compression	7	-117.70	0.34	0.50
			Max. Mx	5	-97.02	1.29	-0.43
			Max. My	9	-97.27	-0.28	1.35
			Max. Vy	11	-3.38	-0.90	-0.05
			Max. Vx	2	-3.24	0.38	-0.76
		Diagonal	Max Tension	13	5.42	0.00	0.00
			Max. Compression	7	-5.90	0.00	0.00
			Max. Mx	18	3.53	0.00	0.00
			Max. My	19	-0.49	0.00	-0.00
			Max. Vy	18	-0.00	0.00	0.00
		Top Girt	Max. Vx	19	0.00	0.00	0.00
			Max Tension	11	0.67	0.00	0.00
			Max. Compression	6	-0.42	0.00	0.00
			Max. Mx	14	0.13	0.00	0.00
			Max. My	19	0.17	0.00	0.00
T10	20 - 5	Bottom Girt	Max. Vy	14	0.00	0.00	0.00
			Max. Vx	19	-0.00	0.00	0.00
			Max Tension	6	1.36	0.00	0.00
			Max. Compression	13	-1.23	0.00	0.00
			Max. Mx	14	0.10	0.00	0.00
		Leg	Max. My	18	-0.74	0.00	0.00
			Max. Vy	14	0.00	0.00	0.00
			Max. Vx	18	-0.00	0.00	0.00
			Max Tension	6	12.99	0.48	0.74
			Max. Compression	7	-94.74	0.14	-0.46
			Max. Mx	26	-65.45	1.53	0.83
			Max. My	20	-65.35	-0.17	-1.73
			Max. Vy	5	10.36	-1.38	0.72
			Max. Vx	9	10.73	0.03	-1.60
		Diagonal	Max Tension	7	7.72	0.00	0.00
			Max. Compression	13	-7.53	0.00	0.00
			Max. Mx	18	5.79	0.01	0.00
			Max. My	19	0.21	0.00	-0.00
			Max. Vy	18	-0.01	0.00	0.00
		Top Girt	Max. Vx	19	0.00	0.00	0.00
			Max Tension	13	1.97	0.00	0.00
			Max. Compression	6	-1.60	0.00	0.00
			Max. Mx	14	0.16	0.00	0.00
			Max. My	18	1.42	0.00	0.00
T11	5 - 0	Bottom Girt	Max. Vy	14	-0.01	0.00	0.00
			Max. Vx	18	-0.00	0.00	0.00
			Max Tension	18	4.06	0.00	0.00
			Max. Compression	1	0.00	0.00	0.00
			Max. Mx	14	2.35	0.00	0.00
		Leg	Max. My	18	2.69	0.00	0.00
			Max. Vy	14	-0.01	0.00	0.00
			Max. Vx	18	-0.00	0.00	0.00
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	24	-70.40	0.18	-0.01
			Max. Mx	6	-41.35	1.97	0.45
			Max. My	6	-61.38	0.46	-0.66
			Max. Vy	19	16.52	1.64	-0.20

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Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
		Top Girt	Max. Vx	11	2.28	-1.78	-0.44
			Max Tension	18	11.16	0.13	-0.06
			Max. Compression	1	0.00	0.00	0.00
			Max. Mx	6	9.52	0.71	-0.27
			Max. My	2	9.51	0.59	-0.29
		Bottom Girt	Max. Vy	6	-0.29	0.71	-0.27
			Max. Vx	2	-0.11	-0.28	0.08
			Max Tension	2	4.40	-0.29	0.39
			Max. Compression	5	-6.33	1.32	-0.78
			Max. Mx	6	-4.66	1.82	-1.15
		Mid Girt	Max. My	6	-4.66	1.82	-1.15
			Max. Vy	6	-7.64	1.82	-1.15
			Max. Vx	6	4.74	-0.79	0.47
			Max Tension	2	0.25	0.00	0.00
			Max. Compression	5	-0.71	0.00	0.00
			Max. Mx	17	-0.37	-0.01	0.00
			Max. My	19	-0.27	0.00	-0.00
			Max. Vy	17	0.01	0.00	0.00
			Max. Vx	19	0.00	0.00	0.00

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Mast	Max. Vert	23	171.53	3.57	-2.02
	Max. H _x	11	135.18	6.44	0.29
	Max. H _z	2	147.25	0.02	6.05
	Max. M _x	1	0.00	0.01	0.01
	Max. M _z	1	0.00	0.01	0.01
	Max. Torsion	1	0.00	0.01	0.01
	Min. Vert	1	77.47	0.01	0.01
	Min. H _x	5	134.84	-6.44	0.27
	Min. H _z	8	107.66	-0.06	-7.05
	Min. M _x	1	0.00	0.01	0.01
	Min. M _z	1	0.00	0.01	0.01
	Min. Torsion	1	0.00	0.01	0.01
	Max. Vert	10	-0.65	-0.31	0.18
	Max. H _x	10	-0.65	-0.31	0.18
Guy C @ 140 ft Elev 0 ft Azimuth 240 deg	Max. H _z	3	-64.11	-59.54	35.39
	Min. Vert	3	-64.11	-59.54	35.39
	Min. H _x	5	-64.07	-60.38	33.89
	Min. H _z	10	-0.65	-0.31	0.18
	Max. Vert	6	-0.66	0.32	0.18
Guy B @ 140 ft Elev 0 ft Azimuth 120 deg	Max. H _x	11	-64.31	60.37	33.89
	Max. H _z	13	-64.23	59.54	35.25
	Min. Vert	11	-64.31	60.37	33.89
	Min. H _x	6	-0.66	0.32	0.18
	Min. H _z	6	-0.66	0.32	0.18
Guy A @ 140 ft Elev 0 ft Azimuth 0 deg	Max. Vert	2	-0.66	-0.00	-0.37
	Max. H _x	24	-32.17	1.81	-34.05

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Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
	Max. H _z	2	-0.66	-0.00	-0.37
	Min. Vert	9	-64.28	0.88	-69.28
	Min. H _x	18	-32.04	-1.81	-34.05
	Min. H _z	9	-64.28	0.88	-69.28

Tower Mast Reaction Summary

Load Combination	Vertical K	Shear _x K	Shear _z K	Overturning Moment, M _x kip-ft	Overturning Moment, M _z kip-ft	Torque kip-ft
Dead Only	77.47	-0.01	-0.01	0.00	0.00	0.00
Dead+Wind 0 deg - No Ice+Guy	147.25	-0.02	-6.05	0.00	0.00	0.00
Dead+Wind 30 deg - No Ice+Guy	134.98	3.45	-5.45	0.00	0.00	0.00
Dead+Wind 60 deg - No Ice+Guy	107.35	6.12	-3.52	0.00	0.00	0.00
Dead+Wind 90 deg - No Ice+Guy	134.84	6.44	-0.27	0.00	0.00	0.00
Dead+Wind 120 deg - No Ice+Guy	147.13	5.22	3.03	0.00	0.00	0.00
Dead+Wind 150 deg - No Ice+Guy	134.87	2.97	5.73	0.00	0.00	0.00
Dead+Wind 180 deg - No Ice+Guy	107.66	0.06	7.05	0.00	0.00	0.00
Dead+Wind 210 deg - No Ice+Guy	135.20	-2.98	5.70	0.00	0.00	0.00
Dead+Wind 240 deg - No Ice+Guy	147.48	-5.22	3.00	0.00	0.00	0.00
Dead+Wind 270 deg - No Ice+Guy	135.18	-6.44	-0.29	0.00	0.00	0.00
Dead+Wind 300 deg - No Ice+Guy	107.53	-6.11	-3.58	0.00	0.00	0.00
Dead+Wind 330 deg - No Ice+Guy	134.98	-3.49	-5.45	0.00	0.00	0.00
Dead+Ice+Temp+Guy	113.69	-0.02	-0.03	0.00	0.00	0.00
Dead+Wind 0 deg+Ice+Temp+Guy	171.21	-0.02	-4.16	0.00	0.00	0.00
Dead+Wind 30 deg+Ice+Temp+Guy	162.15	2.48	-3.74	0.00	0.00	0.00
Dead+Wind 60 deg+Ice+Temp+Guy	145.08	4.29	-2.49	0.00	0.00	0.00
Dead+Wind 90 deg+Ice+Temp+Guy	162.06	4.46	-0.32	0.00	0.00	0.00
Dead+Wind 120 deg+Ice+Temp+Guy	171.14	3.55	2.05	0.00	0.00	0.00
Dead+Wind 150 deg+Ice+Temp+Guy	162.09	1.95	4.00	0.00	0.00	0.00
Dead+Wind 180 deg+Ice+Temp+Guy	145.36	0.02	4.93	0.00	0.00	0.00
Dead+Wind 210 deg+Ice+Temp+Guy	162.45	-1.96	3.98	0.00	0.00	0.00
Dead+Wind 240 deg+Ice+Temp+Guy	171.53	-3.57	2.02	0.00	0.00	0.00
Dead+Wind 270 deg+Ice+Temp+Guy	162.44	-4.47	-0.35	0.00	0.00	0.00
Dead+Wind 300	145.29	-4.30	-2.53	0.00	0.00	0.00

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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
deg+Ice+Temp+Guy						
Dead+Wind 330	162.15	-2.53	-3.74	0.00	0.00	0.00
deg+Ice+Temp+Guy						
Dead+Wind 0 deg -	78.87	-0.01	-2.09	0.00	0.00	0.00
Service+Guy						
Dead+Wind 30 deg -	78.54	1.01	-1.80	0.00	0.00	0.00
Service+Guy						
Dead+Wind 60 deg -	78.37	1.76	-1.03	0.00	0.00	0.00
Service+Guy						
Dead+Wind 90 deg -	78.57	2.05	0.00	0.00	0.00	0.00
Service+Guy						
Dead+Wind 120 deg -	78.93	1.79	1.03	0.00	0.00	0.00
Service+Guy						
Dead+Wind 150 deg -	78.59	1.03	1.77	0.00	0.00	0.00
Service+Guy						
Dead+Wind 180 deg -	78.38	-0.01	2.04	0.00	0.00	0.00
Service+Guy						
Dead+Wind 210 deg -	78.49	-1.05	1.77	0.00	0.00	0.00
Service+Guy						
Dead+Wind 240 deg -	78.75	-1.81	1.03	0.00	0.00	0.00
Service+Guy						
Dead+Wind 270 deg -	78.49	-2.07	-0.00	0.00	0.00	0.00
Service+Guy						
Dead+Wind 300 deg -	78.37	-1.79	-1.03	0.00	0.00	0.00
Service+Guy						
Dead+Wind 330 deg -	78.55	-1.03	-1.80	0.00	0.00	0.00
Service+Guy						

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	-36.23	0.00	-0.00	36.23	-0.00	0.002%
2	0.00	-36.42	-67.17	0.00	36.42	67.17	0.002%
3	33.50	-36.23	-58.04	-33.50	36.23	58.04	0.002%
4	57.98	-36.04	-33.48	-57.98	36.04	33.48	0.001%
5	67.00	-36.23	-0.00	-67.00	36.23	-0.00	0.001%
6	58.16	-36.42	33.59	-58.16	36.42	-33.59	0.002%
7	33.50	-36.23	58.04	-33.50	36.23	-58.04	0.001%
8	-0.00	-36.04	66.97	0.00	36.04	-66.97	0.002%
9	-33.50	-36.23	58.04	33.50	36.23	-58.04	0.002%
10	-58.16	-36.42	33.59	58.16	36.42	-33.59	0.003%
11	-67.00	-36.23	0.00	67.00	36.23	0.00	0.001%
12	-57.98	-36.04	-33.48	57.99	36.04	33.48	0.002%
13	-33.50	-36.23	-58.04	33.50	36.23	58.04	0.001%
14	0.00	-66.20	0.00	-0.00	66.20	-0.00	0.000%
15	0.00	-66.55	-61.68	-0.00	66.55	61.68	0.002%
16	30.61	-66.20	-53.03	-30.61	66.20	53.03	0.002%
17	52.76	-65.84	-30.47	-52.76	65.84	30.46	0.001%
18	61.22	-66.20	-0.00	-61.22	66.20	0.00	0.001%
19	53.41	-66.55	30.84	-53.41	66.55	-30.84	0.001%
20	30.61	-66.20	53.03	-30.61	66.20	-53.03	0.001%
21	-0.00	-65.84	60.93	0.00	65.84	-60.93	0.001%
22	-30.61	-66.20	53.03	30.61	66.20	-53.03	0.001%
23	-53.41	-66.55	30.84	53.41	66.55	-30.84	0.001%
24	-61.22	-66.20	0.00	61.22	66.20	0.00	0.001%
25	-52.76	-65.84	-30.47	52.76	65.84	30.47	0.001%

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Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
26	-30.61	-66.20	-53.03	30.61	66.20	53.03	0.001%
27	0.00	-36.29	-18.61	0.00	36.29	18.61	0.001%
28	9.28	-36.23	-16.08	-9.28	36.23	16.08	0.001%
29	16.06	-36.18	-9.28	-16.06	36.18	9.28	0.000%
30	18.56	-36.23	-0.00	-18.56	36.23	-0.00	0.001%
31	16.11	-36.29	9.30	-16.11	36.29	-9.30	0.001%
32	9.28	-36.23	16.08	-9.28	36.23	-16.08	0.001%
33	-0.00	-36.18	18.55	0.00	36.18	-18.55	0.000%
34	-9.28	-36.23	16.08	9.28	36.23	-16.08	0.001%
35	-16.11	-36.29	9.30	16.11	36.29	-9.30	0.001%
36	-18.56	-36.23	0.00	18.56	36.23	-0.00	0.000%
37	-16.06	-36.18	-9.28	16.06	36.18	9.28	0.001%
38	-9.28	-36.23	-16.08	9.28	36.23	16.08	0.001%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	10	0.00000001	0.00008321
2	Yes	20	0.00000001	0.00005666
3	Yes	19	0.00000001	0.00005112
4	Yes	18	0.00000001	0.00006965
5	Yes	20	0.00000001	0.00005161
6	Yes	20	0.00000001	0.00008867
7	Yes	20	0.00000001	0.00005469
8	Yes	21	0.00000001	0.00007552
9	Yes	19	0.00000001	0.00005510
10	Yes	19	0.00003110	0.00008755
11	Yes	20	0.00000001	0.00004879
12	Yes	20	0.00000001	0.00009428
13	Yes	20	0.00000001	0.00005226
14	Yes	9	0.00000001	0.00009899
15	Yes	19	0.00004477	0.00008425
16	Yes	19	0.00000001	0.00005481
17	Yes	17	0.00000001	0.00007640
18	Yes	20	0.00000001	0.00006441
19	Yes	20	0.00000001	0.00007627
20	Yes	20	0.00000001	0.00005455
21	Yes	19	0.00000001	0.00007002
22	Yes	19	0.00004346	0.00006069
23	Yes	20	0.00000001	0.00006330
24	Yes	20	0.00000001	0.00007534
25	Yes	19	0.00000001	0.00007066
26	Yes	20	0.00000001	0.00005501
27	Yes	14	0.00000001	0.00009680
28	Yes	14	0.00000001	0.00004009
29	Yes	13	0.00000001	0.00004853
30	Yes	14	0.00000001	0.00006158
31	Yes	15	0.00000001	0.00005643
32	Yes	14	0.00000001	0.00006541
33	Yes	13	0.00000001	0.00005086
34	Yes	13	0.00000001	0.00008776
35	Yes	14	0.00000001	0.00007164
36	Yes	14	0.00000001	0.00004071
37	Yes	13	0.00000001	0.00005726
38	Yes	14	0.00000001	0.00005400

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Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	190 - 180	3.581	37	0.2029	0.2413
T2	180 - 160	3.158	37	0.1945	0.2415
T3	160 - 140	2.517	35	0.0909	0.2184
T4	140 - 120	2.476	31	0.0583	0.2274
T5	120 - 100	2.365	31	0.0551	0.1473
T6	100 - 80	2.302	31	0.0455	0.1149
T7	80 - 60	2.656	31	0.0701	0.1390
T8	60 - 40	2.808	31	0.0287	0.1642
T9	40 - 20	2.427	31	0.1660	0.2007
T10	20 - 5	1.405	31	0.2887	0.2231
T11	5 - 0	0.362	31	0.3372	0.2346

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
188.75	20' x 3" Dia Omni	37	3.527	0.2030	0.2417	52592
188.00	APX16PV-16PVL-X w/mount pipe	37	3.495	0.2030	0.2420	52592
180.00	2' x 2" Dia Omni	37	3.158	0.1945	0.2415	25701
178.75	(2) 7770.00	37	3.107	0.1907	0.2405	22485
177.50	Rohn 6'x12' Boom Gate (3)	37	3.057	0.1861	0.2392	19881
170.25	FG4605	37	2.788	0.1484	0.2284	11470
169.00	Pirod 15' T-Frame Sector Mount (1)	37	2.746	0.1409	0.2264	10687
162.50	Guy	36	2.564	0.1030	0.2190	7986
155.50	4 Bay Dipole	35	2.459	0.0748	0.2212	10412
150.50	Rohn 6'x12' Boom Gate (3)	31	2.421	0.0645	0.2271	20418
150.00	(2) DB980H90E-M	31	2.424	0.0638	0.2276	22590
147.00	FG4607	31	2.444	0.0607	0.2303	45987
140.33	(4) DB844H90E-XY	31	2.475	0.0583	0.2280	12753
130.00	(2) 800-10504	31	2.447	0.0575	0.1924	22213
126.00	DB408	31	2.417	0.0576	0.1738	37586
122.50	3' Standoff	31	2.387	0.0569	0.1577	56430
121.00	PD220	31	2.374	0.0560	0.1513	41450
120.00	LLPX310R	31	2.365	0.0551	0.1473	34656
111.00	Folded Dipole	31	2.294	0.0430	0.1223	12005
110.00	3'-6" Standoff	31	2.289	0.0413	0.1206	11154
106.00	2' x 2" Dia Omni	31	2.278	0.0396	0.1161	8690
105.00	2' Standoff	31	2.279	0.0402	0.1154	8217
102.50	Guy	31	2.286	0.0423	0.1146	7282

Maximum Tower Deflections - Design Wind

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Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	190 - 180	24.930	10	0.9991	1.3942
T2	180 - 160	23.310	10	0.9879	1.3948
T3	160 - 140	20.597	10	0.6840	1.3066
T4	140 - 120	19.254	6	0.6047	1.2939
T5	120 - 100	17.723	6	0.5932	0.9516
T6	100 - 80	16.507	6	0.2591	0.8029
T7	80 - 60	16.810	6	0.2034	0.8265
T8	60 - 40	16.151	6	0.4409	0.8588
T9	40 - 20	13.158	6	1.0384	0.9961
T10	20 - 5	7.390	6	1.5664	1.0828
T11	5 - 0	1.891	6	1.7719	1.0880

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
188.75	20' x 3" Dia Omni	10	24.726	1.0015	1.3958	22283
188.00	APX16PV-16PVL-X w/mount pipe	10	24.603	1.0027	1.3967	22283
180.00	2' x 2" Dia Omni	10	23.310	0.9879	1.3948	10312
178.75	(2) 7770.00	10	23.111	0.9776	1.3912	8707
177.50	Rohn 6'x12' Boom Gate (3)	10	22.915	0.9647	1.3866	7421
170.25	FG4605	10	21.831	0.8553	1.3483	3735
169.00	Pirol 15' T-Frame Sector Mount (1)	10	21.658	0.8330	1.3411	3435
162.50	Guy	10	20.854	0.7201	1.3114	2456
155.50	4 Bay Dipole	10	20.213	0.6365	1.3097	3296
150.50	Rohn 6'x12' Boom Gate (3)	10	19.870	0.6076	1.3200	7495
150.00	(2) DB980H90E-M	10	19.839	0.6059	1.3208	8473
147.00	FG4607	10	19.656	0.5995	1.3230	29682
140.33	(4) DB844H90E-XY	6	19.272	0.6040	1.2968	4311
130.00	(2) 800-10504	6	18.563	0.6281	1.1395	8089
126.00	DB408	6	18.234	0.6262	1.0606	15712
122.50	3' Standoff	6	17.937	0.6123	0.9941	14042
121.00	PD220	6	17.809	0.6019	0.9680	10483
120.00	LLPX310R	6	17.723	0.5932	0.9516	8863
111.00	Folded Dipole	6	17.010	0.4622	0.8478	3325
110.00	3'-6" Standoff	6	16.942	0.4438	0.8405	3078
106.00	2' x 2" Dia Omni	6	16.709	0.3679	0.8185	2368
105.00	2' Standoff	6	16.662	0.3488	0.8145	2239
102.50	Guy	6	16.566	0.3023	0.8071	1997

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	190	Leg	A325N	0.7500	4	0.00	19.44	0.000 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.6250	2	1.95	6.44	0.303 ✓	1.333	Bolt Shear
		Top Girt	A325N	0.6250	2	0.11	6.44	0.017 ✓	1.333	Bolt Shear

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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
T2	180	Bottom Girt	A325N	0.6250	2	0.38	6.44	0.060 ✓	1.333	Bolt Shear
		Leg	A325N	0.7500	4	2.62	19.41	0.135 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.6250	2	6.24	6.44	0.969 ✓	1.333	Bolt Shear
		Top Girt	A325N	0.6250	2	0.24	6.44	0.038 ✓	1.333	Bolt Shear
T3	160	Bottom Girt	A325N	0.6250	2	3.46	6.44	0.538 ✓	1.333	Bolt Shear
		Leg	A325N	0.7500	4	4.77	19.18	0.249 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.5000	1	7.16	4.12	1.737 ✗	1.333	Bolt Shear
		Top Girt	A325N	0.5000	1	0.59	4.12	0.142 ✓	1.333	Bolt Shear
T4	140	Bottom Girt	A325N	0.5000	1	0.94	4.12	0.227 ✓	1.333	Bolt Shear
		Leg	A325N	0.7500	4	0.00	19.42	0.000 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.5000	1	5.34	4.12	1.295 ✓	1.333	Bolt Shear
		Top Girt	A325N	0.5000	1	0.68	4.12	0.165 ✓	1.333	Bolt Shear
T5	120	Bottom Girt	A325N	0.5000	1	1.06	4.12	0.258 ✓	1.333	Bolt Shear
		Leg	A325N	0.7500	4	0.00	19.30	0.000 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.6250	2	6.16	6.44	0.957 ✓	1.333	Bolt Shear
		Top Girt	A325N	0.6250	2	0.85	6.44	0.133 ✓	1.333	Bolt Shear
T6	100	Bottom Girt	A325N	0.6250	2	2.90	6.44	0.450 ✓	1.333	Bolt Shear
		Leg	A325N	0.7500	4	6.33	18.98	0.334 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.5000	1	7.10	3.30	2.153 ✗	1.333	Member Bearing
		Top Girt	A325N	0.5000	1	0.72	3.30	0.219 ✓	1.333	Member Bearing
T7	80	Bottom Girt	A325N	0.5000	1	1.24	3.30	0.377 ✓	1.333	Member Bearing
		Leg	A325N	0.7500	4	0.00	19.28	0.000 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.5000	1	9.41	4.12	2.282 ✗	1.333	Bolt Shear
		Top Girt	A325N	0.5000	1	3.59	4.12	0.869 ✓	1.333	Bolt Shear
T8	60	Bottom Girt	A325N	0.5000	1	1.50	4.12	0.364 ✓	1.333	Bolt Shear
		Leg	A325N	0.7500	4	8.89	19.41	0.458 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.5000	1	3.51	3.30	1.063 ✓	1.333	Member Bearing
		Top Girt	A325N	0.5000	1	0.92	3.30	0.280 ✓	1.333	Member Bearing
T9	40	Bottom Girt	A325N	0.5000	1	0.41	3.30	0.125 ✓	1.333	Member Bearing
		Leg	A325N	0.7500	4	10.85	19.43	0.559 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.5000	1	5.42	3.30	1.644 ✗	1.333	Member Bearing
		Top Girt	A325N	0.5000	1	0.67	3.30	0.204 ✓	1.333	Member Bearing
T10	20	Bottom Girt	A325N	0.5000	1	1.36	3.30	0.412 ✓	1.333	Member Bearing
		Leg	A325N	0.7500	4	3.25	19.35	0.168 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.5000	1	7.72	4.12	1.873 ✗	1.333	Bolt Shear
		Top Girt	A325N	0.5000	1	1.97	4.12	0.477 ✓	1.333	Bolt Shear
T11	5	Bottom Girt	A325N	0.5000	1	4.06	4.12	0.986 ✓	1.333	Bolt Shear
		Leg	A325N	0.7500	4	0.00	17.41	0.000 ✓	1.333	Bolt Tension

Guy Design Data

Section No.	Elevation <i>ft</i>	Size	Initial Tension <i>K</i>	Breaking Load <i>K</i>	Actual <i>T</i> <i>K</i>	Allowable <i>T_a</i> <i>K</i>	Required <i>S.F.</i>	Actual <i>S.F.</i>
T2	162.50 (A) (468)	3/4 EHS	5.83	58.30	24.77	29.15	2.000	2.353 ✓
	162.50 (A) (469)	3/4 EHS	5.83	58.30	26.30	29.15	2.000	2.216 ✓
	162.50 (B) (464)	3/4 EHS	5.83	58.30	26.31	29.15	2.000	2.216 ✓
	162.50 (B) (465)	3/4 EHS	5.83	58.30	25.59	29.15	2.000	2.278 ✓
	162.50 (C) (460)	3/4 EHS	5.83	58.30	26.05	29.15	2.000	2.238 ✓
	162.50 (C) (461)	3/4 EHS	5.83	58.30	25.18	29.15	2.000	2.316 ✓
T5	102.50 (A) (480)	5/8 EHS	4.24	42.40	22.41	21.20	2.000	1.892 ✗
	102.50 (A) (481)	5/8 EHS	4.24	42.40	23.44	21.20	2.000	1.809 ✗
	102.50 (B) (476)	5/8 EHS	4.24	42.40	23.14	21.20	2.000	1.832 ✗
	102.50 (B) (477)	5/8 EHS	4.24	42.40	22.26	21.20	2.000	1.905 ✗
	102.50 (C) (472)	5/8 EHS	4.24	42.40	23.67	21.20	2.000	1.791 ✗
	102.50 (C) (473)	5/8 EHS	4.24	42.40	23.53	21.20	2.000	1.802 ✗

Compression Checks

Leg Design Data (Compression)

[illegible]

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Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	Mast Stability Index	F _a ksi	A in ²	Actual P K	Allow. P _a K	Ratio P P _a
T7	80 - 60	P3x.3	20.00	2.41	51.0 K=2.00	0.96	23.129	3.0159	-108.65	69.75	1.558 X
		H1-3 (1.56 CR) - 321									
T8	60 - 40	P3x.3	20.00	2.41	51.0 K=2.00	0.96	23.191	3.0159	-118.66	69.94	1.697 X
		H1-3 (1.70 CR) - 354/2									
T9	40 - 20	P3x.3	20.00	2.41	51.0 K=2.00	0.96	23.177	3.0159	-117.70	69.90	1.684 X
		H1-3 (1.68 CR) - 387/9									
T10	20 - 5	P3x.3	15.00	2.38	50.3 K=2.00	0.95	22.969	3.0159	-94.74	69.27	1.368 X
		H1-3 (1.37 CR) - 420/7									
T11	5 - 0	P3x.3	5.38	1.55	16.4 K=1.00	0.80	22.869	3.0159	-70.40	68.97	1.021 ✓

Diagonal 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	190 - 180	L2x2x1/4	4.21	1.74	70.1 K=1.31	16.417	0.9380	-3.91	15.40	0.254
T2	180 - 160	L2x2x1/4	4.18	1.73	69.9 K=1.31	16.446	0.9380	-12.48	15.43	0.809
T3	160 - 140	ROHN TS1.5x11 ga	4.18	3.89	95.3 K=1.00	14.702	0.5202	-7.16	7.65	0.936
T4	140 - 120	ROHN TS1.5x11 ga	4.18	3.89	95.3 K=1.00	14.702	0.5202	-5.34	7.65	0.698
T5	120 - 100	L2x2x1/4	4.18	1.70	69.1 K=1.33	16.522	0.9380	-12.33	15.50	0.795
T6	100 - 80	ROHN TS1.5x16 ga	4.18	3.83	90.1 K=1.00	15.535	0.2706	-7.68	4.20	1.828 X
		bolt (2.15 CR) - 314								
T7	80 - 60	ROHN TS1.5x11 ga	4.18	3.83	93.7 K=1.00	14.954	0.5202	-9.41	7.78	1.209
T8	60 - 40	ROHN TS1.5x16 ga	4.18	3.83	90.1 K=1.00	15.535	0.2706	-4.05	4.20	0.963
T9	40 - 20	ROHN TS1.5x16 ga	4.18	3.83	90.1 K=1.00	15.535	0.2706	-5.90	4.20	1.404 X
		bolt (1.64 CR) - 395								
T10	20 - 5	ROHN TS1.5x11 ga	4.17	3.81	93.4 K=1.00	15.015	0.5202	-7.53	7.81	0.964 ✓

RISATower**CENTEK Engineering, Inc.**

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Job

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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	190 - 180	L2x2x1/4	3.42	2.75	102.2 K=1.21	12.697	0.9380	-0.22	11.91	0.018
T2	180 - 160	L2x2x1/4	3.42	2.75	102.2 K=1.21	12.697	0.9380	-0.48	11.91	0.041
T4	140 - 120	ROHN TS1.5x11 ga	3.42	3.18	77.9 K=1.00	17.376	0.5202	-0.03	9.04	0.003
T5	120 - 100	L2x2x1/4	3.42	2.70	101.4 K=1.22	12.799	0.9380	-0.65	12.01	0.054
T6	100 - 80	ROHN TS1.5x16 ga	3.42	3.13	73.6 K=1.00	17.981	0.2706	-0.17	4.87	0.035
T7	80 - 60	ROHN TS1.5x11 ga	3.42	3.13	76.6 K=1.00	17.559	0.5202	-3.31	9.13	0.362
T8	60 - 40	ROHN TS1.5x16 ga	3.42	3.13	73.6 K=1.00	17.981	0.2706	-0.85	4.87	0.174
T9	40 - 20	ROHN TS1.5x16 ga	3.42	3.13	73.6 K=1.00	17.981	0.2706	-0.42	4.87	0.086
T10	20 - 5	ROHN TS1.5x11 ga	3.42	3.13	76.6 K=1.00	17.559	0.5202	-1.60	9.13	0.175

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	190 - 180	L2x2x1/4	3.42	2.75	102.2 K=1.21	12.697	0.9380	-0.76	11.91	0.064
T2	180 - 160	L2x2x1/4	3.42	2.75	102.2 K=1.21	12.697	0.9380	-5.47	11.91	0.459
T3	160 - 140	ROHN TS1.5x11 ga	3.42	3.18	77.9 K=1.00	17.376	0.5202	-0.27	9.04	0.030
T4	140 - 120	ROHN TS1.5x11 ga	3.42	3.18	77.9 K=1.00	17.376	0.5202	-0.38	9.04	0.042
T5	120 - 100	L2x2x1/4	3.42	2.70	101.4 K=1.22	12.799	0.9380	-3.79	12.01	0.315
T6	100 - 80	ROHN TS1.5x16 ga	3.42	3.13	73.6 K=1.00	17.981	0.2706	-0.60	4.87	0.124
T7	80 - 60	ROHN TS1.5x11 ga	3.42	3.13	76.6 K=1.00	17.559	0.5202	-1.10	9.13	0.120
T8	60 - 40	ROHN TS1.5x16 ga	3.42	3.13	73.6 K=1.00	17.981	0.2706	-0.22	4.87	0.046
T9	40 - 20	ROHN TS1.5x16 ga	3.42	3.13	73.6 K=1.00	17.981	0.2706	-1.23	4.87	0.253
T11	5 - 0	L3x3x1/2	0.34	0.05	60.5 K=58.86	17.380	2.7500	-6.33	47.80	0.132

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Mid 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
T11	5 - 0	L3x3x1/2	2.32	2.02	80.8 K=1.94	15.266	2.7500	-0.71	41.98	0.017



Torque-Arm Top Design Data

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	F _a ksi	A in ²	Actual P K	Allow. P _a K	Ratio P P _a
T2	180 - 160 (462)	C15x33.9	3.42	3.30	114.3	11.079	9.9600	-8.53	110.35	0.077
T2	180 - 160 (463)	C15x33.9	3.42	3.30	K=1.00 114.3	11.079	9.9600	-8.65	110.35	0.078
T2	180 - 160 (466)	C15x33.9	3.42	3.30	K=1.00 114.3	11.079	9.9600	-8.23	110.35	0.075
T2	180 - 160 (467)	C15x33.9	3.42	3.30	K=1.00 114.3	11.079	9.9600	-8.06	110.35	0.073
T2	180 - 160 (470)	C15x33.9	3.42	3.30	K=1.00 114.3	11.079	9.9600	-7.64	110.35	0.069
T2	180 - 160 (471)	C15x33.9	3.42	3.30	K=1.00 114.3	11.079	9.9600	-7.59	110.35	0.069
T5	120 - 100 (474)	C15x33.9	3.42	3.27	K=1.00 113.6	11.186	9.9600	-11.20	111.41	0.101
T5	120 - 100 (475)	C15x33.9	3.42	3.27	K=1.00 113.6	11.186	9.9600	-11.09	111.41	0.100
T5	120 - 100 (478)	C15x33.9	3.42	3.27	K=1.00 113.6	11.186	9.9600	-10.89	111.41	0.098
T5	120 - 100 (479)	C15x33.9	3.42	3.27	K=1.00 113.6	11.186	9.9600	-11.09	111.41	0.100
T5	120 - 100 (482)	C15x33.9	3.42	3.27	K=1.00 113.6	11.186	9.9600	-10.26	111.41	0.092
T5	120 - 100 (483)	C15x33.9	3.42	3.27	K=1.00 113.6	11.186	9.9600	-10.33	111.41	0.093

Torque-Arm Top Bending Design Data

Section No.	Elevation ft	Size	Actual M _x kip-ft	Actual f _{bx} ksi	Allow. F _{bx} ksi	Ratio f _{bx} F _{bx}	Actual M _y kip-ft	Actual f _{by} ksi	Allow. F _{by} ksi	Ratio f _{by} F _{by}
T2	180 - 160 (462)	C15x33.9	-66.03	-18.866	21.600	0.873	-0.00	-0.000	21.600	0.000
T2	180 - 160 (463)	C15x33.9	-67.03	-19.151	21.600	0.887	0.00	-0.000	21.600	0.000
T2	180 - 160 (466)	C15x33.9	-65.99	-18.854	21.600	0.873	0.00	-0.000	21.600	0.000
T2	180 - 160 (467)	C15x33.9	-64.41	-18.404	21.600	0.852	-0.00	-0.000	21.600	0.000
T2	180 - 160 (470)	C15x33.9	-63.86	-18.245	21.600	0.845	-0.00	-0.000	21.600	0.000
T2	180 - 160 (471)	C15x33.9	-63.29	-18.083	21.600	0.837	0.00	-0.000	21.600	0.000
T5	120 - 100 (474)	C15x33.9	-43.94	-12.554	21.600	0.581	-0.00	-0.000	21.600	0.000
T5	120 - 100 (475)	C15x33.9	-43.57	-12.449	21.600	0.576	0.00	-0.000	21.600	0.000
T5	120 - 100 (478)	C15x33.9	-43.10	-12.315	21.600	0.570	-0.00	-0.000	21.600	0.000
T5	120 - 100 (479)	C15x33.9	-43.73	-12.494	21.600	0.578	0.00	-0.000	21.600	0.000
T5	120 - 100 (482)	C15x33.9	-41.40	-11.830	21.600	0.548	-0.00	-0.000	21.600	0.000

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Section No.	Elevation ft	Size	Actual M_x kip-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y kip-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
T5	120 - 100 (483)	C15x33.9	-41.65	-11.901	21.600	0.551	0.00	-0.000	21.600	0.000

Torque-Arm Top Interaction Design Data

Section No.	Elevation ft	Size	Ratio P P_a	Ratio f_{bx} F_{bx}	Ratio f_{by} F_{by}	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
T2	180 - 160 (462)	C15x33.9	0.077	0.873	0.000	0.951 ✓	1.333	H1-3 ✓
T2	180 - 160 (463)	C15x33.9	0.078	0.887	0.000	0.965 ✓	1.333	H1-3 ✓
T2	180 - 160 (466)	C15x33.9	0.075	0.873	0.000	0.947 ✓	1.333	H1-3 ✓
T2	180 - 160 (467)	C15x33.9	0.073	0.852	0.000	0.925 ✓	1.333	H1-3 ✓
T2	180 - 160 (470)	C15x33.9	0.069	0.845	0.000	0.914 ✓	1.333	H1-3 ✓
T2	180 - 160 (471)	C15x33.9	0.069	0.837	0.000	0.906 ✓	1.333	H1-3 ✓
T5	120 - 100 (474)	C15x33.9	0.101	0.581	0.000	0.682 ✓	1.333	H1-3 ✓
T5	120 - 100 (475)	C15x33.9	0.100	0.576	0.000	0.676 ✓	1.333	H1-3 ✓
T5	120 - 100 (478)	C15x33.9	0.098	0.570	0.000	0.668 ✓	1.333	H1-3 ✓
T5	120 - 100 (479)	C15x33.9	0.100	0.578	0.000	0.678 ✓	1.333	H1-3 ✓
T5	120 - 100 (482)	C15x33.9	0.092	0.548	0.000	0.640 ✓	1.333	H1-3 ✓
T5	120 - 100 (483)	C15x33.9	0.093	0.551	0.000	0.644 ✓	1.333	H1-3 ✓

Tension Checks

Leg 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	190 - 180	P2.5x.276	10.00	2.46	31.9	30.000	2.2535	10.46	67.61	0.155
T2	180 - 160	P2.5x.276	20.00	2.41	31.3	30.000	2.2535	63.68	67.61	0.942 ✓
T3	160 - 140	P2.5x.276	20.00	2.41	31.3	30.000	2.2535	19.09	67.61	0.282 ✓
T5	120 - 100	P3x.3	20.00	2.41	25.5	30.000	3.0159	61.67	90.48	0.682 ✓
T6	100 - 80	H1-3 (1.40 CR) - 207/2 P3x.3	20.00	2.41	25.5	30.000	3.0159	25.33	90.48	0.280 ✓
T7	80 - 60	H1-3 (1.40 CR) - 264/8 P3x.3	20.00	2.41	25.5	30.000	3.0159	35.55	90.48	0.393 ✓
		H1-3 (1.56 CR) - 320								✓

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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
T8	60 - 40	P3x.3	20.00	2.41	25.5	30.000	3.0159	45.56	90.48	0.504
T9	40 - 20	H1-3 (1.70 CR) - 353/3 P3x.3	20.00	2.41	25.5	30.000	3.0159	43.42	90.48	0.480
T10	20 - 5	H1-3 (1.68 CR) - 386/8 P3x.3	15.00	2.38	25.2	30.000	3.0159	12.99	90.48	0.144
		H1-3 (1.37 CR) - 419/6								

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	190 - 180	L2x2x1/4	4.21	1.74	38.6	29.000	0.5629	3.77	16.32	0.231
T2	180 - 160	L2x2x1/4	4.18	1.73	38.3	29.000	0.5629	10.84	16.32	0.664
T3	160 - 140	ROHN TS1.5x11 ga	4.18	3.89	95.3	25.200	0.5202	6.60	13.11	0.503
T4	140 - 120	ROHN TS1.5x11 ga	4.18	3.89	95.3	25.200	0.5202	4.72	13.11	0.360
T5	120 - 100	L2x2x1/4	4.18	1.70	37.7	29.000	0.5629	11.24	16.32	0.688
T6	100 - 80	ROHN TS1.5x16 ga	4.18	3.83	90.1	25.200	0.2706	7.10	6.82	1.041
T7	80 - 60	bolt (2.15 CR) - 314 ROHN TS1.5x11 ga	4.18	3.83	93.7	25.200	0.5202	9.01	13.11	0.687
T8	60 - 40	ROHN TS1.5x16 ga	4.18	3.83	90.1	25.200	0.2706	3.51	6.82	0.514
T9	40 - 20	ROHN TS1.5x16 ga	4.18	3.83	90.1	25.200	0.2706	5.42	6.82	0.795
T10	20 - 5	bolt (1.64 CR) - 395 ROHN TS1.5x11 ga	4.17	3.81	93.4	25.200	0.5202	7.72	13.11	0.589

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	190 - 180	L2x2x1/4	3.42	2.75	62.6	29.000	0.5629	0.19	16.32	0.012
T2	180 - 160	L2x2x1/4	3.42	2.75	62.6	29.000	0.5629	0.47	16.32	0.029
T3	160 - 140	ROHN TS1.5x11 ga	3.42	3.18	77.9	25.200	0.5202	0.59	13.11	0.045

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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
T4	140 - 120	ROHN TS1.5x11 ga	3.42	3.18	77.9	25.200	0.5202	0.68	13.11	✓ 0.052
T5	120 - 100	L2x2x1/4	3.42	2.70	61.6	29.000	0.5629	1.71	16.32	✓ 0.105
T6	100 - 80	ROHN TS1.5x16 ga	3.42	3.13	73.6	25.200	0.2706	0.72	6.82	✓ 0.106
T7	80 - 60	ROHN TS1.5x11 ga	3.42	3.13	76.6	25.200	0.5202	3.59	13.11	✓ 0.273
T8	60 - 40	ROHN TS1.5x16 ga	3.42	3.13	73.6	25.200	0.2706	0.92	6.82	✓ 0.136
T9	40 - 20	ROHN TS1.5x16 ga	3.42	3.13	73.6	25.200	0.2706	0.67	6.82	✓ 0.098
T10	20 - 5	ROHN TS1.5x11 ga	3.42	3.13	76.6	25.200	0.5202	1.97	13.11	✓ 0.150
T11	5 - 0	L3x3x1/2	3.30	3.01	40.2	21.600	2.7500	11.16	59.40	✓ 0.188

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	190 - 180	L2x2x1/4	3.42	2.75	62.6	29.000	0.5629	0.77	16.32	✓ 0.047
T2	180 - 160	L2x2x1/4	3.42	2.75	62.6	29.000	0.5629	6.93	16.32	✓ 0.424
T3	160 - 140	ROHN TS1.5x11 ga	3.42	3.18	77.9	25.200	0.5202	0.94	13.11	✓ 0.071
T4	140 - 120	ROHN TS1.5x11 ga	3.42	3.18	77.9	25.200	0.5202	1.06	13.11	✓ 0.081
T5	120 - 100	L2x2x1/4	3.42	2.70	61.6	29.000	0.5629	5.80	16.32	✓ 0.355
T6	100 - 80	ROHN TS1.5x16 ga	3.42	3.13	73.6	25.200	0.2706	1.24	6.82	✓ 0.182
T7	80 - 60	ROHN TS1.5x11 ga	3.42	3.13	76.6	25.200	0.5202	1.50	13.11	✓ 0.115
T8	60 - 40	ROHN TS1.5x16 ga	3.42	3.13	73.6	25.200	0.2706	0.41	6.82	✓ 0.061
T9	40 - 20	ROHN TS1.5x16 ga	3.42	3.13	73.6	25.200	0.2706	1.36	6.82	✓ 0.199
T10	20 - 5	ROHN TS1.5x11 ga	3.42	3.13	76.6	25.200	0.5202	4.06	13.11	✓ 0.310
T11	5 - 0	L3x3x1/2	0.34	0.05	0.7	21.600	2.7500	4.40	59.40	✓ 0.074

Mid Girt Design Data (Tension)

RISATower**CENTEK Engineering, Inc.**

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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
T11	5 - 0	L3x3x1/2	1.33	1.04	13.9	21.600	2.7500	0.25	59.40	0.004

**Torque-Arm Top Design Data**

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	F _a ksi	A in ²	Actual P K	Allow. P _a K	Ratio P P _a
T2	180 - 160 (462)	C15x33.9	3.42	3.30	43.8	21.600	9.9600	0.21	215.14	0.001
T2	180 - 160 (463)	C15x33.9	3.42	3.30	43.8	21.600	9.9600	6.49	215.14	0.030
T2	180 - 160 (466)	C15x33.9	3.42	3.30	43.8	21.600	9.9600	5.94	215.14	0.028
T2	180 - 160 (467)	C15x33.9	3.42	3.30	43.8	21.600	9.9600	1.21	215.14	0.006
T2	180 - 160 (470)	C15x33.9	3.42	3.30	43.8	21.600	9.9600	0.15	215.14	0.001
T2	180 - 160 (471)	C15x33.9	3.42	3.30	43.8	21.600	9.9600	1.18	215.14	0.006
T5	120 - 100 (474)	C15x33.9	3.42	3.27	43.4	21.600	9.9600	9.04	215.14	0.042
T5	120 - 100 (475)	C15x33.9	3.42	3.27	43.4	21.600	9.9600	7.69	215.14	0.036
T5	120 - 100 (478)	C15x33.9	3.42	3.27	43.4	21.600	9.9600	7.57	215.14	0.035
T5	120 - 100 (479)	C15x33.9	3.42	3.27	43.4	21.600	9.9600	9.07	215.14	0.042
T5	120 - 100 (482)	C15x33.9	3.42	3.27	43.4	21.600	9.9600	8.19	215.14	0.038
T5	120 - 100 (483)	C15x33.9	3.42	3.27	43.4	21.600	9.9600	8.32	215.14	0.039

Torque-Arm Top Bending Design Data

Section No.	Elevation ft	Size	Actual M _x kip-ft	Actual f _{bx} ksi	Allow. F _{bx} ksi	Ratio f _{bx} F _{bx}	Actual M _y kip-ft	Actual f _{by} ksi	Allow. F _{by} ksi	Ratio f _{by} F _{by}
T2	180 - 160 (462)	C15x33.9	-65.42	18.692	21.600	0.865	-0.00	0.000	27.000	0.000
T2	180 - 160 (463)	C15x33.9	-56.22	16.064	21.600	0.744	-0.00	0.000	27.000	0.000
T2	180 - 160 (466)	C15x33.9	-55.96	15.989	21.600	0.740	0.00	0.000	27.000	0.000
T2	180 - 160 (467)	C15x33.9	-67.05	19.159	21.600	0.887	0.00	0.000	27.000	0.000
T2	180 - 160 (470)	C15x33.9	-67.02	19.150	21.600	0.887	0.00	0.000	27.000	0.000
T2	180 - 160 (471)	C15x33.9	-68.07	19.449	21.600	0.900	-0.00	0.000	27.000	0.000
T5	120 - 100 (474)	C15x33.9	-40.20	11.486	21.600	0.532	-0.00	0.000	27.000	0.000
T5	120 - 100 (475)	C15x33.9	-37.53	10.724	21.600	0.496	-0.00	0.000	27.000	0.000
T5	120 - 100 (478)	C15x33.9	-37.04	10.583	21.600	0.490	0.00	0.000	27.000	0.000
T5	120 - 100 (479)	C15x33.9	-40.33	11.522	21.600	0.533	0.00	0.000	27.000	0.000
T5	120 - 100 (482)	C15x33.9	-38.08	10.879	21.600	0.504	-0.00	0.000	27.000	0.000
T5	120 - 100 (483)	C15x33.9	-38.72	11.062	21.600	0.512	-0.00	0.000	27.000	0.000

Torque-Arm Top Interaction Design Data

Section No.	Elevation ft	Size	Ratio P P _a	Ratio f _{bx} F _{bx}	Ratio f _{by} F _{by}	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
T2	180 - 160 (462)	C15x33.9	0.001	0.865	0.000	0.866 ✓	1.333	H2-1 ✓
T2	180 - 160 (463)	C15x33.9	0.030	0.744	0.000	0.774 ✓	1.333	H2-1 ✓

Job	190' Guyed Rohn Model 80 - Un-reinforced ~ Rev 1	Page	49 of 51
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Client	Verizon	Designed by	Jrm

Section No.	Elevation	Size	Ratio P	Ratio f_{bx}	Ratio f_{by}	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
	ft		P_a	F_{bx}	F_{by}			
T2	180 - 160 (466)	C15x33.9	0.028	0.740	0.000	0.768 ✓	1.333	H2-1 ✓
T2	180 - 160 (467)	C15x33.9	0.006	0.887	0.000	0.893 ✓	1.333	H2-1 ✓
T2	180 - 160 (470)	C15x33.9	0.001	0.887	0.000	0.887 ✓	1.333	H2-1 ✓
T2	180 - 160 (471)	C15x33.9	0.006	0.900	0.000	0.906 ✓	1.333	H2-1 ✓
T5	120 - 100 (474)	C15x33.9	0.042	0.532	0.000	0.574 ✓	1.333	H2-1 ✓
T5	120 - 100 (475)	C15x33.9	0.036	0.496	0.000	0.532 ✓	1.333	H2-1 ✓
T5	120 - 100 (478)	C15x33.9	0.035	0.490	0.000	0.525 ✓	1.333	H2-1 ✓
T5	120 - 100 (479)	C15x33.9	0.042	0.533	0.000	0.576 ✓	1.333	H2-1 ✓
T5	120 - 100 (482)	C15x33.9	0.038	0.504	0.000	0.542 ✓	1.333	H2-1 ✓
T5	120 - 100 (483)	C15x33.9	0.039	0.512	0.000	0.551 ✓	1.333	H2-1 ✓

Section Capacity Table

[illegible]

RISATower CEN TEK Engineering, Inc. 63-2 N Branford Rd Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job	190' Guyed Rohn Model 80 - Un-reinforced ~ Rev 1	Page	50 of 51
	Project	57 Cook Road, Montville, CT	Date	12:54:08 12/08/11
	Client	Verizon	Designed by	Jrm

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	SF*P _{allow} K	% Capacity	Pass Fail
T4	140 - 120	Top Girt	ROHN TS1.5x11 ga	153	0.68	17.48	3.9	Pass
T5	120 - 100	Top Girt	L2x2x1/4	210	1.71	21.76	12.4 (b)	Pass
T6	100 - 80	Top Girt	ROHN TS1.5x16 ga	267	0.72	9.09	7.9	Pass
T7	80 - 60	Top Girt	ROHN TS1.5x11 ga	322	-3.31	12.18	10.0 (b)	Pass
T8	60 - 40	Top Girt	ROHN TS1.5x16 ga	355	-0.85	6.49	16.4 (b)	Pass
T9	40 - 20	Top Girt	ROHN TS1.5x16 ga	389	0.67	9.09	27.2	Pass
T10	20 - 5	Top Girt	ROHN TS1.5x11 ga	422	-1.60	12.18	65.2 (b)	Pass
T11	5 - 0	Top Girt	L3x3x1/2	450	11.16	79.18	13.1	Pass
T1	190 - 180	Bottom Girt	L2x2x1/4	7	-0.76	15.88	35.8 (b)	Pass
T2	180 - 160	Bottom Girt	L2x2x1/4	40	-5.47	15.88	14.1	Pass
T3	160 - 140	Bottom Girt	ROHN TS1.5x11 ga	98	0.94	17.48	4.8	Pass
T4	140 - 120	Bottom Girt	ROHN TS1.5x11 ga	155	1.06	17.48	34.4	Pass
T5	120 - 100	Bottom Girt	L2x2x1/4	213	5.80	21.76	40.3 (b)	Pass
T6	100 - 80	Bottom Girt	ROHN TS1.5x16 ga	268	1.24	9.09	5.4	Pass
T7	80 - 60	Bottom Girt	ROHN TS1.5x11 ga	325	-1.10	12.18	17.0 (b)	Pass
T8	60 - 40	Bottom Girt	ROHN TS1.5x16 ga	360	0.41	9.09	6.1	Pass
T9	40 - 20	Bottom Girt	ROHN TS1.5x16 ga	392	-1.23	6.49	19.3 (b)	Pass
T10	20 - 5	Bottom Girt	ROHN TS1.5x11 ga	426	4.06	17.48	26.6	Pass
T11	5 - 0	Bottom Girt	L3x3x1/2	452	-6.00	63.71	33.7 (b)	Pass
T11	5 - 0	Mid Girt	L3x3x1/2	459	-0.71	55.96	13.7	Pass
T2	180 - 160	Guy A@162.496	3/4	469	26.30	29.15	9.0	Pass
T5	120 - 100	Guy A@102.496	5/8	481	23.44	21.20	28.3 (b)	Pass
T2	180 - 160	Guy B@162.496	3/4	464	26.31	29.15	27.3 (b)	Fail X
T5	120 - 100	Guy B@102.496	5/8	476	23.14	21.20	4.5	Pass
T2	180 - 160	Guy C@162.496	3/4	460	26.05	29.15	9.4 (b)	Fail X
T5	120 - 100	Guy C@102.496	5/8	472	23.67	21.20	19.0	Pass
T2	180 - 160	Torque Arm Top@162.496	C15x33.9	463	-8.65	147.10	30.9 (b)	Fail X
T5	120 - 100	Torque Arm Top@102.496	C15x33.9	474	-11.20	148.51	23.3	Pass

Summary		
Leg (T8)	127.3	Fail X
Diagonal (T7)	171.2	Fail X
Top Girt (T7)	65.2	Pass
Bottom Girt (T10)	73.9	Pass
Mid Girt (T11)	1.3	Pass
Guy A (T5)	110.6	Fail X
Guy B (T5)	109.2	Fail X
Guy C (T5)	111.7	Fail X
Torque Arm	72.4	Pass

RISATower CEN TEK Engineering, Inc. 63-2 N Branford Rd Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job	190' Guyed Rohn Model 80 - Un-reinforced ~ Rev 1	Page	51 of 51
	Project	57 Cook Road, Montville, CT	Date	12:54:08 12/08/11
	Client	Verizon	Designed by	Jrm

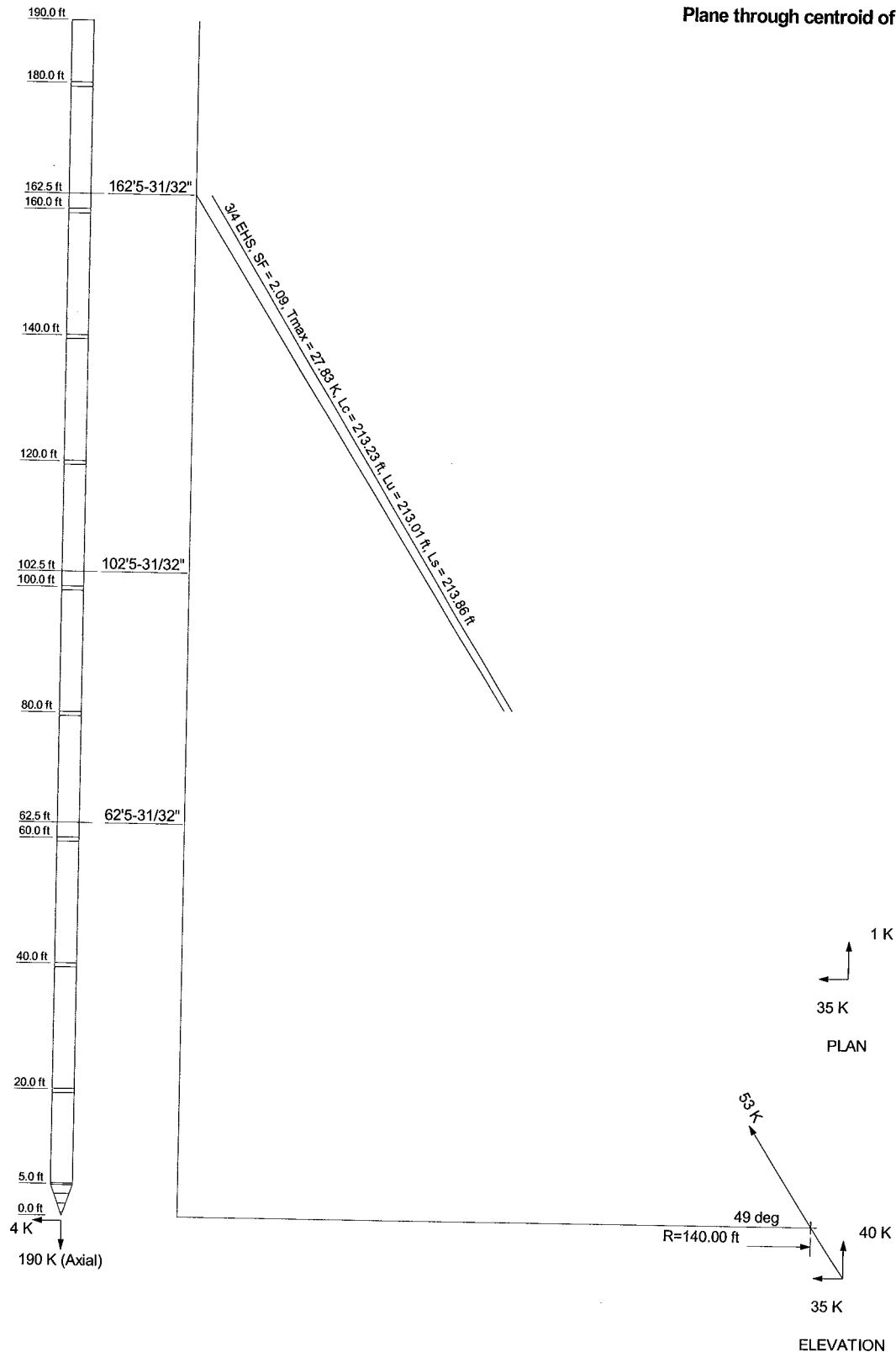
Section No.	Elevation ft	Component Type	Size	Critical Element	P K	SF*P _{allow} K	% Capacity	Pass Fail
						Top (T2)		
						Bolt Checks	171.2	Fail X
						RATING =	171.2	Fail X

Program Version 5.4.2.0 - 6/17/2010 File:J:/Jobs/1100100.WI/CO27 - Montville 4 - 54 Cook Drive, Montville, CT/Structural/Rev
 1/Calcs/ERI/Without Prop Reinf/95mph 190' Guyed Rohn Tower.eri

Guy Tensions and Tower Reactions TIA/EIA-222-F - 95 mph/82 mph 0.5000 in Ice

Maximum Values

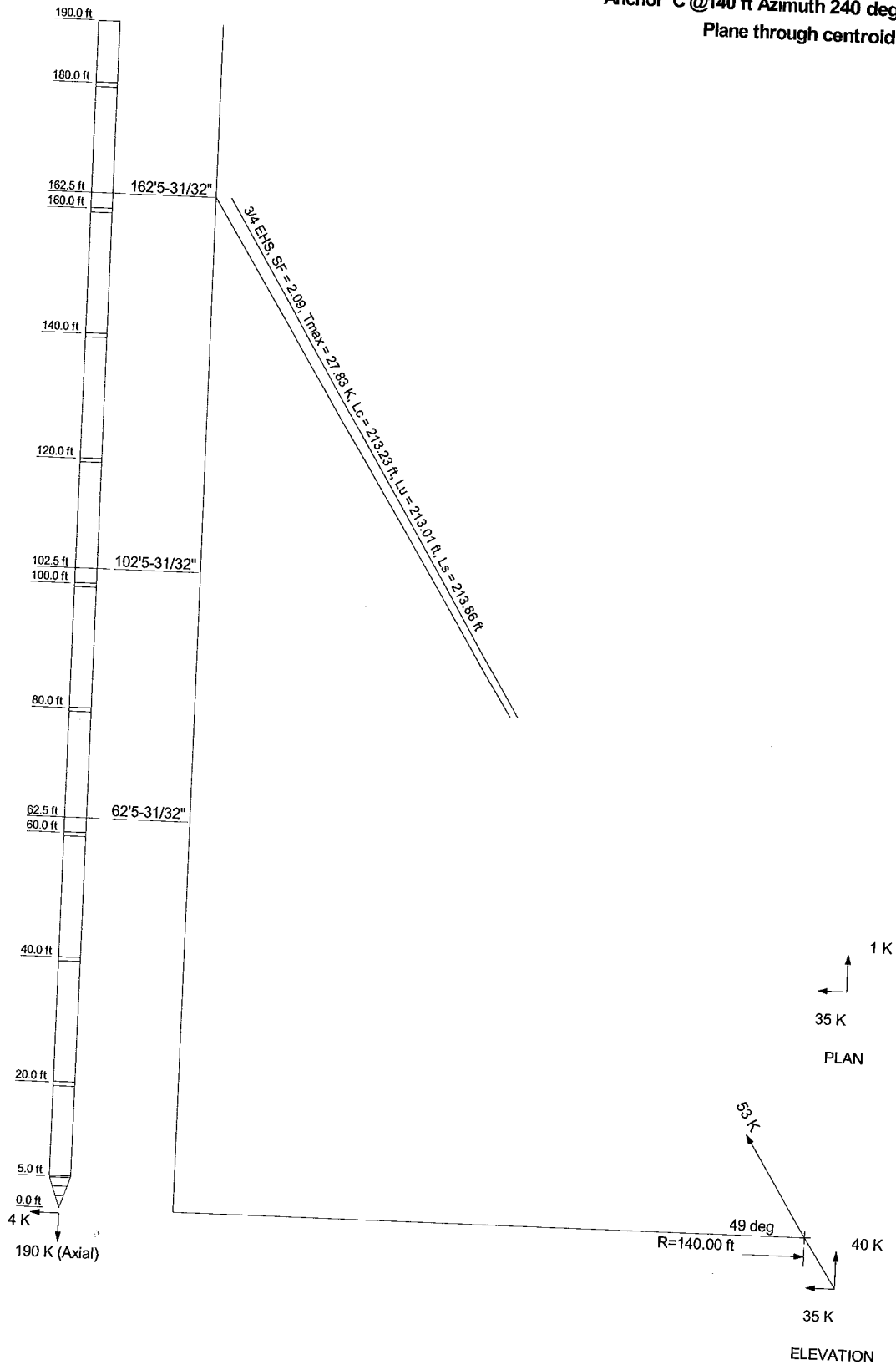
Anchor 'C' @ 140 ft Azimuth 240 deg Elev 0 ft
Plane through centroid of tower



CEN TEK Engineering, Inc.		Job: 190' Guyed Rohn Model 80 - w/ Proposed Reinf. ~ Rev 1	
63-2 N Branford Rd Branford, CT 06405		Project: 57 Cook Road, Montville, CT	
Phone: (203) 488-0580		Client: Verizon	Drawn by: Jrm
FAX: (203) 488-8587		Code: TIA/EIA-222-F	Date: 12/08/11
		Path:	App'd:
			Scale: NTS
			Dwg No. E-6

Guy Tensions and Tower Reactions TIA/EIA-222-F - 95 mph/82 mph 0.5000 in Ice

Maximum Values
Anchor 'C' @ 140 ft Azimuth 240 deg Elev 0 ft
Plane through centroid of tower



CEN TEK Engineering, Inc.
63-2 N Branford Rd
Branford, CT 06405
Phone: (203) 488-0580
FAX: (203) 488-8587

Job: **190' Guyed Rohn Model 80 - w/ Proposed Reinf. ~ Rev 1**
Project: **57 Cook Road, Montville, CT**
Client: **Verizon** Drawn by: **Jrm** App'd:
Code: **TIA/EIA-222-F** Date: **12/08/11** Scale: **NTS**
Path: **Dwg No. E-6**

Job : Verizon Wireless ~ Montville 4: 190-ft Guyed Lattice Tower
Address: 54 Cook Drive Montville, CT ~ Rev 1
Description: Guy Anchor Evaluation - 2005 CSBC 3108.4.2/TIA Req

Project No. 11001.CO27
Computed by JRM
Checked by CFC

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Date 12/8/11
Date

CHECK UPLIFT RESISTANCE

ANCHOR (C) AT 100.0ft RADIUS

RESULTS FROM COMPUTER ANALYSIS:

Uplift = 35 kips
Sliding = 40 kips

CONCRETE PARAMETERS:

$\gamma_{conc} = 150$ pcf
 $w = 6$ ft
 $h = 4$ ft
 $d = 12$ ft

 $Vol. = 288.00$ ft³
 $Wc = 43.20$ kips

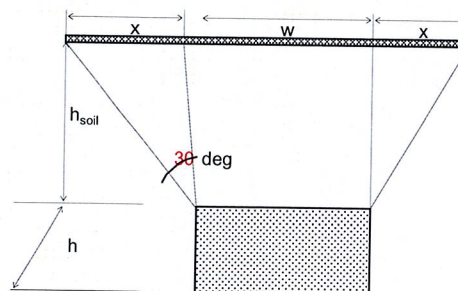
SOIL PARAMETERS:

$\gamma_{soil} = 125$ pcf
 $h_{soil} = 4$ ft
 $x = 2.31$ ft

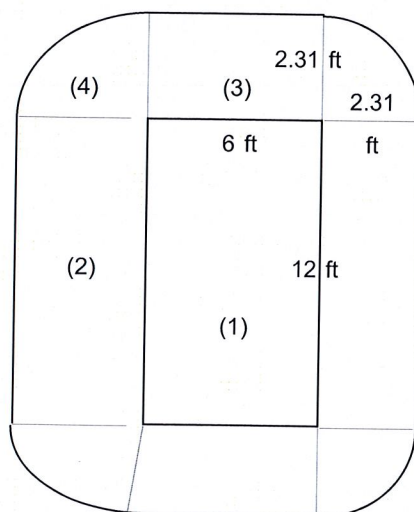
Soil Weight (Wr):

(1) = 36.00 kips
(2) = 13.86 kips
(3) = 6.93 kips
(4) = 2.79 kips

* (5) Anchor Reinf. = 0 kips
Total = 59.58 kips



Foundation Section



Foundation Plan View

CHECK UPLIFT (PER EIA/TIA-222-F STANDARD AND 2005 CT BUILDING CODE):

$$Wr / 2.0 + Wc / 2.0 > \text{UPLIFT}$$

$$51.39 > 35 \quad \text{OK}$$

$$(Wr + Wc) / 1.5 > \text{UPLIFT}$$

$$68.52 > 35 \quad \text{OK}$$

→ GUY ANCHORS AGAINST UPLIFT ARE ADEQUATE

Job : Verizon Wireless ~ Montville 4: 190-ft Guyed Lattice Tower
Address: 54 Cook Drive Montville, CT ~ Rev 1
Description: Guy Anchor Evaluation - 2005 CSBC 3108.4.2/TIA Req

Project No. 11001.CO33
Computed by JRM
Checked by CFC

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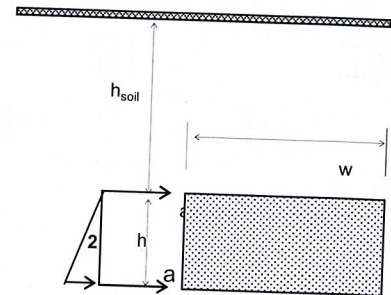
CHECK SLIDING RESISTANCE

SOIL PARAMETERS

$\gamma_{soil} = 125$ pcf
 $h_{soil} = 4$ ft
 $h = 4$ ft
 $\phi = 32$ degrees

ANCHOR PARAMETERS

$w = 6.0$ ft
 $h = 4.0$ ft
 $d = 12.0$ ft



Foundation Elevation View

$$K_a = 0.31$$

$$K_p = 3.25$$

$$\Delta = 2.95$$

HORIZONTAL FORCES

$$\begin{aligned} 1 &= 70.74 \text{ k} \\ 2 &= 35.37 \text{ k} \\ \text{RESIST TO SLIDING} &= 106.10 \text{ k} \end{aligned}$$

$$\begin{aligned} \text{SOIL \& CONCRETE WEIGHT} &= \\ \text{UPLIFT REACTIONS} &= \\ \text{SUM} &= \end{aligned}$$

$$\begin{aligned} W_r + W_c &= 102.78 \text{ k} \\ &= -35 \text{ k} \\ &= 67.78 \text{ k} \end{aligned}$$

$$\begin{aligned} \text{COEF. OF FRICTION, (0.45)} &= \\ \text{RESIST TO SLIDING} &= \\ \text{SUM} &= \end{aligned}$$

$$\begin{aligned} &= 30.50 \text{ k} \\ &= 106.10 \text{ k} \\ &= 136.60 \text{ k} \end{aligned}$$

SF AGAINST SLIDING

$$SF = 3.4 > 2$$

OK

→ GUY ANCHORS AGAINST SLIDING ARE ADEQUATE

Job : Verizon Wireless ~ Montville 4: 190-ft Guyed Lattice Tower
Address: 54 Cook Drive Montville, CT ~ Rev 1
Description: Guy Anchor Evaluation - 2005 CSBC 3108.4.2/TIA Req

Project No. 11001.CO27
Computed by JRM
Checked by CFC

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Date

CHECK UPLIFT RESISTANCE

ANCHOR (C) AT 140.0ft RADIUS

RESULTS FROM COMPUTER ANALYSIS:

Uplift = 40 kips
Sliding = 35 kips

CONCRETE PARAMETERS:

$\gamma_{\text{conc}} = 87.6$ pcf
 $w = 5$ ft
 $h = 2$ ft
 $d = 9$ ft

 $\text{Vol.} = 90.00$ ft³
 $W_c = 7.88$ kips

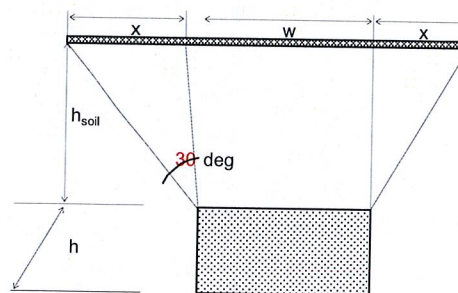
SOIL PARAMETERS:

$\gamma_{\text{soil}} = 125$ pcf
 $h_{\text{soil}} = 8$ ft
 $x = 4.62$ ft

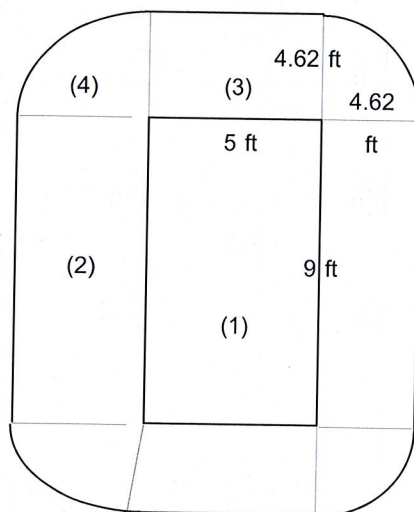
Soil Weight (Wr):

(1) = 45.00 kips
(2) = 41.57 kips
(3) = 23.09 kips
(4) = 22.34 kips

* (5) Anchor Reinf. = 0 kips
Total = 132.00 kips



Foundation Section



Foundation Plan View

CHECK UPLIFT (PER EIA/TIA-222-F STANDARD AND 2005 CT BUILDING CODE):

$$W_r / 2.0 + W_c / 2.0 > \text{UPLIFT}$$

$$69.94 > 40 \quad \text{OK}$$

$$(W_r + W_c) / 1.5 > \text{UPLIFT}$$

$$93.26 > 40 \quad \text{OK}$$

→ GUY ANCHORS AGAINST UPLIFT ARE ADEQUATE

Job : Verizon Wireless ~ Montville 4: 190-ft Guyed Lattice Tower
Address: 54 Cook Drive Montville, CT ~ Rev 1
Description: Guy Anchor Evaluation - 2005 CSBC 3108.4.2/TIA Req

Project No. 11001.CO33
Computed by JRM
Checked by CFC

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Date 12/8/11
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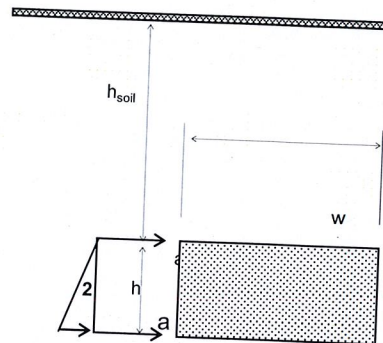
CHECK SLIDING RESISTANCE

SOIL PARAMETERS

$\gamma_{soil} = 125$ pcf
 $\gamma_{soil2} = 62.6$ pcf
 $h_{soil} = 8$ ft
 $h = 2$ ft
 $\phi = 32$ degrees

ANCHOR PARAMETERS

$w = 5.0$ ft
 $h = 2.0$ ft
 $d = 9.0$ ft



Foundation Elevation View

$$K_a = 0.31$$

$$K_p = 3.25$$

$$\Delta = 2.95$$

HORIZONTAL FORCES

1 =	53.05 k
2 =	3.32 k
RESIST TO SLIDING =	56.37 k

SOIL & CONCRETE WEIGHT =	Wr + Wc = 139.89 k
UPLIFT REACTIONS =	-40 k
SUM =	99.89 k

COEF. OF FRICTION, (0.45) =	44.95 k
RESIST TO SLIDING =	56.37 k
SUM =	101.32 k

SF AGAINST SLIDING

$$SF = 2.9 > 2$$

OK

→ **GUY ANCHORS AGAINST SLIDING ARE ADEQUATE**

Subject:

Base Foundation Analysis

Location:

190-ft ROHN Model 80 Guyed Lattice
 Tower
 Madison, CT.

Rev. 1: 12/08/11

Prepared by: J.R.M.

Standard Monopole Foundation:

Input Data:

Tower Data

Shear Force =	Shear := 4.0-kip	(User Input from RISATower)
Axial Force =	Axial := 190.0-kip	(User Input from RISATower)
Tower Height =	H _t := 190.0-ft	(User Input)

Footing Data:

Overall Depth of Footing =	D _f := 5.0-ft	(User Input)	(Based on foundation type CB-11 ref: ROHN standard concrete base schedule drawing C610621, dated 01.09.85)
Length of Pier =	L _p := 3.75-ft	(User Input)	
Extension of Pier Above Grade =	L _{pag} := 0.5-ft	(User Input)	
Diameter of Pier =	d _p := 2.5-ft	(User Input)	
Thickness of Footing =	T _f := 1.75-ft	(User Input)	
Width of Footing =	W _f := 7.0-ft	(User Input)	

Material Properties:

Concrete Compressive Strength =	f _c := 3000-psi	(User Input)	
Steel Reinforcement Yield Strength =	f _y := 60000-psi	(User Input)	
Internal Friction Angle of Soil =	Φ _s := 32-deg	(User Input)	
Allowable Soil Bearing Capacity =	q _s := 6000-psf	(User Input)	
Unit Weight of Soil =	γ _{soil} := 125-pcf	(User Input)	
Unit Weight of Concrete =	γ _{conc} := 150-pcf	(User Input)	
Foundation Bouyancy =	Bouyancy := 1	(User Input)	(Yes=1 / No=0)
Depth to Neglect =	n := 1.0-ft	(User Input)	
Cohesion of Clay Type Soil =	c := 0-ksf	(User Input)	(Use 0 for Sandy Soil)
Seismic Zone Factor =	Z := 2	(User Input)	(UBC-1997 Fig 23-2)
Coefficient of Friction Between Concrete =	μ := 0.45	(User Input)	

Subject:

Base Foundation Analysis

Location:

190-ft ROHN Model 80 Guyed Lattice
 Tower
 Madison, CT.

Rev. 1: 12/08/11

Prepared by: J.R.M.

Pier Reinforcement:

Bar Size =	$BS_{\text{pier}} := 7$	(User Input)	
Bar Diameter =	$d_{\text{bpier}} := 0.875\text{-in}$	(User Input)	
Number of Bars =	$NB_{\text{pier}} := 8$	(User Input)	
Clear Cover of Reinforcement =	$Cvr_{\text{pier}} := 3\text{-in}$	(User Input)	
Reinforcement Location Factor =	$\alpha_{\text{pier}} := 1.0$	(User Input)	(ACI-2008 12.2.4)
Coating Factor =	$\beta_{\text{pier}} := 1.0$	(User Input)	(ACI-2008 12.2.4)
Concrete Strength Factor =	$\lambda_{\text{pier}} := 1.0$	(User Input)	(ACI-2008 12.2.4)
Reinforcement Size Factor =	$\gamma_{\text{pier}} := 1.0$	(User Input)	(ACI-2008 12.2.4)
Diameter of Tie =	$d_{\text{Tie}} := 4\text{-in}$	(User Input)	

Pad Reinforcement:

Bar Size =	$BS_{\text{bot}} := 6$	(User Input)	(Bottom of Pad)
Bar Diameter =	$d_{\text{bbot}} := 0.750\text{-in}$	(User Input)	(Bottom of Pad)
Number of Bars =	$NB_{\text{bot}} := 8$	(User Input)	(Bottom of Pad)
Clear Cover of Reinforcement =	$Cvr_{\text{pad}} := 3.0\text{-in}$	(User Input)	
Reinforcement Location Factor =	$\alpha_{\text{pad}} := 1.0$	(User Input)	(ACI-2008 12.2.4)
Coating Factor =	$\beta_{\text{pad}} := 1.0$	(User Input)	(ACI-2008 12.2.4)
Concrete Strength Factor =	$\lambda_{\text{pad}} := 1.0$	(User Input)	(ACI-2008 12.2.4)
Reinforcement Size Factor =	$\gamma_{\text{pad}} := 1.0$	(User Input)	(ACI-2008 12.2.4)

Calculated Factors:

Pier Reinforcement Bar Area =	$A_{\text{bpier}} := \frac{\pi \cdot d_{\text{bpier}}^2}{4} = 0.601\text{-in}^2$	
Pad Bottom Reinforcement Bar Area =	$A_{\text{bbot}} := \frac{\pi \cdot d_{\text{bbot}}^2}{4} = 0.442\text{-in}^2$	
Coefficient of Lateral Soil Pressure =	$K_p := \frac{1 + \sin(\Phi_s)}{1 - \sin(\Phi_s)} = 3.255$	
Load Factor =	$LF := \begin{cases} 1.333 & \text{if } H_t \leq 700\text{-ft} \\ 1.7 & \text{if } H_t \geq 1200\text{-ft} \\ 1.333 + \left(\frac{H_t - 700\text{ft}}{1200\text{ft} - 700\text{ft}} \right) \cdot 0.4 & \text{otherwise} \end{cases}$	= 1.333

Stability of Footing:

Subject:

Base Foundation Analysis

Location:

190-ft ROHN Model 80 Guyed Lattice
 Tower
 Madison, CT.

Rev. 1: 12/08/11

Prepared by: J.R.M.

Adjusted Concrete Unit Weight =

$$\gamma_c := \text{if}(\text{Bouyancy} = 1, \gamma_{\text{conc}} - 62.4 \text{ pcf}, \gamma_{\text{conc}}) = 87.6 \text{ pcf}$$

Adjusted Soil Unit Weight =

$$\gamma_s := \text{if}(\text{Bouyancy} = 1, \gamma_{\text{soil}} - 62.4 \text{ pcf}, \gamma_{\text{soil}}) = 62.6 \text{ pcf}$$

Passive Pressure =

$$P_{pn} := K_p \cdot \gamma_s \cdot n + c \cdot 2 \cdot \sqrt{K_p} = 0.204 \text{ ksf}$$

$$P_{pt} := K_p \cdot \gamma_s \cdot (D_f - T_f) + c \cdot 2 \cdot \sqrt{K_p} = 0.662 \text{ ksf}$$

$$P_{top} := \text{if}(n < (D_f - T_f), P_{pt}, P_{pn}) = 0.662 \text{ ksf}$$

$$P_{bot} := K_p \cdot \gamma_s \cdot D_f + c \cdot 2 \cdot \sqrt{K_p} = 1.019 \text{ ksf}$$

$$P_{ave} := \frac{P_{top} + P_{bot}}{2} = 0.84 \text{ ksf}$$

$$T_p := \text{if}(n < (D_f - T_f), T_f, (D_f - n)) = 1.75$$

$$A_p := W_f \cdot T_p = 12.25$$

Ultimate Shear =

$$S_u := P_{ave} \cdot A_p = 10.295 \text{ kip}$$

Weight of Concrete =

$$W_{Tc} := \left[\left(W_f^2 \cdot T_f \right) + d_p^2 \cdot L_p \right] \cdot \gamma_c = 9.56 \text{ kip}$$

Total Weight =

$$W_{Ttot} := W_{Tc} + \text{Axial} = 199.56 \text{ kip}$$

Soil/Concrete Friction Resistance =

$$Sl_2 := \mu \cdot W_{Ttot} = 89.8 \text{ kips}$$

Total Sliding Resistance =

$$Sl_{tot} := S_u + Sl_2 = 100.1 \text{ kips}$$

$$\text{Sliding_Resistance_ratio} := \frac{\text{Shear} \cdot 2.0}{Sl_{tot}} = 0.08$$

$$\text{Sliding_Resistance_Check} := \text{if}\left(\frac{\text{Shear} \cdot 2.0}{Sl_{tot}}, \text{"Okay"}, \text{"No Good"}\right)$$

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

Overturning Moment =

$$M_{ot} := \text{Shear} \cdot (L_p + T_f) = 22 \text{ kip-ft}$$

Factor of Safety Required =

$$FS_{req} := 2$$

Shear Capacity in Pier:

Shear Resistance of Pier =

$$S_p := \frac{P_{ave} \cdot A_p + \mu \cdot W_{Ttot}}{FS_{req}} = 50.05 \text{ kips}$$

$$\text{Shear_Check} := \text{if}(S_p > \text{Shear}, \text{"Okay"}, \text{"No Good"})$$

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

Bearing Pressure Caused by Footing:

Area of the Mat =

$$A_{mat} := W_f^2 = 49$$

Section Modulus of Mat =

$$S_{mat} := \frac{W_f^3}{6} = 57.17 \cdot \text{ft}^3$$

Maximum Pressure in Mat =

$$P_{max} := \frac{W_{T_{tot}}}{A_{mat}} + \frac{M_{ot}}{S} = 4.458 \cdot \text{ksf}$$

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

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

Minimum Pressure in Mat =

$$P_{min} := \frac{W_{T_{tot}}}{A_{mat}} - \frac{M_{ot}}{S} = 3.688 \cdot \text{ksf}$$

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

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

Distance to Resultant of Pressure Distribution =

$$X_p := \frac{P_{max}}{P_{max} - P_{min}} \cdot \frac{1}{3} = 13.513$$

Distance to Kern =

$$X_k := \frac{W_f}{6} = 1.167$$

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

Eccentricity =

$$e := \frac{M_{ot}}{W_{T_{tot}}} = 0.11$$

Adjusted Soil Pressure =

$$P_a := \frac{2 \cdot W_{T_{tot}}}{3 \cdot W_f \left(\frac{W_f}{2} - e \right)} = 5.607 \cdot \text{ksf}$$

$$q_{adj} := \text{if}(P_{min} < 0, P_a, P_{max}) = 4.458 \cdot \text{ksf}$$

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

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

Concrete Bearing Capacity:

Strength Reduction Factor =

$$\Phi_c = 0.65 \quad (\text{ACI-2008 9.3.2.2})$$

Bearing Strength Between Pier and Pad =

$$P_b := \Phi_c \cdot 0.85 \cdot f_c \cdot d_p^2 = 1491.75 \cdot \text{kips} \quad (\text{ACI-2008 10.14})$$

$$\text{Bearing_Check} := \text{if}(P_b > \text{LF} \cdot \text{Axial}, \text{"Okay"}, \text{"No Good"})$$

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

RISATower CENTEK Engineering, Inc. 63-2 N Branford Rd Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job	190' Guyed Rohn Model 80 - w/ Proposed Reinf. ~ Rev 1	Page	1 of 53
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Tower Input Data

The main tower is a 3x guyed tower with an overall height of 190.00 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 3.42 ft at the top and tapered at the base.

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

The following design criteria apply:

Basic wind speed of 95 mph.

Nominal ice thickness of 0.5000 in.

Ice density of 56 pcf.

A wind speed of 82 mph is used in combination with ice.

Temperature drop of 50 °F.

Deflections calculated using a wind speed of 50 mph.

Pressures are calculated at each section.

Safety factor used in guy design is 2.

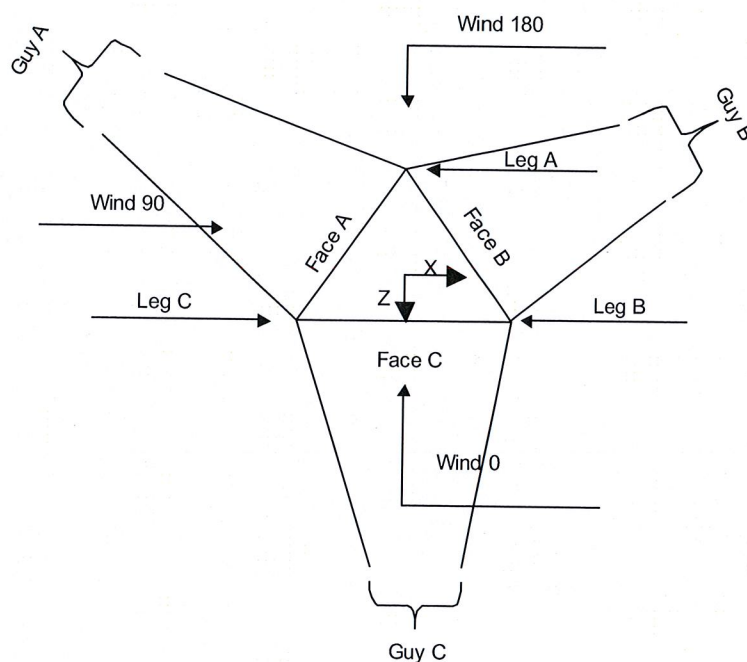
Stress ratio used in tower member design is 1.333.

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

Options

- | | | |
|--|--|---|
| <ul style="list-style-type: none"> Consider Moments - Legs Consider Moments - Horizontals Consider Moments - Diagonals Use Moment Magnification ✓ Use Code Stress Ratios ✓ Use Code Safety Factors - Guys Escalate Ice Always Use Max Kz Use Special Wind Profile ✓ Include Bolts In Member Capacity ✓ Leg Bolts Are At Top Of Section ✓ Secondary Horizontal Braces Leg Use Diamond Inner Bracing (4 Sided) Add IBC .6D+W Combination | <ul style="list-style-type: none"> Distribute Leg Loads As Uniform Assume Legs Pinned ✓ Assume Rigid Index Plate ✓ Use Clear Spans For Wind Area ✓ Use Clear Spans For KL/r ✓ Retension Guys To Initial Tension Bypass Mast Stability Checks Use Azimuth Dish Coefficients ✓ Project Wind Area of Appurt. ✓ Autocalc Torque Arm Areas SR Members Have Cut Ends ✓ Sort Capacity Reports By Component Triangulate Diamond Inner Bracing | <ul style="list-style-type: none"> Treat Feedline Bundles As Cylinder Use ASCE 10 X-Brace Ly Rules ✓ Calculate Redundant Bracing Forces Ignore Redundant Members in FEA SR Leg Bolts Resist Compression ✓ All Leg Panels Have Same Allowable Offset Girt At Foundation ✓ Consider Feedline Torque Include Angle Block Shear Check Poles Include Shear-Torsion Interaction Always Use Sub-Critical Flow Use Top Mounted Sockets |
|--|--|---|

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Face Guyed

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	190.00-180.00			3.42	1	10.00
T2	180.00-160.00			3.42	1	20.00
T3	160.00-140.00			3.42	1	20.00
T4	140.00-120.00			3.42	1	20.00
T5	120.00-100.00			3.42	1	20.00
T6	100.00-80.00			3.42	1	20.00
T7	80.00-60.00			3.42	1	20.00
T8	60.00-40.00			3.42	1	20.00
T9	40.00-20.00			3.42	1	20.00
T10	20.00-5.00			3.42	1	15.00
T11	5.00-0.00			3.42	1	5.00

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Tower Section Geometry (cont'd)

Tower Section	Tower Elevation ft	Diagonal Spacing ft	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset in	Bottom Girt Offset in
T1	190.00-180.00	2.46					
T2	180.00-160.00	2.41	X Brace	No	No	1.0000	1.0000
T3	160.00-140.00	2.41	X Brace	No	No	7.3750	1.0000
T4	140.00-120.00	2.41	CX Brace	No	No	7.3750	1.0000
T5	120.00-100.00	2.41	CX Brace	No	No	7.3750	1.0000
T6	100.00-80.00	2.41	X Brace	No	No	7.3750	1.0000
T7	80.00-60.00	2.41	CX Brace	No	No	7.3750	1.0000
T8	60.00-40.00	2.41	X Brace	No	No	7.3750	1.0000
T9	40.00-20.00	2.41	X Brace	No	No	7.3750	1.0000
T10	20.00-5.00	2.38	K Brace Left	No	No	7.3750	1.0000
T11	5.00-0.00	1.44	K Brace Left	No	No	7.3750	1.0000
			X Brace	No	Yes	2.0000	6.0000

Tower Section Geometry (cont'd)

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T1 190.00-180.00	Pipe	P2.5x.276	A572-50 (50 ksi)	Single Angle	L2x2x1/4	A36 (36 ksi)
T2 180.00-160.00	Pipe	P2.5x.276	A572-50 (50 ksi)	Single Angle	L2x2x1/4	A36 (36 ksi)
T3 160.00-140.00	Pipe	P2.5x.276	A572-50 (50 ksi)	Pipe	ROHN TS1.5x11 ga	A53-B-42 (42 ksi)
T4 140.00-120.00	Pipe	P2.5x.276	A572-50 (50 ksi)	Pipe	ROHN TS1.5x11 ga	A53-B-42 (42 ksi)
T5 120.00-100.00	Pipe	P3x.3	A572-50 (50 ksi)	Single Angle	L2x2x1/4	A36 (36 ksi)
T6 100.00-80.00	Pipe	P3x.3	A572-50 (50 ksi)	Pipe	ROHN TS1.5x16 ga	A53-B-42 (42 ksi)
T7 80.00-60.00	Pipe	P3x.3	A572-50 (50 ksi)	Pipe	ROHN TS1.5x11 ga	A36 (36 ksi)
T8 60.00-40.00	Pipe	P3x.3	A572-50 (50 ksi)	Pipe	ROHN TS1.5x11 ga	A36 (36 ksi)
T9 40.00-20.00	Pipe	P3x.3	A572-50 (50 ksi)	Pipe	ROHN TS1.5x11 ga	A36 (36 ksi)
T10 20.00-5.00	Pipe	P3x.3	A572-50 (50 ksi)	Pipe	ROHN TS1.5x16 ga	A53-B-42 (42 ksi)
T11 5.00-0.00	Pipe	P3x.3	A572-50 (50 ksi)	Pipe	ROHN TS1.5x11 ga	A53-B-42 (42 ksi)
			A572-50 (50 ksi)	Single Angle		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 190.00-180.00	Single Angle	L2x2x1/4	A36 (36 ksi)	Single Angle	L2x2x1/4	A36 (36 ksi)
T2 180.00-160.00	Single Angle	L2x2x1/4	A36 (36 ksi)	Single Angle	L2x2x1/4	A36 (36 ksi)

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Tower Elevation ft	Top Girt Type	Top Girt Size	Top Girt Grade	Bottom Girt Type	Bottom Girt Size	Bottom Girt Grade
T3 160.00-140.00	Pipe	ROHN TS1.5x11 ga	A53-B-42 (42 ksi)	Pipe	ROHN TS1.5x11 ga	A53-B-42 (42 ksi)
T4 140.00-120.00	Pipe	ROHN TS1.5x11 ga	A53-B-42 (42 ksi)	Pipe	ROHN TS1.5x11 ga	A53-B-42 (42 ksi)
T5 120.00-100.00	Single Angle	L2x2x1/4	A36 (36 ksi)	Single Angle	L2x2x1/4	A36 (36 ksi)
T6 100.00-80.00	Pipe	ROHN TS1.5x16 ga	A53-B-42 (42 ksi)	Pipe	ROHN TS1.5x16 ga	A53-B-42 (42 ksi)
T7 80.00-60.00	Pipe	ROHN TS1.5x11 ga	A53-B-42 (42 ksi)	Pipe	ROHN TS1.5x11 ga	A53-B-42 (42 ksi)
T8 60.00-40.00	Pipe	ROHN TS1.5x11 ga	A53-B-42 (42 ksi)	Pipe	ROHN TS1.5x11 ga	A53-B-42 (42 ksi)
T9 40.00-20.00	Pipe	ROHN TS1.5x16 ga	A53-B-42 (42 ksi)	Pipe	ROHN TS1.5x16 ga	A53-B-42 (42 ksi)
T10 20.00-5.00	Pipe	ROHN TS1.5x11 ga	A53-B-42 (42 ksi)	Pipe	ROHN TS1.5x11 ga	A53-B-42 (42 ksi)
T11 5.00-0.00	Single Angle	L3x3x1/2	A36 (36 ksi)	Equal Angle	L3x3x1/2	A36 (36 ksi)

Tower Section Geometry (cont'd)

Tower Elevation ft	No. of Mid Girts	Mid Girt Type	Mid Girt Size	Mid Girt Grade	Horizontal Type	Horizontal Size	Horizontal Grade
T11 5.00-0.00	2	Single Angle	L3x3x1/2	A36 (36 ksi)	Single Angle		A572-50 (50 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 Horizontals in
T1 190.00-180.00	0.28	0.3750	A36 (36 ksi)	1	1	1	36.0000	36.0000
T2 180.00-160.00	0.07	0.3750	A36 (36 ksi)	1	1	1	36.0000	36.0000
T3 160.00-140.00	0.07	0.3750	A36 (36 ksi)	1	1	1	36.0000	36.0000
T4 140.00-120.00	0.07	0.3750	A36 (36 ksi)	1	1	1	36.0000	36.0000
T5 120.00-100.00	0.07	0.3750	A36 (36 ksi)	1	1	1	36.0000	36.0000
T6 100.00-80.00	0.07	0.3750	A36 (36 ksi)	1	1	1	36.0000	36.0000
T7 80.00-60.00	0.07	0.3750	A36 (36 ksi)	1	1	1	36.0000	36.0000
T8 60.00-40.00	0.07	0.3750	A36 (36 ksi)	1	1	1	36.0000	36.0000

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<i>Tower Elevation</i>	<i>Gusset Area (per face)</i>	<i>Gusset Thickness</i>	<i>Gusset Grade</i>	<i>Adjust. Factor A_f</i>	<i>Adjust. Factor A_r</i>	<i>Weight Mult.</i>	<i>Double Angle Stitch Bolt Spacing Diagonals in</i>	<i>Double Angle Stitch Bolt Spacing Horizontals in</i>
<i>ft</i>	<i>ft²</i>	<i>in</i>						
T9 40.00-20.00	0.07	0.3750	A36 (36 ksi)	1	1	1	36.0000	36.0000
T10 20.00-5.00	0.07	0.3750	A36 (36 ksi)	1	1	1	36.0000	36.0000
T11 5.00-0.00	0.07	0.3750	A36 (36 ksi)	1	1	1	36.0000	36.0000

Tower Section Geometry (cont'd)

Tower Elevation	Calc K Single Angles	Calc K Solid Rounds	Legs	K Factors ¹						
				X Brace Diags X Y	K Brace Diags X Y	Single Diags X Y	Girts X Y	Horiz. X Y	Sec. Horiz. X Y	Inner Brace X Y
T1 190.00- 180.00	Yes	Yes	1	1	1	1	1	1	1	1
T2 180.00- 160.00	Yes	Yes	1	1	1	1	1	1	1	1
T3 160.00- 140.00	Yes	Yes	1	1	1	1	1	1	1	1
T4 140.00- 120.00	Yes	Yes	1	1	1	1	1	1	1	1
T5 120.00- 100.00	Yes	Yes	1	1	1	1	1	1	1	1
T6 100.00- 80.00	Yes	Yes	1	1	1	1	1	1	1	1
T7 80.00- 60.00	Yes	Yes	1	1	1	1	1	1	1	1
T8 60.00- 40.00	Yes	Yes	1	1	1	1	1	1	1	1
T9 40.00- 20.00	Yes	Yes	1	1	1	1	1	1	1	1
T10 20.00- 5.00	Yes	Yes	1	1	1	1	1	1	1	1
T11 5.00-0.00	Yes	Yes	1	1	1	1	1	1	1	1

¹Note: K factors are applied to member segment lengths. K factors are not applied to tower section lengths.

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)

[illegible]

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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
T2 180.00-160.00	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 160.00-140.00	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 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
T5 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
T6 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
T7 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
T8 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
T9 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
T10 20.00-5.00	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
T11 5.00-0.00	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)

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 190.00-180.00	Flange	0.7500	4	0.6250	2	0.6250	2	0.6250	2	0.6250	0	0.6250	0	0.6250	0
T2 180.00-160.00	Flange	A325N	4	A325N	2	A325N	2	A325N	2	A325N	0	A325N	0	A325N	0
T3 160.00-140.00	Flange	0.7500	4	0.6250	2	0.6250	2	0.6250	2	0.6250	0	0.6250	0	0.6250	0
T4 140.00-120.00	Flange	A325N	4	A325N	1	A325N	1	A325N	1	A325N	0	A325N	0	A325N	0
T5 120.00-100.00	Flange	0.7500	4	A490X	1	A325N	1	A325N	1	A325N	0	A325N	0	A325N	0
T6 100.00-80.00	Flange	A325N	4	0.5000	1	0.5000	1	0.5000	1	0.6250	0	0.6250	0	0.6250	0
T7 80.00-60.00	Flange	0.7500	4	A325N	2	A325N	2	A325N	2	A325N	0	A325N	0	A325N	0
T8 60.00-40.00	Flange	A325N	4	A325N	1	A325N	1	A325N	1	A325N	0	A325N	0	A325N	0
T9 40.00-20.00	Flange	0.7500	4	0.5000	1	0.5000	1	0.5000	1	0.6250	0	0.6250	0	0.6250	0
T10 20.00-5.00	Flange	A325N	4	A490X	1	A325N	1	A325N	1	A325N	0	A325N	0	A325N	0
T11 5.00-0.00	Flange	0.7500	4	A325N	1	A325N	1	A325N	1	A325N	0	A325N	0	A325N	0
		A325N	4	A325N	0	A325N	0	A325N	0	A325N	0	A325N	0	A325N	0

Guy Data

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Guy Elevation	Guy Grade	Guy Size	Initial Tension	%	Guy Modulus	Guy Weight	L _u	Anchor Radius	Anchor Azimuth Adj. °	Anchor Elevation	End Fitting Efficiency	
ft			K		ksi	plf	ft	ft		ft	%	
162.496	EHS	A	3/4	5.83	10%	19000	1.155	213.04	140.00	0.0000	0.00	100%
		B	3/4	5.83	10%	19000	1.155	213.04	140.00	0.0000	0.00	100%
		C	3/4	5.83	10%	19000	1.155	213.04	140.00	0.0000	0.00	100%
102.496	EHS	A	5/8	4.24	10%	21000	0.813	141.75	100.00	0.0000	0.00	100%
		B	5/8	4.24	10%	21000	0.813	141.75	100.00	0.0000	0.00	100%
		C	5/8	4.24	10%	21000	0.813	141.75	100.00	0.0000	0.00	100%
62.4961	EHS	A	1/2	2.69	10%	21000	0.517	116.21	100.00	0.0000	0.00	100%
		B	1/2	2.69	10%	21000	0.517	116.21	100.00	0.0000	0.00	100%
		C	1/2	2.69	10%	21000	0.517	116.21	100.00	0.0000	0.00	100%

Guy Data(cont'd)

Guy Elevation	Mount Type	Torque-Arm Spread	Torque-Arm Leg Angle	Torque-Arm Style	Torque-Arm Grade	Torque-Arm Type	Torque-Arm Size
ft		ft	°				
162.496	Torque Arm	6.83	0.0000	Channel	A36	Channel	C15x33.9
102.496	Torque Arm	6.83	0.0000	Channel	(36 ksi) A36	Channel	C15x33.9
62.4961	Torque Arm	6.83	0.0000	Channel	(36 ksi) A36	Channel	C15x33.9

Guy Data (cont'd)

Guy Elevation	Diagonal Grade	Diagonal Type	Upper Diagonal Size	Lower Diagonal Size	Is Strap.	Pull-Off Grade	Pull-Off Type	Pull-Off Size
ft								
162.50	A572-50 (50 ksi)	Solid Round				A36 (36 ksi)	Channel	
102.50	A572-50 (50 ksi)	Solid Round				A36 (36 ksi)	Channel	
62.50	A572-50 (50 ksi)	Solid Round				A36 (36 ksi)	Channel	

Guy Data (cont'd)

Guy Elevation	Cable Weight A	Cable Weight B	Cable Weight C	Cable Weight D	Tower Intercept A	Tower Intercept B	Tower Intercept C	Tower Intercept D
ft	K	K	K	K	ft	ft	ft	ft
162.496	0.25	0.25	0.25		4.43	4.43	4.43	
102.496	0.12	0.12	0.12		3.6 sec/pulse 1.91	3.6 sec/pulse 1.91	3.6 sec/pulse 1.91	
62.4961	0.06	0.06	0.06		2.4 sec/pulse 1.29	2.4 sec/pulse 1.29	2.4 sec/pulse 1.29	

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Guy Elevation	Cable Weight A	Cable Weight B	Cable Weight C	Cable Weight D	Tower Intercept A	Tower Intercept B	Tower Intercept C	Tower Intercept D
ft	K	K	K	K	ft	ft	ft	ft
					2.0 sec/pulse	2.0 sec/pulse	2.0 sec/pulse	

Guy Data (cont'd)

Guy Elevation ft	Calc K Single Angles	Calc K Solid Rounds	Torque Arm		Pull Off		Diagonal	
			K _x	K _y	K _x	K _y	K _x	K _y
162.496	No	No	1	1	1	1	1	1
102.496	No	No	1	1	1	1	1	1
62.4961	No	No	1	1	1	1	1	1

Guy Data (cont'd)

Guy Elevation ft	Torque-Arm				Pull Off				Diagonal			
	Bolt Size in	Number	Net Width Deduct in	U	Bolt Size in	Number	Net Width Deduct in	U	Bolt Size in	Number	Net Width Deduct in	U
162.496	0.0000	0	0.0000	1	0.6250	0	0.0000	0.75	0.6250	0	0.0000	0.75
102.496	A325N				A325N				A325N			
	0.0000	0	0.0000	1	0.6250	0	0.0000	0.75	0.6250	0	0.0000	0.75
	A325N				A325N				A325N			
62.4961	0.0000	0	0.0000	1	0.6250	0	0.0000	0.75	0.6250	0	0.0000	0.75
	A325N				A325N				A325N			

Guy Pressures

Guy Elevation ft	Guy Location	z ft	q _z psf	q _z Ice psf	Ice Thickness in
162.496	A	81.25	30	22	0.5000
	B	81.25	30	22	0.5000
	C	81.25	30	22	0.5000
102.496	A	51.25	26	20	0.5000
	B	51.25	26	20	0.5000
	C	51.25	26	20	0.5000
62.4961	A	31.25	23	17	0.5000
	B	31.25	23	17	0.5000
	C	31.25	23	17	0.5000

Guy-Mast Forces (Excluding Wind) - No Ice

CEN TEK Engineering, Inc.
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Branford, CT 06405
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FAX: (203) 488-8587

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Guy Elevation	Guy Location	Chord Angle	Guy Tension Top Bottom K	F_x	F_y	F_z	M_x	M_y	M_z
ft		°		K	K	K	kip-ft	kip-ft	kip-ft
162.496	A	49.6461	6.02 5.83	-0.09	4.64	-3.83	-9.15	13.29	-15.84
	A	49.6461	6.02 5.83	0.09	4.64	-3.83	-9.15	-13.29	15.84
	B	49.6461	6.02 5.83	3.37	4.64	1.83	18.30	13.29	0.00
	B	49.6461	6.02 5.83	3.27	4.64	2.00	-9.15	-13.29	-15.84
	C	49.6461	6.02 5.83	-3.27	4.64	2.00	-9.15	13.29	15.84
	C	49.6461	6.02 5.83	-3.37	4.64	1.83	18.30	-13.29	0.00
102.496	A	46.2593	Sum: 4.32 4.24	0.00 -0.10	27.82 3.15	0.00 -2.96	-0.00 -6.22	0.00 10.31	0.00 -10.77
	A	46.2593	4.32 4.24	0.10	3.15	-2.96	-6.22	-10.31	10.77
	B	46.2593	4.32 4.24	2.61	3.15	1.39	12.43	10.31	0.00
	B	46.2593	4.32 4.24	2.51	3.15	1.57	-6.22	-10.31	-10.77
	C	46.2593	4.32 4.24	-2.51	3.15	1.57	-6.22	10.31	10.77
	C	46.2593	4.32 4.24	-2.61	3.15	1.39	12.43	-10.31	0.00
62.4961	A	32.5033	Sum: 2.72 2.69	0.00 -0.08	18.91 1.48	0.00 -2.28	-0.00 -2.93	0.00 7.95	0.00 -5.07
	A	32.5033	2.72 2.69	0.08	1.48	-2.28	-2.93	-7.95	5.07
	B	32.5033	2.72 2.69	2.01	1.48	1.07	5.86	7.95	0.00
	B	32.5033	2.72 2.69	1.94	1.48	1.21	-2.93	-7.95	-5.07
	C	32.5033	2.72 2.69	-1.94	1.48	1.21	-2.93	7.95	5.07
	C	32.5033	2.72 2.69	-2.01	1.48	1.07	5.86	-7.95	0.00
			Sum:	0.00	8.90	0.00	-0.00	0.00	0.00

Guy-Mast Forces (Excluding Wind) - Ice

Guy Elevation	Guy Location	Chord Angle	Guy Tension Top Bottom K	F_x	F_y	F_z	M_x	M_y	M_z
ft		°		K	K	K	kip-ft	kip-ft	kip-ft
162.496	A	49.6461	8.25	-0.13	6.37	-5.24	-12.57	18.15	-21.77
	A	49.6461	7.94						
			8.25	0.13	6.37	-5.24	-12.57	-18.15	21.77
	B	49.6461	7.94						
			8.25	4.60	6.37	2.51	25.14	18.15	0.00
	B	49.6461	7.94						
			8.25	4.47	6.37	2.73	-12.57	-18.15	-21.77

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Guy Elevation	Guy Location	Chord Angle	Guy Tension Top Bottom	F _x	F _y	F _z	M _x	M _y	M _z
ft		°	K	K	K	K	kip-ft	kip-ft	kip-ft
102.496	C	49.6461	7.94						
			8.25	-4.47	6.37	2.73	-12.57	18.15	21.77
	C	49.6461	7.94						
			8.25	-4.60	6.37	2.51	25.14	-18.15	0.00
			7.94						
	A	46.2593	Sum:	0.00	38.23	0.00	-0.00	0.00	0.00
			6.02	-0.14	4.40	-4.11	-8.68	14.32	-15.04
	A	46.2593	5.87						
			6.02	0.14	4.40	-4.11	-8.68	-14.32	15.04
	B	46.2593	5.87						
			6.02	3.63	4.40	1.93	17.37	14.32	0.00
	B	46.2593	5.87						
62.4961			6.02	3.49	4.40	2.18	-8.68	-14.32	-15.04
	C	46.2593	6.02	-3.49	4.40	2.18	-8.68	14.32	15.04
			5.87						
	C	46.2593	6.02	-3.63	4.40	1.93	17.37	-14.32	0.00
			5.87						
	A	32.5033	Sum:	0.00	26.41	0.00	-0.00	0.00	0.00
			3.83	-0.11	2.10	-3.20	-4.15	11.15	-7.19
	A	32.5033	3.76						
			3.83	0.11	2.10	-3.20	-4.15	-11.15	7.19
	B	32.5033	3.76						
			3.83	2.83	2.10	1.50	8.30	11.15	0.00
	B	32.5033	3.76						
			3.83	2.71	2.10	1.70	-4.15	-11.15	-7.19
	C	32.5033	3.76						
			3.83	-2.71	2.10	1.70	-4.15	11.15	7.19
			3.76						
	C	32.5033	3.83	-2.83	2.10	1.50	8.30	-11.15	0.00
			3.76						
	Sum:			0.00	12.63	0.00	-0.00	0.00	0.00

Guy-Mast Forces (Excluding Wind) - Service

Guy Elevation	Guy Location	Chord Angle	Guy Tension Top Bottom	F _x	F _y	F _z	M _x	M _y	M _z
ft		°	K	K	K	K	kip-ft	kip-ft	kip-ft
162.496	A	49.6461	6.02	-0.09	4.64	-3.83	-9.15	13.29	-15.84
			5.83						
	A	49.6461	6.02	0.09	4.64	-3.83	-9.15	-13.29	15.84
			5.83						
	B	49.6461	6.02	3.37	4.64	1.83	18.30	13.29	0.00
			5.83						
	B	49.6461	6.02	3.27	4.64	2.00	-9.15	-13.29	-15.84
			5.83						
	C	49.6461	6.02	-3.27	4.64	2.00	-9.15	13.29	15.84
			5.83						
	C	49.6461	6.02	-3.37	4.64	1.83	18.30	-13.29	0.00
			5.83						
102.496	A	46.2593	Sum:	0.00	27.82	0.00	-0.00	0.00	0.00
			4.32	-0.10	3.15	-2.96	-6.22	10.31	-10.77

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Guy Elevation	Guy Location	Chord Angle	Guy Tension Top Bottom K	F _x	F _y	F _z	M _x	M _y	M _z
ft		°		K	K	K	kip-ft	kip-ft	kip-ft
62.4961	A	46.2593	4.24	0.10	3.15	-2.96	-6.22	-10.31	10.77
			4.32						
			4.24						
	B	46.2593	4.32	2.61	3.15	1.39	12.43	10.31	0.00
			4.24						
	B	46.2593	4.32	2.51	3.15	1.57	-6.22	-10.31	-10.77
			4.24						
	C	46.2593	4.32	-2.51	3.15	1.57	-6.22	10.31	10.77
			4.24						
	C	46.2593	4.32	-2.61	3.15	1.39	12.43	-10.31	0.00
			4.24						
	A	32.5033	Sum:	0.00	18.91	0.00	-0.00	0.00	0.00
			2.72	-0.08	1.48	-2.28	-2.93	7.95	-5.07
			2.69						
	A	32.5033	2.72	0.08	1.48	-2.28	-2.93	-7.95	5.07
			2.69						
	B	32.5033	2.72	2.01	1.48	1.07	5.86	7.95	0.00
			2.69						
	B	32.5033	2.72	1.94	1.48	1.21	-2.93	-7.95	-5.07
			2.69						
	C	32.5033	2.72	-1.94	1.48	1.21	-2.93	7.95	5.07
			2.69						
	C	32.5033	2.72	-2.01	1.48	1.07	5.86	-7.95	0.00
			2.69						
	Sum:			0.00	8.90	0.00	-0.00	0.00	0.00

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Leg	Allow Shield	Component Type	Placement	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
				ft								
1 1/4 (Nextel)	A	Yes	Ar (CfAe)	140.33 - 8.00	0.0000	0.33	6	3	0.5000	1.5500		0.66
1 1/4 (Nextel)	A	Yes	Ar (CfAe)	140.33 - 8.00	0.0000	0.1	6	6	1.0000	1.5500		0.66
1 5/8 (T-Mobile)	A	Yes	Ar (CfAe)	188.00 - 8.00	0.0000	-0.3	6	3	0.5000	1.9800		1.04
1/2	A	Yes	Ar (CfAe)	105.00 - 8.00	0.0000	-0.1	2	2	0.5000	0.5800		0.25
1 5/8 (Verizon)	B	Yes	Ar (CfAe)	169.00 - 8.00	0.0000	-0.05	18	12	0.5000	1.9800		1.04
7/8	B	Yes	Ar (CfAe)	179.00 - 8.00	3.0000	0.25	1	1	1.0000	1.1100		0.54
1 1/4 (ATT)	C	Yes	Ar (CfAe)	177.50 - 3.00	0.0000	0.1	9	9	1.0000	1.5500		0.66
1 1/4 (ATT)	C	Yes	Ar (CfAe)	177.50 - 3.00	-1.0000	0.3	3	3	1.5500	1.5500		0.66
7/8	C	Yes	Ar (CfAe)	170.00 - 8.00	0.0000	-0.35	2	1	0.5000	1.1100		0.54
1 1/4	C	Yes	Ar (CfAe)	152.00 - 8.00	0.0000	-0.4	1	1	0.7500	1.5500		0.66
7/8	C	Yes	Ar (CfAe)	144.00 - 8.00	4.0000	-0.35	1	1	1.5500	1.1100		0.54
1 1/4	C	Yes	Ar (CfAe)	122.00 - 8.00	2.0000	-0.4	1	1	1.5500	1.5500		0.66
1 5/8	C	Yes	Ar (CfAe)	110.00 - 8.00	2.0000	-0.3	2	1	1.9800	1.9800		1.04
1 1/4	C	Yes	Ar (CfAe)	108.00 - 8.00	4.0000	-0.4	1	1	0.7500	1.5500		0.66

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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 (T-Mobile)	B	Yes	Ar (CfAe)	188.00 - 8.00	2.5000	0.35	6	3	0.5000	1.9800		1.04
1 1/4 2" Inner Duct (Clearwire Existing)	C	Yes	Ar (CfAe)	147.00 - 8.00	0.0000	-0.3	1	1	0.7500			
	A	No	Ar (Leg)	120.00 - 8.00	0.0000	0	1	1	1.5500	1.5500		0.66
									2.0000	2.0000		1.00
									1.5000			
1 5/8 (MetroPCS - Reserved)	C	Yes	Ar (CfAe)	130.00 - 8.00	2.5000	0.15	12	9	1.0000	1.9800		1.04
1/2 (MetroPCS - Reserved)	C	Yes	Ar (CfAe)	130.00 - 8.00	0.0000	-0.23	1	1	0.5800	0.5800		0.25
1 5/8 (Sprint - Relcoated)	A	Yes	Ar (CfAe)	150.00 - 8.00	2.5000	0.05	6	6	0.5000	1.9800		1.04
									1.0000			

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	190.00-180.00	A	3.960	0.000	0.000	0.000	0.05
		B	3.960	0.000	0.000	0.000	0.05
		C	0.000	0.000	0.000	0.000	0.00
T2	180.00-160.00	A	9.900	0.000	0.000	0.000	0.12
		B	29.478	0.000	0.000	0.000	0.30
		C	28.050	0.000	0.000	0.000	0.15
T3	160.00-140.00	A	20.184	0.000	0.000	0.000	0.19
		B	51.350	0.000	0.000	0.000	0.51
		C	35.674	0.000	0.000	0.000	0.19
T4	140.00-120.00	A	52.950	0.000	0.000	0.000	0.41
		B	51.350	0.000	0.000	0.000	0.51
		C	55.458	0.000	0.000	0.000	0.35
T5	120.00-100.00	A	56.767	0.000	0.000	0.000	0.43
		B	54.683	0.000	0.000	0.000	0.51
		C	75.800	0.000	0.000	0.000	0.51
T6	100.00-80.00	A	58.217	0.000	0.000	0.000	0.44
		B	54.683	0.000	0.000	0.000	0.51
		C	79.000	0.000	0.000	0.000	0.54
T7	80.00-60.00	A	58.217	0.000	0.000	0.000	0.44
		B	54.683	0.000	0.000	0.000	0.51
		C	79.000	0.000	0.000	0.000	0.54
T8	60.00-40.00	A	58.217	0.000	0.000	0.000	0.44
		B	54.683	0.000	0.000	0.000	0.51
		C	79.000	0.000	0.000	0.000	0.54
T9	40.00-20.00	A	58.217	0.000	0.000	0.000	0.44
		B	54.683	0.000	0.000	0.000	0.51
		C	79.000	0.000	0.000	0.000	0.54
T10	20.00-5.00	A	34.930	0.000	0.000	0.000	0.26
		B	32.810	0.000	0.000	0.000	0.31
		C	52.050	0.000	0.000	0.000	0.35
T11	5.00-0.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	3.100	0.000	0.000	0.000	0.02

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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	190.00-180.00	A	0.500	1.987	3.307	0.000	0.000	0.12
		B		1.987	3.307	0.000	0.000	0.13
		C		0.000	0.000	0.000	0.000	0.00
T2	180.00-160.00	A	0.500	4.967	8.267	0.000	0.000	0.30
		B		10.543	28.727	0.000	0.000	0.76
		C		9.196	35.729	0.000	0.000	0.51
T3	160.00-140.00	A	0.500	7.590	18.995	0.000	0.000	0.47
		B		13.450	53.733	0.000	0.000	1.26
		C		16.758	40.833	0.000	0.000	0.65
T4	140.00-120.00	A	0.500	18.433	52.850	0.000	0.000	1.09
		B		13.450	53.733	0.000	0.000	1.26
		C		28.258	60.700	0.000	0.000	1.09
T5	120.00-100.00	A	0.500	24.092	53.300	0.000	0.000	1.15
		B		18.450	53.733	0.000	0.000	1.26
		C		40.067	80.567	0.000	0.000	1.55
T6	100.00-80.00	A	0.500	26.067	54.650	0.000	0.000	1.18
		B		18.450	53.733	0.000	0.000	1.26
		C		45.100	80.567	0.000	0.000	1.63
T7	80.00-60.00	A	0.500	26.067	54.650	0.000	0.000	1.18
		B		18.450	53.733	0.000	0.000	1.26
		C		45.100	80.567	0.000	0.000	1.63
T8	60.00-40.00	A	0.500	26.067	54.650	0.000	0.000	1.18
		B		18.450	53.733	0.000	0.000	1.26
		C		45.100	80.567	0.000	0.000	1.63
T9	40.00-20.00	A	0.500	26.067	54.650	0.000	0.000	1.18
		B		18.450	53.733	0.000	0.000	1.26
		C		45.100	80.567	0.000	0.000	1.63
T10	20.00-5.00	A	0.500	15.640	32.790	0.000	0.000	0.71
		B		11.070	32.240	0.000	0.000	0.76
		C		28.335	54.465	0.000	0.000	1.06
T11	5.00-0.00	A	0.500	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.850	4.083	0.000	0.000	0.05

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	190.00-180.00	A	0.000	0.523	0.782	1.046
		B	0.000	0.523	0.782	1.046
		C	0.000	0.000	0.000	0.000
T2	180.00-160.00	A	0.000	1.190	1.781	2.381
		B	0.000	3.532	5.303	7.064
		C	0.000	4.041	5.046	8.082
T3	160.00-140.00	A	2.723	5.978	0.000	0.000
		B	6.928	15.107	0.000	0.000
		C	4.813	12.950	0.000	0.000
T4	140.00-120.00	A	7.144	16.029	0.000	0.000
		B	6.928	15.107	0.000	0.000
		C	7.482	20.003	0.000	0.000
T5	120.00-100.00	A	0.000	6.511	9.612	13.022
		B	0.000	6.043	9.237	12.086
		C	0.000	10.850	13.636	21.701

RISATower CEN TEK Engineering, Inc. 63-2 N Branford Rd Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job	Page
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Section	Elevation	Face	A_R	$A_{R_{Ice}}$	A_F	$A_{F_{Ice}}$
	ft		ft ²	ft ²	ft ²	ft ²
T6	100.00-80.00	A	7.405	17.026	0.000	0.000
		B	6.928	15.107	0.000	0.000
		C	10.658	28.258	0.000	0.000
T7	80.00-60.00	A	7.405	17.026	0.000	0.000
		B	6.928	15.107	0.000	0.000
		C	10.658	28.258	0.000	0.000
T8	60.00-40.00	A	7.405	17.026	0.000	0.000
		B	6.928	15.107	0.000	0.000
		C	10.658	28.258	0.000	0.000
T9	40.00-20.00	A	4.045	9.302	0.000	0.000
		B	3.785	8.253	0.000	0.000
		C	5.823	15.438	0.000	0.000
T10	20.00-5.00	A	2.556	5.878	0.000	0.000
		B	2.392	5.215	0.000	0.000
		C	4.041	10.713	0.000	0.000
T11	5.00-0.00	A	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000
		C	0.000	0.278	0.477	0.789

Feed Line Center of Pressure

Section	Elevation	CP_X	CP_Z	$CP_{X_{Ice}}$	$CP_{Z_{Ice}}$
	ft	in	in	in	in
T1	190.00-180.00	0.2576	0.6016	0.1014	0.2367
T2	180.00-160.00	0.7897	1.7718	0.7150	1.3798
T3	160.00-140.00	1.5880	0.3471	1.4969	0.5725
T4	140.00-120.00	-0.2223	-0.0401	0.3117	0.7400
T5	120.00-100.00	-0.2432	0.8236	0.3179	1.3463
T6	100.00-80.00	-0.1503	1.0682	0.4539	1.6127
T7	80.00-60.00	-0.1503	1.0682	0.4539	1.6127
T8	60.00-40.00	-0.1503	1.0682	0.4539	1.6127
T9	40.00-20.00	-0.1610	1.1691	0.4242	1.8261
T10	20.00-5.00	-0.3255	1.4163	0.2550	1.9701
T11	5.00-0.00	-0.7643	1.4922	-0.5685	1.3217

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
APX16PV-16PVL-X w/mount pipe (T-Mobile)	A	From Leg	3.00 0.00 0.00	0.0000	188.00	No Ice 1/2" Ice	6.85 7.32	0.07 0.11
APX16PV-16PVL-X w/mount pipe (T-Mobile)	B	From Leg	3.00 0.00 0.00	0.0000	188.00	No Ice 1/2" Ice	6.85 7.32	0.07 0.11
APX16PV-16PVL-X	C	From Leg	3.00	0.0000	188.00	No Ice	6.85	0.07

RISATower CEN TEK Engineering, Inc. 63-2 N Branford Rd Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job	190' Guyed Rohn Model 80 - w/ Proposed Reinf. ~ Rev 1	Page	15 of 53
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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
w/mount pipe (T-Mobile)			0.00			1/2" Ice	7.32	3.96	0.11
(2) G20057A1 TMA (T-Mobile)	A	From Leg	0.00 3.00 0.00	0.0000	188.00	No Ice 1/2" Ice	0.82 0.95	0.39 0.49	0.01 0.02
(2) G20057A1 TMA (T-Mobile)	B	From Leg	0.00 3.00 0.00	0.0000	188.00	No Ice 1/2" Ice	0.82 0.95	0.39 0.49	0.01 0.02
(2) G20057A1 TMA (T-Mobile)	C	From Leg	0.00 3.00 0.00	0.0000	188.00	No Ice 1/2" Ice	0.82 0.95	0.39 0.49	0.01 0.02
Rohn 6'x10' Boom Gate (3) (T-Mobile)	A	From Leg	0.00 2.00 0.00	0.0000	188.00	No Ice 1/2" Ice	47.40 56.40	47.40 56.40	1.62 2.01
(2) 7770.00 (ATT)	A	From Leg	0.00 4.75 0.00	0.0000	178.75	No Ice 1/2" Ice	5.88 6.31	2.93 3.27	0.04 0.07
(2) 7770.00 (ATT)	B	From Leg	0.00 4.75 0.00	0.0000	178.75	No Ice 1/2" Ice	5.88 6.31	2.93 3.27	0.04 0.07
(2) 7770.00 (ATT)	C	From Leg	0.00 4.75 0.00	0.0000	178.75	No Ice 1/2" Ice	5.88 6.31	2.93 3.27	0.04 0.07
(2) TMA 10"x8"x3" (ATT)	A	From Leg	0.00 4.75 0.00	0.0000	178.75	No Ice 1/2" Ice	0.78 0.90	0.29 0.38	0.02 0.02
(2) TMA 10"x8"x3" (ATT)	B	From Leg	0.00 4.75 0.00	0.0000	178.75	No Ice 1/2" Ice	0.78 0.90	0.29 0.38	0.02 0.02
(2) TMA 10"x8"x3" (ATT)	C	From Leg	0.00 4.75 0.00	0.0000	178.75	No Ice 1/2" Ice	0.78 0.90	0.29 0.38	0.02 0.02
Diplexer (ATT)	A	From Leg	0.00 4.75 0.00	0.0000	178.75	No Ice 1/2" Ice	0.35 0.43	0.12 0.17	0.01 0.01
Diplexer (ATT)	B	From Leg	0.00 4.75 0.00	0.0000	178.75	No Ice 1/2" Ice	0.35 0.43	0.12 0.17	0.01 0.01
Diplexer (ATT)	C	From Leg	0.00 4.75 0.00	0.0000	178.75	No Ice 1/2" Ice	0.35 0.43	0.12 0.17	0.01 0.01
Rohn 6'x12' Boom Gate (3) (ATT)	C	From Leg	0.00 2.00 0.00	0.0000	177.50	No Ice 1/2" Ice	49.80 59.30	49.80 59.30	1.68 2.10
Pirot 15' T-Frame Sector Mount (1) (Verizon)	A	From Leg	0.00 2.00 0.00	0.0000	169.00	No Ice 1/2" Ice	15.00 20.60	15.00 20.60	0.50 0.65
Pirot 15' T-Frame Sector Mount (1) (Verizon)	B	From Leg	0.00 2.00 0.00	0.0000	169.00	No Ice 1/2" Ice	15.00 20.60	15.00 20.60	0.50 0.65
Pirot 15' T-Frame Sector Mount (1) (Verizon)	C	From Leg	0.00 2.00 0.00	0.0000	169.00	No Ice 1/2" Ice	15.00 20.60	15.00 20.60	0.50 0.65
(2) DB980H90E-M (Sprint)	A	From Leg	0.00 3.00 0.00	0.0000	150.00	No Ice 1/2" Ice	3.80 4.18	2.19 2.56	0.01 0.03
(2) DB980H90E-M	B	From Leg	0.00 3.00	0.0000	150.00	No Ice	3.80	2.19	0.01

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		Jrm

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
(Sprint)			0.00			1/2" Ice	4.18	2.56	0.03
(2) DB980H90E-M (Sprint)	C	From Leg	0.00 3.00 0.00	0.0000	150.00	No Ice 1/2" Ice	3.80 4.18	2.19 2.56	0.01 0.03
Rohn 6'x12' Boom Gate (3) (Sprint)	C	From Leg	0.00 2.00 0.00	0.0000	150.50	No Ice 1/2" Ice	49.80 59.30	49.80 59.30	1.68 2.10
(4) DB844H90E-XY (Nextel)	A	From Leg	0.00 3.00 0.00	0.0000	140.33	No Ice 1/2" Ice	2.87 3.18	3.73 4.10	0.01 0.04
(4) DB844H90E-XY (Nextel)	B	From Leg	0.00 3.00 0.00	0.0000	140.33	No Ice 1/2" Ice	2.87 3.18	3.73 4.10	0.01 0.04
(4) DB844H90E-XY (Nextel)	C	From Leg	0.00 3.00 0.00	0.0000	140.33	No Ice 1/2" Ice	2.87 3.18	3.73 4.10	0.01 0.04
Rohn 6'x12' Boom Gate (3) (Nextel)	C	From Leg	0.00 1.50 0.00	0.0000	140.33	No Ice 1/2" Ice	49.80 59.30	49.80 59.30	1.68 2.10
BXA-171085-8BF (Verizon - proposed)	A	From Leg	0.00 3.00 0.00	0.0000	169.00	No Ice 1/2" Ice	2.94 3.26	2.16 2.46	0.01 0.03
BXA-171085-8BF (Verizon - proposed)	B	From Leg	0.00 3.00 0.00	0.0000	169.00	No Ice 1/2" Ice	2.94 3.26	2.16 2.46	0.01 0.03
BXA-171085-8BF (Verizon - proposed)	C	From Leg	0.00 3.00 0.00	0.0000	169.00	No Ice 1/2" Ice	2.94 3.26	2.16 2.46	0.01 0.03
BXA-70063/6CF (Verizon - proposed)	A	From Leg	0.00 3.00 0.00	0.0000	169.00	No Ice 1/2" Ice	7.73 8.27	4.16 4.60	0.02 0.06
BXA-70063/6CF (Verizon - proposed)	B	From Leg	0.00 3.00 0.00	0.0000	169.00	No Ice 1/2" Ice	7.73 8.27	4.16 4.60	0.02 0.06
BXA-70063/6CF (Verizon - proposed)	C	From Leg	0.00 3.00 0.00	0.0000	169.00	No Ice 1/2" Ice	7.73 8.27	4.16 4.60	0.02 0.06
(2) LPA-80080-4CF (Verizon - proposed)	A	From Leg	0.00 3.00 0.00	0.0000	169.00	No Ice 1/2" Ice	2.62 2.92	6.06 6.45	0.01 0.05
(2) LPA-80080-4CF (Verizon - proposed)	B	From Leg	0.00 3.00 0.00	0.0000	169.00	No Ice 1/2" Ice	2.62 2.92	6.06 6.45	0.01 0.05
(2) LPA-80080-4CF (Verizon - proposed)	C	From Leg	0.00 3.00 0.00	0.0000	169.00	No Ice 1/2" Ice	2.62 2.92	6.06 6.45	0.01 0.05
LLPX310R (Clearwire Existing)	A	From Leg	0.00 2.00 0.00	0.0000	120.00	No Ice 1/2" Ice	4.83 5.18	1.95 2.21	0.03 0.05
LLPX310R (Clearwire Existing)	B	From Leg	0.00 2.00 0.00	0.0000	120.00	No Ice 1/2" Ice	4.83 5.18	1.95 2.21	0.03 0.05
LLPX310R (Clearwire Existing)	C	From Leg	0.00 2.00 0.00	0.0000	120.00	No Ice 1/2" Ice	4.83 5.18	1.95 2.21	0.03 0.05
RRU	A	From Leg	0.00 1.00	0.0000	120.00	No Ice	1.80	0.78	0.03

RISATower

CEN TEK Engineering, Inc.

63-2 N Branford Rd
Branford, CT 06405
Phone: (203) 488-0580
FAX: (203) 488-8587

Job

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Date

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Client

Verizon

Designed by

Jrm

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft	C _{MA} Front ft ²	C _{MA} Side ft ²	Weight K
(Clearwire Existing)			0.00					
RRU	B	From Leg	0.00			1/2" Ice	2.00	0.04
(Clearwire Existing)			1.00	0.0000	120.00	No Ice	1.80	0.03
RRU	C	From Leg	0.00			1/2" Ice	2.00	0.04
(Clearwire Existing)			1.00	0.0000	120.00	No Ice	1.80	0.03
Splice Box	A	From Leg	0.00			1/2" Ice	2.00	0.04
(Clearwire Existing)			0.00	0.0000	120.00	No Ice	1.05	0.02
6-ft T-Frame	A	From Leg	0.00			1/2" Ice	1.21	0.02
(Clearwire Existing)			1.00	0.0000	120.00	No Ice	13.60	0.38
6-ft T-Frame	B	From Leg	0.00			1/2" Ice	17.50	0.53
(Clearwire Existing)			1.00	0.0000	120.00	No Ice	13.60	0.38
6-ft T-Frame	C	From Leg	0.00			1/2" Ice	17.50	0.53
(Clearwire Existing)			1.00	0.0000	120.00	No Ice	13.60	0.38
6'x4" Pipe Mount	A	From Leg	0.00			1/2" Ice	17.50	0.53
(Clearwire Existing)			2.00	0.0000	120.00	No Ice	2.09	0.05
6'x4" Pipe Mount	B	From Leg	0.00			1/2" Ice	2.46	0.07
(Clearwire Existing)			2.00	0.0000	120.00	No Ice	2.09	0.05
6'x4" Pipe Mount	C	From Leg	0.00			1/2" Ice	2.46	0.07
(Clearwire Existing)			2.00	0.0000	120.00	No Ice	2.09	0.05
20' x 3" Dia Omni	A	From Leg	0.00			1/2" Ice	2.46	0.07
			4.75	0.0000	188.75	No Ice	6.00	0.05
2' x 2" Dia Omni	C	From Leg	0.00			1/2" Ice	8.03	0.09
			4.75	0.0000	180.00	No Ice	0.30	0.02
FG4605	A	From Leg	0.00			1/2" Ice	0.43	0.02
			4.75	0.0000	170.25	No Ice	0.60	0.03
FG4605	C	From Leg	6.00			1/2" Ice	1.00	0.04
			0.00	0.0000	170.25	No Ice	0.60	0.03
4 Bay Dipole	A	From Leg	4.75			1/2" Ice	1.00	0.04
			0.00	0.0000	155.50	No Ice	1.65	0.02
FG4607	A	From Leg	0.00			1/2" Ice	2.61	0.03
			4.75	0.0000	147.00	No Ice	2.67	0.01
DB408	B	From Leg	0.00			1/2" Ice	3.60	0.03
			4.75	0.0000	126.00	No Ice	1.65	0.02
3' Standoff	B	From Leg	0.00			1/2" Ice	2.61	0.03
			1.50	0.0000	122.50	No Ice	3.00	0.05
PD220	A	From Leg	0.00			1/2" Ice	4.00	0.07
			4.00	0.0000	121.00	No Ice	3.08	0.02
3'-6" Standoff	A	From Leg	0.00			1/2" Ice	5.30	0.05
			2.00	0.0000	110.00	No Ice	2.40	0.05

RISATower CEN TEK Engineering, Inc. 63-2 N Branford Rd Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job		Page
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	Project		Date
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	Verizon		Jrm

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
PD220	B	From Leg	0.00	0.0000	121.00	1/2" Ice	3.20	3.20	0.07
			0.00			No Ice	3.08	3.08	0.02
			0.00			1/2" Ice	5.30	5.30	0.05
3'-6" Standoff	B	From Leg	2.00	0.0000	110.00	No Ice	2.40	2.40	0.05
			0.00			1/2" Ice	3.20	3.20	0.07
			0.00						
Folded Dipole	C	From Leg	1.50	0.0000	111.00	No Ice	1.20	1.20	0.03
			0.00			1/2" Ice	2.40	2.40	0.04
			0.00						
6'x3" Pipe Mount	C	From Leg	1.00	0.0000	111.00	No Ice	1.77	1.77	0.03
			0.00			1/2" Ice	2.13	2.13	0.05
			0.00						
2' Standoff	B	From Leg	1.00	0.0000	105.00	No Ice	0.60	0.60	0.01
			0.00			1/2" Ice	0.80	0.80	0.02
			0.00						
2' x 2" Dia Omni	B	From Leg	2.00	0.0000	106.00	No Ice	0.30	0.30	0.02
			0.00			1/2" Ice	0.43	0.43	0.02
			0.00						
(2) 800-10504 (MetroPCS - Reserved)	A	From Leg	4.00	0.0000	130.00	No Ice	3.66	2.26	0.02
			0.00			1/2" Ice	4.01	2.59	0.04
			0.00						
(2) 800-10504 (MetroPCS - Reserved)	B	From Leg	4.00	0.0000	130.00	No Ice	3.66	2.26	0.02
			0.00			1/2" Ice	4.01	2.59	0.04
			0.00						
(2) 800-10504 (MetroPCS - Reserved)	C	From Leg	4.00	0.0000	130.00	No Ice	3.66	2.26	0.02
			0.00			1/2" Ice	4.01	2.59	0.04
			0.00						
(2) 860 10025 RCU (MetroPCS - Reserved)	A	From Leg	4.00	0.0000	130.00	No Ice	0.16	0.13	0.00
			0.00			1/2" Ice	0.22	0.19	0.00
			0.00						
(2) 860 10025 RCU (MetroPCS - Reserved)	B	From Leg	4.00	0.0000	130.00	No Ice	0.16	0.13	0.00
			0.00			1/2" Ice	0.22	0.19	0.00
			0.00						
(2) 860 10025 RCU (MetroPCS - Reserved)	C	From Leg	4.00	0.0000	130.00	No Ice	0.16	0.13	0.00
			0.00			1/2" Ice	0.22	0.19	0.00
			0.00						
Splice Box (MetroPCS - Reserved)	A	From Leg	4.00	0.0000	130.00	No Ice	0.16	0.13	0.00
			0.00			1/2" Ice	0.22	0.19	0.00
			0.00						
Andrew QT SF12-2-72 (MetroPCS - Reserved)	A	From Leg	2.00	0.0000	130.00	No Ice	16.30	16.30	0.39
			0.00			1/2" Ice	20.60	20.60	0.55
			0.00						
Andrew QT SF12-2-72 (MetroPCS - Reserved)	B	From Leg	2.00	0.0000	130.00	No Ice	16.30	16.30	0.39
			0.00			1/2" Ice	20.60	20.60	0.55
			0.00						
Andrew QT SF12-2-72 (MetroPCS - Reserved)	C	From Leg	2.00	0.0000	130.00	No Ice	16.30	16.30	0.39
			0.00			1/2" Ice	20.60	20.60	0.55
			0.00						
GPS (MetroPCS - Reserved)	C	From Leg	4.00	0.0000	130.00	No Ice	1.00	1.00	0.01
			0.00			1/2" Ice	1.50	1.50	0.01
			0.00						

RISATower CENTEK Engineering, Inc. 63-2 N Branford Rd Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job	190' Guyed Rohn Model 80 - w/ Proposed Reinf. ~ Rev 1	Page	19 of 53
	Project	57 Cook Road, Montville, CT	Date	12:57:25 12/08/11
	Client	Verizon	Designed by	Jrm

Tower Pressures - No Ice

$$G_H = 1.117$$

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	C _A A _A Out Face
ft	ft		psf	ft ²		ft ²	ft ²	ft ²		ft ²	ft ²
T1 190.00-180.00	185.00	1.636	38	36.566	A	5.776	8.752	4.792	32.98	0.000	0.000
					B	5.776	8.752		32.98	0.000	0.000
					C	6.558	4.792		42.22	0.000	0.000
T2 180.00-160.00	170.00	1.597	37	73.132	A	9.718	19.483	9.583	32.82	0.000	0.000
					B	6.196	39.061		21.18	0.000	0.000
					C	6.453	37.633		21.74	0.000	0.000
T3 160.00-140.00	150.00	1.541	36	73.132	A	0.067	35.618	9.583	26.86	0.000	0.000
					B	0.067	62.579		15.30	0.000	0.000
					C	0.067	49.018		19.52	0.000	0.000
T4 140.00-120.00	130.00	1.48	34	73.132	A	0.067	63.963	9.583	14.97	0.000	0.000
					B	0.067	62.579		15.30	0.000	0.000
					C	0.067	66.133		14.48	0.000	0.000
T5 120.00-100.00	110.00	1.411	33	74.173	A	1.699	68.433	11.667	16.64	0.000	0.000
					B	2.074	66.350		17.05	0.000	0.000
					C	0.000	87.467		13.34	0.000	0.000
T6 100.00-80.00	90.00	1.332	31	74.173	A	0.067	70.912	11.667	16.44	0.000	0.000
					B	0.067	67.855		17.18	0.000	0.000
					C	0.067	88.441		13.18	0.000	0.000
T7 80.00-60.00	70.00	1.24	29	74.173	A	0.067	70.912	11.667	16.44	0.000	0.000
					B	0.067	67.855		17.18	0.000	0.000
					C	0.067	88.441		13.18	0.000	0.000
T8 60.00-40.00	50.00	1.126	26	74.173	A	0.067	70.912	11.667	16.44	0.000	0.000
					B	0.067	67.855		17.18	0.000	0.000
					C	0.067	88.441		13.18	0.000	0.000
T9 40.00-20.00	30.00	1	23	74.173	A	0.067	70.445	11.667	16.55	0.000	0.000
					B	0.067	67.172		17.35	0.000	0.000
					C	0.067	89.451		13.03	0.000	0.000
T10 20.00-5.00	12.50	1	23	55.630	A	0.067	44.763	8.750	19.52	0.000	0.000
					B	0.067	42.808		20.41	0.000	0.000
					C	0.067	60.399		14.47	0.000	0.000
T11 5.00-0.00	2.50	1	23	10.084	A	1.598	3.135	3.135	66.24	0.000	0.000
					B	1.598	3.135		66.24	0.000	0.000
					C	1.121	6.235		42.62	0.000	0.000

Tower Pressure - With Ice

$$G_H = 1.117$$

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	C _A A _A Out Face
ft	ft		psf	in	ft ²		ft ²	ft ²	ft ²		ft ²	ft ²
T1 190.00-180.00	185.00	1.636	28	0.5000	37.399	A	8.819	11.149	6.458	32.34	0.000	0.000
						B	8.819	11.149		32.34	0.000	0.000
						C	6.558	9.686		39.76	0.000	0.000
T2 180.00-160.00	170.00	1.597	28	0.5000	74.798	A	17.385	22.452	12.917	32.42	0.000	0.000
						B	33.161	25.686		21.95	0.000	0.000
						C	39.146	23.831		20.51	0.000	0.000

RISATower CEN TEK Engineering, Inc. 63-2 N Branford Rd Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job	Page
	190' Guyed Rohn Model 80 - w/ Proposed Reinf. ~ Rev 1	20 of 53
	Project	Date
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	Client	Designed by
	Verizon	Jrm

Section Elevation	z	K _Z	q _z	t _z	A _G	F a c e	A _F	A _R	A _{leg}	Leg %	C _{AA} In Face ft ²	C _{AA} Out Face ft ²
ft	ft		psf	in	ft ²		ft ²	ft ²	ft ²			
T3 160.00-140.00	150.00	1.541	27	0.5000	74.798	A	19.062	28.862	12.917	26.95	0.000	0.000
						B	53.800	25.592		16.27	0.000	0.000
						C	40.900	31.057		17.95	0.000	0.000
T4 140.00-120.00	130.00	1.48	26	0.5000	74.798	A	52.917	29.654	12.917	15.64	0.000	0.000
						B	53.800	25.592		16.27	0.000	0.000
						C	60.767	35.504		13.42	0.000	0.000
T5 120.00-100.00	110.00	1.411	24	0.5000	75.840	A	51.589	38.246	15.000	16.70	0.000	0.000
						B	52.959	33.073		17.44	0.000	0.000
						C	70.177	49.882		12.49	0.000	0.000
T6 100.00-80.00	90.00	1.332	23	0.5000	75.840	A	54.717	38.139	15.000	16.15	0.000	0.000
						B	53.800	32.442		17.39	0.000	0.000
						C	80.634	45.941		11.85	0.000	0.000
T7 80.00-60.00	70.00	1.24	21	0.5000	75.840	A	54.717	38.139	15.000	16.15	0.000	0.000
						B	53.800	32.442		17.39	0.000	0.000
						C	80.634	45.941		11.85	0.000	0.000
T8 60.00-40.00	50.00	1.126	20	0.5000	75.840	A	54.717	38.139	15.000	16.15	0.000	0.000
						B	53.800	32.442		17.39	0.000	0.000
						C	80.634	45.941		11.85	0.000	0.000
T9 40.00-20.00	30.00	1	17	0.5000	75.840	A	54.717	39.487	15.000	15.92	0.000	0.000
						B	53.800	32.919		17.30	0.000	0.000
						C	80.634	52.384		11.28	0.000	0.000
T10 20.00-5.00	12.50	1	17	0.5000	56.880	A	32.857	27.121	11.250	18.76	0.000	0.000
						B	32.307	23.213		20.26	0.000	0.000
						C	54.532	34.981		12.57	0.000	0.000
T11 5.00-0.00	2.50	1	17	0.5000	10.524	A	1.598	4.585	4.031	65.21	0.000	0.000
						B	1.598	4.585		65.21	0.000	0.000
						C	4.892	5.157		40.12	0.000	0.000

Tower Pressure - Service

$$G_H = 1.117$$

Section Elevation	z	K _Z	q _z	A _G	F a c e	A _F	A _R	A _{leg}	Leg %	C _{AA} In Face ft ²	C _{AA} Out Face ft ²
ft	ft		psf	ft ²		ft ²	ft ²	ft ²			
T1 190.00-180.00	185.00	1.636	10	36.566	A	5.776	8.752	4.792	32.98	0.000	0.000
					B	5.776	8.752		32.98	0.000	0.000
					C	6.558	4.792		42.22	0.000	0.000
T2 180.00-160.00	170.00	1.597	10	73.132	A	9.718	19.483	9.583	32.82	0.000	0.000
					B	6.196	39.061		21.18	0.000	0.000
					C	6.453	37.633		21.74	0.000	0.000
T3 160.00-140.00	150.00	1.541	10	73.132	A	0.067	35.618	9.583	26.86	0.000	0.000
					B	0.067	62.579		15.30	0.000	0.000
					C	0.067	49.018		19.52	0.000	0.000
T4 140.00-120.00	130.00	1.48	9	73.132	A	0.067	63.963	9.583	14.97	0.000	0.000
					B	0.067	62.579		15.30	0.000	0.000
					C	0.067	66.133		14.48	0.000	0.000
T5 120.00-100.00	110.00	1.411	9	74.173	A	1.699	68.433	11.667	16.64	0.000	0.000
					B	2.074	66.350		17.05	0.000	0.000
					C	0.000	87.467		13.34	0.000	0.000
T6 100.00-80.00	90.00	1.332	9	74.173	A	0.067	70.912	11.667	16.44	0.000	0.000
					B	0.067	67.855		17.18	0.000	0.000
					C	0.067	88.441		13.18	0.000	0.000
T7 80.00-60.00	70.00	1.24	8	74.173	A	0.067	70.912	11.667	16.44	0.000	0.000

RISATower CEN TEK Engineering, Inc. 63-2 N Branford Rd Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job	190' Guyed Rohn Model 80 - w/ Proposed Reinf. ~ Rev 1	Page	21 of 53
	Project	57 Cook Road, Montville, CT	Date	12:57:25 12/08/11
	Client	Verizon	Designed by	Jrm

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	C _A A _A Out Face
ft	ft		psf	ft ²		ft ²	ft ²	ft ²		ft ²	ft ²
T8 60.00-40.00	50.00	1.126	7	74.173	B	0.067	67.855		17.18	0.000	0.000
					C	0.067	88.441		13.18	0.000	0.000
					A	0.067	70.912	11.667	16.44	0.000	0.000
					B	0.067	67.855		17.18	0.000	0.000
T9 40.00-20.00	30.00	1	6	74.173	C	0.067	88.441		13.18	0.000	0.000
					A	0.067	70.445	11.667	16.55	0.000	0.000
					B	0.067	67.172		17.35	0.000	0.000
					C	0.067	89.451		13.03	0.000	0.000
T10 20.00-5.00	12.50	1	6	55.630	A	0.067	44.763		19.52	0.000	0.000
					B	0.067	42.808	8.750	20.41	0.000	0.000
					C	0.067	60.399		14.47	0.000	0.000
T11 5.00-0.00	2.50	1	6	10.084	A	1.598	3.135		66.24	0.000	0.000
					B	1.598	3.135	3.135	66.24	0.000	0.000
					C	1.121	6.235		42.62	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 190.00-180.00	0.11	0.62	A	0.397	2.069	0.65	1	1	11.469			
			B	0.397	2.069	0.65	1	1	11.469	1.00	100.25	B
			C	0.31	2.269	0.619	1	1	9.525			
T2 180.00-160.00	0.58	1.17	A	0.399	2.065	0.651	1	1	22.407			
		TA 0.69	B	0.619	1.794	0.765	1	1	36.090	2.67	133.45	B
			C	0.603	1.802	0.755	1	1	34.879			
T3 160.00-140.00	0.90	0.85	A	0.488	1.916	0.691	1	1	24.694			
			B	0.857	1.869	0.944	1	1	59.157	4.40	219.91	B
			C	0.671	1.777	0.8	1	1	39.269			
T4 140.00-120.00	1.27	0.85	A	0.876	1.891	0.961	1	1	61.533			
			B	0.857	1.869	0.944	1	1	59.157	4.82	241.21	C
			C	0.905	1.932	0.988	1	1	65.400			
T5 120.00-100.00	1.45	1.32	A	0.946	1.996	1	1	1	70.133			
		TA 0.69	B	0.922	1.958	1	1	1	68.424	5.40*	270.07	C
			C	1	2.1	1	1	1	87.467			
T6 100.00-80.00	1.49	0.82	A	0.957	2.016	1	1	1	70.979			
			B	0.916	1.947	0.998	1	1	67.763	5.10*	255.02	C
			C	1	2.1	1	1	1	88.508			
T7 80.00-60.00	1.49	1.01	A	0.957	2.016	1	1	1	70.979			
		TA 0.69	B	0.916	1.947	0.998	1	1	67.763	4.75*	237.35	C
			C	1	2.1	1	1	1	88.508			
T8 60.00-40.00	1.49	1.01	A	0.957	2.016	1	1	1	70.979			
			B	0.916	1.947	0.998	1	1	67.763	4.31*	215.60	C
			C	1	2.1	1	1	1	88.508			
T9 40.00-20.00	1.49	0.73	A	0.951	2.005	1	1	1	70.512			
			B	0.907	1.933	0.989	1	1	66.507	3.83*	191.46	C
			C	1	2.1	1	1	1	89.518			
T10 20.00-5.00	0.92	0.63	A	0.806	1.82	0.901	1	1	40.407			
			B	0.771	1.797	0.873	1	1	37.435	2.87*	191.46	C
			C	1	2.1	1	1	1	60.466			
T11 5.00-0.00	0.02	0.37	A	0.469	1.943	0.682	1	1	3.737			
			B	0.469	1.943	0.682	1	1	3.737	0.29	58.54	C
			C	0.73	1.781	0.841	1	1	6.368			
Sum Weight:	11.21	11.50			2A _g limit					39.45		

RISATower CENTEK Engineering, Inc. 63-2 N Branford Rd Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job	Page
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	Project	Date
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Client	Verizon	Designed by
		Jrm

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	e						ft ²	K	plf	
T1 190.00-180.00	0.11	0.62	A	0.397	2.069	0.65	0.8	1	10.314	0.90	90.15	B
			B	0.397	2.069	0.65	0.8	1	10.314			
			C	0.31	2.269	0.619	0.8	1	8.213			
T2 180.00-160.00	0.58	1.17	A	0.399	2.065	0.651	0.8	1	20.464	2.58	128.86	B
		TA 0.69	B	0.619	1.794	0.765	0.8	1	34.850			
			C	0.603	1.802	0.755	0.8	1	33.588			
T3 160.00-140.00	0.90	0.85	A	0.488	1.916	0.691	0.8	1	24.681	4.40	219.86	B
			B	0.857	1.869	0.944	0.8	1	59.143			
			C	0.671	1.777	0.8	0.8	1	39.256			
T4 140.00-120.00	1.27	0.85	A	0.876	1.891	0.961	0.8	1	61.520	4.82	241.17	C
			B	0.857	1.869	0.944	0.8	1	59.143			
			C	0.905	1.932	0.988	0.8	1	65.387			
T5 120.00-100.00	1.45	1.32	A	0.946	1.996	1	0.8	1	69.793	5.40*	270.07	C
		TA 0.69	B	0.922	1.958	1	0.8	1	68.009			
			C	1	2.1	1	0.8	1	87.467			
T6 100.00-80.00	1.49	0.82	A	0.957	2.016	1	0.8	1	70.965	5.10*	255.02	C
			B	0.916	1.947	0.998	0.8	1	67.750			
			C	1	2.1	1	0.8	1	88.495			
T7 80.00-60.00	1.49	1.01	A	0.957	2.016	1	0.8	1	70.965	4.75*	237.35	C
		TA 0.69	B	0.916	1.947	0.998	0.8	1	67.750			
			C	1	2.1	1	0.8	1	88.495			
T8 60.00-40.00	1.49	1.01	A	0.957	2.016	1	0.8	1	70.965	4.31*	215.60	C
			B	0.916	1.947	0.998	0.8	1	67.750			
			C	1	2.1	1	0.8	1	88.495			
T9 40.00-20.00	1.49	0.73	A	0.951	2.005	1	0.8	1	70.499	3.83*	191.46	C
			B	0.907	1.933	0.989	0.8	1	66.494			
			C	1	2.1	1	0.8	1	89.505			
T10 20.00-5.00	0.92	0.63	A	0.806	1.82	0.901	0.8	1	40.394	2.87*	191.46	C
			B	0.771	1.797	0.873	0.8	1	37.422			
			C	1	2.1	1	0.8	1	60.452			
T11 5.00-0.00	0.02	0.37	A	0.469	1.943	0.682	0.8	1	3.418	0.28	56.48	C
			B	0.469	1.943	0.682	0.8	1	3.418			
			C	0.73	1.781	0.841	0.8	1	6.144			
Sum Weight:	11.21	11.50								39.24		

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	e						ft ²	K	plf	
T1 190.00-180.00	0.11	0.62	A	0.397	2.069	0.65	0.85	1	10.602	0.93	92.68	B
			B	0.397	2.069	0.65	0.85	1	10.602			
			C	0.31	2.269	0.619	0.85	1	8.541			
T2 180.00-160.00	0.58	1.17	A	0.399	2.065	0.651	0.85	1	20.950	2.60	130.01	B
		TA 0.69	B	0.619	1.794	0.765	0.85	1	35.160			
			C	0.603	1.802	0.755	0.85	1	33.911			
T3 160.00-	0.90	0.85	A	0.488	1.916	0.691	0.85	1	24.684	4.40	219.88	B

RISATower CENTEK Engineering, Inc. 63-2 N Branford Rd Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job	190' Guyed Rohn Model 80 - w/ Proposed Reinf. ~ Rev 1	Page	23 of 53
	Project	57 Cook Road, Montville, CT	Date	12:57:25 12/08/11
	Client	Verizon	Designed by	Jrm

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
140.00			B	0.857	1.869	0.944	0.85	1	59.146			
T4 140.00-120.00	1.27	0.85	C	0.671	1.777	0.8	0.85	1	39.259			
			A	0.876	1.891	0.961	0.85	1	61.523	4.82	241.18	C
			B	0.857	1.869	0.944	0.85	1	59.146			
T5 120.00-100.00	1.45	1.32	C	0.905	1.932	0.988	0.85	1	65.390			
		TA 0.69	A	0.946	1.996	1	0.85	1	69.878	5.40*	270.07	C
			B	0.922	1.958	1	0.85	1	68.113			
			C	1	2.1	1	0.85	1	87.467			
T6 100.00-80.00	1.49	0.82	A	0.957	2.016	1	0.85	1	70.969	5.10*	255.02	C
			B	0.916	1.947	0.998	0.85	1	67.753			
			C	1	2.1	1	0.85	1	88.498			
T7 80.00-60.00	1.49	1.01	A	0.957	2.016	1	0.85	1	70.969	4.75*	237.35	C
		TA 0.69	B	0.916	1.947	0.998	0.85	1	67.753			
			C	1	2.1	1	0.85	1	88.498			
T8 60.00-40.00	1.49	1.01	A	0.957	2.016	1	0.85	1	70.969	4.31*	215.60	C
			B	0.916	1.947	0.998	0.85	1	67.753			
			C	1	2.1	1	0.85	1	88.498			
T9 40.00-20.00	1.49	0.73	A	0.951	2.005	1	0.85	1	70.502	3.83*	191.46	C
			B	0.907	1.933	0.989	0.85	1	66.497			
			C	1	2.1	1	0.85	1	89.508			
T10 20.00-5.00	0.92	0.63	A	0.806	1.82	0.901	0.85	1	40.397	2.87*	191.46	C
			B	0.771	1.797	0.873	0.85	1	37.425			
			C	1	2.1	1	0.85	1	60.456			
T11 5.00-0.00	0.02	0.37	A	0.469	1.943	0.682	0.85	1	3.498	0.28	57.00	C
			B	0.469	1.943	0.682	0.85	1	3.498			
			C	0.73	1.781	0.841	0.85	1	6.200			
Sum Weight:	11.21	11.50			2A _g limit					39.30		

Tower Forces - With Ice - 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 190.00-180.00	0.27	0.92	A	0.534	1.86	0.715	1	1	16.795	0.99	98.96	B
			B	0.534	1.86	0.715	1	1	16.795			
			C	0.434	2	0.666	1	1	13.011			
T2 180.00-160.00	1.58	1.72	A	0.533	1.861	0.715	1	1	33.430	3.52	175.77	C
		TA 0.88	B	0.787	1.807	0.886	1	1	55.911			
			C	0.842	1.853	0.932	1	1	61.345			
T3 160.00-140.00	2.39	1.25	A	0.641	1.784	0.779	1	1	41.555	4.46*	223.19	B
			B	1	2.1	1	1	1	79.393			
			C	0.962	2.025	1	1	1	71.957			
T4 140.00-120.00	3.45	1.25	A	1	2.1	1	1	1	82.571	4.28*	214.25	C
			B	1	2.1	1	1	1	79.393			
			C	1	2.1	1	1	1	96.271			
T5 120.00-100.00	3.97	1.90	A	1	2.1	1	1	1	89.835	4.14*	207.10	C
		TA 0.88	B	1	2.1	1	1	1	86.032			
			C	1	2.1	1	1	1	120.059			
T6 100.00-80.00	4.07	1.24	A	1	2.1	1	1	1	92.856	3.91*	195.56	C
			B	1	2.1	1	1	1	86.242			
			C	1	2.1	1	1	1	126.575			
T7 80.00-60.00	4.07	1.42	A	1	2.1	1	1	1	92.856	3.64*	182.01	C
		TA 0.88	B	1	2.1	1	1	1	86.242			
			C	1	2.1	1	1	1	126.575			

RISATower CENTEK Engineering, Inc. 63-2 N Branford Rd Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job	Page
	190' Guyed Rohn Model 80 - w/ Proposed Reinf. ~ Rev 1	24 of 53
	Project	Date
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Client		Designed by
Verizon		Jrm

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	
T8 60.00-40.00	4.07	1.42	A	1	2.1	1	1	1	92.856	3.31*	165.33	C
			B	1	2.1	1	1	1	86.242			
			C	1	2.1	1	1	1	126.575			
T9 40.00-20.00	4.07	1.02	A	1	2.1	1	1	1	94.204	2.94*	146.82	C
			B	1	2.1	1	1	1	86.719			
			C	1	2.1	1	1	1	133.018			
T10 20.00-5.00	2.53	0.86	A	1	2.1	1	1	1	59.978	2.20*	146.82	C
			B	0.976	2.052	1	1	1	55.520			
			C	1	2.1	1	1	1	89.513			
T11 5.00-0.00	0.06	0.47	A	0.587	1.812	0.746	1	1	5.018	0.39	78.29	C
			B	0.587	1.812	0.746	1	1	5.018			
			C	0.955	2.012	1	1	1	5.018			
Sum Weight:	30.54	16.13			*2A _g limit				10.049	33.78		

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 190.00-180.00	0.27	0.92	A	0.534	1.86	0.715	0.8	1	15.031	0.89	88.57	B
			B	0.534	1.86	0.715	0.8	1	15.031			
			C	0.434	2	0.666	0.8	1	11.699			
T2 180.00-160.00	1.58	1.72	A	0.533	1.861	0.715	0.8	1	29.953	3.07	153.34	C
		TA 0.88	B	0.787	1.807	0.886	0.8	1	49.278			
			C	0.842	1.853	0.932	0.8	1	53.516			
T3 160.00-140.00	2.39	1.25	A	0.641	1.784	0.779	0.8	1	37.743	4.30	215.03	B
			B	1	2.1	1	0.8	1	68.633			
			C	0.962	2.025	1	0.8	1	63.777			
T4 140.00-120.00	3.45	1.25	A	1	2.1	1	0.8	1	71.987	4.28*	214.25	C
			B	1	2.1	1	0.8	1	68.633			
			C	1	2.1	1	0.8	1	84.118			
T5 120.00-100.00	3.97	1.90	A	1	2.1	1	0.8	1	79.517	4.14*	207.10	C
		TA 0.88	B	1	2.1	1	0.8	1	75.440			
			C	1	2.1	1	0.8	1	106.023			
T6 100.00-80.00	4.07	1.24	A	1	2.1	1	0.8	1	81.913	3.91*	195.56	C
			B	1	2.1	1	0.8	1	75.482			
			C	1	2.1	1	0.8	1	110.448			
T7 80.00-60.00	4.07	1.42	A	1	2.1	1	0.8	1	81.913	3.64*	182.01	C
		TA 0.88	B	1	2.1	1	0.8	1	75.482			
			C	1	2.1	1	0.8	1	110.448			
T8 60.00-40.00	4.07	1.42	A	1	2.1	1	0.8	1	81.913	3.31*	165.33	C
			B	1	2.1	1	0.8	1	75.482			
			C	1	2.1	1	0.8	1	110.448			
T9 40.00-20.00	4.07	1.02	A	1	2.1	1	0.8	1	83.261	2.94*	146.82	C
			B	1	2.1	1	0.8	1	75.959			
			C	1	2.1	1	0.8	1	116.891			
T10 20.00-5.00	2.53	0.86	A	1	2.1	1	0.8	1	53.406	2.20*	146.82	C
			B	0.976	2.052	1	0.8	1	49.059			
			C	1	2.1	1	0.8	1	78.606			
T11 5.00-0.00	0.06	0.47	A	0.587	1.812	0.746	0.8	1	4.698	0.35	70.67	C
			B	0.587	1.812	0.746	0.8	1	4.698			
			C	0.955	2.012	1	0.8	1	9.071			
Sum Weight:	30.54	16.13			*2A _g					33.03		

RISATower CEN TEK Engineering, Inc. 63-2 N Branford Rd Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job	190' Guyed Rohn Model 80 - w/ Proposed Reinf. ~ Rev 1	Page	25 of 53
	Project	57 Cook Road, Montville, CT	Date	12:57:25 12/08/11
	Client	Verizon	Designed by	Jrm

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	
					limit							

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 190.00-180.00	0.27	0.92	A	0.534	1.86	0.715	0.85	1	15.472	0.91	91.16	B
			B	0.534	1.86	0.715	0.85	1	15.472			
			C	0.434	2	0.666	0.85	1	12.027			
T2 180.00-160.00	1.58	1.72	A	0.533	1.861	0.715	0.85	1	30.823	3.18	158.94	C
		TA 0.88	B	0.787	1.807	0.886	0.85	1	50.937			
			C	0.842	1.853	0.932	0.85	1	55.473			
T3 160.00-140.00	2.39	1.25	A	0.641	1.784	0.779	0.85	1	38.696	4.46*	223.19	B
			B	1	2.1	1	0.85	1	71.323			
			C	0.962	2.025	1	0.85	1	65.822			
T4 140.00-120.00	3.45	1.25	A	1	2.1	1	0.85	1	74.633	4.28*	214.25	C
			B	1	2.1	1	0.85	1	71.323			
			C	1	2.1	1	0.85	1	87.156			
T5 120.00-100.00	3.97	1.90	A	1	2.1	1	0.85	1	82.096	4.14*	207.10	C
		TA 0.88	B	1	2.1	1	0.85	1	78.088			
			C	1	2.1	1	0.85	1	109.532			
T6 100.00-80.00	4.07	1.24	A	1	2.1	1	0.85	1	84.649	3.91*	195.56	C
			B	1	2.1	1	0.85	1	78.172			
			C	1	2.1	1	0.85	1	114.480			
T7 80.00-60.00	4.07	1.42	A	1	2.1	1	0.85	1	84.649	3.64*	182.01	C
		TA 0.88	B	1	2.1	1	0.85	1	78.172			
			C	1	2.1	1	0.85	1	114.480			
T8 60.00-40.00	4.07	1.42	A	1	2.1	1	0.85	1	84.649	3.31*	165.33	C
			B	1	2.1	1	0.85	1	78.172			
			C	1	2.1	1	0.85	1	114.480			
T9 40.00-20.00	4.07	1.02	A	1	2.1	1	0.85	1	85.996	2.94*	146.82	C
			B	1	2.1	1	0.85	1	78.649			
			C	1	2.1	1	0.85	1	120.923			
T10 20.00-5.00	2.53	0.86	A	1	2.1	1	0.85	1	55.049	2.20*	146.82	C
			B	0.976	2.052	1	0.85	1	50.674			
			C	1	2.1	1	0.85	1	81.333			
T11 5.00-0.00	0.06	0.47	A	0.587	1.812	0.746	0.85	1	4.778	0.36	72.57	C
			B	0.587	1.812	0.746	0.85	1	4.778			
			C	0.955	2.012	1	0.85	1	9.315			
Sum Weight:	30.54	16.13								33.34		

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 190.00-	0.11	0.62	A	0.397	2.069	0.65	1	1	11.469	0.28	27.77	B

RISATower CENTEK Engineering, Inc. 63-2 N Branford Rd Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job	Page
	190' Guyed Rohn Model 80 - w/ Proposed Reinf. ~ Rev 1	26 of 53
	Project	Date
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Client	Verizon	Designed by
		Jrm

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	
180.00			B	0.397	2.069	0.65	1	1	11.469			
T2 180.00-160.00	0.58	1.17	C	0.31	2.269	0.619	1	1	9.525			
		TA 0.69	A	0.399	2.065	0.651	1	1	22.407	0.74	36.97	B
T3 160.00-140.00	0.90	0.85	B	0.619	1.794	0.765	1	1	36.090			
			C	0.603	1.802	0.755	1	1	34.879			
			A	0.488	1.916	0.691	1	1	24.694	1.22	60.92	B
T4 140.00-120.00	1.27	0.85	B	0.857	1.869	0.944	1	1	59.157			
			C	0.671	1.777	0.8	1	1	39.269			
			A	0.876	1.891	0.961	1	1	61.533	1.34	66.82	C
T5 120.00-100.00	1.45	1.32	B	0.857	1.869	0.944	1	1	59.157			
		TA 0.69	C	0.905	1.932	0.988	1	1	65.400			
			A	0.946	1.996	1	1	1	70.133	1.50*	74.81	C
T6 100.00-80.00	1.49	0.82	B	0.922	1.958	1	1	1	68.424			
			C	1	2.1	1	1	1	87.467			
			A	0.957	2.016	1	1	1	70.979	1.41*	70.64	C
T7 80.00-60.00	1.49	1.01	B	0.916	1.947	0.998	1	1	67.763			
		TA 0.69	C	1	2.1	1	1	1	88.508			
			A	0.957	2.016	1	1	1	70.979	1.31*	65.75	C
T8 60.00-40.00	1.49	1.01	B	0.916	1.947	0.998	1	1	67.763			
			C	1	2.1	1	1	1	88.508			
			A	0.957	2.016	1	1	1	70.979	1.19*	59.72	C
T9 40.00-20.00	1.49	0.73	B	0.916	1.947	0.998	1	1	67.763			
			C	1	2.1	1	1	1	88.508			
			A	0.951	2.005	1	1	1	70.512	1.06*	53.04	C
T10 20.00-5.00	0.92	0.63	B	0.907	1.933	0.989	1	1	66.507			
			C	1	2.1	1	1	1	89.518			
			A	0.806	1.82	0.901	1	1	40.407	0.80*	53.04	C
T11 5.00-0.00	0.02	0.37	B	0.771	1.797	0.873	1	1	37.435			
			C	1	2.1	1	1	1	60.466			
			A	0.469	1.943	0.682	1	1	3.737	0.08	16.22	C
			B	0.469	1.943	0.682	1	1	3.737			
Sum Weight:	11.21	11.50	C	0.73	1.781	0.841	1	1	6.368	10.93		
					2A _g limit							

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 190.00-180.00	0.11	0.62	A	0.397	2.069	0.65	0.8	1	10.314	0.25	24.97	B
			B	0.397	2.069	0.65	0.8	1	10.314			
T2 180.00-160.00	0.58	1.17	C	0.31	2.269	0.619	0.8	1	8.213			
		TA 0.69	A	0.399	2.065	0.651	0.8	1	20.464	0.71	35.70	B
			B	0.619	1.794	0.765	0.8	1	34.850			
T3 160.00-140.00	0.90	0.85	C	0.603	1.802	0.755	0.8	1	33.588			
			A	0.488	1.916	0.691	0.8	1	24.681	1.22	60.90	B
			B	0.857	1.869	0.944	0.8	1	59.143			
T4 140.00-120.00	1.27	0.85	C	0.671	1.777	0.8	0.8	1	39.256			
			A	0.876	1.891	0.961	0.8	1	61.520	1.34	66.80	C
			B	0.857	1.869	0.944	0.8	1	59.143			
T5 120.00-100.00	1.45	1.32	C	0.905	1.932	0.988	0.8	1	65.387			
		TA 0.69	A	0.946	1.996	1	0.8	1	69.793	1.50*	74.81	C
			B	0.922	1.958	1	0.8	1	68.009			
			C	1	2.1	1	0.8	1	87.467			

RISATower**CEN TEK Engineering, Inc.**

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 Branford, CT 06405
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Job

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Date

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Verizon

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Jrm

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	
T6 100.00-80.00	1.49	0.82	A	0.957	2.016	1	0.8	1	70.965	1.41*	70.64	C
			B	0.916	1.947	0.998	0.8	1	67.750			
			C	1	2.1	1	0.8	1	88.495			
T7 80.00-60.00	1.49	1.01	A	0.957	2.016	1	0.8	1	70.965	1.31*	65.75	C
		TA 0.69	B	0.916	1.947	0.998	0.8	1	67.750			
			C	1	2.1	1	0.8	1	88.495			
T8 60.00-40.00	1.49	1.01	A	0.957	2.016	1	0.8	1	70.965	1.19*	59.72	C
			B	0.916	1.947	0.998	0.8	1	67.750			
			C	1	2.1	1	0.8	1	88.495			
T9 40.00-20.00	1.49	0.73	A	0.951	2.005	1	0.8	1	70.499	1.06*	53.04	C
			B	0.907	1.933	0.989	0.8	1	66.494			
			C	1	2.1	1	0.8	1	89.505			
T10 20.00-5.00	0.92	0.63	A	0.806	1.82	0.901	0.8	1	40.394	0.80*	53.04	C
			B	0.771	1.797	0.873	0.8	1	37.422			
			C	1	2.1	1	0.8	1	60.452			
T11 5.00-0.00	0.02	0.37	A	0.469	1.943	0.682	0.8	1	3.418	0.08	15.65	C
			B	0.469	1.943	0.682	0.8	1	3.418			
			C	0.73	1.781	0.841	0.8	1	6.144			
Sum Weight:	11.21	11.50			2A _g limit					10.87		

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 190.00-180.00	0.11	0.62	A	0.397	2.069	0.65	0.85	1	10.602	0.26	25.67	B
			B	0.397	2.069	0.65	0.85	1	10.602			
			C	0.31	2.269	0.619	0.85	1	8.541			
T2 180.00-160.00	0.58	1.17	A	0.399	2.065	0.651	0.85	1	20.950	0.72	36.01	B
		TA 0.69	B	0.619	1.794	0.765	0.85	1	35.160			
			C	0.603	1.802	0.755	0.85	1	33.911			
T3 160.00-140.00	0.90	0.85	A	0.488	1.916	0.691	0.85	1	24.684	1.22	60.91	B
			B	0.857	1.869	0.944	0.85	1	59.146			
			C	0.671	1.777	0.8	0.85	1	39.259			
T4 140.00-120.00	1.27	0.85	A	0.876	1.891	0.961	0.85	1	61.523	1.34	66.81	C
			B	0.857	1.869	0.944	0.85	1	59.146			
			C	0.905	1.932	0.988	0.85	1	65.390			
T5 120.00-100.00	1.45	1.32	A	0.946	1.996	1	0.85	1	69.878	1.50*	74.81	C
		TA 0.69	B	0.922	1.958	1	0.85	1	68.113			
			C	1	2.1	1	0.85	1	87.467			
T6 100.00-80.00	1.49	0.82	A	0.957	2.016	1	0.85	1	70.969	1.41*	70.64	C
			B	0.916	1.947	0.998	0.85	1	67.753			
			C	1	2.1	1	0.85	1	88.498			
T7 80.00-60.00	1.49	1.01	A	0.957	2.016	1	0.85	1	70.969	1.31*	65.75	C
		TA 0.69	B	0.916	1.947	0.998	0.85	1	67.753			
			C	1	2.1	1	0.85	1	88.498			
T8 60.00-40.00	1.49	1.01	A	0.957	2.016	1	0.85	1	70.969	1.19*	59.72	C
			B	0.916	1.947	0.998	0.85	1	67.753			
			C	1	2.1	1	0.85	1	88.498			
T9 40.00-20.00	1.49	0.73	A	0.951	2.005	1	0.85	1	70.502	1.06*	53.04	C
			B	0.907	1.933	0.989	0.85	1	66.497			
			C	1	2.1	1	0.85	1	89.508			
T10 20.00-5.00	0.92	0.63	A	0.806	1.82	0.901	0.85	1	40.397	0.80*	53.04	C
			B	0.771	1.797	0.873	0.85	1	37.425			

RISATower

CENTEK Engineering, Inc.
63-2 N Branford Rd
Branford, CT 06405
Phone: (203) 488-0580
FAX: (203) 488-8587

Job	190' Guyed Rohn Model 80 - w/ Proposed Reinf. ~ Rev 1	Page	28 of 53
Project	57 Cook Road, Montville, CT	Date	12:57:25 12/08/11
Client	Verizon	Designed by	Jrm

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	
T11 5.00-0.00	0.02	0.37	C	1	2.1	1	0.85	1	60.456			
			A	0.469	1.943	0.682	0.85	1	3.498	0.08	15.79	C
			B	0.469	1.943	0.682	0.85	1	3.498			
			C	0.73	1.781	0.841	0.85	1	6.200			
Sum Weight:	11.21	11.50			*2A _B limit					10.89		

Force Totals (Does not include forces on guys)

Load Case	Vertical Forces	Sum of Forces X	Sum of Forces Z	Sum of Torques
	K	K	K	kip-ft
Leg Weight	5.32			
Bracing Weight	6.14			
Total Member Self-Weight	11.46			
Gusset Weight	0.04			
Guy Weight	2.53			
Total Weight	37.60			
Wind 0 deg - No Ice		0.00	-64.55	-18.51
Wind 30 deg - No Ice		32.19	-55.77	-14.30
Wind 60 deg - No Ice		55.72	-32.17	-6.25
Wind 90 deg - No Ice		64.39	0.00	3.48
Wind 120 deg - No Ice		55.89	32.28	12.28
Wind 150 deg - No Ice		32.19	55.77	17.78
Wind 180 deg - No Ice		0.00	64.35	18.52
Wind 210 deg - No Ice		-32.19	55.77	14.30
Wind 240 deg - No Ice		-55.89	32.28	6.23
Wind 270 deg - No Ice		-64.39	0.00	-3.48
Wind 300 deg - No Ice		-55.72	-32.17	-12.27
Wind 330 deg - No Ice		-32.19	-55.77	-17.78
Member Ice	4.63			
Gusset Ice	0.02			
Guy Ice	1.99			
Total Weight Ice	68.29			
Wind 0 deg - Ice		0.00	-56.15	-14.96
Wind 30 deg - Ice		27.85	-48.24	-11.14
Wind 60 deg - Ice		47.96	-27.70	-4.35
Wind 90 deg - Ice		55.69	0.00	3.67
Wind 120 deg - Ice		48.62	28.07	10.70
Wind 150 deg - Ice		27.85	48.24	14.81
Wind 180 deg - Ice		0.00	55.39	15.01
Wind 210 deg - Ice		-27.85	48.24	11.14
Wind 240 deg - Ice		-48.62	28.07	4.27
Wind 270 deg - Ice		-55.69	0.00	-3.67
Wind 300 deg - Ice		-47.96	-27.70	-10.66
Wind 330 deg - Ice		-27.85	-48.24	-14.81
Total Weight	37.60			
Wind 0 deg - Service		0.00	-17.88	-5.13
Wind 30 deg - Service		8.92	-15.45	-3.96
Wind 60 deg - Service		15.43	-8.91	-1.73
Wind 90 deg - Service		17.84	0.00	0.96
Wind 120 deg - Service		15.48	8.94	3.40
Wind 150 deg - Service		8.92	15.45	4.92
Wind 180 deg - Service		0.00	17.83	5.13
Wind 210 deg - Service		-8.92	15.45	3.96

<i>RISA</i>Tower CEN TEK Engineering, Inc. 63-2 N Branford Rd Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job 190' Guyed Rohn Model 80 - w/ Proposed Reinf. ~ Rev 1	Page 29 of 53
	Project 57 Cook Road, Montville, CT	Date 12:57:25 12/08/11
	Client Verizon	Designed by Jrm

Load Case	Vertical Forces <i>K</i>	Sum of Forces <i>X</i> <i>K</i>	Sum of Forces <i>Z</i> <i>K</i>	Sum of Torques <i>kip-ft</i>
Wind 240 deg - Service		-15.48	8.94	1.73
Wind 270 deg - Service		-17.84	0.00	-0.96
Wind 300 deg - Service		-15.43	-8.91	-3.40
Wind 330 deg - Service		-8.92	-15.45	-4.92

Load Combinations

Comb. No.	Description
1	Dead Only
2	Dead+Wind 0 deg - No Ice+Guy
3	Dead+Wind 30 deg - No Ice+Guy
4	Dead+Wind 60 deg - No Ice+Guy
5	Dead+Wind 90 deg - No Ice+Guy
6	Dead+Wind 120 deg - No Ice+Guy
7	Dead+Wind 150 deg - No Ice+Guy
8	Dead+Wind 180 deg - No Ice+Guy
9	Dead+Wind 210 deg - No Ice+Guy
10	Dead+Wind 240 deg - No Ice+Guy
11	Dead+Wind 270 deg - No Ice+Guy
12	Dead+Wind 300 deg - No Ice+Guy
13	Dead+Wind 330 deg - No Ice+Guy
14	Dead+Ice+Temp+Guy
15	Dead+Wind 0 deg+Ice+Temp+Guy
16	Dead+Wind 30 deg+Ice+Temp+Guy
17	Dead+Wind 60 deg+Ice+Temp+Guy
18	Dead+Wind 90 deg+Ice+Temp+Guy
19	Dead+Wind 120 deg+Ice+Temp+Guy
20	Dead+Wind 150 deg+Ice+Temp+Guy
21	Dead+Wind 180 deg+Ice+Temp+Guy
22	Dead+Wind 210 deg+Ice+Temp+Guy
23	Dead+Wind 240 deg+Ice+Temp+Guy
24	Dead+Wind 270 deg+Ice+Temp+Guy
25	Dead+Wind 300 deg+Ice+Temp+Guy
26	Dead+Wind 330 deg+Ice+Temp+Guy
27	Dead+Wind 0 deg - Service+Guy
28	Dead+Wind 30 deg - Service+Guy
29	Dead+Wind 60 deg - Service+Guy
30	Dead+Wind 90 deg - Service+Guy
31	Dead+Wind 120 deg - Service+Guy
32	Dead+Wind 150 deg - Service+Guy
33	Dead+Wind 180 deg - Service+Guy
34	Dead+Wind 210 deg - Service+Guy
35	Dead+Wind 240 deg - Service+Guy
36	Dead+Wind 270 deg - Service+Guy
37	Dead+Wind 300 deg - Service+Guy
38	Dead+Wind 330 deg - Service+Guy

Maximum Member Forces

RISATower CEN TEK Engineering, Inc. 63-2 N Branford Rd Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job	190' Guyed Rohn Model 80 - w/ Proposed Reinf. ~ Rev 1	Page	30 of 53
	Project	57 Cook Road, Montville, CT	Date	12:57:25 12/08/11
	Client	Verizon	Designed by	Jrm

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
T1	190 - 180	Leg	Max Tension	12	10.48	-0.09	-0.70
			Max. Compression	15	-13.63	-0.06	-0.27
			Max. Mx	11	-3.04	-0.89	0.03
			Max. My	6	-10.15	0.10	0.72
			Max. Vy	5	2.74	0.66	0.02
		Diagonal	Max. Vx	6	2.08	0.04	0.54
			Max Tension	12	3.78	0.00	0.00
			Max. Compression	6	-3.93	0.00	0.00
			Max. Mx	23	1.93	0.02	-0.01
			Max. My	11	-2.82	0.01	-0.02
		Top Girt	Max. Vy	23	0.01	0.02	-0.01
			Max. Vx	11	-0.01	0.00	0.00
			Max Tension	8	0.19	0.00	0.00
			Max. Compression	10	-0.22	0.00	0.00
			Max. Mx	14	-0.03	-0.01	0.00
		Bottom Girt	Max. My	15	0.05	0.00	0.00
			Max. Vy	14	0.01	0.00	0.00
			Max. Vx	15	-0.00	0.00	0.00
			Max Tension	12	0.76	0.00	0.00
			Max. Compression	2	-0.76	0.00	0.00
		Leg	Max. Mx	14	0.05	-0.01	0.00
			Max. My	15	0.38	0.00	0.00
			Max. Vy	14	0.01	0.00	0.00
			Max. Vx	15	-0.00	0.00	0.00
			Max Tension	12	64.01	0.51	0.33
T2	180 - 160	Leg	Max. Compression	2	-70.33	-0.24	2.79
			Max. Mx	11	-4.38	3.07	-0.21
			Max. My	2	-70.33	-0.24	2.79
			Max. Vy	12	6.36	2.51	1.01
			Max. Vx	8	-6.69	0.12	-2.64
		Diagonal	Max Tension	13	11.56	0.00	0.00
			Max. Compression	13	-13.54	-0.09	-0.06
			Max. Mx	13	3.74	-0.23	0.05
			Max. My	9	-5.82	-0.07	-0.11
			Max. Vy	13	-0.11	0.00	0.00
		Top Girt	Max. Vx	9	0.05	-0.07	-0.11
			Max Tension	10	0.47	0.00	0.00
			Max. Compression	8	-0.48	0.00	0.00
			Max. Mx	14	0.03	-0.01	0.00
			Max. My	15	-0.18	0.00	0.00
		Bottom Girt	Max. Vy	14	0.01	0.00	0.00
			Max. Vx	15	-0.00	0.00	0.00
			Max Tension	10	7.51	0.00	0.00
			Max. Compression	8	-6.11	0.00	0.00
			Max. Mx	14	0.42	-0.01	0.00
		Guy A	Max. My	15	-2.05	0.00	0.00
			Max. Vy	14	0.01	0.00	0.00
			Max. Vx	15	-0.00	0.00	0.00
			Bottom Tension	20	27.45		
			Top Tension	7	27.64		
		Guy B	Top Cable Vert	20	21.24		
			Top Cable Norm	20	17.69		
			Top Cable Tan	20	0.07		
			Bot Cable Vert	7	-20.70		
			Bot Cable Norm	7	18.03		
		Guy B	Bot Cable Tan	7	0.26		
			Bottom Tension	26	27.62		
			Top Tension	13	27.83		
			Top Cable Vert	26	21.38		
			Top Cable Norm	26	17.81		
			Top Cable Tan	26	0.07		

RISATower**CEN TEK Engineering, Inc.**

63-2 N Branford Rd
 Branford, CT 06405
 Phone: (203) 488-0580
 FAX: (203) 488-8587

Job

190' Guyed Rohn Model 80 - w/ Proposed Reinf. ~ Rev 1

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Project

57 Cook Road, Montville, CT

Date

12:57:25 12/08/11

Client

Verizon

Designed by

Jrm

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
T3	160 - 140	Guy C	Bot Cable Vert	13	-20.82		
			Bot Cable Norm	13	18.14		
			Bot Cable Tan	13	0.26		
			Bottom Tension	3	27.02		
			Top Tension	3	27.20		
			Top Cable Vert	3	20.80		
			Top Cable Norm	3	17.53		
			Top Cable Tan	3	0.04		
			Bot Cable Vert	3	-20.36		
			Bot Cable Norm	3	17.76		
		Torque Arm Top	Bot Cable Tan	3	0.25		
			Max Tension	9	19.94	0.00	0.00
			Max. Compression	9	-9.94	0.00	0.00
			Max. Mx	22	1.09	-72.17	-0.00
			Max. My	15	-6.88	-58.39	-0.00
		Leg	Max. Vy	22	21.19	-72.17	-0.00
			Max. Vx	15	-0.00	-58.39	-0.00
			Max Tension	12	15.38	1.98	0.80
			Max. Compression	2	-60.56	0.16	-1.77
			Max. Mx	6	-57.20	-2.08	-0.83
			Max. My	2	-60.55	-0.19	2.24
			Max. Vy	12	6.34	1.98	0.80
			Max. Vx	8	-6.67	0.09	-2.08
		Diagonal	Max Tension	11	7.06	0.00	0.00
			Max. Compression	11	-7.65	0.00	0.00
			Max. Mx	23	-6.10	0.01	0.00
			Max. My	15	0.83	0.00	0.00
			Max. Vy	23	0.01	0.00	0.00
T4	140 - 120	Top Girt	Max. Vx	15	-0.00	0.00	0.00
			Max Tension	2	0.62	0.00	0.00
			Max. Compression	1	0.00	0.00	0.00
			Max. Mx	14	0.24	0.00	0.00
			Max. My	15	0.51	0.00	-0.00
		Bottom Girt	Max. Vy	14	-0.01	0.00	0.00
			Max. Vx	15	0.00	0.00	0.00
			Max Tension	6	1.18	0.00	0.00
			Max. Compression	8	-0.58	0.00	0.00
			Max. Mx	14	0.24	0.00	0.00
		Leg	Max. My	15	0.11	0.00	-0.00
			Max. Vy	14	-0.01	0.00	0.00
			Max. Vx	15	0.00	0.00	0.00
			Max Tension	6	1.13	0.01	0.02
			Max. Compression	16	-54.68	0.17	-0.11
		Diagonal	Max. Mx	5	-38.27	1.00	-0.21
			Max. My	8	-35.77	-0.33	1.02
			Max. Vy	6	3.15	0.53	0.15
			Max. Vx	8	3.19	0.12	0.58
			Max Tension	8	4.22	0.00	0.00
		Top Girt	Max. Compression	2	-5.04	0.00	0.00
			Max. Mx	23	2.62	0.01	0.00
			Max. My	15	1.32	0.00	0.00
			Max. Vy	23	-0.01	0.00	0.00
			Max. Vx	15	-0.00	0.00	0.00
		Bottom Girt	Max Tension	19	0.68	0.00	0.00
			Max. Compression	1	0.00	0.00	0.00
			Max. Mx	14	0.17	0.00	0.00
			Max. My	15	0.23	0.00	-0.00
			Max. Vy	14	-0.01	0.00	0.00
			Max. Vx	15	0.00	0.00	0.00
			Max Tension	16	0.80	0.00	0.00
			Max. Compression	6	-0.12	0.00	0.00

RISATower CEN TEK Engineering, Inc. 63-2 N Branford Rd Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job	190' Guyed Rohn Model 80 - w/ Proposed Reinf. ~ Rev 1	Page	32 of 53
	Project	57 Cook Road, Montville, CT	Date	12:57:25 12/08/11
	Client	Verizon	Designed by	Jrm

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
T5	120 - 100	Leg	Max. Mx	14	0.26	0.00	0.00
			Max. My	26	0.44	0.00	-0.00
			Max. Vy	14	-0.01	0.00	0.00
			Max. Vx	26	0.00	0.00	0.00
			Max Tension	12	27.05	0.43	0.29
		Diagonal	Max. Compression	23	-96.68	1.48	-0.71
			Max. Mx	5	-26.19	-3.32	-0.37
			Max. My	13	-25.97	1.47	3.25
			Max. Vy	6	3.83	-1.82	-0.58
			Max. Vx	8	3.99	-0.03	-1.87
		Top Girt	Max Tension	7	8.78	-0.11	-0.03
			Max. Compression	2	-7.91	0.00	0.00
			Max. Mx	9	2.32	0.16	-0.02
			Max. My	3	-5.41	-0.02	0.06
			Max. Vy	22	-0.08	0.16	-0.02
		Bottom Girt	Max. Vx	3	-0.03	-0.02	0.06
			Max Tension	6	1.91	0.00	0.00
			Max. Compression	4	-0.86	0.00	0.00
			Max. Mx	14	0.37	-0.01	0.00
			Max. My	26	0.62	0.00	0.00
		Guy A	Max. Vy	14	0.01	0.00	0.00
			Max. Vx	26	-0.00	0.00	0.00
			Max Tension	20	-0.00	0.00	0.00
			Bottom Tension	7	18.34	0.00	0.00
			Top Tension	7	18.43	0.00	0.00
		Guy B	Top Cable Vert	7	13.35	0.00	0.00
			Top Cable Norm	7	12.70	0.00	0.00
			Top Cable Tan	7	0.02	0.00	0.00
			Bot Cable Vert	7	-13.14	0.00	0.00
			Bot Cable Norm	7	12.80	0.00	0.00
		Guy C	Bot Cable Tan	7	0.13	0.00	0.00
			Bottom Tension	13	18.23	0.00	0.00
			Top Tension	13	18.31	0.00	0.00
			Top Cable Vert	13	13.26	0.00	0.00
			Top Cable Norm	13	12.62	0.00	0.00
		Torque Arm Top	Top Cable Tan	13	0.02	0.00	0.00
			Bot Cable Vert	13	-13.06	0.00	0.00
			Bot Cable Norm	13	12.72	0.00	0.00
			Bot Cable Tan	13	0.13	0.00	0.00
			Bottom Tension	5	17.77	0.00	0.00
T6	100 - 80	Leg	Top Tension	5	17.85	0.00	0.00
			Top Cable Vert	5	12.94	0.00	0.00
			Top Cable Norm	5	12.30	0.00	0.00
			Top Cable Tan	5	0.02	0.00	0.00
			Bot Cable Vert	5	-12.73	0.00	0.00
			Bot Cable Norm	5	12.40	0.00	0.00
			Bot Cable Tan	5	0.13	0.00	0.00
			Max Tension	3	13.92	0.00	0.00
			Max. Compression	3	-7.09	0.00	0.00
			Max. Mx	3	0.16	-45.11	0.00
		Leg	Max. My	20	-2.51	-23.11	0.00
			Max. Vy	3	13.26	-45.11	0.00
			Max. Vx	20	0.00	-23.11	0.00
			Max Tension	12	1.54	1.02	0.69
			Max. Compression	23	-94.56	-0.02	-0.05
			Max. Mx	10	-86.22	1.51	-0.76

RISATower CEN TEK Engineering, Inc. 63-2 N Branford Rd Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job	Page
	190' Guyed Rohn Model 80 - w/ Proposed Reinf. ~ Rev 1	33 of 53
	Project	Date
	57 Cook Road, Montville, CT	12:57:25 12/08/11
	Client	Designed by
	Verizon	Jrm

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
T7	80 - 60	Diagonal	Max. My	2	-84.92	0.18	1.66
			Max. Vy	4	-2.86	-1.12	0.49
			Max. Vx	8	-3.15	-0.22	-1.23
			Max Tension	8	2.50	0.00	0.00
			Max. Compression	13	-2.85	0.00	0.00
			Max. Mx	15	-1.22	0.00	0.00
		Top Girt	Max. My	15	0.47	0.00	0.00
			Max. Vy	15	-0.00	0.00	0.00
			Max. Vx	15	-0.00	0.00	0.00
			Max Tension	6	0.86	0.00	0.00
			Max. Compression	4	-0.29	0.00	0.00
			Max. Mx	14	0.21	0.00	0.00
		Bottom Girt	Max. My	20	0.35	0.00	-0.00
			Max. Vy	14	0.00	0.00	0.00
			Max. Vx	20	-0.00	0.00	0.00
			Max Tension	15	0.50	0.00	0.00
			Max. Compression	1	0.00	0.00	0.00
			Max. Mx	14	0.26	0.00	0.00
		Leg	Max. My	20	0.43	0.00	-0.00
			Max. Vy	14	0.00	0.00	0.00
			Max. Vx	20	-0.00	0.00	0.00
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	19	-100.37	0.55	0.40
			Max. Mx	5	-38.81	-2.22	-0.33
		Diagonal	Max. My	2	-84.79	-0.00	2.22
			Max. Vy	6	-3.95	-1.95	-1.08
			Max. Vx	2	4.45	-0.00	2.22
			Max Tension	7	3.98	0.04	0.01
			Max. Compression	7	-5.20	0.01	-0.01
			Max. Mx	5	0.64	-0.05	0.01
		Top Girt	Max. My	5	-4.22	-0.00	-0.02
			Max. Vy	18	0.03	-0.05	0.00
			Max. Vx	5	-0.01	0.00	0.00
			Max Tension	22	0.89	0.00	0.00
			Max. Compression	1	0.00	0.00	0.00
			Max. Mx	14	0.46	0.00	0.00
		Bottom Girt	Max. My	20	0.72	0.00	-0.00
			Max. Vy	14	-0.01	0.00	0.00
			Max. Vx	20	0.00	0.00	0.00
			Max Tension	6	1.68	0.00	0.00
			Max. Compression	4	-0.42	0.00	0.00
			Max. Mx	14	0.54	0.00	0.00
		Guy A	Max. My	19	0.48	0.00	0.00
			Max. Vy	14	-0.01	0.00	0.00
			Max. Vx	19	-0.00	0.00	0.00
			Bottom Tension	7	9.53		
			Top Tension	7	9.56		
			Top Cable Vert	7	5.17		
		Guy B	Top Cable Norm	7	8.05		
			Top Cable Tan	7	0.00		
			Bot Cable Vert	7	-5.07		
			Bot Cable Norm	7	8.07		
			Bot Cable Tan	7	0.05		
			Bottom Tension	13	9.49		
			Top Tension	13	9.52		
			Top Cable Vert	13	5.15		
			Top Cable Norm	13	8.01		
			Top Cable Tan	13	0.00		
			Bot Cable Vert	13	-5.05		
			Bot Cable Norm	13	8.04		
			Bot Cable Tan	13	0.05		

RISATower CENTEK Engineering, Inc. 63-2 N Branford Rd Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job	190' Guyed Rohn Model 80 - w/ Proposed Reinf. ~ Rev 1	Page	34 of 53
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Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
T8	60 - 40	Guy C	Bottom Tension	5	9.42		
			Top Tension	5	9.46		
			Top Cable Vert	5	5.11		
			Top Cable Norm	5	7.96		
			Top Cable Tan	5	0.00		
			Bot Cable Vert	5	-5.01		
			Bot Cable Norm	5	7.98		
		Torque Arm Top	Bot Cable Tan	5	0.05		
			Max Tension	5	9.04	0.00	0.00
			Max. Compression	5	-4.64	0.00	0.00
			Max. Mx	5	0.12	-17.42	-0.00
			Max. My	19	-2.97	-12.19	0.00
			Max. Vy	5	5.16	-17.42	-0.00
			Max. Vx	19	0.00	-12.19	0.00
		Leg	Max Tension	1	0.00	0.00	0.00
			Max. Compression	19	-94.74	0.54	0.23
			Max. Mx	6	-80.80	-1.62	-0.90
			Max. My	2	-80.63	-0.00	1.85
			Max. Vy	6	-3.98	-1.62	-0.90
			Max. Vx	2	4.49	-0.00	1.85
		Diagonal	Max Tension	5	3.26	0.03	-0.00
			Max. Compression	5	-4.60	-0.01	-0.00
			Max. Mx	19	1.44	0.03	-0.00
			Max. My	23	-3.37	-0.01	0.00
			Max. Vy	19	0.02	0.00	0.00
			Max. Vx	23	-0.00	0.00	0.00
		Top Girt	Max Tension	6	0.91	0.00	0.00
			Max. Compression	1	0.00	0.00	0.00
			Max. Mx	14	0.52	0.00	0.00
			Max. My	19	0.81	0.00	0.00
			Max. Vy	14	-0.01	0.00	0.00
			Max. Vx	19	-0.00	0.00	0.00
		Bottom Girt	Max Tension	13	1.18	0.00	0.00
			Max. Compression	1	0.00	0.00	0.00
			Max. Mx	14	0.54	0.00	0.00
			Max. My	6	0.16	0.00	0.00
			Max. Vy	14	-0.01	0.00	0.00
			Max. Vx	6	-0.00	0.00	0.00
		T9	40 - 20	Leg	Max Tension	1	0.00
Max. Compression	24				-71.11	-0.48	-0.04
Max. Mx	19				-63.57	-0.92	-0.39
Max. My	15				-63.32	0.05	0.99
Max. Vy	11				1.66	0.83	-0.21
Max. Vx	2				1.59	-0.00	0.90
Diagonal	Max Tension			5	2.59	0.00	0.00
	Max. Compression			11	-2.93	0.00	0.00
	Max. Mx			18	-0.54	0.00	0.00
	Max. My			25	-0.12	0.00	0.00
	Max. Vy			18	-0.00	0.00	0.00
	Max. Vx			25	0.00	0.00	0.00
Top Girt	Max Tension			23	0.97	0.00	0.00
	Max. Compression			5	-0.66	0.00	0.00
	Max. Mx			14	0.12	0.00	0.00
	Max. My			20	0.83	0.00	-0.00
	Max. Vy			14	0.00	0.00	0.00
	Max. Vx			20	-0.00	0.00	0.00
Bottom Girt	Max Tension			18	0.36	0.00	0.00
	Max. Compression			12	-0.11	0.00	0.00
	Max. Mx			14	0.13	0.00	0.00
	Max. My			18	0.19	0.00	0.00
	Max. Vy			14	0.00	0.00	0.00

RISATower CENTEK Engineering, Inc. 63-2 N Branford Rd Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job	190' Guyed Rohn Model 80 - w/ Proposed Reinf. ~ Rev 1	Page	35 of 53
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Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
T10	20 - 5	Leg	Max. Vx	18	-0.00	0.00	0.00
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	24	-71.02	-0.41	0.17
			Max. Mx	26	-64.81	1.37	0.74
			Max. My	22	-64.75	-0.04	-1.55
			Max. Vy	18	7.51	-1.33	0.80
		Diagonal	Max. Vx	22	8.39	-0.04	-1.55
			Max Tension	13	3.17	0.00	0.00
			Max. Compression	7	-2.81	0.00	0.00
			Max. Mx	18	1.98	0.01	0.00
			Max. My	25	0.15	0.00	0.00
			Max. Vy	18	-0.01	0.00	0.00
		Top Girt	Max. Vx	25	-0.00	0.00	0.00
			Max Tension	12	0.64	0.00	0.00
			Max. Compression	6	-0.13	0.00	0.00
			Max. Mx	14	0.17	0.00	0.00
			Max. My	6	0.33	0.00	0.00
			Max. Vy	14	-0.01	0.00	0.00
		Bottom Girt	Max. Vx	6	-0.00	0.00	0.00
			Max Tension	19	4.11	0.00	0.00
			Max. Compression	1	0.00	0.00	0.00
			Max. Mx	23	4.11	0.00	0.00
			Max. My	6	3.04	0.00	0.00
			Max. Vy	23	-0.01	0.00	0.00
T11	5 - 0	Leg	Max. Vx	6	-0.00	0.00	0.00
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	23	-70.75	0.16	-0.03
			Max. Mx	19	-63.72	-1.69	-0.01
			Max. My	8	-35.18	-1.23	-0.28
			Max. Vy	19	16.99	1.47	-0.09
		Top Girt	Max. Vx	11	0.92	-1.51	-0.26
			Max Tension	15	11.17	0.21	-0.08
			Max. Compression	1	0.00	0.00	0.00
			Max. Mx	7	9.61	0.40	-0.11
			Max. My	23	10.95	0.21	-0.15
			Max. Vy	7	-0.12	0.40	-0.11
		Bottom Girt	Max. Vx	22	-0.02	0.27	-0.08
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	19	-3.03	0.70	-0.29
			Max. Mx	6	-2.82	0.83	-0.35
			Max. My	6	-2.82	0.83	-0.35
			Max. Vy	13	2.00	0.82	-0.28
		Mid Girt	Max. Vx	6	0.66	0.16	-0.13
			Max Tension	2	0.11	0.00	0.00
			Max. Compression	22	-0.64	0.00	0.00
			Max. Mx	17	-0.44	-0.01	0.00
			Max. My	18	-0.47	0.00	-0.00
			Max. Vy	17	0.01	0.00	0.00
			Max. Vx	18	0.00	0.00	0.00

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Mast	Max. Vert	23	190.46	1.40	-0.76
	Max. H _x	12	122.13	3.26	1.89

RISATower

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Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Guy C @ 140 ft Elev 0 ft Azimuth 240 deg	Max. H _z	2	167.00	0.03	2.61
	Max. M _x	1	0.00	0.03	0.01
	Max. M _z	1	0.00	0.03	0.01
	Max. Torsion	1	0.00	0.03	0.01
	Min. Vert	1	90.69	0.03	0.01
	Min. H _x	4	122.00	-3.22	1.88
	Min. H _z	8	122.28	0.01	-3.74
	Min. M _x	1	0.00	0.03	0.01
	Min. M _z	1	0.00	0.03	0.01
	Min. Torsion	1	0.00	0.03	0.01
Guy B @ 140 ft Elev 0 ft Azimuth 120 deg	Max. Vert	10	-0.62	-0.29	0.17
	Max. H _x	10	-0.62	-0.29	0.17
	Max. H _z	16	-39.20	-29.64	17.87
	Min. Vert	3	-39.65	-29.66	17.73
	Min. H _x	18	-39.12	-30.22	16.72
	Min. H _z	10	-0.62	-0.29	0.17
	Max. Vert	6	-0.63	0.30	0.17
	Max. H _x	24	-39.89	30.79	17.04
	Max. H _z	26	-39.72	30.05	18.04
	Min. Vert	11	-40.22	30.60	17.09
Guy A @ 140 ft Elev 0 ft Azimuth 0 deg	Min. H _x	6	-0.63	0.30	0.17
	Min. H _z	6	-0.63	0.30	0.17
	Max. Vert	2	-0.63	-0.00	-0.34
	Max. H _x	24	-21.06	1.11	-18.30
	Max. H _z	2	-0.63	-0.00	-0.34
	Min. Vert	9	-40.05	0.53	-34.91
	Min. H _x	18	-20.75	-1.11	-18.03
	Min. H _z	22	-39.71	0.67	-35.04
	Max. Vert	10	-0.26	-0.17	0.10
	Max. H _x	10	-0.26	-0.17	0.10
Guy C @ 100 ft Elev 0 ft Azimuth 240 deg	Max. H _z	3	-35.12	-34.72	20.45
	Min. Vert	5	-35.14	-35.11	19.87
	Min. H _x	5	-35.14	-35.11	19.87
	Min. H _z	10	-0.26	-0.17	0.10
	Max. Vert	6	-0.26	0.17	0.10
	Max. H _x	11	-34.59	34.57	19.57
	Max. H _z	13	-34.65	34.33	20.14
	Min. Vert	13	-34.65	34.33	20.14
	Min. H _x	6	-0.26	0.17	0.10
	Min. H _z	6	-0.26	0.17	0.10
Guy B @ 100 ft Elev 0 ft Azimuth 120 deg	Max. Vert	2	-0.26	-0.00	-0.19
	Max. H _x	24	-16.61	0.89	-19.26
	Max. H _z	2	-0.26	-0.00	-0.19
	Min. Vert	7	-34.87	-0.28	-40.05
	Min. H _x	18	-16.84	-0.90	-19.54
	Min. H _z	7	-34.87	-0.28	-40.05
	Max. H _x	24	-16.61	0.89	-19.26
	Max. H _z	2	-0.26	-0.00	-0.19
	Min. Vert	7	-34.87	-0.28	-40.05
	Min. H _x	18	-16.84	-0.90	-19.54

RISATower

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Tower Mast Reaction Summary

Load Combination	Vertical K	Shear _x K	Shear _z K	Overturning Moment, M _x kip-ft	Overturning Moment, M _z kip-ft	Torque kip-ft
Dead Only	90.69	-0.03	-0.01	0.00	0.00	0.00
Dead+Wind 0 deg - No Ice+Guy	167.00	-0.03	-2.61	0.00	0.00	0.00
Dead+Wind 30 deg - No Ice+Guy	152.85	1.89	-2.41	0.00	0.00	0.00
Dead+Wind 60 deg - No Ice+Guy	122.00	3.22	-1.88	0.00	0.00	0.00
Dead+Wind 90 deg - No Ice+Guy	152.80	3.02	-0.47	0.00	0.00	0.00
Dead+Wind 120 deg - No Ice+Guy	166.96	2.23	1.30	0.00	0.00	0.00
Dead+Wind 150 deg - No Ice+Guy	152.82	1.09	2.86	0.00	0.00	0.00
Dead+Wind 180 deg - No Ice+Guy	122.28	-0.01	3.74	0.00	0.00	0.00
Dead+Wind 210 deg - No Ice+Guy	152.95	-1.15	2.86	0.00	0.00	0.00
Dead+Wind 240 deg - No Ice+Guy	167.10	-2.29	1.29	0.00	0.00	0.00
Dead+Wind 270 deg - No Ice+Guy	152.94	-3.07	-0.47	0.00	0.00	0.00
Dead+Wind 300 deg - No Ice+Guy	122.13	-3.26	-1.89	0.00	0.00	0.00
Dead+Wind 330 deg - No Ice+Guy	152.85	-1.95	-2.41	0.00	0.00	0.00
Dead+Ice+Temp+Guy	128.69	-0.03	-0.03	0.00	0.00	0.00
Dead+Wind 0 deg+Ice+Temp+Guy	190.28	-0.04	-1.60	0.00	0.00	0.00
Dead+Wind 30 deg+Ice+Temp+Guy	180.76	1.37	-1.51	0.00	0.00	0.00
Dead+Wind 60 deg+Ice+Temp+Guy	163.36	2.22	-1.34	0.00	0.00	0.00
Dead+Wind 90 deg+Ice+Temp+Guy	180.75	1.95	-0.51	0.00	0.00	0.00
Dead+Wind 120 deg+Ice+Temp+Guy	190.30	1.33	0.76	0.00	0.00	0.00
Dead+Wind 150 deg+Ice+Temp+Guy	180.75	0.53	1.94	0.00	0.00	0.00
Dead+Wind 180 deg+Ice+Temp+Guy	163.58	-0.04	2.58	0.00	0.00	0.00
Dead+Wind 210 deg+Ice+Temp+Guy	180.99	-0.61	1.93	0.00	0.00	0.00
Dead+Wind 240 deg+Ice+Temp+Guy	190.46	-1.40	0.76	0.00	0.00	0.00
Dead+Wind 270 deg+Ice+Temp+Guy	180.97	-2.02	-0.51	0.00	0.00	0.00
Dead+Wind 300 deg+Ice+Temp+Guy	163.49	-2.29	-1.33	0.00	0.00	0.00
Dead+Wind 330 deg+Ice+Temp+Guy	180.75	-1.45	-1.51	0.00	0.00	0.00
Dead+Wind 0 deg - Service+Guy	91.37	-0.03	-1.14	0.00	0.00	0.00
Dead+Wind 30 deg - Service+Guy	91.41	0.54	-0.98	0.00	0.00	0.00
Dead+Wind 60 deg - Service+Guy	91.49	0.95	-0.57	0.00	0.00	0.00

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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+ Wind 90 deg - Service+Guy	91.39	1.11	-0.00	0.00	0.00	0.00
Dead+ Wind 120 deg - Service+Guy	91.34	0.96	0.56	0.00	0.00	0.00
Dead+ Wind 150 deg - Service+Guy	91.42	0.54	0.97	0.00	0.00	0.00
Dead+ Wind 180 deg - Service+Guy	91.52	-0.03	1.12	0.00	0.00	0.00
Dead+ Wind 210 deg - Service+Guy	91.45	-0.59	0.97	0.00	0.00	0.00
Dead+ Wind 240 deg - Service+Guy	91.40	-1.01	0.56	0.00	0.00	0.00
Dead+ Wind 270 deg - Service+Guy	91.45	-1.16	-0.00	0.00	0.00	0.00
Dead+ Wind 300 deg - Service+Guy	91.52	-1.00	-0.57	0.00	0.00	0.00
Dead+ Wind 330 deg - Service+Guy	91.43	-0.59	-0.98	0.00	0.00	0.00

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	-37.60	0.00	-0.00	37.60	-0.00	0.002%
2	0.00	-37.80	-68.38	-0.00	37.80	68.38	0.001%
3	34.10	-37.60	-59.08	-34.10	37.60	59.08	0.001%
4	59.03	-37.40	-34.09	-59.03	37.40	34.09	0.002%
5	68.21	-37.60	-0.00	-68.21	37.60	0.00	0.001%
6	59.21	-37.80	34.19	-59.21	37.80	-34.19	0.001%
7	34.10	-37.60	59.08	-34.10	37.60	-59.08	0.001%
8	-0.00	-37.40	68.17	-0.00	37.40	-68.17	0.002%
9	-34.10	-37.60	59.08	34.10	37.60	-59.08	0.001%
10	-59.21	-37.80	34.19	59.21	37.80	-34.19	0.001%
11	-68.21	-37.60	0.00	68.21	37.60	0.00	0.001%
12	-59.03	-37.40	-34.09	59.03	37.40	34.09	0.001%
13	-34.10	-37.60	-59.08	34.10	37.60	59.08	0.001%
14	0.00	-68.29	0.00	-0.00	68.29	0.00	0.001%
15	0.00	-68.68	-63.30	-0.00	68.68	63.30	0.001%
16	31.42	-68.29	-54.43	-31.42	68.29	54.43	0.001%
17	54.16	-67.90	-31.27	-54.16	67.90	31.27	0.002%
18	62.84	-68.29	-0.00	-62.83	68.29	0.00	0.001%
19	54.81	-68.68	31.65	-54.81	68.68	-31.65	0.001%
20	31.42	-68.29	54.43	-31.42	68.29	-54.43	0.001%
21	-0.00	-67.90	62.55	-0.00	67.90	-62.55	0.001%
22	-31.42	-68.29	54.43	31.42	68.29	-54.43	0.001%
23	-54.81	-68.68	31.65	54.81	68.68	-31.65	0.001%
24	-62.84	-68.29	0.00	62.83	68.29	0.00	0.001%
25	-54.16	-67.90	-31.27	54.16	67.90	31.27	0.002%
26	-31.42	-68.29	-54.43	31.42	68.29	54.43	0.001%
27	0.00	-37.65	-18.94	-0.00	37.65	18.94	0.001%
28	9.45	-37.60	-16.37	-9.45	37.60	16.37	0.001%
29	16.35	-37.54	-9.44	-16.35	37.54	9.44	0.002%
30	18.89	-37.60	-0.00	-18.89	37.60	0.00	0.002%
31	16.40	-37.65	9.47	-16.40	37.65	-9.47	0.001%
32	9.45	-37.60	16.37	-9.45	37.60	-16.37	0.002%
33	-0.00	-37.54	18.88	-0.00	37.54	-18.88	0.003%
34	-9.45	-37.60	16.37	9.45	37.60	-16.37	0.001%

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Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
35	-16.40	-37.65	9.47	16.40	37.65	-9.47	0.001%
36	-18.89	-37.60	0.00	18.89	37.60	0.00	0.001%
37	-16.35	-37.54	-9.44	16.35	37.54	9.44	0.003%
38	-9.45	-37.60	-16.37	9.45	37.60	16.36	0.002%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	10	0.00000001	0.00006433
2	Yes	20	0.00000001	0.00008054
3	Yes	20	0.00000001	0.00005057
4	Yes	17	0.00006693	0.00004985
5	Yes	20	0.00000001	0.00006685
6	Yes	20	0.00000001	0.00009076
7	Yes	20	0.00000001	0.00006325
8	Yes	18	0.00009449	0.00009003
9	Yes	20	0.00000001	0.00005488
10	Yes	20	0.00000001	0.00007817
11	Yes	20	0.00000001	0.00006752
12	Yes	18	0.00006373	0.00006112
13	Yes	20	0.00000001	0.00006140
14	Yes	9	0.00000001	0.00006547
15	Yes	20	0.00004178	0.00008423
16	Yes	20	0.00000001	0.00005258
17	Yes	15	0.00008225	0.00006518
18	Yes	20	0.00000001	0.00007350
19	Yes	20	0.00004129	0.00009827
20	Yes	20	0.00000001	0.00006623
21	Yes	17	0.00007151	0.00005782
22	Yes	20	0.00000001	0.00005561
23	Yes	20	0.00004275	0.00009100
24	Yes	20	0.00000001	0.00007413
25	Yes	16	0.00008172	0.00007183
26	Yes	20	0.00000001	0.00006454
27	Yes	12	0.00000001	0.00004677
28	Yes	12	0.00000001	0.00003665
29	Yes	10	0.00000001	0.00006891
30	Yes	11	0.00000001	0.00008558
31	Yes	12	0.00000001	0.00004119
32	Yes	11	0.00000001	0.00008385
33	Yes	10	0.00000001	0.00009528
34	Yes	12	0.00000001	0.00004620
35	Yes	12	0.00000001	0.00005943
36	Yes	12	0.00000001	0.00004489
37	Yes	10	0.00000001	0.00009171
38	Yes	11	0.00000001	0.00009544

Maximum Tower Deflections - Service Wind

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Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	190 - 180	3.853	36	0.2204	0.2312
T2	180 - 160	3.398	36	0.2127	0.2315
T3	160 - 140	2.660	36	0.1113	0.2077
T4	140 - 120	2.411	29	0.1008	0.2089
T5	120 - 100	1.960	29	0.1437	0.1210
T6	100 - 80	1.355	29	0.1131	0.0825
T7	80 - 60	0.991	29	0.0744	0.0511
T8	60 - 40	0.750	29	0.0358	0.0352
T9	40 - 20	0.641	27	0.0389	0.0430
T10	20 - 5	0.414	37	0.0781	0.0679
T11	5 - 0	0.110	37	0.1007	0.0809

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
188.75	20' x 3" Dia Omni	36	3.796	0.2205	0.2317	52355
188.00	APX16PV-16PVL-X w/mount pipe	36	3.761	0.2206	0.2320	52355
180.00	2' x 2" Dia Omni	36	3.398	0.2127	0.2315	25634
178.75	(2) 7770.00	36	3.342	0.2091	0.2305	22455
177.50	Rohn 6'x12' Boom Gate (3)	36	3.288	0.2046	0.2292	19888
170.25	FG4605	36	2.990	0.1674	0.2185	11579
169.00	Pirol 15' T-Frame Sector Mount (1)	36	2.943	0.1599	0.2166	10796
162.50	Guy	36	2.727	0.1228	0.2087	8099
155.50	4 Bay Dipole	36	2.562	0.0973	0.2094	11417
150.50	Rohn 6'x12' Boom Gate (3)	33	2.500	0.0908	0.2135	31028
150.00	(2) DB980H90E-M	33	2.495	0.0906	0.2139	37284
147.00	FG4607	33	2.466	0.0910	0.2153	22685
140.33	(4) DB844H90E-XY	29	2.415	0.1001	0.2097	9017
130.00	(2) 800-10504	29	2.234	0.1259	0.1686	12178
126.00	DB408	29	2.133	0.1345	0.1484	15450
122.50	3' Standoff	29	2.035	0.1407	0.1316	20274
121.00	PD220	29	1.991	0.1428	0.1250	23675
120.00	LLPX310R	29	1.960	0.1437	0.1210	26896
111.00	Folded Dipole	29	1.676	0.1407	0.0971	34858
110.00	3'-6" Standoff	29	1.644	0.1388	0.0954	29873
106.00	2' x 2" Dia Omni	29	1.521	0.1292	0.0898	19004
105.00	2' Standoff	29	1.492	0.1265	0.0886	17419
102.50	Guy	29	1.421	0.1197	0.0856	14601
62.50	Guy	29	0.772	0.0392	0.0358	23891

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	190 - 180	28.590	10	1.2932	1.2815
T2	180 - 160	26.122	10	1.2820	1.2821
T3	160 - 140	21.717	10	0.9792	1.1911
T4	140 - 120	18.555	6	0.9599	1.1439
T5	120 - 100	14.791	6	1.0702	0.7662

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Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T6	100 - 80	10.750	6	0.8638	0.5894
T7	80 - 60	7.781	6	0.6307	0.3720
T8	60 - 40	5.539	6	0.4217	0.2699
T9	40 - 20	4.043	6	0.3784	0.2924
T10	20 - 5	2.322	6	0.4905	0.3667
T11	5 - 0	0.603	6	0.5619	0.3683

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
188.75	20' x 3" Dia Omni	10	28.280	1.2956	1.2830	22424
188.00	APX16PV-16PVL-X w/mount pipe	10	28.094	1.2969	1.2839	22424
180.00	2' x 2" Dia Omni	10	26.122	1.2820	1.2821	10326
178.75	(2) 7770.00	10	25.818	1.2713	1.2786	8692
177.50	Rohn 6'x12' Boom Gate (3)	10	25.516	1.2581	1.2742	7385
170.25	FG4605	10	23.820	1.1466	1.2364	3763
169.00	Piord 15' T-Frame Sector Mount (1)	10	23.541	1.1241	1.2292	3468
162.50	Guy	10	22.186	1.0131	1.1976	2494
155.50	4 Bay Dipole	10	20.948	0.9390	1.1894	3669
150.50	Rohn 6'x12' Boom Gate (3)	10	20.169	0.9226	1.1922	11700
150.00	(2) DB980H90E-M	10	20.094	0.9224	1.1921	14696
147.00	FG4607	10	19.641	0.9258	1.1886	9515
140.33	(4) DB844H90E-XY	6	18.606	0.9577	1.1476	2927
130.00	(2) 800-10504	6	16.809	1.0375	0.9656	4043
126.00	DB408	6	16.024	1.0611	0.8796	5289
122.50	3' Standoff	6	15.311	1.0713	0.8095	7273
121.00	PD220	6	15.000	1.0716	0.7826	8794
120.00	LLPX310R	6	14.791	1.0702	0.7662	10341
111.00	Folded Dipole	6	12.900	1.0058	0.6669	6254
110.00	3'-6" Standoff	6	12.693	0.9943	0.6595	5652
106.00	2' x 2" Dia Omni	6	11.883	0.9434	0.6326	4081
105.00	2' Standoff	6	11.687	0.9298	0.6260	3816
102.50	Guy	6	11.207	0.8967	0.6089	3312
62.50	Guy	6	5.773	0.4423	0.2745	3963

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	190	Leg	A325N	0.7500	4	0.00	19.44	0.000 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.6250	2	1.96	6.44	0.305 ✓	1.333	Bolt Shear
		Top Girt	A325N	0.6250	2	0.11	6.44	0.017 ✓	1.333	Bolt Shear
		Bottom Girt	A325N	0.6250	2	0.38	6.44	0.059 ✓	1.333	Bolt Shear
T2	180	Leg	A325N	0.7500	4	2.62	19.41	0.135 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.6250	2	6.77	6.44	1.050 ✓	1.333	Bolt Shear

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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
T3	160	Top Girt	A325N	0.6250	2	0.24	6.44	0.037 ✓	1.333	Bolt Shear
		Bottom Girt	A325N	0.6250	2	3.76	6.44	0.583 ✓	1.333	Bolt Shear
		Leg	A325N	0.7500	4	3.85	19.11	0.201 ✓	1.333	Bolt Tension
		Diagonal	A490X	0.5000	1	7.06	6.62	1.067 ✓	1.333	Member Bearing
T4	140	Top Girt	A325N	0.5000	1	0.62	4.12	0.150 ✓	1.333	Bolt Shear
		Bottom Girt	A325N	0.5000	1	1.18	4.12	0.287 ✓	1.333	Bolt Shear
		Leg	A325N	0.7500	4	0.04	19.43	0.002 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.5000	1	5.04	4.12	1.222 ✓	1.333	Bolt Shear
T5	120	Top Girt	A325N	0.5000	1	0.68	4.12	0.165 ✓	1.333	Bolt Shear
		Bottom Girt	A325N	0.5000	1	0.80	4.12	0.193 ✓	1.333	Bolt Shear
		Leg	A325N	0.7500	4	0.00	19.32	0.000 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.6250	2	4.39	6.44	0.682 ✓	1.333	Bolt Shear
T6	100	Top Girt	A325N	0.6250	2	0.95	6.44	0.148 ✓	1.333	Bolt Shear
		Bottom Girt	A325N	0.6250	2	1.89	6.44	0.294 ✓	1.333	Bolt Shear
		Leg	A325N	0.7500	4	0.39	19.37	0.020 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.5000	1	2.50	3.30	0.757 ✓	1.333	Member Bearing
T7	80	Top Girt	A325N	0.5000	1	0.86	3.30	0.262 ✓	1.333	Member Bearing
		Bottom Girt	A325N	0.5000	1	0.50	3.30	0.152 ✓	1.333	Member Bearing
		Leg	A325N	0.7500	4	0.00	19.44	0.000 ✓	1.333	Bolt Tension
		Diagonal	A490X	0.5000	1	5.20	7.85	0.663 ✓	1.333	Bolt Shear
T8	60	Top Girt	A325N	0.5000	1	0.89	4.12	0.215 ✓	1.333	Bolt Shear
		Bottom Girt	A325N	0.5000	1	1.68	4.12	0.408 ✓	1.333	Bolt Shear
		Leg	A325N	0.7500	4	0.00	19.29	0.000 ✓	1.333	Bolt Tension
		Diagonal	A490X	0.5000	1	4.60	7.85	0.585 ✓	1.333	Bolt Shear
T9	40	Top Girt	A325N	0.5000	1	0.91	4.12	0.220 ✓	1.333	Bolt Shear
		Bottom Girt	A325N	0.5000	1	1.18	4.12	0.286 ✓	1.333	Bolt Shear
		Leg	A325N	0.7500	4	0.00	19.42	0.000 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.5000	1	2.59	3.30	0.785 ✓	1.333	Member Bearing
T10	20	Top Girt	A325N	0.5000	1	0.97	3.30	0.294 ✓	1.333	Member Bearing
		Bottom Girt	A325N	0.5000	1	0.36	3.30	0.108 ✓	1.333	Member Bearing
		Leg	A325N	0.7500	4	0.00	19.44	0.000 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.5000	1	3.17	4.12	0.770 ✓	1.333	Bolt Shear
T11	5	Top Girt	A325N	0.5000	1	0.64	4.12	0.156 ✓	1.333	Bolt Shear
		Bottom Girt	A325N	0.5000	1	4.11	4.12	0.998 ✓	1.333	Bolt Shear
		Leg	A325N	0.7500	4	0.00	17.28	0.000 ✓	1.333	Bolt Tension

Guy Design Data

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Section No.	Elevation ft	Size	Initial Tension K	Breaking Load K	Actual T K	Allowable T _a K	Required S.F.	Actual S.F.
T2	162.50 (A) (516)	3/4 EHS	5.83	58.30	26.34	29.15	2.000	2.214 ✓
	162.50 (A) (517)	3/4 EHS	5.83	58.30	27.64	29.15	2.000	2.109 ✓
	162.50 (B) (512)	3/4 EHS	5.83	58.30	27.83	29.15	2.000	2.095 ✓
	162.50 (B) (513)	3/4 EHS	5.83	58.30	27.20	29.15	2.000	2.143 ✓
	162.50 (C) (508)	3/4 EHS	5.83	58.30	27.20	29.15	2.000	2.143 ✓
	162.50 (C) (509)	3/4 EHS	5.83	58.30	26.32	29.15	2.000	2.215 ✓
T5	102.50 (A) (528)	5/8 EHS	4.24	42.40	17.46	21.20	2.000	2.428 ✓
	102.50 (A) (529)	5/8 EHS	4.24	42.40	18.43	21.20	2.000	2.301 ✓
	102.50 (B) (524)	5/8 EHS	4.24	42.40	18.31	21.20	2.000	2.316 ✓
	102.50 (B) (525)	5/8 EHS	4.24	42.40	17.58	21.20	2.000	2.412 ✓
	102.50 (C) (520)	5/8 EHS	4.24	42.40	17.85	21.20	2.000	2.375 ✓
	102.50 (C) (521)	5/8 EHS	4.24	42.40	17.62	21.20	2.000	2.407 ✓
T7	62.50 (A) (540)	1/2 EHS	2.69	26.90	9.15	13.45	2.000	2.941 ✓
	62.50 (A) (541)	1/2 EHS	2.69	26.90	9.56	13.45	2.000	2.813 ✓
	62.50 (B) (536)	1/2 EHS	2.69	26.90	9.52	13.45	2.000	2.825 ✓
	62.50 (B) (537)	1/2 EHS	2.69	26.90	9.10	13.45	2.000	2.957 ✓
	62.50 (C) (532)	1/2 EHS	2.69	26.90	9.39	13.45	2.000	2.863 ✓
	62.50 (C) (533)	1/2 EHS	2.69	26.90	9.46	13.45	2.000	2.845 ✓

Compression Checks

Leg Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	Mast Stability Index	F _a ksi	A in ²	Actual P K	Allow. P _a K	Ratio P P _a
T1	190 - 180	P2.5x.276	10.00	2.46	31.9 K=1.00	1.00	26.912	2.2535	-13.63	60.65	0.225
T2	180 - 160	P2.5x.276	20.00	2.41	31.3 K=1.00	1.00	26.986	2.2535	-70.33	60.82	1.156 ✓
T3	160 - 140	P2.5x.276	20.00	2.41	31.3 K=1.00	0.98	26.579	2.2535	-60.56	59.90	1.011 ✓
T4	140 - 120	P2.5x.276	20.00	2.41	31.3 K=1.00	0.97	26.263	2.2535	-54.68	59.18	0.924 ✓
T5	120 - 100	P3x.3	20.00	2.41	25.5	0.97	26.900	3.0159	-96.68	81.13	1.192 ✓

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Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	Mast Stability Index	F _a ksi	A in ²	Actual P K	Allow. P _a K	Ratio P P _a
T6	100 - 80	P3x.3	20.00	2.41	K=1.00 25.5	0.99	27.543	3.0159	-94.56	83.07	1.138 ✓
T7	80 - 60	P3x.3	20.00	2.41	K=1.00 25.5	0.99	27.534	3.0159	-100.37	83.04	1.209 ✓
T8	60 - 40	P3x.3	20.00	2.41	K=1.00 25.5	0.96	26.525	3.0159	-94.74	80.00	1.184 ✓
T9	40 - 20	P3x.3	20.00	2.41	K=1.00 51.0	1.00	24.201	3.0159	-71.11	72.99	0.974 ✓
T10	20 - 5	P3x.3	15.00	2.38	K=2.00 50.3	1.00	24.297	3.0159	-71.02	73.28	0.969 ✓
T11	5 - 0	P3x.3	5.38	1.55	K=2.00 16.4 K=1.00	0.91	26.144	3.0159	-70.75	78.85	0.897 ✓

Diagonal 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	190 - 180	L2x2x1/4	4.21	1.74	70.1 K=1.31	16.417	0.9380	-3.93	15.40	0.255 ✓
T2	180 - 160	L2x2x1/4	4.18	1.73	69.9 K=1.31	16.446	0.9380	-13.54	15.43	0.877 ✓
T3	160 - 140	ROHN TS1.5x11 ga	4.18	3.89	95.3 K=1.00	14.702	0.5202	-7.65	7.65	1.000 ✓
T4	140 - 120	ROHN TS1.5x11 ga	4.18	3.89	95.3 K=1.00	14.702	0.5202	-5.04	7.65	0.659 ✓
T5	120 - 100	L2x2x1/4	4.18	1.70	69.1 K=1.33	16.522	0.9380	-7.91	15.50	0.511 ✓
T6	100 - 80	ROHN TS1.5x16 ga	4.18	3.83	90.1 K=1.00	15.535	0.2706	-2.85	4.20	0.679 ✓
T7	80 - 60	ROHN TS1.5x11 ga	4.18	1.91	46.9 K=1.00	18.622	0.5202	-5.20	9.69	0.537 ✓
T8	60 - 40	ROHN TS1.5x11 ga	4.18	1.91	46.9 K=1.00	18.622	0.5202	-4.60	9.69	0.474 ✓
T9	40 - 20	ROHN TS1.5x16 ga	4.18	3.83	90.1 K=1.00	15.535	0.2706	-2.93	4.20	0.697 ✓
T10	20 - 5	ROHN TS1.5x11 ga	4.17	3.81	93.4 K=1.00	15.015	0.5202	-2.81	7.81	0.360 ✓

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
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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	190 - 180	L2x2x1/4	3.42	2.75	102.2 K=1.21	12.697	0.9380	-0.22	11.91	0.018
T2	180 - 160	L2x2x1/4	3.42	2.75	102.2 K=1.21	12.697	0.9380	-0.48	11.91	0.040
T5	120 - 100	L2x2x1/4	3.42	2.70	101.4 K=1.22	12.799	0.9380	-0.86	12.01	0.071
T6	100 - 80	ROHN TS1.5x16 ga	3.42	3.13	73.6 K=1.00	17.981	0.2706	-0.29	4.87	0.059
T9	40 - 20	ROHN TS1.5x16 ga	3.42	3.13	73.6 K=1.00	17.981	0.2706	-0.66	4.87	0.136
T10	20 - 5	ROHN TS1.5x11 ga	3.42	3.13	76.6 K=1.00	17.559	0.5202	-0.13	9.13	0.014

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	190 - 180	L2x2x1/4	3.42	2.75	102.2 K=1.21	12.697	0.9380	-0.76	11.91	0.064
T2	180 - 160	L2x2x1/4	3.42	2.75	102.2 K=1.21	12.697	0.9380	-6.11	11.91	0.513
T3	160 - 140	ROHN TS1.5x11 ga	3.42	3.18	77.9 K=1.00	17.376	0.5202	-0.58	9.04	0.064
T4	140 - 120	ROHN TS1.5x11 ga	3.42	3.18	77.9 K=1.00	17.376	0.5202	-0.12	9.04	0.013
T5	120 - 100	L2x2x1/4	3.42	2.70	101.4 K=1.22	12.799	0.9380	-1.97	12.01	0.164
T7	80 - 60	ROHN TS1.5x11 ga	3.42	3.13	76.6 K=1.00	17.559	0.5202	-0.42	9.13	0.046
T9	40 - 20	ROHN TS1.5x16 ga	3.42	3.13	73.6 K=1.00	17.981	0.2706	-0.11	4.87	0.022
T11	5 - 0	L3x3x1/2	0.34	0.05	60.5 K=58.86	17.380	2.7500	-3.03	47.80	0.063

Mid 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
T11	5 - 0	L3x3x1/2	2.32	2.02	80.8 K=1.94	15.266	2.7500	-0.64	41.98	0.015

Torque-Arm Top Design Data

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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
T2	180 - 160 (510)	C15x33.9	3.42	3.30	114.3	11.079	9.9600	-9.85	110.35	0.089
T2	180 - 160 (511)	C15x33.9	3.42	3.30	K=1.00 114.3	11.079	9.9600	-9.94	110.35	0.090
T2	180 - 160 (514)	C15x33.9	3.42	3.30	K=1.00 114.3	11.079	9.9600	-8.61	110.35	0.078
T2	180 - 160 (515)	C15x33.9	3.42	3.30	K=1.00 114.3	11.079	9.9600	-8.44	110.35	0.076
T2	180 - 160 (518)	C15x33.9	3.42	3.30	K=1.00 114.3	11.079	9.9600	-8.07	110.35	0.073
T2	180 - 160 (519)	C15x33.9	3.42	3.30	K=1.00 114.3	11.079	9.9600	-8.02	110.35	0.073
T5	120 - 100 (522)	C15x33.9	3.42	3.27	K=1.00 113.6	11.186	9.9600	-7.09	111.41	0.064
T5	120 - 100 (523)	C15x33.9	3.42	3.27	K=1.00 113.6	11.186	9.9600	-7.00	111.41	0.063
T5	120 - 100 (526)	C15x33.9	3.42	3.27	K=1.00 113.6	11.186	9.9600	-6.81	111.41	0.061
T5	120 - 100 (527)	C15x33.9	3.42	3.27	K=1.00 113.6	11.186	9.9600	-6.95	111.41	0.062
T5	120 - 100 (530)	C15x33.9	3.42	3.27	K=1.00 113.6	11.186	9.9600	-6.41	111.41	0.058
T5	120 - 100 (531)	C15x33.9	3.42	3.27	K=1.00 113.6	11.186	9.9600	-6.47	111.41	0.058
T7	80 - 60 (534)	C15x33.9	3.42	3.27	K=1.00 113.6	11.186	9.9600	-4.60	111.41	0.041
T7	80 - 60 (535)	C15x33.9	3.42	3.27	K=1.00 113.6	11.186	9.9600	-4.56	111.41	0.041
T7	80 - 60 (538)	C15x33.9	3.42	3.27	K=1.00 113.6	11.186	9.9600	-4.57	111.41	0.041
T7	80 - 60 (539)	C15x33.9	3.42	3.27	K=1.00 113.6	11.186	9.9600	-4.64	111.41	0.042
T7	80 - 60 (542)	C15x33.9	3.42	3.27	K=1.00 113.6	11.186	9.9600	-4.34	111.41	0.039
T7	80 - 60 (543)	C15x33.9	3.42	3.27	K=1.00 113.6	11.186	9.9600	-4.36	111.41	0.039

Torque-Arm Top Bending Design Data

Section No.	Elevation ft	Size	Actual M _x kip-ft	Actual f _{bx} ksi	Allow. F _{bx} ksi	Ratio f _{bx} F _{bx}	Actual M _y kip-ft	Actual f _{by} ksi	Allow. F _{by} ksi	Ratio f _{by} F _{by}
T2	180 - 160 (510)	C15x33.9	-69.85	-19.958	21.600	0.924	-0.00	-0.000	21.600	0.000
T2	180 - 160 (511)	C15x33.9	-70.61	-20.174	21.600	0.934	0.00	-0.000	21.600	0.000
T2	180 - 160 (514)	C15x33.9	-69.88	-19.965	21.600	0.924	0.00	-0.000	21.600	0.000
T2	180 - 160 (515)	C15x33.9	-68.38	-19.536	21.600	0.904	-0.00	-0.000	21.600	0.000
T2	180 - 160 (518)	C15x33.9	-67.90	-19.401	21.600	0.898	-0.00	-0.000	21.600	0.000
T2	180 - 160 (519)	C15x33.9	-67.35	-19.242	21.600	0.891	0.00	-0.000	21.600	0.000
T5	120 - 100 (522)	C15x33.9	-43.91	-12.546	21.600	0.581	-0.00	-0.000	21.600	0.000
T5	120 - 100 (523)	C15x33.9	-43.54	-12.441	21.600	0.576	0.00	-0.000	21.600	0.000
T5	120 - 100 (526)	C15x33.9	-42.78	-12.224	21.600	0.566	-0.00	-0.000	21.600	0.000
T5	120 - 100 (527)	C15x33.9	-43.43	-12.408	21.600	0.574	0.00	-0.000	21.600	0.000
T5	120 - 100 (530)	C15x33.9	-41.22	-11.777	21.600	0.545	-0.00	-0.000	21.600	0.000
T5	120 - 100 (531)	C15x33.9	-41.49	-11.853	21.600	0.549	0.00	-0.000	21.600	0.000
T7	80 - 60 (534)	C15x33.9	-16.96	-4.844	21.600	0.224	-0.00	-0.000	21.600	0.000

RISATower CEN TEK Engineering, Inc. 63-2 N Branford Rd Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job	190' Guyed Rohn Model 80 - w/ Proposed Reinf. ~ Rev 1	Page	47 of 53
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Section No.	Elevation ft	Size	Actual M_x kip-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y kip-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
T7	80 - 60 (535)	C15x33.9	-16.82	-4.807	21.600	0.223	0.00	-0.000	21.600	0.000
T7	80 - 60 (538)	C15x33.9	-16.92	-4.834	21.600	0.224	-0.00	-0.000	21.600	0.000
T7	80 - 60 (539)	C15x33.9	-17.13	-4.895	21.600	0.227	0.00	-0.000	21.600	0.000
T7	80 - 60 (542)	C15x33.9	-16.31	-4.661	21.600	0.216	-0.00	-0.000	21.600	0.000
T7	80 - 60 (543)	C15x33.9	-16.38	-4.681	21.600	0.217	0.00	-0.000	21.600	0.000

Torque-Arm Top Interaction Design Data

Section No.	Elevation ft	Size	Ratio P P_a	Ratio f_{bx} F_{bx}	Ratio f_{by} F_{by}	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
T2	180 - 160 (510)	C15x33.9	0.089	0.924	0.000	1.013 ✓	1.333	H1-3 ✓
T2	180 - 160 (511)	C15x33.9	0.090	0.934	0.000	1.024 ✓	1.333	H1-3 ✓
T2	180 - 160 (514)	C15x33.9	0.078	0.924	0.000	1.002 ✓	1.333	H1-3 ✓
T2	180 - 160 (515)	C15x33.9	0.076	0.904	0.000	0.981 ✓	1.333	H1-3 ✓
T2	180 - 160 (518)	C15x33.9	0.073	0.898	0.000	0.971 ✓	1.333	H1-3 ✓
T2	180 - 160 (519)	C15x33.9	0.073	0.891	0.000	0.964 ✓	1.333	H1-3 ✓
T5	120 - 100 (522)	C15x33.9	0.064	0.581	0.000	0.644 ✓	1.333	H1-3 ✓
T5	120 - 100 (523)	C15x33.9	0.063	0.576	0.000	0.639 ✓	1.333	H1-3 ✓
T5	120 - 100 (526)	C15x33.9	0.061	0.566	0.000	0.627 ✓	1.333	H1-3 ✓
T5	120 - 100 (527)	C15x33.9	0.062	0.574	0.000	0.637 ✓	1.333	H1-3 ✓
T5	120 - 100 (530)	C15x33.9	0.058	0.545	0.000	0.603 ✓	1.333	H1-3 ✓
T5	120 - 100 (531)	C15x33.9	0.058	0.549	0.000	0.607 ✓	1.333	H1-3 ✓
T7	80 - 60 (534)	C15x33.9	0.041	0.224	0.000	0.266 ✓	1.333	H1-3 ✓
T7	80 - 60 (535)	C15x33.9	0.041	0.223	0.000	0.263 ✓	1.333	H1-3 ✓
T7	80 - 60 (538)	C15x33.9	0.041	0.224	0.000	0.265 ✓	1.333	H1-3 ✓
T7	80 - 60 (539)	C15x33.9	0.042	0.227	0.000	0.268 ✓	1.333	H1-3 ✓
T7	80 - 60 (542)	C15x33.9	0.039	0.216	0.000	0.255 ✓	1.333	H1-3 ✓
T7	80 - 60 (543)	C15x33.9	0.039	0.217	0.000	0.256 ✓	1.333	H1-3 ✓

Tension Checks

Leg 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	190 - 180	P2.5x.276	10.00	2.46	31.9	30.000	2.2535	10.48	67.61	0.155
T2	180 - 160	P2.5x.276	20.00	2.41	31.3	30.000	2.2535	64.01	67.61	0.947 ✓

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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
T3	160 - 140	P2.5x.276	20.00	2.41	31.3	30.000	2.2535	15.38	67.61	0.228
T4	140 - 120	P2.5x.276	20.00	2.41	31.3	30.000	2.2535	1.13	67.61	0.017 ✓
T5	120 - 100	P3x.3	20.00	2.41	25.5	30.000	3.0159	27.05	90.48	0.299 ✓
T6	100 - 80	P3x.3	20.00	2.41	25.5	30.000	3.0159	1.54	90.48	0.017 ✓

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	190 - 180	L2x2x1/4	4.21	1.74	38.6	29.000	0.5629	3.78	16.32	0.232
T2	180 - 160	L2x2x1/4	4.18	1.73	38.3	29.000	0.5629	11.56	16.32	0.708 ✓
T3	160 - 140	ROHN TS1.5x11 ga	4.18	3.89	95.3	25.200	0.5202	7.06	13.11	0.538 ✓
T4	140 - 120	ROHN TS1.5x11 ga	4.18	3.89	95.3	25.200	0.5202	4.22	13.11	0.322 ✓
T5	120 - 100	L2x2x1/4	4.18	1.70	37.7	29.000	0.5629	8.78	16.32	0.538 ✓
T6	100 - 80	ROHN TS1.5x16 ga	4.18	3.83	90.1	25.200	0.2706	2.50	6.82	0.366 ✓
T7	80 - 60	ROHN TS1.5x11 ga	4.18	1.91	46.9	21.600	0.5202	3.98	11.24	0.354 ✓
T8	60 - 40	ROHN TS1.5x11 ga	4.18	1.91	46.9	21.600	0.5202	3.26	11.24	0.290 ✓
T9	40 - 20	ROHN TS1.5x16 ga	4.18	3.83	90.1	25.200	0.2706	2.59	6.82	0.380 ✓
T10	20 - 5	ROHN TS1.5x11 ga	4.17	3.81	93.4	25.200	0.5202	3.17	13.11	0.242 ✓

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	190 - 180	L2x2x1/4	3.42	2.75	62.6	29.000	0.5629	0.19	16.32	0.012
T2	180 - 160	L2x2x1/4	3.42	2.75	62.6	29.000	0.5629	0.47	16.32	0.029 ✓
T3	160 - 140	ROHN TS1.5x11 ga	3.42	3.18	77.9	25.200	0.5202	0.62	13.11	0.047 ✓
T4	140 - 120	ROHN TS1.5x11 ga	3.42	3.18	77.9	25.200	0.5202	0.68	13.11	0.052 ✓

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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
T5	120 - 100	L2x2x1/4	3.42	2.70	61.6	29.000	0.5629	1.91	16.32	0.117 ✓
T6	100 - 80	ROHN TS1.5x16 ga	3.42	3.13	73.6	25.200	0.2706	0.86	6.82	0.127 ✓
T7	80 - 60	ROHN TS1.5x11 ga	3.42	3.13	76.6	25.200	0.5202	0.89	13.11	0.068 ✓
T8	60 - 40	ROHN TS1.5x11 ga	3.42	3.13	76.6	25.200	0.5202	0.91	13.11	0.069 ✓
T9	40 - 20	ROHN TS1.5x16 ga	3.42	3.13	73.6	25.200	0.2706	0.97	6.82	0.142 ✓
T10	20 - 5	ROHN TS1.5x11 ga	3.42	3.13	76.6	25.200	0.5202	0.64	13.11	0.049 ✓
T11	5 - 0	L3x3x1/2	3.30	3.01	40.2	21.600	2.7500	11.17	59.40	0.188 ✓

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	190 - 180	L2x2x1/4	3.42	2.75	62.6	29.000	0.5629	0.76	16.32	0.046 ✓
T2	180 - 160	L2x2x1/4	3.42	2.75	62.6	29.000	0.5629	7.51	16.32	0.460 ✓
T3	160 - 140	ROHN TS1.5x11 ga	3.42	3.18	77.9	25.200	0.5202	1.18	13.11	0.090 ✓
T4	140 - 120	ROHN TS1.5x11 ga	3.42	3.18	77.9	25.200	0.5202	0.80	13.11	0.061 ✓
T5	120 - 100	L2x2x1/4	3.42	2.70	61.6	29.000	0.5629	3.78	16.32	0.232 ✓
T6	100 - 80	ROHN TS1.5x16 ga	3.42	3.13	73.6	25.200	0.2706	0.50	6.82	0.074 ✓
T7	80 - 60	ROHN TS1.5x11 ga	3.42	3.13	76.6	25.200	0.5202	1.68	13.11	0.128 ✓
T8	60 - 40	ROHN TS1.5x11 ga	3.42	3.13	76.6	25.200	0.5202	1.18	13.11	0.090 ✓
T9	40 - 20	ROHN TS1.5x16 ga	3.42	3.13	73.6	25.200	0.2706	0.36	6.82	0.052 ✓
T10	20 - 5	ROHN TS1.5x11 ga	3.42	3.13	76.6	25.200	0.5202	4.11	13.11	0.314 ✓

Mid 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
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RISATower CEN TEK Engineering, Inc. 63-2 N Branford Rd Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job	190' Guyed Rohn Model 80 - w/ Proposed Reinf. ~ Rev 1	Page	50 of 53
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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
T11	5 - 0	L3x3x1/2	1.33	1.04	13.9	21.600	2.7500	0.11	59.40	0.002

Torque-Arm Top Design Data

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	F _a ksi	A in ²	Actual P K	Allow. P _a K	Ratio P P _a
T2	180 - 160 (510)	C15x33.9	3.42	3.30	43.8	21.600	9.9600	0.05	215.14	0.000
T2	180 - 160 (511)	C15x33.9	3.42	3.30	43.8	21.600	9.9600	7.03	215.14	0.033
T2	180 - 160 (514)	C15x33.9	3.42	3.30	43.8	21.600	9.9600	6.43	215.14	0.030
T2	180 - 160 (515)	C15x33.9	3.42	3.30	43.8	21.600	9.9600	1.13	215.14	0.005
T2	180 - 160 (518)	C15x33.9	3.42	3.30	43.8	21.600	9.9600	7.23	215.14	0.034
T2	180 - 160 (519)	C15x33.9	3.42	3.30	43.8	21.600	9.9600	1.09	215.14	0.005
T5	120 - 100 (522)	C15x33.9	3.42	3.27	43.4	21.600	9.9600	6.08	215.14	0.028
T5	120 - 100 (523)	C15x33.9	3.42	3.27	43.4	21.600	9.9600	5.19	215.14	0.024
T5	120 - 100 (526)	C15x33.9	3.42	3.27	43.4	21.600	9.9600	5.07	215.14	0.024
T5	120 - 100 (527)	C15x33.9	3.42	3.27	43.4	21.600	9.9600	0.16	215.14	0.001
T5	120 - 100 (530)	C15x33.9	3.42	3.27	43.4	21.600	9.9600	0.03	215.14	0.000
T5	120 - 100 (531)	C15x33.9	3.42	3.27	43.4	21.600	9.9600	0.19	215.14	0.001
T7	80 - 60 (534)	C15x33.9	3.42	3.27	43.4	21.600	9.9600	0.12	215.14	0.001
T7	80 - 60 (535)	C15x33.9	3.42	3.27	43.4	21.600	9.9600	3.27	215.14	0.015
T7	80 - 60 (538)	C15x33.9	3.42	3.27	43.4	21.600	9.9600	0.04	215.14	0.000
T7	80 - 60 (539)	C15x33.9	3.42	3.27	43.4	21.600	9.9600	0.10	215.14	0.000
T7	80 - 60 (542)	C15x33.9	3.42	3.27	43.4	21.600	9.9600	0.02	215.14	0.000
T7	80 - 60 (543)	C15x33.9	3.42	3.27	43.4	21.600	9.9600			

Torque-Arm Top Bending Design Data

Section No.	Elevation ft	Size	Actual M _x kip-ft	Actual f _{bx} ksi	Allow. F _{bx} ksi	Ratio f _{bx} F _{bx}	Actual M _y kip-ft	Actual f _{by} ksi	Allow. F _{by} ksi	Ratio f _{by} F _{by}
T2	180 - 160 (510)	C15x33.9	-69.39	19.826	21.600	0.918	-0.00	0.000	27.000	0.000
T2	180 - 160 (511)	C15x33.9	-60.37	17.248	21.600	0.799	-0.00	0.000	27.000	0.000
T2	180 - 160 (514)	C15x33.9	-59.98	17.139	21.600	0.793	0.00	0.000	27.000	0.000
T2	180 - 160 (515)	C15x33.9	-71.19	20.340	21.600	0.942	0.00	0.000	27.000	0.000
T2	180 - 160 (518)	C15x33.9	-61.57	17.592	21.600	0.814	-0.00	0.000	27.000	0.000
T2	180 - 160 (519)	C15x33.9	-72.17	20.619	21.600	0.955	-0.00	0.000	27.000	0.000
T5	120 - 100 (522)	C15x33.9	-40.15	11.472	21.600	0.531	-0.00	0.000	27.000	0.000
T5	120 - 100 (523)	C15x33.9	-37.43	10.695	21.600	0.495	-0.00	0.000	27.000	0.000
T5	120 - 100 (526)	C15x33.9	-36.83	10.521	21.600	0.487	0.00	0.000	27.000	0.000
T5	120 - 100 (527)	C15x33.9	-45.11	12.889	21.600	0.597	0.00	0.000	27.000	0.000
T5	120 - 100 (530)	C15x33.9	-43.91	12.547	21.600	0.581	0.00	0.000	27.000	0.000
T5	120 - 100 (531)	C15x33.9	-44.75	12.786	21.600	0.592	-0.00	0.000	27.000	0.000
T7	80 - 60 (534)	C15x33.9	-17.42	4.978	21.600	0.230	-0.00	0.000	27.000	0.000
T7	80 - 60 (535)	C15x33.9	-14.49	4.141	21.600	0.192	-0.00	0.000	27.000	0.000
T7	80 - 60 (538)	C15x33.9	-14.45	4.128	21.600	0.191	0.00	0.000	27.000	0.000
T7	80 - 60 (539)	C15x33.9	-17.33	4.951	21.600	0.229	0.00	0.000	27.000	0.000
T7	80 - 60 (542)	C15x33.9	-17.19	4.911	21.600	0.227	0.00	0.000	27.000	0.000
T7	80 - 60 (543)	C15x33.9	-17.20	4.913	21.600	0.227	-0.00	0.000	27.000	0.000

Torque-Arm Top Interaction Design Data

Section No.	Elevation <i>ft</i>	Size	Ratio P P_u	Ratio f_{bx} F_{bx}	Ratio f_{by} F_{by}	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
T2	180 - 160 (510)	C15x33.9	0.000	0.918	0.000	0.918 ✓	1.333	H2-1 ✓
T2	180 - 160 (511)	C15x33.9	0.033	0.799	0.000	0.831 ✓	1.333	H2-1 ✓
T2	180 - 160 (514)	C15x33.9	0.030	0.793	0.000	0.823 ✓	1.333	H2-1 ✓
T2	180 - 160 (515)	C15x33.9	0.005	0.942	0.000	0.947 ✓	1.333	H2-1 ✓
T2	180 - 160 (518)	C15x33.9	0.034	0.814	0.000	0.848 ✓	1.333	H2-1 ✓
T2	180 - 160 (519)	C15x33.9	0.005	0.955	0.000	0.960 ✓	1.333	H2-1 ✓
T5	120 - 100 (522)	C15x33.9	0.028	0.531	0.000	0.559 ✓	1.333	H2-1 ✓
T5	120 - 100 (523)	C15x33.9	0.024	0.495	0.000	0.519 ✓	1.333	H2-1 ✓
T5	120 - 100 (526)	C15x33.9	0.024	0.487	0.000	0.511 ✓	1.333	H2-1 ✓
T5	120 - 100 (527)	C15x33.9	0.001	0.597	0.000	0.597 ✓	1.333	H2-1 ✓
T5	120 - 100 (530)	C15x33.9	0.000	0.581	0.000	0.581 ✓	1.333	H2-1 ✓
T5	120 - 100 (531)	C15x33.9	0.001	0.592	0.000	0.593 ✓	1.333	H2-1 ✓
T7	80 - 60 (534)	C15x33.9	0.001	0.230	0.000	0.231 ✓	1.333	H2-1 ✓
T7	80 - 60 (535)	C15x33.9	0.015	0.192	0.000	0.207 ✓	1.333	H2-1 ✓
T7	80 - 60 (538)	C15x33.9	0.015	0.191	0.000	0.206 ✓	1.333	H2-1 ✓
T7	80 - 60 (539)	C15x33.9	0.000	0.229	0.000	0.229 ✓	1.333	H2-1 ✓
T7	80 - 60 (542)	C15x33.9	0.000	0.227	0.000	0.228 ✓	1.333	H2-1 ✓
T7	80 - 60 (543)	C15x33.9	0.000	0.227	0.000	0.228 ✓	1.333	H2-1 ✓

Section Capacity Table

[illegible]

RISATower CEN TEK Engineering, Inc. 63-2 N Branford Rd Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job	190' Guyed Rohn Model 80 - w/ Proposed Reinf. ~ Rev 1	Page	52 of 53
	Project	57 Cook Road, Montville, CT	Date	12:57:25 12/08/11
	Client	Verizon	Designed by	Jrm

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	SF*P _{allow} K	% Capacity	Pass Fail
T6	100 - 80	Diagonal	ROHN TS1.5x16 ga	315	-2.85	5.60	51.1 (b) 50.9	Pass
T7	80 - 60	Diagonal	ROHN TS1.5x11 ga	332	-5.20	12.91	56.8 (b) 40.3	Pass
T8	60 - 40	Diagonal	ROHN TS1.5x11 ga	427	-4.60	12.91	49.7 (b) 35.6	Pass
T9	40 - 20	Diagonal	ROHN TS1.5x16 ga	463	-2.93	5.60	43.9 (b) 52.3	Pass
T10	20 - 5	Diagonal	ROHN TS1.5x11 ga	476	-2.81	10.41	58.9 (b) 27.0	Pass
T1	190 - 180	Top Girt	L2x2x1/4	5	-0.22	15.88	57.7 (b) 1.4	Pass
T2	180 - 160	Top Girt	L2x2x1/4	37	-0.48	15.88	3.0	Pass
T3	160 - 140	Top Girt	ROHN TS1.5x11 ga	96	0.62	17.48	3.5	Pass
T4	140 - 120	Top Girt	ROHN TS1.5x11 ga	153	0.68	17.48	11.3 (b) 3.9	Pass
T5	120 - 100	Top Girt	L2x2x1/4	210	1.91	21.76	12.4 (b) 8.8	Pass
T6	100 - 80	Top Girt	ROHN TS1.5x16 ga	267	0.86	9.09	11.1 (b) 9.5	Pass
T7	80 - 60	Top Girt	ROHN TS1.5x11 ga	322	0.89	17.48	19.6 (b) 5.1	Pass
T8	60 - 40	Top Girt	ROHN TS1.5x11 ga	381	0.91	17.48	16.1 (b) 5.2	Pass
T9	40 - 20	Top Girt	ROHN TS1.5x16 ga	436	0.97	9.09	16.5 (b) 10.7	Pass
T10	20 - 5	Top Girt	ROHN TS1.5x11 ga	470	0.64	17.48	22.1 (b) 3.7	Pass
T11	5 - 0	Top Girt	L3x3x1/2	496	11.17	79.18	11.7 (b) 14.1	Pass
T1	190 - 180	Bottom Girt	L2x2x1/4	7	-0.76	15.88	4.8	Pass
T2	180 - 160	Bottom Girt	L2x2x1/4	40	-6.11	15.88	38.5	Pass
T3	160 - 140	Bottom Girt	ROHN TS1.5x11 ga	99	1.18	17.48	43.7 (b) 6.8	Pass
T4	140 - 120	Bottom Girt	ROHN TS1.5x11 ga	155	0.80	17.48	21.5 (b) 4.6	Pass
T5	120 - 100	Bottom Girt	L2x2x1/4	213	3.78	21.76	14.5 (b) 17.4	Pass
T6	100 - 80	Bottom Girt	ROHN TS1.5x16 ga	269	0.50	9.09	22.0 (b) 5.5	Pass
T7	80 - 60	Bottom Girt	ROHN TS1.5x11 ga	327	1.68	17.48	11.4 (b) 9.6	Pass
T8	60 - 40	Bottom Girt	ROHN TS1.5x11 ga	382	1.18	17.48	30.6 (b) 6.8	Pass
T9	40 - 20	Bottom Girt	ROHN TS1.5x16 ga	441	0.36	9.09	21.5 (b) 3.9	Pass
T10	20 - 5	Bottom Girt	ROHN TS1.5x11 ga	474	4.11	17.48	8.1 (b) 23.5	Pass
T11	5 - 0	Bottom Girt	L3x3x1/2	500	-3.01	63.71	74.8 (b) 7.0	Pass
T11	5 - 0	Mid Girt	L3x3x1/2	506	-0.64	55.96	1.1	Pass
T2	180 - 160	Guy A@162.496	3/4	517	27.64	29.15	94.8	Pass
T5	120 - 100	Guy A@102.496	5/8	529	18.43	21.20	86.9	Pass
T7	80 - 60	Guy A@62.4961	1/2	541	9.56	13.45	71.1	Pass
T2	180 - 160	Guy B@162.496	3/4	512	27.83	29.15	95.5	Pass
T5	120 - 100	Guy B@102.496	5/8	524	18.31	21.20	86.4	Pass
T7	80 - 60	Guy B@62.4961	1/2	536	9.52	13.45	70.8	Pass
T2	180 - 160	Guy C@162.496	3/4	508	27.20	29.15	93.3	Pass
T5	120 - 100	Guy C@102.496	5/8	520	17.85	21.20	84.2	Pass
T7	80 - 60	Guy C@62.4961	1/2	533	9.46	13.45	70.3	Pass
T2	180 - 160	Torque Arm	C15x33.9	511	-9.94	147.10	76.8	Pass

RISATower CEN TEK Engineering, Inc. 63-2 N Branford Rd Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job	190' Guyed Rohn Model 80 - w/ Proposed Reinf. ~ Rev 1	Page	53 of 53
	Project	57 Cook Road, Montville, CT	Date	12:57:25 12/08/11
	Client	Verizon	Designed by	Jrm

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	SF*P _{allow} K	% Capacity	Pass Fail
T5	120 - 100	Top@162.496 Torque Arm	C15x33.9	522	-7.09	148.51	48.3	Pass
T7	80 - 60	Top@102.496 Torque Arm Top@62.4961	C15x33.9	539	-4.64	148.51	20.1	Pass
							Summary	
							Leg (T7)	90.7 Pass
							Diagonal (T4)	91.6 Pass
							Top Girt (T9)	22.1 Pass
							Bottom Girt (T10)	74.8 Pass
							Mid Girt (T11)	1.1 Pass
							Guy A (T2)	94.8 Pass
							Guy B (T2)	95.5 Pass
							Guy C (T2)	93.3 Pass
							Torque Arm	76.8 Pass
							Top (T2)	
							Bolt Checks	91.6 Pass
							RATING =	95.5 Pass

Program Version 5.4.2.0 - 6/17/2010 File:J:\Jobs\1100100.WI\CO27 - Montville 4 - 54 Cook Drive, Montville, CT/Structural/Rev 1/Cals/ERI/With Prop Reinf/95mph 190' Guyed Rohn Tower.eri

GOVERNING CODE: 2003 INTERNATIONAL BUILDING CODE (IBC) AS MODIFIED BY THE 2009 CONNECTICUT SUPPLEMENT.

1. DESIGN CRITERIA:
 - WIND SPEED OF 95 MPH (FASTEST MILE) AND 82 MPH (FASTEST MILE) CONCURRENT WITH 0.5" OF RADIAL ICE PER APPENDIX 'K' OF THE 2005 CONNECTICUT STATE BUILDING CODE WHICH CONTROLS OVER THE EIA/TIA 222 F-96 WIND SPEED OF 85 MPH (FASTEST MILE).
 - SEISMIC LOAD: PER ASCE 7-95 MINIMUM DESIGN LOADS FOR BUILDINGS AND OTHER STRUCTURES (DOES NOT GOVERN).
 - REFER TO GEOTECHNICAL STUDY REPORT PREPARED BY CLARENCE WELTI AND ASSOCIATES, INC. FOR KT TOWER ENTERPRISES, LLC, DATED APRIL 18, 2011. SAID GEOTECHNICAL REPORT WAS PREPARED FOR A PROPOSED LATTICE TOWER WITHIN CLOSE PROXIMITY OF THE EXISTING GUYED TOWER AND WAS USED AS THE BASIS FOR ESTABLISHING THE SOIL CONDITIONS OF THE SUBJECT SITE.

1. PROVIDE TEMPORARY ANCHORS, GUYING AND/OR BRACING AS REQUIRED TO SAFELY CONDUCT THE WORK.

2. ALL WORK SHALL BE IN ACCORDANCE WITH TIA/EIA-222 REVISION "F" STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWERS AND SUPPORTING STRUCTURES.
3. THE CONTRACTOR IS SOLELY RESPONSIBLE TO DETERMINE CONSTRUCTION PROCEDURE AND SEQUENCE, AND TO ENSURE THE SAFETY OF THE EXISTING STRUCTURES AND ITS COMPONENT PARTS DURING CONSTRUCTION. THIS INCLUDES THE ADDITION OF WHATEVER SHORING, BRACING, UNDERPINNING, ETC. THAT MAY BE NECESSARY, MAINTAIN EXISTING SITE OPERATIONS, COORDINATE WORK WITH TOWER OWNER.
4. DRAWINGS INDICATE THE MINIMUM STANDARDS, BUT IF ANY WORK SHOULD BE INDICATED TO BE SUBSTANDARD TO ANY ORDINANCES, LAWS, CODES, RULES, OR REGULATIONS BEARING ON THE WORK, THE CONTRACTOR SHALL INCLUDE IN HIS WORKSHEET AND SHALL EXECUTE THE WORK CORRECTLY IN ACCORDANCE WITH SUCH ORDINANCES, LAWS, CODES, RULES OR REGULATIONS WITH NO INCREASE IN COSTS.
5. THE CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS, ELEVATIONS, ANGLES, AND EXISTING CONDITIONS AT THE SITE, PRIOR TO FABRICATION AND/OR INSTALLATION OF ANY WORK IN THE CONTRACT AREA.
6. ALL DAMAGE CAUSED TO ANY EXISTING STRUCTURE SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR. THE CONTRACTOR WILL BE HELD LIABLE FOR ALL REPAIRS REQUIRED FOR EXISTING STRUCTURES IF DAMAGED DURING CONSTRUCTION ACTIVITIES.
7. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL ON-SITE SAFETY FROM THE TIME THE JOB IS AWARDED UNTIL ALL WORK IS COMPLETE AND ACCEPTED BY THE OWNER.
8. CONTRACTOR SHALL TAKE FIELD MEASUREMENTS NECESSARY TO ASSURE PROPER FIT OF ALL FINISHED WORK.
9. TOWER REINFORCING SHALL BE CONDUCTED BY FIELD CREWS EXPERIENCED IN THE ASSEMBLY AND ERECTION OF RADIO ANTENNAS AND SUPPORT STRUCTURES. ALL SAFETY PROCEDURES, RIGGING AND ERECTION METHODS SHALL BE STANDARD TO THE INDUSTRY AND IN COMPLIANCE WITH OSHA.
10. EXISTING COAXIAL CABLES AND ALL ACCESSORIES SHALL BE RELOCATED AS NECESSARY AND REINSTALLED BY THE CONTRACTOR WITHOUT INTERRUPTION IN SERVICE WHERE THEY ARE IN CONFLICT WITH TOWER REINFORCEMENT.
11. IF ANY FIELD CONDITIONS EXIST WHICH PRECLUDE COMPLIANCE WITH THE DRAWINGS, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ENGINEER AND SHALL PROCEED WITH AFFECTED WORK AFTER CONFLICT IS SATISFACTORILY RESOLVED.

[illegible]

VERIZON WIRELESS	PROCESSED BY: VERIZON WIRELESS	DATE: 08/15/11
MONTVILLE 4	190' ROHN MODEL 80 GUYED TOWER	SCALE: AS SHOWN
REINFORCEMENT DESIGN FOR	ANTENNA MODIFICATION	DWG NO. 11001-0022
64 CORK DRIVE, MONTVILLE CT 06055		

STRUCTURAL
NOTES

SHEET NO. **N-1** of 1

CONCRETE CONSTRUCTION NOTES

1. CONCRETE CONSTRUCTION SHALL CONFORM TO THE FOLLOWING STANDARDS:
ACI 211 - STANDARD PRACTICE FOR SELECTING PROPORTIONS FOR NORMAL AND HEAVYWEIGHT CONCRETE.
ACI 301 - SPECIFICATIONS FOR STRUCTURAL CONCRETE FOR BUILDINGS.
ACI 302 - GUIDE FOR CONCRETE FLOOR AND SLAB CONSTRUCTION
ACI 304 - RECOMMENDED PRACTICE FOR MEASURING, MIXING, TRANSPORTING, AND PLACING CONCRETE.
ACI 306.1 STANDARD SPECIFICATION FOR COLD WEATHER CONCRETING
ACI 318 - BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE.
CONCRETE SHALL DEVELOP COMPRESSIVE STRENGTH IN 28 DAYS AS FOLLOWS:
GUY ANCHOR BLOCK: 4,000 PSI
- PORTLAND CEMENT: ASTM C150, TYPE II, (540 LBS/CUBIC YARD)
- AGGREGATE: ASTM C33, NO. 67, TYPICAL
- WATER: POTABLE WITH MAXIMUM WATER CEMENT RATIO OF .55
- SLUMP: 3" TO 4"
- ADMIXTURES: USE AIR ENTRAINING AGENT CONFORMING TO ASTM C260 WITH 4 TO 6% TOTAL AIR. USE WATER REDUCING AGENT CONFORMING TO ASTM C494, TYPE A, IN ALL CONCRETE. CALCIUM CHLORIDE MAY NOT BE USED TO ACCELERATE THE CONCRETE SETTING TIME.
3. REINFORCING STEEL SHALL BE 60,000 PSI YIELD STRENGTH.
4. ALL DETAILING, FABRICATION, AND ERECTION OF REINFORCING BARS, UNLESS OTHERWISE NOTED, MUST FOLLOW THE LATEST ACI CODE AND LATEST ACI "MANUAL OF STANDARD PRACTICE FOR DETAILING REINFORCED CONCRETE STRUCTURES".
5. CONCRETE SHALL BE PLACED ON UNDISTURBED VIRGIN EARTH OR SOUND BEDROCK.
6. COMPACT BACKFILL TO 95% OF MAXIMUM DRY DENSITY PER ASTM D-1557.
7. CONCRETE COVER OVER REINFORCING SHALL CONFORM TO THE FOLLOWING, UNLESS OTHERWISE SHOWN:
ALL ANCHOR BLOCK SURFACES: 3 INCHES
8. NO STEEL WIRE, METAL FORM TIES, OR ANY OTHER METAL SHALL REMAIN WITHIN THE REQUIRED COVER OF ANY CONCRETE SURFACE.
9. ALL REINFORCEMENT SHALL BE CONTINUOUS UNLESS OTHERWISE NOTED. SPLICES SHALL BE WELL STAGGERED. ADDITIONAL BARS AND SPECIAL BENDING DETAILS ARE REQUIRED AT INTERSECTING WALLS AND AT JOINTS. SUCH DETAILS SHALL COMPLY WITH ACI 315 RECOMMENDATIONS UNLESS OTHERWISE SHOWN.
10. NO TACK WELDING OF REINFORCING WILL BE PERMITTED.
11. NO CALCIUM CHLORIDE OR ADMIXTURES CONTAINING MORE THAN 1% CHLORIDE BY WEIGHT OF ADMIXTURE SHALL BE USED IN THE CONCRETE.

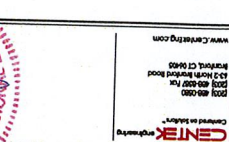
12. UNLESS OTHERWISE NOTED, ALL LAP SPLICES SHALL BE 48 BAR DIAMETERS.
13. INSPECTION AND TESTING OF CONCRETE WORK SHALL BE PERFORMED BY AN INDEPENDENT TESTING LABORATORY, PAID BY THE OWNER, AND APPROVED BY THE ENGINEER. THE INSPECTOR SHALL OBSERVE CONDITION OF SOILS AND FORMWORK BEFORE FOOTINGS ARE PLACED, SIZE, SPACING AND LOCATION OF REINFORCEMENT, AND PLACEMENT OF CONCRETE.
14. THE TESTING COMPANY SHALL ALSO OBTAIN A MINIMUM OF THREE (3) COMPRESSIVE STRENGTH TEST SPECIMENS FOR EACH CONCRETE MIX DESIGN. ONE SPECIMEN TESTED AT 7 DAYS, ONE AT 28 DAYS, AND ONE HELD IN RESERVE FOR FUTURE TESTING, IF NEEDED.
15. FOUR COPIES OF ALL INSPECTION TEST REPORTS SHALL BE SUBMITTED TO THE ENGINEER WITHIN TEN (10) WORKING DAYS OF THE DATE OF INSPECTION.

GUY CABLE ASSEMBLY NOTES

1. GUY CABLES SHALL BE EXTRA HIGH STRENGTH GUY STRAND (EHS), CLASS A GALVANIZED, LEFT HAND LAY ONLY PER ASTM A-475 SPECIFICATION.
2. GUY CABLE HARDWARE SHALL BE RATED TO CAPACITY OF CONNECTING CABLE.
3. SUBMIT CUT SHEETS/PRODUCT SPECIFICATION INFORMATION OF ALL CABLE AND HARDWARE TO ENGINEER PRIOR TO COMMENCEMENT OF WORK.
4. PROVIDE NEW HARDWARE AT RELOCATED GUY CABLE CONNECTION TO NEW REINFORCED CONCRETE ANCHOR BLOCK. CONTRACTOR SHALL NOT UNDER ANY CIRCUMSTANCE RE-USE PRE-FORMED GUY GRIPS.
5. INITIAL TENSION OF ALL GUY WIRES TO BE 10% OF BREAKING STRENGTH PER EIA/TIA-222-F STANDARD SECTION 10.2.1 WITH ADJUSTMENT MADE BASED ON THE SITE AMBIENT TEMPERATURE.

DESIGNED BY: JAM	DATE: 08/18/11	REVISION: 1	DESCRIPTION: 1. 100' ROHN MODEL 80 GUYED TOWER REINFORCEMENT DESIGN FOR ANTENNA MODIFICATION
DRAWN BY: JAM	DATE: 08/18/11	REVISION: 2	DESCRIPTION: 2. 100' ROHN MODEL 80 GUYED TOWER REINFORCEMENT DESIGN FOR ANTENNA MODIFICATION
CHECKED BY: JAM	DATE: 08/18/11	REVISION: 3	DESCRIPTION: 3. 100' ROHN MODEL 80 GUYED TOWER REINFORCEMENT DESIGN FOR ANTENNA MODIFICATION
APPROVED BY: JAM	DATE: 08/18/11	REVISION: 4	DESCRIPTION: 4. 100' ROHN MODEL 80 GUYED TOWER REINFORCEMENT DESIGN FOR ANTENNA MODIFICATION
PROJECT: VERIZON WIRELESS	PROJECT NO.: 11001.00227	DATE: 08/18/11	SCALE: AS SHOWN
SHEET NO. N-2			

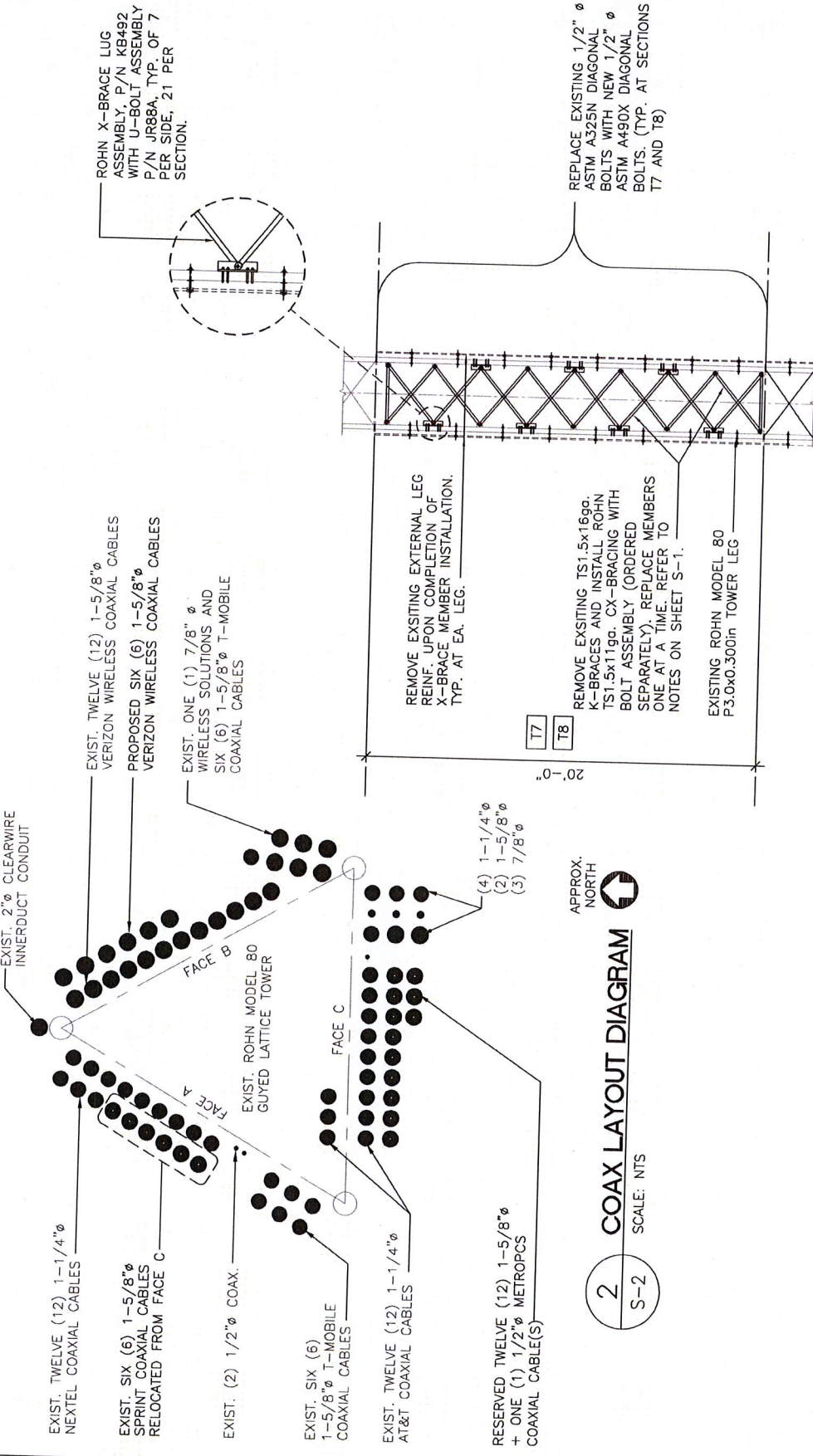
DESIGNED BY:	REV. DATE	BY	DATE	DESCRIPTION
DRAWN BY:	1/2/08	JRM	1/2/08	ISSUED FOR CONSTRUCTION
CHECKED BY:				RE-DESIGNED FOR CONSTRUCTION
				GROUNDING NOTES
				RESERVED ANTENNA, NATION P/N, ADDED



VERIZON WIRELESS	PROJECT NO.	1100100077
MONTVILLE 4	DATE	08/12/11
190' ROHN MODEL 80 GUYED TOWER	SCALE	1" = 5'-0"
REINFORCEMENT DESIGN FOR		
ANTENNA WORKSPACE		
64 COOK DRIVE, MONTVILLE, CT 06058		

TOWER REINFORCEMENT AND COAX PLAN

SHEET NO.	S-2
Sheet No. 2 of 2	



2 COAX LAYOUT DIAGRAM

SCALE: NTS

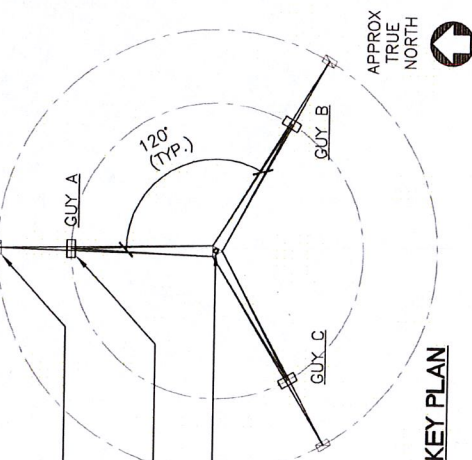
1 TYPICAL X-BRACE REINFORCEMENT DETAILS

SCALE: 1" = 5'-0"

ANCHOR BLOCK FACTORED DESIGN LOADS

FOUNDATION DESIGN INCLUDES A SAFETY FACTOR OF 2.0 PER 2005 CSBC, SECTION 3108.4.2. GUY ANCHOR DESIGN IS BASED ON MEDIUM DENSE, DRY SAND SOILS WITH AN ALLOWABLE BEARING CAPACITY OF 6,000 PSF. REFER TO DESIGN BASIS NOTES ON SHEET N-1.

UPLIFT (kips)	70
HORZ SHEAR (kips)	80



EXIST. REINF. CONC. GUY ANCHORS AT 140'-ft RADIUS TO REMAIN, TYP. OF 3.

PROPOSED REINF. CONC. GUY ANCHOR BLOCKS AT 100'-ft RADIUS, TYP. OF 3.

EXIST. 180'-ft ROHN MODEL 80 GUYED TOWER

KEY PLAN

5/8" EHS GUY WIRES, END SLEEVE (PIROD P/N 320557), GALVANIZED STEEL DEAD-ENDS (PIROD P/N 320507), THIMBLES (PIROD P/N 320782) AND TURNBUCKLES (PIROD P/N 320604) (TYP.). REFER TO S-1 AND KEY PLAN FOR LOCATIONS.

1/4" EHS GUY WIRE SAFETY LOOPS, TYP.

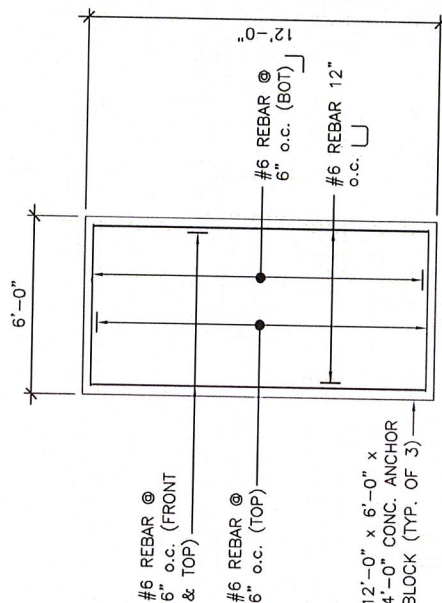
PIROD ROD-TYPE GUY ANCHOR (P/N 125968) (TYP. OF 3)

SEE NOTE 1.

1/2" EHS GUY WIRE, END SLEEVE (PIROD P/N 320555), GALVANIZED STEEL DEAD-END (PIROD P/N 320505), THIMBLE (PIROD P/N 320780) AND TURNBUCKLE (PIROD P/N 320603) (TYP.). REFER TO S-1 FOR LOCATIONS.

NOTES:

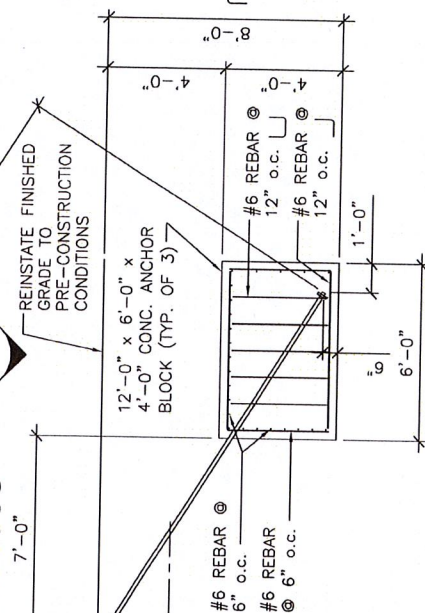
- GROUND ANCHOR ROD w/ #2 AWG SOLID TINNED COPPER GROUND LEAD BONDED TO GROUND ROD/EXISTING GROUND SYSTEM PER NEC REQUIREMENTS, TYP.
- REFER TO NOTES ON DRAWING N-2 FOR ADDITIONAL REQUIREMENTS.



1 ANCHOR BLOCK REINF. PLAN

S-3

SCALE: 3/8" = 1'-0"



2 ANCHOR BLOCK SECTION

S-3

SCALE: 3/8" = 1'-0"

DESIGNED BY:	JDA
DRAWN BY:	JDA
CHECKED BY:	CFC
DATE:	08/15/11
SCALE:	AS SHOWN
SHEET NO.:	11001.00227



www.Centimark.com
1001 4th Ave SE
Atlanta, GA 30316
404.525.1100
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Email: info@centimark.com

VERIZON WIRELESS
MONTVILLE 4
180' ROHN MODEL 80 GUYED TOWER
REINFORCEMENT DESIGN FOR
ANTENNA MODIFICATION
64 COKER DRIVE, MONTVILLE, CT 06058

GUY ANCHOR
REINFORCEMENT
PLANS AND
DETAILS
S-3
Sheet No. 2 of 2

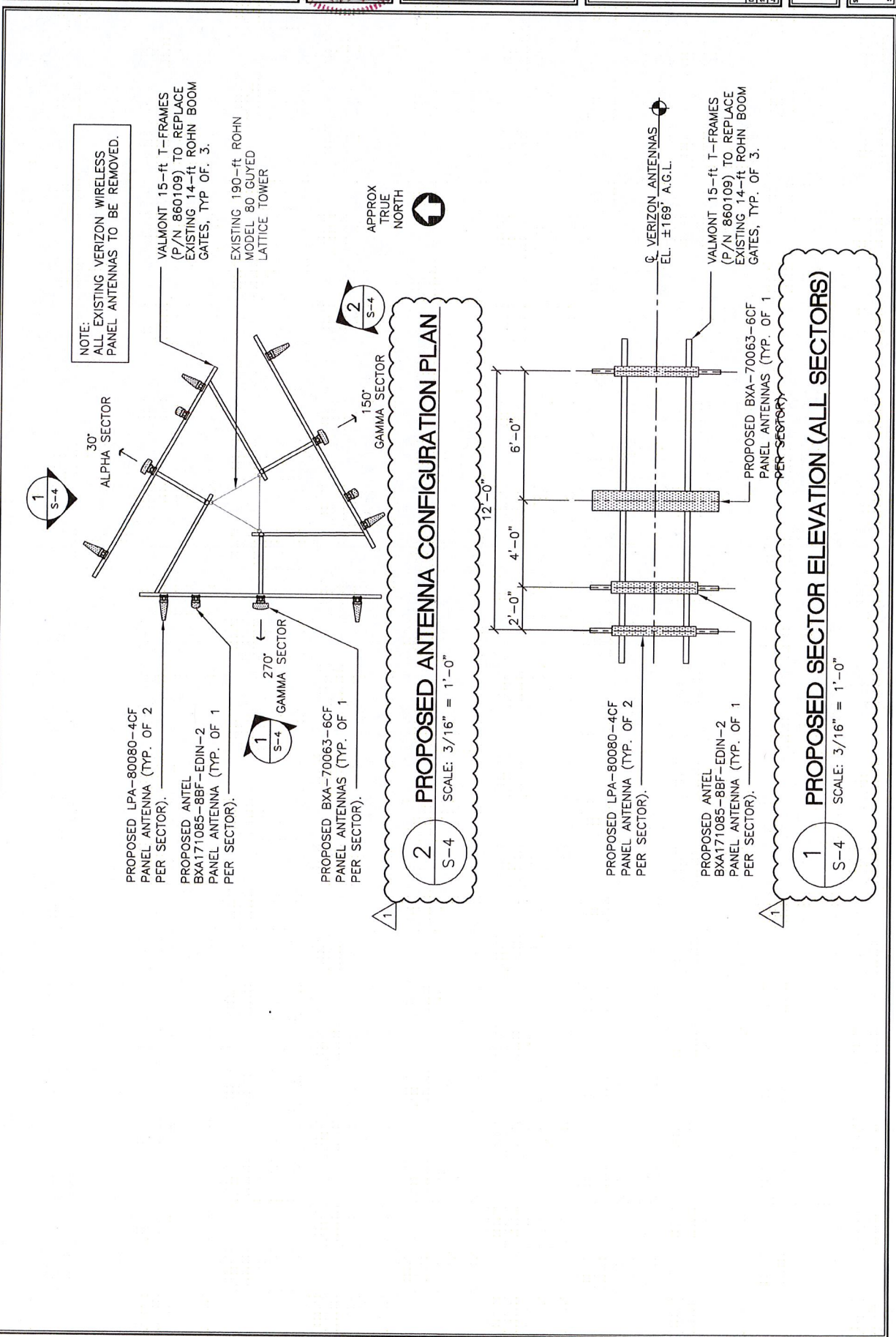
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DRAWN BY:	JSM
CHECKED BY:	CFC
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www.Centering.com
 1000 4th Avenue
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 New York, NY 10004
 (212) 691-1000
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 Centering is a leader in providing innovative solutions for the construction industry.

VERIZON WIRELESS
 MONTVILLE 4
 REINFORCEMENT DESIGN FOR
 180' ROHN MODEL 80 GUYED TOWER
 ANTENNA MODIFICATION
 84 COOK DRIVE, MONTVILLE, CT 06055

DATE: 08/16/17
 SCALE: AS SHOWN
 JOB NO.: 110012027
 SHEET NO.: S-4
 ANTENNA CONFIGURATION DETAILS



UNR-ROHN

Division of UNR Industries, Inc.

6718 W. Plank Road, P.O. Box 2000, Peoria, Illinois 61656 USA

Phone: (309) 697-4400

FAX: (309) 697-5612

PURCHASER:

WIRELESS SOLUTIONS

NAME OF PROJECT:

#57 COOK DR.
MONTVILLE CT, NEW LONDON COUNTY, CT
180 FT. MODEL 80 TOWER

UNR-ROHN FILE NUMBER:

35489PH

UNR-ROHN DRAWING NUMBERS:

B971656

I CERTIFY THAT THE DESIGN OF THE REFERENCED TOWER WAS PREPARED UNDER MY SUPERVISION IN ACCORDANCE WITH THE LOADING AND SOIL CRITERIA SPECIFIED BY THE PURCHASER AND THAT I AM A REGISTERED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF CONNECTICUT.

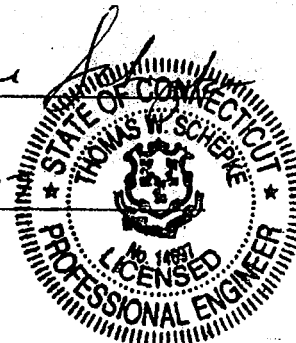
THE REFERENCED FOUNDATIONS ARE STANDARD FOUNDATIONS DESIGNED IN ACCORDANCE WITH ANSI/EIA-222-E NORMAL SOIL PARAMETERS. STANDARD FOUNDATIONS SHOULD NOT BE RELIED UPON FOR THE REFERENCED SITE WITHOUT COMPETENT PROFESSIONAL EXAMINATION AND VERIFICATION OF THEIR SUITABILITY BASED ON THE SUBSURFACE CONDITIONS EXISTING AT THE SITE.

CERTIFIED BY:

Thomas W. Scherke

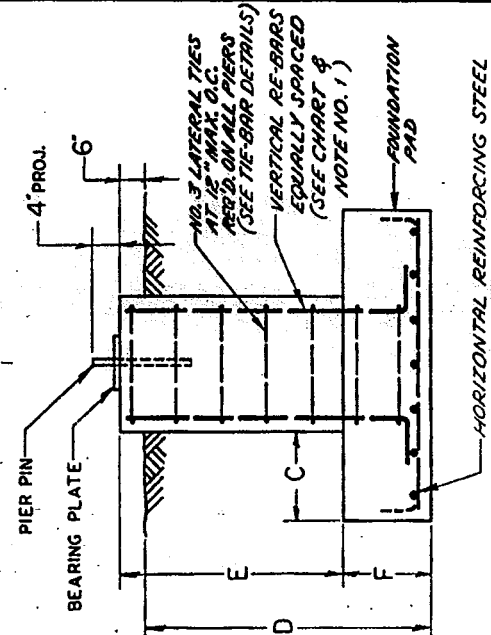
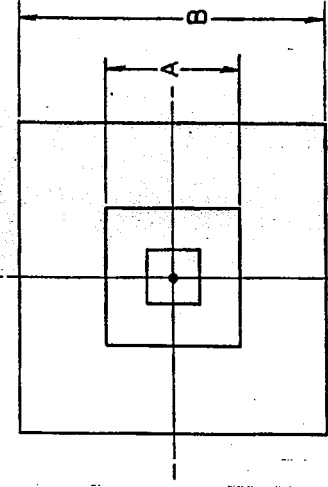
DATE:

3-20-9



CONCRETE BASE SCHEDULE

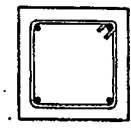
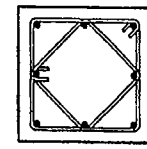
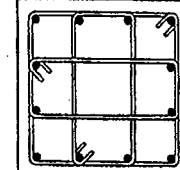
CB NO.	Tower Base Reaction	DIMENSIONS						BEARING PLATE	CONC. (CU. YDS)	VERTICAL BARS (NO. & SIZE)	HORIZ. BARS (NO. & SIZE)
		A	B	C	D	E	F				
1	14000	2'-0"	2'-0"	0	4'-0"	0	0	BP 6	.70	4-NO. 6	NONE*
2	22000	2'-6"	2'-6"	0	4'-0"	0	0	BP 6	1.00	4-NO. 6	NONE*
3	32000	3'-0"	3'-0"	0	4'-0"	0	0	BP 6	1.50	4-NO. 6	NONE*
4	44000	3'-6"	3'-6"	0	4'-0"	0	0	BP 6	2.10	4-NO. 6	NONE*
5	58000	2'-0"	4'-0"	1'-0"	4'-0"	3'-3"	1'-3"	BP 6	1.22	4-NO. 6	6-NO. 4
6	74000	2'-0"	4'-6"	1'-3"	4'-0"	3'-3"	1'-3"	BP 6	1.42	4-NO. 6	6-NO. 5
7	90000	2'-0"	5'-0"	1'-6"	4'-6"	3'-9"	1'-3"	BP 10	1.70	8-NO. 6	6-NO. 5
8	109000	2'-0"	5'-6"	1'-9"	4'-6"	3'-9"	1'-3"	BP 10	2.00	8-NO. 6	6-NO. 5
9	130000	2'-0"	6'-0"	2'-0"	4'-6"	3'-6"	1'-6"	BP 10	2.50	8-NO. 6	7-NO. 5
10	150000	2'-0"	6'-6"	2'-3"	4'-6"	3'-6"	1'-6"	BP 10	2.90	8-NO. 6	8-NO. 5
11	173000	2'-6"	7'-0"	2'-3"	5'-0"	3'-9"	1'-9"	BP 15	4.00	8-NO. 7	8-NO. 6
12	198000	2'-6"	7'-6"	2'-6"	5'-0"	3'-9"	1'-9"	BP 15	4.50	8-NO. 7	8-NO. 6
13	224000	2'-6"	8'-0"	2'-9"	5'-0"	3'-9"	1'-9"	BP 15	5.00	8-NO. 7	9-NO. 6
14	251000	3'-0"	8'-6"	2'-9"	5'-0"	3'-6"	2'-0"	BP 15	6.50	12-NO. 7	9-NO. 7
15	279000	3'-0"	9'-0"	3'-0"	5'-0"	3'-6"	2'-0"	BP 15	7.20	12-NO. 7	10-NO. 7



*NOTE: DUE TO VARIABLES INVOLVED IN ROOF AND OTHER INSTALLATIONS, IT SHALL BE THE CUSTOMER'S OR INSTALLER'S RESPONSIBILITY TO PROVIDE STRUCTURALLY ADEQUATE SUPPORTS FOR PIER & ANCHOR CONNECTIONS. IT MAY ALSO BE NECESSARY FOR THE CUSTOMER OR INSTALLER TO SECURE THE SERVICE OF A LOCAL ENGINEER TO DETERMINE THAT INSTALLATION COMPLIES WITH LOCAL BUILDING CODES.

GENERAL NOTES:

FOR REQUIRED MATERIAL SPECIFICATION, INSTALLATION NOTES AND TOLERANCES SEE DRAWING NUMBER BB41300



CB7 THRU CB13

CB14 & CB 15

TIE BAR DETAILS

NO.	DESCRIPTION	DATE	BY
A1	ADDED NOTE	7-6-76	DA
R1	RE-DRAWN - SUPERSEDES C61062102-2-75	2-26-75	DA

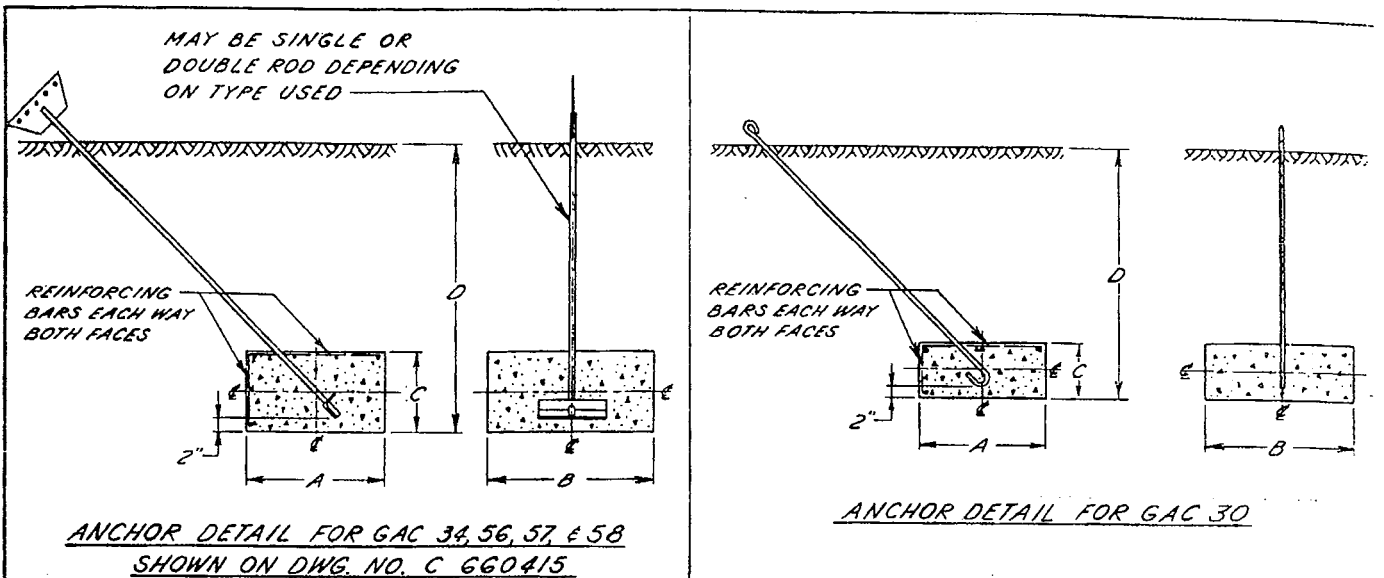
ROHN[®] MANUFACTURING
DIVISION OF

CONCRETE BASE SCHEDULE

SCALE	SHEET NO.	DATE	BY	FILE NO.
1" = 1'-0"	14	7-6-75	DA	C 610621 R
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1" = 1'-0"	98	7-6-75	DA	
1" = 1'-0"	99	7-6-75	DA	
1" = 1'-0"	100	7-6-75	DA	

1. VERTICAL REINFORCING STEEL MAY BE PLACED WITH AN OPTIONAL STANDARD ACI 90° BEND AT BOTTOM.

2. BEARING PLATE PROVIDED ONLY ON TOWERS WITH TAPERED BASE.
*3. HORIZ. BARS IN CHART REFER ONLY TO THE BARS IN THE FOUNDATION PAD.



NOTE: DUE TO VARIABLES INVOLVED IN ROOF AND OTHER INSTALLATIONS, IT SHALL BE THE CUSTOMER'S OR INSTALLER'S RESPONSIBILITY TO PROVIDE STRUCTURALLY ADEQUATE SUPPORTS FOR PIER & ANCHOR CONNECTIONS. IT MAY ALSO BE NECESSARY FOR THE CUSTOMER OR INSTALLER TO SECURE THE SERVICE OF A LOCAL ENGINEER TO DETERMINE THAT INSTALLATION COMPLIES WITH LOCAL BUILDING CODES.

FOR REQUIRED MATERIAL SPECIFICATIONS, INSTALLATION NOTES AND TOLERANCES SEE DRAWING NUMBER B841300.

General Notes

1. MINIMUM $\frac{1}{2}$ " DIAMETER REINFORCING BARS IN ALL ANCHORS WITH MAXIMUM SPACING OF 12" EXCEPT NO. 10 BLOCK MAXIMUM SPACING OF 6".

CONCRETE ANCHOR DATA									
DEPTH, D (FT.)	ROD NO.	BLOCK NO.	ANCHOR DIMENSIONS (FT.)			WEIGHT CONCRETE (LBS)	CONCRETE (CU. YDS.)	UPLIFT * CAPACITY (LBS)	LATERAL CAPACITY (LBS)
			A	B	C				
3	GAC 30	3a	1.5	1.5	1	310	.08	900	1,500
		3b	2	2	1	560	.15	1,320	2,000
		3c	2.5	2.5	1	870	.23	1,810	2,500
		3d	3	3	1	1,260	.33	2,535	3,000
		3e	3	4	1	1,680	.44	3,020	4,000
4	GAC 30 OR GAC 34	4a	3	3	1.5	1,890	.50	3,490	5,850
		4b	3	4	1.5	2,520	.67	4,360	7,800
		4c	3	5	1.5	3,150	.84	4,985	9,750
		4d	3	6	1.5	3,780	1.00	6,090	11,700
		4e	4	6	1.5	5,050	1.33	7,660	11,700
6	GAC 56	6a	3	4	1.5	2,520	.67	10,035	12,600
		6b	3	5	1.5	3,150	.84	11,600	15,750
		6c	3	6	1.5	3,780	1.00	13,150	18,900
		6d	4	6	1.5	5,050	1.33	15,850	18,900
		8a	3	5	1.5	3,150	.84	22,150	21,750
8	GAC 57	8b	3	6	1.5	3,780	1.00	24,700	26,100
		8c	4	6	1.5	5,050	1.33	28,500	26,100
		8d	6	6	2.0	10,800	2.67	33,380	33,600
		10a	3	6	2.0	5,040	1.33	37,450	43,200
		10b	4	6	2.0	6,720	1.78	42,700	43,200
10	GAC 58	10c	4	7	2.0	7,840	2.07	46,800	50,400
		10d	5	7	2.0	9,800	2.59	52,350	50,400
		10e	5	9	2.0	12,600	3.33	61,700	64,800

* INCLUDES SAFETY FACTOR OF 2

** NORMAL SOIL IS A COHESIVE TYPE SOIL WITH A HORIZONTAL BEARING CAPACITY OF 400 POUNDS PER SQUARE FOOT PER LINEAL FOOT OF DEPTH. ROCK, NON-COHESIVE SOILS, OR SATURATED OR SUBMERGED SOILS ARE NOT TO BE CONSIDERED AS NORMAL.

ROHN[®] MANUFACTURING	
DIVISION OF	
TITLE STANDARD CONCRETE ANCHOR	
THIS DRAWING IS THE PROPERTY OF ROHN. IT IS NOT TO BE REPRODUCED, COPIED, OR TRACED IN WHOLE OR IN PART WITHOUT OUR WRITTEN CONSENT.	
SCALE: NONE	FIGS: 1
DATE: 4/1/77	UNLESS OTHERWISE SPECIFIED, DIMENSIONS ARE IN INCHES
BY: JER	DWG. NO. C 620643
CHK: JER	DATE: 4-4-73
APP: JER	DATE: 4-4-73
DATE: 4-4-73	DATE: 4-4-73

R/S INCREASED ROD LENGTHS; PART NO. GAC30 WAS GAC25
6-30-88

REV.	DESCRIPTION	DATE	BY
R1	REVISED ANCHOR DETAIL Dwg. No. 18-18-71 R/LH	8-18-71	R/LH
R2	REVISED RS-222-B FROM GEN. NOTE NO. 1	1/27/72	G/LS
R3	ADDED NOTE	7-6-76	O/H
R4	REVISE DESIGN NOTE 1.	1-14-78	W/L
R5	REVISE DESIGN NOTE 1. & TITLE BLOCK	11-21-78	W/L
R6	GAC-25 WAS GA-25	12-7-79	JER
R7	REVISED FOR EIA RS-222-B	4/4/79	G/LS

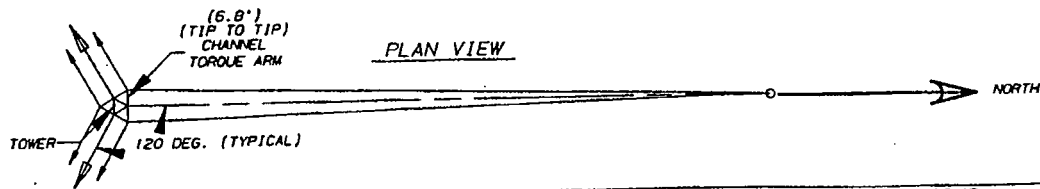
STANDARD FOUNDATION NOTES

1. FOUNDATION DESIGNS ARE IN ACCORDANCE WITH ANSI/EIA-222-E, "STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWERS AND ANTENNA SUPPORTING STRUCTURES", SECTION 7, FOR "NORMAL" SOIL CONDITIONS. "NORMAL" SOIL IS DEFINED AS DRY, COHESIVE SOIL WITH AN ALLOWABLE NET VERTICAL BEARING CAPACITY OF 4000 PSF (192 kPa), AND AN ALLOWABLE NET HORIZONTAL PRESSURE OF 400 PSF PER LINEAL FOOT OF DEPTH (62.8 kPa PER LINEAL METER OF DEPTH) TO A MAXIMUM OF 4000 PSF (192 kPa).
2. THE PURCHASER MUST VERIFY THAT ACTUAL SITE SOIL PARAMETERS MEET OR EXCEED E. I. A. "NORMAL" SOIL PARAMETERS AND THAT THE DEPTH OF STANDARD FOUNDATIONS ARE ADEQUATE BASED ON THE FROST PENETRATION AND/OR ZONE OF SEASONAL MOISTURE VARIATION AT THE SITE. "FOUNDATION DESIGN MODIFI- CATIONS" MAY BE REQUIRED IN THE EVENT "NORMAL" SOIL PARAMETERS ARE NOT APPLICABLE FOR THE ACTUAL SUBSURFACE CONDITIONS ENCOUNTERED.
3. FOUNDATION DESIGNS ASSUME FIELD INSPECTIONS WILL BE PERFORMED BY THE PURCHASER'S REPRESENTATIVE TO VERIFY THAT CONSTRUCTION MATERIALS, INSTALLATION METHODS AND ASSUMED DESIGN PARAMETERS ARE ACCEPTABLE BASED ON THE CONDITIONS EXISTING AT THE SITE.
4. WORK SHALL BE IN ACCORDANCE WITH LOCAL CODES, SAFETY REGULATIONS AND UNLESS OTHERWISE NOTED, THE LATEST REVISION OF ACI 318, "BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE". PROCEDURES FOR THE PROTECTION OF EXCAVATIONS, EXISTING CONSTRUCTION AND UTILITIES SHALL BE ESTABLISHED PRIOR TO FOUNDATION INSTALLATION.
5. ANCHOR BOLTS SHALL MEET OR EXCEED THE REQUIREMENTS OF ASTM A354 GRADE BC AND SHALL BE TIGHTENED TO A SNUG TIGHT CONDITION (FULL EFFORT OF A MAN USING AN ORDINARY SPUD WRENCH).
6. PAL NUTS OR ANCO NUTS SHALL BE INSTALLED ON ALL ANCHOR BOLTS.
7. CONCRETE MATERIALS SHALL CONFORM TO THE APPROPRIATE STATE REQUIREMENTS FOR EXPOSED STRUCTURAL CONCRETE.
8. PROPORTIONS OF CONCRETE MATERIALS SHALL BE SUITABLE FOR THE INSTALLATION METHOD UTILIZED AND SHALL RESULT IN DURABLE CONCRETE FOR RESISTANCE TO LOCAL ANTICIPATED AGGRESSIVE ACTIONS. THE DURABILITY REQUIREMENTS OF ACI 318 CHAPTER 4 SHALL BE SATISFIED BASED ON THE CONDITIONS EXPECTED AT THE SITE. AS A MINIMUM, CONCRETE SHALL DEVELOP A MINIMUM COMPRESSIVE STRENGTH OF 3000 PSI (20.7 MPa) IN 28 DAYS.
9. MAXIMUM SIZE OF AGGREGATE SHALL NOT EXCEED SIZE SUITABLE FOR INSTALLATION METHOD UTILIZED OR 1/3 CLEAR DISTANCE BEHIND OR BETWEEN REINFORCING. MAXIMUM SIZE MAY BE INCREASED TO 2/3 CLEAR DISTANCE PROVIDED WORKABILITY AND METHODS OF CONSOLIDATION SUCH AS VIBRATING WILL PREVENT HONEYCOMBS OR VOIDS.
10. REINFORCEMENT SHALL BE DEFORMED AND CONFORM TO THE REQUIREMENTS OF ASTM A615 GRADE 60 UNLESS OTHERWISE NOTED. SPLICES IN REINFORCEMENT SHALL NOT BE ALLOWED UNLESS OTHERWISE INDICATED.
11. REINFORCING CAGES SHALL BE BRACED TO RETAIN PROPER DIMENSIONS DURING HANDLING AND THROUGHOUT PLACEMENT OF CONCRETE.
12. WELDING IS PROHIBITED ON REINFORCING STEEL AND EMBEDMENTS.
13. MINIMUM CONCRETE COVER FOR REINFORCEMENT SHALL BE 3 INCHES (76 mm) UNLESS OTHERWISE NOTED. APPROVED SPACERS SHALL BE USED TO INSURE A 3 INCH (76 mm) MINIMUM COVER ON REINFORCEMENT.
14. CONCRETE COVER FROM TOP OF FOUNDATION TO ENDS OF VERTICAL REINFORCEMENT SHALL NOT EXCEED 3 INCHES (76 mm) NOR BE LESS THAN 2 INCHES (51 mm).
15. SPACERS SHALL BE ATTACHED INTERMITTENTLY THROUGHOUT THE ENTIRE LENGTH OF VERTICAL REINFORCING CAGES TO INSURE CONCENTRIC PLACEMENT OF CAGES IN EXCAVATIONS.
16. FOUNDATION DESIGNS ASSUME STRUCTURAL BACKFILL TO BE COMPACTED IN 8 INCH (200 mm) MAXIMUM LAYERS TO 95% OF MAXIMUM DRY DENSITY AT OPTIMUM MOISTURE CONTENT IN ACCORDANCE WITH ASTM D698. ADDITIONALLY, STRUCTURAL BACKFILL MUST HAVE A MINIMUM COMPACTED UNIT WEIGHT OF 100 POUNDS PER CUBIC FOOT (16 kN/m³).
17. FOUNDATION DESIGNS ASSUME LEVEL GRADE AT TOWER SITE.

18. FOUNDATION INSTALLATION SHALL BE SUPERVISED BY PERSONNEL KNOWLEDGEABLE AND EXPERIENCED WITH THE PROPOSED FOUNDATION TYPE. CONSTRUCTION SHALL BE IN ACCORDANCE WITH GENERALLY ACCEPTED INSTALLATION PRACTICES.
19. FOR FOUNDATION AND ANCHOR TOLERANCES SEE DRAWING AB10214.
20. LOOSE MATERIAL SHALL BE REMOVED FROM BOTTOM OF EXCAVATION PRIOR TO CONCRETE PLACEMENT. SIDES OF EXCAVATION SHALL BE ROUGH AND FREE OF LOOSE CUTTINGS.
21. CONCRETE SHALL BE PLACED IN A MANNER THAT WILL PREVENT SEGREGATION OF CONCRETE MATERIALS AND OTHER OCCURRENCES WHICH MAY DECREASE THE STRENGTH OR DURABILITY OF THE FOUNDATION.
22. FREE FALL CONCRETE MAY BE USED PROVIDED FALL IS VERTICAL DOWN WITHOUT HITTING SIDES OF EXCAVATION. FORMWORK, REINFORCING BARS, CAGE BRACING OR OTHER OBSTRUCTIONS, UNDER NO CIRCUMSTANCES SHALL CONCRETE FALL THROUGH WATER.
23. CONCRETE SHALL BE PLACED AGAINST UNDISTURBED SOIL EXCEPT FOR PIERS OF PIER AND PAD FOUNDATIONS. FORMS FOR PIERS SHALL BE REMOVED PRIOR TO PLACING STRUCTURAL BACKFILL.
24. CONSTRUCTION JOINTS, IF REQUIRED IN PIER MUST BE AT LEAST 12 INCHES (305mm) BELOW BOTTOM OF EMBEDMENTS AND MUST BE INTENTIONALLY ROUGHENED TO A FULL AMPLITUDE OF 1/4 INCH (6mm). FOUNDATION DESIGN ASSUMES NO OTHER CONSTRUCTION JOINTS.
25. TOP OF FOUNDATION OUTSIDE LIMITS OF ANCHOR BOLTS SHALL BE SLOPED TO DRAIN WITH A FLOATED FINISH. AREA INSIDE LIMITS OF ANCHOR BOLTS SHALL BE LEVEL WITH A SCRATCHED FINISH.
26. EXPOSED EDGES OF CONCRETE SHALL BE CHAMFERED 3/4" X 3/4" (19 mm X 19 mm) MINIMUM.
27. FOR ANCHOR BLOCK TYPE FOUNDATIONS, THE PORTION OF ALL STEEL ANCHORS FROM TOP OF ANCHOR BLOCK TO GROUND LEVEL, SHALL BE COATED WITH BITUMEN. DESIGN ASSUMES PERIODIC INSPECTIONS WILL BE PERFORMED OVER THE LIFE OF THE STRUCTURE TO DETERMINE IF ADDITIONAL ANCHOR CORROSION PROTECTION MEASURES MUST BE IMPLEMENTED BASED ON OBSERVED SITE-SPECIFIC CONDITIONS.

R10	REVISED NOTE #9 & #24	11/13/94	CSR	472	KJK
R9	REV'D NOTES 27 & 9	1-18-94	RKB	WOU	XK
No. ▲ Revision Description ▲ Date ▲ Rev. By ▲ Ckd. By ▲ App. By					
R O H N					
Scale: NONE Drawn: CSR Checked: HA App. Eng.: XK App. Sign: AE		Title: 6/17/97 1/6/98 1/6/98 2/2/98			
FOUNDATION MATERIAL SPECIFICATION INSTALLATION NOTES AND TOLERANCES					
					DRAWING NO.: B841300R1

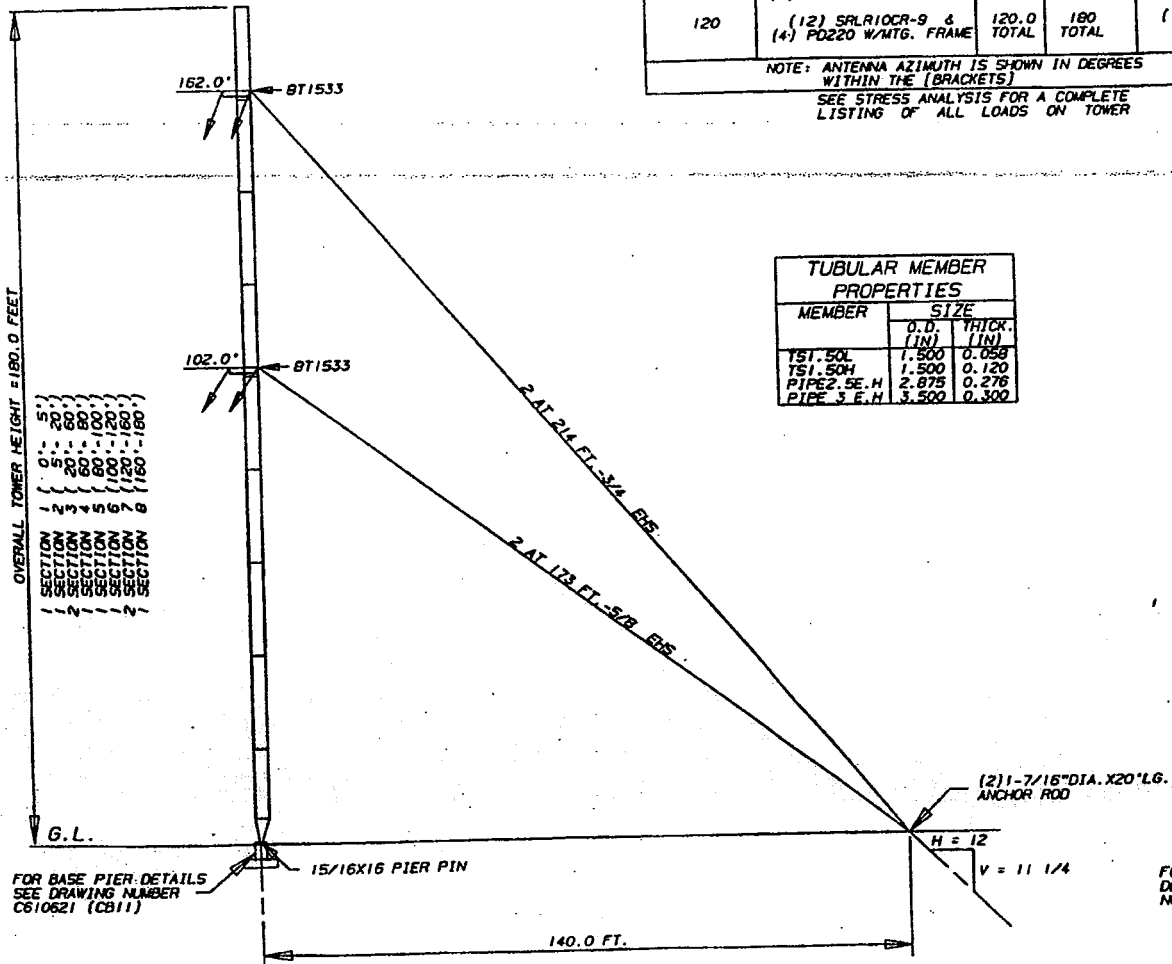
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TOWER DESIGN LOADING				
DESIGN WIND LOAD PER ANSI/EIA-222-E-1991, 90 MPH BASIC WIND SPEED (1/2" RADIAL ICE LOAD). THIS TOWER IS DESIGNED TO SUPPORT THE FOLLOWING LOADS:				
ELEVATION (FT)	ANTENNA TYPE	F.P.A. (SF)		LINE SIZE (NOM)
		NO ICE	W/ICE	
TOP	(12) SRL410CR-9 & (4) PD220 W/MTG. FRAME	120.0 TOTAL	180 TOTAL	(16) 1-5/8"
1700	(2) 6' DISHES (0) [180]	75.0 TOTAL	75.0 TOTAL	(2) EW63
160	(12) SRL410CR-9 & (4) PD220 W/MTG. FRAME	120.0 TOTAL	180 TOTAL	(16) 1-5/8"
140	(12) SRL410CR-9 & (4) PD220 W/MTG. FRAME	120.0 TOTAL	180 TOTAL	(16) 1-5/8"
120	(12) SRL410CR-9 & (4) PD220 W/MTG. FRAME	120.0 TOTAL	180 TOTAL	(16) 1-5/8"

NOTE: ANTENNA AZIMUTH IS SHOWN IN DEGREES WITHIN THE [BRACKETS]

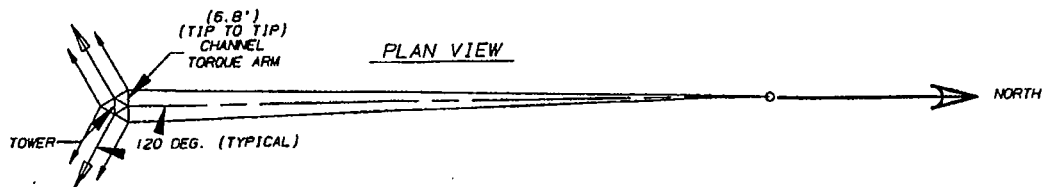
SEE STRESS ANALYSIS FOR A COMPLETE LISTING OF ALL LOADS ON TOWER



TUBULAR MEMBER PROPERTIES		
MEMBER	SIZE	
	O.D. (IN)	THICK. (IN)
TST. 50L	1.500	0.088
TST. 50H	1.500	0.120
PIPE 2.5E.H	2.875	0.276
PIPE 3 E.H	3.500	0.300

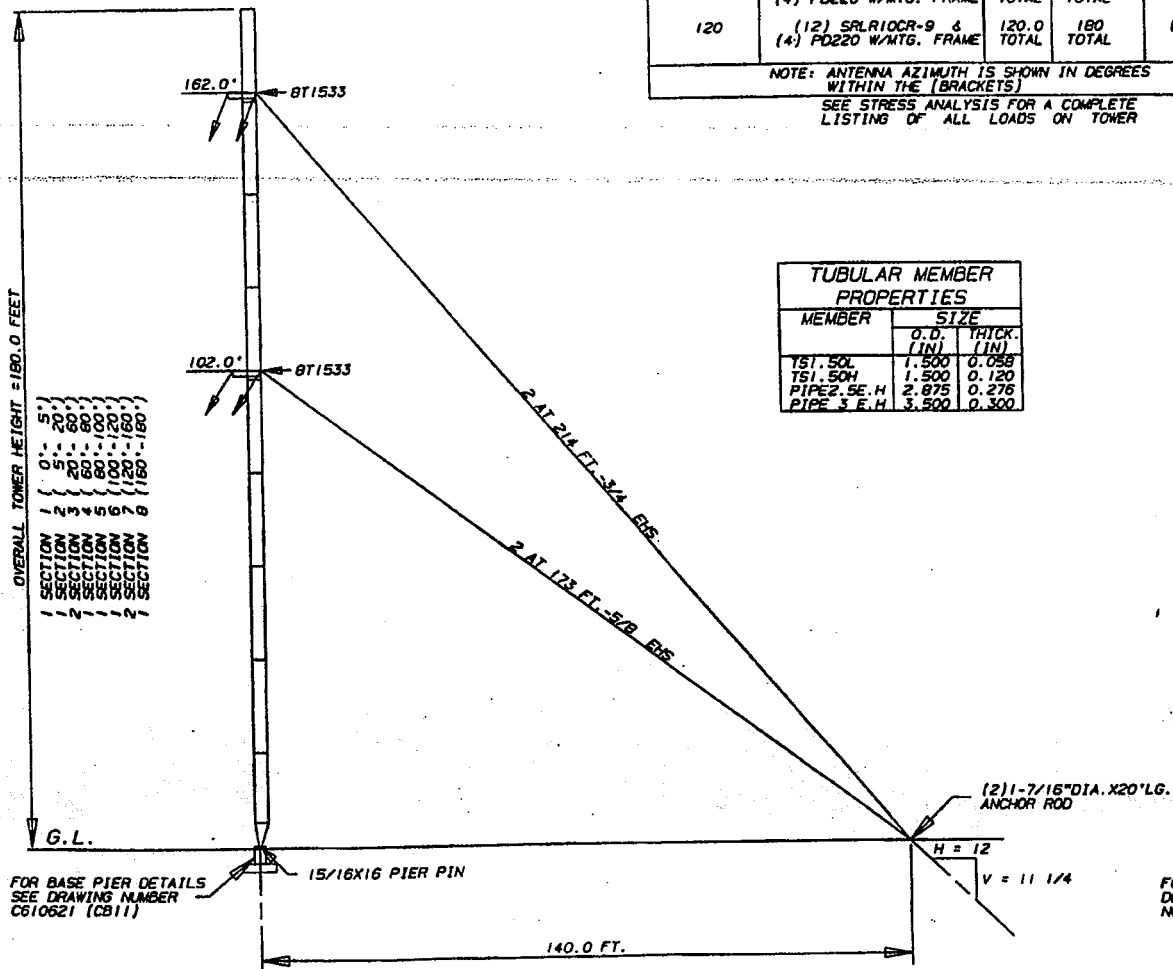
ELEVATION VIEW

TOWER SITE: MONTVILLE, CT. (COUN



TOWER DESIGN LOADING				
DESIGN WIND LOAD PER ANSI/EIA-222-E-1991, 90 MPH BASIC WIND SPEED (1/2" RADIAL ICE LOAD). THIS TOWER IS DESIGNED TO SUPPORT THE FOLLOWING LOADS:				
ELEVATION (FT)	ANTENNA TYPE	E.P.A. (SF)		LINE SIZE (NOM)
		NO ICE	W/ICE	
TOP	(12) SRL410CR-9 & (4) PD220 W/MTG. FRAME	120.0 TOTAL	180 TOTAL	(16) 1-5/8"
1700	(2) 6" DISHES (0) (180)	75.0 TOTAL	75.0 TOTAL	(2) EW63
160	(12) SRL410CR-9 & (4) PD220 W/MTG. FRAME	120.0 TOTAL	180 TOTAL	(16) 1-5/8"
140	(12) SRL410CR-9 & (4) PD220 W/MTG. FRAME	120.0 TOTAL	180 TOTAL	(16) 1-5/8"
120	(12) SRL410CR-9 & (4) PD220 W/MTG. FRAME	120.0 TOTAL	180 TOTAL	(16) 1-5/8"

NOTE: ANTENNA AZIMUTH IS SHOWN IN DEGREES WITHIN THE [BRACKETS]
SEE STRESS ANALYSIS FOR A COMPLETE LISTING OF ALL LOADS ON TOWER



TUBULAR MEMBER PROPERTIES		
MEMBER	SIZE	
	O.D. (IN)	THICK. (IN)
TS1.50L	1.500	0.058
TS1.50H	1.500	0.120
PIPE 2.5E.H	2.875	0.276
PIPE 3.E.H	3.500	0.300

ELEVATION VIEW

TOWER SITE: MONTVILLE, CT. (COUNT

SECTION MEMBER SCHEDULE							
ELEVATION (FT)	SECTION	LEG			BRACE		
		SIZE	BOLTED FLANGE CONNECTION	SIZE	BOLTED END CONNECTION	NO.	SIZE
0 - 5	1	PIPE 3 E.H	4	3/4	TS1.50L	1	1/2
5 - 20	2	PIPE 3 E.H	4	3/4	TS1.50L	1	1/2
20 - 60	3	PIPE 3 E.H	4	3/4	TS1.50H	1	1/2
60 - 80	4	PIPE 3 E.H	4	3/4	TS1.50L	1	1/2
80 - 100	5	PIPE 3 E.H	4	3/4	L 2X2X1/4	2	5/8
100 - 120	6	PIPE 3 E.H	4	3/4	TS1.50H	1	1/2
120 - 160	7	PIPE2.5E.H	4	3/4	L 2X2X1/4	2	5/8
160 - 180	8	PIPE2.5E.H	4	3/4			

NOTE: SECTION NUMBERS ARE FOR REFERENCE ONLY.
 * THESE SECTIONS ARE DOUBLE BRACED, ALL OTHERS ARE SINGLE BRACED.
 BRACING PATTERN: TENSION COMPRESSION SYSTEM WITH 2" - 5"
 NOMINAL PANEL SPACING.
 FACE WIDTH = 3" - 5"

TORQUE ARM SCHEDULE							
ELEVATION (FT)	TYPE	MAX. GUY SIZE ALLOWED (IN)	MAIN MEMBERS		SECONDARY MEMBERS		
			SIZE	CONNECTION	SIZE	CONNECTION	NO.
102	BT1533	5/8	C15X33.9	4	7/8	-----	---
162	BT1533	3/4	C15X33.9	4	7/8	-----	---

GUY WIRE DATA			
GUY ELEV. (FT)	SIZE (IN)	TYPE	ULT. STR. (KIPS)
102	5/8	EHS	42.40
162	3/4	EHS	59.30

GENERAL NOTES

1. ROHN COMMUNICATION TOWER DESIGNS CONFORM TO E.I.A.-222-E UNLESS OTHERWISE SPECIFIED UNDER TOWER DESIGN LOADING.
2. THE DESIGN LOADING CRITERIA INDICATED HAS BEEN PROVIDED TO ROHN. THE DESIGN LOADING CRITERIA HAS BEEN ASSUMED TO BE BASED ON SITE-SPECIFIC DATA IN ACCORDANCE WITH ANSI/EIA-222-E AND MUST BE VERIFIED BY OTHERS PRIOR TO INSTALLATION.
3. ANTENNAS AND LINES LISTED IN TOWER DESIGN LOADING TABLE ARE PROVIDED BY OTHERS UNLESS OTHERWISE SPECIFIED.
4. TOWER MEMBER DESIGN DOES NOT INCLUDE STRESSES DUE TO ERECTION SINCE ERECTION EQUIPMENT AND CONDITIONS ARE UNKNOWN. DESIGN ASSUMES COMPETENT AND QUALIFIED PERSONNEL WILL ERECT THE TOWER.
5. WORK SHALL BE IN ACCORDANCE WITH E.I.A.-222-E, "STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWERS AND ANTENNA SUPPORTING STRUCTURES".
6. THE MINIMUM YIELD STRENGTH OF STRUCTURAL STEEL MEMBERS SHALL BE 50 KSI, EXCEPT AS NOTED BELOW.
 ANGLE BRACES L 2X2X1/4 SHALL BE 36 KSI.
 TUBULAR BRACES SHALL BE 42 KSI.
 STRUCTURAL PLATES SHALL BE 36 KSI.
 CHANNELS FOR TORQUE ARMS SHALL BE 36 KSI.
7. FIELD CONNECTIONS SHALL BE BOLTED. NO FIELD WELDS SHALL BE ALLOWED.
8. STRUCTURAL BOLTS SHALL CONFORM TO ASTM A-325, EXCEPT WHERE NOTED.
9. PAL NUTS SHALL BE PROVIDED FOR ALL TOWER BOLTS.
10. STRUCTURAL STEEL AND CONNECTION BOLTS SHALL BE HOT-DIPPED GALVANIZED AFTER FABRICATION, IN ACCORDANCE WITH E.I.A.-222-E.
11. INITIAL TENSION OF GUY WIRES SHALL BE 10% OF THEIR ULTIMATE STRENGTHS.
12. THE FACTOR OF SAFETY OF GUYS AND THEIR CONNECTIONS SHALL NOT BE LESS THAN 2.0.
13. IT SHALL BE THE RESPONSIBILITY OF THE ERECTOR TO TEMPORARILY GUY THE STRUCTURE WHEN REQUIRED DURING ERECTION TO MAINTAIN THE STABILITY OF THE STRUCTURE AND TO PREVENT OVERLOADING ANY MEMBER OF THE STRUCTURE.
14. ALL HIGH STRENGTH BOLTS ARE TO BE TIGHTENED TO A "SNUGTIGHT" CONDITION AS DEFINED IN THE NOVEMBER 13, 1985, AISC "SPECIFICATION FOR STRUCTURAL JOINTS USING ASTM A325 OR A490 BOLTS".
15. PURCHASER SHALL VERIFY THE INSTALLATION IS IN CONFORMANCE WITH LOCAL, STATE, AND FEDERAL REQUIREMENTS FOR OBSTRUCTION MARKING AND LIGHTING.
16. TOLERANCE ON TOWER STEEL HEIGHT IS EQUAL TO PLUS 1X OR MINUS 1/2X.
17. DESIGN ASSUMES THAT, AS A MINIMUM, MAINTENANCE AND INSPECTION WILL BE PERFORMED OVER THE LIFE OF THE STRUCTURE IN ACCORDANCE WITH ANSI/EIA-222-E.
18. DESIGN ASSUMES ALL ANTENNAS ARE MOUNTED SYMMETRICALLY TO MINIMIZE TORQUE.
19. WAVEGUIDE BRACE BRACKETS SHALL BE PROVIDED FROM 5' TO TOP OF TOWER ON THREE TOWER FACES.
20. TOWER ORIENTATION PROVIDED BY THE CUSTOMER.
21. THE PURCHASER SHALL VERIFY THAT ACTUAL SITE SOIL PARAMETERS, MEET OR EXCEED E.I.A. "NORMAL" SOIL PARAMETERS.
22. DESIGN ASSUMES ALL TRANSMISSION LINES AND WAVEGUIDE BRACE BRACKETS ARE EQUALLY DISTRIBUTED ON THREE TOWER FACES.
23. ROHN SHALL HAVE THE OPTION TO REVIEW FINAL DISH LOCATIONS, AZIMUTHS AND MOUNTS TO VERIFY THAT ASSUMED TORQUE VALUES AND LOCAL STRESSES ARE NOT EXCEEDED.
24. DISH AZIMUTHS SHOWN ARE NOMINAL AZIMUTHS USED FOR DESIGN. ACTUAL AZIMUTHS (TO BE DETERMINED BY OTHERS) MUST NOT RESULT IN INCREASED DESIGN LOADS.

REACTIONS		
AT	VERT. (+/-)	HORIZ. (+/-)
BASE-0.0 FT	160.2 KIPS	
140.0 FT	-57.6 KIPS	61.9 KIPS

No. Revision Description		Date Rev By Ckd By App'd B	
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Designer: NONE Drawn: CSR Checked: GEN/3/19/97 App. Eng.: 753/19/97 App. Select: RAN/3/19/97		Title: 180' NO. 80 TOWER DESIGN FOR WIRELESS SOLUTIONS	
		ENG. FILE: 35489PH DRAWING NO.: B971656	

NEW LONDON)

DR. CLARENCE WELTI, P.E., P.C.

GEOTECHNICAL ENGINEERING

227 Williams Street • P.O. Box 397

Glastonbury, CT 06033

April 18, 2011

(860) 633-4623 / FAX (860) 657-2514

Mr. Ken Thomas
KT Tower Enterprises, LLC
c/o Wireless Solutions, LLC
P.O. Box 284
Old Lyme, CT 06371

**Re: Geotechnical Study for Proposed Tower
Cook Road, Montville, CT**

Dear Mr. Thomas:

1.0 Herewith are the data from the test borings taken at the above referenced site. Three borings were drilled at the proposed tower location to auger refusal on bedrock or boulders at depths ranging from 12 to 14 feet below the existing grades. A five foot rock core was taken at one of the boring locations. The boring locations are shown on the attached plan. *The borings were drilled by Clarence Welti Associates, Inc. and sampling was conducted by this firm solely to obtain indications of subsurface conditions as part of a geotechnical exploration program. No services were performed to evaluate subsurface environmental conditions.*

2.0 The Subject Project will include the construction of a new three legged self supported tower with a height of about 180 feet.

3.0 The soils/rock cross section from the borings is generally as follows:

Topsoil to 4" to 6"

Subsoils; SILT, some fine Sand, trace Gravel to 2 to 3 feet, loose to medium compact

Moraine; fine to medium SAND, some Silt, little Gravel, few Cobbles to auger refusal on boulders or bedrock at 12 to 14 feet, dense to very dense

Bedrock; Granitic Gneiss - the rock core taken from 17 to 21 feet had an RQD value of 51%

3.1 The Ground Water Table was at 5.5 to 6 feet below the existing grades at the completion of the borings.

4.0 In general the criteria for tower support is that the foundation capacity would exceed the loads, which might collapse the tower. Movements from strains in the soils should be limited to differential settlement (or lateral movements of less than $\frac{1}{2}$ ").

5.0 The recommended foundation system for the proposed tower would be with a large mat, placed sufficiently deep to prevent overturning by gravity resistance of the mat or mat and overlying soils. The mat can be placed on the natural moraine soils at least 4 feet below the existing grades. Based on the borings the sub grade will be atop a silty moraine which will be sensitive to remolding beneath equipment when wet. To address this condition there should be a minimum 8" layer of 3/8" or $\frac{1}{2}$ " crushed stone beneath the mat foundation. The allowable bearing pressure on the crushed stone atop the natural moraine deposits can be 3 Tons/sf.

5.1 Summary of design parameters:

Parameter	Value
Allowable Bearing Pressure on Crushed Stone Layer atop Moraine Soils	3 Tons/sf
Unit Weight of Backfill above water table	125 pcf
Unit Weight of Backfill below water table	60 pcf
Pull Out Angle (from Vertical)	30°

6.0 Fill placed atop the mat foundation, which is used as part of the gravity resistance to overturning, shall meet the following gradation:

Percent Passing	Sieve size
100	3.5"
50 - 100	3/4"
25 - 75	No.4

The fraction, passing the No.4 sieve, shall have less than 15%, passing the No. 200 sieve. All backfill and fill must be placed and compacted to at least 95% of modified optimum density (ASTM 1557-D).

7.0 This report has been prepared for specific application to the subject project in accordance with generally accepted soil and foundation engineering practices. No other warranty, express or implied, is made. In the event that any changes in the nature, design and location of structures are planned,

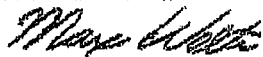
the conclusions and recommendations contained in this report should not be considered valid unless the changes are reviewed and conclusions of this report modified or verified in writing.

The analyses and recommendations submitted in this report are based in part upon data obtained from referenced explorations. The extent of variations between explorations may not become evident until construction. If variations then appear evident, it will be necessary to re-evaluate the recommendations of this report.

Dr. Clarence Welti, P.E., P.C., should perform a general review of the final design and specifications in order that geotechnical design recommendations may be properly interpreted and implemented as they were intended.

If you have any questions please call me.

Very truly yours,



Max Welti, P. E.

CLARENCE WELTI ASSOC., INC. P.O. BOX 397 GLASTONBURY, CONN 06033				CLIENT WIRELESS SOLUTIONS, LLC		PROJECT NAME PROPOSED TOWER	
						LOCATION COOK ROAD, MONTVILLE, CT.	
	AUGER	CASING	SAMPLER	CORE BAR.	OFFSET	SURFACE ELEV.	HOLE NO. B-1
TYPE	HSA		SS	NQ	LINE & STA.		
SIZE I.D.	3.75"		1.375"	2.0"	N. COORDINATE		
HAMMER WT.			140 lbs		E. COORDINATE		
HAMMER FALL			30"				
						GROUND WATER OBSERVATIONS AT 5.5 FT AFTER 0 HOURS	START DATE 4/12/11
						AT FT AFTER HOURS	FINISH DATE 4/12/11
DEPTH	SAMPLE			A	STRATUM DESCRIPTION + REMARKS		ELEV.
	NO.	BLOWS/6"	DEPTH				
0					TOPSOIL		0.33
					BR. SILT, LITTLE FINE SAND, TRACE FINE GRAVEL		
	1	10-22-22-24	2.00'-4.00'		LIGHT GREY/BR. FINE-MED. SAND, SOME SILT, LITTLE GRAVEL		2.0
	2	20-17-22-28	4.00'-8.00'				
5							
					GREY FINE-MED. SAND, SOME SILT, LITTLE GRAVEL		8.0
10	3	13-27-50	10.00'-11.50'				
					CORED BOULDERS & COBBLES		14.0
15							
					CORD BEDROCK - GRANITIC GNEISS		17.0
					RUN #1 17.0' - 21.0' RECOVERED 46" RQD=51%		
20							
					BOTTOM OF BORING @ 21.0'		21.0
25							
30							
35							
LEGEND: COL. A=RECOVERY " SAMPLE TYPE: D=DRY A=AUGER C=CORE U=UNDISTURBED PISTON S=SPLIT SPOON PROPORTIONS USED: TRACE=0-10% LITTLE=10-30% SOME=30-35% AND=35-50%						DRILLER: L. LINDENBERGER INSPECTOR:	
						SHEET 1 OF 1 HOLE NO. B-1	

CLARENCE WELT ASSOC., INC. P.O. BOX 397 GLASTONBURY, CONN 06033				CLIENT WIRELESS SOLUTIONS, LLC		PROJECT NAME PROPOSED TOWER	
						LOCATION COOK ROAD, MONTVILLE, CT.	
	AUGER	CASING	SAMPLER	CORE BAR.	OFFSET	SURFACE ELEV.	HOLE NO. B-2
TYPE	HSA		SS		LINE & STA.	GROUND WATER OBSERVATIONS	
SIZE (I.D.)	3.75"		1.375"		N. COORDINATE	AT 8.0 FT. AFTER 0 HOURS	START DATE 4/12/11
HAMMER WT.			140 lbs		E. COORDINATE	AT FT AFTER HOURS	FINISH DATE 4/12/11
HAMMER FALL			30"				

DEPTH	SAMPLE			A	STRATUM DESCRIPTION + REMARKS	ELEV.
	NO.	BLOWS/6"	DEPTH			
0					TOPSOIL	0.33
					BR. SILT, LITTLE FINE SAND, TRACE FINE GRAVEL	
	1	4-5-9-25	2.00'-4.00'			
					GREY/BR. FINE-MED. SAND, SOME SILT, LITTLE GRAVEL, FEW COBBLES	3.0
5						
	2	22-8-16-15	5.00'-7.00'			
					GREY FINE-MED. SAND, SOME SILT, SOME GRAVEL, FEW COBBLES	9.0
10						
					AUGER REFUSAL @ 13.0	13.0
15						
20						
25						
30						
35						

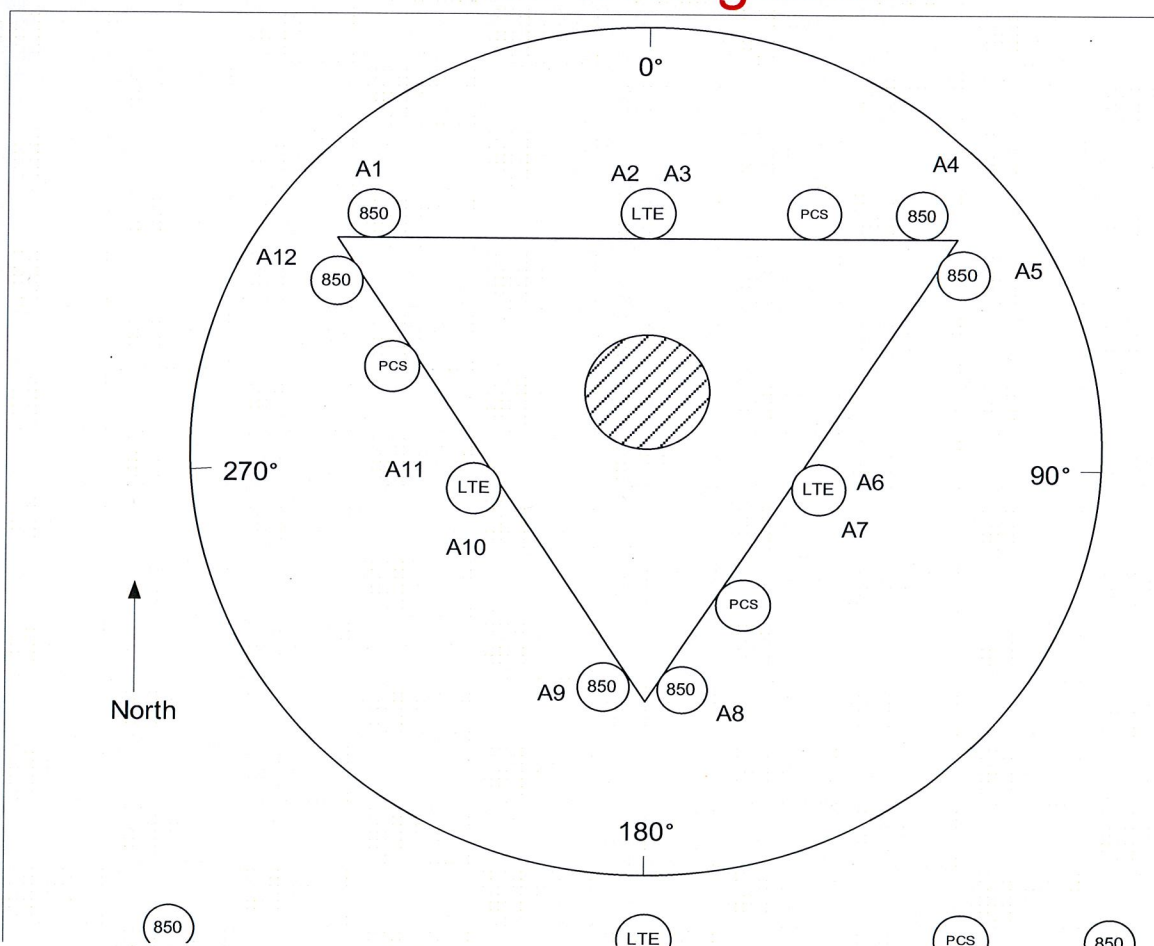
LEGEND: COL. A=RECOVERY "				DRILLER: L. LINDENBERGER	
SAMPLE TYPE: D=DRY A=AUGER C=CORE U=UNDISTURBED PISTON S=SPLIT SPOON				INSPECTOR:	
PROPORTIONS USED: TRACE=0-10% LITTLE=10-20% SOME=20-33% AND=33-50%				SHEET 1 OF 1	
				HOLE NO. B-2	

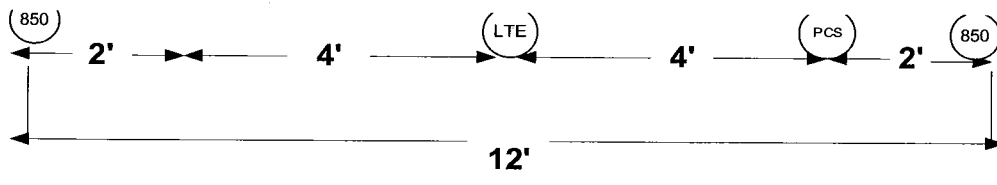
CLARENCE WELTI ASSOC., INC. P.O. BOX 387 GLASTONBURY, CONN 06033				CLIENT WIRELESS SOLUTIONS, LLC		PROJECT NAME PROPOSED TOWER				
						LOCATION COOK ROAD, MONTVILLE, CT.				
		AUGER	CASING	SAMPLER	CORE BAR	OFFSET	SURFACE ELEV.		HOLE NO. B-3	
TYPE		HSA		SS		LINE & STA.	GROUND WATER OBSERVATIONS		START DATE 4/12/11	
SIZE I.D.		3.75"		1.375"		N. COORDINATE	AT 8.0 FT. AFTER 0 HOURS			
HAMMER WT.				140 lbs		E. COORDINATE	AT FT. AFTER HOURS		FINISH DATE 4/12/11	
HAMMER FALL				30"						
DEPTH		SAMPLE			STRATUM DESCRIPTION + REMARKS					ELEV.
NO.		BLOWS/6"		DEPTH						
0					TOPSOIL					0.50
					BR. SILT, SOME FINE-MED. SAND, TRACE GRAVEL					
1		15-23-23-30		2.00'-4.00'	LIGHT GREY/BR. FINE-MED. SAND, SOME SILT, LITTLE GRAVEL, FEW COBBLES					2.5
2		60		4.00'-4.25'						
3		25-60		10.00'-10.75'	GREY/BR. FINE-MED. SAND, SOME SILT & GRAVEL, FEW COBBLES					9.0
					AUGER REFUSAL @ 12.0'					12.0
35										
LEGEND: COL. A=RECOVERY "						DRILLER: L. LINDENBERGER				
SAMPLE TYPE: D=DRY A=AUGER C=CORE U=UNDISTURBED PISTON S=SPLIT SPOON						INSPECTOR:				
PROPORTIONS USED: TRACE=0-10% LITTLE=10-20% SOME=30-35% AND=35-50%						SHEET 1 OF 1		HOLE NO. B-3		

SITE NAME		MONTVILLE 4 CT		ECP - CELL #		2		325	
LATITUDE		41-28-29.95 N		LONGITUDE		72-06-18.18 W			
Additional Comments: Adding LTE antenna and 6 cables				SAVE BUTTON					
				STRUCTURE TYPE		MONOPOLE			
700 Mhz C - LTE ANTENNA ADD		ALPHA		BETA		GAMMA			
EQUIPMENT TYPE		eNodeB		eNodeB		eNodeB			
ANTENNA TYPE		BXA-70063-6CF-2		BXA-70063-6CF-2		BXA-70063-6CF-2			
QTY OF ANTENNAS PER FACE		1		1		1			
ORIENTATION (DEG)		30		150		270			
DOWN TILT (MECH/DEG)		4		2		4			
RAD CTR (FT AGL)		169		169		169			
TMA - QTY / MODEL									
DIPLEXER - QTY / MODEL									
MCPA BRICKS (QTY)									
850 Cellular - Current Config		ALPHA		BETA		GAMMA			
EQUIPMENT TYPE		BTS8440		BTS8440		BTS8440			
ANTENNA TYPE		ALP9212		ALP9212		ALP9212			
QTY OF ANTENNAS PER FACE		2		2		2			
ORIENTATION (DEG)		30		150		270			
DOWN TILT (MECH/DEG)		0		0		0			
RAD CTR (FT AGL)		169		169		169			
TMA - QTY / MODEL									
DIPLEXER - QTY / MODEL									
DIPLEXER KIT - QTY / MODEL									
MCPA BRICKS (QTY)									
850 Cellular - Future Config		ALPHA		BETA		GAMMA			
EQUIPMENT TYPE		BTS8440		BTS8440		BTS8440			
ANTENNA TYPE		LPA-80080/4CF		LPA-80080/4CF		LPA-80080/4CF			
QTY OF ANTENNAS PER FACE		2		2		2			
ORIENTATION (DEG)		30		150		270			
DOWN TILT (MECH/DEG)		4		0		4			
RAD CTR (FT AGL)		169		169		169			
TMA - QTY / MODEL									
DIPLEXER - QTY / MODEL									
DIPLEXER KIT - QTY / MODEL									
MCPA BRICKS (QTY)									
1900 PCS - Current Config		ALPHA		BETA		GAMMA			
EQUIPMENT TYPE		PCS Modcell 4.0B		PCS Modcell 4.0B		PCS Modcell 4.0B			
ANTENNA TYPE		948F85T2E-M_2		948F85T2E-M_2		948F85T2E-M_2			
QTY OF ANTENNAS PER FACE		2		2		2			
ORIENTATION (DEG)		30		150		270			
DOWN TILT (MECH/DEG)		0		0		0			
RAD CTR (FT AGL)		169		169		169			
TMA - QTY / MODEL									
DIPLEXER - QTY / MODEL									
DIPLEXER KIT - QTY / MODEL									
MCPA BRICKS (QTY)									
1900 PCS - Future Config		ALPHA		BETA		GAMMA			
EQUIPMENT TYPE		PCS Modcell 4.0B		PCS Modcell 4.0B		PCS Modcell 4.0B			
ANTENNA TYPE		BXA-171085_8BF_2		BXA-171085_8BF_2		BXA-171085_8BF_2			
QTY OF ANTENNAS PER FACE		1		1		1			
ORIENTATION (DEG)		30		150		270			
DOWN TILT (MECH/DEG)		0		0		0			
RAD CTR (FT AGL)		169		169		169			
TMA - QTY / MODEL									
DIPLEX WITH CELLULAR CABLE									
MCPA BRICKS (QTY)									

NUMBER OF CABLE'S NEEDED					ESTIMATED CABLE LENGTH						
MAINLINE SIZE		1 5/8"	TOTAL # OF MAINLINES		18	MAINLINE (FT)					
JUMPER SIZE		1/2 "	TOTAL # OF TOP JUMPERS		18	TOP JUMPER (FT)			12		
Equipment Cable Ordering		MAIN CABLE	12	+	6	TOP JUMPER #	12	+	6		
TX / RX FREQUENCIES					TX POWER OUTPUT						
Cellular A-Band			PCS F-Band			Cellular (Watts)			20		
TX - 869-880,890-891.5 MHz			TX - 1970-1975			PCS (Watts)			16		
RX - 824-835,845-846.5 MHz			RX - 1890-1895			LTE (Watts)			40		
700 MHz A - Block			700 MHz C - Block			AWS F - Block					
TX - 698 - 704 MHz			TX - 746-757			TX - 2145-2155					
RX - 728 - 734 MHz			RX - 776-787			RX - 1745-1755					
ALPHA				BETA				GAMMA			
Ant.	Freq.	Func.	Color Code	Ant.	Freq.	Func.	Color Code	Ant.	Freq.	Func.	Color Code
A1	800	Tx1/Rx0	RED	A7	800	Tx2/Rx0	BLUE	A13	800	Tx3/Rx0	GREEN
A2-A	1900	Tx1/Rx0	RED/ WHITE	A8-A	1900	Tx2/Rx0	BLUE/ WHITE	A14-A	1900	Tx3/Rx0	GREEN/WHITE
A3	700-C	Tx1/Rx0	RED/ ORANGE	A9	700-C	Tx2/Rx0	BLUE/ ORANGE	A15	700-C	Tx3/Rx0	GREEN/ORANGE
A4	700-C	Tx1/Rx0	RED/RED/ ORANGE	A10	700-C	Tx2/Rx0	BLUE/BLUE/ ORANGE	A16	700-C	Tx3/Rx0	GREEN/GREEN/ORANGE
A5-A	1900	Tx4/Rx1	RED/RED/ WHITE	A11-A	1900	Tx5/Rx1	BLUE/BLUE/ WHITE	A17-B	1900	Tx6/Rx1	GREEN/GREEN/ WHITE
A6	800	Tx4/Rx1	RED/RED	A12	800	Tx5/Rx1	BLUE/BLUE	A18	800	Tx6/Rx1	GREEN/GREEN
RF ENGINEER			RF MANAGER				INITIALS		DATE		
Prepared By : Mark Brauer			Steve Weatherbee				MB		10/13/2011		

Site Configuration





Swedcom Corporation

ALP 9212-N

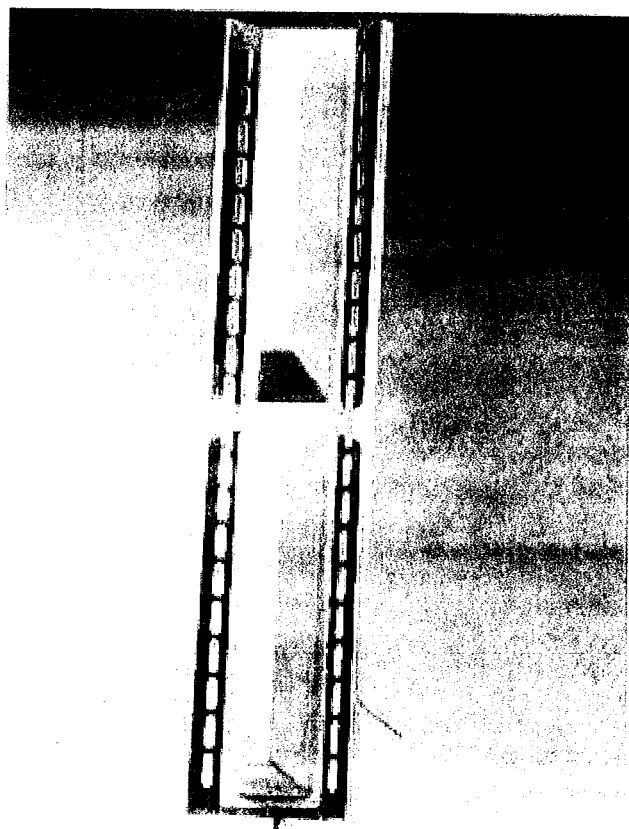
Log-Periodic Reflector Antenna

92 Degrees 12 dBd

Features:

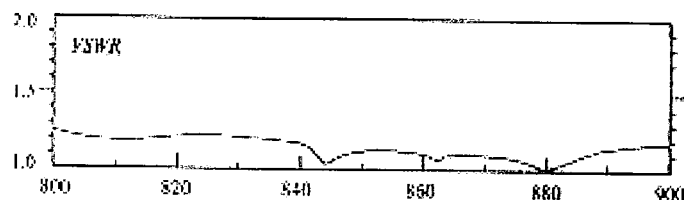
- ☐ Broadbanded. (800-900 MHz)
- ☐ Low backlobe radiation. Front-to-back ratio better than 28 dB
- ☐ Low Intermodulation Products.
- ☐ Low Wind-load.
- ☐ Low weight.
- ☐ Small size.
- ☐ Rugged design.

Please see the following pages including radiation patterns/tables for ALP 9212-N.



Electrical Specifications:

Frequency range:	806-896 MHz
Impedance:	50 ohm
Connector:	N-female or 7/8" EIA
VSWR:	Typ. 1.3:1 max 1.5:1
Polarization:	Vertical
Gain:	12 dBd
Front to back ratio:	>28 dB
Side-lobe suppression:	>18 dB
Intermodulation: (2x25W):	IM3 >148 dB IM5 >153 dB IM7 & IM9 >163 dB
Power Rating:	500 W
H-Plane: -3 dB	95 °
E-Plane: -3 dB	15 °
Lightning Protection:	DC Grounded



Mechanical Specifications:

Overall Height:	52 in	(1320 mm)
Width:	11.4 in	(290 mm)
Depth:	11.4 in	(290 mm)
Weight including brackets:	26.7 lbs	(12 Kg)
Rated wind velocity:	113 mph	(180 Km/h)
Wind Area (CxA/Front):	3.9 sq ft	(0.36 sq.m)
Lateral thrust at rated wind		
Worst case:	570 N	

Materials:

Radiating elements:	Aluminum
Element housing:	Grey PVC
Back-plate:	Aluminum

Mounting hardware
clamps:
bolts:

Hot dip galvanized steel
Stainless steel

Manufactured by: Allgon System AB

DECIBEL®
Base Station Antennas

948F85T2E-M

16.1 dBi, Directed Dipole Antenna
1850-1990 MHz

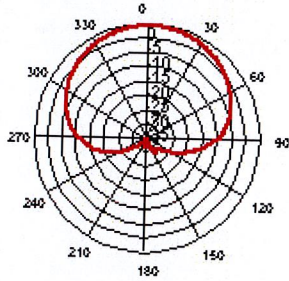
1850-1990 MHz

MaxFill™

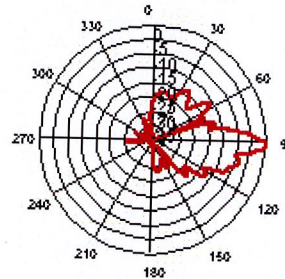
dB Director®

- Exceptional azimuth roll-off reducing soft hand-offs and improving capacity
- Excellent upper side lobe suppression
- Deep null filling below the horizon assures improved signal intensity
- Low profile appearance and low wind loading profile for easier zoning approvals

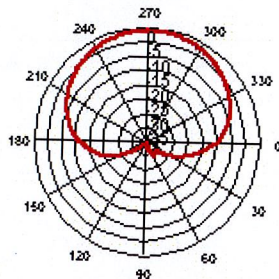
850



Azimuth 1850 MHz (Tilt=2)



Vertical 1850 MHz (Tilt=2)



Horizontal 1850 MHz (Tilt=2)



ELECTRICAL

Frequency (MHz):	1850-1990
Polarization:	Vertical
Gain (dBd/dBi):	14/16.1
Azimuth BW:	85°
Elevation BW:	8°
Beam Tilt:	2°
USLS* (dB):	>18
Null Fill* (dB):	15
Front-to-Back Ratio* (dB):	40
VSWR:	<1.33:1
IM Suppression - Two 20 Watt Carriers:	-150 dBc
Impedance:	50 Ohms
Max Input Power:	250 Watts
Lightning Protection:	DC Ground
Opt Electrical Tilt:	0°, 4°, 6°

MECHANICAL

Weight:	8.5 lbs (3.9 kg)
Dimensions (LxWxD):	48 X 3.5 X 7 in (1219 X 89 X 178 mm)
Max. Wind Area:	1.18 ft² (0.11 m²)
Max. Wind Load (@ 100mph):	65 lbf (289 N)
Max. Wind Speed:	125 mph (201 km/h)
Radiator Material:	Low Loss Circuit Board
Reflector Material:	Aluminum
Radome Material:	ABS, UV Resistant
Mounting Hardware Material:	Galvanized Steel
Connector Type:	7-16 DIN - Female (Bottom)
Color:	Light Gray
Standard Mounting Hardware:	DB390 Pipe Mount Kit, included
Downtilt Mounting Hardware:	DB5098, optional
Opt. Mounting Hardware:	DB5094-AZ Azimuth Wall Mount



Andrew Corporation
8635 Stemmons Freeway
Dallas, Texas U.S.A 75247-3701
Tel: 214.631.0310

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

Date: 4/29/2004
* - Indicates Typical Values

dbtech@andrew.com

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 fiberglass 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⁾	2°
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.

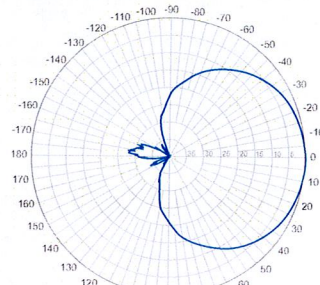
3) NE indicates an elongated N connector.
E-DIN indicates an elongated DIN connector.

4) Antenna weight does not include brackets.

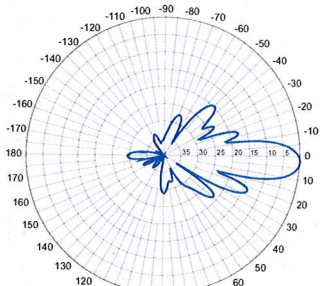
5) Add'l downtilts may be available. Check website for details.

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

Radiation-pattern¹⁾
750 MHz

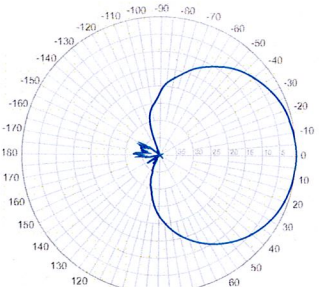


Horizontal

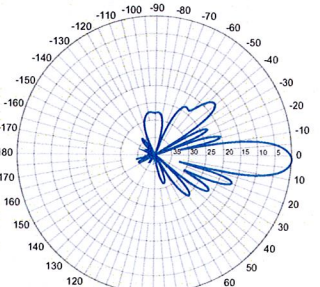


Vertical

850 MHz



Horizontal

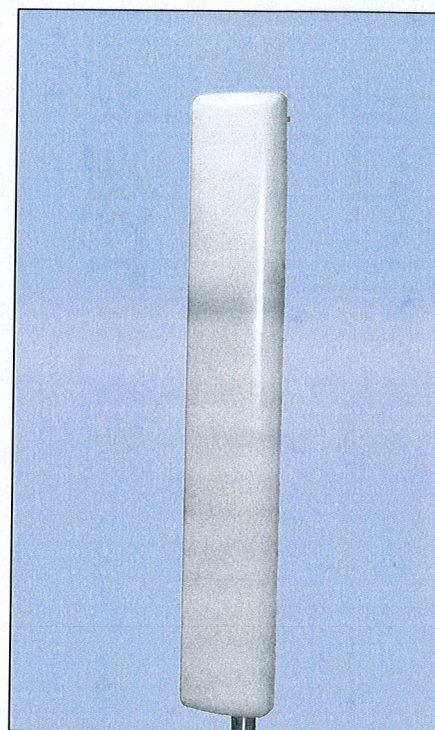


Vertical

696-900 MHz

BXA-70063/6CF 2°

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: 04/07/09

LPA-80080/4CF

When ordering replace "___" with connector type.

Mechanical specifications

Length	1200 mm	47.2 in
Width	140 mm	5.5 in
Depth	335 mm	13.2 in
Depth with z-bracket	375 mm	14.8 in
4) Weight	5.4 kg	12.0 lbs
Wind Area		
Fore/Aft	0.17 m ²	1.8 ft ²
Side	0.40 m ²	4.3 ft ²
Rated Wind Velocity (Safety factor 2.0)		
	>369 km/hr	>229 mph
Wind Load @ 100 mph (161 km/hr)		
Fore/Aft	254 N	57.1 lbs
Side	574 N	129.0 lbs

Antenna consisting of aluminum alloy with brass feedlines covered by a UV safe fiberglass radome.

Mounting and Downtilting

Mounting brackets attach to a pipe diameter of Ø50-102 mm (2.0-4.0 in). If the lock-down brace is used, the maximum diameter is Ø88.9 mm (3.5 in).

Mounting Bracket & Downtilt Bracket Kit
#21699999

Electrical specifications

Frequency Range	806-960 MHz
Impedance	50Ω
3) Connector(s)	NE or E-DIN 1 port / center
1) VSWR	≤ 1.4:1
Polarization	Vertical
1) Gain	12.5 dBd
2) Power Rating	500 W
1) Half Power Angle	
H-Plane	80°
E-Plane	15°
1) Electrical Downtilt	0°
1) Null Fill	15%
Lightning Protection	Direct Ground

1) Typical values.

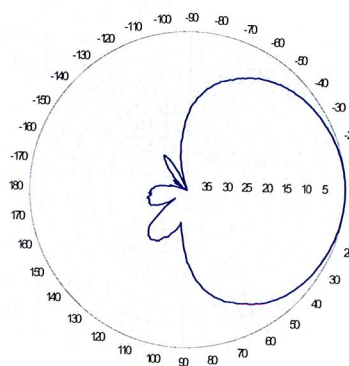
2) Power rating limited by connector only.

3) NE indicates an elongated N connector.
E-DIN indicates an elongated DIN connector.

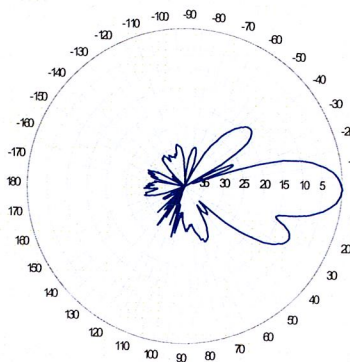
4) The antenna weight listed above does not include the bracket weight.

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

Radiation pattern¹⁾



Horizontal

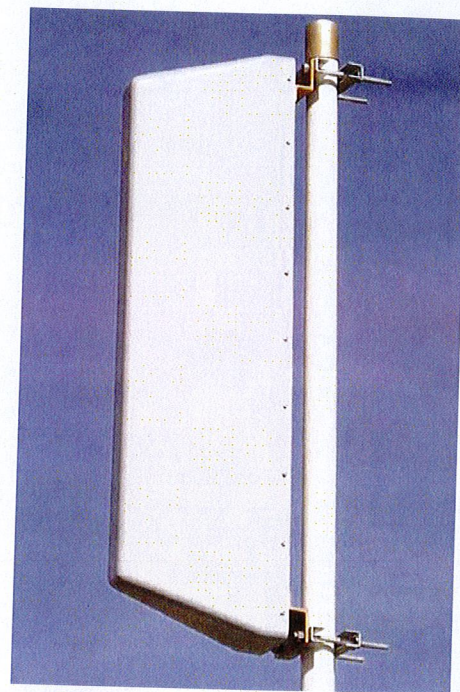


Vertical

Featuring upper side lobe suppression.

Radiation patterns for all antennas are measured with the antenna mounted on a fiberglass pole.

Mounting on a metal pole will typically improve the Front-to-Back ratio.



**Amphenol Antel's
Exclusive 3T (True
Transmission Line
Technology)
Antenna Design:**

- True log-periodic design allows for superior front-to-side characteristics to minimize sector overlap.
- 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.

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

Antenna available with center-fed connector only.

CF Denotes a Center-Fed Connector.

806-960 MHz

**Amphenol
Antel, Inc.**
The Antenna Technology Company

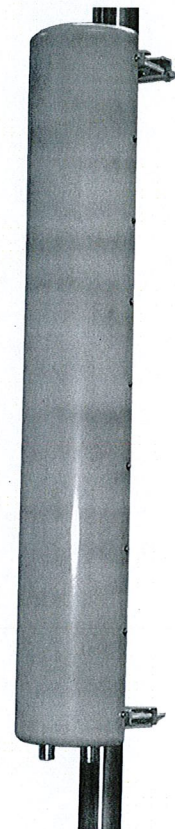
Revision Date: 7/5/07

BXA-171085-8BF-EDIN-X

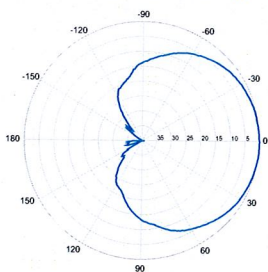
Replace "X" with desired electrical downtilt.

X-Pol | FET Panel | 85° | 16.4 dBi

Electrical Characteristics	1710-2170 MHz		
Frequency bands	1710-1880 MHz	1850-1990 MHz	1920-2170 MHz
Polarization	±45°	±45°	±45°
Horizontal beamwidth	88°	85°	80°
Vertical beamwidth	7°	7°	7°
Gain	13.5 dBd / 15.6 dBi	13.9 dBd / 16.0 dBi	14.3 dBd / 16.4 dBi
Electrical downtilt (X)	0, 2, 4		
Impedance	50Ω		
VSWR	≤1.5:1		
First upper sidelobe	< -17 dB		
Front-to-back isolation	> 30 dB		
In-band isolation	> 28 dB		
IM3 (20W carrier)	< -150 dBc		
Input power	300 W		
Lightning protection	Direct Ground		
Connector(s)	2 Ports / EDIN / Female / Bottom		
Operating temperature	-40° to +60° C / -40° to +140° F		
Mechanical Characteristics			
Dimensions Length x Width x Depth	1232 x 154 x 105 mm	48.5 x 6.1 x 4.1 in	
Depth with t-brackets	133 mm	5.2 in	
Weight without mounting brackets	4.8 kg	10.5 lbs	
Survival wind speed	296 km/hr	184 mph	
Wind area	Front: 0.19 m ² Side: 0.14 m ²	Front: 2.0 ft ² Side: 1.5 ft ²	
Wind load @ 161 km/hr (100 mph)	Front: 281 N Side: 223 N	Front: 63 lbf Side: 50 lbf	
Mounting Options	Part Number	Fits Pipe Diameter	Weight
2-Point Mounting Bracket Kit	26799997	50-102 mm 2.0-4.0 in	2.3 kg 5 lbs
2-Point Mounting & Downtilt Bracket Kit	26799999	50-102 mm 2.0-4.0 in	3.6 kg 8 lbs
Concealment Configurations	For concealment configurations, order BXA-171085-8BF-EDIN-X-FP		

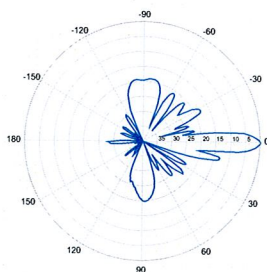


BXA-171085-8BF-EDIN-X



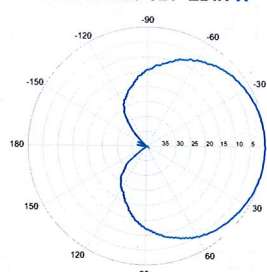
Horizontal | 1710-1880 MHz

BXA-171085-8BF-EDIN-0



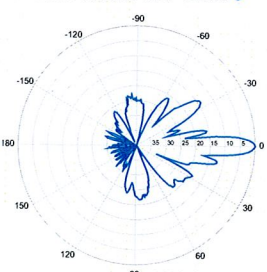
0° | Vertical | 1710-1880 MHz

BXA-171085-8BF-EDIN-X



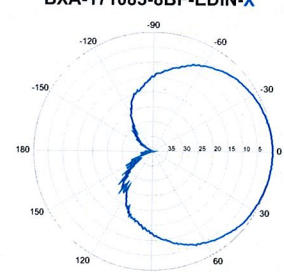
Horizontal | 1850-1990 MHz

BXA-171085-8BF-EDIN-0



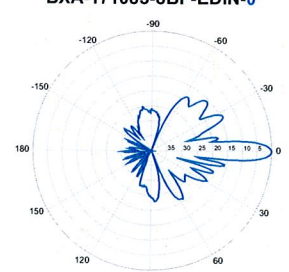
0° | Vertical | 1850-1990 MHz

BXA-171085-8BF-EDIN-X



Horizontal | 1920-2170 MHz

BXA-171085-8BF-EDIN-0



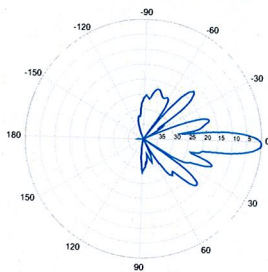
0° | Vertical | 1920-2170 MHz

Quoted performance parameters are provided to offer typical or range values only and may vary as a result of normal manufacturing and operational conditions. Extreme operational conditions and/or stress on structural supports is beyond our control. Such conditions may result in damage to this product. Improvements to product may be made without notice.

BXA-171085-8BF-EDIN-X

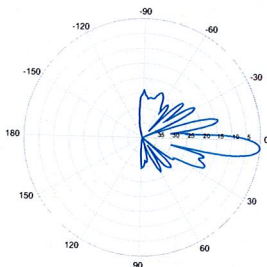
X-Pol | FET Panel | 85° | 16.4 dBi

BXA-171085-8BF-EDIN-2



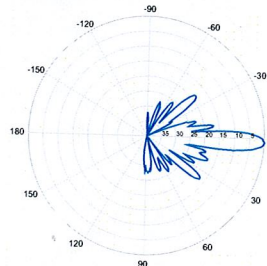
2° | Vertical | 1710-1880 MHz

BXA-171085-8BF-EDIN-4



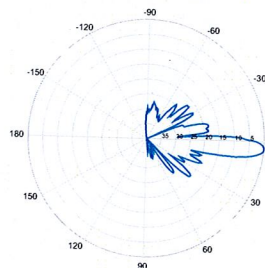
4° | Vertical | 1710-1880 MHz

BXA-171085-8BF-EDIN-2



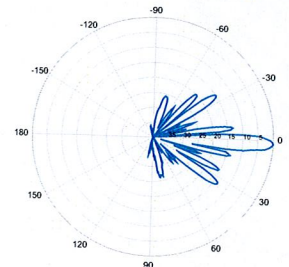
2° | Vertical | 1850-1990 MHz

BXA-171085-8BF-EDIN-4



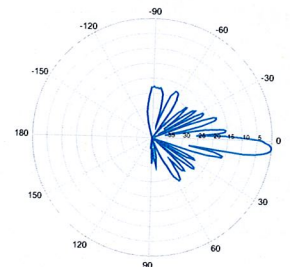
4° | Vertical | 1850-1990 MHz

BXA-171085-8BF-EDIN-2



2° | Vertical | 1920-2170 MHz

BXA-171085-8BF-EDIN-4



4° | Vertical | 1920-2170 MHz

Quoted performance parameters are provided to offer typical or range values only and may vary as a result of normal manufacturing and operational conditions. Extreme operational conditions and/or stress on structural supports is beyond our control. Such conditions may result in damage to this product. Improvements to product may be made without notice.