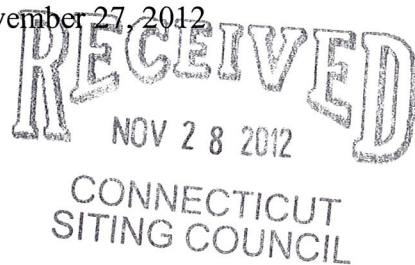


280 Trumbull Street
Hartford, CT 06103-3597
Main (860) 275-8200
Fax (860) 275-8299
kbaldwin@rc.com
Direct (860) 275-8345

Also admitted in Massachusetts

November 27, 2012



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

Re: **Notice of Exempt Modification – Antenna Swap
179 Shunpike Road, Cromwell, Connecticut**

Dear Ms. Roberts:

Cellco Partnership d/b/a Verizon Wireless (“Cellco”) currently maintains twelve (12) wireless telecommunications antennas at the 100-foot level on an existing 170-foot tower at the above-referenced address. The tower and underlying property are owned by the Cromwell Fire District. Cellco’s use of the tower was approved by the Council in 2007. Cellco now intends to replace all of its existing antennas with six (6) SC-E 6014 rev 2 cellular antennas; three (3) model BXA-171063-12BF PCS antennas; and three (3) model SWCP 2X5514 LTE antennas, all at the same 100-foot level on the tower. Cellco also intends to install six (6) coax cable diplexers behind its antennas. Attached behind Tab 1 are the specifications for Cellco’s replacement antennas and cable diplexers.

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 Mertie Terry, First Selectman of the Town of Cromwell. A copy of this letter is also being sent to Cromwell Fire District, the owner 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), as amended.



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ROBINSON & COLE_{LLP}

Linda Roberts
November 27, 2012
Page 2

1. The proposed modifications will not result in an increase in the height of the existing tower. Cellco's replacement antennas will be located at the 100-foot level on the existing 170-foot tower.
2. The proposed modifications do not involve any change to ground-mounted equipment and, therefore, will not require the extension of the site boundary.
3. The proposed modifications will not increase noise levels at the facility by six decibels or more, or to levels that exceed state and local criteria.
4. The operation of the replacement antennas will not increase radio frequency (RF) emissions 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.
5. The proposed modifications will not cause a change or alteration in the physical or environmental characteristics of the site.
6. The tower and its foundation can support Cellco's proposed modifications. (*See Detailed Structural Analysis attached behind 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:

Mertie Terry, Cromwell First Selectman
Cromwell Fire District
Sandy M. Carter

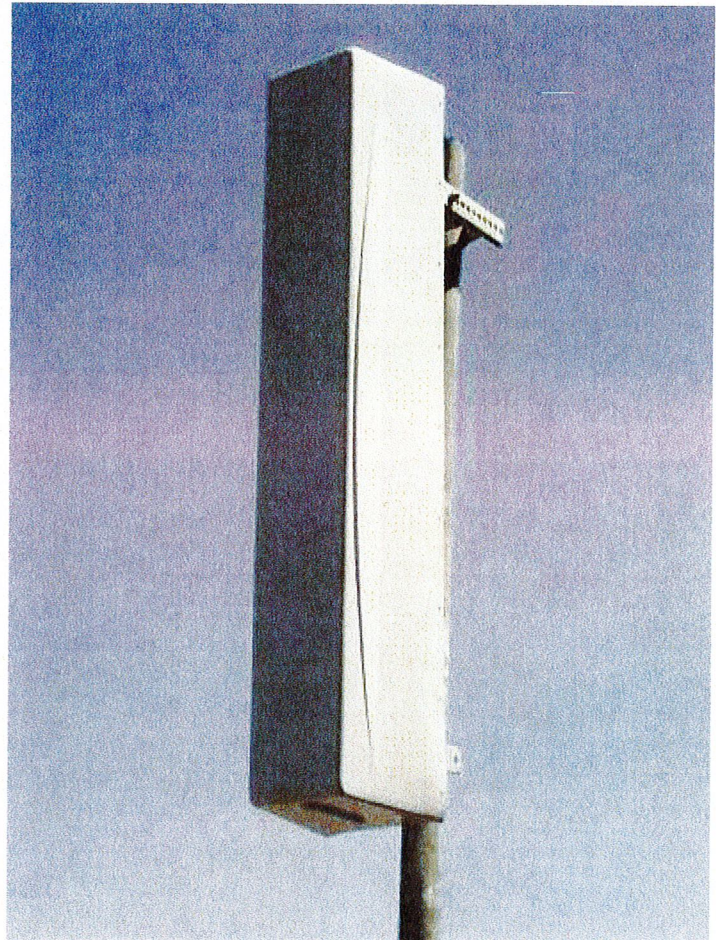


SC-E 6014 rev2

Enhanced 800 - 960 MHz log-periodic antenna

Features

- Small size
- Aesthetically pleasing
- Suitable for TDMA/CDMA/GSM/3G
- High return loss
- Low intermodulation
- High front-to-back ratio
- Outstanding performance over the entire band (800 - 960 MHz)
- Upper side-lobe suppression
- Rugged design
- Dramatically improved signal to interference performance



Electrical specifications

Frequency range:	800-960 MHz
Impedance:	50 ohm
Connector type:	7/16 Din
Return loss:	20 dB
Polarization:	Vertical
Gain:	14 dBd
Front-to-back ratio:	> 30 dB
Upper side-lobe suppression:	18 dB

Intermodulation (2x20W):	IM5 160 dB
	IM7/9 170 dB

Power rating:	500 W
H-plane (-3 dB point):	54 - 60°
V-plane (-3 dB point):	16 - 18°
Lightning protection:	DC grounded

Mechanical specifications

Overall height:	43 in	[1092 mm]
Width:	8.5 in	[216 mm]
Depth:	8 in	[203 mm]
Weight (excluding brackets):	15 lbs	[6.8 Kg]
Wind load measured up to:	150 mph	[240 Km/h]
Wind area (side of antenna):	2.54 sq. ft.	[0.24 sq.m]
Lateral thrust At 113 mph/ 180Km/h (worst case):	122 lbs	[577 N]

Materials

Radiating Elements:	Aluminum
Transformer (Power distribution)	Ceramic PCB
Chassis:	Aluminum
Radome:	Grey Fiberglass/PVC
Tilt-bracket:	Hot dip galvanized steel
Mounting bolts:	Stainless steel

The SC-E 6014 rev2 is made in the U.S.A.

BXA-171063-12BF-EDIN-X

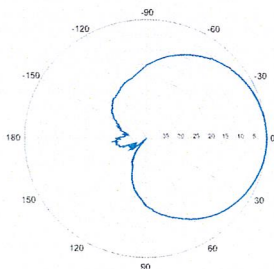
Replace "X" with desired electrical downtilt.

X-Pol | FET Panel | 63° | 19.0 dBi

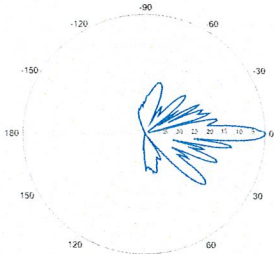
Electrical Characteristics	1710-2170 MHz		
Frequency bands	1710-1880 MHz	1850-1990 MHz	1920-2170 MHz
Polarization	±45°	±45°	±45°
Horizontal beamwidth	68°	65°	60°
Vertical beamwidth	4.5°	4.5°	4.5°
Gain	16.1 dBd / 18.2 dBi	16.5 dBd / 18.6 dBi	16.9 dBd / 19.0 dBi
Electrical downtilt (X)		0, 2, 5	
Impedance		50Ω	
VSWR		≤1.5:1	
First upper sidelobe		< -17 dB	
Front-to-back ratio		> 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	1820 x 154 x 105 mm	71.7 x 6.1 x 4.1 in	
Depth with z-brackets	133 mm	5.2 in	
Weight without mounting brackets	6.8 kg	15 lbs	
Survival wind speed	> 201 km/hr	> 125 mph	
Wind area	Front: 0.28 m ² Side: 0.19 m ²	Front: 3.1 ft ²	Side: 2.1 ft ²
Wind load @ 161 km/hr (100 mph)	Front: 460 N Side: 304 N	Front: 103 lbf	Side: 68 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-171063-12BF-EDIN-X-FP		



BXA-171063-12BF-EDIN-X

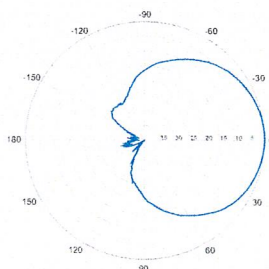


Horizontal | 1710-1880 MHz
BXA-171063-12BF-EDIN-0

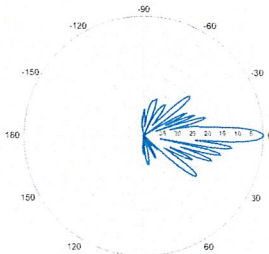


0° | Vertical | 1710-1880 MHz

BXA-171063-12BF-EDIN-X

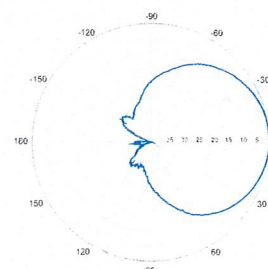


Horizontal | 1850-1990 MHz
BXA-171063-12BF-EDIN-0

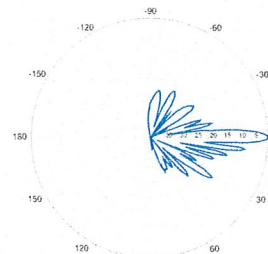


0° | Vertical | 1850-1990 MHz

BXA-171063-12BF-EDIN-X



Horizontal | 1920-2170 MHz
BXA-171063-12BF-EDIN-0



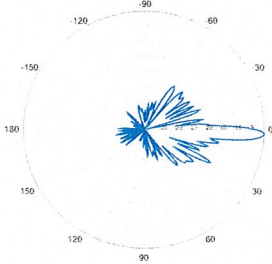
0° | Vertical | 1920-2170 MHz

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.

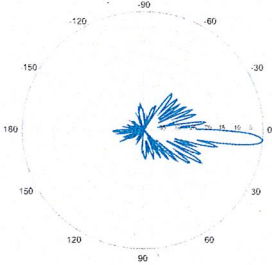
BXA-171063-12BF-EDIN-X

X-Pol | FET Panel | 63° | 19.0 dBi

BXA-171063-12BF-EDIN-2

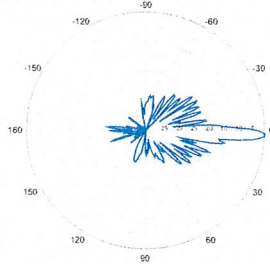


2° | Vertical | 1710-1880 MHz
BXA-171063-12BF-EDIN-5

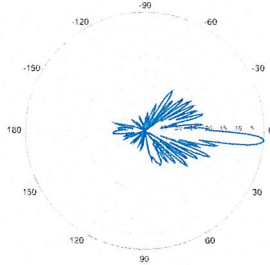


5° | Vertical | 1710-1880 MHz

BXA-171063-12BF-EDIN-2

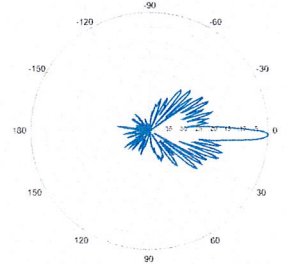


2° | Vertical | 1850-1990 MHz
BXA-171063-12BF-EDIN-5

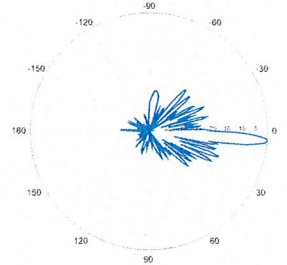


5° | Vertical | 1850-1990 MHz

BXA-171063-12BF-EDIN-2



2° | Vertical | 1920-2170 MHz
BXA-171063-12BF-EDIN-5



5° | Vertical | 1920-2170 MHz

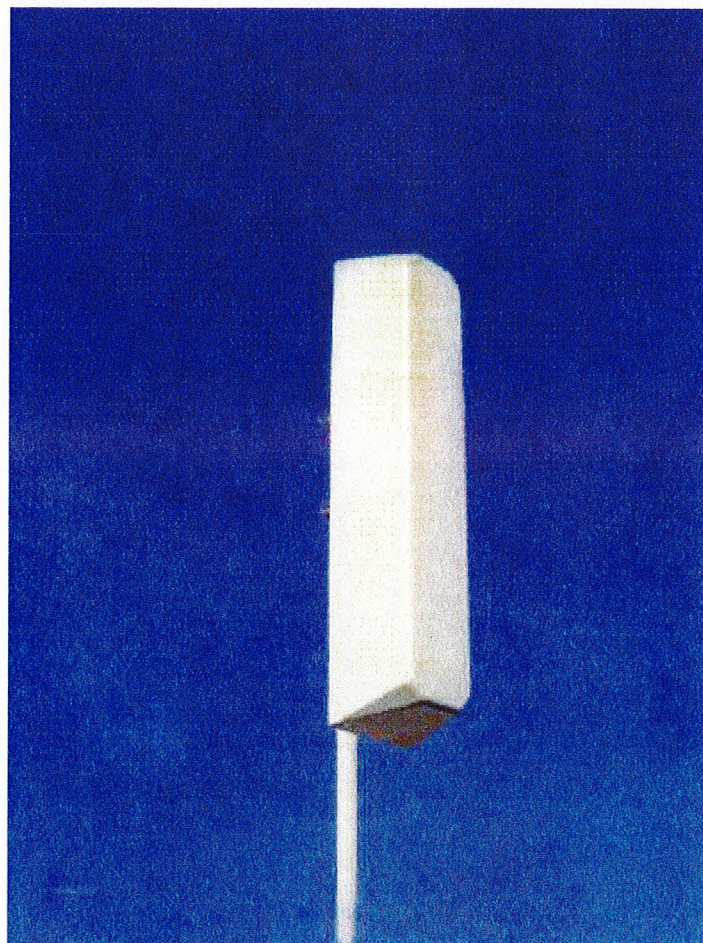
Quoted performance parameters are provided to offer typical or range values only and may vary as a result of normal manufacturing and operational conditions. Extreme operational conditions and/or stress on structural supports is beyond our control. Such conditions may result in damage to this product.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

SWCP 2x5514

698 - 896 MHz Dual (2x) CP log-periodic antenna

Features

- Transmit Diversity Gain
- Can be configured to combine space & polarization diversity
- Outstanding performance over the entire band (698 - 896 MHz)
- Excellent Axial Ratio
- Optimized for 4G & 3G systems
- Low intermodulation
- Improved Side-to-side rejection
- Fading reduction
- Excellent isolation between ports



Electrical specifications

Frequency range:	698-896 MHz
Impedance:	50 ohm
Connector type:	7/16 Din
Return loss:	18 dB
Polarization:	Circular
Gain ea. port [Circular]:	2x14 dBdC
Gain ea. port [Linear]:	2x11 dBdL
Axial Ratio:	2 dB
Isolation between ports (TX band):	30 dB
Front-to-back ratio:	30 dB
Intermodulation (2x20W):	IM3 150 dB
	IM5 160 dB
	IM7/9 170 dB
Power rating:	2x 500 W
H-plane (-3 dB point):	2x 55°
V-plane (-3 dB point):	2x 16°
Lightning protection:	DC grounded

Mechanical specifications

Overall height:	51.9 in	[1318 mm]
Width:	13.9 in	[353 mm]
Depth:	11.3 in	[287 mm]
Weight (excluding brackets):	20 lbs	[9 Kg]
Wind load measured up to:	150 mph	[240 Km/h]
Wind area (front of antenna):	5.01 sq. ft.	[0.46 sq.m]
Lateral thrust at 113 mph/ 180 Km/h (worst case):	256 lbs	[1138 N]

Materials

Radiating Elements:	Aluminum
Transformer (Power distribution)	Ceramic PCB
Chassis:	Aluminum
Radome:	Grey Fiberglass/PVC
Mounting bolts:	Stainless steel

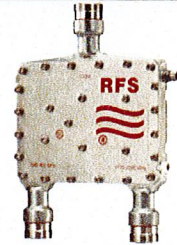
The SWCP 2x5514 is made in the U.S.A.



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

Product Description

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



Features/Benefits

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

Technical Specifications

Product Type	Diplexer/Cross Band Coupler
Application	LTE700, GSM900, UMTS, GSM1800, Cellular 800, PCS
Frequency Range 1, MHz	698-960
Frequency Range 2, MHz	1710-2200
Configuration	Sharelite Single diplexer, outdoor, DC pass in the 1710-2170MHz path, with mounting hardware SEM2-1A
Mounting	Wall Mounting: With 4 screws (maximum 6mm diameter); Pole Mounting: With included clamp set 40-110mm (1.57-4.33)
Return Loss All Ports Min/Typ, dB	19/23
Power Handling Continuous, Max, W	1250 at common port; 750 in low frequency path & 500 in high frequency path
Power Handling Peak, Max, W	15000 in low frequency path & 8000 in high frequency path
Impedance, Ohms	50
Insertion Loss, Path 1, dB	0.07 typ.
Insertion Loss, Path 2, dB	0.13 typ.
Rejection Between Bands Min/Typ, dB	58/64@698-960MHz; 57/70@1710-2200MHz
IMP Level at the COM Port, Typ, dBm	-112 @ 2x43
DC Pass in Low Frequency Path	No
DC Pass in High Frequency Path	Yes
Temperature Range, °C (°F)	-40 to +60 (-40 to +140)
Environmental	ETSI 300-019-2-4 Class 4.1E
Ingress Protection	IP 67
Lightning Protection	EN/IEC61000-4-5 Level 4
Connectors	In-line long-neck 7-16-Female
Weight, kg (lb)	1.2 (2.6)
Shipping Weight, kg (lb)	3.2 (7) for 2 * single units in 1 * box, 9.8 (21.6) for 6 * units = 3 * Boxes in 1 * overwrap
Dimensions, H x W x D, mm (in)	147 x 164 x 37 (5.8 x 6.5 x 1.5)
Shipping Dimensions, H x W x D, mm (in)	254 x 406 x 82 (10 x 16 x 3.2) for 2 * Single Units in 1 * box, 280 x 406 x 241 (11 x 16 x 9.5) for 6 * units = 3 * Boxes in 1 * overwrap
Volume, L	0.43
Housing	Aluminum

Notes

All information contained in the present datasheet is subject to confirmation at time of ordering

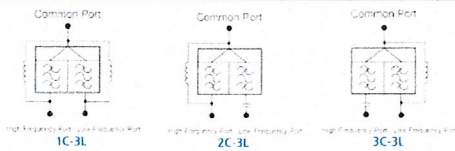


ShareLite Wideband Diplexer – In-line 698-960 MHz/1710-2200 MHz, DC pass in high frequency path

Other Documentation

FD9R6004/2C-3L Installation Instructions: [Wideband_Diplexer_Installation_Rev5.pdf](#)

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



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

Mounting Hardware and Ground Cable Ordering Information		
Model Number	Description	
SEM2-1A	Mounting Hardware, Pole mount ø40-110mm (Included with the Single and Dual Diplexer) Wall Screws M6 (Not included with the product)	
SEM2-3	Assembly kit for 2 pcs of FD9R6004/xC-3L (Can be ordered separately but included with the Dual Diplexer Kit)	
CA020-2	Ground Cable, 2m, includes lugs (Optional)	
CA030-2	Ground Cable, 2m, includes lugs (Optional)	
SEM6	Mounting Hardware for 6 Diplexers, Tower Base (Optional)	

All information contained in the present datasheet is subject to confirmation at time of ordering

		General		Power		Density							
Site Name: Cromwell N													
Tower Height: Verizon @ 100Ft.													
CARRIER	# OF CHAN.	WATTS ERP	HEIGHT	CALC. POWER DENS	FREQ.	MAX. PERMISS. EXP.	FRACTION MPE	Total					
*AT&T UMTS	2	565	115	0.0307	880	0.5867	5.24%						
*AT&T UMTS	2	875	115	0.0476	1900	1.0000	4.76%						
*AT&T GSM	1	283	115	0.0077	880	0.5867	1.31%						
*AT&T GSM	4	525	115	0.0571	1900	1.0000	5.71%						
*AT&T LTE	1	1313	115	0.0357	734	0.4893	7.30%						
*Pocket	3	631	160	0.0266	2130	1.0000	2.66%						
*T-Mobile GSM	8	131	125	0.0241	1945	1.0000	2.41%						
*T-Mobile UMTS	2	740	125	0.0341	2100	1.0000	3.41%						
*CR Police Dept	1	635	159	0.0090	635	0.4233	2.13%						
*CR Fire Dept	1	100	128	0.0022	46	0.2000	1.10%						
*CR Fire Dept	1	110	135	0.0022	154	0.2000	1.09%						
*CR Fire Alarm	1	500	127	0.0111	460	0.3067	3.63%						
*Clearwire	2	153	134	0.0061	2496	1.0000	0.61%						
*Clearwire	1	211	134	0.0042	11 GHz	1.0000	0.42%						
*Sprint	11	359	170	0.0491	1962.5	1.0000	4.91%						
Verizon PCS	11	268	100	0.1060	1970	1.0000	10.60%						
Verizon Cellular	9	268	100	0.0867	869	0.5793	14.97%						
Verizon AWS	1	1750	100	0.0629	2145	1.0000	6.29%						
Verizon 700	1	875	100	0.0315	698	0.4653	6.76%						
								85.31%					
* Source: Siting Council													

**DETAILED STRUCTURAL ANALYSIS AND
EVALUATION OF AN EXISTING 170' SELF
SUPPORTING LATTICE TOWER AND
FOUNDATION FOR PROPOSED ANTENNA
ARRANGEMENT**

**Site Name: Cromwell N CT
Address: 179 Shunpike Road
Cromwell, CT**

prepared for



**Verizon Wireless
99 East River Drive
East Hartford, Connecticut 06108**

prepared by

URS

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

36922291.00000
VZ5-133 (Rev 1)

November 21, 2012

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

1. EXECUTIVE SUMMARY

This report summarizes the structural analysis of the existing 170' self supporting lattice tower located at 179 Shunpike Road in Cromwell, Connecticut. The analysis was conducted in accordance with the 2005 Connecticut State Building Code which requires a three second gust wind speed of 100 mph which converts to an 80 mph fastest mile per 2003 IBC (Table 1609.3.1) and the TIA/EIA-222-F standard for a wind velocity of 85 mph (fastest mile). The wind speed from the Connecticut State Building Code governs the design at 85 mph (fastest mile) and 74 mph (fastest mile) concurrent with ½ " ice. The antenna loading considered in the analysis consists of all existing and proposed antennas, transmission lines, and ancillary items as outlined in the Introduction Section of this report.

Proposed Antenna and Mount	Carrier	Antenna Center Elevation
Install:		
(3) SWCP 2x5514 antennas, (6) SC-E 6014 Rev 2 antennas, (3) BXA-171063-12BF_2 antennas, (6) FD9R6004/2C-3L Diplexers	Verizon (Proposed)	@ 101'

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

This analysis is based on:

- 1) The tower structure's theoretical capacity, not including any assessment of the condition of the tower.
- 2) Tower geometry, structural member sizes, and Foundation information taken from a tower report prepared by PIROD Inc., ENG. File No. A-116398, dated November 18, 1999.
- 3) Preliminary Construction Drawings prepared by Dewberry-Goodkind, Inc., project number 50048347 / 50048372 dated March 5, 2012.
- 4) Existing inventory taken from a tower mapping and inventory prepared by Northeast Towers, Inc performed on February 9, 2012.
- 5) Structural analysis performed by URS Corp, project number MXN-004 / 36924397 signed and sealed August 16, 2010.
- 6) Structural analysis performed by URS Corp, project number TW4-004 / 36924372 signed and sealed April 13, 2010.
- 7) Foundation modification drawings prepared by Teconic, dated May 5, 2004.
- 8) Proposed additional antenna and mount configuration as specified in Section 2 of this report.
- 9) Structural analysis performed by URS Corp, project number CFD-003 / 36924489 signed and sealed May 29, 2012.

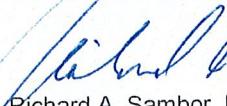
1. EXECUTIVE SUMMARY (continued)

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

If you should have any questions, please call.

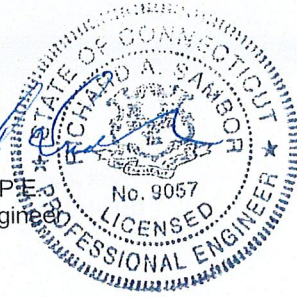
Sincerely,

URS Corporation



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

RAS/kab



2. INTRODUCTION

The subject tower is located at 179 Shunpike Road in Cromwell, Connecticut. The structure is a 170' self supporting lattice tower designed and manufactured by PiROD Inc.

The current inventory with proposed modification is summarized in the table below:

Antenna Type	Carrier	Mount	Antenna Centerline Elevation	Cable
(1) Tx Rx 101-90-08 antenna	Town (existing)	15' Mast pipe on 9 Arm Halo Mount	183'	(1) 7/8"
(1) 8 Bay Dipole (3" dia x 20')	Town (existing)	9 Arm Halo Mount	178'	(1) 7/8"
(1) 2 1/2" dia x 20' Whip	Town (existing)	9 Arm Halo Mount	178'	(1) 1 1/2"
(1) OD12-2400	Town (existing)	9 Arm Halo Mount	175'6"	(1) 3/8"
(3) 2 1/2" dia x 15' Whip	Town (existing)	9 Arm Halo Mount	175'	(3) 7/8"
1 1/2" dia x 12' Whip	Town (existing)	9 Arm Halo Mount	174'	(1) 7/8"
(1) SU-RA-HP-2.4 (1' x 1' Antenna)	Town (existing)	9 Arm Halo Mount	168'	(1) 3/8"
(6) Decibel 950G65VTZE-M antennas	Sprint (existing)	9 Arm Halo Mount	168'	(6) 1 5/8"
(3) APXV18-206517S	Unknown (existing)	Leg Mount	159'6"	(6) 1 5/8"
3 1/2" dia x 9' Whip	Town (Existing)	Leg Mount	158'6"	(1) 1 5/8"
(2) 3" dia x 20' Whip	Town (existing)	20' Platform	144'	(2) 7/8"
(1) 2 1/2" x 20' Whip	Town (existing)	20' Platform	144'	(1) 1/2"
2" dia x 15' Whip	Town (existing)	20' Platform	141'	(1) 1/2"
(1) 1.5" dia x 10' Whip	Town (existing)	20' Platform	139'	(1) 1/2"
(1) 3.5" dia x 9' Whip	Town (existing)	20' Platform	138'6"	---
(3) Argus LLPX310R antennas (3) Samsung Remote Radio Heads U-RAS	Clearwire (existing)	20' Platform	134'	(6) CAT 5 cable
(3) Andrew VHLP2.5 dish (2.5' dia.) (1) Andrew VHLP2 dish (2' dia.): Gamma Sector		20' Platform	134'	(4) 1/2"
(3) RFS APX16DWV-16DWVS-A20 antennas w/ (3) Twin AWS TMAs. (3) RFS APX16DWV-16DWV-S w/ (3) Twin PCS TMAs.	T-Mobile (existing)	(3) Existing T-Frames	125'	(18) 1 5/8"
(6) Powerwave 7770 (12) TMA's	AT&T (existing)	(3) T-Frames	115'	(12) 1 5/8"
(3) KMW AM-X-CD-16-65-00T-RET (6) RRU (1) Surge Suppressor	AT&T (proposed)	Shared with Above	115'	(3) Optic Fiber & (6) DC Cables (Located within 3" dia Flex Conduit)

Antenna Type	Carrier	Mount	Antenna Centerline Elevation	Cable
Existing antennas to be replaced	Verizon (existing)	(3) T-Frames (PiROD part #800093)	101'	(12) 1 5/8"
(3) SWCP 2x5514 antennas, (6) SC-E 6014 Rev 2 antennas, (3) BXA-171063-12BF_2 antennas, (6) FD9R6004/2C-3L Diplexers	Verizon (proposed)	Shared with Above	101'	Existing cables above
(1) 3" x 2" x 22" Panel (1) TMA	AT&T (existing)	Pipe Mount	87'	(2) CAT 5
(1) 3' Dish (1) TMA	AT&T (existing)	3' Stand-off	83'	(2) CAT 5
(1) 3" x 2" x 22" Panel (1) TMA	AT&T (existing)	3' Stand-off	80'	(2) CAT 5
(1) Camera	Unknown (existing)	Leg Mounted	30'	(2) 1/2" (estimated from photographs)
(1) 3' Yagi	Unknown (existing)	Leg Mounted	24'	(1) 1/2"

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

3. ANALYSIS METHODOLOGY AND LOADING CONDITIONS

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

The analysis was conducted using TNX Tower 6.0. Two load conditions were evaluated as shown below which were compared to allowable stresses according to AISC and TIA/EIA.

Basic Wind Speed:

- Middlesex County; $v = 85$ mph (fastest mile) [Section 16 of TIA/EIA-222-F-1996]
- Cromwell; $v = 100$ mph (3 second gust) equivalent to 80 mph (fastest mile) [Appendix K, 2005 Connecticut State Building Code Supplement]

Loading Cases:

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

Load Condition 2 = 74 mph (fastest mile) Wind Load (with ice) + Ice Load + Tower Dead Load

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

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

4. FINDINGS AND EVALUATION

Stresses on the tower structure and foundation were evaluated to compare with allowable stresses in accordance with AISC. The results of the analysis indicate that the calculated stresses on the structure with the proposed loading are within the allowable stresses. Additionally, the anchor bolts were found to be within the allowable limits.

TABLE 1: Tower Component Stress vs. Capacity Summary:

Component/ (Section No.)	Existing Component Size	Controlling Component/Elevation	Percent Capacity	Pass/Fail
Tower Leg (T7)	PIROD Truss Leg	Compression 60'-80'	94.7%	Pass
Diagonal (T7)	L3x3x5/16	Compression 60'-80'	99.3%	Pass
Top Girt (T1)	7/8" SR	Compression 150'-170'	3.5%	Pass
Bottom Girt (T1)	7/8" SR	Compression 150'-170'	3.7%	Pass
Mid Girt (T4)	L3x3x3/16	Compression 100'-120'	25.0%	Pass
Bolt Checks				
Anchor Bolts	(6) 1-1/4"	Tension	74.0%	Pass

TABLE 2: Foundation Summary

Foundation	Component	Stress (% capacity/FOS)	Pass/Fail	Comments:
Drilled Concrete Caisson	Uplift	87.0%/2.30	Pass	Min. F.O.S of 2.0 req'd per IBC 2003 Section 3108.4.2

5. CONCLUSIONS AND RECOMMENDATIONS

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

Limitations/Assumptions:

This report is based on the following:

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

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

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

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

Ongoing and Periodic Inspection and Maintenance:

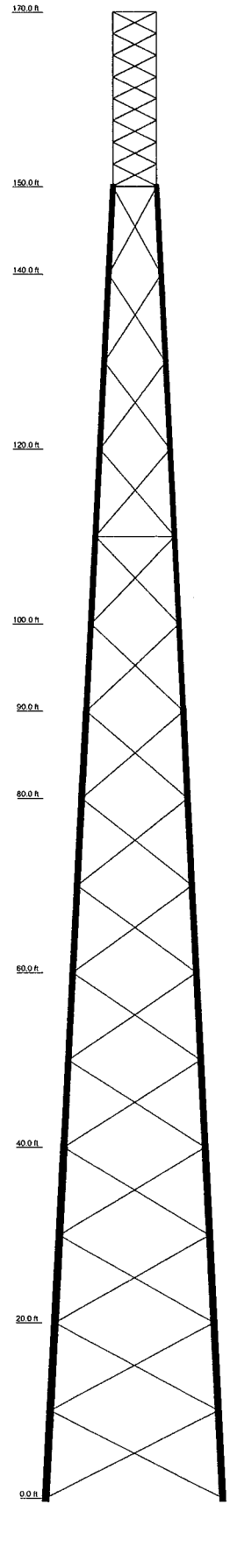
After the Contractor has successfully completed the installation and the work has been accepted, the owner will be responsible for the ongoing and periodic inspection and maintenance of the tower.

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

6. DRAWINGS AND DATA

TNX TOWER INPUT/OUTPUT SUMMARY

Section	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
Leg Grade	SR 7/8	SR 7/8	SR 7/8	SR 7/8	SR 7/8	SR 7/8	SR 7/8	SR 7/8	SR 7/8	SR 7/8	SR 7/8	SR 7/8	SR 7/8	SR 7/8	SR 7/8	SR 7/8	SR 7/8	SR 7/8	SR 7/8	SR 7/8	SR 7/8	SR 7/8	SR 7/8	SR 7/8	SR 7/8	SR 7/8
Diagonal Grade	A72-50	A72-50	A72-50	A72-50	A72-50	A72-50	A72-50	A72-50	A72-50	A72-50	A72-50	A72-50	A72-50	A72-50	A72-50	A72-50	A72-50	A72-50	A72-50	A72-50	A72-50	A72-50	A72-50	A72-50	A72-50	A72-50
Top Chords	L3x3x3/16	L3x3x3/16	L3x3x3/16	L3x3x3/16	L3x3x3/16	L3x3x3/16	L3x3x3/16	L3x3x3/16	L3x3x3/16	L3x3x3/16	L3x3x3/16	L3x3x3/16	L3x3x3/16	L3x3x3/16	L3x3x3/16	L3x3x3/16	L3x3x3/16	L3x3x3/16	L3x3x3/16	L3x3x3/16	L3x3x3/16	L3x3x3/16	L3x3x3/16	L3x3x3/16	L3x3x3/16	L3x3x3/16
Web Chords	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Section Chords	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Flange Width (In)	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
# Flange @ (In)	8 @ 2.400/18	8 @ 2.400/18	8 @ 2.400/18	8 @ 2.400/18	8 @ 2.400/18	8 @ 2.400/18	8 @ 2.400/18	8 @ 2.400/18	8 @ 2.400/18	8 @ 2.400/18	8 @ 2.400/18	8 @ 2.400/18	8 @ 2.400/18	8 @ 2.400/18	8 @ 2.400/18	8 @ 2.400/18	8 @ 2.400/18	8 @ 2.400/18	8 @ 2.400/18	8 @ 2.400/18	8 @ 2.400/18	8 @ 2.400/18	8 @ 2.400/18	8 @ 2.400/18	8 @ 2.400/18	
Weight (Lb)	28.4	28.4	28.4	28.4	28.4	28.4	28.4	28.4	28.4	28.4	28.4	28.4	28.4	28.4	28.4	28.4	28.4	28.4	28.4	28.4	28.4	28.4	28.4	28.4	28.4	28.4



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
101-90-08-0-01 (Municipal)	183	PIROD 10' Lightweight T-Frame (T-Mobile)	125.5
15' Mount Pipe (Municipal)	179.75	(2) TMA (shielded) (ATI)	115
3' Dia 20' Omni (Municipal)	176	(2) TMA (shielded) (ATI)	115
2.5' x 20' Whip (Municipal)	176	(2) TMA (shielded) (ATI)	115
OD12-2400 (Municipal)	175.5	(2) TMA (shielded) (ATI)	115
2.5' x 14' Omni (Municipal)	175	(2) TMA (shielded) (ATI)	115
2.5' x 14' Omni (Municipal)	175	PIROD 12' Lightweight T-Frame (ATI)	115
2.5' x 14' Omni (Municipal)	175	PIROD 12' Lightweight T-Frame (ATI)	115
1.5' x 12' Omni (Municipal)	174	PIROD 12' Lightweight T-Frame (ATI)	115
9 Arm Halo Mount (Municipal)	168	7770.00 (ATI)	115
SU-RA-MP-Z 4 Antenna (Municipal)	168	7770.00 (ATI)	115
950G65VT2E-M (Sprint)	168	7770.00 (ATI)	115
950G65VT2E-M (Sprint)	168	7770.00 (ATI)	115
950G65VT2E-M (Sprint)	168	7770.00 (ATI)	115
950G65VT2E-M (Sprint)	168	7770.00 (ATI)	115
950G65VT2E-M (Sprint)	168	7770.00 (ATI)	115
950G65VT2E-M (Sprint)	168	AM-X-CD-16-65-00T-RET (6) (ATI)	115
950G65VT2E-M (Sprint)	168	AM-X-CD-16-65-00T-RET (6) (ATI)	115
APXV18-206517S-C w/ mounting hardware	159.5	AM-X-CD-16-65-00T-RET (6) (ATI)	115
APXV18-206517S-C w/ mounting hardware	159.5	(2) REMOTE RADIO HEAD (RRH) (ATI)	115
APXV18-206517S-C w/ mounting hardware	159.5	(2) REMOTE RADIO HEAD (RRH) (ATI)	115
9' Whip (Municipal)	158.5	(2) REMOTE RADIO HEAD (RRH) (ATI)	115
3' Dia 20' Omni (Municipal)	144	Surge Suppressor (ATI)	115
3' Dia 20' Omni (Municipal)	144	(2) TMA (shielded) (ATI)	115
2.5' x 20' Whip (Municipal)	144	BXA-171063-12BF (Verizon)	101
2' Dia 15' Omni (Municipal)	141	SWCP 2x5514 (Verizon)	101
1.5' x 10' Omni (Municipal)	139	SC-E 6014 rev2 (Verizon)	101
9' Whip (Municipal)	138.5	SC-E 6014 rev2 (Verizon)	101
PIROD 20 Universal Platform (Municipal)	134	PIROD 12' Lightweight T-Frame (Verizon)	101
Argus LLPX310R (Clearwire)	134	BXA-171063-12BF (Verizon)	101
Argus LLPX310R (Clearwire)	134	SWCP 2x5514 (Verizon)	101
Argus LLPX310R (Clearwire)	134	SWCP 2x5514 (Verizon)	101
Argus LLPX310R (Clearwire)	134	SC-E 6014 rev2 (Verizon)	101
REMOTE RADIO HEAD (RRH) (Clearwire)	134	BXA-171063-12BF (Verizon)	101
REMOTE RADIO HEAD (RRH) (Clearwire)	134	SWCP 2x5514 (Verizon)	101
REMOTE RADIO HEAD (RRH) (Clearwire)	134	SC-E 6014 rev2 (Verizon)	101
VHLP2 5-180 (Clearwire)	134	(2) Diplexer (Verizon)	101
VHLP2 5-180 (Clearwire)	134	(2) Diplexer (Verizon)	101
VHLP2 5-180 (Clearwire)	134	(2) Diplexer (Verizon)	101
VHLP2 5-180 (Clearwire)	134	SC-E 6014 rev2 (Verizon)	101
APX16DWW-16DWW-S-A20 (T-Mobile)	125.5	PIROD 12' Lightweight T-Frame (Verizon)	101
APX16DWW-16DWW-S-A20 (T-Mobile)	125.5	SC-E 6014 rev2 (Verizon)	101
APX16DWW-16DWW-S-A20 (T-Mobile)	125.5	PIROD 12' Lightweight T-Frame (Verizon)	101
Andrew Twin AWS TMA (T-Mobile)	125.5	3' x 2' Panel	87
Andrew Twin AWS TMA (T-Mobile)	125.5	TMA	84.5
Andrew Twin AWS TMA (T-Mobile)	125.5	3' Stand-off	83.5
APX16DWW-16DWW-S (T-Mobile)	125.5	3' Stand-off	83.5
APX16DWW-16DWW-S (T-Mobile)	125.5	3' Dash	83
APX16DWW-16DWW-S (T-Mobile)	125.5	TMA	83
Twin PCS TMA (T-Mobile)	125.5	TMA	82.5
Twin PCS TMA (T-Mobile)	125.5	3' x 2' Panel	80
Twin PCS TMA (T-Mobile)	125.5	Camera	30
PIROD 10' Lightweight T-Frame (T-Mobile)	125.5	PC9013N	24
PIROD 10' Lightweight T-Frame (T-Mobile)	125.5		

SYMBOL LIST

MARK	SIZE	MARK	SIZE
A	PIROD 105217 reinf w/ 1" dia bar		

MATERIAL STRENGTH

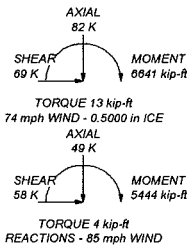
GRADE	Fy	Fu	GRADE	Fy	Fu
A572-50	50 ksi	65 ksi	A36	36 ksi	58 ksi

TOWER DESIGN NOTES

1. Tower designed for a 85 mph basic wind in accordance with the TIA/EIA-222-F Standard.
2. Tower is also designed for a 74 mph basic wind with 0.50 in ice.
3. Deflections are based upon a 50 mph wind.
4. Weld together tower sections have flange connections.
5. Connections use galvanized A325 bolts, nuts and locking devices. Installation per TIA/EIA-222 and AISC Specifications.
6. Tower members are "hot dipped" galvanized in accordance with ASTM A123 and ASTM A153 Standards.
7. Welds are fabricated with ER-70S-6 electrodes.
8. TOWER RATING: 99.3%

MAX. CORNER REACTIONS AT BASE:

DOWN: 411 K
 UPLIFT: -353 K
 SHEAR: 46 K



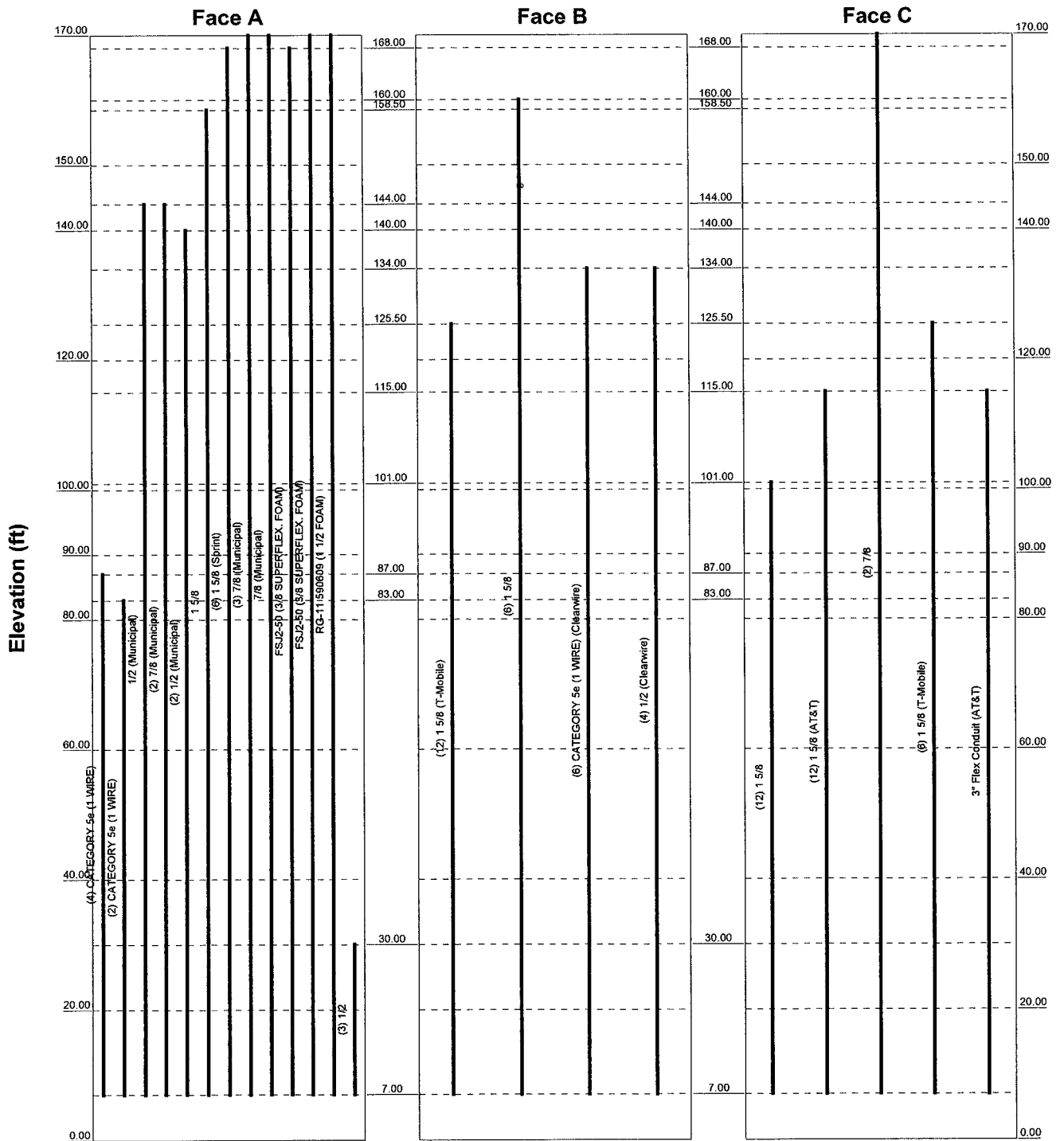
URS Corporation		Job: PIROD U20'-0"x170' Lattice Tower	
500 Enterprise Drive, Suite 3B		Project: VZ8133	
Rocky Hill, CT 06067		Client: Verizon Wireless	
Phone: (860) 529-8882		Drawn by: Kevin Barker	
FAX: (860) 529-3991		Date: 11/21/12	
		Scale: NTS	
		Dwg No: E-1	

TNX TOWER FEEDLINE DISTRIBUTION CHART

Feedline Distribution Chart

0' - 170'

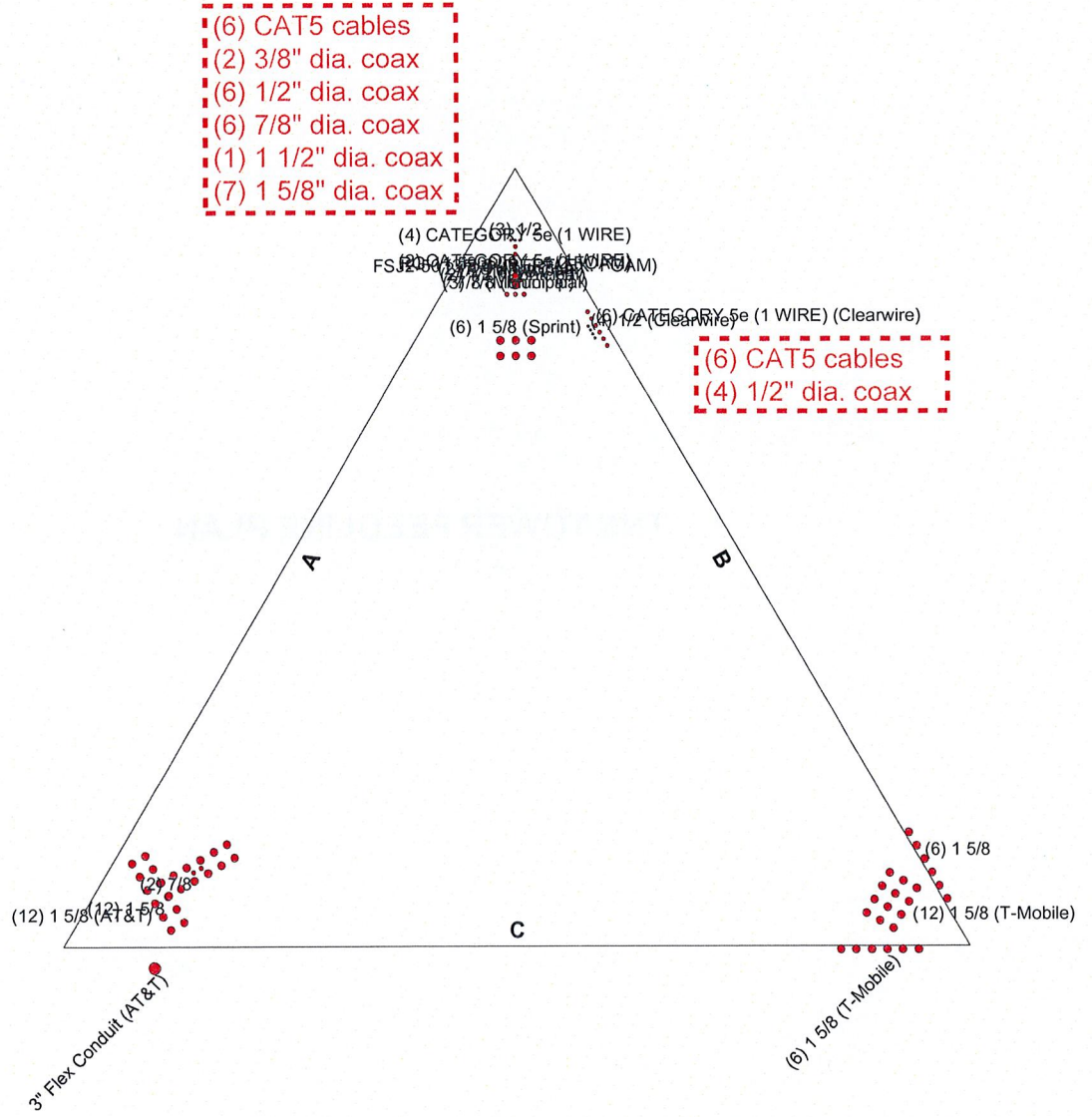
Round
Flat
App In Face
App Out Face
Truss Leg



URS Corporation		Job: PIROD U20'-0"x170' Lattice Tower	
500 Enterprise Drive, Suite 3B		Project: VZ5133	
Rocky Hill, CT 06067		Client: Verizon Wireless	Drawn by: Kevin Barke
Phone: (860) 529-8882		Code: TIA/EIA-222-F	Date: 11/21/12
FAX: (860) 529-3991		Path: P:\06067\PIROD U20'x170' PIROD Self-Supporting Lattice Tower.dwg	Scale: NTS
			Dwg No. E-7

TNX TOWER FEEDLINE PLAN

Feedline Plan



URS Corporation		Job: PiROD U20'-0"x170' Lattice Tower	
500 Enterprise Drive, Suite 3B		Project: VZ5133	
Rocky Hill, CT 06067		Client: Verizon Wireless	Drawn by: Kevin_Barker
Phone: (860) 529-8882		Code: TIA/EIA-222-F	Date: 11/21/12
FAX: (860) 529-3991		Path:	App'd:
		Scale: NTS	
		Dwg No. E-7	

TNX TOWER DETAILED OUTPUT

tnxTower URS Corporation 500 Enterprise Drive, Suite 3B Rocky Hill, CT 06067 Phone: (860) 529-8882 FAX: (860) 529-3991	Job PiROD U20'-0"x170' Lattice Tower	Page 1 of 42
	Project VZ5133	Date 07:48:57 11/21/12
	Client Verizon Wireless	Designed by Kevin_Barker

Tower Input Data

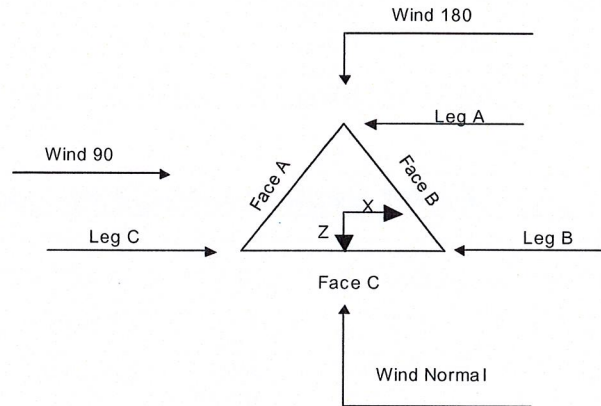
The main tower is a 3x free standing tower with an overall height of 170.00 ft above the ground line.
The base of the tower is set at an elevation of 0.00 ft above the ground line.
The face width of the tower is 5.00 ft at the top and 20.00 ft at the base.
This tower is designed using the TIA/EIA-222-F standard.
The following design criteria apply:

- Basic wind speed of 85 mph.
- Nominal ice thickness of 0.5000 in.
- Ice density of 56 pcf.
- A wind speed of 74 mph is used in combination with ice.
- Temperature drop of 50 °F.
- Deflections calculated using a wind speed of 50 mph.
- Weld together tower sections have flange connections..
- Connections use galvanized A325 bolts, nuts and locking devices. Installation per TIA/EIA-222 and AISC Specifications..
- Tower members are "hot dipped" galvanized in accordance with ASTM A123 and ASTM A153 Standards..
- Welds are fabricated with ER-70S-6 electrodes..
- A non-linear (P-delta) analysis was used.
- Pressures are calculated at each section.
- Stress ratio used in tower member design is 1.333.
- Local bending stresses due to climbing loads, feedline supports, and appurtenance mounts are not considered.

Options

- | | | |
|--|--|---|
| <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 <li style="padding-left: 40px;">Poles Include Shear-Torsion Interaction Always Use Sub-Critical Flow Use Top Mounted Sockets |
|--|--|---|

tnxTower URS Corporation 500 Enterprise Drive, Suite 3B Rocky Hill, CT 06067 Phone: (860) 529-8882 FAX: (860) 529-3991	Job PiROD U20'-0"x170' Lattice Tower	Page 2 of 42
	Project VZ5133	Date 07:48:57 11/21/12
	Client Verizon Wireless	Designed by Kevin_Barker



Triangular Tower

Tower Section Geometry

Tower Section	Tower Elevation	Assembly Database	Description	Section Width	Number of Sections	Section Length
	ft			ft		ft
T1	170.00-150.00			5.00	1	20.00
T2	150.00-140.00		U6.0 105244	5.00	1	10.00
T3	140.00-120.00		U8.0 105216	6.00	1	20.00
T4	120.00-100.00		U10.0 105217 L3x3/16	8.00	1	20.00
T5	100.00-90.00		U12.0 105216	10.00	1	10.00
T6	90.00-80.00		U12.0 105216	11.00	1	10.00
T7	80.00-60.00		U14.0 105218	12.00	1	20.00
T8	60.00-40.00		U16.0 105219	14.00	1	20.00
T9	40.00-20.00		U18.0 105219	16.00	1	20.00
T10	20.00-0.00		U20.0 105219 L4x1/4	18.00	1	20.00

Tower Section Geometry (cont'd)

Tower Section	Tower Elevation	Diagonal Spacing	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset	Bottom Girt Offset
	ft	ft				in	in
T1	170.00-150.00	2.49	X Brace	No	No	0.0000	1.0000
T2	150.00-140.00	10.00	X Brace	No	No	0.0000	0.0000
T3	140.00-120.00	10.00	X Brace	No	No	0.0000	0.0000
T4	120.00-100.00	10.00	X Brace	No	No	0.0000	0.0000
T5	100.00-90.00	10.00	X Brace	No	No	0.0000	0.0000

tnxTower URS Corporation 500 Enterprise Drive, Suite 3B Rocky Hill, CT 06067 Phone: (860) 529-8882 FAX: (860) 529-3991	Job	PIROD U20'-0"x170' Lattice Tower	Page	3 of 42
	Project	VZ5133	Date	07:48:57 11/21/12
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Tower Section	Tower Elevation	Diagonal Spacing	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset	Bottom Girt Offset
	ft	ft				in	in
T6	90.00-80.00	10.00	X Brace	No	No	0.0000	0.0000
T7	80.00-60.00	10.00	X Brace	No	No	0.0000	0.0000
T8	60.00-40.00	10.00	X Brace	No	No	0.0000	0.0000
T9	40.00-20.00	10.00	X Brace	No	No	0.0000	0.0000
T10	20.00-0.00	10.00	X Brace	No	No	0.0000	0.0000

Tower Section Geometry (cont'd)

Tower Elevation	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
ft						
T1 170.00-150.00	Solid Round	1 3/4	A572-50 (50 ksi)	Solid Round	7/8	A572-50 (50 ksi)
T2 150.00-140.00	Truss Leg	Pirod 105244	A572-50 (50 ksi)	Single Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T3 140.00-120.00	Truss Leg	Pirod 105216	A572-50 (50 ksi)	Single Angle	L3x3x3/16	A36 (36 ksi)
T4 120.00-100.00	Truss Leg	Pirod 105217	A572-50 (50 ksi)	Single Angle	L3x3x3/16	A36 (36 ksi)
T5 100.00-90.00	Truss Leg	Pirod 105217	A572-50 (50 ksi)	Single Angle	L3x3x5/16	A36 (36 ksi)
T6 90.00-80.00	Truss Leg	Pirod 105217 reinf w/ 1" dia bar	A572-50 (50 ksi)	Single Angle	L3x3x5/16	A36 (36 ksi)
T7 80.00-60.00	Truss Leg	Pirod 105218	A572-50 (50 ksi)	Single Angle	L3x3x5/16	A36 (36 ksi)
T8 60.00-40.00	Truss Leg	Pirod 105219	A572-50 (50 ksi)	Single Angle	L3 1/2x3 1/2x5/16	A36 (36 ksi)
T9 40.00-20.00	Truss Leg	Pirod 105219 reinf w/ 1" dia bar	A572-50 (50 ksi)	Single Angle	L3 1/2x3 1/2x5/16	A36 (36 ksi)
T10 20.00-0.00	Truss Leg	Pirod 105220	A572-50 (50 ksi)	Single Angle	L4x4x1/4	A36 (36 ksi)

Tower Section Geometry (cont'd)

Tower Elevation	Top Girt Type	Top Girt Size	Top Girt Grade	Bottom Girt Type	Bottom Girt Size	Bottom Girt Grade
ft						
T1 170.00-150.00	Solid Round	7/8	A572-50 (50 ksi)	Solid Round	7/8	A572-50 (50 ksi)
T2 150.00-140.00	Single Angle	L3x3x3/16	A36 (36 ksi)	Single Angle		A36 (36 ksi)

Tower Section Geometry (cont'd)

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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 150.00-140.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T3 140.00-120.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T4 120.00-100.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T5 100.00-90.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T6 90.00-80.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T7 80.00-60.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T8 60.00-40.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T9 40.00-20.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T10 20.00-0.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1

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 170.00-150.00	Flange	0.7500	0	0.6250	1	0.6250	0	0.6250	0	0.6250	0	0.6250	0	0.6250	0
T2 150.00-140.00	Flange	1.0000	6	1.0000	1	1.0000	1	0.6250	0	0.6250	0	0.6250	0	0.6250	0
T3 140.00-120.00	Flange	1.0000	6	1.0000	1	0.6250	0	0.6250	0	0.6250	0	0.6250	0	0.6250	0
T4 120.00-100.00	Flange	1.0000	6	1.0000	1	0.6250	0	0.6250	0	1.0000	1	0.6250	0	0.6250	0
T5 100.00-90.00	Flange	1.0000	6	1.0000	1	0.6250	0	0.0000	0	0.6250	0	0.6250	0	0.6250	0
T6 90.00-80.00	Flange	1.0000	6	1.0000	1	0.6250	0	0.6250	0	0.6250	0	0.6250	0	0.6250	0
T7 80.00-60.00	Flange	1.0000	6	1.0000	1	0.6250	0	0.6250	0	0.6250	0	0.6250	0	0.6250	0
T8 60.00-40.00	Flange	1.2500	6	1.2500	1	0.6250	0	0.6250	0	0.6250	0	0.6250	0	0.6250	0
T9 40.00-20.00	Flange	1.2500	6	1.2500	1	0.6250	0	0.6250	0	0.6250	0	0.6250	0	0.6250	0
T10 20.00-0.00	Flange	0.0000	0	1.2500	1	0.6250	0	0.6250	0	0.6250	0	0.6250	0	0.6250	0

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Leg	Allow Shield No	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
CATEGORY	A	No	Ar (Leg)	87.00 - 7.00	0.0000	0.1	4	4	1.0000	1.0000		0.21

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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
5e (1 WIRE) CATEGORY	A	No	Ar (Leg)	83.00 - 7.00	0.0000	0.12	2	2	1.0000	1.0000		0.21
5e (1 WIRE) 1/2 (Municipal)	A	No	Ar (Leg)	144.00 - 7.00	0.0000	0.125	1	1	0.5800	0.5800		0.25
7/8 (Municipal)	A	No	Ar (Leg)	144.00 - 7.00	0.0000	0.125	2	1	1.1100	1.1100		0.54
1/2 (Municipal)	A	No	Ar (Leg)	140.00 - 7.00	0.0000	0.13	2	1	0.5800	0.5800		0.25
1 5/8 (Municipal)	A	No	Ar (Leg)	158.50 - 7.00	0.0000	0.13	1	1	1.9800	1.9800		1.04
1 5/8 (Municipal)	A	No	Ar (Leg)	168.00 - 7.00	0.0000	0.2	6	2	1.9800	1.9800		1.04
7/8 (Municipal)	A	No	Ar (Leg)	170.00 - 7.00	0.0000	0.14	3	1	1.1100	1.1100		0.54
7/8 (Municipal)	A	No	Ar (Leg)	170.00 - 7.00	0.0000	0.14	1	1	1.1100	1.1100		0.54
FSJ2-50 (3/8 SUPERFLEX. FOAM)	A	No	Ar (Leg)	168.00 - 7.00	0.0000	0.12	1	1	0.4300	0.4300		0.08
FSJ2-50 (3/8 SUPERFLEX. FOAM)	A	No	Ar (Leg)	170.00 - 7.00	0.0000	0.12	1	1	0.4300	0.4300		0.08
RG-11 590609 (1 1/2 FOAM)	A	No	Ar (Leg)	170.00 - 7.00	0.0000	0.12	1	1	1.5900	1.5900		0.94
1 5/8 (T-Mobile)	B	No	Ar (Leg)	125.50 - 7.00	0.0000	0.1	12	3	1.9800	1.9800		1.04
1 5/8 (T-Mobile)	B	Yes	Ar (CfAe)	160.00 - 7.00	0.0000	0.4	6	6	1.9800	1.9800		1.04
1 5/8 (T-Mobile)	C	No	Ar (Leg)	101.00 - 7.00	0.0000	0.17	12	6	1.9800	1.9800		1.04
1 5/8 (T-Mobile)	C	No	Ar (Leg)	115.00 - 7.00	0.0000	0.12	12	2	1.9800	1.9800		1.04
7/8 (T-Mobile)	C	No	Ar (Leg)	170.00 - 7.00	0.0000	0.17	2	2	1.1100	1.1100		0.54
1 5/8 (T-Mobile)	C	Yes	Ar (CfAe)	125.50 - 7.00	0.0000	-0.4	6	6	1.9800	1.9800		1.04
CATEGORY 5e (1 WIRE) (Clearwire)	B	Yes	Ar (CfAe)	134.00 - 7.00	-2.0000	-0.3	6	6	1.0000	1.0000		0.21
1/2 (Clearwire)	B	Yes	Ar (CfAe)	134.00 - 7.00	-4.0000	-0.3	4	4	0.5800	0.5800		0.25
3" Flex Conduit (AT&T)	C	Yes	Ar (CfAe)	115.00 - 7.00	4.0000	0.4	1	1	0.0000	3.0000		3.00
1/2 (AT&T)	A	No	Ar (Leg)	30.00 - 7.00	0.0000	0.08	3	1	0.5800	0.5800		0.25

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A _R ft ²	A _F ft ²	C _A A _I In Face ft ²	C _A A _I Out Face ft ²	Weight K
T1	170.00-150.00	A	32.766	0.000	0.000	0.000	0.19
		B	38.966	0.000	0.000	0.000	0.06
		C	3.700	0.000	0.000	0.000	0.02
T2	150.00-140.00	A	19.204	0.000	0.000	0.000	0.11
		B	27.254	0.000	0.000	0.000	0.06
		C	1.850	0.000	0.000	0.000	0.01
T3	140.00-120.00	A	43.141	0.000	0.000	0.000	0.25
		B	76.400	0.000	0.000	0.000	0.23
		C	16.597	0.000	0.000	0.000	0.06

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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
T4	120.00-100.00	A	72.704	0.000	0.000	0.000	0.25
		B	100.205	0.000	0.000	0.000	0.42
		C	83.909	0.000	0.000	0.000	0.39
T5	100.00-90.00	A	58.524	0.000	0.000	0.000	0.12
		B	50.102	0.000	0.000	0.000	0.21
		C	64.752	0.000	0.000	0.000	0.35
T6	90.00-80.00	A	61.358	0.000	0.000	0.000	0.13
		B	52.936	0.000	0.000	0.000	0.21
		C	64.752	0.000	0.000	0.000	0.35
T7	80.00-60.00	A	127.048	0.000	0.000	0.000	0.27
		B	110.205	0.000	0.000	0.000	0.42
		C	129.504	0.000	0.000	0.000	0.71
T8	60.00-40.00	A	127.048	0.000	0.000	0.000	0.27
		B	110.205	0.000	0.000	0.000	0.42
		C	129.504	0.000	0.000	0.000	0.71
T9	40.00-20.00	A	128.498	0.000	0.000	0.000	0.28
		B	111.655	0.000	0.000	0.000	0.42
		C	129.504	0.000	0.000	0.000	0.71
T10	20.00-0.00	A	84.466	0.000	0.000	0.000	0.19
		B	73.518	0.000	0.000	0.000	0.27
		C	84.177	0.000	0.000	0.000	0.46

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	170.00-150.00	A	0.500	49.808	0.000	0.000	0.000	0.49
		B		57.675	0.000	0.000	0.000	0.15
		C		7.033	0.000	0.000	0.000	0.06
T2	150.00-140.00	A	0.500	29.371	0.000	0.000	0.000	0.29
		B		40.754	0.000	0.000	0.000	0.15
		C		3.517	0.000	0.000	0.000	0.03
T3	140.00-120.00	A	0.500	69.108	0.000	0.000	0.000	0.67
		B		103.961	15.727	0.000	0.000	0.64
		C		23.138	0.000	agonal.000	0.000	0.15
T4	120.00-100.00	A	0.500	100.004	0.000	0.000	0.000	0.67
		B		126.605	22.467	0.000	0.000	1.16
		C		101.493	0.000	0.000	0.000	0.94
T5	100.00-90.00	A	0.500	73.174	0.000	0.000	0.000	0.33
		B		63.302	11.233	0.000	0.000	0.58
		C		74.752	0.000	0.000	0.000	0.85
T6	90.00-80.00	A	0.500	74.841	4.000	0.000	0.000	0.38
		B		64.969	15.233	0.000	0.000	0.58
		C		74.752	0.000	0.000	0.000	0.85
T7	80.00-60.00	A	0.500	153.015	13.333	0.000	0.000	0.83
		B		133.271	35.800	0.000	0.000	1.16
		C		149.504	0.000	0.000	0.000	1.70
T8	60.00-40.00	A	0.500	153.015	13.333	0.000	0.000	0.83
		B		133.271	35.800	0.000	0.000	1.16
		C		149.504	0.000	0.000	0.000	1.70
T9	40.00-20.00	A	0.500	156.265	13.333	0.000	0.000	0.85
		B		136.521	35.800	0.000	0.000	1.16
		C		149.504	0.000	0.000	0.000	1.70
T10	20.00-0.00	A	0.500	103.685	8.667	0.000	0.000	0.57
		B		90.851	23.270	0.000	0.000	0.75
		C		97.177	0.000	0.000	0.000	1.10

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Feed Line Shielding

Section	Elevation ft	Face	A_R	$A_{R\ Ice}$	A_F	$A_{F\ Ice}$
			ft^2	ft^2	ft^2	ft^2
T1	170.00-150.00	A	0.000	0.000	0.000	0.000
		B	0.717	2.313	0.000	0.000
		C	0.000	0.000	0.000	0.000
T2	150.00-140.00	A	0.000	0.000	0.000	0.000
		B	0.000	0.639	1.103	1.659
		C	0.000	0.000	0.000	0.000
T3	140.00-120.00	A	0.000	0.000	0.000	0.000
		B	0.000	1.449	2.581	4.348
		C	0.000	0.239	0.476	0.717
T4	120.00-100.00	A	0.000	0.000	0.000	0.000
		B	0.000	1.696	2.942	5.088
		C	0.000	1.014	2.058	3.041
T5	100.00-90.00	A	0.000	0.000	0.000	0.000
		B	0.000	0.670	1.162	2.010
		C	0.000	0.420	0.856	1.259
T6	90.00-80.00	A	0.000	0.000	0.000	0.000
		B	0.000	0.643	1.115	1.929
		C	0.000	0.403	0.822	1.208
T7	80.00-60.00	A	0.000	0.000	0.000	0.000
		B	0.000	1.225	2.125	3.676
		C	0.000	0.767	1.565	2.302
T8	60.00-40.00	A	0.000	0.000	0.000	0.000
		B	0.000	1.167	2.361	4.084
		C	0.000	0.731	1.739	2.558
T9	40.00-20.00	A	0.000	0.000	0.000	0.000
		B	0.000	1.126	2.279	3.942
		C	0.000	0.705	1.679	2.469
T10	20.00-0.00	A	0.000	0.000	0.000	0.000
		B	0.000	0.713	1.649	2.852
		C	0.000	0.447	1.215	1.786

Feed Line Center of Pressure

Section	Elevation ft	CP_x	CP_z	CP_x	CP_z
		in	in	Ice in	Ice in
T1	170.00-150.00	1.5663	-4.9231	1.0910	-4.5322
T2	150.00-140.00	2.2724	-3.3575	1.9663	-3.3128
T3	140.00-120.00	4.7577	-4.3236	4.0237	-4.7861
T4	120.00-100.00	3.8026	0.8756	3.9819	-0.7817
T5	100.00-90.00	-0.7788	3.4329	0.5839	1.2813
T6	90.00-80.00	-0.8016	2.8085	0.6304	0.4983
T7	80.00-60.00	-0.8637	2.4574	0.7199	-0.0362
T8	60.00-40.00	-0.9935	2.6964	0.7691	-0.0663
T9	40.00-20.00	-1.0765	2.6765	0.8740	-0.5603
T10	20.00-0.00	-1.0139	2.1467	0.7421	-0.9275

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Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C _{AA} Front	C _{AA} Side	Weight	
			Horz Lateral	Vert						
			ft	ft	°	ft	ft ²	ft ²	K	
PC9013N	A	From Leg	1.00	0.00	0.0000	24.00	No Ice 1/2" Ice	0.46 0.52	0.46 0.52	0.00 0.00
3"x2"x22" Panel	B	From Leg	2.00	0.00	0.0000	80.00	No Ice 1/2" Ice	0.65 0.81	0.47 0.61	0.05 0.05
TMA	B	From Leg	2.00	0.00	0.0000	82.50	No Ice 1/2" Ice	0.78 0.90	0.39 0.48	0.02 0.02
TMA	B	From Leg	2.00	0.00	0.0000	84.50	No Ice 1/2" Ice	0.78 0.90	0.39 0.48	0.02 0.02
3"x2"x22" Panel	B	From Leg	2.00	0.00	0.0000	87.00	No Ice 1/2" Ice	0.65 0.81	0.47 0.61	0.05 0.05
3' Stand-off	B	From Leg	1.50	0.00	0.0000	83.50	No Ice 1/2" Ice	1.00 1.20	2.00 2.70	0.05 0.07
3' Stand-off	A	From Leg	1.50	0.00	0.0000	83.50	No Ice 1/2" Ice	1.00 1.20	2.00 2.70	0.05 0.07
TMA	A	From Leg	2.00	0.00	0.0000	83.00	No Ice 1/2" Ice	0.78 0.90	0.39 0.48	0.02 0.02
SC-E 6014 rev2 (Verizon)	A	From Leg	4.00	6.00	0.0000	101.00	No Ice 1/2" Ice	3.55 3.89	3.34 3.68	0.02 0.04
BXA-171063-12BF (Verizon)	A	From Leg	4.00	0.00	0.0000	101.00	No Ice 1/2" Ice	4.73 5.18	3.57 4.01	0.02 0.04
SWCP 2x5514 (Verizon)	A	From Leg	4.00	-4.00	0.0000	101.00	No Ice 1/2" Ice	7.01 7.44	5.70 6.12	0.02 0.07
SC-E 6014 rev2 (Verizon)	A	From Leg	4.00	-6.00	0.0000	101.00	No Ice 1/2" Ice	3.55 3.89	3.34 3.68	0.02 0.04
SC-E 6014 rev2 (Verizon)	B	From Leg	4.00	6.00	0.0000	101.00	No Ice 1/2" Ice	3.55 3.89	3.34 3.68	0.02 0.04
BXA-171063-12BF (Verizon)	B	From Leg	4.00	0.00	0.0000	101.00	No Ice 1/2" Ice	4.73 5.18	3.57 4.01	0.02 0.04
SWCP 2x5514 (Verizon)	B	From Leg	4.00	-4.00	0.0000	101.00	No Ice 1/2" Ice	7.01 7.44	5.70 6.12	0.02 0.07
SC-E 6014 rev2 (Verizon)	B	From Leg	4.00	-6.00	0.0000	101.00	No Ice 1/2" Ice	3.55 3.89	3.34 3.68	0.02 0.04
SC-E 6014 rev2 (Verizon)	C	From Leg	4.00	6.00	0.0000	101.00	No Ice 1/2" Ice	3.55 3.89	3.34 3.68	0.02 0.04
BXA-171063-12BF (Verizon)	C	From Leg	4.00	0.00	0.0000	101.00	No Ice 1/2" Ice	4.73 5.18	3.57 4.01	0.02 0.04

tnxTower URS Corporation 500 Enterprise Drive, Suite 3B Rocky Hill, CT 06067 Phone: (860) 529-8882 FAX: (860) 529-3991	Job	PIROD U20'-0"x170' Lattice Tower	Page	11 of 42
	Project	VZ5133	Date	07:48:57 11/21/12
	Client	Verizon Wireless	Designed by	Kevin_Barker

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C _A A _A Front	C _A A _A Side	Weight
			Horz	Vert					
			Lateral	ft					
SWCP 2x5514 (Verizon)	C	From Leg	4.00	4.00	0.0000	101.00	No Ice 7.01	5.70	0.02
			-4.00	0.00			1/2" Ice 7.44	6.12	0.07
SC-E 6014 rev2 (Verizon)	C	From Leg	4.00	4.00	0.0000	101.00	No Ice 3.55	3.34	0.02
			-6.00	0.00			1/2" Ice 3.89	3.68	0.04
PiROD 12' Lightweight T-Frame (Verizon)	A	From Leg	2.00	2.00	0.0000	101.00	No Ice 10.20	10.20	0.25
			0.00	0.00			1/2" Ice 16.20	16.20	0.35
PiROD 12' Lightweight T-Frame (Verizon)	B	From Leg	2.00	2.00	0.0000	101.00	No Ice 10.20	10.20	0.25
			0.00	0.00			1/2" Ice 16.20	16.20	0.35
PiROD 12' Lightweight T-Frame (Verizon)	C	From Leg	2.00	2.00	0.0000	101.00	No Ice 10.20	10.20	0.25
			0.00	0.00			1/2" Ice 16.20	16.20	0.35
(2) TMA (shielded) (AT&T)	A	From Leg	4.00	4.00	0.0000	115.00	No Ice 0.00	0.00	0.01
			6.00	0.00			1/2" Ice 0.00	0.00	0.01
(2) TMA (shielded) (AT&T)	A	From Leg	4.00	4.00	0.0000	115.00	No Ice 0.00	0.00	0.01
			-6.00	0.00			1/2" Ice 0.00	0.00	0.01
(2) TMA (shielded) (AT&T)	B	From Leg	4.00	4.00	0.0000	115.00	No Ice 0.00	0.00	0.01
			6.00	0.00			1/2" Ice 0.00	0.00	0.01
(2) TMA (shielded) (AT&T)	B	From Leg	4.00	4.00	0.0000	115.00	No Ice 0.00	0.00	0.01
			-6.00	0.00			1/2" Ice 0.00	0.00	0.01
(2) TMA (shielded) (AT&T)	C	From Leg	4.00	4.00	0.0000	115.00	No Ice 0.00	0.00	0.01
			6.00	0.00			1/2" Ice 0.00	0.00	0.01
(2) TMA (shielded) (AT&T)	C	From Leg	4.00	4.00	0.0000	115.00	No Ice 0.00	0.00	0.01
			-6.00	0.00			1/2" Ice 0.00	0.00	0.01
PiROD 12' Lightweight T-Frame (AT&T)	A	From Leg	2.00	2.00	0.0000	115.00	No Ice 10.20	10.20	0.25
			0.00	0.00			1/2" Ice 16.20	16.20	0.35
PiROD 12' Lightweight T-Frame (AT&T)	B	From Leg	2.00	2.00	0.0000	115.00	No Ice 10.20	10.20	0.25
			0.00	0.00			1/2" Ice 16.20	16.20	0.35
PiROD 12' Lightweight T-Frame (AT&T)	C	From Leg	2.00	2.00	0.0000	115.00	No Ice 10.20	10.20	0.25
			0.00	0.00			1/2" Ice 16.20	16.20	0.35
PiROD 10' Lightweight T-Frame (T-Mobile)	A	From Leg	2.00	2.00	0.0000	125.50	No Ice 9.30	9.30	0.25
			0.00	0.00			1/2" Ice 14.50	14.50	0.34
PiROD 10' Lightweight T-Frame (T-Mobile)	B	From Leg	2.00	2.00	0.0000	125.50	No Ice 9.30	9.30	0.25
			0.00	0.00			1/2" Ice 14.50	14.50	0.34
PiROD 10' Lightweight T-Frame (T-Mobile)	C	From Leg	2.00	2.00	0.0000	125.50	No Ice 9.30	9.30	0.25
			0.00	0.00			1/2" Ice 14.50	14.50	0.34
3" Dia 20' Omni (Municipal)	C	From Face	6.00	6.00	0.0000	144.00	No Ice 4.00	4.00	0.06
			9.00	0.00			1/2" Ice 6.00	6.00	0.10
PiROD 20' Universal Platform (Municipal)	C	None			0.0000	134.00	No Ice 33.10	33.10	2.27
							1/2" Ice 47.10	47.10	2.70

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	Client Verizon Wireless	Designed by Kevin_Barker

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft	C _{AA} Front ft ²	C _{AA} Side ft ²	Weight K
3" Dia 20' Omni (Municipal)	A	From Face	6.00 -9.00 0.00	0.0000	144.00	No Ice 4.00 1/2" Ice 6.00	4.00 6.00	0.06 0.10
9' Whip (Municipal)	A	From Face	6.00 0.00 0.00	0.0000	138.50	No Ice 5.85 1/2" Ice 7.66	5.85 7.66	0.12 0.17
2.5" x 20'6" Whip (Municipal)	A	From Face	6.00 9.00 0.00	0.0000	144.00	No Ice 5.14 1/2" Ice 7.24	5.14 7.24	0.15 0.19
2" Dia 15' Omni (Municipal)	B	From Face	6.00 -5.00 0.00	0.0000	141.00	No Ice 3.20 1/2" Ice 4.83	3.20 4.83	0.04 0.06
1.5" x 10' Omni (Municipal)	B	From Face	6.00 5.00 0.00	0.0000	139.00	No Ice 1.50 1/2" Ice 2.52	1.50 2.52	0.06 0.07
9' Whip (Municipal)	A	From Face	6.00 0.00 0.00	0.0000	158.50	No Ice 5.85 1/2" Ice 7.66	5.85 7.66	0.12 0.17
APXV18-206517S-C w/ mounting hardware	A	From Leg	1.00 0.00 0.00	0.0000	159.50	No Ice 5.08 1/2" Ice 5.53	4.46 5.39	0.05 0.09
APXV18-206517S-C w/ mounting hardware	B	From Leg	1.00 0.00 0.00	0.0000	159.50	No Ice 5.08 1/2" Ice 5.53	4.46 5.39	0.05 0.09
APXV18-206517S-C w/ mounting hardware	C	From Leg	1.00 0.00 0.00	0.0000	159.50	No Ice 5.08 1/2" Ice 5.53	4.46 5.39	0.05 0.09
9 Arm Halo Mount (Municipal)	C	None		0.0000	168.00	No Ice 62.60 1/2" Ice 80.40	62.60 80.40	3.60 4.80
SU-RA-HP-2.4 Antenna (Municipal)	B	From Face	3.00 2.50 0.00	0.0000	168.00	No Ice 0.80 1/2" Ice 0.93	0.37 0.47	0.00 0.01
950G65VTZE-M (Sprint)	B	From Face	6.00 1.25 0.00	0.0000	168.00	No Ice 3.99 1/2" Ice 4.37	2.78 3.15	0.01 0.03
950G65VTZE-M (Sprint)	B	From Leg	2.50 0.00 0.00	0.0000	168.00	No Ice 3.99 1/2" Ice 4.37	2.78 3.15	0.01 0.03
950G65VTZE-M (Sprint)	C	From Face	6.00 -1.25 0.00	0.0000	168.00	No Ice 3.99 1/2" Ice 4.37	2.78 3.15	0.01 0.03
950G65VTZE-M (Sprint)	C	From Face	6.00 1.25 0.00	0.0000	168.00	No Ice 3.99 1/2" Ice 4.37	2.78 3.15	0.01 0.03
950G65VTZE-M (Sprint)	C	From Leg	2.50 0.00 0.00	0.0000	168.00	No Ice 3.99 1/2" Ice 4.37	2.78 3.15	0.01 0.03
950G65VTZE-M (Sprint)	A	From Face	6.00 0.00 0.00	0.0000	168.00	No Ice 3.99 1/2" Ice 4.37	2.78 3.15	0.01 0.03
101-90-08-0-01 (Municipal)	A	From Leg	2.50 2.00 0.00	0.0000	183.00	No Ice 3.33 1/2" Ice 4.31	3.33 4.31	0.04 0.06
3" Dia 20' Omni (Municipal)	B	From Face	9.00 0.00 0.00	0.0000	178.00	No Ice 4.00 1/2" Ice 6.00	4.00 6.00	0.06 0.10
OD12-2400	C	From Face	3.00	0.0000	175.50	No Ice 0.34	0.34	0.00

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	Client	Verizon Wireless	Designed by	Kevin_Barker

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft	C _{AA} Front ft ²	C _{AA} Side ft ²	Weight K	
(Municipal)			-2.50 0.00			1/2" Ice 0.65	0.65	0.01	
2.5" x 20'6" Whip (Municipal)	C	From Face	0.00 0.00 0.00	0.0000	178.00	No Ice 1/2" Ice 7.24	5.14 7.24	0.15 0.19	
2.5" x 14' Omni (Municipal)	C	From Face	0.00 0.00 0.00	0.0000	175.00	No Ice 1/2" Ice 4.93	3.50 4.93	0.03 0.06	
2.5" x 14' Omni (Municipal)	C	From Face	0.00 0.00 0.00	0.0000	175.00	No Ice 1/2" Ice 4.93	3.50 4.93	0.03 0.06	
15' Mount Pipe (Municipal)	A	From Leg	2.50 2.00 0.00	0.0000	179.75	No Ice 1/2" Ice 6.03	4.50 6.03	0.09 0.12	
2.5" x 14' Omni (Municipal)	C	From Face	0.00 0.00 0.00	0.0000	175.00	No Ice 1/2" Ice 4.93	3.50 4.93	0.03 0.06	
1.5" x 12' Omni (Municipal)	A	From Face	2.50 4.00 0.00	0.0000	174.00	No Ice 1/2" Ice 2.52	1.50 2.52	0.06 0.07	
APX16DWV-16DWVS-A20 (T-Mobile)	A	From Leg	4.00 3.00 0.00	0.0000	125.50	No Ice 1/2" Ice 7.76	7.08 2.89	0.04 0.08	
APX16DWV-16DWVS-A20 (T-Mobile)	B	From Leg	4.00 3.00 0.00	0.0000	125.50	No Ice 1/2" Ice 7.76	7.08 2.89	0.04 0.08	
APX16DWV-16DWVS-A20 (T-Mobile)	C	From Leg	4.00 3.00 0.00	0.0000	125.50	No Ice 1/2" Ice 7.76	7.08 2.89	0.04 0.08	
Andrew Twin AWS TMA (T-Mobile)	A	From Leg	4.00 3.00 0.00	0.0000	125.50	No Ice 1/2" Ice 0.62	0.50 0.34	0.01 0.02	
Andrew Twin AWS TMA (T-Mobile)	B	From Leg	4.00 3.00 0.00	0.0000	125.50	No Ice 1/2" Ice 0.62	0.50 0.34	0.01 0.02	
Andrew Twin AWS TMA (T-Mobile)	C	From Leg	4.00 3.00 0.00	0.0000	125.50	No Ice 1/2" Ice 0.62	0.50 0.34	0.01 0.02	
APX16DWV-16DWV-S (T-Mobile)	A	From Leg	4.00 -3.00 0.00	0.0000	125.50	No Ice 1/2" Ice 7.76	7.08 2.89	0.04 0.08	
APX16DWV-16DWV-S (T-Mobile)	B	From Leg	4.00 -3.00 0.00	0.0000	125.50	No Ice 1/2" Ice 7.76	7.08 2.89	0.04 0.08	
APX16DWV-16DWV-S (T-Mobile)	C	From Leg	4.00 -3.00 0.00	0.0000	125.50	No Ice 1/2" Ice 7.76	7.08 2.89	0.04 0.08	
Twin PCS TMA (T-Mobile)	A	From Leg	4.00 -3.00 0.00	0.0000	125.50	No Ice 1/2" Ice 0.96	0.77 0.52	0.01 0.02	
Twin PCS TMA (T-Mobile)	B	From Leg	4.00 -3.00 0.00	0.0000	125.50	No Ice 1/2" Ice 0.96	0.77 0.52	0.01 0.02	
Twin PCS TMA (T-Mobile)	C	From Leg	4.00 -3.00 0.00	0.0000	125.50	No Ice 1/2" Ice 0.96	0.77 0.52	0.01 0.02	
Argus LLPX310R	A	From Face	6.00	0.0000	134.00	No Ice	4.86	3.46	0.03

Job	PiROD U20'-0"x170' Lattice Tower	Page	14 of 42
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Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft	C _A A ₁ Front ft ²	C _A A ₂ Side ft ²	Weight K	
(Clearwire)			7.00			1/2" Ice	5.22	3.80	0.06
Argus LLPX310R (Clearwire)	B	From Face	6.00	0.0000	134.00	No Ice	4.86	3.46	0.03
			0.00			1/2" Ice	5.22	3.80	0.06
Argus LLPX310R (Clearwire)	C	From Face	6.00	0.0000	134.00	No Ice	4.86	3.46	0.03
			7.00			1/2" Ice	5.22	3.80	0.06
REMOTE RADIO HEAD (RRH) (Clearwire)	A	From Face	6.00	0.0000	134.00	No Ice	1.82	0.83	0.03
			7.00			1/2" Ice	2.00	0.97	0.04
REMOTE RADIO HEAD (RRH) (Clearwire)	B	From Face	6.00	0.0000	134.00	No Ice	1.82	0.83	0.03
			0.00			1/2" Ice	2.00	0.97	0.04
REMOTE RADIO HEAD (RRH) (Clearwire)	C	From Face	6.00	0.0000	134.00	No Ice	1.82	0.83	0.03
			7.00			1/2" Ice	2.00	0.97	0.04
7770.00 (AT&T)	A	From Leg	4.00	0.0000	115.00	No Ice	10.03	5.60	0.02
			6.00			1/2" Ice	10.61	6.15	0.07
			0.00						
7770.00 (AT&T)	A	From Leg	4.00	0.0000	115.00	No Ice	10.03	5.60	0.02
			-6.00			1/2" Ice	10.61	6.15	0.07
			0.00						
7770.00 (AT&T)	B	From Leg	4.00	0.0000	115.00	No Ice	10.03	5.60	0.02
			6.00			1/2" Ice	10.61	6.15	0.07
			0.00						
7770.00 (AT&T)	B	From Leg	4.00	0.0000	115.00	No Ice	10.03	5.60	0.02
			-6.00			1/2" Ice	10.61	6.15	0.07
			0.00						
7770.00 (AT&T)	C	From Leg	4.00	0.0000	115.00	No Ice	10.03	5.60	0.02
			6.00			1/2" Ice	10.61	6.15	0.07
			0.00						
7770.00 (AT&T)	C	From Leg	4.00	0.0000	115.00	No Ice	10.03	5.60	0.02
			-6.00			1/2" Ice	10.61	6.15	0.07
			0.00						
AM-X-CD-16-65-00T-RET (6') (AT&T)	A	From Leg	4.00	0.0000	115.00	No Ice	8.26	4.64	0.05
			0.00			1/2" Ice	8.81	5.09	0.10
			0.00						
AM-X-CD-16-65-00T-RET (6') (AT&T)	B	From Leg	4.00	0.0000	115.00	No Ice	8.26	4.64	0.05
			0.00			1/2" Ice	8.81	5.09	0.10
			0.00						
AM-X-CD-16-65-00T-RET (6') (AT&T)	C	From Leg	4.00	0.0000	115.00	No Ice	8.26	4.64	0.05
			0.00			1/2" Ice	8.81	5.09	0.10
			0.00						
(2) REMOTE RADIO HEAD (RRH) (AT&T)	A	From Leg	0.00	0.0000	115.00	No Ice	1.82	0.83	0.03
			0.00			1/2" Ice	2.00	0.97	0.04
			0.00						
(2) REMOTE RADIO HEAD (RRH) (AT&T)	B	From Leg	0.00	0.0000	115.00	No Ice	1.82	0.83	0.03
			0.00			1/2" Ice	2.00	0.97	0.04
			0.00						
(2) REMOTE RADIO HEAD (RRH) (AT&T)	C	From Leg	0.00	0.0000	115.00	No Ice	1.82	0.83	0.03
			0.00			1/2" Ice	2.00	0.97	0.04
			0.00						
Surge Suppressor (AT&T)	C	From Leg	0.00	0.0000	115.00	No Ice	0.80	0.80	0.03
			0.00			1/2" Ice	0.94	0.94	0.04
			0.00						
Camera	A	From Leg	0.00	0.0000	30.00	No Ice	0.50	0.50	0.01

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Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C _{AA} Front	C _{AA} Side	Weight	
			Horz	Lateral						
			ft	ft	°	ft	ft ²	ft ²	K	
			0.00			1/2" Ice	0.60	0.60	0.02	
(2) Diplexer (Verizon)	A	From Leg	0.00		0.0000	101.00	No Ice	0.23	0.17	0.01
			4.00							
			6.00							
(2) Diplexer (Verizon)	B	From Leg	0.00		0.0000	101.00	No Ice	0.23	0.17	0.01
			4.00							
			6.00							
(2) Diplexer (Verizon)	C	From Leg	0.00		0.0000	101.00	No Ice	0.23	0.17	0.01
			4.00							
			6.00							
			0.00							

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets:		Azimuth Adjustment	3 dB Beam Width	Elevation	Outside Diameter	Aperture Area	Weight	
				Horz	Lateral							
				ft	ft	°	°	ft	ft	ft ²	K	
3' Dish	A	Paraboloid w/o Radome	From Leg	2.00		0.0000		83.00	3.00	No Ice	7.07	0.23
				0.00								
				0.00								
VHLP2.5-180 (Clearwire)	A	Paraboloid w/o Radome	From Face	6.00		0.0000		134.00	2.50	No Ice	4.90	0.07
				0.00								
				0.00								
VHLP2.5-180 (Clearwire)	A	Paraboloid w/o Radome	From Face	6.00		0.0000		134.00	2.50	No Ice	4.90	0.07
				-7.00								
				0.00								
VHLP2.5-180 (Clearwire)	B	Paraboloid w/o Radome	From Face	6.00		0.0000		134.00	2.50	No Ice	4.90	0.07
				-7.00								
				0.00								
VHLP2-180 (Clearwire)	C	Paraboloid w/o Radome	From Face	6.00		0.0000		134.00	2.00	No Ice	3.14	0.03
				0.00								
				0.00								

Truss-Leg Properties

Section Designation	Area	Area Ice	Self Weight	Ice Weight	Equiv. Diameter	Equiv. Diameter Ice	Leg Area
	in ²	in ²	K	K	in	in	in ²
Pirod 105244	1026.8606	1727.9786	0.56	0.21	7.1310	11.9999	3.6816
Pirod 105216	1998.0891	3357.4497	0.51	0.43	6.9378	11.6578	3.6816
Pirod 105217	2130.7479	3520.4599	0.62	0.44	7.3984	12.2238	5.3014
Pirod 105217	2130.7479	3520.4599	0.62	0.44	7.3984	12.2238	5.3014
Pirod 105217 reinf w/ 1" dia bar	2291.5652	3727.7657	0.79	0.46	7.9568	12.9436	7.6570
Pirod 105218	2263.4687	3690.8612	0.75	0.46	7.8593	12.8155	7.2158

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Section Designation	Area	Area Ice	Self Weight	Ice Weight	Equiv. Diameter	Equiv. Diameter Ice	Leg Area
	in ²	in ²	K	K	in	in	in ²
Pirod 105219	2441.8688	3942.2854	0.94	0.49	8.4787	13.6885	9.4248
Pirod 105219 reinf w 1" dia bar	2571.0468	4121.6676	1.11	0.50	8.9272	14.3113	11.7803
Pirod 105220	2578.8005	4132.5504	1.12	0.50	8.9542	14.3491	11.9282

Tower Pressures - No Ice

$G_H = 1.125$

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
T1 170.00-150.00	160.00	1.57	29	102.917	A	0.000	45.634	5.833	12.78	0.000	0.000
					B	0.000	51.117		11.41	0.000	0.000
					C	0.000	16.568		35.21	0.000	0.000
T2 150.00-140.00	145.00	1.526	28	66.055	A	5.476	31.109	11.905	32.54	0.000	0.000
					B	4.373	39.159		27.35	0.000	0.000
					C	5.476	13.755		61.91	0.000	0.000
T3 140.00-120.00	130.00	1.48	27	162.111	A	10.467	66.306	23.165	30.17	0.000	0.000
					B	7.886	99.564		21.56	0.000	0.000
					C	9.991	39.761		46.56	0.000	0.000
T4 120.00-100.00	110.00	1.411	26	202.528	A	13.964	97.407	24.703	22.18	0.000	0.000
					B	11.023	124.907		18.17	0.000	0.000
					C	11.907	108.612		20.50	0.000	0.000
T5 100.00-90.00	95.00	1.353	25	116.264	A	6.561	70.875	12.351	15.95	0.000	0.000
					B	5.399	62.454		18.20	0.000	0.000
					C	5.705	77.103		14.92	0.000	0.000
T6 90.00-80.00	85.00	1.31	24	126.517	A	6.959	74.641	13.283	16.28	0.000	0.000
					B	5.844	66.219		18.43	0.000	0.000
					C	6.137	78.035		15.78	0.000	0.000
T7 80.00-60.00	70.00	1.24	23	282.945	A	15.144	153.290	26.241	15.58	0.000	0.000
					B	13.019	136.446		17.56	0.000	0.000
					C	13.579	155.745		15.50	0.000	0.000
T8 60.00-40.00	50.00	1.126	21	323.362	A	19.635	155.358	28.309	16.18	0.000	0.000
					B	17.274	138.514		18.17	0.000	0.000
					C	17.895	157.813		16.11	0.000	0.000
T9 40.00-20.00	30.00	1	18	363.756	A	21.661	158.305	29.807	16.56	0.000	0.000
					B	19.382	141.462		18.53	0.000	0.000
					C	19.982	159.311		16.62	0.000	0.000
T10 20.00-0.00	10.00	1	18	403.780	A	27.125	114.363	29.897	21.13	0.000	0.000
					B	25.476	103.415		23.20	0.000	0.000
					C	25.910	114.074		21.36	0.000	0.000

Tower Pressure - With Ice

$G_H = 1.125$

Section Elevation	z	K _Z	q _z	t _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	in	ft ²	c	ft ²	ft ²	ft ²		ft ²	ft ²
T1	160.00	1.57	22	0.5000	104.583	A	0.000	74.048	9.167	12.38	0.000	0.000

tnxTower URS Corporation 500 Enterprise Drive, Suite 3B Rocky Hill, CT 06067 Phone: (860) 529-8882 FAX: (860) 529-3991	Job PIROD U20'-0"x170' Lattice Tower	Page 17 of 42
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	Client Verizon Wireless	Designed by Kevin_Barker

Section Elevation ft	z ft	K _Z	q _z psf	t _z in	A _G ft ²	F a c e ft ²	A _F ft ²	A _R ft ²	A _{leg} ft ²	Leg %	C _A A _A In Face ft ²	C _A A _A Out Face ft ²	
170.00-150.00						B	0.000	79.601		11.52	0.000	0.000	
						C	0.000	31.273		29.31	0.000	0.000	
T2	145.00	1.526	21	0.5000	66.890	A	5.476	51.513	20.033	35.15	0.000	0.000	
150.00-140.00						B	3.816	62.257		30.32	0.000	0.000	
						C	5.476	25.659		64.34	0.000	0.000	
T3	130.00	1.48	21	0.5000	163.780	A	10.467	111.521	38.924	31.91	0.000	0.000	
140.00-120.00						B	21.845	144.925		23.34	0.000	0.000	
						C	9.750	65.312		51.86	0.000	0.000	
T4	110.00	1.411	20	0.5000	204.197	A	13.964	145.473	40.814	25.60	0.000	0.000	
120.00-100.00						B	31.343	170.377		20.23	0.000	0.000	
						C	10.924	145.948		26.02	0.000	0.000	
T5	100.00-90.00	95.00	1.353	19	0.5000	117.098	A	6.561	95.768	20.407	19.94	0.000	0.000
						B	15.784	85.226		20.20	0.000	0.000	
						C	5.302	96.926		19.96	0.000	0.000	
T6	90.00-80.00	85.00	1.31	18	0.5000	127.351	A	10.959	98.769	21.609	19.69	0.000	0.000
						B	20.263	88.254		19.91	0.000	0.000	
						C	5.751	98.277		20.77	0.000	0.000	
T7	80.00-60.00	70.00	1.24	17	0.5000	284.614	A	28.477	200.853	42.789	18.66	0.000	0.000
						B	47.268	179.884		18.84	0.000	0.000	
						C	12.842	196.574		20.43	0.000	0.000	
T8	60.00-40.00	50.00	1.126	16	0.5000	325.031	A	32.968	204.329	45.704	19.26	0.000	0.000
						B	51.351	183.419		19.47	0.000	0.000	
						C	17.077	200.087		21.05	0.000	0.000	
T9	40.00-20.00	30.00	1	14	0.5000	365.425	A	34.994	210.238	47.784	19.49	0.000	0.000
						B	53.519	189.368		19.67	0.000	0.000	
						C	19.192	202.771		21.53	0.000	0.000	
T10	20.00-0.00	10.00	1	14	0.5000	405.448	A	35.792	158.376	47.910	24.67	0.000	0.000
						B	47.543	144.830		24.90	0.000	0.000	
						C	25.339	151.422		27.10	0.000	0.000	

Tower Pressure - Service

$G_H = 1.125$

Section Elevation ft	z ft	K _Z	q _z psf	A _G ft ²	F a c e ft ²	A _F ft ²	A _R ft ²	A _{leg} ft ²	Leg %	C _A A _A In Face ft ²	C _A A _A Out Face ft ²	
T1	160.00	1.57	10	102.917	A	0.000	45.634	5.833	12.78	0.000	0.000	
170.00-150.00					B	0.000	51.117		11.41	0.000	0.000	
					C	0.000	16.568		35.21	0.000	0.000	
T2	145.00	1.526	10	66.055	A	5.476	31.109	11.905	32.54	0.000	0.000	
150.00-140.00					B	4.373	39.159		27.35	0.000	0.000	
					C	5.476	13.755		61.91	0.000	0.000	
T3	130.00	1.48	9	162.111	A	10.467	66.306	23.165	30.17	0.000	0.000	
140.00-120.00					B	7.886	99.564		21.56	0.000	0.000	
					C	9.991	39.761		46.56	0.000	0.000	
T4	110.00	1.411	9	202.528	A	13.964	97.407	24.703	22.18	0.000	0.000	
120.00-100.00					B	11.023	124.907		18.17	0.000	0.000	
					C	11.907	108.612		20.50	0.000	0.000	
T5	95.00	1.353	9	116.264	A	6.561	70.875	12.351	15.95	0.000	0.000	
100.00-90.00					B	5.399	62.454		18.20	0.000	0.000	
					C	5.705	77.103		14.92	0.000	0.000	
T6	90.00-80.00	85.00	1.31	8	126.517	A	6.959	74.641	13.283	16.28	0.000	0.000
					B	5.844	66.219		18.43	0.000	0.000	

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Section Elevation ft	z ft	K _Z	q _z psf	A _G ft ²	F a c e	A _F ft ²	A _R ft ²	A _{leg} ft ²	Leg %	C _A A _A In Face ft ²	C _A A _A Out Face ft ²
T7 80.00-60.00	70.00	1.24	8	282.945	C	6.137	78.035	26.241	15.78	0.000	0.000
					A	15.144	153.290		15.58	0.000	0.000
					B	13.019	136.446		17.56	0.000	0.000
T8 60.00-40.00	50.00	1.126	7	323.362	C	13.579	155.745	28.309	15.50	0.000	0.000
					A	19.635	155.358		16.18	0.000	0.000
					B	17.274	138.514		18.17	0.000	0.000
T9 40.00-20.00	30.00	1	6	363.756	C	17.895	157.813	29.807	16.11	0.000	0.000
					A	21.661	158.305		16.56	0.000	0.000
					B	19.382	141.462		18.53	0.000	0.000
T10 20.00-0.00	10.00	1	6	403.780	C	19.982	159.311	29.897	16.62	0.000	0.000
					A	27.125	114.363		21.13	0.000	0.000
					B	25.476	103.415		23.20	0.000	0.000
					C	25.910	114.074		21.36	0.000	0.000

Tower Forces - No 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 170.00-150.00	0.27	1.16	A	0.443	1.984	0.67	1	1	30.587	2.21	110.61	B
			B	0.497	1.904	0.696	1	1	35.568			
			C	0.161	2.732	0.583	1	1	9.663			
T2 150.00-140.00	0.18	1.12	A	0.554	1.84	0.726	1	1	28.074	2.00	199.82	B
			B	0.659	1.779	0.791	1	1	35.367			
			C	0.291	2.32	0.613	1	1	13.910			
T3 140.00-120.00	0.53	2.09	A	0.474	1.937	0.684	1	1	55.846	4.76	237.96	B
			B	0.663	1.778	0.794	1	1	86.945			
			C	0.307	2.278	0.618	1	1	34.565			
T4 120.00-100.00	1.06	2.60	A	0.55	1.844	0.724	1	1	84.508	5.78	289.20	B
			B	0.671	1.777	0.8	1	1	110.915			
			C	0.595	1.807	0.751	1	1	93.430			
T5 100.00-90.00	0.69	1.48	A	0.666	1.778	0.796	1	1	62.995	3.48	348.09	C
			B	0.584	1.815	0.744	1	1	51.846			
			C	0.712	1.777	0.829	1	1	69.602			
T6 90.00-80.00	0.69	1.76	A	0.645	1.783	0.782	1	1	65.340	3.31	330.72	C
			B	0.57	1.826	0.735	1	1	54.545			
			C	0.665	1.778	0.796	1	1	68.233			
T7 80.00-60.00	1.40	3.52	A	0.595	1.807	0.751	1	1	130.223	6.09	304.43	C
			B	0.528	1.866	0.712	1	1	110.211			
			C	0.598	1.805	0.753	1	1	130.799			
T8 60.00-40.00	1.40	4.45	A	0.541	1.852	0.719	1	1	131.393	5.70	285.18	C
			B	0.482	1.925	0.688	1	1	112.623			
			C	0.543	1.85	0.721	1	1	131.613			
T9 40.00-20.00	1.41	5.11	A	0.495	1.907	0.695	1	1	131.657	5.22	261.14	A
			B	0.442	1.987	0.67	1	1	114.121			
			C	0.493	1.909	0.694	1	1	130.528			
T10 20.00-0.00	0.92	5.16	A	0.35	2.171	0.633	1	1	99.474	4.49	224.58	A
			B	0.319	2.246	0.622	1	1	89.797			
			C	0.347	2.179	0.631	1	1	97.925			
Sum Weight:	8.54	28.44						OTM	3423.40 kip-ft	43.05		

tnxTower URS Corporation 500 Enterprise Drive, Suite 3B Rocky Hill, CT 06067 Phone: (860) 529-8882 FAX: (860) 529-3991	Job PiROD U20'-0"x170' Lattice Tower	Page 19 of 42
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	Client Verizon Wireless	Designed by Kevin_Barker

Tower Forces - No Ice - Wind 45 To Face

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
ft	K	K							ft ²	K	plf	
T1 170.00-150.00	0.27	1.16	A	0.443	1.984	0.67	0.825	1	30.587	2.21	110.61	B
			B	0.497	1.904	0.696	0.825	1	35.568			
			C	0.161	2.732	0.583	0.825	1	9.663			
T2 150.00-140.00	0.18	1.12	A	0.554	1.84	0.726	0.825	1	27.116	1.95	195.49	B
			B	0.659	1.779	0.791	0.825	1	34.602			
			C	0.291	2.32	0.613	0.825	1	12.952			
T3 140.00-120.00	0.53	2.09	A	0.474	1.937	0.684	0.825	1	54.014	4.68	234.19	B
			B	0.663	1.778	0.794	0.825	1	85.565			
			C	0.307	2.278	0.618	0.825	1	32.816			
T4 120.00-100.00	1.06	2.60	A	0.55	1.844	0.724	0.825	1	82.065	5.68	284.17	B
			B	0.671	1.777	0.8	0.825	1	108.986			
			C	0.595	1.807	0.751	0.825	1	91.347			
T5 100.00-90.00	0.69	1.48	A	0.666	1.778	0.796	0.825	1	61.847	3.43	343.10	C
			B	0.584	1.815	0.744	0.825	1	50.901			
			C	0.712	1.777	0.829	0.825	1	68.603			
T6 90.00-80.00	0.69	1.76	A	0.645	1.783	0.782	0.825	1	64.122	3.26	325.51	C
			B	0.57	1.826	0.735	0.825	1	53.522			
			C	0.665	1.778	0.796	0.825	1	67.159			
T7 80.00-60.00	1.40	3.52	A	0.595	1.807	0.751	0.825	1	127.573	5.98	298.90	C
			B	0.528	1.866	0.712	0.825	1	107.933			
			C	0.598	1.805	0.753	0.825	1	128.423			
T8 60.00-40.00	1.40	4.45	A	0.541	1.852	0.719	0.825	1	127.957	5.57	278.40	C
			B	0.482	1.925	0.688	0.825	1	109.600			
			C	0.543	1.85	0.721	0.825	1	128.481			
T9 40.00-20.00	1.41	5.11	A	0.495	1.907	0.695	0.825	1	127.866	5.07	253.62	A
			B	0.442	1.987	0.67	0.825	1	110.729			
			C	0.493	1.909	0.694	0.825	1	127.031			
T10 20.00-0.00	0.92	5.16	A	0.35	2.171	0.633	0.825	1	94.727	4.28	213.86	A
			B	0.319	2.246	0.622	0.825	1	85.339			
			C	0.347	2.179	0.631	0.825	1	93.391			
Sum Weight:	8.54	28.44						OTM	3365.89 kip-ft	42.12		

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 170.00-150.00	0.27	1.16	A	0.443	1.984	0.67	0.8	1	30.587	2.21	110.61	B
			B	0.497	1.904	0.696	0.8	1	35.568			
			C	0.161	2.732	0.583	0.8	1	9.663			
T2 150.00-140.00	0.18	1.12	A	0.554	1.84	0.726	0.8	1	26.979	1.95	194.88	B
			B	0.659	1.779	0.791	0.8	1	34.492			
			C	0.291	2.32	0.613	0.8	1	12.815			
T3 140.00-120.00	0.53	2.09	A	0.474	1.937	0.684	0.8	1	53.752	4.67	233.65	B
			B	0.663	1.778	0.794	0.8	1	85.368			
			C	0.307	2.278	0.618	0.8	1	32.566			
T4 120.00-100.00	1.06	2.60	A	0.55	1.844	0.724	0.8	1	81.715	5.67	283.45	B
			B	0.671	1.777	0.8	0.8	1	108.711			
			C	0.595	1.807	0.751	0.8	1	91.049			
T5 100.00-90.00	0.69	1.48	A	0.666	1.778	0.796	0.8	1	61.683	3.42	342.39	C
			B	0.584	1.815	0.744	0.8	1	50.766			

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	Client Verizon Wireless	Designed by Kevin_Barker

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
ft	K	K	e						ft ²	K	plf	
T6 90.00-80.00	0.69	1.76	C	0.712	1.777	0.829	0.8	1	68.461	3.25	324.77	C
			A	0.645	1.783	0.782	0.8	1	63.948			
			B	0.57	1.826	0.735	0.8	1	53.376			
T7 80.00-60.00	1.40	3.52	C	0.665	1.778	0.796	0.8	1	67.006	5.96	298.11	C
			A	0.595	1.807	0.751	0.8	1	127.194			
			B	0.528	1.866	0.712	0.8	1	107.607			
T8 60.00-40.00	1.40	4.45	C	0.598	1.805	0.753	0.8	1	128.083	5.55	277.43	C
			A	0.541	1.852	0.719	0.8	1	127.466			
			B	0.482	1.925	0.688	0.8	1	109.168			
T9 40.00-20.00	1.41	5.11	C	0.543	1.85	0.721	0.8	1	128.034	5.05	252.55	A
			A	0.495	1.907	0.695	0.8	1	127.325			
			B	0.442	1.987	0.67	0.8	1	110.244			
T10 20.00-0.00	0.92	5.16	C	0.493	1.909	0.694	0.8	1	126.531	4.25	212.33	A
			A	0.35	2.171	0.633	0.8	1	94.049			
			B	0.319	2.246	0.622	0.8	1	84.702			
Sum Weight:	8.54	28.44	C	0.347	2.179	0.631	0.8	1	92.743	41.98		
								OTM	3357.68 kip-ft			

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 170.00-150.00	0.27	1.16	A	0.443	1.984	0.67	0.85	1	30.587	2.21	110.61	B
			B	0.497	1.904	0.696	0.85	1	35.568			
			C	0.161	2.732	0.583	0.85	1	9.663			
T2 150.00-140.00	0.18	1.12	A	0.554	1.84	0.726	0.85	1	27.253	1.96	196.11	B
			B	0.659	1.779	0.791	0.85	1	34.711			
			C	0.291	2.32	0.613	0.85	1	13.089			
T3 140.00-120.00	0.53	2.09	A	0.474	1.937	0.684	0.85	1	54.276	4.69	234.73	B
			B	0.663	1.778	0.794	0.85	1	85.762			
			C	0.307	2.278	0.618	0.85	1	33.066			
T4 120.00-100.00	1.06	2.60	A	0.55	1.844	0.724	0.85	1	82.414	5.70	284.89	B
			B	0.671	1.777	0.8	0.85	1	109.262			
			C	0.595	1.807	0.751	0.85	1	91.644			
T5 100.00-90.00	0.69	1.48	A	0.666	1.778	0.796	0.85	1	62.011	3.44	343.81	C
			B	0.584	1.815	0.744	0.85	1	51.036			
			C	0.712	1.777	0.829	0.85	1	68.746			
T6 90.00-80.00	0.69	1.76	A	0.645	1.783	0.782	0.85	1	64.296	3.26	326.26	C
			B	0.57	1.826	0.735	0.85	1	53.669			
			C	0.665	1.778	0.796	0.85	1	67.313			
T7 80.00-60.00	1.40	3.52	A	0.595	1.807	0.751	0.85	1	127.951	5.99	299.69	C
			B	0.528	1.866	0.712	0.85	1	108.258			
			C	0.598	1.805	0.753	0.85	1	128.762			
T8 60.00-40.00	1.40	4.45	A	0.541	1.852	0.719	0.85	1	128.448	5.59	279.37	C
			B	0.482	1.925	0.688	0.85	1	110.032			
			C	0.543	1.85	0.721	0.85	1	128.929			
T9 40.00-20.00	1.41	5.11	A	0.495	1.907	0.695	0.85	1	128.408	5.09	254.70	A
			B	0.442	1.987	0.67	0.85	1	111.213			
			C	0.493	1.909	0.694	0.85	1	127.530			
T10 20.00-0.00	0.92	5.16	A	0.35	2.171	0.633	0.85	1	95.405	4.31	215.40	A
			B	0.319	2.246	0.622	0.85	1	85.976			
			C	0.347	2.179	0.631	0.85	1	94.039			

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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	e						ft ²	K	plf	
Sum Weight:	8.54	28.44						OTM	3374.11 kip-ft	42.25		

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	e						ft ²	K	plf	
T1 170.00-150.00	0.70	1.49	A	0.708	1.777	0.826	1	1	61.139	3.02	151.23	B
			B	0.761	1.792	0.865	1	1	68.891			
			C	0.299	2.299	0.616	1	1	19.252			
T2 150.00-140.00	0.47	1.64	A	0.852	1.864	0.94	1	1	53.908	3.19*	318.60	B
			B	0.988	2.075	1	1	1	66.074			
			C	0.465	1.949	0.68	1	1	22.936			
T3 140.00-120.00	1.45	3.77	A	0.745	1.786	0.853	1	1	105.587	7.56*	378.07	B
			B	1	2.1	1	1	1	166.770			
			C	0.458	1.96	0.677	1	1	53.975			
T4 120.00-100.00	2.76	4.44	A	0.781	1.803	0.881	1	1	142.115	8.99*	449.40	B
			B	0.988	2.075	1	1	1	201.720			
			C	0.768	1.796	0.871	1	1	138.044			
T5 100.00-90.00	1.76	2.39	A	0.874	1.889	0.959	1	1	98.447	3.93	392.53	A
			B	0.863	1.876	0.949	1	1	96.706			
			C	0.873	1.888	0.959	1	1	98.225			
T6 90.00-80.00	1.81	2.70	A	0.862	1.875	0.949	1	1	104.653	4.01	401.08	A
			B	0.852	1.864	0.94	1	1	103.249			
			C	0.817	1.829	0.91	1	1	95.213			
T7 80.00-60.00	3.68	5.43	A	0.806	1.82	0.901	1	1	209.469	7.38	368.76	A
			B	0.798	1.815	0.895	1	1	208.238			
			C	0.736	1.783	0.846	1	1	179.165			
T8 60.00-40.00	3.68	6.58	A	0.73	1.781	0.842	1	1	204.980	6.41	320.67	A
			B	0.722	1.779	0.836	1	1	204.702			
			C	0.668	1.778	0.798	1	1	176.680			
T9 40.00-20.00	3.71	7.34	A	0.671	1.777	0.8	1	1	203.117	5.66	283.15	B
			B	0.665	1.778	0.795	1	1	204.125			
			C	0.607	1.8	0.758	1	1	172.926			
T10 20.00-0.00	2.43	7.56	A	0.479	1.929	0.687	1	1	144.591	4.43	221.53	B
			B	0.474	1.935	0.685	1	1	146.724			
			C	0.436	1.997	0.667	1	1	126.328			
Sum Weight:	22.46	43.35				2A _B limit		OTM	4682.52 kip-ft	54.58		

Tower Forces - With Ice - Wind 45 To Face

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
ft	K	K	e						ft ²	K	plf	
T1 170.00-150.00	0.70	1.49	A	0.708	1.777	0.826	0.825	1	61.139	3.02	151.23	B
			B	0.761	1.792	0.865	0.825	1	68.891			
			C	0.299	2.299	0.616	0.825	1	19.252			

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Section Elevation ft	Add Weight K	Self Weight K	F a c e	e	C _F	R _R	D _F	D _R	A _E ft ²	F K	w plf	Ctrl. Face
T2 150.00-140.00	0.47	1.64	A	0.852	1.864	0.94	0.825	1	52.949	3.19'	318.60	B
			B	0.988	2.075	1	0.825	1	65.406			
			C	0.465	1.949	0.68	0.825	1	21.978			
T3 140.00-120.00	1.45	3.77	A	0.745	1.786	0.853	0.825	1	103.756	7.56'	378.07	B
			B	1	2.1	1	0.825	1	162.947			
			C	0.458	1.96	0.677	0.825	1	52.269			
T4 120.00-100.00	2.76	4.44	A	0.781	1.803	0.881	0.825	1	139.671	8.96	448.08	B
			B	0.988	2.075	1	0.825	1	196.235			
			C	0.768	1.796	0.871	0.825	1	136.132			
T5 100.00-90.00	1.76	2.39	A	0.874	1.889	0.959	0.825	1	97.299	3.88	387.96	A
			B	0.863	1.876	0.949	0.825	1	93.944			
			C	0.873	1.888	0.959	0.825	1	97.297			
T6 90.00-80.00	1.81	2.70	A	0.862	1.875	0.949	0.825	1	102.735	3.94	393.73	A
			B	0.852	1.864	0.94	0.825	1	99.703			
			C	0.817	1.829	0.91	0.825	1	94.207			
T7 80.00-60.00	3.68	5.43	A	0.806	1.82	0.901	0.825	1	204.485	7.20	359.99	A
			B	0.798	1.815	0.895	0.825	1	199.966			
			C	0.736	1.783	0.846	0.825	1	176.918			
T8 60.00-40.00	3.68	6.58	A	0.73	1.781	0.842	0.825	1	199.210	6.23	311.65	A
			B	0.722	1.779	0.836	0.825	1	195.716			
			C	0.668	1.778	0.798	0.825	1	173.691			
T9 40.00-20.00	3.71	7.34	A	0.671	1.777	0.8	0.825	1	196.994	5.46	273.10	A
			B	0.665	1.778	0.795	0.825	1	194.759			
			C	0.607	1.8	0.758	0.825	1	169.567			
T10 20.00-0.00	2.43	7.56	A	0.479	1.929	0.687	0.825	1	138.327	4.18	208.97	B
			B	0.474	1.935	0.685	0.825	1	138.404			
			C	0.436	1.997	0.667	0.825	1	121.893			
Sum Weight:	22.46	43.35			2A _g limit			OTM	4639.17 kip-ft	53.62		

Tower Forces - With Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	F a c e	e	C _F	R _R	D _F	D _R	A _E ft ²	F K	w plf	Ctrl. Face
T1 170.00-150.00	0.70	1.49	A	0.708	1.777	0.826	0.8	1	61.139	3.02	151.23	B
			B	0.761	1.792	0.865	0.8	1	68.891			
			C	0.299	2.299	0.616	0.8	1	19.252			
T2 150.00-140.00	0.47	1.64	A	0.852	1.864	0.94	0.8	1	52.813	3.19'	318.60	B
			B	0.988	2.075	1	0.8	1	65.310			
			C	0.465	1.949	0.68	0.8	1	21.841			
T3 140.00-120.00	1.45	3.77	A	0.745	1.786	0.853	0.8	1	103.494	7.56'	378.07	B
			B	1	2.1	1	0.8	1	162.401			
			C	0.458	1.96	0.677	0.8	1	52.025			
T4 120.00-100.00	2.76	4.44	A	0.781	1.803	0.881	0.8	1	139.322	8.93	446.29	B
			B	0.988	2.075	1	0.8	1	195.451			
			C	0.768	1.796	0.871	0.8	1	135.859			
T5 100.00-90.00	1.76	2.39	A	0.874	1.889	0.959	0.8	1	97.135	3.87	387.30	A
			B	0.863	1.876	0.949	0.8	1	93.549			
			C	0.873	1.888	0.959	0.8	1	97.165			
T6 90.00-80.00	1.81	2.70	A	0.862	1.875	0.949	0.8	1	102.461	3.93	392.68	A
			B	0.852	1.864	0.94	0.8	1	99.197			
			C	0.817	1.829	0.91	0.8	1	94.063			
T7 80.00-60.00	3.68	5.43	A	0.806	1.82	0.901	0.8	1	203.773	7.17	358.74	A
			B	0.798	1.815	0.895	0.8	1	198.785			

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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	3.68	6.58	C	0.736	1.783	0.846	0.8	1	176.597	6.21	310.36	A
			A	0.73	1.781	0.842	0.8	1	198.386			
			B	0.722	1.779	0.836	0.8	1	194.432			
T9 40.00-20.00	3.71	7.34	C	0.668	1.778	0.798	0.8	1	173.264	5.44	271.89	A
			A	0.671	1.777	0.8	0.8	1	196.119			
			B	0.665	1.778	0.795	0.8	1	193.421			
T10 20.00-0.00	2.43	7.56	C	0.607	1.8	0.758	0.8	1	169.087	4.14	207.17	B
			A	0.479	1.929	0.687	0.8	1	137.432			
			B	0.474	1.935	0.685	0.8	1	137.215			
Sum Weight:	22.46	43.35	C	0.436	1.997	0.667	0.8	1	121.260	53.46		
					*2A _g limit			OTM	4629.59 kip-ft			

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 170.00-150.00	0.70	1.49	A	0.708	1.777	0.826	0.85	1	61.139	3.02	151.23	B
			B	0.761	1.792	0.865	0.85	1	68.891			
			C	0.299	2.299	0.616	0.85	1	19.252			
T2 150.00-140.00	0.47	1.64	A	0.852	1.864	0.94	0.85	1	53.086	3.19*	318.60	B
			B	0.988	2.075	1	0.85	1	65.501			
			C	0.465	1.949	0.68	0.85	1	22.115			
T3 140.00-120.00	1.45	3.77	A	0.745	1.786	0.853	0.85	1	104.017	7.56*	378.07	B
			B	1	2.1	1	0.85	1	163.493			
			C	0.458	1.96	0.677	0.85	1	52.512			
T4 120.00-100.00	2.76	4.44	A	0.781	1.803	0.881	0.85	1	140.020	8.99*	449.40	B
			B	0.988	2.075	1	0.85	1	197.019			
			C	0.768	1.796	0.871	0.85	1	136.405			
T5 100.00-90.00	1.76	2.39	A	0.874	1.889	0.959	0.85	1	97.463	3.89	388.61	A
			B	0.863	1.876	0.949	0.85	1	94.338			
			C	0.873	1.888	0.959	0.85	1	97.430			
T6 90.00-80.00	1.81	2.70	A	0.862	1.875	0.949	0.85	1	103.009	3.95	394.78	A
			B	0.852	1.864	0.94	0.85	1	100.210			
			C	0.817	1.829	0.91	0.85	1	94.350			
T7 80.00-60.00	3.68	5.43	A	0.806	1.82	0.901	0.85	1	205.197	7.22	361.24	A
			B	0.798	1.815	0.895	0.85	1	201.148			
			C	0.736	1.783	0.846	0.85	1	177.239			
T8 60.00-40.00	3.68	6.58	A	0.73	1.781	0.842	0.85	1	200.035	6.26	312.94	A
			B	0.722	1.779	0.836	0.85	1	197.000			
			C	0.668	1.778	0.798	0.85	1	174.118			
T9 40.00-20.00	3.71	7.34	A	0.671	1.777	0.8	0.85	1	197.868	5.49	274.31	A
			B	0.665	1.778	0.795	0.85	1	196.097			
			C	0.607	1.8	0.758	0.85	1	170.047			
T10 20.00-0.00	2.43	7.56	A	0.479	1.929	0.687	0.85	1	139.222	4.22	210.76	B
			B	0.474	1.935	0.685	0.85	1	139.593			
			C	0.436	1.997	0.667	0.85	1	122.527			
Sum Weight:	22.46	43.35			*2A _g limit			OTM	4647.72 kip-ft	53.78		

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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 170.00-150.00	0.27	1.16	A	0.443	1.984	0.67	1	1	30.587	0.77	38.27	B
			B	0.497	1.904	0.696	1	1	35.568			
			C	0.161	2.732	0.583	1	1	9.663			
T2 150.00-140.00	0.18	1.12	A	0.554	1.84	0.726	1	1	28.074	0.69	69.14	B
			B	0.659	1.779	0.791	1	1	35.367			
			C	0.291	2.32	0.613	1	1	13.910			
T3 140.00-120.00	0.53	2.09	A	0.474	1.937	0.684	1	1	55.846	1.65	82.34	B
			B	0.663	1.778	0.794	1	1	86.945			
			C	0.307	2.278	0.618	1	1	34.565			
T4 120.00-100.00	1.06	2.60	A	0.55	1.844	0.724	1	1	84.508	2.00	100.07	B
			B	0.671	1.777	0.8	1	1	110.915			
			C	0.595	1.807	0.751	1	1	93.430			
T5 100.00-90.00	0.69	1.48	A	0.666	1.778	0.796	1	1	62.995	1.20	120.45	C
			B	0.584	1.815	0.744	1	1	51.846			
			C	0.712	1.777	0.829	1	1	69.602			
T6 90.00-80.00	0.69	1.76	A	0.645	1.783	0.782	1	1	65.340	1.14	114.44	C
			B	0.57	1.826	0.735	1	1	54.545			
			C	0.665	1.778	0.796	1	1	68.233			
T7 80.00-60.00	1.40	3.52	A	0.595	1.807	0.751	1	1	130.223	2.11	105.34	C
			B	0.528	1.866	0.712	1	1	110.211			
			C	0.598	1.805	0.753	1	1	130.799			
T8 60.00-40.00	1.40	4.45	A	0.541	1.852	0.719	1	1	131.393	1.97	98.68	C
			B	0.482	1.925	0.688	1	1	112.623			
			C	0.543	1.85	0.721	1	1	131.613			
T9 40.00-20.00	1.41	5.11	A	0.495	1.907	0.695	1	1	131.657	1.81	90.36	A
			B	0.442	1.987	0.67	1	1	114.121			
			C	0.493	1.909	0.694	1	1	130.528			
T10 20.00-0.00	0.92	5.16	A	0.35	2.171	0.633	1	1	99.474	1.55	77.71	A
			B	0.319	2.246	0.622	1	1	89.797			
			C	0.347	2.179	0.631	1	1	97.925			
Sum Weight:	8.54	28.44						OTM	1184.57 kip-ft	14.90		

Tower Forces - Service - Wind 45 To Face

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
ft	K	K							ft ²	K	plf	
T1 170.00-150.00	0.27	1.16	A	0.443	1.984	0.67	0.825	1	30.587	0.77	38.27	B
			B	0.497	1.904	0.696	0.825	1	35.568			
			C	0.161	2.732	0.583	0.825	1	9.663			
T2 150.00-140.00	0.18	1.12	A	0.554	1.84	0.726	0.825	1	27.116	0.68	67.64	B
			B	0.659	1.779	0.791	0.825	1	34.602			
			C	0.291	2.32	0.613	0.825	1	12.952			
T3 140.00-120.00	0.53	2.09	A	0.474	1.937	0.684	0.825	1	54.014	1.62	81.03	B
			B	0.663	1.778	0.794	0.825	1	85.565			
			C	0.307	2.278	0.618	0.825	1	32.816			
T4 120.00-100.00	1.06	2.60	A	0.55	1.844	0.724	0.825	1	82.065	1.97	98.33	B
			B	0.671	1.777	0.8	0.825	1	108.986			
			C	0.595	1.807	0.751	0.825	1	91.347			
T5 100.00-90.00	0.69	1.48	A	0.666	1.778	0.796	0.825	1	61.847	1.19	118.72	C
			B	0.584	1.815	0.744	0.825	1	50.901			

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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	e						ft ²	K	plf	
T6 90.00-80.00	0.69	1.76	C	0.712	1.777	0.829	0.825	1	68.603	1.13	112.63	C
			A	0.645	1.783	0.782	0.825	1	64.122			
			B	0.57	1.826	0.735	0.825	1	53.522			
T7 80.00-60.00	1.40	3.52	C	0.665	1.778	0.796	0.825	1	67.159	2.07	103.42	C
			A	0.595	1.807	0.751	0.825	1	127.573			
			B	0.528	1.866	0.712	0.825	1	107.933			
T8 60.00-40.00	1.40	4.45	C	0.598	1.805	0.753	0.825	1	128.423	1.93	96.33	C
			A	0.541	1.852	0.719	0.825	1	127.957			
			B	0.482	1.925	0.688	0.825	1	109.600			
T9 40.00-20.00	1.41	5.11	C	0.543	1.85	0.721	0.825	1	128.481	1.76	87.76	A
			A	0.495	1.907	0.695	0.825	1	127.866			
			B	0.442	1.987	0.67	0.825	1	110.729			
T10 20.00-0.00	0.92	5.16	C	0.493	1.909	0.694	0.825	1	127.031	1.48	74.00	A
			A	0.35	2.171	0.633	0.825	1	94.727			
			B	0.319	2.246	0.622	0.825	1	85.339			
Sum Weight:	8.54	28.44	C	0.347	2.179	0.631	0.825	1	93.391	14.57		
								OTM	1164.67 kip-ft			

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	e						ft ²	K	plf	
T1 170.00-150.00	0.27	1.16	A	0.443	1.984	0.67	0.8	1	30.587	0.77	38.27	B
			B	0.497	1.904	0.696	0.8	1	35.568			
			C	0.161	2.732	0.583	0.8	1	9.663			
T2 150.00-140.00	0.18	1.12	A	0.554	1.84	0.726	0.8	1	26.979	0.67	67.43	B
			B	0.659	1.779	0.791	0.8	1	34.492			
			C	0.291	2.32	0.613	0.8	1	12.815			
T3 140.00-120.00	0.53	2.09	A	0.474	1.937	0.684	0.8	1	53.752	1.62	80.85	B
			B	0.663	1.778	0.794	0.8	1	85.368			
			C	0.307	2.278	0.618	0.8	1	32.566			
T4 120.00-100.00	1.06	2.60	A	0.55	1.844	0.724	0.8	1	81.715	1.96	98.08	B
			B	0.671	1.777	0.8	0.8	1	108.711			
			C	0.595	1.807	0.751	0.8	1	91.049			
T5 100.00-90.00	0.69	1.48	A	0.666	1.778	0.796	0.8	1	61.683	1.18	118.47	C
			B	0.584	1.815	0.744	0.8	1	50.766			
			C	0.712	1.777	0.829	0.8	1	68.461			
T6 90.00-80.00	0.69	1.76	A	0.645	1.783	0.782	0.8	1	63.948	1.12	112.38	C
			B	0.57	1.826	0.735	0.8	1	53.376			
			C	0.665	1.778	0.796	0.8	1	67.006			
T7 80.00-60.00	1.40	3.52	A	0.595	1.807	0.751	0.8	1	127.194	2.06	103.15	C
			B	0.528	1.866	0.712	0.8	1	107.607			
			C	0.598	1.805	0.753	0.8	1	128.083			
T8 60.00-40.00	1.40	4.45	A	0.541	1.852	0.719	0.8	1	127.466	1.92	96.00	C
			B	0.482	1.925	0.688	0.8	1	109.168			
			C	0.543	1.85	0.721	0.8	1	128.034			
T9 40.00-20.00	1.41	5.11	A	0.495	1.907	0.695	0.8	1	127.325	1.75	87.39	A
			B	0.442	1.987	0.67	0.8	1	110.244			
			C	0.493	1.909	0.694	0.8	1	126.531			
T10 20.00-0.00	0.92	5.16	A	0.35	2.171	0.633	0.8	1	94.049	1.47	73.47	A
			B	0.319	2.246	0.622	0.8	1	84.702			
			C	0.347	2.179	0.631	0.8	1	92.743			

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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	
Sum Weight:	8.54	28.44						OTM	1161.83 kip-ft	14.53		

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 170.00-150.00	0.27	1.16	A	0.443	1.984	0.67	0.85	1	30.587	0.77	38.27	B
			B	0.497	1.904	0.696	0.85	1	35.568			
			C	0.161	2.732	0.583	0.85	1	9.663			
T2 150.00-140.00	0.18	1.12	A	0.554	1.84	0.726	0.85	1	27.253	0.68	67.86	B
			B	0.659	1.779	0.791	0.85	1	34.711			
			C	0.291	2.32	0.613	0.85	1	13.089			
T3 140.00-120.00	0.53	2.09	A	0.474	1.937	0.684	0.85	1	54.276	1.62	81.22	B
			B	0.663	1.778	0.794	0.85	1	85.762			
			C	0.307	2.278	0.618	0.85	1	33.066			
T4 120.00-100.00	1.06	2.60	A	0.55	1.844	0.724	0.85	1	82.414	1.97	98.58	B
			B	0.671	1.777	0.8	0.85	1	109.262			
			C	0.595	1.807	0.751	0.85	1	91.644			
T5 100.00-90.00	0.69	1.48	A	0.666	1.778	0.796	0.85	1	62.011	1.19	118.97	C
			B	0.584	1.815	0.744	0.85	1	51.036			
			C	0.712	1.777	0.829	0.85	1	68.746			
T6 90.00-80.00	0.69	1.76	A	0.645	1.783	0.782	0.85	1	64.296	1.13	112.89	C
			B	0.57	1.826	0.735	0.85	1	53.669			
			C	0.665	1.778	0.796	0.85	1	67.313			
T7 80.00-60.00	1.40	3.52	A	0.595	1.807	0.751	0.85	1	127.951	2.07	103.70	C
			B	0.528	1.866	0.712	0.85	1	108.258			
			C	0.598	1.805	0.753	0.85	1	128.762			
T8 60.00-40.00	1.40	4.45	A	0.541	1.852	0.719	0.85	1	128.448	1.93	96.67	C
			B	0.482	1.925	0.688	0.85	1	110.032			
			C	0.543	1.85	0.721	0.85	1	128.929			
T9 40.00-20.00	1.41	5.11	A	0.495	1.907	0.695	0.85	1	128.408	1.76	88.13	A
			B	0.442	1.987	0.67	0.85	1	111.213			
			C	0.493	1.909	0.694	0.85	1	127.530			
T10 20.00-0.00	0.92	5.16	A	0.35	2.171	0.633	0.85	1	95.405	1.49	74.53	A
			B	0.319	2.246	0.622	0.85	1	85.976			
			C	0.347	2.179	0.631	0.85	1	94.039			
Sum Weight:	8.54	28.44						OTM	1167.51 kip-ft	14.62		

Force Totals

Load Case	Vertical Forces	Sum of Forces X	Sum of Forces Z	Sum of Overturning Moments, M _x	Sum of Overturning Moments, M _z	Sum of Torques
	K	K	K	kip-ft	kip-ft	kip-ft
Leg Weight	18.66					
Bracing Weight	9.78					
Total Member Self-Weight	28.44			2.02	-0.08	

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Load Case	Vertical Forces K	Sum of Forces X K	Sum of Forces Z K	Sum of Overturning Moments, M _x kip-ft	Sum of Overturning Moments, M _z kip-ft	Sum of Torques kip-ft
Total Weight	48.53			2.02	-0.08	
Wind 0 deg - No Ice		-0.02	-57.87	-5392.75	2.43	-2.11
Wind 30 deg - No Ice		28.43	-49.38	-4622.38	-2659.43	-2.97
Wind 45 deg - No Ice		40.37	-40.12	-3755.18	-3791.26	-2.51
Wind 60 deg - No Ice		49.39	-28.23	-2640.18	-4645.05	-1.73
Wind 90 deg - No Ice		57.09	0.23	32.89	-5354.94	-0.93
Wind 120 deg - No Ice		50.18	29.23	2728.20	-4686.18	0.08
Wind 135 deg - No Ice		40.38	40.41	3787.28	-3796.12	0.51
Wind 150 deg - No Ice		28.70	49.52	4637.10	-2699.66	1.44
Wind 180 deg - No Ice		0.19	57.04	5357.51	-25.82	4.32
Wind 210 deg - No Ice		-28.53	49.45	4628.66	2676.99	3.20
Wind 225 deg - No Ice		-40.27	40.33	3776.32	3781.17	3.09
Wind 240 deg - No Ice		-50.07	29.15	2717.37	4672.26	3.39
Wind 270 deg - No Ice		-57.02	0.11	17.30	5345.28	3.16
Wind 300 deg - No Ice		-49.29	-28.39	-2661.90	4631.03	2.19
Wind 315 deg - No Ice		-40.29	-40.24	-3770.48	3780.54	1.26
Wind 330 deg - No Ice		-28.47	-49.44	-4630.07	2664.08	-0.62
Member Ice	14.91					
Total Weight Ice	82.22			1.60	-3.01	
Wind 0 deg - Ice		-0.01	-68.78	-6574.69	-1.29	4.41
Wind 30 deg - Ice		33.91	-58.84	-5659.75	-3263.35	-1.79
Wind 45 deg - Ice		48.05	-47.85	-4604.73	-4636.61	-4.31
Wind 60 deg - Ice		58.76	-33.70	-3242.58	-5676.73	-6.41
Wind 90 deg - Ice		68.00	0.18	26.07	-6552.31	-10.06
Wind 120 deg - Ice		59.62	34.62	3312.37	-5709.68	-11.15
Wind 135 deg - Ice		48.06	48.07	4629.67	-4640.21	-10.44
Wind 150 deg - Ice		34.12	58.94	5670.99	-3295.23	-8.75
Wind 180 deg - Ice		0.15	67.85	6546.03	-23.35	-2.56
Wind 210 deg - Ice		-33.99	58.89	5664.52	3271.69	1.98
Wind 225 deg - Ice		-47.97	48.01	4621.31	4622.77	4.78
Wind 240 deg - Ice		-59.53	34.56	3304.20	5692.94	7.83
Wind 270 deg - Ice		-67.94	0.09	14.17	6538.68	11.85
Wind 300 deg - Ice		-58.67	-33.82	-3259.48	5659.31	12.80
Wind 315 deg - Ice		-47.99	-47.94	-4616.58	4621.71	11.86
Wind 330 deg - Ice		-33.93	-58.88	-5665.62	3260.68	9.41
Total Weight	48.53			2.02	-0.08	
Wind 0 deg - Service		-0.01	-20.02	-1872.63	2.35	-0.73
Wind 30 deg - Service		9.84	-17.09	-1606.07	-918.71	-1.03
Wind 45 deg - Service		13.97	-13.88	-1306.00	-1310.35	-0.87
Wind 60 deg - Service		17.09	-9.77	-920.19	-1605.78	-0.60
Wind 90 deg - Service		19.76	0.08	4.75	-1851.41	-0.32
Wind 120 deg - Service		17.36	10.12	937.39	-1620.01	0.03
Wind 135 deg - Service		13.97	13.98	1303.85	-1312.03	0.18
Wind 150 deg - Service		9.93	17.13	1597.90	-932.63	0.50
Wind 180 deg - Service		0.07	19.74	1847.18	-7.43	1.49
Wind 210 deg - Service		-9.87	17.11	1594.98	927.80	1.11
Wind 225 deg - Service		-13.93	13.95	1300.05	1309.87	1.07
Wind 240 deg - Service		-17.33	10.09	933.64	1618.21	1.17
Wind 270 deg - Service		-19.73	0.04	-0.64	1851.08	1.09
Wind 300 deg - Service		-17.05	-9.83	-927.70	1603.94	0.76
Wind 315 deg - Service		-13.94	-13.92	-1311.29	1309.65	0.44
Wind 330 deg - Service		-9.85	-17.11	-1608.73	923.33	-0.21

Load Combinations

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

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
T1	170 - 150	Leg	Max Tension	22	23.60	-0.03	0.03
			Max. Compression	19	-29.23	0.01	0.37
			Max. Mx	30	-28.39	0.30	-0.21

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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	
T2	150 - 140	Diagonal	Max. My	19	-29.23	0.01	0.37	
			Max. Vy	30	-3.14	0.30	-0.21	
			Max. Vx	19	-3.73	0.01	0.37	
			Max Tension	34	2.92	0.00	0.00	
			Max. Compression	26	-2.97	0.00	0.00	
			Max. Mx	19	2.36	-0.00	0.00	
			Max. My	26	-1.95	-0.00	-0.00	
			Max. Vy	19	0.01	-0.00	0.00	
		Top Girt	Max. Vx	26	0.00	-0.00	-0.00	
			Max Tension	5	0.09	0.00	0.00	
			Max. Compression	2	-0.12	0.00	0.00	
			Max. Mx	18	-0.02	0.01	0.00	
			Max. My	31	0.01	0.00	-0.00	
			Max. Vy	18	-0.01	0.00	0.00	
		Bottom Girt	Max. Vx	31	0.00	0.00	0.00	
			Max Tension	15	0.13	0.00	0.00	
			Max. Compression	2	-0.13	0.00	0.00	
			Max. Mx	18	-0.00	0.01	0.00	
			Max. My	31	-0.01	0.00	-0.00	
			Max. Vy	18	-0.01	0.00	0.00	
		Leg	Max. Vx	31	0.00	0.00	0.00	
			Max Tension	22	28.22	-0.34	0.03	
			Max. Compression	19	-34.40	2.41	0.19	
			Max. Mx	22	27.60	-2.86	0.23	
			Max. My	31	-3.99	-0.21	-3.23	
			Max. Vy	27	0.58	-2.82	-0.26	
			Max. Vx	31	0.75	-0.21	-3.23	
			Diagonal	Max Tension	32	4.60	0.00	0.00
				Max. Compression	24	-5.12	0.00	0.00
				Max. Mx	22	3.53	0.04	0.00
				Max. My	32	-3.30	-0.00	-0.02
			Top Girt	Max. Vy	22	0.01	0.04	0.00
Max. Vx	32			0.00	0.00	0.00		
Max Tension	5			0.33	0.00	0.00		
Max. Compression	2			-0.29	0.00	0.00		
Max. Mx	18			0.04	-0.02	0.00		
Max. My	31	0.03		0.00	0.00			
Leg	Max. Vy	18	0.02	0.00	0.00			
	Max. Vx	31	-0.00	0.00	0.00			
	Max Tension	32	60.97	-3.15	-0.18			
	Max. Compression	19	-73.45	2.72	-0.06			
	Max. Mx	32	59.96	-3.47	-0.10			
	Max. My	23	-7.83	-0.34	5.03			
	Max. Vy	27	0.66	-3.10	-0.11			
	Max. Vx	31	0.74	0.06	-3.15			
	Diagonal	Max Tension	28	8.61	0.00	0.00		
		Max. Compression	29	-9.02	0.00	0.00		
	Leg	Max. Mx	19	5.86	0.10	0.00		
		Max. My	22	-5.91	-0.02	0.02		
Max. Vy		19	-0.03	0.10	0.00			
Max. Vx		22	-0.00	0.00	0.00			
Max Tension		32	106.75	-4.54	-0.02			
Max. Compression		19	-125.46	3.72	-0.05			
Diagonal	Max. Mx	19	-97.99	5.41	-0.02			
	Max. My	31	-10.60	-0.44	-7.37			
	Max. Vy	32	0.90	-4.57	-0.20			
	Max. Vx	20	1.52	-0.46	-7.17			
	Max Tension	33	11.19	0.00	0.00			
	Max. Compression	25	-11.90	0.00	0.00			
	Max. Mx	32	9.12	0.09	-0.00			
	Max. My	33	-10.68	-0.02	-0.04			

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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	100 - 90	Mid Girt	Max. Vy	32	0.03	0.09	-0.00	
			Max. Vx	33	0.01	0.00	0.00	
			Max Tension	32	2.95	0.00	0.00	
			Max. Compression	19	-2.30	0.00	0.00	
			Max. Mx	18	0.35	-0.07	0.00	
			Max. My	31	0.28	0.00	0.00	
		Leg	Max. Vy	18	-0.03	0.00	0.00	
			Max. Vx	31	-0.00	0.00	0.00	
			Max Tension	22	133.78	-4.57	0.08	
			Max. Compression	19	-156.02	4.17	-0.01	
			Max. Mx	32	133.65	-4.57	-0.20	
			Max. My	31	-11.67	-0.44	-7.37	
			Max. Vy	32	-0.21	-4.57	-0.20	
			Max. Vx	31	-0.50	-0.44	-7.37	
Diagonal	Max Tension	26	12.92	0.00	0.00			
	Max. Compression	26	-13.24	0.00	0.00			
	Max. Mx	19	10.13	0.16	-0.01			
	Max. My	31	-6.36	0.04	-0.01			
	Max. Vy	19	-0.05	0.16	-0.01			
	Max. Vx	24	0.00	0.00	0.00			
T6	90 - 80	Leg	Max Tension	22	161.78	-3.95	-0.03	
			Max. Compression	19	-187.31	5.26	-0.02	
			Max. Mx	24	-187.15	5.27	0.03	
			Max. My	23	-13.22	0.05	3.61	
			Max. Vy	27	0.37	-5.16	0.03	
			Max. Vx	28	-0.23	0.08	3.58	
		Diagonal	Max Tension	26	12.73	0.00	0.00	
			Max. Compression	26	-12.98	0.00	0.00	
			Max. Mx	24	10.03	0.14	0.01	
			Max. My	24	-0.67	0.08	0.01	
			Max. Vy	24	-0.04	0.14	0.01	
			Max. Vx	24	0.00	0.00	0.00	
			Leg	Max Tension	22	212.50	-4.43	-0.03
				Max. Compression	24	-244.59	5.75	0.04
Max. Mx	24	-244.59		5.75	0.04			
Max. My	20	-14.50		-0.22	-5.97			
Max. Vy	19	-0.27		5.75	-0.02			
Max. Vx	20	0.36		-0.22	-5.97			
Diagonal	Max Tension	26		13.07	0.00	0.00		
	Max. Compression	26		-13.57	0.00	0.00		
	Max. Mx	24	10.14	0.16	0.01			
	Max. My	33	-12.75	-0.00	-0.02			
	Max. Vy	24	-0.05	0.16	0.01			
	Max. Vx	33	0.00	0.00	0.00			
T8	60 - 40	Leg	Max Tension	22	259.75	-5.07	-0.03	
			Max. Compression	24	-299.64	4.38	0.01	
			Max. Mx	24	-272.27	5.75	0.04	
			Max. My	23	-18.84	-0.67	5.55	
			Max. Vy	32	0.18	-5.65	0.00	
			Max. Vx	28	-0.15	-0.66	5.53	
		Diagonal	Max Tension	26	13.35	0.00	0.00	
			Max. Compression	26	-13.73	0.00	0.00	
			Max. Mx	24	10.49	0.20	0.01	
			Max. My	32	-11.60	0.04	-0.02	
			Max. Vy	22	0.06	0.20	0.01	
			Max. Vx	32	0.00	0.00	0.00	
			Leg	Max Tension	27	302.56	-3.48	0.02
				Max. Compression	24	-352.33	0.07	-0.01
Max. Mx	22	301.61		-10.31	-0.03			
Max. My	23	-19.57		-0.67	5.55			
Max. Vy	19	0.85		7.80	-0.00			
Max. Vx	19	0.85		7.80	-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	
T10	20 - 0	Diagonal	Max. Vx	31	-0.20	2.14	-4.90	
			Max Tension	34	14.47	0.00	0.00	
			Max. Compression	26	-14.06	0.00	0.00	
			Max. Mx	24	10.75	0.19	0.01	
			Max. My	33	-12.50	0.05	-0.02	
		Leg	Max. Vy	27	0.07	0.19	0.01	
			Max. Vx	33	0.00	0.00	0.00	
			Max Tension	27	339.77	2.33	0.04	
			Max. Compression	24	-401.59	-0.00	-0.00	
			Max. Mx	24	-374.33	13.34	0.02	
			Max. My	26	-28.07	7.75	-9.72	
			Max. Vy	19	1.40	13.32	0.00	
			Max. Vx	23	1.06	7.75	9.71	
			Diagonal	Max Tension	33	17.66	0.00	0.00
				Max. Compression	34	-15.74	0.00	0.00
		Max. Mx		27	8.38	0.26	0.02	
		Max. My		33	-15.44	0.10	-0.03	
		Max. Vy		27	0.07	0.26	0.02	
		Max. Vx	33	0.00	0.00	0.00		

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Leg C	Max. Vert	30	409.76	32.86	-19.23
	Max. H _x	30	409.76	32.86	-19.23
	Max. H _z	21	-339.59	-37.89	23.14
	Min. Vert	22	-352.36	-39.53	23.05
	Min. H _x	22	-352.36	-39.53	23.05
	Min. H _z	30	409.76	32.86	-19.23
Leg B	Max. Vert	24	410.84	-32.87	-19.35
	Max. H _x	32	-351.97	39.42	23.20
	Max. H _z	33	-339.19	37.77	23.33
	Min. Vert	32	-351.97	39.42	23.20
	Min. H _x	24	410.84	-32.87	-19.35
	Min. H _z	24	410.84	-32.87	-19.35
Leg A	Max. Vert	19	409.32	0.13	38.03
	Max. H _x	31	26.59	3.92	-4.02
	Max. H _z	19	409.32	0.13	38.03
	Min. Vert	27	-352.84	-0.07	-45.82
	Min. H _x	23	25.90	-3.86	-4.08
	Min. H _z	27	-352.84	-0.07	-45.82

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	48.53	0.00	0.00	2.02	-0.08	-0.00
Dead+Wind 0 deg - No Ice	48.53	-0.02	-57.87	-5414.22	2.45	-2.12
Dead+Wind 30 deg - No Ice	48.53	28.43	-49.38	-4640.85	-2670.02	-2.98
Dead+Wind 45 deg - No Ice	48.53	40.37	-40.12	-3770.21	-3806.39	-2.53

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Load Combination	Vertical	Shear _x	Shear _z	Overturning Moment, M _x	Overturning Moment, M _z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
Dead+Wind 60 deg - No Ice	48.53	49.39	-28.23	-2650.76	-4663.60	-1.77
Dead+Wind 90 deg - No Ice	48.53	57.09	0.23	32.97	-5376.30	-0.99
Dead+Wind 120 deg - No Ice	48.53	50.18	29.23	2738.98	-4704.84	0.05
Dead+Wind 135 deg - No Ice	48.53	40.38	40.41	3802.30	-3811.27	0.50
Dead+Wind 150 deg - No Ice	48.53	28.70	49.52	4655.53	-2710.43	1.45
Dead+Wind 180 deg - No Ice	48.53	0.19	57.04	5378.85	-25.90	4.32
Dead+Wind 210 deg - No Ice	48.53	-28.53	49.45	4647.04	2687.70	3.21
Dead+Wind 225 deg - No Ice	48.53	-40.27	40.33	3791.28	3796.28	3.10
Dead+Wind 240 deg - No Ice	48.53	-50.07	29.15	2728.08	4690.88	3.43
Dead+Wind 270 deg - No Ice	48.53	-57.02	0.11	17.31	5366.61	3.21
Dead+Wind 300 deg - No Ice	48.53	-49.29	-28.39	-2672.58	4649.53	2.22
Dead+Wind 315 deg - No Ice	48.53	-40.29	-40.24	-3785.57	3795.64	1.28
Dead+Wind 330 deg - No Ice	48.53	-28.47	-49.44	-4648.57	2674.71	-0.62
Dead+Ice+Temp	82.22	-0.00	-0.00	1.58	-3.00	-0.00
Dead+Wind 0 deg+Ice+Temp	82.22	-0.01	-68.78	-6614.93	-1.31	4.42
Dead+Wind 30 deg+Ice+Temp	82.22	33.91	-58.84	-5694.52	-3283.35	-1.79
Dead+Wind 45 deg+Ice+Temp	82.22	48.05	-47.85	-4633.06	-4665.07	-4.33
Dead+Wind 60 deg+Ice+Temp	82.22	58.76	-33.70	-3262.59	-5711.59	-6.47
Dead+Wind 90 deg+Ice+Temp	82.22	68.00	0.18	26.08	-6592.49	-10.16
Dead+Wind 120 deg+Ice+Temp	82.22	59.62	34.62	3332.45	-5744.62	-11.22
Dead+Wind 135 deg+Ice+Temp	82.22	48.06	48.07	4657.91	-4668.71	-10.48
Dead+Wind 150 deg+Ice+Temp	82.22	34.12	58.94	5705.63	-3315.47	-8.77
Dead+Wind 180 deg+Ice+Temp	82.22	0.15	67.85	6586.11	-23.51	-2.58
Dead+Wind 210 deg+Ice+Temp	82.22	-33.99	58.89	5699.12	3291.76	1.97
Dead+Wind 225 deg+Ice+Temp	82.22	-47.97	48.01	4649.49	4651.14	4.80
Dead+Wind 240 deg+Ice+Temp	82.22	-59.53	34.56	3324.22	5727.77	7.88
Dead+Wind 270 deg+Ice+Temp	82.22	-67.94	0.09	14.09	6578.79	11.95
Dead+Wind 300 deg+Ice+Temp	82.22	-58.67	-33.82	-3279.63	5694.05	12.87
Dead+Wind 315 deg+Ice+Temp	82.22	-47.99	-47.94	-4645.01	4650.06	11.90
Dead+Wind 330 deg+Ice+Temp	82.22	-33.93	-58.88	-5700.44	3280.66	9.43
Dead+Wind 0 deg - Service	48.53	-0.01	-20.02	-1872.18	0.80	-0.73
Dead+Wind 30 deg - Service	48.53	9.84	-17.09	-1604.56	-923.95	-1.04
Dead+Wind 45 deg - Service	48.53	13.97	-13.88	-1303.29	-1317.17	-0.88
Dead+Wind 60 deg - Service	48.53	17.09	-9.77	-915.93	-1613.78	-0.61
Dead+Wind 90 deg - Service	48.53	19.76	0.08	12.71	-1860.40	-0.33
Dead+Wind 120 deg - Service	48.53	17.36	10.12	949.06	-1628.06	0.02
Dead+Wind 135 deg - Service	48.53	13.97	13.98	1317.00	-1318.86	0.17
Dead+Wind 150 deg - Service	48.53	9.93	17.13	1612.24	-937.94	0.49
Dead+Wind 180 deg - Service	48.53	0.07	19.74	1862.52	-9.02	1.50
Dead+Wind 210 deg - Service	48.53	-9.87	17.11	1609.30	929.96	1.12
Dead+Wind 225 deg - Service	48.53	-13.93	13.95	1313.19	1313.57	1.08
Dead+Wind 240 deg - Service	48.53	-17.33	10.09	945.30	1623.12	1.19
Dead+Wind 270 deg - Service	48.53	-19.73	0.04	7.29	1856.95	1.10
Dead+Wind 300 deg - Service	48.53	-17.05	-9.83	-923.48	1608.81	0.77
Dead+Wind 315 deg - Service	48.53	-13.94	-13.92	-1308.61	1313.34	0.45
Dead+Wind 330 deg - Service	48.53	-9.85	-17.11	-1607.24	925.47	-0.20

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	-48.53	0.00	0.00	48.53	0.00	0.000%	
2	-0.02	-48.53	-57.87	0.02	48.53	57.87	0.000%	
3	28.43	-48.53	-49.38	-28.43	48.53	49.38	0.000%	
4	40.37	-48.53	-40.12	-40.37	48.53	40.12	0.000%	
5	49.39	-48.53	-28.23	-49.39	48.53	28.23	0.000%	
6	57.09	-48.53	0.23	-57.09	48.53	-0.23	0.000%	

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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	
7	50.18	-48.53	29.23	-50.18	48.53	-29.23	0.000%
8	40.38	-48.53	40.41	-40.38	48.53	-40.41	0.000%
9	28.70	-48.53	49.52	-28.70	48.53	-49.52	0.000%
10	0.19	-48.53	57.04	-0.19	48.53	-57.04	0.000%
11	-28.53	-48.53	49.45	28.53	48.53	-49.45	0.000%
12	-40.27	-48.53	40.33	40.27	48.53	-40.33	0.000%
13	-50.07	-48.53	29.15	50.07	48.53	-29.15	0.000%
14	-57.02	-48.53	0.11	57.02	48.53	-0.11	0.000%
15	-49.29	-48.53	-28.39	49.29	48.53	28.39	0.000%
16	-40.29	-48.53	-40.24	40.29	48.53	40.24	0.000%
17	-28.47	-48.53	-49.44	28.47	48.53	49.44	0.000%
18	0.00	-82.22	0.00	0.00	82.22	0.00	0.000%
19	-0.01	-82.22	-68.78	0.01	82.22	68.78	0.000%
20	33.91	-82.22	-58.84	-33.91	82.22	58.84	0.000%
21	48.05	-82.22	-47.85	-48.05	82.22	47.85	0.000%
22	58.76	-82.22	-33.70	-58.76	82.22	33.70	0.000%
23	68.00	-82.22	0.18	-68.00	82.22	-0.18	0.000%
24	59.62	-82.22	34.62	-59.62	82.22	-34.62	0.000%
25	48.06	-82.22	48.07	-48.06	82.22	-48.07	0.000%
26	34.12	-82.22	58.94	-34.12	82.22	-58.94	0.000%
27	0.15	-82.22	67.85	-0.15	82.22	-67.85	0.000%
28	-33.99	-82.22	58.89	33.99	82.22	-58.89	0.000%
29	-47.97	-82.22	48.01	47.97	82.22	-48.01	0.000%
30	-59.53	-82.22	34.56	59.53	82.22	-34.56	0.000%
31	-67.94	-82.22	0.09	67.94	82.22	-0.09	0.000%
32	-58.67	-82.22	-33.82	58.67	82.22	33.82	0.000%
33	-47.99	-82.22	-47.94	47.99	82.22	47.94	0.000%
34	-33.93	-82.22	-58.88	33.93	82.22	58.88	0.000%
35	-0.01	-48.53	-20.02	0.01	48.53	20.02	0.000%
36	9.84	-48.53	-17.09	-9.84	48.53	17.09	0.000%
37	13.97	-48.53	-13.88	-13.97	48.53	13.88	0.000%
38	17.09	-48.53	-9.77	-17.09	48.53	9.77	0.000%
39	19.76	-48.53	0.08	-19.76	48.53	-0.08	0.000%
40	17.36	-48.53	10.12	-17.36	48.53	-10.12	0.000%
41	13.97	-48.53	13.98	-13.97	48.53	-13.98	0.000%
42	9.93	-48.53	17.13	-9.93	48.53	-17.13	0.000%
43	0.07	-48.53	19.74	-0.07	48.53	-19.74	0.000%
44	-9.87	-48.53	17.11	9.87	48.53	-17.11	0.000%
45	-13.93	-48.53	13.95	13.93	48.53	-13.95	0.000%
46	-17.33	-48.53	10.09	17.33	48.53	-10.09	0.000%
47	-19.73	-48.53	0.04	19.73	48.53	-0.04	0.000%
48	-17.05	-48.53	-9.83	17.05	48.53	9.83	0.000%
49	-13.94	-48.53	-13.92	13.94	48.53	13.92	0.000%
50	-9.85	-48.53	-17.11	9.85	48.53	17.11	0.000%

Non-Linear Convergence Results

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

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8	Yes	4	0.0000001	0.0000001
9	Yes	4	0.0000001	0.0000001
10	Yes	4	0.0000001	0.0000001
11	Yes	4	0.0000001	0.0000001
12	Yes	4	0.0000001	0.0000001
13	Yes	4	0.0000001	0.0000001
14	Yes	4	0.0000001	0.0000001
15	Yes	4	0.0000001	0.0000001
16	Yes	4	0.0000001	0.0000001
17	Yes	4	0.0000001	0.0000001
18	Yes	4	0.0000001	0.0000001
19	Yes	4	0.0000001	0.00000077
20	Yes	4	0.0000001	0.00000117
21	Yes	4	0.0000001	0.00000115
22	Yes	4	0.0000001	0.00000113
23	Yes	4	0.0000001	0.00000127
24	Yes	4	0.0000001	0.00000093
25	Yes	4	0.0000001	0.00000101
26	Yes	4	0.0000001	0.00000115
27	Yes	4	0.0000001	0.00000110
28	Yes	4	0.0000001	0.00000117
29	Yes	4	0.0000001	0.00000102
30	Yes	4	0.0000001	0.00000095
31	Yes	4	0.0000001	0.00000129
32	Yes	4	0.0000001	0.00000115
33	Yes	4	0.0000001	0.00000113
34	Yes	4	0.0000001	0.00000114
35	Yes	4	0.0000001	0.00000001
36	Yes	4	0.0000001	0.00000001
37	Yes	4	0.0000001	0.00000001
38	Yes	4	0.0000001	0.00000001
39	Yes	4	0.0000001	0.00000001
40	Yes	4	0.0000001	0.00000001
41	Yes	4	0.0000001	0.00000001
42	Yes	4	0.0000001	0.00000001
43	Yes	4	0.0000001	0.00000001
44	Yes	4	0.0000001	0.00000001
45	Yes	4	0.0000001	0.00000001
46	Yes	4	0.0000001	0.00000001
47	Yes	4	0.0000001	0.00000001
48	Yes	4	0.0000001	0.00000001
49	Yes	4	0.0000001	0.00000001
50	Yes	4	0.0000001	0.00000001

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	170 - 150	5.669	35	0.3055	0.0391
T2	150 - 140	4.401	35	0.2817	0.0333
T3	140 - 120	3.815	35	0.2652	0.0278
T4	120 - 100	2.770	40	0.2208	0.0143
T5	100 - 90	1.888	40	0.1803	0.0061
T6	90 - 80	1.521	40	0.1560	0.0045
T7	80 - 60	1.199	40	0.1377	0.0034
T8	60 - 40	0.677	40	0.0949	0.0018
T9	40 - 20	0.323	40	0.0595	0.0009
T10	20 - 0	0.101	40	0.0299	0.0004

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Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
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Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
183.00	101-90-08-0-01	35	5.669	0.3055	0.0391	116212
179.75	15' Mount Pipe	35	5.669	0.3055	0.0391	116212
178.00	3" Dia 20' Omni	35	5.669	0.3055	0.0391	116212
175.50	OD12-2400	35	5.669	0.3055	0.0391	116212
175.00	2.5" x 14' Omni	35	5.669	0.3055	0.0391	116212
174.00	1.5" x 12' Omni	35	5.669	0.3055	0.0391	116212
168.00	9 Arm Halo Mount	35	5.540	0.3033	0.0387	116212
159.50	APXV18-206517S-C w/ mounting hardware	35	4.993	0.2939	0.0367	55339
158.50	9' Whip	35	4.929	0.2927	0.0364	50527
144.00	3" Dia 20' Omni	35	4.044	0.2724	0.0303	29008
141.00	2" Dia 15' Omni	35	3.872	0.2671	0.0284	28978
139.00	1.5" x 10' Omni	35	3.759	0.2632	0.0272	29049
138.50	9' Whip	35	3.731	0.2622	0.0268	29086
134.00	VHLP2.5-180	35	3.483	0.2526	0.0238	29612
125.50	PiROD 10' Lightweight T-Frame	40	3.042	0.2330	0.0178	30766
115.00	(2) TMA (shielded)	40	2.533	0.2108	0.0115	28270
101.00	SC-E 6014 rev2	40	1.928	0.1827	0.0063	22264
87.00	3"x2"x22" Panel	40	1.420	0.1501	0.0042	28513
84.50	TMA	40	1.339	0.1456	0.0039	29216
83.50	3' Stand-off	40	1.307	0.1439	0.0038	29483
83.00	3' Dish	40	1.291	0.1430	0.0037	29608
82.50	TMA	40	1.276	0.1422	0.0037	29724
80.00	3"x2"x22" Panel	40	1.199	0.1377	0.0034	30063
30.00	Camera	40	0.195	0.0445	0.0007	35880
24.00	PC9013N	40	0.134	0.0357	0.0005	33211

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	170 - 150	19.873	19	1.0428	0.1498
T2	150 - 140	15.537	24	0.9733	0.1273
T3	140 - 120	13.519	24	0.9233	0.1065
T4	120 - 100	9.840	24	0.7799	0.0610
T5	100 - 90	6.699	24	0.6415	0.0323
T6	90 - 80	5.393	24	0.5553	0.0262
T7	80 - 60	4.246	24	0.4899	0.0214
T8	60 - 40	2.391	24	0.3372	0.0134
T9	40 - 20	1.133	24	0.2109	0.0082
T10	20 - 0	0.351	24	0.1058	0.0039

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Critical Deflections and Radius of Curvature - Design Wind

Elevation	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
183.00	101-90-08-0-01	19	19.873	1.0428	0.1498	41031
179.75	15' Mount Pipe	19	19.873	1.0428	0.1498	41031
178.00	3" Dia 20' Omni	19	19.873	1.0428	0.1498	41031
175.50	OD12-2400	19	19.873	1.0428	0.1498	41031
175.00	2.5" x 14' Omni	19	19.873	1.0428	0.1498	41031
174.00	1.5" x 12' Omni	19	19.873	1.0428	0.1498	41031
168.00	9 Arm Halo Mount	19	19.432	1.0366	0.1481	41031
159.50	APXV18-206517S-C w/ mounting hardware	19	17.566	1.0091	0.1403	19538
158.50	9' Whip	19	17.349	1.0056	0.1392	17839
144.00	3" Dia 20' Omni	24	14.312	0.9455	0.1155	9829
141.00	2" Dia 15' Omni	24	13.715	0.9292	0.1088	9638
139.00	1.5" x 10' Omni	24	13.323	0.9171	0.1042	9562
138.50	9' Whip	24	13.226	0.9140	0.1030	9552
134.00	VHLP2.5-180	24	12.364	0.8834	0.0924	9534
125.50	PiROD 10' Lightweight T-Frame	24	10.803	0.8199	0.0727	9544
115.00	(2) TMA (shielded)	24	8.997	0.7466	0.0515	8328
101.00	SC-E 6014 rev2	24	6.840	0.6498	0.0331	6239
87.00	3"x2"x22" Panel	24	5.034	0.5341	0.0247	8006
84.50	TMA	24	4.744	0.5181	0.0235	8196
83.50	3' Stand-off	24	4.631	0.5120	0.0231	8267
83.00	3' Dish	24	4.575	0.5089	0.0228	8301
82.50	TMA	24	4.519	0.5058	0.0226	8331
80.00	3"x2"x22" Panel	24	4.246	0.4899	0.0214	8419
30.00	Camera	24	0.682	0.1575	0.0060	10031
24.00	PC9013N	24	0.468	0.1265	0.0047	9284

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	170	Diagonal	A325N	0.6250	1	2.97	6.44	0.461 ✓	1.333	Bolt Shear
T2	150	Leg	A325N	1.0000	6	4.70	34.56	0.136 ✓	1.333	Bolt Tension
		Diagonal	A325N	1.0000	1	4.60	9.52	0.483 ✓	1.333	Member Bearing
		Top Girt	A325N	1.0000	1	0.33	9.52	0.035 ✓	1.333	Member Bearing
T3	140	Leg	A325N	1.0000	6	7.15	34.56	0.207 ✓	1.333	Bolt Tension
		Diagonal	A325N	1.0000	1	8.61	9.52	0.905 ✓	1.333	Member Bearing
T4	120	Leg	A325N	1.0000	6	13.77	34.56	0.399 ✓	1.333	Bolt Tension
		Diagonal	A325N	1.0000	1	11.19	9.52	1.176 ✓	1.333	Member Bearing
		Mid Girt	A325N	1.0000	1	2.95	9.52	0.310 ✓	1.333	Member Bearing
T5	100	Leg	A325N	1.0000	6	22.30	34.56	0.645 ✓	1.333	Bolt Tension
		Diagonal	A325N	1.0000	1	12.92	15.86	0.814 ✓	1.333	Member Bearing
T6	90	Leg	A325N	1.0000	6	26.96	34.56	0.780 ✓	1.333	Bolt Tension
		Diagonal	A325N	1.0000	1	12.73	15.86	0.803 ✓	1.333	Member Bearing

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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
T7	80	Leg	A325N	1.0000	6	31.21	34.56	0.903 ✓	1.333	Bolt Tension
		Diagonal	A325N	1.0000	1	13.07	15.86	0.824 ✓	1.333	Member Bearing
T8	60	Leg	A325N	1.2500	6	39.51	54.00	0.732 ✓	1.333	Bolt Tension
		Diagonal	A325N	1.2500	1	13.35	20.39	0.655 ✓	1.333	Member Bearing
T9	40	Leg	A325N	1.2500	6	47.08	54.00	0.872 ✓	1.333	Bolt Tension
		Diagonal	A325N	1.2500	1	14.47	20.39	0.709 ✓	1.333	Member Bearing
T10	20	Diagonal	A325N	1.2500	1	17.66	16.31	1.082 ✓	1.333	Member Bearing

Compression Checks

Leg Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	F _a ksi	A in ²	Actual P K	Allow. P _a K	Ratio P P _a
T1	170 - 150	1 3/4	20.00	2.49	68.3 K=1.00	21.253	2.4053	-29.23	51.12	0.572 ✓
T2	150 - 140	Pirod 105244	10.02	10.02	45.4 K=1.00	25.051	3.6816	-34.40	92.23	0.373 ✓
T3	140 - 120	Pirod 105216	20.03	10.02	45.4 K=1.00	25.051	3.6816	-73.45	92.23	0.796 ✓
T4	120 - 100	Pirod 105217	20.03	10.02	37.8 K=1.00	26.132	5.3014	-125.46	138.54	0.906 ✓
T5	100 - 90	Pirod 105217	10.02	10.02	37.8 K=1.00	26.132	5.3014	-156.02	138.54	1.126 ✓
T6	90 - 80	Pirod 105217 reinf w/ 1" dia bar	10.02	10.02	31.5 K=1.00	26.968	7.6570	-187.31	206.49	0.907 ✓
T7	80 - 60	Pirod 105218	20.03	10.02	32.4 K=1.00	26.848	7.2158	-244.59	193.73	1.263 ✓
T8	60 - 40	Pirod 105219	20.03	10.02	28.4 K=1.00	27.351	9.4248	-299.63	257.78	1.162 ✓
T9	40 - 20	Pirod 105219 reinf w/ 1" dia bar	20.03	10.02	25.4 K=1.00	27.705	11.7803	-352.33	326.37	1.080 ✓
T10	20 - 0	Pirod 105220	20.03	10.02	25.2 K=1.00	27.723	11.9282	-401.59	330.69	1.214 ✓

Truss-Leg Diagonal Data

Section No.	Elevation ft	Diagonal Size	L _d ft	Kl/r	F _a ksi	A in ²	Actual V K	Allow. V _a K	Stress Ratio
T2	150 - 140	0.5	1.48	121.0	10.193	0.1963	0.79	2.24	0.354

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Section No.	Elevation ft	Diagonal Size	L_d ft	Kl/r	F_a ksi	A in ²	Actual V K	Allow. V_a K	Stress Ratio
T3	140 - 120	0.5	1.48	121.0	10.133	0.1963	0.75	2.23	0.335 ✓
T4	120 - 100	0.5	1.47	120.0	10.279	0.1963	1.53	2.26	0.678 ✓
T5	100 - 90	0.5	1.47	120.0	10.279	0.1963	0.51	2.26	0.225 ✓
T6	90 - 80	0.5	1.46	118.8	10.452	0.1963	0.37	2.30	0.161 ✓
T7	80 - 60	0.5	1.46	119.0	10.423	0.1963	0.36	2.29	0.157 ✓
T8	60 - 40	0.625	1.45	94.4	13.671	0.3068	0.19	4.69	0.041 ✓
T9	40 - 20	0.625	1.44	93.7	16.133	0.3068	0.85	5.54	0.153 ✓
T10	20 - 0	0.625	1.43	93.6	13.766	0.3068	1.47	4.73	0.310 ✓

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 $\frac{P}{P_a}$
T1	170 - 150	7/8	5.59	2.71	111.6 K=0.75	12.001	0.6013	-2.97	7.22	0.412 ✓
T2	150 - 140	L2 1/2x2 1/2x3/16	11.42	5.00	121.3 K=1.00	10.097	0.9020	-5.12	9.11	0.562 ✓
T3	140 - 120	L3x3x3/16	12.50	5.65	115.3 K=1.01	10.840	1.0900	-9.02	11.82	0.763 ✓
T4	120 - 100	L3x3x3/16	13.80	6.35	127.8 K=1.00	9.141	1.0900	-11.90	9.96	1.194 ✓
T5	100 - 90	L3x3x5/16	14.50	6.72	136.9 K=1.00	7.969	1.7800	-13.24	14.19	0.933 ✓
T6	90 - 80	L3x3x5/16	15.24	7.10	144.7 K=1.00	7.132	1.7800	-12.98	12.69	1.023 ✓
T7	80 - 60	L3x3x5/16	16.80	7.90	161.0 K=1.00	5.760	1.7800	-13.57	10.25	1.324 ✓
T8	60 - 40	L3 1/2x3 1/2x5/16	18.45	8.70	151.3 K=1.00	6.527	2.0900	-13.73	13.64	1.007 ✓
T9	40 - 20	L3 1/2x3 1/2x5/16	20.16	9.56	166.3 K=1.00	5.400	2.0900	-13.09	11.29	1.159 ✓
T10	20 - 0	L4x4x1/4	21.03	10.01	151.1 K=1.00	6.542	1.9400	-15.74	12.69	1.240 ✓

Top Girt Design Data (Compression)

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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	170 - 150	7/8	5.00	4.85	186.4 K=0.70	4.298	0.6013	-0.12	2.58	0.047 ✓
T2	150 - 140	L3x3x3/16	5.00	4.48	105.1 K=1.17	12.131	1.0900	-0.29	13.22	0.022 ✓

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	170 - 150	7/8	5.00	4.85	186.4 K=0.70	4.298	0.6013	-0.13	2.58	0.050 ✓

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
T4	120 - 100	L3x3x3/16	9.00	7.63	153.5 K=1.00	6.336	1.0900	-2.30	6.91	0.333 ✓

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	170 - 150	1 3/4	20.00	2.49	68.3	30.000	2.4053	23.60	72.16	0.327 ✓
T2	150 - 140	Pirod 105244	10.02	10.02	45.4	30.000	3.6816	28.22	110.45	0.256 ✓
T3	140 - 120	Pirod 105216	20.03	10.02	45.4	30.000	3.6816	60.97	110.45	0.552 ✓
T4	120 - 100	Pirod 105217	20.03	10.02	37.8	30.000	5.3014	106.75	159.04	0.671 ✓
T5	100 - 90	Pirod 105217	10.02	10.02	37.8	30.000	5.3014	133.78	159.04	0.841 ✓
T6	90 - 80	Pirod 105217 reinf w/ 1" dia bar	10.02	10.02	31.5	30.000	7.6570	161.78	229.71	0.704 ✓
T7	80 - 60	Pirod 105218	20.03	10.02	32.4	30.000	7.2158	212.50	216.47	0.982 ✓
T8	60 - 40	Pirod 105219	20.03	10.02	28.4	30.000	9.4248	259.75	282.74	0.919 ✓

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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 $\frac{P}{P_a}$
T9	40 - 20	Pi rod 105219 reinf w /1" dia bar	20.03	10.02	25.4	30.000	11.7803	302.54	353.41	0.856 ✓
T10	20 - 0	Pi rod 105220	20.03	10.02	25.2	30.000	11.9282	339.77	357.85	0.949 ✓

Truss-Leg Diagonal Data

Section No.	Elevation ft	Diagonal Size	L _d ft	Kl/r	F _a ksi	A in ²	Actual V K	Allow. V _a K	Stress Ratio
T2	150 - 140	0.5	1.48	121.0	10.193	0.1963	0.79	2.24	0.354 ✓
T3	140 - 120	0.5	1.48	121.0	10.133	0.1963	0.75	2.23	0.335 ✓
T4	120 - 100	0.5	1.47	120.0	10.279	0.1963	1.53	2.26	0.678 ✓
T5	100 - 90	0.5	1.47	120.0	10.279	0.1963	0.51	2.26	0.225 ✓
T6	90 - 80	0.5	1.46	118.8	10.452	0.1963	0.37	2.30	0.161 ✓
T7	80 - 60	0.5	1.46	119.0	10.423	0.1963	0.36	2.29	0.157 ✓
T8	60 - 40	0.625	1.45	94.4	13.671	0.3068	0.19	4.69	0.041 ✓
T9	40 - 20	0.625	1.44	93.7	16.133	0.3068	0.85	5.54	0.153 ✓
T10	20 - 0	0.625	1.43	93.6	13.766	0.3068	1.47	4.73	0.310 ✓

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 $\frac{P}{P_a}$
T1	170 - 150	7/8	5.59	2.71	148.7	30.000	0.6013	2.92	18.04	0.162 ✓
T2	150 - 140	L2 1/2x2 1/2x3/16	11.42	5.00	80.1	21.600	0.9020	4.60	19.48	0.236 ✓
T3	140 - 120	L3x3x3/16	12.50	5.65	74.6	21.600	1.0900	8.61	23.54	0.366 ✓
T4	120 - 100	L3x3x3/16	13.80	6.35	83.5	21.600	1.0900	11.19	23.54	0.475 ✓
T5	100 - 90	L3x3x5/16	14.50	6.72	89.9	21.600	1.7800	12.92	38.45	0.336 ✓
T6	90 - 80	L3x3x5/16	15.24	7.10	94.9	21.600	1.7800	12.73	38.45	0.331 ✓

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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
T7	80 - 60	L3x3x5/16	16.80	7.90	105.3	21.600	1.7800	13.07	38.45	0.340 ✓
T8	60 - 40	L3 1/2x3 1/2x5/16	18.45	8.70	99.2	21.600	2.0900	13.35	45.14	0.296 ✓
T9	40 - 20	L3 1/2x3 1/2x5/16	20.16	9.56	108.8	21.600	2.0900	14.47	45.14	0.320 ✓
T10	20 - 0	L4x4x1/4	21.92	10.45	102.5	21.600	1.9400	17.66	41.90	0.421 ✓

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	170 - 150	7/8	5.00	4.85	266.3	30.000	0.6013	0.09	18.04	0.005 ✓
T2	150 - 140	L3x3x3/16	5.00	4.48	62.0	21.600	1.0900	0.33	23.54	0.014 ✓

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	170 - 150	7/8	5.00	4.85	266.3	30.000	0.6013	0.13	18.04	0.007 ✓

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
T4	120 - 100	L3x3x3/16	9.00	7.63	102.2	21.600	1.0900	2.95	23.54	0.125 ✓

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	SF*P _{allow} K	% Capacity	Pass Fail
T1	170 - 150	Leg	1 3/4	3	-29.23	68.14	42.9	Pass
T2	150 - 140	Leg	Pirod 105244	60	-34.40	122.94	28.0	Pass
T3	140 - 120	Leg	Pirod 105216	72	-73.45	122.94	59.7	Pass

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Section No.	Elevation ft	Component Type	Size	Critical Element	P K	SF*P _{allow} K	% Capacity	Pass Fail	
T4	120 - 100	Leg	Pirod 105217	87	-125.46	184.67	67.9	Pass	
T5	100 - 90	Leg	Pirod 105217	105	-156.02	184.67	84.5	Pass	
T6	90 - 80	Leg	Pirod 105217 reinf w/ 1" dia bar	114	-187.31	275.26	68.0	Pass	
T7	80 - 60	Leg	Pirod 105218	122	-244.59	258.24	94.7	Pass	
T8	60 - 40	Leg	Pirod 105219	137	-299.63	343.62	87.2	Pass	
T9	40 - 20	Leg	Pirod 105219 reinf w /1" dia bar	152	-352.33	435.06	81.0	Pass	
T10	20 - 0	Leg	Pirod 105220	167	-401.59	440.81	91.1	Pass	
T1	170 - 150	Diagonal	7/8	12	-2.97	9.62	30.9	Pass	
T2	150 - 140	Diagonal	L2 1/2x2 1/2x3/16	66	-5.12	12.14	42.1	Pass	
T3	140 - 120	Diagonal	L3x3x3/16	78	-9.02	15.75	57.3	Pass	
T4	120 - 100	Diagonal	L3x3x3/16	93	-11.90	13.28	89.6	Pass	
T5	100 - 90	Diagonal	L3x3x5/16	108	-13.24	18.91	70.0	Pass	
T6	90 - 80	Diagonal	L3x3x5/16	117	-12.98	16.92	76.7	Pass	
T7	80 - 60	Diagonal	L3x3x5/16	126	-13.57	13.67	99.3	Pass	
T8	60 - 40	Diagonal	L3 1/2x3 1/2x5/16	141	-13.73	18.18	75.5	Pass	
T9	40 - 20	Diagonal	L3 1/2x3 1/2x5/16	156	-13.09	15.04	87.0	Pass	
T10	20 - 0	Diagonal	L4x4x1/4	178	-15.74	16.92	93.0	Pass	
T1	170 - 150	Top Girt	7/8	4	-0.12	3.45	3.5	Pass	
T2	150 - 140	Top Girt	L3x3x3/16	61	-0.29	17.63	1.6	Pass	
T1	170 - 150	Bottom Girt	7/8	7	-0.13	3.45	3.7	Pass	
T4	120 - 100	Mid Girt	L3x3x3/16	88	-2.30	9.21	25.0	Pass	
							Summary		
							Leg (T7)	94.7	Pass
							Diagonal (T7)	99.3	Pass
							Top Girt (T1)	3.5	Pass
							Bottom Girt (T1)	3.7	Pass
							Mid Girt (T4)	25.0	Pass
							Bolt Checks	88.2	Pass
							RATING =	99.3	Pass

ANCHOR BOLT EVALUATION

ANCHOR BOLT ANALYSIS

Input Data

Max Pier Reactions:

Uplift:	Uplift := 353·kips	<i>user input</i>
Shear:	Shear := 46·kips	<i>user input</i>
Compression:	Compression := 411·kips	<i>user input</i>

Anchor Bolt Data:

Use ASTM A687 Grade

Number of Anchor Bolts = N	$N := 6$	<i>user input</i>
Bolt Ultimate Strength:	$F_u := 150 \cdot \text{ksi}$	<i>user input</i>
Bolt Yield Strength:	$F_y := 105 \cdot \text{ksi}$	<i>user input</i>
Bolt Modulus:	$E := 29000 \cdot \text{ksi}$	<i>user input</i>
Thickness of Anchor Bolts	$D := 1.25 \text{in}$	<i>user input</i>
Threads per Inch:	$n := 7$	<i>user input</i>
Coefficient of Friction:	$\mu := 0.55$	<i>user input</i> (for baseplate with grout ASCE 10-97)

Anchor Bolt Area:

Gross Area of Bolt:

$$A_g := \frac{\pi}{4} \cdot D^2 \qquad A_g = 1.227 \cdot \text{in}^2$$

Net Area of Bolt:

$$A_n := \frac{\pi}{4} \cdot \left(D - \frac{0.9743 \cdot \text{in}}{n} \right)^2 \qquad A_n = 0.969 \cdot \text{in}^2$$

Check Tensile Forces:

Maximum Tensile Force (Gross Area):

$$\text{AllowableTension} := 1.33 \cdot (0.33 \cdot A_g \cdot F_u) \qquad \text{AllowableTension} = 80.8 \cdot \text{kips}$$

Note: 1.33 increase allowed per TIA/EIA

Maximum Tensile Force (Net Area):

$$F_{\text{net.area}} := 1.33 \cdot (0.60 \cdot A_n \cdot F_y) \qquad F_{\text{net.area}} = 81.2 \cdot \text{kips}$$

Note: 1.33 increase allowed per TIA/EIA

Applied Tension:

$$\text{MaxTension} := \frac{\text{Uplift}}{N} \qquad \text{MaxTension} = 58.8 \cdot \text{kips}$$

Check Stresses:

$$\frac{\text{MaxTension}}{F_{\text{net.area}}} = 0.72$$

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

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

Check Anchor Bolt Area:

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

Required Area:

$$A_{s1} := \frac{\text{Uplift}}{F_y} + \frac{\text{Shear}}{\mu \cdot 0.85 \cdot F_y} \quad A_{s1} = 4.3 \cdot \text{in}^2$$

$$A_{s2} := \left| \frac{\text{Shear} - (0.3 \cdot \text{Compression})}{\mu \cdot 0.85 \cdot F_y} \right| \quad A_{s2} = 1.6 \cdot \text{in}^2$$

Provided Area:

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

$$\text{Condition2} := \text{if} \left(\frac{A_{s1}}{A_{s\text{provided}}} \leq 1.00, \text{"OK"}, \text{"Overstressed"} \right) \quad \frac{A_{s1}}{A_{s\text{provided}}} = 0.74$$

Condition2 = "OK"

$$\text{Condition3} := \text{if} \left(\frac{A_{s2}}{A_{s\text{provided}}} \leq 1.00, \text{"OK"}, \text{"Overstressed"} \right) \quad \frac{A_{s2}}{A_{s\text{provided}}} = 0.27$$

Condition3 = "OK"

FOUNDATION EVALUATION

FOUNDATION ANALYSIS

Input Data

Maximum Pier Reactions:

Compression: $C_t := 411 \cdot \text{kips}$ *user input*
 Uplift: $U_t := 353 \cdot \text{kips}$ *user input*

Material Properties:

Unit Weight of Concrete: $\gamma_c := 150 \text{pcf}$ *user input*
 Unit Weight of Water: $\gamma_w := 62.4 \text{pcf}$ *user input*
 Unit Weight of Soil: $\gamma_s := 100 \text{pcf}$ *user input*

Foundation Dimensions:

Drilled Caisson Length: $C_{\text{Length}} := 41.5 \text{ft}$ *user input*
 Diameter of Pier: $d_p := 5.5 \text{ft}$ *user input*
 Extension of Pier Above Grade: $L_{\text{pag}} := 0.5 \text{ft}$ *user input*

Allowable Soil Bearing Capacity (Allowable Bearing Pressure at Depth 41') $q_s := 6 \cdot \text{ksf}$ *user input*
 Water Table Below Grade: $W_d := 41 \cdot \text{ft}$ *user input*

Additional Concrete $\text{Conc}_{\text{addl}} := 5 \text{ft} \cdot \left(13 \text{ft} \cdot 13 \text{ft} - \frac{\pi \cdot d_p^2}{4} \right)$
 $\text{Conc}_{\text{addl}} = 726.2 \cdot \text{ft}^3$

Average Allowable Shear: $fl := 859 \cdot \text{psf}$ *user input*
 Depth Neglected for Skin Friction at Top: $\text{Depthunbond} := 4 \cdot \text{ft}$ *user input*

Foundation reinforcement per drawings by Tectonic, dated May 5, 2004

Loading:

$$\text{TotalDownload} := C_t + \pi \cdot \frac{d_p^2}{4} \cdot [L_{\text{pag}} \cdot \gamma_c + [\gamma_c \cdot (C_{\text{Length}} - L_{\text{pag}})]]$$

TotalDownload = 558.9 · kips

$$\text{PierWeight} := \pi \cdot \frac{d_p^2}{4} \cdot [(W_d + L_{\text{pag}}) \cdot \gamma_c + (C_{\text{Length}} - W_d - L_{\text{pag}}) \cdot (\gamma_c - \gamma_w)] + \text{Conc}_{\text{addl}} \cdot \gamma_c$$

PierWeight = 256.8 · kips

$$\text{SoilShear} := \pi \cdot d_p \cdot [fl \cdot (C_{\text{Length}} - \text{Depthunbond})]$$

SoilShear = 556.6 · kips

Compression Capacity:

$$\text{TotalDownLoadCapacity} := \text{SoilShear} + q_s \cdot \left(\pi \cdot \frac{d_p^2}{4} \right)$$

$$\text{TotalDownLoadCapacity} = 699.1 \cdot \text{kips}$$

$$\text{CheckDownLoadCapacity} := \text{if}(\text{TotalDownLoad} < \text{TotalDownLoadCapacity}, \text{"Okay"}, \text{"No Good"})$$

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

Tension Capacity:

$$\text{TotalUpLiftCapacity} := \text{SoilShear} + \text{PierWeight}$$

$$\text{TotalUpLiftCapacity} = 813.4 \cdot \text{kips}$$

$$\text{CheckUpLiftCapacity} := \text{if}(U_t < \text{TotalUpLiftCapacity}, \text{"Okay"}, \text{"No Good"})$$

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

$$\text{SafetyFactor}_{\text{provided}} := \frac{\text{TotalUpLiftCapacity}}{U_t}$$

$$\text{SafetyFactor}_{\text{provided}} = 2.30$$

Check Cone Failure:

$$\text{ConeFailureCapacity} := \frac{[(C_{\text{Length}} - L_{\text{pag}}) \cdot \tan(30\text{deg}) \cdot 2 + d_p]^2 \cdot \pi \cdot C_{\text{Length}} - L_{\text{pag}} \cdot \gamma_s}{4 \cdot 3}$$

$$\text{ConeFailureCapacity} = 2997.25 \cdot \text{kips}$$

$$\text{CheckConeFailureCapacity} := \text{if}(U_t < \text{ConeFailureCapacity}, \text{"Okay"}, \text{"No Good"})$$

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

$$\text{ConeSafetyFactor}_{\text{provided}} := \frac{\text{ConeFailureCapacity}}{U_t}$$

$$\text{ConeSafetyFactor}_{\text{provided}} = 8.49$$