ROBINSON & COLE

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Also admitted in Massachusetts

EM-VER-062-121114

November 12, 2012

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

Re: **Notice of Exempt Modification – Antenna Swap**
1055 Wintergreen Avenue, Hamden, Connecticut

Dear Ms. Roberts:

Cellco Partnership d/b/a Verizon Wireless ("Cellco") currently maintains twelve (12) wireless telecommunications antennas at the 170-foot level on an existing 250-foot lattice tower at the above-referenced address. The tower is managed by Message Center Management. Cellco's use of the tower was approved by the Council in 1986. Cellco now intends to replace all twelve (12) of its existing antennas with six (6) model LPA-80063-4CF cellular antennas; three (3) model BXA-171063-8BF PCS antennas; and three (3) model BXA-70063-4CF LTE antennas, at the same 170-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 Scott D. Jackson, Mayor of the Town of Hamden. A copy of this letter is also being sent to Westrock, LLC, 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.

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 170-foot level on the existing 250-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 boundaries.

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 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, with certain modifications, can support Cellco's proposed modifications. (*See* Structural Analysis Report and Reinforcement Design 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:
Scott D. Jackson, Hamden Mayor
Westrock, LLC
Sandy M. Carter

Amphenol ANTENNA SOLUTIONS

LPA-80063-4CF-EDIN-X

V-Pol | Log Periodic | 63° | 13.0 dBd

Replace "X" with desired electrical downtilt.

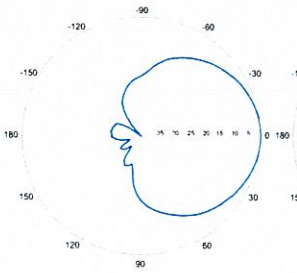
Antenna is also available with NE connector(s). Replace "EDIN" with "NE" in the model number when ordering.

Electrical Characteristics	
Frequency bands	806-960 MHz
Polarization	Vertical
Horizontal beamwidth	63°
Vertical beamwidth	15°
Gain	13.0 dBd (15.1 dBi)
Electrical downtilt (X)	0, 2, 4, 5, 6, 8, 10, 12, 14
Impedance	50Ω
VSWR	≤1.4:1
Upper sidelobe suppression (0°)	-15.7 dB
Front-to-back ratio (+/-30°)	-31.7 dB
Null fill	5% (-26.02 dB)
Input power	500 W
Lightning protection	Direct Ground
Connector(s)	1 Port / EDIN or NE / Female / Center (Back)

Mechanical Characteristics		
Dimensions Length x Width x Depth	1205 x 385 x 332 mm	47.4 x 15.2 x 13.1 in
Depth of antenna with z-bracket	372 mm	14.6 in
Weight without mounting brackets	9.1 kg	20 lbs
Survival wind speed	> 201 km/hr	> 125 mph
Wind area	Front: 0.46 m^2 Side: 0.39 m^2	Front: 5.0 ft^2 Side: 4.2 ft^2
Wind load @ 161 km/hr (100 mph)	Front: 660 N Side: 550 N	Front: 149 lbf Side: 124 lbf

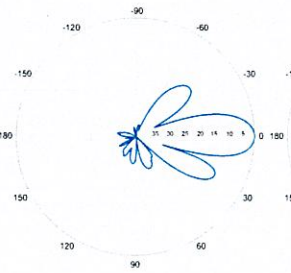
Mounting Options	Part Number	Fits Pipe Diameter	Weight
2-Point Mounting & Downtilt Bracket Kit (0-20°)	21699999	50-102 mm 2.0-4.0 in	5.4 kg 12 lbs
Lock-Down Brace	If the lock-down brace is used, the maximum diameter of the mounting pipe is 88.9 mm or 3.5 in.		

LPA-80063-4CF-EDIN-X



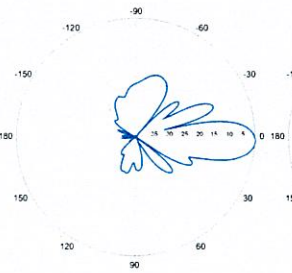
Horizontal

LPA-80063-4CF-EDIN-0



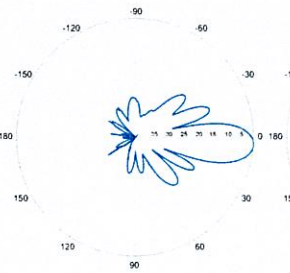
0° | Vertical

LPA-80063-4CF-EDIN-2



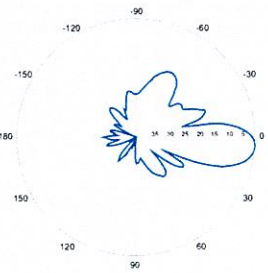
2° | Vertical

LPA-80063-4CF-EDIN-4



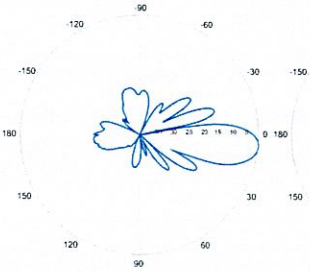
4° | Vertical

LPA-80063-4CF-EDIN-5



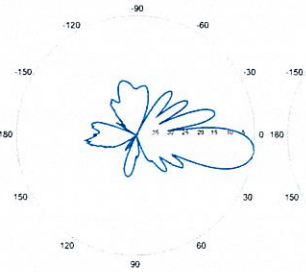
5° | Vertical

LPA-80063-4CF-EDIN-6



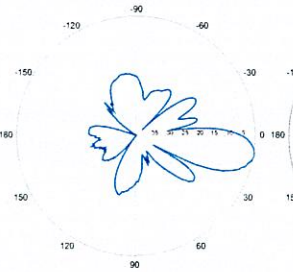
6° | Vertical

LPA-80063-4CF-EDIN-8



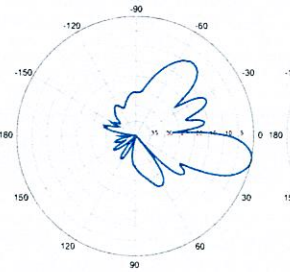
8° | Vertical

LPA-80063-4CF-EDIN-10



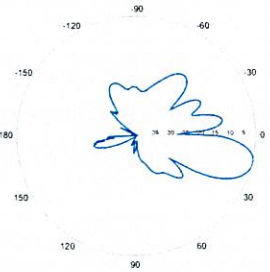
10° | Vertical

LPA-80063-4CF-EDIN-12



12° | Vertical

LPA-80063-4CF-EDIN-14



14° | Vertical

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.

Amphenol ANTENNA SOLUTIONS

BXA-171063-8BF-EDIN-X

Replace "X" with desired electrical downtilt.

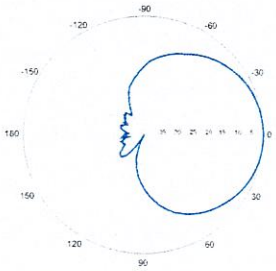
X-Pol | FET Panel | 63° | 17.4 dBi

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	7°	7°	7°
Gain	14.5 dBd / 16.6 dBi	14.9 dBd / 17.0 dBi	15.3 dBd / 17.4 dBi
Electrical downtilt (X)	0, 2, 4, 8		
Impedance	50Ω		
VSWR	≤1.5:1		
First upper sidelobe	< -17 dB		
Front-to-back isolation	> 30 dB		
In-band isolation	> 28 dB		
IM3 (20W carrier)	< -150 dBc		
Input power	300 W		
Lightning protection	Direct Ground		
Connector(s)	2 Ports / EDIN / Female / Bottom		
Operating temperature	-40° to +60° C / -40° to +140° F		

Mechanical Characteristics				
Dimensions Length x Width x Depth	1232 x 154 x 105 mm		48.5 x 6.1 x 4.1 in	
Depth with t-brackets	133 mm		5.2 in	
Weight without mounting brackets	4.8 kg		10.5 lbs	
Survival wind speed	296 km/hr		184 mph	
Wind area	Front: 0.19 m^2 Side: 0.14 m^2		Front: 2.0 ft^2 Side: 1.5 ft^2	
Wind load @ 161 km/hr (100 mph)	Front: 281 N Side: 223 N		Front: 63 lbf Side: 50 lbf	

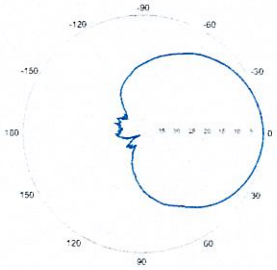
Mounting Options	Part Number	Fits Pipe Diameter		Weight	
2-Point Mounting Bracket Kit	26799997	50-102 mm	2.0-4.0 in	2.3 kg	5 lbs
2-Point Mounting & Downtilt Bracket Kit	26799999	50-102 mm	2.0-4.0 in	3.6 kg	8 lbs
Concealment Configurations	For concealment configurations, order BXA-171063-8BF-EDIN-X-FP				

BXA-171063-8BF-EDIN-X



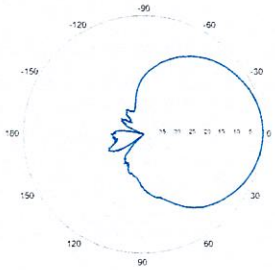
Horizontal | 1710-1880 MHz

BXA-171063-8BF-EDIN-X



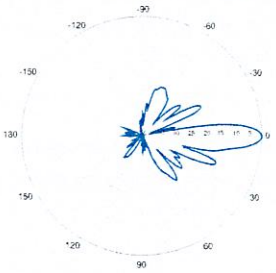
Horizontal | 1850-1990 MHz

BXA-171063-8BF-EDIN-X



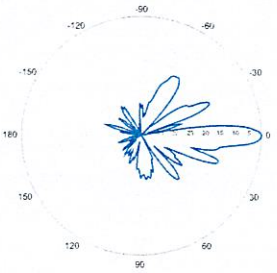
Horizontal | 1920-2170 MHz

BXA-171063-8BF-EDIN-0



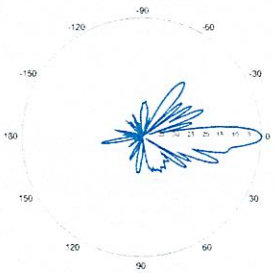
0° | Vertical | 1710-1880 MHz

BXA-171063-8BF-EDIN-0



0° | Vertical | 1850-1990 MHz

BXA-171063-8BF-EDIN-0

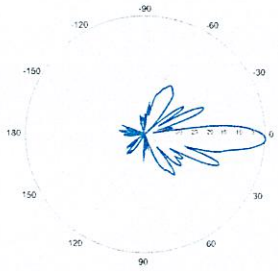


0° | Vertical | 1920-2170 MHz

BXA-171063-8BF-EDIN-X

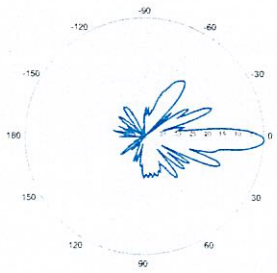
X-Pol | FET Panel | 63° | 17.4 dBi

BXA-171063-8BF-EDIN-2



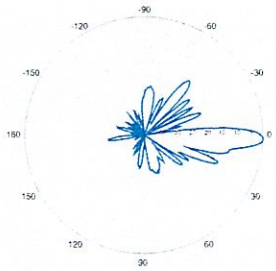
2° | Vertical | 1710-1880 MHz

BXA-171063-8BF-EDIN-2



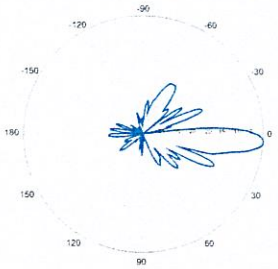
2° | Vertical | 1850-1990 MHz

BXA-171063-8BF-EDIN-2



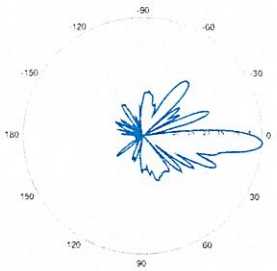
2° | Vertical | 1920-2170 MHz

BXA-171063-8BF-EDIN-4



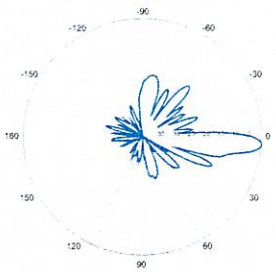
4° | Vertical | 1710-1880 MHz

BXA-171063-8BF-EDIN-4



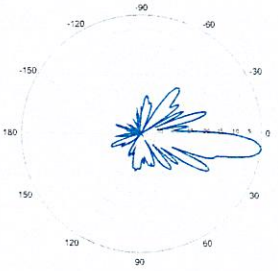
4° | Vertical | 1850-1990 MHz

BXA-171063-8BF-EDIN-4



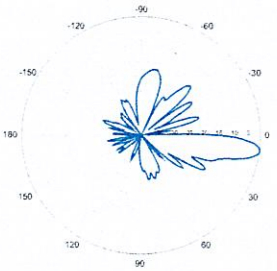
4° | Vertical | 1920-2170 MHz

BXA-171063-8BF-EDIN-8



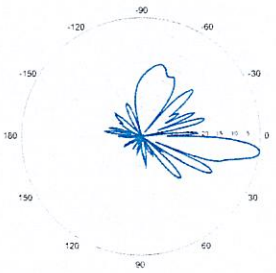
8° | Vertical | 1710-1880 MHz

BXA-171063-8BF-EDIN-8



8° | Vertical | 1850-1990 MHz

BXA-171063-8BF-EDIN-8



8° | Vertical | 1920-2170 MHz

Amphenol ANTENNA SOLUTIONS

BXA-70063-4CF-EDIN-X

X-Pol | FET Panel | 63° | 13.0 dBd

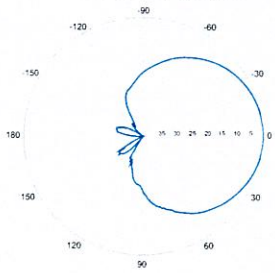
Replace "X" with desired electrical downtilt.

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

Electrical Characteristics	696-900 MHz	
Frequency bands	696-806 MHz	806-900 MHz
Polarization	±45°	
Horizontal beamwidth	65°	63°
Vertical beamwidth	17°	15°
Gain	12.5 dBd (14.6 dBi)	13.0 dBd (15.1 dBi)
Electrical downtilt (X)	0, 2, 3, 4, 5, 6, 8, 9, 10, 12, 14	
Impedance	50Ω	
VSWR	≤1.35:1	
Upper sidelobe suppression (0°)	-16.3 dB	-22.1 dB
Front-to-back ratio (+/-30°)	-36.1 dB	-34.9 dB
Null fill	5% (-26.02 dB)	
Isolation between ports	< -30 dB	
Input power with EDIN connectors	500 W	
Input power with NE connectors	300 W	
Lightning protection	Direct Ground	
Connector(s)	2 Ports / EDIN or NE / Female / Center (Back)	
Mechanical Characteristics		
Dimensions Length x Width x Depth	1205 x 285 x 133 mm	47.4 x 11.2 x 5.2 in
Depth with z-brackets	173 mm	6.8 in
Weight without mounting brackets	4.5 kg	9.9 lbs
Survival wind speed	> 201 km/hr	> 125 mph
Wind area	Front: 0.34 m^2 Side: 0.16 m^2	Front: 3.7 ft^2 Side: 1.7 ft^2
Wind load @ 161 km/hr (100 mph)	Front: 498 N Side: 260 N	Front: 111 lbf Side: 55 lbf

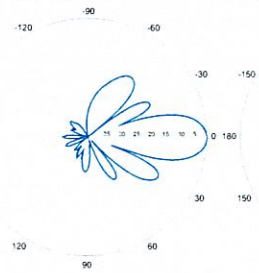
Mounting Options	Part Number	Fits Pipe Diameter	Weight
2-Point Mounting & Downtilt Bracket Kit	36210006	40-115 mm 1.57-4.5 in	4.1 kg 9 lbs
Concealment Configurations	For concealment configurations, order BXA-70063-4CF-EDIN-X-FP		

BXA-70063-4CF-EDIN-X



Horizontal | 750 MHz

BXA-70063-4CF-EDIN-0



0° | Vertical | 750 MHz

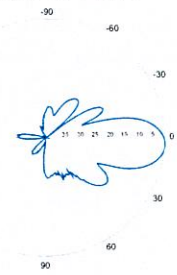
BXA-70063-4CF-EDIN-2

2° | Vertical | 750 MHz

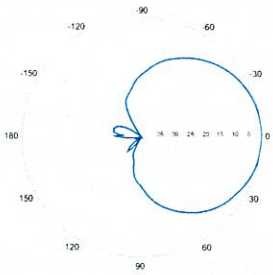
BXA-70063-4CF-EDIN-3

3° | Vertical | 750 MHz

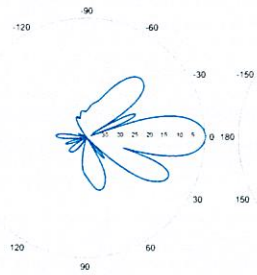
BXA-70063-4CF-EDIN-4



4° | Vertical | 750 MHz



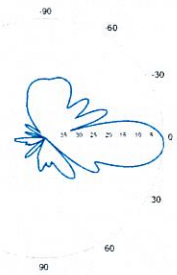
Horizontal | 850 MHz



0° | Vertical | 850 MHz

2° | Vertical | 850 MHz

3° | Vertical | 850 MHz



4° | Vertical | 850 MHz

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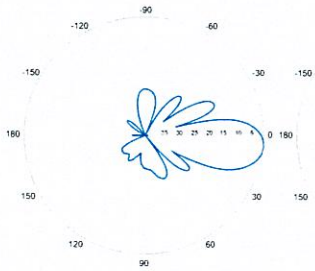
BXA-70063-4CF-EDIN-X

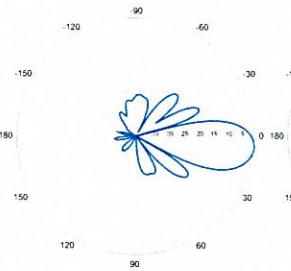
X-Pol | FET Panel | 63° | 13.0 dBd

BXA-70063-4CF-EDIN-5



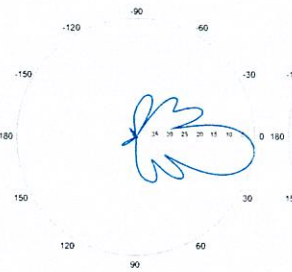
5° | Vertical | 750 MHz

BXA-70063-4CF-EDIN-6



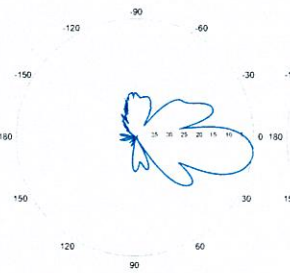
6° | Vertical | 750 MHz

BXA-70063-4CF-EDIN-8



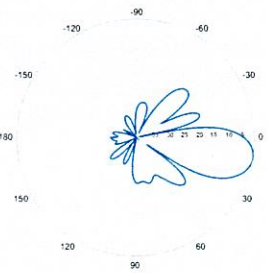
8° | Vertical | 750 MHz

BXA-70063-4CF-EDIN-9

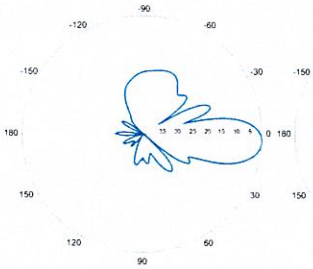


9° | Vertical | 750 MHz

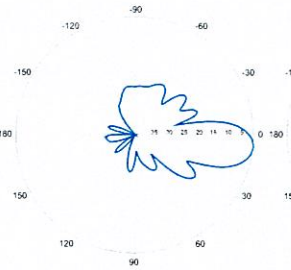
BXA-70063-4CF-EDIN-10



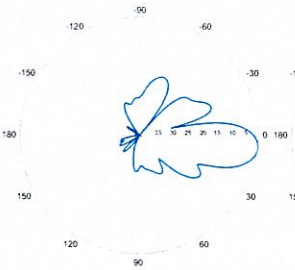
10° | Vertical | 750 MHz



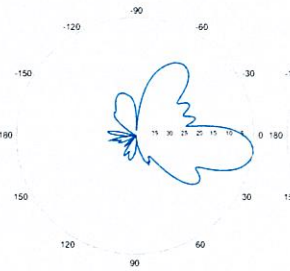
5° | Vertical | 850 MHz



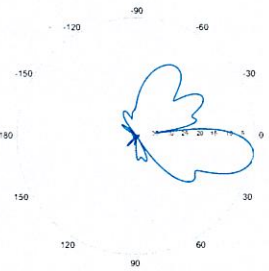
6° | Vertical | 850 MHz



8° | Vertical | 850 MHz

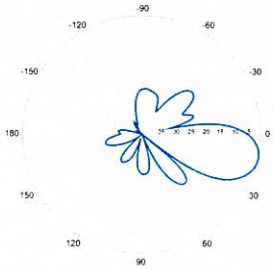


9° | Vertical | 850 MHz



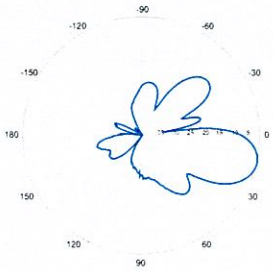
10° | Vertical | 850 MHz

BXA-70063-4CF-EDIN-12

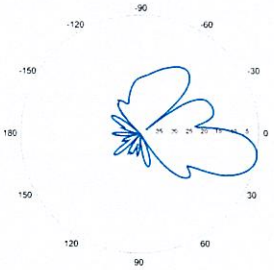


12° | Vertical | 750 MHz

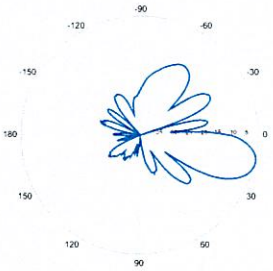
BXA-70063-4CF-EDIN-14



14° | Vertical | 750 MHz



12° | Vertical | 850 MHz



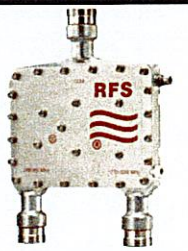
14° | Vertical | 850 MHz

Product Data Sheet | **FD9R6004/2C-3L**

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

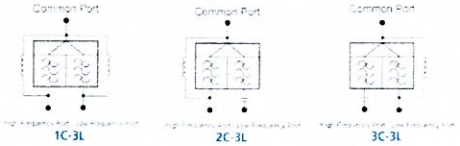
Notes

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 o40-110mm (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)	

	General	Power	Density					
Site Name: Hamden								
Tower Height: Verizon @ 170Ft.								
CARRIER	**# OF CHAN.**	**WATTS ERP**	**HEIGHT**	**CALC. POWER DENS**	**FREQ.**	**MAX. PERMISS. EXP.**	**FRACTION MPE**	**Total**
*Mobile Comm	1	250	246	0.0015	931	0.6207	0.24%	
*Page America	1	150	242	0.0009	931	0.6207	0.15%	
*Tri State Radio	1	300	145	0.0051	929	0.6193	0.83%	
*Skytel	1	250	128	0.0055	930	0.6200	0.88%	
*Utility Comm	1	200	69	0.0151	461	0.3073	4.91%	
*Marcus/VoiceLink	1	100	250	0.0006	5.8 GHz	1.0000	0.06%	
*Marcus/VoiceLink	1	100	180	0.0011	5.8 GHz	1.0000	0.11%	
*Destineer			225	0.0071	940	0.6267	1.13%	
*Pronet			205	0.0008	454	0.3027	0.26%	
*Airtouch			203	0.0262	158	0.2000	13.10%	
*Metrocall			203	0.0078	930	0.6200	1.26%	
*United Illum.			152	0.0078	49	0.2000	3.90%	
*PageNet			148	0.0148	940	0.6267	2.36%	
*Tri State Radio			140	0.0110	931	0.6207	1.77%	
*United Illum.			138	0.0094	451	0.3007	3.13%	
*ProNET			126	0.0020	454	0.3027	0.66%	
*Emergency Medical			116	0.0040	463	0.3087	1.30%	
*Arch CT paging			115	0.0408	929	0.6193	6.59%	
*Airtouch			88	0.0232	152	0.2000	11.60%	
*Teligent			61	0.0001	25000	1.0000	0.01%	
Verizon PCS	**7**	**227**	**170**	**0.0198**	**1970**	**1.0000**	**1.98%**	
Verizon Cellular	**9**	**242**	**170**	**0.0271**	**869**	**0.5793**	**4.68%**	
Verizon AWS	**1**	**1750**	**170**	**0.0218**	**2145**	**1.0000**	**2.18%**	
Verizon 700	**1**	**799**	**170**	**0.0099**	**698**	**0.4653**	**2.14%**	
								65.22%
* Source: Siting Council								

CENTEK engineering

Centered on Solutions™

Structural Analysis Report and Reinforcement Design

250-ft Existing Lattice Tower

Proposed Verizon Wireless
Antenna Upgrade

Verizon Site Ref: Hamden (West Rock)

Baldwin Drive
Hamden, CT

Centek Project No. 12001.CO80

Date: November 05, 2012

Prepared for:

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

63-2 North Branford Road, Branford, CT 06405 203.488.0580 Fax 203.488.8587 www.CentekEng.com

Table of Contents

SECTION 4 – DRAWINGS

SECTION 5 – REFERENCE MATERIAL

Introduction

The purpose of this report is to summarize the results of the non-linear, P-Δ structural analysis of the antenna upgrade proposed by Verizon Wireless on the existing lattice (tower) located in Hamden, CT.

The host tower is a 250-ft, three legged, tapered steel self-support lattice tower manufactured by Advanced Industries circa 1980. The tower geometry and structure member sizes were obtained a previous structural report prepared by H.E. Bergeron Engineers; project no. 2000-021 dated February 17, 2000. The existing tower foundation information was obtained from a sub-surface foundation investigation conducted by Centek Engineering, Inc. on October 11, 2012.

Antenna and appurtenance information were obtained from a tower inventory list provided by Message Center Management (MCM), visual verification conducted from grade by Centek personnel on September 5, 2012 and a Verizon RF data sheet.

The tower consists of ten (10) tapered vertical steel sections consisting of pipe legs conforming to A572-50 (50ksi). Diagonal lateral support bracing consists of steel pipe and angle construction conforming to ASTM A53 Gr B (35ksi) and ASTM A36 (36ksi). The vertical tower sections are connected by bolted flange plates while the pipe legs and lateral bracing are connected by bolted and welded gusset connections. The tower face width is 5.00-ft at the top and 25.90-ft at the bottom.

Verizon proposes the removal of twelve (12) panel antennas and the installation of twelve (12) panel antennas and six (6) diplexers mounted on three (3) 12-ft boom gates. Refer to the Antenna and Appurtenance Summary below for a detailed description of the proposed antenna and appurtenance configuration.

Antenna and Appurtenance Summary

The existing, proposed and future loads considered in this analysis consist of the following:

- WYBC (Existing):
  Antennas: One (1) Jampro JMPC-1R 1-Bay FM antenna pipe mounted to the top of the tower.
  Coax Cables: One (1) 1-5/8" ∅ coax cable running on a leg/face of the existing tower as specified in Section 3 of this report.
- MARCUS (Existing):
  Antennas: One (1) 4-ft ∅ dish pipe mounted with a RAD center elevation of ±248-ft above tower base.
  Coax Cables: One (1) 1/2" ∅ coax cable running on a leg/face of the existing tower as specified in Section 3 of this report.
- VELOCITA (Existing):
  Antennas: One (1) Antel BCD-87010N Omni-directional whip antenna mounted on a 3-ft sidearm with an elevation of ±242-ft above tower base.
  Coax Cables: One (1) 1-1/4" ∅ coax cable running on a leg/face of the existing tower as specified in Section 3 of this report.

- MARCUS (Existing):
  Antennas: One (1) Celwave PD-458 Omni-directional whip antenna mounted on a 6-ft sidearm with an elevation of ±236-ft above tower base.
  Coax Cables: One (1) 1-5/8" ∅ coax cable running on a leg/face of the existing tower as specified in Section 3 of this report.
- MARCUS (Existing):
  Antennas: One (1) 4-ft ∅ grid dish leg mounted with a RAD center elevation of ±235-ft above tower base.
  Coax Cables: One (1) 1/2" ∅ coax cable running on a leg/face of the existing tower as specified in Section 3 of this report.
- UNKNOWN (Existing):
  Antennas: One (1) Celwave PD-220 Omni-directional whip antenna and one (1) Celwave PD-1158S yagi antenna mounted on a 3-ft sidearm with an elevation of ±230-ft above tower base.
  Coax Cables: Two (2) 7/8" ∅ coax cable running on a leg/face of the existing tower as specified in Section 3 of this report.
- UNKNOWN (Existing):
  Antennas: One (1) Celwave PD-220 Omni-directional whip antenna mounted on a 3-ft sidearm with an elevation of ±205-ft above tower base.
  Coax Cables: One (1) 7/8" ∅ coax cable running on a leg/face of the existing tower as specified in Section 3 of this report.
- MARCUS (Existing):
  Antennas: One (1) 2-ft ∅ dish leg mounted with a RAD center elevation of ±197-ft above tower base.
  Coax Cables: One (1) 1/2" ∅ coax cable running on a leg/face of the existing tower as specified in Section 3 of this report.
- MARCUS (Existing):
  Antennas: One (1) Celwave PD-458 Omni-directional whip antenna mounted on a 3-ft sidearm with an elevation of ±178-ft above tower base.
  Coax Cables: One (1) 1-1/4" ∅ coax cable running on a leg/face of the existing tower as specified in Section 3 of this report.
- MCM (Existing):
  Antennas: Two (2) Celwave PD-458 Omni-directional whip antennas mounted on two (2) 6-ft sidearms with an elevation of ±178-ft above tower base.
  Coax Cables: Two (2) 7/8" ∅ coax cable running on a leg/face of the existing tower as specified in Section 3 of this report.
- UNKNOWN (Existing):
  Antennas: One (1) Empty pipe mount with an elevation of ±143-ft above tower base.

- METROCALL (Existing):
  Antennas: Two (2) Decibel DB806 Omni-directional whip antennas (one upright and one inverted) mounted on a 6-ft sidearm with an elevation of ±138-ft above tower base.
  Coax Cables: Two (2) 7/8" ∅ coax cables running on a leg/face of the existing tower as specified in Section 3 of this report.
- UNITED ILLUMINATING (Existing):
  Antennas: One (1) Celwave PD220 Omni-directional whip antenna mounted on a 1-ft sidearm with an elevation of ±126-ft above tower base.
  Coax Cables: One (1) 7/8" ∅ coax cables running on a leg/face of the existing tower as specified in Section 3 of this report.
- UNKNOWN (Existing):
  Antennas: One (1) Empty 6-ft sidearm with an elevation of ±114-ft above tower base.
- MCM (Existing):
  Antennas: One (1) Celwave PD1151 Omni-directional whip antenna mounted on a 1-ft sidearm with an elevation of ±114-ft above tower base.
  Coax Cables: One (1) 7/8" ∅ coax cables running on a leg/face of the existing tower as specified in Section 3 of this report.
- UNKNOWN (Existing):
  Antennas: One (1) 2-ft ∅ dish pipe mounted with a RAD center elevation of ±104-ft above tower base.
  Coax Cables: One (1) 1/2" ∅ coax cable running on a leg/face of the existing tower as specified in Section 3 of this report.
- AAA CT MOTOR CLUB (Existing):
  Antennas: One (1) Decibel DB224 dipole antenna mounted on a 1-ft sidearm with an elevation of ±76-ft above tower base.
  Coax Cables: One (1) 7/8" ∅ coax cables running on a leg/face of the existing tower as specified in Section 3 of this report.
- UNKNOWN (Existing):
  Antennas: One (1) Celwave PD-320 antenna leg mounted with an elevation of ±69-ft above tower base.
  Coax Cables: One (1) 7/8" ∅ coax cable running on a leg/face of the existing tower as specified in Section 3 of this report.
- ARCH (Existing):
  Antennas: One (1) GPS antenna mounted on a 3-ft sidearm with an elevation of ±62-ft above tower base.
  Coax Cables: One (1) 1/2" ∅ coax cables running on a leg/face of the existing tower as specified in Section 3 of this report.

- VERIZON (Existing to Remain):
  Coax Cables: Twelve (12) 1-5/8" ∅ coax cables running on a leg/face of the existing tower as specified in Section 3 of this report.
- **VERIZON (Existing to Remove):**
  Antennas: Six (6) Decibel DB844H80-XY and six (6) Decibel 948F85T4E-M panel antennas mounted on three (3) 12-ft boom gates with a RAD center elevation of 170-ft above grade level.
- **VERIZON (Proposed):**
  Antennas: Three (3) Antel BXA-70063-4CF panel antennas, six (6) Antel LPA-80063-4CF panel antennas, three (3) Antel BXA-171063-8BF panel antennas and six (6) RFS FD9R6004/2C-3L diplexers mounted on three (3) 12-ft boom gates with a RAD center elevation of 170-ft above grade level.

Primary Assumptions Used in the Analysis

- The tower structure's theoretical capacity not including any assessment of the condition of the tower.
- The tower carries the horizontal and vertical loads due to the weight of antennas, ice load and wind.
- Tower is properly installed and maintained.
- Tower is in plumb condition.
- Tower loading for antennas and mounts as listed in this report.
- All bolts are appropriately tightened providing the necessary connection continuity.
- All welds are fabricated with ER-70S-6 electrodes.
- All members are assumed to be as specified in the original tower design documents or reinforcement drawings.
- All members are "hot dipped" galvanized in accordance with ASTM A123 and ASTM A153 Standards.
- All member protective coatings are in good condition.
- All tower members were properly designed, detailed, fabricated, installed and have been properly maintained since erection.
- Any deviation from the analyzed antenna loading will require a new analysis for verification of structural adequacy.
- **All coax cables routed as specified within Section 4 of this report.**

Analysis

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

The existing tower was analyzed for the controlling basic wind speed (fastest mile) with no ice and a 75% reduction of wind force with ½ inch accumulative ice to determine stresses in members as per guidelines of TIA/EIA-222-F-96 entitled "Structural Standards for Steel Antenna Towers and Antenna Supporting Structures", the American Institute of Steel Construction (AISC) and the Manual of Steel Construction; Allowable Stress Design (ASD).

The controlling wind speed is determined by evaluating the local available wind speed data as provided in Appendix K of the CSBC[1] and the wind speed data available in the TIA/EIA-222-F-96 Standard. The higher of the two wind speeds is utilized in preparation on the tower analysis.

Tower Loading

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

Basic Wind Speed:	New Haven; v = 85 mph (fastest mile)	*[Section 16 of TIA/EIA-222-F-96]*
	Hamden; v = 105 mph (3 second gust) equivalent to v = 85 mph (fastest mile)	*[Appendix K of the 2005 CT Building Code Supplement]*
	TIA-EIA and Appendix-K wind speeds are equal.	
Load Cases:	Load Case 1; 85 mph wind speed w/ no ice plus gravity load – used in calculation of tower stresses and rotation.	*[Section 2.3.16 of TIA/EIA-222-F-96]*
	Load Case 2; 74 mph wind speed w/ ½" radial ice plus gravity load – used in calculation of tower stresses. The 74 mph wind speed velocity represents 75% of the wind pressure generated by the 85 mph wind speed.	*[Section 2.3.16 of TIA/EIA-222-F-96]*
	Load Case 3; Seismic – not checked	*[Section 1614.5 of State Bldg. Code 2005] does not control in the design of this structure type*

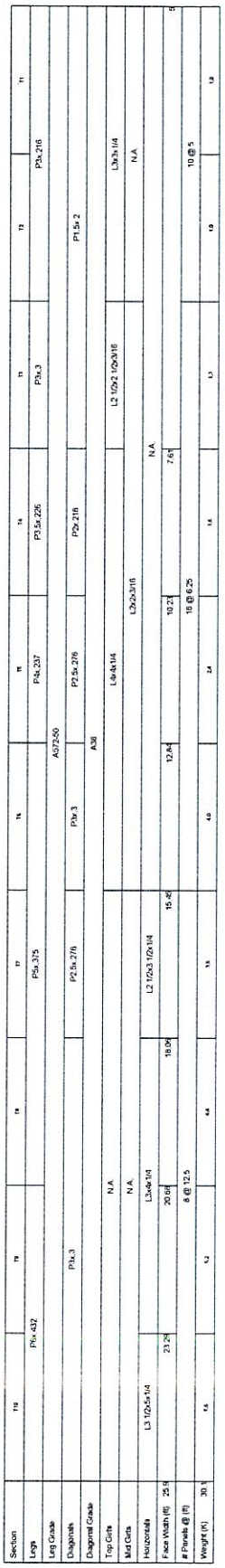
[1] The 2005 Connecticut State Building Code as amended by the 2009 CT State Supplement. (CSBC)

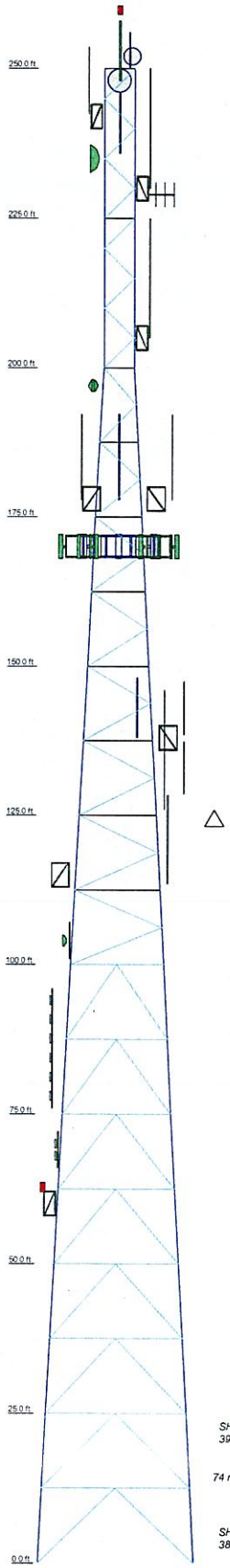
GENERAL DESCRIPTION OF STRUCTURAL ANALYSIS PROGRAM

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

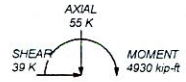
tnxTower Features:

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

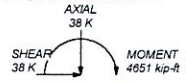




MAX. CORNER REACTIONS AT BASE:
DOWN: 238 K
UPLIFT: -195 K
SHEAR: 24 K



TORQUE 37 kip-ft
74 mph WIND - 0.5000 in ICE



TORQUE 44 kip-ft
REACTIONS - 85 mph WIND

DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
Flash Beacon Lighting (MCM - Existing)	259	BXA-70063/4CF (Verizon - Proposed)	170
10'0"x4" Pipe Mount (MCM - Existing)	253	BXA-171063/8BF (Verizon - Proposed)	170
6'x4" Pipe Mount (WYBC - Existing)	253	BXA-70063/4CF (Verizon - Proposed)	170
JMPC-1R (WYBC - Existing)	250	LPA-80063-4CF (Verizon - Proposed)	170
4'x4" Pipe Mount (Marcus - Existing)	248	BXA-70063/4CF (Verizon - Proposed)	170
Andrew 4' w/Radome (Marcus - Existing)	248	BXA-171063/8BF (Verizon - Proposed)	170
BCD-87010N (Velocita - Existing)	242	LPA-80063-4CF (Verizon - Proposed)	170
3' Side Mount Standoff (Velocita - Existing)	242	LPA-80063-4CF (Verizon - Proposed)	170
PD458-1 (Marcus - Existing)	236	Rohn 6' x 12' Boom Gate (1) (Verizon - Existing)	170
ROHN 6-ft Side Arm (Marcus - Existing)	236		
SRL-460 (Marcus - Existing)	235	(2) FD9R6004/2C-3L Diplexer (Verizon - Proposed)	170
PD220 (Unknown - Existing)	230		
3' Side Mount Standoff (Unknown - Existing)	230	BXA-171063/8BF (Verizon - Proposed)	170
PD1158S (Unknown - Existing)	229	LPA-80063-4CF (Verizon - Proposed)	170
PD220 (Unknown - Existing)	205	LPA-80063-4CF (Verizon - Proposed)	170
3' Side Mount Standoff (Unknown - Existing)	205	10'x2.5" Pipe Mount (Empty)	143
Andrew 2' w/Radome (Marcus - Existing)	197	DB806D-Y (Metrocall - Existing)	138
PD458-1 (MCM - Existing)	178	DB806D-Y (Metrocall - Existing)	138
ROHN 6-ft Side Arm (MCM - Existing)	178	ROHN 6-ft Side Arm (Metrocall - Existing)	138
PD458-1 (MCM - Existing)	178	1-ft Stand Off (UI - Existing)	126
ROHN 6-ft Side Arm (MCM - Existing)	178	PD220 (UI - Existing)	126
PD458-1 (Marcus - Existing)	178	ROHN 6-ft Side Arm (Empty)	115
3' Side Mount Standoff (Marcus - Existing)	178	1151-4 (MCM - Existing)	114
(2) FD9R6004/2C-3L Diplexer (Verizon - Proposed)	170	1-ft Stand Off (MCM - Existing)	114
		2-ft dish (Unknown - Existing)	104
Rohn 6' x 12' Boom Gate (1) (Verizon - Existing)	170	6'x4" Pipe Mount (Unknown - Existing)	104
		DB224 (AAA - Existing)	76
Rohn 6' x 12' Boom Gate (1) (Verizon - Existing)	170	1-ft Stand Off (AAA - Existing)	76
		PD320 (Unknown - Existing)	69
LPA-80063-4CF (Verizon - Proposed)	170	GPS (ARCH - Existing)	62
(2) FD9R6004/2C-3L Diplexer (Verizon - Proposed)	170	3' Side Mount Standoff (ARCH - Existing)	60

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. TOWER RATING: 109.2%

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

Job: *12001.CO80 - Hamden (West Rock) - Un-reinforced*			
Project: *250' Lattice Tower - Baldwin Dr., Hamden, CT*			
Client: Verizon Wireless	Drawn by: jrm	App'd:	
Code: TIA/EIA-222-F	Date: 10/31/12	Scale: NTS	
Path: [illegible]		Dwg No. E-1	

Tower Capacity

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

Unrelated to the proposed Verizon upgrades, calculated leg stresses from 200' – 225' were determined to be at 109.2% of total capacity under tnxTower Load Case 2. With the tower reinforcements outlined in Section 4.0 of this report, leg stresses will be reduced to within allowable limits at 98.5% of total capacity.

A summary of tower member percentage of capacity values is provided below for the unreinforced and reinforced scenarios:

Proposed Loading - Without Reinforcements						
Elevation	Percentage of Capacity					
	Leg	Diagonal	Horizontal	Top Girt	Mid Girt	Bolts
225' – 250'	34.4	36.9	-	1.9	-	12.5
200' – 225'	**109.2**	**48.0**	**-**	**11.1**	**-**	**40.6**
175' – 200'	60.9	47.0	-	11.9	4.9	53.9
150' – 175'	92.0	74.0	-	3.2	22.5	73.1
125' – 150'	98.5	55.7	-	2.6	45.7	68.9
100'– 125'	61.2	42.0	-	4.8	54.8	41.0
75'– 100'	73.1	72.4	82.7	-	-	45.2
50'– 75'	84.7	41.7	52.4	-	-	36.0
25'– 50'	67.8	48.3	74.6	-	-	40.5
0'– 25'	76.1	55.9	58.0	-	-	75.8

Proposed Loading - With Reinforcements						
Elevation	Percentage of Capacity					
	Leg	Diagonal	Horizontal	Top Girt	Mid Girt	Bolts
225' – 250'	34.4	36.9	-	1.9	-	12.5
200' – 225'	**63.3**	**48.0**	**-**	**11.1**	**-**	**40.6**
175' – 200'	60.9	47.0	-	11.9	4.9	53.9
150' – 175'	92.0	74.0	-	3.2	22.5	73.1
125' – 150'	98.5	55.7	-	2.6	45.7	68.9
100'– 125'	61.2	42.0	-	4.8	54.8	41.0
75'– 100'	73.1	72.4	82.7	-	-	45.2
50'– 75'	84.7	41.7	52.4	-	-	36.0
25'– 50'	67.8	48.3	74.6	-	-	40.5
0'– 25'	76.1	55.9	58.0	-	-	75.8

Foundation and Anchors

A limited sub-surface investigation of the existing foundation was conducted by Centek personnel. A portion of the existing foundation located immediately below the northwesterly tower leg was exposed. Based on observations made and obtained field measurements, the existing foundation at the location investigated was determined to consist of a 3.0-ft square x 2.5-ft long reinforced concrete pier with an ±8.0-ft square x 2.0-ft thick reinforced concrete pad bearing directly on rock. In analyzing the existing tower foundation it was assumed that all three tower legs are supported by footings of the same configuration and size. The rock design parameters utilized in the analysis of the existing foundation system were based on design values established from information available at an existing tower structure in proximity to the site.

Based on the tower base reactions obtained from our analysis, it is be reasonable to assume that the existing tower foundation system is anchored to the underlying bedrock. However, as the design and extent of the existing anchorage system could not be verified, any additional resistance provided by the presence of anchors was not taken into account.

The tower legs are connected to the foundation with (4) 1-3/4"∅ anchor bolts per leg as verified in the field by Centek personnel during October 2012, with an assumed min steel yield conforming to ASTM A-36 (Fy = 36ksi).

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

- The tower reactions developed from the governing Load Case 2 were used in the verification of the existing foundation system:

Load Effect	Proposed Tower Reactions
Leg Shear	24 kips
Leg Compression	238 kips
Leg Uplift	195 kips
Base Moment	4930 ft-kips
Base Shear	39 kips

- The anchor bolts were found to be within allowable limits:

Tower Section	Component	Stress Ratio (% capacity)	Result
Anchor Bolts	Tension	75.9%	**PASS**

- The foundation **was NOT found** to be within allowable limits. Reinforcement of the existing foundation is required. Refer to the structural modification drawings in Section 4.0 of this report for specific requirements.

Foundation Type	Design Limit	Allowable Limit/FS	Proposed Loading	Result
Existing Foundation				
Independent Pad & Pier	Bearing Pressure	50.0 ksf (4)	3.0 ksf	PASS
	Uplift	2.0 (2)	<1.0 (3)	FAIL
Foundation with Reinforcement				
Independent Pad & Piers w/ Rock Anchors	Bearing Pressure	50.0 ksf (4)	6.2 ksf	PASS
	Uplift (4)	2.0 (2)	2.4	PASS

Note 2: Minimum required Factor of Safety (FS) of 2.0 required per IBC 2003/2005 CSBC Section 3108.4.2.
Note 3: Does not include any additional resistance provided by unconfirmed existence of grouted rock anchors.
Note 4: Allowable soil bearing pressure obtained from original design values for an existing within proximity to the site.

Conclusion

This analysis shows that the subject tower **is adequate** to support the proposed antenna modification **with the implementation of the proposed structural modifications in Section 4.0 of this report.**

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

Please feel free to call with any questions or comments.

Respectfully Submitted by:

Carlo F. Centore, PE
Principal ~ Structural Engineer

Prepared by:

Timothy J. Lynn, EIT
Structural Engineer

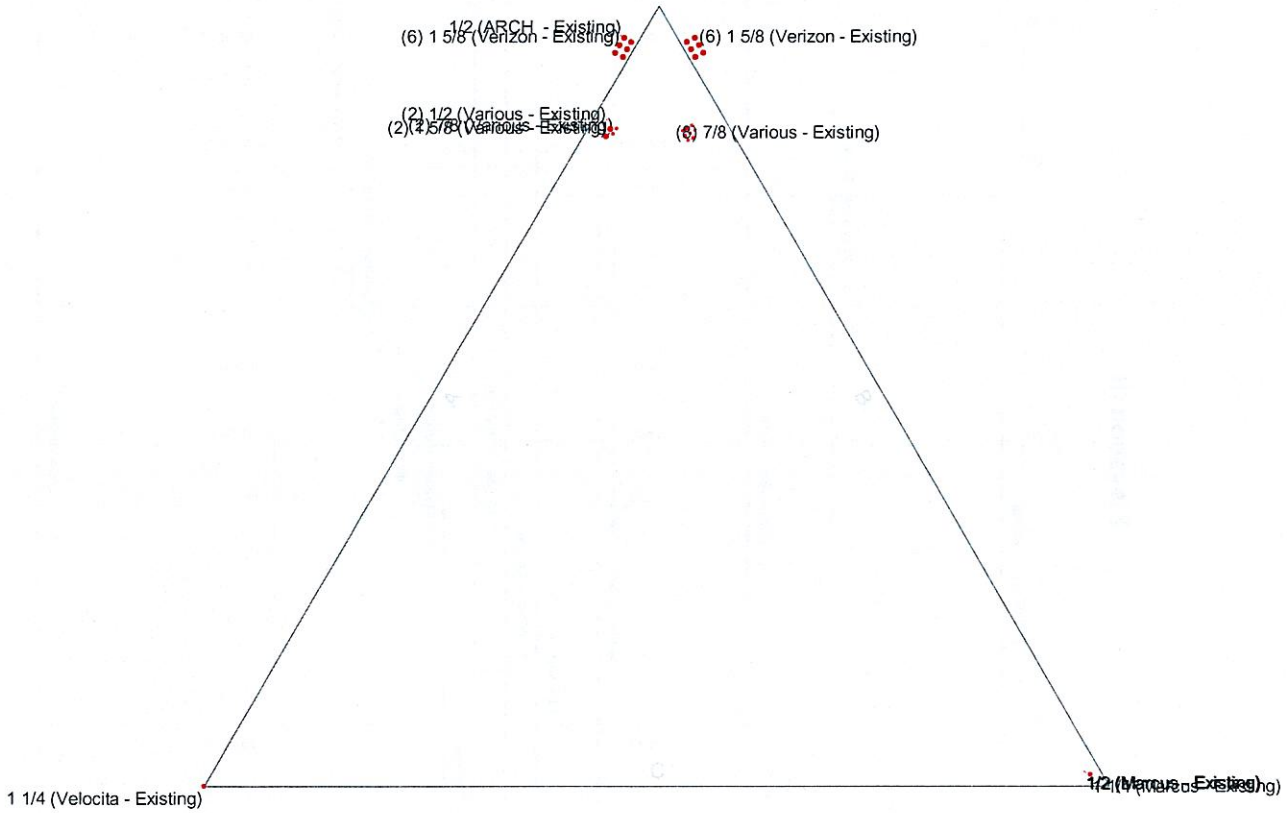
Standard Conditions for Furnishing of Professional Engineering Services on Existing Structures

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

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

Feedline Plan

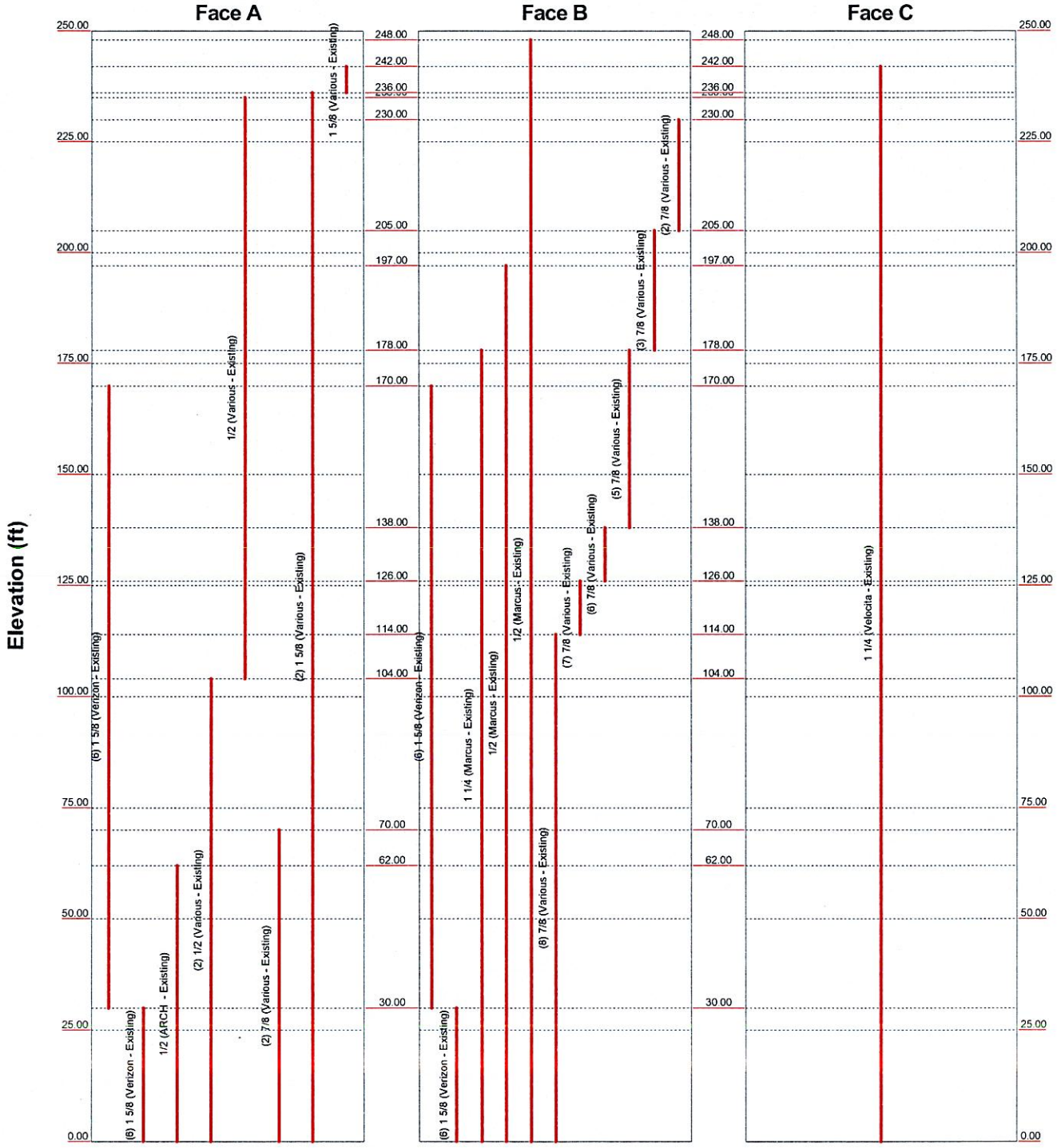
Round Flat App In Face App Out Face



Centek Engineering Inc 63-2 N. Branford Rd., Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job: ***12001.CO80 - Hamden (West Rock) - Un-reinforced***		
	Project: ***250' Lattice Tower - Baldwin Dr., Hamden, CT***		
	Client: Verizon Wireless	Drawn by: jrm	App'd:
	Code: TIA/EIA-222-F	Date: 10/31/12	Scale: NTS
	Path: J:\Jobs\1200100 W\CO80- West Rock\Calcs\ERI Files\Un-reinforced\250-ft Lattice Tower.er		Dwg No. E-7

Feedline Distribution Chart
0' - 250'

Round | Flat | App In Face | App Out Face | Truss Leg



Centek Engineering Inc 63-2 N. Branford Rd., Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job: ***12001.CO80 - Hamden (West Rock) - Un-reinforced***		
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	Client: Verizon Wireless	Drawn by: jrm	App'd:
	Code: TIA/EIA-222-F	Date: 10/31/12	Scale: NTS
	Path: J:\Jobs\12001\00 W\CO80- West Rock\Calcs\ERI Files\Un-reinforced\250-ft Lattice Tower.er		Dwg No. E-7

Tower Input Data

The main tower is a 3x free standing tower with an overall height of 250.00 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 25.90 ft at the base.
This tower is designed using the TIA/EIA-222-F standard.
The following design criteria apply:

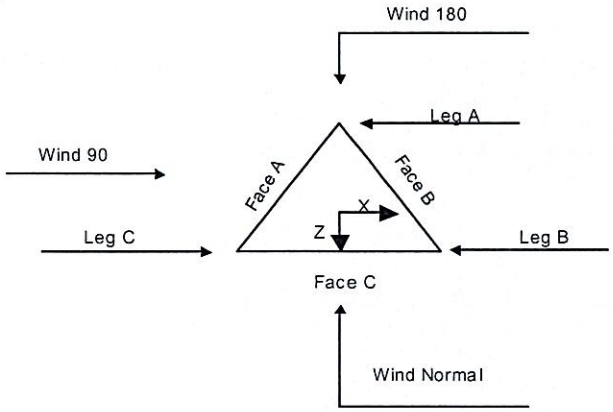
Basic wind speed of 85 mph.
Nominal ice thickness of 0.5000 in.
Ice density of 56 pcf.
A wind speed of 74 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 50 mph.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.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

Options

Consider Moments - Legs
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

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

Treat Feedline Bundles As Cylinder
Use ASCE 10 X-Brace Ly Rules
√ Calculate Redundant Bracing Forces
Ignore Redundant Members in FEA
SR Leg Bolts Resist Compression
√ All Leg Panels Have Same Allowable
Offset Girt At Foundation
√ Consider Feedline Torque
Include Angle Block Shear Check
Poles
Include Shear-Torsion Interaction
Always Use Sub-Critical Flow
Use Top Mounted Sockets



Triangular Tower

Tower Section Geometry

Tower Section	Tower Elevation ft	Assembly Database	Description	Section Width ft	Number of Sections	Section Length ft
T1	250.00-225.00			5.00	1	25.00
T2	225.00-200.00			5.00	1	25.00
T3	200.00-175.00			5.00	1	25.00
T4	175.00-150.00			7.61	1	25.00
T5	150.00-125.00			10.23	1	25.00
T6	125.00-100.00			12.84	1	25.00
T7	100.00-75.00			15.45	1	25.00
T8	75.00-50.00			18.06	1	25.00
T9	50.00-25.00			20.68	1	25.00
T10	25.00-0.00			23.29	1	25.00

Tower Section Geometry *(cont'd)*

Tower Section	Tower Elevation ft	Diagonal Spacing ft	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset in	Bottom Girt Offset in
T1	250.00-225.00	5.00	K Brace Left	No	Yes	0.0000	0.0000
T2	225.00-200.00	5.00	K Brace Left	No	Yes	0.0000	0.0000
T3	200.00-175.00	6.25	K Brace Left	No	Yes	0.0000	0.0000
T4	175.00-150.00	6.25	K Brace Left	No	Yes	0.0000	0.0000
T5	150.00-125.00	6.25	K Brace Left	No	Yes	0.0000	0.0000

Tower Section	Tower Elevation ft	Diagonal Spacing ft	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset in	Bottom Girt Offset in
T6	125.00-100.00	6.25	K Brace Left	No	Yes	0.0000	0.0000
T7	100.00-75.00	12.50	K Brace Down	No	Yes	0.0000	0.0000
T8	75.00-50.00	12.50	K Brace Down	No	Yes	0.0000	0.0000
T9	50.00-25.00	12.50	K Brace Down	No	Yes	0.0000	0.0000
T10	25.00-0.00	12.50	K Brace Down	No	Yes	0.0000	0.0000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T1 250.00-225.00	Pipe	P3x.216	A572-50 (50 ksi)	Pipe	P1.5x.2	A36 (36 ksi)
T2 225.00-200.00	Pipe	P3x.216	A572-50 (50 ksi)	Pipe	P1.5x.2	A36 (36 ksi)
T3 200.00-175.00	Pipe	P3x.3	A572-50 (50 ksi)	Pipe	P1.5x.2	A36 (36 ksi)
T4 175.00-150.00	Pipe	P3.5x.226	A572-50 (50 ksi)	Pipe	P2x.218	A36 (36 ksi)
T5 150.00-125.00	Pipe	P4x.237	A572-50 (50 ksi)	Pipe	P2.5x.276	A36 (36 ksi)
T6 125.00-100.00	Pipe	P5x.375	A572-50 (50 ksi)	Pipe	P3x.3	A36 (36 ksi)
T7 100.00-75.00	Pipe	P5x.375	A572-50 (50 ksi)	Pipe	P2.5x.276	A36 (36 ksi)
T8 75.00-50.00	Pipe	P5x.375	A572-50 (50 ksi)	Pipe	P3x.3	A36 (36 ksi)
T9 50.00-25.00	Pipe	P6x.432	A572-50 (50 ksi)	Pipe	P3x.3	A36 (36 ksi)
T10 25.00-0.00	Pipe	P6x.432	A572-50 (50 ksi)	Pipe	P3x.3	A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Top Girt Type	Top Girt Size	Top Girt Grade	Bottom Girt Type	Bottom Girt Size	Bottom Girt Grade
T1 250.00-225.00	Single Angle	L3x3x1/4	A36 (36 ksi)	Solid Round		A36 (36 ksi)
T2 225.00-200.00	Single Angle	L3x3x1/4	A36 (36 ksi)	Single Angle		A36 (36 ksi)
T3 200.00-175.00	Single Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)	Single Angle		A36 (36 ksi)
T4 175.00-150.00	Single Angle	L4x4x1/4	A36 (36 ksi)	Single Angle		A36 (36 ksi)
T5 150.00-125.00	Single Angle	L4x4x1/4	A36 (36 ksi)	Single Angle		A36 (36 ksi)
T6 125.00-100.00	Single Angle	L4x4x1/4	A36 (36 ksi)	Single Angle		A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	No. of Mid Girts	Mid Girt Type	Mid Girt Size	Mid Girt Grade	Horizontal Type	Horizontal Size	Horizontal Grade
T3 200.00-175.00	1	Single Angle	L2x2x3/16	A36 (36 ksi)	Single Angle		A36 (36 ksi)
T4 175.00-150.00	1	Single Angle	L2x2x3/16	A36 (36 ksi)	Single Angle		A36 (36 ksi)
T5 150.00-125.00	1	Single Angle	L2x2x3/16	A36 (36 ksi)	Single Angle		A36 (36 ksi)
T6 125.00-100.00	1	Single Angle	L2x2x3/16	A36 (36 ksi)	Single Angle		A36 (36 ksi)
T7 100.00-75.00	None	Single Angle		A36 (36 ksi)	Single Angle	L2 1/2x3 1/2x1/4	A36 (36 ksi)
T8 75.00-50.00	None	Single Angle		A36 (36 ksi)	Single Angle	L3x4x1/4	A36 (36 ksi)
T9 50.00-25.00	None	Single Angle		A36 (36 ksi)	Single Angle	L3x4x1/4	A36 (36 ksi)
T10 25.00-0.00	None	Single Angle		A36 (36 ksi)	Single Angle	L3 1/2x5x1/4	A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in
T1 250.00-225.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T2 225.00-200.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T3 200.00-175.00	0.00	0.0000	A36 (36 ksi)	1	1.05	1.05	36.0000	36.0000
T4 175.00-150.00	0.00	0.0000	A36 (36 ksi)	1	1.05	1.05	36.0000	36.0000
T5 150.00-125.00	0.00	0.0000	A36 (36 ksi)	1	1.05	1.05	36.0000	36.0000
T6 125.00-100.00	0.00	0.0000	A36 (36 ksi)	1	1.05	1.05	36.0000	36.0000
T7 100.00-75.00	0.00	0.0000	A36 (36 ksi)	1	1.05	1.05	36.0000	36.0000
T8 75.00-50.00	0.00	0.0000	A36 (36 ksi)	1	1.05	1.05	36.0000	36.0000
T9 50.00-25.00	0.00	0.0000	A36 (36 ksi)	1	1.05	1.05	36.0000	36.0000
T10 25.00-0.00	0.00	0.0000	A36 (36 ksi)	1	1.05	1.05	36.0000	36.0000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Calc K Single Angles	Calc K Solid Rounds	K Factors[1] Legs	X Brace Diags X Y	K Brace Diags X Y	Single Diags X Y	Girts X Y	Horiz. X Y	Sec. Horiz. X Y	Inner Brace X Y
T1	No	No	1	1	1	1	1	1	1	1
250.00-225.00				1	1	1	1	1	1	1
T2	No	No	1	1	1	1	1	1	1	1
225.00-200.00				1	1	1	1	1	1	1
T3	No	No	0.335	1	1	1	1	1	1	1
200.00-175.00				1	1	1	1	1	1	1
T4	No	No	0.335	1	1	1	1	1	1	1
175.00-150.00				1	1	1	1	1	1	1
T5	No	No	0.335	1	1	1	1	1	1	1
150.00-125.00				1	1	1	1	1	1	1
T6	No	No	0.335	1	1	1	1	1	1	1
125.00-100.00				1	1	1	1	1	1	1
T7	No	No	0.5	1	1	1	1	1	1	1
100.00-75.00				1	1	1	1	1	1	1
T8	No	No	0.5	1	1	1	1	1	1	1
75.00-50.00				1	1	1	1	1	1	1
T9	No	No	0.5	1	1	1	1	1	1	1
50.00-25.00				1	1	1	1	1	1	1
T10	No	No	0.5	1	1	1	1	1	1	1
25.00-0.00				1	1	1	1	1	1	1

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

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Net Width Deduct in	Leg U	Diagonal Net Width Deduct in	Diagonal U	Top Girt Net Width Deduct in	Top Girt U	Bottom Girt Net Width Deduct in	Bottom Girt U	Mid Girt Net Width Deduct in	Mid Girt U	Long Horizontal Net Width Deduct in	Long Horizontal U	Short Horizontal Net Width Deduct in	Short Horizontal U
T1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
250.00-225.00														
T2	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
225.00-200.00														
T3	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
200.00-175.00														
T4	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
175.00-150.00														
T5	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
150.00-125.00														
T6	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
125.00-100.00														
T7	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
100.00-75.00														
T8 75.00-50.00	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T9 50.00-25.00	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T10 25.00-0.00	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75

Tower Section Geometry *(cont'd)*

Tower Elevation	Connection Offsets							
	Diagonal				K-Bracing			
	Vert. Top	Horiz. Top	Vert. Bot.	Horiz. Bot.	Vert. Top	Horiz. Top	Vert.	Horiz. Bot.
ft	in	in	in	in	in	in	in	in
T1 250.00-225.00	0.0000	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000
T2 225.00-200.00	0.0000	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000
T3 200.00-175.00	0.0000	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000
T4 175.00-150.00	0.0000	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000
T5 150.00-125.00	0.0000	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000
T6 125.00-100.00	0.0000	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000
T7 100.00-75.00	0.0000	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000
T8 75.00-50.00	0.0000	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000
T9 50.00-25.00	0.0000	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000
T10 25.00-0.00	0.0000	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000

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 250.00-225.00	Flange	0.7500 A325N	4	0.5000 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.5000 A325N	0	0.6250 A325N	0
T2 225.00-200.00	Flange	0.7500 A325N	4	0.5000 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.5000 A325N	0	0.6250 A325N	0
T3 200.00-175.00	Flange	0.7500 A325N	4	0.7500 A325N	0	0.6250 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.7500 A325N	0	0.6250 A325N	0
T4 175.00-150.00	Flange	0.7500 A325N	4	0.7500 A325N	0	0.6250 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.5000 A325N	0	0.6250 A325N	0
T5 150.00-125.00	Flange	0.8750 A325N	4	0.7500 A325N	0	0.6250 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.5000 A325N	0	0.6250 A325N	0
T6 125.00-100.00	Flange	1.2500 A325N	4	0.7500 A325N	0	0.6250 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.5000 A325N	0	0.6250 A325N	0
T7 100.00-75.00	Flange	1.2500 A325N	4	0.7500 A325N	0	0.6250 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.5000 A325N	0	0.6250 A325N	0
T8 75.00-50.00	Flange	1.5000 A325N	4	0.7500 A325N	0	0.6250 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.5000 A325N	0	0.6250 A325N	0
T9 50.00-25.00	Flange	1.5000 A325N	4	0.7500 A325N	0	0.6250 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.5000 A325N	0	0.6250 A325N	0
T10 25.00-0.00	Flange	1.7500 A36	4	0.7500 A325N	0	0.6250 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.5000 A325N	0	0.6250 A325N	0

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
1 5/8 (Verizon - Existing)	A	Yes	Ar (CfAe)	170.00 - 30.00	1.0000	0.38	6	6	1.9800	1.9800		1.04
1 5/8 (Verizon - Existing)	B	Yes	Ar (CfAe)	170.00 - 30.00	1.0000	-0.38	6	6	1.9800	1.9800		1.04
1 5/8 (Verizon - Existing)	A	Yes	Ar (CfAe)	30.00 - 0.00	1.0000	0.44	6	3	1.0000	1.9800		1.04
1 5/8 (Verizon - Existing)	B	Yes	Ar (CfAe)	30.00 - 0.00	1.0000	-0.44	6	3	1.0000	1.9800		1.04
1/2 (ARCH - Existing)	A	Yes	Ar (CfAe)	62.00 - 0.00	6.0000	0.45	1	1	0.5800	0.5800		0.25
1 1/4 (Velocita - Existing)	C	No	Ar (Leg)	242.00 - 0.00	0.0000	0	1	1	1.5500	1.5500		0.66
1 1/4 (Marcus - Existing)	B	No	Ar (Leg)	178.00 - 0.00	0.0000	0.025	1	1	1.5500	1.5500		0.66
1/2 (Marcus - Existing)	B	No	Ar (Leg)	197.00 - 0.00	0.0000	0.03	1	1	0.5800	0.5800		0.25
1/2 (Marcus - Existing)	B	No	Ar (Leg)	248.00 - 0.00	0.0000	0.032	1	1	0.5800	0.5800		0.25
1/2 (Various - Existing)	A	No	Ar (CfAe)	104.00 - 0.00	-4.0000	0.36	2	2	0.5800	0.5800		0.25
1/2 (Various - Existing)	A	No	Ar (CfAe)	235.00 - 104.00	-4.0000	0.36	1	1	0.5800	0.5800		0.25
7/8 (Various - Existing)	A	No	Ar (CfAe)	70.00 - 0.00	-8.0000	0.355	2	2	1.1100	1.1100		0.54
1 5/8 (Various - Existing)	A	No	Ar (CfAe)	236.00 - 0.00	-6.0000	0.35	2	2	1.0000	1.9800		1.04
1 5/8 (Various - Existing)	A	No	Ar (CfAe)	242.00 - 236.00	-6.0000	0.35	1	1	1.0000	1.9800		1.04
7/8 (Various - Existing)	B	No	Ar (CfAe)	114.00 - 0.00	-14.0000	-0.36	8	3	0.8000	1.1100		0.54
7/8 (Various - Existing)	B	No	Ar (CfAe)	126.00 - 114.00	-14.0000	-0.36	7	3	0.8000	1.1100		0.54
7/8 (Various - Existing)	B	No	Ar (CfAe)	138.00 - 126.00	-14.0000	-0.36	6	3	0.8000	1.1100		0.54
7/8 (Various - Existing)	B	No	Ar (CfAe)	178.00 - 138.00	-14.0000	-0.36	5	3	0.8000	1.1100		0.54
7/8 (Various - Existing)	B	No	Ar (CfAe)	205.00 - 178.00	-14.0000	-0.36	3	3	0.8000	1.1100		0.54
7/8	B	No	Ar (CfAe)	230.00 - 205.00	-14.0000	-0.36	2	2	0.8000	1.1100		0.54

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
(Various - Existing)												

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
T1	250.00-225.00	A	7.299	0.000	0.000	0.000	0.03
		B	2.037	0.000	0.000	0.000	0.01
		C	3.308	0.000	0.000	0.000	0.01
T2	225.00-200.00	A	12.688	0.000	0.000	0.000	0.06
		B	6.296	0.000	0.000	0.000	0.04
		C	4.438	0.000	0.000	0.000	0.02
T3	200.00-175.00	A	12.688	0.000	0.000	0.000	0.06
		B	9.597	0.000	0.000	0.000	0.06
		C	5.888	0.000	0.000	0.000	0.02
T4	175.00-150.00	A	32.487	0.000	0.000	0.000	0.18
		B	32.383	0.000	0.000	0.000	0.22
		C	8.875	0.000	0.000	0.000	0.02
T5	150.00-125.00	A	37.438	0.000	0.000	0.000	0.21
		B	37.333	0.000	0.000	0.000	0.26
		C	8.875	0.000	0.000	0.000	0.02
T6	125.00-100.00	A	37.631	0.000	0.000	0.000	0.22
		B	37.333	0.000	0.000	0.000	0.29
		C	8.875	0.000	0.000	0.000	0.02
T7	100.00-75.00	A	38.646	0.000	0.000	0.000	0.22
		B	37.333	0.000	0.000	0.000	0.29
		C	8.875	0.000	0.000	0.000	0.02
T8	75.00-50.00	A	42.926	0.000	0.000	0.000	0.25
		B	37.333	0.000	0.000	0.000	0.29
		C	8.875	0.000	0.000	0.000	0.02
T9	50.00-25.00	A	42.004	0.000	0.000	0.000	0.25
		B	34.858	0.000	0.000	0.000	0.29
		C	8.875	0.000	0.000	0.000	0.02
T10	25.00-0.00	A	32.104	0.000	0.000	0.000	0.25
		B	24.958	0.000	0.000	0.000	0.29
		C	8.875	0.000	0.000	0.000	0.02

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
T1	250.00-225.00	A	0.500	9.151	2.732	0.000	0.000	0.09
		B		3.908	0.796	0.000	0.000	0.04
		C		6.641	0.000	0.000	0.000	0.03
T2	225.00-200.00	A	0.500	14.813	6.208	0.000	0.000	0.17
		B		7.688	4.775	0.000	0.000	0.11
		C		8.604	0.000	0.000	0.000	0.05
T3	200.00-175.00	A	0.500	14.813	6.208	0.000	0.000	0.17
		B		11.222	7.958	0.000	0.000	0.18
		C		12.138	0.000	0.000	0.000	0.05
T4	175.00-150.00	A	0.500	44.612	6.208	0.000	0.000	0.48

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
		B		46.092	7.958	0.000	0.000	0.61
		C		17.208	0.000	0.000	0.000	0.05
T5	150.00-125.00	A	0.500	52.063	6.208	0.000	0.000	0.55
		B		53.542	7.958	0.000	0.000	0.71
		C		17.208	0.000	0.000	0.000	0.05
T6	125.00-100.00	A	0.500	52.063	6.595	0.000	0.000	0.56
		B		53.542	7.958	0.000	0.000	0.79
		C		17.208	0.000	0.000	0.000	0.05
T7	100.00-75.00	A	0.500	52.063	8.625	0.000	0.000	0.57
		B		53.542	7.958	0.000	0.000	0.80
		C		17.208	0.000	0.000	0.000	0.05
T8	75.00-50.00	A	0.500	60.676	8.625	0.000	0.000	0.65
		B		53.542	7.958	0.000	0.000	0.80
		C		17.208	0.000	0.000	0.000	0.05
T9	50.00-25.00	A	0.500	57.938	11.108	0.000	0.000	0.69
		B		47.333	10.442	0.000	0.000	0.82
		C		17.208	0.000	0.000	0.000	0.05
T10	25.00-0.00	A	0.500	33.104	21.042	0.000	0.000	0.75
		B		22.500	20.375	0.000	0.000	0.88
		C		17.208	0.000	0.000	0.000	0.05

Feed Line Shielding

Section	Elevation ft	Face	A_R ft^2	A_R Ice ft^2	A_F ft^2	A_F Ice ft^2
T1	250.00-225.00	A	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	0.000
T2	225.00-200.00	A	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	0.000
T3	200.00-175.00	A	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	0.000
T4	175.00-150.00	A	0.768	1.841	0.396	0.596
		B	0.768	1.841	0.396	0.596
		C	0.000	0.000	0.000	0.000
T5	150.00-125.00	A	1.080	2.440	0.495	0.745
		B	1.080	2.440	0.495	0.745
		C	0.000	0.000	0.000	0.000
T6	125.00-100.00	A	1.263	2.693	0.495	0.745
		B	1.263	2.693	0.495	0.745
		C	0.000	0.000	0.000	0.000
T7	100.00-75.00	A	0.831	1.933	0.412	0.621
		B	0.831	1.933	0.412	0.621
		C	0.000	0.000	0.000	0.000
T8	75.00-50.00	A	0.946	2.123	0.507	0.777
		B	0.924	2.036	0.495	0.745
		C	0.000	0.000	0.000	0.000
T9	50.00-25.00	A	0.817	1.891	0.470	0.736
		B	0.775	1.722	0.446	0.670
		C	0.000	0.000	0.000	0.000
T10	25.00-0.00	A	0.446	1.072	0.317	0.511
		B	0.406	0.911	0.289	0.435
		C	0.000	0.000	0.000	0.000

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
T1	250.00-225.00	-0.4638	-1.0861	-0.2149	-0.3285
T2	225.00-200.00	-1.0748	-2.8800	-0.7705	-1.3972
T3	200.00-175.00	-0.7420	-3.6142	-0.0672	-1.7158
T4	175.00-150.00	0.3976	-15.0163	1.1118	-13.3901
T5	150.00-125.00	0.4726	-19.0565	1.2787	-17.7103
T6	125.00-100.00	0.5351	-19.8158	1.4322	-18.9204
T7	100.00-75.00	0.6278	-25.2209	1.7718	-23.1366
T8	75.00-50.00	0.4919	-27.9389	1.6312	-26.8558
T9	50.00-25.00	0.4521	-28.2625	1.6440	-26.7980
T10	25.00-0.00	0.5119	-23.3256	1.9017	-16.7785

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
Rohn 6' x 12' Boom Gate (1)	A	From Leg	2.00	0.0000	170.00	No Ice	16.60	16.60	0.56
(Verizon - Existing)			0.00			1/2" Ice	19.80	19.80	0.70
			0.00						
Rohn 6' x 12' Boom Gate (1)	B	From Leg	2.00	0.0000	170.00	No Ice	16.60	16.60	0.56
(Verizon - Existing)			0.00			1/2" Ice	19.80	19.80	0.70
			0.00						
Rohn 6' x 12' Boom Gate (1)	C	From Leg	2.00	0.0000	170.00	No Ice	16.60	16.60	0.56
(Verizon - Existing)			0.00			1/2" Ice	19.80	19.80	0.70
			0.00						
LPA-80063-4CF	A	From Leg	3.00	0.0000	170.00	No Ice	7.00	6.04	0.02
(Verizon - Proposed)			6.00			1/2" Ice	7.41	6.43	0.07
			0.00						
BXA-70063/4CF	A	From Leg	3.00	0.0000	170.00	No Ice	5.16	2.44	0.01
(Verizon - Proposed)			0.00			1/2" Ice	5.55	2.74	0.04
			0.00						
BXA-171063/8BF	A	From Leg	3.00	0.0000	170.00	No Ice	2.94	2.16	0.01
(Verizon - Proposed)			-4.00			1/2" Ice	3.26	2.46	0.03
			0.00						
LPA-80063-4CF	A	From Leg	3.00	0.0000	170.00	No Ice	7.00	6.04	0.02
(Verizon - Proposed)			-6.00			1/2" Ice	7.41	6.43	0.07
			0.00						
LPA-80063-4CF	B	From Leg	3.00	0.0000	170.00	No Ice	7.00	6.04	0.02
(Verizon - Proposed)			6.00			1/2" Ice	7.41	6.43	0.07
			0.00						
BXA-70063/4CF	B	From Leg	3.00	0.0000	170.00	No Ice	5.16	2.44	0.01
(Verizon - Proposed)			0.00			1/2" Ice	5.55	2.74	0.04
			0.00						
BXA-171063/8BF	B	From Leg	3.00	0.0000	170.00	No Ice	2.94	2.16	0.01
(Verizon - Proposed)			-4.00			1/2" Ice	3.26	2.46	0.03
			0.00						

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
LPA-80063-4CF	B	From Leg	3.00	0.0000	170.00	No Ice	7.00	6.04	0.02
(Verizon - Proposed)			-6.00			1/2" Ice	7.41	6.43	0.07
			0.00						
LPA-80063-4CF	C	From Leg	3.00	0.0000	170.00	No Ice	7.00	6.04	0.02
(Verizon - Proposed)			6.00			1/2" Ice	7.41	6.43	0.07
			0.00						
BXA-70063/4CF	C	From Leg	3.00	0.0000	170.00	No Ice	5.16	2.44	0.01
(Verizon - Proposed)			0.00			1/2" Ice	5.55	2.74	0.04
			0.00						
BXA-171063/8BF	C	From Leg	3.00	0.0000	170.00	No Ice	2.94	2.16	0.01
(Verizon - Proposed)			-4.00			1/2" Ice	3.26	2.46	0.03
			0.00						
LPA-80063-4CF	C	From Leg	3.00	0.0000	170.00	No Ice	7.00	6.04	0.02
(Verizon - Proposed)			-6.00			1/2" Ice	7.41	6.43	0.07
			0.00						
(2) FD9R6004/2C-3L	A	From Leg	3.00	0.0000	170.00	No Ice	0.37	0.08	0.00
Diplexer			0.00			1/2" Ice	0.45	0.14	0.01
(Verizon - Proposed)			0.00						
(2) FD9R6004/2C-3L	B	From Leg	3.00	0.0000	170.00	No Ice	0.37	0.08	0.00
Diplexer			0.00			1/2" Ice	0.45	0.14	0.01
(Verizon - Proposed)			0.00						
(2) FD9R6004/2C-3L	C	From Leg	3.00	0.0000	170.00	No Ice	0.37	0.08	0.00
Diplexer			0.00			1/2" Ice	0.45	0.14	0.01
(Verizon - Proposed)			0.00						
Flash Beacon Lighting	C	None		0.0000	259.00	No Ice	2.70	2.70	0.05
(MCM - Existing)						1/2" Ice	3.10	3.10	0.07
10'0"x4" Pipe Mount	C	None		0.0000	253.00	No Ice	4.50	4.50	0.11
(MCM - Existing)						1/2" Ice	5.24	5.24	0.14
GPS	C	From Leg	3.00	0.0000	62.00	No Ice	1.00	1.00	0.01
(ARCH - Existing)			0.00			1/2" Ice	1.50	1.50	0.01
			0.00						
3' Side Mount Standoff	C	From Leg	1.50	0.0000	60.00	No Ice	2.64	2.64	0.04
(ARCH - Existing)			0.00			1/2" Ice	3.69	3.69	0.05
			0.00						
PD320	C	From Leg	0.50	0.0000	69.00	No Ice	2.03	2.03	0.01
(Unknown - Existing)			0.00			1/2" Ice	4.58	4.58	0.03
			0.00						
DB224	C	From Leg	2.00	0.0000	76.00	No Ice	3.15	3.15	0.03
(AAA - Existing)			0.00			1/2" Ice	5.67	5.67	0.04
			10.00						
1-ft Stand Off	C	From Leg	1.00	0.0000	76.00	No Ice	1.07	1.07	0.02
(AAA - Existing)			0.00			1/2" Ice	1.62	1.62	0.03
			0.00						
6'x4" Pipe Mount	C	From Leg	0.50	0.0000	104.00	No Ice	2.09	2.09	0.05
(Unknown - Existing)			0.00			1/2" Ice	2.46	2.46	0.07
			0.00						
ROHN 6-ft Side Arm	C	From Leg	3.00	0.0000	115.00	No Ice	6.68	6.68	0.08
(Empty)			0.00			1/2" Ice	10.00	10.00	0.10
			0.00						
1151-4	B	From Leg	1.50	0.0000	114.00	No Ice	2.53	2.53	0.02
(MCM - Existing)			0.00			1/2" Ice	4.05	4.05	0.04
			7.00						
1-ft Stand Off	C	From Leg	1.00	0.0000	114.00	No Ice	1.07	1.07	0.02
(MCM - Existing)			0.00			1/2" Ice	1.62	1.62	0.03
			0.00						
PD220	B	From Leg	1.50	0.0000	126.00	No Ice	3.08	3.08	0.02
(UI - Existing)			0.00			1/2" Ice	5.30	5.30	0.05

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			10.00						
1-ft Stand Off	C	From Leg	1.00	0.0000	126.00	No Ice	1.07	1.07	0.02
(UI - Existing)			0.00			1/2" Ice	1.62	1.62	0.03
			0.00						
DB806D-Y	B	From Leg	6.00	0.0000	138.00	No Ice	2.21	2.21	0.03
(Metrocall - Existing)			0.00			1/2" Ice	3.12	3.12	0.04
			5.00						
DB806D-Y	B	From Leg	6.00	0.0000	138.00	No Ice	2.21	2.21	0.03
(Metrocall - Existing)			0.00			1/2" Ice	3.12	3.12	0.04
			-5.00						
ROHN 6-ft Side Arm	B	From Leg	3.00	0.0000	138.00	No Ice	6.68	6.68	0.08
(Metrocall - Existing)			0.00			1/2" Ice	10.00	10.00	0.10
			0.00						
10'x2.5" Pipe Mount	B	From Face	0.50	0.0000	143.00	No Ice	2.88	2.88	0.06
(Empty)			0.00			1/2" Ice	3.91	3.91	0.08
			0.00						
PD458-1	A	From Leg	6.00	0.0000	178.00	No Ice	2.88	2.88	0.02
(MCM - Existing)			0.00			1/2" Ice	4.34	4.34	0.05
			7.00						
ROHN 6-ft Side Arm	A	From Leg	3.00	0.0000	178.00	No Ice	6.68	6.68	0.08
(MCM - Existing)			0.00			1/2" Ice	10.00	10.00	0.10
			0.00						
PD458-1	B	From Leg	6.00	0.0000	178.00	No Ice	2.88	2.88	0.02
(MCM - Existing)			0.00			1/2" Ice	4.34	4.34	0.05
			7.00						
ROHN 6-ft Side Arm	B	From Leg	3.00	0.0000	178.00	No Ice	6.68	6.68	0.08
(MCM - Existing)			0.00			1/2" Ice	10.00	10.00	0.10
			0.00						
PD458-1	C	From Leg	3.00	0.0000	178.00	No Ice	2.88	2.88	0.02
(Marcus - Existing)			0.00			1/2" Ice	4.34	4.34	0.05
			7.00						
3' Side Mount Standoff	C	From Leg	1.00	0.0000	178.00	No Ice	2.64	2.64	0.04
(Marcus - Existing)			0.00			1/2" Ice	3.69	3.69	0.05
			0.00						
PD220	B	From Leg	3.00	0.0000	205.00	No Ice	3.08	3.08	0.02
(Unknown - Existing)			0.00			1/2" Ice	5.30	5.30	0.05
			10.00						
3' Side Mount Standoff	B	From Leg	1.50	0.0000	205.00	No Ice	2.64	2.64	0.04
(Unknown - Existing)			0.00			1/2" Ice	3.69	3.69	0.05
			0.00						
PD458-1	A	From Leg	6.00	0.0000	236.00	No Ice	2.88	2.88	0.02
(Marcus - Existing)			0.00			1/2" Ice	4.34	4.34	0.05
			7.00						
ROHN 6-ft Side Arm	A	From Leg	3.00	0.0000	236.00	No Ice	6.68	6.68	0.08
(Marcus - Existing)			0.00			1/2" Ice	10.00	10.00	0.10
			0.00						
4'x4" Pipe Mount	A	From Leg	0.50	0.0000	248.00	No Ice	1.32	1.32	0.04
(Marcus - Existing)			0.00			1/2" Ice	1.58	1.58	0.06
			0.00						
PD220	B	From Leg	3.00	0.0000	230.00	No Ice	3.08	3.08	0.02
(Unknown - Existing)			0.00			1/2" Ice	5.30	5.30	0.05
			10.00						
3' Side Mount Standoff	B	From Leg	1.50	0.0000	230.00	No Ice	2.64	2.64	0.04
(Unknown - Existing)			0.00			1/2" Ice	3.69	3.69	0.05
			0.00						
PD1158S	B	From Leg	3.00	0.0000	229.00	No Ice	1.71	1.71	0.01
(Unknown - Existing)			0.00			1/2" Ice	5.45	5.45	0.03

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00						
BCD-87010N	C	From Leg	3.00	0.0000	242.00	No Ice	2.90	2.90	0.03
(Velocita - Existing)			0.00			1/2" Ice	4.05	4.05	0.05
			6.00						
3' Side Mount Standoff	C	From Leg	1.50	0.0000	242.00	No Ice	2.64	2.64	0.04
(Velocita - Existing)			0.00			1/2" Ice	3.69	3.69	0.05
			0.00						
6'x4" Pipe Mount	B	From Face	0.50	0.0000	253.00	No Ice	2.09	2.09	0.05
(WYBC - Existing)			0.00			1/2" Ice	2.46	2.46	0.07
			0.00						

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight K
2-ft dish	C	Paraboloid w/o	From	1.00	Worst		104.00	2.00	No Ice	3.14	0.05
(Unknown - Existing)		Radome	Leg	0.00					1/2" Ice	3.41	0.08
				0.00							
Andrew 2' w/Radome	C	Paraboloid	From	1.00	Worst		197.00	2.00	No Ice	3.14	0.07
(Marcus - Existing)		w/Radome	Leg	0.00					1/2" Ice	3.41	0.28
				0.00							
Andrew 4' w/Radome	A	Paraboloid	From	1.00	Worst		248.00	4.00	No Ice	12.57	0.14
(Marcus - Existing)		w/Radome	Leg	0.00					1/2" Ice	13.10	0.28
				0.00							
SRL-460	C	Grid	From	1.00	Worst		235.00	4.67	No Ice	2.70	0.02
(Marcus - Existing)			Leg	0.00					1/2" Ice	17.71	0.11
				0.00							
JMPC-1R	B	Paraboloid w/o	From	1.00	Worst		250.00	3.00	No Ice	7.07	0.07
(WYBC - Existing)		Radome	Face	0.00					1/2" Ice	7.47	0.14
				2.00							

Tower Pressures - No Ice

$G_H = 1.099$

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft^2	Face	A_F ft^2	A_R ft^2	A_{leg} ft^2	Leg % 	C_AA_A In Face ft^2	C_AA_A Out Face ft^2
T1	237.50	1.758	33	132.292	A	1.177	27.208	14.583	51.38	0.000	0.000
250.00-225.00					B	1.177	21.945		63.07	0.000	0.000
					C	1.177	23.216		59.78	0.000	0.000
T2	212.50	1.703	31	132.292	A	1.177	32.596	14.583	43.18	0.000	0.000
225.00-200.00					B	1.177	26.205		53.26	0.000	0.000

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
					C	1.177	24.346		57.14	0.000	0.000
T3	187.50	1.643	30	164.927	A	1.983	33.713	14.610	40.93	0.000	0.000
200.00-175.00					B	1.983	30.622		44.81	0.000	0.000
					C	1.983	26.914		50.56	0.000	0.000
T4	162.50	1.577	29	231.345	A	3.475	57.977	16.697	27.17	0.000	0.000
175.00-150.00					B	3.475	57.873		27.22	0.000	0.000
					C	3.871	35.133		42.81	0.000	0.000
T5	137.50	1.503	28	297.763	A	4.664	68.848	18.784	25.55	0.000	0.000
150.00-125.00					B	4.664	68.744		25.59	0.000	0.000
					C	5.159	41.366		40.37	0.000	0.000
T6	112.50	1.42	26	365.230	A	5.940	79.140	23.221	27.29	0.000	0.000
125.00-100.00					B	5.940	78.843		27.39	0.000	0.000
					C	6.435	51.648		39.98	0.000	0.000
T7	87.50	1.321	24	430.480	A	6.104	77.123	23.221	27.90	0.000	0.000
100.00-75.00					B	6.104	75.811		28.35	0.000	0.000
					C	6.516	48.183		42.45	0.000	0.000
T8 75.00-50.00	62.50	1.2	22	495.855	A	8.619	85.536	23.222	24.66	0.000	0.000
					B	8.631	79.965		26.21	0.000	0.000
					C	9.126	52.430		37.72	0.000	0.000
T9 50.00-25.00	37.50	1.037	19	563.446	A	9.943	90.385	27.654	27.56	0.000	0.000
					B	9.967	83.281		29.66	0.000	0.000
					C	10.412	58.073		40.38	0.000	0.000
T10 25.00-0.00	12.50	1	18	628.696	A	13.327	81.988	27.654	29.01	0.000	0.000
					B	13.356	74.882		31.34	0.000	0.000
					C	13.644	59.205		37.96	0.000	0.000

Tower Pressure - With Ice

$G_H = 1.099$

Section Elevation ft	z ft	K_Z	q_z psf	t_Z in	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
T1	237.50	1.758	24	0.5000	134.375	A	3.909	36.421	18.750	46.49	0.000	0.000
250.00-225.00						B	1.973	31.178		56.56	0.000	0.000
						C	1.177	33.911		53.44	0.000	0.000
T2	212.50	1.703	24	0.5000	134.375	A	7.385	42.083	18.750	37.90	0.000	0.000
225.00-200.00						B	5.952	34.958		45.83	0.000	0.000
						C	1.177	35.875		50.60	0.000	0.000
T3	187.50	1.643	23	0.5000	167.013	A	8.191	44.151	18.784	35.89	0.000	0.000
200.00-175.00						B	9.941	40.560		37.19	0.000	0.000
						C	1.983	41.477		43.22	0.000	0.000
T4	162.50	1.577	22	0.5000	233.431	A	9.483	78.478	20.871	23.73	0.000	0.000
175.00-150.00						B	11.233	79.957		22.89	0.000	0.000
						C	3.871	52.915		36.76	0.000	0.000
T5	137.50	1.503	21	0.5000	299.849	A	10.622	92.780	22.958	22.20	0.000	0.000
150.00-125.00						B	12.372	94.259		21.53	0.000	0.000
						C	5.159	60.366		35.04	0.000	0.000
T6	112.50	1.42	20	0.5000	367.317	A	12.285	104.067	27.395	23.55	0.000	0.000
125.00-100.00						B	13.649	105.546		22.98	0.000	0.000
						C	6.435	71.906		34.97	0.000	0.000
T7 100.00-75.00	87.50	1.321	18	0.5000	432.567	A	14.520	101.749	27.395	23.56	0.000	0.000
						B	13.854	103.228		23.40	0.000	0.000
						C	6.516	68.828		36.36	0.000	0.000
T8 75.00-50.00	62.50	1.2	17	0.5000	497.942	A	16.974	115.163	27.396	20.73	0.000	0.000

Section Elevation ft	z ft	K_Z	q_z psf	t_Z in	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
						B	16.339	108.116		22.01	0.000	0.000
						C	9.126	73.819		33.03	0.000	0.000
T9 50.00-25.00	37.50	1.037	14	0.5000	565.532	A	20.784	119.031	31.828	22.76	0.000	0.000
						B	20.183	108.596		24.72	0.000	0.000
						C	10.412	80.193		35.13	0.000	0.000
T10 25.00-0.00	12.50	1	14	0.5000	630.782	A	34.175	96.923	31.828	24.28	0.000	0.000
						B	33.585	86.480		26.51	0.000	0.000
						C	13.644	82.099		33.24	0.000	0.000

Tower Pressure - Service

$G_H = 1.099$

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
T1	237.50	1.758	11	132.292	A	1.177	27.208	14.583	51.38	0.000	0.000
250.00-225.00					B	1.177	21.945		63.07	0.000	0.000
					C	1.177	23.216		59.78	0.000	0.000
T2	212.50	1.703	11	132.292	A	1.177	32.596	14.583	43.18	0.000	0.000
225.00-200.00					B	1.177	26.205		53.26	0.000	0.000
					C	1.177	24.346		57.14	0.000	0.000
T3	187.50	1.643	11	164.927	A	1.983	33.713	14.610	40.93	0.000	0.000
200.00-175.00					B	1.983	30.622		44.81	0.000	0.000
					C	1.983	26.914		50.56	0.000	0.000
T4	162.50	1.577	10	231.345	A	3.475	57.977	16.697	27.17	0.000	0.000
175.00-150.00					B	3.475	57.873		27.22	0.000	0.000
					C	3.871	35.133		42.81	0.000	0.000
T5	137.50	1.503	10	297.763	A	4.664	68.848	18.784	25.55	0.000	0.000
150.00-125.00					B	4.664	68.744		25.59	0.000	0.000
					C	5.159	41.366		40.37	0.000	0.000
T6	112.50	1.42	9	365.230	A	5.940	79.140	23.221	27.29	0.000	0.000
125.00-100.00					B	5.940	78.843		27.39	0.000	0.000
					C	6.435	51.648		39.98	0.000	0.000
T7	87.50	1.321	8	430.480	A	6.104	77.123	23.221	27.90	0.000	0.000
100.00-75.00					B	6.104	75.811		28.35	0.000	0.000
					C	6.516	48.183		42.45	0.000	0.000
T8 75.00-50.00	62.50	1.2	8	495.855	A	8.619	85.536	23.222	24.66	0.000	0.000
					B	8.631	79.965		26.21	0.000	0.000
					C	9.126	52.430		37.72	0.000	0.000
T9 50.00-25.00	37.50	1.037	7	563.446	A	9.943	90.385	27.654	27.56	0.000	0.000
					B	9.967	83.281		29.66	0.000	0.000
					C	10.412	58.073		40.38	0.000	0.000
T10 25.00-0.00	12.50	1	6	628.696	A	13.327	81.988	27.654	29.01	0.000	0.000
					B	13.356	74.882		31.34	0.000	0.000
					C	13.644	59.205		37.96	0.000	0.000

Tower Forces - No Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
T1	0.05	1.01	A	0.215	2.548	0.593	1	1	17.324	1.58	63.10	A
250.00-225.00			B	0.175	2.682	0.586	1	1	14.028			
			C	0.184	2.649	0.587	1	1	14.813			
T2	0.11	1.01	A	0.255	2.422	0.603	1	1	20.840	1.75	69.88	A
225.00-200.00			B	0.207	2.573	0.592	1	1	16.686			
			C	0.193	2.62	0.589	1	1	15.517			
T3	0.13	1.30	A	0.216	2.542	0.594	1	1	22.005	1.87	74.73	A
200.00-175.00			B	0.198	2.604	0.59	1	1	20.048			
			C	0.175	2.681	0.586	1	1	17.745			
T4	0.42	1.61	A	0.266	2.391	0.606	1	1	38.608	2.96	118.41	A
175.00-150.00			B	0.265	2.393	0.606	1	1	38.538			
			C	0.169	2.704	0.584	1	1	24.405			
T5	0.49	2.38	A	0.247	2.447	0.601	1	1	46.047	3.44	137.77	A
150.00-125.00			B	0.247	2.448	0.601	1	1	45.979			
			C	0.156	2.749	0.582	1	1	29.253			
T6	0.52	3.96	A	0.233	2.49	0.598	1	1	53.240	3.83	153.04	A
125.00-100.00			B	0.232	2.492	0.597	1	1	53.047			
			C	0.159	2.739	0.583	1	1	36.541			
T7	0.53	3.61	A	0.193	2.618	0.589	1	1	51.534	3.63	145.00	A
100.00-75.00			B	0.19	2.629	0.588	1	1	50.716			
			C	0.127	2.858	0.578	1	1	34.377			
T8	0.55	4.39	A	0.19	2.63	0.588	1	1	58.947	3.78	151.33	A
75.00-50.00			B	0.179	2.669	0.586	1	1	55.512			
			C	0.124	2.869	0.578	1	1	39.423			
T9	0.56	5.21	A	0.178	2.671	0.586	1	1	62.924	3.54	141.77	A
50.00-25.00			B	0.165	2.715	0.584	1	1	58.601			
			C	0.122	2.879	0.578	1	1	43.951			
T10	0.56	5.61	A	0.152	2.766	0.582	1	1	61.022	3.43	137.25	A
25.00-0.00			B	0.14	2.807	0.58	1	1	56.791			
			C	0.116	2.901	0.577	1	1	47.797			
Sum Weight:	3.94	30.09						OTM	3210.72 kip-ft	29.81		

Tower Forces - No Ice - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
T1	0.05	1.01	A	0.215	2.548	0.593	0.825	1	17.118	1.56	62.35	A
250.00-225.00			B	0.175	2.682	0.586	0.825	1	13.822			
			C	0.184	2.649	0.587	0.825	1	14.607			
T2	0.11	1.01	A	0.255	2.422	0.603	0.825	1	20.634	1.73	69.19	A
225.00-200.00			B	0.207	2.573	0.592	0.825	1	16.480			
			C	0.193	2.62	0.589	0.825	1	15.311			
T3	0.13	1.30	A	0.216	2.542	0.594	0.825	1	21.658	1.84	73.55	A
200.00-175.00			B	0.198	2.604	0.59	0.825	1	19.701			
			C	0.175	2.681	0.586	0.825	1	17.398			
T4	0.42	1.61	A	0.266	2.391	0.606	0.825	1	38.000	2.91	116.55	A
175.00-150.00			B	0.265	2.393	0.606	0.825	1	37.930			
			C	0.169	2.704	0.584	0.825	1	23.728			
T5	0.49	2.38	A	0.247	2.447	0.601	0.825	1	45.231	3.38	135.33	A
150.00-125.00			B	0.247	2.448	0.601	0.825	1	45.163			
			C	0.156	2.749	0.582	0.825	1	28.350			
T6	0.52	3.96	A	0.233	2.49	0.598	0.825	1	52.201	3.75	150.05	A
125.00-100.00			B	0.232	2.492	0.597	0.825	1	52.008			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
			C	0.159	2.739	0.583	0.825	1	35.414			
T7	0.53	3.61	A	0.193	2.618	0.589	0.825	1	50.466	3.55	142.00	A
100.00-75.00			B	0.19	2.629	0.588	0.825	1	49.648			
			C	0.127	2.858	0.578	0.825	1	33.237			
T8	0.55	4.39	A	0.19	2.63	0.588	0.825	1	57.439	3.69	147.46	A
75.00-50.00			B	0.179	2.669	0.586	0.825	1	54.002			
			C	0.124	2.869	0.578	0.825	1	37.826			
T9	0.56	5.21	A	0.178	2.671	0.586	0.825	1	61.184	3.45	137.85	A
50.00-25.00			B	0.165	2.715	0.584	0.825	1	56.856			
			C	0.122	2.879	0.578	0.825	1	42.129			
T10	0.56	5.61	A	0.152	2.766	0.582	0.825	1	58.690	3.30	132.01	A
25.00-0.00			B	0.14	2.807	0.58	0.825	1	54.454			
			C	0.116	2.901	0.577	0.825	1	45.409			
Sum Weight:	3.94	30.09						OTM	3154.76 kip-ft	29.16		

Tower Forces - No Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.05	1.01	A	0.215	2.548	0.593	0.8	1	17.089	1.56	62.24	A
250.00-225.00			B	0.175	2.682	0.586	0.8	1	13.792			
			C	0.184	2.649	0.587	0.8	1	14.577			
T2	0.11	1.01	A	0.255	2.422	0.603	0.8	1	20.605	1.73	69.09	A
225.00-200.00			B	0.207	2.573	0.592	0.8	1	16.451			
			C	0.193	2.62	0.589	0.8	1	15.281			
T3	0.13	1.30	A	0.216	2.542	0.594	0.8	1	21.608	1.83	73.39	A
200.00-175.00			B	0.198	2.604	0.59	0.8	1	19.651			
			C	0.175	2.681	0.586	0.8	1	17.349			
T4	0.42	1.61	A	0.266	2.391	0.606	0.8	1	37.913	2.91	116.28	A
175.00-150.00			B	0.265	2.393	0.606	0.8	1	37.843			
			C	0.169	2.704	0.584	0.8	1	23.631			
T5	0.49	2.38	A	0.247	2.447	0.601	0.8	1	45.115	3.37	134.98	A
150.00-125.00			B	0.247	2.448	0.601	0.8	1	45.046			
			C	0.156	2.749	0.582	0.8	1	28.221			
T6	0.52	3.96	A	0.233	2.49	0.598	0.8	1	52.052	3.74	149.63	A
125.00-100.00			B	0.232	2.492	0.597	0.8	1	51.859			
			C	0.159	2.739	0.583	0.8	1	35.254			
T7	0.53	3.61	A	0.193	2.618	0.589	0.8	1	50.313	3.54	141.57	A
100.00-75.00			B	0.19	2.629	0.588	0.8	1	49.495			
			C	0.127	2.858	0.578	0.8	1	33.074			
T8	0.55	4.39	A	0.19	2.63	0.588	0.8	1	57.223	3.67	146.91	A
75.00-50.00			B	0.179	2.669	0.586	0.8	1	53.786			
			C	0.124	2.869	0.578	0.8	1	37.598			
T9	0.56	5.21	A	0.178	2.671	0.586	0.8	1	60.935	3.43	137.29	A
50.00-25.00			B	0.165	2.715	0.584	0.8	1	56.607			
			C	0.122	2.879	0.578	0.8	1	41.869			
T10	0.56	5.61	A	0.152	2.766	0.582	0.8	1	58.356	3.28	131.26	A
25.00-0.00			B	0.14	2.807	0.58	0.8	1	54.120			
			C	0.116	2.901	0.577	0.8	1	45.068			
Sum Weight:	3.94	30.09						OTM	3146.76 kip-ft	29.07		

Tower Forces - No Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.05	1.01	A	0.215	2.548	0.593	0.85	1	17.148	1.56	62.46	A
250.00-225.00			B	0.175	2.682	0.586	0.85	1	13.851			
			C	0.184	2.649	0.587	0.85	1	14.636			
T2	0.11	1.01	A	0.255	2.422	0.603	0.85	1	20.664	1.73	69.29	A
225.00-200.00			B	0.207	2.573	0.592	0.85	1	16.510			
			C	0.193	2.62	0.589	0.85	1	15.340			
T3	0.13	1.30	A	0.216	2.542	0.594	0.85	1	21.707	1.84	73.72	A
200.00-175.00			B	0.198	2.604	0.59	0.85	1	19.751			
			C	0.175	2.681	0.586	0.85	1	17.448			
T4	0.42	1.61	A	0.266	2.391	0.606	0.85	1	38.087	2.92	116.81	A
175.00-150.00			B	0.265	2.393	0.606	0.85	1	38.017			
			C	0.169	2.704	0.584	0.85	1	23.825			
T5	0.49	2.38	A	0.247	2.447	0.601	0.85	1	45.348	3.39	135.68	A
150.00-125.00			B	0.247	2.448	0.601	0.85	1	45.279			
			C	0.156	2.749	0.582	0.85	1	28.479			
T6	0.52	3.96	A	0.233	2.49	0.598	0.85	1	52.349	3.76	150.48	A
125.00-100.00			B	0.232	2.492	0.597	0.85	1	52.156			
			C	0.159	2.739	0.583	0.85	1	35.575			
T7	0.53	3.61	A	0.193	2.618	0.589	0.85	1	50.619	3.56	142.43	A
100.00-75.00			B	0.19	2.629	0.588	0.85	1	49.800			
			C	0.127	2.858	0.578	0.85	1	33.400			
T8	0.55	4.39	A	0.19	2.63	0.588	0.85	1	57.654	3.70	148.01	A
75.00-50.00			B	0.179	2.669	0.586	0.85	1	54.218			
			C	0.124	2.869	0.578	0.85	1	38.054			
T9	0.56	5.21	A	0.178	2.671	0.586	0.85	1	61.432	3.46	138.41	A
50.00-25.00			B	0.165	2.715	0.584	0.85	1	57.106			
			C	0.122	2.879	0.578	0.85	1	42.389			
T10	0.56	5.61	A	0.152	2.766	0.582	0.85	1	59.023	3.32	132.76	A
25.00-0.00			B	0.14	2.807	0.58	0.85	1	54.787			
			C	0.116	2.901	0.577	0.85	1	45.750			
Sum Weight:	3.94	30.09						OTM	3162.75 kip-ft	29.25		

Tower Forces - With Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.16	1.38	A	0.3	2.296	0.616	1	1	26.342	1.62	64.83	A
250.00-225.00			B	0.247	2.447	0.601	1	1	20.712			
			C	0.261	2.405	0.605	1	1	21.686			
T2	0.33	1.38	A	0.368	2.131	0.639	1	1	34.281	1.90	75.85	A
225.00-200.00			B	0.304	2.284	0.617	1	1	27.531			
			C	0.276	2.363	0.609	1	1	23.017			
T3	0.40	1.70	A	0.313	2.261	0.62	1	1	35.569	2.01	80.58	A
200.00-175.00			B	0.302	2.29	0.617	1	1	34.952			
			C	0.26	2.407	0.605	1	1	27.057			
T4	1.13	2.17	A	0.377	2.112	0.642	1	1	59.898	3.16	126.28	B
175.00-150.00			B	0.391	2.083	0.648	1	1	63.031			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
			C	0.243	2.458	0.6	1	1	35.629			
T5	1.31	3.10	A	0.345	2.184	0.631	1	1	69.134	3.57	142.88	B
150.00-125.00			B	0.356	2.159	0.634	1	1	72.179			
			C	0.219	2.535	0.594	1	1	41.038			
T6	1.39	4.89	A	0.317	2.252	0.621	1	1	76.929	3.84	153.67	B
125.00-100.00			B	0.325	2.233	0.624	1	1	79.478			
			C	0.213	2.552	0.593	1	1	49.090			
T7	1.43	4.53	A	0.269	2.382	0.607	1	1	76.266	3.67	146.65	B
100.00-75.00			B	0.271	2.377	0.607	1	1	76.550			
			C	0.174	2.685	0.585	1	1	46.813			
T8	1.50	5.49	A	0.265	2.392	0.606	1	1	86.753	3.80	151.93	A
75.00-50.00			B	0.25	2.438	0.602	1	1	81.409			
			C	0.167	2.711	0.584	1	1	52.247			
T9	1.55	6.43	A	0.247	2.446	0.601	1	1	92.343	3.57	142.89	A
50.00-25.00			B	0.228	2.506	0.596	1	1	84.955			
			C	0.16	2.734	0.583	1	1	57.172			
T10	1.67	6.99	A	0.208	2.57	0.592	1	1	91.556	3.59	143.53	A
25.00-0.00			B	0.19	2.629	0.588	1	1	84.476			
			C	0.152	2.765	0.582	1	1	61.405			
Sum Weight:	10.86	38.06						OTM	3338.96 kip-ft	30.73		

Tower Forces - With Ice - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
T1	0.16	1.38	A	0.3	2.296	0.616	0.825	1	25.658	1.58	63.15	A
250.00-225.00			B	0.247	2.447	0.601	0.825	1	20.367			
			C	0.261	2.405	0.605	0.825	1	21.480			
T2	0.33	1.38	A	0.368	2.131	0.639	0.825	1	32.989	1.82	72.99	A
225.00-200.00			B	0.304	2.284	0.617	0.825	1	26.489			
			C	0.276	2.363	0.609	0.825	1	22.811			
T3	0.40	1.70	A	0.313	2.261	0.62	0.825	1	34.136	1.93	77.34	A
200.00-175.00			B	0.302	2.29	0.617	0.825	1	33.212			
			C	0.26	2.407	0.605	0.825	1	26.710			
T4	1.13	2.17	A	0.377	2.112	0.642	0.825	1	58.239	3.06	122.34	B
175.00-150.00			B	0.391	2.083	0.648	0.825	1	61.066			
			C	0.243	2.458	0.6	0.825	1	34.951			
T5	1.31	3.10	A	0.345	2.184	0.631	0.825	1	67.275	3.46	138.59	B
150.00-125.00			B	0.356	2.159	0.634	0.825	1	70.014			
			C	0.219	2.535	0.594	0.825	1	40.135			
T6	1.39	4.89	A	0.317	2.252	0.621	0.825	1	74.779	3.73	149.06	B
125.00-100.00			B	0.325	2.233	0.624	0.825	1	77.090			
			C	0.213	2.552	0.593	0.825	1	47.964			
T7	1.43	4.53	A	0.269	2.382	0.607	0.825	1	73.725	3.55	142.00	B
100.00-75.00			B	0.271	2.377	0.607	0.825	1	74.126			
			C	0.174	2.685	0.585	0.825	1	45.672			
T8	1.50	5.49	A	0.265	2.392	0.606	0.825	1	83.783	3.67	146.73	A
75.00-50.00			B	0.25	2.438	0.602	0.825	1	78.550			
			C	0.167	2.711	0.584	0.825	1	50.650			
T9	1.55	6.43	A	0.247	2.446	0.601	0.825	1	88.705	3.43	137.26	A
50.00-25.00			B	0.228	2.506	0.596	0.825	1	81.423			
			C	0.16	2.734	0.583	0.825	1	55.350			
T10	1.67	6.99	A	0.208	2.57	0.592	0.825	1	85.575	3.35	134.15	A

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
25.00-0.00			B	0.19	2.629	0.588	0.825	1	78.599			
			C	0.152	2.765	0.582	0.825	1	59.018			
Sum Weight:	10.86	38.06						OTM	3228.33 kip-ft	29.59		

Tower Forces - With Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
T1	0.16	1.38	A	0.3	2.296	0.616	0.8	1	25.560	1.57	62.90	A
250.00-225.00			B	0.247	2.447	0.601	0.8	1	20.318			
			C	0.261	2.405	0.605	0.8	1	21.450			
T2	0.33	1.38	A	0.368	2.131	0.639	0.8	1	32.804	1.81	72.58	A
225.00-200.00			B	0.304	2.284	0.617	0.8	1	26.340			
			C	0.276	2.363	0.609	0.8	1	22.781			
T3	0.40	1.70	A	0.313	2.261	0.62	0.8	1	33.931	1.92	76.87	A
200.00-175.00			B	0.302	2.29	0.617	0.8	1	32.964			
			C	0.26	2.407	0.605	0.8	1	26.661			
T4	1.13	2.17	A	0.377	2.112	0.642	0.8	1	58.002	3.04	121.78	B
175.00-150.00			B	0.391	2.083	0.648	0.8	1	60.785			
			C	0.243	2.458	0.6	0.8	1	34.855			
T5	1.31	3.10	A	0.345	2.184	0.631	0.8	1	67.009	3.45	137.98	B
150.00-125.00			B	0.356	2.159	0.634	0.8	1	69.705			
			C	0.219	2.535	0.594	0.8	1	40.006			
T6	1.39	4.89	A	0.317	2.252	0.621	0.8	1	74.472	3.71	148.40	B
125.00-100.00			B	0.325	2.233	0.624	0.8	1	76.748			
			C	0.213	2.552	0.593	0.8	1	47.803			
T7	1.43	4.53	A	0.269	2.382	0.607	0.8	1	73.362	3.53	141.34	B
100.00-75.00			B	0.271	2.377	0.607	0.8	1	73.780			
			C	0.174	2.685	0.585	0.8	1	45.510			
T8	1.50	5.49	A	0.265	2.392	0.606	0.8	1	83.358	3.65	145.98	A
75.00-50.00			B	0.25	2.438	0.602	0.8	1	78.142			
			C	0.167	2.711	0.584	0.8	1	50.422			
T9	1.55	6.43	A	0.247	2.446	0.601	0.8	1	88.186	3.41	136.46	A
50.00-25.00			B	0.228	2.506	0.596	0.8	1	80.918			
			C	0.16	2.734	0.583	0.8	1	55.090			
T10	1.67	6.99	A	0.208	2.57	0.592	0.8	1	84.721	3.32	132.81	A
25.00-0.00			B	0.19	2.629	0.588	0.8	1	77.759			
			C	0.152	2.765	0.582	0.8	1	58.676			
Sum Weight:	10.86	38.06						OTM	3212.53 kip-ft	29.43		

Tower Forces - With Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
T1	0.16	1.38	A	0.3	2.296	0.616	0.85	1	25.756	1.58	63.39	A

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
250.00-225.00			B	0.247	2.447	0.601	0.85	1	20.416			
			C	0.261	2.405	0.605	0.85	1	21.509			
T2	0.33	1.38	A	0.368	2.131	0.639	0.85	1	33.174	1.83	73.40	A
225.00-200.00			B	0.304	2.284	0.617	0.85	1	26.638			
			C	0.276	2.363	0.609	0.85	1	22.840			
T3	0.40	1.70	A	0.313	2.261	0.62	0.85	1	34.340	1.94	77.80	A
200.00-175.00			B	0.302	2.29	0.617	0.85	1	33.461			
			C	0.26	2.407	0.605	0.85	1	26.760			
T4	1.13	2.17	A	0.377	2.112	0.642	0.85	1	58.476	3.07	122.90	B
175.00-150.00			B	0.391	2.083	0.648	0.85	1	61.347			
			C	0.243	2.458	0.6	0.85	1	35.048			
T5	1.31	3.10	A	0.345	2.184	0.631	0.85	1	67.541	3.48	139.21	B
150.00-125.00			B	0.356	2.159	0.634	0.85	1	70.323			
			C	0.219	2.535	0.594	0.85	1	40.264			
T6	1.39	4.89	A	0.317	2.252	0.621	0.85	1	75.086	3.74	149.72	B
125.00-100.00			B	0.325	2.233	0.624	0.85	1	77.431			
			C	0.213	2.552	0.593	0.85	1	48.125			
T7	1.43	4.53	A	0.269	2.382	0.607	0.85	1	74.088	3.57	142.67	B
100.00-75.00			B	0.271	2.377	0.607	0.85	1	74.472			
			C	0.174	2.685	0.585	0.85	1	45.835			
T8	1.50	5.49	A	0.265	2.392	0.606	0.85	1	84.207	3.69	147.47	A
75.00-50.00			B	0.25	2.438	0.602	0.85	1	78.959			
			C	0.167	2.711	0.584	0.85	1	50.878			
T9	1.55	6.43	A	0.247	2.446	0.601	0.85	1	89.225	3.45	138.07	A
50.00-25.00			B	0.228	2.506	0.596	0.85	1	81.928			
			C	0.16	2.734	0.583	0.85	1	55.611			
T10	1.67	6.99	A	0.208	2.57	0.592	0.85	1	86.430	3.39	135.49	A
25.00-0.00			B	0.19	2.629	0.588	0.85	1	79.438			
			C	0.152	2.765	0.582	0.85	1	59.359			
Sum Weight:	10.86	38.06						OTM	3244.14 kip-ft	29.75		

Tower Forces - Service - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.05	1.01	A	0.215	2.548	0.593	1	1	17.324	0.55	21.83	A
250.00-225.00			B	0.175	2.682	0.586	1	1	14.028			
			C	0.184	2.649	0.587	1	1	14.813			
T2	0.11	1.01	A	0.255	2.422	0.603	1	1	20.840	0.60	24.18	A
225.00-200.00			B	0.207	2.573	0.592	1	1	16.686			
			C	0.193	2.62	0.589	1	1	15.517			
T3	0.13	1.30	A	0.216	2.542	0.594	1	1	22.005	0.65	25.86	A
200.00-175.00			B	0.198	2.604	0.59	1	1	20.048			
			C	0.175	2.681	0.586	1	1	17.745			
T4	0.42	1.61	A	0.266	2.391	0.606	1	1	38.608	1.02	40.97	A
175.00-150.00			B	0.265	2.393	0.606	1	1	38.538			
			C	0.169	2.704	0.584	1	1	24.405			
T5	0.49	2.38	A	0.247	2.447	0.601	1	1	46.047	1.19	47.67	A
150.00-125.00			B	0.247	2.448	0.601	1	1	45.979			
			C	0.156	2.749	0.582	1	1	29.253			
T6	0.52	3.96	A	0.233	2.49	0.598	1	1	53.240	1.32	52.96	A
125.00-100.00			B	0.232	2.492	0.597	1	1	53.047			
			C	0.159	2.739	0.583	1	1	36.541			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
T7	0.53	3.61	A	0.193	2.618	0.589	1	1	51.534	1.25	50.17	A
100.00-75.00			B	0.19	2.629	0.588	1	1	50.716			
			C	0.127	2.858	0.578	1	1	34.377			
T8	0.55	4.39	A	0.19	2.63	0.588	1	1	58.947	1.31	52.36	A
75.00-50.00			B	0.179	2.669	0.586	1	1	55.512			
			C	0.124	2.869	0.578	1	1	39.423			
T9	0.56	5.21	A	0.178	2.671	0.586	1	1	62.924	1.23	49.06	A
50.00-25.00			B	0.165	2.715	0.584	1	1	58.601			
			C	0.122	2.879	0.578	1	1	43.951			
T10	0.56	5.61	A	0.152	2.766	0.582	1	1	61.022	1.19	47.49	A
25.00-0.00			B	0.14	2.807	0.58	1	1	56.791			
			C	0.116	2.901	0.577	1	1	47.797			
Sum Weight:	3.94	30.09						OTM	1110.98 kip-ft	10.31		

Tower Forces - Service - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
T1	0.05	1.01	A	0.215	2.548	0.593	0.825	1	17.118	0.54	21.57	A
250.00-225.00			B	0.175	2.682	0.586	0.825	1	13.822			
			C	0.184	2.649	0.587	0.825	1	14.607			
T2	0.11	1.01	A	0.255	2.422	0.603	0.825	1	20.634	0.60	23.94	A
225.00-200.00			B	0.207	2.573	0.592	0.825	1	16.480			
			C	0.193	2.62	0.589	0.825	1	15.311			
T3	0.13	1.30	A	0.216	2.542	0.594	0.825	1	21.658	0.64	25.45	A
200.00-175.00			B	0.198	2.604	0.59	0.825	1	19.701			
			C	0.175	2.681	0.586	0.825	1	17.398			
T4	0.42	1.61	A	0.266	2.391	0.606	0.825	1	38.000	1.01	40.33	A
175.00-150.00			B	0.265	2.393	0.606	0.825	1	37.930			
			C	0.169	2.704	0.584	0.825	1	23.728			
T5	0.49	2.38	A	0.247	2.447	0.601	0.825	1	45.231	1.17	46.83	A
150.00-125.00			B	0.247	2.448	0.601	0.825	1	45.163			
			C	0.156	2.749	0.582	0.825	1	28.350			
T6	0.52	3.96	A	0.233	2.49	0.598	0.825	1	52.201	1.30	51.92	A
125.00-100.00			B	0.232	2.492	0.597	0.825	1	52.008			
			C	0.159	2.739	0.583	0.825	1	35.414			
T7	0.53	3.61	A	0.193	2.618	0.589	0.825	1	50.466	1.23	49.13	A
100.00-75.00			B	0.19	2.629	0.588	0.825	1	49.648			
			C	0.127	2.858	0.578	0.825	1	33.237			
T8	0.55	4.39	A	0.19	2.63	0.588	0.825	1	57.439	1.28	51.02	A
75.00-50.00			B	0.179	2.669	0.586	0.825	1	54.002			
			C	0.124	2.869	0.578	0.825	1	37.826			
T9	0.56	5.21	A	0.178	2.671	0.586	0.825	1	61.184	1.19	47.70	A
50.00-25.00			B	0.165	2.715	0.584	0.825	1	56.856			
			C	0.122	2.879	0.578	0.825	1	42.129			
T10	0.56	5.61	A	0.152	2.766	0.582	0.825	1	58.690	1.14	45.68	A
25.00-0.00			B	0.14	2.807	0.58	0.825	1	54.454			
			C	0.116	2.901	0.577	0.825	1	45.409			
Sum Weight:	3.94	30.09						OTM	1091.61 kip-ft	10.09		

Tower Forces - Service - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.05	1.01	A	0.215	2.548	0.593	0.8	1	17.089	0.54	21.54	A
250.00-225.00			B	0.175	2.682	0.586	0.8	1	13.792			
			C	0.184	2.649	0.587	0.8	1	14.577			
T2	0.11	1.01	A	0.255	2.422	0.603	0.8	1	20.605	0.60	23.91	A
225.00-200.00			B	0.207	2.573	0.592	0.8	1	16.451			
			C	0.193	2.62	0.589	0.8	1	15.281			
T3	0.13	1.30	A	0.216	2.542	0.594	0.8	1	21.608	0.63	25.39	A
200.00-175.00			B	0.198	2.604	0.59	0.8	1	19.651			
			C	0.175	2.681	0.586	0.8	1	17.349			
T4	0.42	1.61	A	0.266	2.391	0.606	0.8	1	37.913	1.01	40.24	A
175.00-150.00			B	0.265	2.393	0.606	0.8	1	37.843			
			C	0.169	2.704	0.584	0.8	1	23.631			
T5	0.49	2.38	A	0.247	2.447	0.601	0.8	1	45.115	1.17	46.71	A
150.00-125.00			B	0.247	2.448	0.601	0.8	1	45.046			
			C	0.156	2.749	0.582	0.8	1	28.221			
T6	0.52	3.96	A	0.233	2.49	0.598	0.8	1	52.052	1.29	51.77	A
125.00-100.00			B	0.232	2.492	0.597	0.8	1	51.859			
			C	0.159	2.739	0.583	0.8	1	35.254			
T7	0.53	3.61	A	0.193	2.618	0.589	0.8	1	50.313	1.22	48.99	A
100.00-75.00			B	0.19	2.629	0.588	0.8	1	49.495			
			C	0.127	2.858	0.578	0.8	1	33.074			
T8	0.55	4.39	A	0.19	2.63	0.588	0.8	1	57.223	1.27	50.83	A
75.00-50.00			B	0.179	2.669	0.586	0.8	1	53.786			
			C	0.124	2.869	0.578	0.8	1	37.598			
T9	0.56	5.21	A	0.178	2.671	0.586	0.8	1	60.935	1.19	47.50	A
50.00-25.00			B	0.165	2.715	0.584	0.8	1	56.607			
			C	0.122	2.879	0.578	0.8	1	41.869			
T10	0.56	5.61	A	0.152	2.766	0.582	0.8	1	58.356	1.14	45.42	A
25.00-0.00			B	0.14	2.807	0.58	0.8	1	54.120			
			C	0.116	2.901	0.577	0.8	1	45.068			
Sum Weight:	3.94	30.09						OTM	1088.85 kip-ft	10.06		

Tower Forces - Service - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.05	1.01	A	0.215	2.548	0.593	0.85	1	17.148	0.54	21.61	A
250.00-225.00			B	0.175	2.682	0.586	0.85	1	13.851			
			C	0.184	2.649	0.587	0.85	1	14.636			
T2	0.11	1.01	A	0.255	2.422	0.603	0.85	1	20.664	0.60	23.98	A
225.00-200.00			B	0.207	2.573	0.592	0.85	1	16.510			
			C	0.193	2.62	0.589	0.85	1	15.340			
T3	0.13	1.30	A	0.216	2.542	0.594	0.85	1	21.707	0.64	25.51	A
200.00-175.00			B	0.198	2.604	0.59	0.85	1	19.751			
			C	0.175	2.681	0.586	0.85	1	17.448			
T4	0.42	1.61	A	0.266	2.391	0.606	0.85	1	38.087	1.01	40.42	A
175.00-150.00			B	0.265	2.393	0.606	0.85	1	38.017			
			C	0.169	2.704	0.584	0.85	1	23.825			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
T5	0.49	2.38	A	0.247	2.447	0.601	0.85	1	45.348	1.17	46.95	A
150.00-125.00			B	0.247	2.448	0.601	0.85	1	45.279			
			C	0.156	2.749	0.582	0.85	1	28.479			
T6	0.52	3.96	A	0.233	2.49	0.598	0.85	1	52.349	1.30	52.07	A
125.00-100.00			B	0.232	2.492	0.597	0.85	1	52.156			
			C	0.159	2.739	0.583	0.85	1	35.575			
T7	0.53	3.61	A	0.193	2.618	0.589	0.85	1	50.619	1.23	49.28	A
100.00-75.00			B	0.19	2.629	0.588	0.85	1	49.800			
			C	0.127	2.858	0.578	0.85	1	33.400			
T8	0.55	4.39	A	0.19	2.63	0.588	0.85	1	57.654	1.28	51.22	A
75.00-50.00			B	0.179	2.669	0.586	0.85	1	54.218			
			C	0.124	2.869	0.578	0.85	1	38.054			
T9	0.56	5.21	A	0.178	2.671	0.586	0.85	1	61.432	1.20	47.89	A
50.00-25.00			B	0.165	2.715	0.584	0.85	1	57.106			
			C	0.122	2.879	0.578	0.85	1	42.389			
T10	0.56	5.61	A	0.152	2.766	0.582	0.85	1	59.023	1.15	45.94	A
25.00-0.00			B	0.14	2.807	0.58	0.85	1	54.787			
			C	0.116	2.901	0.577	0.85	1	45.750			
Sum Weight:	3.94	30.09						OTM	1094.38 kip-ft	10.12		

Force Totals

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
Leg Weight	12.95					
Bracing Weight	17.13					
Total Member Self-Weight	30.09			-24.15	0.43	
Total Weight	37.59			-24.15	0.43	
Wind 0 deg - No Ice		0.00	-37.84	-4704.85	0.43	1.76
Wind 30 deg - No Ice		18.64	-32.29	-4036.21	-2315.93	-20.51
Wind 45 deg - No Ice		26.30	-26.30	-3294.33	-3269.75	-29.79
Wind 60 deg - No Ice		32.13	-18.55	-2332.52	-3997.78	-36.97
Wind 90 deg - No Ice		37.29	0.00	-24.15	-4632.29	-44.03
Wind 120 deg - No Ice		32.77	18.92	2316.19	-4053.17	-39.87
Wind 135 deg - No Ice		26.30	26.30	3246.02	-3269.75	-32.24
Wind 150 deg - No Ice		18.64	32.29	3987.90	-2315.93	-23.52
Wind 180 deg - No Ice		0.00	37.10	4592.58	0.43	-1.73
Wind 210 deg - No Ice		-18.64	32.29	3987.90	2316.79	20.51
Wind 225 deg - No Ice		-26.30	26.30	3246.02	3270.61	29.79
Wind 240 deg - No Ice		-32.77	18.92	2316.19	4054.03	38.11
Wind 270 deg - No Ice		-37.29	0.00	-24.15	4633.16	44.03
Wind 300 deg - No Ice		-32.13	-18.55	-2332.52	3998.64	38.71
Wind 315 deg - No Ice		-26.30	-26.30	-3294.33	3270.61	32.24
Wind 330 deg - No Ice		-18.64	-32.29	-4036.21	2316.79	23.52
Member Ice	7.97					
Total Weight Ice	54.55			-67.23	-0.00	
Wind 0 deg - Ice		0.00	-39.17	-4978.68	-0.00	2.33
Wind 30 deg - Ice		19.10	-33.08	-4238.55	-2408.32	-16.47
Wind 45 deg - Ice		26.89	-26.89	-3461.93	-3394.70	-24.29
Wind 60 deg - Ice		32.80	-18.93	-2459.74	-4143.95	-30.37
Wind 90 deg - Ice		38.19	0.00	-67.23	-4816.63	-36.79
Wind 120 deg - Ice		33.92	19.58	2388.50	-4253.44	-34.24
Wind 135 deg - Ice		26.89	26.89	3327.47	-3394.70	-27.41

Load Case	Vertical Forces K	Sum of Forces X K	Sum of Forces Z K	Sum of Overturning Moments, M_x kip-ft	Sum of Overturning Moments, M_z kip-ft	Sum of Torques kip-ft
Wind 150 deg - Ice		19.10	33.08	4104.09	-2408.32	-20.32
Wind 180 deg - Ice		0.00	37.87	4717.79	-0.00	-2.19
Wind 210 deg - Ice		-19.10	33.08	4104.09	2408.31	16.47
Wind 225 deg - Ice		-26.89	26.89	3327.47	3394.69	24.29
Wind 240 deg - Ice		-33.92	19.58	2388.50	4253.44	31.91
Wind 270 deg - Ice		-38.19	0.00	-67.23	4816.63	36.79
Wind 300 deg - Ice		-32.80	-18.93	-2459.74	4143.95	32.56
Wind 315 deg - Ice		-26.89	-26.89	-3461.93	3394.69	27.41
Wind 330 deg - Ice		-19.10	-33.08	-4238.55	2408.31	20.32
Total Weight	37.59			-24.15	0.43	
Wind 0 deg - Service		0.00	-13.09	-1617.97	0.76	0.61
Wind 30 deg - Service		6.45	-11.17	-1386.61	-800.75	-7.10
Wind 45 deg - Service		9.10	-9.10	-1129.90	-1130.79	-10.31
Wind 60 deg - Service		11.12	-6.42	-797.09	-1382.70	-12.79
Wind 90 deg - Service		12.90	0.00	1.65	-1602.25	-15.23
Wind 120 deg - Service		11.34	6.55	811.46	-1401.87	-13.80
Wind 135 deg - Service		9.10	9.10	1133.20	-1130.79	-11.16
Wind 150 deg - Service		6.45	11.17	1389.90	-800.75	-8.14
Wind 180 deg - Service		0.00	12.84	1599.14	0.76	-0.60
Wind 210 deg - Service		-6.45	11.17	1389.90	802.27	7.10
Wind 225 deg - Service		-9.10	9.10	1133.20	1132.31	10.31
Wind 240 deg - Service		-11.34	6.55	811.46	1403.39	13.19
Wind 270 deg - Service		-12.90	0.00	1.65	1603.78	15.23
Wind 300 deg - Service		-11.12	-6.42	-797.09	1384.23	13.39
Wind 315 deg - Service		-9.10	-9.10	-1129.90	1132.31	11.16
Wind 330 deg - Service		-6.45	-11.17	-1386.61	802.27	8.14

Load Combinations

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

Comb. No.	Description
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	250 - 225	Leg	Max Tension	22	12.91	-0.66	0.32
			Max. Compression	30	-14.28	0.70	-0.26
			Max. Mx	33	-1.06	0.93	-0.75
			Max. My	22	-2.43	-0.04	1.34
			Max. Vy	33	0.56	0.32	-0.75
			Max. Vx	27	0.47	0.56	-1.16
		Diagonal	Max Tension	28	4.46	0.00	0.00
			Max. Compression	20	-4.41	0.00	0.00
			Max. Mx	20	1.40	0.02	0.00
			Max. My	30	0.91	0.00	-0.00
			Max. Vy	20	-0.01	0.00	0.00
			Max. Vx	30	0.00	0.00	0.00
		Top Girt	Max Tension	10	0.52	0.00	0.00
			Max. Compression	2	-0.50	0.00	0.00
			Max. Mx	19	0.03	-0.02	0.00
			Max. My	6	-0.15	0.00	0.00
			Max. Vy	19	0.02	0.00	0.00
			Max. Vx	6	-0.00	0.00	0.00
T2	225 - 200	Leg	Max Tension	22	42.01	-1.13	0.22
			Max. Compression	19	-45.31	-0.66	1.32
			Max. Mx	31	-37.56	1.66	0.02
			Max. My	26	-37.47	-0.85	-1.46
			Max. Vy	31	-0.42	1.66	0.02
			Max. Vx	19	-0.44	0.04	1.19
		Diagonal	Max Tension	28	5.68	0.00	0.00
			Max. Compression	20	-5.73	0.00	0.00
			Max. Mx	34	4.09	0.02	0.00
			Max. My	30	0.49	0.00	-0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vy	34	-0.01	0.00	0.00
			Max. Vx	30	0.00	0.00	0.00
		Top Girt	Max Tension	20	2.85	0.00	0.00
			Max. Compression	28	-2.88	0.00	0.00
			Max. Mx	27	-0.30	-0.02	0.00
			Max. My	14	1.39	0.00	0.00
			Max. Vy	27	0.02	0.00	0.00
			Max. Vx	14	-0.00	0.00	0.00
T3	200 - 175	Leg	Max Tension	22	55.91	-1.16	-0.58
			Max. Compression	19	-61.73	1.27	0.61
			Max. Mx	26	-52.07	1.86	1.70
			Max. My	10	-26.07	1.64	1.90
			Max. Vy	34	0.46	-1.60	-1.36
			Max. Vx	19	0.48	-1.50	-1.65
		Diagonal	Max Tension	8	3.32	0.00	0.00
			Max. Compression	16	-3.23	0.00	0.00
			Max. Mx	34	2.60	0.04	0.00
			Max. My	22	-0.34	0.00	0.00
			Max. Vy	34	-0.02	0.00	0.00
			Max. Vx	24	-0.00	0.00	0.00
		Top Girt	Max Tension	33	1.30	0.00	0.00
			Max. Compression	19	-1.59	0.00	0.00
			Max. Mx	18	-0.03	-0.02	0.00
			Max. My	23	-1.17	0.00	0.00
			Max. Vy	18	0.01	0.00	0.00
			Max. Vx	23	0.00	0.00	0.00
		Mid Girt	Max Tension	30	0.17	0.00	0.00
			Max. Compression	8	-0.21	0.00	0.00
			Max. Mx	18	0.02	-0.02	0.00
			Max. My	23	0.07	0.00	0.00
			Max. Vy	18	0.01	0.00	0.00
			Max. Vx	23	0.00	0.00	0.00
T4	175 - 150	Leg	Max Tension	22	75.75	0.63	-0.28
			Max. Compression	19	-85.99	0.68	-0.42
			Max. Mx	20	-61.82	-2.24	-2.94
			Max. My	20	-58.60	-1.56	-3.34
			Max. Vy	4	1.10	-1.06	0.98
			Max. Vx	4	0.86	0.75	1.20
		Diagonal	Max Tension	9	7.11	0.00	0.00
			Max. Compression	17	-7.09	0.00	0.00
			Max. Mx	34	6.29	0.09	0.00
			Max. My	21	1.06	0.00	0.00
			Max. Vy	34	-0.03	0.00	0.00
			Max. Vx	21	0.00	0.00	0.00
		Top Girt	Max Tension	14	0.93	0.00	0.00
			Max. Compression	6	-0.95	0.00	0.00
			Max. Mx	18	0.02	-0.08	0.00
			Max. My	23	0.42	0.00	0.00
			Max. Vy	18	-0.04	0.00	0.00
			Max. Vx	23	-0.00	0.00	0.00
		Mid Girt	Max Tension	13	0.53	0.00	0.00
			Max. Compression	6	-0.47	0.00	0.00
			Max. Mx	18	0.04	-0.04	0.00
			Max. My	23	0.00	0.00	0.00
			Max. Vy	18	0.02	0.00	0.00
			Max. Vx	23	-0.00	0.00	0.00
T5	150 - 125	Leg	Max Tension	22	97.21	-0.99	-0.26
			Max. Compression	19	-111.36	1.01	-0.16
			Max. Mx	26	-82.83	1.93	1.31
			Max. My	19	-92.15	0.10	-1.39
			Max. Vy	25	-0.63	1.88	1.27

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vx	26	-0.53	1.93	1.31
		Diagonal	Max Tension	9	8.16	0.00	0.00
			Max. Compression	17	-8.20	0.00	0.00
			Max. Mx	34	7.67	0.21	0.00
			Max. My	24	0.90	0.00	0.00
			Max. Vy	34	-0.06	0.00	0.00
			Max. Vx	24	-0.00	0.00	0.00
		Top Girt	Max Tension	30	0.35	0.00	0.00
			Max. Compression	8	-0.45	0.00	0.00
			Max. Mx	19	0.13	-0.14	0.00
			Max. My	23	0.14	0.00	0.00
			Max. Vy	19	-0.05	0.00	0.00
			Max. Vx	23	-0.00	0.00	0.00
		Mid Girt	Max Tension	20	0.55	0.00	0.00
			Max. Compression	8	-0.56	0.00	0.00
			Max. Mx	19	0.44	-0.07	0.00
			Max. My	23	0.33	0.00	0.00
			Max. Vy	19	-0.03	0.00	0.00
			Max. Vx	23	0.00	0.00	0.00
T6	125 - 100	Leg	Max Tension	22	118.00	0.75	-0.32
			Max. Compression	19	-137.06	1.78	-0.09
			Max. Mx	20	-106.13	2.03	0.99
			Max. My	31	-11.32	-0.25	-1.40
			Max. Vy	20	-0.56	2.03	0.99
			Max. Vx	14	0.35	-0.27	-1.38
		Diagonal	Max Tension	9	9.25	0.00	0.00
			Max. Compression	17	-9.32	0.00	0.00
			Max. Mx	34	8.71	0.39	0.00
			Max. My	24	1.16	0.00	0.00
			Max. Vy	34	-0.10	0.00	0.00
			Max. Vx	24	-0.00	0.00	0.00
		Top Girt	Max Tension	32	0.47	0.00	0.00
			Max. Compression	8	-0.53	0.00	0.00
			Max. Mx	18	0.05	-0.21	0.00
			Max. My	31	-0.32	0.00	0.01
			Max. Vy	18	0.07	0.00	0.00
			Max. Vx	31	-0.00	0.00	0.00
		Mid Girt	Max Tension	27	0.49	0.00	0.00
			Max. Compression	3	-0.45	0.00	0.00
			Max. Mx	18	0.07	-0.11	0.00
			Max. My	31	-0.32	0.00	0.00
			Max. Vy	18	0.03	0.00	0.00
			Max. Vx	31	0.00	0.00	0.00
T7	100 - 75	Leg	Max Tension	22	130.06	-0.31	-0.02
			Max. Compression	19	-153.06	0.57	-0.01
			Max. Mx	19	-139.93	1.17	-0.44
			Max. My	31	-9.65	0.13	-1.18
			Max. Vy	10	-0.16	-1.14	0.27
			Max. Vx	14	-0.20	0.13	-1.14
		Diagonal	Max Tension	9	8.32	0.00	0.00
			Max. Compression	26	-8.54	0.00	0.00
			Max. Mx	34	8.08	0.18	0.00
			Max. My	24	0.79	0.00	0.00
			Max. Vy	34	-0.05	0.00	0.00
			Max. Vx	24	-0.00	0.00	0.00
		Horizontal	Max Tension	9	8.41	0.04	0.02
			Max. Compression	17	-8.67	0.04	0.03
			Max. Mx	22	1.35	0.11	0.02
			Max. My	32	-7.51	0.05	0.04
			Max. Vy	22	0.05	0.11	0.02
			Max. Vx	32	-0.01	0.00	0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
T8	75 - 50	Leg	Max Tension	32	149.17	-0.51	-0.08
			Max. Compression	19	-177.41	0.37	-0.00
			Max. Mx	27	137.22	-0.63	0.00
			Max. My	14	-7.58	-0.01	-0.71
			Max. Vy	10	-0.12	-0.52	-0.03
			Max. Vx	6	0.16	-0.02	0.60
		Diagonal	Max Tension	9	8.54	0.00	0.00
			Max. Compression	26	-8.93	0.00	0.00
			Max. Mx	34	8.33	0.28	0.00
			Max. My	24	0.77	0.00	0.00
			Max. Vy	34	0.07	0.00	0.00
			Max. Vx	24	-0.00	0.00	0.00
		Horizontal	Max Tension	16	5.49	0.00	0.00
			Max. Compression	8	-5.62	0.09	0.04
			Max. Mx	32	1.63	0.16	0.04
			Max. My	32	-4.74	0.09	0.05
			Max. Vy	32	0.06	0.16	0.04
			Max. Vx	32	-0.01	0.00	0.00
T9	50 - 25	Leg	Max Tension	32	167.93	-0.65	-0.10
			Max. Compression	19	-202.25	0.43	-0.01
			Max. Mx	27	163.75	-0.71	0.01
			Max. My	14	-9.90	-0.03	-0.75
			Max. Vy	10	0.11	-0.69	0.00
			Max. Vx	6	-0.15	-0.03	0.75
		Diagonal	Max Tension	9	8.90	0.00	0.00
			Max. Compression	26	-9.34	0.00	0.00
			Max. Mx	34	8.66	0.33	0.00
			Max. My	24	0.80	0.00	0.00
			Max. Vy	34	-0.08	0.00	0.00
			Max. Vx	24	-0.00	0.00	0.00
		Horizontal	Max Tension	16	6.16	0.00	0.00
			Max. Compression	8	-6.22	0.10	0.05
			Max. Mx	32	1.86	0.17	0.05
			Max. My	32	-5.28	0.13	0.06
			Max. Vy	32	0.07	0.17	0.05
			Max. Vx	32	-0.01	0.00	0.00
T10	25 - 0	Leg	Max Tension	32	186.03	-0.38	-0.06
			Max. Compression	19	-227.03	0.00	-0.00
			Max. Mx	30	-222.09	1.17	-0.04
			Max. My	14	-12.01	-0.04	-0.84
			Max. Vy	30	0.16	1.17	-0.04
			Max. Vx	14	-0.19	-0.04	-0.84
		Diagonal	Max Tension	9	9.20	0.00	0.00
			Max. Compression	26	-9.69	0.00	0.00
			Max. Mx	26	9.09	0.39	0.00
			Max. My	24	0.80	0.00	0.00
			Max. Vy	26	-0.09	0.00	0.00
			Max. Vx	24	0.00	0.00	0.00
		Horizontal	Max Tension	26	6.76	0.18	0.08
			Max. Compression	8	-6.78	0.16	0.06
			Max. Mx	32	2.10	0.24	0.06
			Max. My	24	-6.46	0.20	0.08
			Max. Vy	32	0.09	0.23	0.07
			Max. Vx	24	0.01	0.00	0.00

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Leg C	Max. Vert	30	233.49	20.35	-12.61
	Max. H_x	30	233.49	20.35	-12.61
	Max. H_z	4	-184.90	-16.37	11.22
	Min. Vert	22	-194.65	-17.53	10.88
	Min. H_x	22	-194.65	-17.53	10.88
	Min. H_z	30	233.49	20.35	-12.61
Leg B	Max. Vert	24	233.49	-20.33	-12.65
	Max. H_x	32	-194.65	17.50	10.92
	Max. H_z	16	-184.94	16.34	11.27
	Min. Vert	32	-194.65	17.50	10.92
	Min. H_x	24	233.49	-20.33	-12.65
	Min. H_z	24	233.49	-20.33	-12.65
Leg A	Max. Vert	19	237.97	0.05	23.99
	Max. H_x	14	13.63	4.32	1.00
	Max. H_z	19	237.97	0.05	23.99
	Min. Vert	27	-190.13	-0.05	-20.55
	Min. H_x	6	13.61	-4.32	1.00
	Min. H_z	27	-190.13	-0.05	-20.55

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	37.59	-0.00	0.00	-23.98	0.46	0.00
Dead+Wind 0 deg - No Ice	37.59	-0.00	-37.81	-4650.50	0.41	1.78
Dead+Wind 30 deg - No Ice	37.59	18.63	-32.26	-3990.23	-2289.67	-20.56
Dead+Wind 45 deg - No Ice	37.59	26.28	-26.28	-3257.22	-3232.78	-29.88
Dead+Wind 60 deg - No Ice	37.59	32.10	-18.53	-2306.59	-3952.74	-37.09
Dead+Wind 90 deg - No Ice	37.59	37.25	0.00	-24.31	-4579.94	-44.16
Dead+Wind 120 deg - No Ice	37.59	32.74	18.90	2288.95	-4006.36	-39.96
Dead+Wind 135 deg - No Ice	37.59	26.27	26.28	3208.74	-3232.51	-32.32
Dead+Wind 150 deg - No Ice	37.59	18.63	32.26	3942.17	-2289.43	-23.58
Dead+Wind 180 deg - No Ice	37.59	-0.00	37.07	4540.54	0.45	-1.75
Dead+Wind 210 deg - No Ice	37.59	-18.63	32.26	3942.47	2290.67	20.55
Dead+Wind 225 deg - No Ice	37.59	-26.28	26.28	3209.05	3233.80	29.87
Dead+Wind 240 deg - No Ice	37.59	-32.74	18.90	2288.97	4007.18	38.23
Dead+Wind 270 deg - No Ice	37.59	-37.25	-0.00	-24.59	4580.27	44.16
Dead+Wind 300 deg - No Ice	37.59	-32.10	-18.53	-2306.75	3953.52	38.80
Dead+Wind 315 deg - No Ice	37.59	-26.28	-26.28	-3257.59	3233.62	32.32
Dead+Wind 330 deg - No Ice	37.59	-18.63	-32.26	-3990.96	2290.51	23.58
Dead+Ice+Temp	54.55	-0.00	0.00	-66.89	0.00	-0.00
Dead+Wind 0 deg+Ice+Temp	54.55	-0.00	-39.14	-4929.94	-0.03	2.35
Dead+Wind 30 deg+Ice+Temp	54.55	19.08	-33.05	-4198.35	-2385.44	-16.63
Dead+Wind 45 deg+Ice+Temp	54.55	26.87	-26.87	-3429.86	-3362.59	-24.53
Dead+Wind 60 deg+Ice+Temp	54.55	32.77	-18.92	-2437.53	-4104.96	-30.66
Dead+Wind 90 deg+Ice+Temp	54.55	38.17	0.00	-67.60	-4770.99	-37.14
Dead+Wind 120 deg+Ice+Temp	54.55	33.90	19.57	2363.96	-4211.63	-34.52
Dead+Wind 135 deg+Ice+Temp	54.55	26.87	26.87	3294.73	-3362.08	-27.64
Dead+Wind 150 deg+Ice+Temp	54.55	19.08	33.05	4063.97	-2385.09	-20.49
Dead+Wind 180 deg+Ice+Temp	54.55	-0.00	37.84	4672.54	-0.02	-2.20
Dead+Wind 210 deg+Ice+Temp	54.55	-19.08	33.05	4064.27	2385.51	16.62
Dead+Wind 225 deg+Ice+Temp	54.55	-26.87	26.87	3295.12	3362.69	24.52
Dead+Wind 240 deg+Ice+Temp	54.55	-33.90	19.57	2363.95	4211.58	32.22
Dead+Wind 270 deg+Ice+Temp	54.55	-38.16	-0.00	-67.93	4770.36	37.13
Dead+Wind 300 deg+Ice+Temp	54.55	-32.77	-18.92	-2437.58	4104.91	32.84
Dead+Wind 315 deg+Ice+Temp	54.55	-26.87	-26.87	-3430.15	3362.59	27.64

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead+Wind 330 deg+Ice+Temp	54.55	-19.08	-33.05	-4199.26	2385.42	20.48
Dead+Wind 0 deg - Service	37.59	-0.00	-13.08	-1625.16	0.43	0.61
Dead+Wind 30 deg - Service	37.59	6.45	-11.16	-1396.73	-791.97	-7.12
Dead+Wind 45 deg - Service	37.59	9.09	-9.09	-1143.07	-1118.40	-10.33
Dead+Wind 60 deg - Service	37.59	11.11	-6.41	-814.03	-1367.52	-12.83
Dead+Wind 90 deg - Service	37.59	12.89	0.00	-24.24	-1584.50	-15.28
Dead+Wind 120 deg - Service	37.59	11.33	6.54	776.24	-1386.09	-13.84
Dead+Wind 135 deg - Service	37.59	9.09	9.09	1094.54	-1118.38	-11.19
Dead+Wind 150 deg - Service	37.59	6.45	11.16	1348.38	-792.05	-8.16
Dead+Wind 180 deg - Service	37.59	-0.00	12.83	1555.43	0.43	-0.60
Dead+Wind 210 deg - Service	37.59	-6.45	11.16	1348.39	792.91	7.11
Dead+Wind 225 deg - Service	37.59	-9.09	9.09	1094.55	1119.23	10.33
Dead+Wind 240 deg - Service	37.59	-11.33	6.54	776.25	1386.94	13.23
Dead+Wind 270 deg - Service	37.59	-12.89	0.00	-24.24	1585.36	15.28
Dead+Wind 300 deg - Service	37.59	-11.11	-6.41	-814.03	1368.38	13.43
Dead+Wind 315 deg - Service	37.59	-9.09	-9.09	-1143.08	1119.26	11.18
Dead+Wind 330 deg - Service	37.59	-6.45	-11.16	-1396.80	792.89	8.16

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
1	0.00	-37.59	0.00	0.00	37.59	-0.00	0.003%
2	0.00	-37.59	-37.84	0.00	37.59	37.81	0.066%
3	18.64	-37.59	-32.29	-18.63	37.59	32.26	0.067%
4	26.30	-37.59	-26.30	-26.28	37.59	26.28	0.064%
5	32.13	-37.59	-18.55	-32.10	37.59	18.53	0.062%
6	37.29	-37.59	0.00	-37.25	37.59	-0.00	0.061%
7	32.77	-37.59	18.92	-32.74	37.59	-18.90	0.063%
8	26.30	-37.59	26.30	-26.27	37.59	-26.28	0.065%
9	18.64	-37.59	32.29	-18.63	37.59	-32.26	0.065%
10	0.00	-37.59	37.10	0.00	37.59	-37.07	0.061%
11	-18.64	-37.59	32.29	18.63	37.59	-32.26	0.060%
12	-26.30	-37.59	26.30	26.28	37.59	-26.28	0.061%
13	-32.77	-37.59	18.92	32.74	37.59	-18.90	0.063%
14	-37.29	-37.59	0.00	37.25	37.59	0.00	0.065%
15	-32.13	-37.59	-18.55	32.10	37.59	18.53	0.062%
16	-26.30	-37.59	-26.30	26.28	37.59	26.28	0.061%
17	-18.64	-37.59	-32.29	18.63	37.59	32.26	0.061%
18	0.00	-54.55	0.00	0.00	54.55	-0.00	0.005%
19	0.00	-54.55	-39.17	0.00	54.55	39.14	0.049%
20	19.10	-54.55	-33.08	-19.08	54.55	33.05	0.047%
21	26.89	-54.55	-26.89	-26.87	54.55	26.87	0.043%
22	32.80	-54.55	-18.93	-32.77	54.55	18.92	0.041%
23	38.19	-54.55	0.00	-38.17	54.55	-0.00	0.041%
24	33.92	-54.55	19.58	-33.90	54.55	-19.57	0.044%
25	26.89	-54.55	26.89	-26.87	54.55	-26.87	0.045%
26	19.10	-54.55	33.08	-19.08	54.55	-33.05	0.044%
27	0.00	-54.55	37.87	0.00	54.55	-37.84	0.041%
28	-19.10	-54.55	33.08	19.08	54.55	-33.05	0.040%
29	-26.89	-54.55	26.89	26.87	54.55	-26.87	0.040%
30	-33.92	-54.55	19.58	33.90	54.55	-19.57	0.044%
31	-38.19	-54.55	0.00	38.16	54.55	0.00	0.045%
32	-32.80	-54.55	-18.93	32.77	54.55	18.92	0.041%
33	-26.89	-54.55	-26.89	26.87	54.55	26.87	0.041%
34	-19.10	-54.55	-33.08	19.08	54.55	33.05	0.041%
35	0.00	-37.59	-13.09	0.00	37.59	13.08	0.029%

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
36	6.45	-37.59	-11.17	-6.45	37.59	11.16	0.029%
37	9.10	-37.59	-9.10	-9.09	37.59	9.09	0.028%
38	11.12	-37.59	-6.42	-11.11	37.59	6.41	0.028%
39	12.90	-37.59	0.00	-12.89	37.59	-0.00	0.028%
40	11.34	-37.59	6.55	-11.33	37.59	-6.54	0.028%
41	9.10	-37.59	9.10	-9.09	37.59	-9.09	0.028%
42	6.45	-37.59	11.17	-6.45	37.59	-11.16	0.028%
43	0.00	-37.59	12.84	0.00	37.59	-12.83	0.028%
44	-6.45	-37.59	11.17	6.45	37.59	-11.16	0.028%
45	-9.10	-37.59	9.10	9.09	37.59	-9.09	0.028%
46	-11.34	-37.59	6.55	11.33	37.59	-6.54	0.028%
47	-12.90	-37.59	0.00	12.89	37.59	-0.00	0.028%
48	-11.12	-37.59	-6.42	11.11	37.59	6.41	0.028%
49	-9.10	-37.59	-9.10	9.09	37.59	9.09	0.028%
50	-6.45	-37.59	-11.17	6.45	37.59	11.16	0.028%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00040556
2	Yes	9	0.00078513	0.00096022
3	Yes	9	0.00078160	0.00098880
4	Yes	9	0.00073361	0.00097228
5	Yes	9	0.00071308	0.00098793
6	Yes	9	0.00069872	0.00094690
7	Yes	9	0.00074859	0.00094644
8	Yes	9	0.00078034	0.00096844
9	Yes	9	0.00075834	0.00097332
10	Yes	9	0.00071106	0.00099682
11	Yes	9	0.00069828	0.00094530
12	Yes	9	0.00070237	0.00093150
13	Yes	9	0.00075184	0.00094722
14	Yes	9	0.00076862	0.00098042
15	Yes	9	0.00071264	0.00098287
16	Yes	9	0.00070490	0.00097995
17	Yes	9	0.00069918	0.00094422
18	Yes	4	0.00000001	0.00069905
19	Yes	10	0.00074337	0.00074517
20	Yes	10	0.00066118	0.00078239
21	Yes	10	0.00057761	0.00076687
22	Yes	10	0.00055550	0.00080921
23	Yes	10	0.00054641	0.00074984
24	Yes	10	0.00064126	0.00073810
25	Yes	10	0.00067049	0.00075803
26	Yes	10	0.00061651	0.00076555
27	Yes	10	0.00055413	0.00083485
28	Yes	10	0.00054770	0.00074941
29	Yes	10	0.00055246	0.00073201
30	Yes	10	0.00064740	0.00073876
31	Yes	10	0.00063401	0.00077348
32	Yes	10	0.00055535	0.00080437
33	Yes	10	0.00055070	0.00080281
34	Yes	10	0.00054700	0.00074594
35	Yes	9	0.00070012	0.00091718
36	Yes	9	0.00070307	0.00092143

37	Yes	9	0.00070363	0.00092218
38	Yes	9	0.00070321	0.00092154
39	Yes	9	0.00070007	0.00091702
40	Yes	9	0.00069811	0.00091408
41	Yes	9	0.00069935	0.00091585
42	Yes	9	0.00070012	0.00091677
43	Yes	9	0.00070028	0.00091683
44	Yes	9	0.00069769	0.00091314
45	Yes	9	0.00069716	0.00091245
46	Yes	9	0.00069713	0.00091223
47	Yes	9	0.00070098	0.00091763
48	Yes	9	0.00070239	0.00091977
49	Yes	9	0.00070158	0.00091879
50	Yes	9	0.00070053	0.00091755

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	250 - 225	11.806	35	0.4626	0.1117
T2	225 - 200	9.134	35	0.4447	0.0882
T3	200 - 175	6.698	35	0.3710	0.0570
T4	175 - 150	4.746	35	0.3100	0.0374
T5	150 - 125	3.198	35	0.2364	0.0272
T6	125 - 100	2.066	35	0.1681	0.0209
T7	100 - 75	1.224	35	0.1319	0.0162
T8	75 - 50	0.649	35	0.0942	0.0110
T9	50 - 25	0.280	35	0.0559	0.0072
T10	25 - 0	0.067	35	0.0280	0.0034

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
259.00	Flash Beacon Lighting	35	11.806	0.4626	0.1117	179645
253.00	10'0"x4" Pipe Mount	35	11.806	0.4626	0.1117	179645
252.00	JMPC-1R	35	11.806	0.4626	0.1117	179645
248.00	Andrew 4' w/Radome	35	11.590	0.4625	0.1101	179645
242.00	BCD-87010N	35	10.941	0.4615	0.1053	112278
236.00	PD458-1	35	10.296	0.4588	0.1000	64159
235.00	SRL-460	35	10.189	0.4581	0.0990	59881
230.00	PD220	35	9.658	0.4530	0.0940	44911
229.00	PD1158S	35	9.553	0.4516	0.0929	42761
205.00	PD220	35	7.150	0.3864	0.0625	14640
197.00	Andrew 2' w/Radome	35	6.438	0.3627	0.0540	13464
178.00	PD458-1	35	4.957	0.3174	0.0391	20247
170.00	Rohn 6' x 12' Boom Gate (1)	35	4.405	0.2967	0.0348	20426
143.00	10'x2.5" Pipe Mount	35	2.843	0.2149	0.0252	18207
138.00	DB806D-Y	35	2.609	0.2002	0.0239	20511
126.00	PD220	35	2.105	0.1702	0.0211	28931
115.00	ROHN 6-ft Side Arm	35	1.697	0.1512	0.0190	28589
114.00	1151-4	35	1.663	0.1498	0.0189	28404
104.00	2-ft dish	35	1.341	0.1370	0.0170	26686
76.00	DB224	35	0.668	0.0958	0.0112	36469

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
69.00	PD320	35	0.544	0.0844	0.0100	40169
62.00	GPS	35	0.436	0.0733	0.0089	44356
60.00	3' Side Mount Standoff	35	0.407	0.0702	0.0086	45717

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	250 - 225	37.126	19	1.4667	0.3187
T2	225 - 200	28.635	19	1.4186	0.2515
T3	200 - 175	20.859	19	1.1823	0.1627
T4	175 - 150	14.665	19	0.9778	0.1078
T5	150 - 125	9.824	19	0.7353	0.0781
T6	125 - 100	6.318	19	0.5189	0.0606
T7	100 - 75	3.729	19	0.4057	0.0468
T8	75 - 50	1.970	19	0.2886	0.0319
T9	50 - 25	0.845	19	0.1705	0.0209
T10	25 - 0	0.200	19	0.0853	0.0099

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
259.00	Flash Beacon Lighting	19	37.126	1.4667	0.3187	64060
253.00	10'0"x4" Pipe Mount	19	37.126	1.4667	0.3187	64060
252.00	JMPC-1R	19	37.126	1.4667	0.3187	64060
248.00	Andrew 4' w/Radome	19	36.439	1.4671	0.3140	64060
242.00	BCD-87010N	19	34.381	1.4666	0.2995	40037
236.00	PD458-1	19	32.333	1.4603	0.2841	22878
235.00	SRL-460	19	31.994	1.4583	0.2814	21353
230.00	PD220	19	30.305	1.4436	0.2672	16014
229.00	PD1158S	19	29.970	1.4395	0.2642	15245
205.00	PD220	19	22.302	1.2325	0.1792	4505
197.00	Andrew 2' w/Radome	19	20.028	1.1547	0.1538	4081
178.00	PD458-1	19	15.331	1.0026	0.1126	5955
170.00	Rohn 6' x 12' Boom Gate (1)	19	13.592	0.9334	0.1005	6070
143.00	10'x2.5" Pipe Mount	19	8.721	0.6665	0.0724	5728
138.00	DB806D-Y	19	7.998	0.6201	0.0688	6468
126.00	PD220	19	6.439	0.5254	0.0612	9201
115.00	ROHN 6-ft Side Arm	19	5.183	0.4659	0.0550	9132
114.00	1151-4	19	5.077	0.4615	0.0545	9075
104.00	2-ft dish	19	4.086	0.4215	0.0491	8548
76.00	DB224	19	2.027	0.2936	0.0324	11884
69.00	PD320	19	1.651	0.2584	0.0289	13098
62.00	GPS	19	1.320	0.2240	0.0258	14446
60.00	3' Side Mount Standoff	19	1.233	0.2145	0.0250	14883

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	250	Leg	A325N	0.7500	4	3.24	19.44	0.167 ✓	1.333	Bolt Tension
T2	225	Leg	A325N	0.7500	4	10.51	19.44	0.541 ✓	1.333	Bolt Tension
T3	200	Leg	A325N	0.7500	4	13.98	19.44	0.719 ✓	1.333	Bolt Tension
T4	175	Leg	A325N	0.7500	4	18.94	19.44	0.974 ✓	1.333	Bolt Tension
T5	150	Leg	A325N	0.8750	4	24.30	26.46	0.919 ✓	1.333	Bolt Tension
T6	125	Leg	A325N	1.2500	4	29.50	54.00	0.546 ✓	1.333	Bolt Tension
T7	100	Leg	A325N	1.2500	4	32.51	54.00	0.602 ✓	1.333	Bolt Tension
T8	75	Leg	A325N	1.5000	4	37.29	77.75	0.480 ✓	1.333	Bolt Tension
T9	50	Leg	A325N	1.5000	4	41.98	77.75	0.540 ✓	1.333	Bolt Tension
T10	25	Leg	A36	1.7500	4	46.51	46.04	1.010 ✓	1.333	Bolt Tension

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 $\frac{P}{P_a}$
T1	250 - 225	P3x.216	25.00	5.00	103.1 K=2.00	13.973	2.2285	-14.28	31.14	0.458 ✓
T2	225 - 200	P3x.216	25.00	5.00	103.1 K=2.00	13.973	2.2285	-45.31	31.14	1.455 ✗
T3	200 - 175	H1-3 (1.46 CR) - 24 P3x.3	25.05	6.26	44.3 K=0.67	25.214	3.0159	-61.73	76.04	0.812 ✓
T4	175 - 150	P3.5x.226	25.05	6.26	37.7 K=0.67	26.156	2.6795	-85.99	70.09	1.227 ✓
T5	150 - 125	P4x.237	25.05	6.26	33.3 K=0.67	26.729	3.1741	-111.36	84.84	1.313 ✓
T6	125 - 100	P5x.375	25.05	6.26	27.4 K=0.67	27.471	6.1120	-137.06	167.90	0.816 ✓
T7	100 - 75	P5x.375	25.05	12.52	40.9 K=0.50	25.711	6.1120	-153.06	157.15	0.974 ✓
T8	75 - 50	P5x.375	25.05	12.52	40.9 K=0.50	25.711	6.1120	-177.41	157.15	1.129 ✓
T9	50 - 25	P6x.432	25.05	12.52	34.2 K=0.50	26.614	8.4049	-202.25	223.69	0.904 ✓
T10	25 - 0	P6x.432	25.05	12.52	34.2 K=0.50	26.614	8.4049	-227.03	223.69	1.015 ✓

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	250 - 225	P1.5x.2	6.73	6.73	133.4 K=1.00	8.394	1.0681	-4.41	8.97	0.492 ✓
T2	225 - 200	P1.5x.2	6.73	6.73	133.4 K=1.00	8.394	1.0681	-5.73	8.97	0.640 ✓
T3	200 - 175	P1.5x.2	9.23	9.23	182.9 K=1.00	4.462	1.0681	-2.98	4.77	0.626 ✓
T4	175 - 150	P2x.218	11.29	11.29	176.8 K=1.00	4.778	1.4773	-6.96	7.06	0.986 ✓
T5	150 - 125	P2.5x.276	13.54	13.54	175.9 K=1.00	4.827	2.2535	-8.07	10.88	0.742 ✓
T6	125 - 100	P3x.3	15.90	15.90	168.0 K=1.00	5.294	3.0159	-8.94	15.97	0.560 ✓
T7	100 - 75	P2.5x.276	15.43	15.03	195.2 K=1.00	3.920	2.2535	-8.53	8.83	0.966 ✓
T8	75 - 50	P3x.3	16.23	15.86	167.5 K=1.00	5.321	3.0159	-8.93	16.05	0.556 ✓
T9	50 - 25	P3x.3	17.09	16.68	176.2 K=1.00	4.811	3.0159	-9.34	14.51	0.644 ✓
T10	25 - 0	P3x.3	18.00	17.62	186.1 K=1.00	4.314	3.0159	-9.69	13.01	0.745 ✓

Horizontal 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 $\frac{P}{P_a}$
T7	100 - 75	L2 1/2x3 1/2x1/4	15.45	7.49	165.3 K=1.00	5.466	1.4400	-8.67	7.87	1.102 ✓
T8	75 - 50	L3x4x1/4	19.37	18.91	177.2 K=1.00	4.755	1.6900	-5.62	8.04	0.699 ✓
T9	50 - 25	L3x4x1/4	21.99	21.43	200.9 K=1.00	3.700	1.6900	-6.22	6.25	0.995 ✓
T10	25 - 0	KL/R > 200 (C) - 175 L3 1/2x5x1/4	24.60	12.02	187.3 K=1.00	4.255	2.0600	-6.78	8.76	0.774 ✓

Top Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	250 - 225	L3x3x1/4	5.00	4.71	95.4 K=1.00	13.547	1.4400	-0.50	19.51	0.026 ✓
T2	225 - 200	L3x3x1/4	5.00	4.71	95.4	13.547	1.4400	-2.88	19.51	0.148

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 $\frac{P}{P_a}$
					K=1.00					✓
T3	200 - 175	L2 1/2x2 1/2x3/16	5.00	4.71	114.1 K=1.00	11.107	0.9020	-1.59	10.02	0.159 ✓
T4	175 - 150	L4x4x1/4	7.61	7.32	110.5 K=1.00	11.461	1.9400	-0.95	22.23	0.043 ✓
T5	150 - 125	L4x4x1/4	10.23	9.90	149.4 K=1.00	6.692	1.9400	-0.45	12.98	0.034 ✓
T6	125 - 100	L4x4x1/4	12.84	12.47	188.2 K=1.00	4.218	1.9400	-0.53	8.18	0.065 ✓

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 $\frac{P}{P_a}$
T3	200 - 175	L2x2x3/16	6.31	6.01	183.1 K=1.00	4.452	0.7150	-0.21	3.18	0.066 ✓
T4	175 - 150	L2x2x3/16	8.92	8.59	261.5 K=1.00	2.183	0.7150	-0.47	1.56	0.300 ✓
T5	150 - 125	KL/R > 200 (C) - 71 L2x2x3/16	11.53	11.16	339.9 K=1.00	1.293	0.7150	-0.56	0.92	0.609 ✓
T6	125 - 100	KL/R > 200 (C) - 92 L2x2x3/16	14.15	13.68	416.7 K=1.00	0.860	0.7150	-0.45	0.61	0.730 ✓
		KL/R > 200 (C) - 114								

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 $\frac{P}{P_a}$
T1	250 - 225	P3x.216	25.00	5.00	51.6	30.000	2.2285	12.95	66.85	0.194 ✓
T2	225 - 200	P3x.216	25.00	5.00	51.6	30.000	2.2285	42.05	66.85	0.629 ✓
T3	200 - 175	H1-3 (1.44 CR) - 22 P3x.3	25.05	6.26	66.1	30.000	3.0159	55.91	90.48	0.618 ✓
T4	175 - 150	P3.5x.226	25.05	6.26	56.2	30.000	2.6795	75.75	80.39	0.942 ✓
T5	150 - 125	P4x.237	25.05	6.26	49.8	30.000	3.1741	97.21	95.22	1.021 ✓
T6	125 - 100	P5x.375	25.05	6.26	40.9	30.000	6.1120	118.00	183.36	0.644

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 $\frac{P}{P_a}$
T7	100 - 75	P5x.375	25.05	12.52	81.7	30.000	6.1120	130.06	183.36	0.709 ✓
T8	75 - 50	P5x.375	25.05	12.52	81.7	30.000	6.1120	149.17	183.36	0.814 ✓
T9	50 - 25	P6x.432	25.05	12.52	68.5	30.000	8.4049	167.93	252.15	0.666 ✓
T10	25 - 0	P6x.432	25.05	12.52	68.5	30.000	8.4049	186.03	252.15	0.738 ✓

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	250 - 225	P1.5x.2	6.73	6.73	133.4	21.600	1.0681	4.46	23.07	0.193 ✓
T2	225 - 200	P1.5x.2	6.73	6.73	133.4	21.600	1.0681	5.68	23.07	0.246 ✓
T3	200 - 175	P1.5x.2	7.90	7.90	156.6	21.600	1.0681	3.32	23.07	0.144 ✓
T4	175 - 150	P2x.218	10.75	10.75	168.3	21.600	1.4773	7.11	31.91	0.223 ✓
T5	150 - 125	P2.5x.276	12.97	12.97	168.4	21.600	2.2535	8.16	48.68	0.168 ✓
T6	125 - 100	P3x.3	15.31	15.31	161.6	21.600	3.0159	9.25	65.14	0.142 ✓
T7	100 - 75	P2.5x.276	15.05	14.66	190.3	21.600	2.2535	8.32	48.68	0.171 ✓
T8	75 - 50	P3x.3	16.23	15.86	167.5	21.600	3.0159	8.54	65.14	0.131 ✓
T9	50 - 25	P3x.3	17.09	16.68	176.2	21.600	3.0159	8.90	65.14	0.137 ✓
T10	25 - 0	P3x.3	18.00	17.62	186.1	21.600	3.0159	9.20	65.14	0.141 ✓

Horizontal 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 $\frac{P}{P_a}$
T7	100 - 75	L2 1/2x3 1/2x1/4	15.45	7.49	160.9	21.600	1.4400	8.41	31.10	0.270 ✓
T8	75 - 50	L3x4x1/4	19.37	18.91	177.2	21.600	1.6900	5.49	36.50	0.150 ✓
T9	50 - 25	L3x4x1/4	21.99	21.43	200.9	21.600	1.6900	6.16	36.50	0.169 ✓

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 $\frac{P}{P_a}$
T10	25 - 0	L3 1/2x5x1/4	24.60	12.02	178.1	21.600	2.0600	6.76	44.50	0.152 ✓

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 $\frac{P}{P_a}$
T1	250 - 225	L3x3x1/4	5.00	4.71	60.8	21.600	1.4400	0.52	31.10	0.017 ✓
T2	225 - 200	L3x3x1/4	5.00	4.71	60.8	21.600	1.4400	2.85	31.10	0.092 ✓
T3	200 - 175	L2 1/2x2 1/2x3/16	5.00	4.71	72.6	21.600	0.9020	1.30	19.48	0.067 ✓
T4	175 - 150	L4x4x1/4	7.61	7.32	70.3	21.600	1.9400	0.93	41.90	0.022 ✓
T5	150 - 125	L4x4x1/4	10.23	9.90	95.0	21.600	1.9400	0.35	41.90	0.008 ✓
T6	125 - 100	L4x4x1/4	12.84	12.47	119.7	21.600	1.9400	0.47	41.90	0.011 ✓

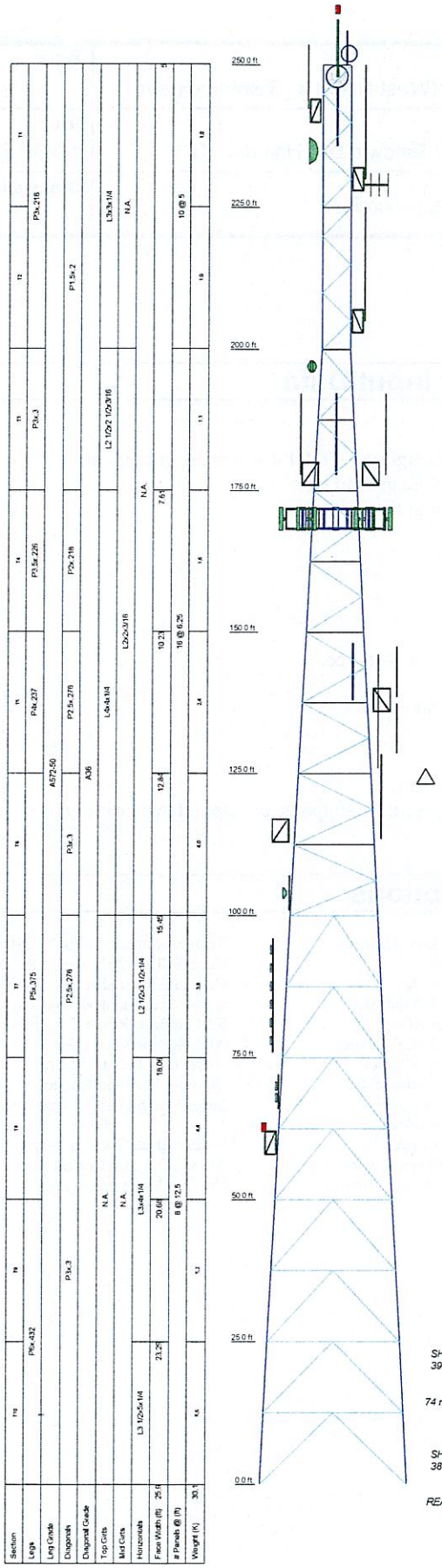
Mid Girt Design Data (Tension)

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 $\frac{P}{P_a}$
T3	200 - 175	L2x2x3/16	6.31	6.01	117.0	21.600	0.7150	0.17	15.44	0.011 ✓
T4	175 - 150	L2x2x3/16	8.92	8.59	167.0	21.600	0.7150	0.53	15.44	0.034 ✓
T5	150 - 125	L2x2x3/16	11.53	11.16	217.1	21.600	0.7150	0.55	15.44	0.036 ✓
T6	125 - 100	L2x2x3/16	14.15	13.68	266.1	21.600	0.7150	0.49	15.44	0.032 ✓

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
T1	250 - 225	Leg	P3x.216	1	-14.28	41.51	34.4	Pass
T2	225 - 200	Leg	P3x.216	24	-45.31	41.51	109.2	Fail ✗
T3	200 - 175	Leg	P3x.3	45	-61.73	101.37	60.9	Pass
T4	175 - 150	Leg	P3.5x.226	66	-85.99	93.42	92.0	Pass
T5	150 - 125	Leg	P4x.237	87	-111.36	113.09	98.5	Pass
T6	125 - 100	Leg	P5x.375	108	-137.06	223.82	61.2	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
T7	100 - 75	Leg	P5x.375	129	-153.06	209.48	73.1	Pass
T8	75 - 50	Leg	P5x.375	150	-177.41	209.48	84.7	Pass
T9	50 - 25	Leg	P6x.432	171	-202.25	298.18	67.8	Pass
T10	25 - 0	Leg	P6x.432	192	-227.03	298.18	76.1	Pass
T1	250 - 225	Diagonal	P1.5x.2	9	-4.41	11.95	36.9	Pass
T2	225 - 200	Diagonal	P1.5x.2	30	-5.73	11.95	48.0	Pass
T3	200 - 175	Diagonal	P1.5x.2	53	-2.98	6.35	47.0	Pass
T4	175 - 150	Diagonal	P2x.218	74	-6.96	9.41	74.0	Pass
T5	150 - 125	Diagonal	P2.5x.276	95	-8.07	14.50	55.7	Pass
T6	125 - 100	Diagonal	P3x.3	116	-8.94	21.28	42.0	Pass
T7	100 - 75	Diagonal	P2.5x.276	134	-8.53	11.78	72.4	Pass
T8	75 - 50	Diagonal	P3x.3	155	-8.93	21.39	41.7	Pass
T9	50 - 25	Diagonal	P3x.3	176	-9.34	19.34	48.3	Pass
T10	25 - 0	Diagonal	P3x.3	197	-9.69	17.34	55.9	Pass
T7	100 - 75	Horizontal	L2 1/2x3 1/2x1/4	142	-8.67	10.49	82.7	Pass
T8	75 - 50	Horizontal	L3x4x1/4	154	-5.62	10.71	52.4	Pass
T9	50 - 25	Horizontal	L3x4x1/4	175	-6.22	8.34	74.6	Pass
T10	25 - 0	Horizontal	L3 1/2x5x1/4	196	-6.78	11.68	58.0	Pass
T1	250 - 225	Top Girt	L3x3x1/4	5	-0.50	26.00	1.9	Pass
T2	225 - 200	Top Girt	L3x3x1/4	27	-2.88	26.00	11.1	Pass
T3	200 - 175	Top Girt	L2 1/2x2 1/2x3/16	47	-1.59	13.35	11.9	Pass
T4	175 - 150	Top Girt	L4x4x1/4	68	-0.95	29.64	3.2	Pass
T5	150 - 125	Top Girt	L4x4x1/4	89	-0.45	17.31	2.6	Pass
T6	125 - 100	Top Girt	L4x4x1/4	110	-0.53	10.91	4.8	Pass
T3	200 - 175	Mid Girt	L2x2x3/16	50	-0.21	4.24	4.9	Pass
T4	175 - 150	Mid Girt	L2x2x3/16	71	-0.47	2.08	22.5	Pass
T5	150 - 125	Mid Girt	L2x2x3/16	92	-0.56	1.23	45.7	Pass
T6	125 - 100	Mid Girt	L2x2x3/16	114	-0.45	0.82	54.8	Pass
							Summary	
						Leg (T2)	109.2	Fail ✗
						Diagonal (T4)	74.0	Pass
						Horizontal (T7)	82.7	Pass
						Top Girt (T3)	11.9	Pass
						Mid Girt (T6)	54.8	Pass
						Bolt Checks	75.8	Pass
						RATING =	**109.2**	**Fail ✗**



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
Flash Beacon Lighting (MCM - Existing)	259	BXA-70063/4CF (Verizon - Proposed)	170
10'0"x4" Pipe Mount (MCM - Existing)	253	BXA-171063/8BF (Verizon - Proposed)	170
6'x4" Pipe Mount (WYBC - Existing)	253	BXA-70063/4CF (Verizon - Proposed)	170
JMPC-1R (WYBC - Existing)	250	LPA-80063-4CF (Verizon - Proposed)	170
4'x4" Pipe Mount (Marcus - Existing)	248	BXA-70063/4CF (Verizon - Proposed)	170
Andrew 4' w/Radome (Marcus - Existing)	248	BXA-171063/8BF (Verizon - Proposed)	170
BCD-87010N (Velocita - Existing)	242	LPA-80063-4CF (Verizon - Proposed)	170
3' Side Mount Standoff (Velocita - Existing)	242	LPA-80063-4CF (Verizon - Proposed)	170
PD458-1 (Marcus - Existing)	236	Rohn 6' x 12' Boom Gate (1) (Verizon - Existing)	170
ROHN 6-ft Side Arm (Marcus - Existing)	236	(2) FD9R6004/2C-3L Diplexer (Verizon - Proposed)	170
SRL-460 (Marcus - Existing)	235	BXA-171063/8BF (Verizon - Proposed)	170
PD220 (Unknown - Existing)	230	LPA-80063-4CF (Verizon - Proposed)	170
3' Side Mount Standoff (Unknown - Existing)	230	LPA-80063-4CF (Verizon - Proposed)	170
PD1158S (Unknown - Existing)	229	10'x2.5" Pipe Mount (Empty)	143
PD220 (Unknown - Existing)	205	DB806D-Y (Metrocall - Existing)	138
3' Side Mount Standoff (Unknown - Existing)	205	DB806D-Y (Metrocall - Existing)	138
Andrew 2' w/Radome (Marcus - Existing)	197	ROHN 6-ft Side Arm (Metrocall - Existing)	138
PD458-1 (MCM - Existing)	178	1-ft Stand Off (UI - Existing)	126
ROHN 6-ft Side Arm (MCM - Existing)	178	PD220 (UI - Existing)	126
PD458-1 (MCM - Existing)	178	ROHN 6-ft Side Arm (Empty)	115
ROHN 6-ft Side Arm (MCM - Existing)	178	1151-4 (MCM - Existing)	114
PD458-1 (Marcus - Existing)	178	1-ft Stand Off (MCM - Existing)	114
3' Side Mount Standoff (Marcus - Existing)	178	2-ft dish (Unknown - Existing)	104
(2) FD9R6004/2C-3L Diplexer (Verizon - Proposed)	170	6'x4" Pipe Mount (Unknown - Existing)	104
Rohn 6' x 12' Boom Gate (1) (Verizon - Existing)	170	DB224 (AAA - Existing)	76
Rohn 6' x 12' Boom Gate (1) (Verizon - Existing)	170	1-ft Stand Off (AAA - Existing)	76
LPA-80063-4CF (Verizon - Proposed)	170	PD320 (Unknown - Existing)	69
(2) FD9R6004/2C-3L Diplexer (Verizon - Proposed)	170	GPS (ARCH - Existing)	62
		3' Side Mount Standoff (ARCH - Existing)	60

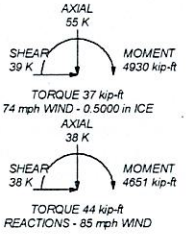
MATERIAL STRENGTH

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. TOWER RATING: 98.5%

MAX. CORNER REACTIONS AT BASE:
DOWN: 238 K
UPLIFT: -195 K
SHEAR: 24 K



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

Job: *12001.CO80 - Hamden (West Rock) w_Reinforcement*			
Project: *250' Lattice Tower - Baldwin Dr., Hamden, CT*			
Client: Verizon Wireless	Drawn by: jrm	Appd:	
Code: TIA/EIA-222-F	Date: 10/31/12	Scale: NTS	
Path:		Dwg No: E-1	

Tower Input Data

The main tower is a 3x free standing tower with an overall height of 250.00 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 25.90 ft at the base.
This tower is designed using the TIA/EIA-222-F standard.
The following design criteria apply:

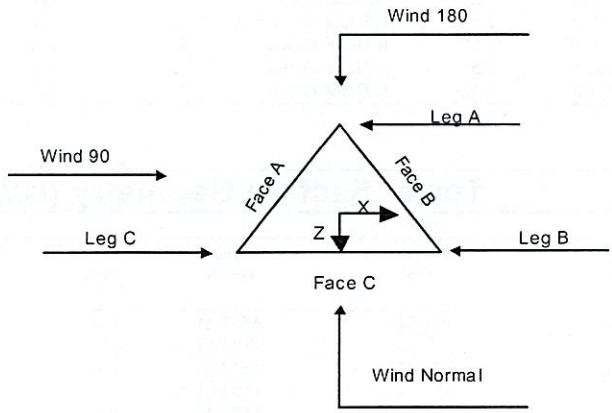
Basic wind speed of 85 mph.
Nominal ice thickness of 0.5000 in.
Ice density of 56 pcf.
A wind speed of 74 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 50 mph.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.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

Options

Consider Moments - Legs
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

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

Treat Feedline Bundles As Cylinder
Use ASCE 10 X-Brace Ly Rules
√ Calculate Redundant Bracing Forces
Ignore Redundant Members in FEA
SR Leg Bolts Resist Compression
√ All Leg Panels Have Same Allowable
Offset Girt At Foundation
√ Consider Feedline Torque
Include Angle Block Shear Check
Poles
Include Shear-Torsion Interaction
Always Use Sub-Critical Flow
Use Top Mounted Sockets



Triangular Tower

Tower Section Geometry

Tower Section	Tower Elevation ft	Assembly Database	Description	Section Width ft	Number of Sections	Section Length ft
T1	250.00-225.00			5.00	1	25.00
T2	225.00-200.00			5.00	1	25.00
T3	200.00-175.00			5.00	1	25.00
T4	175.00-150.00			7.61	1	25.00
T5	150.00-125.00			10.23	1	25.00
T6	125.00-100.00			12.84	1	25.00
T7	100.00-75.00			15.45	1	25.00
T8	75.00-50.00			18.06	1	25.00
T9	50.00-25.00			20.68	1	25.00
T10	25.00-0.00			23.29	1	25.00

Tower Section Geometry *(cont'd)*

Tower Section	Tower Elevation ft	Diagonal Spacing ft	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset in	Bottom Girt Offset in
T1	250.00-225.00	5.00	K Brace Left	No	Yes	0.0000	0.0000
T2	225.00-200.00	5.00	K Brace Left	No	Yes	0.0000	0.0000
T3	200.00-175.00	6.25	K Brace Left	No	Yes	0.0000	0.0000
T4	175.00-150.00	6.25	K Brace Left	No	Yes	0.0000	0.0000
T5	150.00-125.00	6.25	K Brace Left	No	Yes	0.0000	0.0000

Tower Section	Tower Elevation ft	Diagonal Spacing ft	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset in	Bottom Girt Offset in
T6	125.00-100.00	6.25	K Brace Left	No	Yes	0.0000	0.0000
T7	100.00-75.00	12.50	K Brace Down	No	Yes	0.0000	0.0000
T8	75.00-50.00	12.50	K Brace Down	No	Yes	0.0000	0.0000
T9	50.00-25.00	12.50	K Brace Down	No	Yes	0.0000	0.0000
T10	25.00-0.00	12.50	K Brace Down	No	Yes	0.0000	0.0000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T1 250.00-225.00	Pipe	P3x.216	A572-50 (50 ksi)	Pipe	P1.5x.2	A36 (36 ksi)
T2 225.00-200.00	Pipe	P3x.216	A572-50 (50 ksi)	Pipe	P1.5x.2	A36 (36 ksi)
T3 200.00-175.00	Pipe	P3x.3	A572-50 (50 ksi)	Pipe	P1.5x.2	A36 (36 ksi)
T4 175.00-150.00	Pipe	P3.5x.226	A572-50 (50 ksi)	Pipe	P2x.218	A36 (36 ksi)
T5 150.00-125.00	Pipe	P4x.237	A572-50 (50 ksi)	Pipe	P2.5x.276	A36 (36 ksi)
T6 125.00-100.00	Pipe	P5x.375	A572-50 (50 ksi)	Pipe	P3x.3	A36 (36 ksi)
T7 100.00-75.00	Pipe	P5x.375	A572-50 (50 ksi)	Pipe	P2.5x.276	A36 (36 ksi)
T8 75.00-50.00	Pipe	P5x.375	A572-50 (50 ksi)	Pipe	P3x.3	A36 (36 ksi)
T9 50.00-25.00	Pipe	P6x.432	A572-50 (50 ksi)	Pipe	P3x.3	A36 (36 ksi)
T10 25.00-0.00	Pipe	P6x.432	A572-50 (50 ksi)	Pipe	P3x.3	A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Top Girt Type	Top Girt Size	Top Girt Grade	Bottom Girt Type	Bottom Girt Size	Bottom Girt Grade
T1 250.00-225.00	Single Angle	L3x3x1/4	A36 (36 ksi)	Solid Round		A36 (36 ksi)
T2 225.00-200.00	Single Angle	L3x3x1/4	A36 (36 ksi)	Single Angle		A36 (36 ksi)
T3 200.00-175.00	Single Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)	Single Angle		A36 (36 ksi)
T4 175.00-150.00	Single Angle	L4x4x1/4	A36 (36 ksi)	Single Angle		A36 (36 ksi)
T5 150.00-125.00	Single Angle	L4x4x1/4	A36 (36 ksi)	Single Angle		A36 (36 ksi)
T6 125.00-100.00	Single Angle	L4x4x1/4	A36 (36 ksi)	Single Angle		A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	No. of Mid Girts	Mid Girt Type	Mid Girt Size	Mid Girt Grade	Horizontal Type	Horizontal Size	Horizontal Grade
T3 200.00-175.00	1	Single Angle	L2x2x3/16	A36 (36 ksi)	Single Angle		A36 (36 ksi)
T4 175.00-150.00	1	Single Angle	L2x2x3/16	A36 (36 ksi)	Single Angle		A36 (36 ksi)
T5 150.00-125.00	1	Single Angle	L2x2x3/16	A36 (36 ksi)	Single Angle		A36 (36 ksi)
T6 125.00-100.00	1	Single Angle	L2x2x3/16	A36 (36 ksi)	Single Angle		A36 (36 ksi)
T7 100.00-75.00	None	Single Angle		A36 (36 ksi)	Single Angle	L2 1/2x3 1/2x1/4	A36 (36 ksi)
T8 75.00-50.00	None	Single Angle		A36 (36 ksi)	Single Angle	L3x4x1/4	A36 (36 ksi)
T9 50.00-25.00	None	Single Angle		A36 (36 ksi)	Single Angle	L3x4x1/4	A36 (36 ksi)
T10 25.00-0.00	None	Single Angle		A36 (36 ksi)	Single Angle	L3 1/2x5x1/4	A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in
T1 250.00-225.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T2 225.00-200.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T3 200.00-175.00	0.00	0.0000	A36 (36 ksi)	1	1.05	1.05	36.0000	36.0000
T4 175.00-150.00	0.00	0.0000	A36 (36 ksi)	1	1.05	1.05	36.0000	36.0000
T5 150.00-125.00	0.00	0.0000	A36 (36 ksi)	1	1.05	1.05	36.0000	36.0000
T6 125.00-100.00	0.00	0.0000	A36 (36 ksi)	1	1.05	1.05	36.0000	36.0000
T7 100.00-75.00	0.00	0.0000	A36 (36 ksi)	1	1.05	1.05	36.0000	36.0000
T8 75.00-50.00	0.00	0.0000	A36 (36 ksi)	1	1.05	1.05	36.0000	36.0000
T9 50.00-25.00	0.00	0.0000	A36 (36 ksi)	1	1.05	1.05	36.0000	36.0000
T10 25.00-0.00	0.00	0.0000	A36 (36 ksi)	1	1.05	1.05	36.0000	36.0000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Calc K Single Angles	Calc K Solid Rounds	K Factors[1] Legs	X Brace Diags X Y	K Brace Diags X Y	Single Diags X Y	Girts X Y	Horiz. X Y	Sec. Horiz. X Y	Inner Brace X Y
T1	No	No	1	1	1	1	1	1	1	1
250.00-225.00				1	1	1	1	1	1	1
T2	No	No	0.5	1	1	1	1	1	1	1
225.00-200.00				1	1	1	1	1	1	1
T3	No	No	0.335	1	1	1	1	1	1	1
200.00-175.00				1	1	1	1	1	1	1
T4	No	No	0.335	1	1	1	1	1	1	1
175.00-150.00				1	1	1	1	1	1	1
T5	No	No	0.335	1	1	1	1	1	1	1
150.00-125.00				1	1	1	1	1	1	1
T6	No	No	0.335	1	1	1	1	1	1	1
125.00-100.00				1	1	1	1	1	1	1
T7	No	No	0.5	1	1	1	1	1	1	1
100.00-75.00				1	1	1	1	1	1	1
T8	No	No	0.5	1	1	1	1	1	1	1
75.00-50.00				1	1	1	1	1	1	1
T9	No	No	0.5	1	1	1	1	1	1	1
50.00-25.00				1	1	1	1	1	1	1
T10	No	No	0.5	1	1	1	1	1	1	1
25.00-0.00				1	1	1	1	1	1	1

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

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Net Width Deduct in	Leg U	Diagonal Net Width Deduct in	Diagonal U	Top Girt Net Width Deduct in	Top Girt U	Bottom Girt Net Width Deduct in	Bottom Girt U	Mid Girt Net Width Deduct in	Mid Girt U	Long Horizontal Net Width Deduct in	Long Horizontal U	Short Horizontal Net Width Deduct in	Short Horizontal U
T1 250.00-225.00	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T2 225.00-200.00	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T3 200.00-175.00	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T4 175.00-150.00	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T5 150.00-125.00	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T6 125.00-100.00	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T7 100.00-75.00	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T8 75.00-50.00	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T9 50.00-25.00	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T10 25.00-0.00	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75

Tower Section Geometry *(cont'd)*

Tower Elevation	Connection Offsets							
	Diagonal				K-Bracing			
	Vert. Top	Horiz. Top	Vert. Bot.	Horiz. Bot.	Vert. Top	Horiz. Top	Vert. Bot.	Horiz. Bot.
ft	in	in	in	in	in	in	in	in
T1 250.00-225.00	0.0000	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000
T2 225.00-200.00	0.0000	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000
T3 200.00-175.00	0.0000	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000
T4 175.00-150.00	0.0000	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000
T5 150.00-125.00	0.0000	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000
T6 125.00-100.00	0.0000	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000
T7 100.00-75.00	0.0000	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000
T8 75.00-50.00	0.0000	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000
T9 50.00-25.00	0.0000	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000
T10 25.00-0.00	0.0000	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000

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 250.00-225.00	Flange	0.7500 A325N	4	0.5000 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.5000 A325N	0	0.6250 A325N	0
T2 225.00-200.00	Flange	0.7500 A325N	4	0.5000 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.5000 A325N	0	0.6250 A325N	0
T3 200.00-175.00	Flange	0.7500 A325N	4	0.7500 A325N	0	0.6250 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.7500 A325N	0	0.6250 A325N	0
T4 175.00-150.00	Flange	0.7500 A325N	4	0.7500 A325N	0	0.6250 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.5000 A325N	0	0.6250 A325N	0
T5 150.00-125.00	Flange	0.8750 A325N	4	0.7500 A325N	0	0.6250 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.5000 A325N	0	0.6250 A325N	0
T6 125.00-100.00	Flange	1.2500 A325N	4	0.7500 A325N	0	0.6250 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.5000 A325N	0	0.6250 A325N	0
T7 100.00-75.00	Flange	1.2500 A325N	4	0.7500 A325N	0	0.6250 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.5000 A325N	0	0.6250 A325N	0
T8 75.00-50.00	Flange	1.5000 A325N	4	0.7500 A325N	0	0.6250 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.5000 A325N	0	0.6250 A325N	0
T9 50.00-25.00	Flange	1.5000 A325N	4	0.7500 A325N	0	0.6250 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.5000 A325N	0	0.6250 A325N	0
T10 25.00-0.00	Flange	1.7500 A36	4	0.7500 A325N	0	0.6250 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.5000 A325N	0	0.6250 A325N	0

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
1 5/8 (Verizon - Existing)	A	Yes	Ar (CfAe)	170.00 - 30.00	1.0000	0.38	6	6	1.9800	1.9800		1.04
1 5/8 (Verizon - Existing)	B	Yes	Ar (CfAe)	170.00 - 30.00	1.0000	-0.38	6	6	1.9800	1.9800		1.04
1 5/8 (Verizon - Existing)	A	Yes	Ar (CfAe)	30.00 - 0.00	1.0000	0.44	6	3	1.0000	1.9800		1.04
1 5/8 (Verizon - Existing)	B	Yes	Ar (CfAe)	30.00 - 0.00	1.0000	-0.44	6	3	1.0000	1.9800		1.04
1/2 (ARCH - Existing)	A	Yes	Ar (CfAe)	62.00 - 0.00	6.0000	0.45	1	1	0.5800	0.5800		0.25
1 1/4 (Velocita - Existing)	C	No	Ar (Leg)	242.00 - 0.00	0.0000	0	1	1	1.5500	1.5500		0.66
1 1/4 (Marcus - Existing)	B	No	Ar (Leg)	178.00 - 0.00	0.0000	0.025	1	1	1.5500	1.5500		0.66
1/2 (Marcus - Existing)	B	No	Ar (Leg)	197.00 - 0.00	0.0000	0.03	1	1	0.5800	0.5800		0.25
1/2 (Marcus - Existing)	B	No	Ar (Leg)	248.00 - 0.00	0.0000	0.032	1	1	0.5800	0.5800		0.25
1/2 (Various - Existing)	A	No	Ar (CfAe)	104.00 - 0.00	-4.0000	0.36	2	2	0.5800	0.5800		0.25
1/2 (Various - Existing)	A	No	Ar (CfAe)	235.00 - 104.00	-4.0000	0.36	1	1	0.5800	0.5800		0.25
7/8 (Various - Existing)	A	No	Ar (CfAe)	70.00 - 0.00	-8.0000	0.355	2	2	1.1100	1.1100		0.54
1 5/8 (Various - Existing)	A	No	Ar (CfAe)	236.00 - 0.00	-6.0000	0.35	2	2	1.0000	1.9800		1.04
1 5/8 (Various - Existing)	A	No	Ar (CfAe)	242.00 - 236.00	-6.0000	0.35	1	1	1.0000	1.9800		1.04
7/8 (Various - Existing)	B	No	Ar (CfAe)	114.00 - 0.00	-14.0000	-0.36	8	3	0.8000	1.1100		0.54
7/8 (Various - Existing)	B	No	Ar (CfAe)	126.00 - 114.00	-14.0000	-0.36	7	3	0.8000	1.1100		0.54
7/8 (Various - Existing)	B	No	Ar (CfAe)	138.00 - 126.00	-14.0000	-0.36	6	3	0.8000	1.1100		0.54
7/8 (Various - Existing)	B	No	Ar (CfAe)	178.00 - 138.00	-14.0000	-0.36	5	3	0.8000	1.1100		0.54
7/8 (Various - Existing)	B	No	Ar (CfAe)	205.00 - 178.00	-14.0000	-0.36	3	3	0.8000	1.1100		0.54
7/8	B	No	Ar (CfAe)	230.00 - 205.00	-14.0000	-0.36	2	2	0.8000	1.1100		0.54

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
(Various - Existing)												

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
T1	250.00-225.00	A	7.299	0.000	0.000	0.000	0.03
		B	2.037	0.000	0.000	0.000	0.01
		C	3.308	0.000	0.000	0.000	0.01
T2	225.00-200.00	A	12.688	0.000	0.000	0.000	0.06
		B	6.296	0.000	0.000	0.000	0.04
		C	4.438	0.000	0.000	0.000	0.02
T3	200.00-175.00	A	12.688	0.000	0.000	0.000	0.06
		B	9.597	0.000	0.000	0.000	0.06
		C	5.888	0.000	0.000	0.000	0.02
T4	175.00-150.00	A	32.487	0.000	0.000	0.000	0.18
		B	32.383	0.000	0.000	0.000	0.22
		C	8.875	0.000	0.000	0.000	0.02
T5	150.00-125.00	A	37.438	0.000	0.000	0.000	0.21
		B	37.333	0.000	0.000	0.000	0.26
		C	8.875	0.000	0.000	0.000	0.02
T6	125.00-100.00	A	37.631	0.000	0.000	0.000	0.22
		B	37.333	0.000	0.000	0.000	0.29
		C	8.875	0.000	0.000	0.000	0.02
T7	100.00-75.00	A	38.646	0.000	0.000	0.000	0.22
		B	37.333	0.000	0.000	0.000	0.29
		C	8.875	0.000	0.000	0.000	0.02
T8	75.00-50.00	A	42.926	0.000	0.000	0.000	0.25
		B	37.333	0.000	0.000	0.000	0.29
		C	8.875	0.000	0.000	0.000	0.02
T9	50.00-25.00	A	42.004	0.000	0.000	0.000	0.25
		B	34.858	0.000	0.000	0.000	0.29
		C	8.875	0.000	0.000	0.000	0.02
T10	25.00-0.00	A	32.104	0.000	0.000	0.000	0.25
		B	24.958	0.000	0.000	0.000	0.29
		C	8.875	0.000	0.000	0.000	0.02

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
T1	250.00-225.00	A	0.500	9.151	2.732	0.000	0.000	0.09
		B		3.908	0.796	0.000	0.000	0.04
		C		6.641	0.000	0.000	0.000	0.03
T2	225.00-200.00	A	0.500	14.813	6.208	0.000	0.000	0.17
		B		7.688	4.775	0.000	0.000	0.11
		C		8.604	0.000	0.000	0.000	0.05
T3	200.00-175.00	A	0.500	14.813	6.208	0.000	0.000	0.17
		B		11.222	7.958	0.000	0.000	0.18
		C		12.138	0.000	0.000	0.000	0.05
T4	175.00-150.00	A	0.500	44.612	6.208	0.000	0.000	0.48

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
		B		46.092	7.958	0.000	0.000	0.61
		C		17.208	0.000	0.000	0.000	0.05
T5	150.00-125.00	A	0.500	52.063	6.208	0.000	0.000	0.55
		B		53.542	7.958	0.000	0.000	0.71
		C		17.208	0.000	0.000	0.000	0.05
T6	125.00-100.00	A	0.500	52.063	6.595	0.000	0.000	0.56
		B		53.542	7.958	0.000	0.000	0.79
		C		17.208	0.000	0.000	0.000	0.05
T7	100.00-75.00	A	0.500	52.063	8.625	0.000	0.000	0.57
		B		53.542	7.958	0.000	0.000	0.80
		C		17.208	0.000	0.000	0.000	0.05
T8	75.00-50.00	A	0.500	60.676	8.625	0.000	0.000	0.65
		B		53.542	7.958	0.000	0.000	0.80
		C		17.208	0.000	0.000	0.000	0.05
T9	50.00-25.00	A	0.500	57.938	11.108	0.000	0.000	0.69
		B		47.333	10.442	0.000	0.000	0.82
		C		17.208	0.000	0.000	0.000	0.05
T10	25.00-0.00	A	0.500	33.104	21.042	0.000	0.000	0.75
		B		22.500	20.375	0.000	0.000	0.88
		C		17.208	0.000	0.000	0.000	0.05

Feed Line Shielding

Section	Elevation ft	Face	A_R ft^2	A_R Ice ft^2	A_F ft^2	A_F Ice ft^2
T1	250.00-225.00	A	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	0.000
T2	225.00-200.00	A	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	0.000
T3	200.00-175.00	A	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	0.000
T4	175.00-150.00	A	0.768	1.841	0.396	0.596
		B	0.768	1.841	0.396	0.596
		C	0.000	0.000	0.000	0.000
T5	150.00-125.00	A	1.080	2.440	0.495	0.745
		B	1.080	2.440	0.495	0.745
		C	0.000	0.000	0.000	0.000
T6	125.00-100.00	A	1.263	2.693	0.495	0.745
		B	1.263	2.693	0.495	0.745
		C	0.000	0.000	0.000	0.000
T7	100.00-75.00	A	0.831	1.933	0.412	0.621
		B	0.831	1.933	0.412	0.621
		C	0.000	0.000	0.000	0.000
T8	75.00-50.00	A	0.946	2.123	0.507	0.777
		B	0.924	2.036	0.495	0.745
		C	0.000	0.000	0.000	0.000
T9	50.00-25.00	A	0.817	1.891	0.470	0.736
		B	0.775	1.722	0.446	0.670
		C	0.000	0.000	0.000	0.000
T10	25.00-0.00	A	0.446	1.072	0.317	0.511
		B	0.406	0.911	0.289	0.435
		C	0.000	0.000	0.000	0.000

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
T1	250.00-225.00	-0.4638	-1.0861	-0.2149	-0.3285
T2	225.00-200.00	-1.0748	-2.8800	-0.7705	-1.3972
T3	200.00-175.00	-0.7420	-3.6142	-0.0672	-1.7158
T4	175.00-150.00	0.3976	-15.0163	1.1118	-13.3901
T5	150.00-125.00	0.4726	-19.0565	1.2787	-17.7103
T6	125.00-100.00	0.5351	-19.8158	1.4322	-18.9204
T7	100.00-75.00	0.6278	-25.2209	1.7718	-23.1366
T8	75.00-50.00	0.4919	-27.9389	1.6312	-26.8558
T9	50.00-25.00	0.4521	-28.2625	1.6440	-26.7980
T10	25.00-0.00	0.5119	-23.3256	1.9017	-16.7785

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
Rohn 6' x 12' Boom Gate (1)	A	From Leg	2.00	0.0000	170.00	No Ice	16.60	16.60	0.56
(Verizon - Existing)			0.00			1/2" Ice	19.80	19.80	0.70
			0.00						
Rohn 6' x 12' Boom Gate (1)	B	From Leg	2.00	0.0000	170.00	No Ice	16.60	16.60	0.56
(Verizon - Existing)			0.00			1/2" Ice	19.80	19.80	0.70
			0.00						
Rohn 6' x 12' Boom Gate (1)	C	From Leg	2.00	0.0000	170.00	No Ice	16.60	16.60	0.56
(Verizon - Existing)			0.00			1/2" Ice	19.80	19.80	0.70
			0.00						
LPA-80063-4CF	A	From Leg	3.00	0.0000	170.00	No Ice	7.00	6.04	0.02
(Verizon - Proposed)			6.00			1/2" Ice	7.41	6.43	0.07
			0.00						
BXA-70063/4CF	A	From Leg	3.00	0.0000	170.00	No Ice	5.16	2.44	0.01
(Verizon - Proposed)			0.00			1/2" Ice	5.55	2.74	0.04
			0.00						
BXA-171063/8BF	A	From Leg	3.00	0.0000	170.00	No Ice	2.94	2.16	0.01
(Verizon - Proposed)			-4.00			1/2" Ice	3.26	2.46	0.03
			0.00						
LPA-80063-4CF	A	From Leg	3.00	0.0000	170.00	No Ice	7.00	6.04	0.02
(Verizon - Proposed)			-6.00			1/2" Ice	7.41	6.43	0.07
			0.00						
LPA-80063-4CF	B	From Leg	3.00	0.0000	170.00	No Ice	7.00	6.04	0.02
(Verizon - Proposed)			6.00			1/2" Ice	7.41	6.43	0.07
			0.00						
BXA-70063/4CF	B	From Leg	3.00	0.0000	170.00	No Ice	5.16	2.44	0.01
(Verizon - Proposed)			0.00			1/2" Ice	5.55	2.74	0.04
			0.00						
BXA-171063/8BF	B	From Leg	3.00	0.0000	170.00	No Ice	2.94	2.16	0.01
(Verizon - Proposed)			-4.00			1/2" Ice	3.26	2.46	0.03
			0.00						

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
LPA-80063-4CF	B	From Leg	3.00	0.0000	170.00	No Ice	7.00	6.04	0.02
(Verizon - Proposed)			-6.00			1/2" Ice	7.41	6.43	0.07
			0.00						
LPA-80063-4CF	C	From Leg	3.00	0.0000	170.00	No Ice	7.00	6.04	0.02
(Verizon - Proposed)			6.00			1/2" Ice	7.41	6.43	0.07
			0.00						
BXA-70063/4CF	C	From Leg	3.00	0.0000	170.00	No Ice	5.16	2.44	0.01
(Verizon - Proposed)			0.00			1/2" Ice	5.55	2.74	0.04
			0.00						
BXA-171063/8BF	C	From Leg	3.00	0.0000	170.00	No Ice	2.94	2.16	0.01
(Verizon - Proposed)			-4.00			1/2" Ice	3.26	2.46	0.03
			0.00						
LPA-80063-4CF	C	From Leg	3.00	0.0000	170.00	No Ice	7.00	6.04	0.02
(Verizon - Proposed)			-6.00			1/2" Ice	7.41	6.43	0.07
			0.00						
(2) FD9R6004/2C-3L	A	From Leg	3.00	0.0000	170.00	No Ice	0.37	0.08	0.00
Diplexer			0.00			1/2" Ice	0.45	0.14	0.01
(Verizon - Proposed)			0.00						
(2) FD9R6004/2C-3L	B	From Leg	3.00	0.0000	170.00	No Ice	0.37	0.08	0.00
Diplexer			0.00			1/2" Ice	0.45	0.14	0.01
(Verizon - Proposed)			0.00						
(2) FD9R6004/2C-3L	C	From Leg	3.00	0.0000	170.00	No Ice	0.37	0.08	0.00
Diplexer			0.00			1/2" Ice	0.45	0.14	0.01
(Verizon - Proposed)			0.00						
Flash Beacon Lighting	C	None		0.0000	259.00	No Ice	2.70	2.70	0.05
(MCM - Existing)						1/2" Ice	3.10	3.10	0.07
10'0"x4" Pipe Mount	C	None		0.0000	253.00	No Ice	4.50	4.50	0.11
(MCM - Existing)						1/2" Ice	5.24	5.24	0.14
GPS	C	From Leg	3.00	0.0000	62.00	No Ice	1.00	1.00	0.01
(ARCH - Existing)			0.00			1/2" Ice	1.50	1.50	0.01
			0.00						
3' Side Mount Standoff	C	From Leg	1.50	0.0000	60.00	No Ice	2.64	2.64	0.04
(ARCH - Existing)			0.00			1/2" Ice	3.69	3.69	0.05
			0.00						
PD320	C	From Leg	0.50	0.0000	69.00	No Ice	2.03	2.03	0.01
(Unknown - Existing)			0.00			1/2" Ice	4.58	4.58	0.03
			0.00						
DB224	C	From Leg	2.00	0.0000	76.00	No Ice	3.15	3.15	0.03
(AAA - Existing)			0.00			1/2" Ice	5.67	5.67	0.04
			10.00						
1-ft Stand Off	C	From Leg	1.00	0.0000	76.00	No Ice	1.07	1.07	0.02
(AAA - Existing)			0.00			1/2" Ice	1.62	1.62	0.03
			0.00						
6'x4" Pipe Mount	C	From Leg	0.50	0.0000	104.00	No Ice	2.09	2.09	0.05
(Unknown - Existing)			0.00			1/2" Ice	2.46	2.46	0.07
			0.00						
ROHN 6-ft Side Arm	C	From Leg	3.00	0.0000	115.00	No Ice	6.68	6.68	0.08
(Empty)			0.00			1/2" Ice	10.00	10.00	0.10
			0.00						
1151-4	B	From Leg	1.50	0.0000	114.00	No Ice	2.53	2.53	0.02
(MCM - Existing)			0.00			1/2" Ice	4.05	4.05	0.04
			7.00						
1-ft Stand Off	C	From Leg	1.00	0.0000	114.00	No Ice	1.07	1.07	0.02
(MCM - Existing)			0.00			1/2" Ice	1.62	1.62	0.03
			0.00						
PD220	B	From Leg	1.50	0.0000	126.00	No Ice	3.08	3.08	0.02
(UI - Existing)			0.00			1/2" Ice	5.30	5.30	0.05

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			10.00						
1-ft Stand Off	C	From Leg	1.00	0.0000	126.00	No Ice	1.07	1.07	0.02
(UI - Existing)			0.00			1/2" Ice	1.62	1.62	0.03
			0.00						
DB806D-Y	B	From Leg	6.00	0.0000	138.00	No Ice	2.21	2.21	0.03
(Metrocall - Existing)			0.00			1/2" Ice	3.12	3.12	0.04
			5.00						
DB806D-Y	B	From Leg	6.00	0.0000	138.00	No Ice	2.21	2.21	0.03
(Metrocall - Existing)			0.00			1/2" Ice	3.12	3.12	0.04
			-5.00						
ROHN 6-ft Side Arm	B	From Leg	3.00	0.0000	138.00	No Ice	6.68	6.68	0.08
(Metrocall - Existing)			0.00			1/2" Ice	10.00	10.00	0.10
			0.00						
10'x2.5" Pipe Mount	B	From Face	0.50	0.0000	143.00	No Ice	2.88	2.88	0.06
(Empty)			0.00			1/2" Ice	3.91	3.91	0.08
			0.00						
PD458-1	A	From Leg	6.00	0.0000	178.00	No Ice	2.88	2.88	0.02
(MCM - Existing)			0.00			1/2" Ice	4.34	4.34	0.05
			7.00						
ROHN 6-ft Side Arm	A	From Leg	3.00	0.0000	178.00	No Ice	6.68	6.68	0.08
(MCM - Existing)			0.00			1/2" Ice	10.00	10.00	0.10
			0.00						
PD458-1	B	From Leg	6.00	0.0000	178.00	No Ice	2.88	2.88	0.02
(MCM - Existing)			0.00			1/2" Ice	4.34	4.34	0.05
			7.00						
ROHN 6-ft Side Arm	B	From Leg	3.00	0.0000	178.00	No Ice	6.68	6.68	0.08
(MCM - Existing)			0.00			1/2" Ice	10.00	10.00	0.10
			0.00						
PD458-1	C	From Leg	3.00	0.0000	178.00	No Ice	2.88	2.88	0.02
(Marcus - Existing)			0.00			1/2" Ice	4.34	4.34	0.05
			7.00						
3' Side Mount Standoff	C	From Leg	1.00	0.0000	178.00	No Ice	2.64	2.64	0.04
(Marcus - Existing)			0.00			1/2" Ice	3.69	3.69	0.05
			0.00						
PD220	B	From Leg	3.00	0.0000	205.00	No Ice	3.08	3.08	0.02
(Unknown - Existing)			0.00			1/2" Ice	5.30	5.30	0.05
			10.00						
3' Side Mount Standoff	B	From Leg	1.50	0.0000	205.00	No Ice	2.64	2.64	0.04
(Unknown - Existing)			0.00			1/2" Ice	3.69	3.69	0.05
			0.00						
PD458-1	A	From Leg	6.00	0.0000	236.00	No Ice	2.88	2.88	0.02
(Marcus - Existing)			0.00			1/2" Ice	4.34	4.34	0.05
			7.00						
ROHN 6-ft Side Arm	A	From Leg	3.00	0.0000	236.00	No Ice	6.68	6.68	0.08
(Marcus - Existing)			0.00			1/2" Ice	10.00	10.00	0.10
			0.00						
4'x4" Pipe Mount	A	From Leg	0.50	0.0000	248.00	No Ice	1.32	1.32	0.04
(Marcus - Existing)			0.00			1/2" Ice	1.58	1.58	0.06
			0.00						
PD220	B	From Leg	3.00	0.0000	230.00	No Ice	3.08	3.08	0.02
(Unknown - Existing)			0.00			1/2" Ice	5.30	5.30	0.05
			10.00						
3' Side Mount Standoff	B	From Leg	1.50	0.0000	230.00	No Ice	2.64	2.64	0.04
(Unknown - Existing)			0.00			1/2" Ice	3.69	3.69	0.05
			0.00						
PD1158S	B	From Leg	3.00	0.0000	229.00	No Ice	1.71	1.71	0.01
(Unknown - Existing)			0.00			1/2" Ice	5.45	5.45	0.03

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00						
BCD-87010N	C	From Leg	3.00	0.0000	242.00	No Ice	2.90	2.90	0.03
(Velocita - Existing)			0.00			1/2" Ice	4.05	4.05	0.05
			6.00						
3' Side Mount Standoff	C	From Leg	1.50	0.0000	242.00	No Ice	2.64	2.64	0.04
(Velocita - Existing)			0.00			1/2" Ice	3.69	3.69	0.05
			0.00						
6'x4" Pipe Mount	B	From Face	0.50	0.0000	253.00	No Ice	2.09	2.09	0.05
(WYBC - Existing)			0.00			1/2" Ice	2.46	2.46	0.07
			0.00						

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight K
2-ft dish	C	Paraboloid w/o	From	1.00	Worst		104.00	2.00	No Ice	3.14	0.05
(Unknown - Existing)		Radome	Leg	0.00					1/2" Ice	3.41	0.08
				0.00							
Andrew 2' w/Radome	C	Paraboloid	From	1.00	Worst		197.00	2.00	No Ice	3.14	0.07
(Marcus - Existing)		w/Radome	Leg	0.00					1/2" Ice	3.41	0.28
				0.00							
Andrew 4' w/Radome	A	Paraboloid	From	1.00	Worst		248.00	4.00	No Ice	12.57	0.14
(Marcus - Existing)		w/Radome	Leg	0.00					1/2" Ice	13.10	0.28
				0.00							
SRL-460	C	Grid	From	1.00	Worst		235.00	4.67	No Ice	2.70	0.02
(Marcus - Existing)			Leg	0.00					1/2" Ice	17.71	0.11
				0.00							
JMPC-1R	B	Paraboloid w/o	From	1.00	Worst		250.00	3.00	No Ice	7.07	0.07
(WYBC - Existing)		Radome	Face	0.00					1/2" Ice	7.47	0.14
				2.00							

Tower Pressures - No Ice

$G_H = 1.099$

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft^2	Face	A_F ft^2	A_R ft^2	A_{leg} ft^2	Leg % 	C_AA_A In Face ft^2	C_AA_A Out Face ft^2
T1	237.50	1.758	33	132.292	A	1.177	27.208	14.583	51.38	0.000	0.000
250.00-225.00					B	1.177	21.945		63.07	0.000	0.000
					C	1.177	23.216		59.78	0.000	0.000
T2	212.50	1.703	31	132.292	A	1.177	32.596	14.583	43.18	0.000	0.000
225.00-200.00					B	1.177	26.205		53.26	0.000	0.000

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
					C	1.177	24.346		57.14	0.000	0.000
T3	187.50	1.643	30	164.927	A	1.983	33.713	14.610	40.93	0.000	0.000
200.00-175.00					B	1.983	30.622		44.81	0.000	0.000
					C	1.983	26.914		50.56	0.000	0.000
T4	162.50	1.577	29	231.345	A	3.475	57.977	16.697	27.17	0.000	0.000
175.00-150.00					B	3.475	57.873		27.22	0.000	0.000
					C	3.871	35.133		42.81	0.000	0.000
T5	137.50	1.503	28	297.763	A	4.664	68.848	18.784	25.55	0.000	0.000
150.00-125.00					B	4.664	68.744		25.59	0.000	0.000
					C	5.159	41.366		40.37	0.000	0.000
T6	112.50	1.42	26	365.230	A	5.940	79.140	23.221	27.29	0.000	0.000
125.00-100.00					B	5.940	78.843		27.39	0.000	0.000
					C	6.435	51.648		39.98	0.000	0.000
T7	87.50	1.321	24	430.480	A	6.104	77.123	23.221	27.90	0.000	0.000
100.00-75.00					B	6.104	75.811		28.35	0.000	0.000
					C	6.516	48.183		42.45	0.000	0.000
T8 75.00-50.00	62.50	1.2	22	495.855	A	8.619	85.536	23.222	24.66	0.000	0.000
					B	8.631	79.965		26.21	0.000	0.000
					C	9.126	52.430		37.72	0.000	0.000
T9 50.00-25.00	37.50	1.037	19	563.446	A	9.943	90.385	27.654	27.56	0.000	0.000
					B	9.967	83.281		29.66	0.000	0.000
					C	10.412	58.073		40.38	0.000	0.000
T10 25.00-0.00	12.50	1	18	628.696	A	13.327	81.988	27.654	29.01	0.000	0.000
					B	13.356	74.882		31.34	0.000	0.000
					C	13.644	59.205		37.96	0.000	0.000

Tower Pressure - With Ice

$G_H = 1.099$

Section Elevation ft	z ft	K_Z	q_z psf	t_Z in	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
T1	237.50	1.758	24	0.5000	134.375	A	3.909	36.421	18.750	46.49	0.000	0.000
250.00-225.00						B	1.973	31.178		56.56	0.000	0.000
						C	1.177	33.911		53.44	0.000	0.000
T2	212.50	1.703	24	0.5000	134.375	A	7.385	42.083	18.750	37.90	0.000	0.000
225.00-200.00						B	5.952	34.958		45.83	0.000	0.000
						C	1.177	35.875		50.60	0.000	0.000
T3	187.50	1.643	23	0.5000	167.013	A	8.191	44.151	18.784	35.89	0.000	0.000
200.00-175.00						B	9.941	40.560		37.19	0.000	0.000
						C	1.983	41.477		43.22	0.000	0.000
T4	162.50	1.577	22	0.5000	233.431	A	9.483	78.478	20.871	23.73	0.000	0.000
175.00-150.00						B	11.233	79.957		22.89	0.000	0.000
						C	3.871	52.915		36.76	0.000	0.000
T5	137.50	1.503	21	0.5000	299.849	A	10.622	92.780	22.958	22.20	0.000	0.000
150.00-125.00						B	12.372	94.259		21.53	0.000	0.000
						C	5.159	60.366		35.04	0.000	0.000
T6	112.50	1.42	20	0.5000	367.317	A	12.285	104.067	27.395	23.55	0.000	0.000
125.00-100.00						B	13.649	105.546		22.98	0.000	0.000
						C	6.435	71.906		34.97	0.000	0.000
T7 100.00-75.00	87.50	1.321	18	0.5000	432.567	A	14.520	101.749	27.395	23.56	0.000	0.000
						B	13.854	103.228		23.40	0.000	0.000
						C	6.516	68.828		36.36	0.000	0.000
T8 75.00-50.00	62.50	1.2	17	0.5000	497.942	A	16.974	115.163	27.396	20.73	0.000	0.000

Section Elevation ft	z ft	K_Z	q_z psf	t_Z in	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
						B	16.339	108.116		22.01	0.000	0.000
						C	9.126	73.819		33.03	0.000	0.000
T9 50.00-25.00	37.50	1.037	14	0.5000	565.532	A	20.784	119.031	31.828	22.76	0.000	0.000
						B	20.183	108.596		24.72	0.000	0.000
						C	10.412	80.193		35.13	0.000	0.000
T10 25.00-0.00	12.50	1	14	0.5000	630.782	A	34.175	96.923	31.828	24.28	0.000	0.000
						B	33.585	86.480		26.51	0.000	0.000
						C	13.644	82.099		33.24	0.000	0.000

Tower Pressure - Service

$G_H = 1.099$

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
T1	237.50	1.758	11	132.292	A	1.177	27.208	14.583	51.38	0.000	0.000
250.00-225.00					B	1.177	21.945		63.07	0.000	0.000
					C	1.177	23.216		59.78	0.000	0.000
T2	212.50	1.703	11	132.292	A	1.177	32.596	14.583	43.18	0.000	0.000
225.00-200.00					B	1.177	26.205		53.26	0.000	0.000
					C	1.177	24.346		57.14	0.000	0.000
T3	187.50	1.643	11	164.927	A	1.983	33.713	14.610	40.93	0.000	0.000
200.00-175.00					B	1.983	30.622		44.81	0.000	0.000
					C	1.983	26.914		50.56	0.000	0.000
T4	162.50	1.577	10	231.345	A	3.475	57.977	16.697	27.17	0.000	0.000
175.00-150.00					B	3.475	57.873		27.22	0.000	0.000
					C	3.871	35.133		42.81	0.000	0.000
T5	137.50	1.503	10	297.763	A	4.664	68.848	18.784	25.55	0.000	0.000
150.00-125.00					B	4.664	68.744		25.59	0.000	0.000
					C	5.159	41.366		40.37	0.000	0.000
T6	112.50	1.42	9	365.230	A	5.940	79.140	23.221	27.29	0.000	0.000
125.00-100.00					B	5.940	78.843		27.39	0.000	0.000
					C	6.435	51.648		39.98	0.000	0.000
T7	87.50	1.321	8	430.480	A	6.104	77.123	23.221	27.90	0.000	0.000
100.00-75.00					B	6.104	75.811		28.35	0.000	0.000
					C	6.516	48.183		42.45	0.000	0.000
T8 75.00-50.00	62.50	1.2	8	495.855	A	8.619	85.536	23.222	24.66	0.000	0.000
					B	8.631	79.965		26.21	0.000	0.000
					C	9.126	52.430		37.72	0.000	0.000
T9 50.00-25.00	37.50	1.037	7	563.446	A	9.943	90.385	27.654	27.56	0.000	0.000
					B	9.967	83.281		29.66	0.000	0.000
					C	10.412	58.073		40.38	0.000	0.000
T10 25.00-0.00	12.50	1	6	628.696	A	13.327	81.988	27.654	29.01	0.000	0.000
					B	13.356	74.882		31.34	0.000	0.000
					C	13.644	59.205		37.96	0.000	0.000

Tower Forces - No Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
T1	0.05	1.01	A	0.215	2.548	0.593	1	1	17.324	1.58	63.10	A
250.00-225.00			B	0.175	2.682	0.586	1	1	14.028			
			C	0.184	2.649	0.587	1	1	14.813			
T2	0.11	1.01	A	0.255	2.422	0.603	1	1	20.840	1.75	69.88	A
225.00-200.00			B	0.207	2.573	0.592	1	1	16.686			
			C	0.193	2.62	0.589	1	1	15.517			
T3	0.13	1.30	A	0.216	2.542	0.594	1	1	22.005	1.87	74.73	A
200.00-175.00			B	0.198	2.604	0.59	1	1	20.048			
			C	0.175	2.681	0.586	1	1	17.745			
T4	0.42	1.61	A	0.266	2.391	0.606	1	1	38.608	2.96	118.41	A
175.00-150.00			B	0.265	2.393	0.606	1	1	38.538			
			C	0.169	2.704	0.584	1	1	24.405			
T5	0.49	2.38	A	0.247	2.447	0.601	1	1	46.047	3.44	137.77	A
150.00-125.00			B	0.247	2.448	0.601	1	1	45.979			
			C	0.156	2.749	0.582	1	1	29.253			
T6	0.52	3.96	A	0.233	2.49	0.598	1	1	53.240	3.83	153.04	A
125.00-100.00			B	0.232	2.492	0.597	1	1	53.047			
			C	0.159	2.739	0.583	1	1	36.541			
T7	0.53	3.61	A	0.193	2.618	0.589	1	1	51.534	3.63	145.00	A
100.00-75.00			B	0.19	2.629	0.588	1	1	50.716			
			C	0.127	2.858	0.578	1	1	34.377			
T8	0.55	4.39	A	0.19	2.63	0.588	1	1	58.947	3.78	151.33	A
75.00-50.00			B	0.179	2.669	0.586	1	1	55.512			
			C	0.124	2.869	0.578	1	1	39.423			
T9	0.56	5.21	A	0.178	2.671	0.586	1	1	62.924	3.54	141.77	A
50.00-25.00			B	0.165	2.715	0.584	1	1	58.601			
			C	0.122	2.879	0.578	1	1	43.951			
T10	0.56	5.61	A	0.152	2.766	0.582	1	1	61.022	3.43	137.25	A
25.00-0.00			B	0.14	2.807	0.58	1	1	56.791			
			C	0.116	2.901	0.577	1	1	47.797			
Sum Weight:	3.94	30.09						OTM	3210.72 kip-ft	29.81		

Tower Forces - No Ice - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
T1	0.05	1.01	A	0.215	2.548	0.593	0.825	1	17.118	1.56	62.35	A
250.00-225.00			B	0.175	2.682	0.586	0.825	1	13.822			
			C	0.184	2.649	0.587	0.825	1	14.607			
T2	0.11	1.01	A	0.255	2.422	0.603	0.825	1	20.634	1.73	69.19	A
225.00-200.00			B	0.207	2.573	0.592	0.825	1	16.480			
			C	0.193	2.62	0.589	0.825	1	15.311			
T3	0.13	1.30	A	0.216	2.542	0.594	0.825	1	21.658	1.84	73.55	A
200.00-175.00			B	0.198	2.604	0.59	0.825	1	19.701			
			C	0.175	2.681	0.586	0.825	1	17.398			
T4	0.42	1.61	A	0.266	2.391	0.606	0.825	1	38.000	2.91	116.55	A
175.00-150.00			B	0.265	2.393	0.606	0.825	1	37.930			
			C	0.169	2.704	0.584	0.825	1	23.728			
T5	0.49	2.38	A	0.247	2.447	0.601	0.825	1	45.231	3.38	135.33	A
150.00-125.00			B	0.247	2.448	0.601	0.825	1	45.163			
			C	0.156	2.749	0.582	0.825	1	28.350			
T6	0.52	3.96	A	0.233	2.49	0.598	0.825	1	52.201	3.75	150.05	A
125.00-100.00			B	0.232	2.492	0.597	0.825	1	52.008			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
			C	0.159	2.739	0.583	0.825	1	35.414			
T7	0.53	3.61	A	0.193	2.618	0.589	0.825	1	50.466	3.55	142.00	A
100.00-75.00			B	0.19	2.629	0.588	0.825	1	49.648			
			C	0.127	2.858	0.578	0.825	1	33.237			
T8	0.55	4.39	A	0.19	2.63	0.588	0.825	1	57.439	3.69	147.46	A
75.00-50.00			B	0.179	2.669	0.586	0.825	1	54.002			
			C	0.124	2.869	0.578	0.825	1	37.826			
T9	0.56	5.21	A	0.178	2.671	0.586	0.825	1	61.184	3.45	137.85	A
50.00-25.00			B	0.165	2.715	0.584	0.825	1	56.856			
			C	0.122	2.879	0.578	0.825	1	42.129			
T10	0.56	5.61	A	0.152	2.766	0.582	0.825	1	58.690	3.30	132.01	A
25.00-0.00			B	0.14	2.807	0.58	0.825	1	54.454			
			C	0.116	2.901	0.577	0.825	1	45.409			
Sum Weight:	3.94	30.09						OTM	3154.76 kip-ft	29.16		

Tower Forces - No Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
T1	0.05	1.01	A	0.215	2.548	0.593	0.8	1	17.089	1.56	62.24	A
250.00-225.00			B	0.175	2.682	0.586	0.8	1	13.792			
			C	0.184	2.649	0.587	0.8	1	14.577			
T2	0.11	1.01	A	0.255	2.422	0.603	0.8	1	20.605	1.73	69.09	A
225.00-200.00			B	0.207	2.573	0.592	0.8	1	16.451			
			C	0.193	2.62	0.589	0.8	1	15.281			
T3	0.13	1.30	A	0.216	2.542	0.594	0.8	1	21.608	1.83	73.39	A
200.00-175.00			B	0.198	2.604	0.59	0.8	1	19.651			
			C	0.175	2.681	0.586	0.8	1	17.349			
T4	0.42	1.61	A	0.266	2.391	0.606	0.8	1	37.913	2.91	116.28	A
175.00-150.00			B	0.265	2.393	0.606	0.8	1	37.843			
			C	0.169	2.704	0.584	0.8	1	23.631			
T5	0.49	2.38	A	0.247	2.447	0.601	0.8	1	45.115	3.37	134.98	A
150.00-125.00			B	0.247	2.448	0.601	0.8	1	45.046			
			C	0.156	2.749	0.582	0.8	1	28.221			
T6	0.52	3.96	A	0.233	2.49	0.598	0.8	1	52.052	3.74	149.63	A
125.00-100.00			B	0.232	2.492	0.597	0.8	1	51.859			
			C	0.159	2.739	0.583	0.8	1	35.254			
T7	0.53	3.61	A	0.193	2.618	0.589	0.8	1	50.313	3.54	141.57	A
100.00-75.00			B	0.19	2.629	0.588	0.8	1	49.495			
			C	0.127	2.858	0.578	0.8	1	33.074			
T8	0.55	4.39	A	0.19	2.63	0.588	0.8	1	57.223	3.67	146.91	A
75.00-50.00			B	0.179	2.669	0.586	0.8	1	53.786			
			C	0.124	2.869	0.578	0.8	1	37.598			
T9	0.56	5.21	A	0.178	2.671	0.586	0.8	1	60.935	3.43	137.29	A
50.00-25.00			B	0.165	2.715	0.584	0.8	1	56.607			
			C	0.122	2.879	0.578	0.8	1	41.869			
T10	0.56	5.61	A	0.152	2.766	0.582	0.8	1	58.356	3.28	131.26	A
25.00-0.00			B	0.14	2.807	0.58	0.8	1	54.120			
			C	0.116	2.901	0.577	0.8	1	45.068			
Sum Weight:	3.94	30.09						OTM	3146.76 kip-ft	29.07		

Tower Forces - No Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
T1	0.05	1.01	A	0.215	2.548	0.593	0.85	1	17.148	1.56	62.46	A
250.00-225.00			B	0.175	2.682	0.586	0.85	1	13.851			
			C	0.184	2.649	0.587	0.85	1	14.636			
T2	0.11	1.01	A	0.255	2.422	0.603	0.85	1	20.664	1.73	69.29	A
225.00-200.00			B	0.207	2.573	0.592	0.85	1	16.510			
			C	0.193	2.62	0.589	0.85	1	15.340			
T3	0.13	1.30	A	0.216	2.542	0.594	0.85	1	21.707	1.84	73.72	A
200.00-175.00			B	0.198	2.604	0.59	0.85	1	19.751			
			C	0.175	2.681	0.586	0.85	1	17.448			
T4	0.42	1.61	A	0.266	2.391	0.606	0.85	1	38.087	2.92	116.81	A
175.00-150.00			B	0.265	2.393	0.606	0.85	1	38.017			
			C	0.169	2.704	0.584	0.85	1	23.825			
T5	0.49	2.38	A	0.247	2.447	0.601	0.85	1	45.348	3.39	135.68	A
150.00-125.00			B	0.247	2.448	0.601	0.85	1	45.279			
			C	0.156	2.749	0.582	0.85	1	28.479			
T6	0.52	3.96	A	0.233	2.49	0.598	0.85	1	52.349	3.76	150.48	A
125.00-100.00			B	0.232	2.492	0.597	0.85	1	52.156			
			C	0.159	2.739	0.583	0.85	1	35.575			
T7	0.53	3.61	A	0.193	2.618	0.589	0.85	1	50.619	3.56	142.43	A
100.00-75.00			B	0.19	2.629	0.588	0.85	1	49.800			
			C	0.127	2.858	0.578	0.85	1	33.400			
T8	0.55	4.39	A	0.19	2.63	0.588	0.85	1	57.654	3.70	148.01	A
75.00-50.00			B	0.179	2.669	0.586	0.85	1	54.218			
			C	0.124	2.869	0.578	0.85	1	38.054			
T9	0.56	5.21	A	0.178	2.671	0.586	0.85	1	61.432	3.46	138.41	A
50.00-25.00			B	0.165	2.715	0.584	0.85	1	57.106			
			C	0.122	2.879	0.578	0.85	1	42.389			
T10	0.56	5.61	A	0.152	2.766	0.582	0.85	1	59.023	3.32	132.76	A
25.00-0.00			B	0.14	2.807	0.58	0.85	1	54.787			
			C	0.116	2.901	0.577	0.85	1	45.750			
Sum Weight:	3.94	30.09						OTM	3162.75 kip-ft	29.25		

Tower Forces - With Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
T1	0.16	1.38	A	0.3	2.296	0.616	1	1	26.342	1.62	64.83	A
250.00-225.00			B	0.247	2.447	0.601	1	1	20.712			
			C	0.261	2.405	0.605	1	1	21.686			
T2	0.33	1.38	A	0.368	2.131	0.639	1	1	34.281	1.90	75.85	A
225.00-200.00			B	0.304	2.284	0.617	1	1	27.531			
			C	0.276	2.363	0.609	1	1	23.017			
T3	0.40	1.70	A	0.313	2.261	0.62	1	1	35.569	2.01	80.58	A
200.00-175.00			B	0.302	2.29	0.617	1	1	34.952			
			C	0.26	2.407	0.605	1	1	27.057			
T4	1.13	2.17	A	0.377	2.112	0.642	1	1	59.898	3.16	126.28	B
175.00-150.00			B	0.391	2.083	0.648	1	1	63.031			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
			C	0.243	2.458	0.6	1	1	35.629			
T5	1.31	3.10	A	0.345	2.184	0.631	1	1	69.134	3.57	142.88	B
150.00-125.00			B	0.356	2.159	0.634	1	1	72.179			
			C	0.219	2.535	0.594	1	1	41.038			
T6	1.39	4.89	A	0.317	2.252	0.621	1	1	76.929	3.84	153.67	B
125.00-100.00			B	0.325	2.233	0.624	1	1	79.478			
			C	0.213	2.552	0.593	1	1	49.090			
T7	1.43	4.53	A	0.269	2.382	0.607	1	1	76.266	3.67	146.65	B
100.00-75.00			B	0.271	2.377	0.607	1	1	76.550			
			C	0.174	2.685	0.585	1	1	46.813			
T8	1.50	5.49	A	0.265	2.392	0.606	1	1	86.753	3.80	151.93	A
75.00-50.00			B	0.25	2.438	0.602	1	1	81.409			
			C	0.167	2.711	0.584	1	1	52.247			
T9	1.55	6.43	A	0.247	2.446	0.601	1	1	92.343	3.57	142.89	A
50.00-25.00			B	0.228	2.506	0.596	1	1	84.955			
			C	0.16	2.734	0.583	1	1	57.172			
T10	1.67	6.99	A	0.208	2.57	0.592	1	1	91.556	3.59	143.53	A
25.00-0.00			B	0.19	2.629	0.588	1	1	84.476			
			C	0.152	2.765	0.582	1	1	61.405			
Sum Weight:	10.86	38.06						OTM	3338.96 kip-ft	30.73		

Tower Forces - With Ice - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
T1	0.16	1.38	A	0.3	2.296	0.616	0.825	1	25.658	1.58	63.15	A
250.00-225.00			B	0.247	2.447	0.601	0.825	1	20.367			
			C	0.261	2.405	0.605	0.825	1	21.480			
T2	0.33	1.38	A	0.368	2.131	0.639	0.825	1	32.989	1.82	72.99	A
225.00-200.00			B	0.304	2.284	0.617	0.825	1	26.489			
			C	0.276	2.363	0.609	0.825	1	22.811			
T3	0.40	1.70	A	0.313	2.261	0.62	0.825	1	34.136	1.93	77.34	A
200.00-175.00			B	0.302	2.29	0.617	0.825	1	33.212			
			C	0.26	2.407	0.605	0.825	1	26.710			
T4	1.13	2.17	A	0.377	2.112	0.642	0.825	1	58.239	3.06	122.34	B
175.00-150.00			B	0.391	2.083	0.648	0.825	1	61.066			
			C	0.243	2.458	0.6	0.825	1	34.951			
T5	1.31	3.10	A	0.345	2.184	0.631	0.825	1	67.275	3.46	138.59	B
150.00-125.00			B	0.356	2.159	0.634	0.825	1	70.014			
			C	0.219	2.535	0.594	0.825	1	40.135			
T6	1.39	4.89	A	0.317	2.252	0.621	0.825	1	74.779	3.73	149.06	B
125.00-100.00			B	0.325	2.233	0.624	0.825	1	77.090			
			C	0.213	2.552	0.593	0.825	1	47.964			
T7	1.43	4.53	A	0.269	2.382	0.607	0.825	1	73.725	3.55	142.00	B
100.00-75.00			B	0.271	2.377	0.607	0.825	1	74.126			
			C	0.174	2.685	0.585	0.825	1	45.672			
T8	1.50	5.49	A	0.265	2.392	0.606	0.825	1	83.783	3.67	146.73	A
75.00-50.00			B	0.25	2.438	0.602	0.825	1	78.550			
			C	0.167	2.711	0.584	0.825	1	50.650			
T9	1.55	6.43	A	0.247	2.446	0.601	0.825	1	88.705	3.43	137.26	A
50.00-25.00			B	0.228	2.506	0.596	0.825	1	81.423			
			C	0.16	2.734	0.583	0.825	1	55.350			
T10	1.67	6.99	A	0.208	2.57	0.592	0.825	1	85.575	3.35	134.15	A

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
25.00-0.00			B	0.19	2.629	0.588	0.825	1	78.599			
			C	0.152	2.765	0.582	0.825	1	59.018			
Sum Weight:	10.86	38.06						OTM	3228.33 kip-ft	29.59		

Tower Forces - With Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face e	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
T1	0.16	1.38	A	0.3	2.296	0.616	0.8	1	25.560	1.57	62.90	A
250.00-225.00			B	0.247	2.447	0.601	0.8	1	20.318			
			C	0.261	2.405	0.605	0.8	1	21.450			
T2	0.33	1.38	A	0.368	2.131	0.639	0.8	1	32.804	1.81	72.58	A
225.00-200.00			B	0.304	2.284	0.617	0.8	1	26.340			
			C	0.276	2.363	0.609	0.8	1	22.781			
T3	0.40	1.70	A	0.313	2.261	0.62	0.8	1	33.931	1.92	76.87	A
200.00-175.00			B	0.302	2.29	0.617	0.8	1	32.964			
			C	0.26	2.407	0.605	0.8	1	26.661			
T4	1.13	2.17	A	0.377	2.112	0.642	0.8	1	58.002	3.04	121.78	B
175.00-150.00			B	0.391	2.083	0.648	0.8	1	60.785			
			C	0.243	2.458	0.6	0.8	1	34.855			
T5	1.31	3.10	A	0.345	2.184	0.631	0.8	1	67.009	3.45	137.98	B
150.00-125.00			B	0.356	2.159	0.634	0.8	1	69.705			
			C	0.219	2.535	0.594	0.8	1	40.006			
T6	1.39	4.89	A	0.317	2.252	0.621	0.8	1	74.472	3.71	148.40	B
125.00-100.00			B	0.325	2.233	0.624	0.8	1	76.748			
			C	0.213	2.552	0.593	0.8	1	47.803			
T7	1.43	4.53	A	0.269	2.382	0.607	0.8	1	73.362	3.53	141.34	B
100.00-75.00			B	0.271	2.377	0.607	0.8	1	73.780			
			C	0.174	2.685	0.585	0.8	1	45.510			
T8	1.50	5.49	A	0.265	2.392	0.606	0.8	1	83.358	3.65	145.98	A
75.00-50.00			B	0.25	2.438	0.602	0.8	1	78.142			
			C	0.167	2.711	0.584	0.8	1	50.422			
T9	1.55	6.43	A	0.247	2.446	0.601	0.8	1	88.186	3.41	136.46	A
50.00-25.00			B	0.228	2.506	0.596	0.8	1	80.918			
			C	0.16	2.734	0.583	0.8	1	55.090			
T10	1.67	6.99	A	0.208	2.57	0.592	0.8	1	84.721	3.32	132.81	A
25.00-0.00			B	0.19	2.629	0.588	0.8	1	77.759			
			C	0.152	2.765	0.582	0.8	1	58.676			
Sum Weight:	10.86	38.06						OTM	3212.53 kip-ft	29.43		

Tower Forces - With Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face e	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
T1	0.16	1.38	A	0.3	2.296	0.616	0.85	1	25.756	1.58	63.39	A

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
250.00-225.00			B	0.247	2.447	0.601	0.85	1	20.416			
			C	0.261	2.405	0.605	0.85	1	21.509			
T2	0.33	1.38	A	0.368	2.131	0.639	0.85	1	33.174	1.83	73.40	A
225.00-200.00			B	0.304	2.284	0.617	0.85	1	26.638			
			C	0.276	2.363	0.609	0.85	1	22.840			
T3	0.40	1.70	A	0.313	2.261	0.62	0.85	1	34.340	1.94	77.80	A
200.00-175.00			B	0.302	2.29	0.617	0.85	1	33.461			
			C	0.26	2.407	0.605	0.85	1	26.760			
T4	1.13	2.17	A	0.377	2.112	0.642	0.85	1	58.476	3.07	122.90	B
175.00-150.00			B	0.391	2.083	0.648	0.85	1	61.347			
			C	0.243	2.458	0.6	0.85	1	35.048			
T5	1.31	3.10	A	0.345	2.184	0.631	0.85	1	67.541	3.48	139.21	B
150.00-125.00			B	0.356	2.159	0.634	0.85	1	70.323			
			C	0.219	2.535	0.594	0.85	1	40.264			
T6	1.39	4.89	A	0.317	2.252	0.621	0.85	1	75.086	3.74	149.72	B
125.00-100.00			B	0.325	2.233	0.624	0.85	1	77.431			
			C	0.213	2.552	0.593	0.85	1	48.125			
T7	1.43	4.53	A	0.269	2.382	0.607	0.85	1	74.088	3.57	142.67	B
100.00-75.00			B	0.271	2.377	0.607	0.85	1	74.472			
			C	0.174	2.685	0.585	0.85	1	45.835			
T8	1.50	5.49	A	0.265	2.392	0.606	0.85	1	84.207	3.69	147.47	A
75.00-50.00			B	0.25	2.438	0.602	0.85	1	78.959			
			C	0.167	2.711	0.584	0.85	1	50.878			
T9	1.55	6.43	A	0.247	2.446	0.601	0.85	1	89.225	3.45	138.07	A
50.00-25.00			B	0.228	2.506	0.596	0.85	1	81.928			
			C	0.16	2.734	0.583	0.85	1	55.611			
T10	1.67	6.99	A	0.208	2.57	0.592	0.85	1	86.430	3.39	135.49	A
25.00-0.00			B	0.19	2.629	0.588	0.85	1	79.438			
			C	0.152	2.765	0.582	0.85	1	59.359			
Sum Weight:	10.86	38.06						OTM	3244.14 kip-ft	29.75		

Tower Forces - Service - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.05	1.01	A	0.215	2.548	0.593	1	1	17.324	0.55	21.83	A
250.00-225.00			B	0.175	2.682	0.586	1	1	14.028			
			C	0.184	2.649	0.587	1	1	14.813			
T2	0.11	1.01	A	0.255	2.422	0.603	1	1	20.840	0.60	24.18	A
225.00-200.00			B	0.207	2.573	0.592	1	1	16.686			
			C	0.193	2.62	0.589	1	1	15.517			
T3	0.13	1.30	A	0.216	2.542	0.594	1	1	22.005	0.65	25.86	A
200.00-175.00			B	0.198	2.604	0.59	1	1	20.048			
			C	0.175	2.681	0.586	1	1	17.745			
T4	0.42	1.61	A	0.266	2.391	0.606	1	1	38.608	1.02	40.97	A
175.00-150.00			B	0.265	2.393	0.606	1	1	38.538			
			C	0.169	2.704	0.584	1	1	24.405			
T5	0.49	2.38	A	0.247	2.447	0.601	1	1	46.047	1.19	47.67	A
150.00-125.00			B	0.247	2.448	0.601	1	1	45.979			
			C	0.156	2.749	0.582	1	1	29.253			
T6	0.52	3.96	A	0.233	2.49	0.598	1	1	53.240	1.32	52.96	A
125.00-100.00			B	0.232	2.492	0.597	1	1	53.047			
			C	0.159	2.739	0.583	1	1	36.541			

Section Elevation ft	Add Weight K	Self Weight K	Face e	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T7	0.53	3.61	A	0.193	2.618	0.589	1	1	51.534	1.25	50.17	A
100.00-75.00			B	0.19	2.629	0.588	1	1	50.716			
			C	0.127	2.858	0.578	1	1	34.377			
T8	0.55	4.39	A	0.19	2.63	0.588	1	1	58.947	1.31	52.36	A
75.00-50.00			B	0.179	2.669	0.586	1	1	55.512			
			C	0.124	2.869	0.578	1	1	39.423			
T9	0.56	5.21	A	0.178	2.671	0.586	1	1	62.924	1.23	49.06	A
50.00-25.00			B	0.165	2.715	0.584	1	1	58.601			
			C	0.122	2.879	0.578	1	1	43.951			
T10	0.56	5.61	A	0.152	2.766	0.582	1	1	61.022	1.19	47.49	A
25.00-0.00			B	0.14	2.807	0.58	1	1	56.791			
			C	0.116	2.901	0.577	1	1	47.797			
Sum Weight:	3.94	30.09						OTM	1110.98 kip-ft	10.31		

Tower Forces - Service - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face e	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.05	1.01	A	0.215	2.548	0.593	0.825	1	17.118	0.54	21.57	A
250.00-225.00			B	0.175	2.682	0.586	0.825	1	13.822			
			C	0.184	2.649	0.587	0.825	1	14.607			
T2	0.11	1.01	A	0.255	2.422	0.603	0.825	1	20.634	0.60	23.94	A
225.00-200.00			B	0.207	2.573	0.592	0.825	1	16.480			
			C	0.193	2.62	0.589	0.825	1	15.311			
T3	0.13	1.30	A	0.216	2.542	0.594	0.825	1	21.658	0.64	25.45	A
200.00-175.00			B	0.198	2.604	0.59	0.825	1	19.701			
			C	0.175	2.681	0.586	0.825	1	17.398			
T4	0.42	1.61	A	0.266	2.391	0.606	0.825	1	38.000	1.01	40.33	A
175.00-150.00			B	0.265	2.393	0.606	0.825	1	37.930			
			C	0.169	2.704	0.584	0.825	1	23.728			
T5	0.49	2.38	A	0.247	2.447	0.601	0.825	1	45.231	1.17	46.83	A
150.00-125.00			B	0.247	2.448	0.601	0.825	1	45.163			
			C	0.156	2.749	0.582	0.825	1	28.350			
T6	0.52	3.96	A	0.233	2.49	0.598	0.825	1	52.201	1.30	51.92	A
125.00-100.00			B	0.232	2.492	0.597	0.825	1	52.008			
			C	0.159	2.739	0.583	0.825	1	35.414			
T7	0.53	3.61	A	0.193	2.618	0.589	0.825	1	50.466	1.23	49.13	A
100.00-75.00			B	0.19	2.629	0.588	0.825	1	49.648			
			C	0.127	2.858	0.578	0.825	1	33.237			
T8	0.55	4.39	A	0.19	2.63	0.588	0.825	1	57.439	1.28	51.02	A
75.00-50.00			B	0.179	2.669	0.586	0.825	1	54.002			
			C	0.124	2.869	0.578	0.825	1	37.826			
T9	0.56	5.21	A	0.178	2.671	0.586	0.825	1	61.184	1.19	47.70	A
50.00-25.00			B	0.165	2.715	0.584	0.825	1	56.856			
			C	0.122	2.879	0.578	0.825	1	42.129			
T10	0.56	5.61	A	0.152	2.766	0.582	0.825	1	58.690	1.14	45.68	A
25.00-0.00			B	0.14	2.807	0.58	0.825	1	54.454			
			C	0.116	2.901	0.577	0.825	1	45.409			
Sum Weight:	3.94	30.09						OTM	1091.61 kip-ft	10.09		

Tower Forces - Service - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.05	1.01	A	0.215	2.548	0.593	0.8	1	17.089	0.54	21.54	A
250.00-225.00			B	0.175	2.682	0.586	0.8	1	13.792			
			C	0.184	2.649	0.587	0.8	1	14.577			
T2	0.11	1.01	A	0.255	2.422	0.603	0.8	1	20.605	0.60	23.91	A
225.00-200.00			B	0.207	2.573	0.592	0.8	1	16.451			
			C	0.193	2.62	0.589	0.8	1	15.281			
T3	0.13	1.30	A	0.216	2.542	0.594	0.8	1	21.608	0.63	25.39	A
200.00-175.00			B	0.198	2.604	0.59	0.8	1	19.651			
			C	0.175	2.681	0.586	0.8	1	17.349			
T4	0.42	1.61	A	0.266	2.391	0.606	0.8	1	37.913	1.01	40.24	A
175.00-150.00			B	0.265	2.393	0.606	0.8	1	37.843			
			C	0.169	2.704	0.584	0.8	1	23.631			
T5	0.49	2.38	A	0.247	2.447	0.601	0.8	1	45.115	1.17	46.71	A
150.00-125.00			B	0.247	2.448	0.601	0.8	1	45.046			
			C	0.156	2.749	0.582	0.8	1	28.221			
T6	0.52	3.96	A	0.233	2.49	0.598	0.8	1	52.052	1.29	51.77	A
125.00-100.00			B	0.232	2.492	0.597	0.8	1	51.859			
			C	0.159	2.739	0.583	0.8	1	35.254			
T7	0.53	3.61	A	0.193	2.618	0.589	0.8	1	50.313	1.22	48.99	A
100.00-75.00			B	0.19	2.629	0.588	0.8	1	49.495			
			C	0.127	2.858	0.578	0.8	1	33.074			
T8	0.55	4.39	A	0.19	2.63	0.588	0.8	1	57.223	1.27	50.83	A
75.00-50.00			B	0.179	2.669	0.586	0.8	1	53.786			
			C	0.124	2.869	0.578	0.8	1	37.598			
T9	0.56	5.21	A	0.178	2.671	0.586	0.8	1	60.935	1.19	47.50	A
50.00-25.00			B	0.165	2.715	0.584	0.8	1	56.607			
			C	0.122	2.879	0.578	0.8	1	41.869			
T10	0.56	5.61	A	0.152	2.766	0.582	0.8	1	58.356	1.14	45.42	A
25.00-0.00			B	0.14	2.807	0.58	0.8	1	54.120			
			C	0.116	2.901	0.577	0.8	1	45.068			
Sum Weight:	3.94	30.09						OTM	1088.85 kip-ft	10.06		

Tower Forces - Service - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.05	1.01	A	0.215	2.548	0.593	0.85	1	17.148	0.54	21.61	A
250.00-225.00			B	0.175	2.682	0.586	0.85	1	13.851			
			C	0.184	2.649	0.587	0.85	1	14.636			
T2	0.11	1.01	A	0.255	2.422	0.603	0.85	1	20.664	0.60	23.98	A
225.00-200.00			B	0.207	2.573	0.592	0.85	1	16.510			
			C	0.193	2.62	0.589	0.85	1	15.340			
T3	0.13	1.30	A	0.216	2.542	0.594	0.85	1	21.707	0.64	25.51	A
200.00-175.00			B	0.198	2.604	0.59	0.85	1	19.751			
			C	0.175	2.681	0.586	0.85	1	17.448			
T4	0.42	1.61	A	0.266	2.391	0.606	0.85	1	38.087	1.01	40.42	A
175.00-150.00			B	0.265	2.393	0.606	0.85	1	38.017			
			C	0.169	2.704	0.584	0.85	1	23.825			

Section Elevation ft	Add Weight K	Self Weight K	Face e	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T5	0.49	2.38	A	0.247	2.447	0.601	0.85	1	45.348	1.17	46.95	A
150.00-125.00			B	0.247	2.448	0.601	0.85	1	45.279			
			C	0.156	2.749	0.582	0.85	1	28.479			
T6	0.52	3.96	A	0.233	2.49	0.598	0.85	1	52.349	1.30	52.07	A
125.00-100.00			B	0.232	2.492	0.597	0.85	1	52.156			
			C	0.159	2.739	0.583	0.85	1	35.575			
T7	0.53	3.61	A	0.193	2.618	0.589	0.85	1	50.619	1.23	49.28	A
100.00-75.00			B	0.19	2.629	0.588	0.85	1	49.800			
			C	0.127	2.858	0.578	0.85	1	33.400			
T8	0.55	4.39	A	0.19	2.63	0.588	0.85	1	57.654	1.28	51.22	A
75.00-50.00			B	0.179	2.669	0.586	0.85	1	54.218			
			C	0.124	2.869	0.578	0.85	1	38.054			
T9	0.56	5.21	A	0.178	2.671	0.586	0.85	1	61.432	1.20	47.89	A
50.00-25.00			B	0.165	2.715	0.584	0.85	1	57.106			
			C	0.122	2.879	0.578	0.85	1	42.389			
T10	0.56	5.61	A	0.152	2.766	0.582	0.85	1	59.023	1.15	45.94	A
25.00-0.00			B	0.14	2.807	0.58	0.85	1	54.787			
			C	0.116	2.901	0.577	0.85	1	45.750			
Sum Weight:	3.94	30.09						OTM	1094.38 kip-ft	10.12		

Force Totals

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
Leg Weight	12.95					
Bracing Weight	17.13					
Total Member Self-Weight	30.09			-24.15	0.43	
Total Weight	37.59			-24.15	0.43	
Wind 0 deg - No Ice		0.00	-37.84	-4704.85	0.43	1.76
Wind 30 deg - No Ice		18.64	-32.29	-4036.21	-2315.93	-20.51
Wind 45 deg - No Ice		26.30	-26.30	-3294.33	-3269.75	-29.79
Wind 60 deg - No Ice		32.13	-18.55	-2332.52	-3997.78	-36.97
Wind 90 deg - No Ice		37.29	0.00	-24.15	-4632.29	-44.03
Wind 120 deg - No Ice		32.77	18.92	2316.19	-4053.17	-39.87
Wind 135 deg - No Ice		26.30	26.30	3246.02	-3269.75	-32.24
Wind 150 deg - No Ice		18.64	32.29	3987.90	-2315.93	-23.52
Wind 180 deg - No Ice		0.00	37.10	4592.58	0.43	-1.73
Wind 210 deg - No Ice		-18.64	32.29	3987.90	2316.79	20.51
Wind 225 deg - No Ice		-26.30	26.30	3246.02	3270.61	29.79
Wind 240 deg - No Ice		-32.77	18.92	2316.19	4054.03	38.11
Wind 270 deg - No Ice		-37.29	0.00	-24.15	4633.16	44.03
Wind 300 deg - No Ice		-32.13	-18.55	-2332.52	3998.64	38.71
Wind 315 deg - No Ice		-26.30	-26.30	-3294.33	3270.61	32.24
Wind 330 deg - No Ice		-18.64	-32.29	-4036.21	2316.79	23.52
Member Ice	7.97					
Total Weight Ice	54.55			-67.23	-0.00	
Wind 0 deg - Ice		0.00	-39.17	-4978.68	-0.00	2.33
Wind 30 deg - Ice		19.10	-33.08	-4238.55	-2408.32	-16.47
Wind 45 deg - Ice		26.89	-26.89	-3461.93	-3394.70	-24.29
Wind 60 deg - Ice		32.80	-18.93	-2459.74	-4143.95	-30.37
Wind 90 deg - Ice		38.19	0.00	-67.23	-4816.63	-36.79
Wind 120 deg - Ice		33.92	19.58	2388.50	-4253.44	-34.24
Wind 135 deg - Ice		26.89	26.89	3327.47	-3394.70	-27.41

Load Case	Vertical Forces K	Sum of Forces X K	Sum of Forces Z K	Sum of Overturning Moments, M_x kip-ft	Sum of Overturning Moments, M_z kip-ft	Sum of Torques kip-ft
Wind 150 deg - Ice		19.10	33.08	4104.09	-2408.32	-20.32
Wind 180 deg - Ice		0.00	37.87	4717.79	-0.00	-2.19
Wind 210 deg - Ice		-19.10	33.08	4104.09	2408.31	16.47
Wind 225 deg - Ice		-26.89	26.89	3327.47	3394.69	24.29
Wind 240 deg - Ice		-33.92	19.58	2388.50	4253.44	31.91
Wind 270 deg - Ice		-38.19	0.00	-67.23	4816.63	36.79
Wind 300 deg - Ice		-32.80	-18.93	-2459.74	4143.95	32.56
Wind 315 deg - Ice		-26.89	-26.89	-3461.93	3394.69	27.41
Wind 330 deg - Ice		-19.10	-33.08	-4238.55	2408.31	20.32
Total Weight	37.59			-24.15	0.43	
Wind 0 deg - Service		0.00	-13.09	-1617.97	0.76	0.61
Wind 30 deg - Service		6.45	-11.17	-1386.61	-800.75	-7.10
Wind 45 deg - Service		9.10	-9.10	-1129.90	-1130.79	-10.31
Wind 60 deg - Service		11.12	-6.42	-797.09	-1382.70	-12.79
Wind 90 deg - Service		12.90	0.00	1.65	-1602.25	-15.23
Wind 120 deg - Service		11.34	6.55	811.46	-1401.87	-13.80
Wind 135 deg - Service		9.10	9.10	1133.20	-1130.79	-11.16
Wind 150 deg - Service		6.45	11.17	1389.90	-800.75	-8.14
Wind 180 deg - Service		0.00	12.84	1599.14	0.76	-0.60
Wind 210 deg - Service		-6.45	11.17	1389.90	802.27	7.10
Wind 225 deg - Service		-9.10	9.10	1133.20	1132.31	10.31
Wind 240 deg - Service		-11.34	6.55	811.46	1403.39	13.19
Wind 270 deg - Service		-12.90	0.00	1.65	1603.78	15.23
Wind 300 deg - Service		-11.12	-6.42	-797.09	1384.23	13.39
Wind 315 deg - Service		-9.10	-9.10	-1129.90	1132.31	11.16
Wind 330 deg - Service		-6.45	-11.17	-1386.61	802.27	8.14

Load Combinations

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

Comb. No.	Description
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	250 - 225	Leg	Max Tension	22	12.91	-0.66	0.32
			Max. Compression	30	-14.28	0.70	-0.26
			Max. Mx	33	-1.06	0.93	-0.75
			Max. My	22	-2.43	-0.04	1.34
			Max. Vy	33	0.56	0.32	-0.75
			Max. Vx	27	0.47	0.56	-1.16
		Diagonal	Max Tension	28	4.46	0.00	0.00
			Max. Compression	20	-4.41	0.00	0.00
			Max. Mx	20	1.40	0.02	0.00
			Max. My	30	0.91	0.00	-0.00
			Max. Vy	20	-0.01	0.00	0.00
			Max. Vx	30	0.00	0.00	0.00
		Top Girt	Max Tension	10	0.52	0.00	0.00
			Max. Compression	2	-0.50	0.00	0.00
			Max. Mx	19	0.03	-0.02	0.00
			Max. My	6	-0.15	0.00	0.00
			Max. Vy	19	0.02	0.00	0.00
			Max. Vx	6	-0.00	0.00	0.00
T2	225 - 200	Leg	Max Tension	22	42.01	-1.13	0.22
			Max. Compression	19	-45.31	-0.66	1.32
			Max. Mx	31	-37.56	1.66	0.02
			Max. My	26	-37.47	-0.85	-1.46
			Max. Vy	31	-0.42	1.66	0.02
			Max. Vx	19	-0.44	0.04	1.19
		Diagonal	Max Tension	28	5.68	0.00	0.00
			Max. Compression	20	-5.73	0.00	0.00
			Max. Mx	34	4.09	0.02	0.00
			Max. My	30	0.49	0.00	-0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vy	34	-0.01	0.00	0.00
			Max. Vx	30	0.00	0.00	0.00
		Top Girt	Max Tension	20	2.85	0.00	0.00
			Max. Compression	28	-2.88	0.00	0.00
			Max. Mx	27	-0.30	-0.02	0.00
			Max. My	14	1.39	0.00	0.00
			Max. Vy	27	0.02	0.00	0.00
			Max. Vx	14	-0.00	0.00	0.00
T3	200 - 175	Leg	Max Tension	22	55.91	-1.16	-0.58
			Max. Compression	19	-61.73	1.27	0.61
			Max. Mx	26	-52.07	1.86	1.70
			Max. My	10	-26.07	1.64	1.90
			Max. Vy	34	0.46	-1.60	-1.36
			Max. Vx	19	0.48	-1.50	-1.65
		Diagonal	Max Tension	8	3.32	0.00	0.00
			Max. Compression	16	-3.23	0.00	0.00
			Max. Mx	34	2.60	0.04	0.00
			Max. My	22	-0.34	0.00	0.00
			Max. Vy	34	-0.02	0.00	0.00
			Max. Vx	24	-0.00	0.00	0.00
		Top Girt	Max Tension	33	1.30	0.00	0.00
			Max. Compression	19	-1.59	0.00	0.00
			Max. Mx	18	-0.03	-0.02	0.00
			Max. My	23	-1.17	0.00	0.00
			Max. Vy	18	0.01	0.00	0.00
			Max. Vx	23	0.00	0.00	0.00
		Mid Girt	Max Tension	30	0.17	0.00	0.00
			Max. Compression	8	-0.21	0.00	0.00
			Max. Mx	18	0.02	-0.02	0.00
			Max. My	23	0.07	0.00	0.00
			Max. Vy	18	0.01	0.00	0.00
			Max. Vx	23	0.00	0.00	0.00
T4	175 - 150	Leg	Max Tension	22	75.75	0.63	-0.28
			Max. Compression	19	-85.99	0.68	-0.42
			Max. Mx	20	-61.82	-2.24	-2.94
			Max. My	20	-58.60	-1.56	-3.34
			Max. Vy	4	1.10	-1.06	0.98
			Max. Vx	4	0.86	0.75	1.20
		Diagonal	Max Tension	9	7.11	0.00	0.00
			Max. Compression	17	-7.09	0.00	0.00
			Max. Mx	34	6.29	0.09	0.00
			Max. My	21	1.06	0.00	0.00
			Max. Vy	34	-0.03	0.00	0.00
			Max. Vx	21	0.00	0.00	0.00
		Top Girt	Max Tension	14	0.93	0.00	0.00
			Max. Compression	6	-0.95	0.00	0.00
			Max. Mx	18	0.02	-0.08	0.00
			Max. My	23	0.42	0.00	0.00
			Max. Vy	18	-0.04	0.00	0.00
			Max. Vx	23	-0.00	0.00	0.00
		Mid Girt	Max Tension	13	0.53	0.00	0.00
			Max. Compression	6	-0.47	0.00	0.00
			Max. Mx	18	0.04	-0.04	0.00
			Max. My	23	0.00	0.00	0.00
			Max. Vy	18	0.02	0.00	0.00
			Max. Vx	23	-0.00	0.00	0.00
T5	150 - 125	Leg	Max Tension	22	97.21	-0.99	-0.26
			Max. Compression	19	-111.36	1.01	-0.16
			Max. Mx	26	-82.83	1.93	1.31
			Max. My	19	-92.15	0.10	-1.39
			Max. Vy	25	-0.63	1.88	1.27

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vx	26	-0.53	1.93	1.31
		Diagonal	Max Tension	9	8.16	0.00	0.00
			Max. Compression	17	-8.20	0.00	0.00
			Max. Mx	34	7.67	0.21	0.00
			Max. My	24	0.90	0.00	0.00
			Max. Vy	34	-0.06	0.00	0.00
			Max. Vx	24	-0.00	0.00	0.00
		Top Girt	Max Tension	30	0.35	0.00	0.00
			Max. Compression	8	-0.45	0.00	0.00
			Max. Mx	19	0.13	-0.14	0.00
			Max. My	23	0.14	0.00	0.00
			Max. Vy	19	-0.05	0.00	0.00
			Max. Vx	23	-0.00	0.00	0.00
		Mid Girt	Max Tension	20	0.55	0.00	0.00
			Max. Compression	8	-0.56	0.00	0.00
			Max. Mx	19	0.44	-0.07	0.00
			Max. My	23	0.33	0.00	0.00
			Max. Vy	19	-0.03	0.00	0.00
			Max. Vx	23	0.00	0.00	0.00
T6	125 - 100	Leg	Max Tension	22	118.00	0.75	-0.32
			Max. Compression	19	-137.06	1.78	-0.09
			Max. Mx	20	-106.13	2.03	0.99
			Max. My	31	-11.32	-0.25	-1.40
			Max. Vy	20	-0.56	2.03	0.99
			Max. Vx	14	0.35	-0.27	-1.38
		Diagonal	Max Tension	9	9.25	0.00	0.00
			Max. Compression	17	-9.32	0.00	0.00
			Max. Mx	34	8.71	0.39	0.00
			Max. My	24	1.16	0.00	0.00
			Max. Vy	34	-0.10	0.00	0.00
			Max. Vx	24	-0.00	0.00	0.00
		Top Girt	Max Tension	32	0.47	0.00	0.00
			Max. Compression	8	-0.53	0.00	0.00
			Max. Mx	18	0.05	-0.21	0.00
			Max. My	31	-0.32	0.00	0.01
			Max. Vy	18	0.07	0.00	0.00
			Max. Vx	31	-0.00	0.00	0.00
		Mid Girt	Max Tension	27	0.49	0.00	0.00
			Max. Compression	3	-0.45	0.00	0.00
			Max. Mx	18	0.07	-0.11	0.00
			Max. My	31	-0.32	0.00	0.00
			Max. Vy	18	0.03	0.00	0.00
			Max. Vx	31	0.00	0.00	0.00
T7	100 - 75	Leg	Max Tension	22	130.06	-0.31	-0.02
			Max. Compression	19	-153.06	0.57	-0.01
			Max. Mx	19	-139.93	1.17	-0.44
			Max. My	31	-9.65	0.13	-1.18
			Max. Vy	10	-0.16	-1.14	0.27
			Max. Vx	14	-0.20	0.13	-1.14
		Diagonal	Max Tension	9	8.32	0.00	0.00
			Max. Compression	26	-8.54	0.00	0.00
			Max. Mx	34	8.08	0.18	0.00
			Max. My	24	0.79	0.00	0.00
			Max. Vy	34	-0.05	0.00	0.00
			Max. Vx	24	-0.00	0.00	0.00
		Horizontal	Max Tension	9	8.41	0.04	0.02
			Max. Compression	17	-8.67	0.04	0.03
			Max. Mx	22	1.35	0.11	0.02
			Max. My	32	-7.51	0.05	0.04
			Max. Vy	22	0.05	0.11	0.02
			Max. Vx	32	-0.01	0.00	0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
T8	75 - 50	Leg	Max Tension	32	149.17	-0.51	-0.08
			Max. Compression	19	-177.41	0.37	-0.00
			Max. Mx	27	137.22	-0.63	0.00
			Max. My	14	-7.58	-0.01	-0.71
			Max. Vy	10	-0.12	-0.52	-0.03
			Max. Vx	6	0.16	-0.02	0.60
		Diagonal	Max Tension	9	8.54	0.00	0.00
			Max. Compression	26	-8.93	0.00	0.00
			Max. Mx	34	8.33	0.28	0.00
			Max. My	24	0.77	0.00	0.00
			Max. Vy	34	0.07	0.00	0.00
			Max. Vx	24	-0.00	0.00	0.00
		Horizontal	Max Tension	16	5.49	0.00	0.00
			Max. Compression	8	-5.62	0.09	0.04
			Max. Mx	32	1.63	0.16	0.04
			Max. My	32	-4.74	0.09	0.05
			Max. Vy	32	0.06	0.16	0.04
			Max. Vx	32	-0.01	0.00	0.00
T9	50 - 25	Leg	Max Tension	32	167.93	-0.65	-0.10
			Max. Compression	19	-202.25	0.43	-0.01
			Max. Mx	27	163.75	-0.71	0.01
			Max. My	14	-9.90	-0.03	-0.75
			Max. Vy	10	0.11	-0.69	0.00
			Max. Vx	6	-0.15	-0.03	0.75
		Diagonal	Max Tension	9	8.90	0.00	0.00
			Max. Compression	26	-9.34	0.00	0.00
			Max. Mx	34	8.66	0.33	0.00
			Max. My	24	0.80	0.00	0.00
			Max. Vy	34	-0.08	0.00	0.00
			Max. Vx	24	-0.00	0.00	0.00
		Horizontal	Max Tension	16	6.16	0.00	0.00
			Max. Compression	8	-6.22	0.10	0.05
			Max. Mx	32	1.86	0.17	0.05
			Max. My	32	-5.28	0.13	0.06
			Max. Vy	32	0.07	0.17	0.05
			Max. Vx	32	-0.01	0.00	0.00
T10	25 - 0	Leg	Max Tension	32	186.03	-0.38	-0.06
			Max. Compression	19	-227.03	0.00	-0.00
			Max. Mx	30	-222.09	1.17	-0.04
			Max. My	14	-12.01	-0.04	-0.84
			Max. Vy	30	0.16	1.17	-0.04
			Max. Vx	14	-0.19	-0.04	-0.84
		Diagonal	Max Tension	9	9.20	0.00	0.00
			Max. Compression	26	-9.69	0.00	0.00
			Max. Mx	26	9.09	0.39	0.00
			Max. My	24	0.80	0.00	0.00
			Max. Vy	26	-0.09	0.00	0.00
			Max. Vx	24	0.00	0.00	0.00
		Horizontal	Max Tension	26	6.76	0.18	0.08
			Max. Compression	8	-6.78	0.16	0.06
			Max. Mx	32	2.10	0.24	0.06
			Max. My	24	-6.46	0.20	0.08
			Max. Vy	32	0.09	0.23	0.07
			Max. Vx	24	0.01	0.00	0.00

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Leg C	Max. Vert	30	233.49	20.35	-12.61
	Max. H_x	30	233.49	20.35	-12.61
	Max. H_z	4	-184.90	-16.37	11.22
	Min. Vert	22	-194.65	-17.53	10.88
	Min. H_x	22	-194.65	-17.53	10.88
	Min. H_z	30	233.49	20.35	-12.61
Leg B	Max. Vert	24	233.49	-20.33	-12.65
	Max. H_x	32	-194.65	17.50	10.92
	Max. H_z	16	-184.94	16.34	11.27
	Min. Vert	32	-194.65	17.50	10.92
	Min. H_x	24	233.49	-20.33	-12.65
	Min. H_z	24	233.49	-20.33	-12.65
Leg A	Max. Vert	19	237.97	0.05	23.99
	Max. H_x	14	13.63	4.32	1.00
	Max. H_z	19	237.97	0.05	23.99
	Min. Vert	27	-190.13	-0.05	-20.55
	Min. H_x	6	13.61	-4.32	1.00
	Min. H_z	27	-190.13	-0.05	-20.55

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	37.59	-0.00	0.00	-23.98	0.46	0.00
Dead+Wind 0 deg - No Ice	37.59	-0.00	-37.81	-4650.50	0.41	1.78
Dead+Wind 30 deg - No Ice	37.59	18.63	-32.26	-3990.23	-2289.67	-20.56
Dead+Wind 45 deg - No Ice	37.59	26.28	-26.28	-3257.22	-3232.78	-29.88
Dead+Wind 60 deg - No Ice	37.59	32.10	-18.53	-2306.59	-3952.74	-37.09
Dead+Wind 90 deg - No Ice	37.59	37.25	0.00	-24.31	-4579.94	-44.16
Dead+Wind 120 deg - No Ice	37.59	32.74	18.90	2288.95	-4006.36	-39.96
Dead+Wind 135 deg - No Ice	37.59	26.27	26.28	3208.74	-3232.51	-32.32
Dead+Wind 150 deg - No Ice	37.59	18.63	32.26	3942.17	-2289.43	-23.58
Dead+Wind 180 deg - No Ice	37.59	-0.00	37.07	4540.54	0.45	-1.75
Dead+Wind 210 deg - No Ice	37.59	-18.63	32.26	3942.47	2290.67	20.55
Dead+Wind 225 deg - No Ice	37.59	-26.28	26.28	3209.05	3233.80	29.87
Dead+Wind 240 deg - No Ice	37.59	-32.74	18.90	2288.97	4007.18	38.23
Dead+Wind 270 deg - No Ice	37.59	-37.25	-0.00	-24.59	4580.27	44.16
Dead+Wind 300 deg - No Ice	37.59	-32.10	-18.53	-2306.75	3953.52	38.80
Dead+Wind 315 deg - No Ice	37.59	-26.28	-26.28	-3257.59	3233.62	32.32
Dead+Wind 330 deg - No Ice	37.59	-18.63	-32.26	-3990.96	2290.51	23.58
Dead+Ice+Temp	54.55	-0.00	0.00	-66.89	0.00	-0.00
Dead+Wind 0 deg+Ice+Temp	54.55	-0.00	-39.14	-4929.94	-0.03	2.35
Dead+Wind 30 deg+Ice+Temp	54.55	19.08	-33.05	-4198.35	-2385.44	-16.63
Dead+Wind 45 deg+Ice+Temp	54.55	26.87	-26.87	-3429.86	-3362.59	-24.53
Dead+Wind 60 deg+Ice+Temp	54.55	32.77	-18.92	-2437.53	-4104.96	-30.66
Dead+Wind 90 deg+Ice+Temp	54.55	38.17	0.00	-67.60	-4770.99	-37.14
Dead+Wind 120 deg+Ice+Temp	54.55	33.90	19.57	2363.96	-4211.63	-34.52
Dead+Wind 135 deg+Ice+Temp	54.55	26.87	26.87	3294.73	-3362.08	-27.64
Dead+Wind 150 deg+Ice+Temp	54.55	19.08	33.05	4063.97	-2385.09	-20.49
Dead+Wind 180 deg+Ice+Temp	54.55	-0.00	37.84	4672.54	-0.02	-2.20
Dead+Wind 210 deg+Ice+Temp	54.55	-19.08	33.05	4064.27	2385.51	16.62
Dead+Wind 225 deg+Ice+Temp	54.55	-26.87	26.87	3295.12	3362.69	24.52
Dead+Wind 240 deg+Ice+Temp	54.55	-33.90	19.57	2363.95	4211.58	32.22
Dead+Wind 270 deg+Ice+Temp	54.55	-38.16	-0.00	-67.93	4770.36	37.13
Dead+Wind 300 deg+Ice+Temp	54.55	-32.77	-18.92	-2437.58	4104.91	32.84
Dead+Wind 315 deg+Ice+Temp	54.55	-26.87	-26.87	-3430.15	3362.59	27.64

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead+Wind 330 deg+Ice+Temp	54.55	-19.08	-33.05	-4199.26	2385.42	20.48
Dead+Wind 0 deg - Service	37.59	-0.00	-13.08	-1625.16	0.43	0.61
Dead+Wind 30 deg - Service	37.59	6.45	-11.16	-1396.73	-791.97	-7.12
Dead+Wind 45 deg - Service	37.59	9.09	-9.09	-1143.07	-1118.40	-10.33
Dead+Wind 60 deg - Service	37.59	11.11	-6.41	-814.03	-1367.52	-12.83
Dead+Wind 90 deg - Service	37.59	12.89	0.00	-24.24	-1584.50	-15.28
Dead+Wind 120 deg - Service	37.59	11.33	6.54	776.24	-1386.09	-13.84
Dead+Wind 135 deg - Service	37.59	9.09	9.09	1094.54	-1118.38	-11.19
Dead+Wind 150 deg - Service	37.59	6.45	11.16	1348.38	-792.05	-8.16
Dead+Wind 180 deg - Service	37.59	-0.00	12.83	1555.43	0.43	-0.60
Dead+Wind 210 deg - Service	37.59	-6.45	11.16	1348.39	792.91	7.11
Dead+Wind 225 deg - Service	37.59	-9.09	9.09	1094.55	1119.23	10.33
Dead+Wind 240 deg - Service	37.59	-11.33	6.54	776.25	1386.94	13.23
Dead+Wind 270 deg - Service	37.59	-12.89	0.00	-24.24	1585.36	15.28
Dead+Wind 300 deg - Service	37.59	-11.11	-6.41	-814.03	1368.38	13.43
Dead+Wind 315 deg - Service	37.59	-9.09	-9.09	-1143.08	1119.26	11.18
Dead+Wind 330 deg - Service	37.59	-6.45	-11.16	-1396.80	792.89	8.16

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
1	0.00	-37.59	0.00	0.00	37.59	-0.00	0.003%
2	0.00	-37.59	-37.84	0.00	37.59	37.81	0.066%
3	18.64	-37.59	-32.29	-18.63	37.59	32.26	0.067%
4	26.30	-37.59	-26.30	-26.28	37.59	26.28	0.064%
5	32.13	-37.59	-18.55	-32.10	37.59	18.53	0.062%
6	37.29	-37.59	0.00	-37.25	37.59	-0.00	0.061%
7	32.77	-37.59	18.92	-32.74	37.59	-18.90	0.063%
8	26.30	-37.59	26.30	-26.27	37.59	-26.28	0.065%
9	18.64	-37.59	32.29	-18.63	37.59	-32.26	0.065%
10	0.00	-37.59	37.10	0.00	37.59	-37.07	0.061%
11	-18.64	-37.59	32.29	18.63	37.59	-32.26	0.060%
12	-26.30	-37.59	26.30	26.28	37.59	-26.28	0.061%
13	-32.77	-37.59	18.92	32.74	37.59	-18.90	0.063%
14	-37.29	-37.59	0.00	37.25	37.59	0.00	0.065%
15	-32.13	-37.59	-18.55	32.10	37.59	18.53	0.062%
16	-26.30	-37.59	-26.30	26.28	37.59	26.28	0.061%
17	-18.64	-37.59	-32.29	18.63	37.59	32.26	0.061%
18	0.00	-54.55	0.00	0.00	54.55	-0.00	0.005%
19	0.00	-54.55	-39.17	0.00	54.55	39.14	0.049%
20	19.10	-54.55	-33.08	-19.08	54.55	33.05	0.047%
21	26.89	-54.55	-26.89	-26.87	54.55	26.87	0.043%
22	32.80	-54.55	-18.93	-32.77	54.55	18.92	0.041%
23	38.19	-54.55	0.00	-38.17	54.55	-0.00	0.041%
24	33.92	-54.55	19.58	-33.90	54.55	-19.57	0.044%
25	26.89	-54.55	26.89	-26.87	54.55	-26.87	0.045%
26	19.10	-54.55	33.08	-19.08	54.55	-33.05	0.044%
27	0.00	-54.55	37.87	0.00	54.55	-37.84	0.041%
28	-19.10	-54.55	33.08	19.08	54.55	-33.05	0.040%
29	-26.89	-54.55	26.89	26.87	54.55	-26.87	0.040%
30	-33.92	-54.55	19.58	33.90	54.55	-19.57	0.044%
31	-38.19	-54.55	0.00	38.16	54.55	0.00	0.045%
32	-32.80	-54.55	-18.93	32.77	54.55	18.92	0.041%
33	-26.89	-54.55	-26.89	26.87	54.55	26.87	0.041%
34	-19.10	-54.55	-33.08	19.08	54.55	33.05	0.041%
35	0.00	-37.59	-13.09	0.00	37.59	13.08	0.029%

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
36	6.45	-37.59	-11.17	-6.45	37.59	11.16	0.029%
37	9.10	-37.59	-9.10	-9.09	37.59	9.09	0.028%
38	11.12	-37.59	-6.42	-11.11	37.59	6.41	0.028%
39	12.90	-37.59	0.00	-12.89	37.59	-0.00	0.028%
40	11.34	-37.59	6.55	-11.33	37.59	-6.54	0.028%
41	9.10	-37.59	9.10	-9.09	37.59	-9.09	0.028%
42	6.45	-37.59	11.17	-6.45	37.59	-11.16	0.028%
43	0.00	-37.59	12.84	0.00	37.59	-12.83	0.028%
44	-6.45	-37.59	11.17	6.45	37.59	-11.16	0.028%
45	-9.10	-37.59	9.10	9.09	37.59	-9.09	0.028%
46	-11.34	-37.59	6.55	11.33	37.59	-6.54	0.028%
47	-12.90	-37.59	0.00	12.89	37.59	-0.00	0.028%
48	-11.12	-37.59	-6.42	11.11	37.59	6.41	0.028%
49	-9.10	-37.59	-9.10	9.09	37.59	9.09	0.028%
50	-6.45	-37.59	-11.17	6.45	37.59	11.16	0.028%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00040556
2	Yes	9	0.00078513	0.00096022
3	Yes	9	0.00078160	0.00098880
4	Yes	9	0.00073361	0.00097228
5	Yes	9	0.00071308	0.00098793
6	Yes	9	0.00069872	0.00094690
7	Yes	9	0.00074859	0.00094644
8	Yes	9	0.00078034	0.00096844
9	Yes	9	0.00075834	0.00097332
10	Yes	9	0.00071106	0.00099682
11	Yes	9	0.00069828	0.00094530
12	Yes	9	0.00070237	0.00093150
13	Yes	9	0.00075184	0.00094722
14	Yes	9	0.00076862	0.00098042
15	Yes	9	0.00071264	0.00098287
16	Yes	9	0.00070490	0.00097995
17	Yes	9	0.00069918	0.00094422
18	Yes	4	0.00000001	0.00069905
19	Yes	10	0.00074337	0.00074517
20	Yes	10	0.00066118	0.00078239
21	Yes	10	0.00057761	0.00076687
22	Yes	10	0.00055550	0.00080921
23	Yes	10	0.00054641	0.00074984
24	Yes	10	0.00064126	0.00073810
25	Yes	10	0.00067049	0.00075803
26	Yes	10	0.00061651	0.00076555
27	Yes	10	0.00055413	0.00083485
28	Yes	10	0.00054770	0.00074941
29	Yes	10	0.00055246	0.00073201
30	Yes	10	0.00064740	0.00073876
31	Yes	10	0.00063401	0.00077348
32	Yes	10	0.00055535	0.00080437
33	Yes	10	0.00055070	0.00080281
34	Yes	10	0.00054700	0.00074594
35	Yes	9	0.00070012	0.00091718
36	Yes	9	0.00070307	0.00092143

37	Yes	9	0.00070363	0.00092218
38	Yes	9	0.00070321	0.00092154
39	Yes	9	0.00070007	0.00091702
40	Yes	9	0.00069811	0.00091408
41	Yes	9	0.00069935	0.00091585
42	Yes	9	0.00070012	0.00091677
43	Yes	9	0.00070028	0.00091683
44	Yes	9	0.00069769	0.00091314
45	Yes	9	0.00069716	0.00091245
46	Yes	9	0.00069713	0.00091223
47	Yes	9	0.00070098	0.00091763
48	Yes	9	0.00070239	0.00091977
49	Yes	9	0.00070158	0.00091879
50	Yes	9	0.00070053	0.00091755

Maximum Tower Deflections - Service Wind

Section No.	*Elevation* *ft*	*Horz. Deflection* *in*	*Gov. Load Comb.*	*Tilt* °	*Twist* °
T1	250 - 225	11.806	35	0.4626	0.1117
T2	225 - 200	9.134	35	0.4447	0.0882
T3	200 - 175	6.698	35	0.3710	0.0570
T4	175 - 150	4.746	35	0.3100	0.0374
T5	150 - 125	3.198	35	0.2364	0.0272
T6	125 - 100	2.066	35	0.1681	0.0209
T7	100 - 75	1.224	35	0.1319	0.0162
T8	75 - 50	0.649	35	0.0942	0.0110
T9	50 - 25	0.280	35	0.0559	0.0072
T10	25 - 0	0.067	35	0.0280	0.0034

Critical Deflections and Radius of Curvature - Service Wind

Elevation *ft*	*Appurtenance*	*Gov. Load Comb.*	*Deflection* *in*	*Tilt* °	*Twist* °	*Radius of Curvature* *ft*
259.00	Flash Beacon Lighting	35	11.806	0.4626	0.1117	179645
253.00	10'0"x4" Pipe Mount	35	11.806	0.4626	0.1117	179645
252.00	JMPC-1R	35	11.806	0.4626	0.1117	179645
248.00	Andrew 4' w/Radome	35	11.590	0.4625	0.1101	179645
242.00	BCD-87010N	35	10.941	0.4615	0.1053	112278
236.00	PD458-1	35	10.296	0.4588	0.1000	64159
235.00	SRL-460	35	10.189	0.4581	0.0990	59881
230.00	PD220	35	9.658	0.4530	0.0940	44911
229.00	PD1158S	35	9.553	0.4516	0.0929	42761
205.00	PD220	35	7.150	0.3864	0.0625	14640
197.00	Andrew 2' w/Radome	35	6.438	0.3627	0.0540	13464
178.00	PD458-1	35	4.957	0.3174	0.0391	20247
170.00	Rohn 6' x 12' Boom Gate (1)	35	4.405	0.2967	0.0348	20426
143.00	10'x2.5" Pipe Mount	35	2.843	0.2149	0.0252	18207
138.00	DB806D-Y	35	2.609	0.2002	0.0239	20511
126.00	PD220	35	2.105	0.1702	0.0211	28931
115.00	ROHN 6-ft Side Arm	35	1.697	0.1512	0.0190	28589
114.00	1151-4	35	1.663	0.1498	0.0189	28404
104.00	2-ft dish	35	1.341	0.1370	0.0170	26686
76.00	DB224	35	0.668	0.0958	0.0112	36469

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
69.00	PD320	35	0.544	0.0844	0.0100	40169
62.00	GPS	35	0.436	0.0733	0.0089	44356
60.00	3' Side Mount Standoff	35	0.407	0.0702	0.0086	45717

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	250 - 225	37.126	19	1.4667	0.3187
T2	225 - 200	28.635	19	1.4186	0.2515
T3	200 - 175	20.859	19	1.1823	0.1627
T4	175 - 150	14.665	19	0.9778	0.1078
T5	150 - 125	9.824	19	0.7353	0.0781
T6	125 - 100	6.318	19	0.5189	0.0606
T7	100 - 75	3.729	19	0.4057	0.0468
T8	75 - 50	1.970	19	0.2886	0.0319
T9	50 - 25	0.845	19	0.1705	0.0209
T10	25 - 0	0.200	19	0.0853	0.0099

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
259.00	Flash Beacon Lighting	19	37.126	1.4667	0.3187	64060
253.00	10'0"x4" Pipe Mount	19	37.126	1.4667	0.3187	64060
252.00	JMPC-1R	19	37.126	1.4667	0.3187	64060
248.00	Andrew 4' w/Radome	19	36.439	1.4671	0.3140	64060
242.00	BCD-87010N	19	34.381	1.4666	0.2995	40037
236.00	PD458-1	19	32.333	1.4603	0.2841	22878
235.00	SRL-460	19	31.994	1.4583	0.2814	21353
230.00	PD220	19	30.305	1.4436	0.2672	16014
229.00	PD1158S	19	29.970	1.4395	0.2642	15245
205.00	PD220	19	22.302	1.2325	0.1792	4505
197.00	Andrew 2' w/Radome	19	20.028	1.1547	0.1538	4081
178.00	PD458-1	19	15.331	1.0026	0.1126	5955
170.00	Rohn 6' x 12' Boom Gate (1)	19	13.592	0.9334	0.1005	6070
143.00	10'x2.5" Pipe Mount	19	8.721	0.6665	0.0724	5728
138.00	DB806D-Y	19	7.998	0.6201	0.0688	6468
126.00	PD220	19	6.439	0.5254	0.0612	9201
115.00	ROHN 6-ft Side Arm	19	5.183	0.4659	0.0550	9132
114.00	1151-4	19	5.077	0.4615	0.0545	9075
104.00	2-ft dish	19	4.086	0.4215	0.0491	8548
76.00	DB224	19	2.027	0.2936	0.0324	11884
69.00	PD320	19	1.651	0.2584	0.0289	13098
62.00	GPS	19	1.320	0.2240	0.0258	14446
60.00	3' Side Mount Standoff	19	1.233	0.2145	0.0250	14883

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	250	Leg	A325N	0.7500	4	3.24	19.44	0.167 ✓	1.333	Bolt Tension
T2	225	Leg	A325N	0.7500	4	10.51	19.44	0.541 ✓	1.333	Bolt Tension
T3	200	Leg	A325N	0.7500	4	13.98	19.44	0.719 ✓	1.333	Bolt Tension
T4	175	Leg	A325N	0.7500	4	18.94	19.44	0.974 ✓	1.333	Bolt Tension
T5	150	Leg	A325N	0.8750	4	24.30	26.46	0.919 ✓	1.333	Bolt Tension
T6	125	Leg	A325N	1.2500	4	29.50	54.00	0.546 ✓	1.333	Bolt Tension
T7	100	Leg	A325N	1.2500	4	32.51	54.00	0.602 ✓	1.333	Bolt Tension
T8	75	Leg	A325N	1.5000	4	37.29	77.75	0.480 ✓	1.333	Bolt Tension
T9	50	Leg	A325N	1.5000	4	41.98	77.75	0.540 ✓	1.333	Bolt Tension
T10	25	Leg	A36	1.7500	4	46.51	46.04	1.010 ✓	1.333	Bolt Tension

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	250 - 225	P3x.216	25.00	5.00	103.1 K=2.00	13.973	2.2285	-14.28	31.14	0.458 ✓
T2	225 - 200	P3x.216	25.00	5.00	51.6 K=1.00	24.105	2.2285	-45.31	53.72	0.844 ✓
T3	200 - 175	P3x.3	25.05	6.26	44.3 K=0.67	25.214	3.0159	-61.73	76.04	0.812 ✓
T4	175 - 150	P3.5x.226	25.05	6.26	37.7 K=0.67	26.156	2.6795	-85.99	70.09	1.227 ✓
T5	150 - 125	P4x.237	25.05	6.26	33.3 K=0.67	26.729	3.1741	-111.36	84.84	1.313 ✓
T6	125 - 100	P5x.375	25.05	6.26	27.4 K=0.67	27.471	6.1120	-137.06	167.90	0.816 ✓
T7	100 - 75	P5x.375	25.05	12.52	40.9 K=0.50	25.711	6.1120	-153.06	157.15	0.974 ✓
T8	75 - 50	P5x.375	25.05	12.52	40.9 K=0.50	25.711	6.1120	-177.41	157.15	1.129 ✓
T9	50 - 25	P6x.432	25.05	12.52	34.2 K=0.50	26.614	8.4049	-202.25	223.69	0.904 ✓
T10	25 - 0	P6x.432	25.05	12.52	34.2 K=0.50	26.614	8.4049	-227.03	223.69	1.015 ✓

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	250 - 225	P1.5x.2	6.73	6.73	133.4 K=1.00	8.394	1.0681	-4.41	8.97	0.492 ✓
T2	225 - 200	P1.5x.2	6.73	6.73	133.4 K=1.00	8.394	1.0681	-5.73	8.97	0.640 ✓
T3	200 - 175	P1.5x.2	9.23	9.23	182.9 K=1.00	4.462	1.0681	-2.98	4.77	0.626 ✓
T4	175 - 150	P2x.218	11.29	11.29	176.8 K=1.00	4.778	1.4773	-6.96	7.06	0.986 ✓
T5	150 - 125	P2.5x.276	13.54	13.54	175.9 K=1.00	4.827	2.2535	-8.07	10.88	0.742 ✓
T6	125 - 100	P3x.3	15.90	15.90	168.0 K=1.00	5.294	3.0159	-8.94	15.97	0.560 ✓
T7	100 - 75	P2.5x.276	15.43	15.03	195.2 K=1.00	3.920	2.2535	-8.53	8.83	0.966 ✓
T8	75 - 50	P3x.3	16.23	15.86	167.5 K=1.00	5.321	3.0159	-8.93	16.05	0.556 ✓
T9	50 - 25	P3x.3	17.09	16.68	176.2 K=1.00	4.811	3.0159	-9.34	14.51	0.644 ✓
T10	25 - 0	P3x.3	18.00	17.62	186.1 K=1.00	4.314	3.0159	-9.69	13.01	0.745 ✓

Horizontal 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 $\frac{P}{P_a}$
T7	100 - 75	L2 1/2x3 1/2x1/4	15.45	7.49	165.3 K=1.00	5.466	1.4400	-8.67	7.87	1.102 ✓
T8	75 - 50	L3x4x1/4	19.37	18.91	177.2 K=1.00	4.755	1.6900	-5.62	8.04	0.699 ✓
T9	50 - 25	L3x4x1/4	21.99	21.43	200.9 K=1.00	3.700	1.6900	-6.22	6.25	0.995 ✓
T10	25 - 0	KL/R > 200 (C) - 175 L3 1/2x5x1/4	24.60	12.02	187.3 K=1.00	4.255	2.0600	-6.78	8.76	0.774 ✓

Top Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	250 - 225	L3x3x1/4	5.00	4.71	95.4 K=1.00	13.547	1.4400	-0.50	19.51	0.026 ✓
T2	225 - 200	L3x3x1/4	5.00	4.71	95.4	13.547	1.4400	-2.88	19.51	0.148

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 $\frac{P}{P_a}$
					K=1.00					✓
T3	200 - 175	L2 1/2x2 1/2x3/16	5.00	4.71	114.1 K=1.00	11.107	0.9020	-1.59	10.02	0.159 ✓
T4	175 - 150	L4x4x1/4	7.61	7.32	110.5 K=1.00	11.461	1.9400	-0.95	22.23	0.043 ✓
T5	150 - 125	L4x4x1/4	10.23	9.90	149.4 K=1.00	6.692	1.9400	-0.45	12.98	0.034 ✓
T6	125 - 100	L4x4x1/4	12.84	12.47	188.2 K=1.00	4.218	1.9400	-0.53	8.18	0.065 ✓

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 $\frac{P}{P_a}$
T3	200 - 175	L2x2x3/16	6.31	6.01	183.1 K=1.00	4.452	0.7150	-0.21	3.18	0.066 ✓
T4	175 - 150	L2x2x3/16	8.92	8.59	261.5 K=1.00	2.183	0.7150	-0.47	1.56	0.300 ✓
T5	150 - 125	KL/R > 200 (C) - 71 L2x2x3/16	11.53	11.16	339.9 K=1.00	1.293	0.7150	-0.56	0.92	0.609 ✓
T6	125 - 100	KL/R > 200 (C) - 92 L2x2x3/16	14.15	13.68	416.7 K=1.00	0.860	0.7150	-0.45	0.61	0.730 ✓
		KL/R > 200 (C) - 114								

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 $\frac{P}{P_a}$
T1	250 - 225	P3x.216	25.00	5.00	51.6	30.000	2.2285	12.95	66.85	0.194 ✓
T2	225 - 200	P3x.216	25.00	5.00	51.6	30.000	2.2285	42.05	66.85	0.629 ✓
T3	200 - 175	P3x.3	25.05	6.26	66.1	30.000	3.0159	55.91	90.48	0.618 ✓
T4	175 - 150	P3.5x.226	25.05	6.26	56.2	30.000	2.6795	75.75	80.39	0.942 ✓
T5	150 - 125	P4x.237	25.05	6.26	49.8	30.000	3.1741	97.21	95.22	1.021 ✓
T6	125 - 100	P5x.375	25.05	6.26	40.9	30.000	6.1120	118.00	183.36	0.644 ✓

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 $\frac{P}{P_a}$
T7	100 - 75	P5x.375	25.05	12.52	81.7	30.000	6.1120	130.06	183.36	0.709 ✓
T8	75 - 50	P5x.375	25.05	12.52	81.7	30.000	6.1120	149.17	183.36	0.814 ✓
T9	50 - 25	P6x.432	25.05	12.52	68.5	30.000	8.4049	167.93	252.15	0.666 ✓
T10	25 - 0	P6x.432	25.05	12.52	68.5	30.000	8.4049	186.03	252.15	0.738 ✓

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	250 - 225	P1.5x.2	6.73	6.73	133.4	21.600	1.0681	4.46	23.07	0.193 ✓
T2	225 - 200	P1.5x.2	6.73	6.73	133.4	21.600	1.0681	5.68	23.07	0.246 ✓
T3	200 - 175	P1.5x.2	7.90	7.90	156.6	21.600	1.0681	3.32	23.07	0.144 ✓
T4	175 - 150	P2x.218	10.75	10.75	168.3	21.600	1.4773	7.11	31.91	0.223 ✓
T5	150 - 125	P2.5x.276	12.97	12.97	168.4	21.600	2.2535	8.16	48.68	0.168 ✓
T6	125 - 100	P3x.3	15.31	15.31	161.6	21.600	3.0159	9.25	65.14	0.142 ✓
T7	100 - 75	P2.5x.276	15.05	14.66	190.3	21.600	2.2535	8.32	48.68	0.171 ✓
T8	75 - 50	P3x.3	16.23	15.86	167.5	21.600	3.0159	8.54	65.14	0.131 ✓
T9	50 - 25	P3x.3	17.09	16.68	176.2	21.600	3.0159	8.90	65.14	0.137 ✓
T10	25 - 0	P3x.3	18.00	17.62	186.1	21.600	3.0159	9.20	65.14	0.141 ✓

Horizontal 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 $\frac{P}{P_a}$
T7	100 - 75	L2 1/2x3 1/2x1/4	15.45	7.49	160.9	21.600	1.4400	8.41	31.10	0.270 ✓
T8	75 - 50	L3x4x1/4	19.37	18.91	177.2	21.600	1.6900	5.49	36.50	0.150 ✓
T9	50 - 25	L3x4x1/4	21.99	21.43	200.9	21.600	1.6900	6.16	36.50	0.169 ✓
T10	25 - 0	L3 1/2x5x1/4	24.60	12.02	178.1	21.600	2.0600	6.76	44.50	0.152

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 $\frac{P}{P_a}$
										✓

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 $\frac{P}{P_a}$
T1	250 - 225	L3x3x1/4	5.00	4.71	60.8	21.600	1.4400	0.52	31.10	0.017 ✓
T2	225 - 200	L3x3x1/4	5.00	4.71	60.8	21.600	1.4400	2.85	31.10	0.092 ✓
T3	200 - 175	L2 1/2x2 1/2x3/16	5.00	4.71	72.6	21.600	0.9020	1.30	19.48	0.067 ✓
T4	175 - 150	L4x4x1/4	7.61	7.32	70.3	21.600	1.9400	0.93	41.90	0.022 ✓
T5	150 - 125	L4x4x1/4	10.23	9.90	95.0	21.600	1.9400	0.35	41.90	0.008 ✓
T6	125 - 100	L4x4x1/4	12.84	12.47	119.7	21.600	1.9400	0.47	41.90	0.011 ✓

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 $\frac{P}{P_a}$
T3	200 - 175	L2x2x3/16	6.31	6.01	117.0	21.600	0.7150	0.17	15.44	0.011 ✓
T4	175 - 150	L2x2x3/16	8.92	8.59	167.0	21.600	0.7150	0.53	15.44	0.034 ✓
T5	150 - 125	L2x2x3/16	11.53	11.16	217.1	21.600	0.7150	0.55	15.44	0.036 ✓
T6	125 - 100	L2x2x3/16	14.15	13.68	266.1	21.600	0.7150	0.49	15.44	0.032 ✓

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
T1	250 - 225	Leg	P3x.216	1	-14.28	41.51	34.4	Pass
T2	225 - 200	Leg	P3x.216	24	-45.31	71.60	63.3	Pass
T3	200 - 175	Leg	P3x.3	45	-61.73	101.37	60.9	Pass
T4	175 - 150	Leg	P3.5x.226	66	-85.99	93.42	92.0	Pass
T5	150 - 125	Leg	P4x.237	87	-111.36	113.09	98.5	Pass
T6	125 - 100	Leg	P5x.375	108	-137.06	223.82	61.2	Pass
T7	100 - 75	Leg	P5x.375	129	-153.06	209.48	73.1	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
T8	75 - 50	Leg	P5x.375	150	-177.41	209.48	84.7	Pass
T9	50 - 25	Leg	P6x.432	171	-202.25	298.18	67.8	Pass
T10	25 - 0	Leg	P6x.432	192	-227.03	298.18	76.1	Pass
T1	250 - 225	Diagonal	P1.5x.2	9	-4.41	11.95	36.9	Pass
T2	225 - 200	Diagonal	P1.5x.2	30	-5.73	11.95	48.0	Pass
T3	200 - 175	Diagonal	P1.5x.2	53	-2.98	6.35	47.0	Pass
T4	175 - 150	Diagonal	P2x.218	74	-6.96	9.41	74.0	Pass
T5	150 - 125	Diagonal	P2.5x.276	95	-8.07	14.50	55.7	Pass
T6	125 - 100	Diagonal	P3x.3	116	-8.94	21.28	42.0	Pass
T7	100 - 75	Diagonal	P2.5x.276	134	-8.53	11.78	72.4	Pass
T8	75 - 50	Diagonal	P3x.3	155	-8.93	21.39	41.7	Pass
T9	50 - 25	Diagonal	P3x.3	176	-9.34	19.34	48.3	Pass
T10	25 - 0	Diagonal	P3x.3	197	-9.69	17.34	55.9	Pass
T7	100 - 75	Horizontal	L2 1/2x3 1/2x1/4	142	-8.67	10.49	82.7	Pass
T8	75 - 50	Horizontal	L3x4x1/4	154	-5.62	10.71	52.4	Pass
T9	50 - 25	Horizontal	L3x4x1/4	175	-6.22	8.34	74.6	Pass
T10	25 - 0	Horizontal	L3 1/2x5x1/4	196	-6.78	11.68	58.0	Pass
T1	250 - 225	Top Girt	L3x3x1/4	5	-0.50	26.00	1.9	Pass
T2	225 - 200	Top Girt	L3x3x1/4	27	-2.88	26.00	11.1	Pass
T3	200 - 175	Top Girt	L2 1/2x2 1/2x3/16	47	-1.59	13.35	11.9	Pass
T4	175 - 150	Top Girt	L4x4x1/4	68	-0.95	29.64	3.2	Pass
T5	150 - 125	Top Girt	L4x4x1/4	89	-0.45	17.31	2.6	Pass
T6	125 - 100	Top Girt	L4x4x1/4	110	-0.53	10.91	4.8	Pass
T3	200 - 175	Mid Girt	L2x2x3/16	50	-0.21	4.24	4.9	Pass
T4	175 - 150	Mid Girt	L2x2x3/16	71	-0.47	2.08	22.5	Pass
T5	150 - 125	Mid Girt	L2x2x3/16	92	-0.56	1.23	45.7	Pass
T6	125 - 100	Mid Girt	L2x2x3/16	114	-0.45	0.82	54.8	Pass
							Summary	
						Leg (T5)	98.5	Pass
						Diagonal (T4)	74.0	Pass
						Horizontal (T7)	82.7	Pass
						Top Girt (T3)	11.9	Pass
						Mid Girt (T6)	54.8	Pass
						Bolt Checks	75.8	Pass
						RATING =	**98.5**	**Pass**

Filename:	250-ft_Lattice_Tower
Directory:	C:\Users\jrm\Documents
Template:	C:\Users\jrm\AppData\Roaming\Microsoft\Templates\Normal.dotm
Title:	CHRONOS
Subject:	
Author:	Dan Horn
Keywords:	
Comments:	
Creation Date:	10/3/1999 9:50:00 AM
Change Number:	2
Last Saved On:	10/3/1999 9:50:00 AM
Last Saved By:	Dan Horn
Total Editing Time:	1 Minute
Last Printed On:	10/31/2012 9:36:00 AM
As of Last Complete Printing	
Number of Pages:	40
Number of Words:	12,696 (approx.)
Number of Characters:	72,372 (approx.)

Rock Anchor Design:

Input Data:

Max Pier Reactions:

Uplift =	$Uplift := 195 \cdot kips$	*user input*	
Shear =	$Shear := 24 \cdot kips$	*user input*	
Compression =	$Axial := 238 \cdot kips$	*user input*	

Structure:

Footing Width =	$B_{ftg} := 10ft$	*user input*	
Footing Length =	$L_{ftg} := 8ft$	*user input*	
Footing Thickness =	$T_{ftg} := 2ft$	*user input*	
Pier Length/Width =	$L_{pier} := 3ft$	*user input*	
Pier Depth =	$T_{pier} := 2ft$	*user input*	
Pier Projection Above Grade =	$P_p := 0 \cdot ft$	*user input*	
Volum e of Proposed Concrete =	$V_{propconc} := 88.5 \cdot ft^3$	*user input*	

Depths:

Depth to Bottom of Footing =	$D_{ftg} := 4.0ft$	*user input*	(from grade line)
Depth to Suitable Rock =	$D_{rock} := 4ft$	*user input*	(from grade line)
Depth to Suitable Earth =	$D_{earth} := 1.5ft$	*user input*	(from grade line)
Anchor Depth =	$D_{anchor} := 27.0ft$	*user input*	(from grade line)

Subgrade Properties:

Internal Friction Angle =	$\phi := 30deg$	*user input*	
Unit Weight of Earth =	$\gamma_{earth} := 125 \frac{lb}{ft^3}$	*user input*	
Unit Weight of Rock =	$\gamma_{rock} := 165 \frac{lb}{ft^3}$	*user input*	
Unit Weight of Conc =	$\gamma_{conc} := 150 \frac{lb}{ft^3}$	*user input*	
Allowable Bearing =	$Bearing := 50000 \cdot psf$	*user input*	Obtained from original design values for a tower structure within proximity to the site.

Rock Anchor Properties:

Number of Anchors =	$N_{anchor} := 2$	*user input*	
Hole Diameter =	$hole_d := 4.0in$	*user input*	
Allowable Bond Stress Between Rock and Grout =	$\sigma_{bond} := 120 \cdot psi$	*user input*	
Grout Allowable Compressive Stress =	$fc_g := 5000 \cdot psi$	*user input*	
Required Factor of Safety =	$F_S := 2.0$	*user input*	
Rock Anchor Ultimate Strength =	$Fu_{anchor} := 150.0ksi$	*user input*	Williams R71-11 1-3/8" dia. 150ksi
Rock Anchor Yield Strength =	$Fy_{anchor} := 127.7ksi$	*user input*	Per Recommendation of PTI For Prestressed Rock Anchors and Soil Anchors Section 6.6 Design Load Should not be more than 60% of Specified Minimum Tensile Strength.
Rock Anchor Diameter =	$d_{ra} := 1.375in$	*user input*	
Rock Anchor Area per Group =	$A_g := 1.580in^2$	*user input*	
Rock Anchor Allowable Tension =	$T_{all} := 0.60 \cdot 237kips = 142.2 \cdot kips$		
Rock Anchor Maximum Working Load to Yield =	$T_y := 0.80 \cdot 237kips = 189.6 \cdot kips$		
Rock Anchor Shear Capacity =	$Sh := 0.4 \cdot T_y = 75.84 \cdot kips$		

Rock Anchor Tension/Shear Check:

Tension Force per Anchor = $T_a := \frac{Uplift}{N_{anchor}} = 97.5 \cdot kips$

Design Shear Force per Anchor = $S_a := \frac{Shear}{N_{anchor}} = 12 \cdot kips$

Reduced Tension For Tension/Shear Combination = $T_r := \left[1 - \left(\frac{S_a}{T_{all}}\right)^2\right] \cdot T_{all} = 141.19 \cdot kips$

Tension Check = $TensionCheck := if\left(T_r \geq T_a, "OK", "IncreaseSize"\right) = "OK"$

Shear Check = $ShearCheck := if\left(Sh \geq S_a, "OK", "IncreaseSize"\right) = "OK"$

Provided Safety Factor = $\frac{T_r}{T_a} = 1.45$

$SafetyFactor := if\left(\frac{T_r}{T_a} \geq 1.0, "OK", "Overstressed"\right)$

$\boxed{SafetyFactor = "OK"}$

Rock Anchor Req'd Development Length in Rock:

Minimum Free Stress Length Required = $F_{stressreqd} := 10.0ft$

Minimum Free Stress Length Provided = $F_{stressprov} := 12ft$

Controlling Free Stress Length: $L_f := if(F_{stressprov} > F_{stressreqd}, F_{stressprov}, F_{stressreqd})$ $L_f = 12ft$

Proof Load Rock Anchors To 1.33x Design Load = $T_p := T_a \cdot 1.33 = 129.7 \cdot kips$ $T_r = 141.19 \cdot kips$

Release Load To 1.10x Design Load (Lock off Load) = $T_L := T_a \cdot 1.10 = 107.3 \cdot kips$

Note:
Max Allowable Tensile Load = 60% of Ultimate Strength.
Max Lock Off Load = 60% of Ultimate Strength.
Max. Proof Load = 80% of Ultimate Strength.

Rock Anchor/Grout Bond Length: $L_d := \frac{\left(\frac{0.04}{in} T_p\right)}{\sqrt{fc_g \cdot psi}}$ $L_d = 6.11 \cdot ft$

Rock/Grout Bond Length: $L_b := \frac{T_p \cdot F_S}{\pi \cdot hole_d \cdot \sigma_{bond}} = 14.33ft$

Controlling Length: $L_a := if(L_b < L_d, L_d, L_b)$ $L_a = 14.33ft$

$L_{bprov} := D_{anchor} - L_f = 15ft$

$Bond\_Length\_Check := if\left(\frac{L_a}{L_{bprov}} \le 1.00, "OK", "Increase Length"\right)$

Bond_Length_Check = "OK"

Calculated Resistance:

Total Volume of Concrete = $V_{conc} := B_{ftg} \cdot L_{ftg} \cdot T_{ftg} + L_{pier}^2 \cdot T_{pier} + V_{propconc} = 266.5 \cdot ft^3$

Weight of Pad = $W_{pad} := (B_{ftg} \cdot L_{ftg} \cdot T_{ftg}) \cdot \gamma_{conc} = 24 \cdot kips$

Weight of Pier = $W_{pier} := (L_{pier}^2 \cdot T_{pier}) \cdot \gamma_{conc} = 2.7 \cdot kips$

Weight of Proposed Concrete = $W_{propconc} := (V_{propconc}) \cdot \gamma_{conc} = 13.3 \cdot kips$

Total Weight of Foundation = $W_{conc} := W_{pad} + W_{pier} + W_{propconc} = 40 \cdot kips$

Intermediate Dimension:

Suitable Earth Height = $H := D_{rock} - D_{earth} = 2.5ft$

Suitable Rock Height = $Z := \frac{(D_{anchor} - F_{stressprov})}{2} + (F_{stressprov} - D_{rock}) = 15.5ft$

Volumes:

Base Area 1 of Resisting Pyramid = $B_1 := (\tan(\phi) \cdot Z \cdot 2)^2 \cdot \frac{\pi}{4} = 251.6ft^2$

Base Area 2 of Resisting Pyramid = $B_2 := [\tan(\phi) \cdot (Z + H) \cdot 2]^2 \cdot \frac{\pi}{4} = 339.3ft^2$

Total Volume of Resisting Material = $V_{tot} := \frac{[(Z+H)\cdot B_2]\cdot 1.5}{3} = 3053.6\cdot ft^3$

1.5 used instead of two rock anchors to account for anchor engagment overlap.

Volume of Rock = $V_{rock} := \frac{(Z\cdot B_1)\cdot 1.5}{3} = 1949.8\cdot ft^3$

Volume of Earth = $V_{earth} := V_{tot} - V_{rock} - V_{conc} = 837.3\cdot ft^3$

Resisting Forces:

Resisting Rock Force = $W_{rock} := V_{rock}\cdot \gamma_{rock} = 321.7\cdot kips$

Resisting Earth Force = $W_{earth} := V_{earth}\cdot \gamma_{earth} = 104.7\cdot kips$

Total Resisting Force = $W_{total} := W_{rock} + W_{earth} + W_{conc} = 466.4\cdot kips$

Foundation Uplift Check:

Factor of Safety = $\frac{W_{total}}{Uplift} = 2.39$

$Uplift\_Check := if\left(\frac{W_{total}}{Uplift} \geq F_S, "OK", "Overstressed"\right)$

Uplift_Check = "OK"

Rock Bearing Capacity Check:

Bearing Force = $MaxBearing := \left[\frac{(Axial + W_{conc}) + (N_{anchor}T_L)}{B_{ftg}\cdot L_{ftg}}\right] = 6.156\cdot ksf$

$\frac{MaxBearing}{Bearing} = 0.12$

Note: TL = P Design x1.10 equals Lock Off Load

$Rock\_Bearing\_Check := if\left(\frac{MaxBearing}{Bearing} \leq 1.00, "OK", "Overstressed"\right)$

Rock_Bearing_Check = "OK"

DESIGN BASIS:

1. GOVERNING CODE: 2003 INTERNATIONAL BUILDING CODE AS MODIFIED BY THE 2005 CT STATE BUILDING CODE AND 2009 AMENDMENTS.

2. TIA/EIA-222-F-1996 "STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWERS AND ANTENNA SUPPORTING STRUCTURES".

3. DESIGN CRITERIA

   WIND LOAD: (TIA/EIA-222-F-1996)
   BASIC WIND SPEED (V) = 85 MPH (FASTEST MILE).

   WIND LOAD: (2005 CT STATE BUILDING CODE APPENDIX K)
   BASIC WIND SPEED (V) = 105 MPH (3-SECOND GUST)
   EQUIVALENT TO (V) = 85 MPH (FASTEST MILE).

GENERAL NOTES:

1. ALL CONSTRUCTION SHALL BE IN COMPLIANCE WITH THE GOVERNING BUILDING CODE.

2. DRAWINGS INDICATE THE MINIMUM STANDARDS, BUT IF ANY WORK SHOULD BE INDICATED TO BE SUBSTANDARD TO ANY ORDINANCES, LAWS, CODES, RULES, OR REGULATIONS BEARING ON THE WORK, THE CONTRACTOR SHALL INCLUDE IN HIS WORK AND SHALL EXECUTE THE WORK CORRECTLY IN ACCORDANCE WITH SUCH ORDINANCES, LAWS, CODES, RULES OR REGULATIONS WITH NO INCREASE IN COSTS.

3. BEFORE BEGINNING THE WORK, THE CONTRACTOR IS RESPONSIBLE FOR MAKING SUCH INVESTIGATIONS CONCERNING PHYSICAL CONDITIONS (SURFACE AND SUBSURFACE) AT OR CONTIGUOUS TO THE SITE WHICH MAY AFFECT PERFORMANCE AND COST OF THE WORK.

4. THE CONTRACTOR SHALL VERIFY AND COORDINATE THE SIZE AND LOCATION OF ALL OPENINGS, SLEEVES AND ANCHOR BOLTS AS REQUIRED BY ALL TRADES.

5. ALL DIMENSIONS, ELEVATIONS, AND OTHER REFERENCES TO EXISTING STRUCTURES, SURFACE, AND SUBSURFACE CONDITIONS ARE APPROXIMATE. NO GUARANTEE IS MADE FOR THE ACCURACY OR COMPLETENESS OF THE INFORMATION SHOWN. THE CONTRACTOR SHALL VERIFY AND COORDINATE ALL DIMENSIONS, ELEVATIONS, ANGLES WITH EXISTING CONDITIONS AND WITH ARCHITECTURAL AND SITE DRAWINGS BEFORE PROCEEDING WITH ANY WORK.

6. AS THE WORK PROGRESSES, THE CONTRACTOR SHALL NOTIFY THE OWNER OF ANY CONDITIONS WHICH ARE IN CONFLICT OR OTHERWISE NOT CONSISTENT WITH THE CONSTRUCTION DOCUMENTS AND SHALL NOT PROCEED WITH SUCH WORK UNTIL THE CONFLICT IS SATISFACTORILY RESOLVED.

7. THE CONTRACTOR SHALL COMPLY WITH ALL APPLICABLE SAFETY CODES AND REGULATIONS DURING ALL PHASES OF CONSTRUCTION. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR PROVIDING AND MAINTAINING ADEQUATE SHORING, BRACING, AND BARRICADES AS MAY BE REQUIRED FOR THE PROTECTION OF EXISTING PROPERTY, CONSTRUCTION WORKERS, AND FOR PUBLIC SAFETY.

8. THE CONTRACTOR IS SOLELY RESPONSIBLE TO DETERMINE CONSTRUCTION PROCEDURE AND SEQUENCE, AND TO ENSURE THE SAFETY OF THE EXISTING STRUCTURES AND ITS COMPONENT PARTS DURING CONSTRUCTION. THIS INCLUDES THE ADDITION OF WHATEVER SHORING, BRACING, UNDERPINNING, ETC. THAT MAY BE NECESSARY. MAINTAIN EXISTING SITE OPERATIONS, COORDINATE WORK WITH OWNER.

9. THE STRUCTURE IS DESIGNED TO BE SELF-SUPPORTING AND STABLE AFTER FOUNDATION REMEDIATION WORK IS COMPLETE. IT IS THE CONTRACTOR'S SOLE RESPONSIBILITY TO DETERMINE ERECTION PROCEDURE AND SEQUENCE AND TO ENSURE THE SAFETY OF THE STRUCTURE AND ITS COMPONENT PARTS DURING ERECTION. THIS INCLUDES THE ADDITION OF WHATEVER SHORING, TEMPORARY BRACING, GUYS OR TIEDOWNS, WHICH MIGHT BE NECESSARY.

10. THE CONTRACTOR SHALL LIMIT THE DURATION OF ANY FOUNDATION MODIFICATION WORK. THE EXISTING FOUNDATION WITHIN THE SHOWN LIMITS IS STABLE FOR WIND SPEEDS LESS THAN 50MPH WITHOUT ICE LOADING. IF HIGHER WIND SPEED OR ICE EVENT IS EXPECTED, THE EXCAVATION AREA SHALL BE FILLED WITH COMPACT FILL MATERIAL.

11. ALL DAMAGE CAUSED TO ANY EXISTING STRUCTURE SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR. THE CONTRACTOR WILL BE HELD LIABLE FOR ALL REPAIRS REQUIRED FOR EXISTING STRUCTURES IF DAMAGED DURING CONSTRUCTION ACTIVITIES.

MODIFICATION INSPECTIONS

1. SHOP DRAWINGS, CONCRETE MIX DESIGNS, TEST REPORTS, AND OTHER SUBMITTALS PERTAINING TO STRUCTURAL WORK SHALL BE FORWARDED TO THE OWNER FOR REVIEW BEFORE FABRICATION AND/OR INSTALLATION IS MADE. SHOP DRAWINGS SHALL INCLUDE ERECTION DRAWINGS AND COMPLETE DETAILS OF CONNECTIONS AS WELL AS MANUFACTURER'S SPECIFICATION DATA WHERE APPROPRIATE. SHOP DRAWINGS SHALL BE CHECKED BY THE CONTRACTOR AND BEAR THE CHECKER'S INITIALS BEFORE BEING SUBMITTED FOR REVIEW.

2. INSPECTION AND TESTING OF CONCRETE WORK SHALL BE PERFORMED BY AN INDEPENDENT TESTING LABORATORY, PAID BY THE OWNER, AND APPROVED BY THE ENGINEER. THE INSPECTOR SHALL OBSERVE CONDITION OF SOILS AND FORMWORK BEFORE FOOTINGS ARE PLACED, SIZE, SPACING AND LOCATION OF REINFORCEMENT, AND PLACEMENT OF CONCRETE.

3. INSPECTION AND TESTING OF ALL WELDING AND HIGH STRENGTH BOLTING SHALL BE PERFORMED BY AN INDEPENDENT TESTING LABORATORY.

4. FOUR COPIES OF ALL INSPECTION TEST REPORTS SHALL BE SUBMITTED TO THE ENGINEER WITHIN TEN (10) WORKING DAYS OF THE DATE OF INSPECTION.

6. ROCK ANCHORS SHALL BE PROOF LOAD TESTED TO 130 kips AND TESTED FOR 10 MIN. AFTER ROCK ANCHOR HAS PASSED PROOF LOAD TESTING THE ANCHOR TENSION SHALL BE RELEASED TO 108 kips PRE-TENSION AND LOCKED OFF.

DESIGNED BY:	TJL
DRAWN BY:	TJL
CHK'D BY:	CFC

REV	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
0	11/05/12	TJL/DEB	CFC	ISSUED FOR CLIENT REVIEW

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HAMDEN

BALDWIN DRIVE
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DATE:	10/25/12
SCALE:	AS SHOWN
JOB NO.	12001.C080

DESIGN BASIS, GENERAL & MOD. INSPECTIONS NOTES

SHEET NO.
N-1
Sheet No. 1 of 1

SITE NOTES

1. THE CONTRACTOR SHALL CALL UTILITIES PRIOR TO THE START OF CONSTRUCTION.
2. ACTIVE EXISTING UTILITIES, WHERE ENCOUNTERED IN THE WORK, SHALL BE PROTECTED AT ALL TIMES. THE ENGINEER SHALL BE NOTIFIED IMMEDIATELY, PRIOR TO PROCEEDING, SHOULD ANY UNCOVERED EXISTING UTILITY PRECLUDE COMPLETION OF THE WORK IN ACCORDANCE WITH THE CONTRACT DOCUMENTS.
3. ALL RUBBISH, STUMPS, DEBRIS, STICKS, STONES AND OTHER REFUSE SHALL BE REMOVED OFF SITE AND BE LEGALLY DISPOSED, AT NO ADDITIONAL COST.
4. THE SITE SHALL BE GRADED TO CAUSE SURFACE WATER TO FLOW AWAY FROM THE EQUIPMENT AND TOWER AREAS.
5. NO FILL OR EMBANKMENT MATERIAL SHALL BE PLACED ON FROZEN GROUND. FROZEN MATERIALS, SNOW OR ICE SHALL NOT BE PLACED IN ANY FILL OR EMBANKMENT.
6. THE SUBGRADE SHALL BE COMPACTED AND BROUGHT TO A SMOOTH UNIFORM GRADE PRIOR TO FINISHED SURFACE APPLICATION.
7. THE AREAS OF THE COMPOUND DISTURBED BY THE WORK SHALL BE RETURNED TO THEIR ORIGINAL CONDITION.
8. CONTRACTOR SHALL MINIMIZE DISTURBANCE TO EXISTING SITE DURING CONSTRUCTION. EROSION CONTROL MEASURES, SHALL BE IN CONFORMANCE WITH THE LOCAL GUIDELINES FOR EROSION AND SEDIMENT CONTROL.
9. IF ANY FIELD CONDITIONS EXIST WHICH PRECLUDE COMPLIANCE WITH THE DRAWINGS, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ENGINEER AND SHALL PROCEED WITH AFFECTED WORK AFTER CONFLICT IS SATISFACTORILY RESOLVED.

EARTHWORK NOTES

1. COMPACTED GRAVEL FILL SHALL BE FURNISHED AND PLACED AS A FOUNDATION FOR STRUCTURES, WHERE SHOWN ON THE CONTRACT DRAWINGS OR DIRECTED BY THE ENGINEER.
2. CRUSHED STONE FILL SHALL BE PLACED IN 12" MAX. LIFTS AND CONSOLIDATED USING A HAND OPERATED VIBRATORY PLATE COMPACTOR WITH A MINIMUM OF 2 PAQSSES OF COMPACTOR PER LIFT.
3. COMPACTED GRAVEL FILL TO BE WELL GRADED BANK RUN GRAVEL MEETING THE FOLLOWING GRADATION REQUIREMENTS:

SIEVE DESIGNATION	% PASSING
1 ½"	100
No. 4	40–70
No. 100	5–20
No. 200	4–8

4. CRUSHED STONE TO BE UNIFORMLY GRADED, CLEAN, HARD PROCESS AGGREGATE MEETING THE FOLLOWING GRADATION REQUIREMENTS:

SIEVE DESIGNATION	% PASSING
1"	100
¾"	90–100
½"	0–15
⅜"	0–5

5. SELECT BACKFILL FOR FOUNDATION WALLS SHALL BE FREE OF ORGANIC MATERIAL, TOPSOIL, DEBRIS AND BOULDERS LARGER THAN 6".
6. GRAVEL AND GRANULAR FILL SHALL BE INSTALLED IN 10" MAX. LIFTS. COMPACTED TO 95% MIN. AT MAX. DRY DENSITY.
7. NON WOVEN GEOTEXTILE FOR SEPARATION PURPOSES SHALL BE MIRAFI 140N, OR ENGINEER APPROVED EQUAL.

DESIGNED BY:	TJL
DRAWN BY:	TJL
CHK'D BY:	CFC

REV	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
0	11/05/12	TJL/DEB	CFC	ISSUED FOR CLIENT REVIEW

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DATE:	10/25/12
SCALE:	AS SHOWN
JOB NO.	12001.0080

SITE AND EARTHWORK NOTES

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

CONCRETE CONSTRUCTION NOTES

1. CONCRETE CONSTRUCTION SHALL CONFORM TO THE FOLLOWING STANDARDS:

   ACI 211 – STANDARD PRACTICE FOR SELECTING PROPORTIONS FOR NORMAL AND HEAVYWEIGHT CONCRETE.

   ACI 301 – SPECIFICATIONS FOR STRUCTURAL CONCRETE FOR BUILDINGS.

   ACI 302 – GUIDE FOR CONCRETE FLOOR AND SLAB CONSTRUCTION

   ACI 304 – RECOMMENDED PRACTICE FOR MEASURING, MIXING, TRANSPORTING, AND PLACING CONCRETE.

   ACI 306.1 STANDARD SPECIFICATION FOR COLD WEATHER CONCRETING

   ACI 318 – BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE.

2. CONCRETE SHALL DEVELOP COMPRESSIVE STRENGTH IN 28 DAYS AS FOLLOWS:

SLABS ON GRADE	4,000 PSI
ALL OTHER CONCRETE	3,000 PSI

   – PORTLAND CEMENT: ASTM C150, TYPE II, (540 LBS/CUBIC YARD)
   – AGGREGATE: ASTM C33, No. 67, TYPICAL
   – WATER: POTABLE WITH MAXIMUM WATER CEMENT RATIO OF .55
   – SLUMP: 3" TO 4"
   – ADMIXTURES: USE AIR ENTRAINING AGENT CONFORMING TO ASTM C260 WITH 4 TO 6% TOTAL AIR. USE WATER REDUCING AGENT CONFORMING TO ASTM C494, TYPE A, IN ALL CONCRETE. CALCIUM CHLORIDE MAY NOT BE USED TO ACCELERATE THE CONCRETE SETTING TIME.

3. REINFORCING STEEL SHALL BE 60,000 PSI YIELD STRENGTH.

4. WELDED WIRE FABRIC SHALL CONFORM TO ASTM– A–185.

5. ALL DETAILING, FABRICATION, AND ERECTION OF REINFORCING BARS, UNLESS OTHERWISE NOTED, MUST FOLLOW THE LATEST ACI CODE AND LATEST ACI "MANUAL OF STANDARD PRACTICE FOR DETAILING REINFORCED CONCRETE STRUCTURES".

6. CONCRETE COVER OVER REINFORCING SHALL CONFORM TO THE FOLLOWING, UNLESS OTHERWISE SHOWN:

CONCRETE CAST AGAINST & PERMANENTLY EXPOSED TO EARTH:	3 INCHES
CONCRETE EXPOSED TO EARTH OR WEATHER:	
#6 THROUGH #18 BARS	2 INCHES
#5 BAR, W31 OR D31 WIRE & SMALLER	1½ INCHES
CONCRETE NOT EXPOSED TO WEATHER OR IN CONTACT WITH THE GROUND:	
#14 THROUGH #18 BARS	1½ INCHES
#11 BAR AND SMALLER	¾ INCHES

7. NO STEEL WIRE, METAL FORM TIES, OR ANY OTHER METAL SHALL REMAIN WITHIN THE REQUIRED COVER OF ANY CONCRETE SURFACE.

8. ALL REINFORCEMENT SHALL BE CONTINUOUS UNLESS OTHERWISE NOTED. SPLICES SHALL BE WELL STAGGERED. ADDITIONAL BARS AND SPECIAL BENDING DETAILS ARE REQUIRED AT INTERSECTING WALLS AND AT JOINTS. SUCH DETAILS SHALL COMPLY WITH ACI 315 RECOMMENDATIONS UNLESS OTHERWISE SHOWN.

9. NO TACK WELDING OF REINFORCING WILL BE PERMITTED.

10. NO CALCIUM CHLORIDE OR ADMIXTURES CONTAINING MORE THAN 1% CHLORIDE BY WEIGHT OF ADMIXTURE SHALL BE USED IN THE CONCRETE.

11. UNLESS OTHERWISE NOTED, ALL LAP SPLICES SHALL BE 48 BAR DIAMETERS.

12. SLAB ON GRADE FINISHES:

    EXTERIOR SLAB: NON–SLIP BROOM FINISH
    INTERIOR SLAB: STEEL TROWEL FINISH

DESIGNED BY:	TJL
DRAWN BY:	TJL
CHK'D BY:	CFC

REV	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
0	11/05/12	TJL/DGB	CFC	ISSUED FOR CLIENT REVIEW

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HAMDEN CT 06514

DATE:	10/25/12
SCALE:	AS SHOWN
JOB NO.	12001.C080

CONCRETE CONSTRUCTION NOTES

SHEET NO.
N-3
Sheet No. 3 of 3

STRUCTURAL STEEL

1. ALL STRUCTURAL STEEL IS DESIGNED BY ALLOWABLE STRESS DESIGN (ASD)

   A. STRUCTURAL STEEL (W SHAPES)---ASTM A992 (FY = 50 KSI)
   B. STRUCTURAL STEEL (OTHER SHAPES)---ASTM A36 (FY = 36 KSI)
   C. STRUCTURAL HSS (RECTANGULAR SHAPES)---ASTM A500 GRADE B, (FY = 46 KSI)
   D. STRUCTURAL HSS (ROUND SHAPES)---ASTM A500 GRADE B, (FY = 42 KSI)
   E. PIPE---ASTM A53 (FY = 35 KSI)
   F. CONNECTION BOLTS---ASTM A325-N
   G. U-BOLTS---ASTM A36
   H. ANCHOR RODS---ASTM F 1554
   I. WELDING ELECTRODE---ASTM E 70XX

2. CONTRACTOR TO REVIEW ALL SHOP DRAWINGS AND SUBMIT COPY TO ENGINEER FOR APPROVAL. DRAWINGS MUST BEAR THE CHECKER'S INITIALS BEFORE SUBMITTING TO THE ENGINEER FOR REVIEW. SHOP DRAWINGS SHALL INCLUDE THE FOLLOWING: SECTION PROFILES, SIZES, CONNECTION ATTACHMENTS, REINFORCING, ANCHORAGE, SIZE AND TYPE OF FASTENERS AND ACCESSORIES. INCLUDE ERECTION DRAWINGS, ELEVATIONS AND DETAILS.

3. STRUCTURAL STEEL SHALL BE DETAILED, FABRICATED AND ERECTED IN ACCORDANCE WITH THE LATEST PROVISIONS OF AISC MANUAL OF STEEL CONSTRUCTION.

4. PROVIDE ALL PLATES, CLIP ANGLES, CLOSURE PIECES, STRAP ANCHORS, MISCELLANEOUS PIECES AND HOLES REQUIRED TO COMPLETE THE STRUCTURE.

5. FIT AND SHOP ASSEMBLE FABRICATIONS IN THE LARGEST PRACTICAL SECTIONS FOR DELIVERY TO SITE.

6. INSTALL FABRICATIONS PLUMB AND LEVEL, ACCURATELY FITTED, AND FREE FROM DISTORTIONS OR DEFECTS.

7. AFTER ERECTION OF STRUCTURES, TOUCHUP ALL WELDS, ABRASIONS AND NON-GALVANIZED SURFACES WITH A 95% ORGANIC ZINC RICH PAINT IN ACCORDANCE WITH ASTM 780.

8. ALL STEEL MATERIAL (EXPOSED TO WEATHER) SHALL BE GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123 "ZINC (HOT DIPPED GALVANIZED) COATINGS" ON IRONS AND STEEL PRODUCTS.

9. ALL BOLTS, ANCHORS AND MISCELLANEOUS HARDWARE SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A153 "ZINC COATING (HOT-DIP) ON IRON AND STEEL HARDWARE".

10. CONTRACTOR SHALL COMPLY WITH AWS CODE FOR PROCEDURES APPEARANCE AND QUALITY OF WELDS, AND WELDING PROCESSES SHALL BE QUALIFIED IN ACCORDANCE WITH AWS "STANDARD QUALIFICATION PROCEDURES". ALL WELDING SHALL BE DONE USING E70XX ELECTRODES AND WELDING SHALL CONFORM TO AISC AND D1.1 WHERE FILLET WELD SIZES ARE NOT SHOWN, PROVIDE THE MINIMUM SIZE PER TABLET J2.4 IN THE AISC "MANUAL OF STEEL CONSTRUCTION" 9TH EDITION. AT THE COMPLETION OF WELDING, ALL DAMAGE TO GALVANIZED COATING SHALL BE REPAIRED.

11. THE ENGINEER SHALL BE NOTIFIED OF ANY INCORRECTLY FABRICATED, DAMAGED OR OTHERWISE MISFITTING OR NON CONFORMING MATERIALS OR CONDITIONS TO REMEDIAL OR CORRECTIVE ACTION. ANY SUCH ACTION SHALL REQUIRE ENGINEER REVIEW.

12. CONNECTION ANGLES SHALL HAVE A MINIMUM THICKNESS OF 1/4 INCHES.

13. STRUCTURAL CONNECTION BOLTS SHALL CONFORM TO ASTM A325. ALL BOLTS SHALL BE 3/4" DIAMETER MINIMUM AND SHALL HAVE A MINIMUM OF TWO BOLTS, UNLESS OTHERWISE ON THE DRAWINGS.

14. LOCK WASHER ARE NOT PERMITTED FOR A325 STEEL ASSEMBLIES.

15. SHOP CONNECTIONS SHALL BE WELDED OR HIGH STRENGTH BOLTED.

16. MILL BEARING ENDS OF COLUMNS, STIFFENERS, AND OTHER BEARING SURFACES TO TRANSFER LOAD OVER ENTIRE CROSS SECTION.

17. FABRICATE BEAMS WITH MILL CAMBER UP.

18. LEVEL AND PLUMB INDIVIDUAL MEMBERS OF THE STRUCTURE TO AN ACCURACY OF 1:500, BUT NOT TO EXCEED 1/4" IN THE FULL HEIGHT OF THE COLUMN.

19. COMMENCEMENT OF STRUCTURAL STEEL WORK WITHOUT NOTIFYING THE ENGINEER OF ANY DISCREPANCIES WILL BE CONSIDERED ACCEPTANCE OF PRECEDING WORK.

ROCK ANCHORS

1. THE TOWER FOUNDATION MUST BEAR ON COMPETENT (SOUND) ROCK. BEDROCK BEARING SURFACE SHALL BE LEVEL, CLEANED OF ANY SOIL, LOOSE ROCK FRAGMENTS AND ANY UNSUITABLE BEARING MATERIAL. THE FINISHED BEARING SURFACE IS TO BE INSPECTED BY THE DESIGN ENGINEER FOR APPROVAL.

2. DRILLED HOLES SHALL BE CLEAR OF DEBRIS BEFORE GROUTING.

3. ALL WORK SHALL BE SUBJECT TO SPECIAL INSPECTION RETAINED BY THE OWNER/CONTRACTOR AS PER THE 2005 CONNECTICUT STATE BUILDING CODE WITH 2009 SUPPLEMENT.

4. GROUT SHALL BE HIGH STRENGTH NON SHRINK GROUT WITH A MINIMUM COMPRESSIVE STRENGTH (f'c) of 5,000psi.

5. FOR GROUTING TECHNIQUES, GROUT CURE TIME AND PROCEDURES CONTACT WILLIAMS FORM ENGINEERING CORP. (616) 866-0815.

6. ALL ROCK ANCHORS SHALL BE DRILLED AND INSTALLED PLUMB.

DESIGNED BY:	TJL
DRAWN BY:	TJL
CHK'D BY:	CFC

REV.	DATE	DRAWN BY	CHK'D BY	REMARKS
1	11/06/12	TJL	CFC	ISSUED FOR CLIENT REVIEW

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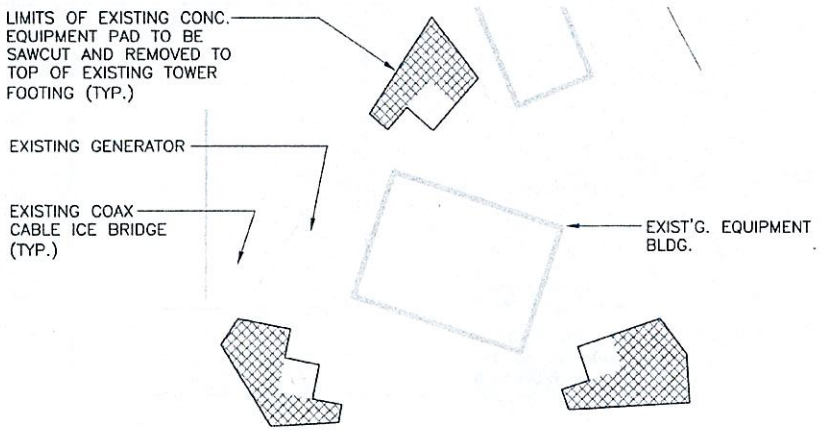
HAMDEN, CT 06514

DATE: 10/25/12
SCALE: AS SHOWN
JOB NO. 12001.C080

STRUCTURAL STEEL AND ROCK ANCHORS NOTES

SHEET NO.
N-4
Sheet No. 4 of 5



NOTE

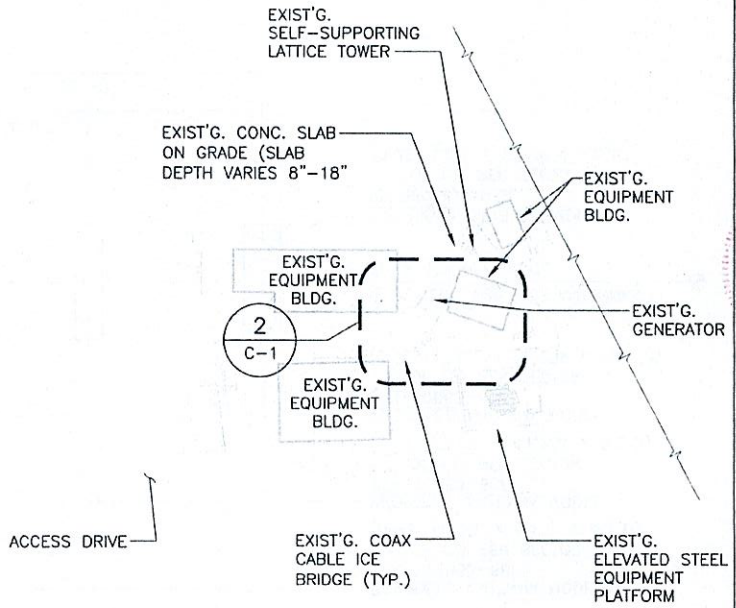
FILL WITH GRAVEL AREAS OF EQUIPMENT PAD REMOVAL OUTSIDE OF PROPOSED FOUNDATION REINFORCEMENTS. WORK THIS PLAN WITH TYPICAL FOUNDATION REINFORCEMENT PLAN 1/S-2.

2 / C-1 EQUIPMENT PAD DEMO PLAN

SCALE: 1" = 10'

NORTH

(IN FEET)
1 inch = 10 ft.



1 / C-1 KEY PLAN

SCALE: 1" = 30'

NORTH

(IN FEET)
1 inch = 30 ft.

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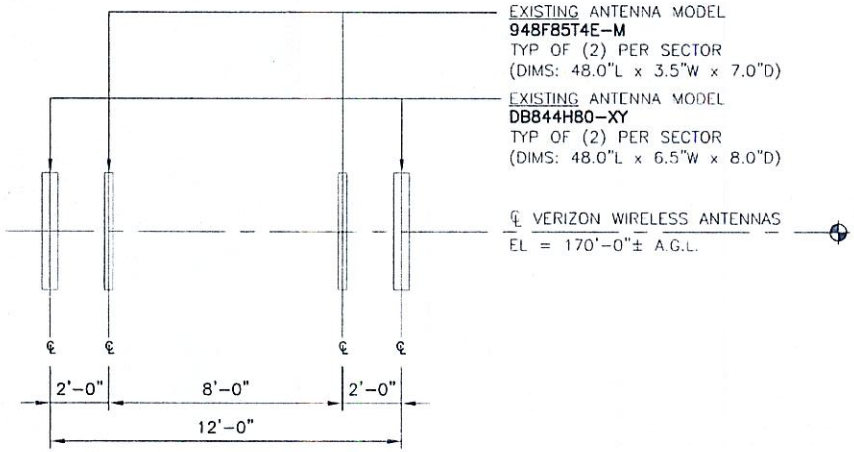
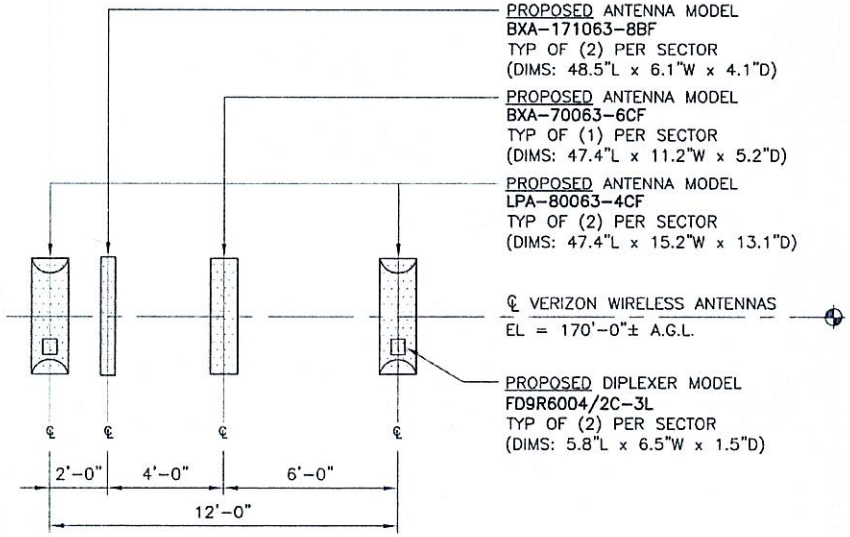
KEY AND SLAB DEMO PLANS

SHEET NO.
C-1
Sheet No. 1 of 3



1 C-2 **MOUNTING CONFIGURATION - EXISTING**

SCALE: 1/4" = 1'-0"



2 C-2 **MOUNTING CONFIGURATION - PROPOSED**

SCALE: 1/4" = 1'-0"

DESIGNED BY:	TJL
DRAWN BY:	TJL
CHK'D BY:	CFC

NO.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
0	10/26/12	TJL	CFC	ISSUED FOR CLIENT REVIEW

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Cellco Partnership d/b/a Verizon Wireless
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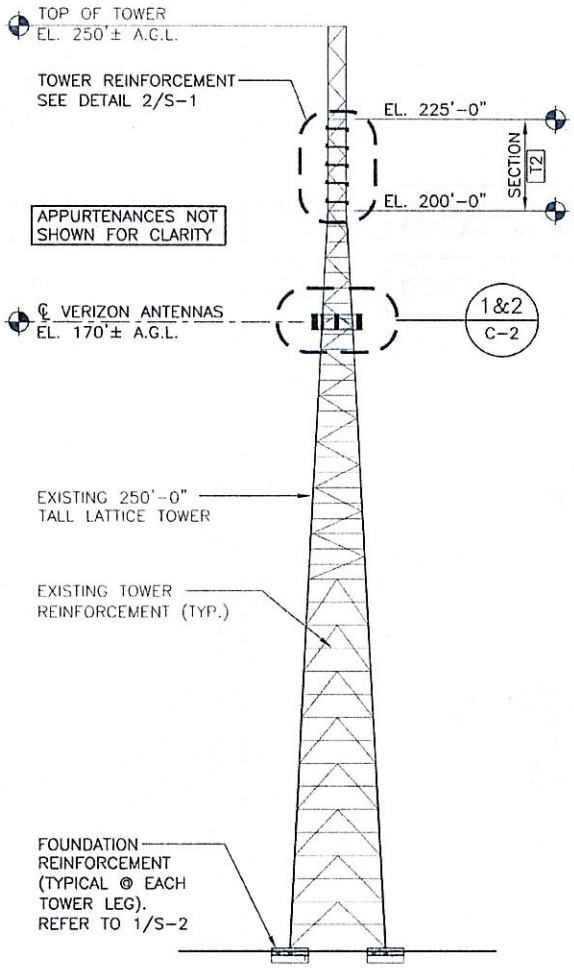
ANTENNA MOUNTING CONFIGURATIONS

SHEET NO.
C-2
Sheet No. of

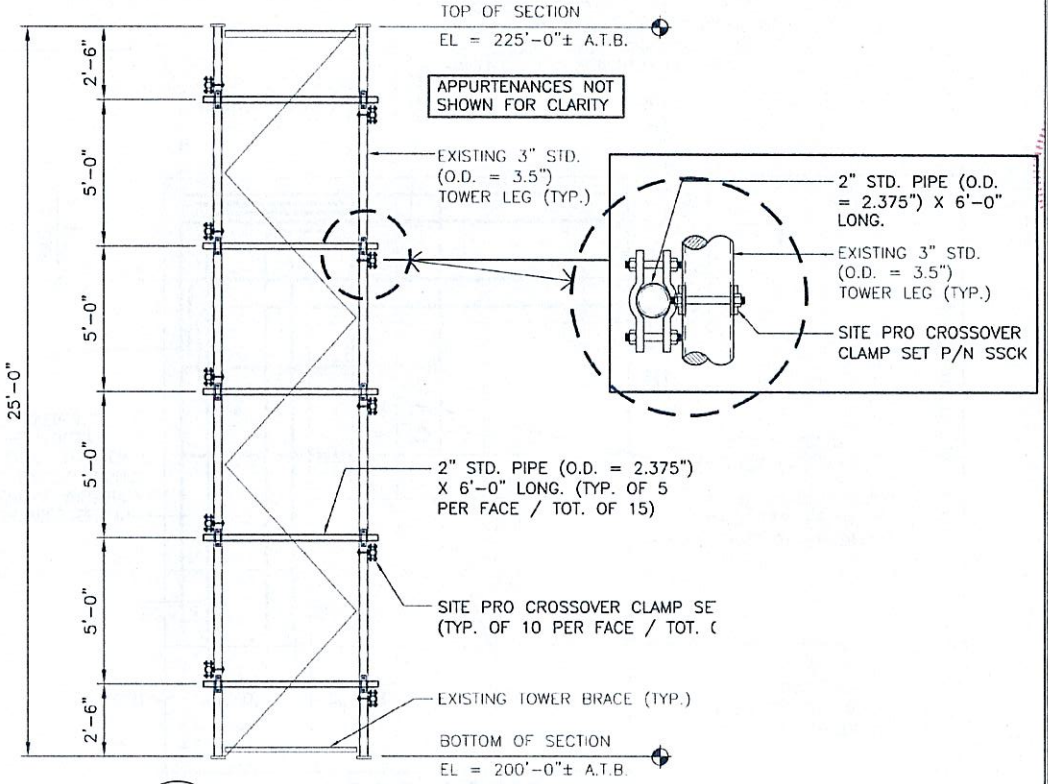


1 / S-1 **TOWER ELEVATION - PROPOSED**

SCALE: NOT TO SCALE

TOWER REINFORCEMENT NOTES

1. REFER TO STRUCTURAL ANALYSIS AND REINFORCEMENT DESIGN PREPARED BY CENTEK ENGINEERING, INC., FOR VERIZON WIRELESS, DATED 10/26/12.
2. TOWER GEOMETRY AND STRUCTURE MEMBER SIZES WERE OBTAINED FROM A PREVIOUS STRUCTURAL ANALYSIS REPORT PREPARED BY H.E. BERGERON ENGINEERS, PROJECT #2000-021, DATED FEBRUARY 17, 2000.
3. ALL STEEL REINFORCEMENT SHOWN HEREIN APPLIES TO ALL SIDES OF THE TOWER.
4. COORDINATE INSTALLATION OF REINFORCEMENT WITH EXISTING ANTENNAS/APPURTENANCES. REFER TO RISA TOWER OUTPUT GRAPHIC SUMMARY FOR INFORMATION.



2 / S-1 **TOWER REINFORCEMENT**

SCALE: 1/4" = 1'-0"

DESIGNED BY:	TJL
DRAWN BY:	TJL
CHK'D BY:	CFC

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
0	11/05/12	TJL/DGS	CFC	ISSUED FOR CLIENT REVIEW

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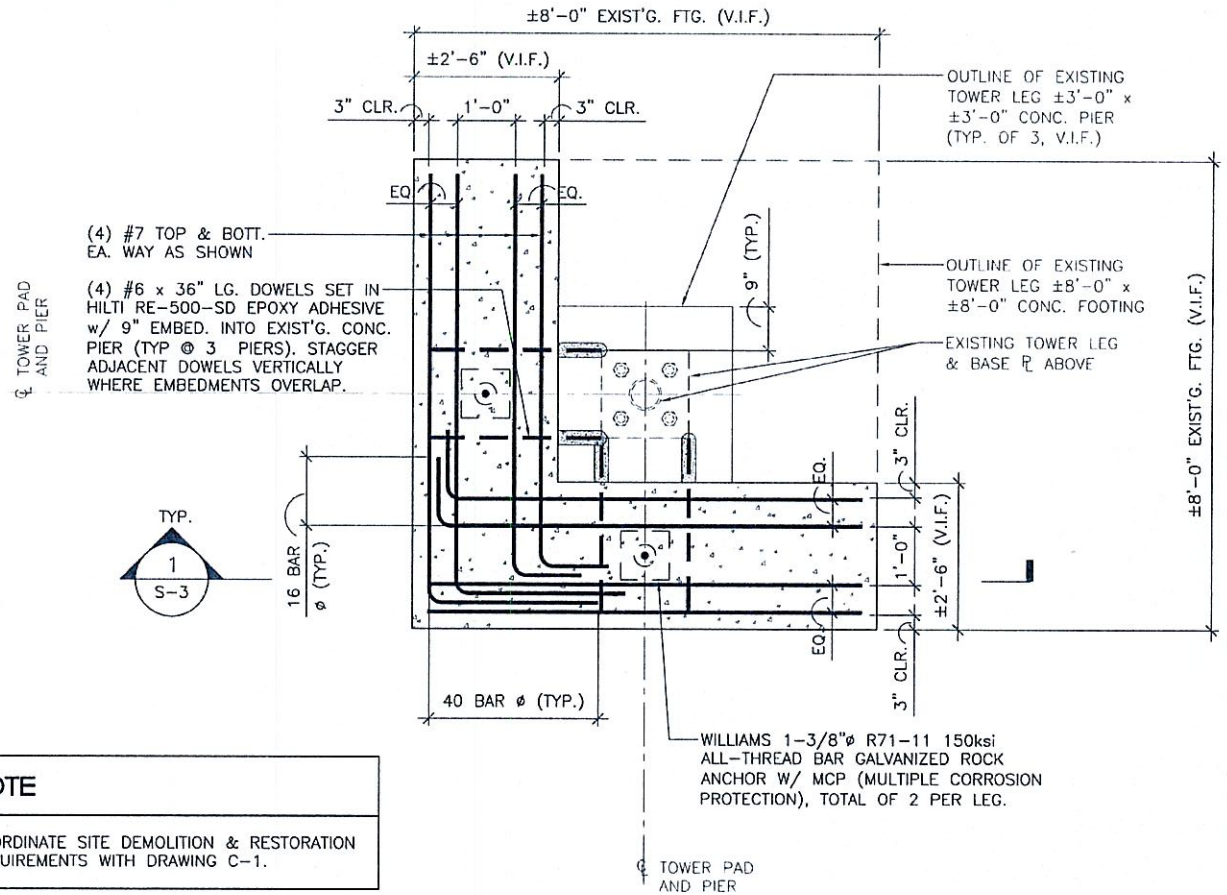
DATE:	10/25/12
SCALE:	AS SHOWN
JOB NO.	12001.C080

TOWER ELEVATION AND REINFORCEMENT DETAILS

SHEET NO.
S-1
Sheet No. 2 of 2



NOTE
COORDINATE SITE DEMOLITION & RESTORATION REQUIREMENTS WITH DRAWING C-1.

1 / S-2 **FOUNDATION REINFORCEMENT PLAN**

SCALE: 1/2" = 1'-0"

DESIGNED BY:	TJL
DRAWN BY:	TJL
CHK'D BY:	CFC

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
0	11/05/12	TJL	CFC	ISSUED FOR CLIENT REVIEW

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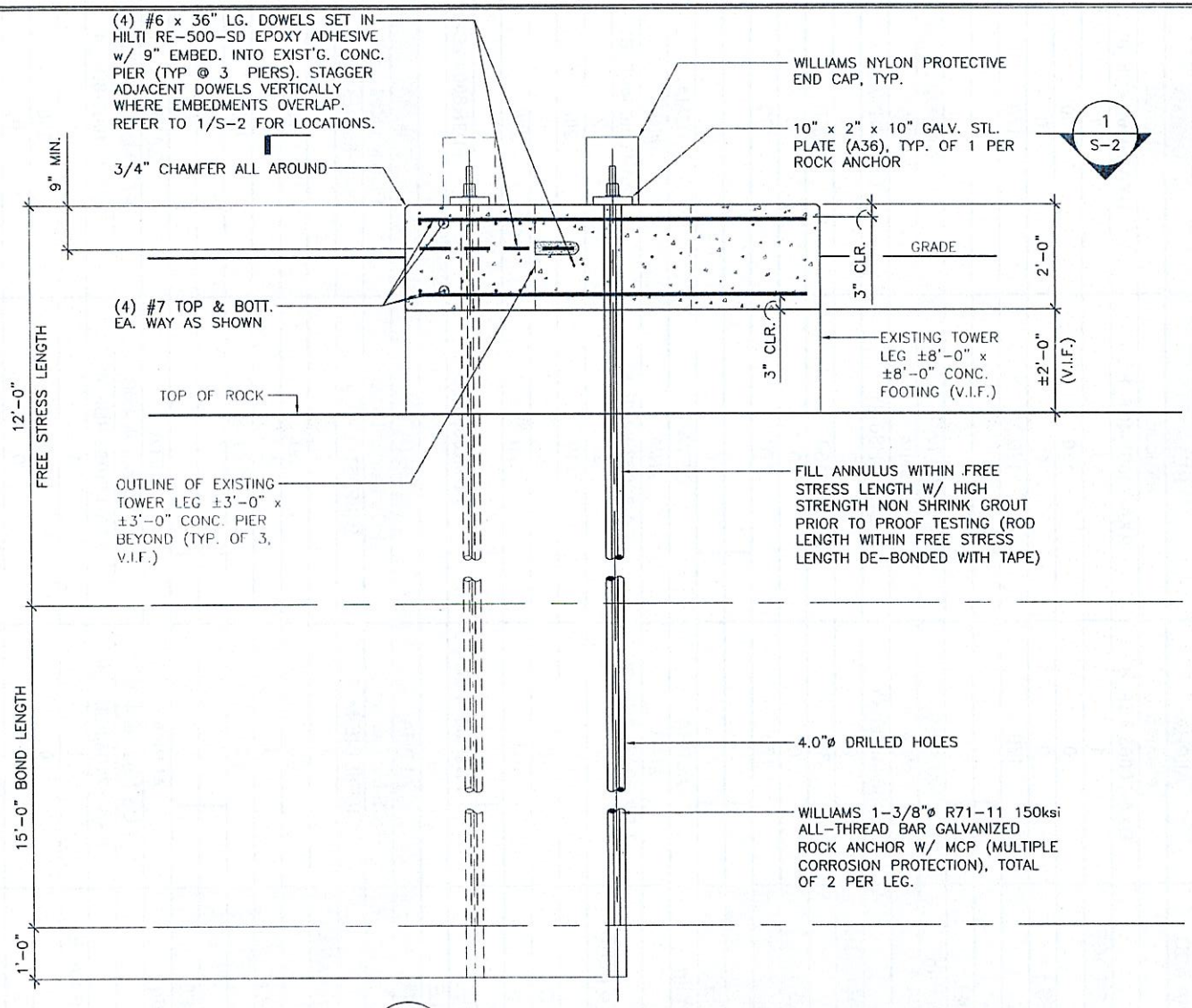
Cellco Partnership d/b/a Verizon Wireless
PREPARED FOR THIS PROJECT BY:
HAMDEN
RALDON DRIVE
HAMDEN CT, 06514

DATE:	10/25/12
SCALE:	AS SHOWN
JOB NO.	12001.C080

FOUNDATION REINFORCEMENT PLAN

SHEET NO.
S-2
Sheet No. 1 of 2



1 S-3 **FOUNDATION REINFORCEMENT ELEVATION**

SCALE: 1/2" = 1'-0"

DESIGNED BY:	TJL
DRAWN BY:	TJL
CHK'D BY:	CFC

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
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FOUNDATION REINFORCEMENT SECTION

SHEET NO.
S-3
Sheet No. 3 of 3

SITE NAME	HAMDEN CT	ECP - CELL #	2 / 213
LATITUDE	41-20-59.35 N	LONGITUDE	72-58-21.37 W
Additional Comments:		SAVE BUTTON	
		STRUCTURE TYPE	LATTICE

700 Mhz - LTE ANTENNA ADD	ALPHA	BETA	GAMMA
EQUIPMENT TYPE	eNodeB	eNodeB	eNodeB
ANTENNA TYPE	BXA-70063-4CF_8°	BXA-70063-4CF_8°	BXA-70063-4CF_8°
QTY OF ANTENNAS PER FACE	1	1	1
ORIENTATION (DEG)	0	110	200
DOWN TILT (MECH/DEG)	0	4°	0
RAD CTR (FT AGL)	170	170	170
TMA - QTY / MODEL			
DIPLEXER - QTY / MODEL			

850 Celluar - Current Config	ALPHA	BETA	GAMMA
EQUIPMENT TYPE	#N/A	#N/A	#N/A
ANTENNA TYPE	DB844H80-XY	DB844H80-XY	DB844H80-XY
QTY OF ANTENNAS PER FACE	2	2	2
ORIENTATION (DEG)	30	150	270
DOWN TILT (MECH/DEG)	0	0	0
RAD CTR (FT AGL)	170	170	170
TMA - QTY / MODEL			
DIPLEXER - QTY / MODEL			

850 Celluar - Future Config	ALPHA	BETA	GAMMA
EQUIPMENT TYPE	#N/A	#N/A	#N/A
ANTENNA TYPE	LPA-80063-4CF_8°	LPA-80063-64CF_8°	LPA-80063-4CF_8°
QTY OF ANTENNAS PER FACE	2	2	2
ORIENTATION (DEG)	0	110	200
DOWN TILT (MECH/DEG)	0	0	0
RAD CTR (FT AGL)	170	170	170
TMA - QTY / MODEL			
DIPLEXER - QTY / MODEL	2 FD9R6004/2C-3L	2 FD9R6004/2C-3L	2 FD9R6004/2C-3L
DIPLEX WITH LTE CABLE			

1900 PCS - Current Config	ALPHA	BETA	GAMMA
EQUIPMENT TYPE	PCS Modcell 4.0B	PCS Modcell 4.0B	PCS Modcell 4.0B
ANTENNA TYPE	948F85T4E-M_4	948F85T4E-M_4	948F85T4E-M_4
QTY OF ANTENNAS PER FACE	2	2	2
ORIENTATION (DEG)	30	150	270
DOWN TILT (MECH/DEG)	0	0	0
RAD CTR (FT AGL)	170	170	170
TMA - QTY / MODEL			
DIPLEXER - QTY / MODEL			

1900 PCS - Future Config	ALPHA	BETA	GAMMA
EQUIPMENT TYPE	PCS Modcell 4.0B	PCS Modcell 4.0B	PCS Modcell 4.0B
ANTENNA TYPE	BXA-171063-8BF_4°	BXA-171063-8BF_4°	BXA-171063-8BF_4°
QTY OF ANTENNAS PER FACE	1	1	1
ORIENTATION (DEG)	0	110	200
DOWN TILT (MECH/DEG)	0	0	0
RAD CTR (FT AGL)	170	170	170
TMA - QTY / MODEL			
DIPLEX WITH CELLULAR CABLE	DIPLEX with Cellular Cable	DIPLEX with Cellular Cable	DIPLEX with Cellular Cable

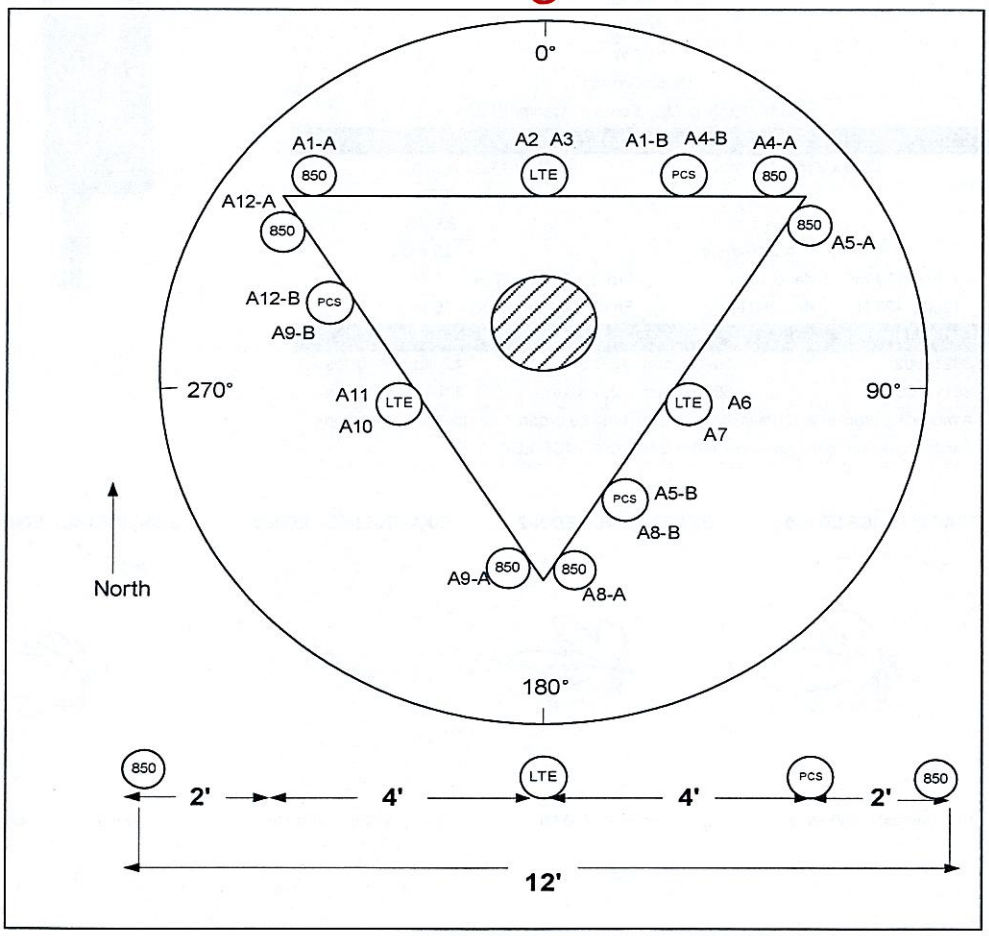
NUMBER OF CABLE'S NEEDED					ESTIMATED CABLE LENGTH			
MAINLINE SIZE	1 5/8"	TOTAL # OF MAINLINES		12	MAINLINE (FT)			
JUMPER SIZE	1/2 "	TOTAL # OF TOP JUMPERS		18	TOP JUMPER (FT)			12
Equipment Cable Ordering		MAIN CABLE	12	+	TOP JUMPER #	12	+	6

TX / RX FREQUENCIES			TX POWER OUTPUT	
Cellular A-Band	PCS F / AWS-Band	700 Mhz C - E	Cellular (Watts)	20
TX - 869-880,890-891.5 MHz	TX - 1970-1975 / 2145-21	TX - 746-757	PCS (Watts)	16
RX - 824-835,845-846.5 MHz	RX - 1890-1895 / 1745-17	RX - 776-787	LTE (Watts)	40

ALPHA				BETA				GAMMA			
Ant.	Freq.	Func.	Color Code	Ant.	Freq.	Func.	Color Code	Ant.	Freq.	Func.	Color Code
A1-A	800	Tx1/Rx0	RED	A5-A	800	Tx2/Rx0	BLUE	A9-A	800	Tx3/Rx0	GREEN
A1-B	1900	Tx1/Rx0	RED/ WHITE	A5-B	1900	Tx2/Rx0	BLUE/ WHITE	A9-B	1900	Tx3/Rx0	GREEN/WHITE
A2	700	Tx1/Rx0	RED/ ORANGE	A6	700	Tx2/Rx0	BLUE/ ORANGE	A10	700	Tx3/Rx0	GREEN/ORANGE
A3	700	Tx4/Rx1	RED/RED/ ORANGE	A7	700	Tx5/Rx1	BLUE/BLUE/ ORANGE	A11	700	Tx6/Rx1	GREEN/GREEN/ ORANGE
A4-B	1900	Tx4/Rx1	RED/RED/ WHITE	A8-B	1900	Tx5/Rx1	BLUE/BLUE/ WHITE	A12-B	1900	Tx6/Rx1	GREEN/GREEN/ WHITE
A4-A	800	Tx4/Rx1	RED/RED	A8-A	800	Tx5/Rx1	BLUE/BLUE	A12-A	800	Tx6/Rx1	GREEN/GREEN

RF ENGINEER	RF MANAGER	INITIALS	DATE
Prepared By: Dany Bustamante	Steve Weatherbee	DB	6/14/2012

Site Configuration



Amphenol ANTENNA SOLUTIONS

BXA-70063-4CF-EDIN-X

X-Pol | FET Panel | 63° | 13.0 dBd

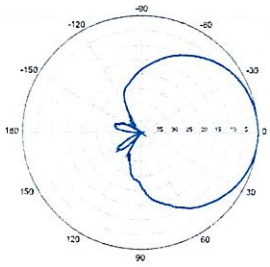
Replace "X" with desired electrical downtilt.

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

Electrical Characteristics	696-900 MHz	
Frequency bands	696-806 MHz	806-900 MHz
Polarization	±45°	
Horizontal beamwidth	65°	63°
Vertical beamwidth	17°	15°
Gain	12.5 dBd (14.6 dBi)	13.0 dBd (15.1 dBi)
Electrical downtilt (X)	0, 2, 3, 4, 5, 6, 8, 9, 10, 12, 14	
Impedance	50Ω	
VSWR	≤1.35:1	
Upper sidelobe suppression (0°)	-16.3 dB	-22.1 dB
Front-to-back ratio (+/-30°)	-36.1 dB	-34.9 dB
Null fill	5% (-26.02 dB)	
Isolation between ports	< -30 dB	
Input power with EDIN connectors	500 W	
Input power with NE connectors	300 W	
Lightning protection	Direct Ground	
Connector(s)	2 Ports / EDIN or NE / Female / Center (Back)	
Mechanical Characteristics		
Dimensions Length x Width x Depth	1205 x 285 x 133 mm	47.4 x 11.2 x 5.2 in
Depth with z-brackets	173 mm	6.8 in
Weight without mounting brackets	4.5 kg	9.9 lbs
Survival wind speed	> 201 km/hr	> 125 mph
Wind area	Front: 0.34 m^2 Side: 0.16 m^2	Front: 3.7 ft^2 Side: 1.7 ft^2
Wind load @ 161 km/hr (100 mph)	Front: 498 N Side: 260 N	Front: 111 lbf Side: 55 lbf

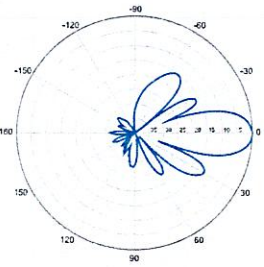
Mounting Options	Part Number	Fits Pipe Diameter	Weight
2-Point Mounting Bracket Kit	36210002	50-160 mm 2.0-6.3 in	4.5 kg 10 lbs
2-Point Downtilt Bracket Kit (0-20°)	36114003	50-160 mm 2.0-6.3 in	4.9 kg 11 lbs
Downtilt Mounting Applications	A mounting bracket and downtilt bracket kit must be ordered for downtilt applications		
Concealment Configurations	For concealment configurations, order BXA-70063-4CF-EDIN-X-FP		

BXA-70063-4CF-EDIN-X



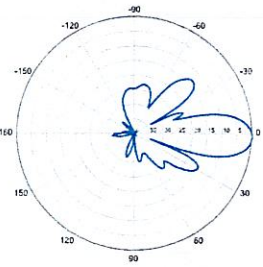
Horizontal | 750 MHz

BXA-70063-4CF-EDIN-0



0° | Vertical | 750 MHz

BXA-70063-4CF-EDIN-2

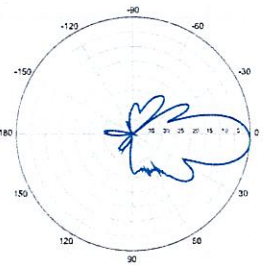


2° | Vertical | 750 MHz

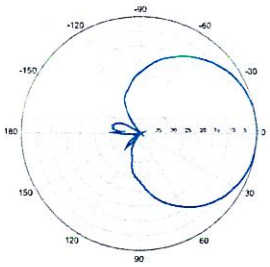
BXA-70063-4CF-EDIN-3

3° | Vertical | 750 MHz

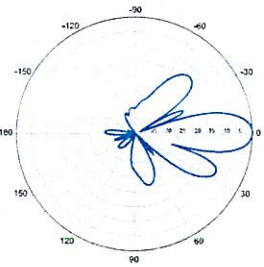
BXA-70063-4CF-EDIN-4



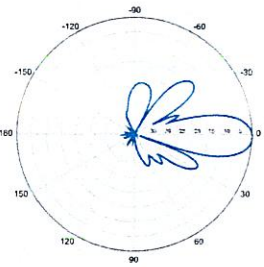
4° | Vertical | 750 MHz



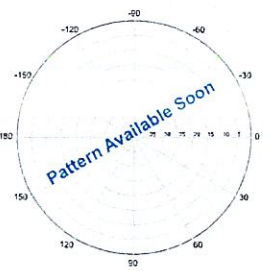
Horizontal | 850 MHz



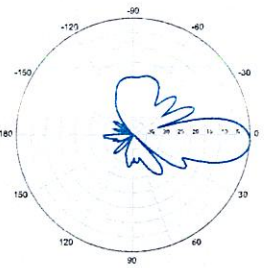
0° | Vertical | 850 MHz



2° | Vertical | 850 MHz



3° | Vertical | 850 MHz



4° | Vertical | 850 MHz

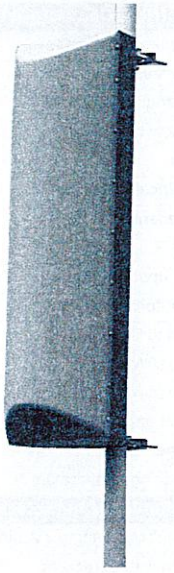
Amphenol ANTENNA SOLUTIONS

LPA-80063-4CF-EDIN-X

V-Pol | Log Periodic | 63° | 13.0 dBd

Replace "X" with desired electrical downtilt.

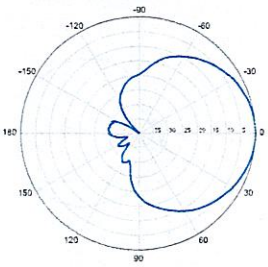
Antenna is also available with NE connector(s). Replace "EDIN" with "NE" in the model number when ordering.



Electrical Characteristics				
Frequency bands	806-960 MHz			
Polarization	Vertical			
Horizontal beamwidth	63°			
Vertical beamwidth	15°			
Gain	13.0 dBd (15.1 dBi)			
Electrical downtilt (X)	0, 2, 4, 5, 6, 8, 10, 12, 14			
Impedance	50Ω			
VSWR	≤1.4:1			
Upper sidelobe suppression (0°)	-15.7 dB			
Front-to-back ratio (+/-30°)	-31.7 dB			
Null fill	5% (-26.02 dB)			
Input power	500 W			
Lightning protection	Direct Ground			
Connector(s)	1 Port / EDIN or NE / Female / Center (Back)			
Mechanical Characteristics				
Dimensions Length x Width x Depth	1205 x 385 x 332 mm		47.4 x 15.2 x 13.1 in	
Depth of antenna with z-bracket	372 mm		14.6 in	
Weight without mounting brackets	9.1 kg		20 lbs	
Survival wind speed	> 201 km/hr		> 125 mph	
Wind area	Front: 0.46 m^2	Side: 0.39 m^2	Front: 5.0 ft^2	Side: 4.2 ft^2
Wind load @ 161 km/hr (100 mph)	Front: 660 N	Side: 550 N	Front: 149 lbf	Side: 124 lbf

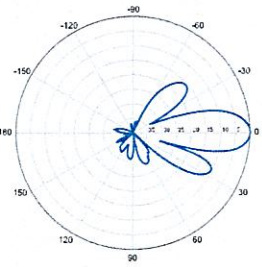
Mounting Options	Part Number	Fits Pipe Diameter		Weight	
2-Point Mounting & Downtilt Bracket Kit (0-20°)	21699999	50-102 mm	2.0-4.0 in	5.4 kg	12 lbs
Lock-Down Brace	If the lock-down brace is used, the maximum diameter of the mounting pipe is 88.9 mm or 3.5 in.				

LPA-80063-4CF-EDIN-X



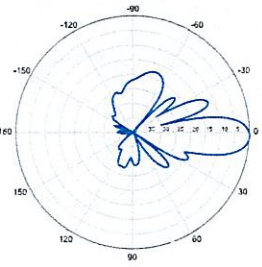
Horizontal

LPA-80063-4CF-EDIN-0



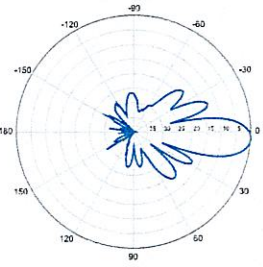
0° | Vertical

LPA-80063-4CF-EDIN-2



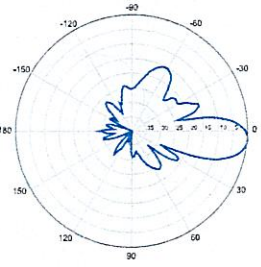
2° | Vertical

LPA-80063-4CF-EDIN-4



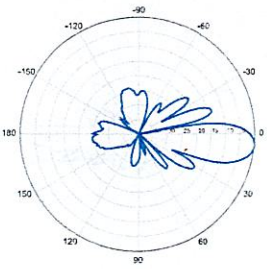
4° | Vertical

LPA-80063-4CF-EDIN-5



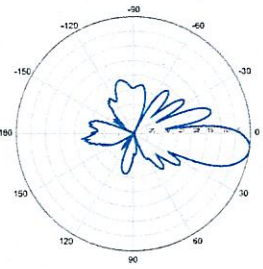
5° | Vertical

LPA-80063-4CF-EDIN-6



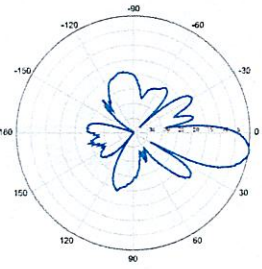
6° | Vertical

LPA-80063-4CF-EDIN-8



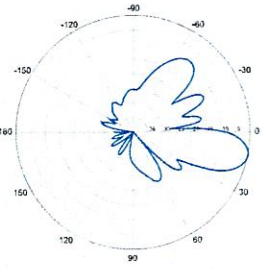
8° | Vertical

LPA-80063-4CF-EDIN-10



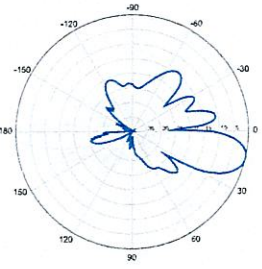
10° | Vertical

LPA-80063-4CF-EDIN-12



12° | Vertical

LPA-80063-4CF-EDIN-14



14° | Vertical

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.

Amphenol ANTENNA SOLUTIONS

BXA-171063-8BF-EDIN-X

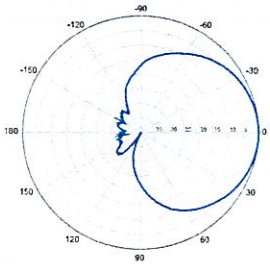
· Replace "X" with desired electrical downtilt.

X-Pol | FET Panel | 63° | 17.4 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	7°	7°	7°
Gain	14.5 dBd / 16.6 dBi	14.9 dBd / 17.0 dBi	15.3 dBd / 17.4 dBi
Electrical downtilt (X)	0, 2, 4, 8		
Impedance	50Ω		
VSWR	≤1.5:1		
First upper sidelobe	< -17 dB		
Front-to-back isolation	> 30 dB		
In-band isolation	> 28 dB		
IM3 (20W carrier)	< -150 dBc		
Input power	300 W		
Lightning protection	Direct Ground		
Connector(s)	2 Ports / EDIN / Female / Bottom		
Operating temperature	-40° to +60° C / -40° to +140° F		
Mechanical Characteristics			
Dimensions Length x Width x Depth	1232 x 154 x 105 mm	48.5 x 6.1 x 4.1 in	
Depth with t-brackets	133 mm	5.2 in	
Weight without mounting brackets	4.8 kg	10.5 lbs	
Survival wind speed	296 km/hr	184 mph	
Wind area	Front: 0.19 m² Side: 0.14 m²	Front: 2.0 ft² Side: 1.5 ft²	
Wind load @ 161 km/hr (100 mph)	Front: 281 N Side: 223 N	Front: 63 lbf Side: 50 lbf	

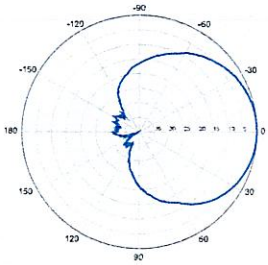
Mounting Options	Part Number	Fits Pipe Diameter	Weight
2-Point Mounting Bracket Kit	26799997	50-102 mm 2.0-4.0 in	2.3 kg 5 lbs
2-Point Mounting & Downtilt Bracket Kit	26799999	50-102 mm 2.0-4.0 in	3.6 kg 8 lbs
Concealment Configurations	For concealment configurations, order BXA-171063-8BF-EDIN-X-FP		

BXA-171063-8BF-EDIN-X



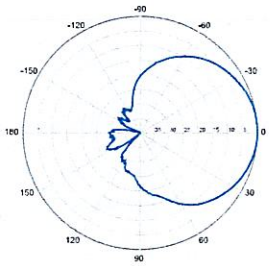
Horizontal | 1710-1880 MHz

BXA-171063-8BF-EDIN-X



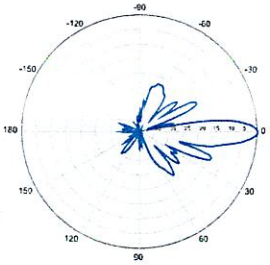
Horizontal | 1850-1990 MHz

BXA-171063-8BF-EDIN-X



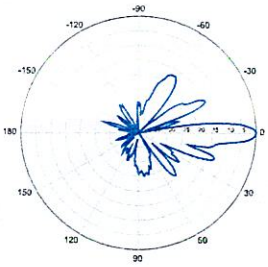
Horizontal | 1920-2170 MHz

BXA-171063-8BF-EDIN-0



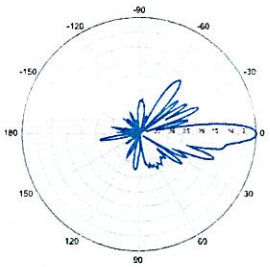
0° | Vertical | 1710-1880 MHz

BXA-171063-8BF-EDIN-0



0° | Vertical | 1850-1990 MHz

BXA-171063-8BF-EDIN-0



0° | Vertical | 1920-2170 MHz

Product Data Sheet | **FD9R6004/2C-3L**

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)**
- **Mounting hardware for Wall and Pole mount provided (P/N SEM2-1A)**
- **Grounding already provided through the mounting bracket**
- **Kit available for easy dual mount**

Technical Specifications

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

Notes