ROBINSON & COLE LLP

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Direct (860) 275-8345

June 16, 2011

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

Re: **Notice of Completion of Construction Activity**

EM-VER-113-110224 – 74 Goodrich Lane, Portland, Connecticut
EM-VER-152-110310 – 41 Manitock Hill, Waterford, Connecticut
EM-VER-003-110303 – Janowski Road, Ashford, Connecticut

Dear Ms. Roberts:

This letter will serve as notice that construction activity associated with the above-referenced facility modifications has been completed.

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

Sincerely,

Kenneth C. Baldwin

Copy to:
Sandy M. Carter

11128396-v1

STATE OF CONNECTICUT

CONNECTICUT SITING COUNCIL

Ten Franklin Square, New Britain, CT 06051

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

E-Mail: siting.council@ct.gov

Internet: ct.gov/csc

Daniel F. Caruso

Chairman

March 21, 2011

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

RE: **EM-VER-003-110303** - Cellco Partnership d/b/a Verizon Wireless notice of intent to modify an existing telecommunications facility located at 33 Janowski Road, Ashford, Connecticut.

Dear Attorney Baldwin:

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

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

The proposed modifications including the placement of all necessary equipment and shelters within the tower compound are to be implemented as specified here and in your notice dated March 2, 2011. The modifications are in compliance with the exception criteria in Section 16-50j-72 (b) of the Regulations of Connecticut State Agencies as changes to an existing facility site that would not increase tower height, extend the boundaries of the tower site, increase noise levels at the tower site boundary by six decibels, and increase the total radio frequencies electromagnetic radiation power density measured at the tower site boundary to or above the standard adopted by the State Department of Environmental Protection pursuant to General Statutes § 22a-162. This facility has also been carefully modeled to ensure that radio frequency emissions are conservatively below State and federal standards applicable to the frequencies now used on this tower.

This decision is under the exclusive jurisdiction of the Council. Please be advised that the validity of this action shall expire one year from the date of this letter. Any additional change to this facility will require explicit notice to this agency pursuant to Regulations of Connecticut State Agencies Section 16-50j-73. Such notice shall include all relevant information regarding the proposed change with cumulative worst-case modeling of radio frequency exposure at the closest point of uncontrolled access to the tower base, consistent with Federal Communications Commission, Office of Engineering and Technology, Bulletin 65. Thank you for your attention and cooperation.

Very truly yours,

Linda Roberts
Executive Director

LR/CDM/laf

c: The Honorable Ralph H. Fletcher, First Selectman, Town of Ashford
Richard Dziadus, Zoning Enforcement Officer, Town of Ashford
Crown Castle USA, Inc.

STATE OF CONNECTICUT

CONNECTICUT SITING COUNCIL

Ten Franklin Square, New Britain, CT 06051

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

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Internet: ct.gov/csc

Daniel F. Caruso
Chairman

March 10, 2011

The Honorable Ralph H. Fletcher
First Selectman
Town of Ashford
Knowlton Memorial Town Hall
5 Town Hall Road
Ashford, CT 06278

RE: **EM-VER-003-110303** - Cellco Partnership d/b/a Verizon Wireless notice of intent to modify an existing telecommunications facility located at 33 Janowski Road, Ashford, Connecticut.

Dear First Selectman Fletcher:

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

If you have any questions or comments regarding this proposal, please call me or inform the Council by March 24, 2011.

Thank you for your cooperation and consideration.

Very truly yours,

Linda Roberts

Linda Roberts
Executive Director

LR/jbw

Enclosure: Notice of Intent

c: Richard Dziadus, Zoning Enforcement Officer, Town of Ashford

EM-VER-003-110303

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ORIGINAL

March 2, 2011

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

Re: **Notice of Exempt Modification – Antenna Swap**
33 Janowski Road, Ashford, Connecticut

Dear Ms. Roberts:

Cellco Partnership d/b/a Verizon Wireless ("Cellco") currently maintains twelve (12) wireless telecommunications antennas at the 180-foot level on the existing 190-foot tower at the above-referenced address. The tower is owned by Crown Castle. The Connecticut Siting Council ("Council") approved Cellco's use of this tower in 2000. Cellco intends to remove all if its existing antennas and replace them with twelve (12) new antennas (six (6) model LPA-80080/4CF cellular antennas; three (3) model MG D5-800T2 PCS antennas; and three (3) model BXA 70063/6CF LTE antennas). All new antennas will be installed at the same 180-foot level on the tower. Cellco will also install six (6) coax cable diplexers on the existing antenna platform. Attached behind Tab 1 of this filing are the specifications for each of the proposed 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 Ralph H. Fletcher, First Selectman for the Town of Ashford. A copy of this letter is also being sent to David H. Martin, 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).

1. The proposed modifications will not result in any increase in the overall height of the existing tower. Cellco's replacement antennas and diplexers will be located at the 180-foot level on the 190-foot tower.

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

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

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

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

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

Sincerely,

Kenneth C. Baldwin

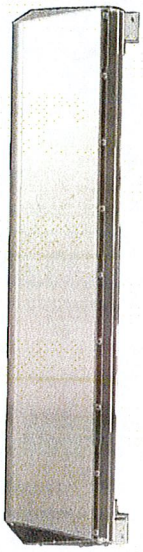
Enclosures
Copy to:
Ralph H. Fletcher, Ashford First Selectman
David H. Martin
Sandy M. Carter

LPA-80080-4CF-EDIN-X

V-Pol | Log Periodic | 80° | 12.5 dBd

Replace "X" with desired electrical downtilt.

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

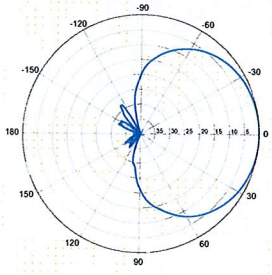


Electrical Characteristics	
Frequency bands	806-960 MHz
Polarization	Vertical
Horizontal beamwidth	80°
Vertical beamwidth	15°
Gain	12.5 dBd (14.6 dBi)
Electrical downtilt (X)	0, 2, 4, 5, 6, 8, 10, 12, 14
Impedance	50Ω
VSWR	≤1.4:1
Upper sidelobe suppression (0°)	-14.2 dB
Front-to-back ratio (+/-30°)	-34.7 dB
Null fill	15% (-16.48 dB)
Input power	500 W
Lightning protection	Direct Ground
Connector(s)	1 Port / EDIN or NE / Female / Center (Back)

Mechanical Characteristics		
Dimensions Length x Width x Depth	1200 x 140 x 335 mm	47.2 x 5.5 x 13.2 in
Depth of antenna with z-bracket	375 mm	14.8 in
Weight without mounting brackets	5.4 kg	12 lbs
Survival wind speed	> 201 km/hr	> 125 mph
Wind area	Front: 0.17 m² Side: 0.40 m²	Front: 1.8 ft² Side: 4.3 ft²
Wind load @ 161 km/hr (100 mph)	Front: 254 N Side: 574 N	Front: 57 lbf Side: 129 lbf

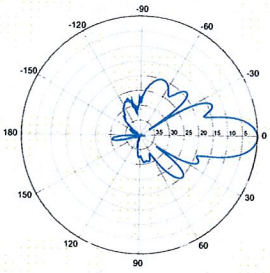
Mounting Options	Part Number	Fits Pipe Diameter	Weight
2-Point Mounting & Downtilt Bracket Kit (0-20°)	21699999	50-102 mm 2.0-4.0 in	5.4 kg 12 lbs
Lock-Down Brace	If the lock-down brace is used, the maximum diameter of the mounting pipe is 88.9 mm or 3.5 in.		

LPA-80080-4CF-EDIN-X



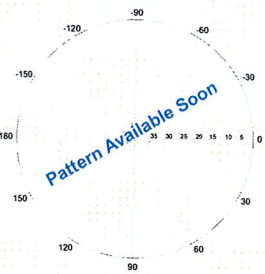
Horizontal

LPA-80080-4CF-EDIN-0



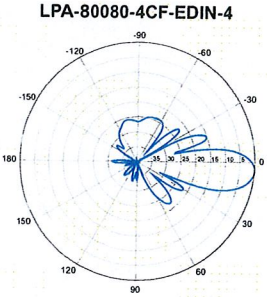
0° | Vertical

LPA-80080-4CF-EDIN-2



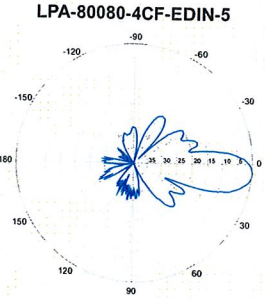
2° | Vertical

LPA-80080-4CF-EDIN-4



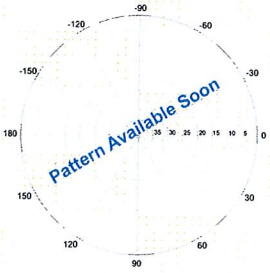
2° | Vertical

LPA-80080-4CF-EDIN-5



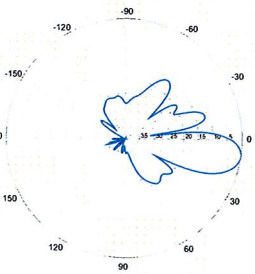
5° | Vertical

LPA-80080-4CF-EDIN-6



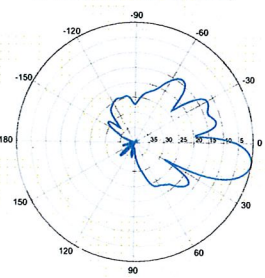
6° | Vertical

LPA-80080-4CF-EDIN-8



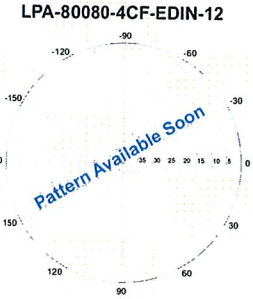
8° | Vertical

LPA-80080-4CF-EDIN-10



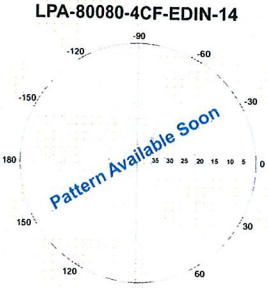
10° | Vertical

LPA-80080-4CF-EDIN-12



12° | Vertical

LPA-80080-4CF-EDIN-14



14° | Vertical

SINGLE-BAND PANEL ANTENNA
BROADBAND 1710-2170 MHz

MGD5-800TX

1710 - 2170		
1710-1880	1850-1990	1920-2170
H84º V7.5º	H83º V7º	H83º V6.5º
Fixed Tilt 0º,2º,4º,6º	Fixed Tilt 0º,2º,4º,6º	Fixed Tilt 0º,2º,4º,6º

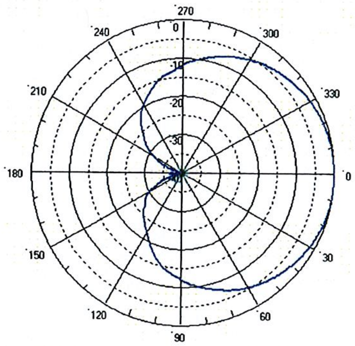
ELECTRICAL SPECIFICATIONS

***BROADBAND** 1710-2170 MHz*

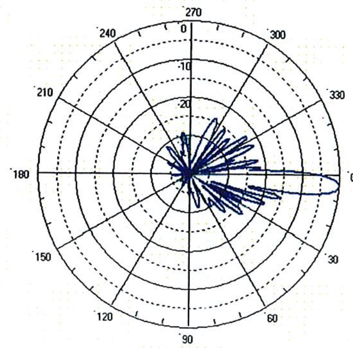
Antenna Model	MGD5-800TX		
Polarization	± 45º		
Frequency	***1710-2170***		
	1710 - 1880	1850 - 1990	1920 - 2170
Horizontal Beamwidth	84º	83º	83º
Vertical Beamwidth	7.5º	7º	6.5º
Gain (dBi)	16.5	16.6	17
Vertical Electrical Tilt	FIXED 0º,2º,4º,6º	FIXED 0º,2º,4º,6º	FIXED 0º,2º,4º,6º
Upper Sidelobe Suppression for the 1st lobe above main beam (dB)	16	16	20
Front-to-Back Ratio @ 180º ± 20º (dB)	> 30	> 30	> 30
VSWR	< 1.4 : 1	< 1.4 : 1	< 1.4 : 1
Cross Polar Ratio @ ± 60º (dB)	> 10	> 10	> 10
Isolation Between Ports (dB)	> 30	> 30	> 30
Maximum Power Per Input (W)	250		
Intermodulation (dBc)	< - 150		
Impedance (Ω)	50		

MECHANICAL SPECIFICATIONS

Connectors	2 X 7/16 Female
Connector Position	Bottom
Survival Wind Speed km/h (mph)	200 (125)
Front Windload N @ 160 km/h (lbs @ 100 mph)	370 (85)
Lateral Windload N @ 160 km/h (lbs @ 100 mph)	170 (40)
Radome Color	Grey, paintable
Humidity	100%
Antenna Weight kg (lbs)	7 (15)
Antenna Dimension mm (in) H X W X D	1340 X 170 X 100 (53 X 7 X 4)



H&V Pattern



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Amphenol ANTENNA SOLUTIONS

BXA-70063-6CF-EDIN-X

X-Pol | FET Panel | 63° | 14.5 dBd

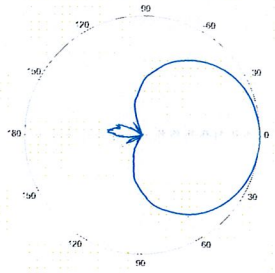
Replace "X" with desired electrical downtilt.

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

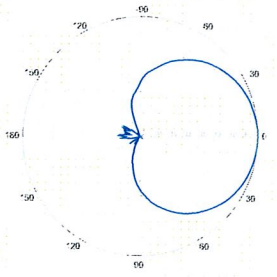
Electrical Characteristics	696-900 MHz	
Frequency bands	696-806 MHz	806-900 MHz
Polarization	±45°	
Horizontal beamwidth	65°	63°
Vertical beamwidth	13°	11°
Gain	14.0 dBd (16.1 dBi)	14.5 dBd (16.6 dBi)
Electrical downtilt (X)	0, 2, 3, 4, 5, 6, 8, 10	
Impedance	50Ω	
VSWR	≤1.35:1	
Upper sidelobe suppression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

Mounting Options	Part Number	Fits Pipe Diameter	Weight
3-Point Mounting Bracket Kit	36210003	50-160 mm 2.0-6.3 in	6.3 kg 14 lbs
3-Point Downtilt Bracket Kit (0-14°)	36210004	50-160 mm 2.0-6.3 in	7.3 kg 16 lbs
Downtilt Mounting Applications	A mounting bracket and downtilt bracket kit must be ordered for downtilt applications		
Concealment Configurations	For concealment configurations, order BXA-70063-6CF-EDIN-X-FP		

BXA-70063-6CF-EDIN-X

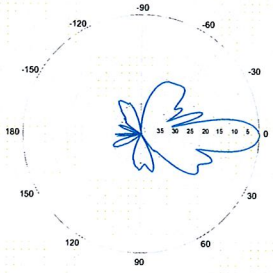


Horizontal | 750 MHz

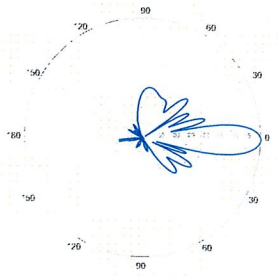


Horizontal | 850 MHz

BXA-70063-6CF-EDIN-0

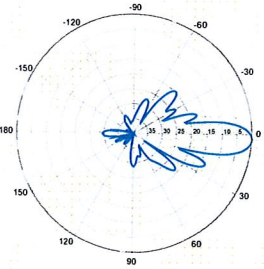


0° | Vertical | 750 MHz

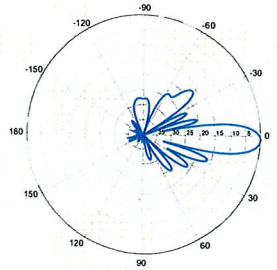


0° | Vertical | 850 MHz

BXA-70063-6CF-EDIN-2



2° | Vertical | 750 MHz



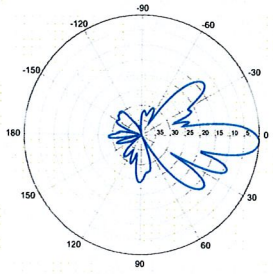
2° | Vertical | 850 MHz

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

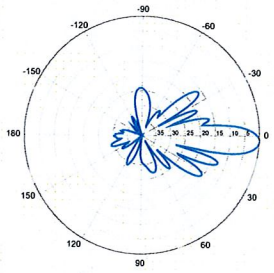
BXA-70063-6CF-EDIN-X

X-Pol | FET Panel | 63° | 14.5 dBd

BXA-70063-6CF-EDIN-3

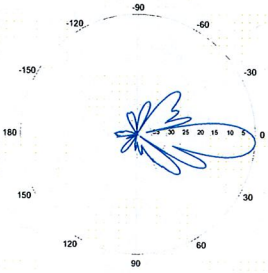


3° | Vertical | 750 MHz

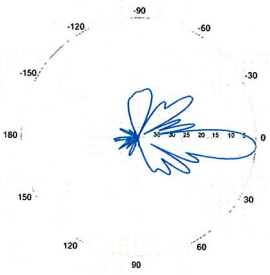


3° | Vertical | 850 MHz

BXA-70063-6CF-EDIN-4

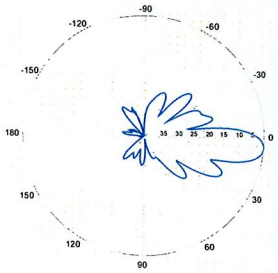


4° | Vertical | 750 MHz

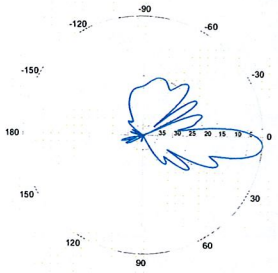


4° | Vertical | 850 MHz

BXA-70063-6CF-EDIN-5

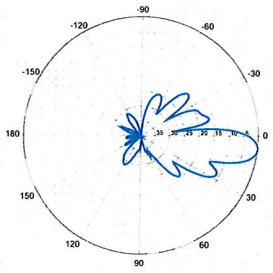


5° | Vertical | 750 MHz

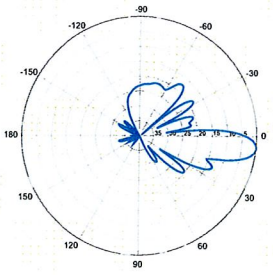


5° | Vertical | 850 MHz

BXA-70063-6CF-EDIN-6

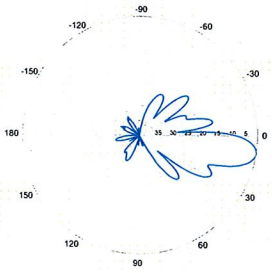


6° | Vertical | 750 MHz

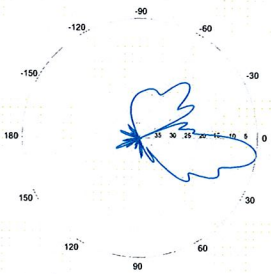


6° | Vertical | 850 MHz

BXA-70063-6CF-EDIN-8

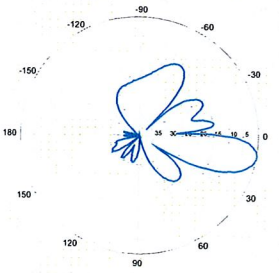


8° | Vertical | 750 MHz

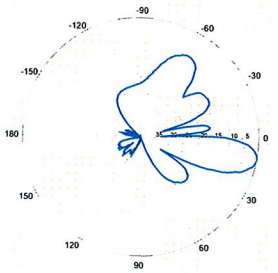


8° | Vertical | 850 MHz

BXA-70063-6CF-EDIN-10



10° | Vertical | 750 MHz



10° | 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**

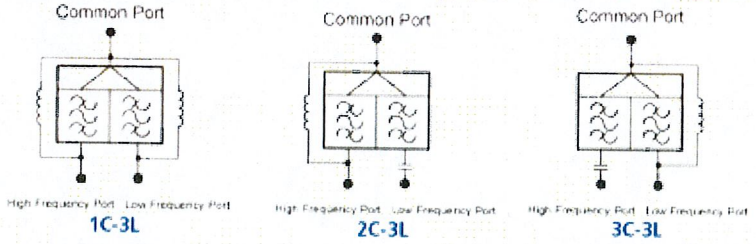
Technical Specifications

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

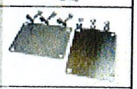
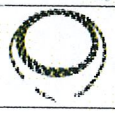
Notes

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

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



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

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

	General	Power	Density					
Site Name: Westford								
Tower Height: Verizon @ 180ft								
CARRIER	**# OF CHAN.**	**WATTS ERP**	**HEIGHT**	**CALC. POWER DENS**	**FREQ.**	**MAX. PERMISS. EXP.**	**FRACTION MPE**	**Total**
*Cingular UMTS	1	500	140	0.0092	880	0.5867	1.56%	
*Cingular GSM	2	296	140	0.0109	880	0.5867	1.85%	
*Cingular GSM	2	427	140	0.0157	1900	1.0000	1.57%	
*VoiceStream	1	823	150	0.0132	1930	1.0000	1.32%	
*Nextel	9	100	170	0.0112	851	0.5673	1.97%	
*Sprint	11	122	190	0.0134	1962.5	1.0000	1.34%	
Verizon	**3**	**329**	**180**	**0.0110**	**1970**	**1.0000**	**1.10%**	
Verizon	**9**	**256**	**180**	**0.0256**	**869**	**0.5793**	**4.41%**	
Verizon	**1**	**760**	**180**	**0.0084**	**757**	**0.4973**	**1.70%**	
								16.81%
* Source: Siting Council								

Date: **January 14, 2011**

Cheryl Schultz
Crown Castle
3530 Toringdon Way, Suite 300
Charlotte, NC 28277

Crown Castle
2000 Corporate Drive
Canonsburg, PA 15317
(724) 416-2000

Subject: **Structural Analysis Report**

Carrier Designation:	***Verizon Wireless* Co-Locate**	
	Carrier Site Number:	118614
	Carrier Site Name:	Westford CT
Crown Castle Designation:	**Crown Castle BU Number:**	876345
	Crown Castle Site Name:	SKY HILL
	Crown Castle JDE Job Number:	148246
	Crown Castle Work Order Number:	380798
Engineering Firm Designation:	**Crown Castle Project Number:**	380798
Site Data:	**33 Janowski Road, Ashford, Windham County, CT**	
	Latitude *41° 57' 7.7"*, Longitude *-72° 11' 43.9"*	
	190 Foot - Self Support Tower	

Dear Cheryl Schultz,

Crown Castle is pleased to submit this **"Structural Analysis Report"** to determine the structural integrity of the above mentioned tower. This analysis has been performed in accordance with the Crown Castle Structural 'Statement of Work' and the terms of Crown Castle Purchase Order Number 380798, in accordance with application 114810, revision 1.

The purpose of the analysis is to determine acceptability of the tower stress level. Based on our analysis we have determined the tower stress level for the structure and foundation, under the following load case, to be:

LC1: Existing + Reserved + Proposed Equipment **Sufficient Capacity**
Note: See Table I and Table II for the proposed and existing/reserved loading, respectively.

The analysis has been performed in accordance with the TIA/EIA-222-F standard and local code requirements based upon a wind speed of 85 mph fastest mile.

All modifications and equipment proposed in this report shall be installed in accordance with the attached drawings for the determined available structural capacity to be effective.

We at *Crown Castle* appreciate the opportunity of providing our continuing professional services to you and Crown Castle. If you have any questions or need further assistance on this or any other projects please give us a call.

Structural analysis prepared by: Matt Anspach, E.I.T. / SLS

Respectfully submitted by:

Kenton C. Weber, P.E.
Engineering Supervisor

STATE OF CONNECTICUT · KENTON C. WEBER · No. 27263 · LICENSED PROFESSIONAL ENGINEER

1/14/11

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 190 ft Self Support tower designed by ROHN in December of 1996. The tower was originally designed for a wind speed of 90 mph per TIA/EIA-222-E.

2) ANALYSIS CRITERIA

The structural analysis was performed for this tower in accordance with the requirements of TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a fastest mile wind speed of 85 mph with no ice, 28.1 mph with 1.00 inch ice thickness and 50 mph under service loads.

Table 1 - Proposed Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
180	181	3	antel	BXA-70063/6CF w/ Mount Pipe	-	-	-
		6	antel	LPA-80080/4CF w/ Mount Pipe			
		6	rfs celwave	FD9R6004/2C-3L			
		3	rymsa wireless	MG D5-800Tx w/ Mount Pipe			

Table 2 - Existing and Reserved Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
190	192	9	mla	MLA_ANTENNA w/ Mount Pipe	9	1-5/8	3
		6	decibel	DB980H90E-M w/ Mount Pipe	6	1-5/8	1
	190	1	tower mounts	Sector Mount [SM 504-3]			
180	181	6	rfs celwave	APL199016-42T2 w/ Mount Pipe	-	-	4
		6	rfs celwave	APL869012-42T0 w/ Mount Pipe			
	180	1	tower mounts	Sector Mount [SM 504-3]	12	1-5/8	1
170	172	9	allgon	7130.16.33.00 w/ Mount Pipe	9	1-5/8	1
	170	1	tower mounts	Sector Mount [SM 502-3]			
150	151	2	dapa	79210 w/ Mount Pipe	-	-	1
		1	ems wireless	RR65-19-02DP w/ Mount Pipe			
	150	2	tower mounts	Side Arm Mount [SO 307-1]			
140	141	6	css	DUO1417-8686 w/ Mount Pipe	12	7/8	1
		3	powerwave technologies	7770.00 w/ Mount Pipe			
		3	powerwave technologies	LGP13519			
	140	1	tower mounts	Sector Mount [SM 502-3]			

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
111	111	1	dielectric	TLP-08P-1E	1	1-5/8	2
		1	tower mounts	Pipe Mount [PM 602-1]			
98	101	1	symmetricom	58532A	1	1/2	1
	98	1	tower mounts	Side Arm Mount [SO 310-1]			
30	30	1	patriot antenna systems	1.8 Meter	1	5/16	2
		1	tower mounts	Pipe Mount [PM 601-1]			
20	20	1	patriot antenna systems	1.8 Meter	1	5/16	2
		1	tower mounts	Pipe Mount [PM 601-1]			

Notes:
1) Existing Equipment
2) Reserved Equipment
3) MLA Equipment Controlling, was considered in this analysis.
4) Equipment to be Removed, was not considered in this analysis.

Table 3 - Design Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
189	189	12	Decibel	DB980H90E-M	12	2 1/4
170	170	12	Swedcom	ALP9212	12	1 5/8
150	150	12	Swedcom	ALP9212	12	1 5/8
80	80	1	Generic	12' Gate Boom	1	7/8
		1	Generic	GPS Antenna		

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	FDH	2189896	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	ROHN	1631622	CCISITES
4-TOWER MANUFACTURER DRAWINGS	UNR-ROHN	1631630	CCISITES

3.1) Analysis Method

RISATower (version 5.4.2.0), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A.

3.2) Assumptions

1) Tower and structures were built in accordance with the manufacturer's specifications.
2) The tower and structures have been maintained in accordance with the manufacturer's specification.
3) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.
4) When applicable, transmission cables are considered as structural components for calculating wind loads as allowed by TIA/EIA-222-F.

This analysis may be affected if any assumptions are not valid or have been made in error. Crown Castle should be notified to determine the effect on the structural integrity of the tower.

4) ANALYSIS RESULTS

Table 5 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
T1	190 - 180	Leg	ROHN 2.5 STD	1	-7.764	57.961	13.4	Pass
T2	180 - 160	Leg	ROHN 2.5 STD	27	-37.739	50.253	75.1	Pass
T3	160 - 140	Leg	ROHN 3 EH	57	-67.995	83.781	81.2	Pass
T4	140 - 120	Leg	ROHN 4 EH	78	-103.217	139.064	74.2	Pass
T5	120 - 100	Leg	ROHN 5 EH	99	-136.310	206.284	66.1	Pass
T6	100 - 80	Leg	ROHN 6 EHS	120	-165.592	212.190	78.0	Pass
T7	80 - 60	Leg	ROHN 6 EH	135	-197.514	264.317	74.7	Pass
T8	60 - 40	Leg	ROHN 8 EHS	150	-227.507	332.508	68.4	Pass
T9	40 - 20	Leg	ROHN 8 EHS	165	-258.021	332.551	77.6	Pass
T10	20 - 0	Leg	ROHN 8 EHS	180	-299.516	332.857	90.0	Pass
T1	190 - 180	Diagonal	L1 3/4x1 3/4x3/16	7	-1.826	8.563	21.3 21.9 (b)	Pass
T2	180 - 160	Diagonal	L2x2x3/16	36	-4.912	6.913	71.1	Pass
T3	160 - 140	Diagonal	L2 1/2x2 1/2x1/4	63	-6.049	10.953	55.2 70.4 (b)	Pass
T4	140 - 120	Diagonal	L2 1/2x2 1/2x1/4	84	-7.214	8.362	86.3	Pass
T5	120 - 100	Diagonal	L3x3x1/4	105	-7.627	11.577	65.9	Pass
T6	100 - 80	Diagonal	L3 1/2x3 1/2x1/4	126	-8.995	12.623	71.3 72.7 (b)	Pass
T7	80 - 60	Diagonal	L4x4x1/4	141	-9.861	16.019	61.6 79.7 (b)	Pass
T8	60 - 40	Diagonal	L4x4x5/16	156	-9.534	16.538	57.6 77.1 (b)	Pass
T9	40 - 20	Diagonal	L4x4x5/16	169	-11.532	14.254	80.9	Pass
T10	20 - 0	Diagonal	L4x4x3/8	185	-12.416	14.572	85.2	Pass
T1	190 - 180	Top Girt	L1 3/4x1 3/4x3/16	5	-0.543	2.749	19.8	Pass
T2	180 - 160	Top Girt	L2x2x3/16	29	-0.637	4.165	15.3	Pass
							Summary	
						Leg (T10)	90.0	Pass
						Diagonal (T4)	86.3	Pass
						Top Girt	19.8	Pass

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
						(T1)		
						Bolt Checks	84.0	Pass
						Rating =	90.0	Pass

Table 6 - Tower Component Stresses vs. Capacity - LC1

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	61.0	Pass
1	Base Foundation	0	78.4	Pass

Structure Rating (max from all components) =	90%

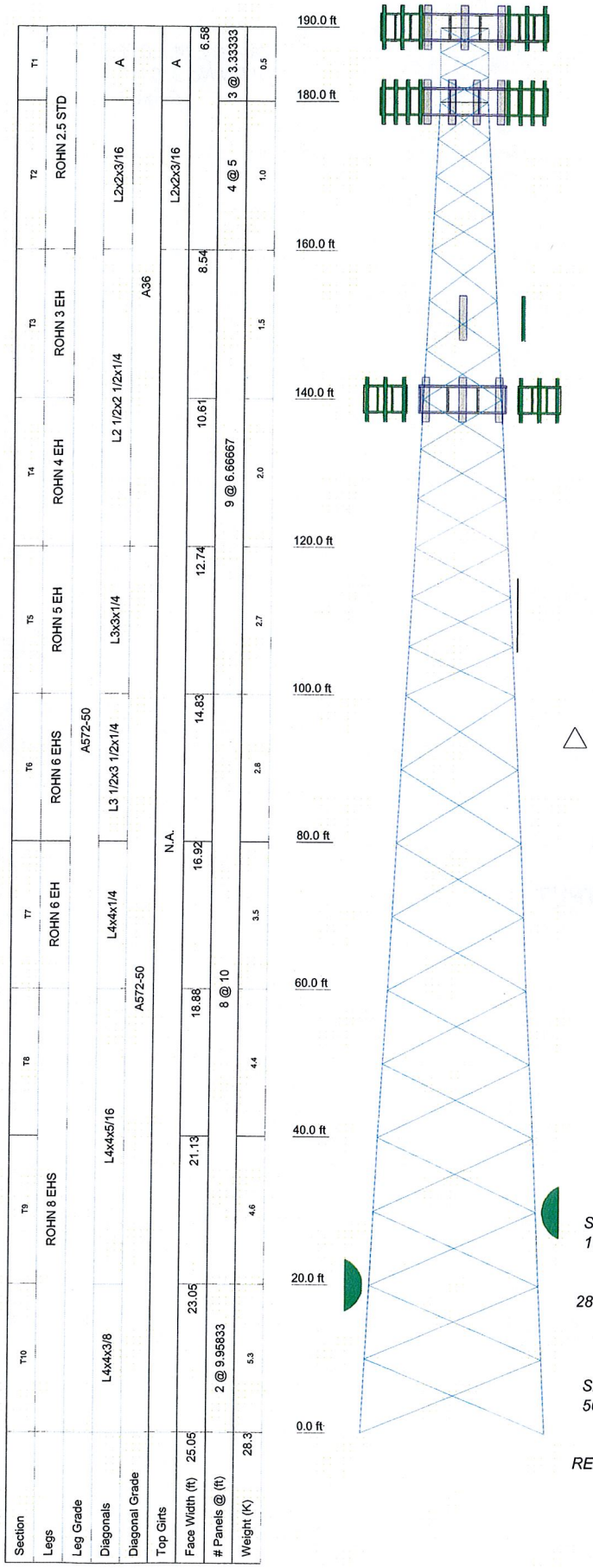
Notes:
1) See additional documentation in "Appendix C – Additional Calculations" for calculations supporting the % capacity consumed.

4.1) Recommendations

The tower and its foundation have sufficient capacity to carry the existing, reserved, and proposed loads. No modifications are required at this time

APPENDIX A

RISA TOWER OUTPUT



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
(3) MLA_ANTENNA w/ Mount Pipe	190	Side Arm Mount [SO 307-1]	150
(3) MLA_ANTENNA w/ Mount Pipe	190	Side Arm Mount [SO 307-1]	150
(3) MLA_ANTENNA w/ Mount Pipe	190	(2) DUO1417-8686 w/ Mount Pipe	140
Sector Mount [SM 504-3]	190	7770.00 w/ Mount Pipe	140
BXA-70063/6CF w/ Mount Pipe	180	LGP13519	140
(2) LPA-80080/4CF w/ Mount Pipe	180	(2) DUO1417-8686 w/ Mount Pipe	140
(2) FD9R6004/2C-3L	180	7770.00 w/ Mount Pipe	140
MG D5-800Tx w/ Mount Pipe	180	LGP13519	140
BXA-70063/6CF w/ Mount Pipe	180	(2) DUO1417-8686 w/ Mount Pipe	140
(2) LPA-80080/4CF w/ Mount Pipe	180	7770.00 w/ Mount Pipe	140
(2) FD9R6004/2C-3L	180	LGP13519	140
MG D5-800Tx w/ Mount Pipe	180	Sector Mount [SM 502-3]	140
BXA-70063/6CF w/ Mount Pipe	180	5'x2 1/2" Pipe Mount	140
(2) LPA-80080/4CF w/ Mount Pipe	180	5'x2 1/2" Pipe Mount	140
(2) FD9R6004/2C-3L	180	5'x2 1/2" Pipe Mount	140
MG D5-800Tx w/ Mount Pipe	180	TLP-08P-1E	111
Sector Mount [SM 504-3]	180	Pipe Mount [PM 602-1]	111
(3) 7130.16.33.00 w/ Mount Pipe	170	58532A	98
(3) 7130.16.33.00 w/ Mount Pipe	170	Side Arm Mount [SO 310-1]	98
(3) 7130.16.33.00 w/ Mount Pipe	170	Pipe Mount [PM 601-1]	30
Sector Mount [SM 502-3]	170	1.8 Meter	30
RR65-19-02DP w/ Mount Pipe	150	Pipe Mount [PM 601-1]	20
79210 w/ Mount Pipe	150	1.8 Meter	20
79210 w/ Mount Pipe	150		

SYMBOL LIST

MARK	SIZE	MARK	SIZE
A	L1 3/4x1 3/4x3/16		

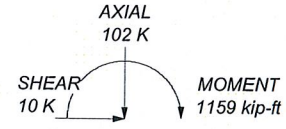
MATERIAL STRENGTH

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

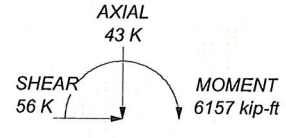
TOWER DESIGN NOTES

1. Tower is located in Windham County, Connecticut.
2. Tower designed for a 85 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 28 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 90%

MAX. CORNER REACTIONS AT BASE:
DOWN: 298 K
UPLIFT: -262 K
SHEAR: 34 K



TORQUE 6 kip-ft
28 mph WIND - 1.000 in ICE



TORQUE 52 kip-ft
REACTIONS - 85 mph WIND

CROWN CASTLE
Shaping the Wireless World
Crown Castle
2000 Corporate Drive
Canonsburg, PA 15317
Phone: (724) 416-2000
FAX: (724) 416-2254

Job: 876345			
Project:			
Client: Crown Castle	Drawn by: SSoukis		App'd:
Code: TIA/EIA-222-F	Date: 01/14/11		Scale: NTS
Path: R:\SA Models - Letters\Work Area\MAnspach\876345\876345.eri			Dwg No. E-1

RISATower	Job	Page
	876345	1 of 25
Crown Castle 2000 Corporate Drive Canonsburg, PA 15317 Phone: (724) 416-2000 FAX: (724) 416-2254	Project	Date 08:11:54 01/14/11
	Client Crown Castle	Designed by SSoukis

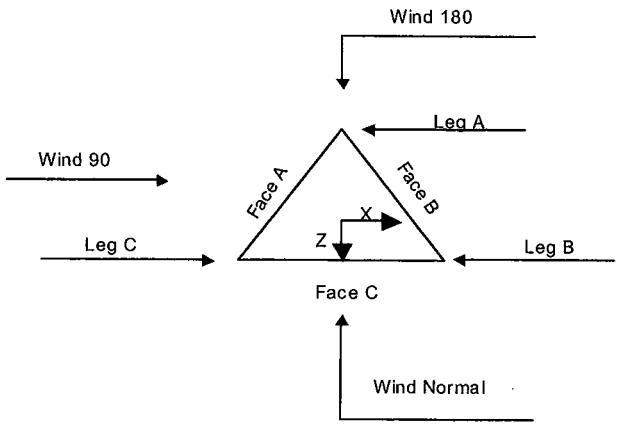
Tower Input Data

The main tower is a 3x free standing tower with an overall height of 190.000 ft above the ground line.
The base of the tower is set at an elevation of 0.000 ft above the ground line.
The face width of the tower is 6.580 ft at the top and 25.050 ft at the base.
This tower is designed using the TIA/EIA-222-F standard.
The following design criteria apply:

Tower is located in Windham County, Connecticut.
Basic wind speed of 85 mph.
Nominal ice thickness of 1.000 in.
Ice thickness is considered to increase with height.
Ice density of 56.000 pcf.
A wind speed of 28 mph is used in combination with ice.
Temperature drop of 50.000 °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	Distribute Leg Loads As Uniform	Treat Feedline Bundles As Cylinder
Consider Moments - Horizontals	Assume Legs Pinned	Use ASCE 10 X-Brace Ly Rules
Consider Moments - Diagonals	√ Assume Rigid Index Plate	√ Calculate Redundant Bracing Forces
Use Moment Magnification	√ Use Clear Spans For Wind Area	Ignore Redundant Members in FEA
√ Use Code Stress Ratios	√ Use Clear Spans For KL/r	SR Leg Bolts Resist Compression
√ Use Code Safety Factors - Guys	Retension Guys To Initial Tension	√ All Leg Panels Have Same Allowable
√ Escalate Ice	√ Bypass Mast Stability Checks	√ Offset Girt At Foundation
Always Use Max Kz	√ Use Azimuth Dish Coefficients	√ Consider Feedline Torque
Use Special Wind Profile	√ Project Wind Area of Appurt.	Include Angle Block Shear Check
√ Include Bolts In Member Capacity	√ Autocalc Torque Arm Areas	Poles
Leg Bolts Are At Top Of Section	SR Members Have Cut Ends	Include Shear-Torsion Interaction
√ Secondary Horizontal Braces Leg	√ Sort Capacity Reports By Component	Always Use Sub-Critical Flow
Use Diamond Inner Bracing (4 Sided)	Triangulate Diamond Inner Bracing	Use Top Mounted Sockets
Add IBC .6D+W Combination		



Triangular Tower

Tower Section Geometry

Tower Section	Tower Elevation	Assembly Database	Description	Section Width	Number of Sections	Section Length
	ft			ft		ft
T1	190.000-180.000			6.580	1	10.000
T2	180.000-160.000			6.580	1	20.000
T3	160.000-140.000			8.540	1	20.000
T4	140.000-120.000			10.610	1	20.000
T5	120.000-100.000			12.740	1	20.000
T6	100.000-80.000			14.830	1	20.000
T7	80.000-60.000			16.920	1	20.000
T8	60.000-40.000			18.880	1	20.000
T9	40.000-20.000			21.130	1	20.000
T10	20.000-0.000			23.050	1	20.000

Tower Section Geometry *(cont'd)*

Tower Section	Tower Elevation	Diagonal Spacing	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset	Bottom Girt Offset
	ft	ft				in	in
T1	190.000-180.000	3.333	X Brace	No	No	0.000	0.000
T2	180.000-160.000	5.000	X Brace	No	No	0.000	0.000
T3	160.000-140.000	6.667	X Brace	No	No	0.000	0.000
T4	140.000-120.000	6.667	X Brace	No	No	0.000	0.000
T5	120.000-100.000	6.667	X Brace	No	No	0.000	0.000

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	100.000-80.000	10.000	X Brace	No	No	0.000	0.000
T7	80.000-60.000	10.000	X Brace	No	No	0.000	0.000
T8	60.000-40.000	10.000	X Brace	No	No	0.000	0.000
T9	40.000-20.000	10.000	X Brace	No	No	0.000	0.000
T10	20.000-0.000	9.958	X Brace	No	No	0.000	1.000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T1 190.000-180.000	Pipe	ROHN 2.5 STD	A572-50 (50 ksi)	Single Angle	L1 3/4x1 3/4x3/16	A36 (36 ksi)
T2 180.000-160.000	Pipe	ROHN 2.5 STD	A572-50 (50 ksi)	Single Angle	L2x2x3/16	A36 (36 ksi)
T3 160.000-140.000	Pipe	ROHN 3 EH	A572-50 (50 ksi)	Single Angle	L2 1/2x2 1/2x1/4	A36 (36 ksi)
T4 140.000-120.000	Pipe	ROHN 4 EH	A572-50 (50 ksi)	Single Angle	L2 1/2x2 1/2x1/4	A36 (36 ksi)
T5 120.000-100.000	Pipe	ROHN 5 EH	A572-50 (50 ksi)	Single Angle	L3x3x1/4	A572-50 (50 ksi)
T6 100.000-80.000	Pipe	ROHN 6 EHS	A572-50 (50 ksi)	Single Angle	L3 1/2x3 1/2x1/4	A572-50 (50 ksi)
T7 80.000-60.000	Pipe	ROHN 6 EH	A572-50 (50 ksi)	Single Angle	L4x4x1/4	A572-50 (50 ksi)
T8 60.000-40.000	Pipe	ROHN 8 EHS	A572-50 (50 ksi)	Single Angle	L4x4x5/16	A572-50 (50 ksi)
T9 40.000-20.000	Pipe	ROHN 8 EHS	A572-50 (50 ksi)	Single Angle	L4x4x5/16	A572-50 (50 ksi)
T10 20.000-0.000	Pipe	ROHN 8 EHS	A572-50 (50 ksi)	Single Angle	L4x4x3/8	A572-50 (50 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Top Girt Type	Top Girt Size	Top Girt Grade	Bottom Girt Type	Bottom Girt Size	Bottom Girt Grade
T1 190.000-180.000	Single Angle	L1 3/4x1 3/4x3/16	A36 (36 ksi)	Single Angle		A36 (36 ksi)
T2 180.000-160.000	Single Angle	L2x2x3/16	A36 (36 ksi)	Single Angle		A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Gusset Area (per face) ft²	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in
T1 190.000-180.000	0.000	0.000	A36 (36 ksi)	1.05	1	1.05	36.000	36.000
T2 180.000-160.000	0.000	0.000	A36 (36 ksi)	1.05	1	1.05	36.000	36.000
T3 160.000-140.000	0.000	0.000	A36 (36 ksi)	1.05	1	1.05	36.000	36.000
T4 140.000-120.000	0.000	0.000	A36 (36 ksi)	1.05	1	1.05	36.000	36.000
T5 120.000-100.000	0.000	0.000	A36 (36 ksi)	1.05	1	1.05	36.000	36.000
T6 100.000-80.000	0.000	0.000	A36 (36 ksi)	1.05	1	1.05	36.000	36.000
T7 80.000-60.000	0.000	0.000	A36 (36 ksi)	1.05	1	1.05	36.000	36.000
T8 60.000-40.000	0.000	0.000	A36 (36 ksi)	1.05	1	1.05	36.000	36.000
T9 40.000-20.000	0.000	0.000	A36 (36 ksi)	1.05	1	1.05	36.000	36.000
T10 20.000-0.000	0.000	0.000	A36 (36 ksi)	1.05	1	1.05	36.000	36.000

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 190.000-180.000	Yes	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T2 180.000-160.000	Yes	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T3 160.000-140.000	Yes	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T4 140.000-120.000	Yes	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T5 120.000-100.000	Yes	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T6 100.000-80.000	Yes	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T7 80.000-60.000	Yes	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1

Tower Elevation ft	Calc K Single Angles	Calc K Solid Rounds	K Factors[1] Legs	X Brace Diags X	X Brace Diags Y	K Brace Diags X	K Brace Diags Y	Single Diags X	Single Diags Y	Girts X	Girts Y	Horiz. X	Horiz. Y	Sec. Horiz. X	Sec. Horiz. Y	Inner Brace X	Inner Brace Y
T8	Yes	No	1	1		1		1		1		1		1		1	
60.000-40.000					1		1		1		1		1		1		1
T9	Yes	No	1	1		1		1		1		1		1		1	
40.000-20.000					1		1		1		1		1		1		1
T10	Yes	No	1	1		1		1		1		1		1		1	
20.000-0.000					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	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
190.000-180.000														
T2	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
180.000-160.000														
T3	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
160.000-140.000														
T4	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
140.000-120.000														
T5	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
120.000-100.000														
T6	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
100.000-80.000														
T7	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
80.000-60.000														
T8	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
60.000-40.000														
T9	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
40.000-20.000														
T10	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
20.000-0.000														

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Connection Type	Leg Bolt Size in	Leg No.	Diagonal Bolt Size in	Diagonal No.	Top Girt Bolt Size in	Top Girt No.	Bottom Girt Bolt Size in	Bottom Girt No.	Mid Girt Bolt Size in	Mid Girt No.	Long Horizontal Bolt Size in	Long Horizontal No.	Short Horizontal Bolt Size in	Short Horizontal No.
T1 190.000-180.000	Flange	0.625 A325N	4	0.625 A325N	1	0.625 A325N	1	0.625 A325N	0	0.625 A325X	0	0.625 A325N	0	0.625 A325X	0
T2 180.000-160.000	Flange	0.625 A325N	4	0.625 A325N	1	0.625 A325N	1	0.625 A325N	0	0.625 A325X	0	0.625 A325N	0	0.625 A325X	0
T3 160.000-140.000	Flange	0.875 A325N	4	0.625 A325N	1	0.625 A325N	0	0.625 A325N	0	0.625 A325X	0	0.625 A325N	0	0.625 A325X	0
T4 140.000-120.000	Flange	1.000 A325N	4	0.625 A325N	1	0.625 A325N	0	0.625 A325N	0	0.625 A325X	0	0.625 A325N	0	0.625 A325X	0
T5 120.000-100.000	Flange	1.000 A325N	6	0.750 A325N	1	0.625 A325N	0	0.000 A325N	0	0.625 A325X	0	0.625 A325N	0	0.625 A325X	0
T6 100.000-80.000	Flange	1.000 A325N	6	0.750 A325N	1	0.625 A325N	0	0.000 A325N	0	0.625 A325X	0	0.625 A325N	0	0.625 A325X	0
T7 80.000-60.000	Flange	1.000 A325N	8	0.750 A325N	1	0.625 A325N	0	0.625 A325N	0	0.625 A325X	0	0.625 A325N	0	0.625 A325X	0
T8 60.000-40.000	Flange	1.000 A325N	8	0.750 A325N	1	0.625 A325N	0	0.000 A325N	0	0.625 A325X	0	0.625 A325N	0	0.625 A325X	0
T9 40.000-20.000	Flange	1.000 A325N	8	0.750 A325X	1	0.625 A325N	0	0.625 A325N	0	0.625 A325X	0	0.625 A325N	0	0.625 A325X	0
T10 20.000-0.000	Flange	1.000 A354-BC	10	0.750 A325X	1	0.625 A325N	0	0.000 A325N	0	0.625 A325X	0	0.625 A325N	0	0.625 A325X	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 klf
LDF7-50A(1-5/8") ***	A	Yes	Ar (CfAe)	190.000 - 8.000	0.000	-0.4	9	9	0.750	1.980		0.001
LDF7-50A(1-5/8") ***	A	Yes	Ar (CfAe)	180.000 - 8.000	0.000	0.35	12	12	0.750	1.980		0.001
LDF7-50A(1-5/8") ***	B	Yes	Ar (CfAe)	170.000 - 8.000	0.000	-0.4	9	9	0.750	1.980		0.001
FLC 78-50J(7/8") ***	C	Yes	Ar (CfAe)	140.000 - 8.000	0.000	-0.4	12	12	1.112	1.112		0.000
AVA7-50(1-5/8") ***	C	No	Ar (CfAe)	111.000 - 8.000	-1.000	-0.4	1	1	2.010	2.010		0.001
LDF4-50A(1/2") ***	A	No	Ar (CfAe)	98.000 - 8.000	0.000	0.41	1	1	0.630	0.630		0.000
LMR-300-75(5/16") ***	C	No	Ar (CfAe)	30.000 - 20.000	-1.000	-0.4	1	1	0.300	0.300		0.000
LMR-300-75(	C	No	Ar (CfAe)	20.000 - 8.000	-1.000	-0.4	2	2	0.300	0.300		0.000

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 klf
5/16")												

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	190.000-180.000	A	14.850	0.000	0.000	0.000	0.074
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	0.000	0.000
T2	180.000-160.000	A	69.300	0.000	0.000	0.000	0.344
		B	14.850	0.000	0.000	0.000	0.074
		C	0.000	0.000	0.000	0.000	0.000
T3	160.000-140.000	A	69.300	0.000	0.000	0.000	0.344
		B	29.700	0.000	0.000	0.000	0.148
		C	0.000	0.000	0.000	0.000	0.000
T4	140.000-120.000	A	69.300	0.000	0.000	0.000	0.344
		B	29.700	0.000	0.000	0.000	0.148
		C	22.240	0.000	0.000	0.000	0.096
T5	120.000-100.000	A	69.300	0.000	0.000	0.000	0.344
		B	29.700	0.000	0.000	0.000	0.148
		C	24.083	0.000	0.000	0.000	0.104
T6	100.000-80.000	A	70.245	0.000	0.000	0.000	0.347
		B	29.700	0.000	0.000	0.000	0.148
		C	25.590	0.000	0.000	0.000	0.110
T7	80.000-60.000	A	70.350	0.000	0.000	0.000	0.347
		B	29.700	0.000	0.000	0.000	0.148
		C	25.590	0.000	0.000	0.000	0.110
T8	60.000-40.000	A	70.350	0.000	0.000	0.000	0.347
		B	29.700	0.000	0.000	0.000	0.148
		C	25.590	0.000	0.000	0.000	0.110
T9	40.000-20.000	A	70.350	0.000	0.000	0.000	0.347
		B	29.700	0.000	0.000	0.000	0.148
		C	25.840	0.000	0.000	0.000	0.111
T10	20.000-0.000	A	42.210	0.000	0.000	0.000	0.208
		B	17.820	0.000	0.000	0.000	0.089
		C	15.954	0.000	0.000	0.000	0.067

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	190.000-180.000	A	1.230	3.700	18.200	0.000	0.000	0.403
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	0.000	0.000
T2	180.000-160.000	A	1.217	14.716	86.450	0.000	0.000	1.861
		B		3.679	18.200	0.000	0.000	0.401
		C		0.000	0.000	0.000	0.000	0.000
T3	160.000-140.000	A	1.199	14.595	86.450	0.000	0.000	1.842
		B		7.297	36.400	0.000	0.000	0.793
		C		0.000	0.000	0.000	0.000	0.000
T4	140.000-120.000	A	1.179	14.459	86.450	0.000	0.000	1.821
		B		7.229	36.400	0.000	0.000	0.784

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
		C		5.783	40.773	0.000	0.000	0.739
T5	120.000-100.000	A	1.155	14.303	86.450	0.000	0.000	1.798
		B		7.151	36.400	0.000	0.000	0.773
		C		9.666	40.773	0.000	0.000	0.785
T6	100.000-80.000	A	1.128	18.448	86.450	0.000	0.000	1.816
		B		7.060	36.400	0.000	0.000	0.761
		C		12.723	40.773	0.000	0.000	0.816
T7	80.000-60.000	A	1.094	18.594	86.450	0.000	0.000	1.785
		B		6.948	36.400	0.000	0.000	0.746
		C		12.500	40.773	0.000	0.000	0.797
T8	60.000-40.000	A	1.051	18.161	86.450	0.000	0.000	1.738
		B		6.804	36.400	0.000	0.000	0.727
		C		12.211	40.773	0.000	0.000	0.773
T9	40.000-20.000	A	1.000	17.650	86.450	0.000	0.000	1.684
		B		6.633	36.400	0.000	0.000	0.705
		C		13.787	40.773	0.000	0.000	0.761
T10	20.000-0.000	A	1.000	10.590	51.870	0.000	0.000	1.010
		B		3.980	21.840	0.000	0.000	0.423
		C		9.422	25.064	0.000	0.000	0.473

Feed Line Shielding

Section	Elevation ft	Face	A_R ft^2	A_R Ice ft^2	A_F ft^2	A_F Ice ft^2
T1	190.000-180.000	A	0.000	3.468	1.673	2.467
		B	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	0.000
T2	180.000-160.000	A	0.000	10.891	6.128	8.946
		B	0.000	2.355	1.313	1.935
		C	0.000	0.000	0.000	0.000
T3	160.000-140.000	A	0.000	7.394	5.285	7.706
		B	0.000	3.197	2.265	3.333
		C	0.000	0.000	0.000	0.000
T4	140.000-120.000	A	0.000	6.855	4.992	7.268
		B	0.000	2.964	2.139	3.143
		C	0.000	3.162	1.602	3.353
T5	120.000-100.000	A	0.000	6.468	5.776	8.397
		B	0.000	2.796	2.475	3.630
		C	0.000	2.984	1.854	3.874
T6	100.000-80.000	A	0.000	4.471	4.779	6.936
		B	0.000	1.932	2.048	2.997
		C	0.000	2.062	1.534	3.199
T7	80.000-60.000	A	0.000	4.194	5.293	7.665
		B	0.000	1.812	2.269	3.311
		C	0.000	1.934	1.699	3.535
T8	60.000-40.000	A	0.000	3.920	5.166	7.459
		B	0.000	1.693	2.214	3.221
		C	0.000	1.807	1.658	3.439
T9	40.000-20.000	A	0.000	3.649	5.072	7.298
		B	0.000	1.575	2.174	3.149
		C	0.000	1.682	1.628	3.364
T10	20.000-0.000	A	0.000	2.159	3.001	4.318
		B	0.000	0.932	1.286	1.863
		C	0.000	0.995	0.963	1.990

Feed Line Center of Pressure

Section	Elevation	CP_X	CP_Z	CP_X Ice	CP_Z Ice
	ft	in	in	in	in
T1	190.000-180.000	-9.579	4.070	-4.685	1.990
T2	180.000-160.000	-9.114	-11.314	-5.766	-7.383
T3	160.000-140.000	-9.394	-16.573	-6.600	-11.860
T4	140.000-120.000	-3.856	-12.530	-0.773	-7.584
T5	120.000-100.000	-3.384	-12.398	-0.055	-7.456
T6	100.000-80.000	-3.360	-13.876	0.401	-9.456
T7	80.000-60.000	-3.513	-14.606	0.420	-10.218
T8	60.000-40.000	-3.554	-14.804	0.410	-10.686
T9	40.000-20.000	-3.725	-15.853	0.886	-11.220
T10	20.000-0.000	-2.552	-11.552	0.487	-8.489

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
***									
***									
(3) MLA_ANTENNA w/ Mount Pipe	A	From Leg	4.000 0.000 2.000	0.0000	190.000	No Ice	8.637	6.946	0.066
						1/2" Ice	9.290	8.127	0.131
						1" Ice	9.910	9.021	0.209
						2" Ice	11.176	10.844	0.391
						4" Ice	13.829	14.851	0.896
(3) MLA_ANTENNA w/ Mount Pipe	B	From Leg	4.000 0.000 2.000	0.0000	190.000	No Ice	8.637	6.946	0.066
						1/2" Ice	9.290	8.127	0.131
						1" Ice	9.910	9.021	0.209
						2" Ice	11.176	10.844	0.391
						4" Ice	13.829	14.851	0.896
(3) MLA_ANTENNA w/ Mount Pipe	C	From Leg	4.000 0.000 2.000	0.0000	190.000	No Ice	8.637	6.946	0.066
						1/2" Ice	9.290	8.127	0.131
						1" Ice	9.910	9.021	0.209
						2" Ice	11.176	10.844	0.391
						4" Ice	13.829	14.851	0.896
Sector Mount [SM 504-3]	C	None		0.0000	190.000	No Ice	34.250	34.250	1.708
						1/2" Ice	48.980	48.980	2.286
						1" Ice	63.710	63.710	2.864
						2" Ice	93.170	93.170	4.020
						4" Ice	152.090	152.090	6.333
***									
BXA-70063/6CF w/ Mount Pipe	A	From Leg	4.000 0.000 1.000	0.0000	180.000	No Ice	7.979	5.695	0.040
						1/2" Ice	8.621	6.849	0.098
						1" Ice	9.228	7.715	0.167
						2" Ice	10.473	9.497	0.331
						4" Ice	13.082	13.262	0.798
(2) LPA-80080/4CF w/ Mount Pipe	A	From Leg	4.000 0.000 1.000	0.0000	180.000	No Ice	2.856	7.227	0.030
						1/2" Ice	3.220	7.922	0.074
						1" Ice	3.592	8.634	0.127

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						2" Ice	4.450	10.112	0.253
						4" Ice	6.318	13.339	0.613
(2) FD9R6004/2C-3L	A	From Leg	4.000 0.000 1.000	0.0000	180.000	No Ice	0.367	0.085	0.003
						1/2" Ice	0.451	0.136	0.005
						1" Ice	0.543	0.196	0.009
						2" Ice	0.755	0.343	0.020
						4" Ice	1.281	0.740	0.063
MG D5-800Tx w/ Mount Pipe	A	From Leg	4.000 0.000 1.000	0.0000	180.000	No Ice	3.570	3.418	0.035
						1/2" Ice	3.979	4.119	0.067
						1" Ice	4.387	4.784	0.107
						2" Ice	5.325	6.164	0.208
						4" Ice	7.341	9.175	0.518
BXA-70063/6CF w/ Mount Pipe	B	From Leg	4.000 0.000 1.000	0.0000	180.000	No Ice	7.979	5.695	0.040
						1/2" Ice	8.621	6.849	0.098
						1" Ice	9.228	7.715	0.167
						2" Ice	10.473	9.497	0.331
						4" Ice	13.082	13.262	0.798
(2) LPA-80080/4CF w/ Mount Pipe	B	From Leg	4.000 0.000 1.000	0.0000	180.000	No Ice	2.856	7.227	0.030
						1/2" Ice	3.220	7.922	0.074
						1" Ice	3.592	8.634	0.127
						2" Ice	4.450	10.112	0.253
						4" Ice	6.318	13.339	0.613
(2) FD9R6004/2C-3L	B	From Leg	4.000 0.000 1.000	0.0000	180.000	No Ice	0.367	0.085	0.003
						1/2" Ice	0.451	0.136	0.005
						1" Ice	0.543	0.196	0.009
						2" Ice	0.755	0.343	0.020
						4" Ice	1.281	0.740	0.063
MG D5-800Tx w/ Mount Pipe	B	From Leg	4.000 0.000 1.000	0.0000	180.000	No Ice	3.570	3.418	0.035
						1/2" Ice	3.979	4.119	0.067
						1" Ice	4.387	4.784	0.107
						2" Ice	5.325	6.164	0.208
						4" Ice	7.341	9.175	0.518
BXA-70063/6CF w/ Mount Pipe	C	From Leg	4.000 0.000 1.000	0.0000	180.000	No Ice	7.979	5.695	0.040
						1/2" Ice	8.621	6.849	0.098
						1" Ice	9.228	7.715	0.167
						2" Ice	10.473	9.497	0.331
						4" Ice	13.082	13.262	0.798
(2) LPA-80080/4CF w/ Mount Pipe	C	From Leg	4.000 0.000 1.000	0.0000	180.000	No Ice	2.856	7.227	0.030
						1/2" Ice	3.220	7.922	0.074
						1" Ice	3.592	8.634	0.127
						2" Ice	4.450	10.112	0.253
						4" Ice	6.318	13.339	0.613
(2) FD9R6004/2C-3L	C	From Leg	4.000 0.000 1.000	0.0000	180.000	No Ice	0.367	0.085	0.003
						1/2" Ice	0.451	0.136	0.005
						1" Ice	0.543	0.196	0.009
						2" Ice	0.755	0.343	0.020
						4" Ice	1.281	0.740	0.063
MG D5-800Tx w/ Mount Pipe	C	From Leg	4.000 0.000 1.000	0.0000	180.000	No Ice	3.570	3.418	0.035
						1/2" Ice	3.979	4.119	0.067
						1" Ice	4.387	4.784	0.107
						2" Ice	5.325	6.164	0.208
						4" Ice	7.341	9.175	0.518
Sector Mount [SM 504-3]	C	None		0.0000	180.000	No Ice	34.250	34.250	1.708
						1/2" Ice	48.980	48.980	2.286
						1" Ice	63.710	63.710	2.864
						2" Ice	93.170	93.170	4.020
						4" Ice	152.090	152.090	6.333

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
***									
(3) 7130.16.33.00 w/ Mount Pipe	A	From Leg	4.000 0.000 2.000	0.0000	170.000	No Ice	6.001	7.030	0.037
						1/2" Ice	6.485	7.812	0.094
						1" Ice	6.971	8.567	0.160
						2" Ice	7.974	10.130	0.316
						4" Ice	10.105	13.477	0.744
(3) 7130.16.33.00 w/ Mount Pipe	B	From Leg	4.000 0.000 2.000	0.0000	170.000	No Ice	6.001	7.030	0.037
						1/2" Ice	6.485	7.812	0.094
						1" Ice	6.971	8.567	0.160
						2" Ice	7.974	10.130	0.316
						4" Ice	10.105	13.477	0.744
(3) 7130.16.33.00 w/ Mount Pipe	C	From Leg	4.000 0.000 2.000	0.0000	170.000	No Ice	6.001	7.030	0.037
						1/2" Ice	6.485	7.812	0.094
						1" Ice	6.971	8.567	0.160
						2" Ice	7.974	10.130	0.316
						4" Ice	10.105	13.477	0.744
Sector Mount [SM 502-3]	C	None		0.0000	170.000	No Ice	33.020	33.020	1.673
						1/2" Ice	47.360	47.360	2.224
						1" Ice	61.700	61.700	2.775
						2" Ice	90.380	90.380	3.876
						4" Ice	147.740	147.740	6.080
***									
RR65-19-02DP w/ Mount Pipe	A	From Leg	4.000 0.000 1.000	0.0000	150.000	No Ice	6.104	4.412	0.042
						1/2" Ice	6.666	5.624	0.086
						1" Ice	7.194	6.496	0.141
						2" Ice	8.273	8.273	0.278
						4" Ice	10.822	12.027	0.685
79210 w/ Mount Pipe	A	From Leg	4.000 0.000 1.000	0.0000	150.000	No Ice	8.556	4.421	0.053
						1/2" Ice	9.204	5.590	0.107
						1" Ice	9.818	6.447	0.172
						2" Ice	11.075	8.209	0.328
						4" Ice	13.710	11.935	0.778
79210 w/ Mount Pipe	B	From Leg	4.000 0.000 1.000	0.0000	150.000	No Ice	8.556	4.421	0.053
						1/2" Ice	9.204	5.590	0.107
						1" Ice	9.818	6.447	0.172
						2" Ice	11.075	8.209	0.328
						4" Ice	13.710	11.935	0.778
Side Arm Mount [SO 307-1]	A	From Leg	2.000 0.000 0.000	0.0000	150.000	No Ice	0.980	2.600	0.048
						1/2" Ice	1.700	4.500	0.070
						1" Ice	2.420	6.400	0.093
						2" Ice	3.860	10.200	0.137
						4" Ice	6.740	17.800	0.227
Side Arm Mount [SO 307-1]	B	From Leg	2.000 0.000 0.000	0.0000	150.000	No Ice	0.980	2.600	0.048
						1/2" Ice	1.700	4.500	0.070
						1" Ice	2.420	6.400	0.093
						2" Ice	3.860	10.200	0.137
						4" Ice	6.740	17.800	0.227
***									
(2) DUO1417-8686 w/ Mount Pipe	A	From Leg	4.000 0.000 1.000	0.0000	140.000	No Ice	6.771	5.388	0.039
						1/2" Ice	7.239	6.069	0.092
						1" Ice	7.716	6.763	0.155
						2" Ice	8.701	8.205	0.301
						4" Ice	10.809	11.352	0.705
7770.00 w/ Mount Pipe	A	From Leg	4.000 0.000 1.000	0.0000	140.000	No Ice	6.119	4.254	0.055
						1/2" Ice	6.626	5.014	0.101
						1" Ice	7.128	5.711	0.155
						2" Ice	8.164	7.155	0.287

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
LGP13519	A	From Leg	4.000 0.000 1.000	0.0000	140.000	4" Ice	10.360	10.412	0.665
						No Ice	0.338	0.207	0.005
						1/2" Ice	0.422	0.280	0.008
						1" Ice	0.515	0.362	0.012
						2" Ice	0.726	0.551	0.024
						4" Ice	1.252	1.034	0.071
(2) DUO1417-8686 w/ Mount Pipe	B	From Leg	4.000 0.000 1.000	0.0000	140.000	No Ice	6.771	5.388	0.039
						1/2" Ice	7.239	6.069	0.092
						1" Ice	7.716	6.763	0.155
						2" Ice	8.701	8.205	0.301
						4" Ice	10.809	11.352	0.705
7770.00 w/ Mount Pipe	B	From Leg	4.000 0.000 1.000	0.0000	140.000	No Ice	6.119	4.254	0.055
						1/2" Ice	6.626	5.014	0.101
						1" Ice	7.128	5.711	0.155
						2" Ice	8.164	7.155	0.287
						4" Ice	10.360	10.412	0.665
LGP13519	B	From Leg	4.000 0.000 1.000	0.0000	140.000	No Ice	0.338	0.207	0.005
						1/2" Ice	0.422	0.280	0.008
						1" Ice	0.515	0.362	0.012
						2" Ice	0.726	0.551	0.024
						4" Ice	1.252	1.034	0.071
(2) DUO1417-8686 w/ Mount Pipe	C	From Leg	4.000 0.000 1.000	0.0000	140.000	No Ice	6.771	5.388	0.039
						1/2" Ice	7.239	6.069	0.092
						1" Ice	7.716	6.763	0.155
						2" Ice	8.701	8.205	0.301
						4" Ice	10.809	11.352	0.705
7770.00 w/ Mount Pipe	C	From Leg	4.000 0.000 1.000	0.0000	140.000	No Ice	6.119	4.254	0.055
						1/2" Ice	6.626	5.014	0.101
						1" Ice	7.128	5.711	0.155
						2" Ice	8.164	7.155	0.287
						4" Ice	10.360	10.412	0.665
LGP13519	C	From Leg	4.000 0.000 1.000	0.0000	140.000	No Ice	0.338	0.207	0.005
						1/2" Ice	0.422	0.280	0.008
						1" Ice	0.515	0.362	0.012
						2" Ice	0.726	0.551	0.024
						4" Ice	1.252	1.034	0.071
Sector Mount [SM 502-3]	C	None		0.0000	140.000	No Ice	33.020	33.020	1.673
						1/2" Ice	47.360	47.360	2.224
						1" Ice	61.700	61.700	2.775
						2" Ice	90.380	90.380	3.876
						4" Ice	147.740	147.740	6.080
5'x2 1/2" Pipe Mount	A	From Leg	4.000 0.000 0.000	0.0000	140.000	No Ice	1.328	1.328	0.029
						1/2" Ice	1.632	1.632	0.040
						1" Ice	1.946	1.946	0.054
						2" Ice	2.601	2.601	0.093
						4" Ice	4.108	4.108	0.221
5'x2 1/2" Pipe Mount	B	From Leg	4.000 0.000 0.000	0.0000	140.000	No Ice	1.328	1.328	0.029
						1/2" Ice	1.632	1.632	0.040
						1" Ice	1.946	1.946	0.054
						2" Ice	2.601	2.601	0.093
						4" Ice	4.108	4.108	0.221
5'x2 1/2" Pipe Mount	C	From Leg	4.000 0.000 0.000	0.0000	140.000	No Ice	1.328	1.328	0.029
						1/2" Ice	1.632	1.632	0.040
						1" Ice	1.946	1.946	0.054
						2" Ice	2.601	2.601	0.093
						4" Ice	4.108	4.108	0.221

***

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft Vert ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
TLP-08P-1E	B	From Leg	1.000 0.000 0.000	0.0000	111.000	No Ice	18.009	18.009	0.200
						1/2" Ice	18.908	18.908	0.314
						1" Ice	19.814	19.814	0.439
						2" Ice	21.649	21.649	0.723
						4" Ice	25.408	25.408	1.432
Pipe Mount [PM 602-1]	B	From Leg	0.500 0.000 0.000	0.0000	111.000	No Ice	5.250	1.580	0.093
						1/2" Ice	6.500	1.950	0.118
						1" Ice	7.750	2.320	0.142
						2" Ice	10.250	3.060	0.192
						4" Ice	15.250	4.540	0.291
***									
58532A	A	From Leg	4.000 0.000 3.000	0.0000	98.000	No Ice	0.221	0.221	0.000
						1/2" Ice	0.290	0.290	0.003
						1" Ice	0.367	0.367	0.006
						2" Ice	0.548	0.548	0.017
						4" Ice	1.014	1.014	0.060
Side Arm Mount [SO 310-1]	A	From Leg	2.000 0.000 0.000	0.0000	98.000	No Ice	2.970	2.990	0.055
						1/2" Ice	4.400	4.580	0.083
						1" Ice	5.830	6.170	0.112
						2" Ice	8.690	9.350	0.169
						4" Ice	14.410	15.710	0.282
***									
Pipe Mount [PM 601-1]	B	From Leg	0.500 0.000 0.000	0.0000	30.000	No Ice	3.000	0.900	0.065
						1/2" Ice	3.740	1.120	0.079
						1" Ice	4.480	1.340	0.093
						2" Ice	5.960	1.780	0.122
						4" Ice	8.920	2.660	0.178
***									
Pipe Mount [PM 601-1]	C	From Leg	0.500 0.000 0.000	0.0000	20.000	No Ice	3.000	0.900	0.065
						1/2" Ice	3.740	1.120	0.079
						1" Ice	4.480	1.340	0.093
						2" Ice	5.960	1.780	0.122
						4" Ice	8.920	2.660	0.178

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral ft Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight K
1.8 Meter	B	Paraboloid w/o Radome	From Leg	1.000 0.000 0.000	26.0000		30.000	7.083	No Ice	34.770	0.030
									1/2" Ice	35.640	0.040
									1" Ice	36.530	0.550
									2" Ice	38.340	0.130
									4" Ice	42.100	0.450
***											
1.8 Meter	C	Paraboloid w/o Radome	From Leg	1.000 0.000 0.000	-57.0000		20.000	7.083	No Ice	34.770	0.030
									1/2" Ice	35.640	0.040
									1" Ice	36.530	0.550
									2" Ice	38.340	0.130

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
									4" Ice	42.100	0.450

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 60 deg - No Ice
5	Dead+Wind 90 deg - No Ice
6	Dead+Wind 120 deg - No Ice
7	Dead+Wind 150 deg - No Ice
8	Dead+Wind 180 deg - No Ice
9	Dead+Wind 210 deg - No Ice
10	Dead+Wind 240 deg - No Ice
11	Dead+Wind 270 deg - No Ice
12	Dead+Wind 300 deg - No Ice
13	Dead+Wind 330 deg - No Ice
14	Dead+Ice+Temp
15	Dead+Wind 0 deg+Ice+Temp
16	Dead+Wind 30 deg+Ice+Temp
17	Dead+Wind 60 deg+Ice+Temp
18	Dead+Wind 90 deg+Ice+Temp
19	Dead+Wind 120 deg+Ice+Temp
20	Dead+Wind 150 deg+Ice+Temp
21	Dead+Wind 180 deg+Ice+Temp
22	Dead+Wind 210 deg+Ice+Temp
23	Dead+Wind 240 deg+Ice+Temp
24	Dead+Wind 270 deg+Ice+Temp
25	Dead+Wind 300 deg+Ice+Temp
26	Dead+Wind 330 deg+Ice+Temp
27	Dead+Wind 0 deg - Service
28	Dead+Wind 30 deg - Service
29	Dead+Wind 60 deg - Service
30	Dead+Wind 90 deg - Service
31	Dead+Wind 120 deg - Service
32	Dead+Wind 150 deg - Service
33	Dead+Wind 180 deg - Service
34	Dead+Wind 210 deg - Service
35	Dead+Wind 240 deg - Service
36	Dead+Wind 270 deg - Service
37	Dead+Wind 300 deg - Service
38	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	190 - 180	Leg	Max Tension	12	5.899	0.009	-0.006
			Max. Compression	10	-7.764	0.027	-0.052
			Max. Mx	8	-4.258	-0.053	0.036

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. My	4	-4.252	0.010	-0.073
			Max. Vy	11	1.222	0.000	-0.000
			Max. Vx	8	-1.225	0.000	0.000
		Diagonal	Max Tension	11	1.786	0.000	0.000
			Max. Compression	11	-1.826	0.000	0.000
			Max. Mx	22	0.084	0.014	0.000
			Max. My	13	-1.686	0.001	0.001
			Max. Vy	22	-0.017	0.014	0.000
			Max. Vx	13	0.000	0.000	0.000
		Top Girt	Max Tension	6	0.551	0.000	0.000
			Max. Compression	4	-0.543	0.000	0.000
			Max. Mx	21	-0.086	-0.043	0.000
			Max. My	10	-0.262	0.000	-0.000
			Max. Vy	21	0.026	0.000	0.000
			Max. Vx	10	-0.000	0.000	0.000
T2	180 - 160	Leg	Max Tension	12	32.006	-0.079	-0.004
			Max. Compression	2	-37.738	0.092	0.041
			Max. Mx	10	-37.700	0.095	-0.046
			Max. My	11	-1.856	-0.010	-0.148
			Max. Vy	8	-1.035	-0.052	-0.023
			Max. Vx	5	1.041	0.008	-0.023
		Diagonal	Max Tension	3	4.916	0.000	0.000
			Max. Compression	9	-4.912	0.000	0.000
			Max. Mx	15	0.879	0.028	-0.003
			Max. My	9	-4.807	-0.004	-0.008
			Max. Vy	15	-0.023	0.028	-0.003
			Max. Vx	9	0.002	0.000	0.000
		Top Girt	Max Tension	10	0.607	0.000	0.000
			Max. Compression	4	-0.637	0.000	0.000
			Max. Mx	14	-0.013	-0.047	0.000
			Max. My	23	-0.067	0.000	0.001
			Max. Vy	14	0.028	0.000	0.000
			Max. Vx	23	0.001	0.000	0.000
T3	160 - 140	Leg	Max Tension	12	60.429	-0.223	-0.136
			Max. Compression	2	-67.995	0.102	0.049
			Max. Mx	8	50.575	-0.257	0.023
			Max. My	11	-3.589	-0.002	-0.443
			Max. Vy	8	-0.163	-0.257	0.023
			Max. Vx	11	0.281	-0.002	-0.443
		Diagonal	Max Tension	9	5.925	0.000	0.000
			Max. Compression	9	-6.049	0.000	0.000
			Max. Mx	15	0.787	0.053	-0.006
			Max. My	4	-5.065	0.002	0.010
			Max. Vy	25	0.037	0.048	0.007
			Max. Vx	17	-0.002	0.000	0.000
T4	140 - 120	Leg	Max Tension	12	91.951	-0.217	-0.024
			Max. Compression	2	-103.217	0.305	0.028
			Max. Mx	2	-103.217	0.305	0.028
			Max. My	5	-5.344	0.003	0.359
			Max. Vy	8	0.059	-0.235	-0.003
			Max. Vx	11	0.118	-0.001	-0.333
		Diagonal	Max Tension	9	7.115	0.000	0.000
			Max. Compression	9	-7.214	0.000	0.000
			Max. Mx	15	1.030	0.066	-0.008
			Max. My	4	-6.095	0.009	0.010
			Max. Vy	25	0.044	0.065	0.008
			Max. Vx	23	0.003	0.000	0.000
T5	120 - 100	Leg	Max Tension	12	121.909	-0.418	-0.010
			Max. Compression	2	-136.310	0.679	0.035
			Max. Mx	6	-135.747	0.683	0.076
			Max. My	5	-6.438	0.001	0.634

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vy	12	-0.224	-0.528	-0.023
			Max. Vx	3	-0.309	-0.020	-0.557
		Diagonal	Max Tension	9	7.560	0.000	0.000
			Max. Compression	9	-7.627	0.000	0.000
			Max. Mx	25	0.869	0.094	-0.012
			Max. My	4	-6.846	0.024	0.013
			Max. Vy	25	0.058	0.094	-0.012
			Max. Vx	24	-0.003	0.000	0.000
T6	100 - 80	Leg	Max Tension	12	148.492	-0.598	-0.065
			Max. Compression	2	-165.592	0.820	0.018
			Max. Mx	6	-164.884	0.822	0.062
			Max. My	5	-7.010	-0.049	1.029
			Max. Vy	8	-0.117	-0.670	-0.034
			Max. Vx	5	-0.175	-0.049	1.029
		Diagonal	Max Tension	9	8.824	0.000	0.000
			Max. Compression	9	-8.995	0.000	0.000
			Max. Mx	15	1.407	0.150	-0.019
			Max. My	4	-7.547	0.027	0.024
			Max. Vy	25	0.075	0.150	0.020
			Max. Vx	23	-0.004	0.000	0.000
T7	80 - 60	Leg	Max Tension	12	176.953	-0.555	-0.043
			Max. Compression	2	-197.514	1.116	0.009
			Max. Mx	6	-196.733	1.119	0.076
			Max. My	11	-9.539	0.023	-0.997
			Max. Vy	6	-0.132	1.119	0.076
			Max. Vx	5	-0.140	-0.055	0.793
		Diagonal	Max Tension	9	9.636	0.000	0.000
			Max. Compression	9	-9.861	0.000	0.000
			Max. Mx	25	1.267	0.194	0.024
			Max. My	23	0.282	0.171	-0.025
			Max. Vy	25	0.092	0.194	0.024
			Max. Vx	23	-0.005	0.000	0.000
T8	60 - 40	Leg	Max Tension	12	202.678	-1.287	-0.028
			Max. Compression	2	-227.507	1.036	-0.078
			Max. Mx	21	6.809	-1.877	0.003
			Max. My	11	-11.323	0.011	-1.187
			Max. Vy	21	0.300	-1.877	0.003
			Max. Vx	5	-0.144	-0.068	1.183
		Diagonal	Max Tension	9	9.417	0.000	0.000
			Max. Compression	9	-9.534	0.000	0.000
			Max. Mx	25	0.600	0.252	0.033
			Max. My	24	-0.409	0.230	-0.036
			Max. Vy	25	0.109	0.243	-0.035
			Max. Vx	24	-0.006	0.000	0.000
T9	40 - 20	Leg	Max Tension	12	228.829	-1.133	0.017
			Max. Compression	2	-258.021	1.638	-0.147
			Max. Mx	25	11.103	-3.921	-0.015
			Max. My	5	-11.747	-0.101	1.452
			Max. Vy	21	0.661	-3.913	0.015
			Max. Vx	3	-0.630	-0.086	-1.330
		Diagonal	Max Tension	13	11.163	0.000	0.000
			Max. Compression	13	-11.532	0.000	0.000
			Max. Mx	25	0.264	0.308	0.034
			Max. My	23	-0.753	0.281	-0.036
			Max. Vy	25	0.115	0.308	0.034
			Max. Vx	23	-0.006	0.000	0.000
T10	20 - 0	Leg	Max Tension	12	263.509	1.286	0.066
			Max. Compression	2	-299.516	0.000	-0.000
			Max. Mx	15	-79.536	4.144	-0.004
			Max. My	13	-13.111	-0.122	2.772
			Max. Vy	2	-17.484	0.000	-0.000

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
		Diagonal	Max. Vx	11	5.073	0.000	-0.000
			Max Tension	3	12.095	0.000	0.000
			Max. Compression	3	-12.416	0.000	0.000
			Max. Mx	25	-1.443	0.445	-0.051
			Max. My	17	-4.294	0.424	0.053
			Max. Vy	25	0.142	0.445	-0.051
			Max. Vx	17	-0.008	0.000	0.000

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Leg C	Max. Vert	10	295.081	28.714	-17.673
	Max. H_x	10	295.081	28.714	-17.673
	Max. H_z	4	-260.176	-25.592	16.346
	Min. Vert	4	-260.176	-25.592	16.346
	Min. H_x	4	-260.176	-25.592	16.346
	Min. H_z	10	295.081	28.714	-17.673
Leg B	Max. Vert	6	296.231	-29.102	-17.539
	Max. H_x	12	-262.154	26.265	16.095
	Max. H_z	12	-262.154	26.265	16.095
	Min. Vert	12	-262.154	26.265	16.095
	Min. H_x	6	296.231	-29.102	-17.539
	Min. H_z	6	296.231	-29.102	-17.539
Leg A	Max. Vert	2	298.044	-0.314	34.426
	Max. H_x	11	16.483	5.067	1.726
	Max. H_z	2	298.044	-0.314	34.426
	Min. Vert	8	-260.477	0.250	-30.526
	Min. H_x	5	14.320	-4.851	1.191
	Min. H_z	8	-260.477	0.250	-30.526

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	42.652	-0.000	0.000	-12.505	2.255	-0.000
Dead+Wind 0 deg - No Ice	42.652	-0.653	-56.316	-6157.316	30.799	-16.724
Dead+Wind 30 deg - No Ice	42.652	25.922	-47.816	-5238.471	-2962.031	-34.128
Dead+Wind 60 deg - No Ice	42.652	45.703	-27.281	-2998.184	-5142.552	-51.797
Dead+Wind 90 deg - No Ice	42.652	53.489	0.027	-2.224	-5988.050	-39.467
Dead+Wind 120 deg - No Ice	42.652	47.885	27.896	3061.103	-5297.125	-26.432
Dead+Wind 150 deg - No Ice	42.652	27.091	46.887	5199.539	-3009.073	-9.320
Dead+Wind 180 deg - No Ice	42.652	0.107	53.571	5959.195	-9.202	11.077
Dead+Wind 210 deg - No Ice	42.652	-26.681	46.664	5184.280	2986.854	27.386
Dead+Wind 240 deg - No Ice	42.652	-47.648	27.348	3030.702	5285.859	41.791
Dead+Wind 270 deg - No Ice	42.652	-53.799	-0.914	-49.143	6001.894	47.424
Dead+Wind 300 deg - No Ice	42.652	-46.061	-28.273	-3042.584	5166.463	24.544
Dead+Wind 330 deg - No Ice	42.652	-27.012	-47.772	-5245.247	3014.593	6.661
Dead+Ice+Temp	101.970	-0.000	-0.000	-55.167	8.836	-0.000
Dead+Wind 0 deg+Ice+Temp	101.970	-0.072	-9.823	-1158.732	11.561	-0.696
Dead+Wind 30 deg+Ice+Temp	101.970	4.361	-7.870	-946.112	-500.773	-2.960

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
Dead+Wind 60 deg+Ice+Temp	101.970	7.466	-4.407	-555.900	-856.440	-5.412
Dead+Wind 90 deg+Ice+Temp	101.970	8.905	-0.000	-54.692	-1016.496	-4.774
Dead+Wind 120 deg+Ice+Temp	101.970	8.419	4.879	496.059	-945.763	-4.209
Dead+Wind 150 deg+Ice+Temp	101.970	4.489	7.760	833.326	-505.176	-2.278
Dead+Wind 180 deg+Ice+Temp	101.970	0.009	8.694	944.934	8.117	0.007
Dead+Wind 210 deg+Ice+Temp	101.970	-4.448	7.738	832.150	520.819	2.184
Dead+Wind 240 deg+Ice+Temp	101.970	-8.395	4.821	493.566	962.245	4.748
Dead+Wind 270 deg+Ice+Temp	101.970	-8.940	-0.102	-58.933	1035.295	5.687
Dead+Wind 300 deg+Ice+Temp	101.970	-7.504	-4.515	-560.010	875.819	3.544
Dead+Wind 330 deg+Ice+Temp	101.970	-4.480	-7.862	-946.319	523.021	1.974
Dead+Wind 0 deg - Service	42.652	-0.226	-19.486	-2138.803	12.127	-5.787
Dead+Wind 30 deg - Service	42.652	8.970	-16.545	-1820.850	-1023.482	-11.811
Dead+Wind 60 deg - Service	42.652	15.815	-9.440	-1045.637	-1777.997	-17.924
Dead+Wind 90 deg - Service	42.652	18.508	0.009	-8.954	-2070.548	-13.654
Dead+Wind 120 deg - Service	42.652	16.569	9.653	1051.031	-1831.457	-9.144
Dead+Wind 150 deg - Service	42.652	9.374	16.224	1790.977	-1039.735	-3.227
Dead+Wind 180 deg - Service	42.652	0.037	18.537	2053.834	-1.713	3.834
Dead+Wind 210 deg - Service	42.652	-9.232	16.147	1785.702	1034.993	9.478
Dead+Wind 240 deg - Service	42.652	-16.487	9.463	1040.522	1830.513	14.458
Dead+Wind 270 deg - Service	42.652	-18.616	-0.316	-25.187	2078.296	16.407
Dead+Wind 300 deg - Service	42.652	-15.938	-9.783	-1061.008	1789.223	8.493
Dead+Wind 330 deg - Service	42.652	-9.347	-16.530	-1823.201	1044.616	2.306

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	0.000	-42.652	0.000	0.000	42.652	-0.000	0.000%
2	-0.653	-42.652	-56.315	0.653	42.652	56.316	0.001%
3	25.923	-42.652	-47.816	-25.922	42.652	47.816	0.002%
4	45.705	-42.652	-27.282	-45.703	42.652	27.281	0.002%
5	53.490	-42.652	0.026	-53.489	42.652	-0.027	0.002%
6	47.885	-42.652	27.896	-47.885	42.652	-27.896	0.001%
7	27.091	-42.652	46.888	-27.091	42.652	-46.887	0.002%
8	0.107	-42.652	53.573	-0.107	42.652	-53.571	0.002%
9	-26.680	-42.652	46.665	26.681	42.652	-46.664	0.002%
10	-47.648	-42.652	27.347	47.648	42.652	-27.348	0.001%
11	-53.799	-42.652	-0.915	53.799	42.652	0.914	0.002%
12	-46.062	-42.652	-28.273	46.061	42.652	28.273	0.002%
13	-27.013	-42.652	-47.772	27.012	42.652	47.772	0.002%
14	0.000	-101.970	0.000	0.000	101.970	0.000	0.000%
15	-0.072	-101.970	-9.823	0.072	101.970	9.823	0.000%
16	4.361	-101.970	-7.870	-4.361	101.970	7.870	0.000%
17	7.466	-101.970	-4.407	-7.466	101.970	4.407	0.000%
18	8.905	-101.970	-0.000	-8.905	101.970	0.000	0.000%
19	8.418	-101.970	4.879	-8.419	101.970	-4.879	0.000%
20	4.489	-101.970	7.760	-4.489	101.970	-7.760	0.000%
21	0.009	-101.970	8.694	-0.009	101.970	-8.694	0.000%
22	-4.448	-101.970	7.738	4.448	101.970	-7.738	0.000%
23	-8.394	-101.970	4.821	8.395	101.970	-4.821	0.000%
24	-8.940	-101.970	-0.102	8.940	101.970	0.102	0.000%
25	-7.504	-101.970	-4.515	7.504	101.970	4.515	0.000%
26	-4.480	-101.970	-7.862	4.480	101.970	7.862	0.000%
27	-0.226	-42.652	-19.486	0.226	42.652	19.486	0.000%
28	8.970	-42.652	-16.545	-8.970	42.652	16.545	0.000%
29	15.815	-42.652	-9.440	-15.815	42.652	9.440	0.001%
30	18.509	-42.652	0.009	-18.508	42.652	-0.009	0.000%

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
31	16.569	-42.652	9.653	-16.569	42.652	-9.653	0.000%
32	9.374	-42.652	16.224	-9.374	42.652	-16.224	0.000%
33	0.037	-42.652	18.537	-0.037	42.652	-18.537	0.001%
34	-9.232	-42.652	16.147	9.232	42.652	-16.147	0.000%
35	-16.487	-42.652	9.463	16.487	42.652	-9.463	0.000%
36	-18.616	-42.652	-0.317	18.616	42.652	0.316	0.000%
37	-15.939	-42.652	-9.783	15.938	42.652	9.783	0.001%
38	-9.347	-42.652	-16.530	9.347	42.652	16.530	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	4	0.00000001	0.00007689
3	Yes	4	0.00000001	0.00008366
4	Yes	4	0.00000001	0.00008914
5	Yes	4	0.00000001	0.00008372
6	Yes	4	0.00000001	0.00007692
7	Yes	4	0.00000001	0.00008352
8	Yes	4	0.00000001	0.00008905
9	Yes	4	0.00000001	0.00008370
10	Yes	4	0.00000001	0.00007695
11	Yes	4	0.00000001	0.00008374
12	Yes	4	0.00000001	0.00008901
13	Yes	4	0.00000001	0.00008346
14	Yes	4	0.00000001	0.00001521
15	Yes	4	0.00000001	0.00018105
16	Yes	4	0.00000001	0.00017635
17	Yes	4	0.00000001	0.00017272
18	Yes	4	0.00000001	0.00016990
19	Yes	4	0.00000001	0.00017012
20	Yes	4	0.00000001	0.00016393
21	Yes	4	0.00000001	0.00016284
22	Yes	4	0.00000001	0.00016627
23	Yes	4	0.00000001	0.00017378
24	Yes	4	0.00000001	0.00017404
25	Yes	4	0.00000001	0.00017611
26	Yes	4	0.00000001	0.00017821
27	Yes	4	0.00000001	0.00008169
28	Yes	4	0.00000001	0.00008385
29	Yes	4	0.00000001	0.00008590
30	Yes	4	0.00000001	0.00008389
31	Yes	4	0.00000001	0.00008164
32	Yes	4	0.00000001	0.00008376
33	Yes	4	0.00000001	0.00008577
34	Yes	4	0.00000001	0.00008384
35	Yes	4	0.00000001	0.00008174
36	Yes	4	0.00000001	0.00008393
37	Yes	4	0.00000001	0.00008585
38	Yes	4	0.00000001	0.00008384

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	190 - 180	5.888	27	0.2975	0.0343
T2	180 - 160	5.260	27	0.2929	0.0343
T3	160 - 140	4.066	27	0.2535	0.0304
T4	140 - 120	3.064	27	0.2101	0.0250
T5	120 - 100	2.227	27	0.1712	0.0187
T6	100 - 80	1.542	27	0.1385	0.0141
T7	80 - 60	0.999	27	0.1058	0.0107
T8	60 - 40	0.584	27	0.0778	0.0076
T9	40 - 20	0.285	27	0.0526	0.0050
T10	20 - 0	0.086	27	0.0268	0.0026

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
190.000	(3) MLA_ANTENNA w/ Mount Pipe	27	5.888	0.2975	0.0343	205413
180.000	BXA-70063/6CF w/ Mount Pipe	27	5.260	0.2929	0.0343	94301
170.000	(3) 7130.16.33.00 w/ Mount Pipe	27	4.645	0.2766	0.0328	33459
150.000	RR65-19-02DP w/ Mount Pipe	27	3.541	0.2311	0.0278	24692
140.000	(2) DUO1417-8686 w/ Mount Pipe	27	3.064	0.2101	0.0250	31565
111.000	TLP-08P-1E	27	1.901	0.1561	0.0165	32068
98.000	58532A	27	1.482	0.1353	0.0138	33933
30.000	1.8 Meter	27	0.171	0.0399	0.0037	41596
20.000	1.8 Meter	27	0.086	0.0268	0.0026	34636

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	190 - 180	16.931	2	0.8549	0.0992
T2	180 - 160	15.125	2	0.8416	0.0991
T3	160 - 140	11.693	2	0.7283	0.0879
T4	140 - 120	8.816	2	0.6036	0.0722
T5	120 - 100	6.410	2	0.4921	0.0541
T6	100 - 80	4.439	2	0.3984	0.0409
T7	80 - 60	2.878	2	0.3041	0.0308
T8	60 - 40	1.683	2	0.2238	0.0219
T9	40 - 20	0.821	2	0.1514	0.0146
T10	20 - 0	0.249	2	0.0771	0.0074

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
190.000	(3) MLA_ANTENNA w/ Mount Pipe	2	16.931	0.8549	0.0992	72340
180.000	BXA-70063/6CF w/ Mount Pipe	2	15.125	0.8416	0.0991	33115
170.000	(3) 7130.16.33.00 w/ Mount Pipe	2	13.358	0.7947	0.0948	11640
150.000	RR65-19-02DP w/ Mount Pipe	2	10.185	0.6639	0.0804	8609
140.000	(2) DUO1417-8686 w/ Mount Pipe	2	8.816	0.6036	0.0722	11040
111.000	TLP-08P-1E	2	5.470	0.4489	0.0476	11162
98.000	58532A	2	4.266	0.3890	0.0398	11800
30.000	1.8 Meter	2	0.494	0.1147	0.0108	14449
20.000	1.8 Meter	2	0.249	0.0771	0.0074	11969

Bolt Design Data

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt K	Allowable Load K	Ratio Load / Allowable	Allowable Ratio	Criteria
T1	190	Leg	A325N	0.625	4	1.475	13.499	0.109 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.625	1	1.786	6.117	0.292 ✓	1.333	Member Bearing
		Top Girt	A325N	0.625	1	0.551	6.117	0.090 ✓	1.333	Member Bearing
T2	180	Leg	A325N	0.625	4	8.001	13.499	0.593 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.625	1	4.916	6.117	0.804 ✓	1.333	Member Bearing
		Top Girt	A325N	0.625	1	0.607	6.117	0.099 ✓	1.333	Member Bearing
T3	160	Leg	A325N	0.875	4	15.107	26.458	0.571 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.625	1	6.049	6.443	0.939 ✓	1.333	Bolt Shear
T4	140	Leg	A325N	1.000	4	22.988	34.557	0.665 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.625	1	7.214	6.443	1.120 ✓	1.333	Bolt Shear
T5	120	Leg	A325N	1.000	6	20.318	34.557	0.588 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.750	1	7.627	9.278	0.822 ✓	1.333	Bolt Shear
T6	100	Leg	A325N	1.000	6	24.749	34.557	0.716 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.750	1	8.995	9.278	0.970 ✓	1.333	Bolt Shear
T7	80	Leg	A325N	1.000	8	22.119	34.557	0.640 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.750	1	9.861	9.278	1.063 ✓	1.333	Bolt Shear
T8	60	Leg	A325N	1.000	8	25.335	34.557	0.733 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.750	1	9.534	9.278	1.028 ✓	1.333	Bolt Shear
T9	40	Leg	A325N	1.000	8	28.594	34.557	0.827 ✓	1.333	Bolt Tension
		Diagonal	A325X	0.750	1	11.163	12.695	0.879 ✓	1.333	Member Bearing
T10	20	Leg	A354-BC	1.000	10	26.351	32.398	0.813 ✓	1.333	Bolt Tension
		Diagonal	A325X	0.750	1	12.416	13.254	0.937 ✓	1.333	Bolt Shear

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	190 - 180	ROHN 2.5 STD	10.000	3.333	42.2 K=1.00	25.517	1.704	-7.764	43.482	0.179 ✓
T2	180 - 160	ROHN 2.5 STD	20.032	5.008	63.4 K=1.00	22.123	1.704	-37.739	37.699	1.001 ✓
T3	160 - 140	ROHN 3 EH	20.036	6.679	70.5 K=1.00	20.840	3.016	-67.995	62.852	1.082 ✓
T4	140 - 120	ROHN 4 EH	20.038	6.679	54.3 K=1.00	23.670	4.407	-103.217	104.324	0.989 ✓
T5	120 - 100	ROHN 5 EH	20.036	6.679	43.6 K=1.00	25.320	6.112	-136.310	154.752	0.881 ✓
T6	100 - 80	ROHN 6 EHS	20.036	10.018	54.0 K=1.00	23.712	6.713	-165.592	159.182	1.040 ✓
T7	80 - 60	ROHN 6 EH	20.032	10.016	54.8 K=1.00	23.592	8.405	-197.514	198.287	0.996 ✓
T8	60 - 40	ROHN 8 EHS	20.042	10.021	41.2 K=1.00	25.665	9.719	-227.507	249.443	0.912 ✓
T9	40 - 20	ROHN 8 EHS	20.031	10.015	41.2 K=1.00	25.668	9.719	-258.021	249.476	1.034 ✓
T10	20 - 0	ROHN 8 EHS	20.033	9.975	41.0 K=1.00	25.692	9.719	-299.516	249.705	1.199 ✓

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	190 - 180	L1 3/4x1 3/4x3/16	7.376	3.418	119.6 K=1.00	10.343	0.621	-1.826	6.424	0.284 ✓
T2	180 - 160	L2x2x3/16	9.686	4.711	143.5 K=1.00	7.254	0.715	-4.912	5.186	0.947 ✓
T3	160 - 140	L2 1/2x2 1/2x1/4	12.241	6.017	147.1 K=1.00	6.905	1.190	-6.049	8.217	0.736 ✓
T4	140 - 120	L2 1/2x2 1/2x1/4	14.067	6.887	168.3 K=1.00	5.272	1.190	-7.214	6.273	1.150 ✓
T5	120 - 100	L3x3x1/4	15.944	7.763	157.4 K=1.00	6.031	1.440	-7.627	8.685	0.878 ✓
T6	100 - 80	L3 1/2x3 1/2x1/4	19.209	9.441	163.2 K=1.00	5.603	1.690	-8.995	9.470	0.950 ✓
T7	80 - 60	L4x4x1/4	20.935	10.286	155.3 K=1.00	6.194	1.940	-9.861	12.017	0.821 ✓
T8	60 - 40	L4x4x5/16	22.872	11.203	170.0 K=1.00	5.169	2.400	-9.534	12.407	0.768 ✓
T9	40 - 20	L4x4x5/16	24.688	12.067	183.1 K=1.00	4.456	2.400	-11.532	10.694	1.078 ✓

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	20 - 0	L4x4x3/8	26.489	12.979	197.7 K=1.00	3.822	2.860	-12.416	10.932	1.136

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	190 - 180	L1 3/4x1 3/4x3/16	6.580	6.070	212.1 K=1.00	3.320	0.621	-0.543	2.062	0.263
T2	180 - 160	KL/R > 200 (C) - 5 L2x2x3/16	6.580	6.070	184.9 K=1.00	4.370	0.715	-0.637	3.124	0.204

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	190 - 180	ROHN 2.5 STD	10.000	3.333	42.2	30.000	1.704	5.899	51.121	0.115
T2	180 - 160	ROHN 2.5 STD	20.032	5.008	63.4	30.000	1.704	32.006	51.121	0.626
T3	160 - 140	ROHN 3 EH	20.036	6.679	70.5	30.000	3.016	60.429	90.478	0.668
T4	140 - 120	ROHN 4 EH	20.038	6.679	54.3	30.000	4.407	91.951	132.223	0.695
T5	120 - 100	ROHN 5 EH	20.036	6.679	43.6	30.000	6.112	121.909	183.359	0.665
T6	100 - 80	ROHN 6 EHS	20.036	10.018	54.0	30.000	6.713	148.492	201.398	0.737
T7	80 - 60	ROHN 6 EH	20.032	10.016	54.8	30.000	8.405	176.953	252.148	0.702
T8	60 - 40	ROHN 8 EHS	20.042	10.021	41.2	30.000	9.719	202.678	291.579	0.695
T9	40 - 20	ROHN 8 EHS	20.031	10.015	41.2	30.000	9.719	228.752	291.579	0.785
T10	20 - 0	ROHN 8 EHS	20.033	9.975	41.0	30.000	9.719	263.509	291.579	0.904

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	190 - 180	L1 3/4x1 3/4x3/16	7.376	3.418	79.4	29.000	0.360	1.786	10.450	0.171 ✓
T2	180 - 160	L2x2x3/16	9.686	4.711	94.3	29.000	0.431	4.916	12.493	0.394 ✓
T3	160 - 140	L2 1/2x2 1/2x1/4	12.241	6.017	96.0	29.000	0.752	5.925	21.804	0.272 ✓
T4	140 - 120	L2 1/2x2 1/2x1/4	14.067	6.887	109.6	29.000	0.752	7.115	21.804	0.326 ✓
T5	120 - 100	L3x3x1/4	15.944	7.763	102.0	32.500	0.916	7.560	29.768	0.254 ✓
T6	100 - 80	L3 1/2x3 1/2x1/4	19.209	9.441	105.5	32.500	1.103	8.824	35.862	0.246 ✓
T7	80 - 60	L4x4x1/4	20.935	10.286	100.1	32.500	1.291	9.636	41.956	0.230 ✓
T8	60 - 40	L4x4x5/16	22.872	11.203	109.8	32.500	1.595	9.417	51.835	0.182 ✓
T9	40 - 20	L4x4x5/16	24.688	12.067	118.2	32.500	1.595	11.163	51.835	0.215 ✓
T10	20 - 0	L4x4x3/8	26.489	12.979	128.1	32.500	1.899	12.095	61.715	0.196 ✓

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	190 - 180	L1 3/4x1 3/4x3/16	6.580	6.070	141.7	29.000	0.360	0.551	10.450	0.053 ✓
T2	180 - 160	L2x2x3/16	6.580	6.070	123.3	29.000	0.431	0.607	12.493	0.049 ✓

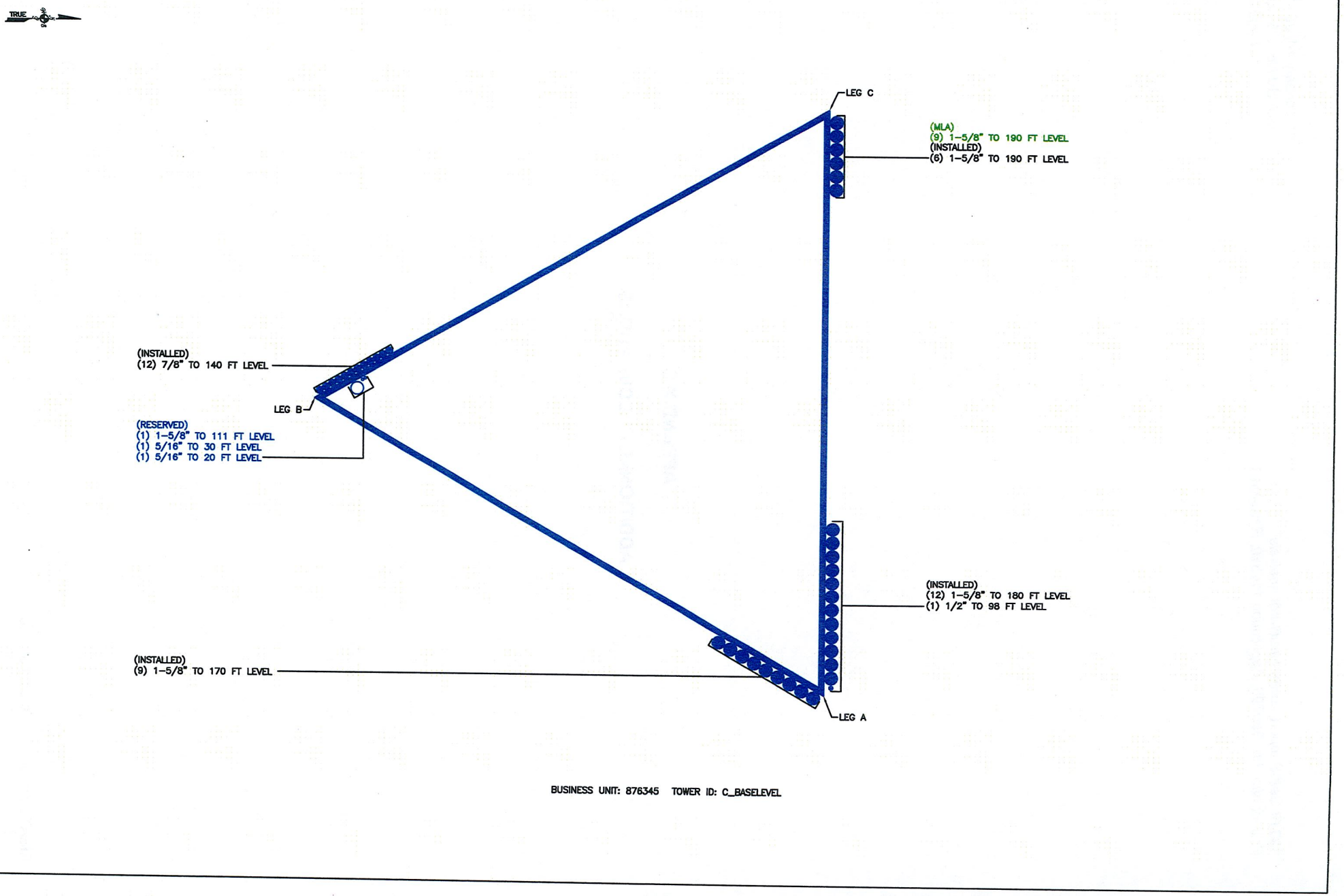
Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
T1	190 - 180	Leg	ROHN 2.5 STD	1	-7.764	57.961	13.4	Pass
T2	180 - 160	Leg	ROHN 2.5 STD	27	-37.739	50.253	75.1	Pass
T3	160 - 140	Leg	ROHN 3 EH	57	-67.995	83.781	81.2	Pass
T4	140 - 120	Leg	ROHN 4 EH	78	-103.217	139.064	74.2	Pass
T5	120 - 100	Leg	ROHN 5 EH	99	-136.310	206.284	66.1	Pass
T6	100 - 80	Leg	ROHN 6 EHS	120	-165.592	212.190	78.0	Pass
T7	80 - 60	Leg	ROHN 6 EH	135	-197.514	264.317	74.7	Pass
T8	60 - 40	Leg	ROHN 8 EHS	150	-227.507	332.508	68.4	Pass
T9	40 - 20	Leg	ROHN 8 EHS	165	-258.021	332.551	77.6	Pass
T10	20 - 0	Leg	ROHN 8 EHS	180	-299.516	332.857	90.0	Pass
T1	190 - 180	Diagonal	L1 3/4x1 3/4x3/16	7	-1.826	8.563	21.3	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
T2	180 - 160	Diagonal	L2x2x3/16	36	-4.912	6.913	21.9 (b) 71.1	Pass
T3	160 - 140	Diagonal	L2 1/2x2 1/2x1/4	63	-6.049	10.953	55.2	Pass
T4	140 - 120	Diagonal	L2 1/2x2 1/2x1/4	84	-7.214	8.362	70.4 (b) 86.3	Pass
T5	120 - 100	Diagonal	L3x3x1/4	105	-7.627	11.577	65.9	Pass
T6	100 - 80	Diagonal	L3 1/2x3 1/2x1/4	126	-8.995	12.623	71.3	Pass
T7	80 - 60	Diagonal	L4x4x1/4	141	-9.861	16.019	72.7 (b) 61.6	Pass
T8	60 - 40	Diagonal	L4x4x5/16	156	-9.534	16.538	79.7 (b) 57.6	Pass
T9	40 - 20	Diagonal	L4x4x5/16	169	-11.532	14.254	77.1 (b) 80.9	Pass
T10	20 - 0	Diagonal	L4x4x3/8	185	-12.416	14.572	85.2	Pass
T1	190 - 180	Top Girt	L1 3/4x1 3/4x3/16	5	-0.543	2.749	19.8	Pass
T2	180 - 160	Top Girt	L2x2x3/16	29	-0.637	4.165	15.3	Pass
							Summary	
						Leg (T10)	90.0	Pass
						Diagonal (T4)	86.3	Pass
						Top Girt (T1)	19.8	Pass
						Bolt Checks	84.0	Pass
						RATING =	**90.0**	**Pass**

APPENDIX B

BASE LEVEL DRAWING



BUSINESS UNIT: 876345 TOWER ID: C_BASELEVEL

APPENDIX C

ADDITIONAL CALCULATIONS

Drilled Pier Foundation

Checks capacity of piers under axial loads

BU#: 876345
Site Name: Sky Hill
App Num: 114810

CROWN CASTLE

Design Parameters		
Tower Width:	25.05	ft
Pier Diameter:	5.00	ft
Bell Diameter:	none	ft
Water is at:	none	ft
Extension Above Ground:	0.50	ft
Neglect Top:	2.50	ft
Neglect Bottom (Compression):	0.00	ft
Factor of Safety:	2	
Number of Pier Diameters:	3	
Seismic Zone:	1	

Design Reactions		
Compression/Leg:	298.00	kips
Tower Uplift/Leg:	262.00	kips
Total Uplift/Leg:	262.00	kips
Shear Total:	56.00	kips
Moment Total:	0.00	ft*kips

Design Summary

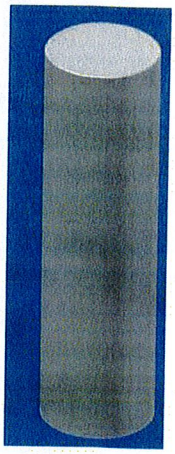
Pier Diameter (ft)	Design Depth (ft)	Concrete Volume (yd^3)	Circular Ties Size #	Minimum Concrete Compressive Strength (psi)
5.00	65.00	47.63	5	3000

Uplift Resistance:

Layer #	From (ft)	To (ft)	Cont. Layer Length (ft)	Pier Diameter (ft)	Allowable Skin Friction (ksf)	Friction Force (kips)	Concrete Unit Weight (pcf)	Concrete Weight (kips)	Uplift Resistance (kips)
1	0.00	2.50	2.50	5.00		0.00	150.0	7.07	7.07
2	2.50	26.00	23.50	5.00		0.00	150.0	55.37	55.37
3	26.00	26.00	0.00	5.00		0.00	150.0	0.00	0.00
4	26.00	26.00	0.00	5.00		0.00	150.0	0.00	0.00
5	26.00	26.00	0.00	5.00		0.00	150.0	0.00	0.00
6	26.00	26.00	0.00	5.00		0.00	150.0	0.00	0.00
7	26.00	26.00	0.00	5.00		0.00	150.0	0.00	0.00
8	26.00	26.00	0.00	5.00		0.00	150.0	0.00	0.00
9	26.00	26.00	0.00	5.00		0.00	150.0	0.00	0.00
10	26.00	26.00	0.00	5.00		0.00	150.0	0.00	0.00
				UPLIFT CAPACITY =		380.00	kips	OK	

Compression Resistance:

Layer #	From (ft)	To (ft)	Cont. Layer Length (ft)	Diameter (ft)	Allowable Skin Friction (ksf)	Friction Force (kips)	Allowable Bearing Capacity (ksf)	Allowable Tip Capacity (kips)
1	0.00	2.50	2.50	5.00		0.00	-	-
2	2.50	26.00	23.50	5.00		0.00	-	-
3	26.00	26.00	0.00	5.00		0.00	-	-
4	26.00	26.00	0.00	5.00		0.00	-	-
5	26.00	26.00	0.00	5.00		0.00	-	-
6	26.00	26.00	0.00	5.00		0.00	-	-
7	26.00	26.00	0.00	5.00		0.00	-	-
8	26.00	26.00	0.00	5.00		0.00	-	-
9	26.00	26.00	0.00	5.00		0.00	-	-
10	26.00	26.00	0.00	5.00		0.00	-	-
Neg	26.00	26.00	0.00	5.00		0.00	-	-
Tip	26.00	26.00	0.00	5.00	-	-	12.73	249.95
				COMPRESSION CAPACITY =		380.00	kips	OK
				Total Friction Capacity =		0.00	kips	



Reinforcement Design: **Minimum area of steel is OK.**

# of Bars	Bar Size #	Ultimate Lateral Resistance (kcf)	Concrete Clear Cover (in)	Concrete Strength (psi)	Steel Strength (psi)	Area per Bar (in^2)	Clear Spacing (in)
18	9	3.00	3.00	3000	60000	1.00	8.30

Minimum Length (ft*)	Induced Moment (ft*k)*	Bar Area (in^2)	Outer diameter (in.)	Inner diameter (in.)	Section modulus (cu.in.)	Maximum Allowable Moment (ft-kips)**	Steel Required (in^2)
6.34	90.44	18.00	54.00	53.79	242.05	1046.29	14.14

* see Broms method

** see Maximum Allowable Moment of a Circular Section

Check				
	Capacity / Availabilty	**Demands or Limits**	**Checks**	**%**
Uplift, (kips):	380.00	262.00	**OK**	**68.9%**
Compression, (kips):	380.00	298.00	**OK**	**78.4%**
Rebar area, (in^2):	18.00	14.14	**OK**	**N/A**
Bar spacing, (in):	8.30	12 > s > 4.5	**OK**	**N/A**
Moment capacity, (kip-ft):	1046.29	90.44	**OK**	**8.6%**
Length, (ft):	65.50	6.34	**OK**	**N/A**