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March 26, 2012

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

Re: **Completion of Construction Activity**
EM-VER-097-111110 – Rt. 34, Newtown, Connecticut
EM-VER-085-111219 – 474 Main Street, Monroe, Connecticut
EM-VER-082-111209 – 484 Meriden Road, Middlefield, Connecticut
EM-VER-054-120106 – 175 Dickson Road, Glastonbury, Connecticut
EM-VER-067-111108 – 107 Buck Road, Hebron, Connecticut
EM-VER-079-111110 – 43 North Main Street, Marlborough, Connecticut

Dear Ms. Roberts:

The purpose of this letter is to notify you and the Connecticut Siting Council that construction activity associated with each of the above-referenced facility modification filings has now been completed.

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

Sincerely,

Kenneth C. Baldwin

Copy to:
Sandy M. Carter

STATE OF CONNECTICUT

CONNECTICUT SITING COUNCIL

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

November 30, 2011

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

RE: **EM-VER-097-111110** - Cellco Partnership d/b/a Verizon Wireless notice of intent to modify an existing telecommunications facility located at Route 34 (Berkshire Road), Newtown, 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 November 9, 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 LAB

Linda Roberts
Executive Director

LR/CDM/laf

c: The Honorable Patricia E. Llodra, First Selectman, Town of Newtown
Gary Frenette, Zoning Enforcement Officer, Town of Newtown
Crown Castle USA, Inc.

STATE OF CONNECTICUT
CONNECTICUT SITING COUNCIL
Ten Franklin Square, New Britain, CT 06051
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www.ct.gov/csc

November 15, 2011

The Honorable Patricia E. Llodra
First Selectman
Town of Newtown
Town Hall
3 Primrose Street
Newtown, CT 06470-5307

RE: **EM-VER-097-111110** - Cellco Partnership d/b/a Verizon Wireless notice of intent to modify an existing telecommunications facility located at Route 34 (Berkshire Road), Newtown, Connecticut.

Dear First Selectman Llodra:

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 November 30, 2011.

Thank you for your cooperation and consideration.

Very truly yours,

Linda Roberts

Linda Roberts
Executive Director

LR/jbw

Enclosure: Notice of Intent

c: Gary Frenette, Zoning Enforcement Officer, Town of Newtown

CSC
CONNECTICUT SITING COUNCIL

ROBINSON & COLE LLP

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EM-VER-097-111110

November 9, 2011

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

Re: **Notice of Exempt Modification – Antenna Swap**
Route 34 (Berkshire Road), Newtown, Connecticut

Dear Ms. Roberts:

Cellco Partnership d/b/a Verizon Wireless ("Cellco") currently maintains wireless telecommunications antennas at the top of the existing 185-foot tower at the above-referenced address. The tower is owned by Crown Castle. The Council approved Cellco's shared use of the existing tower in 1988. Cellco now intends to modify its installation by replacing six (6) of its existing antennas with three (3) model BXA-171063-12BF PCS antennas and three (3) BXA-70063/6CF LTE antennas, all at the same 185-foot level on the tower. Cellco also intends to install six (6) coax cable diplexers on its antenna platform. Attached behind Tab 1 are the specifications for 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 E. Patricia Llodra, First Selectwoman of the Town of Newtown. A copy of this letter is also being sent to Carmine V. Renzulli, 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 an increase in the overall height of the existing tower. Cellco's antennas and diplexers will be located at the same 185-foot level on the existing 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 power density table for Cellco's modified facility is included behind Tab 2.

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

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

Sincerely,

Kenneth C. Baldwin

Enclosures
Copy to:
E. Patricia Llodra, Newtown First Selectwoman
Carmine V. Renzulli
Sandy M. Carter

Amphenol ANTENNA SOLUTIONS

BXA-171063-12BF-EDIN-X

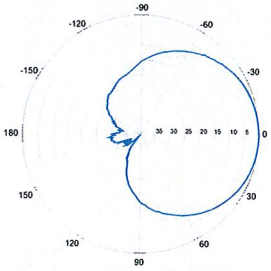
Replace "X" with desired electrical downtilt.

X-Pol | FET Panel | 63° | 19.0 dBi

Electrical Characteristics	1710-2170 MHz		
Frequency bands	1710-1880 MHz	1850-1990 MHz	1920-2170 MHz
Polarization	±45°	±45°	±45°
Horizontal beamwidth	68°	65°	60°
Vertical beamwidth	4.5°	4.5°	4.5°
Gain	16.1 dBd / 18.2 dBi	16.5 dBd / 18.6 dBi	16.9 dBd / 19.0 dBi
Electrical downtilt (X)	0, 2, 5		
Impedance	50Ω		
VSWR	≤1.5:1		
First upper sidelobe	< -17 dB		
Front-to-back ratio	> 30 dB		
In-band isolation	> 28 dB		
IM3 (20W carrier)	< -150 dBc		
Input power	300 W		
Lightning protection	Direct Ground		
Connector(s)	2 Ports / EDIN / Female / Bottom		
Operating temperature	-40° to +60° C / -40° to +140° F		
Mechanical Characteristics			
Dimensions Length x Width x Depth	1820 x 154 x 105 mm		71.7 x 6.1 x 4.1 in
Depth with z-brackets	133 mm		5.2 in
Weight without mounting brackets	6.8 kg		15 lbs
Survival wind speed	> 201 km/hr		> 125 mph
Wind area	Front: 0.28 m² Side: 0.19 m²		Front: 3.1 ft² Side: 2.1 ft²
Wind load @ 161 km/hr (100 mph)	Front: 460 N Side: 304 N		Front: 103 lbf Side: 68 lbf

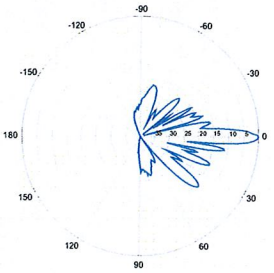
Mounting Options	Part Number	Fits Pipe Diameter	Weight
2-Point Mounting Bracket Kit	26799997	50-102 mm 2.0-4.0 in	2.3 kg 5 lbs
2-Point Mounting & Downtilt Bracket Kit	26799999	50-102 mm 2.0-4.0 in	3.6 kg 8 lbs
Concealment Configurations	For concealment configurations, order BXA-171063-12BF-EDIN-X-FP		

BXA-171063-12BF-EDIN-X



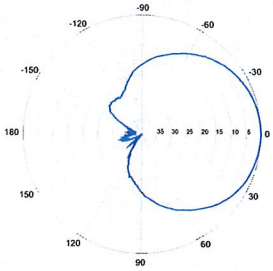
Horizontal | 1710-1880 MHz

BXA-171063-12BF-EDIN-0



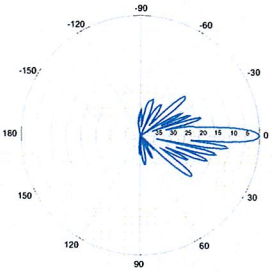
0° | Vertical | 1710-1880 MHz

BXA-171063-12BF-EDIN-X



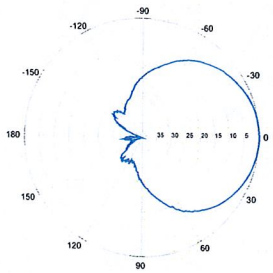
Horizontal | 1850-1990 MHz

BXA-171063-12BF-EDIN-0



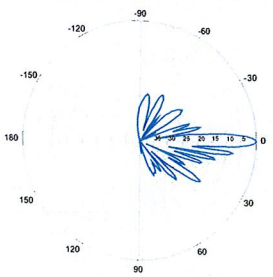
0° | Vertical | 1850-1990 MHz

BXA-171063-12BF-EDIN-X



Horizontal | 1920-2170 MHz

BXA-171063-12BF-EDIN-0

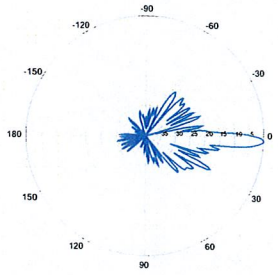


0° | Vertical | 1920-2170 MHz

BXA-171063-12BF-EDIN-X

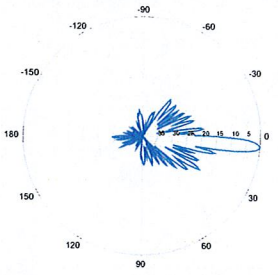
X-Pol | FET Panel | 63° | 19.0 dBi

BXA-171063-12BF-EDIN-2



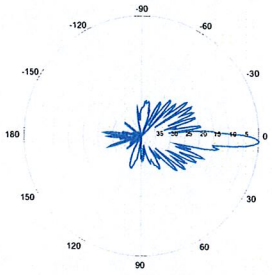
2° | Vertical | 1710-1880 MHz

BXA-171063-12BF-EDIN-5



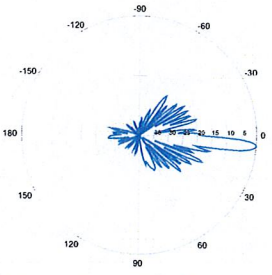
5° | Vertical | 1710-1880 MHz

BXA-171063-12BF-EDIN-2



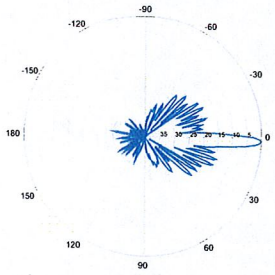
2° | Vertical | 1850-1990 MHz

BXA-171063-12BF-EDIN-5



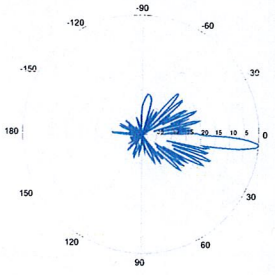
5° | Vertical | 1850-1990 MHz

BXA-171063-12BF-EDIN-2



2° | Vertical | 1920-2170 MHz

BXA-171063-12BF-EDIN-5



5° | Vertical | 1920-2170 MHz

Amphenol ANTENNA SOLUTIONS

BXA-70063-6CF-EDIN-X

X-Pol | FET Panel | 63° | 14.5 dBd

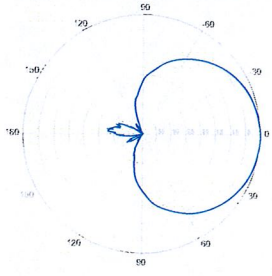
Replace "X" with desired electrical downtilt

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

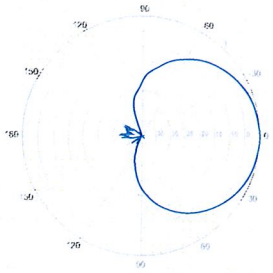
Electrical Characteristics	696-900 MHz	
Frequency bands	696-806 MHz	806-900 MHz
Polarization	±45°	
Horizontal beamwidth	65°	63°
Vertical beamwidth	13°	11°
Gain	14.0 dBd (16.1 dBi)	14.5 dBd (16.6 dBi)
Electrical downtilt (X)	0, 2, 3, 4, 5, 6, 8, 10	
Impedance	50Ω	
VSWR	≤1.35:1	
Upper sidelobe suppression (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 with EDIN connectors	500 W	
Input power with NE connectors	300 W	
Lightning protection	Direct Ground	
Connector(s)	2 Ports / EDIN or NE / Female / Center (Back)	
Mechanical Characteristics		
Dimensions Length x Width x Depth	1804 x 285 x 132 mm	71.0 x 11.2 x 5.2 in
Depth with z-brackets	172 mm	6.8 in
Weight without mounting brackets	7.9 kg	17 lbs
Survival wind speed	> 201 km/hr	> 125 mph
Wind area	Front: 0.51 m² Side: 0.24 m²	Front: 5.5 ft² Side: 2.6 ft²
Wind load @ 161 km/hr (100 mph)	Front: 759 N Side: 391 N	Front: 169 lbf Side: 89 lbf

Mounting Options	Part Number	Fits Pipe Diameter	Weight
3-Point Mounting 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

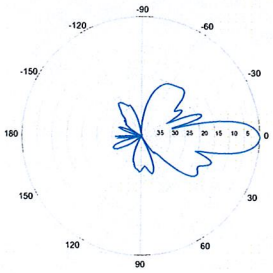


Horizontal | 750 MHz

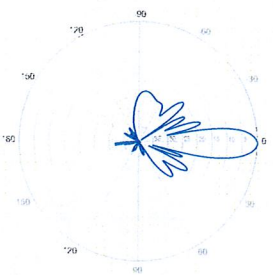


Horizontal | 850 MHz

BXA-70063-6CF-EDIN-0

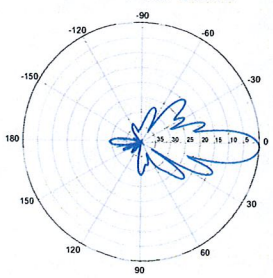


0° | Vertical | 750 MHz

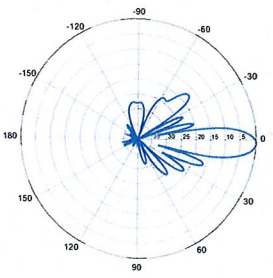


0° | Vertical | 850 MHz

BXA-70063-6CF-EDIN-2



2° | Vertical | 750 MHz

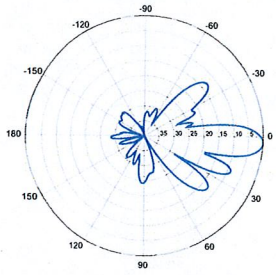


2° | Vertical | 850 MHz

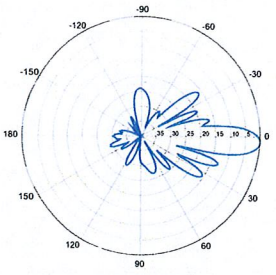
BXA-70063-6CF-EDIN-X

X-Pol | FET Panel | 63° | 14.5 dBd

BXA-70063-6CF-EDIN-3

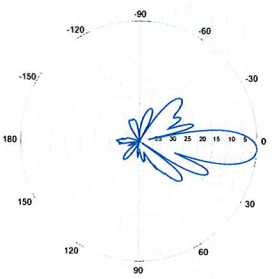


3° | Vertical | 750 MHz

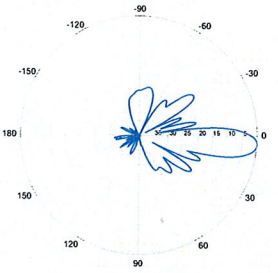


3° | Vertical | 850 MHz

BXA-70063-6CF-EDIN-4

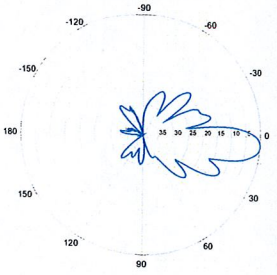


4° | Vertical | 750 MHz

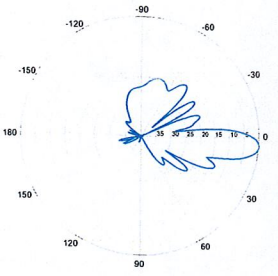


4° | Vertical | 850 MHz

BXA-70063-6CF-EDIN-5

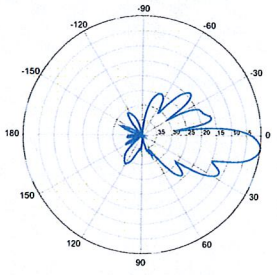


5° | Vertical | 750 MHz

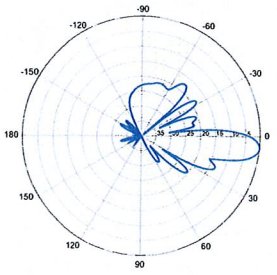


5° | Vertical | 850 MHz

BXA-70063-6CF-EDIN-6

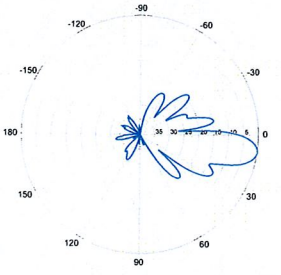


6° | Vertical | 750 MHz

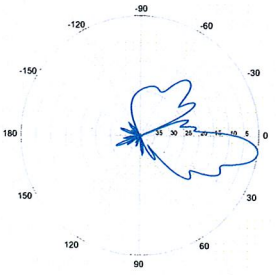


6° | Vertical | 850 MHz

BXA-70063-6CF-EDIN-8

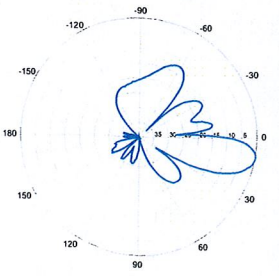


8° | Vertical | 750 MHz

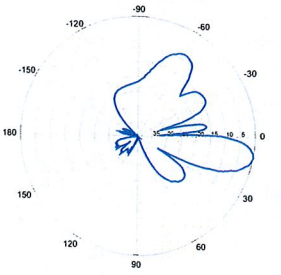


8° | Vertical | 850 MHz

BXA-70063-6CF-EDIN-10



10° | Vertical | 750 MHz



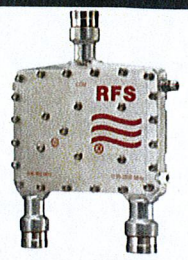
10° | Vertical | 850 MHz

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 Range 1, MHz	698-960
Frequency Range 2, MHz	1710-2200
Application	LTE700, GSM900, UMTS, GSM1800, Cellular 800, PCS
Configuration	Sharelite Single diplexer, outdoor, DC pass in the 1710-2170MHz path, with mounting hardware SEM2-1A
Mounting	Wall Mounting: With 4 screws (maximum 6mm diameter); Pole Mounting: With included clamp set 40-110mm (1.57-4.33)
Return Loss All Ports Min/Typ, dB	19/23
Power Handling Continuous, Max, W	1250 at common port; 750 in low frequency path & 500 in high frequency path
Power Handling Peak, Max, W	15000 in low frequency path & 8000 in high frequency path
Impedance, Ohms	50
Insertion Loss, Path 1, dB	0.07 typ.
Insertion Loss, Path 2, dB	0.13 typ.
Rejection Between Bands Min/Typ, dB	58/64@698-960MHz; 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
Dimensions, H x W x D, mm (in)	147 x 164 x 37 (5.8 x 6.5 x 1.5)
Shipping Dimensions, H x W x D, mm (in)	254 x 406 x 82 (10 x 16 x 3.2) for 2 * Single Units in 1 * box, 280 x 406 x 241 (11 x 16 x 9.5) for 6 * units = 3 * Boxes in 1 * overwrap
Volume, L	0.43
Housing	Aluminum

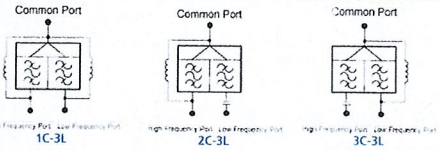
Notes

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

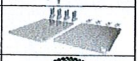
Other Documentation

FD9R6004/2C-3L Installation Instructions: Wideband_Diplexer_Installation_Rev5.pdf

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



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

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

	General	Power	Density					
Site Name: Newtown								
Tower Height: Verizon @ 185ft								
CARRIER	**# OF CHAN.**	**WATTS ERP**	**HEIGHT**	**CALC. POWER DENS**	**FREQ.**	**MAX. PERMISS. EXP.**	**FRACTION MPE**	**Total**
*AT&T UMTS	1	500	177	0.0057	880	0.5867	0.98%	
*AT&T UMTS	1	500	177	0.0057	1900	1.0000	0.57%	
*AT&T GSM	6	296	177	0.0204	880	0.5867	3.47%	
*AT&T GSM	6	427	177	0.0294	1900	1.0000	2.94%	
*AT&T LTE	1	500	177	0.0057	740	0.4933	1.16%	
*MetroPCS	3	443.61	135	0.0263	2140	1.0000	2.63%	
*Sprint			165	0.0105	1962.5	1.0000	1.05%	
*Nextel	9	100	155	0.0135	851	0.5673	2.37%	
*T-Mobile GSM	8	129	145	0.0176	1945	1.0000	1.76%	
*T-Mobile UMTS	2	730	145	0.0250	2100	1.0000	2.50%	
Verizon PCS	**7**	**253**	**185**	**0.0186**	**1970**	**1.0000**	**1.86%**	
Verizon Cellular	**9**	**354**	**185**	**0.0335**	**869**	**0.5793**	**5.78%**	
Verizon AWS	**1**	**631**	**185**	**0.0066**	**2145**	**1.0000**	**0.66%**	
Verizon 700	**2**	**664**	**185**	**0.0140**	**698**	**0.4653**	**3.00%**	
								30.74%
* Source: Siting Council								

Date: **September 23, 2011**

Eva Morales
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 Name:	Newtown CT
Crown Castle Designation:	**Crown Castle BU Number:**	806354
	Crown Castle Site Name:	BRG 123 943084
	Crown Castle JDE Job Number:	166740
	Crown Castle Work Order Number:	438106
Engineering Firm Designation:	**Crown Castle Project Number:**	438106

Site Data: **ROUTE 34 - WASHINGTON AVEUNE, NEWTOWN, Fairfield County, CT**
Latitude *41° 24' 45.53"*, Longitude *-73° 16' 12.34"*
185 Foot - Monopole Tower

Dear Eva Morales,

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 438106, in accordance with application 131162, 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 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: Eric Anderson, E.I.T. / JAH

Respectfully submitted by:

Aaron C. Poot, P.E.
Engineering Supervisor

STATE OF CONNECTICUT
AARON C. POOT
No. 25050
LICENSED
PROFESSIONAL ENGINEER

RISA Tower Report - version 5.4.2.0

9/23/11

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 185 ft Monopole tower designed by ENGINEERED ENDEAVORS, INC. in July of 1999, and was later modified per specifications by Vertical Structures, Inc. dated February of 2009. The tower was originally designed for a wind speed of 90 mph per TIA/EIA-222-F.

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, 37.6 mph with 0.75 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
185	187	3	antel	BXA-171063-12BF w/ Mount Pipe	-	-	-
		3	antel	BXA-70063-6CF-2 w/ Mount Pipe			
		6	rfs celwave	FD9R6004/2C-3L			

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
185	187	6	decibel	DB948F85T2E-M w/ Mount Pipe	-	-	3
		6	decibel	DB846F65ZAXY w/ Mount Pipe	12	1-5/8	1
	185	1	tower mounts	Platform Mount [LP 601-1]			
		1	tower mounts	Side Arm Mount [SO 103-3]			
180	194	1	decibel	DB222	1	1/2	1
	180	1	tower mounts	10'6"x4" Pipe Mount			
175	177	6	ericsson	RRUS-11	1 2	3/8 5/8	2
		3	powerwave technologies	P65-16-XLH-RR w/ Mount Pipe			
		3	powerwave technologies	TT19-08BP111-001			
		1	raycap	DC6-48-60-18-8F			
		6	powerwave technologies	7770.00 w/ Mount Pipe	12	1-5/8	1
		6	powerwave technologies	LGP2140X			
	175	1	tower mounts	Platform Mount [LP 601-1]			
165	167	6	decibel	DB980H90T2E-M w/ Mount Pipe	6	1-5/8	1
	165	1	tower mounts	Platform Mount [LP 601-1]			

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
155	158	12	decibel	DB844H90 w/ Mount Pipe	12	1-1/4	1
	155	1	tower mounts	Platform Mount [LP 602-1]			
145	148	3	ems wireless	RR90-17-02DPL2 w/ Mount Pipe	6	1-5/8	1
		3	rfs celwave	APX16DWV-16DWV-S-E-A20 w/ Mount Pipe	6	1-5/8	2
		3	rfs celwave	ATMAA1412D-1A20			
		3	rfs celwave	ATMPP1412D-1CWA			
	145	1	tower mounts	Platform Mount [LP 601-1]	-	-	1
135	137	3	kathrein	800 10504 w/ Mount Pipe	6	1-5/8	1
		3	kathrein	860 10025			
	135	1	tower mounts	T-Arm Mount [TA 602-3]			
102	102	1	gps	GPS_A	1	1/2	1
		1	tower mounts	Side Arm Mount [SO 701-1]			
100	100	1	gps	GPS_A	1	1/2	1
		1	tower mounts	Side Arm Mount [SO 701-1]			
40	40	1	gps	GPS_A	1	1/2	1
		1	tower mounts	Side Arm Mount [SO 701-1]			

Notes:
1) Existing Equipment
2) Reserved Equipment
3) Equipment to be removed, not considered in 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)
185	185	12	swedcom	ALP 9212	-	-
175	175	12	swedcom	ALP 11011	-	-
165	165	9	decibel	DB 980	-	-
155	155	12	swedcom	ALP 9011	-	-
145	145	6	ems wireless	RR65-18	-	-
		1	scala	OGB9-900		
110	110	1	generic	GPS	-	-
50	50	1	generic	GPS	-	-

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	DR. CLARENCE WELTI	2297011	CCISITES
4-POST-MODIFICATION INSPECTION	Vertical Structures, Inc.	2447231	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	EEI	822037	CCISITES
4-TOWER MANUFACTURER DRAWINGS	EEI	822035	CCISITES
4-TOWER REINFORCEMENT DESIGN/DRAWINGS/DATA	Vertical Structures, Inc.	2381114	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
L1	185 - 149.458	Pole	TP36.06x29x0.25	1	-8.44	1435.57	42.3	Pass
L2	149.458 - 114.083	Pole	TP42.46x34.5502x0.3125	2	-17.07	2114.51	79.3	Pass
L3	114.083 - 76.6667	Pole	TP49.15x40.6946x0.375	3	-26.91	2937.43	93.7	Pass
L4	76.6667 - 38.25	Pole	TP55.9x47.0967x0.4375	4	-39.87	3898.15	96.8	Pass
L5	38.25 - 0	Pole	TP62.5x53.5605x0.5	5	-59.58	5115.21	95.7	Pass
							Summary	
						Pole (L4)	96.8	Pass
						Rating =	96.8	Pass

Table 6 - Tower Component Stresses vs. Capacity - LC1

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	85.3	Pass
1	Base Plate	0	88.7	Pass
1	Base Foundation	0	91.3	Pass

Structure Rating (max from all components) =	96.8%

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

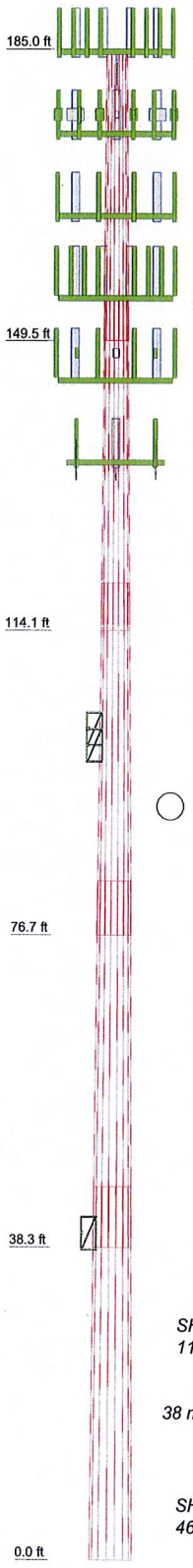
4.1) Recommendations

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

Section	5	4	3	2	1
Length (ft)	45'9"	45'31/32"	43'3"	40'5-17/32"	35'6-15/32"
Number of Sides	18	18	18	18	18
Thickness (in)	0.5000	0.4375	0.3750	0.3125	0.2500
Socket Length (ft)		7'6"	6'8-1/32"	5'9-31/32"	5'31/32"
Top Dia (in)	53.5605	47.0967	40.6946	34.5502	29.0000
Bot Dia (in)	62.5000	55.9000	49.1500	42.4600	36.0600
Grade			A572-65		
Weight (K)	14.2	10.9	7.8	5.2	3.1



AXIAL
89 K
SHEAR
11 K
MOMENT
1606 kip-ft

TORQUE 1 kip-ft
38 mph WIND - 0.7500 in ICE

AXIAL
60 K
SHEAR
46 K
MOMENT
6163 kip-ft

TORQUE 2 kip-ft
REACTIONS - 85 mph WIND

DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
(2) DB846F65ZAXY w/ Mount Pipe	185	(4) DB844H90 w/ Mount Pipe	155
(2) DB846F65ZAXY w/ Mount Pipe	185	(4) DB844H90 w/ Mount Pipe	155
(2) DB846F65ZAXY w/ Mount Pipe	185	(4) DB844H90 w/ Mount Pipe	155
BXA-171063-12BF w/ Mount Pipe	185	Platform Mount [LP 602-1]	155
BXA-70063-6CF-2 w/ Mount Pipe	185	RR90-17-02DPL2 w/ Mount Pipe	145
(2) FD9R6004/2C-3L	185	APX16DWV-16DWV-S-E-A20 w/ Mount Pipe	145
BXA-171063-12BF w/ Mount Pipe	185	ATMAA1412D-1A20	145
BXA-70063-6CF-2 w/ Mount Pipe	185	ATMPP1412D-1CWA	145
(2) FD9R6004/2C-3L	185	RR90-17-02DPL2 w/ Mount Pipe	145
BXA-171063-12BF w/ Mount Pipe	185	APX16DWV-16DWV-S-E-A20 w/ Mount Pipe	145
BXA-70063-6CF-2 w/ Mount Pipe	185	ATMAA1412D-1A20	145
(2) FD9R6004/2C-3L	185	ATMPP1412D-1CWA	145
Platform Mount [LP 601-1]	185	RR90-17-02DPL2 w/ Mount Pipe	145
Side Arm Mount [SO 103-3]	185	APX16DWV-16DWV-S-E-A20 w/ Mount Pipe	145
DB222	180	ATMAA1412D-1A20	145
10'6"x4" Pipe Mount	180	ATMPP1412D-1CWA	145
(2) 7770.00 w/ Mount Pipe	175	Platform Mount [LP 601-1]	145
(2) LGP2140X	175	800 10504 w/ Mount Pipe	135
(2) RRUS-11	175	860 10025	135
P65-16-XLH-RR w/ Mount Pipe	175	800 10504 w/ Mount Pipe	135
TT19-08BP111-001	175	860 10025	135
(2) 7770.00 w/ Mount Pipe	175	800 10504 w/ Mount Pipe	135
(2) LGP2140X	175	860 10025	135
(2) RRUS-11	175	T-Arm Mount [TA 602-3]	135
P65-16-XLH-RR w/ Mount Pipe	175	5' x 2' Pipe Mount	135
TT19-08BP111-001	175	5' x 2' Pipe Mount	135
(2) 7770.00 w/ Mount Pipe	175	5' x 2' Pipe Mount	135
(2) LGP2140X	175	GPS_A	102
(2) RRUS-11	175	Side Arm Mount [SO 701-1]	102
P65-16-XLH-RR w/ Mount Pipe	175	GPS_A	100
TT19-08BP111-001	175	Side Arm Mount [SO 701-1]	100
DC6-48-60-18-8F	175	GPS_A	40
Platform Mount [LP 601-1]	175	Side Arm Mount [SO 701-1]	40
(2) DB980H90T2E-M w/ Mount Pipe	165		
(2) DB980H90T2E-M w/ Mount Pipe	165		
(2) DB980H90T2E-M w/ Mount Pipe	165		
Platform Mount [LP 601-1]	165		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-65	65 ksi	80 ksi			

TOWER DESIGN NOTES

1. Tower is located in Fairfield 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 38 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 96.8%

CROWN CASTLE
We Are Solutions
Crown Castle
2000 Corporate Drive
Canonsburg, PA 15317
Phone: 724-416-2000
FAX:

Job: BU# 806354			
Project:			
Client: Crown Castle	Drawn by: EAnderson		App'd:
Code: TIA/EIA-222-F	Date: 09/22/11		Scale: NTS
Path: R:\SA Models - Letters\Work Area\EAnderson\806354\806354.eri			Dwg No. E-1

Tower Input Data

There is a pole section.
This tower is designed using the TIA/EIA-222-F standard.
The following design criteria apply:

Tower is located in Fairfield County, Connecticut.
Basic wind speed of 85 mph.
Nominal ice thickness of 0.7500 in.
Ice thickness is considered to increase with height.
Ice density of 56 pcf.
A wind speed of 38 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 50 mph.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in pole 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				

Tapered Pole Section Geometry

Section	*Elevation* *ft*	*Section Length* *ft*	*Splice Length* *ft*	*Number of Sides*	*Top Diameter* *in*	*Bottom Diameter* *in*	*Wall Thickness* *in*	*Bend Radius* *in*	*Pole Grade*
L1	185'-149'5-17/32"	35'6-15/32"	5'31/32"	18	29.0000	36.0600	0.2500	1.0000	A572-65 (65 ksi)
L2	149'5-17/32"-114'31/32"	40'5-17/32"	5'9-31/32"	18	34.5502	42.4600	0.3125	1.2500	A572-65 (65 ksi)
L3	114'31/32"-76'8-1/32"	43'3"	6'8-1/32"	18	40.6946	49.1500	0.3750	1.5000	A572-65 (65 ksi)
L4	76'8-1/32"-38'3"	45'31/32"	7'6"	18	47.0967	55.9000	0.4375	1.7500	A572-65 (65 ksi)
L5	38'3"-0'	45'9"		18	53.5605	62.5000	0.5000	2.0000	A572-65 (65 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	29.4474	22.8131	2382.3081	10.2063	14.7320	161.7098	4767.7509	11.4087	4.6640	18.656
	36.6163	28.4152	4603.5975	12.7126	18.3185	251.3089	9213.2525	14.2103	5.9066	23.626
L2	36.0924	33.9596	5029.3273	12.1544	17.5515	286.5465	10065.2723	16.9830	5.5308	17.699
	43.1150	41.8051	9382.3116	14.9624	21.5697	434.9769	18776.9687	20.9065	6.9230	22.153
L3	42.4804	47.9904	9856.5073	14.3134	20.6728	476.7854	19725.9841	23.9997	6.5022	17.339
	49.9082	58.0544	17448.8767	17.3151	24.9682	698.8440	34920.7131	29.0327	7.9904	21.308
L4	49.1451	64.7921	17821.0419	16.5640	23.9251	744.8680	35665.5332	32.4022	7.5190	17.186
	56.7623	77.0166	29930.9675	19.6892	28.3972	1054.0112	59901.3189	38.5156	9.0684	20.728
L5	55.8748	84.2070	29952.1569	18.8365	27.2087	1100.8290	59943.7256	42.1115	8.5466	17.093
	63.4642	98.3940	47784.7640	22.0100	31.7500	1505.0319	95632.4044	49.2063	10.1200	20.24

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in
L1 185'-149'5-17/32"				1	1	1		
L2 149'5-17/32"-114'31/32"				1	1	1		
L3 114'31/32"-76'8-1/32"				1	1	1		
L4 76'8-1/32"-38'3"				1	1	1		
L5 38'3"-0'				1	1	1		

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#		C_AA_A ft^2/ft	Weight plf
HJ7-50A(1-5/8")	A	No	Inside Pole	185' - 0'	0.0000	0	12	No Ice	0.00	1.04
								1/2" Ice	0.00	1.04
								1" Ice	0.00	1.04
								2" Ice	0.00	1.04
								4" Ice	0.00	1.04
LDF4P-50A(1/2")	A	No	Inside Pole	180' - 0'	0.0000	0	1	No Ice	0.00	0.15
								1/2" Ice	0.00	0.15
								1" Ice	0.00	0.15
								2" Ice	0.00	0.15
								4" Ice	0.00	0.15
CR 50 1873(1-5/8")	A	No	CaAa (Out Of Face)	175' - 0'	0.0000	0	2	No Ice	0.20	0.83
								1/2" Ice	0.30	2.34
								1" Ice	0.40	4.47
								2" Ice	0.60	10.55
								4" Ice	1.00	30.05

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#		C_AA_A ft^2/ft	Weight plf
CR 50 1873(1-5/8")	A	No	CaAa (Out Of Face)	175' - 0'	0.0000	0	10	No Ice	0.00	0.83
								1/2" Ice	0.00	2.34
								1" Ice	0.00	4.47
								2" Ice	0.00	10.55
								4" Ice	0.00	30.05
FB-L98B-002-75000(3/8")	A	No	CaAa (Out Of Face)	175' - 0'	0.0000	0	1	No Ice	0.00	0.06
								1/2" Ice	0.00	0.60
								1" Ice	0.00	1.76
								2" Ice	0.00	5.91
								4" Ice	0.00	21.53
WR-VG82ST-BRDA(5/8")	A	No	CaAa (Out Of Face)	175' - 0'	0.0000	0	2	No Ice	0.00	0.31
								1/2" Ice	0.00	1.01
								1" Ice	0.00	2.32
								2" Ice	0.00	6.77
								4" Ice	0.00	23.01
LDF7-50A(1-5/8")	A	No	Inside Pole	165' - 0'	0.0000	0	6	No Ice	0.00	0.82
								1/2" Ice	0.00	0.82
								1" Ice	0.00	0.82
								2" Ice	0.00	0.82
								4" Ice	0.00	0.82
LDF6-50A(1-1/4")	C	No	Inside Pole	155' - 0'	0.0000	0	12	No Ice	0.00	0.66
								1/2" Ice	0.00	0.66
								1" Ice	0.00	0.66
								2" Ice	0.00	0.66
								4" Ice	0.00	0.66
LDF7-50A(1-5/8")	A	No	Inside Pole	145' - 0'	0.0000	0	6	No Ice	0.00	0.82
								1/2" Ice	0.00	0.82
								1" Ice	0.00	0.82
								2" Ice	0.00	0.82
								4" Ice	0.00	0.82
LDF7-50A(1-5/8")	A	No	CaAa (Out Of Face)	145' - 0'	0.0000	0	2	No Ice	0.20	0.82
								1/2" Ice	0.30	2.33
								1" Ice	0.40	4.46
								2" Ice	0.60	10.54
								4" Ice	1.00	30.04
LDF7-50A(1-5/8")	A	No	CaAa (Out Of Face)	145' - 0'	0.0000	0	4	No Ice	0.00	0.82
								1/2" Ice	0.00	2.33
								1" Ice	0.00	4.46
								2" Ice	0.00	10.54
								4" Ice	0.00	30.04
CR 50 1873(1-5/8")	B	No	Inside Pole	135' - 0'	0.0000	0	6	No Ice	0.00	0.83
								1/2" Ice	0.00	0.83
								1" Ice	0.00	0.83
								2" Ice	0.00	0.83
								4" Ice	0.00	0.83
LDF4-50A(1/2")	C	No	Inside Pole	100' - 0'	0.0000	0	2	No Ice	0.00	0.15
								1/2" Ice	0.00	0.15
								1" Ice	0.00	0.15
								2" Ice	0.00	0.15
								4" Ice	0.00	0.15
*** Climbing Ladder (Flat)	C	No	CaAa (Out Of Face)	185' - 175'	24.0000	0	1	No Ice	0.58	4.81
								1/2" Ice	1.03	7.12
								1" Ice	1.48	10.35
								2" Ice	2.37	19.55
								4" Ice	4.15	48.96
FSJ4-50B(1/2")	A	No	Inside Pole	40' - 0'	0.0000	0	1	No Ice	0.00	0.14
								1/2" Ice	0.00	0.14
								1" Ice	0.00	0.14
								2" Ice	0.00	0.14
								4" Ice	0.00	0.14

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
L1	185'-149'5-17/32"	A	0.000	0.000	0.000	10.115	0.80
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	5.844	0.09
L2	149'5-17/32"-114' 31/32"	A	0.000	0.000	0.000	26.252	1.30
		B	0.000	0.000	0.000	0.000	0.10
		C	0.000	0.000	0.000	0.000	0.28
L3	114'31/32"-76'8-1/ 32"	A	0.000	0.000	0.000	29.634	1.42
		B	0.000	0.000	0.000	0.000	0.19
		C	0.000	0.000	0.000	0.000	0.30
L4	76'8-1/32"-38'3"	A	0.000	0.000	0.000	30.426	1.46
		B	0.000	0.000	0.000	0.000	0.19
		C	0.000	0.000	0.000	0.000	0.32
L5	38'3"-0'	A	0.000	0.000	0.000	30.294	1.46
		B	0.000	0.000	0.000	0.000	0.19
		C	0.000	0.000	0.000	0.000	0.31

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
L1	185'-149'5-17/32"	A	0.911	0.000	0.000	0.000	19.421	1.92
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	13.965	0.14
L2	149'5-17/32"-114' 31/32"	A	0.885	0.000	0.000	0.000	50.406	3.47
		B		0.000	0.000	0.000	0.000	0.10
		C		0.000	0.000	0.000	0.000	0.28
L3	114'31/32"-76'8-1/ 32"	A	0.852	0.000	0.000	0.000	56.134	3.73
		B		0.000	0.000	0.000	0.000	0.19
		C		0.000	0.000	0.000	0.000	0.30
L4	76'8-1/32"-38'3"	A	0.802	0.000	0.000	0.000	56.599	3.72
		B		0.000	0.000	0.000	0.000	0.19
		C		0.000	0.000	0.000	0.000	0.32
L5	38'3"-0'	A	0.750	0.000	0.000	0.000	54.823	3.55
		B		0.000	0.000	0.000	0.000	0.19
		C		0.000	0.000	0.000	0.000	0.31

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	185'-149'5-17/32"	-0.1690	-0.2798	-0.3356	-0.4085
L2	149'5-17/32"-114'31/ 32"	0.0000	-0.9109	0.0000	-1.4467
L3	114'31/32"-76'8-1/32 "	0.0000	-0.9827	0.0000	-1.5686
L4	76'8-1/32"-38'3"	0.0000	-1.0049	0.0000	-1.6111

Section	Elevation	CP_X	CP_Z	CP_X Ice	CP_Z Ice
	ft	in	in	in	in
L5	38'3"-0'	0.0000	-1.0226	0.0000	-1.6288

Discrete Tower Loads

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) DB846F65ZAXY w/ Mount Pipe	A	From Leg	4.00 0' 2'	0.0000	185'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.27 7.88 8.48 9.72 12.33	7.82 9.01 9.91 11.81 15.98	0.05 0.11 0.19 0.37 0.87
(2) DB846F65ZAXY w/ Mount Pipe	B	From Leg	4.00 0' 2'	0.0000	185'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.27 7.88 8.48 9.72 12.33	7.82 9.01 9.91 11.81 15.98	0.05 0.11 0.19 0.37 0.87
(2) DB846F65ZAXY w/ Mount Pipe	C	From Leg	4.00 0' 2'	0.0000	185'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.27 7.88 8.48 9.72 12.33	7.82 9.01 9.91 11.81 15.98	0.05 0.11 0.19 0.37 0.87
BXA-171063-12BF w/ Mount Pipe	A	From Leg	4.00 0' 2'	0.0000	185'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.97 5.52 6.04 7.09 9.36	5.23 6.39 7.26 9.05 12.82	0.04 0.08 0.14 0.27 0.67
BXA-70063-6CF-2 w/ Mount Pipe	A	From Leg	4.00 0' 2'	0.0000	185'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.97 8.61 9.22 10.46 13.07	5.80 6.95 7.82 9.60 13.37	0.04 0.10 0.17 0.34 0.80
(2) FD9R6004/2C-3L	A	From Leg	4.00 0' 2'	0.0000	185'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.37 0.45 0.54 0.75 1.28	0.08 0.14 0.20 0.34 0.74	0.00 0.01 0.01 0.02 0.06
BXA-171063-12BF w/ Mount Pipe	B	From Leg	4.00 0' 2'	0.0000	185'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.97 5.52 6.04 7.09 9.36	5.23 6.39 7.26 9.05 12.82	0.04 0.08 0.14 0.27 0.67
BXA-70063-6CF-2 w/ Mount Pipe	B	From Leg	4.00 0' 2'	0.0000	185'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.97 8.61 9.22 10.46 13.07	5.80 6.95 7.82 9.60 13.37	0.04 0.10 0.17 0.34 0.80
(2) FD9R6004/2C-3L	B	From Leg	4.00 0' 2'	0.0000	185'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.37 0.45 0.54 0.75 1.28	0.08 0.14 0.20 0.34 0.74	0.00 0.01 0.01 0.02 0.06

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
BXA-171063-12BF w/ Mount Pipe	C	From Leg	4.00 0' 2'	0.0000	185'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.97 5.52 6.04 7.09 9.36	5.23 6.39 7.26 9.05 12.82	0.04 0.08 0.14 0.27 0.67
BXA-70063-6CF-2 w/ Mount Pipe	C	From Leg	4.00 0' 2'	0.0000	185'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.97 8.61 9.22 10.46 13.07	5.80 6.95 7.82 9.60 13.37	0.04 0.10 0.17 0.34 0.80
(2) FD9R6004/2C-3L	C	From Leg	4.00 0' 2'	0.0000	185'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.37 0.45 0.54 0.75 1.28	0.08 0.14 0.20 0.34 0.74	0.00 0.01 0.01 0.02 0.06
Platform Mount [LP 601-1]	C	None		0.0000	185'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	28.47 33.59 38.71 48.95 69.43	28.47 33.59 38.71 48.95 69.43	1.12 1.51 1.91 2.69 4.26
Side Arm Mount [SO 103-3]	C	None		0.0000	185'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	9.50 11.80 14.10 18.70 27.90	9.50 11.80 14.10 18.70 27.90	0.22 0.32 0.41 0.60 0.97
***									
DB222	A	From Leg	1.00 0' 14'	0.0000	180'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.60 2.88 4.16 6.72 11.84	1.60 2.88 4.16 6.72 11.84	0.02 0.02 0.03 0.04 0.05
10'6"x4" Pipe Mount	A	From Leg	0.50 0' 0'	0.0000	180'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.72 5.62 6.25 7.55 10.27	4.72 5.62 6.25 7.55 10.27	0.11 0.15 0.19 0.29 0.58
***									
(2) 7770.00 w/ Mount Pipe	A	From Leg	4.00 0' 2'	0.0000	175'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.12 6.63 7.13 8.16 10.36	4.25 5.01 5.71 7.16 10.41	0.06 0.10 0.16 0.29 0.66
(2) LGP2140X	A	From Leg	4.00 0' 2'	0.0000	175'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.26 1.42 1.58 1.94 2.75	0.38 0.49 0.62 0.89 1.54	0.02 0.03 0.04 0.06 0.14
(2) RRUS-11	A	From Leg	4.00 0' 2'	0.0000	175'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.42 4.71 5.00 5.61 6.94	1.19 1.35 1.53 1.90 2.75	0.06 0.08 0.11 0.18 0.37
P65-16-XLH-RR w/ Mount Pipe	A	From Leg	4.00 0' 2'	0.0000	175'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.64 9.29 9.91 11.18 13.83	6.36 7.54 8.43 10.24 14.10	0.08 0.14 0.22 0.39 0.89

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
TT19-08BP111-001	A	From Leg	4.00 0' 2'	0.0000	175'	No Ice	0.64	0.52	0.02
						1/2" Ice	0.75	0.62	0.02
						1" Ice	0.87	0.73	0.03
						2" Ice	1.13	0.98	0.05
						4" Ice	1.77	1.58	0.12
(2) 7770.00 w/ Mount Pipe	B	From Leg	4.00 0' 2'	0.0000	175'	No Ice	6.12	4.25	0.06
						1/2" Ice	6.63	5.01	0.10
						1" Ice	7.13	5.71	0.16
						2" Ice	8.16	7.16	0.29
						4" Ice	10.36	10.41	0.66
(2) LGP2140X	B	From Leg	4.00 0' 2'	0.0000	175'	No Ice	1.26	0.38	0.02
						1/2" Ice	1.42	0.49	0.03
						1" Ice	1.58	0.62	0.04
						2" Ice	1.94	0.89	0.06
						4" Ice	2.75	1.54	0.14
(2) RRUS-11	B	From Leg	4.00 0' 2'	0.0000	175'	No Ice	4.42	1.19	0.06
						1/2" Ice	4.71	1.35	0.08
						1" Ice	5.00	1.53	0.11
						2" Ice	5.61	1.90	0.18
						4" Ice	6.94	2.75	0.37
P65-16-XLH-RR w/ Mount Pipe	B	From Leg	4.00 0' 2'	0.0000	175'	No Ice	8.64	6.36	0.08
						1/2" Ice	9.29	7.54	0.14
						1" Ice	9.91	8.43	0.22
						2" Ice	11.18	10.24	0.39
						4" Ice	13.83	14.10	0.89
TT19-08BP111-001	B	From Leg	4.00 0' 2'	0.0000	175'	No Ice	0.64	0.52	0.02
						1/2" Ice	0.75	0.62	0.02
						1" Ice	0.87	0.73	0.03
						2" Ice	1.13	0.98	0.05
						4" Ice	1.77	1.58	0.12
(2) 7770.00 w/ Mount Pipe	C	From Leg	4.00 0' 2'	0.0000	175'	No Ice	6.12	4.25	0.06
						1/2" Ice	6.63	5.01	0.10
						1" Ice	7.13	5.71	0.16
						2" Ice	8.16	7.16	0.29
						4" Ice	10.36	10.41	0.66
(2) LGP2140X	C	From Leg	4.00 0' 2'	0.0000	175'	No Ice	1.26	0.38	0.02
						1/2" Ice	1.42	0.49	0.03
						1" Ice	1.58	0.62	0.04
						2" Ice	1.94	0.89	0.06
						4" Ice	2.75	1.54	0.14
(2) RRUS-11	C	From Leg	4.00 0' 2'	0.0000	175'	No Ice	4.42	1.19	0.06
						1/2" Ice	4.71	1.35	0.08
						1" Ice	5.00	1.53	0.11
						2" Ice	5.61	1.90	0.18
						4" Ice	6.94	2.75	0.37
P65-16-XLH-RR w/ Mount Pipe	C	From Leg	4.00 0' 2'	0.0000	175'	No Ice	8.64	6.36	0.08
						1/2" Ice	9.29	7.54	0.14
						1" Ice	9.91	8.43	0.22
						2" Ice	11.18	10.24	0.39
						4" Ice	13.83	14.10	0.89
TT19-08BP111-001	C	From Leg	4.00 0' 2'	0.0000	175'	No Ice	0.64	0.52	0.02
						1/2" Ice	0.75	0.62	0.02
						1" Ice	0.87	0.73	0.03
						2" Ice	1.13	0.98	0.05
						4" Ice	1.77	1.58	0.12
DC6-48-60-18-8F	C	From Leg	4.00 0'	0.0000	175'	No Ice	1.27	1.27	0.02
						1/2" Ice	1.46	1.46	0.04

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
			2'			1" Ice	1.66	1.66	0.05
						2" Ice	2.09	2.09	0.10
						4" Ice	3.10	3.10	0.21
Platform Mount [LP 601-1]	C	None		0.0000	175'	No Ice	28.47	28.47	1.12
						1/2" Ice	33.59	33.59	1.51
						1" Ice	38.71	38.71	1.91
						2" Ice	48.95	48.95	2.69
						4" Ice	69.43	69.43	4.26
***									
(2) DB980H90T2E-M w/ Mount Pipe	A	From Leg	4.00 0' 2'	0.0000	165'	No Ice	4.04	3.62	0.03
						1/2" Ice	4.50	4.48	0.06
						1" Ice	4.95	5.22	0.11
						2" Ice	5.87	6.74	0.22
						4" Ice	8.05	10.00	0.55
(2) DB980H90T2E-M w/ Mount Pipe	B	From Leg	4.00 0' 2'	0.0000	165'	No Ice	4.04	3.62	0.03
						1/2" Ice	4.50	4.48	0.06
						1" Ice	4.95	5.22	0.11
						2" Ice	5.87	6.74	0.22
						4" Ice	8.05	10.00	0.55
(2) DB980H90T2E-M w/ Mount Pipe	C	From Leg	4.00 0' 2'	0.0000	165'	No Ice	4.04	3.62	0.03
						1/2" Ice	4.50	4.48	0.06
						1" Ice	4.95	5.22	0.11
						2" Ice	5.87	6.74	0.22
						4" Ice	8.05	10.00	0.55
Platform Mount [LP 601-1]	C	None		0.0000	165'	No Ice	28.47	28.47	1.12
						1/2" Ice	33.59	33.59	1.51
						1" Ice	38.71	38.71	1.91
						2" Ice	48.95	48.95	2.69
						4" Ice	69.43	69.43	4.26
***									
(4) DB844H90 w/ Mount Pipe	A	From Leg	4.00 0' 3'	0.0000	155'	No Ice	3.30	4.92	0.03
						1/2" Ice	3.69	5.60	0.07
						1" Ice	4.12	6.28	0.11
						2" Ice	5.01	7.71	0.22
						4" Ice	6.92	10.83	0.55
(4) DB844H90 w/ Mount Pipe	B	From Leg	4.00 0' 3'	0.0000	155'	No Ice	3.30	4.92	0.03
						1/2" Ice	3.69	5.60	0.07
						1" Ice	4.12	6.28	0.11
						2" Ice	5.01	7.71	0.22
						4" Ice	6.92	10.83	0.55
(4) DB844H90 w/ Mount Pipe	C	From Leg	4.00 0' 3'	0.0000	155'	No Ice	3.30	4.92	0.03
						1/2" Ice	3.69	5.60	0.07
						1" Ice	4.12	6.28	0.11
						2" Ice	5.01	7.71	0.22
						4" Ice	6.92	10.83	0.55
Platform Mount [LP 602-1]	C	None		0.0000	155'	No Ice	32.03	32.03	1.34
						1/2" Ice	38.71	38.71	1.80
						1" Ice	45.39	45.39	2.26
						2" Ice	58.75	58.75	3.17
						4" Ice	85.47	85.47	5.00
***									
RR90-17-02DPL2 w/ Mount Pipe	A	From Leg	4.00 0' 3'	0.0000	145'	No Ice	4.59	3.32	0.04
						1/2" Ice	5.09	4.09	0.07
						1" Ice	5.58	4.78	0.12
						2" Ice	6.59	6.23	0.23
						4" Ice	8.73	9.31	0.56
APX16DWV-16DWV-S-E-A	A	From Leg	4.00	0.0000	145'	No Ice	7.47	3.49	0.06

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
20 w/ Mount Pipe			0' 3'			1/2" Ice	7.99	4.26	0.11
						1" Ice	8.52	4.96	0.16
						2" Ice	9.59	6.40	0.30
						4" Ice	11.87	9.49	0.68
ATMAA1412D-1A20	A	From Leg	4.00 0' 3'	0.0000	145'	No Ice	1.17	0.47	0.01
						1/2" Ice	1.31	0.57	0.02
						1" Ice	1.47	0.69	0.03
						2" Ice	1.81	0.95	0.06
						4" Ice	2.58	1.57	0.14
ATMPP1412D-1CWA	A	From Leg	4.00 0' 3'	0.0000	145'	No Ice	1.17	0.42	0.01
						1/2" Ice	1.32	0.53	0.02
						1" Ice	1.48	0.65	0.03
						2" Ice	1.82	0.92	0.05
						4" Ice	2.61	1.57	0.13
RR90-17-02DPL2 w/ Mount Pipe	B	From Leg	4.00 0' 3'	0.0000	145'	No Ice	4.59	3.32	0.04
						1/2" Ice	5.09	4.09	0.07
						1" Ice	5.58	4.78	0.12
						2" Ice	6.59	6.23	0.23
						4" Ice	8.73	9.31	0.56
APX16DWV-16DWV-S-E-A 20 w/ Mount Pipe	B	From Leg	4.00 0' 3'	0.0000	145'	No Ice	7.47	3.49	0.06
						1/2" Ice	7.99	4.26	0.11
						1" Ice	8.52	4.96	0.16
						2" Ice	9.59	6.40	0.30
						4" Ice	11.87	9.49	0.68
ATMAA1412D-1A20	B	From Leg	4.00 0' 3'	0.0000	145'	No Ice	1.17	0.47	0.01
						1/2" Ice	1.31	0.57	0.02
						1" Ice	1.47	0.69	0.03
						2" Ice	1.81	0.95	0.06
						4" Ice	2.58	1.57	0.14
ATMPP1412D-1CWA	B	From Leg	4.00 0' 3'	0.0000	145'	No Ice	1.17	0.42	0.01
						1/2" Ice	1.32	0.53	0.02
						1" Ice	1.48	0.65	0.03
						2" Ice	1.82	0.92	0.05
						4" Ice	2.61	1.57	0.13
RR90-17-02DPL2 w/ Mount Pipe	C	From Leg	4.00 0' 3'	0.0000	145'	No Ice	4.59	3.32	0.04
						1/2" Ice	5.09	4.09	0.07
						1" Ice	5.58	4.78	0.12
						2" Ice	6.59	6.23	0.23
						4" Ice	8.73	9.31	0.56
APX16DWV-16DWV-S-E-A 20 w/ Mount Pipe	C	From Leg	4.00 0' 3'	0.0000	145'	No Ice	7.47	3.49	0.06
						1/2" Ice	7.99	4.26	0.11
						1" Ice	8.52	4.96	0.16
						2" Ice	9.59	6.40	0.30
						4" Ice	11.87	9.49	0.68
ATMAA1412D-1A20	C	From Leg	4.00 0' 3'	0.0000	145'	No Ice	1.17	0.47	0.01
						1/2" Ice	1.31	0.57	0.02
						1" Ice	1.47	0.69	0.03
						2" Ice	1.81	0.95	0.06
						4" Ice	2.58	1.57	0.14
ATMPP1412D-1CWA	C	From Leg	4.00 0' 3'	0.0000	145'	No Ice	1.17	0.42	0.01
						1/2" Ice	1.32	0.53	0.02
						1" Ice	1.48	0.65	0.03
						2" Ice	1.82	0.92	0.05
						4" Ice	2.61	1.57	0.13
Platform Mount [LP 601-1]	C	None		0.0000	145'	No Ice	28.47	28.47	1.12
						1/2" Ice	33.59	33.59	1.51
						1" Ice	38.71	38.71	1.91

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
						2" Ice	48.95	48.95	2.69
						4" Ice	69.43	69.43	4.26
***									
800 10504 w/ Mount Pipe	A	From Leg	4.00 0' 2'	0.0000	135'	No Ice	3.59	3.18	0.04
						1/2" Ice	4.01	3.91	0.07
						1" Ice	4.42	4.58	0.11
						2" Ice	5.34	5.98	0.21
						4" Ice	7.38	8.98	0.51
860 10025	A	From Leg	4.00 0' 2'	0.0000	135'	No Ice	0.16	0.14	0.00
						1/2" Ice	0.23	0.20	0.00
						1" Ice	0.30	0.27	0.01
						2" Ice	0.48	0.44	0.01
						4" Ice	0.93	0.88	0.05
800 10504 w/ Mount Pipe	B	From Leg	4.00 0' 2'	0.0000	135'	No Ice	3.59	3.18	0.04
						1/2" Ice	4.01	3.91	0.07
						1" Ice	4.42	4.58	0.11
						2" Ice	5.34	5.98	0.21
						4" Ice	7.38	8.98	0.51
860 10025	B	From Leg	4.00 0' 2'	0.0000	135'	No Ice	0.16	0.14	0.00
						1/2" Ice	0.23	0.20	0.00
						1" Ice	0.30	0.27	0.01
						2" Ice	0.48	0.44	0.01
						4" Ice	0.93	0.88	0.05
800 10504 w/ Mount Pipe	C	From Leg	4.00 0' 2'	0.0000	135'	No Ice	3.59	3.18	0.04
						1/2" Ice	4.01	3.91	0.07
						1" Ice	4.42	4.58	0.11
						2" Ice	5.34	5.98	0.21
						4" Ice	7.38	8.98	0.51
860 10025	C	From Leg	4.00 0' 2'	0.0000	135'	No Ice	0.16	0.14	0.00
						1/2" Ice	0.23	0.20	0.00
						1" Ice	0.30	0.27	0.01
						2" Ice	0.48	0.44	0.01
						4" Ice	0.93	0.88	0.05
T-Arm Mount [TA 602-3]	C	None		0.0000	135'	No Ice	11.59	11.59	0.77
						1/2" Ice	15.44	15.44	0.99
						1" Ice	19.29	19.29	1.21
						2" Ice	26.99	26.99	1.64
						4" Ice	42.39	42.39	2.50
5' x 2' Pipe Mount	A	From Leg	4.00 0' 0'	0.0000	135'	No Ice	1.00	1.00	0.03
						1/2" Ice	1.39	1.39	0.04
						1" Ice	1.70	1.70	0.05
						2" Ice	2.35	2.35	0.08
						4" Ice	3.78	3.78	0.20
5' x 2' Pipe Mount	B	From Leg	4.00 0' 0'	0.0000	135'	No Ice	1.00	1.00	0.03
						1/2" Ice	1.39	1.39	0.04
						1" Ice	1.70	1.70	0.05
						2" Ice	2.35	2.35	0.08
						4" Ice	3.78	3.78	0.20
5' x 2' Pipe Mount	C	From Leg	4.00 0' 0'	0.0000	135'	No Ice	1.00	1.00	0.03
						1/2" Ice	1.39	1.39	0.04
						1" Ice	1.70	1.70	0.05
						2" Ice	2.35	2.35	0.08
						4" Ice	3.78	3.78	0.20
***									
GPS_A	C	From Leg	2.00 0' 0'	0.0000	102'	No Ice	0.30	0.30	0.00
						1/2" Ice	0.37	0.37	0.00
						1" Ice	0.46	0.46	0.01

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
						2" Ice	0.65	0.65	0.02
						4" Ice	1.15	1.15	0.08
Side Arm Mount [SO 701-1]	C	From Leg	1.00 0' 0'	0.0000	102'	No Ice	0.85	1.67	0.07
						1/2" Ice	1.14	2.34	0.08
						1" Ice	1.43	3.01	0.09
						2" Ice	2.01	4.35	0.12
						4" Ice	3.17	7.03	0.18
***									
GPS_A	C	From Leg	2.00 0' 0'	0.0000	100'	No Ice	0.30	0.30	0.00
						1/2" Ice	0.37	0.37	0.00
						1" Ice	0.46	0.46	0.01
						2" Ice	0.65	0.65	0.02
						4" Ice	1.15	1.15	0.08
Side Arm Mount [SO 701-1]	C	From Leg	1.00 0' 0'	0.0000	100'	No Ice	0.85	1.67	0.07
						1/2" Ice	1.14	2.34	0.08
						1" Ice	1.43	3.01	0.09
						2" Ice	2.01	4.35	0.12
						4" Ice	3.17	7.03	0.18
***									
GPS_A	C	From Leg	2.00 0' 0'	0.0000	40'	No Ice	0.30	0.30	0.00
						1/2" Ice	0.37	0.37	0.00
						1" Ice	0.46	0.46	0.01
						2" Ice	0.65	0.65	0.02
						4" Ice	1.15	1.15	0.08
Side Arm Mount [SO 701-1]	C	From Leg	1.00 0' 0'	0.0000	40'	No Ice	0.85	1.67	0.07
						1/2" Ice	1.14	2.34	0.08
						1" Ice	1.43	3.01	0.09
						2" Ice	2.01	4.35	0.12
						4" Ice	3.17	7.03	0.18

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

Comb. No.	Description
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
L1	185 - 149.458	Pole	Max Tension	14	0.00	-0.00	-0.00
			Max. Compression	14	-20.07	0.33	2.02
			Max. Mx	11	-8.44	427.29	0.47
			Max. My	2	-8.44	0.12	427.65
			Max. Vy	11	-22.69	427.29	0.47
			Max. Vx	2	-22.69	0.12	427.65
			Max. Torque	5			0.63
L2	149.458 - 114.083	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-34.54	0.37	6.35
			Max. Mx	11	-17.07	1396.97	1.30
			Max. My	2	-17.07	0.17	1398.12
			Max. Vy	11	-31.79	1396.97	1.30
			Max. Vx	2	-31.79	0.17	1398.12
			Max. Torque	10			-0.89
L3	114.083 - 76.6667	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-48.20	0.89	11.73
			Max. Mx	11	-26.91	2656.76	2.78
			Max. My	2	-26.91	1.06	2659.13
			Max. Vy	11	-36.96	2656.76	2.78
			Max. Vx	2	-36.99	1.06	2659.13
			Max. Torque	10			-1.23
L4	76.6667 - 38.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-64.88	0.91	18.08
			Max. Mx	11	-39.87	4137.33	5.24
			Max. My	2	-39.87	2.25	4142.32
			Max. Vy	11	-41.62	4137.33	5.24
			Max. Vx	2	-41.65	2.25	4142.32
			Max. Torque	10			-1.59
L5	38.25 - 0	Pole	Max Tension	1	0.00	0.00	0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Compression	14	-88.92	1.19	25.77
			Max. Mx	11	-59.58	6153.06	8.75
			Max. My	2	-59.58	4.32	6161.67
			Max. Vy	11	-46.28	6153.06	8.75
			Max. Vx	2	-46.33	4.32	6161.67
			Max. Torque	10			-2.01

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	15	88.92	0.01	11.45
	Max. H_x	11	59.61	46.24	0.04
	Max. H_z	2	59.61	0.04	46.29
	Max. M_x	2	6161.67	0.04	46.29
	Max. M_z	5	6151.69	-46.24	-0.04
	Max. Torsion	4	2.01	-40.03	23.11
	Min. Vert	1	59.61	0.00	0.00
	Min. H_x	5	59.61	-46.24	-0.04
	Min. H_z	8	59.61	-0.04	-46.29
	Min. M_x	8	-6151.47	-0.04	-46.29
	Min. M_z	11	-6153.06	46.24	0.04
	Min. Torsion	10	-2.01	40.03	-23.11

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	59.61	0.00	0.00	-4.95	0.66	0.00
Dead+Wind 0 deg - No Ice	59.61	-0.04	-46.29	-6161.67	4.32	-0.98
Dead+Wind 30 deg - No Ice	59.61	23.08	-40.07	-5335.04	-3072.36	-1.73
Dead+Wind 60 deg - No Ice	59.61	40.03	-23.11	-3080.25	-5325.62	-2.01
Dead+Wind 90 deg - No Ice	59.61	46.24	0.04	-1.47	-6151.69	-1.76
Dead+Wind 120 deg - No Ice	59.61	40.07	23.18	3076.33	-5329.26	-1.03
Dead+Wind 150 deg - No Ice	59.61	23.16	40.11	5328.47	-3078.66	-0.03
Dead+Wind 180 deg - No Ice	59.61	0.04	46.29	6151.47	-2.95	0.98
Dead+Wind 210 deg - No Ice	59.61	-23.08	40.07	5324.84	3073.73	1.73
Dead+Wind 240 deg - No Ice	59.61	-40.03	23.11	3070.04	5327.00	2.01
Dead+Wind 270 deg - No Ice	59.61	-46.24	-0.04	-8.75	6153.06	1.76
Dead+Wind 300 deg - No Ice	59.61	-40.07	-23.18	-3086.55	5330.62	1.03
Dead+Wind 330 deg - No Ice	59.61	-23.16	-40.11	-5338.67	3080.02	0.03
Dead+Ice+Temp	88.92	-0.00	-0.00	-25.77	1.19	-0.00
Dead+Wind 0 deg+Ice+Temp	88.92	-0.01	-11.45	-1606.50	2.49	-0.30
Dead+Wind 30 deg+Ice+Temp	88.92	5.70	-9.90	-1394.09	-787.23	-0.61
Dead+Wind 60 deg+Ice+Temp	88.92	9.89	-5.71	-815.09	-1365.69	-0.75
Dead+Wind 90 deg+Ice+Temp	88.92	11.43	0.01	-24.62	-1577.90	-0.69
Dead+Wind 120 deg+Ice+Temp	88.92	9.90	5.74	765.50	-1366.99	-0.44
Dead+Wind 150 deg+Ice+Temp	88.92	5.73	9.92	1343.57	-789.47	-0.08
Dead+Wind 180 deg+Ice+Temp	88.92	0.01	11.45	1554.68	-0.09	0.30
Dead+Wind 210 deg+Ice+Temp	88.92	-5.70	9.90	1342.27	789.63	0.61
Dead+Wind 240 deg+Ice+Temp	88.92	-9.89	5.71	763.26	1368.09	0.75

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 270 deg+Ice+Temp	88.92	-11.43	-0.01	-27.20	1580.29	0.69
Dead+Wind 300 deg+Ice+Temp	88.92	-9.90	-5.74	-817.32	1369.38	0.44
Dead+Wind 330 deg+Ice+Temp	88.92	-5.73	-9.92	-1395.38	791.86	0.08
Dead+Wind 0 deg - Service	59.61	-0.01	-16.02	-2138.85	1.95	-0.34
Dead+Wind 30 deg - Service	59.61	7.99	-13.86	-1852.36	-1064.36	-0.60
Dead+Wind 60 deg - Service	59.61	13.85	-8.00	-1070.90	-1845.29	-0.70
Dead+Wind 90 deg - Service	59.61	16.00	0.01	-3.87	-2131.58	-0.61
Dead+Wind 120 deg - Service	59.61	13.86	8.02	1062.83	-1846.55	-0.36
Dead+Wind 150 deg - Service	59.61	8.01	13.88	1843.37	-1066.54	-0.01
Dead+Wind 180 deg - Service	59.61	0.01	16.02	2128.60	-0.57	0.34
Dead+Wind 210 deg - Service	59.61	-7.99	13.86	1842.11	1065.74	0.60
Dead+Wind 240 deg - Service	59.61	-13.85	8.00	1060.65	1846.67	0.70
Dead+Wind 270 deg - Service	59.61	-16.00	-0.01	-6.38	2132.96	0.61
Dead+Wind 300 deg - Service	59.61	-13.86	-8.02	-1073.08	1847.92	0.36
Dead+Wind 330 deg - Service	59.61	-8.01	-13.88	-1853.62	1067.92	0.01

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX	PY	PZ	PX	PY	PZ	% Error
	K	K	K	K	K	K	
1	0.00	-59.61	0.00	0.00	59.61	0.00	0.000%
2	-0.04	-59.61	-46.29	0.04	59.61	46.29	0.000%
3	23.08	-59.61	-40.07	-23.08	59.61	40.07	0.000%
4	40.03	-59.61	-23.11	-40.03	59.61	23.11	0.000%
5	46.24	-59.61	0.04	-46.24	59.61	-0.04	0.000%
6	40.07	-59.61	23.18	-40.07	59.61	-23.18	0.000%
7	23.16	-59.61	40.11	-23.16	59.61	-40.11	0.000%
8	0.04	-59.61	46.29	-0.04	59.61	-46.29	0.000%
9	-23.08	-59.61	40.07	23.08	59.61	-40.07	0.000%
10	-40.03	-59.61	23.11	40.03	59.61	-23.11	0.000%
11	-46.24	-59.61	-0.04	46.24	59.61	0.04	0.000%
12	-40.07	-59.61	-23.18	40.07	59.61	23.18	0.000%
13	-23.16	-59.61	-40.11	23.16	59.61	40.11	0.000%
14	0.00	-88.92	0.00	0.00	88.92	0.00	0.000%
15	-0.01	-88.92	-11.45	0.01	88.92	11.45	0.000%
16	5.70	-88.92	-9.90	-5.70	88.92	9.90	0.000%
17	9.89	-88.92	-5.71	-9.89	88.92	5.71	0.000%
18	11.43	-88.92	0.01	-11.43	88.92	-0.01	0.000%
19	9.90	-88.92	5.74	-9.90	88.92	-5.74	0.000%
20	5.73	-88.92	9.92	-5.73	88.92	-9.92	0.000%
21	0.01	-88.92	11.45	-0.01	88.92	-11.45	0.000%
22	-5.70	-88.92	9.90	5.70	88.92	-9.90	0.000%
23	-9.89	-88.92	5.71	9.89	88.92	-5.71	0.000%
24	-11.43	-88.92	-0.01	11.43	88.92	0.01	0.000%
25	-9.90	-88.92	-5.74	9.90	88.92	5.74	0.000%
26	-5.73	-88.92	-9.92	5.73	88.92	9.92	0.000%
27	-0.01	-59.61	-16.02	0.01	59.61	16.02	0.000%
28	7.99	-59.61	-13.86	-7.99	59.61	13.86	0.000%
29	13.85	-59.61	-8.00	-13.85	59.61	8.00	0.000%
30	16.00	-59.61	0.01	-16.00	59.61	-0.01	0.000%
31	13.86	-59.61	8.02	-13.86	59.61	-8.02	0.000%
32	8.01	-59.61	13.88	-8.01	59.61	-13.88	0.000%
33	0.01	-59.61	16.02	-0.01	59.61	-16.02	0.000%
34	-7.99	-59.61	13.86	7.99	59.61	-13.86	0.000%
35	-13.85	-59.61	8.00	13.85	59.61	-8.00	0.000%
36	-16.00	-59.61	-0.01	16.00	59.61	0.01	0.000%
37	-13.86	-59.61	-8.02	13.86	59.61	8.02	0.000%

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
38	-8.01	-59.61	-13.88	8.01	59.61	13.88	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	0.00050764
3	Yes	6	0.00000001	0.00005064
4	Yes	6	0.00000001	0.00005187
5	Yes	4	0.00000001	0.00070796
6	Yes	6	0.00000001	0.00005084
7	Yes	6	0.00000001	0.00005112
8	Yes	4	0.00000001	0.00044034
9	Yes	6	0.00000001	0.00005170
10	Yes	6	0.00000001	0.00005048
11	Yes	4	0.00000001	0.00078306
12	Yes	6	0.00000001	0.00005158
13	Yes	6	0.00000001	0.00005128
14	Yes	4	0.00000001	0.00008227
15	Yes	5	0.00000001	0.00036533
16	Yes	5	0.00000001	0.00050381
17	Yes	5	0.00000001	0.00051042
18	Yes	5	0.00000001	0.00035959
19	Yes	5	0.00000001	0.00048560
20	Yes	5	0.00000001	0.00048864
21	Yes	5	0.00000001	0.00035346
22	Yes	5	0.00000001	0.00049130
23	Yes	5	0.00000001	0.00048496
24	Yes	5	0.00000001	0.00036038
25	Yes	5	0.00000001	0.00051104
26	Yes	5	0.00000001	0.00050790
27	Yes	4	0.00000001	0.00015554
28	Yes	5	0.00000001	0.00012121
29	Yes	5	0.00000001	0.00012681
30	Yes	4	0.00000001	0.00018665
31	Yes	5	0.00000001	0.00012127
32	Yes	5	0.00000001	0.00012265
33	Yes	4	0.00000001	0.00015224
34	Yes	5	0.00000001	0.00012536
35	Yes	5	0.00000001	0.00011980
36	Yes	4	0.00000001	0.00019049
37	Yes	5	0.00000001	0.00012566
38	Yes	5	0.00000001	0.00012424

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	185 - 149.458	46.579	27	2.1649	0.0019
L2	154.542 - 114.083	33.092	38	2.0141	0.0013

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L3	119.917 - 76.6667	19.778	38	1.5964	0.0009
L4	83.3333 - 38.25	9.387	38	1.0698	0.0005
L5	45.75 - 0	2.831	38	0.5570	0.0003

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
185'	(2) DB846F65ZAXY w/ Mount Pipe	27	46.579	2.1649	0.0019	39110
180'	DB222	27	44.319	2.1481	0.0018	39110
175'	(2) 7770.00 w/ Mount Pipe	27	42.066	2.1299	0.0017	19554
165'	(2) DB980H90T2E-M w/ Mount Pipe	27	37.615	2.0844	0.0015	9776
155'	(4) DB844H90 w/ Mount Pipe	38	33.286	2.0179	0.0013	6578
145'	RR90-17-02DPL2 w/ Mount Pipe	38	29.139	1.9224	0.0012	5466
135'	800 10504 w/ Mount Pipe	38	25.211	1.8031	0.0011	4731
102'	GPS_A	38	14.198	1.3387	0.0007	4088
100'	GPS_A	38	13.634	1.3097	0.0007	4106
40'	GPS_A	38	2.230	0.4836	0.0002	4017

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	185 - 149.458	133.890	2	6.2261	0.0054
L2	154.542 - 114.083	95.165	2	5.7939	0.0038
L3	119.917 - 76.6667	56.907	2	4.5942	0.0025
L4	83.3333 - 38.25	27.022	13	3.0800	0.0015
L5	45.75 - 0	8.154	13	1.6043	0.0007

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
185'	(2) DB846F65ZAXY w/ Mount Pipe	2	133.890	6.2261	0.0054	13911
180'	DB222	2	127.401	6.1779	0.0051	13911
175'	(2) 7770.00 w/ Mount Pipe	2	120.934	6.1260	0.0049	6954
165'	(2) DB980H90T2E-M w/ Mount Pipe	2	108.153	5.9956	0.0043	3475
155'	(4) DB844H90 w/ Mount Pipe	2	95.723	5.8046	0.0039	2335
145'	RR90-17-02DPL2 w/ Mount Pipe	2	83.809	5.5308	0.0034	1936
135'	800 10504 w/ Mount Pipe	2	72.523	5.1879	0.0030	1671
102'	GPS_A	2	40.862	3.8533	0.0020	1434
100'	GPS_A	2	39.240	3.7701	0.0020	1440
40'	GPS_A	13	6.423	1.3929	0.0006	1397

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
L1	185 - 149.458 (1)	TP36.06x29x0.25	35'6-15/32"	0'	0.0	39.000	27.6140	-8.44	1076.95	0.008
L2	149.458 - 114.083 (2)	TP42.46x34.5502x0.3125	40'5-17/32"	0'	0.0	39.000	40.6739	-17.07	1586.28	0.011
L3	114.083 - 76.6667 (3)	TP49.15x40.6946x0.375	43'3"	0'	0.0	39.000	56.5031	-26.91	2203.62	0.012
L4	76.6667 - 38.25 (4)	TP55.9x47.0967x0.4375	45'31/32"	0'	0.0	39.000	74.9830	-39.87	2924.34	0.014
L5	38.25 - 0 (5)	TP62.5x53.5605x0.5	45'9"	0'	0.0	39.000	98.3940	-59.58	3837.37	0.016

Pole Bending Design Data

Section No.	Elevation ft	Size	Actual M_x kip-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y kip-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
L1	185 - 149.458 (1)	TP36.06x29x0.25	427.65	21.627	39.000	0.555	0.00	0.000	39.000	0.000
L2	149.458 - 114.083 (2)	TP42.46x34.5502x0.3125	1398.12	40.754	39.000	1.045	0.00	0.000	39.000	0.000
L3	114.083 - 76.6667 (3)	TP49.15x40.6946x0.375	2659.42	48.217	39.000	1.236	0.00	0.000	39.000	0.000
L4	76.6667 - 38.25 (4)	TP55.9x47.0967x0.4375	4143.13	49.774	39.000	1.276	0.00	0.000	39.000	0.000
L5	38.25 - 0 (5)	TP62.5x53.5605x0.5	6163.43	49.143	39.000	1.260	0.00	0.000	39.000	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V K	Actual f_v ksi	Allow. F_v ksi	Ratio $\frac{f_v}{F_v}$	Actual T kip-ft	Actual f_{vt} ksi	Allow. F_{vt} ksi	Ratio $\frac{f_{vt}}{F_{vt}}$
L1	185 - 149.458 (1)	TP36.06x29x0.25	22.69	0.822	26.000	0.063	0.34	0.008	26.000	0.000
L2	149.458 - 114.083 (2)	TP42.46x34.5502x0.3125	31.79	0.782	26.000	0.060	0.34	0.005	26.000	0.000
L3	114.083 - 76.6667 (3)	TP49.15x40.6946x0.375	37.01	0.655	26.000	0.050	0.21	0.002	26.000	0.000
L4	76.6667 - 38.25 (4)	TP55.9x47.0967x0.4375	41.67	0.556	26.000	0.043	0.01	0.000	26.000	0.000
L5	38.25 - 0 (5)	TP62.5x53.5605x0.5	46.35	0.471	26.000	0.036	0.03	0.000	26.000	0.000

Pole Interaction Design Data

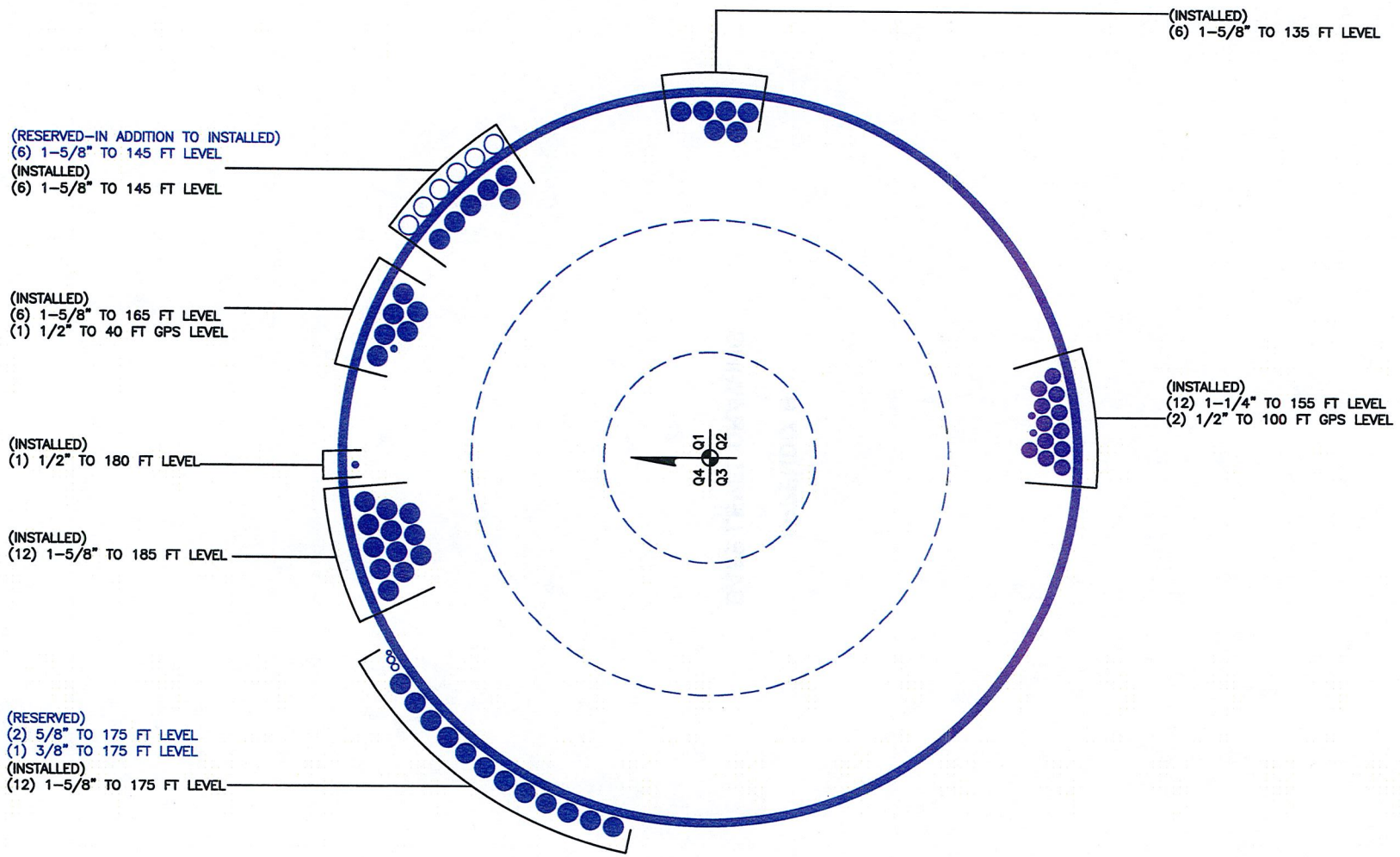
Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	185 - 149.458 (1)	0.008	0.555	0.000	0.063	0.000	0.563 ✓	1.333	H1-3+VT ✓
L2	149.458 - 114.083 (2)	0.011	1.045	0.000	0.060	0.000	1.057 ✓	1.333	H1-3+VT ✓
L3	114.083 - 76.6667 (3)	0.012	1.236	0.000	0.050	0.000	1.249 ✓	1.333	H1-3+VT ✓
L4	76.6667 - 38.25 (4)	0.014	1.276	0.000	0.043	0.000	1.290 ✓	1.333	H1-3+VT ✓
L5	38.25 - 0 (5)	0.016	1.260	0.000	0.036	0.000	1.276 ✓	1.333	H1-3+VT ✓

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
L1	185 - 149.458	Pole	TP36.06x29x0.25	1	-8.44	1435.57	42.3	Pass
L2	149.458 - 114.083	Pole	TP42.46x34.5502x0.3125	2	-17.07	2114.51	79.3	Pass
L3	114.083 - 76.6667	Pole	TP49.15x40.6946x0.375	3	-26.91	2937.43	93.7	Pass
L4	76.6667 - 38.25	Pole	TP55.9x47.0967x0.4375	4	-39.87	3898.15	96.8	Pass
L5	38.25 - 0	Pole	TP62.5x53.5605x0.5	5	-59.58	5115.21	95.7	Pass
							Summary	
						Pole (L4)	96.8	Pass
						RATING =	**96.8**	**Pass**

APPENDIX B

BASE LEVEL DRAWING



BUSINESS UNIT: 806354 TOWER ID: C_BASELEVEL

APPENDIX C

ADDITIONAL CALCULATIONS

Maximum Allowable Moment of a Circular Pier

Axial Load (Negative for Compression) = -60.00 kips

Pier Properties

Concrete:

Pier Diameter = 8.0 ft

Concrete Area = 7238.2 in^2

Reinforcement:

Clear Cover = 3.00 in

Cage Diameter = 7.41 ft

Bar Size = 9

Bar Diameter = 1.13 in

Bar Area = 1 in^2

Number of Bars = 48

Material Properties

Concrete compressive strength = 4000 psi

Reinforcement yield strength = 60000 psi

Modulus of elasticity = 29000 ksi

Reinforcement yield strain = 0.00207

Limiting compressive strain = 0.003

Seismic Properties

Seismic Zone = 1

Minimum Area of Steel

Required area of steel = 36.19 in^2

Provided area of steel = 48.00 in^2 **OK**

Axial Loading

Load factor = 1.3

Reduction factor = 0.9

Factored axial load = -86.6667 kips

Neutral Axis

Distance from extreme edge to neutral axis =	14.05	in
Equivalent compression zone factor =	0.85	
Distance from extreme edge to equivalent compression zone factor =	11.94	in
Distance from centroid to neutral axis =	33.95	in

Compression Zone

Area of steel in compression zone =	9.00	in^2
Angle from centroid of pier to intersection of equivalent compression zone and edge of pier =	41.30	deg
Area of concrete in compression =	518.47	in^2
Force in concrete = 0.85 * f`c * Acc =	1762.79	kips
Total reinforcement forces =	-1676.12	kips
Factored axial load =	-86.67	kips
Force in concrete =	-1762.79	kips
Sum of the forces in concrete =	0.00	kips **OK**

Maximum Moment

First moment of the concrete area in compression about the centoid =	21200.28	in^3
Distance between centroid of concrete in compression and centroid of pier =	40.89	in
Moment of concrete in compression =	72080.94	in-kips
Total reinforcement moment =	48374.96	in-kips
Nominal moment strength of column =	120455.90	in-kips
Factored moment strength of column =	83392.55	in-kips

Maximum Allowable Moment = 6949.38 ft-kips

Individual Bars

Bar #	Angle from first bar (deg)	Distance to centroid (in)	Distance to neutral axis (in)	Distance to equivalent comp. zone (in)	Strain	Area of steel in compression (in^2)	Stress (ksi)	Axial force (kips)
1	0.00	0.00	-33.95	-36.06	-0.0072505	0.00	-60.00	-60.00
2	7.50	5.80	-28.15	-30.26	-0.0060119	0.00	-60.00	-60.00
3	15.00	11.50	-22.45	-24.56	-0.0047944	0.00	-60.00	-60.00
4	22.50	17.00	-16.95	-19.05	-0.0036191	0.00	-60.00	-60.00
5	30.00	22.22	-11.73	-13.84	-0.0025058	0.00	-60.00	-60.00
6	37.50	27.05	-6.90	-9.01	-0.0014737	0.00	-42.74	-42.74
7	45.00	31.42	-2.53	-4.64	-0.0005405	0.00	-15.67	-15.67
8	52.50	35.25	1.30	-0.81	0.000278	0.00	8.06	8.06
9	60.00	38.48	4.53	2.42	0.0009676	1.00	28.06	24.66
10	67.50	41.05	7.10	4.99	0.0015166	1.00	43.98	40.58
11	75.00	42.92	8.97	6.86	0.0019156	1.00	55.55	52.15
12	82.50	44.06	10.10	8.00	0.0021577	1.00	60.00	56.60
13	90.00	44.44	10.48	8.38	0.0022389	1.00	60.00	56.60
14	97.50	44.06	10.10	8.00	0.0021577	1.00	60.00	56.60
15	105.00	42.92	8.97	6.86	0.0019156	1.00	55.55	52.15
16	112.50	41.05	7.10	4.99	0.0015166	1.00	43.98	40.58
17	120.00	38.48	4.53	2.42	0.0009676	1.00	28.06	24.66
18	127.50	35.25	1.30	-0.81	0.000278	0.00	8.06	8.06
19	135.00	31.42	-2.53	-4.64	-0.0005405	0.00	-15.67	-15.67
20	142.50	27.05	-6.90	-9.01	-0.0014737	0.00	-42.74	-42.74
21	150.00	22.22	-11.73	-13.84	-0.0025058	0.00	-60.00	-60.00
22	157.50	17.00	-16.95	-19.05	-0.0036191	0.00	-60.00	-60.00
23	165.00	11.50	-22.45	-24.56	-0.0047944	0.00	-60.00	-60.00
24	172.50	5.80	-28.15	-30.26	-0.0060119	0.00	-60.00	-60.00
25	180.00	0.00	-33.95	-36.06	-0.0072505	0.00	-60.00	-60.00
26	187.50	-5.80	-39.75	-41.86	-0.0084891	0.00	-60.00	-60.00
27	195.00	-11.50	-45.45	-47.56	-0.0097065	0.00	-60.00	-60.00
28	202.50	-17.00	-50.96	-53.06	-0.0108819	0.00	-60.00	-60.00
29	210.00	-22.22	-56.17	-58.28	-0.0119952	0.00	-60.00	-60.00
30	217.50	-27.05	-61.00	-63.11	-0.0130273	0.00	-60.00	-60.00
31	225.00	-31.42	-65.37	-67.48	-0.0139605	0.00	-60.00	-60.00
32	232.50	-35.25	-69.21	-71.31	-0.0147789	0.00	-60.00	-60.00
33	240.00	-38.48	-72.43	-74.54	-0.0154685	0.00	-60.00	-60.00
34	247.50	-41.05	-75.01	-77.11	-0.0160175	0.00	-60.00	-60.00
35	255.00	-42.92	-76.87	-78.98	-0.0164165	0.00	-60.00	-60.00
36	262.50	-44.06	-78.01	-80.11	-0.0166587	0.00	-60.00	-60.00
37	270.00	-44.44	-78.39	-80.50	-0.0167399	0.00	-60.00	-60.00
38	277.50	-44.06	-78.01	-80.11	-0.0166587	0.00	-60.00	-60.00
39	285.00	-42.92	-76.87	-78.98	-0.0164165	0.00	-60.00	-60.00
40	292.50	-41.05	-75.01	-77.11	-0.0160175	0.00	-60.00	-60.00
41	300.00	-38.48	-72.43	-74.54	-0.0154685	0.00	-60.00	-60.00
42	307.50	-35.25	-69.21	-71.31	-0.0147789	0.00	-60.00	-60.00
43	315.00	-31.42	-65.37	-67.48	-0.0139605	0.00	-60.00	-60.00
44	322.50	-27.05	-61.00	-63.11	-0.0130273	0.00	-60.00	-60.00
45	330.00	-22.22	-56.17	-58.28	-0.0119952	0.00	-60.00	-60.00
46	337.50	-17.00	-50.96	-53.06	-0.0108819	0.00	-60.00	-60.00
47	345.00	-11.50	-45.45	-47.56	-0.0097065	0.00	-60.00	-60.00

Monopole Pier and Pad Foundation

BU # : 806354
Site Name: BRG 123 943084
App. Number: 131162

CROWN CASTLE

Design Reactions		
Shear, S:	46	kips
Moment, M:	6163	ft-kips
Tower Height, H:	185	ft
Tower Weight, Wt:	60	kips
Base Diameter, BD:	5.21	ft

Foundation Dimensions		
Depth, D:	6	ft
Pad Width, W:	28	ft
Neglected Depth, N:	2	ft
Thickness, T:	3.00	ft
Pier Diameter, Pd:	8.00	ft
Ext. Above Grade, E:	1.00	ft
Clear Cover, Cc:	3.0	in

Soil Properties		
Soil Unit Weight, γ:	0.120	kcf
Bearing Capacity, Bc:	6.0	ksf
Angle of Friction, Φ:	34	deg
Cohesion, Co:	0.000	ksf
Passive Pressure, Pp:	0.000	kcf
Base Friction, μ:	0.60	

Material Properties		
Rebar Yield Strength, Fy:	60000	psi
Concrete Strength, F'c:	4000	psi
Concrete Unit Weight, δc:	0.150	kcf
Seismic Zone, z:	1	

Rebar Properties		
Pier Rebar Size, Sp:	9	
Pier Rebar Quanity, mp:	48	37
Pad Rebar Size, Spad:	9	
Pad Rebar Quanity, mpad:	20	34
Pier Tie Size, St:	4	3
Tie Quanity, mt:	5	5

Design Checks	Capacity/ Availability	Demand/ Limits	Check	
Req'd Pier Diam.(ft)	8	7.21	OK	
Overturning (ft-kips)	7105.69	6485.00	OK	91.3%
Shear Capacity (kips)	224.96	46.00	OK	20.4%
Bearing (ksf)	6.00	3.34	OK	55.6%
Pad Shear - 1-way (kips)	1378.56	1023.14	OK	74.2%
Pad Shear - 2-way (kips)	3310.96	1887.59	OK	57.0%
Pier Rebar Area (in^2)	48.00	36.19	OK	
Pad Rebar Area (in^2)	20.00	33.97	OK	
Pier Moment Capacity (k-ft)	6949.38	6347.00	OK	91.3%
Pier Bar Spacing (in)	4.76	18 > s > 2	OK	
Pad Bar Spacing (in)	16.18	18 > s > 2	OK	
Pier Development Length (in)	45	31.47	OK	
Pad Development Length (in)	33	31.47	OK	
Hook Development Length (in)	165.00	14.98	OK	
Rebar Hook Length (in)	120.00	19.18	OK	

Modification Checks	Capacity/ Availability	Demand/ Limits	Check
Sleeve Rebar Area (in2):	15.8	0.00	Not Used
Sleeve Moment Capacity (k-ft):	6949.38	6347.00	Not Run
Sleeve Rebar Spacing (in):	N/a	18 > s > 2	Not Used
Sleeve Tie Spacing (in):	N/A	9 > s > 4.5	Not Used
Minimum Extra Thickness (in):	0	0	Not Used
Pad Rebar Area-short (in2):	0.44	15.80	Not Used
Pad Rebar Area-long (in2):	0.44	15.80	Not Used
Pad Rebar Spacing-short (in):	109.5	18 > s > 2	Not Used
Pad Rebar Spacing-long (in):	109.5	18 > s > 2	Not Used
End Cap Width (ft):	0	0	Not Used
End Cap Rebar Area (in2):	3.16	0	Not Used
Rebar Spacing (in):	-3.00	18 > s > 2	Not Used
Tie Spacing (in):	23.07	330 > s > 4.5	Not Used
Dowel Area (in2):	2.2	0.00	Not Used
Dowel Embedment (in):	9	6	Not Used
Cone Shear Strength (kips):	25.15	23.76	Not Used
Dowel Edge Dist (in):	12.00	4.78	Not Used
Dowel Spacing (in):	78.00	18.00	Not Used
Dowel Edge Dist (vert) (in):	18.00	4.78	Not Used
Dowel Devel. Length (in):	-3.00	13.32	Not Used

Modifications					
Pier Sleeve, ds:	0	in	End Cap Width, Wec:	0	ft
Revised Pier Diameter, dx:	8	ft	Revised Width, Wx:	28	ft
PS Rebar Size, Ss:	8		EC Rebar Size, Sec:	8	per side, top & bottom
Rebar Quanity, ms:	20	0	Rebar Quanity, mec:	4	
Tie Size, Sst:	3		EC Tie Size, Sect:	4	per side
Tie Quanity, mst:	9	8	Tie Quanity, mect:	15	0
Pad Thickness, Te:	0	in	EC Dowel Size, Secd:	6	per side
Revised Pier Thickness, Tx:	3.00	ft	Dowel Quanity, mecd:	5	
Rebar Size, Se:	3		Rows of Dowels, Nd:	1	
Rebar Quanity (long), me:	4	34	Dowel Depth, decd:	9	in
Rebar Quanity (short), mex:	4	144	Edge Distance, eecd:	12	in
Dowel Size, Sed:	3				
Dowel Quanity, med:	0	0			

Stiffened or Unstiffened, Ungrouted, Circular Base Plate - Any Rod Material

TIA Rev F

Site Data

BU#: *806354*
Site Name: *BRG 123 943084*
App #: *131162*

Pole Manufacturer:	*Other*

Reactions		
Moment:	6163	ft-kips
Axial:	60	kips
Shear:	46	kips

If No stiffeners, Criteria:	AISC ASD	<-Only Applcable to Unstiffened Cases

Anchor Rod Data		
Qty:	24	
Diam:	2.25	in
Rod Material:	A615-J	
Strength (Fu):	100	ksi
Yield (Fy):	75	ksi
Bolt Circle:	73	in

Plate Data		
Diam:	79	in
Thick:	2.5	in
Grade:	60	ksi
Single-Rod B-eff:	8.27	in

Stiffener Data (Welding at both sides)		
Config:	1	*
Weld Type:	Fillet	
Groove Depth:		<-- Disregard
Groove Angle:		<-- Disregard
Fillet H. Weld:	0.5	in
Fillet V. Weld:	0.375	in
Width:	7	in
Height:	15	in
Thick:	0.75	in
Notch:	0.5	in
Grade:	50	ksi
Weld str.:	70	ksi

Pole Data		
Diam:	62.5	in
Thick:	0.5	in
Grade:	65	ksi
# of Sides:	18	"0" IF Round
Fu	80	ksi
Reinf. Fillet Weld	0	"0" if None

Stress Increase Factor		
ASIF:	1.333	

Anchor Rod Results

		Stiffened
Maximum Rod Tension:	166.3 Kips	Service, ASD
Allowable Tension:	195.0 Kips	Fty*ASIF
Anchor Rod Stress Ratio:	85.3% Pass	

Base Plate Results

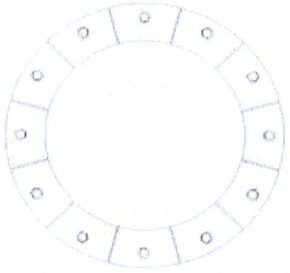
	Flexural Check	Stiffened
Base Plate Stress:	31.0 ksi	Service, ASD
Allowable Plate Stress:	60.0 ksi	0.75*Fy*ASIF
Base Plate Stress Ratio:	51.6% Pass	Y.L. Length: N/A, Roark

Stiffener Results

Horizontal Weld :	88.7% Pass
Vertical Weld:	61.3% Pass
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	31.4% Pass
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	64.3% Pass
Plate Comp. (AISC Bracket):	82.8% Pass

Pole Results

Pole Punching Shear Check:	15.4% Pass



* 0 = none, 1 = every bolt, 2 = every 2 bolts, 3 = 2 per bolt

** Note: for complete joint penetration groove welds the groove depth must be exactly 1/2 the stiffener thickness for calculation purposes