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June 3, 2014

Melanie A. Bachman
Acting Executive Director
Connecticut Siting Council
10 Franklin Square
New Britain, CT 06051

Re: **Notice of Exempt Modification – Facility Modification**
311 Old Gate Lane, Milford, Connecticut

Dear Ms. Bachman:

Cellco Partnership d/b/a Verizon Wireless ("Cellco") currently maintains twelve (12) antennas at the 100-foot level on the existing 120-foot tower at 311 Old Gate Lane in Milford, Connecticut (the "Property"). The tower is owned by Crown Castle. The Council approved Cellco's use of this tower in 2008. Cellco now intends to modify its facility by replacing nine (9) of its existing antennas (three (3) 700 MHz antennas and six (6) 850 MHz antennas) with three (3) model LNX 4514DS, 700 MHz antennas and three (3) model BXA-70063-6BF, 850 MHz antennas and adding three (3) model BXA-171063-8BF, 2100 MHz antennas, for a total of twelve (12) antennas, all at the same 100-foot level on the tower. Cellco also intends to install six (6) cable diplexers at the 100-foot level. Included in Attachment 1 are specifications for Cellco's new and replacement antennas and its 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 Benjamin G. Blake, Mayor of the Town of Milford. A copy of this letter is also being sent to BVS Jai Alai LLC, the owner of the Property.

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 height of the existing tower. Cellco's replacement and new antennas as well as its cable diplexers will be installed at the 100-foot level on the existing tower.

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

3. The proposed modifications will not increase noise levels at the facility by six decibels or more, or to levels that exceed state and local criteria.

4. The operation of the replacement antennas will not increase radio frequency (RF) emissions at the facility to a level at or above the Federal Communications Commission (FCC) safety standard. A General Power Density table for Cellco's modified facility is included in Attachment 2.

5. The proposed modifications will not cause a change or alteration in the physical or environmental characteristics of the site.

6. The tower and its foundation can support Cellco's proposed modifications. (*See* Structural Analysis Report included in Attachment 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:
Benjamin G. Blake, Mayor
BVS Jai Alai LLC
Sandy M. Carter

ATTACHMENT 1

Product Specifications

COMMSCOPE®

POWERED BY ANDREW.

LNX-4514DS-VTM

Andrew® Antenna, 698–896 MHz, 45° horizontal beamwidth, RET compatible

- Broadband, providing future-ready single antenna for application in 700 MHz and existing 850 MHz cellular operation
- Air dielectric design provides superior PIM performance with repeatable antenna-to-antenna gain and pattern consistency
- Single piece radome provides long term mechanical stability
- Proven core design technology, with over 1,000,000 similar antennas deployed
- Specifically designed to have physical dimensions similar to most existing cellular antennas

Electrical Specifications

Frequency Band, MHz	**698–806**	**806–896**
Gain, dBi	15.5	16.4
Beamwidth, Horizontal, degrees	47	45
Beamwidth, Vertical, degrees	17.3	15.8
Beam Tilt, degrees	2–18	2–18
USLS, typical, dB	16	15
Front-to-Back Ratio at 180°, dB	32	28
Isolation, dB	30	30
VSWR | Return Loss, dB	1.4 | 15.6	1.4 | 15.6
PIM, 3rd Order, 2 x 20 W, dBc	-153	-153
Input Power per Port, maximum, watts	500	500
Polarization	±45°	±45°
Impedance	50 ohm	50 ohm

General Specifications

Antenna Brand	Andrew®
Antenna Type	DualPol®
Band	Single band
Brand	DualPol® | Teletilt®
Operating Frequency Band	698 – 896 MHz

Mechanical Specifications

Color	Light gray
Lightning Protection	dc Ground
Radiator Material	Aluminum
Radome Material	Fiberglass, UV resistant
RF Connector Interface	7-16 DIN Female
RF Connector Location	Bottom
RF Connector Quantity, total	2
Wind Loading, maximum	586.4 N @ 150 km/h 131.8 lbf @ 150 km/h
Wind Speed, maximum	241.4 km/h | 150.0 mph

Dimensions

Depth	163.0 mm | 6.4 in

Product Specifications

LNX-4514DS-VTM

Length	1308.0 mm | 51.5 in
Width	389.0 mm | 15.3 in
Net Weight	13.3 kg | 29.3 lb

Remote Electrical Tilt (RET) Information

Model with Factory Installed AISG 2.0 Actuator	LNX-4514DS-A1M
RET System	Teletilt®

Regulatory Compliance/Certifications

Agency	Classification
ISO 9001:2008	Designed, manufactured and/or distributed under this quality management system

Included Products

DB380 — Pipe Mounting Kit for 2.4"-4.5" (60-115mm) OD round members on wide panel antennas. Includes 2 clamp sets and double nuts.

DB5083 — Downtilt Mounting Kit for 2.4"-4.5" (60 - 115 mm) OD round members. Includes a heavy-duty, galvanized steel downtilt mounting bracket assembly and associated hardware. This kit is compatible with the DB380 pipe mount kit for panel antennas that are equipped with two mounting brackets.

BXA-70063-6BF-EDIN-X

X-Pol | FET Panel | 63° | 14.5 dBd

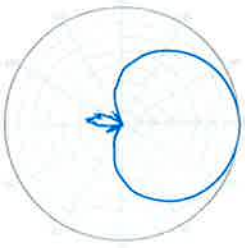
Replace "X" with desired electrical downtilt.

Antenna is also available with N connector(s). Replace "EDIN" with "N" 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 N connectors	300 W	
Lightning protection	Direct Ground	
Connector(s)	2 Ports / EDIN or N / Female / Bottom	
Mechanical Characteristics		
Dimensions Length x Width x Depth	1742 x 285 x 135 mm	68.6 x 11.2 x 5.3 in
Depth with z-brackets	175 mm	6.9 in
Weight without mounting brackets	8.7 kg	19.2 lbs
Survival wind speed	> 201 km/hr	> 125 mph
Wind area	Front: 0.50 m² Side: 0.24 m²	Front: 5.3 ft² Side: 2.5 ft²
Wind load @ 161 km/hr (100 mph)	Front: 733 N Side: 386 N	Front: 164 lbf Side: 88 lbf

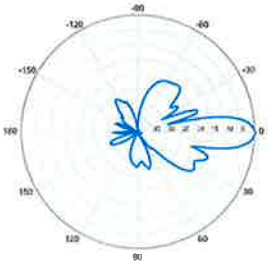
Mounting Options	Part Number	Fits Pipe Diameter	Weight
3-Point Mounting & Downtilt Bracket Kit	36210008	40-115 mm 1.57-4.5 in	6.9 kg 15.2 lbs
Concealment Configurations	For concealment configurations, order BXA-70063-6BF-EDIN-X-FP		

BXA-70063-6BF-EDIN-X



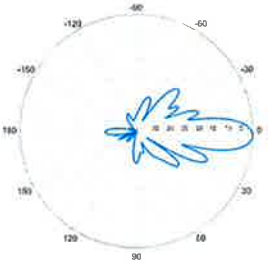
Horizontal | 750 MHz

BXA-70063-6BF-EDIN-0

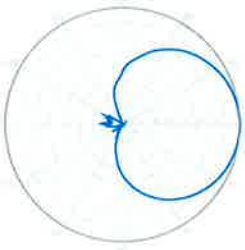


0° | Vertical | 750 MHz

BXA-70063-6BF-EDIN-2

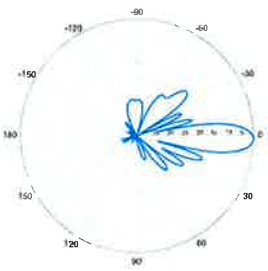


2° | Vertical | 750 MHz



Horizontal | 850 MHz

0° | Vertical | 850 MHz



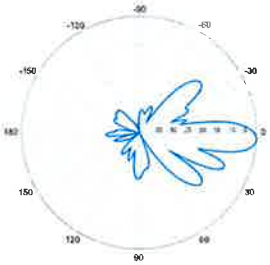
2° | Vertical | 850 MHz

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

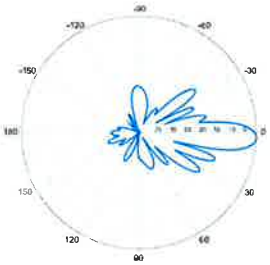
BXA-70063-6BF-EDIN-X

X-Pol | FET Panel | 63° | 14.5 dBd

BXA-70063-6BF-EDIN-3

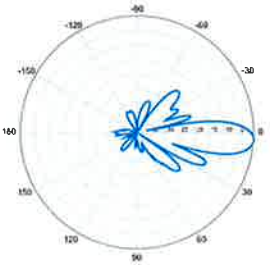


3° | Vertical | 750 MHz

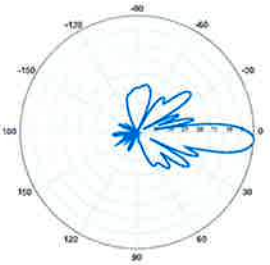


3° | Vertical | 850 MHz

BXA-70063-6BF-EDIN-4

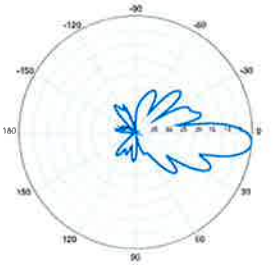


4° | Vertical | 750 MHz

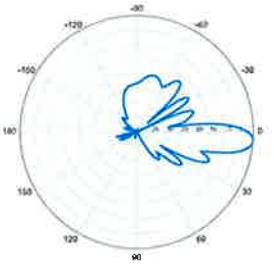


4° | Vertical | 850 MHz

BXA-70063-6BF-EDIN-5

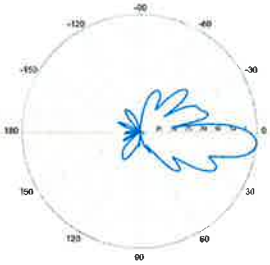


5° | Vertical | 750 MHz

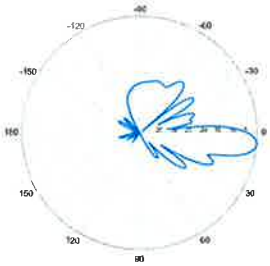


5° | Vertical | 850 MHz

BXA-70063-6BF-EDIN-6

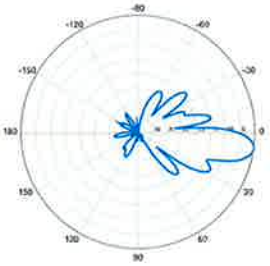


6° | Vertical | 750 MHz

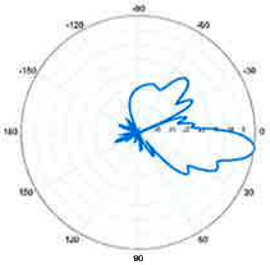


6° | Vertical | 850 MHz

BXA-70063-6BF-EDIN-8

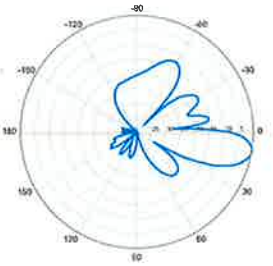


8° | Vertical | 750 MHz

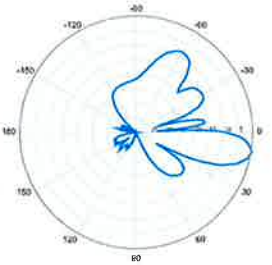


8° | Vertical | 850 MHz

BXA-70063-6BF-EDIN-10



10° | Vertical | 750 MHz



10° | Vertical | 850 MHz

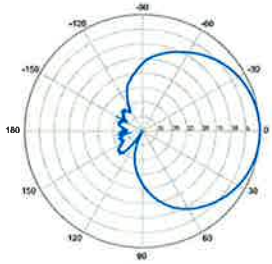
BXA-171063-8BF-EDIN-X

Replace 'X' with desired electrical downtilt

X-Pol | FET Panel | 63° | 17.4 dBi

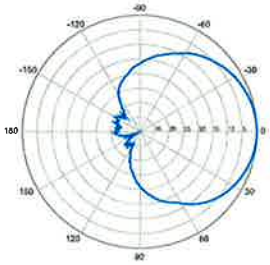
Electrical Characteristics	1710-2170 MHz		
Frequency bands	1710-1880 MHz	1850-1990 MHz	1920-2170 MHz
Polarization	±45°	±45°	±45°
Horizontal beamwidth	68°	65°	60°
Vertical beamwidth	7°	7°	7°
Gain	14.5 dBd / 16.6 dBi	14.9 dBd / 17.0 dBi	15.3 dBd / 17.4 dBi
Electrical downtilt (X)	0, 2, 4, 6, 8		
Impedance	50Ω		
VSWR	≤1.5:1		
First upper sidelobe	< -17 dB		
Front-to-back ratio	> 30 dB		
In-band isolation	< -25 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	1225 x 154 x 105 mm	48.2 x 6.1 x 4.1 in	
Depth with t-brackets	133 mm	5.2 in	
Weight without mounting brackets	4.2 kg	9.2 lbs	
Survival wind speed	296 km/hr	184 mph	
Wind area	Front: 0.19 m² Side: 0.14 m²	Front: 2.0 ft² Side: 1.5 ft²	
Wind load @ 161 km/hr (100 mph)	Front: 281 N Side: 223 N	Front: 63 lbf Side: 50 lbf	
Mounting Options	Part Number	Fits Pipe Diameter	Weight
2-Point Mounting Bracket Kit	26799997	50-102 mm 2.0-4.0 in	2.3 kg 5 lbs
2-Point Mounting & Downtilt Bracket Kit	26799999	50-102 mm 2.0-4.0 in	3.6 kg 8 lbs
Concealment Configurations	For concealment configurations, order BXA-171063-8BF-EDIN-X-FP		

BXA-171063-8BF-EDIN-X



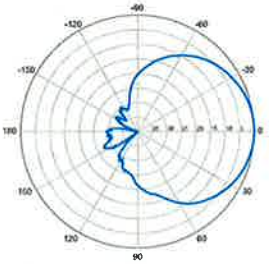
Horizontal | 1710-1880 MHz

BXA-171063-8BF-EDIN-X



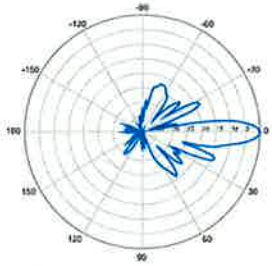
Horizontal | 1850-1990 MHz

BXA-171063-8BF-EDIN-X



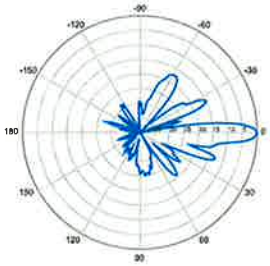
Horizontal | 1920-2170 MHz

BXA-171063-8BF-EDIN-0



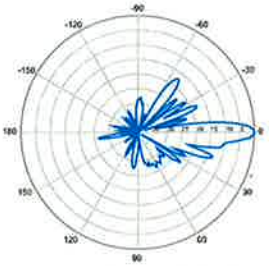
0° | Vertical | 1710-1880 MHz

BXA-171063-8BF-EDIN-0



0° | Vertical | 1850-1990 MHz

BXA-171063-8BF-EDIN-0

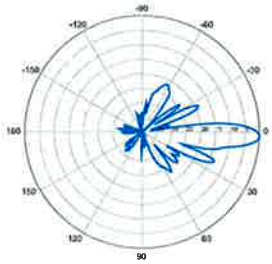


0° | Vertical | 1920-2170 MHz

BXA-171063-8BF-EDIN-X

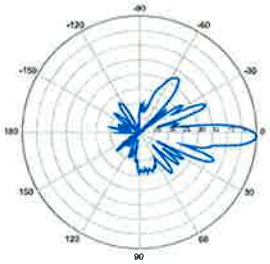
X-Pol | FET Panel | 63° | 17.4 dBi

BXA-171063-8BF-EDIN-2



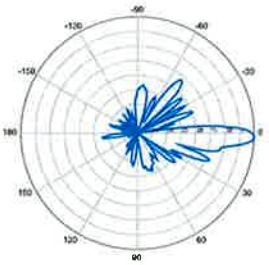
2° | Vertical | 1710-1880 MHz

BXA-171063-8BF-EDIN-2



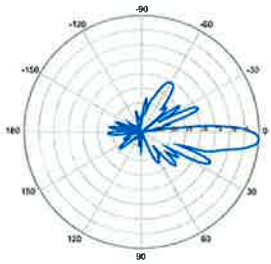
2° | Vertical | 1850-1990 MHz

BXA-171063-8BF-EDIN-2



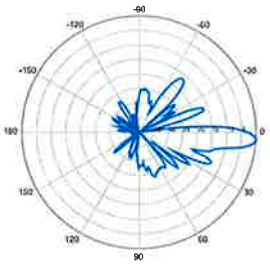
2° | Vertical | 1920-2170 MHz

BXA-171063-8BF-EDIN-4



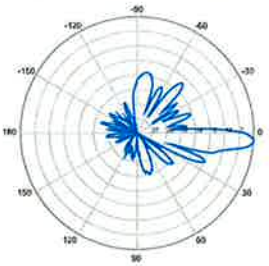
4° | Vertical | 1710-1880 MHz

BXA-171063-8BF-EDIN-4



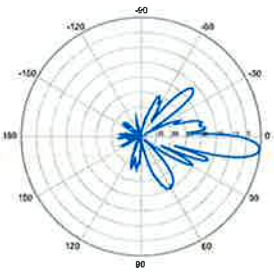
4° | Vertical | 1850-1990 MHz

BXA-171063-8BF-EDIN-4



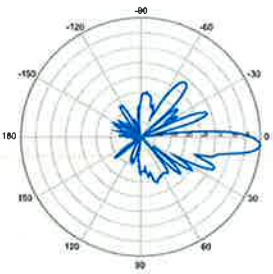
4° | Vertical | 1920-2170 MHz

BXA-171063-8BF-EDIN-6



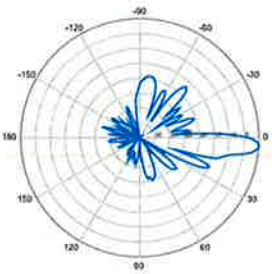
6° | Vertical | 1710-1880 MHz

BXA-171063-8BF-EDIN-6



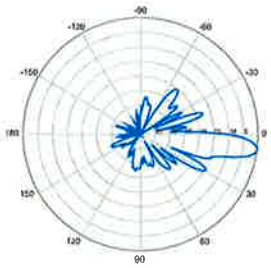
6° | Vertical | 1850-1990 MHz

BXA-171063-8BF-EDIN-6



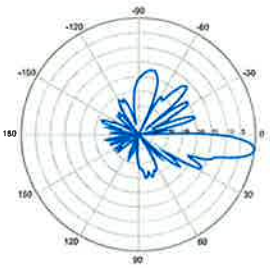
6° | Vertical | 1920-2170 MHz

BXA-171063-8BF-EDIN-8



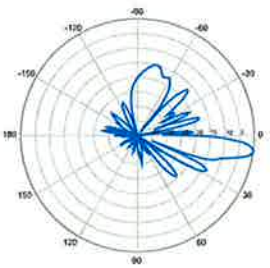
8° | Vertical | 1710-1880 MHz

BXA-171063-8BF-EDIN-8



8° | Vertical | 1850-1990 MHz

BXA-171063-8BF-EDIN-8



8° | Vertical | 1920-2170 MHz

Product Data Sheet FD9R6004/2C-3L

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

Product Description

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

Features/Benefits

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

Technical Specifications

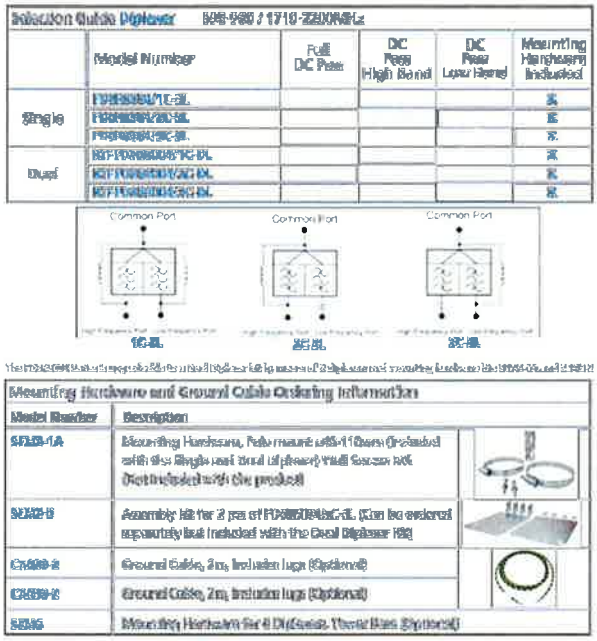
Product Type	Diplexer/Cross Band Coupler
Application	LTE700, GSM900, UMTS, GSM1800, Cellular 800, PCS
Frequency Range 1, MHz	698-960
Frequency Range 2, MHz	1710-2200
Configuration	Sharelite Single diplexer, outdoor, DC pass in the 1710-2170MHz path, with mounting hardware SEM2-1A
Mounting	Wall Mounting: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

Notes

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

Other Documentation

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



Selection Guide Diplexer					
	Model Number	Full DC Pass	DC Pass High Band	DC Pass Low Band	Mounting Hardware Included
Single					
Dual					

Mounting Hardware and Ground Cable Ordering Information		
Model Number	Description	

ATTACHMENT 2

Site Name: OLD GATE, CT
Cumulative Power Density

Operator	Operating Frequency	Number of Trans.	ERP Per Trans.	Total ERP	Distance to Target	Calculated Power Density	Maximum Permissable Exposure*	Fraction of MPE
	(MHz)		(watts)	(watts)	(feet)	(mW/cm^2)	(mW/cm^2)	(%)
VZW PCS	1970	7	313	2188	100	0.0787	1.0	7.87%
VZW Cellular	869	9	411	3701	100	0.1331	0.579333333	22.97%
VZW AWS	2145	1	1265	1265	100	0.0455	1.0	4.55%
VZW 700	698	1	659	659	100	0.0237	0.465333333	5.09%

Total Percentage of Maximum Permissible Exposure 40.49%

*Guidelines adopted by the FCC on August 1, 1996, 47 CFR Part 1 based on NCRP Report 86, 1986 and generally on ANSI/IEEE C95.1-1992

MHz = Megahertz
mW/cm^2 = milliwatts per square centimeter
ERP = Effective Radiated Power

Absolute worst case maximum values used.

ATTACHMENT 3

PAUL J. FORD AND COMPANY
STRUCTURAL ENGINEERS
250 East Broad Street • Suite 600 • Columbus, Ohio 43215-3708

Date: **April 23, 2014**

Charles McGuirt
Crown Castle
3530 Toringdon Way, Suite 300
Charlotte, NC 28277
704.405.6607

Paul J Ford and Company
250 E. Broad Street, Suite 600
Columbus, OH 43215
614.221.6679
cmccartney@pjfweb.com

Subject: **Structural Analysis Report**

Carrier Designation:	***Verizon Wireless* Co-Locate**	
	Carrier Site Number:	NA
	Carrier Site Name:	Old Gate, CT
Crown Castle Designation:	**Crown Castle BU Number:**	876309
	Crown Castle Site Name:	MILFORD JAI-ALAI
	Crown Castle JDE Job Number:	283832
	Crown Castle Work Order Number:	747808
	Crown Castle Application Number:	241961 Rev. 1
Engineering Firm Designation:	**Paul J Ford and Company Project Number:**	37513-2057 R3
Site Data:	**311 Old Gate Lane, Milford, New Haven County, CT** **Latitude *41° 14' 2.59"*, Longitude *-73° 1' 22.4"*** **120 Foot - Monopole Tower**	

Dear Charles McGuirt,

Paul J Ford and Company 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 639213, in accordance with application 241961, 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:

LC7: Existing + Reserved + Proposed Equipment **Sufficient Capacity**
Note: See Table I and Table II for the proposed and existing/reserved loading, respectively.

The structural analysis was performed for this tower in accordance with the requirements of the 2005 Connecticut Building Code and the TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a fastest mile wind speed of 80 mph with no ice, 37.6 mph with 1.25 inch ice thickness and 50 mph under service loads.

We at *Paul J Ford and Company* 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.

Respectfully submitted by:

Corey McCartney, EI
Structural Designer

tnxTower Report - version 6.1.4.1

STATE OF CONNECTICUT
JOSEPH PACHICARAH JACOBS
No. PEN 22731
LICENSED
PROFESSIONAL ENGINEER

APR 23 2014

PAUL J. FORD AND COMPANY
STRUCTURAL ENGINEERS
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Respectfully submitted by:

Corey McCartney, EI
Structural Designer

tnxTower Report - version 6.1.4.1

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 120-ft Monopole tower designed by ROHN in December of 1996. The tower was originally designed for a wind speed of 85 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, 37.6 mph with 1.25 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
100.0	100.0	3	andrew	LNX-4514DS-A1M w/ Mount Pipe	-	-	-
		3	antel	BXA-171063-8BF-EDIN-0 w/ Mount Pipe			
		3	antel	BXA-70063-6BF-EDIN-0 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
117.0	124.0	1	andrew	VHLP1-18	3 3 2	1/4 5/16 1/2	1
		1	dragonwave	Horizon Compact			
	121.0	1	andrew	VHLP1-18			
		1	dragonwave	Horizon Compact			
	120.0	6	alcatel lucent	1900MHz RRH (65MHz)	4	1-1/4	2
		3	alcatel lucent	800 EXTERNAL NOTCH FILTER			
		3	alcatel lucent	800MHZ RRH			
		3	alcatel lucent	TD-RRH8x20-25			
		9	rfs celwave	ACU-A20-N			
		1	rfs celwave	APXV9ERR18-C-A20 w/ Mount Pipe			
		2	rfs celwave	APXVSPP18-C-A20 w/ Mount Pipe			
		3	rfs celwave	APXVTM14-C-120 w/ Mount Pipe			
		3	rfs celwave	IBC1900HB-2			
	119.0	5	rfs celwave	APXV86-906515-C w/ Mount Pipe	1 6 9	1/2 1-1/4 1-5/8	3
	117.0	5	decibel	DB950F85E-M w/Mount Pipe			
		3	samsung telecom	FDD_R6_RRH	-	-	1
		3	argus technologies	LLPX310R W/ Mount Pipe			
		1	tower mounts	Platform Mount [LP 502-1]			
100.0	100.0	3	antel	BXA-70063-6CF-2 w/ Mount Pipe	-	-	3
		6	antel	LPA-80063/8CF w/ Mount Pipe			
		6	rfs celwave	FD9R6004/2C-3L	12	1-5/8	1
		3	antel	BXA-171063-8BF-EDIN-2 w/ Mount Pipe			
		1	tower mounts	Platform Mount [LP 303-1]			

Notes:
1) Existing Equipment
2) Reserved Equipment
3) Equipment To Be Removed

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Remarks	Reference	Source
GEOTECHNICAL REPORTS	FDH, 08-02129G, 03/04/08	2221322	CCISITES
POST-MODIFICATION INSPECTION	GPD, 2010111.29, 05/23/10	2638363	CCISITES
TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	Rohn, 34738SW, 12/16/96	2068407	CCISITES
TOWER MANUFACTURER DRAWINGS	Rohn, 34738SW, 12/16/96	2068406	CCISITES
TOWER REINFORCEMENT DESIGN/DRAWINGS/DATA	Vertical Solutions, 07574.03, 11/12/07	2217524	CCISITES
FABRICATION DRAWINGS	AeroSolutions, BS-29 Rev A, 12/12/11	-	AeroSolutions
TOWER REINFORCEMENT DESIGN/DRAWINGS/DATA	PJF, 37511-0052 BP, 12/28/2011	3088811	CCISITES
POST-MODIFICATION INSPECTION	PJF, 41712-0006 MO R2, 04/20/2012	3158394	CCISITES
TOWER REINFORCEMENT DESIGN/DRAWINGS/DATA	PJF, 37512-0676 BP, 03/19/2012	3139251	CCISITES
TOWER REINFORCEMENT DESIGN/DRAWINGS/DATA	PJF, 37513-2057 BP, 09/25/13	4000292	CCISITES

3.1) Analysis Method

tnxTower (version 6.1.3.1), 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) Monopole was reinforced in conformance with the referenced modification drawings. Please note that our calculations indicate that the existing bridge stiffeners designed by Vertical solutions are not adequate. Therefore, we did not consider them in this analysis.
5) In accordance with discussions with CCI Corporate Engineering: Based on the assumption that the monopole manufacturer (ROHN) has designed the flange plates at splices to adequately develop the full capacity of the unreinforced shaft section using unpublished and/or proprietary methodologies, we are assuming that if our analysis shows that both the existing shaft and the existing flange bolts are at a usage capacity of 100% or less, then the existing flange plates are at a usage capacity of 100% or less and no additional analysis of the flange plate is required.
6) The flange bolts at the 60' elevation were considered in this analysis per methodology used by Crown Castle during original design of existing welded bridge stiffeners. However, the flange bolts were not considered at the 30' elevation for the design of the new welded bridge stiffeners per new Crown Castle standards.

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

4) ANALYSIS RESULTS

Table 4 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	120 - 90	Pole	P24x1/4	1	-5.80	589.19	85.7	Pass
L2	90 - 74	Pole	P24x3/8	2	-7.72	934.94	88.1	Pass
L3	74 - 60	Pole	Pipe 24" x 0.51623" Reinf	3	-9.93	1279.36	91.9	Pass
L4	60 - 43	Pole	RPS 30" x 0.52963"	4	-14.25	1489.91	87.8	Pass
L5	43 - 30	Pole	RPS 30" x 0.68852"	5	-17.41	1787.50	91.0	Pass
L6	30 - 20.5	Pole	RPS 36" x 0.55016"	6	-20.69	1758.76	87.6	Pass
L7	20.5 - 13	Pole	RPS 36" x 0.68817"	7	-22.84	2190.17	78.4	Pass
L8	13 - 6.67	Pole	RPS 36" x 0.70877"	8	-24.71	2202.89	84.5	Pass
L9	6.67 - 0	Pole	RPS 36" x 0.68817"	9	-26.64	2190.17	91.9	Pass
							Summary	
						Pole (L9)	91.9	Pass
						Rating =	91.9	Pass

Table 5 - Tower Component Stresses vs. Capacity – LC7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1, 2	Anchor Rods	0	91.9	Pass
1	Base Plate	0	78.8	Pass
1	Base Foundation	0	84.0	Pass
1	Flange Connection	30	83.1	Pass
1	Flange Connection	60	85.3	Pass
1, 3	Flange Connection	90	44.6	Pass

Structure Rating (max from all components) =	91.9%

Notes:
1) See additional documentation in "Appendix C – Additional Calculations" for calculations supporting the % capacity consumed.
2) Worst case scenario between existing and post installed anchors.
3) See assumption #5.

APPENDIX A

TNXTOWER OUTPUT

Tower Input Data

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

1) Tower is located in New Haven County, Connecticut.
2) Basic wind speed of 85 mph.
3) Nominal ice thickness of 1.2500 in.
4) Ice thickness is considered to increase with height.
5) Ice density of 56.00 pcf.
6) A wind speed of 38 mph is used in combination with ice.
7) Temperature drop of 50 °F.
8) Deflections calculated using a wind speed of 50 mph.
9) A non-linear (P-delta) analysis was used.
10) Pressures are calculated at each section.
11) Stress ratio used in pole design is 1.333.
12) Local bending stresses due to climbing loads, feed line 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		Use TIA-222-G Tension Splice		
			Capacity Exemption		

Pole Section Geometry

Section	*Elevation* *ft*	*Section Length* *ft*	*Pole Size*	*Pole Grade*	*Socket Length* *ft*
L1	120.0000-90.0000	30.0000	P24x1/4	A500-42 (42 ksi)	5.00
L2	85.0000-69.0000	16.0000	P24x3/8	A500-42 (42 ksi)	5.00
L3	69.0000-55.0000	14.0000	Pipe 24" x 0.51623" Reinf	Reinf 42.00 ksi (42 ksi)	5.00
L4	55.0000-38.0000	17.0000	RPS 30" x 0.52963"	Reinf 37.99 ksi (38 ksi)	5.00
L5	38.0000-25.0000	13.0000	RPS 30" x 0.68852"	Reinf 35.25 ksi (35 ksi)	5.00
L6	25.0000-15.5000	9.5000	RPS 36" x 0.55016"	Reinf 35.89 ksi (36 ksi)	5.00
L7	15.5000-8.0000	7.5000	RPS 36" x	Reinf 35.87	5.00

Section	Elevation ft	Section Length ft	Pole Size	Pole Grade	Socket Length ft
			0.68817"	ksi (36 ksi)	
L8	8.0000-1.6700	6.3300	RPS 36" x 0.70877"	Reinf 35.05 ksi (35 ksi)	5.00
L9	1.6700-5.0000	6.6700	RPS 36" x 0.68817"	Reinf 35.87 ksi (36 ksi)	

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 120.0000-90.0000				1	1	1		
L2 90.0000-74.0000				1	1	1		
L3 74.0000-60.0000				1	1	1		
L4 60.0000-43.0000				1	1	1		
L5 43.0000-30.0000				1	1	1		
L6 30.0000-20.5000				1	1	1		
L7 20.5000-13.0000				1	1	1		
L8 13.0000-6.6700				1	1	1		
L9 6.6700-0.0000				1	1	1		

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
HB114-1-0813U4-M5J(1 1/4")	C	No	Inside Pole	117.0000 - 0.0000	4	No Ice	0.0000	1.20
						1/2" Ice	0.0000	1.20
						1" Ice	0.0000	1.20
						2" Ice	0.0000	1.20
						4" Ice	0.0000	1.20
2" Rigid Conduit	C	No	CaAa (Out Of Face)	117.0000 - 0.0000	1	No Ice	0.0000	0.95
						1/2" Ice	0.0000	0.95
						1" Ice	0.0000	0.95
						2" Ice	0.0000	0.95
						4" Ice	0.0000	0.95
2" Rigid Conduit	C	No	CaAa (Out Of Face)	117.0000 - 0.0000	1	No Ice	0.2000	0.95
						1/2" Ice	0.3000	2.48
						1" Ice	0.4000	4.62
						2" Ice	0.6000	10.72
						4" Ice	1.0000	30.27
7983A(1/2")	C	No	CaAa (Out Of Face)	117.0000 - 0.0000	2	No Ice	0.0000	0.08
						1/2" Ice	0.0000	0.74
						1" Ice	0.0000	2.01
						2" Ice	0.0000	6.39
						4" Ice	0.0000	22.47
9207(5/16")	C	No	CaAa (Out Of Face)	117.0000 - 0.0000	3	No Ice	0.0000	0.60
						1/2" Ice	0.0000	1.11
						1" Ice	0.0000	2.22
						2" Ice	0.0000	6.29
						4" Ice	0.0000	21.76
9248(1/4)	C	No	CaAa (Out Of Face)	117.0000 - 0.0000	3	No Ice	0.0000	0.03
						1/2" Ice	0.0000	0.50
						1" Ice	0.0000	1.58
						2" Ice	0.0000	5.58

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
						4" Ice	0.0000	20.90
****								
LDF7-50A (1-5/8 FOAM)	C	No	Inside Pole	100.0000 - 0.0000	12	No Ice	0.0000	0.82
						1/2" Ice	0.0000	0.82
						1" Ice	0.0000	0.82
						2" Ice	0.0000	0.82
						4" Ice	0.0000	0.82
****								
Aero MP3-05	C	No	CaAa (Out Of Face)	30.0000 - 0.0000	1	No Ice	0.3478	0.00
						1/2" Ice	0.4001	0.00
						1" Ice	0.6566	0.00
						2" Ice	0.8788	0.00
						4" Ice	1.3232	0.00
Aero MP3-04	C	No	CaAa (Out Of Face)	60.0000 - 30.0000	1	No Ice	0.2690	0.00
						1/2" Ice	0.3801	0.00
						1" Ice	0.4913	0.00
						2" Ice	0.7135	0.00
						4" Ice	1.1579	0.00
Aero MP3-03	C	No	CaAa (Out Of Face)	75.0000 - 60.0000	1	No Ice	0.2625	0.00
						1/2" Ice	0.3736	0.00
						1" Ice	0.4847	0.00
						2" Ice	0.7069	0.00
						4" Ice	1.1514	0.00

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	120.0000-90.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	5.400	0.33
L2	90.0000-74.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	3.463	0.30
L3	74.0000-60.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	6.475	0.26
L4	60.0000-43.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	7.974	0.32
L5	43.0000-30.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	6.097	0.24
L6	30.0000-20.5000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	5.204	0.18
L7	20.5000-13.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	4.109	0.14
L8	13.0000-6.6700	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	3.468	0.12
L9	6.6700-0.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	3.654	0.12

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	120.0000-90.0000	A	1.436	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	13.156	1.26
L2	90.0000-74.0000	A	1.394	0.000	0.000	0.000	0.000	0.00

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	8.234	0.82
L3	74.0000-60.0000	A	1.361	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	14.519	0.70
L4	60.0000-43.0000	A	1.319	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	17.438	0.82
L5	43.0000-30.0000	A	1.265	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	13.042	0.60
L6	30.0000-20.5000	A	1.250	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	11.040	0.43
L7	20.5000-13.0000	A	1.250	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	8.716	0.34
L8	13.0000-6.6700	A	1.250	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	7.356	0.29
L9	6.6700-0.0000	A	1.250	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	7.751	0.30

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	120.0000-90.0000	-0.2145	0.1239	-0.4255	0.2456
L2	90.0000-74.0000	-0.2537	0.1465	-0.4867	0.2810
L3	74.0000-60.0000	-0.4879	0.2817	-0.8255	0.4766
L4	60.0000-43.0000	-0.5130	0.2962	-0.8894	0.5135
L5	43.0000-30.0000	-0.5130	0.2962	-0.8772	0.5065
L6	30.0000-20.5000	-0.6017	0.3474	-1.0362	0.5983
L7	20.5000-13.0000	-0.6017	0.3474	-1.0362	0.5983
L8	13.0000-6.6700	-0.6017	0.3474	-1.0362	0.5983
L9	6.6700-0.0000	-0.6017	0.3474	-1.0362	0.5983

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
APXVTM14-C-120 w/ Mount Pipe	A	From Face	4.0000 0.00 3.00	0.00	117.0000	No Ice	7.1342	4.9591	0.08
						1/2" Ice	7.6618	5.7544	0.13
						1" Ice	8.1830	6.4723	0.19
						2" Ice	9.2563	8.0099	0.34
						4" Ice	11.5262	11.4120	0.75
APXVTM14-C-120 w/ Mount Pipe	B	From Face	4.0000 0.00 3.00	0.00	117.0000	No Ice	7.1342	4.9591	0.08
						1/2" Ice	7.6618	5.7544	0.13
						1" Ice	8.1830	6.4723	0.19
						2" Ice	9.2563	8.0099	0.34
						4" Ice	11.5262	11.4120	0.75
APXVTM14-C-120 w/ Mount Pipe	C	From Face	4.0000 0.00 3.00	0.00	117.0000	No Ice	7.1342	4.9591	0.08
						1/2" Ice	7.6618	5.7544	0.13
						1" Ice	8.1830	6.4723	0.19
						2" Ice	9.2563	8.0099	0.34
						4" Ice	11.5262	11.4120	0.75

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
APXV9ERR18-C-A20 w/ Mount Pipe	A	From Face	4.0000 0.00 3.00	0.00	117.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.4975 9.1490 9.7672 11.0311 13.6786	7.4708 8.6564 9.5559 11.3884 15.5274	0.09 0.16 0.24 0.42 0.94
APXVSPP18-C-A20 w/ Mount Pipe	B	From Face	4.0000 0.00 3.00	0.00	117.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.4975 9.1490 9.7672 11.0311 13.6786	6.9458 8.1266 9.0212 10.8440 14.8507	0.08 0.15 0.23 0.41 0.91
APXVSPP18-C-A20 w/ Mount Pipe	C	From Face	4.0000 0.00 3.00	0.00	117.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.4975 9.1490 9.7672 11.0311 13.6786	6.9458 8.1266 9.0212 10.8440 14.8507	0.08 0.15 0.23 0.41 0.91
800 EXTERNAL NOTCH FILTER	A	From Face	4.0000 0.00 3.00	0.00	117.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.7701 0.8898 1.0181 1.3007 1.9696	0.3747 0.4647 0.5634 0.7868 1.3372	0.01 0.02 0.02 0.04 0.11
800 EXTERNAL NOTCH FILTER	B	From Face	4.0000 0.00 3.00	0.00	117.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.7701 0.8898 1.0181 1.3007 1.9696	0.3747 0.4647 0.5634 0.7868 1.3372	0.01 0.02 0.02 0.04 0.11
800 EXTERNAL NOTCH FILTER	C	From Face	4.0000 0.00 3.00	0.00	117.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.7701 0.8898 1.0181 1.3007 1.9696	0.3747 0.4647 0.5634 0.7868 1.3372	0.01 0.02 0.02 0.04 0.11
TD-RRH8x20-25	A	From Face	4.0000 0.00 3.00	0.00	117.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.7198 5.0138 5.3165 5.9478 7.3141	1.7027 1.9196 2.1453 2.6224 3.6805	0.07 0.10 0.13 0.20 0.40
TD-RRH8x20-25	B	From Face	4.0000 0.00 3.00	0.00	117.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.7198 5.0138 5.3165 5.9478 7.3141	1.7027 1.9196 2.1453 2.6224 3.6805	0.07 0.10 0.13 0.20 0.40
TD-RRH8x20-25	C	From Face	4.0000 0.00 3.00	0.00	117.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.7198 5.0138 5.3165 5.9478 7.3141	1.7027 1.9196 2.1453 2.6224 3.6805	0.07 0.10 0.13 0.20 0.40
800MHZ RRH	A	From Face	4.0000 0.00 3.00	0.00	117.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.4899 2.7061 2.9310 3.4068 4.4620	2.0685 2.2705 2.4812 2.9284 3.9265	0.05 0.07 0.10 0.16 0.32
800MHZ RRH	B	From Face	4.0000 0.00 3.00	0.00	117.0000	No Ice 1/2" Ice 1" Ice 2" Ice	2.4899 2.7061 2.9310 3.4068 4.4620	2.0685 2.2705 2.4812 2.9284 3.9265	0.05 0.07 0.10 0.16 0.32

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
						4" Ice			
800MHZ RRH	C	From Face	4.0000 0.00 3.00	0.00	117.0000	No Ice	2.4899	2.0685	0.05
						1/2" Ice	2.7061	2.2705	0.07
						1" Ice	2.9310	2.4812	0.10
						2" Ice	3.4068	2.9284	0.16
						4" Ice	4.4620	3.9265	0.32
IBC1900HB-2	A	From Face	4.0000 0.00 3.00	0.00	117.0000	No Ice	1.3125	0.7875	0.04
						1/2" Ice	1.4821	0.9377	0.05
						1" Ice	1.6603	1.0965	0.06
						2" Ice	2.0427	1.4400	0.09
						4" Ice	2.9113	2.2307	0.18
IBC1900HB-2	B	From Face	4.0000 0.00 3.00	0.00	117.0000	No Ice	1.3125	0.7875	0.04
						1/2" Ice	1.4821	0.9377	0.05
						1" Ice	1.6603	1.0965	0.06
						2" Ice	2.0427	1.4400	0.09
						4" Ice	2.9113	2.2307	0.18
IBC1900HB-2	C	From Face	4.0000 0.00 3.00	0.00	117.0000	No Ice	1.3125	0.7875	0.04
						1/2" Ice	1.4821	0.9377	0.05
						1" Ice	1.6603	1.0965	0.06
						2" Ice	2.0427	1.4400	0.09
						4" Ice	2.9113	2.2307	0.18
(3) ACU-A20-N	A	From Face	4.0000 0.00 3.00	0.00	117.0000	No Ice	0.0778	0.1361	0.00
						1/2" Ice	0.1210	0.1890	0.00
						1" Ice	0.1728	0.2506	0.00
						2" Ice	0.3025	0.3997	0.01
						4" Ice	0.6654	0.8015	0.04
(3) ACU-A20-N	B	From Face	4.0000 0.00 3.00	0.00	117.0000	No Ice	0.0778	0.1361	0.00
						1/2" Ice	0.1210	0.1890	0.00
						1" Ice	0.1728	0.2506	0.00
						2" Ice	0.3025	0.3997	0.01
						4" Ice	0.6654	0.8015	0.04
(3) ACU-A20-N	C	From Face	4.0000 0.00 3.00	0.00	117.0000	No Ice	0.0778	0.1361	0.00
						1/2" Ice	0.1210	0.1890	0.00
						1" Ice	0.1728	0.2506	0.00
						2" Ice	0.3025	0.3997	0.01
						4" Ice	0.6654	0.8015	0.04
(2) 1900MHz RRH (65MHz)	A	From Face	4.0000 0.00 3.00	0.00	117.0000	No Ice	2.7087	2.6087	0.06
						1/2" Ice	2.9477	2.8450	0.08
						1" Ice	3.1953	3.0899	0.11
						2" Ice	3.7164	3.6057	0.17
						4" Ice	4.8623	4.7410	0.35
(2) 1900MHz RRH (65MHz)	B	From Face	4.0000 0.00 3.00	0.00	117.0000	No Ice	2.7087	2.6087	0.06
						1/2" Ice	2.9477	2.8450	0.08
						1" Ice	3.1953	3.0899	0.11
						2" Ice	3.7164	3.6057	0.17
						4" Ice	4.8623	4.7410	0.35
(2) 1900MHz RRH (65MHz)	C	From Face	4.0000 0.00 3.00	0.00	117.0000	No Ice	2.7087	2.6087	0.06
						1/2" Ice	2.9477	2.8450	0.08
						1" Ice	3.1953	3.0899	0.11
						2" Ice	3.7164	3.6057	0.17
						4" Ice	4.8623	4.7410	0.35
LLPX310R W/ Mount Pipe	A	From Face	4.0000 0.00 0.00	0.00	117.0000	No Ice	4.9623	2.8484	0.04
						1/2" Ice	5.3512	3.3668	0.08
						1" Ice	5.7501	3.9019	0.12
						1" Ice	6.5777	5.0799	0.23

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	8.3714	7.8368	0.53
						4" Ice			
(2) LLPX310R W/ Mount Pipe	B	From Face	4.0000 0.00 0.00	0.00	117.0000	No Ice	4.9623	2.8484	0.04
						1/2" Ice	5.3512	3.3668	0.08
						1" Ice	5.7501	3.9019	0.12
						2" Ice	6.5777	5.0799	0.23
						4" Ice	8.3714	7.8368	0.53
Horizon Compact	A	From Face	4.0000 0.00 4.00	0.00	117.0000	No Ice	0.8409	0.4295	0.01
						1/2" Ice	0.9658	0.5249	0.02
						1" Ice	1.0993	0.6289	0.03
						2" Ice	1.3922	0.8629	0.05
						4" Ice	2.0819	1.4345	0.12
FDD_R6_RRH	A	From Face	4.0000 0.00 0.00	0.00	117.0000	No Ice	1.7889	0.9889	0.04
						1/2" Ice	1.9715	1.2370	0.05
						1" Ice	2.1627	1.5048	0.07
						2" Ice	2.5710	2.0997	0.12
						4" Ice	3.4914	3.5265	0.27
Horizon Compact	B	From Face	4.0000 0.00 7.00	0.00	117.0000	No Ice	0.8409	0.4295	0.01
						1/2" Ice	0.9658	0.5249	0.02
						1" Ice	1.0993	0.6289	0.03
						2" Ice	1.3922	0.8629	0.05
						4" Ice	2.0819	1.4345	0.12
(2) FDD_R6_RRH	B	From Face	4.0000 0.00 0.00	0.00	117.0000	No Ice	1.7889	0.9889	0.04
						1/2" Ice	1.9715	1.2370	0.05
						1" Ice	2.1627	1.5048	0.07
						2" Ice	2.5710	2.0997	0.12
						4" Ice	3.4914	3.5265	0.27
Platform Mount [LP 502-1]	C	None		0.00	117.0000	No Ice	32.3472	32.3472	0.93
						1/2" Ice	45.6677	45.6677	1.19
						1" Ice	58.9882	58.9882	1.46
						2" Ice	85.6292	85.6292	2.00
						4" Ice	138.9112	138.9112	3.07
****									
BXA-171063-8BF-EDIN-2 w/ Mount Pipe	A	From Face	4.0000 0.00 0.00	0.00	100.0000	No Ice	3.1789	3.3530	0.03
						1/2" Ice	3.5550	3.9709	0.06
						1" Ice	3.9637	4.5951	0.10
						2" Ice	4.8533	5.8933	0.19
						4" Ice	6.7671	8.8855	0.49
BXA-171063-8BF-EDIN-2 w/ Mount Pipe	B	From Face	4.0000 0.00 0.00	0.00	100.0000	No Ice	3.1789	3.3530	0.03
						1/2" Ice	3.5550	3.9709	0.06
						1" Ice	3.9637	4.5951	0.10
						2" Ice	4.8533	5.8933	0.19
						4" Ice	6.7671	8.8855	0.49
BXA-171063-8BF-EDIN-2 w/ Mount Pipe	C	From Face	4.0000 0.00 0.00	0.00	100.0000	No Ice	3.1789	3.3530	0.03
						1/2" Ice	3.5550	3.9709	0.06
						1" Ice	3.9637	4.5951	0.10
						2" Ice	4.8533	5.8933	0.19
						4" Ice	6.7671	8.8855	0.49
(2) FD9R6004/2C-3L	A	From Face	4.0000 0.00 0.00	0.00	100.0000	No Ice	0.3665	0.0846	0.00
						1/2" Ice	0.4506	0.1362	0.01
						1" Ice	0.5433	0.1965	0.01
						2" Ice	0.7546	0.3430	0.02
						4" Ice	1.2808	0.7396	0.06
(2) FD9R6004/2C-3L	B	From Face	4.0000 0.00	0.00	100.0000	No Ice	0.3665	0.0846	0.00
						1/2"	0.4506	0.1362	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
			0.00			Ice	0.5433	0.1965	0.01
						1" Ice	0.7546	0.3430	0.02
						2" Ice	1.2808	0.7396	0.06
						4" Ice			
(2) FD9R6004/2C-3L	C	From Face	4.0000	0.00	100.0000	No Ice	0.3665	0.0846	0.00
			0.00			1/2"	0.4506	0.1362	0.01
			0.00			Ice	0.5433	0.1965	0.01
						1" Ice	0.7546	0.3430	0.02
						2" Ice	1.2808	0.7396	0.06
						4" Ice			
BXA-70063-6BF-EDIN-0 w/ Mount Pipe	A	From Face	4.0000	0.00	100.0000	No Ice	7.5371	5.4600	0.04
			0.00			1/2"	8.0822	6.3840	0.10
			0.00			Ice	8.6298	7.1844	0.16
						1" Ice	9.7523	8.8352	0.32
						2" Ice	12.1061	12.3454	0.76
						4" Ice			
BXA-70063-6BF-EDIN-0 w/ Mount Pipe	B	From Face	4.0000	0.00	100.0000	No Ice	7.5371	5.4600	0.04
			0.00			1/2"	8.0822	6.3840	0.10
			0.00			Ice	8.6298	7.1844	0.16
						1" Ice	9.7523	8.8352	0.32
						2" Ice	12.1061	12.3454	0.76
						4" Ice			
BXA-70063-6BF-EDIN-0 w/ Mount Pipe	C	From Face	4.0000	0.00	100.0000	No Ice	7.5371	5.4600	0.04
			0.00			1/2"	8.0822	6.3840	0.10
			0.00			Ice	8.6298	7.1844	0.16
						1" Ice	9.7523	8.8352	0.32
						2" Ice	12.1061	12.3454	0.76
						4" Ice			
LNX-4514DS-A1M w/ Mount Pipe	A	From Face	4.0000	0.00	100.0000	No Ice	7.9031	4.5411	0.05
			0.00			1/2"	8.4084	5.2329	0.10
			0.00			Ice	8.9164	5.9168	0.17
						1" Ice	9.9637	7.4036	0.31
						2" Ice	12.1852	10.6044	0.73
						4" Ice			
LNX-4514DS-A1M w/ Mount Pipe	B	From Face	4.0000	0.00	100.0000	No Ice	7.9031	4.5411	0.05
			0.00			1/2"	8.4084	5.2329	0.10
			0.00			Ice	8.9164	5.9168	0.17
						1" Ice	9.9637	7.4036	0.31
						2" Ice	12.1852	10.6044	0.73
						4" Ice			
LNX-4514DS-A1M w/ Mount Pipe	C	From Face	4.0000	0.00	100.0000	No Ice	7.9031	4.5411	0.05
			0.00			1/2"	8.4084	5.2329	0.10
			0.00			Ice	8.9164	5.9168	0.17
						1" Ice	9.9637	7.4036	0.31
						2" Ice	12.1852	10.6044	0.73
						4" Ice			
BXA-171063-8BF-EDIN-0 w/ Mount Pipe	A	From Face	4.0000	0.00	100.0000	No Ice	3.1789	3.3530	0.03
			0.00			1/2"	3.5550	3.9709	0.06
			0.00			Ice	3.9637	4.5951	0.10
						1" Ice	4.8533	5.8933	0.19
						2" Ice	6.7671	8.8855	0.49
						4" Ice			
BXA-171063-8BF-EDIN-0 w/ Mount Pipe	B	From Face	4.0000	0.00	100.0000	No Ice	3.1789	3.3530	0.03
			0.00			1/2"	3.5550	3.9709	0.06
			0.00			Ice	3.9637	4.5951	0.10
						1" Ice	4.8533	5.8933	0.19
						2" Ice	6.7671	8.8855	0.49
						4" Ice			
BXA-171063-8BF-EDIN-0 w/ Mount Pipe	C	From Face	4.0000	0.00	100.0000	No Ice	3.1789	3.3530	0.03
			0.00			1/2"	3.5550	3.9709	0.06
			0.00			Ice	3.9637	4.5951	0.10
						1" Ice	4.8533	5.8933	0.19
						2" Ice	6.7671	8.8855	0.49
						4" Ice			
(2) FD9R6004/2C-3L	A	From Face	4.0000	0.00	100.0000	No Ice	0.3665	0.0846	0.00

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
			0.00 0.00			1/2" Ice	0.4506 0.5433	0.1362 0.1965	0.01 0.01
						1" Ice	0.7546	0.3430	0.02
						2" Ice	1.2808	0.7396	0.06
						4" Ice			
(2) FD9R6004/2C-3L	B	From Face	4.0000 0.00 0.00	0.00	100.0000	No Ice 1/2" Ice	0.3665 0.4506 0.5433	0.0846 0.1362 0.1965	0.00 0.01 0.01
						1" Ice	0.7546	0.3430	0.02
						2" Ice	1.2808	0.7396	0.06
						4" Ice			
(2) FD9R6004/2C-3L	C	From Face	4.0000 0.00 0.00	0.00	100.0000	No Ice 1/2" Ice	0.3665 0.4506 0.5433	0.0846 0.1362 0.1965	0.00 0.01 0.01
						1" Ice	0.7546	0.3430	0.02
						2" Ice	1.2808	0.7396	0.06
						4" Ice			
Platform Mount [LP 303-1]	C	None		0.00	100.0000	No Ice 1/2" Ice	14.6600 18.8700 23.0800	14.6600 18.8700 23.0800	1.25 1.48 1.71
						1" Ice	31.5000	31.5000	2.18
						2" Ice	48.3400	48.3400	3.10
						4" Ice			
****									
Bridge Stiffener (93" x 16" x 1.25")	A	From Face	0.0000 0.00 0.00	0.00	30.0000	No Ice 1/2" Ice	1.6146 2.4934 3.3846	14.4667 15.1775 15.8969	0.35 0.41 0.47
						1" Ice	5.1543	17.3617	0.62
						2" Ice	7.4831	20.3951	1.02
						4" Ice			
Bridge Stiffener (93" x 16" x 1.25")	B	From Face	0.0000 0.00 0.00	0.00	30.0000	No Ice 1/2" Ice	1.6146 2.4934 3.3846	14.4667 15.1775 15.8969	0.35 0.41 0.47
						1" Ice	5.1543	17.3617	0.62
						2" Ice	7.4831	20.3951	1.02
						4" Ice			
Bridge Stiffener (93" x 16" x 1.25")	C	From Face	0.0000 0.00 0.00	0.00	30.0000	No Ice 1/2" Ice	1.6146 2.4934 3.3846	14.4667 15.1775 15.8969	0.35 0.41 0.47
						1" Ice	5.1543	17.3617	0.62
						2" Ice	7.4831	20.3951	1.02
						4" Ice			
Bridge Stiffener (58" x 14" x 1.25")	A	From Face	0.0000 0.00 0.00	0.00	60.0000	No Ice 1/2" Ice	1.0069 1.5617 2.0568	7.8944 8.3654 8.8451	0.35 0.38 0.42
						1" Ice	2.7770	9.8302	0.51
						2" Ice	4.3065	11.9043	0.75
						4" Ice			
Bridge Stiffener (58" x 14" x 1.25")	B	From Face	0.0000 0.00 0.00	0.00	60.0000	No Ice 1/2" Ice	1.0069 1.5617 2.0568	7.8944 8.3654 8.8451	0.35 0.38 0.42
						1" Ice	2.7770	9.8302	0.51
						2" Ice	4.3065	11.9043	0.75
						4" Ice			
Bridge Stiffener (58" x 14" x 1.25")	C	From Face	0.0000 0.00 0.00	0.00	60.0000	No Ice 1/2" Ice	1.0069 1.5617 2.0568	7.8944 8.3654 8.8451	0.35 0.38 0.42
						1" Ice	2.7770	9.8302	0.51
						2" Ice	4.3065	11.9043	0.75
						4" Ice			

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight K
VHLP1-18	A	Paraboloid w/o Radome	From Face	4.0000 0.00 4.00	0.00		117.0000	1.2750	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.2800 1.4500 1.6200 1.9700 2.6600	0.01 0.02 0.03 0.04 0.07
VHLP1-18	B	Paraboloid w/o Radome	From Face	4.0000 0.00 7.00	0.00		117.0000	1.2750	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.2800 1.4500 1.6200 1.9700 2.6600	0.01 0.02 0.03 0.04 0.07

Tower Pressures - No Ice

G_H = 1.690

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft^2	Face	A_F ft^2	A_R ft^2	A_{leg} ft^2	Leg %	C_AA_A In Face ft^2	C_AA_A Out Face ft^2
L1 120.0000-90.0000	105.0000	1.392	25.75	60.000	A	0.000	60.000	60.000	100.00	0.000	0.000
					B	0.000	60.000		100.00	0.000	0.000
					C	0.000	60.000		100.00	0.000	5.400
L2 90.0000-74.0000	82.0000	1.297	23.99	32.000	A	0.000	32.000	32.000	100.00	0.000	0.000
					B	0.000	32.000		100.00	0.000	0.000
					C	0.000	32.000		100.00	0.000	3.463
L3 74.0000-60.0000	67.0000	1.224	22.64	28.000	A	0.000	28.000	28.000	100.00	0.000	0.000
					B	0.000	28.000		100.00	0.000	0.000
					C	0.000	28.000		100.00	0.000	6.475
L4 60.0000-43.0000	51.5000	1.136	21.00	42.500	A	0.000	42.500	42.500	100.00	0.000	0.000
					B	0.000	42.500		100.00	0.000	0.000
					C	0.000	42.500		100.00	0.000	7.974
L5 43.0000-30.0000	36.5000	1.029	19.04	32.500	A	0.000	32.500	32.500	100.00	0.000	0.000
					B	0.000	32.500		100.00	0.000	0.000
					C	0.000	32.500		100.00	0.000	6.097
L6 30.0000-20.5000	25.2500	1	18.50	28.500	A	0.000	28.500	28.500	100.00	0.000	0.000
					B	0.000	28.500		100.00	0.000	0.000
					C	0.000	28.500		100.00	0.000	5.204
L7 20.5000-13.0000	16.7500	1	18.50	22.500	A	0.000	22.500	22.500	100.00	0.000	0.000
					B	0.000	22.500		100.00	0.000	0.000
					C	0.000	22.500		100.00	0.000	4.109
L8 13.0000-6.6700	9.8350	1	18.50	18.990	A	0.000	18.990	18.990	100.00	0.000	0.000
					B	0.000	18.990		100.00	0.000	0.000
					C	0.000	18.990		100.00	0.000	3.468
L9 6.6700-0.0000	3.3350	1	18.50	20.010	A	0.000	20.010	20.010	100.00	0.000	0.000
					B	0.000	20.010		100.00	0.000	0.000
					C	0.000	20.010		100.00	0.000	3.654

Tower Pressure - With Ice

G_H = 1.690

Section Elevation ft	z ft	K_Z	q_z psf	t_Z in	A_G ft^2	Face	A_F ft^2	A_R ft^2	A_{leg} ft^2	Leg %	C_AA_A In Face ft^2	C_AA_A Out Face ft^2
L1 120.0000-90.0000	105.0000	1.392	5.04	1.4363	67.181	A	0.000	67.181	67.181	100.00	0.000	0.000
						B	0.000	67.181		100.00	0.000	0.000
						C	0.000	67.181		100.00	0.000	13.156
L2 90.0000-74.0000	82.0000	1.297	4.69	1.3943	35.718	A	0.000	35.718	35.718	100.00	0.000	0.000
						B	0.000	35.718		100.00	0.000	0.000

Section Elevation ft	z ft	K_Z	q_z psf	t_Z in	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
						C	0.000	35.718		100.00	0.000	8.234
L3 74.0000-60.0000	67.0000	1.224	4.43	1.3609	31.175	A	0.000	31.175	31.175	100.00	0.000	0.000
						B	0.000	31.175		100.00	0.000	0.000
						C	0.000	31.175		100.00	0.000	14.519
L4 60.0000-43.0000	51.5000	1.136	4.11	1.3186	46.236	A	0.000	46.236	46.236	100.00	0.000	0.000
						B	0.000	46.236		100.00	0.000	0.000
						C	0.000	46.236		100.00	0.000	17.438
L5 43.0000-30.0000	36.5000	1.029	3.72	1.2652	35.241	A	0.000	35.241	35.241	100.00	0.000	0.000
						B	0.000	35.241		100.00	0.000	0.000
						C	0.000	35.241		100.00	0.000	13.042
L6 30.0000-20.5000	25.2500	1	3.62	1.2500	30.479	A	0.000	30.479	30.479	100.00	0.000	0.000
						B	0.000	30.479		100.00	0.000	0.000
						C	0.000	30.479		100.00	0.000	11.040
L7 20.5000-13.0000	16.7500	1	3.62	1.2500	24.063	A	0.000	24.063	24.063	100.00	0.000	0.000
						B	0.000	24.063		100.00	0.000	0.000
						C	0.000	24.063		100.00	0.000	8.716
L8 13.0000-6.6700	9.8350	1	3.62	1.2500	20.309	A	0.000	20.309	20.309	100.00	0.000	0.000
						B	0.000	20.309		100.00	0.000	0.000
						C	0.000	20.309		100.00	0.000	7.356
L9 6.6700-0.0000	3.3350	1	3.62	1.2500	21.400	A	0.000	21.400	21.400	100.00	0.000	0.000
						B	0.000	21.400		100.00	0.000	0.000
						C	0.000	21.400		100.00	0.000	7.751

Tower Pressure - Service

G_H = 1.690

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1 120.0000-90.0000	105.0000	1.392	8.91	60.000	A	0.000	60.000	60.000	100.00	0.000	0.000
					B	0.000	60.000		100.00	0.000	0.000
					C	0.000	60.000		100.00	0.000	5.400
L2 90.0000-74.0000	82.0000	1.297	8.30	32.000	A	0.000	32.000	32.000	100.00	0.000	0.000
					B	0.000	32.000		100.00	0.000	0.000
					C	0.000	32.000		100.00	0.000	3.463
L3 74.0000-60.0000	67.0000	1.224	7.84	28.000	A	0.000	28.000	28.000	100.00	0.000	0.000
					B	0.000	28.000		100.00	0.000	0.000
					C	0.000	28.000		100.00	0.000	6.475
L4 60.0000-43.0000	51.5000	1.136	7.27	42.500	A	0.000	42.500	42.500	100.00	0.000	0.000
					B	0.000	42.500		100.00	0.000	0.000
					C	0.000	42.500		100.00	0.000	7.974
L5 43.0000-30.0000	36.5000	1.029	6.59	32.500	A	0.000	32.500	32.500	100.00	0.000	0.000
					B	0.000	32.500		100.00	0.000	0.000
					C	0.000	32.500		100.00	0.000	6.097
L6 30.0000-20.5000	25.2500	1	6.40	28.500	A	0.000	28.500	28.500	100.00	0.000	0.000
					B	0.000	28.500		100.00	0.000	0.000
					C	0.000	28.500		100.00	0.000	5.204
L7 20.5000-13.0000	16.7500	1	6.40	22.500	A	0.000	22.500	22.500	100.00	0.000	0.000
					B	0.000	22.500		100.00	0.000	0.000
					C	0.000	22.500		100.00	0.000	4.109
L8 13.0000-6.6700	9.8350	1	6.40	18.990	A	0.000	18.990	18.990	100.00	0.000	0.000
					B	0.000	18.990		100.00	0.000	0.000
					C	0.000	18.990		100.00	0.000	3.468
L9 6.6700-0.0000	3.3350	1	6.40	20.010	A	0.000	20.010	20.010	100.00	0.000	0.000
					B	0.000	20.010		100.00	0.000	0.000
					C	0.000	20.010		100.00	0.000	3.654

Load Combinations

Comb. No.	Description
1	Dead Only

Comb. No.	Description
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
L1	120 - 90	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-15.21	-0.17	1.91
			Max. Mx	5	-5.80	-242.64	1.16
			Max. My	8	-5.83	1.98	-235.86
			Max. Vy	11	-11.47	242.30	-2.84
			Max. Vx	8	11.25	1.98	-235.86
			Max. Torque	6			1.76
L2	90 - 74	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-18.23	0.35	1.64
			Max. Mx	5	-7.73	-433.48	1.54
			Max. My	8	-7.75	3.14	-423.30
			Max. Vy	11	-12.39	433.25	-4.69
			Max. Vx	8	12.17	3.14	-423.30
			Max. Torque	6			1.74
L3	74 - 60	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-21.33	0.78	1.40
			Max. Mx	5	-9.93	-612.84	1.86
			Max. My	8	-9.95	4.17	-599.68
			Max. Vy	11	-13.24	612.71	-6.31
			Max. Vx	8	13.02	4.17	-599.68
			Max. Torque	6			1.72
L4	60 - 43	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-27.19	1.40	1.05
			Max. Mx	11	-14.25	856.57	-8.30
			Max. My	8	-14.26	5.43	-839.80

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vy	11	-14.90	856.57	-8.30
			Max. Vx	8	14.68	5.43	-839.80
			Max. Torque	6			1.68
L5	43 - 30	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-31.22	1.84	0.79
			Max. Mx	11	-17.41	1055.12	-9.81
			Max. My	8	-17.42	6.38	-1035.52
			Max. Vy	11	-15.64	1055.12	-9.81
			Max. Vx	8	15.42	6.38	-1035.52
			Max. Torque	6			1.63
L6	30 - 20.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-35.69	2.22	0.57
			Max. Mx	11	-20.69	1213.92	-10.92
			Max. My	8	-20.70	7.09	-1192.25
			Max. Vy	11	-17.02	1213.92	-10.92
			Max. Vx	8	16.81	7.09	-1192.25
			Max. Torque	6			1.59
L7	20.5 - 13	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-38.41	2.52	0.40
			Max. Mx	11	-22.84	1343.36	-11.79
			Max. My	8	-22.85	7.64	-1320.07
			Max. Vy	11	-17.50	1343.36	-11.79
			Max. Vx	8	17.28	7.64	-1320.07
			Max. Torque	6			1.56
L8	13 - 6.67	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-40.75	2.77	0.25
			Max. Mx	11	-24.71	1455.33	-12.52
			Max. My	8	-24.71	8.11	-1430.68
			Max. Vy	11	-17.88	1455.33	-12.52
			Max. Vx	8	17.67	8.11	-1430.68
			Max. Torque	6			1.53
L9	6.67 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-43.17	3.04	0.10
			Max. Mx	11	-26.64	1575.86	-13.29
			Max. My	8	-26.64	8.59	-1549.78
			Max. Vy	11	-18.26	1575.86	-13.29
			Max. Vx	8	18.05	8.59	-1549.78
			Max. Torque	6			1.51

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	24	43.17	5.06	-0.02
	Max. H_x	11	26.65	18.25	-0.11
	Max. H_z	2	26.65	-0.07	17.99
	Max. M_x	2	1544.74	-0.07	17.99
	Max. M_z	5	1575.41	-18.25	0.02
	Max. Torsion	6	1.48	-15.78	-8.96
	Min. Vert	1	26.65	0.00	0.00
	Min. H_x	5	26.65	-18.25	0.02
	Min. H_z	8	26.65	0.07	-18.04
	Min. M_x	8	-1549.78	0.07	-18.04
	Min. M_z	11	-1575.86	18.25	-0.11
	Min. Torsion	11	-1.43	18.25	-0.11

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	26.65	0.00	0.00	-0.45	0.17	0.00
Dead+Wind 0 deg - No Ice	26.65	0.07	-17.99	-1544.74	-7.98	0.38

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead+Wind 30 deg - No Ice	26.65	9.16	-15.61	-1341.54	-791.34	-0.33
Dead+Wind 60 deg - No Ice	26.65	15.87	-9.01	-774.51	-1372.46	-1.03
Dead+Wind 90 deg - No Ice	26.65	18.25	-0.02	-3.14	-1575.41	-1.44
Dead+Wind 120 deg - No Ice	26.65	15.78	8.96	766.88	-1360.73	-1.48
Dead+Wind 150 deg - No Ice	26.65	9.09	15.55	1332.49	-783.78	-1.11
Dead+Wind 180 deg - No Ice	26.65	-0.07	18.04	1549.78	8.59	-0.37
Dead+Wind 210 deg - No Ice	26.65	-9.21	15.61	1340.69	798.44	0.46
Dead+Wind 240 deg - No Ice	26.65	-15.84	9.07	781.06	1369.33	1.10
Dead+Wind 270 deg - No Ice	26.65	-18.25	0.11	13.29	1575.86	1.43
Dead+Wind 300 deg - No Ice	26.65	-15.81	-8.90	-760.20	1364.87	1.40
Dead+Wind 330 deg - No Ice	26.65	-9.04	-15.55	-1333.35	777.58	0.99
Dead+Ice+Temp	43.17	-0.00	-0.00	-0.10	3.04	0.00
Dead+Wind 0 deg+Ice+Temp	43.17	0.01	-5.01	-453.94	1.76	0.11
Dead+Wind 30 deg+Ice+Temp	43.17	2.53	-4.35	-393.72	-226.98	-0.12
Dead+Wind 60 deg+Ice+Temp	43.17	4.40	-2.50	-226.76	-396.85	-0.34
Dead+Wind 90 deg+Ice+Temp	43.17	5.06	0.00	0.07	-456.62	-0.46
Dead+Wind 120 deg+Ice+Temp	43.17	4.38	2.50	226.26	-394.48	-0.47
Dead+Wind 150 deg+Ice+Temp	43.17	2.53	4.34	392.12	-226.48	-0.35
Dead+Wind 180 deg+Ice+Temp	43.17	-0.01	5.03	455.38	4.55	-0.11
Dead+Wind 210 deg+Ice+Temp	43.17	-2.55	4.35	393.49	235.12	0.15
Dead+Wind 240 deg+Ice+Temp	43.17	-4.39	2.52	228.62	402.10	0.36
Dead+Wind 270 deg+Ice+Temp	43.17	-5.06	0.02	2.81	462.88	0.46
Dead+Wind 300 deg+Ice+Temp	43.17	-4.39	-2.49	-224.36	401.78	0.45
Dead+Wind 330 deg+Ice+Temp	43.17	-2.51	-4.34	-392.34	230.86	0.31
Dead+Wind 0 deg - Service	26.65	0.02	-6.23	-535.21	-2.65	0.13
Dead+Wind 30 deg - Service	26.65	3.17	-5.40	-464.86	-273.91	-0.11
Dead+Wind 60 deg - Service	26.65	5.49	-3.12	-268.51	-475.15	-0.36
Dead+Wind 90 deg - Service	26.65	6.32	-0.01	-1.40	-545.43	-0.50
Dead+Wind 120 deg - Service	26.65	5.46	3.10	265.24	-471.08	-0.52
Dead+Wind 150 deg - Service	26.65	3.15	5.38	461.09	-271.29	-0.39
Dead+Wind 180 deg - Service	26.65	-0.02	6.24	536.33	3.09	-0.13
Dead+Wind 210 deg - Service	26.65	-3.19	5.40	463.93	276.60	0.16
Dead+Wind 240 deg - Service	26.65	-5.48	3.14	270.15	474.29	0.38
Dead+Wind 270 deg - Service	26.65	-6.32	0.04	4.29	545.81	0.50
Dead+Wind 300 deg - Service	26.65	-5.47	-3.08	-263.55	472.74	0.49
Dead+Wind 330 deg - Service	26.65	-3.13	-5.38	-462.01	269.36	0.34

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
1	0.00	-26.65	0.00	0.00	26.65	0.00	0.000%
2	0.07	-26.65	-17.99	-0.07	26.65	17.99	0.000%
3	9.16	-26.65	-15.61	-9.16	26.65	15.61	0.000%
4	15.87	-26.65	-9.01	-15.87	26.65	9.01	0.000%
5	18.25	-26.65	-0.02	-18.25	26.65	0.02	0.000%

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
6	15.78	-26.65	8.96	-15.78	26.65	-8.96	0.000%
7	9.09	-26.65	15.55	-9.09	26.65	-15.55	0.000%
8	-0.07	-26.65	18.04	0.07	26.65	-18.04	0.000%
9	-9.21	-26.65	15.61	9.21	26.65	-15.61	0.000%
10	-15.84	-26.65	9.07	15.84	26.65	-9.07	0.000%
11	-18.25	-26.65	0.11	18.25	26.65	-0.11	0.000%
12	-15.81	-26.65	-8.90	15.81	26.65	8.90	0.000%
13	-9.04	-26.65	-15.55	9.04	26.65	15.55	0.000%
14	0.00	-43.17	0.00	0.00	43.17	0.00	0.000%
15	0.01	-43.17	-5.01	-0.01	43.17	5.01	0.000%
16	2.53	-43.17	-4.35	-2.53	43.17	4.35	0.000%
17	4.40	-43.17	-2.50	-4.40	43.17	2.50	0.000%
18	5.06	-43.17	0.00	-5.06	43.17	-0.00	0.000%
19	4.38	-43.17	2.50	-4.38	43.17	-2.50	0.000%
20	2.53	-43.17	4.34	-2.53	43.17	-4.34	0.000%
21	-0.01	-43.17	5.03	0.01	43.17	-5.03	0.000%
22	-2.55	-43.17	4.35	2.55	43.17	-4.35	0.000%
23	-4.39	-43.17	2.52	4.39	43.17	-2.52	0.000%
24	-5.06	-43.17	0.02	5.06	43.17	-0.02	0.000%
25	-4.39	-43.17	-2.49	4.39	43.17	2.49	0.000%
26	-2.51	-43.17	-4.34	2.51	43.17	4.34	0.000%
27	0.02	-26.65	-6.23	-0.02	26.65	6.23	0.000%
28	3.17	-26.65	-5.40	-3.17	26.65	5.40	0.000%
29	5.49	-26.65	-3.12	-5.49	26.65	3.12	0.000%
30	6.32	-26.65	-0.01	-6.32	26.65	0.01	0.000%
31	5.46	-26.65	3.10	-5.46	26.65	-3.10	0.000%
32	3.15	-26.65	5.38	-3.15	26.65	-5.38	0.000%
33	-0.02	-26.65	6.24	0.02	26.65	-6.24	0.000%
34	-3.19	-26.65	5.40	3.19	26.65	-5.40	0.000%
35	-5.48	-26.65	3.14	5.48	26.65	-3.14	0.000%
36	-6.32	-26.65	0.04	6.32	26.65	-0.04	0.000%
37	-5.47	-26.65	-3.08	5.47	26.65	3.08	0.000%
38	-3.13	-26.65	-5.38	3.13	26.65	5.38	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	5	0.00000001	0.00001807
3	Yes	6	0.00000001	0.00000792
4	Yes	6	0.00000001	0.00000854
5	Yes	5	0.00000001	0.00004002
6	Yes	6	0.00000001	0.00000728
7	Yes	6	0.00000001	0.00000843
8	Yes	5	0.00000001	0.00000949
9	Yes	6	0.00000001	0.00000819
10	Yes	6	0.00000001	0.00000765
11	Yes	5	0.00000001	0.00003132
12	Yes	6	0.00000001	0.00000863
13	Yes	6	0.00000001	0.00000739
14	Yes	4	0.00000001	0.00002611
15	Yes	6	0.00000001	0.00002134
16	Yes	6	0.00000001	0.00002500
17	Yes	6	0.00000001	0.00002541
18	Yes	6	0.00000001	0.00002153
19	Yes	6	0.00000001	0.00002460
20	Yes	6	0.00000001	0.00002484
21	Yes	6	0.00000001	0.00002112
22	Yes	6	0.00000001	0.00002506
23	Yes	6	0.00000001	0.00002505
24	Yes	6	0.00000001	0.00002171
25	Yes	6	0.00000001	0.00002556
26	Yes	6	0.00000001	0.00002490
27	Yes	4	0.00000001	0.00009882
28	Yes	5	0.00000001	0.00002019
29	Yes	5	0.00000001	0.00002372

30	Yes	5	0.00000001	0.00000751
31	Yes	5	0.00000001	0.00001759
32	Yes	5	0.00000001	0.00002328
33	Yes	4	0.00000001	0.00008351
34	Yes	5	0.00000001	0.00002143
35	Yes	5	0.00000001	0.00001887
36	Yes	5	0.00000001	0.00000694
37	Yes	5	0.00000001	0.00002469
38	Yes	5	0.00000001	0.00001797

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	120 - 90	20.41	29	1.54	0.01
L2	90 - 74	11.20	29	1.31	0.00
L3	74 - 60	7.24	29	1.03	0.00
L4	60 - 43	4.60	29	0.76	0.00
L5	43 - 30	2.30	29	0.52	0.00
L6	30 - 20.5	1.10	29	0.34	0.00
L7	20.5 - 13	0.52	29	0.23	0.00
L8	13 - 6.67	0.22	36	0.15	0.00
L9	6.67 - 0	0.06	35	0.08	0.00

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
124.0000	VHLP1-18	29	20.41	1.54	0.01	22689
121.0000	VHLP1-18	29	20.41	1.54	0.01	22689
117.0000	APXVTM14-C-120 w/ Mount Pipe	29	19.45	1.52	0.01	22689
100.0000	BXA-171063-8BF-EDIN-2 w/ Mount Pipe	29	14.09	1.41	0.01	5671
60.0000	Bridge Stiffener (58" x 14" x 1.25")	29	4.60	0.76	0.00	3472
30.0000	Bridge Stiffener (93" x 16" x 1.25")	29	1.10	0.34	0.00	4338

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	120 - 90	58.79	4	4.43	0.03
L2	90 - 74	32.28	4	3.76	0.01
L3	74 - 60	20.88	4	2.97	0.01
L4	60 - 43	13.27	10	2.18	0.00
L5	43 - 30	6.63	10	1.51	0.00
L6	30 - 20.5	3.19	10	1.00	0.00
L7	20.5 - 13	1.52	10	0.68	0.00
L8	13 - 6.67	0.63	10	0.45	0.00
L9	6.67 - 0	0.17	10	0.24	0.00

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
124.0000	VHLP1-18	4	58.79	4.43	0.03	8010
121.0000	VHLP1-18	4	58.79	4.43	0.03	8010
117.0000	APXVTM14-C-120 w/ Mount	4	56.01	4.38	0.02	8010

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
100.0000	Pipe BXA-171063-8BF-EDIN-2 w/ Mount Pipe	4	40.61	4.08	0.02	2000
60.0000	Bridge Stiffener (58" x 14" x 1.25")	10	13.27	2.18	0.00	1209
30.0000	Bridge Stiffener (93" x 16" x 1.25")	10	3.19	1.00	0.00	1504

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	120 - 90 (1)	P24x1/4	30.0000	0.0000	0.0	23.70	18.6532	-5.80	442.00	0.013
L2	90 - 74 (2)	P24x3/8	16.0000	0.0000	0.0	25.20	27.8325	-7.72	701.38	0.011
L3	74 - 60 (3)	Pipe 24" x 0.51623" Reinf	14.0000	0.0000	0.0	25.20	38.0856	-9.93	959.76	0.010
L4	60 - 43 (4)	RPS 30" x 0.52963"	17.0000	0.0000	0.0	22.79	49.0352	-14.25	1117.71	0.013
L5	43 - 30 (5)	RPS 30" x 0.68852"	13.0000	0.0000	0.0	21.15	63.4022	-17.41	1340.96	0.013
L6	30 - 20.5 (6)	RPS 36" x 0.55016"	9.5000	0.0000	0.0	21.53	61.2707	-20.69	1319.40	0.016
L7	20.5 - 13 (7)	RPS 36" x 0.68817"	7.5000	0.0000	0.0	21.52	76.3424	-22.84	1643.04	0.014
L8	13 - 6.67 (8)	RPS 36" x 0.70877"	6.3300	0.0000	0.0	21.03	78.5818	-24.71	1652.58	0.015
L9	6.67 - 0 (9)	RPS 36" x 0.68817"	6.6700	0.0000	0.0	21.52	76.3424	-26.64	1643.04	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	120 - 90 (1)	P24x1/4	243.04	26.61	23.70	1.123	0.00	0.00	23.70	0.000
L2	90 - 74 (2)	P24x3/8	433.91	32.17	27.72	1.161	0.00	0.00	27.72	0.000
L3	74 - 60 (3)	Pipe 24" x 0.51623" Reinf	613.29	33.62	27.72	1.213	0.00	0.00	27.72	0.000
L4	60 - 43 (4)	RPS 30" x 0.52963"	857.02	28.97	25.07	1.155	0.00	0.00	25.07	0.000
L5	43 - 30 (5)	RPS 30" x 0.68852"	1055.47	27.89	23.27	1.199	0.00	0.00	23.27	0.000
L6	30 - 20.5 (6)	RPS 36" x 0.55016"	1214.34	27.25	23.69	1.150	0.00	0.00	23.69	0.000
L7	20.5 - 13 (7)	RPS 36" x 0.68817"	1343.83	24.38	23.67	1.030	0.00	0.00	23.67	0.000
L8	13 - 6.67 (8)	RPS 36" x 0.70877"	1455.85	25.69	23.13	1.111	0.00	0.00	23.13	0.000
L9	6.67 - 0 (9)	RPS 36" x 0.68817"	1576.43	28.61	23.67	1.208	0.00	0.00	23.67	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	120 - 90 (1)	P24x1/4	11.47	1.23	16.80	0.073	1.03	0.06	11.90	0.005
L2	90 - 74 (2)	P24x3/8	12.39	0.89	16.80	0.053	1.03	0.04	16.80	0.002
L3	74 - 60 (3)	Pipe 24" x 0.51623" Reinf	13.24	0.70	16.80	0.041	1.03	0.03	16.80	0.002
L4	60 - 43 (4)	RPS 30" x 0.52963"	14.90	0.61	15.20	0.040	1.03	0.02	15.20	0.001
L5	43 - 30 (5)	RPS 30" x 0.68852"	15.64	0.49	14.10	0.035	1.10	0.01	14.10	0.001
L6	30 - 20.5 (6)	RPS 36" x 0.55016"	17.03	0.56	14.36	0.039	1.10	0.01	14.36	0.001
L7	20.5 - 13 (7)	RPS 36" x 0.68817"	17.50	0.46	14.35	0.032	1.10	0.01	14.35	0.001
L8	13 - 6.67 (8)	RPS 36" x 0.70877"	17.89	0.46	14.02	0.032	1.10	0.01	14.02	0.001
L9	6.67 - 0 (9)	RPS 36" x 0.68817"	18.27	0.48	14.35	0.033	1.10	0.01	14.35	0.001

Pole Interaction Design Data

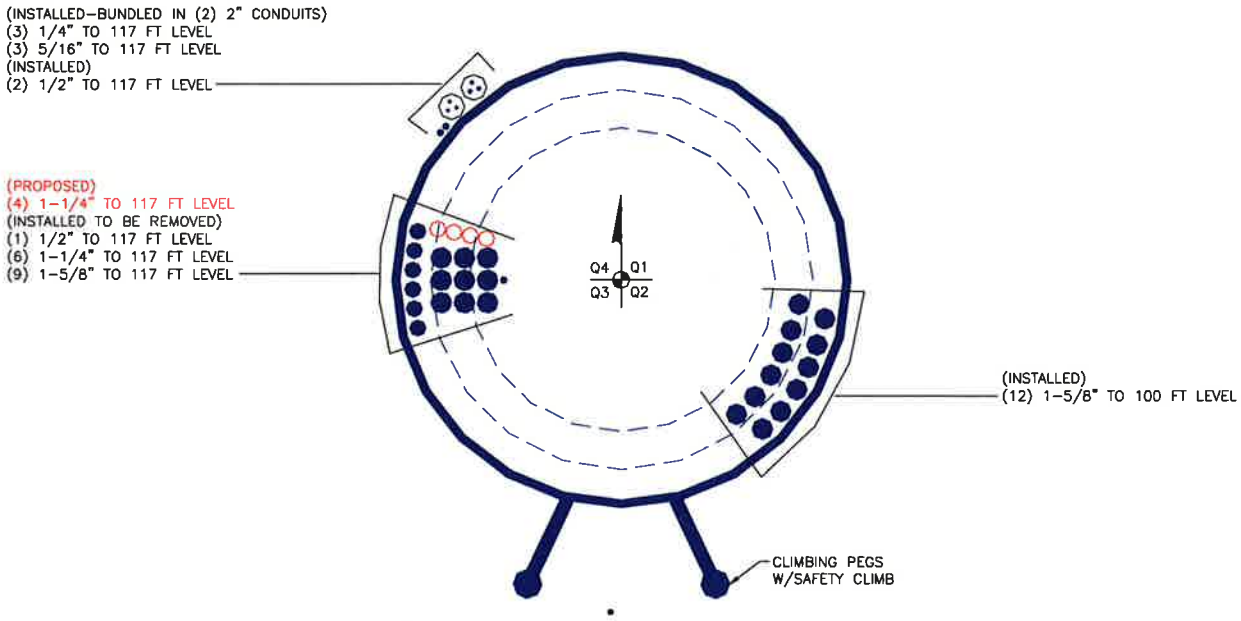
Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	120 - 90 (1)	0.013	1.123	0.000	0.073	0.005	1.142 ✔	1.333	H1-3+VT ✔
L2	90 - 74 (2)	0.011	1.161	0.000	0.053	0.002	1.175 ✔	1.333	H1-3+VT ✔
L3	74 - 60 (3)	0.010	1.213	0.000	0.041	0.002	1.225 ✔	1.333	H1-3+VT ✔
L4	60 - 43 (4)	0.013	1.155	0.000	0.040	0.001	1.170 ✔	1.333	H1-3+VT ✔
L5	43 - 30 (5)	0.013	1.199	0.000	0.035	0.001	1.213 ✔	1.333	H1-3+VT ✔
L6	30 - 20.5 (6)	0.016	1.150	0.000	0.039	0.001	1.167 ✔	1.333	H1-3+VT ✔
L7	20.5 - 13 (7)	0.014	1.030	0.000	0.032	0.001	1.045 ✔	1.333	H1-3+VT ✔
L8	13 - 6.67 (8)	0.015	1.111	0.000	0.032	0.001	1.127 ✔	1.333	H1-3+VT ✔
L9	6.67 - 0 (9)	0.016	1.208	0.000	0.033	0.001	1.226 ✔	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	120 - 90	Pole	P24x1/4	1	-5.80	589.19	85.7	Pass
L2	90 - 74	Pole	P24x3/8	2	-7.72	934.94	88.1	Pass
L3	74 - 60	Pole	Pipe 24" x 0.51623" Reinf	3	-9.93	1279.36	91.9	Pass
L4	60 - 43	Pole	RPS 30" x 0.52963"	4	-14.25	1489.91	87.8	Pass
L5	43 - 30	Pole	RPS 30" x 0.68852"	5	-17.41	1787.50	91.0	Pass
L6	30 - 20.5	Pole	RPS 36" x 0.55016"	6	-20.69	1758.76	87.6	Pass
L7	20.5 - 13	Pole	RPS 36" x 0.68817"	7	-22.84	2190.17	78.4	Pass
L8	13 - 6.67	Pole	RPS 36" x 0.70877"	8	-24.71	2202.89	84.5	Pass
L9	6.67 - 0	Pole	RPS 36" x 0.68817"	9	-26.64	2190.17	91.9	Pass
							Summary	
						Pole (L9)	91.9	Pass
						RATING =	**91.9**	**Pass**

APPENDIX B

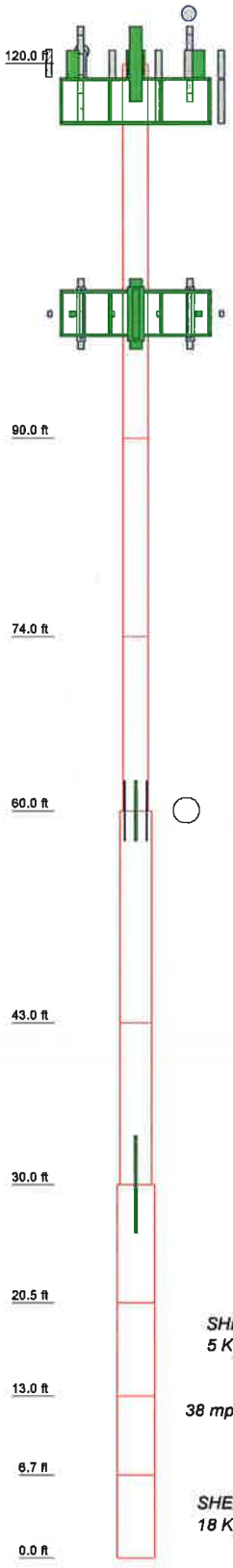
BASE LEVEL DRAWING

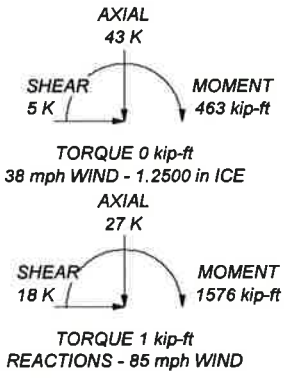


APPENDIX C

ADDITIONAL CALCULATIONS

Section	Size	Length (ft)	Socket Length (ft)	Grade	Weight (K)
1	P24x1/4	30.0000	5.0000	A500-42	1.9
2	P24x3/8	16.0000	5.0000		1.5
3	Pipe 24" x 0.51823" Reinf	14.0000	5.0000	Reinf 42.00 ksi	1.8
4	RPS 30" x 0.52983"	17.0000	5.0000	Reinf 37.99 ksi	2.8
5	RPS 30" x 0.68852"	13.0000	5.0000	Reinf 35.25 ksi	2.8
6	RPS 36" x 0.55016"	9.5000	5.0000	Reinf 35.89 ksi	2.0
7	RPS 36" x 0.6881"	7.5000	5.0000	Reinf 35.87 ksi	1.9
8	RPS 36" x 0.70[illegible]	6.3300	5.0000	Reinf 35.05 ksi	1.7
9	RPS 36" x 0.6[illegible]	6.6700		Reinf 35.[illegible]	1.7
					16.2





DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
APXVTM14-C-120 w/ Mount Pipe	117	(2) FD9R6004/2C-3L	100
APXVTM14-C-120 w/ Mount Pipe	117	(2) FD9R6004/2C-3L	100
APXVTM14-C-120 w/ Mount Pipe	117	(2) FD9R6004/2C-3L	100
APXV9ERR18-C-A20 w/ Mount Pipe	117	BXA-70063-6BF-EDIN-0 w/ Mount Pipe	100
APXVSPP18-C-A20 w/ Mount Pipe	117		
APXVSPP18-C-A20 w/ Mount Pipe	117	BXA-70063-6BF-EDIN-0 w/ Mount Pipe	100
800 EXTERNAL NOTCH FILTER	117		
800 EXTERNAL NOTCH FILTER	117	BXA-70063-6BF-EDIN-0 w/ Mount Pipe	100
800 EXTERNAL NOTCH FILTER	117		
TD-RRH8x20-25	117	LNX-4514DS-A1M w/ Mount Pipe	100
TD-RRH8x20-25	117	LNX-4514DS-A1M w/ Mount Pipe	100
TD-RRH8x20-25	117	LNX-4514DS-A1M w/ Mount Pipe	100
800MHZ RRH	117	BXA-171063-8BF-EDIN-0 w/ Mount Pipe	100
800MHZ RRH	117	BXA-171063-8BF-EDIN-0 w/ Mount Pipe	100
800MHZ RRH	117		
IBC1900HB-2	117	BXA-171063-8BF-EDIN-0 w/ Mount Pipe	100
IBC1900HB-2	117		
IBC1900HB-2	117	(2) FD9R6004/2C-3L	100
(3) ACU-A20-N	117	(2) FD9R6004/2C-3L	100
(3) ACU-A20-N	117	(2) FD9R6004/2C-3L	100
(3) ACU-A20-N	117	Platform Mount [LP 303-1]	100
(2) 1900MHz RRH (65MHz)	117	BXA-171063-8BF-EDIN-2 w/ Mount Pipe	100
(2) 1900MHz RRH (65MHz)	117		
(2) 1900MHz RRH (65MHz)	117	BXA-171063-8BF-EDIN-2 w/ Mount Pipe	100
LLPX310R W/ Mount Pipe	117		
(2) LLPX310R W/ Mount Pipe	117	Bridge Stiffener (58" x 14" x 1.25")	60
Horizon Compact	117	Bridge Stiffener (58" x 14" x 1.25")	60
FDD_R6_RRH	117	Bridge Stiffener (58" x 14" x 1.25")	60
Horizon Compact	117	Bridge Stiffener (93" x 16" x 1.25")	30
(2) FDD_R6_RRH	117	Bridge Stiffener (93" x 16" x 1.25")	30
Platform Mount [LP 502-1]	117	Bridge Stiffener (93" x 16" x 1.25")	30
VHLP1-18	117		
VHLP1-18	117		
BXA-171063-8BF-EDIN-2 w/ Mount Pipe	100		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A500-42	42 ksi	58 ksi	Reinf 35.89 ksi	36 ksi	45 ksi
Reinf 42.00 ksi	42 ksi	53 ksi	Reinf 35.87 ksi	36 ksi	45 ksi
Reinf 37.99 ksi	38 ksi	48 ksi	Reinf 35.05 ksi	35 ksi	44 ksi
Reinf 35.25 ksi	35 ksi	45 ksi			

TOWER DESIGN NOTES

1. Tower is located in New Haven 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 1.25 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 91.9%

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Columbus, OH 43215
Phone: 614.221.6679
FAX: 614.448.4105

Job: *120' MP; Milford JAI-ALAI; Milford, CT*			
Project: *PJF# 37513-2057 R3 (BU# 876309)*			
Client: CCI	Drawn by: cmccartney	App'd:	
Code: TIA/EIA-222-F	Date: 04/23/14	Scale: NTS	
Path:		Dwg No. E-1	

PJF job no. **37513-2057 R3** Project name **BU# 876309**

foundation loads

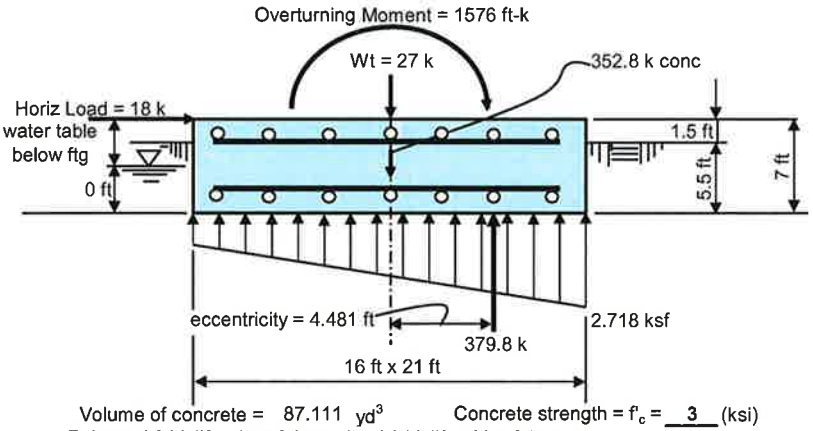
Tower or Pole Weight =	27	kips
Total Horizontal Force =	18	kips
Overturning Moment =	1576	ft-kips

soil properties

Safety factor against overturning =	1.5	
Soil density =	130	pcf
Allowable soil bearing =	10	ksf
Depth to water table =	6.7	ft

mat dimensions

depth to bottom of footing =	5.5	ft
Footing thickness =	7	ft
Footing Width =	16	ft
Footing Length =	21	ft
Tower/Pole Center Offset =	0	ft



Volume of concrete = 87.111 yd^3 Concrete strength = f'_c = 3 (ksi)

Rebar = (34) #8 x 15.5 ft long plus (34) #8 x 20.5 ft long

reinforcing steel = **(17) #8 by 15.5 long @ 15.38 in o.c. top and bot short bars**

reinforcing steel = **(17) #8 by 20.5 long @ 11.63 in o.c. top and bot long bars**

Summary of analysis results

Overturning Moment: (Stress Ratio = 0.84) **< CONTROLLING CRITERIA**

Calculated Overturning Moment = 1702 ft-kips

Resisting Moment = 3038.4 ft-kips

Factor of Safety against overturning = 1.785 **> 1.5 okay**

Rebar strength = F_y = 60 (ksi)

minimum cover over rebar = 3 inches

Soil Bearing (Stress Ratio = 0.272)

Net Soil Bearing Resistance = 10 ksf

Calculated Soil Bearing Pressure = 2.718 **ksf < 10 ksf okay**

Bending Moment (Stress Ratio = 0.232)

Ultimate Bending Moment Resistance = 4755 ft-kips

Calculated Ultimate Bending Moment = 1101 **ft-kips < 4755 ft-kips okay**

Bending Shear (Stress Ratio = 0.113)

Ultimate Bending Shear Resistance = 1421 kips

Calculated Ultimate Bending Shear = 160 **kips < 1421 kips okay**

PAUL J. FORD AND COMPANY
STRUCTURAL ENGINEERS
250 East Broad Street • Suite 600 • Columbus, Ohio 43215-3708

v4.4 - Effective 7-12-13

Date: 4/23/2014
PJF Project: 37513-2057 R3
Client Ref. # BU 876309
Site Name: Milford JAI-ALAI
Description: 120' MP
Owner: CCI
Engineer: CMM

Asymmetric Anchor Rod Analysis

Moment =	1576	k-ft	TIA Ref.	F	Location =	Base Plate		
Axial =	27.0	kips	ASIF =	1.3333	η =	N/A	for BP, Rev. G Sect. 4.9.9	
Shear =	18.0	kips	Max Ratio =	105.0%	Threads =	N/A	for FP, Rev. G	
Anchor Qty =	19							

** For Post Installed Anchors: Check anchors for embedment, epoxy/grout bond, and capacity based on proof load. **

Item	Nominal Anchor Dia, in	Spec	Fy, ksi	Fu, ksi	Location, degrees	Anchor Circle, in	Area Override, in^2	Area, in^2	Max Net Compression, kips	Max Net Tension, kips	Load for Capacity Calc, kips	Capacity Override, kips	Capacity, kips	Capacity Ratio
1	1.500	A354 Gr BC	109	125	0.0	41.00	0.00	1.77	86.52	83.93	83.93	0.00	97.19	86.4%
2	1.500	A354 Gr BC	109	125	22.5	41.00	0.00	1.77	86.24	83.65	83.65	0.00	97.19	86.1%
3	1.500	A354 Gr BC	109	125	45.0	41.00	0.00	1.77	84.23	81.64	81.64	0.00	97.19	84.0%
4	1.500	A354 Gr BC	109	125	67.5	41.00	0.00	1.77	81.83	79.24	79.24	0.00	97.19	81.5%
5	1.500	A354 Gr BC	109	125	90.0	41.00	0.00	1.77	80.76	78.17	78.17	0.00	97.19	80.4%
6	1.500	A354 Gr BC	109	125	112.5	41.00	0.00	1.77	81.98	79.39	79.39	0.00	97.19	81.7%
7	1.500	A354 Gr BC	109	125	135.0	41.00	0.00	1.77	84.94	82.35	82.35	0.00	97.19	84.7%
8	1.500	A354 Gr BC	109	125	157.5	41.00	0.00	1.77	87.97	85.38	85.38	0.00	97.19	87.8%
9	1.500	A354 Gr BC	109	125	180.0	41.00	0.00	1.77	89.41	86.82	86.82	0.00	97.19	89.3%
10	1.500	A354 Gr BC	109	125	202.5	41.00	0.00	1.77	88.44	85.85	85.85	0.00	97.19	88.3%
11	1.500	A354 Gr BC	109	125	225.0	41.00	0.00	1.77	85.41	82.82	82.82	0.00	97.19	85.2%
12	1.500	A354 Gr BC	109	125	247.5	41.00	0.00	1.77	81.75	79.16	79.16	0.00	97.19	81.4%
13	1.500	A354 Gr BC	109	125	270.0	41.00	0.00	1.77	79.36	76.77	76.77	0.00	97.19	79.0%
14	1.500	A354 Gr BC	109	125	292.5	41.00	0.00	1.77	79.49	76.90	76.90	0.00	97.19	79.1%
15	1.500	A354 Gr BC	109	125	315.0	41.00	0.00	1.77	81.83	79.24	79.24	0.00	97.19	81.5%
16	1.500	A354 Gr BC	109	125	337.5	41.00	0.00	1.77	84.75	82.16	82.16	0.00	97.19	84.5%
17	1.750	Dywidag (150 ksi)	127.7	150	11.3	47.00	0.00	2.71	152.43	148.46	148.46	0.00	178.99	82.9%
18	1.750	Dywidag (150 ksi)	127.7	150	123.8	47.00	0.00	2.71	146.00	142.03	142.03	0.00	178.99	79.3%
19	2.000	A193 Gr B7	105	125	258.8	47.00	0.00	3.14	163.36	158.75	158.75	0.00	172.79	91.9%
								36.84						

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

TIA Rev F

Site Data

BU#:	
Site Name:	
App #:	
Pole Manufacturer:	*Other*

Reactions		
Moment:	1204.2	ft-kips
Axial:	20.7	kips
Shear:	13.8	kips

Moment has been adjusted to account for additional anchor rods.

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

Anchor Rod Data		
Qty:	16	
Diam:	1.5	in
Rod Material:	Other	
Strength (Fu):	125	ksi
Yield (Fy):	109	ksi
Bolt Circle:	41	in

Plate Data		
Diam:	47	in
Thick:	2	in
Grade:	36	ksi
Single-Rod B-eff:	7.07	in

Stiffener Data (Welding at both sides)		
Config:	1	*
Weld Type:	Groove	
Groove Depth:	0.4375	in **
Groove Angle:	45	degrees
Fillet H. Weld:		<-- Disregard
Fillet V. Weld:	0.25	in
Width:	5.5	in
Height:	18	in
Thick:	1	in
Notch:	0.75	in
Grade:	50	ksi
Weld str.:	70	ksi

Pole Data		
Diam:	36	in
Thick:	0.375	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	58	ksi
Reinf. Fillet Weld	0	"0" if None

Stress Increase Factor		
ASIF:	1.333	

Anchor Rod Results

		Stiffened
Maximum Rod Tension:	86.8 Kips	Service, ASD
Allowable Tension:	97.2 Kips	Fty*ASIF
Anchor Rod Stress Ratio:	89.3% Pass	

Base Plate Results

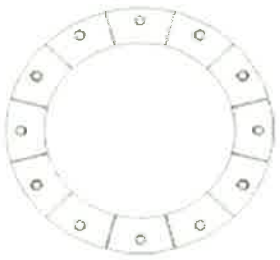
	Flexural Check	Stiffened
Base Plate Stress:	28.4 ksi	Service, ASD
Allowable Plate Stress:	36.0 ksi	0.75*Fy*ASIF
Base Plate Stress Ratio:	78.8% Pass	Y.L. Length:
		N/A, Roark

Stiffener Results

Horizontal Weld :	77.1% Pass
Vertical Weld:	40.6% Pass
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	6.3% Pass
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	34.3% Pass
Plate Comp. (AISC Bracket):	34.0% Pass

Pole Results

Pole Punching Shear Check:	10.7% 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

Stiffened or Unstiffened, Exterior Flange Plate - Any Bolt Material TIA Rev F

Site Data

BU#: *BU8776309*
Site Name: *Milford Jai-Alai*
App #:

Pole Manufacturer:	Rohn

Reactions		
Moment:	243.04	ft-kips
Axial:	5.8	kips
Shear:	11.47	kips
Elevation:	90	feet

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

Bolt Data			
Qty:	20		
Diameter (in.):	1	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:	0	<-- Disregard	Bolt Fty:
N/A:	0	<-- Disregard	44.00
Circle (in.):	28		

Plate Data		
Diam:	32	in
Thick, t:	1.5	in
Grade (Fy):	36	ksi
Strength, Fu:	58	ksi
Single-Rod B-eff:	3.77	in

Stiffener Data (Welding at Both Sides)		
Config:	0	*
Weld Type:	0	
Groove Depth:	0	in **
Groove Angle:	0	degrees
Fillet H. Weld:	0	<-- Disregard
Fillet V. Weld:	0	in
Width:	0	in
Height:	0	in
Thick:	0	in
Notch:	0	in
Grade:	0	ksi
Weld str.:	0	ksi

Pole Data		
Diam:	24	in
Thick:	0.25	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	58	ksi
Reinf. Fillet Weld	0	"0" if None

Stress Increase Factor		
ASIF:	1.3333333	

Flange Bolt Results

		Rigid
Bolt Tension Capacity, **B**:	46.08 kips	Service, ASD
Max Bolt directly applied T:	20.54 Kips	Fty*ASIF
Min. PL "tc" for **B** cap. **w/o** Pry:	1.748 in	
Min PL "treq" for actual **T w/ Pry:**	0.890 in	
Min PL "t1" for actual **T w/o Pry:**	1.167 in	
T allowable with Prying:	41.52 kips	0≤α'≤1 case
Prying Force, Q:	0.00 kips	
Total Bolt Tension=T+Q:	20.54 kips	
Prying Bolt Stress Ratio=(T+Q)/(B):	44.6% **Pass**	

Exterior Flange Plate Results — Flexural Check

		Rigid
Compression Side Plate Stress:	Rohn/Pirod, OK	Service ASD
Allowable Plate Stress:	36.0 ksi	0.75*Fy*ASIF
Compression Plate Stress Ratio:	Rohn/Pirod, OK	Comp. Y.L. Length:
No Prying		14.42
Tension Side Stress Ratio, (treq/t)^2:	35.2% Pass	

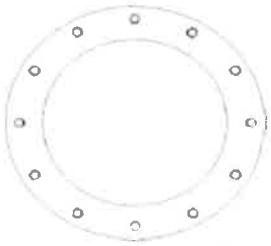
n/a

Stiffener Results — N/A for Rohn / Pirod

Horizontal Weld :	N/A
Vertical Weld:	N/A
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	N/A
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	N/A
Plate Comp. (AISC Bracket):	N/A

Pole Results

Pole Punching Shear Check: N/A



* 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

Stiffened or Unstiffened, Exterior Flange Plate - Any Bolt Material TIA Rev F

Site Data

BU#: *BU8776309*
Site Name: *Milford Jai-Alai*
App #:

Pole Manufacturer:	Rohn

Reactions		
Moment:	243.04	ft-kips
Axial:	5.8	kips
Shear:	11.47	kips
Elevation:	90	feet

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

Bolt Data			
Qty:	20		
Diameter (in.):	1	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:	0	<-- Disregard	Bolt Fty:
N/A:	0	<-- Disregard	44.00
Circle (in.):	28		

Plate Data		
Diam:	32	in
Thick, t:	1.5	in
Grade (Fy):	36	ksi
Strength, Fu:	58	ksi
Single-Rod B-eff:	3.77	in

Stiffener Data (Welding at Both Sides)		
Config:	0	*
Weld Type:	0	
Groove Depth:	0	in **
Groove Angle:	0	degrees
Fillet H. Weld:	0	<-- Disregard
Fillet V. Weld:	0	in
Width:	0	in
Height:	0	in
Thick:	0	in
Notch:	0	in
Grade:	0	ksi
Weld str.:	0	ksi

Pole Data		
Diam:	24	in
Thick:	0.375	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	58	ksi
Reinf. Fillet Weld	0	"0" if None

Stress Increase Factor		
ASIF:	1.3333333	

Flange Bolt Results

			Rigid
Bolt Tension Capacity, **B**:	46.08	kips	Service, ASD
Max Bolt directly applied T:	20.54	Kips	Fty*ASIF
Min. PL "tc" for **B** cap. **w/o** Pry:	1.748	in	
Min PL "treq" for actual **T w/ Pry**:	0.890	in	
Min PL "t1" for actual **T w/o Pry**:	1.167	in	
T allowable with Prying:	41.52	kips	0≤α'≤1 case
Prying Force, Q:	0.00	kips	
Total Bolt Tension=T+Q:	20.54	kips	
Prying Bolt Stress Ratio=(T+Q)/(B):	44.6%	Pass	

Exterior Flange Plate Results — Flexural Check

		Rigid
Compression Side Plate Stress:	Rohn/Pirod, OK	Service ASD
Allowable Plate Stress:	36.0 ksi	0.75*Fy*ASIF
Compression Plate Stress Ratio:	Rohn/Pirod, OK	Comp. Y.L. Length: 14.42
No Prying		
Tension Side Stress Ratio, (treq/t)^2:	35.2% Pass	

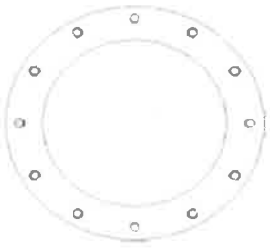
n/a

Stiffener Results — N/A for Rohn / Pirod

Horizontal Weld :	N/A
Vertical Weld:	N/A
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	N/A
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	N/A
Plate Comp. (AISC Bracket):	N/A

Pole Results

Pole Punching Shear Check: N/A



* 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

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STRUCTURAL ENGINEERS
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v2.0, Effective Date: 1-12-12

Date: 4/23/2014
Project No: 37513-2057 R3
Site Name: Milford Jai-Alai
Site Number/BUN: BU8776309
Description:
Owner:
Engineer:

Welded Bridge Stiffener Analysis per TIA/EIA-222-F & AISC 9th Ed. (Green)

General Parameters and Loading:

Flange Elevation:	60.00	ft
TIA Reference Standard:	TIA/EIA-222-F	
AISC Manual:	9th Ed. (Green)	
Method:	ASD	
ASD Stress Increase, ASIF:	1.333333333	
Moment, Mf:	613.3	k-ft
Axial, Pf:	9.9	kips
Shear, Vf:	13.2	kips

Pole Parameters:

	Upper Pole	Lower Pole	
Pole Diameter, Dp:	24.00	30.00	in
Pole Thickness, tp:	0.3750	0.3750	in
Pole Fy:	42	42	ksi
Pole Fu:	58	58	ksi
Flange Diameter, Df:	41.00	41.00	in

Bridge Stiffener Parameters:

	Stiffener Type 1	Stiffener Type 2	
Qty. Stiffeners:	3	0	
Upper Weld Length, L1:	25.00	0.00	in
Lower Weld Length, L2:	22.00	0.00	in
Weld Size, w:	0.3750	0.0000	in
Electrode:	E70	E70	
Effective Stiffener Width, Ws:	4.75	0.00	in
Stiffener Thickness, ts:	1.25	0.00	in
Notch, n:	0.00	0.00	in
Stiffener Fy:	65	0	ksi
Stiffener Fu:	80	0	ksi
Unbraced Length, L:	11.75	0.00	in
K:	0.80	0.00	
Stiffener Spacing:	Symmetric	Symmetric	
Start Angle, for Symmetric:	0	0	degrees
Stiffener Circle:	45.75	41.00	in = Df + 2 n + Ws
Upper Eccentricity, e1:	10.88	8.50	in = (Df - Dp) / 2 + n + Ws / 2
Lower Eccentricity, e2:	7.88	5.50	in = (Df - Dp) / 2 + n + Ws / 2

Flange Bolt Parameters:

Number of Bolt Circles: (1) Bolt Circle

	Bolt Circle 1	Bolt Circle 2	
Qty. Bolts:	12	0	
Bolt Diameter:	1.50	0.00	in
Bolt Circle:	35.00	0.00	in
Bolt Spacing:	Symmetric	Symmetric	
Start Angle, for Symmetric:	0	0	degrees
Bolt Area, Ag:	1.7671	0.0000	in
Max. Tension:	28.78	0.00	kips
Max. Net Tension:	28.33	0.00	kips
Max. Net Compression:	29.23	0.00	kips
Moment to Bolt Circle:	251.84	0.00	k-ft
Axial to Bolt Circle:	5.40	0.00	kips
Shear to Bolt Circle:	7.20	0.00	kips
Equivalent Bolt Circle:	35.00	0.00	in

Weld Analysis per AISC Table XIX & pg. 4-72:

Upper Pole	Stiffener Type 1	Stiffener Type 2	
D:	6	0	Num. of Sixteenths in Weld
a:	0.4350	0.0000	= e1 / L1
k:	0	0	
C:	0.8858	0.0000	Tabulated Cofficient
C1:	1.0000	1.0000	Coefficient for Electrode
ASIF:	1.3333	1.3333	
Stiffener Axial, Ps:	128.1	0.0	kips
Allowable Axial, Pa:	177.2	0.0	kips = ASIF C C1 D L
Ratio:	72.3%	0.0%	

Lower Pole	Stiffener Type 1	Stiffener Type 2	
D:	6	0	Num. of Sixteenths in Weld
a:	0.3580	0.0000	= e2 / L2
k:	0	0	
C:	1.0235	0.0000	Tabulated Cofficient
C1:	1.0000	1.0000	Coefficient for Electrode
ASIF:	1.3333	1.3333	
Stiffener Axial, Ps:	128.1	0.0	kips
Allowable Axial, Pa:	180.1	0.0	kips = ASIF C C1 D L
Ratio:	71.1%	0.0%	

Pole Analysis per AISC Sect. F4:

Upper Pole	Stiffener Type 1	Stiffener Type 2	
Stiffener Axial, P:	128.1	0.0	kips
Effective Throat, te:	0.2651	0.0000	in = 0.707 w
Shear Stress, fv:	2.6	0.0	kips/in= P / (2 L1)
Section Modulus, S:	208.3	0.0	in^2 = $L1^2$ / 3
Bending Stress, fb:	6.7	0.0	kips/in = P e1 / S
Combined Stress, f:	7.2	0.0	kips/in = $(fv^2 + fb^2)^{1/2}$
ASIF:	1.3333	0.0000	
Allowable Stress, F:	8.4	0.0	kips/in = ASIF (0.4 Fy) tp
Ratio:	85.3%	0.0%	

Lower Pole	Stiffener Type 1	Stiffener Type 2	
Stiffener Axial, P:	128.1	0.0	kips
Effective Throat, te:	0.2651	0.0000	in = 0.707 w
Shear Stress, fv:	2.9	0.0	ksi = P / (2 L2)
Section Modulus, S:	161.3	0.0	in^2 = $L2^2$ / 3
Bending Stress, fb:	6.3	0.0	ksi = P e2 / S
Combined Stress, f:	6.9	0.0	kips/in = $(fv^2 + fb^2)^{1/2}$
ASIF:	1.3333	0.0000	
Allowable Stress, F:	8.4	0.0	kips/in = ASIF (0.4 Fy) tp
Ratio:	82.1%	0.0%	

Stiffener 1 Analysis per AISC Sect. D1, E2, F1.2 & App. B

	Stiffener Type 1	
Gross Area, Ag:	5.9375	in^2
Net Area, An:	5.9375	in^2
Stiffener Axial, P:	128.1	kips
Stiffener Stress, f:	21.6	ksi = P / Ag
b:	13.2500	in = (Df - Dp) / 2 + n + Ws, Upper Pole
b / ts:	10.6000	in
Q, Where Qa = 1.0:	0.9580	= Qa 1.340 - 0.00447 (b / ts) $Fy^{1/2}$
r:	0.3608	in^3
K L / r:	26.0500	
ASIF:	1.3333	
Allowable Axial, Fa:	45.28	ksi = ASIF Q [1 - (K L / r) / 2 Cc^2] Fy / [5/3 + 3(K L / r) / 8 Cc' - (K L / r)^3 / 8 Cc^3]
ASIF:	1.3333	
Allowable Bending, Fb:	49.82	ksi = ASIF 0.6 Fy Q
ASIF:	1.3333	
Allowable Net Tension, Ft:	53.33	ksi = ASIF 0.5 Fu
Ratio:	47.7%	

Stiffener 2 Analysis per AISC Sect. D1, E2, F1.2 & App. B

	Stiffener Type 2	
Gross Area, Ag:	0.0000	in^2
Net Area, An:	0.0000	in^2
Stiffener Axial, P:	0.0	kips
Stiffener Stress, f:	0.0	ksi = P / Ag
b:	0.0000	in = (Df - Dp) / 2 + n + Ws, Upper Pole
b / ts:	0.0000	in
Q, Where Qa = 1.0:	0.0000	
r:	0.0000	in^3
K L / r:	0.0000	
ASIF:	0.0000	
Allowable Axial, Fa:	0.00	ksi = ASIF [1 - (K L / r) / 2 Cc^2] Fy / [5/3 + 3(K L / r) / 8 Cc - (K L / r)^3 / 8 Cc^3]
ASIF:	0.0000	
Allowable Bending, Fb:	0.00	ksi = ASIF 0.6 Fy
ASIF:	0.0000	
Allowable Net Tension, Ft:	0.00	ksi = ASIF 0.5 Fu
Ratio:	0.0%	

Analysis Summary:

Bridge Stiffener Type 1
Weld Analysis Ratio: 72.3% PASS
Pole Analysis Ratio: 85.3% PASS
Stiffener Analysis Ratio: 47.7% PASS

Bridge Stiffener Type 2
Weld Analysis Ratio: 0.0% PASS
Pole Analysis Ratio: 0.0% PASS
Stiffener Analysis Ratio: 0.0% PASS

Stiffened or Unstiffened, Exterior Flange Plate - Any Bolt Material TIA Rev F

Site Data

BU#: *BU8776309*
Site Name: *Milford Jai-Alai*
App #:

Pole Manufacturer:	Other

Reactions		
Moment:	251.84	ft-kips
Axial:	5.4	kips
Shear:	7.2	kips
Elevation:	60	feet

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

Bolt Data			
Qty:	12		
Diameter (in.):	1.5	Bolt Fu:	105
Bolt Material:	A325	Bolt Fy:	81
N/A:	0	<-- Disregard	Bolt Fty:
N/A:	0	<-- Disregard	44.00
Circle (in.):	35		

Plate Data		
Diam:	41	in
Thick, t:	2	in
Grade (Fy):	36	ksi
Strength, Fu:	58	ksi
Single-Rod B-eff:	6.28	in

Stiffener Data (Welding at Both Sides)		
Config:	0	*
Weld Type:	0	
Groove Depth:	0	in **
Groove Angle:	0	degrees
Fillet H. Weld:	0	<-- Disregard
Fillet V. Weld:	0	in
Width:	0	in
Height:	0	in
Thick:	0	in
Notch:	0	in
Grade:	0	ksi
Weld str.:	0	ksi

Pole Data		
Diam:	24	in
Thick:	0.375	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	58	ksi
Reinf. Fillet Weld	0	"0" if None

Stress Increase Factor		
ASIF:	1.3333333	

Flange Bolt Results

			Rigid
Bolt Tension Capacity, **B**:	103.67	kips	Service, ASD
Max Bolt directly applied T:	28.33	Kips	Fty*ASIF
Min. PL "tc" for **B** cap. **w/o Pry:**	3.614	in	
Min PL "treq" for actual **T w/ Pry:**	1.428	in	
Min PL "t1" for actual **T w/o Pry:**	1.889	in	
T allowable with Prying:	55.60	kips	α'>1 case
Prying Force, Q:	0.00	kips	
Total Bolt Tension=T+Q:	28.33	kips	
Prying Bolt Stress Ratio=(T+Q)/(B):	27.3%	Pass	

Exterior Flange Plate Results Flexural Check

			Rigid
Compression Side Plate Stress:	18.9	ksi	Service ASD
Allowable Plate Stress:	36.0	ksi	0.75*Fy*ASIF
Compression Plate Stress Ratio:	52.5%	Pass	Comp. Y.L. Length:
No Prying			25.48
Tension Side Stress Ratio, (treq/t)^2:	51.0%	Pass	

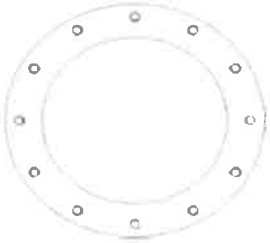
n/a

Stiffener Results

Horizontal Weld :	n/a
Vertical Weld:	n/a
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	n/a
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	n/a
Plate Comp. (AISC Bracket):	n/a

Pole Results

Pole Punching Shear Check: n/a



* 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

Stiffened or Unstiffened, Exterior Flange Plate - Any Bolt Material TIA Rev F

Site Data

BU#: *BU8776309*
Site Name: *Milford Jai-Alai*
App #:

Pole Manufacturer:	Other

Reactions		
Moment:	251.84	ft-kips
Axial:	5.4	kips
Shear:	7.2	kips
Elevation:	60	feet

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

Bolt Data			
Qty:	12		
Diameter (in.):	1.5	Bolt Fu:	105
Bolt Material:	A325	Bolt Fy:	81
N/A:	0	<-- Disregard	Bolt Fty:
N/A:	0	<-- Disregard	44.00
Circle (in.):	35		

Plate Data		
Diam:	41	in
Thick, t:	2	in
Grade (Fy):	36	ksi
Strength, Fu:	58	ksi
Single-Rod B-eff:	7.85	in

Stiffener Data (Welding at Both Sides)		
Config:	0	*
Weld Type:	0	
Groove Depth:	0	in **
Groove Angle:	0	degrees
Fillet H. Weld:	0	<-- Disregard
Fillet V. Weld:	0	in
Width:	0	in
Height:	0	in
Thick:	0	in
Notch:	0	in
Grade:	0	ksi
Weld str.:	0	ksi

Pole Data		
Diam:	30	in
Thick:	0.375	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	58	ksi
Reinf. Fillet Weld	0	"0" if None

Stress Increase Factor		
ASIF:	1.3333333	

Flange Bolt Results

			Rigid
Bolt Tension Capacity, **B**:	103.67	kips	Service, ASD
Max Bolt directly applied T:	28.33	Kips	Fty*ASIF
Min. PL "tc" for **B** cap. **w/o** Pry:	1.962	in	
Min PL "treq" for actual **T w/ Pry**:	0.764	in	
Min PL "t1" for actual **T w/o Pry**:	1.026	in	
T allowable w/o Prying:	103.67	kips	α'<0 case
Prying Force, Q:	0.00	kips	
Total Bolt Tension=T+Q:	28.33	kips	
Non-Prying Bolt Stress Ratio, T/B:	27.3%	Pass	

Exterior Flange Plate Results — Flexural Check

			Rigid
Compression Side Plate Stress:	8.9	ksi	Service ASD
Allowable Plate Stress:	36.0	ksi	0.75*Fy*ASIF
Compression Plate Stress Ratio:	24.9%	Pass	Comp. Y.L. Length:
No Prying			18.03
Tension Side Stress Ratio, (treq/t)^2:	14.6%	Pass	

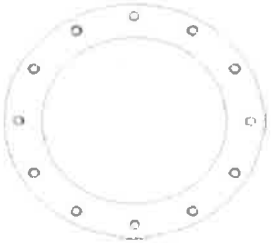
n/a

Stiffener Results

Horizontal Weld :	n/a
Vertical Weld:	n/a
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	n/a
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	n/a
Plate Comp. (AISC Bracket):	n/a

Pole Results

Pole Punching Shear Check: n/a



* 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

PAUL J. FORD AND COMPANY
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v2.0, Effective Date: 1-12-12

Date: 4/23/2014
Project No: 37513-2057 R3
Site Name: Milford Jai-Alai
Site Number/BUN: BU8776309
Description:
Owner:
Engineer:

Welded Bridge Stiffener Analysis per TIA/EIA-222-F & AISC 9th Ed. (Green)

General Parameters and Loading:

Flange Elevation:	30.00	ft
TIA Reference Standard:	TIA/EIA-222-F	
AISC Manual:	9th Ed. (Green)	
Method:	ASD	
ASD Stress Increase, ASIF:	1.333333333	
Moment, Mf:	1055.5	k-ft
Axial, Pf:	17.4	kips
Shear, Vf:	15.6	kips

Pole Parameters:

	Upper Pole	Lower Pole	
Pole Diameter, Dp:	30.00	36.00	in
Pole Thickness, tp:	0.3750	0.3750	in
Pole Fy:	42	42	ksi
Pole Fu:	58	58	ksi
Flange Diameter, Df:	47.00	47.00	in

Bridge Stiffener Parameters:

	Stiffener Type 1	Stiffener Type 2	
Qty. Stiffeners:	3	3	
Upper Weld Length, L1:	25.00	45.25	in
Lower Weld Length, L2:	22.00	42.25	in
Weld Size, w:	0.3750	0.3750	in
Electrode:	E70	E70	
Effective Stiffener Width, Ws:	4.75	7.00	in
Stiffener Thickness, ts:	1.25	1.25	in
Notch, n:	0.00	0.50	in
Stiffener Fy:	65	65	ksi
Stiffener Fu:	80	80	ksi
Unbraced Length, L:	11.75	5.50	in
K:	0.80	0.80	
Stiffener Spacing:	Symmetric	Symmetric	
Start Angle, for Symmetric:	0	30	degrees
Stiffener Circle:	51.75	55.00	in = Df + 2 n + Ws
Upper Eccentricity, e1:	10.88	12.50	in = (Df - Dp) / 2 + n + Ws / 2
Lower Eccentricity, e2:	7.88	9.50	in = (Df - Dp) / 2 + n + Ws / 2

Flange Bolt Parameters:

Number of Bolt Circles: (1) Bolt Circle

	Bolt Circle 1	Bolt Circle 2	
Qty. Bolts:	0	0	
Bolt Diameter:	1.50	0.00	in
Bolt Circle:	41.00	0.00	in
Bolt Spacing:	Symmetric	Symmetric	
Start Angle, for Symmetric:	0	0	degrees
Bolt Area, Ag:	0.0000	0.0000	in
Max. Tension:	0.00	0.00	kips
Max. Net Tension:	0.00	0.00	kips
Max. Net Compression:	0.00	0.00	kips
Moment to Bolt Circle:	0.00	0.00	k-ft
Axial to Bolt Circle:	0.00	0.00	kips
Shear to Bolt Circle:	0.00	0.00	kips
Equivalent Bolt Circle:	0.00	0.00	in

Weld Analysis per AISC Table XIX & pg. 4-72:

Upper Pole	Stiffener Type 1	Stiffener Type 2	
D:	6	6	Num. of Sixteenths in Weld
a:	0.4350	0.2762	= e1 / L1
k:	0	0	
C:	0.8858	1.1970	Tabulated Cofficient
C1:	1.0000	1.0000	Coefficient for Electrode
ASIF:	1.3333	1.3333	
Stiffener Axial, Ps:	124.9	195.3	kips
Allowable Axial, Pa:	177.2	433.3	kips = ASIF C C1 D L
Ratio:	70.5%	45.1%	
Lower Pole			
D:	6	6	Num. of Sixteenths in Weld
a:	0.3580	0.2249	= e2 / L2
k:	0	0	
C:	1.0235	1.3254	Tabulated Cofficient
C1:	1.0000	1.0000	Coefficient for Electrode
ASIF:	1.3333	1.3333	
Stiffener Axial, Ps:	124.9	195.3	kips
Allowable Axial, Pa:	180.1	448.0	kips = ASIF C C1 D L
Ratio:	69.3%	43.6%	

Pole Analysis per AISC Sect. F4:

Upper Pole	Stiffener Type 1	Stiffener Type 2	
Stiffener Axial, P:	124.9	195.3	kips
Effective Throat, te:	0.2651	0.2651	in = 0.707 w
Shear Stress, fv:	2.5	2.2	kips/in= P / (2 L1)
Section Modulus, S:	208.3	682.5	in^2 = $L1^2$ / 3
Bending Stress, fb:	6.5	3.6	kips/in = P e1 / S
Combined Stress, f:	7.0	4.2	kips/in = $(fv^2 + fb^2)^{1/2}$
ASIF:	1.3333	1.3333	
Allowable Stress, F:	8.4	8.4	kips/in = ASIF (0.4 Fy) tp
Ratio:	83.1%	49.7%	
Lower Pole			
Stiffener Axial, P:	124.9	195.3	kips
Effective Throat, te:	0.2651	0.2651	in = 0.707 w
Shear Stress, fv:	2.8	2.3	ksi = P / (2 L2)
Section Modulus, S:	161.3	595.0	in^2 = $L2^2$ / 3
Bending Stress, fb:	6.1	3.1	ksi = P e2 / S
Combined Stress, f:	6.7	3.9	kips/in = $(fv^2 + fb^2)^{1/2}$
ASIF:	1.3333	1.3333	
Allowable Stress, F:	8.4	8.4	kips/in = ASIF (0.4 Fy) tp
Ratio:	80.0%	46.2%	

Stiffener 1 Analysis per AISC Sect. D1, E2, F1.2 & App. B

	Stiffener Type 1	
Gross Area, Ag:	5.9375	in^2
Net Area, An:	5.9375	in^2
Stiffener Axial, P:	124.9	kips
Stiffener Stress, f:	21.0	ksi = P / Ag
b:	13.2500	in = (Df - Dp) / 2 + n + Ws, Upper Pole
b / ts:	10.6000	in
Q, Where Qa = 1.0:	0.9580	= Qa 1.340 - 0.00447 (b / ts) $Fy^{1/2}$
r:	0.3608	in^3
K L / r:	26.0500	
ASIF:	1.3333	
Allowable Axial, Fa:	45.28	ksi = ASIF Q [1 - (K L / r) / 2 Cc'^2] Fy / [5/3 + 3(K L / r) / 8 Cc' - $(K L / r)^3$ / 8 Cc'^3]
ASIF:	1.3333	
Allowable Bending, Fb:	49.82	ksi = ASIF 0.6 Fy Q
ASIF:	1.3333	
Allowable Net Tension, Ft:	53.33	ksi = ASIF 0.5 Fu
Ratio:	46.4%	

Stiffener 2 Analysis per AISC Sect. D1, E2, F1.2 & App. B

	Stiffener Type 2	
Gross Area, Ag:	8.7500	in^2
Net Area, An:	8.7500	in^2
Stiffener Axial, P:	195.3	kips
Stiffener Stress, f:	22.3	ksi = P / Ag
b:	16.0000	in = (Df - Dp) / 2 + n + Ws, Upper Pole
b / ts:	12.8000	in
Q, Where Qa = 1.0:	0.8787	= Qa 1.340 - 0.00447 (b / ts) $Fy^{1/2}$
r:	0.3608	in^3
K L / r:	12.1936	
ASIF:	1.3333	
Allowable Axial, Fa:	44.15	ksi = ASIF Q [1 - (K L / r) / 2 Cc'^2] Fy / [5/3 + 3(K L / r) / 8 Cc' - $(K L / r)^3$ / 8 Cc'^3]
ASIF:	1.3333	
Allowable Bending, Fb:	45.69	ksi = ASIF 0.6 Fy Q
ASIF:	1.3333	
Allowable Net Tension, Ft:	53.33	ksi = ASIF 0.5 Fu
Ratio:	50.6%	

Analysis Summary:

Bridge Stiffener Type 1	Bridge Stiffener Type 2
Weld Analysis Ratio: 70.5% PASS	Weld Analysis Ratio: 45.1% PASS
Pole Analysis Ratio: 83.1% PASS	Pole Analysis Ratio: 49.7% PASS
Stiffener Analysis Ratio: 46.4% PASS	Stiffener Analysis Ratio: 50.6% PASS