Robinson+Cole

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Also admitted in Massachusetts

August 7, 2014

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

Re: **Notice of Exempt Modification – Facility Modification**
439-455 Homestead Avenue, Hartford, Connecticut

Dear Ms. Bachman:

Cellco Partnership d/b/a Verizon Wireless ("Cellco") currently maintains twelve (12) wireless telecommunications antennas at the top of the existing 140-foot tower at 439-455 Homestead Avenue in Hartford, Connecticut (the "Property"). The tower is owned by Crown Castle. The Council approved Cellco's use of this tower in 1990 (Docket No. 126). Cellco now intends to modify its facility by replacing three of its antennas with three (3) model X7C-FRO-660-V, 700 MHz antennas, at the same level on the tower. Included in Attachment 1 are specifications for Cellco's replacement antennas.

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 Pedro E. Segarra, Mayor for the City of Hartford. A copy of this letter is also being sent to Talar Properties, 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 antennas will be installed at the top of the existing 140-foot 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 cumulative 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). Please note, several of the antennas called out in Table 1, entitled "Proposed Antenna and Cable Information" were approved by the Council in EM-VER-064-130220 and have already been installed.

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,

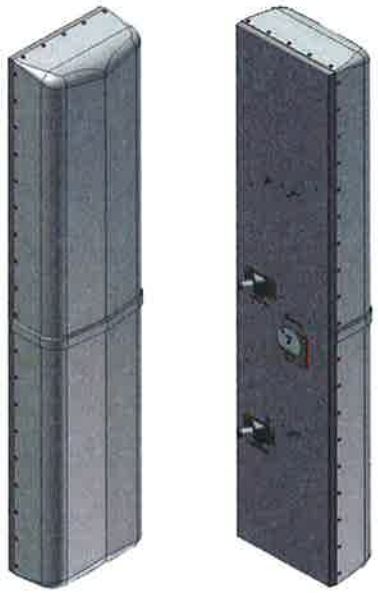
Kenneth C. Baldwin

Enclosures
Copy to:
Pedro E. Segarra, Mayor
Talar Properties, LLC
Sandy M. Carter

ATTACHMENT 1

X7C-FRO-660-V

X-Pol Antenna, 698-896MHz, Fast-Roll-Off 60° H-Beam
RET/MET



- Designed to improve SNR
- Greatly increases LTE data rates
- Broadband radiator
- Macro Cell, high gain antenna
- Suitable for LTE/CDMA/UMTS/GSM
- AISG 2.0 RET or manual MET tilt control

Electrical Specifications

Frequency Band, MHz	**698-824**	**824-896**
Horizontal Beamwidth, 3dB points	62	58
Gain, dBi	15.9	16.0
Vertical Beamwidth, 3dB points	12.0	10.5
Front-to-Back at 180°, dB	>28	
Upper Sidelobe Suppression, Typical, dB	<-18	
Polarization	+/-45°	
Electrical Downtilt	0-10° or 4-14°	
VSWR/Return Loss, dB, Maximum	1.5:1/14.0	
Isolation Between Ports, dB, Mimimum	-28	
Intermodulation (2x20w), IM3, dBc, Maximum	-150	
Impedance, ohms	50	
Maximum Power Per Connector, CW	500	
Lightning Protection	DC Ground	

X7C-FRO-660-V

X-Pol Antenna, 698-896MHz, Fast-Roll-Off 60° H-Beam
RET/MET

Mechanical Specifications

Dimensions, Length/Width/Depth	72.0/14.6/8.0 in (1829/372/204 mm)
Connector (Quantity) Type	(2) 7-16 DIN Female
Connector Torque	220-265 lbf-in (25-30 N-m)
Connector Location	Back
Antenna Weight	35.0 lbs
Bracket Weight	13.2 lbs (6.0 kg)
Standard Bracket Kit	CSS P/N 919011
Mechanical Downtilt Range	0-12°
Radome Material	Ultra High Strength Luran, UV Stabilized, ASTM D1925
Wind Survival	150 mph (241 km/h)
Front Wind Load	205.39 lbf (913.65 N) @100mph
Equivalent Flat Plate	4.09 sq-ft (c=2) @ 100mph

RET Information

Model	CSS-RET-200
Mounting Location	Rear of Antenna
Weight	1.2 lb (0.54 kg)
Communication Standard	AISG 2.0
Control System	CSS-PCU-220

Order Information

Model	*Description*
X7C-FRO-660-VR0	Antenna with manual RET adjust electrical downtilt 0-10°
X7C-FRO-660-VR4	Antenna with manual RET adjust electrical downtilt 4-14°
X7C-FRO-660-VM0	Antenna with remote MET adjust electrical downtilt 0-10°
X7C-FRO-660-VM4	Antenna with remote MET adjust electrical downtilt 4-14°

Optional Bracket Kit

919036	Bracket Kit, 2-Point, 12 deg D-tilt, For 4.5" OD Pole

ATTACHMENT 2

	General	Power	Density					
Site Name: Hartford NW								
Tower Height: Verizon @ 142 ft								
CARRIER	**# OF CHAN.**	**WATTS ERP**	**HEIGHT**	**CALC. POWER DENS**	**FREQ.**	**MAX. PERMISS. EXP.**	**FRACTION MPE**	**Total**
*Sprint CDMA/LTE	6	347.5	104	0.0693	1900	1.0000	6.93%	
*Sprint CDMA/LTE	1	195	104	0.0065	850	0.5667	1.14%	
*Sprint CDMA/LTE	2	195	104	0.0130	2500	1.0000	1.30%	
*Clearwire	2	153	104	0.0102	2496	1.0000	1.02%	
*Clearwire	1	211	108	0.0065	11 GHz	1.0000	0.65%	
*Sensus (CL&P)	1	200	74	0.0131	940.1125	0.6267	2.10%	
*MetroPCS CDMA	3	727	94	0.0888	2135	1.0000	8.88%	
*MetroPCS LTE	1	1200	94	0.0488	2130	1.0000	4.88%	
*T-Mobile GSM/UMTS	2	12	128	0.0005	1950	1.0000	0.05%	
*T-Mobile UMTS	2	12	128	0.0005	2100	1.0000	0.05%	
*T-Mobile LTE	2	24	128	0.0011	2100	1.0000	0.11%	
*AT&T UMTS	2	875	120	0.0437	1900	1.0000	4.37%	
*AT&T UMTS	2	565	120	0.0282	880	0.5867	4.81%	
*AT&T GSM	4	525	120	0.0524	1900	1.0000	5.24%	
*AT&T GSM	1	283	120	0.0071	880	0.5867	1.20%	
*AT&T LTE	1	1615	120	0.0403	734	0.4893	8.24%	
Verizon	**11**	**421**	**142**	**0.0826**	**1970**	**1.0000**	**8.26%**	
Verizon	**9**	**393**	**142**	**0.0631**	**869**	**0.5793**	**10.89%**	
Verizon	**1**	**1750**	**142**	**0.0312**	**2145**	**1.0000**	**3.12%**	
Verizon	**1**	**1050**	**142**	**0.0187**	**698**	**0.4973**	**3.77%**	
								77.00%
* Source: Siting Council								

ATTACHMENT 3

Date: **July 09, 2014**

James Ravencraft
Crown Castle
3530 Toringdon Way Suite 300
Charlotte, NC 28277

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

Subject:	**Structural Analysis Report**	
Carrier Designation:	***Verizon Wireless* Co-Locate** **Carrier Site Name:**	 Hartford NW, CT
Crown Castle Designation:	**Crown Castle BU Number:** **Crown Castle Site Name:** **Crown Castle JDE Job Number:** **Crown Castle Work Order Number:** **Crown Castle Application Number:**	806369 HRT 094 943225 296956 793375 254786 Rev. 0
Engineering Firm Designation:	**Crown Castle Project Number:**	793375
Site Data:	**439-455 HOMESTEAD AVE, HARTFORD, Hartford County, CT** **Latitude *41° 47' 1.61"*, Longitude *-72° 42' 13.66"*** **140 Foot - Monopole Tower**	

Dear James Ravencraft,

Crown Castle is pleased to submit this **"Structural Analysis Report"** to determine the structural integrity of the above mentioned tower. This analysis has been performed in accordance with the Crown Castle Structural 'Statement of Work' and the terms of Crown Castle Purchase Order Number 793375, in accordance with application 254786, revision 0.

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 1 and Table 2 for the proposed and existing/reserved loading, respectively.

This analysis has been performed in accordance with the TIA/EIA-222-F standard and 2005 CT State Building Code with 2009 amendment based upon a wind speed of 80 mph fastest mile.

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

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

Structural analysis prepared by: Tilak Baindur / Mitchell Prust, EIT

Respectfully submitted by:

Jamal A. Huwel, P.E.
Manager Engineering

Date Signed: 07/09/2014

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 140 ft. Monopole tower designed by Valmont in August of 1999. The tower was originally designed for a wind speed of 125 mph per TIA/EIA-222-F.

2) ANALYSIS CRITERIA

The structural analysis was performed for this tower in accordance with the requirements of TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a fastest mile wind speed of 80 mph with no ice, 37.6 mph with 1 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
142.0	142.0	3	alcatel lucent	RRH2x40-AWS	1	1-5/8	-
		3	amphenol	BXA-80063-4BF-EDIN-X w/ Mount Pipe			
		3	antel	BXA-171063-8BF-EDIN-2 w/ Mount Pipe			
		3	antel	BXA-171063/8CF-EDIN-2 w/ Mount Pipe			
		3	css	X7C-FRO-660-V w/ Mount Pipe			
		1	rfs celwave	DB-T1-6Z-8AB-0Z			

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
142.0	142.0	3	antel	BXA-185090/8CF w/ Mount Pipe	-	-	3
		3	antel	BXA-70063/6CF w/ Mount Pipe			
		6	antel	LPA-80080/4CF w/ Mount Pipe			
		6	rfs celwave	FD9R6004/2C-3L	12	1-5/8	1
		1	tower mounts	Platform Mount [LP 101-1]			
126.0	128.0	3	ericsson	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	1	1-5/8	2
		3	ericsson	ERICSSON AIR 21 B4A B2P w/ Mount Pipe			
		3	rfs celwave	ATMAA1412D-1A20			
	126.0	1	tower mounts	Platform Mount [LP 1001-1]	12	1-5/8	1
115.0	117.0	6	ericsson	RRUS-11	12 2 1	1-5/8 3/4 3/8	1
		1	kmw communications	AM-X-CD-16-65-00T-RET w/ Mount Pipe			

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
		2	powerwave technologies	P65-17-XLH-RR w/ Mount Pipe			
	116.0	6	powerwave technologies	7770.00 w/ Mount Pipe			
		12	powerwave technologies	LGP21401			
		1	raycap	DC6-48-60-18-8F			
	115.0	1	tower mounts	Platform Mount [LP 712-1]			
103.0	104.0	3	alcatel lucent	PCS 1900MHz 4x45W-65MHz	-	-	1
	103.0	3	alcatel lucent	PCS 1900MHz 4x45W-65MHz			
		1	tower mounts	Collar Mount [SO 102-3]			
	102.0	3	alcatel lucent	800MHz 2X50W RRH W/FILTER			
102.0	108.0	1	andrew	VHLP2-180	3	1/2	1
		1	andrew	VHLP2.5-11			
		2	dragonwave	HORIZON COMPACT			
	104.0	3	alcatel lucent	TD-RRH8x20-25	1	1-1/4	2
		3	rfs celwave	APXVTM14-C-120 w/ Mount Pipe			
		3	argus technologies	LLPX310R-V1 w/ Mount Pipe	3 3 3	1-1/4 5/16 1/4	1
		1	powerwave technologies	P40-16-XLPP-RR-A w/ Mount Pipe			
		2	rfs celwave	APXVSPP18-C-A20 w/ Mount Pipe			
		3	samsung telecommunications	WIMAX DAP HEAD			
	102.0	3	rfs celwave	IBC1900BB-1			
		3	rfs celwave	IBC1900HG-2A			
		1	tower mounts	Platform Mount [LP 602-1]			
94.0	94.0	3	kathrein	742 213	6	1-5/8	1
		1	tower mounts	Pipe Mount [PM 602-3]			
74.0	80.0	1	antel	BCD-87010	1	7/8	1
	74.0	1	tower mounts	Side Arm Mount [SO 701-1]			
40.0	41.0	1	lucent	KS24019-L112A	1	1/2	1
	40.0	1	tower mounts	Side Arm Mount [SO 701-1]			

Notes:
1) Existing Equipment
2) Reserved Equipment
3) Equipment To Be Removed; Not Considered in this analysis

Table 3 - Design Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
137	137	12	swedcom	ALP 9212-N	-	-
124	124	6	rfs celwave	APN199015	-	-
114	114	9	allgon	7184.15	-	-

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	TEP	2294838	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	TEP (Mapping)	2294380	CCISITES
4-TOWER MANUFACTURER DRAWINGS	TEP (Mapping)	2294379	CCISITES
4-TOWER STRUCTURAL ANALYSIS REPORTS	Valmont	823121	CCISITES

3.1) Analysis Method

tnxTower (version 6.1.4.1), 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) When applicable, transmission cables are considered as structural components for calculating wind loads as allowed by TIA/EIA-222-F.

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

4) ANALYSIS RESULTS

Table 5 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	140 - 86.8333	Pole	TP39.223x26.216x0.313	1	-17.218	1962.962	46.7	Pass
L2	86.8333 - 38	Pole	TP50.56x37.212x0.406	2	-29.408	3294.136	65.6	Pass
L3	38 - 0	Pole	TP59.05x48.033x0.5	3	-46.647	4900.574	65.2	Pass
							Summary	
						Pole (L2)	65.6	Pass
						Rating =	65.6	Pass

Table 6 - Tower Component Stresses vs. Capacity – LC7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	69.8	Pass
1	Base Plate	0	32.6	Pass
1	Base Foundation	0	49.1	Pass

Structure Rating (max from all components) =	69.8%

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

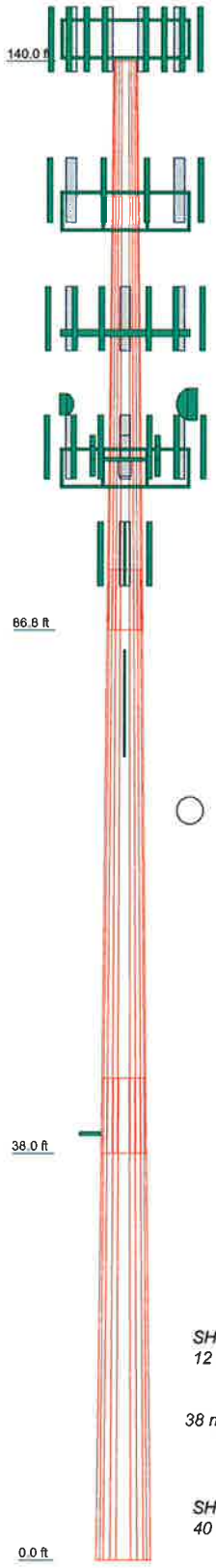
4.1) Recommendations

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

APPENDIX A

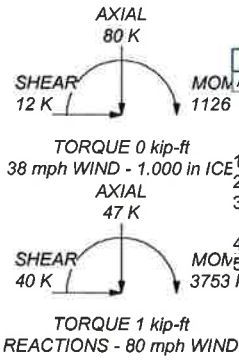
TNXTOWER OUTPUT

Section	1	2	3
Length (ft)	532"	546"	45'
Number of Sides	12	12	12
Thickness (in)	0.313	0.406	0.500
Socket Length (ft)	5'8"	7'	
Top Dia (in)	26.216	37.212	48.033
Bot Dia (in)	39.223	50.560	59.050
Grade	A572-65		
Weight (K)	5.9	10.5	13.1



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
BXA-80063-4BF-EDIN-X w/ Mount Pipe	142	(4) LGP21401	115
BXA-80063-4BF-EDIN-X w/ Mount Pipe	142	(2) RRUS-11	115
BXA-80063-4BF-EDIN-X w/ Mount Pipe	142	(2) RRUS-11	115
X7C-FRO-660-V w/ Mount Pipe	142	(2) RRUS-11	115
X7C-FRO-660-V w/ Mount Pipe	142	DC6-48-60-18-8F	115
X7C-FRO-660-V w/ Mount Pipe	142	8' x 2" Pipe Mount	115
BXA-171063/8CF-EDIN-2 w/ Mount Pipe	142	8' x 2" Pipe Mount	115
BXA-171063/8CF-EDIN-2 w/ Mount Pipe	142	8' x 2" Pipe Mount	115
BXA-171063/8CF-EDIN-2 w/ Mount Pipe	142	Platform Mount [LP 712-1]	115
BXA-171063/8CF-EDIN-2 w/ Mount Pipe	142	PCS 1900MHz 4x45W-65MHz	103
BXA-171063-8BF-EDIN-2 w/ Mount Pipe	142	PCS 1900MHz 4x45W-65MHz	103
BXA-171063-8BF-EDIN-2 w/ Mount Pipe	142	PCS 1900MHz 4x45W-65MHz	103
BXA-171063-8BF-EDIN-2 w/ Mount Pipe	142	PCS 1900MHz 4x45W-65MHz	103
RRH2x40-AWS	142	PCS 1900MHz 4x45W-65MHz	103
RRH2x40-AWS	142	PCS 1900MHz 4x45W-65MHz	103
RRH2x40-AWS	142	800MHz 2X50W RRH W/FILTER	103
DB-T1-6Z-8AB-0Z	142	800MHz 2X50W RRH W/FILTER	103
(2) FD9R6004/2C-3L	142	800MHz 2X50W RRH W/FILTER	103
(2) FD9R6004/2C-3L	142	Collar Mount [SO 102-3]	103
(2) FD9R6004/2C-3L	142	LLPX310R-V1 w/ Mount Pipe	102
Platform Mount [LP 101-1]	142	LLPX310R-V1 w/ Mount Pipe	102
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	126	LLPX310R-V1 w/ Mount Pipe	102
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	126	WIMAX DAP HEAD	102
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	126	WIMAX DAP HEAD	102
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	126	WIMAX DAP HEAD	102
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	126	HORIZON COMPACT	102
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	126	HORIZON COMPACT	102
ATMAA1412D-1A20	126	APXVTM14-C-120 w/ Mount Pipe	102
ATMAA1412D-1A20	126	APXVTM14-C-120 w/ Mount Pipe	102
ATMAA1412D-1A20	126	APXVTM14-C-120 w/ Mount Pipe	102
(2) 6' x 2" Mount Pipe	126	TD-RRH6x20-25	102
(2) 6' x 2" Mount Pipe	126	TD-RRH6x20-25	102
(2) 6' x 2" Mount Pipe	126	TD-RRH6x20-25	102
Platform Mount [LP 1001-1]	126	APXVSPP18-C-A20 w/ Mount Pipe	102
(2) 7770.00 w/ Mount Pipe	115	P40-16-XLPP-RR-A w/ Mount Pipe	102
(2) 7770.00 w/ Mount Pipe	115	APXVSPP18-C-A20 w/ Mount Pipe	102
(2) 7770.00 w/ Mount Pipe	115	IBC1900HG-2A	102
P65-17-XLH-RR w/ Mount Pipe	115	IBC1900HG-2A	102
AM-X-CD-16-65-00T-RET w/ Mount Pipe	115	IBC1900HG-2A	102
P65-17-XLH-RR w/ Mount Pipe	115	IBC1900BB-1	102
(4) LGP21401	115	IBC1900BB-1	102
(4) LGP21401	115	IBC1900BB-1	102
		5' x 2" Pipe Mount	102
		5' x 2" Pipe Mount	102
		5' x 2" Pipe Mount	102
		Platform Mount [LP 602-1]	102
		VHLP2.5-11	102
		VHLP2-180	102
		742 213	94
		Pipe Mount [PM 602-3]	94
		742 213	94
		742 213	94
		BCD-87010	74
		Side Arm Mount [SO 701-1]	74
		KS24019-L112A	40
		Side Arm Mount [SO 701-1]	40



MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower is located in Hartford County, Connecticut.
2. Tower designed for a 80 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 38 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 65.6%

CROWN CASTLE
The Foundation for a Wireless World
Crown Castle
2000 Corporate Drive
Canonsburg, PA
Phone: (724) 416-2000
FAX:

Job: BU# 806369			
Project:			
Client: Crown Castle	Drawn by: Mitchell Prust		App'd:
Code: TIA/EIA-222-F	Date: 07/09/14		Scale: NTS
Path: X:\ENG Work Area\MPrust\B&T India QA\806369 - NEW\QA\806369.eri			Dwg No. E-1

Tower Input Data

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

1) Tower is located in Hartford County, Connecticut.
2) Basic wind speed of 80 mph.
3) Nominal ice thickness of 1.000 in.
4) Ice thickness is considered to increase with height.
5) Ice density of 56.000 pcf.
6) A wind speed of 38 mph is used in combination with ice.
7) Temperature drop of 50.000 °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	

Tapered Pole Section Geometry

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L1	140'-86'10"	53'2"	5'8"	12	26.216	39.223	0.313	1.250	A572-65 (65 ksi)
L2	86'10"-38'	54'6"	7'	12	37.212	50.560	0.406	1.625	A572-65 (65 ksi)
L3	38'-0'	45'		12	48.033	59.050	0.500	2.000	A572-65 (65 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/ft
L1	27.141	26.065	2232.375	9.273	13.580	164.388	4523.397	12.829	6.188	19.803
	40.607	39.154	7566.452	13.930	20.318	372.410	15331.683	19.270	9.674	30.958

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L2	39.961	48.146	8324.740	13.176	19.276	431.879	16868.180	23.696	8.884	21.868
	52.344	65.607	21064.222	17.955	26.190	804.282	42681.825	32.290	12.461	30.674
L3	51.502	76.528	22069.805	17.017	24.881	887.010	44719.408	37.665	11.533	23.066
	61.133	94.266	41247.015	20.961	30.588	1348.475	83577.635	46.395	14.485	28.971

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 140'-86'10"				1	1	1		
L2 86'10"-38'				1	1	1		
L3 38'-0'				1	1	1		

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number	Number Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight klf
*****										

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 klf
LDF7-50A(1-5/8")	B	No	Inside Pole	140' - 0'	12	No Ice	0.000	0.001
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.001
						2" Ice	0.000	0.001
						4" Ice	0.000	0.001
HB158-1-08U8-S8J18(1-5/8)	B	No	CaAa (Out Of Face)	140' - 0'	1	No Ice	0.000	0.001
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.001
						2" Ice	0.000	0.001
						4" Ice	0.000	0.001
*****								
LCF158-50JA-A0(1 5/8")	A	No	Inside Pole	126' - 0'	6	No Ice	0.000	0.000
						1/2" Ice	0.000	0.000
						1" Ice	0.000	0.000
						2" Ice	0.000	0.000
						4" Ice	0.000	0.000
LCF158-50JA-A0(1 5/8")	A	No	CaAa (Out Of Face)	126' - 0'	2	No Ice	0.198	0.000
						1/2" Ice	0.298	0.002
						1" Ice	0.398	0.004
						2" Ice	0.598	0.010
						4" Ice	0.998	0.029
LCF158-50JA-A0(1 5/8")	A	No	CaAa (Out Of Face)	126' - 0'	4	No Ice	0.000	0.000
						1/2" Ice	0.000	0.002
						1" Ice	0.000	0.004
						2" Ice	0.000	0.010
						4" Ice	0.000	0.029
MLE Hybrid 9Power/18Fiber RL 2(1 5/8)	A	No	CaAa (Out Of Face)	126' - 0'	1	No Ice	0.163	0.001
						1/2" Ice	0.263	0.002
						1" Ice	0.362	0.004
						2" Ice	0.562	0.010
						4" Ice	0.962	0.029
*****								
LDF7-50A(1-5/8")	C	No	Inside Pole	115' - 0'	12	No Ice	0.000	0.001
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.001

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight klf
						2" Ice	0.000	0.001
						4" Ice	0.000	0.001
FB-L98B-002-75000(3/8")	C	No	Inside Pole	115' - 0'	1	No Ice	0.000	0.000
						1/2" Ice	0.000	0.000
						1" Ice	0.000	0.000
						2" Ice	0.000	0.000
						4" Ice	0.000	0.000
WR-VG86ST-BRD(3/4)	C	No	Inside Pole	115' - 0'	2	No Ice	0.000	0.001
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.001
						2" Ice	0.000	0.001
						4" Ice	0.000	0.001
2" Rigid Conduit	C	No	Inside Pole	115' - 0'	1	No Ice	0.000	0.003
						1/2" Ice	0.000	0.003
						1" Ice	0.000	0.003
						2" Ice	0.000	0.003
						4" Ice	0.000	0.003
*****								
2" Rigid Conduit	A	No	CaAa (Out Of Face)	102' - 0'	2	No Ice	0.000	0.003
						1/2" Ice	0.000	0.004
						1" Ice	0.000	0.006
						2" Ice	0.000	0.013
						4" Ice	0.000	0.032
FSJ4-50B(1/2")	A	No	CaAa (Out Of Face)	102' - 0'	2	No Ice	0.000	0.000
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.002
						2" Ice	0.000	0.006
						4" Ice	0.000	0.022
FSJ4-50B(1/2")	A	No	CaAa (Out Of Face)	102' - 0'	1	No Ice	0.000	0.000
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.002
						2" Ice	0.000	0.006
						4" Ice	0.000	0.022
LDF1-50A(1/4")	A	No	CaAa (Out Of Face)	102' - 0'	3	No Ice	0.000	0.000
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.002
						2" Ice	0.000	0.006
						4" Ice	0.000	0.021
ATCB-B01-005(5/16)	A	No	CaAa (Out Of Face)	102' - 0'	3	No Ice	0.000	0.000
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.002
						2" Ice	0.000	0.006
						4" Ice	0.000	0.021
HB114-1-08U4-M5J(1 1/4")	A	No	CaAa (Out Of Face)	102' - 0'	3	No Ice	0.000	0.001
						1/2" Ice	0.000	0.002
						1" Ice	0.000	0.004
						2" Ice	0.000	0.010
						4" Ice	0.000	0.028
HB114-1-08U4-M5J(1 1/4")	A	No	CaAa (Out Of Face)	102' - 0'	1	No Ice	0.000	0.001
						1/2" Ice	0.000	0.002
						1" Ice	0.000	0.004
						2" Ice	0.000	0.010
						4" Ice	0.000	0.028
*****								
AVA7-50(1-5/8)	B	No	CaAa (Out Of Face)	94' - 0'	2	No Ice	0.201	0.001
						1/2" Ice	0.301	0.002
						1" Ice	0.401	0.004
						2" Ice	0.601	0.010
						4" Ice	1.001	0.030
AVA7-50(1-5/8)	B	No	CaAa (Out Of Face)	94' - 0'	4	No Ice	0.000	0.001
						1/2" Ice	0.000	0.002
						1" Ice	0.000	0.004
						2" Ice	0.000	0.010
						4" Ice	0.000	0.030
*****								
LDF5-50A(7/8")	B	No	CaAa (Out Of Face)	74' - 0'	1	No Ice	0.000	0.000
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.003
						2" Ice	0.000	0.008

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight klf
						4" Ice	0.000	0.025
*****								
LDF4-50A(1/2")	C	No	Inside Pole	40' - 0'	1	No Ice	0.000	0.000
						1/2" Ice	0.000	0.000
						1" Ice	0.000	0.000
						2" Ice	0.000	0.000
						4" Ice	0.000	0.000
*****								
Thin Flat Bar Climbing Ladder	C	No	Inside Pole	116' - 108'	1	No Ice	0.000	0.004
						1/2" Ice	0.000	0.004
						1" Ice	0.000	0.004
						2" Ice	0.000	0.004
						4" Ice	0.000	0.004
*****								

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	140'-86'10"	A	0.000	0.000	0.000	21.875	0.242
		B	0.000	0.000	0.000	2.881	0.622
		C	0.000	0.000	0.000	0.000	0.423
L2	86'10"-38'	A	0.000	0.000	0.000	27.274	0.624
		B	0.000	0.000	0.000	19.631	0.761
		C	0.000	0.000	0.000	0.000	0.678
L3	38'-0'	A	0.000	0.000	0.000	21.223	0.485
		B	0.000	0.000	0.000	15.276	0.595
		C	0.000	0.000	0.000	0.000	0.533

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	140'-86'10"	A	1.158	0.000	0.000	0.000	49.089	2.188
		B		0.000	0.000	0.000	6.201	0.822
		C		0.000	0.000	0.000	0.000	0.423
L2	86'10"-38'	A	1.079	0.000	0.000	0.000	61.205	4.438
		B		0.000	0.000	0.000	42.252	2.242
		C		0.000	0.000	0.000	0.000	0.678
L3	38'-0'	A	1.000	0.000	0.000	0.000	45.816	3.110
		B		0.000	0.000	0.000	31.672	1.656
		C		0.000	0.000	0.000	0.000	0.533

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	140'-86'10"	0.070	-0.514	0.122	-0.933
L2	86'10"-38'	0.415	-0.426	0.693	-0.759
L3	38'-0'	0.431	-0.442	0.727	-0.795

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
BXA-80063-4BF-EDIN-X w/ Mount Pipe	A	From Leg	4.000 0' 0'	0.000	142'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.089 5.515 5.953 6.859 8.816	3.472 4.045 4.640 5.957 8.886	0.030 0.070 0.116 0.227 0.554
BXA-80063-4BF-EDIN-X w/ Mount Pipe	B	From Leg	4.000 0' 0'	0.000	142'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.089 5.515 5.953 6.859 8.816	3.472 4.045 4.640 5.957 8.886	0.030 0.070 0.116 0.227 0.554
BXA-80063-4BF-EDIN-X w/ Mount Pipe	C	From Leg	4.000 0' 0'	0.000	142'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.089 5.515 5.953 6.859 8.816	3.472 4.045 4.640 5.957 8.886	0.030 0.070 0.116 0.227 0.554
X7C-FRO-660-V w/ Mount Pipe	A	From Leg	4.000 0' 0'	0.000	142'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	10.458 11.127 11.763 13.064 15.784	7.529 8.715 9.615 11.449 15.603	0.061 0.139 0.225 0.426 0.975
X7C-FRO-660-V w/ Mount Pipe	B	From Leg	4.000 0' 0'	0.000	142'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	10.458 11.127 11.763 13.064 15.784	7.529 8.715 9.615 11.449 15.603	0.061 0.139 0.225 0.426 0.975
X7C-FRO-660-V w/ Mount Pipe	C	From Leg	4.000 0' 0'	0.000	142'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	10.458 11.127 11.763 13.064 15.784	7.529 8.715 9.615 11.449 15.603	0.061 0.139 0.225 0.426 0.975
BXA-171063/8CF-EDIN-2 w/ Mount Pipe	A	From Leg	4.000 0' 0'	0.000	142'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.140 3.515 3.915 4.804 6.715	3.510 4.130 4.757 6.059 9.095	0.029 0.062 0.100 0.196 0.492
BXA-171063/8CF-EDIN-2 w/ Mount Pipe	B	From Leg	4.000 0' 0'	0.000	142'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.140 3.515 3.915 4.804 6.715	3.510 4.130 4.757 6.059 9.095	0.029 0.062 0.100 0.196 0.492
BXA-171063/8CF-EDIN-2 w/ Mount Pipe	C	From Leg	4.000 0' 0'	0.000	142'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.140 3.515 3.915 4.804 6.715	3.510 4.130 4.757 6.059 9.095	0.029 0.062 0.100 0.196 0.492
BXA-171063-8BF-EDIN-2 w/ Mount Pipe	A	From Leg	4.000 0' 0'	0.000	142'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.179 3.555 3.964 4.853 6.767	3.353 3.971 4.595 5.893 8.885	0.029 0.061 0.099 0.193 0.488
BXA-171063-8BF-EDIN-2 w/ Mount Pipe	B	From Leg	4.000 0' 0'	0.000	142'	No Ice 1/2" Ice 1" Ice	3.179 3.555 3.964 4.853	3.353 3.971 4.595 5.893	0.029 0.061 0.099 0.193

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 4" Ice	6.767	8.885	0.488
BXA-171063-8BF-EDIN-2 w/ Mount Pipe	C	From Leg	4.000 0' 0'	0.000	142'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.179 3.555 3.964 4.853 6.767	3.353 3.971 4.595 5.893 8.885	0.029 0.061 0.099 0.193 0.488
RRH2x40-AWS	A	From Leg	4.000 0' 0'	0.000	142'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.522 2.753 2.993 3.499 4.615	1.589 1.795 2.010 2.465 3.479	0.044 0.061 0.082 0.132 0.275
RRH2x40-AWS	B	From Leg	4.000 0' 0'	0.000	142'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.522 2.753 2.993 3.499 4.615	1.589 1.795 2.010 2.465 3.479	0.044 0.061 0.082 0.132 0.275
RRH2x40-AWS	C	From Leg	4.000 0' 0'	0.000	142'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.522 2.753 2.993 3.499 4.615	1.589 1.795 2.010 2.465 3.479	0.044 0.061 0.082 0.132 0.275
DB-T1-6Z-8AB-0Z	A	From Leg	4.000 0' 0'	0.000	142'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.600 5.915 6.240 6.914 8.365	2.333 2.558 2.791 3.284 4.373	0.044 0.080 0.120 0.213 0.455
(2) FD9R6004/2C-3L	A	From Leg	4.000 0' 0'	0.000	142'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.367 0.451 0.543 0.755 1.281	0.085 0.136 0.196 0.343 0.740	0.003 0.005 0.009 0.020 0.063
(2) FD9R6004/2C-3L	B	From Leg	4.000 0' 0'	0.000	142'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.367 0.451 0.543 0.755 1.281	0.085 0.136 0.196 0.343 0.740	0.003 0.005 0.009 0.020 0.063
(2) FD9R6004/2C-3L	C	From Leg	4.000 0' 0'	0.000	142'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.367 0.451 0.543 0.755 1.281	0.085 0.136 0.196 0.343 0.740	0.003 0.005 0.009 0.020 0.063
Platform Mount [LP 101-1]	C	None		0.000	142'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	36.210 42.820 49.430 62.650 89.090	36.210 42.820 49.430 62.650 89.090	1.503 2.301 3.099 4.695 7.887
*****									
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	A	From Leg	4.000 0' 2'	0.000	126'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.825 7.347 7.863 8.926 11.175	5.642 6.480 7.257 8.864 12.293	0.112 0.169 0.233 0.383 0.807
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	B	From Leg	4.000 0'	0.000	126'	No Ice 1/2"	6.825 7.347	5.642 6.480	0.112 0.169

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	7.863	7.257	0.233
						1" Ice	8.926	8.864	0.383
						2" Ice	11.175	12.293	0.807
						4" Ice			
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	C	From Leg	4.000 0' 2'	0.000	126'	No Ice	6.825	5.642	0.112
						1/2" Ice	7.347	6.480	0.169
						1" Ice	7.863	7.257	0.233
						2" Ice	8.926	8.864	0.383
						4" Ice	11.175	12.293	0.807
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	A	From Leg	4.000 0' 2'	0.000	126'	No Ice	6.825	5.642	0.112
						1/2" Ice	7.347	6.480	0.169
						1" Ice	7.863	7.257	0.233
						2" Ice	8.926	8.864	0.383
						4" Ice	11.175	12.293	0.807
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	B	From Leg	4.000 0' 2'	0.000	126'	No Ice	6.825	5.642	0.112
						1/2" Ice	7.347	6.480	0.169
						1" Ice	7.863	7.257	0.233
						2" Ice	8.926	8.864	0.383
						4" Ice	11.175	12.293	0.807
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	C	From Leg	4.000 0' 2'	0.000	126'	No Ice	6.825	5.642	0.112
						1/2" Ice	7.347	6.480	0.169
						1" Ice	7.863	7.257	0.233
						2" Ice	8.926	8.864	0.383
						4" Ice	11.175	12.293	0.807
ATMAA1412D-1A20	A	From Leg	4.000 0' 2'	0.000	126'	No Ice	0.467	1.167	0.013
						1/2" Ice	0.575	1.314	0.021
						1" Ice	0.691	1.469	0.030
						2" Ice	0.951	1.806	0.056
						4" Ice	1.573	2.584	0.137
ATMAA1412D-1A20	B	From Leg	4.000 0' 2'	0.000	126'	No Ice	0.467	1.167	0.013
						1/2" Ice	0.575	1.314	0.021
						1" Ice	0.691	1.469	0.030
						2" Ice	0.951	1.806	0.056
						4" Ice	1.573	2.584	0.137
ATMAA1412D-1A20	C	From Leg	4.000 0' 2'	0.000	126'	No Ice	0.467	1.167	0.013
						1/2" Ice	0.575	1.314	0.021
						1" Ice	0.691	1.469	0.030
						2" Ice	0.951	1.806	0.056
						4" Ice	1.573	2.584	0.137
(2) 6' x 2" Mount Pipe	A	From Leg	4.000 0' 0'	0.000	126'	No Ice	1.425	1.425	0.022
						1/2" Ice	1.925	1.925	0.033
						1" Ice	2.294	2.294	0.048
						2" Ice	3.060	3.060	0.090
						4" Ice	4.702	4.702	0.231
(2) 6' x 2" Mount Pipe	B	From Leg	4.000 0' 0'	0.000	126'	No Ice	1.425	1.425	0.022
						1/2" Ice	1.925	1.925	0.033
						1" Ice	2.294	2.294	0.048
						2" Ice	3.060	3.060	0.090
						4" Ice	4.702	4.702	0.231
(2) 6' x 2" Mount Pipe	C	From Leg	4.000 0' 0'	0.000	126'	No Ice	1.425	1.425	0.022
						1/2" Ice	1.925	1.925	0.033
						1" Ice	2.294	2.294	0.048
						2" Ice	3.060	3.060	0.090
						4" Ice	4.702	4.702	0.231
Platform Mount [LP 1001-	C	None		0.000	126'	No Ice	47.700	47.700	3.017

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
1]						1/2" Ice	59.500	59.500	3.621
						1" Ice	71.300	71.300	4.225
						2" Ice	94.900	94.900	5.433
						4" Ice	142.100	142.100	7.849
*****									
(2) 7770.00 w/ Mount Pipe	A	From Leg	4.000 0' 1'	0.000	115'	No Ice	6.119	4.254	0.055
						1/2" Ice	6.626	5.014	0.103
						1" Ice	7.128	5.711	0.157
						2" Ice	8.164	7.155	0.287
						4" Ice	10.360	10.412	0.665
(2) 7770.00 w/ Mount Pipe	B	From Leg	4.000 0' 1'	0.000	115'	No Ice	6.119	4.254	0.055
						1/2" Ice	6.626	5.014	0.103
						1" Ice	7.128	5.711	0.157
						2" Ice	8.164	7.155	0.287
						4" Ice	10.360	10.412	0.665
(2) 7770.00 w/ Mount Pipe	C	From Leg	4.000 0' 1'	0.000	115'	No Ice	6.119	4.254	0.055
						1/2" Ice	6.626	5.014	0.103
						1" Ice	7.128	5.711	0.157
						2" Ice	8.164	7.155	0.287
						4" Ice	10.360	10.412	0.665
P65-17-XLH-RR w/ Mount Pipe	A	From Leg	4.000 0' 2'	0.000	115'	No Ice	11.704	8.938	0.092
						1/2" Ice	12.424	10.450	0.178
						1" Ice	13.153	11.986	0.273
						2" Ice	14.639	14.313	0.498
						4" Ice	17.906	19.144	1.126
AM-X-CD-16-65-00T-RET w/ Mount Pipe	B	From Leg	4.000 0' 2'	0.000	115'	No Ice	8.498	6.304	0.074
						1/2" Ice	9.149	7.479	0.139
						1" Ice	9.767	8.368	0.212
						2" Ice	11.031	10.179	0.385
						4" Ice	13.679	14.024	0.874
P65-17-XLH-RR w/ Mount Pipe	C	From Leg	4.000 0' 2'	0.000	115'	No Ice	11.704	8.938	0.092
						1/2" Ice	12.424	10.450	0.178
						1" Ice	13.153	11.986	0.273
						2" Ice	14.639	14.313	0.498
						4" Ice	17.906	19.144	1.126
(4) LGP21401	A	From Leg	4.000 0' 1'	0.000	115'	No Ice	1.288	0.233	0.014
						1/2" Ice	1.445	0.313	0.021
						1" Ice	1.611	0.403	0.030
						2" Ice	1.969	0.608	0.055
						4" Ice	2.788	1.121	0.135
(4) LGP21401	B	From Leg	4.000 0' 1'	0.000	115'	No Ice	1.288	0.233	0.014
						1/2" Ice	1.445	0.313	0.021
						1" Ice	1.611	0.403	0.030
						2" Ice	1.969	0.608	0.055
						4" Ice	2.788	1.121	0.135
(4) LGP21401	C	From Leg	4.000 0' 1'	0.000	115'	No Ice	1.288	0.233	0.014
						1/2" Ice	1.445	0.313	0.021
						1" Ice	1.611	0.403	0.030
						2" Ice	1.969	0.608	0.055
						4" Ice	2.788	1.121	0.135
(2) RRUS-11	A	From Leg	4.000 0' 2'	0.000	115'	No Ice	3.249	1.373	0.048
						1/2" Ice	3.491	1.551	0.068
						1" Ice	3.741	1.738	0.092
						2" Ice	4.268	2.138	0.150
						4" Ice	5.426	3.042	0.310

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			
(2) RRUS-11	B	From Leg	4.000 0' 2'	0.000	115'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.249 3.491 3.741 4.268 5.426	1.373 1.551 1.738 2.138 3.042	0.048 0.068 0.092 0.150 0.310
(2) RRUS-11	C	From Leg	4.000 0' 2'	0.000	115'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.249 3.491 3.741 4.268 5.426	1.373 1.551 1.738 2.138 3.042	0.048 0.068 0.092 0.150 0.310
DC6-48-60-18-8F	A	From Leg	4.000 0' 1'	0.000	115'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.266 1.456 1.658 2.093 3.098	1.266 1.456 1.658 2.093 3.098	0.020 0.035 0.053 0.095 0.215
8' x 2" Pipe Mount	A	From Leg	4.000 0' 0'	0.000	115'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.900 2.728 3.401 4.396 6.498	1.900 2.728 3.401 4.396 6.498	0.029 0.044 0.063 0.119 0.300
8' x 2" Pipe Mount	B	From Leg	4.000 0' 0'	0.000	115'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.900 2.728 3.401 4.396 6.498	1.900 2.728 3.401 4.396 6.498	0.029 0.044 0.063 0.119 0.300
8' x 2" Pipe Mount	C	From Leg	4.000 0' 0'	0.000	115'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.900 2.728 3.401 4.396 6.498	1.900 2.728 3.401 4.396 6.498	0.029 0.044 0.063 0.119 0.300
Platform Mount [LP 712-1]	C	None		0.000	115'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	24.530 29.940 35.350 46.170 67.810	24.530 29.940 35.350 46.170 67.810	1.335 1.646 1.956 2.577 3.820
*****									
PCS 1900MHz 4x45W-65MHz	A	From Leg	2.000 0' 1'	0.000	103'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.709 2.948 3.195 3.716 4.862	2.611 2.847 3.092 3.608 4.744	0.060 0.083 0.110 0.173 0.347
PCS 1900MHz 4x45W-65MHz	B	From Leg	2.000 0' 1'	0.000	103'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.709 2.948 3.195 3.716 4.862	2.611 2.847 3.092 3.608 4.744	0.060 0.083 0.110 0.173 0.347
PCS 1900MHz 4x45W-65MHz	C	From Leg	2.000 0' 1'	0.000	103'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.709 2.948 3.195 3.716 4.862	2.611 2.847 3.092 3.608 4.744	0.060 0.083 0.110 0.173 0.347
PCS 1900MHz 4x45W-65MHz	A	From Leg	2.000 0' 0'	0.000	103'	No Ice 1/2" Ice	2.709 2.948 3.195	2.611 2.847 3.092	0.060 0.083 0.110

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
						1" Ice	3.716	3.608	0.173
						2" Ice	4.862	4.744	0.347
						4" Ice			
PCS 1900MHz 4x45W-65MHz	B	From Leg	2.000 0' 0'	0.000	103'	No Ice	2.709	2.611	0.060
						1/2" Ice	2.948	2.847	0.083
						1" Ice	3.195	3.092	0.110
						2" Ice	3.716	3.608	0.173
						4" Ice	4.862	4.744	0.347
PCS 1900MHz 4x45W-65MHz	C	From Leg	2.000 0' 0'	0.000	103'	No Ice	2.709	2.611	0.060
						1/2" Ice	2.948	2.847	0.083
						1" Ice	3.195	3.092	0.110
						2" Ice	3.716	3.608	0.173
						4" Ice	4.862	4.744	0.347
800MHz 2X50W RRH W/FILTER	A	From Leg	2.000 0' -1'	0.000	103'	No Ice	2.401	2.254	0.064
						1/2" Ice	2.613	2.460	0.086
						1" Ice	2.833	2.675	0.111
						2" Ice	3.300	3.132	0.172
						4" Ice	4.337	4.148	0.338
800MHz 2X50W RRH W/FILTER	B	From Leg	2.000 0' -1'	0.000	103'	No Ice	2.401	2.254	0.064
						1/2" Ice	2.613	2.460	0.086
						1" Ice	2.833	2.675	0.111
						2" Ice	3.300	3.132	0.172
						4" Ice	4.337	4.148	0.338
800MHz 2X50W RRH W/FILTER	C	From Leg	2.000 0' -1'	0.000	103'	No Ice	2.401	2.254	0.064
						1/2" Ice	2.613	2.460	0.086
						1" Ice	2.833	2.675	0.111
						2" Ice	3.300	3.132	0.172
						4" Ice	4.337	4.148	0.338
Collar Mount [SO 102-3]	C	None		0.000	103'	No Ice	3.000	3.000	0.081
						1/2" Ice	3.480	3.480	0.111
						1" Ice	3.960	3.960	0.141
						2" Ice	4.920	4.920	0.201
						4" Ice	6.840	6.840	0.321
*****									
LLPX310R-V1 w/ Mount Pipe	A	From Leg	4.000 0' 2'	0.000	102'	No Ice	5.065	2.983	0.045
						1/2" Ice	5.480	3.526	0.083
						1" Ice	5.905	4.086	0.126
						2" Ice	6.788	5.313	0.232
						4" Ice	8.704	8.131	0.544
LLPX310R-V1 w/ Mount Pipe	B	From Leg	4.000 0' 2'	0.000	102'	No Ice	5.065	2.983	0.045
						1/2" Ice	5.480	3.526	0.083
						1" Ice	5.905	4.086	0.126
						2" Ice	6.788	5.313	0.232
						4" Ice	8.704	8.131	0.544
LLPX310R-V1 w/ Mount Pipe	C	From Leg	4.000 0' 2'	0.000	102'	No Ice	5.065	2.983	0.045
						1/2" Ice	5.480	3.526	0.083
						1" Ice	5.905	4.086	0.126
						2" Ice	6.788	5.313	0.232
						4" Ice	8.704	8.131	0.544
WIMAX DAP HEAD	A	From Leg	4.000 0' 2'	0.000	102'	No Ice	1.804	0.778	0.033
						1/2" Ice	1.988	0.918	0.045
						1" Ice	2.180	1.067	0.058
						2" Ice	2.589	1.391	0.094
						4" Ice	3.512	2.143	0.201
WIMAX DAP HEAD	B	From Leg	4.000	0.000	102'	No Ice	1.804	0.778	0.033

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'			1/2"	1.988	0.918	0.045
			2'			Ice	2.180	1.067	0.058
						1" Ice	2.589	1.391	0.094
						2" Ice	3.512	2.143	0.201
						4" Ice			
WIMAX DAP HEAD	C	From Leg	4.000	0.000	102'	No Ice	1.804	0.778	0.033
			0'			1/2"	1.988	0.918	0.045
			2'			Ice	2.180	1.067	0.058
						1" Ice	2.589	1.391	0.094
						2" Ice	3.512	2.143	0.201
						4" Ice			
HORIZON COMPACT	B	From Leg	4.000	0.000	102'	No Ice	0.841	0.429	0.012
			0'			1/2"	0.966	0.525	0.018
			6'			Ice	1.099	0.629	0.026
						1" Ice	1.392	0.863	0.048
						2" Ice	2.082	1.435	0.122
						4" Ice			
HORIZON COMPACT	C	From Leg	4.000	0.000	102'	No Ice	0.841	0.429	0.012
			0'			1/2"	0.966	0.525	0.018
			6'			Ice	1.099	0.629	0.026
						1" Ice	1.392	0.863	0.048
						2" Ice	2.082	1.435	0.122
						4" Ice			
APXVTM14-C-120 w/ Mount Pipe	A	From Leg	4.000	0.000	102'	No Ice	7.134	4.959	0.074
			0'			1/2"	7.662	5.754	0.128
			2'			Ice	8.183	6.472	0.190
						1" Ice	9.256	8.010	0.335
						2" Ice	11.526	11.412	0.749
						4" Ice			
APXVTM14-C-120 w/ Mount Pipe	B	From Leg	4.000	0.000	102'	No Ice	7.134	4.959	0.074
			0'			1/2"	7.662	5.754	0.128
			2'			Ice	8.183	6.472	0.190
						1" Ice	9.256	8.010	0.335
						2" Ice	11.526	11.412	0.749
						4" Ice			
APXVTM14-C-120 w/ Mount Pipe	C	From Leg	4.000	0.000	102'	No Ice	7.134	4.959	0.074
			0'			1/2"	7.662	5.754	0.128
			2'			Ice	8.183	6.472	0.190
						1" Ice	9.256	8.010	0.335
						2" Ice	11.526	11.412	0.749
						4" Ice			
TD-RRH8x20-25	A	From Leg	4.000	0.000	102'	No Ice	4.720	1.703	0.070
			0'			1/2"	5.014	1.920	0.097
			2'			Ice	5.316	2.145	0.128
						1" Ice	5.948	2.622	0.201
						2" Ice	7.314	3.680	0.397
						4" Ice			
TD-RRH8x20-25	B	From Leg	4.000	0.000	102'	No Ice	4.720	1.703	0.070
			0'			1/2"	5.014	1.920	0.097
			2'			Ice	5.316	2.145	0.128
						1" Ice	5.948	2.622	0.201
						2" Ice	7.314	3.680	0.397
						4" Ice			
TD-RRH8x20-25	C	From Leg	4.000	0.000	102'	No Ice	4.720	1.703	0.070
			0'			1/2"	5.014	1.920	0.097
			2'			Ice	5.316	2.145	0.128
						1" Ice	5.948	2.622	0.201
						2" Ice	7.314	3.680	0.397
						4" Ice			
APXVSPP18-C-A20 w/ Mount Pipe	A	From Leg	4.000	0.000	102'	No Ice	8.498	6.946	0.083
			0'			1/2"	9.149	8.127	0.151
			2'			Ice	9.767	9.021	0.227
						1" Ice	11.031	10.844	0.406
						2" Ice	13.679	14.851	0.909
						4" Ice			

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
P40-16-XLPP-RR-A w/ Mount Pipe	B	From Leg	4.000 0' 2'	0.000	102'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	10.738 11.294 11.848 12.988 15.392	4.825 5.571 6.265 7.803 11.107	0.073 0.141 0.216 0.389 0.862
APXVSPP18-C-A20 w/ Mount Pipe	C	From Leg	4.000 0' 2'	0.000	102'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.498 9.149 9.767 11.031 13.679	6.946 8.127 9.021 10.844 14.851	0.083 0.151 0.227 0.406 0.909
IBC1900HG-2A	A	From Leg	4.000 0' 0'	0.000	102'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.127 1.273 1.427 1.761 2.534	0.533 0.647 0.770 1.041 1.688	0.022 0.030 0.039 0.065 0.147
IBC1900HG-2A	B	From Leg	4.000 0' 0'	0.000	102'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.127 1.273 1.427 1.761 2.534	0.533 0.647 0.770 1.041 1.688	0.022 0.030 0.039 0.065 0.147
IBC1900HG-2A	C	From Leg	4.000 0' 0'	0.000	102'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.127 1.273 1.427 1.761 2.534	0.533 0.647 0.770 1.041 1.688	0.022 0.030 0.039 0.065 0.147
IBC1900BB-1	A	From Leg	4.000 0' 0'	0.000	102'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.127 1.273 1.427 1.761 2.534	0.533 0.647 0.770 1.041 1.688	0.022 0.030 0.039 0.065 0.147
IBC1900BB-1	B	From Leg	4.000 0' 0'	0.000	102'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.127 1.273 1.427 1.761 2.534	0.533 0.647 0.770 1.041 1.688	0.022 0.030 0.039 0.065 0.147
IBC1900BB-1	C	From Leg	4.000 0' 0'	0.000	102'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.127 1.273 1.427 1.761 2.534	0.533 0.647 0.770 1.041 1.688	0.022 0.030 0.039 0.065 0.147
5' x 2" Pipe Mount	A	From Leg	4.000 0' 0'	0.000	102'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.000 1.393 1.703 2.351 3.778	1.000 1.393 1.703 2.351 3.778	0.029 0.037 0.048 0.082 0.196
5' x 2" Pipe Mount	B	From Leg	4.000 0' 0'	0.000	102'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.000 1.393 1.703 2.351 3.778	1.000 1.393 1.703 2.351 3.778	0.029 0.037 0.048 0.082 0.196
5' x 2" Pipe Mount	C	From Leg	4.000 0' 0'	0.000	102'	No Ice 1/2" Ice 1" Ice 2" Ice	1.000 1.393 1.703 2.351 3.778	1.000 1.393 1.703 2.351 3.778	0.029 0.037 0.048 0.082 0.196

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			
Platform Mount [LP 602-1]	C	None		0.000	102'	No Ice	32.030	32.030	1.343
						1/2" Ice	38.710	38.710	1.800
						1" Ice	45.390	45.390	2.257
						2" Ice	58.750	58.750	3.170
						4" Ice	85.470	85.470	4.998
*****									
*****									
742 213	A	From Leg	1.000 0' 0'	0.000	94'	No Ice	5.135	2.869	0.022
						1/2" Ice	5.609	3.483	0.047
						1" Ice	6.090	3.946	0.078
						2" Ice	7.074	4.893	0.158
						4" Ice	9.130	6.876	0.394
742 213	B	From Leg	1.000 0' 0'	0.000	94'	No Ice	5.135	2.869	0.022
						1/2" Ice	5.609	3.483	0.047
						1" Ice	6.090	3.946	0.078
						2" Ice	7.074	4.893	0.158
						4" Ice	9.130	6.876	0.394
742 213	C	From Leg	1.000 0' 0'	0.000	94'	No Ice	5.135	2.869	0.022
						1/2" Ice	5.609	3.483	0.047
						1" Ice	6.090	3.946	0.078
						2" Ice	7.074	4.893	0.158
						4" Ice	9.130	6.876	0.394
Pipe Mount [PM 602-3]	C	None		0.000	94'	No Ice	7.680	7.680	0.279
						1/2" Ice	9.500	9.500	0.353
						1" Ice	11.320	11.320	0.427
						2" Ice	14.960	14.960	0.576
						4" Ice	22.240	22.240	0.873
*****									
BCD-87010	C	From Face	3.000 0' 6'	0.000	74'	No Ice	2.903	2.903	0.027
						1/2" Ice	4.050	4.050	0.048
						1" Ice	5.213	5.213	0.077
						2" Ice	7.015	7.015	0.156
						4" Ice	9.848	9.848	0.410
Side Arm Mount [SO 701-1]	C	From Face	1.500 0' 0'	0.000	74'	No Ice	0.850	1.670	0.065
						1/2" Ice	1.140	2.340	0.079
						1" Ice	1.430	3.010	0.093
						2" Ice	2.010	4.350	0.121
						4" Ice	3.170	7.030	0.177
*****									
KS24019-L112A	C	From Leg	3.000 0' 1'	0.000	40'	No Ice	0.100	0.100	0.005
						1/2" Ice	0.180	0.180	0.006
						1" Ice	0.260	0.260	0.008
						2" Ice	0.420	0.420	0.011
						4" Ice	0.740	0.740	0.017
Side Arm Mount [SO 701-1]	C	From Leg	1.500 0' 0'	0.000	40'	No Ice	0.850	1.670	0.065
						1/2" Ice	1.140	2.340	0.079
						1" Ice	1.430	3.010	0.093
						2" Ice	2.010	4.350	0.121
						4" Ice	3.170	7.030	0.177
*****									

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 ft²	Weight K
VHLP2.5-11	B	Paraboloid w/Shroud (HP)	From Leg	4.000 0' 6'	3.000		102'	2.917	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.680 7.070 7.460 8.230 9.780	0.030 0.040 0.050 0.070 0.110
VHLP2-180	C	Paraboloid w/Shroud (HP)	From Leg	4.000 0' 6'	86.000		102'	2.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.140 3.407 3.674 4.208 5.277	0.025 0.042 0.060 0.095 0.165
*****											

Load Combinations

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

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	140 - 86.8333	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-35.379	0.041	3.640
			Max. Mx	11	-17.231	680.665	3.724
			Max. My	2	-17.229	3.984	686.078
			Max. Vy	11	-25.923	680.665	3.724
			Max. Vx	8	25.918	-3.285	-685.297
			Max. Torque	4			1.297
L2	86.8333 - 38	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-55.190	-2.502	9.118
			Max. Mx	11	-29.414	2087.389	15.295
			Max. My	2	-29.413	16.853	2092.240
			Max. Vy	11	-33.288	2087.389	15.295
			Max. Vx	8	33.253	-14.645	-2090.909
			Max. Torque	10			-1.144
L3	38 - 0	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-79.811	-5.098	15.425
			Max. Mx	11	-46.647	3733.320	26.935
			Max. My	2	-46.647	29.414	3737.868
			Max. Vy	11	-39.822	3733.320	26.935
			Max. Vx	8	39.799	-25.627	-3735.222
			Max. Torque	2			0.828

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	15	79.811	0.077	11.459
	Max. H_x	11	46.665	39.801	0.239
	Max. H_z	2	46.665	0.283	39.771
	Max. M_x	2	3737.868	0.283	39.771
	Max. M_z	5	3729.197	-39.751	-0.244
	Max. Torsion	4	0.651	-34.371	19.705
	Min. Vert	1	46.665	0.000	0.000
	Min. H_x	5	46.665	-39.751	-0.244
	Min. H_z	8	46.665	-0.237	-39.778
	Min. M_x	8	-3735.222	-0.237	-39.778
	Min. M_z	11	-3733.320	39.801	0.239
	Min. Torsion	10	-0.723	34.418	-19.646

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	46.665	0.000	0.000	-1.656	-0.679	0.000
Dead+Wind 0 deg - No Ice	46.665	-0.283	-39.771	-3737.868	29.414	-0.615
Dead+Wind 30 deg - No Ice	46.665	19.733	-34.356	-3228.366	-1850.252	-0.604
Dead+Wind 60 deg - No Ice	46.665	34.371	-19.705	-1850.874	-3224.236	-0.651
Dead+Wind 90 deg - No Ice	46.665	39.751	0.244	24.017	-3729.197	-0.317
Dead+Wind 120 deg - No Ice	46.665	34.499	20.032	1881.619	-3237.224	-0.004
Dead+Wind 150 deg - No Ice	46.665	20.038	34.501	3239.761	-1881.881	0.332
Dead+Wind 180 deg - No Ice	46.665	0.237	39.778	3735.222	-25.627	0.611
Dead+Wind 210 deg - No Ice	46.665	-19.676	34.397	3229.522	1842.615	0.664
Dead+Wind 240 deg - No Ice	46.665	-34.418	19.646	1841.034	3228.008	0.723
Dead+Wind 270 deg - No Ice	46.665	-39.801	-0.239	-26.935	3733.320	0.521
Dead+Wind 300 deg - No Ice	46.665	-34.531	-20.045	-1886.332	3239.391	0.239
Dead+Wind 330 deg - No Ice	46.665	-20.071	-34.523	-3245.550	1884.080	-0.148
Dead+Ice+Temp	79.811	0.000	-0.000	-15.425	-5.098	-0.000
Dead+Wind 0	79.811	-0.077	-11.459	-1126.299	3.078	-0.128

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
deg+Ice+Temp Dead+Wind 30 deg+Ice+Temp	79.811	5.691	-9.900	-974.972	-555.831	-0.189
Dead+Wind 60 deg+Ice+Temp	79.811	9.911	-5.680	-565.679	-964.625	-0.253
Dead+Wind 90 deg+Ice+Temp	79.811	11.464	0.067	-8.433	-1114.977	-0.195
Dead+Wind 120 deg+Ice+Temp	79.811	9.949	5.772	544.148	-968.479	-0.117
Dead+Wind 150 deg+Ice+Temp	79.811	5.777	9.942	948.098	-564.844	-0.000
Dead+Wind 180 deg+Ice+Temp	79.811	0.065	11.461	1095.358	-12.070	0.128
Dead+Wind 210 deg+Ice+Temp	79.811	-5.677	9.910	944.982	543.909	0.207
Dead+Wind 240 deg+Ice+Temp	79.811	-9.923	5.665	532.833	955.664	0.272
Dead+Wind 270 deg+Ice+Temp	79.811	-11.476	-0.066	-22.582	1106.071	0.250
Dead+Wind 300 deg+Ice+Temp	79.811	-9.957	-5.774	-575.625	959.055	0.177
Dead+Wind 330 deg+Ice+Temp	79.811	-5.785	-9.947	-979.847	555.436	0.046
Dead+Wind 0 deg - Service	46.665	-0.111	-15.536	-1461.679	11.074	-0.242
Dead+Wind 30 deg - Service	46.665	7.708	-13.420	-1262.576	-723.441	-0.236
Dead+Wind 60 deg - Service	46.665	13.426	-7.697	-724.294	-1260.349	-0.253
Dead+Wind 90 deg - Service	46.665	15.528	0.095	8.355	-1457.675	-0.123
Dead+Wind 120 deg - Service	46.665	13.476	7.825	734.252	-1265.431	-0.003
Dead+Wind 150 deg - Service	46.665	7.827	13.477	1264.976	-735.804	0.128
Dead+Wind 180 deg - Service	46.665	0.092	15.538	1458.586	-10.434	0.239
Dead+Wind 210 deg - Service	46.665	-7.686	13.436	1260.968	719.617	0.261
Dead+Wind 240 deg - Service	46.665	-13.444	7.674	718.389	1260.983	0.285
Dead+Wind 270 deg - Service	46.665	-15.547	-0.093	-11.555	1458.447	0.205
Dead+Wind 300 deg - Service	46.665	-13.489	-7.830	-738.153	1265.438	0.092
Dead+Wind 330 deg - Service	46.665	-7.840	-13.485	-1269.298	735.824	-0.060

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX	PY	PZ	PX	PY	PZ	% Error
	K	K	K	K	K	K	
1	0.000	-46.665	0.000	0.000	46.665	0.000	0.000%
2	-0.283	-46.665	-39.771	0.283	46.665	39.771	0.000%
3	19.733	-46.665	-34.356	-19.733	46.665	34.356	0.000%
4	34.371	-46.665	-19.705	-34.371	46.665	19.705	0.000%
5	39.751	-46.665	0.244	-39.751	46.665	-0.244	0.000%
6	34.499	-46.665	20.032	-34.499	46.665	-20.032	0.000%
7	20.038	-46.665	34.501	-20.038	46.665	-34.501	0.000%
8	0.237	-46.665	39.778	-0.237	46.665	-39.778	0.000%
9	-19.676	-46.665	34.397	19.676	46.665	-34.397	0.000%
10	-34.418	-46.665	19.646	34.418	46.665	-19.646	0.000%
11	-39.801	-46.665	-0.239	39.801	46.665	0.239	0.000%
12	-34.531	-46.665	-20.045	34.531	46.665	20.045	0.000%
13	-20.071	-46.665	-34.523	20.071	46.665	34.523	0.000%
14	0.000	-79.811	0.000	-0.000	79.811	0.000	0.000%
15	-0.077	-79.811	-11.459	0.077	79.811	11.459	0.000%
16	5.691	-79.811	-9.900	-5.691	79.811	9.900	0.000%
17	9.911	-79.811	-5.680	-9.911	79.811	5.680	0.000%

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
18	11.463	-79.811	0.067	-11.464	79.811	-0.067	0.000%
19	9.949	-79.811	5.772	-9.949	79.811	-5.772	0.000%
20	5.777	-79.811	9.942	-5.777	79.811	-9.942	0.000%
21	0.065	-79.811	11.461	-0.065	79.811	-11.461	0.000%
22	-5.677	-79.811	9.910	5.677	79.811	-9.910	0.000%
23	-9.923	-79.811	5.665	9.923	79.811	-5.665	0.000%
24	-11.476	-79.811	-0.066	11.476	79.811	0.066	0.000%
25	-9.957	-79.811	-5.774	9.957	79.811	5.774	0.000%
26	-5.785	-79.811	-9.947	5.785	79.811	9.947	0.000%
27	-0.111	-46.665	-15.536	0.111	46.665	15.536	0.000%
28	7.708	-46.665	-13.420	-7.708	46.665	13.420	0.000%
29	13.426	-46.665	-7.697	-13.426	46.665	7.697	0.000%
30	15.528	-46.665	0.095	-15.528	46.665	-0.095	0.000%
31	13.476	-46.665	7.825	-13.476	46.665	-7.825	0.000%
32	7.827	-46.665	13.477	-7.827	46.665	-13.477	0.000%
33	0.092	-46.665	15.538	-0.092	46.665	-15.538	0.000%
34	-7.686	-46.665	13.436	7.686	46.665	-13.436	0.000%
35	-13.444	-46.665	7.674	13.444	46.665	-7.674	0.000%
36	-15.547	-46.665	-0.093	15.547	46.665	0.093	0.000%
37	-13.489	-46.665	-7.830	13.489	46.665	7.830	0.000%
38	-7.840	-46.665	-13.485	7.840	46.665	13.485	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	4	0.00000001	0.00006328
3	Yes	5	0.00000001	0.00002600
4	Yes	5	0.00000001	0.00002693
5	Yes	4	0.00000001	0.00002775
6	Yes	5	0.00000001	0.00002693
7	Yes	5	0.00000001	0.00002671
8	Yes	4	0.00000001	0.00003226
9	Yes	5	0.00000001	0.00002696
10	Yes	5	0.00000001	0.00002576
11	Yes	4	0.00000001	0.00005356
12	Yes	5	0.00000001	0.00002713
13	Yes	5	0.00000001	0.00002727
14	Yes	4	0.00000001	0.00000814
15	Yes	4	0.00000001	0.00066125
16	Yes	4	0.00000001	0.00071865
17	Yes	4	0.00000001	0.00071794
18	Yes	4	0.00000001	0.00065213
19	Yes	4	0.00000001	0.00070724
20	Yes	4	0.00000001	0.00070556
21	Yes	4	0.00000001	0.00064178
22	Yes	4	0.00000001	0.00069658
23	Yes	4	0.00000001	0.00069607
24	Yes	4	0.00000001	0.00064885
25	Yes	4	0.00000001	0.00072006
26	Yes	4	0.00000001	0.00072284
27	Yes	4	0.00000001	0.00001660
28	Yes	4	0.00000001	0.00009422
29	Yes	4	0.00000001	0.00010142
30	Yes	4	0.00000001	0.00001387
31	Yes	4	0.00000001	0.00009951
32	Yes	4	0.00000001	0.00009772
33	Yes	4	0.00000001	0.00001491
34	Yes	4	0.00000001	0.00010134
35	Yes	4	0.00000001	0.00009277
36	Yes	4	0.00000001	0.00001559
37	Yes	4	0.00000001	0.00010101
38	Yes	4	0.00000001	0.00010172

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	140 - 86.8333	20.496	38	1.217	0.002
L2	92.5 - 38	9.285	38	0.949	0.001
L3	45 - 0	2.172	38	0.436	0.000

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
142'	BXA-80063-4BF-EDIN-X w/ Mount Pipe	38	20.496	1.217	0.002	56066
126'	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	38	16.986	1.157	0.001	20023
115'	(2) 7770.00 w/ Mount Pipe	38	14.304	1.103	0.001	11213
108'	VHLP2.5-11	38	12.662	1.062	0.001	8759
103'	PCS 1900MHz 4x45W-65MHz	38	11.529	1.030	0.001	7575
102'	LLPX310R-V1 w/ Mount Pipe	38	11.307	1.023	0.001	7376
94'	742 213	38	9.593	0.962	0.001	6117
74'	BCD-87010	38	5.878	0.765	0.000	5175
40'	KS24019-L112A	38	1.757	0.382	0.000	4876

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	140 - 86.8333	52.382	13	3.110	0.005
L2	92.5 - 38	23.740	13	2.428	0.001
L3	45 - 0	5.556	13	1.114	0.000

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
142'	BXA-80063-4BF-EDIN-X w/ Mount Pipe	13	52.382	3.110	0.005	22058
126'	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	13	43.416	2.957	0.004	7877
115'	(2) 7770.00 w/ Mount Pipe	13	36.566	2.819	0.003	4410
108'	VHLP2.5-11	13	32.369	2.716	0.002	3444
103'	PCS 1900MHz 4x45W-65MHz	13	29.474	2.633	0.002	2978
102'	LLPX310R-V1 w/ Mount Pipe	13	28.907	2.616	0.002	2900
94'	742 213	13	24.527	2.460	0.002	2404
74'	BCD-87010	13	15.032	1.958	0.001	2030
40'	KS24019-L112A	13	4.493	0.977	0.000	1907

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	140 - 86.8333 (1)	TP39.223x26.216x0.313	53'2"	0'	0.0	39.000	37.759	-17.218	1472.590	0.012
L2	86.8333 - 38 (2)	TP50.56x37.212x0.406	54'6"	0'	0.0	39.000	63.365	-29.408	2471.220	0.012
L3	38 - 0 (3)	TP59.05x48.033x0.5	45'	0'	0.0	39.000	94.266	-46.647	3676.350	0.013

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	140 - 86.8333 (1)	TP39.223x26.216x0.313	686.777	23.802	39.000	0.610	0.000	0.000	39.000	0.000
L2	86.8333 - 38 (2)	TP50.56x37.212x0.406	2100.075	33.600	39.000	0.862	0.000	0.000	39.000	0.000
L3	38 - 0 (3)	TP59.05x48.033x0.5	3752.783	33.396	39.000	0.856	0.000	0.000	39.000	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V K	Actual f_v ksi	Allow. F_v ksi	Ratio $\frac{f_v}{F_v}$	Actual T kip-ft	Actual f_{vt} ksi	Allow. F_{vt} ksi	Ratio $\frac{f_{vt}}{F_{vt}}$
L1	140 - 86.8333 (1)	TP39.223x26.216x0.313	26.063	0.690	26.000	0.054	0.314	0.005	26.000	0.000
L2	86.8333 - 38 (2)	TP50.56x37.212x0.406	33.406	0.527	26.000	0.041	0.325	0.002	26.000	0.000
L3	38 - 0 (3)	TP59.05x48.033x0.5	39.954	0.424	26.000	0.033	0.164	0.001	26.000	0.000

Pole Interaction Design Data

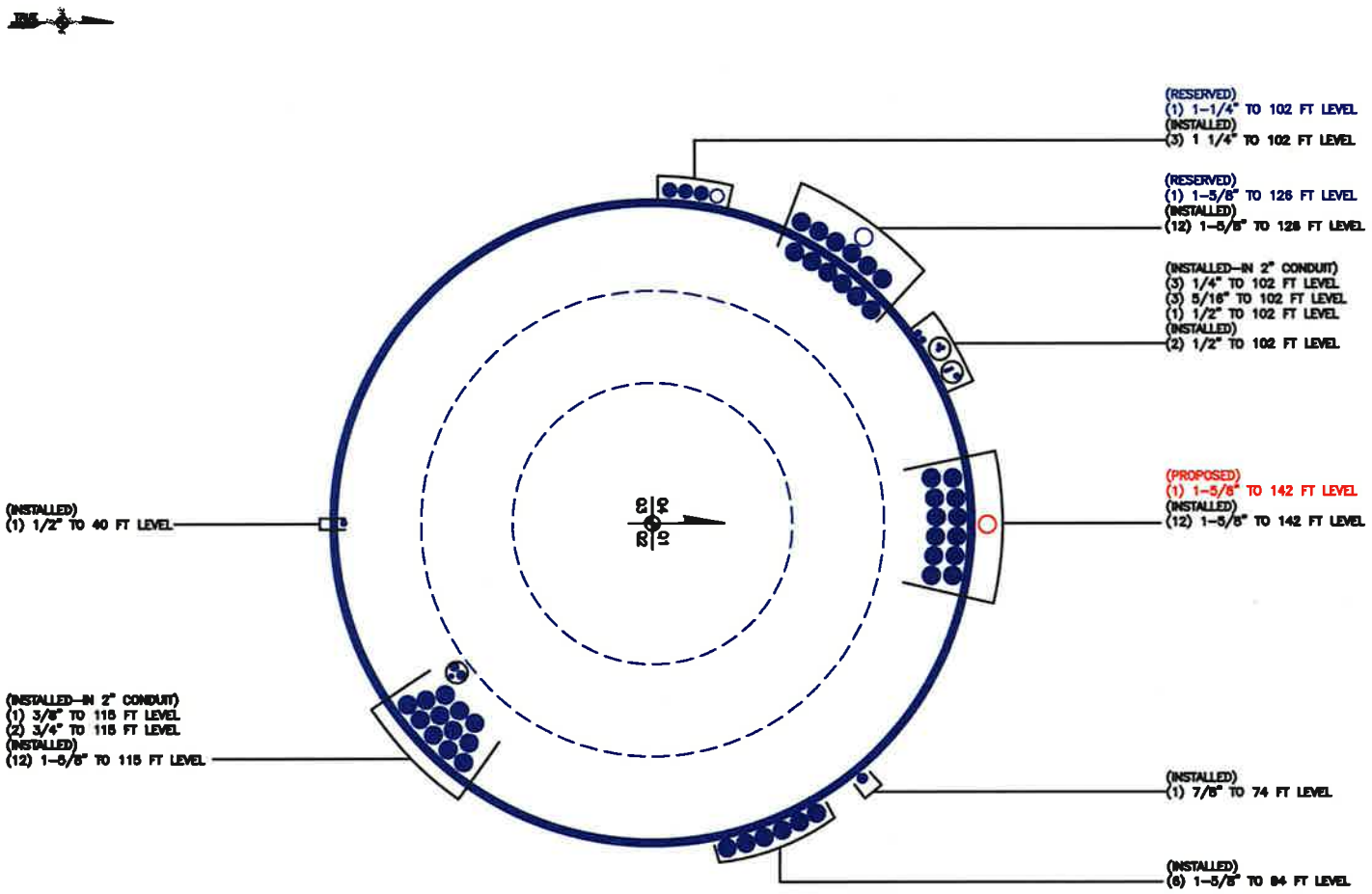
Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	140 - 86.8333 (1)	0.012	0.610	0.000	0.054	0.000	0.623 ✔	1.333	H1-3+VT ✔
L2	86.8333 - 38 (2)	0.012	0.862	0.000	0.041	0.000	0.874 ✔	1.333	H1-3+VT ✔
L3	38 - 0 (3)	0.013	0.856	0.000	0.033	0.000	0.869 ✔	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	140 - 86.8333	Pole	TP39.223x26.216x0.313	1	-17.218	1962.962	46.7	Pass
L2	86.8333 - 38	Pole	TP50.56x37.212x0.406	2	-29.408	3294.136	65.6	Pass
L3	38 - 0	Pole	TP59.05x48.033x0.5	3	-46.647	4900.574	65.2	Pass
							Summary	
						Pole (L2)	65.6	Pass
						RATING =	**65.6**	**Pass**

APPENDIX B

BASE LEVEL DRAWING


(RESERVED)
(1) 1-1/4" TO 102 FT LEVEL
(INSTALLED)
(3) 1 1/4" TO 102 FT LEVEL
(RESERVED)
(1) 1-5/8" TO 126 FT LEVEL
(INSTALLED)
(12) 1-5/8" TO 126 FT LEVEL
(INSTALLED-IN 2" CONDUIT)
(3) 1/4" TO 102 FT LEVEL
(3) 5/16" TO 102 FT LEVEL
(1) 1/2" TO 102 FT LEVEL
(INSTALLED)
(2) 1/2" TO 102 FT LEVEL
(PROPOSED)
(1) 1-5/8" TO 142 FT LEVEL
(INSTALLED)
(12) 1-5/8" TO 142 FT LEVEL
(INSTALLED)
(1) 1/2" TO 40 FT LEVEL
(INSTALLED-IN 2" CONDUIT)
(1) 3/8" TO 115 FT LEVEL
(2) 3/4" TO 115 FT LEVEL
(INSTALLED)
(12) 1-5/8" TO 115 FT LEVEL
(INSTALLED)
(1) 7/8" TO 74 FT LEVEL
(INSTALLED)
(6) 1-5/8" TO 84 FT LEVEL

APPENDIX C

ADDITIONAL CALCULATIONS

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

TIA Rev F

Site Data

BU#: *806369*
Site Name: *HRT 094 943225*
App #: *254786 Revision # 0*
Pole Manufacturer: *Other*

Reactions		
Moment:	3753	ft-kips
Axial:	47	kips
Shear:	40	kips

Anchor Rod Data		
Qty:	20	
Diam:	2.25	in
Rod Material:	A615-J	
Strength (Fu):	100	ksi
Yield (Fy):	75	ksi
Bolt Circle:	65.05	in

Plate Data		
Diam:	71.05	in
Thick:	3	in
Grade:	60	ksi
Single-Rod B-eff:	9.49	in

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

Pole Data		
Diam:	59.05	in
Thick:	0.5	in
Grade:	65	ksi
# of Sides:	12	"0" IF Round
Fu	80	ksi
Reinf. Fillet Weld	0	"0" if None

Stress Increase Factor		
ASIF:	1.333	

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

Anchor Rod Results

Maximum Rod Tension:	136.1 Kips	Rigid
Allowable Tension:	195.0 Kips	Service, ASD
Anchor Rod Stress Ratio:	69.8% **Pass**	Fty*ASIF

Base Plate Results

	Flexural Check	Rigid
Base Plate Stress:	19.5 ksi	Service ASD
Allowable Plate Stress:	60.0 ksi	0.75*Fy*ASIF
Base Plate Stress Ratio:	32.6% Pass	Y.L. Length: 27.29

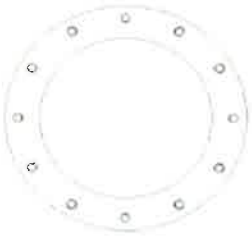
n/a

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

CCI Foundation Tool Suite - Monopole Pier - Beta Release

CCI Foundation Tool Suite - v1.0 Date: 7/9/2014

BU:	806369
Site Name:	HRT 094 943225
App Number:	254786 Rev # 0
Work Order:	793375

Monopole Drilled Pier

Input

Criteria

TIA Revision:	F
ACI 318 Revision:	2002
Seismic Category:	B

Forces

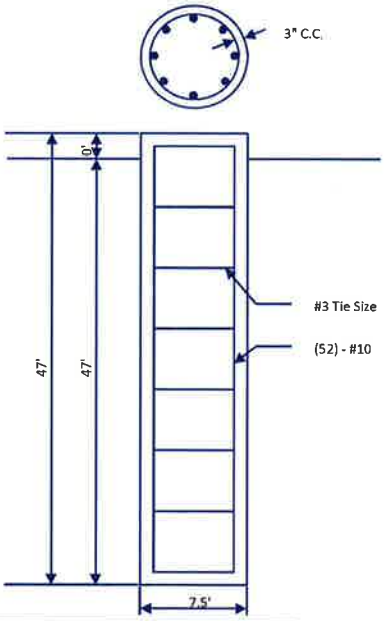
Compression	47 kips
Shear	40 kips
Moment	3753 k-ft
Swelling Force	0 kips

Foundation Dimensions

Pier Diameter:	7.5 ft
Ext. above grade:	0 ft
Depth below grade:	47 ft

Material Properties

Number of Rebar:	52
Rebar Size:	10
Tie Size	3
Rebar tensile strength:	60 ksi
Concrete Strength:	3000 psi
Ultimate Concrete Strain	0.003 in/in
Clear Cover to Ties:	3 in



Soil Profile: Soil

Layer	Thickness (ft)	From (ft)	To (ft)	Unit Weight (pcf)	Cohesion (psf)	Friction Angle (deg)	Ultimate Uplift Skin Friction (ksf)	Ultimate Comp. Skin Friction (ksf)	Ultimate Bearing Capacity (ksf)	SPT 'N' Counts
1	2	0	2	105	0	0	0	0	0	
2	3	2	5	100	0	0	0	0	0	
3	5	5	10	100	500	30	0.6	0.6	0	
4	15	10	25	36	100	27	0.4	0.4	0	
5	10	25	35	36	100	27	0.6	0.6	0	
6	10	35	45	41	200		0.6	0.6	0	
7	2	45	47	41		32	1	1	9	

Analysis Results

Soil Lateral Capacity

Depth to Zero Shear:	8.37 ft
Max Moment, Mu:	4034.71 k-ft
Soil Safety Factor:	6.37
Safety Factor Req'd:	2
RATING:	31.4%

Soil Axial Capacity

Skin Friction (k):	270.96 kips
End Bearing (k):	198.80 kips
Comp. Capacity (k), ϕCn:	469.77 kips
Comp. (k), Cu:	47.00 kips
RATING:	10.0%

Concrete/Steel Check

Mu (from soil analysis)	5245.13 k-ft
ϕMn	10672.72 k-ft
RATING:	49.1%

rho provided	1.04
rho required	0.33 OK
Rebar Spacing	3.68
Spacing required	20.32 OK
Dev. Length required	38.38
Dev. Length provided	55.65 OK

Overall Foundation Rating: 49.1%