



Daniel F. Caruso
Chairman

STATE OF CONNECTICUT

CONNECTICUT SITING COUNCIL

Ten Franklin Square, New Britain, CT 06051

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

E-Mail: siting.council@ct.gov

Internet: ct.gov/csc

February 24, 2010

Kenneth C. Baldwin, Esq.
Robinson & Cole LLP
280 Trumbull Street
Hartford, CT 06103-3597

RE: **EM-VER-132-100125** - Cellco Partnership d/b/a Verizon Wireless notice of intent to modify an existing telecommunications facility located at 190 Burnham Street, South Windsor, Connecticut.

Dear Attorney Baldwin:

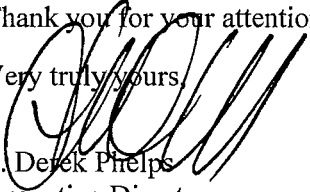
The Connecticut Siting Council (Council) hereby acknowledges your notice to modify this existing telecommunications facility, pursuant to Section 16-50j-73 of the Regulations of Connecticut State Agencies.

The proposed modifications are to be implemented as specified here and in your notice dated January 25, 2010, including the placement of all necessary equipment and shelters within the tower compound. The modifications are in compliance with the exception criteria in Section 16-50j-72 (b) of the Regulations of Connecticut State Agencies as changes to an existing facility site that would not increase tower height, extend the boundaries of the tower site, increase noise levels at the tower site boundary by six decibels, and increase the total radio frequencies electromagnetic radiation power density measured at the tower site boundary to or above the standard adopted by the State Department of Environmental Protection pursuant to General Statutes § 22a-162. This facility has also been carefully modeled to ensure that radio frequency emissions are conservatively below State and federal standards applicable to the frequencies now used on this tower.

This decision is under the exclusive jurisdiction of the Council. Please be advised that the validity of this action shall expire one year from the date of this letter. Any additional change to this facility will require explicit notice to this agency pursuant to Regulations of Connecticut State Agencies Section 16-50j-73. Such notice shall include all relevant information regarding the proposed change with cumulative worst-case modeling of radio frequency exposure at the closest point of uncontrolled access to the tower base, consistent with Federal Communications Commission, Office of Engineering and Technology, Bulletin 65. Any deviation from this format may result in the Council implementing enforcement proceedings pursuant to General Statutes § 16-50u including, without limitation, imposition of expenses resulting from such failure and of civil penalties in an amount not less than one thousand dollars per day for each day of construction or operation in material violation.

Thank you for your attention and cooperation.

Very truly yours,


S. Derek Phelps
Executive Director

SDP/MP/laf

c: The Honorable Matthew Streeter, Mayor, Town of South Windsor
Matthew B. Galligan, Town Manager, Town of South Windsor
Marcia Banach, Director of Planning, Town of South Windsor
Crown Castle USA, Inc.

280 Trumbull Street
 Hartford, CT 06103-3597
 Main (860) 275-8200
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 kbaldwin@rc.com
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ORIGINAL

January 25, 2010

Via Hand Delivery

S. Derek Phelps
 Executive Director
 Connecticut Siting Council
 10 Franklin Square
 New Britain, CT 06051

RECEIVED
 JAN 25 2010
 CONNECTICUT
 SITING COUNCIL

Re: **Notice of Exempt Modification – Antenna Swap
 190 Burnham Street, South Windsor, Connecticut**

Dear Mr. Phelps:

Cellco Partnership d/b/a Verizon Wireless (“Cellco”) currently maintains wireless telecommunications antennas at the 109-foot level on the existing 110-foot tower at the above-referenced address. The tower is owned by Crown Castle. The Council approved Cellco’s use of the existing tower in 1990 in Docket No. 137. Cellco now intends to modify its installation by replacing nine (9) of its existing antennas with four (4) model LPA-80080/4CF cellular antennas; two (2) model LPA-80063/4CF cellular antennas; two (2) model BXA-70063/6CF_6 LTE (700 MHz) antennas; and one (1) model BXA-70063/6CF_2 LTE (700 MHz) antenna, all at the same 109-foot level on the tower. Attached behind Tab 1 are the specifications for the proposed 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 Matthew B. Galligan, Town Manager for the Town of South Windsor. A copy of this letter is being sent to Abraham and Beverly Glassman, the owners of the property on which the tower is located.

The planned modifications to the facility fall squarely within those activities explicitly provided for in R.C.S.A. § 16-50j-72(b)(2).

1. The proposed modifications will not result in any increase in the overall height of the existing tower. Cellco’s antennas will be located at the same 109-foot level on the existing 110-foot tower.



Law Offices

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10183947-v1

ROBINSON & COLE_{LLP}

S. Derek Phelps
January 25, 2010
Page 2

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

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

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

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

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

Sincerely,



Kenneth C. Baldwin

Enclosures

Copy to:

Matthew B. Galligan, South Windsor Town Manager
Abraham and Beverly Glassman
Sandy M. Carter



Vertically Polarized, Log Periodic 80° / 12.5 dBd

LPA-80080/4CF

When ordering replace "___" with connector type.

Mechanical specifications

Length	1200 mm	47.2 in
Width	140 mm	5.5 in
Depth	335 mm	13.2 in
Depth with z-bracket	375 mm	14.8 in
4) Weight	5.4 kg	12.0 lbs
Wind Area		
Fore/Aft	0.17 m ²	1.8 ft ²
Side	0.40 m ²	4.3 ft ²
Rated Wind Velocity (Safety factor 2.0)		
	>369 km/hr	>229 mph
Wind Load @ 100 mph (161 km/hr)		
Fore/Aft	254 N	57.1 lbs
Side	574 N	129.0 lbs

Antenna consisting of aluminum alloy with brass feedlines covered by a UV safe fiberglass radome.

Mounting and Downtilting

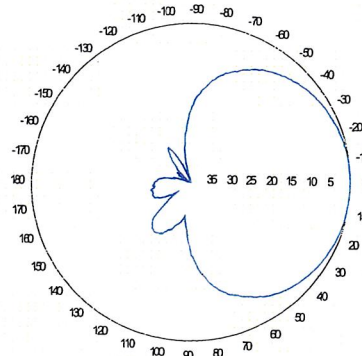
Mounting brackets attach to a pipe diameter of Ø50-102 mm (2.0-4.0 in). If the lock-down brace is used, the maximum diameter is Ø88.9 mm (3.5 in).

Mounting Bracket & Downtilt Bracket Kit
#21699999

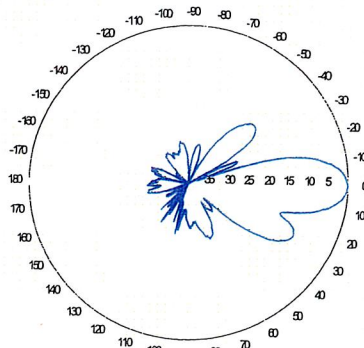
Electrical specifications

Frequency Range	806-960 MHz
Impedance	50Ω
3) Connector(s)	NE or E-DIN 1 port / center
1) VSWR	≤ 1.4:1
Polarization	Vertical
1) Gain	12.5 dBd
2) Power Rating	500 W
1) Half Power Angle	
H-Plane	80°
E-Plane	15°
1) Electrical Downtilt	0°
1) Null Fill	15%
Lightning Protection	Direct Ground

Radiation pattern¹⁾



Horizontal

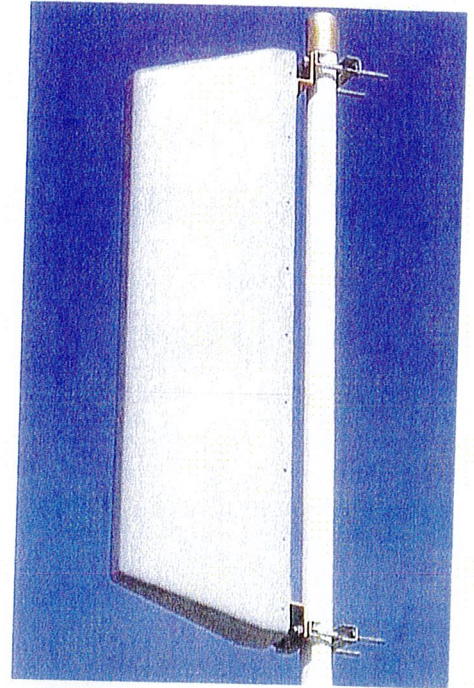


Vertical

Featuring upper side lobe suppression.

Radiation patterns for all antennas are measured with the antenna mounted on a fiberglass pole.

Mounting on a metal pole will typically improve the Front-to-Back ratio.



Amphenol Antel's Exclusive 3T (True Transmission Line Technology) Antenna Design:

- True log-periodic design allows for superior front-to-side characteristics to minimize sector overlap.
- Unique feedline design eliminates the need for conventional solder joints in the signal path.
- A non-collinear system with access to every radiating element for broad bandwidth and superior performance.
- Air as insulation for virtually no internal signal loss.

This Amphenol Antel antenna is under a five-year limited warranty for repair or replacement.

Antenna available with center-fed connector only.

CF Denotes a Center-Fed Connector.

806-960 MHz

- 1) Typical values.
- 2) Power rating limited by connector only.
- 3) NE indicates an elongated N connector. E-DIN indicates an elongated DIN connector.
- 4) The antenna weight listed above does not include the bracket weight.

Improvements to mechanical and/or electrical performance of the antenna may be made without notice.

Amphenol Antel, Inc. 1300 Capital Drive Rockford, Illinois 61109 USA Tel. (815) 399-0001
Toll-Free (888) 417-9562 Fax. (815) 399-0156 antel@antelinc.com www.antelinc.com

Amphenol Antel, Inc.
The Antenna Technology Company

Revision Date: 7/5/07

Mechanical specifications

Length	1205 mm	47.4 in
Width	386 mm	15.2 in
Depth	335 mm	13.2 in
Depth with z-bracket	375 mm	14.8 in
Weight ⁴⁾	9.1 kg	20 lbs
Wind Area Fore/Aft	0.47 m ²	5.0 ft ²
Wind Area Side	0.40 m ²	4.4 ft ²
Max Wind Survivability	>201 km/hr	>125 mph
Wind Load @ 100 mph (161 km/hr)		
Fore/Aft	665 N	150 lbf
Side	577 N	130 lbf

Antenna consisting of aluminum alloy with brass feedlines covered by a gray, UV safe fiberglass radome. RoHS compliant.

Mounting & Downtilting

Mounting hardware attaches to pipe diameter Ø50-102 mm; Ø2.0-4.0 in. If the lock-down brace is used, the maximum diameter is Ø88.9 mm (3.5 in).

Mounting & Downtilt Bracket Kit 2169999

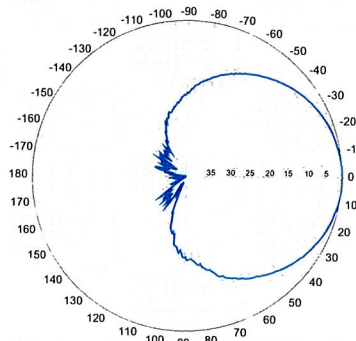
Electrical specifications

Frequency Range	806-960 MHz
Impedance	50Ω
Connector ³⁾	NE or E-DIN Female 1 port / Center
VSWR ¹⁾	≤ 1.4:1
Polarization	Vertical
Gain ¹⁾	13.0 dBd 15.0 dBi
Power Rating ²⁾	500 W
Half Power Angle ¹⁾	
Horizontal Beamwidth	63°
Vertical Beamwidth	15°
Electrical downtilt ⁵⁾	0°
Null fill ¹⁾	10%
Lightning protection	Direct ground

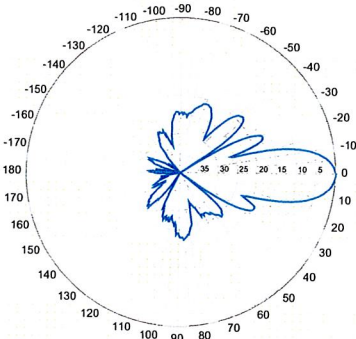
1) Typical values.
2) Power rating limited by connector only.
3) NE indicates an elongated N connector.
E-DIN indicates an elongated DIN connector.
4) Antenna weight does not include brackets.
5) Add'l downtilts may be available. Check website for details.

Improvements to mechanical and/or electrical performance of the antenna may be made without notice.

Radiation-pattern¹⁾



Horizontal

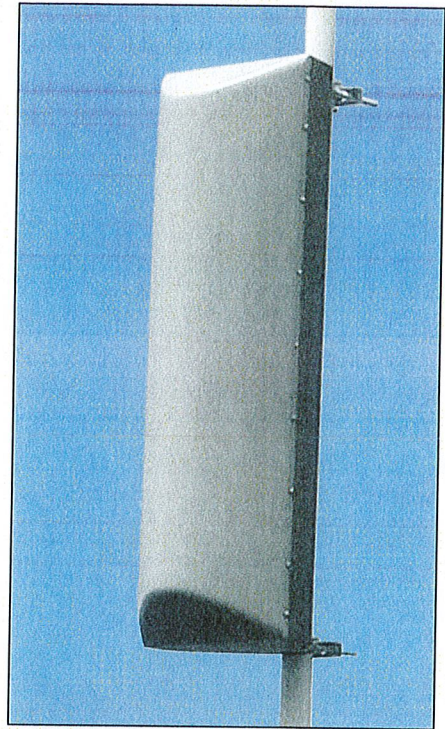


Vertical

Radiation patterns for all antennas are measured with the antenna mounted on a fiberglass pole.

Mounting on a metal pole will typically improve the front-to-back ratio.

LPA-80063/4CF ___
When ordering replace " ___ " with connector type.



Featuring our Exclusive
3T Technology™
Antenna Design:

- True log-periodic design allows for superior front-to-side characteristics to minimize sector overlap.
- Unique feedline design eliminates the need for conventional solder joints in the signal path.
- A non-collinear system with access to every radiating element for broad bandwidth and superior performance.
- Air as insulation for virtually no internal signal loss.

Warranty:

This antenna is under a five-year limited warranty for repair or replacement.

Revision Date 12/26/08

806-960 MHz

Slant $\pm 45^\circ$ Dual Polarized FET Panel $63^\circ / 14.5$ dBd 696-900 MHz

Mechanical specifications

Length	1804 mm	71.0 in
Width	285 mm	11.2 in
Depth	114 mm	4.5 in
Depth with z-bracket	154 mm	6.1 in
Weight ⁴⁾	7.9 kg	17.0 lbs
Wind Area Fore/Aft	0.51 m ²	5.5 ft ²
Wind Area Side	0.21 m ²	2.2 ft ²
Max Wind Survivability	>201 km/hr	>125 mph
Wind Load @ 100 mph (161 km/hr)		
Fore/Aft	753 N	169 lbf
Side	351 N	79 lbf

Antenna consisting of aluminum alloy with brass feedlines covered by a UV safe fiber-glass radome.

Mounting & Downtilting

Mounting hardware attaches to pipe diameter $\varnothing 50$ -160 mm; $\varnothing 2.0$ -6.3 in

Mounting Bracket Kit	36210002
Downtilt Bracket Kit	36114003

Electrical specifications

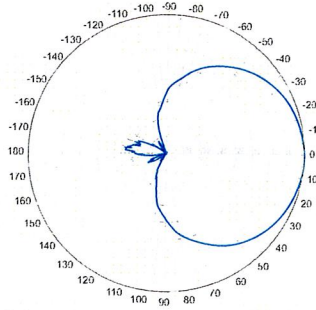
Frequency Range	696-900 MHz
Impedance	50 Ω
Connector ³⁾	NE or E-DIN Female 2 ports / Center
VSWR ¹⁾	$\leq 1.35:1$
Polarization	Slant $\pm 45^\circ$
Isolation Between Ports ¹⁾	< -25 dB
Gain ¹⁾	14.5 dBd 16.5 dBi
Power Rating ²⁾	500 W
Half Power Angle ¹⁾	
Horizontal Beamwidth	63 $^\circ$
Vertical Beamwidth	11 $^\circ$
Electrical downtilt ⁵⁾	2 $^\circ$
Null fill ¹⁾	5%
Lightning protection	Direct ground

Patented Dipole Design: U.S. Patent No. 6,608,600 B2

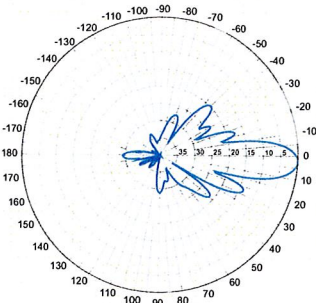
- 1) Typical values.
- 2) Power rating limited by connector only.
- 3) NE indicates an elongated N connector.
E-DIN indicates an elongated DIN connector.
- 4) Antenna weight does not include brackets.
- 5) Add'l downtilts may be available. Check website for details.

Improvements to mechanical and/or electrical performance of the antenna may be made without notice.

Radiation-pattern¹⁾
750 MHz

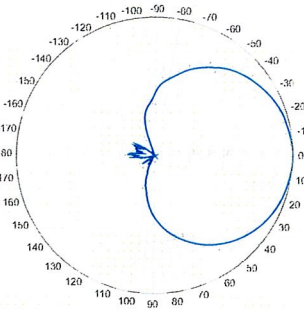


Horizontal

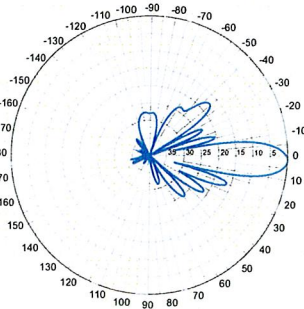


Vertical

850 MHz



Horizontal

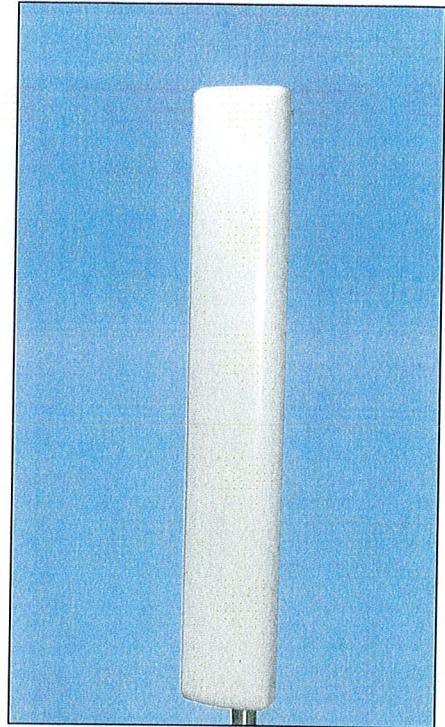


Vertical

696-900 MHz

BXA-70063/6CF __ 2 $^\circ$

When ordering replace " __ " with connector type.



Featuring our Exclusive
3T Technology™
Antenna Design:

- Watercut brass feedline assembly for consistent performance.
- Unique feedline design eliminates the need for conventional solder joints in the signal path.
- A non-collinear system with access to every radiating element for broad bandwidth and superior performance.
- Air as insulation for virtually no internal signal loss.

Warranty:

This antenna is under a five-year limited warranty for repair or replacement.

Revision Date 04/07/09

Slant $\pm 45^\circ$ Dual Polarized FET Panel $63^\circ / 14.5$ dBd 696-900 MHz

Mechanical specifications

Length	1804 mm	71.0 in
Width	285 mm	11.2 in
Depth	114 mm	4.5 in
Depth with z-bracket	154 mm	6.1 in
Weight ⁴⁾	7.9 kg	17.0 lbs
Wind Area Fore/Aft	0.51 m ²	5.5 ft ²
Wind Area Side	0.21 m ²	2.2 ft ²
Max Wind Survivability	>201 km/hr	>125 mph
Wind Load @ 100 mph (161 km/hr)		
Fore/Aft	753 N	169 lbf
Side	351 N	79 lbf

Antenna consisting of aluminum alloy with brass feedlines covered by a UV safe fiber-glass radome.

Mounting & Downtilting

Mounting hardware attaches to pipe diameter $\text{\O}50$ -160 mm; $\text{\O}2.0$ -6.3 in

Mounting Bracket Kit	36210003
Downtilt Bracket Kit	36210004
Mechanical Downtilt	0-14 $^\circ$

Electrical specifications

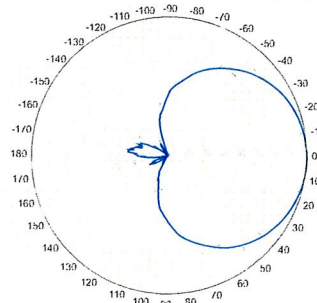
Frequency Range	696-900 MHz
Impedance	50 Ω
Connector ³⁾	NE or E-DIN Female 2 ports / Center
VSWR ¹⁾	$\leq 1.35:1$
Polarization	Slant $\pm 45^\circ$
Isolation Between Ports ¹⁾	< -25 dB
Gain ¹⁾	14.5 dBd 16.5 dBi
Power Rating ²⁾	500 W
Half Power Angle ¹⁾	
Horizontal Beamwidth	63 $^\circ$
Vertical Beamwidth	11 $^\circ$
Electrical downtilt ⁵⁾	6 $^\circ$
Null fill ¹⁾	5%
Lightning protection	Direct ground

Patented Dipole Design: U.S. Patent No. 6,608,600 B2

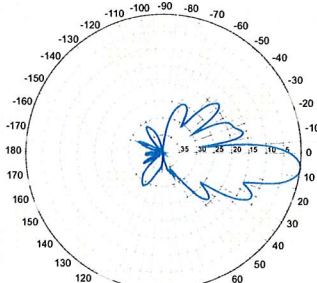
- 1) Typical values.
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Improvements to mechanical and/or electrical performance of the antenna may be made without notice.

Radiation-pattern¹⁾
750 MHz

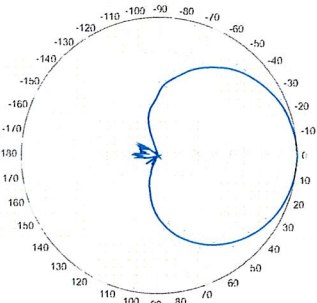


Horizontal

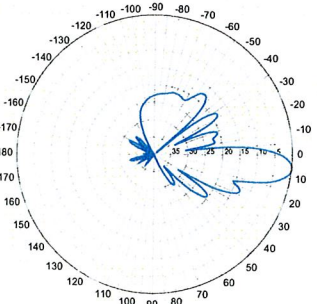


Vertical

850 MHz



Horizontal

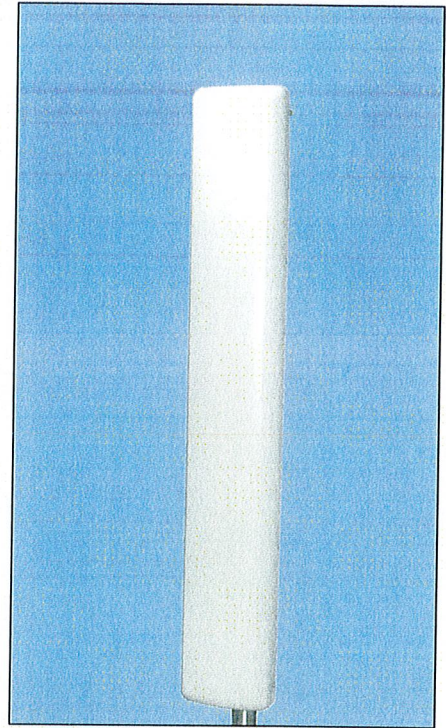


Vertical

696-900 MHz

BXA-70063/6CF __ 6 $^\circ$

When ordering replace " __ " with connector type.



Featuring our Exclusive
3T Technology™
Antenna Design:

- Watercut brass feedline assembly for consistent performance.
- Unique feedline design eliminates the need for conventional solder joints in the signal path.
- A non-collinear system with access to every radiating element for broad bandwidth and superior performance.
- Air as insulation for virtually no internal signal loss.

Warranty:

This antenna is under a five-year limited warranty for repair or replacement.

Revision Date: 04/15/09

Site Name: South Windsor Tower Height: Verizon @ 109'		General		Power		Density			
CARRIER	# OF CHAN.	WATTS ERP	HEIGHT	CALC. POWER DENS	FREQ.	MAX. PERMISS. EXP.	FRACTION MPE	Total	
*Nextel	9	100	100	0.0324	851	0.5673	5.70%		
Verizon	3	269	109	0.0244	1970	1.0000	2.44%		
Verizon	9	272	109	0.0741	869	0.5793	12.79%		
Verizon	1	877	109	0.0265	757	0.4973	5.34%		
* Source: Siting Council									
26.3%									

Date: December 17, 2009

David Eicher
Crown Castle
3530 Toringdon Way, Suite 300
Charlotte, NC 28277



Crown Castle
2000 Corporate Drive
Canonsburg, PA
724-416-2000

Subject: Structural Analysis Report

Carrier Designation: Verizon Wireless Co-Locate

Crown Castle Designation:
Crown Castle BU Number: 806375
Crown Castle Site Name: HRT 095 943237
Crown Castle JDE Job Number: 128320
Crown Castle Work Order Number: 308725

Engineering Firm Designation: **Crown Castle Project Number:** 308725

Site Data: **190 BURNHAM ST, SOUTH WINDSOR, Hartford County, CT**
Latitude 41° 47' 60", Longitude -72° 36' 60"
110 Foot - Monopole Tower

Dear David Eicher,

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 308725, in accordance with application 91527, revision 1.

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

LC1: Existing + Reserved + Proposed Equipment

Sufficient Capacity

Note: See Table I and Table II for the proposed and existing/reserved loading, respectively.

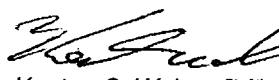
The analysis has been performed in accordance with the TIA/EIA-222-F standard and local code requirements based upon a wind speed of 80 mph fastest mile.

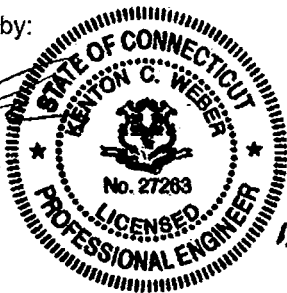
All modifications and equipment proposed in this report shall be installed in accordance with the attached drawings for the determined available structural capacity to be effective.

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

Structural analysis prepared by: Jon W. McElroy, Engineer I/TS

Respectfully submitted by:


Kenton C. Weber, P.E.
Engineering Supervisor



12/17/09

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1) INTRODUCTION

This tower is a 110 ft Monopole tower designed by VALMONT in January of 1991. The tower was originally designed for a wind speed of 90 mph per EIA-222-D.

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, 69.3 mph with 0.5 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
108	109	1	antel	BXA-70063/6CFx2 w/ Mount Pipe	3	1-5/8	-
		2	antel	BXA-70063/6CFx6 w/ Mount Pipe			
		2	antel	LPA-80063/4CF w/ Mount Pipe			
		4	antel	LPA-80080/4CF w/ Mount Pipe			

Table 2 - Existing and Reserved Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
108	109	9	decibel	DB844F90A-SX w/ Mount Pipe	-	-	3
		6	decibel	DB948F85T2E-M w/ Mount Pipe	15	1-5/8	1
	108	1	tower mounts	Platform Mount (LP 101-1)			
97	97	2	-	GPS	11	7/8	1
		9	swedcom	ALP 9212-N w/ Mount Pipe			
		1	tower mounts	Platform Mount (LP 101-1)			
86	87	3	argus technologies	LLPX310R w/ Mount Pipe	4	5/16 1/4 5/8 1/2	2
		1	motorola	TIMING 2000			
		3	samsung telecommunications	WIMAX DAP HEAD			
	86	1	tower mounts	T-Arm Mount [TA 702-3]			
	82	3	dragonwave	A-ANT-18G-2-C			
		3	dragonwave	HORIZON COMPACT			

Notes:

- 1) Existing Equipment
- 2) Reserved Equipment
- 3) Equipment to be Removed

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)
107	107	4	-	PD10017's	-	-
100.5	100.5	12	-	PD1132's	-	-

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	EDP/TRIGGS	262109	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	Leinweber & Assoc.	262107	CCISITES
4-TOWER MANUFACTURER DRAWINGS	Valmont	262106	CCISITES

3.1) Analysis Method

RISATower (version 5.3.1.0), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A.

3.2) Assumptions

- 1) Tower and structures were built in accordance with the manufacturer's specifications.
 - 2) The tower and structures have been maintained in accordance with the manufacturer's specification.
 - 3) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.
 - 4) When applicable, transmission cables are considered as structural components for calculating wind loads as allowed by TIA/EIA-222-F.
 - 5) The base plate grout was not considered in this analysis.
- 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	110 - 70	Pole	TP25.53x15.53x0.25	1	-6.48	1016.11	61.9	Pass	
L2	70 - 34.0833	Pole	TP34.02x24.03x0.3125	2	-11.20	1698.94	71.3	Pass	
L3	34.0833 - 0	Pole	TP41.9x32.1645x0.3438	3	-18.49	2385.98	73.1	Pass	
							Summary:		
							Pole (L3)	73.1	Pass
							RATING =	73.1	Pass

Table 6 - Tower Component Stresses vs. Capacity - LC1

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	59.3	Pass
1	Base Plate	0	42.6	Pass
1,2	Base Foundation	0	75.0	Pass

Structure Rating (max from all components) =	75%
---	------------

Notes:

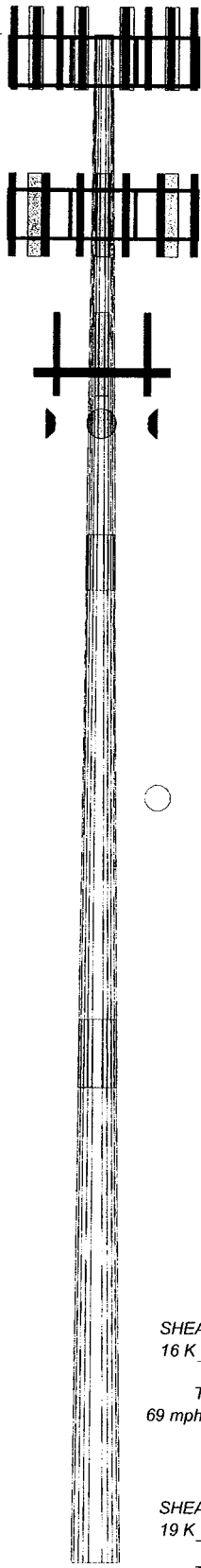
- 1) See additional documentation in "Appendix C – Additional Calculations" for calculations supporting the % capacity consumed.
- 2) Foundation capacity determined by comparing analysis reactions to original design reactions.

4.1) Recommendations

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

APPENDIX A
RISA TOWER OUTPUT

Section	1	2	3
Length (ft)	40.00	39.92	39.00
Number of Sides	12	12	12
Thickness (in)	0.2500	0.3125	0.3438
Lap Splice (ft)		4.92	
Top Dia (in)	15.5300	24.0300	32.1845
Bot Dia (in)	25.5300	34.0200	41.9000
Grade		A572-65	
Weight (K)	2.2	3.9	5.4
	110.0 ft	70.0 ft	34.1 ft
			0.0 ft



DESIGNED APPURTENANCE LOADING

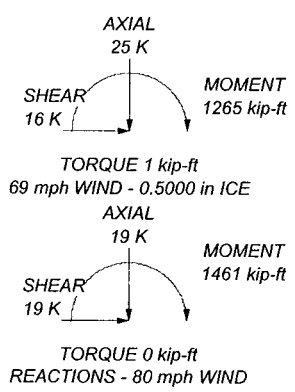
TYPE	ELEVATION	TYPE	ELEVATION
(2) DB948F85T2E-M w/ Mount Pipe	108	Platform Mount (LP 101-1)	97
BXA-70063/6CFx2 w/ Mount Pipe	108	LLPX310R w/ Mount Pipe	86
(2) LPA-80080/4CF w/ Mount Pipe	108	HORIZON COMPACT	86
(2) DB948F85T2E-M w/ Mount Pipe	108	WIMAX DAP HEAD	86
BXA-70063/6CFx6 w/ Mount Pipe	108	LLPX310R w/ Mount Pipe	86
(2) LPA-80080/4CF w/ Mount Pipe	108	HORIZON COMPACT	86
(2) DB948F85T2E-M w/ Mount Pipe	108	WIMAX DAP HEAD	86
BXA-70063/6CFx6 w/ Mount Pipe	108	LLPX310R w/ Mount Pipe	86
(2) LPA-80063/4CF w/ Mount Pipe	108	HORIZON COMPACT	86
Platform Mount (LP 101-1)	108	TIMING 2000	86
(3) ALP 9212-N w/ Mount Pipe	97	WIMAX DAP HEAD	86
(3) ALP 9212-N w/ Mount Pipe	97	T-Arm Mount [TA 702-3]	86
TIMING 2000	97	A-ANT-18G-2-C	86
(3) ALP 9212-N w/ Mount Pipe	97	A-ANT-18G-2-C	86
TIMING 2000	97	A-ANT-18G-2-C	86

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 69 mph basic wind with 0.50 in ice.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 73.1%



 <p>Shaping the Wireless World</p>	Crown Castle USA Inc. 2000 Corporate Drive Canonsburg, PA 15317 Phone: (724) 416-2879 FAX: (724) 416-4879		Job: BU #806375
	Project:		
	Client: Crown Castle	Drawn by: tstyran	App'd:
	Code: TIA/EIA-222-F	Date: 12/17/09	Scale: NTS
	Path:	Dwg No. E-1	

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	Client Crown Castle	Designed by tstyran

Tower Input Data

There is a pole section.

This tower is designed using the TIA/EIA-222-F standard.

The following design criteria apply:

Tower is located in Hartford County, Connecticut.

Basic wind speed of 80 mph.

Nominal ice thickness of 0.5000 in.

Ice density of 56 pcf.

A wind speed of 69 mph is used in combination with ice.

Deflections calculated using a wind speed of 50 mph.

A non-linear (P-delta) analysis was used.

Pressures are calculated at each section.

Stress ratio used in pole design is 1.333.

Local bending stresses due to climbing loads, feedline supports, and appurtenance mounts are not considered.

Options

- | | | |
|--|--|---|
| <ul style="list-style-type: none"> Consider Moments - Legs Consider Moments - Horizontals Consider Moments - Diagonals Use Moment Magnification √ Use Code Stress Ratios √ Use Code Safety Factors - Guys Escalate Ice Always Use Max Kz Use Special Wind Profile Include Bolts In Member Capacity Leg Bolts Are At Top Of Section Secondary Horizontal Braces Leg Use Diamond Inner Bracing (4 Sided) Add IBC .6D+W Combination | <ul style="list-style-type: none"> Distribute Leg Loads As Uniform Assume Legs Pinned √ Assume Rigid Index Plate √ Use Clear Spans For Wind Area Use Clear Spans For KL/r Retension Guys To Initial Tension √ Bypass Mast Stability Checks √ Use Azimuth Dish Coefficients √ Project Wind Area of Appurt. Autocalc Torque Arm Areas SR Members Have Cut Ends Sort Capacity Reports By Component Triangulate Diamond Inner Bracing | <ul style="list-style-type: none"> Treat Feedline Bundles As Cylinder Use ASCE 10 X-Brace Ly Rules Calculate Redundant Bracing Forces Ignore Redundant Members in FEA SR Leg Bolts Resist Compression All Leg Panels Have Same Allowable Offset Girt At Foundation √ Consider Feedline Torque Include Angle Block Shear Check <li style="padding-left: 20px;">Poles √ Include Shear-Torsion Interaction Always Use Sub-Critical Flow Use Top Mounted Sockets |
|--|--|---|

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	110.00-70.00	40.00	4.00	12	15.5300	25.5300	0.2500	1.0000	A572-65 (65 ksi)
L2	70.00-34.08	39.92	4.92	12	24.0300	34.0200	0.3125	1.2500	A572-65 (65 ksi)
L3	34.08-0.00	39.00		12	32.1645	41.9000	0.3438	1.3750	A572-65 (65 ksi)

Tapered Pole Properties

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	Client	Crown Castle	Designed by	tstyrn

Section	Tip Dia. in	Area in ²	I in ⁴	r in	C in	I/C in ³	J in ⁴	I/Q in ²	w in	w/t
L1	16.0778	12.3004	366.5658	5.4702	8.0445	45.5670	742.7616	6.0539	3.4920	13.968
	26.4306	20.3504	1660.0189	9.0502	13.2245	125.5256	3363.6484	10.0158	6.1720	24.688
L2	25.9141	23.8657	1713.5571	8.4909	12.4475	137.6623	3472.1312	11.7460	5.6025	17.928
	35.2201	33.9182	4918.9394	12.0673	17.6224	279.1306	9967.1048	16.6935	8.2799	26.496
L3	34.5698	35.2216	4552.1411	11.3918	16.6612	273.2179	9223.8721	17.3350	7.6988	22.397
	43.3781	45.9976	10138.9640	14.8771	21.7042	467.1429	20544.2898	22.6386	10.3080	29.987

Tower Elevation	Gusset Area (per face)	Gusset Thickness	Gusset Grade	Adjust. Factor A _f	Adjust. Factor A _r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals	Double Angle Stitch Bolt Spacing Horizontals
ft	ft ²	in					in	in
L1	110.00-70.00			1	1	1		
L2	70.00-34.08			1	1	1		
L3	34.08-0.00			1	1	1		

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement	Total Number	C _A A _A	Weight
				ft		ft ² /ft	klf
HJ7-50A(1-5/8")	C	No	Inside Pole	108.00 - 0.00	15	No Ice 1/2" Ice	0.00 0.00
AL7-50(1 5/8")	C	No	CaAa (Out Of Face)	108.00 - 0.00	2	No Ice 1/2" Ice	0.00 0.00
AL7-50(1 5/8")	C	No	CaAa (Out Of Face)	108.00 - 0.00	1	No Ice 1/2" Ice	0.20 0.30
LDF5-50A(7/8")	B	No	Inside Pole	97.00 - 0.00	11	No Ice 1/2" Ice	0.00 0.00
FSJ1-50A(1/4")	C	No	CaAa (Out Of Face)	86.00 - 0.00	3	No Ice 1/2" Ice	0.00 0.00
FSJ4-50B(1/2")	C	No	CaAa (Out Of Face)	86.00 - 0.00	1	No Ice 1/2" Ice	0.00 0.00
FSJ4-50B(1/2")	C	No	CaAa (Out Of Face)	86.00 - 0.00	3	No Ice 1/2" Ice	0.05 0.15
HJ4.5-50(5/8")	C	No	CaAa (Out Of Face)	86.00 - 0.00	3	No Ice 1/2" Ice	0.00 0.00
9207(5/16")	C	No	CaAa (Out Of Face)	86.00 - 0.00	1	No Ice 1/2" Ice	0.00 0.00

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation	Face	A _R	A _F	C _A A _A In Face	C _A A _A Out Face	Weight
	ft		ft ²	ft ²	ft ²	ft ²	K
L1	110.00-70.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.10
		C	0.000	0.000	0.000	9.944	0.69
L2	70.00-34.08	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.13
		C	0.000	0.000	0.000	12.643	0.71
L3	34.08-0.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.12

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Tower Section	Tower Elevation ft	Face	A _R ft ²	A _F ft ²	C _A A _A In Face ft ²	C _A A _A Out Face ft ²	Weight K
		C	0.000	0.000	0.000	11.997	0.67

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 _A A _A In Face ft ²	C _A A _A Out Face ft ²	Weight K
L1	110.00-70.00	A	0.500	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.10
		C		0.000	0.000	0.000	18.544	0.97
L2	70.00-34.08	A	0.500	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.13
		C		0.000	0.000	0.000	27.010	1.12
L3	34.08-0.00	A	0.500	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.12
		C		0.000	0.000	0.000	25.631	1.06

Feed Line Center of Pressure

Section	Elevation ft	CP _X in	CP _Z in	CP _X Ice in	CP _Z Ice in
L1	110.00-70.00	-0.2949	0.1702	-0.4860	0.2806
L2	70.00-34.08	-0.4000	0.2310	-0.7293	0.4211
L3	34.08-0.00	-0.4111	0.2374	-0.7715	0.4454

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft	C _A A _A Front ft ²	C _A A _A Side ft ²	Weight K
**								
(2) DB948F85T2E-M w/ Mount Pipe	A	From Leg	4.00 0.00 1.00	0.0000	108.00	No Ice 2.13 1/2" Ice 2.49	4.45 5.12	0.03 0.06
BXA-70063/6CFx2 w/ Mount Pipe	A	From Leg	4.00 0.00 1.00	0.0000	108.00	No Ice 7.97 1/2" Ice 8.61	5.40 6.55	0.04 0.10
(2) LPA-80080/4CF w/ Mount Pipe	A	From Leg	4.00 0.00 1.00	0.0000	108.00	No Ice 2.86 1/2" Ice 3.22	7.23 7.92	0.03 0.07
(2) DB948F85T2E-M w/ Mount Pipe	B	From Leg	4.00 0.00 1.00	0.0000	108.00	No Ice 2.13 1/2" Ice 2.49	4.45 5.12	0.03 0.06
BXA-70063/6CFx6 w/ Mount	B	From Leg	4.00	0.0000	108.00	No Ice 7.97	5.40	0.03

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Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C _A A ₁ Front	C _A A ₂ Side	Weight	
			Lateral	Vert						
			ft	ft	°	ft	ft ²	ft ²	K	
Pipe			0.00			1/2" Ice	8.61	6.55	0.08	
			1.00							
(2) LPA-80080/4CF w/ Mount Pipe	B	From Leg	4.00		0.0000	108.00	No Ice	2.86	7.23	0.03
			0.00				1/2" Ice	3.22	7.92	0.07
			1.00							
(2) DB948F85T2E-M w/ Mount Pipe	C	From Leg	4.00		0.0000	108.00	No Ice	2.13	4.45	0.03
			0.00				1/2" Ice	2.49	5.12	0.06
			1.00							
BXA-70063/6CFx6 w/ Mount Pipe	C	From Leg	4.00		0.0000	108.00	No Ice	7.97	5.40	0.03
			0.00				1/2" Ice	8.61	6.55	0.08
			1.00							
(2) LPA-80063/4CF w/ Mount Pipe	C	From Leg	4.00		0.0000	108.00	No Ice	7.25	7.26	0.04
			0.00				1/2" Ice	7.72	7.96	0.10
			1.00							
Platform Mount (LP 101-1)	C	None			0.0000	108.00	No Ice	36.21	36.21	1.50
							1/2" Ice	42.82	42.82	2.30
**										
(3) ALP 9212-N w/ Mount Pipe	A	From Leg	4.00		0.0000	97.00	No Ice	6.02	7.05	0.04
			0.00				1/2" Ice	6.51	7.83	0.09
			0.00							
(3) ALP 9212-N w/ Mount Pipe	B	From Leg	4.00		0.0000	97.00	No Ice	6.02	7.05	0.04
			0.00				1/2" Ice	6.51	7.83	0.09
			0.00							
TIMING 2000	B	From Leg	4.00		0.0000	97.00	No Ice	0.13	0.13	0.00
			0.00				1/2" Ice	0.18	0.18	0.00
			0.00							
(3) ALP 9212-N w/ Mount Pipe	C	From Leg	4.00		0.0000	97.00	No Ice	6.02	7.05	0.04
			0.00				1/2" Ice	6.51	7.83	0.09
			0.00							
TIMING 2000	C	From Leg	4.00		0.0000	97.00	No Ice	0.13	0.13	0.00
			0.00				1/2" Ice	0.18	0.18	0.00
			0.00							
Platform Mount (LP 101-1)	C	None			0.0000	97.00	No Ice	36.21	36.21	1.50
							1/2" Ice	42.82	42.82	2.30
**										
LLPX310R w/ Mount Pipe	A	From Leg	3.00		0.0000	86.00	No Ice	5.07	2.98	0.05
			0.00				1/2" Ice	5.48	3.53	0.08
			1.00							
HORIZON COMPACT	A	From Leg	3.00		0.0000	86.00	No Ice	0.84	0.43	0.01
			0.00				1/2" Ice	0.97	0.52	0.02
			-4.00							
WIMAX DAP HEAD	A	From Leg	3.00		0.0000	86.00	No Ice	1.80	0.78	0.03
			0.00				1/2" Ice	1.99	0.92	0.04
			1.00							
LLPX310R w/ Mount Pipe	B	From Leg	3.00		0.0000	86.00	No Ice	5.07	2.98	0.05
			0.00				1/2" Ice	5.48	3.53	0.08
			1.00							
HORIZON COMPACT	B	From Leg	3.00		0.0000	86.00	No Ice	0.84	0.43	0.01
			0.00				1/2" Ice	0.97	0.52	0.02
			-4.00							
WIMAX DAP HEAD	B	From Leg	3.00		0.0000	86.00	No Ice	1.80	0.78	0.03
			0.00				1/2" Ice	1.99	0.92	0.04
			1.00							
LLPX310R w/ Mount Pipe	C	From Leg	3.00		0.0000	86.00	No Ice	5.07	2.98	0.05
			0.00				1/2" Ice	5.48	3.53	0.08
			1.00							
HORIZON COMPACT	C	From Leg	3.00		0.0000	86.00	No Ice	0.84	0.43	0.01

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Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C _A A _A Front	C _A A _A Side	Weight
			Horz Lateral	Vert					
			ft	ft	°	ft	ft ²	ft ²	K
			0.00			1/2" Ice	0.97	0.52	0.02
			-4.00						
TIMING 2000	C	From Leg	3.00		0.0000	86.00	No Ice	0.13	0.00
			0.00			1/2" Ice	0.18	0.18	0.00
			1.00						
WIMAX DAP HEAD	C	From Leg	3.00		0.0000	86.00	No Ice	1.80	0.03
			0.00			1/2" Ice	1.99	0.92	0.04
			1.00						
T-Arm Mount [TA 702-3]	C	None			0.0000	86.00	No Ice	5.64	0.34
						1/2" Ice	6.55	6.55	0.43

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets:		Azimuth Adjustment	3 dB Beam Width	Elevation	Outside Diameter	Aperture Area	Weight	
				Horz Lateral	Vert							
			ft	ft	°	°	ft	ft	ft ²	K		
A-ANT-18G-2-C	A	Paraboloid w/o Radome	From Leg	3.00		0.0000		86.00	2.17	No Ice	3.72	0.03
				0.00						1/2" Ice	4.01	0.03
				-4.00								
A-ANT-18G-2-C	B	Paraboloid w/o Radome	From Leg	3.00		0.0000		86.00	2.17	No Ice	3.72	0.03
				0.00						1/2" Ice	4.01	0.03
				-4.00								
A-ANT-18G-2-C	C	Paraboloid w/o Radome	From Leg	3.00		0.0000		86.00	2.17	No Ice	3.72	0.03
				0.00						1/2" Ice	4.01	0.03
				-4.00								

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
15	Dead+Wind 0 deg+Ice
16	Dead+Wind 30 deg+Ice

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Comb. No.	Description
17	Dead+Wind 60 deg+Ice
18	Dead+Wind 90 deg+Ice
19	Dead+Wind 120 deg+Ice
20	Dead+Wind 150 deg+Ice
21	Dead+Wind 180 deg+Ice
22	Dead+Wind 210 deg+Ice
23	Dead+Wind 240 deg+Ice
24	Dead+Wind 270 deg+Ice
25	Dead+Wind 300 deg+Ice
26	Dead+Wind 330 deg+Ice
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	110 - 70	Pole	Max Tension	24	0.00	-0.00	0.00
			Max. Compression	14	-10.89	0.53	-0.24
			Max. Mx	11	-6.49	303.15	-4.48
			Max. My	2	-6.51	-5.15	297.50
			Max. Vy	11	-12.19	303.15	-4.48
			Max. Vx	2	-12.10	-5.15	297.50
			Max. Torque	20			-0.15
L2	70 - 34.0833	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-16.35	1.07	-0.56
			Max. Mx	11	-11.21	782.90	-6.22
			Max. My	2	-11.22	-10.33	773.66
			Max. Vy	11	-15.23	782.90	-6.22
			Max. Vx	2	-15.14	-10.33	773.66
			Max. Torque	20			-0.33
L3	34.0833 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-24.57	1.87	-1.02
			Max. Mx	11	-18.49	1444.92	-8.13
			Max. My	2	-18.49	-15.95	1431.69
			Max. Vy	11	-18.77	1444.92	-8.13
			Max. Vx	2	-18.68	-15.95	1431.69
			Max. Torque	20			-0.58

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
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Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	24	24.57	16.07	-0.03
	Max. H _x	11	18.50	18.76	-0.04
	Max. H _z	2	18.50	-0.15	18.66
	Max. M _x	2	1431.69	-0.15	18.66
	Max. M _z	5	1443.89	-18.76	0.25
	Max. Torsion	26	0.58	8.01	13.70
	Min. Vert	1	18.50	0.00	0.00
	Min. H _x	5	18.50	-18.76	0.25
	Min. H _z	8	18.50	0.15	-18.62
	Min. M _x	8	-1428.59	0.15	-18.62
	Min. M _z	11	-1444.92	18.76	-0.04
	Min. Torsion	20	-0.58	-7.86	-13.79

Tower Mast Reaction Summary

Load Combination	Vertical K	Shear _x K	Shear _z K	Overtuning Moment, M _x kip-ft	Overtuning Moment, M _z kip-ft	Torque kip-ft
Dead Only	18.50	0.00	0.00	0.25	0.50	0.00
Dead+Wind 0 deg - No Ice	18.50	0.15	-18.66	-1431.69	-15.95	-0.32
Dead+Wind 30 deg - No Ice	18.50	9.59	-16.12	-1238.11	-743.38	-0.18
Dead+Wind 60 deg - No Ice	18.50	16.35	-9.44	-728.14	-1261.10	0.02
Dead+Wind 90 deg - No Ice	18.50	18.76	-0.25	-24.80	-1443.89	0.21
Dead+Wind 120 deg - No Ice	18.50	16.24	9.20	701.97	-1247.82	0.34
Dead+Wind 150 deg - No Ice	18.50	9.16	16.07	1230.80	-700.02	0.38
Dead+Wind 180 deg - No Ice	18.50	-0.15	18.62	1428.59	16.98	0.33
Dead+Wind 210 deg - No Ice	18.50	-9.42	16.22	1247.20	729.54	0.19
Dead+Wind 240 deg - No Ice	18.50	-16.38	9.46	730.45	1265.26	-0.02
Dead+Wind 270 deg - No Ice	18.50	-18.76	0.04	8.13	1444.92	-0.22
Dead+Wind 300 deg - No Ice	18.50	-16.20	-9.18	-699.66	1245.72	-0.35
Dead+Wind 330 deg - No Ice	18.50	-9.34	-15.97	-1221.70	715.93	-0.38
Dead+Ice	24.57	0.00	0.00	1.02	1.87	0.00
Dead+Wind 0 deg+Ice	24.57	0.11	-16.00	-1239.80	-10.91	-0.49
Dead+Wind 30 deg+Ice	24.57	8.20	-13.82	-1071.84	-640.42	-0.28
Dead+Wind 60 deg+Ice	24.57	14.00	-8.08	-628.99	-1089.34	0.02
Dead+Wind 90 deg+Ice	24.57	16.07	-0.20	-18.80	-1248.39	0.31
Dead+Wind 120 deg+Ice	24.57	13.91	7.90	610.36	-1079.10	0.51
Dead+Wind 150 deg+Ice	24.57	7.86	13.79	1068.15	-606.07	0.58
Dead+Wind 180 deg+Ice	24.57	-0.11	15.97	1238.94	14.74	0.50
Dead+Wind 210 deg+Ice	24.57	-8.06	13.90	1080.94	632.10	0.28
Dead+Wind 240 deg+Ice	24.57	-14.03	8.10	632.55	1095.72	-0.02
Dead+Wind 270 deg+Ice	24.57	-16.07	0.03	6.85	1252.22	-0.31
Dead+Wind 300 deg+Ice	24.57	-13.88	-7.88	-606.80	1080.38	-0.52
Dead+Wind 330 deg+Ice	24.57	-8.01	-13.70	-1059.05	622.06	-0.58
Dead+Wind 0 deg - Service	18.50	0.06	-7.29	-559.53	-5.92	-0.13
Dead+Wind 30 deg - Service	18.50	3.75	-6.30	-483.86	-290.30	-0.07
Dead+Wind 60 deg - Service	18.50	6.39	-3.69	-284.50	-492.70	0.01
Dead+Wind 90 deg - Service	18.50	7.33	-0.10	-9.54	-564.14	0.08
Dead+Wind 120 deg - Service	18.50	6.34	3.60	274.57	-487.48	0.13
Dead+Wind 150 deg - Service	18.50	3.58	6.28	481.29	-273.33	0.15
Dead+Wind 180 deg - Service	18.50	-0.06	7.27	558.62	6.96	0.13
Dead+Wind 210 deg - Service	18.50	-3.68	6.34	487.73	285.52	0.07
Dead+Wind 240 deg - Service	18.50	-6.40	3.69	285.72	494.96	-0.01
Dead+Wind 270 deg - Service	18.50	-7.33	0.02	3.33	565.18	-0.08
Dead+Wind 300 deg - Service	18.50	-6.33	-3.59	-273.35	487.30	-0.13
Dead+Wind 330 deg - Service	18.50	-3.65	-6.24	-477.43	280.18	-0.15

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Solution Summary

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
1	0.00	-18.50	0.00	0.00	18.50	0.00	0.000%
2	0.15	-18.50	-18.66	-0.15	18.50	18.66	0.000%
3	9.59	-18.50	-16.12	-9.59	18.50	16.12	0.000%
4	16.35	-18.50	-9.44	-16.35	18.50	9.44	0.000%
5	18.76	-18.50	-0.25	-18.76	18.50	0.25	0.000%
6	16.24	-18.50	9.20	-16.24	18.50	-9.20	0.000%
7	9.16	-18.50	16.07	-9.16	18.50	-16.07	0.000%
8	-0.15	-18.50	18.62	0.15	18.50	-18.62	0.000%
9	-9.42	-18.50	16.22	9.42	18.50	-16.22	0.000%
10	-16.38	-18.50	9.46	16.38	18.50	-9.46	0.000%
11	-18.76	-18.50	0.04	18.76	18.50	-0.04	0.000%
12	-16.20	-18.50	-9.18	16.20	18.50	9.18	0.000%
13	-9.34	-18.50	-15.97	9.34	18.50	15.97	0.000%
14	0.00	-24.57	0.00	0.00	24.57	0.00	0.000%
15	0.11	-24.57	-16.00	-0.11	24.57	16.00	0.000%
16	8.20	-24.57	-13.82	-8.20	24.57	13.82	0.000%
17	14.00	-24.57	-8.08	-14.00	24.57	8.08	0.000%
18	16.07	-24.57	-0.20	-16.07	24.57	0.20	0.000%
19	13.91	-24.57	7.90	-13.91	24.57	-7.90	0.000%
20	7.86	-24.57	13.79	-7.86	24.57	-13.79	0.000%
21	-0.11	-24.57	15.97	0.11	24.57	-15.97	0.000%
22	-8.06	-24.57	13.90	8.06	24.57	-13.90	0.000%
23	-14.03	-24.57	8.10	14.03	24.57	-8.10	0.000%
24	-16.07	-24.57	0.03	16.07	24.57	-0.03	0.000%
25	-13.88	-24.57	-7.88	13.88	24.57	7.88	0.000%
26	-8.01	-24.57	-13.70	8.01	24.57	13.70	0.000%
27	0.06	-18.50	-7.29	-0.06	18.50	7.29	0.000%
28	3.75	-18.50	-6.30	-3.75	18.50	6.30	0.000%
29	6.39	-18.50	-3.69	-6.39	18.50	3.69	0.000%
30	7.33	-18.50	-0.10	-7.33	18.50	0.10	0.000%
31	6.34	-18.50	3.60	-6.34	18.50	-3.60	0.000%
32	3.58	-18.50	6.28	-3.58	18.50	-6.28	0.000%
33	-0.06	-18.50	7.27	0.06	18.50	-7.27	0.000%
34	-3.68	-18.50	6.34	3.68	18.50	-6.34	0.000%
35	-6.40	-18.50	3.69	6.40	18.50	-3.69	0.000%
36	-7.33	-18.50	0.02	7.33	18.50	-0.02	0.000%
37	-6.33	-18.50	-3.59	6.33	18.50	3.59	0.000%
38	-3.65	-18.50	-6.24	3.65	18.50	6.24	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.0000001	0.0000001
2	Yes	4	0.0000001	0.00006372
3	Yes	5	0.0000001	0.00008898
4	Yes	5	0.0000001	0.00008939
5	Yes	4	0.0000001	0.00011863
6	Yes	5	0.0000001	0.00008585
7	Yes	5	0.0000001	0.00008279
8	Yes	4	0.0000001	0.00015253

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9	Yes	5	0.0000001	0.00008899
10	Yes	5	0.0000001	0.00009005
11	Yes	4	0.0000001	0.00009816
12	Yes	5	0.0000001	0.00008394
13	Yes	5	0.0000001	0.00008551
14	Yes	4	0.0000001	0.00000001
15	Yes	4	0.0000001	0.00013884
16	Yes	5	0.0000001	0.00021303
17	Yes	5	0.0000001	0.00021512
18	Yes	4	0.0000001	0.00016990
19	Yes	5	0.0000001	0.00020689
20	Yes	5	0.0000001	0.00019602
21	Yes	4	0.0000001	0.00029995
22	Yes	5	0.0000001	0.00021600
23	Yes	5	0.0000001	0.00021879
24	Yes	4	0.0000001	0.00021435
25	Yes	5	0.0000001	0.00019997
26	Yes	5	0.0000001	0.00020602
27	Yes	4	0.0000001	0.00001641
28	Yes	4	0.0000001	0.00032846
29	Yes	4	0.0000001	0.00033263
30	Yes	4	0.0000001	0.00001741
31	Yes	4	0.0000001	0.00031547
32	Yes	4	0.0000001	0.00029525
33	Yes	4	0.0000001	0.00002644
34	Yes	4	0.0000001	0.00033211
35	Yes	4	0.0000001	0.00033790
36	Yes	4	0.0000001	0.00002134
37	Yes	4	0.0000001	0.00030209
38	Yes	4	0.0000001	0.00031266

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	110 - 70	22.497	35	1.8207	0.0009
L2	74 - 34.0833	10.062	35	1.3303	0.0005
L3	39 - 0	2.708	35	0.6443	0.0002

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
108.00	(2) DB948F85T2E-M w/ Mount Pipe	35	21.751	1.7992	0.0009	18904
97.00	(3) ALP 9212-N w/ Mount Pipe	35	17.696	1.6759	0.0007	7270
86.00	LLPX310R w/ Mount Pipe	35	13.841	1.5318	0.0006	3937
82.00	A-ANT-18G-2-C	35	12.522	1.4708	0.0006	3375

Maximum Tower Deflections - Design Wind

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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	110 - 70 (1)	TP25.53x15.53x0.25	12.36	0.632	26.000	0.049	0.02	0.001	26.000	0.000
L2	70 - 34.0833 (2)	TP34.02x24.03x0.3125	15.40	0.471	26.000	0.037	0.02	0.000	26.000	0.000
L3	34.0833 - 0 (3)	TP41.9x32.1645x0.3438	18.93	0.412	26.000	0.032	0.02	0.000	26.000	0.000

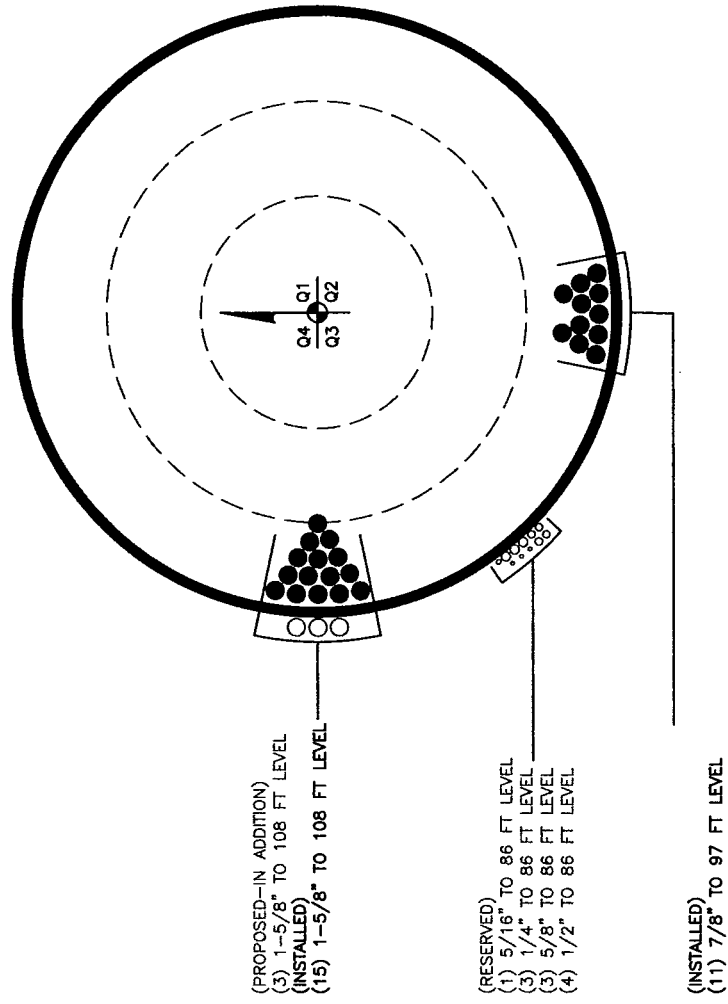
Pole Interaction Design Data

Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	110 - 70 (1)	0.008	0.816	0.000	0.049	0.000	0.825	1.333	H1-3+VT ✓
L2	70 - 34.0833 (2)	0.009	0.941	0.000	0.037	0.000	0.950	1.333	H1-3+VT ✓
L3	34.0833 - 0 (3)	0.010	0.964	0.000	0.032	0.000	0.975	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	110 - 70	Pole	TP25.53x15.53x0.25	1	-6.48	1016.11	61.9	Pass
L2	70 - 34.0833	Pole	TP34.02x24.03x0.3125	2	-11.20	1698.94	71.3	Pass
L3	34.0833 - 0	Pole	TP41.9x32.1645x0.3438	3	-18.49	2385.98	73.1	Pass
Summary								
Pole (L3)							73.1	Pass
RATING =							73.1	Pass

APPENDIX B
BASE LEVEL DRAWING



BUSINESS UNIT: 806375 TOWER ID: C_BASELEVEL

APPENDIX C
ADDITIONAL CALCULATIONS

FOUNDATION REACTION COMPARISON

BU #806375
WO #308725

REACTIONS	DESIGN REACTIONS	CURRENT REACTIONS	% CAPACITY
MOMENT (kip-ft)	1,947.4	1,461.0	75.0%
SHEAR (kips)	24.2	19.0	78.5%

Design loads from: CClsites Doc #262106

Although the shear capacity is at 82.6%, the moment reaction is the governing criteria for a monopole drilled pier foundation. Therefore, the overall capacity for this foundation is 77.0%.

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

TIA Rev F

Site Data

BU#: 806375
Site Name: HRT 095 943237
App #: 91527 Rev #1
Pole Manufacturer: Other

Reactions		
Moment:	1461	ft-kips
Axial:	19	kips
Shear:	19	kips

Anchor Rod Data

Qty:	12	
Diam:	2.25	in
Rod Material:	A615-J	
Strength (Fu):	100	ksi
Yield (Fy):	75	ksi
Bolt Circle:	49.88	in

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

Anchor Rod Results

Maximum Rod Tension: 115.6 Kips
 Allowable Tension: 195.0 Kips
 Anchor Rod Stress Ratio: 59.3% **Pass**

Rigid
Service, ASD
Fty*ASIF

Plate Data

Diam:	55.88	in
Thick:	2.5	in
Grade:	60	ksi
Single-Rod B-eff:	11.23	in

Base Plate Results

Base Plate Stress: 25.6 ksi
 Allowable Plate Stress: 60.0 ksi
 Base Plate Stress Ratio: 42.6% **Pass**

Flexural Check

Rigid
Service ASD
0.75*Fy*ASIF
Y.L. Length: 27.06

Stiffener Data (Welding at both sides)

Config:	0	*
Weld Type:	Both	
Groove Depth:	0.25	in **
Groove Angle:	45	degrees
Fillet H. Weld:	0.3125	in
Fillet V. Weld:	0.3125	in
Width:	5	in
Height:	18	in
Thick:	0.75	in
Notch:	0.5	in
Grade:	50	ksi
Weld str.:	70	ksi

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

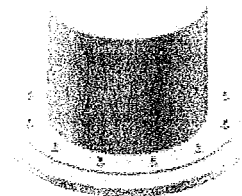
Pole Punching Shear Check: n/a

Pole Data

Diam:	41.9	in
Thick:	0.3438	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
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* 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