Robinson+Cole

KENNETH C. BALDWIN

280 Trumbull Street
Hartford, CT 06103-3597
Main (860) 275-8200
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Also admitted in Massachusetts

January 26, 2015

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

Re: **Notice of Exempt Modification – Facility Modification**
85 Plainfield Road, West Haven, Connecticut

Dear Ms. Bachman:

Cellco Partnership d/b/a Verizon Wireless ("Cellco") currently maintains twelve (12) antennas at the 122-foot level on the existing 148-foot tower at 85 Plainfield Avenue in West Haven, Connecticut (the "Property"). The tower is owned by Crown Castle. The Council approved Cellco's use of the existing tower in 2000. Cellco now intends to modify its facility by replacing three (3) of its existing antennas with three (3) model LNX-6514DS-VTM, 700 MHz antennas at the same 122-foot 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 Edward M. O'Brien, Mayor of the City of West Haven. A copy of this letter is also being sent to Acorn Technology Campus, 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 on its existing antenna platform at the 122-foot level of the 148-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.

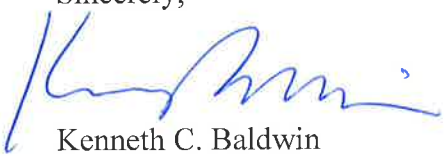
4. The operation of the replacement antennas will not increase radio frequency (RF) emissions at the facility to a level at or above the Federal Communications Commission (FCC) safety standard. A cumulative General Power Density table for Cellco's modified facility is included in Attachment 2.

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).

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:
Edward M. O'Brien, West Haven Mayor
Acorn Technology Campus, LLC
Sandy M. Carter

ATTACHMENT 1

Product Specifications

COMMSCOPE®

LNX-6514DS-VTM

Andrew® Antenna, 698–896 MHz, 65° horizontal beamwidth, RET compatible

POWERED BY ANDREW.

Electrical Specifications

Frequency Band, MHz	698–806	806–896
Gain, dBi	15.7	16.3
Beamwidth, Horizontal, degrees	65	65
Beamwidth, Horizontal Tolerance, degrees	±3	±3
Beamwidth, Vertical, degrees	12.5	11.2
Beam Tilt, degrees	0–10	0–10
USLS, typical, dB	17	18
Front-to-Back Ratio at 180°, dB	32	30
CPR at Boresight, dB	20	20
CPR at Sector, dB	10	10
Isolation, dB	30	30
VSWR | Return Loss, dB	1.4 | 15.6	1.4 | 15.6
PIM, 3rd Order, 2 x 20 W, dBc	-153	-153
Input Power per Port, maximum, watts	400	400
Polarization	±45°	±45°

Mechanical Specifications

Color | Radome Material	Light gray | Fiberglass, UV resistant
Connector Interface | Location | Quantity	7-16 DIN Female | Bottom | 2
Wind Loading, maximum	617.7 N @ 150 km/h 138.9 lbf @ 150 km/h
Wind Speed, maximum	241.0 km/h | 149.8 mph
Antenna Dimensions, L x W x D	1847.0 mm x 301.0 mm x 181.0 mm | 72.7 in x 11.9 in x 7.1 in
Net Weight	17.6 kg | 38.8 lb
Model with factory installed AISG 2.0 RET	LNX-6514DS-A1M

ATTACHMENT 2

	General	Power	Density					
Site Name: West Haven 3								
Tower Height: 148ft								
CARRIER	**# OF CHAN.**	**WATTS ERP**	**HEIGHT**	**CALC. POWER DENS**	**FREQ.**	**MAX. PERMISS. EXP.**	**FRACTION MPE**	**Total**
*MetroPCS CDMA	3	727	148	0.0358	2135	1.0000	3.58%	
*MetroPCS LTE	1	1200	148	0.0197	2130	1.0000	1.97%	
*Clearwire	2	153	134	0.0061	2496	1.0000	0.61%	
*Clearwire	1	211	134	0.0042	11 GHz	1.0000	0.42%	
*Sprint CDMA/LTE	5	693	140	0.0636	1900	1.0000	6.36%	
*Sprint CDMA/LTE	1	390	140	0.0072	850	0.5667	1.26%	
*Sprint CDMA/LTE	2	693	140	0.0254	2300	1.0000	2.54%	
*Sprint Nextel microwave	2	4.42	138	0.0002	22500	1.0000	0.02%	
Verizon PCS	**7**	**425**	**122**	**0.0719**	**1970**	**1.0000**	**7.19%**	
Verizon Cellular	**9**	**397**	**122**	**0.0863**	**869**	**0.5793**	**14.90%**	
Verizon AWS	**1**	**1267**	**122**	**0.0306**	**2145**	**1.0000**	**3.06%**	
Verizon 700	**1**	**696**	**122**	**0.0168**	**746**	**0.4973**	**3.38%**	
								45.29%
* Source: Siting Council								

ATTACHMENT 3

Date: **January 08, 2015**

Holly Haas
Crown Castle
3530 Toringdon Way, Suite 300
Charlotte, NC 28277

Aero Solutions LLC
5500 Flatiron Parkway, Suite 100
Boulder, CO 80301
(720) 304-6882

Subject: **Structural Analysis Report**

Carrier Designation:	***Verizon Wireless* Co-Locate**	
	Carrier Site Number:	20747
	Carrier Site Name:	West Haven 3 CT
Crown Castle Designation:	**Crown Castle BU Number:**	876323
	Crown Castle Site Name:	HILLSIDE
	Crown Castle JDE Job Number:	319042
	Crown Castle Work Order Number:	989422
	Crown Castle Application Number:	277638 Rev. 1
Engineering Firm Designation:	**Aero Solutions LLC Project Number:**	003-15-0010
Site Data:	**85 Plainfield Ave, West Haven, New Haven County, CT** **Latitude *41° 18' 4.59"*, Longitude *-72° 58' 35.2"*** **148 Foot - Monopole Tower**	

Dear Holly Haas,

Aero Solutions LLC 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 744481, in accordance with application 277638, revision 1.

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

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

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 85 mph fastest mile.

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

We at *Aero Solutions LLC* 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: Sina Erturk

Respectfully submitted by:

Shraddha Dharia, P.E.
Structural Engineer
CT PE#: PEN 0028187
Expires: 01/31/2015

1.9.2015

tnxTower Report - version 6.1.4.1

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 148 ft Monopole tower designed by SUMMIT in June of 1997. The tower was originally designed for a wind speed of 90 mph per TIA/EIA-222-F.

The tower has been modified per reinforcement drawings prepared by PSG, in February of 2009. Modifications consist of 10 ft tower extension.

2) ANALYSIS CRITERIA

The structural analysis was performed for this tower in accordance with the requirements of TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a fastest mile wind speed of 85 mph with no ice, 37.6 mph with 0.75 inch ice thickness and 50 mph under service loads.

Table 1 - Proposed Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
122.0	122.0	1	rfs celwave	DB-T1-6Z-8AB-0Z			
		1	tower mounts	Side Arm Mount [SO 102-1]			
120.0	122.0	3	commscope	LNX-6514DS-A1M 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
146.0	146.0	3	rfs celwave	APX18-206517-CT2 w/ Mount Pipe	6	1-5/8"	1
138.0	142.0	1	tower mounts	Miscellaneous [NA 507-1]	3	5/16"	1
	141.0	3	argus technologies	LLPX310R-V1 w/ Mount Pipe	3 3	1/2" 1-1/4"	
	140.0	3	alcatel lucent	TD-RRH8x20-25	1	1-1/4"	2
		6	powerwave technologies	P40-16-XLPP-RR-A w/ Mount Pipe			1
		3	rfs celwave	APXVTM14-C-120 w/ Mount Pipe			2
	139.0	1	andrew	FPA5150-23PM-1 w/ Mount Pipe			1
	138.0	3	alcatel lucent	800 EXTERNAL NOTCH FILTER			
		18	rfs celwave	ACU-A20-N			
		3	samsung telecommunications	FDD_R6_RRH			
		1	tower mounts	Platform Mount [LP 303-1]			
	134.0	2	andrew	VHLP2-11			
136.0	139.0	3	alcatel lucent	800MHZ RRH			1
	137.0	3	alcatel lucent	1900MHz RRH (65MHz)			

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
	136.0	1	tower mounts	Side Arm Mount [SO 104-3]			
	135.0	3	alcatel lucent	1900MHz RRH (65MHz)			
120.0	126.0	1	gps	GPS_A	1 17	1/2" 1-5/8"	
	122.0	3	alcatel lucent	RRH2X40-AWS			1
		3	antel	BXA-171063-8BF-EDIN-0 w/ Mount Pipe			
		1	antel	BXA-70063-6CF-2 w/ Mount Pipe			3
		1	antel	BXA-70063/6CF w/ Mount Pipe			
		1	antel	BXA-70080-6CF-2 w/ Mount Pipe			
		2	antel	BXA-80063/4CF w/ Mount Pipe			
		1	antel	BXA-80063/6CF w/ Mount Pipe			
		2	rfs celwave	FD9R6004/2C-3L			1
		3	rymsa wireless	MG D3-800TV w/ Mount Pipe			
	120.0	1	tower mounts	Platform Mount [LP 1201-1]			
90.0	91.0	1	lucent	KS24019-L112A	1	1/2"	1
	90.0	1	tower mounts	Side Arm Mount [SO 701-1]			

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)
138	138	12		DB98OH		
120	120	12	SWEDCOM	ALP-9212-N		
100	100	12	SWEDCOM	ALP-9212-N		
90	90	1		GPS ANTENNA		

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	FDH	2134228	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	Summit	1614608	CCISITES

Document	Remarks	Reference	Source
4-TOWER MANUFACTURER DRAWINGS	Summit	1615021	CCISITES
4-TOWER REINFORCEMENT DESIGN/DRAWINGS/DATA	PSG	2384593	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.
5) The modifications were installed per the referenced documents.

This analysis may be affected if any assumptions are not valid or have been made in error. Aero Solutions LLC 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	148 - 138	Pole	TP24x24x0.25	1	-0.67	670.56	3.0	Pass
L2	138 - 90.75	Pole	TP31.924x22x0.25	2	-10.20	1174.11	85.0	Pass
L3	90.75 - 44.75	Pole	TP41.086x30.7532x0.3125	3	-18.09	1889.10	98.9	Pass
L4	44.75 - 0	Pole	TP49.86x39.3761x0.375	4	-30.13	2826.47	94.4	Pass
							Summary	
						Pole (L3)	98.9	Pass
						Rating =	98.9	Pass

Table 6 - Tower Component Stresses vs. Capacity – LC7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	95.3	Pass
1	Base Plate	0	78.8	Pass
1	Base Foundation	0	62.2	Pass
1	Base Foundation Soil Interaction	0	76.6	Pass
1	Flange Connection	138	31.1	Pass

Structure Rating (max from all components) =	98.9%

Notes:

1) See additional documentation in "Appendix C – Additional Calculations" for calculations supporting the % capacity consumed.
2) Capacities up to 105% are considered acceptable based on analysis methods used.

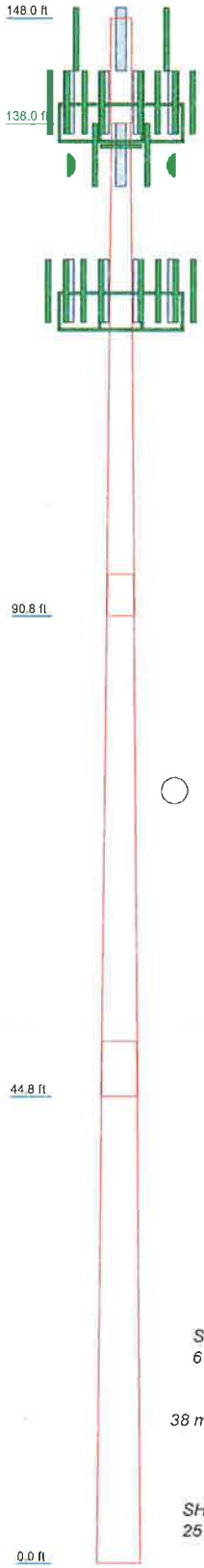
4.1) Recommendations

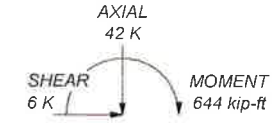
The tower and its foundation have sufficient capacity to carry the existing, reserved, and proposed loads. No modifications are required at this time.

APPENDIX A

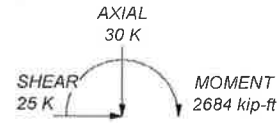
TNXTOWER OUTPUT

Section	1	2	3	4	5	6
Length (ft)	10.00	47.25	50.00	50.00		19.0
Number of Sides	18	18	18	18		
Thickness (in)	0.2500	0.2500	0.3125	0.3750		
Socket Length (ft)		4.00	5.25			
Top Dia (in)	24.0000	22.0000	30.7532	39.3761		
Bot Dia (in)	24.0000	31.9240	41.0860	49.8600		
Grade	A607-50		A607-60			
Weight (K)	0.6	3.4	6.0	9.0		





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



TORQUE 5 kip-ft
REACTIONS - 85 mph WIND

DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
APX18-206517-CT2 w/ Mount Pipe	146	1900MHz RRH (65MHz)	136
APX18-206517-CT2 w/ Mount Pipe	146	Side Arm Mount [SO 104-3]	136
APX18-206517-CT2 w/ Mount Pipe	146	6' x 2" Mount Pipe	136
LLPX310R-V1 w/ Mount Pipe	138	6' x 2" Mount Pipe	136
FDD_R6_RRH	138	6' x 2" Mount Pipe	136
LLPX310R-V1 w/ Mount Pipe	138	800MHZ RRH	136
FDD_R6_RRH	138	800MHZ RRH	136
LLPX310R-V1 w/ Mount Pipe	138	DB-T1-6Z-8AB-0Z	122
FPA5150-23PM-1 w/ Mount Pipe	138	Side Arm Mount [SO 102-1]	122
FDD_R6_RRH	138	MG D3-800TV w/ Mount Pipe	120
(2) P40-16-XLPP-RR-A w/ Mount Pipe	138	RRH2X40-AWS	120
800 EXTERNAL NOTCH FILTER	138	FD9R6004/2C-3L	120
(6) ACU-A20-N	138	LNX-6514DS-A1M w/ Mount Pipe	120
APXVTM14-C-120 w/ Mount Pipe	138	MG D3-800TV w/ Mount Pipe	120
TD-RRH8x20-25	138	BXA-171063-8BF-EDIN-0 w/ Mount Pipe	120
(2) P40-16-XLPP-RR-A w/ Mount Pipe	138		
800 EXTERNAL NOTCH FILTER	138	BXA-80063/4CF w/ Mount Pipe	120
(6) ACU-A20-N	138	FD9R6004/2C-3L	120
APXVTM14-C-120 w/ Mount Pipe	138	RRH2X40-AWS	120
TD-RRH8x20-25	138	LNX-6514DS-A1M w/ Mount Pipe	120
(2) P40-16-XLPP-RR-A w/ Mount Pipe	138	BXA-171063-8BF-EDIN-0 w/ Mount Pipe	120
800 EXTERNAL NOTCH FILTER	138		
(6) ACU-A20-N	138	BXA-80063/6CF w/ Mount Pipe	120
APXVTM14-C-120 w/ Mount Pipe	138	MG D3-800TV w/ Mount Pipe	120
TD-RRH8x20-25	138	RRH2X40-AWS	120
Platform Mount [LP 303-1]	138	LNX-6514DS-A1M w/ Mount Pipe	120
Miscellaneous [NA 507-1]	138	GPS_A	120
6' x 2" Mount Pipe	138	6' x 2" Mount Pipe	120
6' x 2" Mount Pipe	138	6' x 2" Mount Pipe	120
VHLP2-11	138	6' x 2" Mount Pipe	120
VHLP2-11	138	Platform Mount [LP 1201-1]	120
800MHZ RRH	136	BXA-171063-8BF-EDIN-0 w/ Mount Pipe	120
1900MHz RRH (65MHz)	136	BXA-80063/4CF w/ Mount Pipe	120
1900MHz RRH (65MHz)	136	KS24019-L112A	90
1900MHz RRH (65MHz)	136	Side Arm Mount [SO 701-1]	90
1900MHz RRH (65MHz)	136		
1900MHz RRH (65MHz)	136		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A607-50	50 ksi	65 ksi	A607-60	60 ksi	75 ksi

TOWER DESIGN NOTES

1. Tower is located in New Haven County, Connecticut.
2. Tower designed for a 85 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 38 mph basic wind with 0.75 in ice.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 98.9%

Aero Solutions LLC
5500 Flatiron Parkway, Suite 100
Boulder, CO 80301
Phone: (720) 304-6882
FAX: (720) 304-6883

Job: ***BU#876323 HILLSIDE***		
Project: ***Existing 148 ft Monopole***		
Client: CCI	Drawn by: Serturk	App'd:
Code: TIA/EIA-222-F	Date: 01/08/15	Scale: NTS
Path:		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:

4) Tower is located in New Haven County, Connecticut.
5) Basic wind speed of 85 mph.
6) Nominal ice thickness of 0.7500 in.
7) Ice density of 56 pcf.
8) A wind speed of 38 mph is used in combination with ice.
9) Temperature drop of 50 °F.
10) Deflections calculated using a wind speed of 50 mph.
11) A non-linear (P-delta) analysis was used.
12) Pressures are calculated at each section.
13) Stress ratio used in pole design is 1.333.
14) 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	148.00-138.00	10.00	0.00	Round	24.0000	24.0000	0.2500		A607-50 (50 ksi)
L2	138.00-90.75	47.25	4.00	18	22.0000	31.9240	0.2500	1.0000	A607-60 (60 ksi)
L3	90.75-44.75	50.00	5.25	18	30.7532	41.0860	0.3125	1.2500	A607-60 (60 ksi)
L4	44.75-0.00	50.00		18	39.3761	49.8600	0.3750	1.5000	A607-60 (60 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	24.0000	18.6532	1315.3425	8.3974	12.0000	109.6119	2630.6850	9.3210	0.0000	0
	24.0000	18.6532	1315.3425	8.3974	12.0000	109.6119	2630.6850	9.3210	0.0000	0

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	22.3394	17.2586	1031.4832	7.7212	11.1760	92.2945	2064.3237	8.6310	3.4320	13.728
	32.4165	25.1333	3185.6138	11.2443	16.2174	196.4319	6375.4192	12.5690	5.1786	20.714
L3	32.0670	30.1934	3534.7415	10.8064	15.6226	226.2579	7074.1341	15.0995	4.8626	15.56
	41.7198	40.4422	8494.3152	14.4746	20.8717	406.9779	16999.8075	20.2250	6.6811	21.38
L4	41.1013	46.4210	8920.8179	13.8454	20.0030	445.9732	17853.3740	23.2149	6.2702	16.72
	50.6292	58.8995	18222.0135	17.5672	25.3289	719.4165	36468.0040	29.4554	8.1154	21.641

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 148.00-138.00				1	1	1		
L2 138.00-90.75				1	1	1		
L3 90.75-44.75				1	1	1		
L4 44.75-0.00				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 plf
***										

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
***								
LDF7-50A(1-5/8")	A	No	CaAa (Out Of Face)	146.00 - 6.00	5	No Ice	0.00	0.82
						1/2" Ice	0.00	2.33
						1" Ice	0.00	4.46
LDF7-50A(1-5/8")	A	No	CaAa (Out Of Face)	146.00 - 6.00	1	No Ice	0.20	0.82
						1/2" Ice	0.30	2.33
						1" Ice	0.40	4.46
***								
LDF4-50A(1/2")	C	No	Inside Pole	138.00 - 8.00	3	No Ice	0.00	0.15
						1/2" Ice	0.00	0.15
						1" Ice	0.00	0.15
9207(5/16")	C	No	Inside Pole	138.00 - 8.00	3	No Ice	0.00	0.60
						1/2" Ice	0.00	0.60
						1" Ice	0.00	0.60
HB114-1-0813U4-M5J(1 1/4")	C	No	Inside Pole	138.00 - 8.00	3	No Ice	0.00	1.20
						1/2" Ice	0.00	1.20
						1" Ice	0.00	1.20
HB114-21U3M12-XXXF(1-1/4")	C	No	CaAa (Out Of Face)	138.00 - 8.00	1	No Ice	0.15	1.22
						1/2" Ice	0.25	2.47
						1" Ice	0.35	4.32
2.5" Conduit	C	No	Inside Pole	138.00 - 8.00	2	No Ice	0.00	1.00
						1/2" Ice	0.00	1.00
						1" Ice	0.00	1.00
***								
561(1-5/8")	B	No	Inside Pole	120.00 - 8.00	16	No Ice	0.00	1.35
						1/2" Ice	0.00	1.35
						1" Ice	0.00	1.35

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
FSJ4-50B(1/2")	B	No	Inside Pole	120.00 - 8.00	1	No Ice	0.00	0.14
						1/2" Ice	0.00	0.14
						1" Ice	0.00	0.14
HB158-1-08U8-S8J18(1-5/8)	B	No	CaAa (Out Of Face)	120.00 - 8.00	1	No Ice	0.00	1.30
						1/2" Ice	0.00	2.81
						1" Ice	0.00	4.94
***								
LDF4-50A(1/2")	C	No	Inside Pole	90.00 - 8.00	1	No Ice	0.00	0.15
						1/2" Ice	0.00	0.15
						1" Ice	0.00	0.15
***								

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	148.00-138.00	A	0.000	0.000	0.000	1.584	0.04
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.00
L2	138.00-90.75	A	0.000	0.000	0.000	9.355	0.23
		B	0.000	0.000	0.000	0.000	0.67
		C	0.000	0.000	0.000	7.276	0.43
L3	90.75-44.75	A	0.000	0.000	0.000	9.108	0.23
		B	0.000	0.000	0.000	0.000	1.06
		C	0.000	0.000	0.000	7.084	0.42
L4	44.75-0.00	A	0.000	0.000	0.000	7.673	0.19
		B	0.000	0.000	0.000	0.000	0.85
		C	0.000	0.000	0.000	5.659	0.34

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	148.00-138.00	A	0.750	0.000	0.000	0.000	2.784	0.16
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.00
L2	138.00-90.75	A	0.750	0.000	0.000	0.000	16.443	0.96
		B		0.000	0.000	0.000	0.000	0.75
		C		0.000	0.000	0.000	14.364	0.53
L3	90.75-44.75	A	0.750	0.000	0.000	0.000	16.008	0.94
		B		0.000	0.000	0.000	0.000	1.18
		C		0.000	0.000	0.000	13.984	0.52
L4	44.75-0.00	A	0.750	0.000	0.000	0.000	13.485	0.79
		B		0.000	0.000	0.000	0.000	0.94
		C		0.000	0.000	0.000	11.172	0.42

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	148.00-138.00	0.0000	-0.2202	0.0000	-0.3475
L2	138.00-90.75	-0.1730	-0.1569	-0.2934	-0.2185
L3	90.75-44.75	-0.1792	-0.1626	-0.3143	-0.2340
L4	44.75-0.00	-0.1494	-0.1487	-0.2698	-0.2221

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
***									
APX18-206517-CT2 w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	30.0000	146.00	No Ice 1/2" Ice 1" Ice	5.36 5.91 6.44	4.73 5.90 6.79	0.05 0.09 0.15
APX18-206517-CT2 w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	55.0000	146.00	No Ice 1/2" Ice 1" Ice	5.36 5.91 6.44	4.73 5.90 6.79	0.05 0.09 0.15
APX18-206517-CT2 w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	30.0000	146.00	No Ice 1/2" Ice 1" Ice	5.36 5.91 6.44	4.73 5.90 6.79	0.05 0.09 0.15
***									
***									
LLPX310R-V1 w/ Mount Pipe	A	From Leg	4.00 0.00 3.00	50.0000	138.00	No Ice 1/2" Ice 1" Ice	5.07 5.48 5.91	2.98 3.53 4.09	0.05 0.08 0.13
FDD_R6_RRH	A	From Leg	4.00 0.00 0.00	50.0000	138.00	No Ice 1/2" Ice 1" Ice	1.79 1.97 2.16	0.78 0.92 1.07	0.03 0.04 0.06
LLPX310R-V1 w/ Mount Pipe	B	From Leg	4.00 0.00 3.00	80.0000	138.00	No Ice 1/2" Ice 1" Ice	5.07 5.48 5.91	2.98 3.53 4.09	0.05 0.08 0.13
FDD_R6_RRH	B	From Leg	4.00 0.00 0.00	80.0000	138.00	No Ice 1/2" Ice 1" Ice	1.79 1.97 2.16	0.78 0.92 1.07	0.03 0.04 0.06
LLPX310R-V1 w/ Mount Pipe	C	From Leg	4.00 0.00 3.00	40.0000	138.00	No Ice 1/2" Ice 1" Ice	5.07 5.48 5.91	2.98 3.53 4.09	0.05 0.08 0.13
FPA5150-23PM-1 w/ Mount Pipe	C	From Leg	4.00 0.00 1.00	40.0000	138.00	No Ice 1/2" Ice 1" Ice	1.57 1.80 2.04	0.47 0.68 0.93	0.01 0.02 0.04
FDD_R6_RRH	C	From Leg	4.00 0.00 0.00	40.0000	138.00	No Ice 1/2" Ice 1" Ice	1.79 1.97 2.16	0.78 0.92 1.07	0.03 0.04 0.06
***									
(2) P40-16-XLPP-RR-A w/ Mount Pipe	A	From Leg	4.00 0.00 2.00	50.0000	138.00	No Ice 1/2" Ice 1" Ice	9.37 9.91 10.45	4.83 5.57 6.27	0.07 0.14 0.21
800 EXTERNAL NOTCH FILTER	A	From Leg	4.00 0.00 0.00	50.0000	138.00	No Ice 1/2" Ice 1" Ice	0.77 0.89 1.02	0.37 0.46 0.56	0.01 0.02 0.02
(6) ACU-A20-N	A	From Leg	4.00 0.00 0.00	50.0000	138.00	No Ice 1/2" Ice 1" Ice	0.08 0.12 0.17	0.14 0.19 0.25	0.00 0.00 0.00
APXVTM14-C-120 w/ Mount Pipe	A	From Leg	4.00 0.00 2.00	50.0000	138.00	No Ice 1/2" Ice	7.13 7.66 8.18	4.96 5.75 6.47	0.08 0.13 0.19

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft Vert ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						1" Ice			
TD-RRH8x20-25	A	From Leg	4.00	50.0000	138.00	No Ice	4.72	1.70	0.07
			0.00			1/2" Ice	5.01	1.92	0.10
			2.00			1" Ice	5.32	2.15	0.13
(2) P40-16-XLPP-RR-A w/ Mount Pipe	B	From Leg	4.00	80.0000	138.00	No Ice	9.37	4.83	0.07
			0.00			1/2" Ice	9.91	5.57	0.14
			2.00			1" Ice	10.45	6.27	0.21
800 EXTERNAL NOTCH FILTER	B	From Leg	4.00	80.0000	138.00	No Ice	0.77	0.37	0.01
			0.00			1/2" Ice	0.89	0.46	0.02
			0.00			1" Ice	1.02	0.56	0.02
(6) ACU-A20-N	B	From Leg	4.00	80.0000	138.00	No Ice	0.08	0.14	0.00
			0.00			1/2" Ice	0.12	0.19	0.00
			0.00			1" Ice	0.17	0.25	0.00
APXVTM14-C-120 w/ Mount Pipe	B	From Leg	4.00	80.0000	138.00	No Ice	7.13	4.96	0.08
			0.00			1/2" Ice	7.66	5.75	0.13
			2.00			1" Ice	8.18	6.47	0.19
TD-RRH8x20-25	B	From Leg	4.00	80.0000	138.00	No Ice	4.72	1.70	0.07
			0.00			1/2" Ice	5.01	1.92	0.10
			2.00			1" Ice	5.32	2.15	0.13
(2) P40-16-XLPP-RR-A w/ Mount Pipe	C	From Leg	4.00	50.0000	138.00	No Ice	9.37	4.83	0.07
			0.00			1/2" Ice	9.91	5.57	0.14
			2.00			1" Ice	10.45	6.27	0.21
800 EXTERNAL NOTCH FILTER	C	From Leg	4.00	50.0000	138.00	No Ice	0.77	0.37	0.01
			0.00			1/2" Ice	0.89	0.46	0.02
			0.00			1" Ice	1.02	0.56	0.02
(6) ACU-A20-N	C	From Leg	4.00	50.0000	138.00	No Ice	0.08	0.14	0.00
			0.00			1/2" Ice	0.12	0.19	0.00
			0.00			1" Ice	0.17	0.25	0.00
APXVTM14-C-120 w/ Mount Pipe	C	From Leg	4.00	50.0000	138.00	No Ice	7.13	4.96	0.08
			0.00			1/2" Ice	7.66	5.75	0.13
			2.00			1" Ice	8.18	6.47	0.19
TD-RRH8x20-25	C	From Leg	4.00	50.0000	138.00	No Ice	4.72	1.70	0.07
			0.00			1/2" Ice	5.01	1.92	0.10
			2.00			1" Ice	5.32	2.15	0.13
Platform Mount [LP 303-1]	C	None		0.0000	138.00	No Ice	14.66	14.66	1.25
						1/2" Ice	18.87	18.87	1.48
						1" Ice	23.08	23.08	1.71
Miscellaneous [NA 507-1]	C	From Leg	0.00	0.0000	138.00	No Ice	4.80	4.80	0.25
			0.00			1/2" Ice	6.70	6.70	0.29
			4.00			1" Ice	8.60	8.60	0.34
6' x 2" Mount Pipe	B	From Leg	4.00	0.0000	138.00	No Ice	1.43	1.43	0.02
			0.00			1/2" Ice	1.92	1.92	0.03
			-3.00			1" Ice	2.29	2.29	0.05
6' x 2" Mount Pipe	C	From Leg	4.00	0.0000	138.00	No Ice	1.43	1.43	0.02
			0.00			1/2" Ice	1.92	1.92	0.03
			-3.00			1" Ice	2.29	2.29	0.05
***									
800MHZ RRH	A	From Leg	2.00	50.0000	136.00	No Ice	2.49	2.07	0.05
			0.00			1/2" Ice	2.71	2.27	0.07
			3.00			1" Ice	2.93	2.48	0.10

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			
800MHZ RRH	B	From Leg	2.00 0.00 3.00	80.0000	136.00	No Ice 1/2" Ice 1" Ice	2.49 2.71 2.93	2.07 2.27 2.48	0.05 0.07 0.10
800MHZ RRH	C	From Leg	2.00 0.00 3.00	40.0000	136.00	No Ice 1/2" Ice 1" Ice	2.49 2.71 2.93	2.07 2.27 2.48	0.05 0.07 0.10
1900MHz RRH (65MHz)	A	From Leg	2.00 0.00 -1.00	50.0000	136.00	No Ice 1/2" Ice 1" Ice	2.70 2.94 3.18	2.77 3.01 3.26	0.06 0.08 0.11
1900MHz RRH (65MHz)	B	From Leg	2.00 0.00 -1.00	80.0000	136.00	No Ice 1/2" Ice 1" Ice	2.70 2.94 3.18	2.77 3.01 3.26	0.06 0.08 0.11
1900MHz RRH (65MHz)	C	From Leg	2.00 0.00 -1.00	40.0000	136.00	No Ice 1/2" Ice 1" Ice	2.70 2.94 3.18	2.77 3.01 3.26	0.06 0.08 0.11
1900MHz RRH (65MHz)	A	From Leg	2.00 0.00 1.00	50.0000	136.00	No Ice 1/2" Ice 1" Ice	2.70 2.94 3.18	2.77 3.01 3.26	0.06 0.08 0.11
1900MHz RRH (65MHz)	B	From Leg	2.00 0.00 1.00	80.0000	136.00	No Ice 1/2" Ice 1" Ice	2.70 2.94 3.18	2.77 3.01 3.26	0.06 0.08 0.11
1900MHz RRH (65MHz)	C	From Leg	2.00 0.00 1.00	40.0000	136.00	No Ice 1/2" Ice 1" Ice	2.70 2.94 3.18	2.77 3.01 3.26	0.06 0.08 0.11
Side Arm Mount [SO 104-3]	C	None		0.0000	136.00	No Ice 1/2" Ice 1" Ice	3.30 4.13 4.96	3.30 4.13 4.96	0.29 0.32 0.35
6' x 2" Mount Pipe	A	From Leg	1.00 0.00 0.00	0.0000	136.00	No Ice 1/2" Ice 1" Ice	1.43 1.92 2.29	1.43 1.92 2.29	0.02 0.03 0.05
6' x 2" Mount Pipe	B	From Leg	1.00 0.00 0.00	0.0000	136.00	No Ice 1/2" Ice 1" Ice	1.43 1.92 2.29	1.43 1.92 2.29	0.02 0.03 0.05
6' x 2" Mount Pipe	C	From Leg	1.00 0.00 0.00	0.0000	136.00	No Ice 1/2" Ice 1" Ice	1.43 1.92 2.29	1.43 1.92 2.29	0.02 0.03 0.05
***									
DB-T1-6Z-8AB-0Z	C	From Leg	1.00 0.00 0.00	60.0000	122.00	No Ice 1/2" Ice 1" Ice	5.60 5.92 6.24	2.33 2.56 2.79	0.04 0.08 0.12
Side Arm Mount [SO 102-1]	C	From Leg	0.50 0.00 0.00	60.0000	122.00	No Ice 1/2" Ice 1" Ice	1.50 1.74 1.98	1.50 1.75 2.00	0.03 0.04 0.04
***									
BXA-171063-8BF-EDIN-0 w/ Mount Pipe	A	From Leg	4.00 0.00 2.00	30.0000	120.00	No Ice 1/2" Ice 1" Ice	3.18 3.56 3.96	3.35 3.97 4.60	0.03 0.06 0.10
BXA-80063/4CF w/ Mount Pipe	A	From Leg	4.00 0.00	30.0000	120.00	No Ice 1/2"	5.40 5.84	3.42 4.02	0.03 0.07

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
			2.00			Ice	6.30	4.64	0.12
						1" Ice			
MG D3-800TV w/ Mount Pipe	A	From Leg	4.00	30.0000	120.00	No Ice	3.57	3.42	0.04
			0.00			1/2"	3.98	4.12	0.07
			2.00			Ice	4.39	4.78	0.11
						1" Ice			
RRH2X40-AWS	A	From Leg	4.00	30.0000	120.00	No Ice	2.52	1.59	0.04
			0.00			1/2"	2.75	1.80	0.06
			2.00			Ice	2.99	2.01	0.08
						1" Ice			
FD9R6004/2C-3L	A	From Leg	4.00	30.0000	120.00	No Ice	0.37	0.08	0.00
			0.00			1/2"	0.45	0.14	0.01
			2.00			Ice	0.54	0.20	0.01
						1" Ice			
LNX-6514DS-A1M w/ Mount Pipe	A	From Leg	4.00	30.0000	120.00	No Ice	8.65	7.08	0.06
			0.00			1/2"	9.31	8.27	0.13
			2.00			Ice	9.93	9.18	0.21
						1" Ice			
MG D3-800TV w/ Mount Pipe	B	From Leg	4.00	30.0000	120.00	No Ice	3.57	3.42	0.04
			0.00			1/2"	3.98	4.12	0.07
			2.00			Ice	4.39	4.78	0.11
						1" Ice			
BXA-171063-8BF-EDIN-0 w/ Mount Pipe	B	From Leg	4.00	30.0000	120.00	No Ice	3.18	3.35	0.03
			0.00			1/2"	3.56	3.97	0.06
			2.00			Ice	3.96	4.60	0.10
						1" Ice			
BXA-80063/4CF w/ Mount Pipe	B	From Leg	4.00	30.0000	120.00	No Ice	5.40	3.42	0.03
			0.00			1/2"	5.84	4.02	0.07
			2.00			Ice	6.30	4.64	0.12
						1" Ice			
FD9R6004/2C-3L	B	From Leg	4.00	30.0000	120.00	No Ice	0.37	0.08	0.00
			0.00			1/2"	0.45	0.14	0.01
			2.00			Ice	0.54	0.20	0.01
						1" Ice			
RRH2X40-AWS	B	From Leg	4.00	30.0000	120.00	No Ice	2.52	1.59	0.04
			0.00			1/2"	2.75	1.80	0.06
			2.00			Ice	2.99	2.01	0.08
						1" Ice			
LNX-6514DS-A1M w/ Mount Pipe	B	From Leg	4.00	30.0000	120.00	No Ice	8.65	7.08	0.06
			0.00			1/2"	9.31	8.27	0.13
			2.00			Ice	9.93	9.18	0.21
						1" Ice			
BXA-171063-8BF-EDIN-0 w/ Mount Pipe	C	From Leg	4.00	30.0000	120.00	No Ice	3.18	3.35	0.03
			0.00			1/2"	3.56	3.97	0.06
			2.00			Ice	3.96	4.60	0.10
						1" Ice			
BXA-80063/6CF w/ Mount Pipe	C	From Leg	4.00	30.0000	120.00	No Ice	7.98	5.41	0.04
			0.00			1/2"	8.62	6.56	0.10
			2.00			Ice	9.23	7.42	0.17
						1" Ice			
MG D3-800TV w/ Mount Pipe	C	From Leg	4.00	30.0000	120.00	No Ice	3.57	3.42	0.04
			0.00			1/2"	3.98	4.12	0.07
			2.00			Ice	4.39	4.78	0.11
						1" Ice			
RRH2X40-AWS	C	From Leg	4.00	30.0000	120.00	No Ice	2.52	1.59	0.04
			0.00			1/2"	2.75	1.80	0.06
			2.00			Ice	2.99	2.01	0.08
						1" Ice			
LNX-6514DS-A1M w/ Mount Pipe	C	From Leg	4.00	30.0000	120.00	No Ice	8.65	7.08	0.06
			0.00			1/2"	9.31	8.27	0.13
			2.00			Ice	9.93	9.18	0.21
						1" Ice			
GPS_A	A	From Leg	4.00	0.0000	120.00	No Ice	0.30	0.30	0.00
			0.00			1/2"	0.37	0.37	0.00
			6.00			Ice	0.46	0.46	0.01

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						1" Ice			
6' x 2" Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	120.00	No Ice 1/2" Ice 1" Ice	1.43 1.92 2.29	1.43 1.92 2.29	0.02 0.03 0.05
6' x 2" Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	120.00	No Ice 1/2" Ice 1" Ice	1.43 1.92 2.29	1.43 1.92 2.29	0.02 0.03 0.05
6' x 2" Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	120.00	No Ice 1/2" Ice 1" Ice	1.43 1.92 2.29	1.43 1.92 2.29	0.02 0.03 0.05
Platform Mount [LP 1201-1]	C	None		0.0000	120.00	No Ice 1/2" Ice 1" Ice	23.10 26.80 30.50	23.10 26.80 30.50	2.10 2.50 2.90
***									
KS24019-L112A	A	From Leg	3.00 0.00 1.00	0.0000	90.00	No Ice 1/2" Ice 1" Ice	0.16 0.22 0.30	0.16 0.22 0.30	0.01 0.01 0.01
Side Arm Mount [SO 701-1]	A	None		0.0000	90.00	No Ice 1/2" Ice 1" Ice	0.85 1.14 1.43	1.67 2.34 3.01	0.07 0.08 0.09
***									

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight K
VHLP2-11	B	Paraboloid w/o Radome	From Leg	4.00 0.00 -4.00	80.0000		138.00	2.17	No Ice 1/2" Ice 1" Ice	3.72 4.01 4.30	0.03 0.05 0.07
VHLP2-11	C	Paraboloid w/o Radome	From Leg	4.00 0.00 -4.00	40.0000		138.00	2.17	No Ice 1/2" Ice 1" Ice	3.72 4.01 4.30	0.03 0.05 0.07
***											

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

Comb. No.	Description
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	148 - 138	Pole	Max Tension	15	0.00	0.00	-0.00
			Max. Compression	14	-1.39	0.00	0.16
			Max. Mx	5	-0.68	-9.34	0.13
			Max. My	2	-0.68	-0.09	9.48
			Max. Vy	5	1.43	-9.34	0.13
			Max. Vx	2	-1.44	-0.09	9.48
			Max. Torque	9			0.06
L2	138 - 90.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-18.03	0.83	0.10
			Max. Mx	5	-10.24	-611.80	24.65
			Max. My	2	-10.31	-20.22	596.17
			Max. Vy	5	17.50	-611.80	24.65
			Max. Vx	2	-17.10	-20.22	596.17
			Max. Torque	5			-5.20
L3	90.75 - 44.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-27.78	0.80	1.24
			Max. Mx	5	-18.11	-1484.24	48.98
			Max. My	2	-18.14	-39.81	1450.83
			Max. Vy	5	21.37	-1484.24	48.98
			Max. Vx	2	-20.97	-39.81	1450.83
			Max. Torque	5			-5.15
L4	44.75 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-42.01	0.75	2.59
			Max. Mx	5	-30.13	-2645.29	75.62
			Max. My	2	-30.13	-61.11	2592.41
			Max. Vy	5	25.03	-2645.29	75.62
			Max. Vx	2	-24.64	-61.11	2592.41
			Max. Torque	5			-5.04

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	14	42.01	-0.00	-0.00
	Max. H_x	11	30.15	24.85	-0.42
	Max. H_z	2	30.15	-0.42	24.62
	Max. M_x	2	2592.41	-0.42	24.62
	Max. M_z	5	2645.29	-25.00	0.51
	Max. Torsion	11	3.90	24.85	-0.42
	Min. Vert	8	30.15	0.26	-24.53
	Min. H_x	5	30.15	-25.00	0.51
	Min. H_z	8	30.15	0.26	-24.53
	Min. M_x	8	-2580.57	0.26	-24.53
	Min. M_z	11	-2624.45	24.85	-0.42
	Min. Torsion	5	-4.99	-25.00	0.51

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	30.15	-0.00	0.00	-0.32	0.40	0.00
Dead+Wind 0 deg - No Ice	30.15	0.42	-24.62	-2592.41	-61.11	0.42
Dead+Wind 30 deg - No Ice	30.15	12.95	-21.51	-2273.82	-1387.55	2.85
Dead+Wind 60 deg - No Ice	30.15	21.85	-12.68	-1351.25	-2319.47	4.51
Dead+Wind 90 deg - No Ice	30.15	25.00	-0.51	-75.62	-2645.29	4.99
Dead+Wind 120 deg - No Ice	30.15	21.41	11.95	1242.47	-2255.40	3.30
Dead+Wind 150 deg - No Ice	30.15	12.30	21.02	2201.13	-1291.44	2.55
Dead+Wind 180 deg - No Ice	30.15	-0.26	24.53	2580.57	39.99	0.53
Dead+Wind 210 deg - No Ice	30.15	-12.79	21.42	2260.96	1366.20	-1.84
Dead+Wind 240 deg - No Ice	30.15	-21.70	12.59	1338.53	2299.53	-2.93
Dead+Wind 270 deg - No Ice	30.15	-24.85	0.42	61.74	2624.45	-3.90
Dead+Wind 300 deg - No Ice	30.15	-21.26	-12.04	-1256.62	2235.59	-2.96
Dead+Wind 330 deg - No Ice	30.15	-11.95	-21.22	-2229.77	1243.77	-1.05
Dead+Ice+Temp	42.01	0.00	0.00	-2.59	0.75	-0.00
Dead+Wind 0 deg+Ice+Temp	42.01	0.07	-5.75	-627.79	-10.47	-0.04
Dead+Wind 30 deg+Ice+Temp	42.01	2.99	-5.01	-549.35	-329.66	0.49
Dead+Wind 60 deg+Ice+Temp	42.01	5.08	-2.94	-325.48	-555.23	0.89
Dead+Wind 90 deg+Ice+Temp	42.01	5.82	-0.10	-17.11	-635.24	1.06
Dead+Wind 120 deg+Ice+Temp	42.01	5.00	2.81	300.06	-543.26	0.75
Dead+Wind 150 deg+Ice+Temp	42.01	2.88	4.92	530.18	-312.33	0.64
Dead+Wind 180 deg+Ice+Temp	42.01	-0.04	5.73	619.87	7.26	0.23
Dead+Wind 210 deg+Ice+Temp	42.01	-2.96	4.99	541.18	326.38	-0.28
Dead+Wind 240 deg+Ice+Temp	42.01	-5.04	2.92	317.36	552.26	-0.53
Dead+Wind 270 deg+Ice+Temp	42.01	-5.79	0.08	8.74	632.07	-0.80
Dead+Wind 300 deg+Ice+Temp	42.01	-4.96	-2.83	-308.49	540.33	-0.66
Dead+Wind 330 deg+Ice+Temp	42.01	-2.81	-4.96	-541.86	303.18	-0.31
Dead+Wind 0 deg - Service	30.15	0.14	-8.52	-898.41	-20.90	0.14
Dead+Wind 30 deg - Service	30.15	4.48	-7.44	-788.16	-480.57	0.99
Dead+Wind 60 deg - Service	30.15	7.56	-4.39	-468.46	-803.50	1.59
Dead+Wind 90 deg - Service	30.15	8.65	-0.18	-26.41	-916.36	1.76
Dead+Wind 120 deg - Service	30.15	7.41	4.13	430.30	-781.19	1.16

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead+Wind 150 deg - Service	30.15	4.26	7.27	762.42	-447.16	0.88
Dead+Wind 180 deg - Service	30.15	-0.09	8.49	893.90	14.14	0.17
Dead+Wind 210 deg - Service	30.15	-4.42	7.41	783.25	473.69	-0.65
Dead+Wind 240 deg - Service	30.15	-7.51	4.36	463.65	797.14	-1.02
Dead+Wind 270 deg - Service	30.15	-8.60	0.15	21.20	909.67	-1.35
Dead+Wind 300 deg - Service	30.15	-7.36	-4.17	-435.59	774.86	-1.03
Dead+Wind 330 deg - Service	30.15	-4.14	-7.34	-772.76	431.20	-0.37

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
1	0.00	-30.15	0.00	0.00	30.15	0.00	0.000%
2	0.42	-30.15	-24.62	-0.42	30.15	24.62	0.001%
3	12.95	-30.15	-21.51	-12.95	30.15	21.51	0.000%
4	21.85	-30.15	-12.68	-21.85	30.15	12.68	0.000%
5	25.00	-30.15	-0.51	-25.00	30.15	0.51	0.001%
6	21.41	-30.15	11.95	-21.41	30.15	-11.95	0.000%
7	12.30	-30.15	21.02	-12.30	30.15	-21.02	0.000%
8	-0.26	-30.15	24.54	0.26	30.15	-24.53	0.003%
9	-12.79	-30.15	21.42	12.79	30.15	-21.42	0.000%
10	-21.70	-30.15	12.59	21.70	30.15	-12.59	0.000%
11	-24.85	-30.15	0.42	24.85	30.15	-0.42	0.001%
12	-21.26	-30.15	-12.04	21.26	30.15	12.04	0.000%
13	-11.95	-30.15	-21.22	11.95	30.15	21.22	0.000%
14	0.00	-42.01	0.00	-0.00	42.01	-0.00	0.001%
15	0.07	-42.01	-5.75	-0.07	42.01	5.75	0.002%
16	2.99	-42.01	-5.01	-2.99	42.01	5.01	0.001%
17	5.08	-42.01	-2.94	-5.08	42.01	2.94	0.001%
18	5.82	-42.01	-0.10	-5.82	42.01	0.10	0.001%
19	5.00	-42.01	2.81	-5.00	42.01	-2.81	0.001%
20	2.88	-42.01	4.92	-2.88	42.01	-4.92	0.001%
21	-0.04	-42.01	5.73	0.04	42.01	-5.73	0.002%
22	-2.96	-42.01	4.99	2.96	42.01	-4.99	0.001%
23	-5.04	-42.01	2.92	5.04	42.01	-2.92	0.001%
24	-5.79	-42.01	0.08	5.79	42.01	-0.08	0.001%
25	-4.97	-42.01	-2.83	4.96	42.01	2.83	0.001%
26	-2.81	-42.01	-4.96	2.81	42.01	4.96	0.001%
27	0.14	-30.15	-8.52	-0.14	30.15	8.52	0.003%
28	4.48	-30.15	-7.44	-4.48	30.15	7.44	0.001%
29	7.56	-30.15	-4.39	-7.56	30.15	4.39	0.001%
30	8.65	-30.15	-0.18	-8.65	30.15	0.18	0.001%
31	7.41	-30.15	4.13	-7.41	30.15	-4.13	0.001%
32	4.26	-30.15	7.27	-4.26	30.15	-7.27	0.001%
33	-0.09	-30.15	8.49	0.09	30.15	-8.49	0.003%
34	-4.42	-30.15	7.41	4.42	30.15	-7.41	0.001%
35	-7.51	-30.15	4.36	7.51	30.15	-4.36	0.001%
36	-8.60	-30.15	0.15	8.60	30.15	-0.15	0.001%
37	-7.36	-30.15	-4.17	7.36	30.15	4.17	0.001%
38	-4.14	-30.15	-7.34	4.14	30.15	7.34	0.001%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	6	0.00000001	0.00000001
2	Yes	17	0.00000001	0.00010407
3	Yes	20	0.00000001	0.00011266
4	Yes	20	0.00000001	0.00009520
5	Yes	18	0.00000001	0.00007785
6	Yes	20	0.00000001	0.00009878
7	Yes	20	0.00000001	0.00008536
8	Yes	16	0.00003324	0.00011428
9	Yes	20	0.00000001	0.00009768
10	Yes	20	0.00000001	0.00011106
11	Yes	18	0.00000001	0.00012279
12	Yes	20	0.00000001	0.00008291
13	Yes	20	0.00000001	0.00009004
14	Yes	6	0.00000001	0.00000432
15	Yes	15	0.00014022	0.00013170
16	Yes	16	0.00000001	0.00013362
17	Yes	16	0.00000001	0.00012264
18	Yes	16	0.00000001	0.00008211
19	Yes	16	0.00000001	0.00012486
20	Yes	16	0.00000001	0.00011097
21	Yes	15	0.00014026	0.00013073
22	Yes	16	0.00000001	0.00012084
23	Yes	16	0.00000001	0.00013275
24	Yes	16	0.00000001	0.00007926
25	Yes	16	0.00000001	0.00011184
26	Yes	16	0.00000001	0.00011698
27	Yes	15	0.00007616	0.00006280
28	Yes	17	0.00000001	0.00008221
29	Yes	16	0.00000001	0.00011964
30	Yes	16	0.00000001	0.00008268
31	Yes	17	0.00000001	0.00007321
32	Yes	16	0.00000001	0.00010016
33	Yes	15	0.00007617	0.00004934
34	Yes	16	0.00000001	0.00011996
35	Yes	17	0.00000001	0.00008218
36	Yes	16	0.00000001	0.00008111
37	Yes	16	0.00000001	0.00009609
38	Yes	16	0.00000001	0.00011925

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	148 - 138	36.688	29	2.1288	0.0229
L2	138 - 90.75	32.233	29	2.1261	0.0229
L3	94.75 - 44.75	14.934	29	1.5536	0.0078
L4	50 - 0	3.987	29	0.7432	0.0024

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
146.00	APX18-206517-CT2 w/ Mount Pipe	29	35.794	2.1306	0.0230	24575
138.00	LLPX310R-V1 w/ Mount Pipe	29	32.233	2.1261	0.0229	12602
136.00	800MHZ RRH	29	31.350	2.1193	0.0226	10828
134.00	VHLP2-11	29	30.471	2.1098	0.0223	9598
122.00	DB-T1-6Z-8AB-0Z	29	25.325	2.0016	0.0189	5791
120.00	BXA-171063-8BF-EDIN-0 w/ Mount Pipe	29	24.493	1.9764	0.0181	5432

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
90.00	KS24019-L112A	29	13.384	1.4647	0.0064	2999

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	148 - 138	105.637	4	6.1419	0.0669
L2	138 - 90.75	92.821	4	6.1343	0.0668
L3	94.75 - 44.75	43.047	4	4.4807	0.0225
L4	50 - 0	11.501	4	2.1442	0.0069

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
146.00	APX18-206517-CT2 w/ Mount Pipe	4	103.065	6.1471	0.0671	8857
138.00	LLPX310R-V1 w/ Mount Pipe	4	92.821	6.1343	0.0668	4535
136.00	800MHZ RRH	4	90.281	6.1146	0.0662	3891
134.00	VHLP2-11	4	87.755	6.0870	0.0653	3442
122.00	DB-T1-6Z-8AB-0Z	4	72.949	5.7746	0.0551	2050
120.00	BXA-171063-8BF-EDIN-0 w/ Mount Pipe	4	70.555	5.7016	0.0528	1920
90.00	KS24019-L112A	4	38.583	4.2244	0.0185	1053

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	148 - 138 (1)	TP24x24x0.25	10.00	0.00	0.0	26.968	18.6532	-0.67	503.05	0.001
L2	138 - 90.75 (2)	TP31.924x22x0.25	47.25	0.00	0.0	36.000	24.4667	-10.20	880.80	0.012
L3	90.75 - 44.75 (3)	TP41.086x30.7532x0.3125	50.00	0.00	0.0	36.000	39.3661	-18.09	1417.18	0.013
L4	44.75 - 0 (4)	TP49.86x39.3761x0.375	50.00	0.00	0.0	36.000	58.8995	-30.13	2120.38	0.014

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	148 - 138 (1)	TP24x24x0.25	9.54	1.044	26.896	0.039	0.00	0.000	26.896	0.000
L2	138 - 90.75 (2)	TP31.924x22x0.25	625.31	40.319	36.000	1.120	0.00	0.000	36.000	0.000
L3	90.75 - 44.75 (3)	TP41.086x30.7532x0.3125	1509.97	47.000	36.000	1.306	0.00	0.000	36.000	0.000

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 $\frac{f_{by}}{F_{by}}$
L4	44.75 - 0 (4)	TP49.86x39.3761x0.375	2684.37	44.776	36.000	1.244	0.00	0.000	36.000	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	148 - 138 (1)	TP24x24x0.25	1.46	0.078	20.000	0.008	0.06	0.003	12.092	0.000
L2	138 - 90.75 (2)	TP31.924x22x0.25	17.77	0.726	24.000	0.061	4.72	0.148	24.000	0.006
L3	90.75 - 44.75 (3)	TP41.086x30.7532x0.3125	21.64	0.550	24.000	0.046	4.60	0.070	24.000	0.003
L4	44.75 - 0 (4)	TP49.86x39.3761x0.375	25.29	0.429	24.000	0.036	4.52	0.037	24.000	0.002

Pole Interaction Design Data

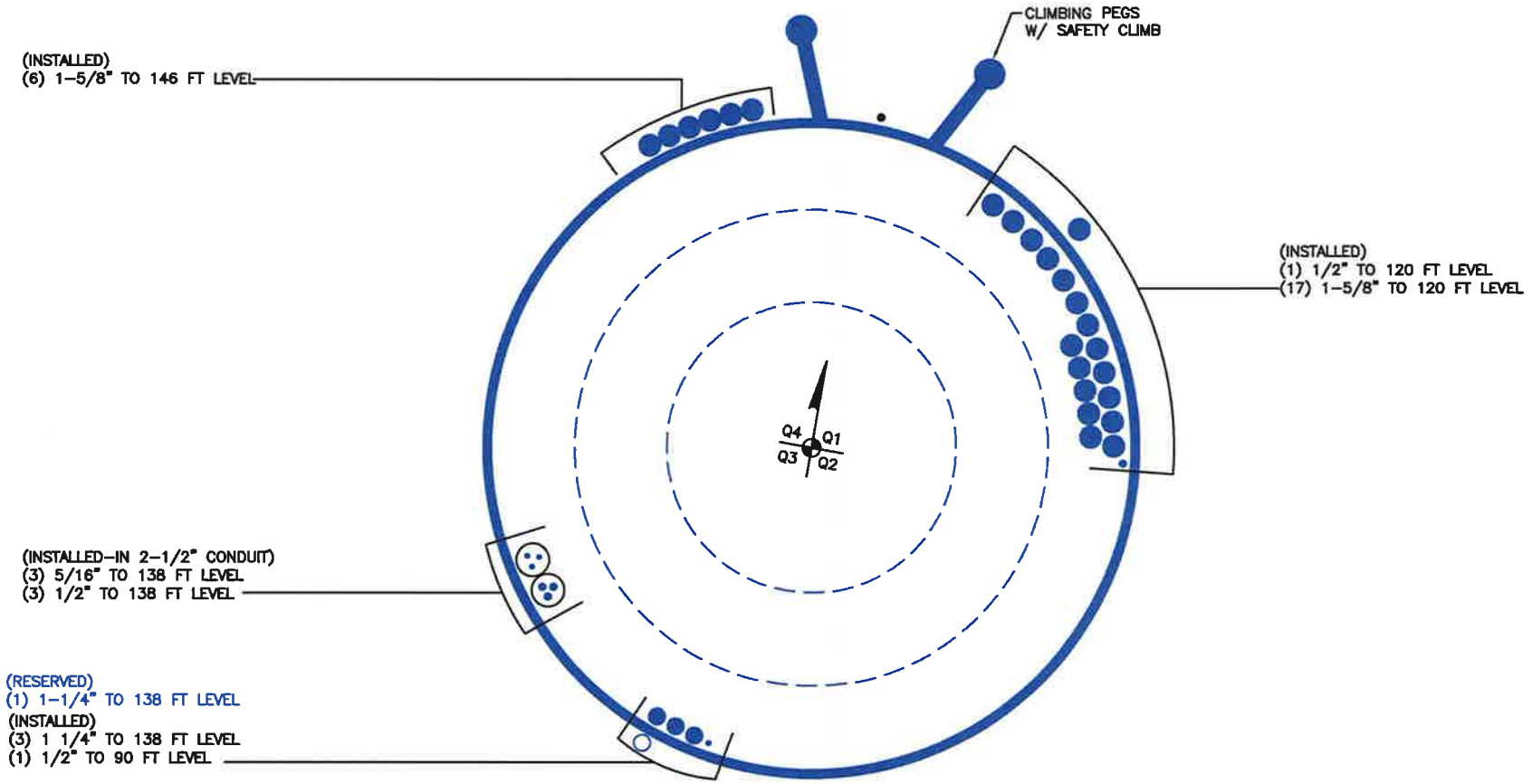
Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	148 - 138 (1)	0.001	0.039	0.000	0.008	0.000	0.040 ✔	1.333	H1-3+VT ✔
L2	138 - 90.75 (2)	0.012	1.120	0.000	0.061	0.006	1.133 ✔	1.333	H1-3+VT ✔
L3	90.75 - 44.75 (3)	0.013	1.306	0.000	0.046	0.003	1.319 ✔	1.333	H1-3+VT ✔
L4	44.75 - 0 (4)	0.014	1.244	0.000	0.036	0.002	1.258 ✔	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	148 - 138	Pole	TP24x24x0.25	1	-0.67	670.56	3.0	Pass
L2	138 - 90.75	Pole	TP31.924x22x0.25	2	-10.20	1174.11	85.0	Pass
L3	90.75 - 44.75	Pole	TP41.086x30.7532x0.3125	3	-18.09	1889.10	98.9	Pass
L4	44.75 - 0	Pole	TP49.86x39.3761x0.375	4	-30.13	2826.47	94.4	Pass
							Summary	
						Pole (L3)	98.9	Pass
						RATING =	**98.9**	**Pass**

APPENDIX B

BASE LEVEL DRAWING


CLIMBING PEGS
W/ SAFETY CLIMB
(INSTALLED)
(6) 1-5/8" TO 146 FT LEVEL
(INSTALLED)
(1) 1/2" TO 120 FT LEVEL
(17) 1-5/8" TO 120 FT LEVEL
Q4
Q1
Q3
Q2
(INSTALLED-IN 2-1/2" CONDUIT)
(3) 5/16" TO 138 FT LEVEL
(3) 1/2" TO 138 FT LEVEL
(RESERVED)
(1) 1-1/4" TO 138 FT LEVEL
(INSTALLED)
(3) 1 1/4" TO 138 FT LEVEL
(1) 1/2" TO 90 FT LEVEL

APPENDIX C

ADDITIONAL CALCULATIONS

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

Site Data

BU#: *876323*
Site Name: *HILLSIDE*
App #: *277638 R1*

Pole Manufacturer:	Other

Bolt Data			
Qty:	8		
Diameter (in.):	1	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:		<-- Disregard	Bolt Fty: 44.00
N/A:		<-- Disregard	
Circle (in.):	28		

Plate Data		
Diam:	32	in
Thick, t:	0.75	in
Grade (Fy):	50	ksi
Strength, Fu:	65	ksi
Single-Rod B-eff:	9.00	in

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

Pole Data		
Diam:	24	in
Thick:	0.25	in
Grade:	50	ksi
# of Sides:	0	"0" IF Round
Fu	65	ksi
Reinf. Fillet Weld	0	"0" if None

Stress Increase Factor		
ASIF:	1.333	

Reactions		
Moment:	19.523525	ft-kips
Axial:	3.3788	kips
Shear:	7.209324	kips
Elevation:	138	feet

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

Flange Bolt Results

Bolt Tension Capacity, **B**:	46.07 kips
Max Bolt directly applied T:	3.76 Kips
Min. PL "tc" for **B** cap. **w/o** Pry:	0.960 in
Min PL "treq" for actual **T w/ Pry:**	0.200 in
Min PL "t1" for actual **T w/o Pry:**	0.274 in
T allowable with Prying:	39.33 kips
Prying Force, Q:	0.00 kips
Total Bolt Tension=T+Q:	3.76 kips
Prying Bolt Stress Ratio=(T+Q)/(B):	8.2% **Pass**

Exterior Flange Plate Results Flexural Check

Compression Side Plate Stress:	13.1 ksi
Allowable Plate Stress:	50.0 ksi
Compression Plate Stress Ratio:	26.2% **Pass**
No Prying	
Tension Side Stress Ratio, (treq/t)^2:	7.1% **Pass**

n/a

Stiffener Results

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

Pole Results

Pole Punching Shear Check: n/a

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

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

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

Site Data

BU#: *876323*
Site Name: *HILLSIDE*
App #: *277638 R1*

Pole Manufacturer:	Other

Reactions		
Moment:	19.523525	ft-kips
Axial:	3.3788	kips
Shear:	7.209324	kips
Elevation:	138	feet

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

Bolt Data

Qty:	8		
Diameter (in.):	1	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:		<-- Disregard	Bolt Fty: 44.00
N/A:		<-- Disregard	
Circle (in.):	28		

Plate Data

Diam:	32	in
Thick, t:	1	in
Grade (Fy):	50	ksi
Strength, Fu:	65	ksi
Single-Rod B-eff:	7.54	in

Stiffener Data (Welding at Both Sides)

Config:	0	*
Weld Type:		
Groove Depth:		in **
Groove Angle:		degrees
Fillet H. Weld:		<-- Disregard
Fillet V. Weld:		in
Width:		in
Height:		in
Thick:		in
Notch:		in
Grade:		ksi
Weld str.:		ksi

Pole Data

Diam:	19	in
Thick:	0.25	in
Grade:	60	ksi
# of Sides:	18	"0" IF Round
Fu	75	ksi
Reinf. Fillet Weld	0	"0" if None

Stress Increase Factor

ASIF:	1.333	

Flange Bolt Results

Bolt Tension Capacity, **B**:	46.07 kips
Max Bolt directly applied T:	3.76 Kips
Min. PL "tc" for **B** cap. **w/o** Pry:	1.722 in
Min PL "treq" for actual **T w/ Pry**:	0.361 in
Min PL "t1" for actual **T w/o Pry**:	0.492 in
T allowable with Prying:	27.28 kips
Prying Force, Q:	0.00 kips
Total Bolt Tension=T+Q:	3.76 kips
Prying Bolt Stress Ratio=(T+Q)/(B):	8.2% **Pass**

Exterior Flange Plate Results Flexural Check

Compression Side Plate Stress:	8.6 ksi
Allowable Plate Stress:	50.0 ksi
Compression Plate Stress Ratio:	17.2% **Pass**
No Prying	
Tension Side Stress Ratio, (treq/t)^2:	13.0% **Pass**

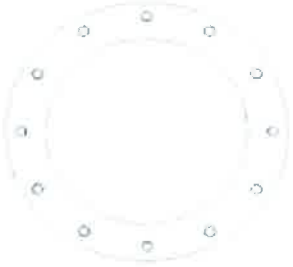
n/a

Stiffener Results

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

Pole Results

Pole Punching Shear Check:	n/a



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

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

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

Site Data

BU#: *876323*
Site Name: *HILLSIDE*
App #: *277638 R1*

Manufacturer:	Other

Reactions		
Moment:	19.523525	ft-kips
Axial:	3.3788	kips
Shear:	7.209324	kips
Exterior Flange Run, T+Q:	2.5524327	kips

Elevation: 138 feet

Bolt Data			
Qty:	18		
Diam:	0.75	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:		<-- Disregard	Bolt Fty: 44.00
N/A:		<-- Disregard	
Circle:	19	in	

Plate Data		
Plate Outer Diam:	27.5	in
Plate Inner Diam:	15	in (Hole @ Ctr)
Thick:	1	in
Grade:	50	ksi
Effective Width:	4.80	in

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

Pole Data		
Pole OuterDiam:	28	in
Thick:	0.25	in
Pole Inner Diam:	27.5	in
Grade:	50	ksi
# of Sides:	0	"0" IF Round
Fu	65	ksi

Stress Increase Factor		
ASIF:	1.333	

Interior Flange Bolt Results

Maximum Bolt Tension:	2.6 Kips, Ext. T=Interior T
Allowable Tension:	25.9 Kips
Bolt Stress Ratio:	9.9% **Pass**

Interior Flange Plate Results Flexural Check

Controlling Bolt Axial Force:	2.9 Kips, Ext. C= Interior C
Plate Stress:	15.6 ksi
Allowable Plate Stress:	50.0 ksi
Plate Stress Ratio:	31.1% **Pass**

n/a

Stiffener Results

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

Pole Results

Pole Punching Shear Check: n/a

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

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

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

Site Data	
BU#:	*876323*
Site Name:	*HILLSIDE*
App #:	*277638 R1*

Manufacturer:	Other

Bolt Data			
Qty:	18		
Diam:	0.75	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:		<-- Disregard	Bolt Fty: 44.00
N/A:		<-- Disregard	
Circle:	19	in	

Plate Data		
Plate Outer Diam:	21.5	in
Plate Inner Diam:	15	in (Hole @ Ctr)
Thick:	0.75	in
Grade:	60	ksi
Effective Width:	3.79	in

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

Pole Data		
Pole OuterDiam:	22	in
Thick:	0.25	in
Pole Inner Diam:	21.5	in
Grade:	60	ksi
# of Sides:	18	"0" IF Round
Fu	75	ksi

Stress Increase Factor		
ASIF:	1.333	

Reactions		
Moment:	19.523525	ft-kips
Axial:	3.3788	kips
Shear:	7.209324	kips
Exterior Flange Run, T+Q:	2.5524327	kips

Elevation: 138 feet

Interior Flange Bolt Results

Maximum Bolt Tension:	2.6 Kips, Ext. T=Interior T
Allowable Tension:	25.9 Kips
Bolt Stress Ratio:	9.9% **Pass**

Interior Flange Plate Results Flexural Check

Controlling Bolt Axial Force:	2.9 Kips, Ext. C= Interior C
Plate Stress:	10.3 ksi
Allowable Plate Stress:	60.0 ksi
Plate Stress Ratio:	17.2% **Pass**

n/a

Stiffener Results

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

Pole Results

Pole Punching Shear Check:	n/a

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

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

Square, Stiffened / Unstiffened Base Plate, Any Rod Material - Rev. F /C

Assumptions: 1) Rod groups at corners. Total # rods divisible by 4. Maximum total # of rods = 48 (12 per Corner).
2) Rod Spacing = Straight Center-to-Center distance between any (2) adjacent rods (same corner)
3) Clear space between bottom of leveling nut and top of concrete **not** exceeding (1)*(Rod Diameter)

Site Data

BU#: *876323*
Site Name: *HILLSIDE*
App #: *277638 R1*

Anchor Rod Data		
Qty:	12	
Diam:	2.25	in
Rod Material:	A615-J	
Yield, Fy:	75	ksi
Strength, Fu:	100	ksi
Bolt Circle:	57	in
Anchor Spacing:	6	in

Plate Data		
W=Side:	53	in
Thick:	3	in
Grade:	60	ksi
Clip Distance:	3	in

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

Pole Data		
Diam:	49.86	in
Thick:	0.375	in
Grade:	60	ksi
# of Sides:	18	"0" IF Round

Stress Increase Factor		
ASD ASIF:	1.333	

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

Base Reactions		
TIA Revision:	F	
Unfactored Moment, M:	2684.36429	ft-kips
Unfactored Axial, P:	30.1327	kips
Unfactored Shear, V:	25.28584	kips

Anchor Rod Results

TIA F --> Maximum Rod Tension	185.9 Kips
Allowable Tension:	195.0 Kips
Anchor Rod Stress Ratio:	95.3% **Pass**

Base Plate Results Flexural Check

Base Plate Stress:	47.3 ksi
Allowable PL Bending Stress:	60.0 ksi
Base Plate Stress Ratio:	78.8% **Pass**

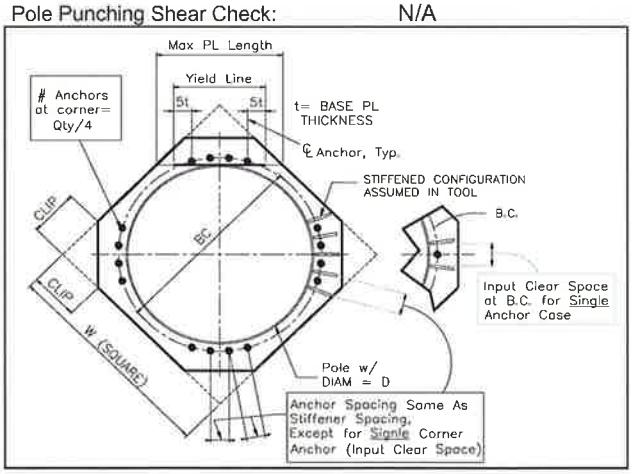
N/A - Unstiffened

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



AeroSolutions LLC
Optimizing Your Tower Infrastructure

Site Number	876323
Site Name	HILLSIDE

Caisson Analysis

Pier Properties		
Moment	2684	kip-ft
Shear	25	kip
Pier Diameter	7.0	ft
Height Above Grade	0.50	ft
Depth Below Grade	21.50	ft
Donut Diameter		ft
Donut Depth		ft

Analysis Properties		
TIA Code	F	
Soil Safety Factor	2.00	
Water Table Depth	5.0	ft
Ignored Soil Depth	3.5	ft
Cohesion Based on	PLS Caisson	
Max Soil Capacity	100%	

Soil Properties

Layer	Top of Soil Layer (ft)	Layer Thickness (ft)	Bottom of Soil Layer (ft)	Soil Unit Weight (pcf)	Cohesion (psf)	Friction Angle (degrees)
Soil.Layer	*Soil.Top*	*Soil.Thick*	*Soil.Bottom*	*Soil.Weight*	*Soil.Cohesion*	*Soil.Phi*
1	0.00	5	5.00	115	0	31
2	5.00	3	8.00	130	0	40
3	8.00	17	25.00	130	0	42
4						
5						
6						
7						
8						
9						
10						

Critical Depths Below Grade		
Rotation Axis	15.31	ft
Zero Shear	5.32	ft

Results		
Soil Capacity	76.6%	OK
Max Pier Moment	2812	kip-ft

Moment At User Defined Depths Below Grade	
kip-ft	kip-ft
kip-ft	kip-ft

V1.0

Moment Capacity of Drilled Concrete Shaft (Caisson) for TIA Rev F or G

Note: Shaft assumed to have ties, not spiral, transverse reinforcing

Site Data

BU#: *876323*
Site Name: *HILLSIDE*
App #: *277638 R1*

Enter Load Factors Below:		
For M (WL)	1.3	<---- Enter Factor
For P (DL)	1.3	<---- Enter Factor

Pier Properties

Concrete:

Pier Diameter =	7.0	ft
Concrete Area =	5541.8	in^2

Reinforcement:

Clear Cover to **Tie**=	4.00	in
Horiz. **Tie** Bar Size=	5	
Vert. Cage Diameter =	6.14	ft
Vert. Cage Diameter =	73.62	in
Vertical Bar Size =	9	
Bar Diameter =	1.13	in
Bar Area =	1	in^2
Number of Bars =	38	
As Total=	38	in^2
A s/ Aconc, Rho:	0.0069	0.69%

ACI 10.5 , ACI 21.10.4, and IBC 1810.
Min As for Flexural, Tension Controlled, Shafts:

(3)*(Sqrt(f'c)/Fy:	0.0027
200 / Fy:	0.0033

Minimum Rho Check:

Actual Req'd Min. Rho:	0.33%	Flexural
Provided Rho:	0.69%	OK

Ref. Shaft Max Axial Capacities, ϕ Max(Pn or Tn):		
Max Pu = (φ=0.65) Pn.		
Pn per ACI 318 (10-2)	8483.60	kips
at Mu=(ϕ=0.65)Mn=	5130.87	ft-kips
Max Tu, (φ=0.9) Tn =	2052	kips
at Mu=ϕ=(0.90)Mn=	0.00	ft-kips

Maximum Shaft Superimposed Forces

TIA Revision:	F	
Max. Service Shaft M:	2811.54	ft-kips **(* Note)**
Max. Service Shaft P:	30.1327	kips
Max Axial Force Type:	Comp.	

(*) Note: Max Shaft Superimposed Moment does not necessarily equal to the shaft top reaction moment

Load Factor	Shaft Factored Loads		
1.30	Mu:	3655.001	ft-kips
1.30	Pu:	39.17251	kips

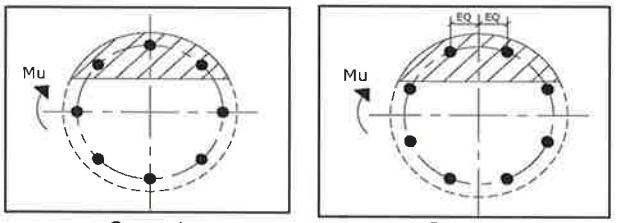
Material Properties

Concrete Comp. strength, f'c =	3000	psi
Reinforcement yield strength, Fy =	60	ksi
Reinforcing Modulus of Elasticity, E =	29000	ksi
Reinforcement yield strain =	0.00207	
Limiting compressive strain =	0.003	
ACI 318 Code		
Select Analysis ACI Code=	2002	
Seismic Properties		
Seismic Design Category =	D	
Seismic Risk =	**High**	

Solve (Run) <-- Press Upon Completing All Input

Results:

Governing Orientation Case: **1**



Case 1 Case 2

Dist. From Edge to Neutral Axis:	**14.85**	in
Extreme Steel Strain, εt:	**0.0129**	
	εt > 0.0050, Tension Controlled	
Reduction Factor,φ:	**0.900**	

Output Note: Negative Pu=Tension

For Axial Compression, φ Pn = Pu:	39.17	kips
Drilled Shaft Moment Capacity, φMn:	**5872.39**	ft-kips
Drilled Shaft Superimposed Mu:	**3655.00**	ft-kips

(Mu/φMn, Drilled Shaft Flexure CSR:	**62.2%**