



RG Towers' Developmental Review Application- Sonic

11.- Structural Calculations



Structural Design Report

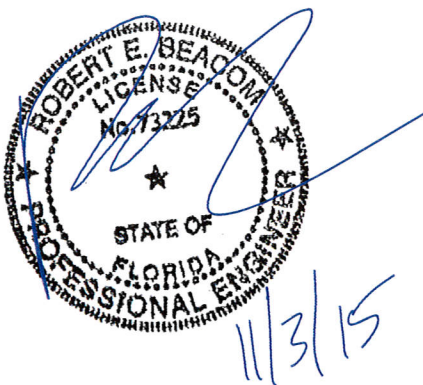
150' Monopole
Site: Sonic-TC04, FL

Prepared for: RG TOWERS, LLC
by: Sabre Towers & Poles™

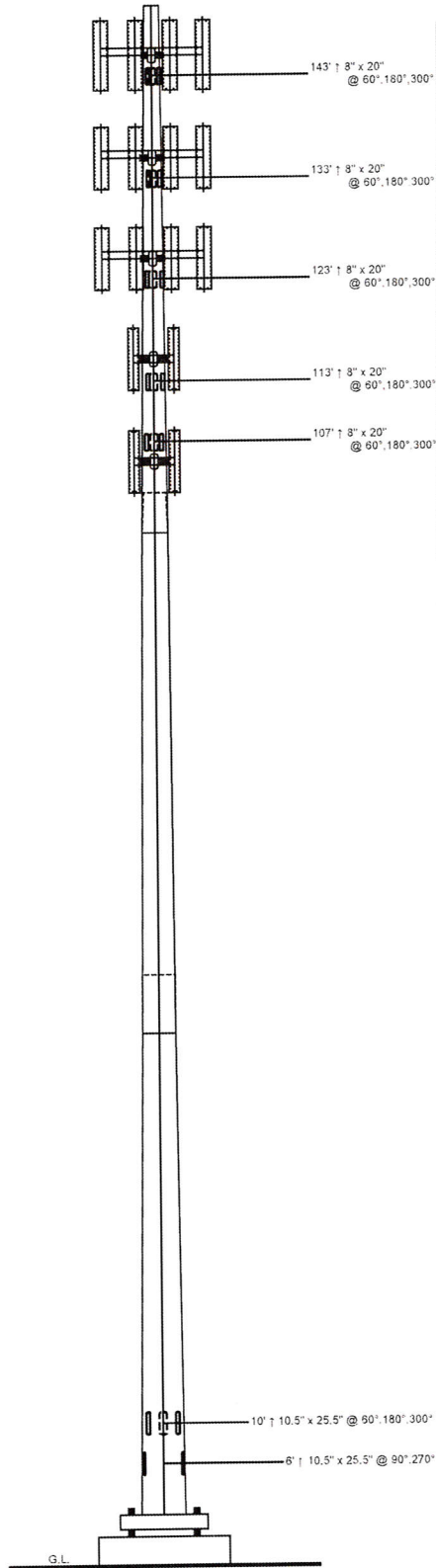
Job Number: 131392

November 3, 2015

Monopole Profile.....	1
Pole Calculations.....	2-10



Section	1	2	3
Length (ft)	53' - 3"	53' - 6"	52' - 0"
Number Of Sides	18		
Thickness (in)	3/8"	5/16"	1/4"
Lap Splice (ft)	38.27"	27.23"	16"
Top Diameter (in)	51.28"	40.3"	26.7"
Bottom Diameter (in)			
Taper (in/ft)		0.2443	
Grade		A572-65	
Weight (lbs)	11836	6412	4063
Overall Steel Height (ft)		149	



Designed Appurtenance Loading

Elev	Description	Tx-Line
145	L.P. Platform (Monopole Only) - 10'	
145	(2) FXFCs	(1) 1 5/8"
145	(3) Frig RRUs	
145	(6) CMA-BDHH/6521/E0-6s	
135	L.P. Platform (Monopole Only) - 10'	
135	(6) X7CQAP-665-Vs	(3) 1 5/8"
125	L.P. Platform (Monopole Only) - 10'	
125	(6) X7CQAP-665-Vs	(3) 1 5/8"
115	3T-Arm - 4' Face - 3' Standoff	
115	(3) RRUS 12s	(4) 3/8"
115	(3) RRUS A2 Modules	(6) 7/8"
115	(3) RRUS 11s	
115	(6) ET-X-UW-68-14-65-18IR-ATs	
115	(3) RRUS 32s	
105	3T-Arm - 4' Face - 3' Standoff	
105	(3) RRUS 12s	(4) 3/8"
105	(3) RRUS A2 Modules	(6) 7/8"
105	(3) RRUS 11s	
105	(6) ET-X-UW-68-14-65-18IR-ATs	
105	(3) RRUS 32s	

Load Case Reactions

Description	Axial (kips)	Shear (kips)	Moment (ft-k)	Deflection (ft)	Sway (deg)
3s Gusted Wind	33.23	41.18	4119.33	13.3	9.38
3s Gusted Wind 0.9 Dead	24.93	41.19	4080.71	13.12	9.24
Service Loads	27.7	5.58	558.64	1.84	1.28

Base Plate Dimensions

Shape	Diameter	Thickness	Bolt Circle	Bolt Qty	Bolt Diameter
Round	63.75"	2.25"	58"	14	2.25"

Anchor Bolt Dimensions

Length	Diameter	Hole Diameter	Weight	Type	Finish
84"	2.25"	2.625"	1695.4	A615-75	Galv-18"

Notes

- 1) Antenna Feed Lines Run Inside Pole
- 2) All dimensions are above ground level, unless otherwise specified.
- 3) Weights shown are estimates. Final weights may vary.
- 4) The Monopole was designed for a basic wind speed of 122 mph with 0" of radial ice, in accordance with ANSI/TIA-222-G, Structure Class II, Exposure Category C, Topographic Category 1.
- 5) Full Height Step Bolts
- 6) The tower design meets the requirements for an Ultimate Wind Speed of 158 mph (Risk Category II), in accordance with the 2014 Florida Building Code.



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Job: **131392**
 Customer: **RG TOWERS, LLC**
 Site Name: **Sonic-TC04, FL**
 Description: **150' Monopole**
 Date: **11/3/2015**

By: **REB**

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150' Monopole / Sonic-TC04, FL

* All pole diameters shown on the following pages are across corners.
 See profile drawing for widths across flats.

POLE GEOMETRY
 =====

ELEV ft	SECTION NAME	No.of SIDES	OUTSIDE DIAM in	THICK- NESS in	RESISTANCES ♦*Pn kip	♦*Mn ft-kip	SPLICE TYPE	...OVERLAP... LENGTH ft	RATIO
149.0	A	18	16.25	0.250	928.5	298.5			
101.0	A/B	18	28.15	0.250	1578.7	890.9	SLIP	4.00	1.70
97.0	B	18	28.65	0.312	2055.9	1175.9			
53.2	B/C	18	39.48	0.312	2674.2	2121.1	SLIP	5.75	1.74
47.5	C	18	40.29	0.375	3432.8	2770.8			
0.0			52.07	0.375	4095.8	4290.2			

POLE ASSEMBLY
 =====

SECTION NAME	BASE ELEV ft	BOLTS NUMBER	AT TYPE	BASE DIAM in	OF SECTION. STRENGTH ksi	THREADS IN SHEAR PLANE	CALC BASE ELEV ft
A	97.000	0	A325	0.00	92.0	0	97.000
B	47.500	0	A325	0.00	92.0	0	47.500
C	0.000	0	A325	0.00	92.0	0	0.000

POLE SECTIONS
 =====

SECTION NAME	No.of SIDES	LENGTH ft	OUTSIDE DIAMETER BOT * in	TOP * in	THICK- NESS in	MAT- ERIAL ID	FLANGE.ID BOT	TOP	FLANGE.WELD ..GROUP.ID.. BOT	TOP
A	18	52.00	29.15	16.25	0.250	1	0	0	0	0
B	18	53.50	40.92	27.65	0.312	2	0	0	0	0
C	18	53.25	52.07	38.86	0.375	3	0	0	0	0

* - Diameter of circumscribed circle

MATERIAL TYPES
 =====

TYPE OF SHAPE	TYPE NO	NO OF ELEM.	ORIENT & deg	HEIGHT in	WIDTH in	.THICKNESS. WEB	FLANGE	IRREGULARITY .PROJECTION. % OF ORIENT AREA	deg
PL	1	1	0.0	29.15	0.25	0.250	0.250	0.00	0.0
PL	2	1	0.0	40.92	0.31	0.312	0.312	0.00	0.0

131392.txt
 PL 3 1 0.0 52.07 0.38 0.375 0.375 0.00 0.0

& - with respect to vertical

MATERIAL PROPERTIES
 =====

MATERIAL TYPE NO.	ELASTIC MODULUS ksi	UNIT WEIGHT pcf	.. STRENGTH .. Fu ksi	Fy ksi	THERMAL COEFFICIENT /deg
1	29000.0	490.0	80.0	65.0	0.00001170
2	29000.0	490.0	80.0	65.0	0.00001170
3	29000.0	490.0	80.0	65.0	0.00001170

* Only 2 condition(s) shown in full
 * Some concentrated wind loads may have been derived from full-scale wind tunnel testing

LOADING CONDITION A
 =====

122 mph wind with no ice. Wind Azimuth: 0

LOADS ON POLE
 =====

LOAD TYPE	ELEV ft	APPLY..RADIUS ft	LOAD..AT AZI	LOAD AZIFORCES.....	MOMENTS.....	
					HORIZ kip	DOWN kip	VERTICAL ft-kip	TORSNAL ft-kip
C	144.000	0.00	0.0	0.0	0.0000	0.1797	0.0000	0.0000
C	144.000	0.00	0.0	0.0	4.4363	1.8235	0.0000	0.0000
C	134.000	0.00	0.0	0.0	0.0000	0.5017	0.0000	0.0000
C	134.000	0.00	0.0	0.0	3.7245	1.3759	0.0000	0.0000
C	124.000	0.00	0.0	0.0	0.0000	0.4643	0.0000	0.0000
C	124.000	0.00	0.0	0.0	3.6646	1.3759	0.0000	0.0000
C	114.000	0.00	0.0	0.0	0.0000	0.5253	0.0000	0.0000
C	114.000	0.00	0.0	0.0	4.9820	2.0269	0.0000	0.0000
C	104.000	0.00	0.0	0.0	0.0000	0.4792	0.0000	0.0000
C	104.000	0.00	0.0	0.0	4.8875	2.0269	0.0000	0.0000
D	149.000	0.00	180.0	0.0	0.0857	0.0575	0.0000	0.0000
D	133.000	0.00	180.0	0.0	0.0857	0.0575	0.0000	0.0000
D	133.000	0.00	180.0	0.0	0.1018	0.0701	0.0000	0.0000
D	117.000	0.00	180.0	0.0	0.1018	0.0701	0.0000	0.0000
D	117.000	0.00	180.0	0.0	0.1166	0.0826	0.0000	0.0000
D	101.000	0.00	180.0	0.0	0.1166	0.0826	0.0000	0.0000
D	101.000	0.00	180.0	0.0	0.1251	0.2016	0.0000	0.0000
D	97.000	0.00	180.0	0.0	0.1251	0.2016	0.0000	0.0000
D	97.000	0.00	180.0	0.0	0.1303	0.1203	0.0000	0.0000
D	82.417	0.00	180.0	0.0	0.1303	0.1203	0.0000	0.0000
D	82.417	0.00	180.0	0.0	0.1405	0.1346	0.0000	0.0000
D	67.833	0.00	180.0	0.0	0.1405	0.1346	0.0000	0.0000
D	67.833	0.00	180.0	0.0	0.1486	0.1489	0.0000	0.0000
D	53.250	0.00	180.0	0.0	0.1486	0.1489	0.0000	0.0000
D	53.250	0.00	180.0	0.0	0.1526	0.3467	0.0000	0.0000
D	47.500	0.00	180.0	0.0	0.1526	0.3467	0.0000	0.0000
D	47.500	0.00	180.0	0.0	0.1524	0.1982	0.0000	0.0000
D	35.625	0.00	180.0	0.0	0.1524	0.1982	0.0000	0.0000
D	35.625	0.00	180.0	0.0	0.1522	0.2122	0.0000	0.0000
D	23.750	0.00	180.0	0.0	0.1522	0.2122	0.0000	0.0000
D	23.750	0.00	180.0	0.0	0.1464	0.2262	0.0000	0.0000
D	11.875	0.00	180.0	0.0	0.1464	0.2262	0.0000	0.0000
D	11.875	0.00	180.0	0.0	0.1484	0.2402	0.0000	0.0000
D	0.000	0.00	180.0	0.0	0.1484	0.2402	0.0000	0.0000

LOADING CONDITION M
 =====

122 mph wind with no ice. Wind Azimuth: 0

LOADS ON POLE
 =====

LOAD TYPE	ELEV	APPLY..RADIUS	LOAD..AT AZI	LOAD AZIFORCES.....	MOMENTS.....	
					HORIZ	DOWN	VERTICAL	TORSNAL

	ft		ft		131392.txt kip		ft-kip	ft-kip
C	144.000	0.00	0.0	0.0	0.0000	0.1348	0.0000	0.0000
C	144.000	0.00	0.0	0.0	4.4363	1.3676	0.0000	0.0000
C	134.000	0.00	0.0	0.0	0.0000	0.3763	0.0000	0.0000
C	134.000	0.00	0.0	0.0	3.7245	1.0319	0.0000	0.0000
C	124.000	0.00	0.0	0.0	0.0000	0.3482	0.0000	0.0000
C	124.000	0.00	0.0	0.0	3.6646	1.0319	0.0000	0.0000
C	114.000	0.00	0.0	0.0	0.0000	0.3940	0.0000	0.0000
C	114.000	0.00	0.0	0.0	4.9820	1.5202	0.0000	0.0000
C	104.000	0.00	0.0	0.0	0.0000	0.3594	0.0000	0.0000
C	104.000	0.00	0.0	0.0	4.8875	1.5202	0.0000	0.0000
D	149.000	0.00	180.0	0.0	0.0857	0.0431	0.0000	0.0000
D	133.000	0.00	180.0	0.0	0.0857	0.0431	0.0000	0.0000
D	133.000	0.00	180.0	0.0	0.1018	0.0525	0.0000	0.0000
D	117.000	0.00	180.0	0.0	0.1018	0.0525	0.0000	0.0000
D	117.000	0.00	180.0	0.0	0.1166	0.0619	0.0000	0.0000
D	101.000	0.00	180.0	0.0	0.1166	0.0619	0.0000	0.0000
D	101.000	0.00	180.0	0.0	0.1251	0.1512	0.0000	0.0000
D	97.000	0.00	180.0	0.0	0.1251	0.1512	0.0000	0.0000
D	97.000	0.00	180.0	0.0	0.1303	0.0902	0.0000	0.0000
D	82.417	0.00	180.0	0.0	0.1303	0.0902	0.0000	0.0000
D	82.417	0.00	180.0	0.0	0.1405	0.1010	0.0000	0.0000
D	67.833	0.00	180.0	0.0	0.1405	0.1010	0.0000	0.0000
D	67.833	0.00	180.0	0.0	0.1486	0.1117	0.0000	0.0000
D	53.250	0.00	180.0	0.0	0.1486	0.1117	0.0000	0.0000
D	53.250	0.00	180.0	0.0	0.1526	0.2600	0.0000	0.0000
D	47.500	0.00	180.0	0.0	0.1526	0.2600	0.0000	0.0000
D	47.500	0.00	180.0	0.0	0.1524	0.1487	0.0000	0.0000
D	35.625	0.00	180.0	0.0	0.1524	0.1487	0.0000	0.0000
D	35.625	0.00	180.0	0.0	0.1522	0.1591	0.0000	0.0000
D	23.750	0.00	180.0	0.0	0.1522	0.1591	0.0000	0.0000
D	23.750	0.00	180.0	0.0	0.1464	0.1696	0.0000	0.0000
D	11.875	0.00	180.0	0.0	0.1464	0.1696	0.0000	0.0000
D	11.875	0.00	180.0	0.0	0.1484	0.1801	0.0000	0.0000
D	0.000	0.00	180.0	0.0	0.1484	0.1801	0.0000	0.0000

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 150' Monopole / Sonic-TC04, FL

MAXIMUM POLE DEFORMATIONS CALCULATED(w.r.t. wind direction)

MAST ELEV ft	DEFLECTIONS (ft)			ROTATIONS (deg)		
	HORIZONTAL ALONG	ACROSS	DOWN	TILT ALONG	ACROSS	TWIST
149.0	13.30K	0.02I	1.62E	9.38K	0.01I	0.00N
133.0	10.76K	0.02I	1.20E	9.23K	0.01I	0.00N
117.0	8.32K	0.02I	0.82E	8.56K	0.01I	0.00N
101.0	6.12K	0.01I	0.52E	7.43K	0.01I	0.00N
97.0	5.62K	0.01I	0.45E	7.15K	0.01I	0.00N
82.4	3.97K	0.01I	0.26E	5.97K	0.01I	0.00N
67.8	2.62K	0.01I	0.14E	4.73K	0.01I	0.00N
53.2	1.58K	0.00I	0.06E	3.50K	0.01I	0.00N
47.5	1.25K	0.00I	0.04E	3.11K	0.01I	0.00N
35.6	0.69K	0.00I	0.02E	2.28K	0.01I	0.00N
23.7	0.30K	0.00I	0.01E	1.48K	0.00I	0.00N
11.9	0.07K	0.00I	0.00E	0.72K	0.00I	0.00N

0.0 0.00A 0.00A 0.00A 0.00A 0.00A 0.00A

MAXIMUM POLE FORCES CALCULATED(w.r.t. to wind direction)

MAST ELEV ft	TOTAL AXIAL kip	SHEAR.w.r.t.WIND.DIR ALONG kip	WIND.DIR ACROSS kip	MOMENT.w.r.t.WIND.DIR ALONG ft-kip	WIND.DIR ACROSS ft-kip	TORSION ft-kip
149.0	0.00 W	0.00 W	0.00 U	0.00 C	0.00 U	0.00 U
	4.79 F	9.52 Q	0.00 U	-66.65 C	-0.01 U	-0.01 B
133.0	4.79 L	9.52 R	0.00 L	-66.65 L	-0.01 L	-0.01 B
	7.74 L	14.79 R	0.00 L	-267.82 I	-0.04 B	-0.05 B
117.0	7.74 L	14.79 R	0.01 I	-267.82 I	-0.03 B	-0.05 B
	14.10 L	26.51 R	0.01 I	-616.25 E	-0.08 I	-0.13 B
101.0	14.12 C	26.59 N	-0.07 F	-616.33 D	0.17 K	-0.13 B
	14.92 C	27.09 N	-0.07 F	-728.93 E	-0.21 U	0.14 T
97.0	14.91 I	27.11 M	0.10 I	-728.86 E	-0.23 U	0.14 T
	16.65 I	29.00 M	0.10 I	-1157.71 K	-1.48 I	0.27 N
82.4	16.71 E	28.99 M	0.10 I	-1157.71 K	-1.48 I	0.27 N
	18.67 E	31.03 M	0.10 I	-1615.03 K	-2.98 I	0.42 N
67.8	18.67 E	31.03 M	0.10 I	-1615.02 K	-2.97 I	0.42 N
	20.83 E	33.19 M	0.10 I	-2101.16 K	-4.46 I	0.54 N
53.2	20.83 E	33.19 M	0.08 I	-2101.13 K	-4.49 I	0.54 N
	22.82 E	34.06 M	0.08 I	-2300.84 K	-4.95 I	0.58 N
47.5	22.82 E	34.07 M	0.11 I	-2300.80 K	-4.94 I	0.58 N
	25.17 E	35.87 M	0.11 I	-2728.09 K	-6.22 I	0.64 N
35.6	25.17 E	35.88 M	0.11 B	-2728.10 K	-6.21 I	0.64 N
	27.69 E	37.69 M	0.11 B	-3174.36 K	-7.42 I	0.68 N
23.7	27.69 E	37.68 M	0.11 B	-3174.36 K	-7.42 I	0.68 N
	30.38 E	39.42 M	0.11 B	-3638.50 K	-8.63 I	0.71 N
11.9	30.38 E	39.43 M	0.11 B	-3638.50 K	-8.63 I	0.71 N
	33.23 E	41.19 M	0.11 B	-4119.33 K	-9.88 I	0.71 N
base reaction	33.23 E	-41.19 M	-0.11 B	4119.33 K	9.88 I	-0.71 N

COMPLIANCE WITH 4.8.2 & 4.5.4

ELEV ft	AXIAL	BENDING	SHEAR + TORSIONAL	TOTAL	SATISFIED	D/t(w/t)	MAX ALLOWED
149.00	0.00W	0.00R	0.00W	0.00R	YES	9.52A	45.2
	0.00F	0.14C	0.02Q	0.15C	YES	12.28A	45.2
133.00	0.00L	0.14L	0.02R	0.15L	YES	12.28A	45.2
	0.01L	0.40I	0.02R	0.40I	YES	15.04A	45.2
117.00	0.01L	0.40I	0.02R	0.40I	YES	15.04A	45.2
	0.01L	0.69E	0.03R	0.70E	YES	17.79A	45.2

101.00	0.01C	0.54D	0.03N	0.55D	YES	13.88A	45.2
	0.01C	0.60E	0.03N	0.61E	YES	14.43A	45.2
97.00	0.01I	0.62E	0.03M	0.63E	YES	14.15A	45.2
	0.01I	0.78K	0.03M	0.78K	YES	16.16A	45.2
82.42	0.01E	0.78K	0.03M	0.78K	YES	16.16A	45.2
	0.01E	0.90K	0.02M	0.91K	YES	18.17A	45.2
67.83	0.01E	0.90K	0.02M	0.91K	YES	18.17A	45.2
	0.01E	0.99K	0.02M	1.00K	YES	20.18A	45.2
53.25	0.01E	0.79K	0.02M	0.79K	YES	16.52A	45.2
	0.01E	0.81K	0.02M	0.82K	YES	17.18A	45.2
47.50	0.01E	0.83K	0.02M	0.84K	YES	16.89A	45.2
	0.01E	0.87K	0.02M	0.88K	YES	18.26A	45.2
35.62	0.01E	0.87K	0.02M	0.88K	YES	18.26A	45.2
	0.01E	0.90K	0.02M	0.91K	YES	19.62A	45.2
23.75	0.01E	0.90K	0.02K	0.91K	YES	19.62A	45.2
	0.01E	0.93K	0.02K	0.94K	YES	20.98A	45.2
11.87	0.01E	0.93K	0.02K	0.94K	YES	20.98A	45.2
	0.01E	0.96K	0.02K	0.97K	YES	22.35A	45.2
0.00							

MAXIMUM LOADS ONTO FOUNDATION(w.r.t. wind direction)

DOWN	SHEAR.w.r.t.WIND.DIR	WIND.DIR	MOMENT.w.r.t.WIND.DIR	WIND.DIR	TORSION
kip	ALONG	ACROSS	ALONG	ACROSS	ft-kip
	kip	kip	ft-kip	ft-kip	
33.23	41.19	0.11	-4119.33	-9.88	0.71
E	M	B	K	I	N

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150' Monopole / Sonic-TC04, FL

 ***** Service Load Condition *****

* Only 1 condition(s) shown in full
 * Some concentrated wind loads may have been derived from full-scale wind tunnel testing

LOADING CONDITION A =====

60 mph wind with no ice. wind Azimuth: 0

LOADS ON POLE

LOAD ELEV APPLY..LOAD..AT LOADFORCES.....MOMENTS.....

131392.txt

TYPE	ft	RADIUS ft	AZI	AZI	HORIZ kip	DOWN kip	VERTICAL ft-kip	TORSNAL ft-kip
C	144.000	0.00	0.0	0.0	0.0000	0.1498	0.0000	0.0000
C	144.000	0.00	0.0	0.0	0.6000	1.5196	0.0000	0.0000
C	134.000	0.00	0.0	0.0	0.0000	0.4181	0.0000	0.0000
C	134.000	0.00	0.0	0.0	0.5038	1.1466	0.0000	0.0000
C	124.000	0.00	0.0	0.0	0.0000	0.3869	0.0000	0.0000
C	124.000	0.00	0.0	0.0	0.4957	1.1466	0.0000	0.0000
C	114.000	0.00	0.0	0.0	0.0000	0.4378	0.0000	0.0000
C	114.000	0.00	0.0	0.0	0.6738	1.6891	0.0000	0.0000
C	104.000	0.00	0.0	0.0	0.0000	0.3994	0.0000	0.0000
C	104.000	0.00	0.0	0.0	0.6611	1.6891	0.0000	0.0000
D	149.000	0.00	180.0	0.0	0.0116	0.0479	0.0000	0.0000
D	133.000	0.00	180.0	0.0	0.0116	0.0479	0.0000	0.0000
D	133.000	0.00	180.0	0.0	0.0138	0.0584	0.0000	0.0000
D	117.000	0.00	180.0	0.0	0.0138	0.0584	0.0000	0.0000
D	117.000	0.00	180.0	0.0	0.0158	0.0688	0.0000	0.0000
D	101.000	0.00	180.0	0.0	0.0158	0.0688	0.0000	0.0000
D	101.000	0.00	180.0	0.0	0.0169	0.1680	0.0000	0.0000
D	97.000	0.00	180.0	0.0	0.0169	0.1680	0.0000	0.0000
D	97.000	0.00	180.0	0.0	0.0176	0.1003	0.0000	0.0000
D	82.417	0.00	180.0	0.0	0.0176	0.1003	0.0000	0.0000
D	82.417	0.00	180.0	0.0	0.0190	0.1122	0.0000	0.0000
D	67.833	0.00	180.0	0.0	0.0190	0.1122	0.0000	0.0000
D	67.833	0.00	180.0	0.0	0.0201	0.1241	0.0000	0.0000
D	53.250	0.00	180.0	0.0	0.0201	0.1241	0.0000	0.0000
D	53.250	0.00	180.0	0.0	0.0206	0.2889	0.0000	0.0000
D	47.500	0.00	180.0	0.0	0.0206	0.2889	0.0000	0.0000
D	47.500	0.00	180.0	0.0	0.0206	0.1652	0.0000	0.0000
D	35.625	0.00	180.0	0.0	0.0206	0.1652	0.0000	0.0000
D	35.625	0.00	180.0	0.0	0.0206	0.1768	0.0000	0.0000
D	23.750	0.00	180.0	0.0	0.0206	0.1768	0.0000	0.0000
D	23.750	0.00	180.0	0.0	0.0198	0.1885	0.0000	0.0000
D	11.875	0.00	180.0	0.0	0.0198	0.1885	0.0000	0.0000
D	11.875	0.00	180.0	0.0	0.0201	0.2001	0.0000	0.0000
D	0.000	0.00	180.0	0.0	0.0201	0.2001	0.0000	0.0000

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MAXIMUM POLE DEFORMATIONS CALCULATED(w.r.t. wind direction)

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MAST ELEV ft	DEFLECTIONS (ft)			ROTATIONS (deg)		
	HORIZONTAL ALONG	ACROSS	DOWN	TILT ALONG	ACROSS	TWIST
149.0	1.84A	0.00K	0.03C	1.28A	0.00K	0.00F
133.0	1.49A	0.00K	0.02C	1.26A	0.00K	0.00F
117.0	1.15A	0.00K	0.02C	1.17A	0.00K	0.00F
101.0	0.84A	0.00K	0.01C	1.01A	0.00K	0.00F
97.0	0.77A	0.00K	0.01C	0.98A	0.00K	0.00F
82.4	0.54A	0.00K	0.01C	0.81A	0.00K	0.00F
67.8	0.36I	0.00K	0.00C	0.64A	0.00K	0.00F
53.2	0.21I	0.00K	0.00C	0.48I	0.00K	0.00F
47.5	0.17I	0.00K	0.00C	0.42I	0.00K	0.00F
35.6	0.09I	0.00K	0.00C	0.31I	0.00K	0.00F
23.7	0.04I	0.00K	0.00C	0.20I	0.00K	0.00F
11.9	0.01I	0.00K	0.00B	0.10I	0.00K	0.00F
0.0	0.00A	0.00A	0.00A	0.00A	0.00A	0.00A

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MAXIMUM POLE FORCES CALCULATED(w.r.t. to wind direction)

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MAST ELEV ft	TOTAL AXIAL kip	SHEAR.w.r.t.WIND.DIR		MOMENT.w.r.t.WIND.DIR		TORSION ft-kip
		ALONG kip	ACROSS kip	ALONG ft-kip	ACROSS ft-kip	
149.0						

131392.txt						
	0.00 K	0.00 H	0.00 L	0.00 H	0.00 I	0.00 L
133.0	4.00 K	1.29 I	0.00 L	-9.17 I	0.00 F	0.00 F
	4.00 C	1.29 L	0.00 C	-9.17 C	0.00 K	0.00 F
117.0	6.47 C	2.01 L	0.00 C	-36.77 D	0.00 L	0.00 F
	6.47 L	2.01 C	0.00 F	-36.77 H	0.00 L	0.00 F
101.0	11.78 L	3.59 C	0.00 F	-84.41 C	0.00 C	0.00 F
	11.78 L	3.59 B	-0.01 E	-84.43 L	-0.01 H	0.00 F
97.0	12.46 L	3.66 B	-0.01 E	-99.76 E	0.02 E	0.00 F
	12.46 L	3.67 A	-0.01 K	-99.76 C	0.03 E	0.00 F
82.4	13.92 L	3.93 A	-0.01 K	-158.13 A	0.17 K	0.00 F
	13.92 L	3.92 F	-0.01 K	-158.13 A	0.17 K	0.00 F
67.8	15.56 L	4.20 F	-0.01 K	-220.08 A	0.33 K	-0.01 F
	15.56 L	4.20 F	-0.01 K	-220.08 A	0.33 K	-0.01 F
53.2	17.37 L	4.49 F	-0.01 K	-285.79 A	0.49 K	-0.01 F
	17.37 L	4.50 A	-0.01 K	-285.79 A	0.49 K	-0.01 F
47.5	19.03 L	4.61 A	-0.01 K	-312.80 A	0.56 K	-0.01 F
	19.03 L	4.61 I	-0.01 K	-312.80 A	0.56 K	-0.01 F
35.6	20.99 L	4.86 I	-0.01 K	-370.54 A	0.70 K	-0.01 F
	20.99 L	4.86 B	-0.01 K	-370.53 A	0.70 K	-0.01 F
23.7	23.09 L	5.10 B	-0.01 K	-430.82 A	0.81 K	-0.01 F
	23.09 L	5.10 B	-0.01 K	-430.82 A	0.81 K	-0.01 F
11.9	25.33 L	5.34 B	-0.01 K	-493.56 I	0.93 K	-0.01 F
	25.33 L	5.34 B	-0.01 I	-493.56 I	0.93 K	-0.01 F
	27.70 L	5.58 B	-0.01 I	-558.64 I	1.03 K	-0.01 F
base reaction	27.70 L	-5.58 B	0.01 I	558.64 I	-1.03 K	0.01 F

COMPLIANCE WITH 4.8.2 & 4.5.4
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ELEV	AXIAL	BENDING	SHEAR + TORSIONAL	TOTAL SATISFIED	D/t(w/t)	MAX ALLOWED	
ft							
149.00	0.00K	0.00H	0.00H	0.00H	YES	9.52A	45.2
133.00	0.00K	0.02I	0.00I	0.02I	YES	12.28A	45.2
	0.00C	0.02C	0.00L	0.02C	YES	12.28A	45.2
117.00	0.00C	0.05D	0.00L	0.06D	YES	15.04A	45.2
	0.00L	0.05H	0.00C	0.06H	YES	15.04A	45.2
101.00	0.01L	0.09C	0.00C	0.10C	YES	17.79A	45.2
	0.01L	0.07L	0.00B	0.08L	YES	13.88A	45.2
97.00	0.01L	0.08E	0.00B	0.09E	YES	14.43A	45.2
	0.01L	0.08C	0.00A	0.09C	YES	14.15A	45.2
82.42	0.01L	0.11A	0.00A	0.11A	YES	16.16A	45.2
	0.01L	0.11A	0.00F	0.11A	YES	16.16A	45.2
67.83	0.01L	0.12A	0.00F	0.13A	YES	18.17A	45.2

	0.01L	0.12A	0.00F	0.13A	131392.txt YES	18.17A	45.2
53.25	0.01L	0.13A	0.00F	0.14A	YES	20.18A	45.2
	0.01L	0.11A	0.00A	0.11A	YES	16.52A	45.2
47.50	0.01L	0.11A	0.00A	0.12A	YES	17.18A	45.2
	0.01L	0.11A	0.00I	0.12A	YES	16.89A	45.2
35.62	0.01L	0.12A	0.00I	0.12A	YES	18.26A	45.2
	0.01L	0.12A	0.00B	0.12A	YES	18.26A	45.2
23.75	0.01L	0.12A	0.00B	0.13A	YES	19.62A	45.2
	0.01L	0.12A	0.00B	0.13A	YES	19.62A	45.2
11.87	0.01L	0.13I	0.00B	0.13I	YES	20.98A	45.2
	0.01L	0.13I	0.00B	0.13I	YES	20.98A	45.2
0.00	0.01L	0.13I	0.00B	0.14I	YES	22.35A	45.2

MAXIMUM LOADS ONTO FOUNDATION(w.r.t. wind direction)

DOWN	SHEAR.w.r.t.WIND.DIR	WIND.DIR	MOMENT.w.r.t.WIND.DIR	WIND.DIR	TORSION
kip	ALONG	ACROSS	ALONG	ACROSS	ft-kip
	kip	kip	ft-kip	ft-kip	
27.70	5.58	-0.01	-558.64	1.03	-0.01
L	B	I	I	K	F

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Round Base Plate and Anchor Rods, per ANSI/TIA 222-G

Pole Data

Diameter: 51.280 in (flat to flat)
Thickness: 0.375 in
Yield (Fy): 65 ksi
of Sides: 18 "0" IF Round
Strength (Fu): 80 ksi

Reactions

Moment, Mu: 4119.33 ft-kips
Axial, Pu: 33.23 kips
Shear, Vu: 41.18 kips

Anchor Rod Data

Quantity: 14
Diameter: 2.25 in
Rod Material: A615
Strength (Fu): 100 ksi
Yield (Fy): 75 ksi
BC Diam. (in): 58 BC Override:

Anchor Rod Results

Maximum Rod (Pu+ Vu/η): 251.8 Kips
Allowable $\Phi \cdot R_{nt}$: 260.0 Kips (per 4.9.9)
Anchor Rod Interaction Ratio: **96.8% Pass**

Plate Data

Diameter (in): 63.75 Dia. Override:
Thickness: 2.25 in
Yield (Fy): 50 ksi
Eff Width/Rod: 11.63 in
Drain Hole: 2.625 in. diameter
Drain Location: 23.5 in. center of pole to center of drain hole
Center Hole: 39 in. diameter

Base Plate Results

Base Plate (Mu/Z): 36.8 ksi
Allowable $\Phi \cdot F_y$: 45.0 ksi (per AISC)
Base Plate Interaction Ratio: **81.8% Pass**