Bolt	Three Bolt	ZFS	31.00	5.38	180.0	90.0	5.00	0.00	-	3.00	-	-	5	0	5
Bolt	Three Bolt	EXT	29.10	5.52	180.0	90.0	5.00	0.00	-	3.00	-	-	5	0	5
Bolt	Three Bolt	TWT	28.20	5.58	180.0	90.0	5.00	0.00	-	3.00	-	-	5	0	5
Bolt	Three Bolt	COX	27.20	5.65	180.0	90.0	5.00	0.00	-	3.00	-	-	5	0	5
Bolt	Three Bolt	CTL	26.20	5.73	180.0	90.0	5.00	0.00	-	3.00	-	-	5	0	5
Bolt	Three Bolt	CTL	25.00	5.82	180.0	90.0	5.00	0.00	-	3.00	-	-	5	0	5
											Totals:	0	615	3,973	4,588

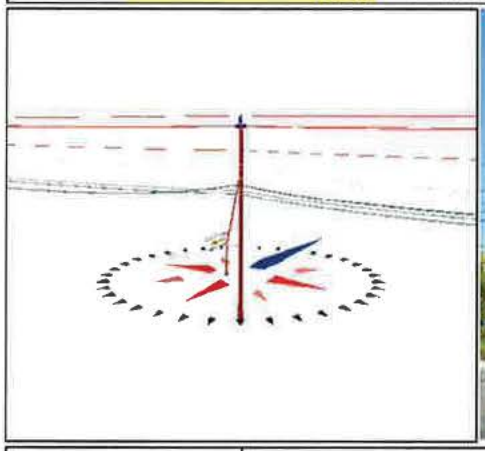
Pole Buckling

Buckling	Buckling (ft)	Buckling Section (% Buckling Col. Hgt.)	Buckling (in)	Min. Buckling (in)	Diameter (in)	Diameter (in)	Modulus of (psi)	Pole (pcf)	Ice Density (pcf)	Pole Tip (ft)	Buckling Load (lbs)	Buckling Load (lbs)	Buckling Load
2.00	27.10	33.88	13.94	23.15	8.60	15.29	1,000,000	50.00	57.00	45.80	28,108	5,259	5.34

O-Calc® Pro *Analysis Report*

Wednesday, October 01, 2014 2:36:16 PM

File Name:	P82149 GRADE B	Pole Length / Class:	55 / 1	Code:	NESC	Structure Type:	Guyed
Pole Num:	P82149	Pole Species:	WESTERN RED CEDAR	NESC Rule:	Rule 250B	Status:	N/A
Aux Data	Warm Springs & Amigo	Setting Depth (ft):	12.60	Construction Grade:	B	Pole Strength Factor:	0.65
Aux Data	Cox	G/L Circumference (in):	45.00	Loading District:	Light	Transverse Wind LF:	2.50
Aux Data	Unset	G/L Fiber Stress (psi):	6,000	Ice Thickness (in):	0.00	Wire Tension LF:	1.65
Aux Data	Unset	Allowable Stress (psi):	3,900	Wind Speed (mph):	59.29	Vertical LF:	1.50
Aux Data	Unset	Fiber Stress Ht. Reduction:	No	Wind Pressure (psf):	9.00		



Pole Capacity Utilization		Height	Wind Angle
Maximum:	167.9%	0.0 ft	176.9°
Groundline:	167.9%	0.0 ft	176.9°
Vertical:	7.7%	27.6 ft	90.0°

Pole Moments		Load Angle	Wind Angle
Max Capac. Util:	155,502 ft-lb	167.1°	176.9°
Groundline:	155,502 ft-lb	167.1°	176.9°

Guy Summary		Guy Tensions		Maximum Guy Tensions	
	Attach Height (ft)	% Allowable Tension	Wind Angle	% Allowable Tension	Wind Angle
Guy 1	27.7	136.4%	176.9°	145.5%	150.0°

Anchor Summary		
	Lead Length (ft)	Max. % Allow. Capacity
Anchor 1	4.2	43.5%

GROUNDLINE LOAD SUMMARY:*Wind at 176.9°, Applied Moment 155,502 ft-lb at 167.1°, Allowable Moment 93,772 ft-lb

	Shear Load (lbs)*	Percent Applied Load	Bending Moment (ft-lb)	Percent of Applied Moment**	Percent of Pole Capacity	Bending Stress (+/- psi)	Vertical Load (lbs)	Vertical Stress (psi)	Total Stress (psi)	Percent of Pole Capacity
Powers:	2,672	50.2	94,324	-101.3	-168.0	3,923	1,172	7	3,930	100.8
Comms:	1,905	35.8	47,646	14.2	23.6	1,982	904	6	1,987	51.0
Guys/Braces:	-249	-4.7	-8,014	-5.2	-8.5	-333	8,083	50	-283	-7.3
Pole:	898	16.8	17,444	11.2	18.6	726	2,325	14	740	19.0
Risers:	9	0.2	109	0.1	0.1	5	73	0	5	0.1
Insulators:	93	1.8	3,990	0.8	1.3	166	304	2	168	4.3

Version: 4.2 / 4.06
* includes Load Factor(s)

² Worst Wind per Guy Wire
³ Wind at 176.9°

Pole Load:	5,328	100.0	155,502	100.0	165.8	6,467	12,862	80	6,547	167.9
Pole Reserve Capacity:			-61,730		-65.8	-2,567			-2,647	-67.9

LOAD SUMMARY BY OWNER

NVE:	1,328	55,789	2,320	1,012	6	2,327	59.7
ZFS:	482	15,402	641	273	2	642	16.5
EXT:	443	11,705	487	8,140	51	537	13.8
TWT:	264	7,391	307	114	1	308	7.9
COX:	684	18,110	753	497	3	756	19.4
CTL:	1,230	29,661	1,234	502	3	1,237	31.7
Pole:	898	17,444	726	2,325	14	740	19.0
Totals	5,328	155,502	6,467	12,862	80	6,547	167.9

Detailed Load Components

Power:		Owner	Height (ft)	Horiz. Offset (in)	Cable Dia. (in)	Rotate Angle (deg)	Cable Weight (lbs/ft)	Lead/Span Length	Span Angle (deg)	Wire Length (ft)	Tension (lbs)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Primary	AAC 954.0 KCM 61 STRAND	NVE	44.51	4.30	1.1260	-	0.895	205.0	270.0	205.0	10,140	-167,009	48	9,384	-157,576
Primary	AAC 954.0 KCM 61 STRAND	NVE	44.51	4.30	1.1260	-	0.895	152.0	90.0	152.0	10,140	167,009	36	6,958	174,002
Primary	AAC 954.0 KCM 61 STRAND	NVE	41.80	29.72	1.1260	-	0.895	205.0	270.0	205.0	10,140	-156,835	332	8,813	-147,690
Primary	AAC 954.0 KCM 61 STRAND	NVE	41.80	29.72	1.1260	-	0.895	152.0	90.0	152.0	10,140	156,835	246	6,534	163,615
Primary	AAC 954.0 KCM 61 STRAND	NVE	41.80	29.72	1.1260	-	0.895	152.0	90.0	152.0	10,140	156,835	-246	6,534	163,123
Primary	AAC 954.0 KCM 61 STRAND	NVE	41.80	29.72	1.1260	-	0.895	205.0	270.0	205.0	10,140	-156,835	-332	8,813	-148,354
Neutral	AAC 2/0 AWG 7 STRAND ASTER	NVE	35.20	16.36	0.4140	-	0.125	152.0	90.0	152.0	1,506	19,603	-19	2,022	21,606
Neutral	AAC 2/0 AWG 7 STRAND ASTER	NVE	35.20	16.36	0.4140	-	0.125	205.0	270.0	205.0	1,506	-19,603	-26	2,727	-16,902
Other	144ct X 2, 72ct 5/16" MESS	ZFS	31.60	7.65	1.4800	-	0.990	152.0	90.0	152.4	1,500	17,519	70	6,485	24,075
Other	144ct X 2, 72ct 5/16" MESS	ZFS	31.60	7.65	1.4800	-	0.990	205.0	270.0	205.1	1,500	-17,519	95	8,747	-8,678
Other	144ct 1/4" MESS	EXT	28.50	5.39	0.9900	-	0.431	152.0	90.0	152.1	1,500	15,801	5	3,913	19,718
Other	72ct, 24ct 5/16" MESS	TWT	27.75	7.95	0.8900	-	0.526	152.0	90.0	152.1	1,500	15,385	39	3,425	18,849
Other	72ct 1/4" MESS	TWT	27.75	7.95	0.7500	-	0.300	205.0	270.0	205.0	1,500	-15,385	30	3,892	-11,463
											Totals:	15,801	277	78,247	94,324

Comm:		Owner	Height (ft)	Horiz. Offset (in)	Cable Dia. (in)	Rotate Angle (deg)	Cable Weight (lbs/ft)	Lead/Span Length	Span Angle (deg)	Wire Length (ft)	Tension (lbs)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
CATV	.50"cx, 288ct, 24ct X 6 1/4" MESS	COX	26.00	8.09	2.1000	-	1.830	152.0	90.0	152.3	1,500	14,415	137	7,572	22,123
CATV	.50"cx, 288ct, 24ct X 6 1/4" MESS	COX	26.00	8.09	2.1000	-	1.830	205.0	270.0	205.7	1,500	-14,415	185	10,212	-4,018
Telco	1.25" 1/4"MESS	CTL	24.50	8.21	1.5000	-	0.727	152.0	90.0	152.2	1,500	13,583	55	5,096	18,735
Telco	1.25" 1/4"MESS	CTL	24.50	8.21	1.5000	-	0.727	205.0	270.0	205.0	1,500	-13,583	75	6,873	-6,635
Telco	2" 1/4"MESS	CTL	23.60	8.28	2.2500	-	0.821	152.0	90.0	152.3	1,500	13,084	63	7,363	20,511
Telco	2" 1/4"MESS	CTL	23.60	8.28	2.2500	-	0.821	205.0	270.0	205.0	1,500	-13,084	85	9,931	-3,068
											Totals:	0	600	47,047	47,646

Riser:		Owner	Height (ft)	Horiz. Offset (in)	Offset Angle (deg)	Rotate Angle (deg)	Unit Weight (lbs)	Unit Height (in)	Unit Depth (in)	Unit Diameter (in)	Unit Length (in)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
3" Riser 0.0°	3" Riser	CTL	24.20	7.74	0.0	0.0	4.03	290.40	-	0.00	-	-	-28	138	109
											Totals:	0	-28	138	109

Version: 4.2 / 4.06
* includes Load Factor(s)

² Worst Wind per Guy Wire
³ Wind at 176.9°

Insulator:		Owner	Height (ft)	Horiz. Offset (in)	Offset Angle (deg)	Rotate Angle (deg)	Unit Weight (lbs)	Unit Height (in)	Unit Depth (in)	Unit Diameter (in)	Unit Length (in)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Post	Post Insulator - 69 kV	NVE	42.40	4.30	180.0	180.0	54.00	25.38	-	7.25	-	-	28	1,231	1,259
Post	Post Insulator - 69 kV	NVE	41.80	4.34	180.0	180.0	54.00	25.38	-	7.25	-	-	196	1,214	1,409
Post	Post Insulator - 69 kV	NVE	41.80	4.34	0.0	0.0	54.00	25.38	-	7.25	-	-	-196	1,214	1,018
Post	Post Insulator - 15 kV	NVE	35.20	4.86	0.0	0.0	11.00	11.50	-	4.75	-	-	-22	300	278
Bolt	Three Bolt	ZFS	31.60	5.15	180.0	90.0	5.00	0.00	-	3.00	-	-	5	0	5
Deadend	Three Bolt	EXT	28.50	5.39	90.0	90.0	5.00	0.00	-	3.00	-	-	1	0	1
Bolt	Three Bolt	TWT	27.75	5.45	180.0	90.0	5.00	0.00	-	3.00	-	-	5	0	5
Bolt	Three Bolt	COX	26.00	5.59	180.0	90.0	5.00	0.00	-	3.00	-	-	5	0	5
Bolt	Three Bolt	CTL	24.50	5.71	180.0	90.0	5.00	0.00	-	3.00	-	-	5	0	5
Bolt	Three Bolt	CTL	23.60	5.78	180.0	90.0	5.00	0.00	-	3.00	-	-	5	0	5
											Totals:	0	32	3,959	3,990

Guy Wire and Brace:		Owner	Attach Height (ft)	End Height (ft)	Lead/Span Length (ft)	Wire Dia. (in)	Percent Solid (%)	Lead Angle (deg)	Incline Angle (deg)	Wire Weight (lbs/ft)	Rest Length (ft)	Stretch Length (in)
Guy 1: EHS 1/4	Sidewalk	EXT	27.70	0.00	4.17	0.250	75.0	270.0	81.4	0.121	26.51	3.07

Guy Wire and Brace (Loads and Reactions)		Elastic Modulus (psi)	Rated Tensile Strength (lbs)	Guy Strength Factor	Allowable Tension (lbs)	Initial Tension (lbs)	Required Tension² (lbs)	Required Tension³ (lbs)	Applied Tension³ (lbs)	Vertical Load³ (lbs)	Shear Load in Guy Dir³ (lbs)	Shear Load at Report Angle³ (lbs)	Moment at GL³ (ft-lb)*
Guy 1: EHS 1/4	Sidewalk	23,000,000	6,650	0.90	5,985	700	8,707	8,163	8,163	8,072	1,215	-272	-8,014
									Totals:	8,072	1,215	-272	-8,014

Anchor/Rod Load Summary:	Owner	Rod Length AGL (in)	Lead Length (ft)	Lead Angle (deg)	Strength of Assembly (lbs)	Anchor/Rod Strength Factor	Allowable Load (lbs)	Max Load² (lbs)	Load at Pole MCU² (lbs)	Max Required Capacity² (%)
Single Helix Anchor	EXT	18.00	4.17	270.0	20,000	1.00	20,000	8,707	8,163	43.5

Pole Buckling

Buckling [illegible]	Buckling [illegible] (ft)	Buckling Section Height (% Buckling Col. Hgt.)	Buckling [illegible] (in)	Min. Buckling [illegible] (in)	Diameter at Tip (in)	Diameter at Ch (in)	Modulus of Elasticity (psi)	Pole Density (pcf)	Ice Density (pcf)	Pole Tip Height (ft)	Buckling Load [illegible] (lbs)	Buckling Load [illegible] (lbs)	Buckling Load Factor of Safety
0.71	27.55	33.90	13.06	21.31	8.60	14.33	1,000,000	50.00	57.00	42.40	167,706	12,862	13.04

Version: 4.2 / 4.06
* includes Load Factor(s)

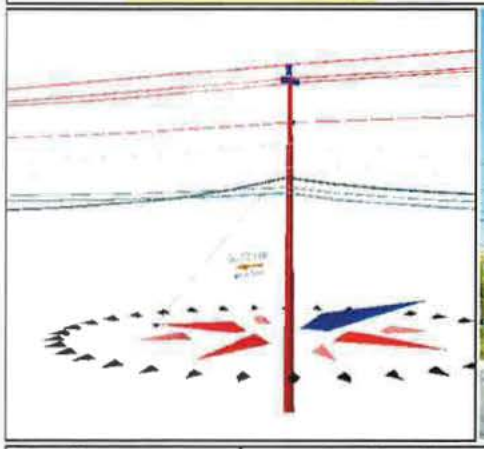
² Worst Wind per Guy Wire
³ Wind at 176.9°

Reused

O-Calc® Pro *Analysis Report*

Friday, October 24, 2014 8:33:10 AM

File Name:	P82149 GRADE B	Pole Length / Class:	55 / 1	Code:	NESC	Structure Type:	Guyed
Pole Num:	P82149	Pole Species:	WESTERN RED CEDAR	NESC Rule:	Rule 250B	Status:	N/A
Aux Data	Warm Springs & Amigo	Setting Depth (ft):	12.60	Construction Grade:	B	Pole Strength Factor:	0.65
Aux Data	Cox	G/L Circumference (in):	54.00	Loading District:	Light	Transverse Wind LF:	2.50
Aux Data	Unset	G/L Fiber Stress (psi):	6,000	Ice Thickness (in):	0.00	Wire Tension LF:	1.65
Aux Data	Unset	Allowable Stress (psi):	3,900	Wind Speed (mph):	59.29	Vertical LF:	1.50
Aux Data	Unset	Fiber Stress Ht. Reduction:	No	Wind Pressure (psf):	9.00		



Pole Capacity Utilization		Height	Wind Angle
Maximum:	95.7%	0.0 ft	178.4°
Groundline:	95.7%	0.0 ft	178.4°
Vertical:	2.4%	26.8 ft	90.0°

Pole Moments		Load Angle	Wind Angle
Max Capac. Util:	153,549 ft-lb	176.4°	178.4°
Groundline:	153,549 ft-lb	176.4°	178.4°

Guy Summary		Guy Tensions		Maximum Guy Tensions	
	Attach Height (ft)	% Allowable Tension	Wind Angle	% Allowable Tension	Wind Angle
Guy 1	28.5	54.2%	178.4°	65.2%	90.0°

Anchor Summary		
	Lead Length (ft)	Max. % Allow. Capacity
Anchor 1	25.0	19.5%

GROUNDLINE LOAD SUMMARY:*Wind at 178.4°, Applied Moment 153,549 ft-lb at 176.4°, Allowable Moment 162,037 ft-lb

	Shear Load (lbs)*	Percent Applied Load	Bending Moment (ft-lb)	Percent of Applied Moment**	Percent of Pole Capacity	Bending Stress (+/- psi)	Vertical Load (lbs)	Vertical Stress (psi)	Total Stress (psi)	Percent of Pole Capacity
Powers:	2,329	44.1	84,979	-24.6	-23.3	2,045	1,172	5	2,050	52.6
Comms:	1,953	37.0	48,844	7.8	7.4	1,176	904	4	1,179	30.2
Guys/Braces:	-126	-2.4	-3,656	-2.4	-2.3	-88	2,461	11	-77	-2.0
Pole:	1,024	19.4	19,300	12.6	11.9	465	2,989	13	477	12.2
Risers:	4	0.1	35	0.0	0.0	1	73	0	1	0.0
Insulators:	95	1.8	4,047	0.8	0.8	97	304	1	99	2.5

Version: 4.2 / 4.08
* includes Load Factor(s)

² Worst Wind per Guy Wire
³ Wind at 178.4°

Pole Load:	5,279	100.0	153,549	100.0	94.8	3,696	7,904	34	3,730	95.6
Pole Reserve Capacity:			8,488		5.2	204			170	4.4

LOAD SUMMARY BY OWNER

NVE:	1,361	57,148	1,375	1,012	4	1,380	35.4
ZFS:	494	15,789	380	273	1	381	9.8
EXT:	172	4,842	117	2,517	11	127	3.3
TWT:	270	7,576	182	114	0	183	4.7
COX:	701	18,565	447	497	2	449	11.5
CTL:	1,256	30,329	730	502	2	732	18.8
Pole:	1,024	19,300	465	2,989	13	477	12.2
Totals	5,279	153,549	3,696	7,904	34	3,730	95.6

Detailed Load Components

Power:		Owner	Height (ft)	Horiz. Offset (in)	Cable Dia. (in)	Rotate Angle (deg)	Cable Weight (lbs/ft)	Lead/Span Length	Span Angle (deg)	Wire Length (ft)	Tension (lbs)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Primary	AAC 954.0 KCM 61 STRAND	NVE	44.51	4.30	1.1260	-	0.895	205.0	270.0	205.0	10,140	-47,405	49	9,620	-37,736
Primary	AAC 954.0 KCM 61 STRAND	NVE	44.51	4.30	1.1260	-	0.895	152.0	90.0	152.0	10,140	47,405	36	7,133	54,575
Primary	AAC 954.0 KCM 61 STRAND	NVE	41.80	29.72	1.1260	-	0.895	205.0	270.0	205.0	10,140	-44,517	340	9,034	-35,143
Primary	AAC 954.0 KCM 61 STRAND	NVE	41.80	29.72	1.1260	-	0.895	152.0	90.0	152.0	10,140	44,517	252	6,698	51,468
Primary	AAC 954.0 KCM 61 STRAND	NVE	41.80	29.72	1.1260	-	0.895	152.0	90.0	152.0	10,140	44,517	-252	6,698	50,964
Primary	AAC 954.0 KCM 61 STRAND	NVE	41.80	29.72	1.1260	-	0.895	205.0	270.0	205.0	10,140	-44,517	-340	9,034	-35,823
Neutral	AAC 2/0 AWG 7 STRAND ASTER	NVE	35.20	16.36	0.4140	-	0.125	152.0	90.0	152.0	1,506	5,564	-19	2,073	7,618
Neutral	AAC 2/0 AWG 7 STRAND ASTER	NVE	35.20	16.36	0.4140	-	0.125	205.0	270.0	205.0	1,506	-5,564	-26	2,795	-2,795
Other	144ct X 2, 72ct 5/16" MESS	ZFS	31.60	7.65	1.4800	-	0.990	152.0	90.0	152.4	1,500	4,973	72	6,648	11,693
Other	144ct X 2, 72ct 5/16" MESS	ZFS	31.60	7.65	1.4800	-	0.990	205.0	270.0	205.1	1,500	-4,973	97	8,967	4,091
Other	144ct 1/4" MESS	EXT	28.50	5.39	0.9900	-	0.431	152.0	90.0	152.1	1,500	4,485	1	4,011	8,498
Other	72ct, 24ct 5/16" MESS	TWT	27.75	7.95	0.8900	-	0.526	152.0	90.0	152.1	1,500	4,367	40	3,511	7,918
Other	72ct 1/4" MESS	TWT	27.75	7.95	0.7500	-	0.300	205.0	270.0	205.0	1,500	-4,367	31	3,990	-346
											Totals:	4,485	280	80,214	84,979

Comm:		Owner	Height (ft)	Horiz. Offset (in)	Cable Dia. (in)	Rotate Angle (deg)	Cable Weight (lbs/ft)	Lead/Span Length	Span Angle (deg)	Wire Length (ft)	Tension (lbs)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
CATV	.50"cx, 288ct, 24ct X 6 1/4" MESS	COX	26.00	8.09	2.1000	-	1.830	152.0	90.0	152.3	1,500	4,092	140	7,762	11,994
CATV	.50"cx, 288ct, 24ct X 6 1/4" MESS	COX	26.00	8.09	2.1000	-	1.830	205.0	270.0	205.7	1,500	-4,092	189	10,468	6,566
Telco	1.25" 1/4"MESS	CTL	24.50	8.21	1.5000	-	0.727	152.0	90.0	152.2	1,500	3,856	57	5,224	9,136
Telco	1.25" 1/4"MESS	CTL	24.50	8.21	1.5000	-	0.727	205.0	270.0	205.0	1,500	-3,856	76	7,046	3,267
Telco	2" 1/4"MESS	CTL	23.60	8.28	2.2500	-	0.821	152.0	90.0	152.3	1,500	3,714	64	7,549	11,327
Telco	2" 1/4"MESS	CTL	23.60	8.28	2.2500	-	0.821	205.0	270.0	205.0	1,500	-3,714	87	10,181	6,554
											Totals:	0	614	48,230	48,844

Riser:		Owner	Height (ft)	Horiz. Offset (in)	Offset Angle (deg)	Rotate Angle (deg)	Unit Weight (lbs)	Unit Height (in)	Unit Depth (in)	Unit Diameter (in)	Unit Length (in)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
3" Riser 0,0°	3" Riser	CTL	24.20	9.47	0.0	0.0	4.03	290.40	-	0.00	-	-	-35	70	35
											Totals:	0	-35	70	35

Insulator:		Owner	Height (ft)	Horiz. Offset (in)	Offset Angle (deg)	Rotate Angle (deg)	Unit Weight (lbs)	Unit Height (in)	Unit Depth (in)	Unit Diameter (in)	Unit Length (in)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Post	Post Insulator - 69 kV	NVE	42.40	4.30	180.0	180.0	54.00	25.38	-	7.25	-	-	29	1,248	1,277
Post	Post Insulator - 69 kV	NVE	41.80	4.34	180.0	180.0	54.00	25.38	-	7.25	-	-	200	1,231	1,431
Post	Post Insulator - 69 kV	NVE	41.80	4.34	0.0	0.0	54.00	25.38	-	7.25	-	-	-200	1,231	1,031
Post	Post Insulator - 15 kV	NVE	35.20	4.86	0.0	0.0	11.00	11.50	-	4.75	-	-	-22	304	282
Bolt	Three Bolt	ZFS	31.60	5.15	180.0	90.0	5.00	0.00	-	3.00	-	-	5	0	5
Deadend	Three Bolt	EXT	28.50	5.39	90.0	90.0	5.00	0.00	-	3.00	-	-	0	0	0
Bolt	Three Bolt	TWT	27.75	5.45	180.0	90.0	5.00	0.00	-	3.00	-	-	5	0	5
Bolt	Three Bolt	COX	26.00	5.59	180.0	90.0	5.00	0.00	-	3.00	-	-	5	0	5
Bolt	Three Bolt	CTL	24.50	5.71	180.0	90.0	5.00	0.00	-	3.00	-	-	5	0	5
Bolt	Three Bolt	CTL	23.60	5.78	180.0	90.0	5.00	0.00	-	3.00	-	-	5	0	5
											Totals:	0	32	4,015	4,047

Guy Wire and Brace:		Owner	Attach Height (ft)	End Height (ft)	Lead/Span Length (ft)	Wire Dia. (in)	Percent Solid (%)	Lead Angle (deg)	Incline Angle (deg)	Wire Weight (lbs/ft)	Rest Length (ft)	Stretch Length (in)
Guy 1: EHS 1/4	Down	EXT	28.50	0.00	25.00	0.250	75.0	270.0	48.7	0.121	36.41	1.67

Guy Wire and Brace (Loads and Reactions)		Elastic Modulus (psi)	Rated Tensile Strength (lbs)	Guy Strength Factor	Allowable Tension (lbs)	Initial Tension (lbs)	Required Tension³ (lbs)	Required Tension³ (lbs)	Applied Tension³ (lbs)	Vertical Load³ (lbs)	Shear Load in Guy Dir³ (lbs)	Shear Load at Report Angle³ (lbs)	Moment at GL³ (ft-lb)*
Guy 1: EHS 1/4	Down	23,000,000	6,650	0.90	5,985	700	3,904	3,242	3,242	2,437	2,138	-136	-3,656
									Totals:	2,437	2,138	-136	-3,656

Anchor/Rod Load Summary:	Owner	Rod Length AGL (in)	Lead Length (ft)	Lead Angle (deg)	Strength of Assembly (lbs)	Anchor/Rod Strength Factor	Allowable Load (lbs)	Max Load² (lbs)	Load at Pole MCU³ (lbs)	Max Required Capacity² (%)
Single Helix Anchor	EXT	18.00	25.00	270.0	20,000	1.00	20,000	3,904	3,242	19.5

Pole Buckling

Buckling	Buckling (ft)	Buckling Section (% Buckling Col. Hgt.)	Buckling (in)	Min. Buckling (in)	Diameter (in)	Diameter (in)	Modulus of (psi)	Pole (pcf)	Ice Density (pcf)	Pole Tip (ft)	Buckling Load (lbs)	Buckling Load (lbs)	Buckling Load
0.71	26.77	34.74	15.30	16.61	8.60	17.20	1,000,000	50.00	57.00	42.40	334,749	7,904	42.35

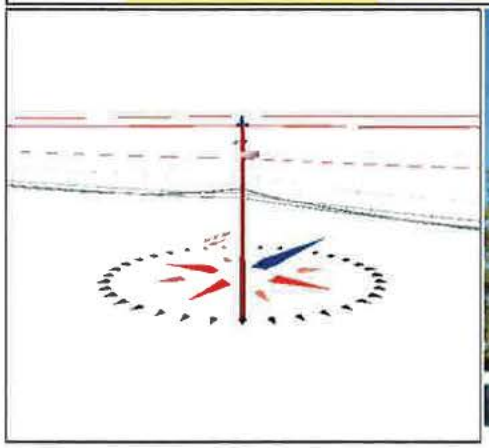
Version: 4.2 / 4.06
* includes Load Factor(s)

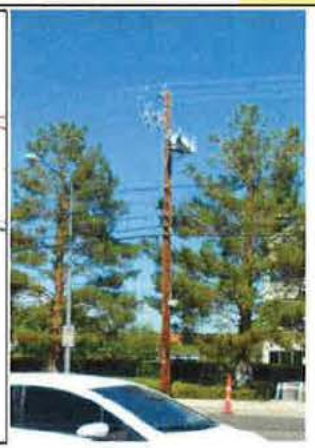
² Worst Wind per Guy Wire
³ Wind at 178.4°

O-Calc® Pro *Analysis Report*

Wednesday, October 01, 2014 2:31:51 PM

File Name:	**P82147 GRADE B**	Pole Length / Class:	**55 / 1**	Code:	**NESC**	Structure Type:	**Unguyed**
Pole Num:	**P82147**	Pole Species:	**WESTERN RED CEDAR**	NESC Rule:	**Rule 250B**	Status:	**N/A**
Aux Data	**Warm Springs & Amigo**	Setting Depth (ft):	**12.80**	Construction Grade:	**B**	Pole Strength Factor:	**0.65**
Aux Data	**Cox**	G/L Circumference (in):	**51.00**	Loading District:	**Light**	Transverse Wind LF:	**2.50**
Aux Data	**Unset**	G/L Fiber Stress (psi):	**6,000**	Ice Thickness (in):	**0.00**	Wire Tension LF:	**1.10**
Aux Data	**Unset**	Allowable Stress (psi):	**3,900**	Wind Speed (mph):	**59.29**	Vertical LF:	**1.50**
Aux Data	**Unset**	Fiber Stress Ht. Reduction:	**No**	Wind Pressure (psf):	**9.00**		





Pole Capacity Utilization		Height	Wind Angle
Maximum:	**116.2%**	0.0 ft	180.0°
Groundline:	**116.2%**	0.0 ft	180.0°
Vertical:	**23.6%**	28.5 ft	180.0°

Pole Moments		Load Angle	Wind Angle
Max Capac. Util:	**157,385 ft-lb**	178.7°	180.0°
Groundline:	**157,385 ft-lb**	178.7°	180.0°

GROUNDLINE LOAD SUMMARY:*Wind at 180.0°, Applied Moment 157,385 ft-lb at 178.7°, Allowable Moment 136,504 ft-lb

	Shear Load (lbs)*	Percent Applied Load	Bending Moment (ft-lb)	Percent of Applied Moment**	Percent of Pole Capacity	Bending Stress (+/- psi)	Vertical Load (lbs)	Vertical Stress (psi)	Total Stress (psi)	Percent of Pole Capacity
Powers:	2,160	39.5	**79,325**	-2.0	**-2.3**	**2,266**	1,197	6	**2,272**	**58.3**
Comms:	2,073	37.9	**49,729**	7.1	**8.2**	**1,421**	958	5	**1,425**	**36.5**
Power Equipment:	135	2.5	**4,699**	3.0	**3.4**	**134**	1,650	8	**142**	**3.6**
Pole:	982	17.9	**18,595**	11.8	**13.6**	**531**	2,744	13	**545**	**14.0**
Crossarms:	4	0.1	**147**	0.1	**0.1**	**4**	60	0	**4**	**0.1**
Insulators:	117	2.1	**4,890**	0.8	**0.9**	**140**	310	2	**141**	**3.6**
Pole Load:	5,471	100.0	**157,385**	100.0	**115.3**	**4,497**	6,919	33	**4,530**	**116.2**
Pole Reserve Capacity:			**-20,882**		**-15.3**	**-597**			**-630**	**-16.2**

LOAD SUMMARY BY OWNER

NVE:	1,600	**65,759**	**1,879**	2,779	13	**1,892**	**48.5**
ZFS:	524	**15,241**	**435**	288	1	**437**	**11.2**
TWT:	293	**8,046**	**230**	127	1	**230**	**5.9**

Version: 4.2 / 4.06
* includes Load Factor(s)

² Worst Wind per Guy Wire
³ Wind at 180.0°

COX:	744	18,892	540	526	3	542	13.9
CTL:	1,329	30,853	881	454	2	884	22.7
Pole:	982	18,595	531	2,744	13	545	14.0
Totals	5,471	157,385	4,497	6,919	33	4,530	116.2

Detailed Load Components

Power:		Owner	Height (ft)	Horiz. Offset (in)	Cable Dia. (in)	Rotate Angle (deg)	Cable Weight (lbs/ft)	Lead/Span Length	Span Angle (deg)	Wire Length (ft)	Tension (lbs)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Primary	AAC 954.0 KCM 61 STRAND	NVE	44.31	4.30	1.1260	-	0.895	173.0	270.0	173.0	10,140	-11,311	42	8,099	-3,170
Primary	AAC 954.0 KCM 61 STRAND	NVE	44.31	4.30	1.1260	-	0.895	205.0	90.0	205.0	10,140	11,311	49	9,597	20,958
Primary	AAC 954.0 KCM 61 STRAND	NVE	41.90	29.70	1.1260	-	0.895	173.0	270.0	173.0	10,140	-10,696	287	7,658	-2,750
Primary	AAC 954.0 KCM 61 STRAND	NVE	41.90	29.70	1.1260	-	0.895	205.0	90.0	205.0	10,140	10,696	340	9,075	20,111
Primary	AAC 954.0 KCM 61 STRAND	NVE	41.90	29.70	1.1260	-	0.895	205.0	90.0	205.0	10,140	10,696	-340	9,075	19,430
Primary	AAC 954.0 KCM 61 STRAND	NVE	41.90	29.70	1.1260	-	0.895	173.0	270.0	173.0	10,140	-10,696	-287	7,658	-3,324
Neutral	AAC 2/0 AWG 7 STRAND ASTER	NVE	33.00	16.63	0.4140	-	0.125	205.0	90.0	205.0	1,506	1,250	-27	2,626	3,850
Neutral	AAC 2/0 AWG 7 STRAND ASTER	NVE	33.00	16.63	0.4140	-	0.125	173.0	270.0	173.0	1,506	-1,250	-22	2,216	944
Other	144ct X 2, 72ct 5/16" MESS	ZFS	28.70	8.02	1.4800	-	0.990	205.0	90.0	205.3	1,500	1,083	102	8,161	9,345
Other	144ct X 2, 72ct 5/16" MESS	ZFS	28.70	8.02	1.4800	-	0.990	173.0	270.0	173.1	1,500	-1,083	86	6,887	5,891
Other	72ct, 24ct 5/16" MESS	TWT	27.20	8.15	0.8900	-	0.526	205.0	90.0	205.1	1,500	1,026	55	4,651	5,732
Other	72ct 1/4" MESS	TWT	27.20	8.15	0.7500	-	0.300	173.0	270.0	173.0	1,500	-1,026	26	3,308	2,308
											Totals:	0	311	79,014	79,325

Comm:		Owner	Height (ft)	Horiz. Offset (in)	Cable Dia. (in)	Rotate Angle (deg)	Cable Weight (lbs/ft)	Lead/Span Length	Span Angle (deg)	Wire Length (ft)	Tension (lbs)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
CATV	.50"cx, 288ct, 24ct X 6 1/4" MESS	COX	24.90	8.36	2.1000	-	1.830	205.0	90.0	205.7	1,500	939	196	10,047	11,182
CATV	.50"cx, 288ct, 24ct X 6 1/4" MESS	COX	24.90	8.36	2.1000	-	1.830	173.0	270.0	173.4	1,500	-939	165	8,479	7,705
Telco	1.25" 1/4"MESS	CTL	23.70	8.47	1.5000	-	0.727	205.0	90.0	205.2	1,500	894	79	6,830	7,803
Telco	1.25" 1/4"MESS	CTL	23.70	8.47	1.5000	-	0.727	173.0	270.0	173.0	1,500	-894	67	5,764	4,937
Telco	2" 1/4"MESS	CTL	22.50	8.58	2.2500	-	0.821	205.0	90.0	205.2	1,500	849	90	9,727	10,666
Telco	2" 1/4"MESS	CTL	22.50	8.58	2.2500	-	0.821	173.0	270.0	173.1	1,500	-849	76	8,209	7,436
											Totals:	0	673	49,056	49,729

PowerEquipment:		Owner	Height (ft)	Horiz. Offset (in)	Offset Angle (deg)	Rotate Angle (deg)	Unit Weight (lbs)	Unit Height (in)	Unit Depth (in)	Unit Diameter (in)	Unit Length (in)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Box	1200 KVAr CAPACITOR BANK	NVE	34.20	31.02	90.0	90.0	1,100.00	18.00	39.00	-	48.00	-	83	4,616	4,699
											Totals:	0	83	4,616	4,699

Crossarm:		Owner	Height (ft)	Horiz. Offset (in)	Offset Angle (deg)	Rotate Angle (deg)	Unit Weight (lbs)	Unit Height (in)	Unit Depth (in)	Unit Diameter (in)	Unit Length (in)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Normal	CROSSARM 3-1/2 X 4-1/2 X 6 -	NVE	37.60	6.46	270.0	270.0	40.00	4.50	3.50	-	72.00	-	-1	148	147
											Totals:	0	-1	148	147

Insulator:		Owner	Height (ft)	Horiz. Offset (in)	Offset Angle (deg)	Rotate Angle (deg)	Unit Weight (lbs)	Unit Height (in)	Unit Depth (in)	Unit Diameter (in)	Unit Length (in)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Post	Post Insulator - 69 kV	NVE	42.20	4.30	180.0	180.0	54.00	25.38	-	7.25	-	-	29	1,243	1,272

Version: 4.2 / 4.06
* includes Load Factor(s)

² Worst Wind per Guy Wire
³ Wind at 180 0°

Post	Post Insulator - 69 kV	NVE	41.90	4.32	180.0	180.0	54.00	25.38	-	7.25	-	-	200	1,234	1,435
Post	Post Insulator - 69 kV	NVE	41.90	4.32	0.0	0.0	54.00	25.38	-	7.25	-	-	-200	1,234	1,034
Post	Post Insulator - 15 kV	NVE	33.00	5.13	0.0	0.0	11.00	11.50	-	4.75	-	-	-23	286	263
Bolt	Three Bolt	ZFS	28.70	5.52	180.0	90.0	5.00	0.00	-	3.00	-	-	5	0	5
Bolt	Three Bolt	TWT	27.20	5.65	180.0	90.0	5.00	0.00	-	3.00	-	-	5	0	5
Bolt	Three Bolt	COX	24.90	5.86	180.0	90.0	5.00	0.00	-	3.00	-	-	5	0	5
Bolt	Three Bolt	CTL	23.70	5.97	180.0	90.0	5.00	0.00	-	3.00	-	-	5	0	5
Bolt	Three Bolt	CTL	22.50	6.08	180.0	90.0	5.00	0.00	-	3.00	-	-	5	0	5
Deadend	CUTOUT	NVE	37.60	32.00	348.6	0.0	3.00	12.75	-	3.80	-	-	-12	285	272
Deadend	CUTOUT	NVE	37.60	-32.00	191.4	0.0	3.00	12.75	-	3.80	-	-	12	285	296
Deadend	CUTOUT	NVE	37.60	-18.00	199.8	0.0	3.00	12.75	-	3.80	-	-	7	285	291
											Totals:	0	38	4,851	4,890

Pole Buckling

Buckling Constant	Buckling Column Hgt. (ft)	Buckling Section Height (% Buckling Col. Hgt.)	Buckling Section Diam. (in)	Min. Buckling Diam. at Gl. (in)	Diameter at Tip (in)	Diameter at Gl. (in)	Modulus of Elasticity (psi)	Pole Density (pcf)	Ice Density (pcf)	Pole Tip Height (ft)	Buckling Load Capacity at Hgt. (lbs)	Buckling Load Applied at Hgt. (lbs)	Buckling Load Factor of Safety
2.00	28.49	34.77	14.44	26.93	8.60	16.24	1,000,000	50.00	57.00	42.20	29,286	6,919	4.23

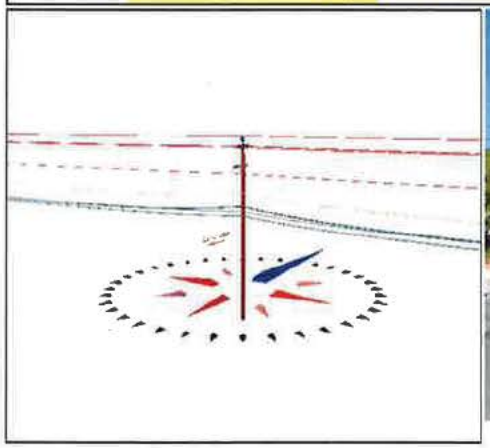
Version: 4.2 / 4.06
* Includes Load Factor(s)

² Worst Wind per Guy Wire
³ Wind at 180.0°

O-Calc® Pro *Analysis Report*

Wednesday, October 01, 2014 2:15:18 PM

File Name:	**P82146 GRADE B**	Pole Length / Class:	**50 / 1**	Code:	**NESC**	Structure Type:	**Unguyed**
Pole Num:	**P82146**	Pole Species:	**WESTERN RED CEDAR**	NESC Rule:	**Rule 250B**	Status:	**N/A**
Aux Data	**Warm Springs & Amigo**	Setting Depth (ft):	**8.90**	Construction Grade:	**B**	Pole Strength Factor:	**0.65**
Aux Data	**Cox**	G/L Circumference (in):	**42.00**	Loading District:	**Light**	Transverse Wind LF:	**2.50**
Aux Data	**Unset**	G/L Fiber Stress (psi):	**6,000**	Ice Thickness (in):	**0.00**	Wire Tension LF:	**1.10**
Aux Data	**Unset**	Allowable Stress (psi):	**3,900**	Wind Speed (mph):	**59.29**	Vertical LF:	**1.50**
Aux Data	**Unset**	Fiber Stress Ht. Reduction:	**No**	Wind Pressure (psf):	**9.00**		



Pole Capacity Utilization		Height	Wind Angle
Maximum:	**179.8%**	0.0 ft	182.0°
Groundline:	**179.8%**	0.0 ft	182.0°
Vertical:	**24.8%**	26.6 ft	182.0°

Pole Moments		Load Angle	Wind Angle
Max Capac. Util:	**136,421 ft-lb**	180.4°	182.0°
Groundline:	**136,421 ft-lb**	180.4°	182.0°

GROUNDLINE LOAD SUMMARY:*Wind at 182.0°, Applied Moment 136,421 ft-lb at 180.4°, Allowable Moment 76,240 ft-lb

	Shear Load (lbs)*	Percent Applied Load	Bending Moment (ft-lb)	Percent of Applied Moment**	Percent of Pole Capacity	Bending Stress (+/- psi)	Vertical Load (lbs)	Vertical Stress (psi)	Total Stress (psi)	Percent of Pole Capacity
Powers:	1,952	39.4	**69,446**	3.3	**5.9**	**3,552**	1,064	8	**3,560**	**91.3**
Comms:	1,890	38.2	**43,147**	5.8	**10.4**	**2,207**	803	6	**2,213**	**56.7**
Pole:	846	17.1	**16,125**	11.8	**21.2**	**825**	2,059	15	**840**	**21.5**
Crossarms:	4	0.1	**139**	0.1	**0.2**	**7**	60	0	**8**	**0.2**
Risers:	140	2.8	**2,862**	2.1	**3.7**	**146**	125	1	**147**	**3.8**
Insulators:	117	2.4	**4,702**	0.9	**1.6**	**241**	310	2	**243**	**6.2**
Pole Load:	4,950	100.0	**136,421**	100.0	**178.9**	**6,979**	4,422	32	**7,010**	**179.7**
Pole Reserve Capacity:			**-60,182**		**-78.9**	**-3,079**			**-3,110**	**-79.7**

LOAD SUMMARY BY OWNER

NVE:	1,488	**57,226**	**2,927**	1,156	8	**2,936**	**75.3**
ZFS:	480	**13,512**	**691**	264	2	**693**	**17.8**
TWT:	243	**6,354**	**325**	85	1	**326**	**8.4**

Version: 4.2 / 4.06
* includes Load Factor(s)

² Worst Wind per Guy Wire
³ Wind at 182.0°

COX:	678	16,437	841	440	3	844	21.6
CTL:	1,216	26,768	1,369	417	3	1,372	35.2
Pole:	846	16,125	825	2,059	15	840	21.5
Totals	4,950	136,421	6,979	4,422	32	7,010	179.7

Detailed Load Components

Power:		Owner	Height (ft)	Horiz. Offset (in)	Cable Dia. (in)	Rotate Angle (deg)	Cable Weight (lbs/ft)	Lead/Span Length	Span Angle (deg)	Wire Length (ft)	Tension (lbs)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Primary	AAC 954.0 KCM 61 STRAND	NVE	43.21	4.30	1.1260	-	0.895	173.0	90.0	173.0	10,140	-3,454	42	7,896	4,484
Primary	AAC 954.0 KCM 61 STRAND	NVE	43.21	4.30	1.1260	-	0.895	173.0	270.0	173.0	10,140	3,454	42	7,896	11,391
Primary	AAC 954.0 KCM 61 STRAND	NVE	40.20	29.75	1.1260	-	0.895	173.0	90.0	173.0	10,140	-3,213	-288	7,346	3,845
Primary	AAC 954.0 KCM 61 STRAND	NVE	40.20	29.75	1.1260	-	0.895	173.0	270.0	173.0	10,140	3,213	-288	7,346	10,271
Primary	AAC 954.0 KCM 61 STRAND	NVE	40.20	29.75	1.1260	-	0.895	173.0	90.0	173.0	10,140	-3,213	288	7,346	4,420
Primary	AAC 954.0 KCM 61 STRAND	NVE	40.20	29.75	1.1260	-	0.895	173.0	270.0	173.0	10,140	3,213	288	7,346	10,846
Neutral	AAC 2/0 AWG 7 STRAND ASTER	NVE	32.60	16.49	0.4140	-	0.125	173.0	90.0	173.0	1,506	-387	-22	2,189	1,780
Neutral	AAC 2/0 AWG 7 STRAND ASTER	NVE	32.60	16.49	0.4140	-	0.125	173.0	270.0	173.0	1,506	387	-22	2,189	2,553
Other	144ct X 2, 72ct 5/16" MESS	ZFS	27.80	7.88	1.4800	-	0.990	173.0	90.0	173.3	1,500	-328	84	6,669	6,425
Other	144ct X 2, 72ct 5/16" MESS	ZFS	27.80	7.88	1.4800	-	0.990	173.0	270.0	173.1	1,500	328	84	6,669	7,082
Other	72ct 1/4" MESS	TWT	25.90	8.03	0.7500	-	0.300	173.0	90.0	173.0	1,500	-306	26	3,149	2,869
Other	72ct 1/4" MESS	TWT	25.90	8.03	0.7500	-	0.300	173.0	270.0	173.0	1,500	306	26	3,149	3,481
											Totals:	0	259	69,186	69,446

Comm:		Owner	Height (ft)	Horiz. Offset (in)	Cable Dia. (in)	Rotate Angle (deg)	Cable Weight (lbs/ft)	Lead/Span Length	Span Angle (deg)	Wire Length (ft)	Tension (lbs)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
CATV	.50"cx, 288ct, 24ct X 4 1/4" MESS	COX	23.90	8.20	2.0800	-	1.546	173.0	90.0	173.3	1,500	-282	137	8,058	7,913
CATV	.50"cx, 288ct, 24ct X 4 1/4" MESS	COX	23.90	8.20	2.0800	-	1.546	173.0	270.0	173.3	1,500	282	137	8,058	8,477
Telco	1 25" 1/4"MESS	CTL	22.50	8.31	1.5000	-	0.727	173.0	90.0	173.1	1,500	-266	65	5,471	5,270
Telco	1.25" 1/4"MESS	CTL	22.50	8.31	1.5000	-	0.727	173.0	270.0	173.1	1,500	266	65	5,471	5,802
Telco	2" 1/4"MESS	CTL	21.30	8.41	2.2500	-	0.821	173.0	90.0	173.2	1,500	-252	75	7,768	7,591
Telco	2" 1/4"MESS	CTL	21.30	8.41	2.2500	-	0.821	173.0	270.0	173.1	1,500	252	75	7,768	8,094
											Totals:	0	554	42,593	43,147

Crossarm:		Owner	Height (ft)	Horiz. Offset (in)	Offset Angle (deg)	Rotate Angle (deg)	Unit Weight (lbs)	Unit Height (in)	Unit Depth (in)	Unit Diameter (in)	Unit Length (in)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Normal	CROSSARM 3-1/2 X 4-1/2 X 6 -	NVE	35.20	6.53	270.0	270.0	40.00	4.50	3.50	-	72.00	-	0	139	139
											Totals:	0	0	139	139

Riser:		Owner	Height (ft)	Horiz. Offset (in)	Offset Angle (deg)	Rotate Angle (deg)	Unit Weight (lbs)	Unit Height (in)	Unit Depth (in)	Unit Diameter (in)	Unit Length (in)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
3" Riser	3" Riser	NVE	31.20	6.97	320.0	320.0	5.20	374.40	-	0.00	-	-	-26	2,846	2,820
2" Riser 0.0°	2" Riser	COX	23.50	6.97	0.0	0.0	1.76	282.00	-	0.00	-	-	-12	54	42
											Totals:	0	-38	2,900	2,862

Insulator:	Owner	Height (ft)	Horiz. Offset (in)	Offset Angle (deg)	Rotate Angle (deg)	Unit Weight (lbs)	Unit Height (in)	Unit Depth (in)	Unit Diameter (in)	Unit Length (in)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*

Version: 4.2 / 4.06
* Includes Load Factor(s)

² Worst Wind per Guy Wire
³ Wind at 182.0°

Post	Post Insulator - 69 kV	NVE	41.10	4.30	180.0	180.0	54.00	25.38	-	7.25	-	-	29	1,211	1,240
Post	Post Insulator - 69 kV	NVE	40.20	4.37	0.0	0.0	54.00	25.38	-	7.25	-	-	-201	1,186	985
Post	Post Insulator - 69 kV	NVE	40.20	4.37	180.0	180.0	54.00	25.38	-	7.25	-	-	201	1,186	1,386
Deadend	CUTOUT	NVE	35.20	32.00	348.5	0.0	3.00	12.75	-	3.80	-	-	-12	266	254
Deadend	CUTOUT	NVE	35.20	-32.00	191.5	0.0	3.00	12.75	-	3.80	-	-	12	266	278
Deadend	CUTOUT	NVE	35.20	-18.00	199.9	0.0	3.00	12.75	-	3.80	-	-	7	266	273
Post	Post Insulator - 15 kV	NVE	32.60	4.99	0.0	0.0	11.00	11.50	-	4.75	-	-	-23	282	260
Bolt	Three Bolt	ZFS	27.80	5.38	180.0	90.0	5.00	0.00	-	3.00	-	-	5	0	5
Bolt	Three Bolt	TWT	25.90	5.53	180.0	90.0	5.00	0.00	-	3.00	-	-	5	0	5
Bolt	Three Bolt	COX	23.90	5.70	180.0	90.0	5.00	0.00	-	3.00	-	-	5	0	5
Bolt	Three Bolt	CTL	22.50	5.81	180.0	90.0	5.00	0.00	-	3.00	-	-	5	0	5
Bolt	Three Bolt	CTL	21.30	5.91	180.0	90.0	5.00	0.00	-	3.00	-	-	5	0	5
											Totals:	0	39	4,664	4,702

Pole Buckling

Buckling	Buckling (ft)	Buckling Section (% Buckling Col. Hgt.)	Buckling (in)	Min. Buckling (in)	Diameter (in)	Diameter (in)	Modulus of (psi)	Pole (pcf)	Ice Density (pcf)	Pole Tip (ft)	Buckling Load (lbs)	Buckling Load (lbs)	Buckling Load
2.00	26.61	33.47	12.33	20.92	8.60	13.38	1,000,000	50.00	57.00	41.10	17,865	4,422	4.04

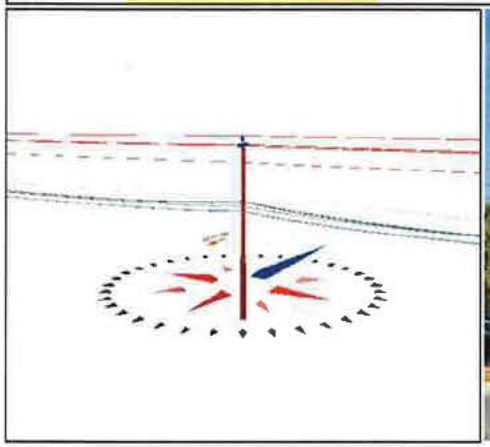
Version: 4.2 / 4.06
* includes Load Factor(s)

² Worst Wind per Guy Wire
³ Wind at 182.0°

O-Calc® Pro *Analysis Report*

Wednesday, October 01, 2014 2:10:45 PM

File Name:	**P82145 GRADE B**	Pole Length / Class:	**50 / 1**	Code:	**NESC**	Structure Type:	**Unguyed**
Pole Num:	**P82145**	Pole Species:	**WESTERN RED CEDAR**	NESC Rule:	**Rule 250B**	Status:	**N/A**
Aux Data	**Warm Springs & Amigo**	Setting Depth (ft):	**9.90**	Construction Grade:	**B**	Pole Strength Factor:	**0.65**
Aux Data	**Cox**	G/L Circumference (in):	**53.00**	Loading District:	**Light**	Transverse Wind LF:	**2.50**
Aux Data	**Unset**	G/L Fiber Stress (psi):	**6,000**	Ice Thickness (in):	**0.00**	Wire Tension LF:	**1.10**
Aux Data	**Unset**	Allowable Stress (psi):	**3,900**	Wind Speed (mph):	**59.29**	Vertical LF:	**1.50**
Aux Data	**Unset**	Fiber Stress Ht. Reduction:	**No**	Wind Pressure (psf):	**9.00**		



Pole Capacity Utilization		Height	Wind Angle
Maximum:	**88.8%**	0.0 ft	181.2°
Groundline:	**88.8%**	0.0 ft	181.2°
Vertical:	**10.5%**	24.6 ft	181.2°

Pole Moments		Load Angle	Wind Angle
Max Capac. Util:	**135,087 ft-lb**	180.2°	181.2°
Groundline:	**135,087 ft-lb**	180.2°	181.2°

GROUNDLINE LOAD SUMMARY:*Wind at 181.2°, Applied Moment 135,087 ft-lb at 180.2°, Allowable Moment 153,201 ft-lb

	Shear Load (lbs)*	Percent Applied Load	Bending Moment (ft-lb)	Percent of Applied Moment**	Percent of Pole Capacity	Bending Stress (+/- psi)	Vertical Load (lbs)	Vertical Stress (psi)	Total Stress (psi)	Percent of Pole Capacity
Powers:	1,970	39.4	**69,133**	4.5	**3.9**	**1,760**	1,079	5	**1,765**	**45.2**
Comms:	1,885	37.7	**43,625**	6.1	**5.3**	**1,111**	746	3	**1,114**	**28.6**
Pole:	957	19.2	**17,112**	12.7	**11.2**	**436**	2,753	12	**448**	**11.5**
Risers:	91	1.8	**1,369**	0.0	**0.0**	**35**	102	0	**35**	**0.9**
Insulators:	95	1.9	**3,849**	0.9	**0.8**	**98**	297	1	**99**	**2.5**
Pole Load:	4,998	100.0	**135,087**	100.0	**88.2**	**3,439**	4,977	22	**3,461**	**88.7**
Pole Reserve Capacity:			**18,113**		**11.8**	**461**			**439**	**11.3**

LOAD SUMMARY BY OWNER

NVE:	1,321	**52,722**	**1,342**	986	4	**1,347**	**34.5**
ZFS:	479	**13,386**	**341**	264	1	**342**	**8.8**
TWT:	268	**6,878**	**175**	174	1	**176**	**4.5**
COX:	760	**17,941**	**457**	384	2	**458**	**11.8**

Version: 4.2 / 4.06
* includes Load Factor(s)

² Worst Wind per Guy Wire
³ Wind at 181.2°

CTL:	1,213	27,049	689	416	2	690	17.7
Pole:	957	17,112	436	2,753	12	448	11.5
Totals	4,998	135,087	3,439	4,977	22	3,461	88.7

Detailed Load Components

Power:		Owner	Height (ft)	Horiz. Offset (in)	Cable Dia. (in)	Rotate Angle (deg)	Cable Weight (lbs/ft)	Lead/Span Length	Span Angle (deg)	Wire Length (ft)	Tension (lbs)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Primary	AAC 954.0 KCM 61 STRAND	NVE	42.21	4.30	1.1260	-	0.895	173.0	90.0	173.0	10,140	-1,745	42	7,716	6,013
Primary	AAC 954.0 KCM 61 STRAND	NVE	42.21	4.30	1.1260	-	0.895	172.0	270.0	172.0	10,140	1,745	41	7,671	9,458
Primary	AAC 954.0 KCM 61 STRAND	NVE	39.50	29.73	1.1260	-	0.895	173.0	90.0	173.0	10,140	-1,633	-288	7,220	5,300
Primary	AAC 954.0 KCM 61 STRAND	NVE	39.50	29.73	1.1260	-	0.895	172.0	270.0	172.0	10,140	1,633	-286	7,179	8,526
Primary	AAC 954.0 KCM 61 STRAND	NVE	39.50	29.73	1.1260	-	0.895	173.0	90.0	173.0	10,140	-1,633	288	7,220	5,875
Primary	AAC 954.0 KCM 61 STRAND	NVE	39.50	29.73	1.1260	-	0.895	172.0	270.0	172.0	10,140	1,633	286	7,179	9,098
Neutral	AAC 2/0 AWG 7 STRAND ASTER	NVE	34.90	16.33	0.4140	-	0.125	173.0	90.0	173.0	1,506	-214	-22	2,344	2,108
Neutral	AAC 2/0 AWG 7 STRAND ASTER	NVE	34.90	16.33	0.4140	-	0.125	172.0	270.0	172.0	1,506	214	-22	2,330	2,523
Other	144ct X 2, 72ct 5/16" MESS	ZFS	27.60	8.09	1.4800	-	0.990	173.0	90.0	173.3	1,500	-169	87	6,623	6,541
Other	144ct X 2, 72ct 5/16" MESS	ZFS	27.60	8.09	1.4800	-	0.990	172.0	270.0	172.1	1,500	169	86	6,585	6,840
Other	72ct 1/4" MESS	TWT	25.60	8.29	0.7500	-	0.300	173.0	90.0	173.0	1,500	-156	27	3,113	2,984
Other	72ct, 24ct 1/4" MESS	TWT	25.60	8.29	0.8900	-	0.442	172.0	270.0	172.0	1,500	156	39	3,673	3,869
											Totals:	0	278	68,855	69,133

Comm:		Owner	Height (ft)	Horiz. Offset (in)	Cable Dia. (in)	Rotate Angle (deg)	Cable Weight (lbs/ft)	Lead/Span Length	Span Angle (deg)	Wire Length (ft)	Tension (lbs)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
CATV	.50"cx, 288ct, 24ct X 4 1/4" MESS	COX	24.30	8.43	2.0800	-	1.546	173.0	90.0	173.3	1,500	-148	141	8,196	8,188
CATV	.50"cx, 288ct, 24ct 1/4" MESS 432ct	COX	24.30	8.43	2.0800	-	1.120	172.0	270.0	172.2	1,500	148	101	8,148	8,398
Telco	1.25" 1/4"MESS	CTL	22.90	8.57	1.5000	-	0.727	173.0	90.0	173.1	1,500	-140	67	5,570	5,497
Telco	1.25" 1/4"MESS	CTL	22.90	8.57	1.5000	-	0.727	172.0	270.0	172.1	1,500	140	67	5,538	5,744
Telco	2" 1/4"MESS	CTL	21.50	8.72	2.2500	-	0.821	173.0	90.0	173.2	1,500	-131	77	7,844	7,790
Telco	2" 1/4"MESS	CTL	21.50	8.72	2.2500	-	0.821	172.0	270.0	172.1	1,500	131	77	7,799	8,007
											Totals:	0	531	43,094	43,625

Riser:		Owner	Height (ft)	Horiz. Offset (in)	Offset Angle (deg)	Rotate Angle (deg)	Unit Weight (lbs)	Unit Height (in)	Unit Depth (in)	Unit Diameter (in)	Unit Length (in)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
3" Riser 0.0"	3" Riser	TWT	23.60	9.04	0.0	0.0	3.93	283.20	-	0.00	-	-	-33	53	20
2" Riser	2" Riser	COX	23.20	9.04	300.0	300.0	1.74	278.40	-	0.00	-	-	-7	1,356	1,349
											Totals:	0	-40	1,410	1,369

Insulator:		Owner	Height (ft)	Horiz. Offset (in)	Offset Angle (deg)	Rotate Angle (deg)	Unit Weight (lbs)	Unit Height (in)	Unit Depth (in)	Unit Diameter (in)	Unit Length (in)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Post	Post Insulator - 69 kV	NVE	40.10	4.30	180.0	180.0	54.00	25.38	-	7.25	-	-	29	1,183	1,212
Post	Post Insulator - 69 kV	NVE	39.50	4.36	0.0	0.0	54.00	25.38	-	7.25	-	-	-201	1,166	965
Post	Post Insulator - 69 kV	NVE	39.50	4.36	180.0	180.0	54.00	25.38	-	7.25	-	-	201	1,166	1,366
Post	Post Insulator - 15 kV	NVE	34.90	4.83	0.0	0.0	11.00	11.50	-	4.75	-	-	-22	302	279
Bolt	Three Bolt	ZFS	27.60	5.59	180.0	90.0	5.00	0.00	-	3.00	-	-	5	0	5
Bolt	Three Bolt	TWT	25.60	5.79	180.0	90.0	5.00	0.00	-	3.00	-	-	5	0	5

Version: 4.2 / 4.06
* Includes Load Factor(s)

² Worst Wind per Guy Wire
³ Wind at 181.2°

Bolt	Three Bolt	COX	24.30	5.93	180.0	90.0	5.00	0.00	-	3.00	-	-	5	0	5
Bolt	Three Bolt	CTL	22.90	6.07	180.0	90.0	5.00	0.00	-	3.00	-	-	5	0	5
Bolt	Three Bolt	CTL	21.50	6.22	180.0	90.0	5.00	0.00	-	3.00	-	-	5	0	5
											Totals:	0	33	3,816	3,849

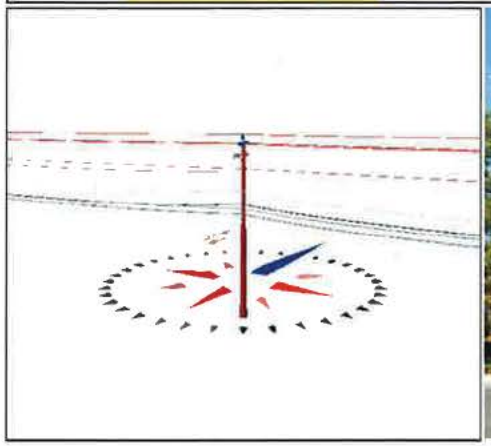
Pole Buckling

Buckling	Buckling (ft)	Buckling Section (% Buckling Col. Hgt.)	Buckling (in)	Min. Buckling (in)	Diameter (in)	Diameter (in)	Modulus of (psi)	Pole (pcf)	Ice Density (pcf)	Pole Tip (ft)	Buckling Load (lbs)	Buckling Load (lbs)	Buckling Load
2.00	24.55	34.51	15.12	21.42	8.60	16.88	1,000,000	50.00	57.00	40.10	47,436	4,977	9.53

O-Calc® Pro *Analysis Report*

Wednesday, October 01, 2014 2:05:46 PM

File Name:	**P82144 GRADE B**	Pole Length / Class:	**50 / 1**	Code:	**NESC**	Structure Type:	**Unguyed**
Pole Num:	**P82144**	Pole Species:	**WESTERN RED CEDAR**	NESC Rule:	**Rule 250B**	Status:	**N/A**
Aux Data	**Warm Springs & Amigo**	Setting Depth (ft):	**10.50**	Construction Grade:	**B**	Pole Strength Factor:	**0.65**
Aux Data	**Cox**	G/L Circumference (in):	**62.00**	Loading District:	**Light**	Transverse Wind LF:	**2.50**
Aux Data	**Unset**	G/L Fiber Stress (psi):	**6,000**	Ice Thickness (in):	**0.00**	Wire Tension LF:	**1.10**
Aux Data	**Unset**	Allowable Stress (psi):	**3,900**	Wind Speed (mph):	**59.29**	Vertical LF:	**1.50**
Aux Data	**Unset**	Fiber Stress Ht. Reduction:	**No**	Wind Pressure (psf):	**9.00**		



Pole Capacity Utilization		Height	Wind Angle
Maximum:	**61.8%**	5.3 ft	181.2°
Groundline:	**61.0%**	0.0 ft	181.2°
Vertical:	**6.3%**	23.3 ft	181.2°

Pole Moments		Load Angle	Wind Angle
Max Capac. Util:	**118,557 ft-lb**	187.1°	181.2°
Groundline:	**148,475 ft-lb**	186.8°	181.2°

GROUNDLINE LOAD SUMMARY:*Wind at 181.2°, Applied Moment 148,475 ft-lb at 186.8°, Allowable Moment 245,250 ft-lb

	Shear Load (lbs)*	Percent Applied Load	Bending Moment (ft-lb)	Percent of Applied Moment**	Percent of Pole Capacity	Bending Stress (+/- psi)	Vertical Load (lbs)	Vertical Stress (psi)	Total Stress (psi)	Percent of Pole Capacity
Powers:	2,353	41.2	**79,431**	-40.0	**-19.3**	**1,263**	1,230	4	**1,267**	**32.5**
Comms:	1,982	34.7	**42,235**	2.7	**1.3**	**672**	733	2	**674**	**17.3**
Pole:	1,044	18.3	**17,919**	15.1	**7.3**	**285**	3,409	11	**296**	**7.6**
Crossarms:	4	0.1	**152**	0.1	**0.1**	**2**	60	0	**3**	**0.1**
Risers:	204	3.6	**4,132**	3.2	**1.6**	**66**	125	0	**66**	**1.7**
Insulators:	118	2.1	**4,606**	1.0	**0.5**	**73**	312	1	**74**	**1.9**
Pole Load:	5,706	100.0	**148,475**	125.2	**60.5**	**2,361**	5,869	19	**2,380**	**61.0**
Pole Reserve Capacity:			**96,775**		**39.5**	**1,539**			**1,520**	**39.0**

LOAD SUMMARY BY OWNER

NVE:	1,823	**66,495**	**1,057**	1,254	4	**1,062**	**27.2**
ZFS:	521	**13,848**	**220**	288	1	**221**	**5.7**
TWT:	313	**7,644**	**122**	133	0	**122**	**3.1**

Version: 4.2 / 4.06
* includes Load Factor(s)

² Worst Wind per Guy Wire
³ Wind at 181.2°

COX:	685	15,391	245	332	1	246	6.3
CTL:	1,319	27,177	432	454	1	434	11.1
Pole:	1,044	17,919	285	3,409	11	296	7.6
Totals	5,706	148,475	2,361	5,869	19	2,380	61.0

Detailed Load Components

Power:		Owner	Height (ft)	Horiz. Offset (in)	Cable Dia. (in)	Rotate Angle (deg)	Cable Weight (lbs/ft)	Lead/Span Length	Span Angle (deg)	Wire Length (ft)	Tension (lbs)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Primary	AAC 954.0 KCM 61 STRAND	NVE	41.61	4.30	1.1260	-	0.895	172.0	90.0	172.0	10,140	-54,971	41	7,509	-47,420
Primary	AAC 954.0 KCM 61 STRAND	NVE	41.61	4.30	1.1260	-	0.895	206.0	270.0	206.0	10,140	54,971	49	8,994	64,014
Primary	AAC 954.0 KCM 61 STRAND	NVE	38.90	29.73	1.1260	-	0.895	172.0	90.0	172.0	10,140	-51,389	-284	7,020	-44,653
Primary	AAC 954.0 KCM 61 STRAND	NVE	38.90	29.73	1.1260	-	0.895	206.0	270.0	206.0	10,140	51,389	-340	8,408	59,457
Primary	AAC 954.0 KCM 61 STRAND	NVE	38.90	29.73	1.1260	-	0.895	172.0	90.0	172.0	10,140	-51,389	284	7,020	-44,085
Primary	AAC 954.0 KCM 61 STRAND	NVE	38.90	29.73	1.1260	-	0.895	206.0	270.0	206.0	10,140	51,389	340	8,408	60,137
Neutral	AAC 2/0 AWG 7 STRAND ASTER	NVE	32.00	16.85	0.4140	-	0.125	172.0	90.0	172.0	1,506	-6,274	-22	2,122	-4,175
Neutral	AAC 2/0 AWG 7 STRAND ASTER	NVE	32.00	16.85	0.4140	-	0.125	206.0	270.0	206.0	1,506	6,274	-27	2,541	8,789
Other	144ct X 2, 72ct 5/16" MESS	ZFS	26.20	8.67	1.4800	-	0.990	172.0	90.0	172.3	1,500	-5,114	92	6,207	1,185
Other	144ct X 2, 72ct 5/16" MESS	ZFS	26.20	8.67	1.4800	-	0.990	206.0	270.0	206.1	1,500	5,114	110	7,434	12,658
Other	72ct, 24ct 1/4" MESS	TWT	24.10	8.97	0.8900	-	0.442	172.0	90.0	172.0	1,500	-4,704	42	3,434	-1,228
Other	72ct, 24ct 1/4" MESS	TWT	24.10	8.97	0.8900	-	0.442	206.0	270.0	206.0	1,500	4,704	51	4,112	8,867
Secondary	#4 AL TPX	NVE	31.60	7.66	0.6400	-	0.180	206.0	270.0	206.1	484	1,990	18	3,878	5,886
											Totals:	1,990	353	77,088	79,431

Comm:		Owner	Height (ft)	Horiz. Offset (in)	Cable Dia. (in)	Rotate Angle (deg)	Cable Weight (lbs/ft)	Lead/Span Length	Span Angle (deg)	Wire Length (ft)	Tension (lbs)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
CATV	.50"cx, 288ct, 24ct 1/4" MESS 432ct	COX	22.40	9.21	2.0800	-	1.120	172.0	90.0	172.2	1,500	-4,372	110	7,458	3,196
CATV	288ct, 24ct 1/4" MESS 432ct PROP	COX	22.40	9.21	1.7200	-	0.970	206.0	270.0	206.2	1,500	4,372	114	7,387	11,873
Telco	1.25" 1/4"MESS	CTL	21.20	9.38	1.5000	-	0.727	172.0	90.0	172.1	1,500	-4,138	73	5,091	1,025
Telco	1.25" 1/4"MESS	CTL	21.20	9.38	1.5000	-	0.727	206.0	270.0	206.1	1,500	4,138	87	6,097	10,322
Telco	2" 1/4"MESS	CTL	19.75	9.58	2.2500	-	0.821	172.0	90.0	172.2	1,500	-3,855	84	7,114	3,343
Telco	2" 1/4"MESS	CTL	19.75	9.58	2.2500	-	0.821	206.0	270.0	206.1	1,500	3,855	101	8,520	12,475
											Totals:	0	569	41,666	42,235

Crossarm:		Owner	Height (ft)	Horiz. Offset (in)	Offset Angle (deg)	Rotate Angle (deg)	Unit Weight (lbs)	Unit Height (in)	Unit Depth (in)	Unit Diameter (in)	Unit Length (in)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Normal	CROSSARM 3-1/2 X 4-1/2 X 6 -	NVE	36.00	6.54	270.0	270.0	40.00	4.50	3.50	-	72.00	-	4	148	152
											Totals:	0	4	148	152

Riser:		Owner	Height (ft)	Horiz. Offset (in)	Offset Angle (deg)	Rotate Angle (deg)	Unit Weight (lbs)	Unit Height (in)	Unit Depth (in)	Unit Diameter (in)	Unit Length (in)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
3" Riser	3" Riser	NVE	31.70	10.78	300.0	300.0	5.28	380.40	-	0.00	-	-	-21	3,836	3,816
2" Riser 15.0°	2" Riser	COX	22.10	10.78	15.0	15.0	1.66	265.20	-	0.00	-	-	-16	332	316
											Totals:	0	-37	4,169	4,132

Version: 4.2 / 4.06
* includes Load Factor(s)

² Worst Wind per Guy Wire
³ Wind at 181.2°

Insulator:		Owner	Height (ft)	Horiz. Offset (in)	Offset Angle (deg)	Rotate Angle (deg)	Unit Weight (lbs)	Unit Height (in)	Unit Depth (in)	Unit Diameter (in)	Unit Length (in)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Post	Post Insulator - 69 kV	NVE	39.50	4.30	180.0	180.0	54.00	25.38	-	7.25	-	-	29	1,160	1,189
Post	Post Insulator - 69 kV	NVE	38.90	4.36	0.0	0.0	54.00	25.38	-	7.25	-	-	-199	1,143	944
Post	Post Insulator - 69 kV	NVE	38.90	4.36	180.0	180.0	54.00	25.38	-	7.25	-	-	199	1,143	1,343
Post	Post Insulator - 15 kV	NVE	32.00	5.35	0.0	0.0	11.00	11.50	-	4.75	-	-	-23	276	253
Bolt	Three Bolt	ZFS	26.20	6.17	180.0	90.0	5.00	0.00	-	3.00	-	-	5	0	5
Bolt	Three Bolt	TWT	24.10	6.47	180.0	90.0	5.00	0.00	-	3.00	-	-	6	0	6
Bolt	Three Bolt	COX	22.40	6.71	180.0	90.0	5.00	0.00	-	3.00	-	-	6	0	6
Bolt	Three Bolt	CTL	21.20	6.88	180.0	90.0	5.00	0.00	-	3.00	-	-	6	0	6
Bolt	Three Bolt	CTL	19.75	7.08	180.0	90.0	5.00	0.00	-	3.00	-	-	6	0	6
Deadend	CUTOUT	NVE	36.00	32.00	348.4	0.0	3.00	12.75	-	3.80	-	-	-11	271	260
Deadend	CUTOUT	NVE	36.00	-32.00	191.6	0.0	3.00	12.75	-	3.80	-	-	13	271	284
Deadend	CUTOUT	NVE	36.00	-18.00	200.0	0.0	3.00	12.75	-	3.80	-	-	7	271	279
Spool	Spool Insulator - 20 kV	NVE	31.60	5.41	180.0	90.0	1.00	2.12	-	2.50	-	-	1	26	27
											Totals:	0	44	4,563	4,606

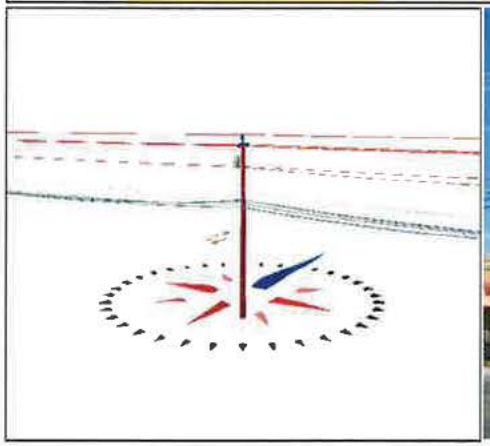
Pole Buckling

Buckling	Buckling (ft)	Buckling Section (% Buckling Col. Hgt.)	Buckling (in)	Min. Buckling (in)	Diameter (in)	Diameter (in)	Modulus of (psi)	Pole (pcf)	Ice Density (pcf)	Pole Tip (ft)	Buckling Load (lbs)	Buckling Load (lbs)	Buckling Load
2.00	23.33	35.00	17.43	22.72	8.60	19.75	1,000,000	50.00	57.00	39.50	92,763	5,869	15.80

O-Calc® Pro *Analysis Report*

Wednesday, October 01, 2014 2:00:28 PM

File Name:	P82142 GRADE B	Pole Length / Class:	50 / 1	Code:	NESC	Structure Type:	Unguyed
Pole Num:	P82142	Pole Species:	WESTERN RED CEDAR	NESC Rule:	Rule 250B	Status:	N/A
Aux Data	Warm Springs & Amigo	Setting Depth (ft):	6.50	Construction Grade:	B	Pole Strength Factor:	0.65
Aux Data	Cox	G/L Circumference (in):	51.00	Loading District:	Light	Transverse Wind LF:	2.50
Aux Data	Unset	G/L Fiber Stress (psi):	6,000	Ice Thickness (in):	0.00	Wire Tension LF:	1.10
Aux Data	Unset	Allowable Stress (psi):	3,900	Wind Speed (mph):	59.29	Vertical LF:	1.50
Aux Data	Unset	Fiber Stress Ht. Reduction:	No	Wind Pressure (psf):	9.00		



Pole Capacity Utilization		Height	Wind Angle
Maximum:	133.9%	0.0 ft	178.6°
Groundline:	133.9%	0.0 ft	178.6°
Vertical:	19.6%	28.4 ft	178.6°

Pole Moments		Load Angle	Wind Angle
Max Capac. Util:	181,743 ft-lb	173.8°	178.6°
Groundline:	181,743 ft-lb	173.8°	178.6°

GROUNDLINE LOAD SUMMARY:*Wind at 178.6°, Applied Moment 181,743 ft-lb at 173.8°, Allowable Moment 136,504 ft-lb

	Shear Load (lbs)*	Percent Applied Load	Bending Moment (ft-lb)	Percent of Applied Moment**	Percent of Pole Capacity	Bending Stress (+/- psi)	Vertical Load (lbs)	Vertical Stress (psi)	Total Stress (psi)	Percent of Pole Capacity
Powers:	2,350	39.1	89,315	35.6	47.4	2,552	1,230	6	2,558	65.6
Comms:	1,988	33.1	53,363	7.8	10.4	1,525	789	4	1,528	39.2
Power Equipment:	134	2.2	4,997	2.7	3.7	143	548	3	145	3.7
Pole:	1,009	16.8	19,695	10.8	14.4	563	2,829	14	576	14.8
Risers:	435	7.2	10,221	0.0	0.0	292	179	1	293	7.5
Insulators:	95	1.6	4,152	0.7	1.0	119	298	1	120	3.1
Pole Load:	6,011	100.0	181,743	100.0	133.1	5,193	5,874	28	5,221	133.9
Pole Reserve Capacity:			-45,239		-33.1	-1,293			-1,321	-33.9

LOAD SUMMARY BY OWNER

NVE:	2,177	83,222	2,378	1,776	9	2,386	61.2
ZFS:	521	16,296	466	288	1	467	12.0
TWT:	313	9,117	260	133	1	261	6.7

Version: 4.2 / 4.06
* includes Load Factor(s)

² Worst Wind per Guy Wire
³ Wind at 178.6°

COX:	670	18,811	537	394	2	539	13.8
CTL:	1,321	34,601	989	454	2	991	25.4
Pole:	1,009	19,695	563	2,829	14	576	14.8
Totals	6,011	181,743	5,193	5,874	28	5,221	133.9

Detailed Load Components

Power:		Owner	Height (ft)	Horiz. Offset (in)	Cable Dia. (in)	Rotate Angle (deg)	Cable Weight (lbs/ft)	Lead/Span Length	Span Angle (deg)	Wire Length (ft)	Tension (lbs)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Primary	AAC 954.0 KCM 61 STRAND	NVE	45.61	4.30	1.1260	-	0.895	206.0	90.0	206.0	10,140	54,772	49	9,869	64,690
Primary	AAC 954.0 KCM 61 STRAND	NVE	45.61	4.30	1.1260	-	0.895	172.0	270.0	172.0	10,140	-54,772	41	8,240	-46,491
Primary	AAC 954.0 KCM 61 STRAND	NVE	42.50	29.76	1.1260	-	0.895	206.0	90.0	206.0	10,140	51,036	-341	9,196	59,891
Primary	AAC 954.0 KCM 61 STRAND	NVE	42.50	29.76	1.1260	-	0.895	172.0	270.0	172.0	10,140	-51,036	-285	7,678	-43,643
Primary	AAC 954.0 KCM 61 STRAND	NVE	42.50	29.76	1.1260	-	0.895	206.0	90.0	206.0	10,140	51,036	341	9,196	60,573
Primary	AAC 954.0 KCM 61 STRAND	NVE	42.50	29.76	1.1260	-	0.895	172.0	270.0	172.0	10,140	-51,036	285	7,678	-43,074
Neutral	AAC 2/0 AWG 7 STRAND ASTER	NVE	36.80	16.39	0.4140	-	0.125	206.0	90.0	206.0	1,506	6,559	-26	2,926	9,459
Neutral	AAC 2/0 AWG 7 STRAND ASTER	NVE	36.80	16.39	0.4140	-	0.125	172.0	270.0	172.0	1,506	-6,559	-22	2,443	-4,138
Other	144ct X 2, 72ct 5/16" MESS	ZFS	30.90	7.90	1.4800	-	0.990	206.0	90.0	206.2	1,500	5,483	100	8,778	14,361
Other	144ct X 2, 72ct 5/16" MESS	ZFS	30.90	7.90	1.4800	-	0.990	172.0	270.0	172.1	1,500	-5,483	84	7,329	1,930
Other	72ct, 24ct 1/4" MESS	TWT	28.80	8.09	0.8900	-	0.442	206.0	90.0	206.0	1,500	5,110	46	4,920	10,076
Other	72ct, 24ct 1/4" MESS	TWT	28.80	8.09	0.8900	-	0.442	172.0	270.0	172.0	1,500	-5,110	38	4,108	-964
Secondary	#4 AL TPX	NVE	36.80	7.14	0.6400	-	0.180	206.0	90.0	206.1	484	2,107	16	4,521	6,644
											Totals:	2,107	326	86,881	89,315

Comm:		Owner	Height (ft)	Horiz. Offset (in)	Cable Dia. (in)	Rotate Angle (deg)	Cable Weight (lbs/ft)	Lead/Span Length	Span Angle (deg)	Wire Length (ft)	Tension (lbs)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
CATV	288ct, 24ct 1/4" MESS 432ct PROP	COX	27.80	8.18	1.7200	-	0.970	206.0	90.0	206.2	1,500	4,933	102	9,178	14,213
CATV	.50"cx X 2, 288ct, 24ct X 3 1/4"	COX	27.80	8.18	2.1000	-	1.554	172.0	270.0	172.3	1,500	-4,933	136	9,356	4,559
Telco	1.25" 1/4"MESS	CTL	26.50	8.29	1.5000	-	0.727	206.0	90.0	206.1	1,500	4,702	77	7,630	12,409
Telco	1.25" 1/4"MESS	CTL	26.50	8.29	1.5000	-	0.727	172.0	270.0	172.1	1,500	-4,702	64	6,371	1,733
Telco	2" 1/4"MESS	CTL	25.60	8.37	2.2500	-	0.821	206.0	90.0	206.1	1,500	4,543	88	11,056	15,687
Telco	2" 1/4"MESS	CTL	25.60	8.37	2.2500	-	0.821	172.0	270.0	172.1	1,500	-4,543	73	9,231	4,762
											Totals:	0	540	52,823	53,363

PowerEquipment:		Owner	Height (ft)	Horiz. Offset (in)	Offset Angle (deg)	Rotate Angle (deg)	Unit Weight (lbs)	Unit Height (in)	Unit Depth (in)	Unit Diameter (in)	Unit Length (in)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Transformer	1PH-25KVA	NVE	38.20	21.76	270.0	270.0	365.00	39.00	-	22.00	-	-	-107	5,103	4,997
											Totals:	0	-107	5,103	4,997

Riser:		Owner	Height (ft)	Horiz. Offset (in)	Offset Angle (deg)	Rotate Angle (deg)	Unit Weight (lbs)	Unit Height (in)	Unit Depth (in)	Unit Diameter (in)	Unit Length (in)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
2" Riser 0.0°	2" Riser	COX	26.70	8.34	0.0	0.0	2.00	320.40	-	0.00	-	-	-16	50	34
2" Riser	2" Riser	NVE	35.40	8.34	270.0	270.0	2.66	424.80	-	0.00	-	-	-2	3,589	3,587
2" Riser	2" Riser	NVE	35.40	8.34	300.0	300.0	2.66	424.80	-	0.00	-	-	-13	3,064	3,052
2" Riser 80.0°	2" Riser	NVE	35.40	8.34	80.0	80.0	2.66	424.80	-	0.00	-	-	-1	3,550	3,549
											Totals:	0	-33	10,254	10,221

Version: 4.2 / 4.06
* includes Load Factor(s)

² Worst Wind per Guy Wire
³ Wind at 178.6°

Insulator:		Owner	Height (ft)	Horiz. Offset (in)	Offset Angle (deg)	Rotate Angle (deg)	Unit Weight (lbs)	Unit Height (in)	Unit Depth (in)	Unit Diameter (in)	Unit Length (in)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Post	Post Insulator - 69 kV	NVE	43.50	4.30	180.0	180.0	54.00	25.38	-	7.25	-	-	29	1,276	1,305
Post	Post Insulator - 69 kV	NVE	42.50	4.38	0.0	0.0	54.00	25.38	-	7.25	-	-	-200	1,248	1,048
Post	Post Insulator - 69 kV	NVE	42.50	4.38	180.0	180.0	54.00	25.38	-	7.25	-	-	200	1,248	1,447
Post	Post Insulator - 15 kV	NVE	36.80	4.89	0.0	0.0	11.00	11.50	-	4.75	-	-	-22	317	295
Bolt	Three Bolt	ZFS	30.90	5.40	180.0	90.0	5.00	0.00	-	3.00	-	-	5	0	5
Bolt	Three Bolt	TWT	28.80	5.59	180.0	90.0	5.00	0.00	-	3.00	-	-	5	0	5
Bolt	Three Bolt	COX	27.80	5.68	180.0	90.0	5.00	0.00	-	3.00	-	-	5	0	5
Bolt	Three Bolt	CTL	26.50	5.79	180.0	90.0	5.00	0.00	-	3.00	-	-	5	0	5
Bolt	Three Bolt	CTL	25.60	5.87	180.0	90.0	5.00	0.00	-	3.00	-	-	5	0	5
Spool	Spool Insulator - 20 kV	NVE	36.80	4.89	180.0	90.0	1.00	2.12	-	2.50	-	-	1	30	31
											Totals:	0	33	4,119	4,152

Pole Buckling

Buckling	Buckling (ft)	Buckling Section (% Buckling Col. Hgt.)	Buckling (in)	Min. Buckling (in)	Diameter (in)	Diameter (in)	Modulus of (psi)	Pole (pcf)	Ice Density (pcf)	Pole Tip (ft)	Buckling Load (lbs)	Buckling Load (lbs)	Buckling Load
2.00	28.42	34.61	14.51	24.90	8.60	16.24	1,000,000	50.00	57.00	43.50	29,970	5,874	5.10

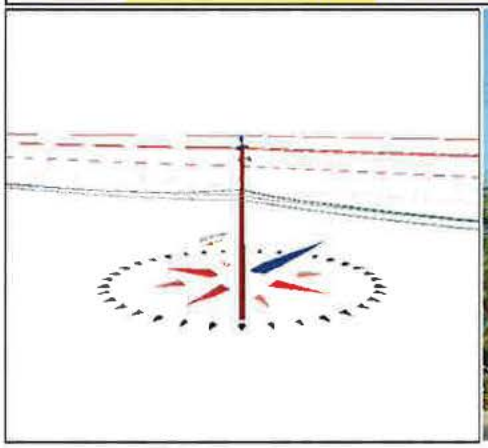
Version: 4 2 / 4.06
* includes Load Factor(s)

² Worst Wind per Guy Wire
³ Wind at 178.6°

O-Calc® Pro *Analysis Report*

Monday, October 13, 2014 4:18:12 PM

File Name:	**P82141 GRADE B**	Pole Length / Class:	**50 / 1**	Code:	**NESC**	Structure Type:	**Unguyed**
Pole Num:	**P82141**	Pole Species:	**WESTERN RED CEDAR**	NESC Rule:	**Rule 250B**	Status:	**N/A**
Aux Data	**Warm Springs & Amigo**	Setting Depth (ft):	**11.60**	Construction Grade:	**B**	Pole Strength Factor:	**0.65**
Aux Data	**Cox**	G/L Circumference (in):	**56.00**	Loading District:	**Light**	Transverse Wind LF:	**2.50**
Aux Data	**Unset**	G/L Fiber Stress (psi):	**6,000**	Ice Thickness (in):	**0.00**	Wire Tension LF:	**1.10**
Aux Data	**Unset**	Allowable Stress (psi):	**3,900**	Wind Speed (mph):	**59.29**	Vertical LF:	**1.50**
Aux Data	**Unset**	Fiber Stress Ht. Reduction:	**No**	Wind Pressure (psf):	**9.00**		



Pole Capacity Utilization		Height	Wind Angle
Maximum:	**78.7%**	4.0 ft	182.7°
Groundline:	**78.0%**	0.0 ft	182.7°
Vertical:	**8.7%**	23.8 ft	182.7°

Pole Moments		Load Angle	Wind Angle
Max Capac. Util:	**119,412 ft-lb**	180.5°	182.7°
Groundline:	**140,030 ft-lb**	180.6°	182.7°

GROUNDLINE LOAD SUMMARY:*Wind at 182.7°, Applied Moment 140,030 ft-lb at 180.6°, Allowable Moment 180,716 ft-lb

	Shear Load (lbs)*	Percent Applied Load	Bending Moment (ft-lb)	Percent of Applied Moment**	Percent of Pole Capacity	Bending Stress (+/- psi)	Vertical Load (lbs)	Vertical Stress (psi)	Total Stress (psi)	Percent of Pole Capacity
Powers:	1,941	37.2	**66,672**	2.5	**1.7**	**1,439**	1,023	4	**1,443**	**37.0**
Comms:	1,901	36.4	**47,109**	7.1	**4.7**	**1,017**	788	3	**1,020**	**26.1**
Pole:	950	18.2	**16,124**	13.5	**8.9**	**348**	2,853	11	**359**	**9.2**
Crossarms:	4	0.1	**136**	0.1	**0.1**	**3**	60	0	**3**	**0.1**
Risers:	301	5.8	**5,413**	0.1	**0.0**	**117**	240	1	**118**	**3.0**
Insulators:	123	2.4	**4,576**	1.0	**0.6**	**99**	310	1	**100**	**2.6**
Pole Load:	5,220	100.0	**140,030**	117.3	**77.5**	**3,022**	5,275	21	**3,043**	**78.0**
Pole Reserve Capacity:			**40,686**		**22.5**	**878**			**857**	**22.0**

LOAD SUMMARY BY OWNER

NVE:	1,432	**52,504**	**1,133**	1,157	5	**1,138**	**29.2**
ZFS:	409	**12,090**	**261**	186	1	**262**	**6.7**
TWT:	523	**12,121**	**262**	234	1	**263**	**6.7**

Version: 4.2 / 4.06
* includes Load Factor(s)

² Worst Wind per Guy Wire
³ Wind at 182.7°

COX:	687	18,003	389	426	2	390	10.0
CTL:	1,219	29,189	630	418	2	632	16.2
Pole:	950	16,124	348	2,853	11	359	9.2
Totals	5,220	140,030	3,022	5,275	21	3,043	78.0

Detailed Load Components

Power:		Owner	Height (ft)	Horiz. Offset (in)	Cable Dia. (in)	Rotate Angle (deg)	Cable Weight (lbs/ft)	Lead/Span Length	Span Angle (deg)	Wire Length (ft)	Tension (lbs)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Primary	AAC 954.0 KCM 61 STRAND	NVE	40.51	4.30	1.1260	-	0.895	172.0	90.0	172.0	10,140	-4,408	41	7,356	2,990
Primary	AAC 954.0 KCM 61 STRAND	NVE	40.51	4.30	1.1260	-	0.895	175.0	270.0	175.0	10,140	4,408	42	7,485	11,934
Primary	AAC 954.0 KCM 61 STRAND	NVE	37.10	29.80	1.1260	-	0.895	172.0	90.0	172.0	10,140	-4,037	-287	6,737	2,414
Primary	AAC 954.0 KCM 61 STRAND	NVE	37.10	29.80	1.1260	-	0.895	175.0	270.0	175.0	10,140	4,037	-292	6,855	10,600
Primary	AAC 954.0 KCM 61 STRAND	NVE	37.10	29.80	1.1260	-	0.895	172.0	90.0	172.0	10,140	-4,037	287	6,737	2,987
Primary	AAC 954.0 KCM 61 STRAND	NVE	37.10	29.80	1.1260	-	0.895	175.0	270.0	175.0	10,140	4,037	292	6,855	11,183
Neutral	AAC 2/0 AWG 7 STRAND ASTER	NVE	32.20	16.39	0.4140	-	0.125	172.0	90.0	172.0	1,506	-520	-22	2,148	1,606
Neutral	AAC 2/0 AWG 7 STRAND ASTER	NVE	32.20	16.39	0.4140	-	0.125	175.0	270.0	175.0	1,506	520	-22	2,186	2,683
Other	144ct, 72ct 5/16" MESS	ZFS	28.97	16.36	1.2400	-	0.687	172.0	90.0	172.1	1,500	-466	121	5,787	5,442
Other	144ct, 72ct 5/16" MESS	ZFS	28.97	16.36	1.2400	-	0.687	175.0	270.0	175.1	1,500	466	123	5,888	6,477
Other	72ct, 24ct 1/4" MESS	TWT	27.10	7.87	0.8900	-	0.442	172.0	90.0	172.0	1,500	-436	37	3,885	3,487
Other	144ct 1/4" MESS	TWT	27.10	7.87	0.9900	-	0.431	175.0	270.0	175.0	1,500	436	37	4,397	4,869
											Totals:	0	357	66,315	66,672

Comm:		Owner	Height (ft)	Horiz. Offset (in)	Cable Dia. (in)	Rotate Angle (deg)	Cable Weight (lbs/ft)	Lead/Span Length	Span Angle (deg)	Wire Length (ft)	Tension (lbs)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
CATV	.50"cx X 2, 288ct, 24ct X 3 1/4"	COX	25.90	7.99	2.1000	-	1.554	172.0	90.0	172.3	1,500	-416	133	8,761	8,478
CATV	.50"cx, 288ct, 24ct X 3 1/4" MESS	COX	25.90	7.99	2.1000	-	1.404	175.0	270.0	175.3	1,500	416	123	8,913	9,452
Telco	1.25" 1/4"MESS	CTL	24.50	8.12	1.5000	-	0.727	172.0	90.0	172.1	1,500	-394	63	5,919	5,589
Telco	1.25" 1/4"MESS	CTL	24.50	8.12	1.5000	-	0.727	175.0	270.0	175.1	1,500	394	65	6,023	6,481
Telco	2" 1/4"MESS	CTL	23.20	8.25	2.2500	-	0.821	172.0	90.0	172.2	1,500	-373	73	8,408	8,108
Telco	2" 1/4"MESS	CTL	23.20	8.25	2.2500	-	0.821	175.0	270.0	175.1	1,500	373	74	8,554	9,001
											Totals:	0	531	46,578	47,109

Crossarm:		Owner	Height (ft)	Horiz. Offset (in)	Offset Angle (deg)	Rotate Angle (deg)	Unit Weight (lbs)	Unit Height (in)	Unit Depth (in)	Unit Diameter (in)	Unit Length (in)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Normal	CROSSARM 3-1/2 X 4-1/2 X 6 -	NVE	34.40	6.43	90.0	90.0	40.00	4.50	3.50	-	72.00	-	0	137	136
											Totals:	0	0	137	136

Riser:		Owner	Height (ft)	Horiz. Offset (in)	Offset Angle (deg)	Rotate Angle (deg)	Unit Weight (lbs)	Unit Height (in)	Unit Depth (in)	Unit Diameter (in)	Unit Length (in)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
2" Riser 0.0"	2" Riser	COX	25.25	9.83	0.0	0.0	1.89	303.00	-	0.00	-	-	-17	85	68
3" Riser	3" Riser	NVE	31.10	9.83	340.0	340.0	5.18	373.20	-	0.00	-	-	-43	1,629	1,586
4" Riser	4" Riser	TWT	26.00	9.83	280.0	280.0	6.28	312.00	-	0.00	-	-	-9	3,769	3,760
											Totals:	0	-69	5,483	5,413

Insulator:		Owner	Height (ft)	Horiz. Offset (in)	Offset Angle (deg)	Rotate Angle (deg)	Unit Weight (lbs)	Unit Height (in)	Unit Depth (in)	Unit Diameter (in)	Unit Length (in)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Post	Post Insulator - 69 kV	NVE	38.40	4.30	180.0	180.0	54.00	25.38	-	7.25	-	-	29	1,133	1,162
Post	Post Insulator - 69 kV	NVE	37.10	4.42	0.0	0.0	54.00	25.38	-	7.25	-	-	-201	1,096	895
Post	Post Insulator - 69 kV	NVE	37.10	4.42	180.0	180.0	54.00	25.38	-	7.25	-	-	201	1,096	1,297
Post	Post Insulator - 15 kV	NVE	32.20	4.89	0.0	0.0	11.00	11.50	-	4.75	-	-	-23	279	256
Davit	Three Bolt	ZFS	28.60	5.23	180.0	90.0	5.00	12.00	-	3.00	-	-	10	161	171
Bolt	Three Bolt	TWT	27.10	5.37	180.0	90.0	5.00	0.00	-	3.00	-	-	5	0	5
Bolt	Three Bolt	COX	25.90	5.49	180.0	90.0	5.00	0.00	-	3.00	-	-	5	0	5
Bolt	Three Bolt	CTL	24.50	5.62	180.0	90.0	5.00	0.00	-	3.00	-	-	5	0	5
Bolt	Three Bolt	CTL	23.20	5.75	180.0	90.0	5.00	0.00	-	3.00	-	-	5	0	5
Deadend	CUTOUT	NVE	34.40	32.00	168.6	0.0	3.00	12.75	-	3.80	-	-	12	260	272
Deadend	CUTOUT	NVE	34.40	-32.00	11.4	0.0	3.00	12.75	-	3.80	-	-	-12	260	248
Deadend	CUTOUT	NVE	34.40	-18.00	19.7	0.0	3.00	12.75	-	3.80	-	-	-7	260	253
											Totals:	0	30	4,546	4,576

Pole Buckling

Buckling	Buckling (ft)	Buckling Section (% Buckling Col. Hgt.)	Buckling (in)	Min. Buckling (in)	Diameter (in)	Diameter (in)	Modulus of (psi)	Pole (pcf)	Ice Density (pcf)	Pole Tip (ft)	Buckling Load (lbs)	Buckling Load (lbs)	Buckling Load
2.00	23.80	34.82	15.83	21.68	8.60	17.83	1,000,000	50.00	57.00	38.40	60,636	5,275	11.50

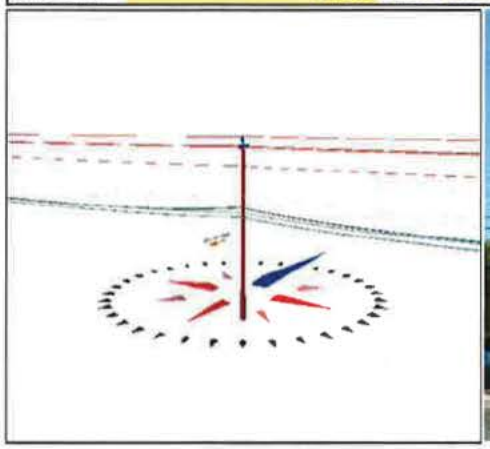
Version: 4.2 / 4.06
* includes Load Factor(s)

[2] Worst Wind per Guy Wire
[3] Wind at 182.7°

O-Calc® Pro *Analysis Report*

Monday, October 13, 2014 4:15:08 PM

File Name:	P82140 GRADE B	Pole Length / Class:	50 / 1	Code:	NESC	Structure Type:	Unguyed
Pole Num:	P82140	Pole Species:	WESTERN RED CEDAR	NESC Rule:	Rule 250B	Status:	N/A
Aux Data	Warm Springs & Amigo	Setting Depth (ft):	7.70	Construction Grade:	B	Pole Strength Factor:	0.65
Aux Data	Cox	G/L Circumference (in):	49.00	Loading District:	Light	Transverse Wind LF:	2.50
Aux Data	Unset	G/L Fiber Stress (psi):	6,000	Ice Thickness (in):	0.00	Wire Tension LF:	1.10
Aux Data	Unset	Allowable Stress (psi):	3,900	Wind Speed (mph):	59.29	Vertical LF:	1.50
Aux Data	Unset	Fiber Stress Ht. Reduction:	No	Wind Pressure (psf):	9.00		



Pole Capacity Utilization		Height	Wind Angle
Maximum:	115.4%	0.0 ft	180.0°
Groundline:	115.4%	0.0 ft	180.0°
Vertical:	14.9%	26.2 ft	180.0°

Pole Moments		Load Angle	Wind Angle
Max Capac. Util:	138,916 ft-lb	180.0°	180.0°
Groundline:	138,916 ft-lb	180.0°	180.0°

GROUNDLINE LOAD SUMMARY:*Wind at 180.0°, Applied Moment 138,916 ft-lb at 180.0°, Allowable Moment 121,066 ft-lb

	Shear Load (lbs)*	Percent Applied Load	Bending Moment (ft-lb)	Percent of Applied Moment**	Percent of Pole Capacity	Bending Stress (+/- psi)	Vertical Load (lbs)	Vertical Stress (psi)	Total Stress (psi)	Percent of Pole Capacity
Powers:	1,932	39.4	70,918	5.9	6.8	2,285	1,017	5	2,290	58.7
Comms:	1,909	38.9	45,469	6.3	7.2	1,465	770	4	1,469	37.7
Pole:	959	19.6	18,332	13.2	15.1	591	2,602	14	604	15.5
Insulators:	100	2.0	4,197	0.9	1.1	135	297	2	137	3.5
Pole Load:	4,900	100.0	138,916	100.0	114.7	4,475	4,687	25	4,500	115.4
Pole Reserve Capacity:			-17,850		-14.7	-575			-600	-15.4

LOAD SUMMARY BY OWNER

NVE:	1,332	55,802	1,798	993	5	1,803	46.2
ZFS:	378	10,785	347	179	1	348	8.9
TWT:	323	8,512	274	120	1	275	7.0
COX:	685	17,318	558	374	2	560	14.4
CTL:	1,223	28,166	907	419	2	910	23.3

Version: 4.2 / 4.06
* includes Load Factor(s)

² Worst Wind per Guy Wire
³ Wind at 180.0°

Pole:	959	18,332	591	2,602	14	604	15.5
Totals	4,900	138,916	4,475	4,687	25	4,500	115.4

Detailed Load Components

Power:		Owner	Height (ft)	Horiz. Offset (in)	Cable Dia. (in)	Rotate Angle (deg)	Cable Weight (lbs/ft)	Lead/Span Length	Span Angle (deg)	Wire Length (ft)	Tension (lbs)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Primary	AAC 954.0 KCM 61 STRAND	NVE	44.41	4.30	1.1260	-	0.895	175.0	90.0	175.0	10,140	0	42	8,214	8,256
Primary	AAC 954.0 KCM 61 STRAND	NVE	44.41	4.30	1.1260	-	0.895	173.0	270.0	173.0	10,140	0	42	8,120	8,161
Primary	AAC 954.0 KCM 61 STRAND	NVE	41.50	29.74	1.1260	-	0.895	175.0	90.0	175.0	10,140	0	-291	7,675	7,384
Primary	AAC 954.0 KCM 61 STRAND	NVE	41.50	29.74	1.1260	-	0.895	173.0	270.0	173.0	10,140	0	-288	7,587	7,300
Primary	AAC 954.0 KCM 61 STRAND	NVE	41.50	29.74	1.1260	-	0.895	175.0	90.0	175.0	10,140	0	291	7,675	7,966
Primary	AAC 954.0 KCM 61 STRAND	NVE	41.50	29.74	1.1260	-	0.895	173.0	270.0	173.0	10,140	0	288	7,587	7,875
Neutral	AAC 2/0 AWG 7 STRAND ASTER	NVE	36.20	16.33	0.4140	-	0.125	175.0	90.0	175.0	1,506	0	-22	2,460	2,438
Neutral	AAC 2/0 AWG 7 STRAND ASTER	NVE	36.20	16.33	0.4140	-	0.125	173.0	270.0	173.0	1,506	0	-22	2,432	2,410
Other	144ct, 24ct 5/16" MESS	ZFS	28.25	8.01	1.1400	-	0.657	175.0	90.0	175.1	1,500	0	58	5,284	5,341
Other	144ct, 24ct 5/16" MESS	ZFS	28.25	8.01	1.1400	-	0.657	173.0	270.0	173.1	1,500	0	57	5,223	5,280
Other	144ct 1/4" MESS	TWT	26.10	8.20	0.9900	-	0.431	175.0	90.0	175.0	1,500	0	39	4,239	4,278
Other	144ct 1/4" MESS	TWT	26.10	8.20	0.9900	-	0.431	173.0	270.0	173.0	1,500	0	38	4,191	4,229
											Totals:	0	231	70,687	70,918

Comm:		Owner	Height (ft)	Horiz. Offset (in)	Cable Dia. (in)	Rotate Angle (deg)	Cable Weight (lbs/ft)	Lead/Span Length	Span Angle (deg)	Wire Length (ft)	Tension (lbs)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
CATV	.50"cx, 288ct, 24ct X 3 1/4" MESS	COX	24.90	8.30	2.1000	-	1.404	175.0	90.0	175.3	1,500	0	128	8,579	8,706
CATV	.50"cx, 288ct, 24ct X 3 1/4" MESS	COX	24.90	8.30	2.1000	-	1.404	173.0	270.0	173.3	1,500	0	126	8,481	8,607
Telco	1.25" 1/4"MESS	CTL	23.50	8.42	1.5000	-	0.727	175.0	90.0	175.1	1,500	0	67	5,783	5,850
Telco	1.25" 1/4"MESS	CTL	23.50	8.42	1.5000	-	0.727	173.0	270.0	173.1	1,500	0	66	5,717	5,783
Telco	2" 1/4"MESS	CTL	22.30	8.53	2.2500	-	0.821	175.0	90.0	175.2	1,500	0	77	8,232	8,308
Telco	2" 1/4"MESS	CTL	22.30	8.53	2.2500	-	0.821	173.0	270.0	173.1	1,500	0	76	8,138	8,213
											Totals:	0	539	44,930	45,469

Insulator:		Owner	Height (ft)	Horiz. Offset (in)	Offset Angle (deg)	Rotate Angle (deg)	Unit Weight (lbs)	Unit Height (in)	Unit Depth (in)	Unit Diameter (in)	Unit Length (in)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Post	Post Insulator - 69 kV	NVE	42.30	4.30	180.0	180.0	54.00	25.38	-	7.25	-	-	29	1,246	1,275
Post	Post Insulator - 69 kV	NVE	41.50	4.37	0.0	0.0	54.00	25.38	-	7.25	-	-	-201	1,223	1,023
Post	Post Insulator - 69 kV	NVE	41.50	4.37	180.0	180.0	54.00	25.38	-	7.25	-	-	201	1,223	1,424
Post	Post Insulator - 15 kV	NVE	36.20	4.83	0.0	0.0	11.00	11.50	-	4.75	-	-	-22	313	291
Bolt	Three Bolt	ZFS	28.25	5.51	180.0	90.0	5.00	12.00	-	3.00	-	-	5	159	164
Bolt	Three Bolt	TWT	26.10	5.70	180.0	90.0	5.00	0.00	-	3.00	-	-	5	0	5
Bolt	Three Bolt	COX	24.90	5.80	180.0	90.0	5.00	0.00	-	3.00	-	-	5	0	5
Bolt	Three Bolt	CTL	23.50	5.92	180.0	90.0	5.00	0.00	-	3.00	-	-	5	0	5
Bolt	Three Bolt	CTL	22.30	6.03	180.0	90.0	5.00	0.00	-	3.00	-	-	5	0	5
											Totals:	0	32	4,165	4,197

Pole Buckling

Version: 4.2 / 4.06
* includes Load Factor(s)

² Worst Wind per Guy Wire
³ Wind at 180.0°

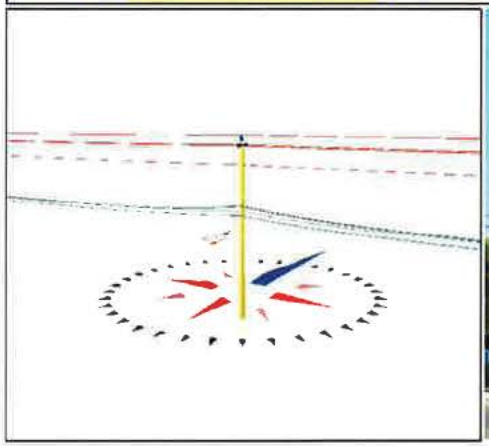
Buckling	Buckling (ft)	Buckling Section (% Buckling Col. Hgt.)	Buckling (in)	Min. Buckling (in)	Diameter (in)	Diameter (in)	Modulus of (psi)	Pole (pcf)	Ice Density (pcf)	Pole Tip (ft)	Buckling Load (lbs)	Buckling Load (lbs)	Buckling Load
2.00	26.22	34.17	14.11	21.48	8.60	15.61	1,000,000	50.00	57.00	42.30	31,555	**4,687**	**6.73**

Revised

O-Calc® Pro *Analysis Report*

Friday, October 24, 2014 8:16:21 AM

File Name:	P82140 GRADE B	Pole Length / Class:	50 / 1	Code:	NESC	Structure Type:	Unguyed
Pole Num:	P82140	Pole Species:	WESTERN RED CEDAR	NESC Rule:	Rule 250B	Status:	N/A
Aux Data	Warm Springs & Amigo	Setting Depth (ft):	7.70	Construction Grade:	B	Pole Strength Factor:	0.65
Aux Data	Cox	G/L Circumference (in):	51.50	Loading District:	Light	Transverse Wind LF:	2.50
Aux Data	Unset	G/L Fiber Stress (psi):	6,000	Ice Thickness (in):	0.00	Wire Tension LF:	1.10
Aux Data	Unset	Allowable Stress (psi):	3,900	Wind Speed (mph):	59.29	Vertical LF:	1.50
Aux Data	Unset	Fiber Stress Ht. Reduction:	No	Wind Pressure (psf):	9.00		



Pole Capacity Utilization		Height	Wind Angle
Maximum:	99.7%	0.0 ft	180.0°
Groundline:	99.7%	0.0 ft	180.0°
Vertical:	12.5%	25.8 ft	180.0°

Pole Moments		Load Angle	Wind Angle
Max Capac. Util:	139,361 ft-lb	180.0°	180.0°
Groundline:	139,361 ft-lb	180.0°	180.0°

GROUNDLINE LOAD SUMMARY:*Wind at 180.0°, Applied Moment 139,361 ft-lb at 180.0°, Allowable Moment 140,558 ft-lb

	Shear Load (lbs)*	Percent Applied Load	Bending Moment (ft-lb)	Percent of Applied Moment**	Percent of Pole Capacity	Bending Stress (+/- psi)	Vertical Load (lbs)	Vertical Stress (psi)	Total Stress (psi)	Percent of Pole Capacity
Powers:	1,932	39.2	70,918	5.9	5.9	1,968	1,017	5	1,973	50.6
Comms:	1,909	38.7	45,469	6.2	6.2	1,262	770	4	1,265	32.4
Pole:	991	20.1	18,777	13.5	13.4	521	2,789	13	534	13.7
Insulators:	100	2.0	4,197	0.9	0.9	116	297	1	118	3.0
Pole Load:	4,932	100.0	139,361	100.0	99.1	3,867	4,873	23	3,890	99.7
Pole Reserve Capacity:			1,197		0.9	33			10	0.3

LOAD SUMMARY BY OWNER

NVE:	1,332	55,802	1,548	993	5	1,553	39.8
ZFS:	378	10,785	299	179	1	300	7.7
TWT:	323	8,512	236	120	1	237	6.1
COX:	685	17,318	481	374	2	482	12.4
CTL:	1,223	28,166	782	419	2	783	20.1

Version: 4.2 / 4.06
* includes Load Factor(s)

² Worst Wind per Guy Wire
³ Wind at 180.0°

Pole:	991	18,777	521	2,789	13	534	13.7
Totals	4,932	139,361	3,867	4,873	23	3,890	99.7

Detailed Load Components

Power:		Owner	Height (ft)	Horiz. Offset (in)	Cable Dia. (in)	Rotate Angle (deg)	Cable Weight (lbs/ft)	Lead/Span Length	Span Angle (deg)	Wire Length (ft)	Tension (lbs)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Primary	AAC 954.0 KCM 61 STRAND	NVE	44.41	4.30	1.1260	-	0.895	175.0	90.0	175.0	10,140	0	42	8,214	8,256
Primary	AAC 954.0 KCM 61 STRAND	NVE	44.41	4.30	1.1260	-	0.895	173.0	270.0	173.0	10,140	0	42	8,120	8,161
Primary	AAC 954.0 KCM 61 STRAND	NVE	41.50	29.74	1.1260	-	0.895	175.0	90.0	175.0	10,140	0	-291	7,675	7,384
Primary	AAC 954.0 KCM 61 STRAND	NVE	41.50	29.74	1.1260	-	0.895	173.0	270.0	173.0	10,140	0	-288	7,587	7,300
Primary	AAC 954.0 KCM 61 STRAND	NVE	41.50	29.74	1.1260	-	0.895	175.0	90.0	175.0	10,140	0	291	7,675	7,966
Primary	AAC 954.0 KCM 61 STRAND	NVE	41.50	29.74	1.1260	-	0.895	173.0	270.0	173.0	10,140	0	288	7,587	7,875
Neutral	AAC 2/0 AWG 7 STRAND ASTER	NVE	36.20	16.33	0.4140	-	0.125	175.0	90.0	175.0	1,506	0	-22	2,460	2,438
Neutral	AAC 2/0 AWG 7 STRAND ASTER	NVE	36.20	16.33	0.4140	-	0.125	173.0	270.0	173.0	1,506	0	-22	2,432	2,410
Other	144ct, 24ct 5/16" MESS	ZFS	28.25	8.01	1.1400	-	0.657	175.0	90.0	175.1	1,500	0	58	5,284	5,341
Other	144ct, 24ct 5/16" MESS	ZFS	28.25	8.01	1.1400	-	0.657	173.0	270.0	173.1	1,500	0	57	5,223	5,280
Other	144ct 1/4" MESS	TWT	26.10	8.20	0.9900	-	0.431	175.0	90.0	175.0	1,500	0	39	4,239	4,278
Other	144ct 1/4" MESS	TWT	26.10	8.20	0.9900	-	0.431	173.0	270.0	173.0	1,500	0	38	4,191	4,229
											Totals:	0	231	70,687	70,918

Comm:		Owner	Height (ft)	Horiz. Offset (in)	Cable Dia. (in)	Rotate Angle (deg)	Cable Weight (lbs/ft)	Lead/Span Length	Span Angle (deg)	Wire Length (ft)	Tension (lbs)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
CATV	.50"cx, 288ct, 24ct X 3 1/4" MESS	COX	24.90	8.30	2.1000	-	1.404	175.0	90.0	175.3	1,500	0	126	8,579	8,706
CATV	.50"cx, 288ct, 24ct X 3 1/4" MESS	COX	24.90	8.30	2.1000	-	1.404	173.0	270.0	173.3	1,500	0	126	8,481	8,607
Telco	1.25" 1/4"MESS	CTL	23.50	8.42	1.5000	-	0.727	175.0	90.0	175.1	1,500	0	67	5,783	5,850
Telco	1.25" 1/4"MESS	CTL	23.50	8.42	1.5000	-	0.727	173.0	270.0	173.1	1,500	0	66	5,717	5,783
Telco	2" 1/4"MESS	CTL	22.30	8.53	2.2500	-	0.821	175.0	90.0	175.2	1,500	0	77	8,232	8,308
Telco	2" 1/4"MESS	CTL	22.30	8.53	2.2500	-	0.821	173.0	270.0	173.1	1,500	0	76	8,138	8,213
											Totals:	0	539	44,930	45,469

Insulator:		Owner	Height (ft)	Horiz. Offset (in)	Offset Angle (deg)	Rotate Angle (deg)	Unit Weight (lbs)	Unit Height (in)	Unit Depth (in)	Unit Diameter (in)	Unit Length (in)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Post	Post Insulator - 69 kV	NVE	42.30	4.30	180.0	180.0	54.00	25.38	-	7.25	-	-	29	1,246	1,275
Post	Post Insulator - 69 kV	NVE	41.50	4.37	0.0	0.0	54.00	25.38	-	7.25	-	-	-201	1,223	1,023
Post	Post Insulator - 69 kV	NVE	41.50	4.37	180.0	180.0	54.00	25.38	-	7.25	-	-	201	1,223	1,424
Post	Post Insulator - 15 kV	NVE	36.20	4.83	0.0	0.0	11.00	11.50	-	4.75	-	-	-22	313	291
Bolt	Three Bolt	ZFS	28.25	5.51	180.0	90.0	5.00	12.00	-	3.00	-	-	5	159	164
Bolt	Three Bolt	TWT	26.10	5.70	180.0	90.0	5.00	0.00	-	3.00	-	-	5	0	5
Bolt	Three Bolt	COX	24.90	5.80	180.0	90.0	5.00	0.00	-	3.00	-	-	5	0	5
Bolt	Three Bolt	CTL	23.50	5.92	180.0	90.0	5.00	0.00	-	3.00	-	-	5	0	5
Bolt	Three Bolt	CTL	22.30	6.03	180.0	90.0	5.00	0.00	-	3.00	-	-	5	0	5
											Totals:	0	32	4,165	4,197

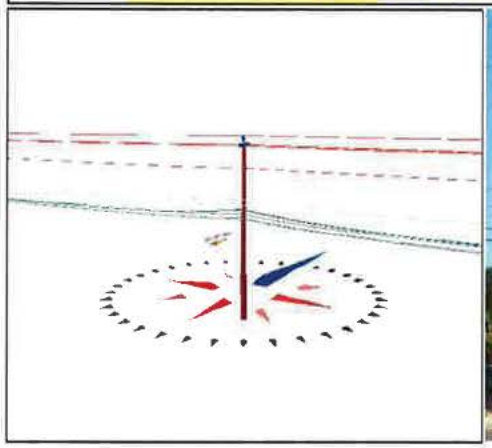
Pole Buckling

Buckling	Buckling (ft)	Buckling Section (% Buckling Col. Hgt.)	Buckling (in)	Min. Buckling (in)	Diameter (in)	Diameter (in)	Modulus of (psi)	Pole (pcf)	Ice Density (pcf)	Pole Tip (ft)	Buckling Load (lbs)	Buckling Load (lbs)	Buckling Load
2.00	25.62	34.36	14.76	21.76	8.60	16.40	1,000,000	50.00	57.00	42.30	38,887	**4,873**	**7.98**

O-Calc® Pro *Analysis Report*

Monday, October 13, 2014 4:11:32 PM

File Name:	P82139 GRADE B	Pole Length / Class:	50 / 1	Code:	NESC	Structure Type:	Unguyed
Pole Num:	P82139	Pole Species:	WESTERN RED CEDAR	NESC Rule:	Rule 250B	Status:	N/A
Aux Data	Warm Springs & Amigo	Setting Depth (ft):	7.70	Construction Grade:	B	Pole Strength Factor:	0.65
Aux Data	Cox	G/L Circumference (in):	52.00	Loading District:	Light	Transverse Wind LF:	2.50
Aux Data	Unset	G/L Fiber Stress (psi):	6,000	Ice Thickness (in):	0.00	Wire Tension LF:	1.10
Aux Data	Unset	Allowable Stress (psi):	3,900	Wind Speed (mph):	59.29	Vertical LF:	1.50
Aux Data	Unset	Fiber Stress Ht. Reduction:	No	Wind Pressure (psf):	9.00		



Pole Capacity Utilization		Height	Wind Angle
Maximum:	97.0%	0.0 ft	180.0°
Groundline:	97.0%	0.0 ft	180.0°
Vertical:	12.0%	25.4 ft	180.0°

Pole Moments		Load Angle	Wind Angle
Max Capac. Util:	139,479 ft-lb	180.0°	180.0°
Groundline:	139,479 ft-lb	180.0°	180.0°

GROUNDLINE LOAD SUMMARY:*Wind at 180.0°, Applied Moment 139,479 ft-lb at 180.0°, Allowable Moment 144,692 ft-lb

	Shear Load (lbs)*	Percent Applied Load	Bending Moment (ft-lb)	Percent of Applied Moment**	Percent of Pole Capacity	Bending Stress (+/- psi)	Vertical Load (lbs)	Vertical Stress (psi)	Total Stress (psi)	Percent of Pole Capacity
Powers:	1,953	38.4	70,762	5.7	5.5	1,907	1,019	5	1,912	49.0
Comms:	1,842	36.2	42,600	5.5	5.3	1,148	766	4	1,152	29.5
Pole:	997	19.6	18,866	13.5	13.0	509	2,827	13	522	13.4
Risers:	197	3.9	3,054	2.2	2.1	82	101	0	83	2.1
Insulators:	100	2.0	4,196	0.9	0.9	113	297	1	114	2.9
Pole Load:	5,090	100.0	139,479	100.0	96.4	3,759	5,010	23	3,783	97.0
Pole Reserve Capacity:			5,213		3.6	141			117	3.0

LOAD SUMMARY BY OWNER

NVE:	1,325	55,547	1,497	988	5	1,502	38.5
ZFS:	408	11,220	302	186	1	303	7.8
TWT:	518	11,229	303	221	1	304	7.8
COX:	626	15,349	414	372	2	415	10.7

Version: 4.2 / 4.06
* includes Load Factor(s)

² Worst Wind per Guy Wire
³ Wind at 180.0°

CTL:	1,216	27,267	735	417	2	737	18.9
Pole:	997	18,866	509	2,827	13	522	13.4
Totals	5,090	139,479	3,759	5,010	23	3,783	97.0

Detailed Load Components

Power:		Owner	Height (ft)	Horiz. Offset (in)	Cable Dia. (in)	Rotate Angle (deg)	Cable Weight (lbs/ft)	Lead/Span Length	Span Angle (deg)	Wire Length (ft)	Tension (lbs)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Primary	AAC 954.0 KCM 61 STRAND	NVE	44.41	4.30	1.1260	-	0.895	173.0	90.0	173.0	10,140	-166	42	8,120	7,996
Primary	AAC 954.0 KCM 61 STRAND	NVE	44.41	4.30	1.1260	-	0.895	173.0	270.0	173.0	10,140	166	42	8,120	8,327
Primary	AAC 954.0 KCM 61 STRAND	NVE	41.70	29.73	1.1260	-	0.895	173.0	90.0	173.0	10,140	-156	-288	7,624	7,181
Primary	AAC 954.0 KCM 61 STRAND	NVE	41.70	29.73	1.1260	-	0.895	173.0	270.0	173.0	10,140	156	-288	7,624	7,492
Primary	AAC 954.0 KCM 61 STRAND	NVE	41.70	29.73	1.1260	-	0.895	173.0	90.0	173.0	10,140	-156	288	7,624	7,756
Primary	AAC 954.0 KCM 61 STRAND	NVE	41.70	29.73	1.1260	-	0.895	173.0	270.0	173.0	10,140	156	288	7,624	8,067
Neutral	AAC 2/0 AWG 7 STRAND ASTER	NVE	35.40	16.42	0.4140	-	0.125	173.0	90.0	173.0	1,506	-20	-22	2,378	2,336
Neutral	AAC 2/0 AWG 7 STRAND ASTER	NVE	35.40	16.42	0.4140	-	0.125	173.0	270.0	173.0	1,506	20	-22	2,378	2,376
Other	144ct, 72ct 5/16" MESS	ZFS	27.20	8.16	1.2400	-	0.687	173.0	90.0	173.1	1,500	-15	61	5,470	5,516
Other	144ct, 72ct 5/16" MESS	ZFS	27.20	8.16	1.2400	-	0.687	173.0	270.0	173.1	1,500	15	61	5,470	5,546
Other	144ct 1/4" MESS	TWT	25.20	8.34	0.9900	-	0.431	173.0	90.0	173.0	1,500	-14	39	4,046	4,071
Other	144ct 1/4" MESS	TWT	25.20	8.34	0.9900	-	0.431	173.0	270.0	173.0	1,500	14	39	4,046	4,099
											Totals:	0	238	70,524	70,762

Comm:		Owner	Height (ft)	Horiz. Offset (in)	Cable Dia. (in)	Rotate Angle (deg)	Cable Weight (lbs/ft)	Lead/Span Length	Span Angle (deg)	Wire Length (ft)	Tension (lbs)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
CATV	.50"cx, 288ct, 24ct X 3 1/4" MESS	COX	24.10	8.44	1.9300	-	1.404	173.0	90.0	173.3	1,500	-13	128	7,544	7,659
CATV	.50"cx, 288ct, 24ct X 3 1/4" MESS	COX	24.10	8.44	1.9300	-	1.404	173.0	270.0	173.3	1,500	13	128	7,544	7,685
Telco	1.25" 1/4"MESS	CTL	22.80	8.56	1.5000	-	0.727	173.0	90.0	173.1	1,500	-13	67	5,547	5,602
Telco	1.25" 1/4"MESS	CTL	22.80	8.56	1.5000	-	0.727	173.0	270.0	173.1	1,500	13	67	5,547	5,627
Telco	2" 1/4"MESS	CTL	21.75	8.65	2.2500	-	0.821	173.0	90.0	173.2	1,500	-12	77	7,937	8,002
Telco	2" 1/4"MESS	CTL	21.75	8.65	2.2500	-	0.821	173.0	270.0	173.1	1,500	12	77	7,937	8,026
											Totals:	0	544	42,055	42,600

Riser:		Owner	Height (ft)	Horiz. Offset (in)	Offset Angle (deg)	Rotate Angle (deg)	Unit Weight (lbs)	Unit Height (in)	Unit Depth (in)	Unit Diameter (in)	Unit Length (in)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
4" Riser	4" Riser	TWT	23.30	8.62	270.0	270.0	5.63	279.60	-	0.00	-	-	0	3,054	3,054
											Totals:	0	0	3,054	3,054

Insulator:		Owner	Height (ft)	Horiz. Offset (in)	Offset Angle (deg)	Rotate Angle (deg)	Unit Weight (lbs)	Unit Height (in)	Unit Depth (in)	Unit Diameter (in)	Unit Length (in)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Post	Post Insulator - 69 kV	NVE	42.30	4.30	180.0	180.0	54.00	25.38	-	7.25	-	-	29	1,246	1,275
Post	Post Insulator - 69 kV	NVE	41.70	4.35	0.0	0.0	54.00	25.38	-	7.25	-	-	-201	1,229	1,028
Post	Post Insulator - 69 kV	NVE	41.70	4.35	180.0	180.0	54.00	25.38	-	7.25	-	-	201	1,229	1,430
Post	Post Insulator - 15 kV	NVE	35.40	4.92	0.0	0.0	11.00	11.50	-	4.75	-	-	-23	306	284
Bolt	Three Bolt	ZFS	27.20	5.66	180.0	90.0	5.00	12.00	-	3.00	-	-	5	153	158
Bolt	Three Bolt	TWT	25.20	5.84	180.0	90.0	5.00	0.00	-	3.00	-	-	5	0	5
Bolt	Three Bolt	COX	24.10	5.94	180.0	90.0	5.00	0.00	-	3.00	-	-	5	0	5

Version: 4.2 / 4.06
* includes Load Factor(s)

² Worst Wind per Guy Wire
³ Wind at 180.0°

Bolt	Three Bolt	CTL	22.80	6.06	180.0	90.0	5.00	0.00	-	3.00	-	-	5	0	5
Bolt	Three Bolt	CTL	21.75	6.15	180.0	90.0	5.00	0.00	-	3.00	-	-	5	0	5
											Totals:	0	33	4,164	4,196

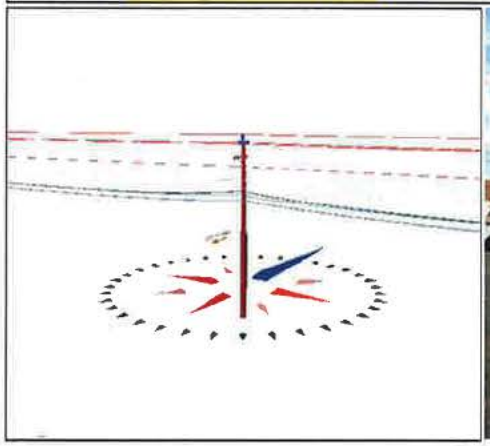
Pole Buckling

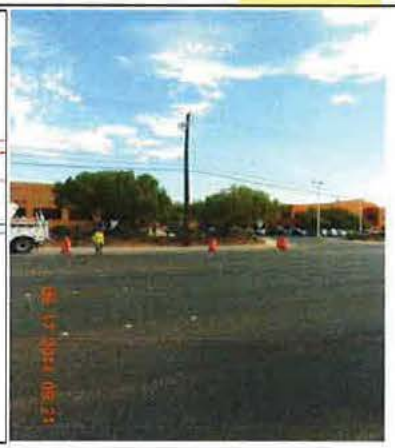
Buckling	Buckling (ft)	Buckling Section (% Buckling Col. Hgt.)	Buckling (in)	Min. Buckling (in)	Diameter (in)	Diameter (in)	Modulus of (psi)	Pole (pcf)	Ice Density (pcf)	Pole Tip (ft)	Buckling Load (lbs)	Buckling Load (lbs)	Buckling Load
2.00	25.43	34.34	14.91	21.91	8.60	16.56	1,000,000	50.00	57.00	42.30	41,784	5,010	8.34

O-Calc® Pro *Analysis Report*

Wednesday, October 01, 2014 1:22:05 PM

File Name:	**P82138 GRADE B**	Pole Length / Class:	**50 / 1**	Code:	**NESC**	Structure Type:	**Unguyed**
Pole Num:	**P82138**	Pole Species:	**WESTERN RED CEDAR**	NESC Rule:	**Rule 250B**	Status:	**N/A**
Aux Data	**Warm Springs & Amigo**	Setting Depth (ft):	**8.90**	Construction Grade:	**B**	Pole Strength Factor:	**0.65**
Aux Data	**Cox**	G/L Circumference (in):	**61.00**	Loading District:	**Light**	Transverse Wind LF:	**2.50**
Aux Data	**Unset**	G/L Fiber Stress (psi):	**6,000**	Ice Thickness (in):	**0.00**	Wire Tension LF:	**1.10**
Aux Data	**Unset**	Allowable Stress (psi):	**3,900**	Wind Speed (mph):	**59.29**	Vertical LF:	**1.50**
Aux Data	**Unset**	Fiber Stress Ht. Reduction:	**No**	Wind Pressure (psf):	**9.00**		





Pole Capacity Utilization		Height	Wind Angle
Maximum:	**63.4%**	8.7 ft	178.6°
Groundline:	**61.6%**	0.0 ft	178.6°
Vertical:	**7.2%**	24.6 ft	178.6°

Pole Moments		Load Angle	Wind Angle
Max Capac. Util:	**101,017 ft-lb**	179.7°	178.6°
Groundline:	**142,700 ft-lb**	179.7°	178.6°

GROUNDLINE LOAD SUMMARY:*Wind at 178.6°, Applied Moment 142,700 ft-lb at 179.7°, Allowable Moment 233,573 ft-lb

	Shear Load (lbs)*	Percent Applied Load	Bending Moment (ft-lb)	Percent of Applied Moment**	Percent of Pole Capacity	Bending Stress (+/- psi)	Vertical Load (lbs)	Vertical Stress (psi)	Total Stress (psi)	Percent of Pole Capacity
Powers:	1,837	37.0	**67,824**	10.3	**4.5**	**1,132**	967	3	**1,136**	**29.1**
Comms:	1,762	35.5	**47,082**	8.9	**3.9**	**786**	733	2	**789**	**20.2**
Pole:	1,079	21.8	**19,320**	19.1	**8.3**	**323**	3,462	12	**334**	**8.6**
Crossarms:	4	0.1	**146**	0.1	**0.1**	**2**	60	0	**3**	**0.1**
Risers:	156	3.1	**3,371**	3.3	**1.4**	**56**	98	0	**57**	**1.5**
Insulators:	123	2.5	**4,957**	1.2	**0.5**	**83**	310	1	**84**	**2.1**
Pole Load:	4,961	100.0	**142,700**	141.3	**61.1**	**2,383**	5,631	19	**2,402**	**61.6**
Pole Reserve Capacity:			**90,874**		**38.9**	**1,517**			**1,498**	**38.4**

LOAD SUMMARY BY OWNER

NVE:	1,454	**56,226**	**939**	1,129	4	**943**	**24.2**
ZFS:	359	**11,146**	**186**	171	1	**187**	**4.8**
TWT:	307	**8,910**	**149**	114	0	**149**	**3.8**

Version: 4.2 / 4.06
* includes Load Factor(s)

² Worst Wind per Guy Wire
³ Wind at 178.6°

COX:	599	16,838	281	356	1	282	7.2
CTL:	1,163	30,260	505	399	1	507	13.0
Pole:	1,079	19,320	323	3,462	12	334	8.6
Totals	4,961	142,700	2,383	5,631	19	2,402	61.6

Detailed Load Components

Power:		Owner	Height (ft)	Horiz. Offset (in)	Cable Dia. (in)	Rotate Angle (deg)	Cable Weight (lbs/ft)	Lead/Span Length	Span Angle (deg)	Wire Length (ft)	Tension (lbs)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Primary	AAC 954.0 KCM 61 STRAND	NVE	43.21	4.30	1.1260	-	0.895	173.0	90.0	173.0	10,140	2,503	42	7,898	10,443
Primary	AAC 954.0 KCM 61 STRAND	NVE	43.21	4.30	1.1260	-	0.895	158.0	270.0	158.0	10,140	-2,503	38	7,213	4,748
Primary	AAC 954.0 KCM 61 STRAND	NVE	40.60	29.74	1.1260	-	0.895	173.0	90.0	173.0	10,140	2,352	-288	7,421	9,485
Primary	AAC 954.0 KCM 61 STRAND	NVE	40.60	29.74	1.1260	-	0.895	158.0	270.0	158.0	10,140	-2,352	-263	6,777	4,162
Primary	AAC 954.0 KCM 61 STRAND	NVE	40.60	29.74	1.1260	-	0.895	173.0	90.0	173.0	10,140	2,352	288	7,421	10,061
Primary	AAC 954.0 KCM 61 STRAND	NVE	40.60	29.74	1.1260	-	0.895	158.0	270.0	158.0	10,140	-2,352	263	6,777	4,688
Neutral	AAC 2/0 AWG 7 STRAND ASTER	NVE	34.30	16.69	0.4140	-	0.125	173.0	90.0	173.0	1,506	295	-23	2,304	2,576
Neutral	AAC 2/0 AWG 7 STRAND ASTER	NVE	34.30	16.69	0.4140	-	0.125	158.0	270.0	158.0	1,506	-295	-21	2,104	1,788
Other	144ct, 24ct 5/16" MESS	ZFS	30.70	8.17	1.1400	-	0.657	173.0	90.0	173.1	1,500	263	58	5,674	5,995
Other	144ct, 24ct 5/16" MESS	ZFS	30.70	8.17	1.1400	-	0.657	158.0	270.0	158.0	1,500	-263	53	5,182	4,973
Other	144ct 1/4" MESS	TWT	28.75	8.42	0.9900	-	0.431	173.0	90.0	173.0	1,500	246	39	4,615	4,900
Other	144ct 1/4" MESS	TWT	28.75	8.42	0.9900	-	0.431	158.0	270.0	158.0	1,500	-246	36	4,215	4,004
											Totals:	0	223	67,601	67,824

Comm:		Owner	Height (ft)	Horiz. Offset (in)	Cable Dia. (in)	Rotate Angle (deg)	Cable Weight (lbs/ft)	Lead/Span Length	Span Angle (deg)	Wire Length (ft)	Tension (lbs)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
CATV	.50"cx, 288ct, 24ct X 3 1/4" MESS	COX	27.70	8.56	1.9300	-	1.404	173.0	90.0	173.3	1,500	237	130	8,668	9,035
CATV	.50"cx, 288ct, 24ct X 3 1/4" MESS	COX	27.70	8.56	1.9300	-	1.404	158.0	270.0	158.2	1,500	-237	119	7,916	7,798
Telco	1.25" 1/4"MESS	CTL	26.60	8.71	1.5000	-	0.727	173.0	90.0	173.1	1,500	228	68	6,469	6,765
Telco	1.25" 1/4"MESS	CTL	26.60	8.71	1.5000	-	0.727	158.0	270.0	158.1	1,500	-228	63	5,908	5,743
Telco	2" 1/4"MESS	CTL	25.20	8.89	2.2500	-	0.821	173.0	90.0	173.2	1,500	216	79	9,193	9,488
Telco	2" 1/4"MESS	CTL	25.20	8.89	2.2500	-	0.821	158.0	270.0	158.1	1,500	-216	72	8,396	8,252
											Totals:	0	531	46,551	47,082

Crossarm:		Owner	Height (ft)	Horiz. Offset (in)	Offset Angle (deg)	Rotate Angle (deg)	Unit Weight (lbs)	Unit Height (in)	Unit Depth (in)	Unit Diameter (in)	Unit Length (in)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Normal	CROSSARM 3-1/2 X 4-1/2 X 6 -	NVE	37.10	6.57	270.0	270.0	40.00	4.50	3.50	-	72.00	-	0	146	146
											Totals:	0	0	146	146

Riser:		Owner	Height (ft)	Horiz. Offset (in)	Offset Angle (deg)	Rotate Angle (deg)	Unit Weight (lbs)	Unit Height (in)	Unit Depth (in)	Unit Diameter (in)	Unit Length (in)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
3" Riser 45.0°	3" Riser	NVE	32.80	10.35	45.0	45.0	5.47	393.60	-	0.00	-	-	-37	3,408	3,371
											Totals:	0	-37	3,408	3,371

Insulator:		Owner	Height (ft)	Horiz. Offset (in)	Offset Angle (deg)	Rotate Angle (deg)	Unit Weight (lbs)	Unit Height (in)	Unit Depth (in)	Unit Diameter (in)	Unit Length (in)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Post	Post Insulator - 69 kV	NVE	41.10	4.30	180.0	180.0	54.00	25.38	-	7.25	-	-	29	1,212	1,241

Version: 4.2 / 4.06
* includes Load Factor(s)

² Worst Wind per Guy Wire
³ Wind at 178.6°

Post	Post Insulator - 69 kV	NVE	40.60	4.36	0.0	0.0	54.00	25.38	-	7.25	-	-	-201	1,197	996
Post	Post Insulator - 69 kV	NVE	40.60	4.36	180.0	180.0	54.00	25.38	-	7.25	-	-	201	1,197	1,398
Post	Post Insulator - 15 kV	NVE	34.30	5.19	0.0	0.0	11.00	11.50	-	4.75	-	-	-23	297	274
Bolt	Three Bolt	ZFS	30.70	5.67	180.0	90.0	5.00	12.00	-	3.00	-	-	5	173	178
Bolt	Three Bolt	TWT	28.75	5.92	180.0	90.0	5.00	0.00	-	3.00	-	-	5	0	5
Bolt	Three Bolt	COX	27.70	6.06	180.0	90.0	5.00	0.00	-	3.00	-	-	5	0	5
Bolt	Three Bolt	CTL	26.60	6.21	180.0	90.0	5.00	0.00	-	3.00	-	-	5	0	5
Bolt	Three Bolt	CTL	25.20	6.39	180.0	90.0	5.00	0.00	-	3.00	-	-	6	0	6
Deadend	CUTOUT	NVE	37.10	32.00	348.4	0.0	3.00	12.75	-	3.80	-	-	-12	281	269
Deadend	CUTOUT	NVE	37.10	-32.00	191.6	0.0	3.00	12.75	-	3.80	-	-	12	281	293
Deadend	CUTOUT	NVE	37.10	-18.00	200.1	0.0	3.00	12.75	-	3.80	-	-	7	281	288
											Totals:	0	39	4,918	4,957

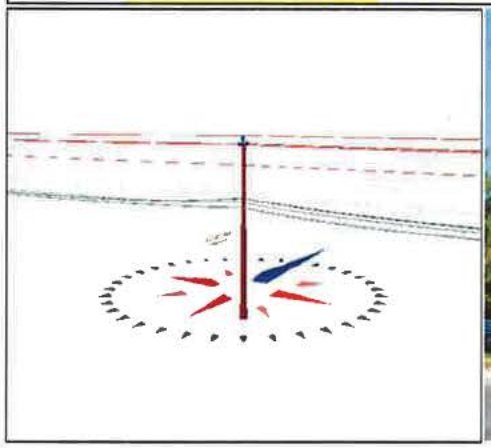
Pole Buckling

Buckling	Buckling (ft)	Buckling Section (% Buckling Col. Hgt.)	Buckling (in)	Min. Buckling (in)	Diameter (in)	Diameter (in)	Modulus of (psi)	Pole (pcf)	Ice Density (pcf)	Pole Tip (ft)	Buckling Load (lbs)	Buckling Load (lbs)	Buckling Load
2.00	24.60	35.00	17.15	22.87	8.60	19.43	1,000,000	50.00	57.00	41.10	78,140	5,631	13.88

O-Calc® Pro *Analysis Report*

Wednesday, October 01, 2014 1:17:58 PM

File Name:	**P82137 GRADE B**	Pole Length / Class:	**50 / 1**	Code:	**NESC**	Structure Type:	**Unguyed**
Pole Num:	**P82137**	Pole Species:	**WESTERN RED CEDAR**	NESC Rule:	**Rule 250B**	Status:	**N/A**
Aux Data	**Warm Springs & Amigo**	Setting Depth (ft):	**8.70**	Construction Grade:	**B**	Pole Strength Factor:	**0.65**
Aux Data	**Cox**	G/L Circumference (in):	**64.00**	Loading District:	**Light**	Transverse Wind LF:	**2.50**
Aux Data	**Unset**	G/L Fiber Stress (psi):	**6,000**	Ice Thickness (in):	**0.00**	Wire Tension LF:	**1.10**
Aux Data	**Unset**	Allowable Stress (psi):	**3,900**	Wind Speed (mph):	**59.29**	Vertical LF:	**1.50**
Aux Data	**Unset**	Fiber Stress Ht. Reduction:	**No**	Wind Pressure (psf):	**9.00**		



Pole Capacity Utilization		Height	Wind Angle
Maximum:	**54.2%**	9.3 ft	180.0°
Groundline:	**52.2%**	0.0 ft	180.0°
Vertical:	**5.8%**	23.9 ft	180.0°

Pole Moments		Load Angle	Wind Angle
Max Capac. Util:	**95,163 ft-lb**	180.0°	180.0°
Groundline:	**139,696 ft-lb**	180.0°	180.0°

GROUNDLINE LOAD SUMMARY:*Wind at 180.0°, Applied Moment 139,696 ft-lb at 180.0°, Allowable Moment 269,758 ft-lb

	Shear Load (lbs)*	Percent Applied Load	Bending Moment (ft-lb)	Percent of Applied Moment**	Percent of Pole Capacity	Bending Stress (+/- psi)	Vertical Load (lbs)	Vertical Stress (psi)	Total Stress (psi)	Percent of Pole Capacity
Powers:	1,899	38.4	**69,466**	7.7	**2.7**	**1,004**	1,000	3	**1,007**	**25.8**
Comms:	1,821	36.9	**46,078**	8.1	**2.8**	**666**	757	2	**668**	**17.1**
Pole:	1,122	22.7	**20,021**	21.0	**7.4**	**289**	3,739	11	**301**	**7.7**
Insulators:	100	2.0	**4,132**	1.3	**0.5**	**60**	297	1	**61**	**1.6**
Pole Load:	4,942	100.0	**139,696**	146.8	**51.8**	**2,020**	5,793	18	**2,037**	**52.2**
Pole Reserve Capacity:			**130,061**		**48.2**	**1,880**			**1,863**	**47.8**

LOAD SUMMARY BY OWNER

NVE:	1,311	**53,937**	**780**	980	3	**783**	**20.1**
ZFS:	371	**10,796**	**156**	176	1	**157**	**4.0**
TWT:	317	**8,847**	**128**	118	0	**128**	**3.3**
COX:	619	**16,610**	**240**	368	1	**241**	**6.2**
CTL:	1,202	**29,485**	**426**	412	1	**428**	**11.0**

Version: 4.2 / 4.06
* includes Load Factor(s)

² Worst Wind per Guy Wire
³ Wind at 180.0°

Pole:	1,122	20,021	289	3,739	11	301	7.7
Totals	4,942	139,696	2,020	5,793	18	2,037	52.2

Detailed Load Components

Power:		Owner	Height (ft)	Horiz. Offset (in)	Cable Dia. (in)	Rotate Angle (deg)	Cable Weight (lbs/ft)	Lead/Span Length	Span Angle (deg)	Wire Length (ft)	Tension (lbs)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Primary	AAC 954.0 KCM 61 STRAND	NVE	43.41	4.30	1.1260	-	0.895	158.0	90.0	158.0	10,140	0	38	7,249	7,287
Primary	AAC 954.0 KCM 61 STRAND	NVE	43.41	4.30	1.1260	-	0.895	184.0	270.0	184.0	10,140	0	44	8,442	8,486
Primary	AAC 954.0 KCM 61 STRAND	NVE	40.90	29.73	1.1260	-	0.895	158.0	90.0	158.0	10,140	0	-263	6,829	6,567
Primary	AAC 954.0 KCM 61 STRAND	NVE	40.90	29.73	1.1260	-	0.895	184.0	270.0	184.0	10,140	0	-306	7,953	7,647
Primary	AAC 954.0 KCM 61 STRAND	NVE	40.90	29.73	1.1260	-	0.895	158.0	90.0	158.0	10,140	0	263	6,829	7,092
Primary	AAC 954.0 KCM 61 STRAND	NVE	40.90	29.73	1.1260	-	0.895	184.0	270.0	184.0	10,140	0	306	7,953	8,259
Neutral	AAC 2/0 AWG 7 STRAND ASTER	NVE	35.40	16.64	0.4140	-	0.125	158.0	90.0	158.0	1,506	0	-21	2,172	2,151
Neutral	AAC 2/0 AWG 7 STRAND ASTER	NVE	35.40	16.64	0.4140	-	0.125	184.0	270.0	184.0	1,506	0	-24	2,529	2,505
Other	144ct, 24ct 5/16" MESS	ZFS	28.75	8.59	1.1400	-	0.657	158.0	90.0	158.1	1,500	0	56	4,855	4,911
Other	144ct, 24ct 5/16" MESS	ZFS	28.75	8.59	1.1400	-	0.657	184.0	270.0	184.0	1,500	0	65	5,654	5,719
Other	144ct 1/4" MESS	TWT	27.60	8.75	0.9900	-	0.431	158.0	90.0	158.0	1,500	0	37	4,047	4,085
Other	144ct 1/4" MESS	TWT	27.60	8.75	0.9900	-	0.431	184.0	270.0	184.0	1,500	0	43	4,713	4,757
											Totals:	0	239	69,227	69,466

Comm:		Owner	Height (ft)	Horiz. Offset (in)	Cable Dia. (in)	Rotate Angle (deg)	Cable Weight (lbs/ft)	Lead/Span Length	Span Angle (deg)	Wire Length (ft)	Tension (lbs)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
CATV	.50"cx, 288ct, 24ct X 3 1/4" MESS	COX	26.40	8.92	1.9300	-	1.404	158.0	90.0	158.2	1,500	0	124	7,547	7,671
CATV	.50"cx, 288ct, 24ct X 3 1/4" MESS	COX	26.40	8.92	1.9300	-	1.404	184.0	270.0	184.3	1,500	0	144	8,789	8,933
Telco	1.25" 1/4"MESS	CTL	25.10	9.11	1.5000	-	0.727	158.0	90.0	158.1	1,500	0	65	5,577	5,642
Telco	1.25" 1/4"MESS	CTL	25.10	9.11	1.5000	-	0.727	184.0	270.0	184.1	1,500	0	76	6,495	6,571
Telco	2" 1/4"MESS	CTL	23.70	9.31	2.2500	-	0.821	158.0	90.0	158.2	1,500	0	75	7,899	7,974
Telco	2" 1/4"MESS	CTL	23.70	9.31	2.2500	-	0.821	184.0	270.0	184.1	1,500	0	88	9,199	9,286
											Totals:	0	573	45,505	46,078

Insulator:		Owner	Height (ft)	Horiz. Offset (in)	Offset Angle (deg)	Rotate Angle (deg)	Unit Weight (lbs)	Unit Height (in)	Unit Depth (in)	Unit Diameter (in)	Unit Length (in)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Post	Post Insulator - 69 kV	NVE	41.30	4.30	180.0	180.0	54.00	25.38	-	7.25	-	-	29	1,218	1,247
Post	Post Insulator - 69 kV	NVE	40.90	4.35	0.0	0.0	54.00	25.38	-	7.25	-	-	-201	1,206	1,005
Post	Post Insulator - 69 kV	NVE	40.90	4.35	180.0	180.0	54.00	25.38	-	7.25	-	-	201	1,206	1,407
Post	Post Insulator - 15 kV	NVE	35.40	5.14	0.0	0.0	11.00	11.50	-	4.75	-	-	-23	306	283
Bolt	Three Bolt	ZFS	28.75	6.09	180.0	90.0	5.00	12.00	-	3.00	-	-	5	162	167
Bolt	Three Bolt	TWT	27.60	6.25	180.0	90.0	5.00	0.00	-	3.00	-	-	5	0	5
Bolt	Three Bolt	COX	26.40	6.42	180.0	90.0	5.00	0.00	-	3.00	-	-	6	0	6
Bolt	Three Bolt	CTL	25.10	6.61	180.0	90.0	5.00	0.00	-	3.00	-	-	6	0	6
Bolt	Three Bolt	CTL	23.70	6.81	180.0	90.0	5.00	0.00	-	3.00	-	-	6	0	6
											Totals:	0	34	4,098	4,132

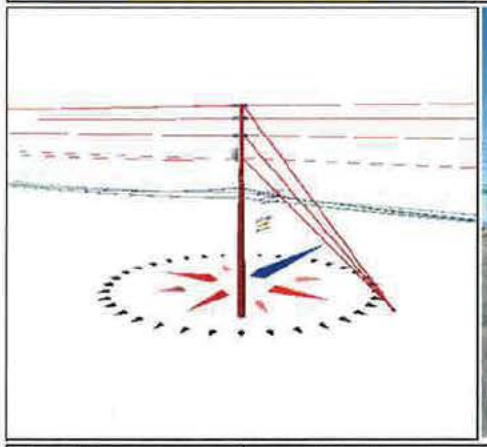
Pole Buckling

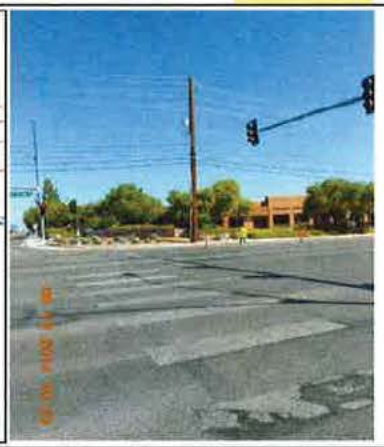
Buckling	Buckling (ft)	Buckling Section (% Buckling Col. Hgt.)	Buckling (in)	Min. Buckling (in)	Diameter (in)	Diameter (in)	Modulus of (psi)	Pole (pcf)	Ice Density (pcf)	Pole Tip (ft)	Buckling Load (lbs)	Buckling Load (lbs)	Buckling Load
2.00	23.91	35.02	17.98	22.93	8.60	20.38	1,000,000	50.00	57.00	41.30	100,029	**5,793**	**17.27**

O-Calc® Pro *Analysis Report*

Wednesday, October 01, 2014 1:13:12 PM

File Name:	P82136 GRADE B	Pole Length / Class:	60 / 1	Code:	NESC	Structure Type:	Guyed
Pole Num:	P82136	Pole Species:	WESTERN RED CEDAR	NESC Rule:	Rule 250B	Status:	N/A
Aux Data	Warm Springs & Amigo	Setting Depth (ft):	9.40	Construction Grade:	B	Pole Strength Factor:	0.65
Aux Data	Cox	G/L Circumference (in):	75.00	Loading District:	Light	Transverse Wind LF:	2.50
Aux Data	Unset	G/L Fiber Stress (psi):	6,000	Ice Thickness (in):	0.00	Wire Tension LF:	1.65
Aux Data	Unset	Allowable Stress (psi):	3,900	Wind Speed (mph):	59.29	Vertical LF:	1.50
Aux Data	Unset	Fiber Stress Ht. Reduction:	No	Wind Pressure (psf):	9.00		





Pole Capacity Utilization		Height	Wind Angle
Maximum:	98.4%	36.0 ft	10.0°
Groundline:	55.4%	0.0 ft	0.0°
Vertical:	22.6%	43.2 ft	270.0°

Pole Moments		Load Angle	Wind Angle
Max Capac. Util:	61,728 ft-lb	293.6°	10.0°
Groundline:	223,525 ft-lb	354.7°	0.0°

Guy Summary		Guy Tensions		Maximum Guy Tensions	
	Attach Height (ft)	% Allowable Tension	Wind Angle	% Allowable Tension	Wind Angle
Guy 1	49.9	182.6%	0.0°	183.2%	310.0°
Guy 2	42.1	178.0%	0.0°	180.8%	270.7°
Guy 3	35.7	104.8%	0.0°	110.7%	270.0°

Anchor Summary		
	Lead Length (ft)	Max. % Allow. Capacity
Anchor 1	40.0	395.7%

GROUNDLINE LOAD SUMMARY:*Wind at 0.0°, Applied Moment 223,525 ft-lb at 354.7°, Allowable Moment 434,128 ft-lb

	Shear Load (lbs)*	Percent Applied Load	Bending Moment (ft-lb)	Percent of Applied Moment**	Percent of Pole Capacity	Bending Stress (+/- psi)	Vertical Load (lbs)	Vertical Stress (psi)	Total Stress (psi)	Percent of Pole Capacity
Powers:	7,453	108.7	329,989	141.2	20.1	2,964	1,506	3	2,968	76.1
Comms:	1,967	28.7	51,602	4.4	0.6	464	826	2	465	11.9
Guys/Braces:	-4,714	-68.7	-211,308	-157.8	-22.4	-1,898	58,184	130	-1,768	-45.3
Power Equipment:	133	1.9	5,037	8.2	1.2	45	548	1	46	1.2

Version: 4.2 / 4.06
* Includes Load Factor(s)

² Worst Wind per Guy Wire
³ Wind at 0.0°

Pole:	1,534	22.4	32,715	53.1	7.5	294	5,857	13	307	7.9
Risers:	281	4.1	5,783	4.8	0.7	52	121	0	52	1.3
Insulators:	203	3.0	9,708	2.7	0.4	87	537	1	88	2.3
Pole Load:	6,857	100.0	223,525	362.6	51.5	2,008	67,579	151	2,159	55.4
Pole Reserve Capacity:			210,603		48.5	1,892			1,741	44.6

LOAD SUMMARY BY OWNER

NVE:	2,458		114,316			1,027	60,459	135	1,162	29.8
ZFS:	499		13,988			126	250	1	126	3.2
TWT:	343		9,906			89	127	0	89	2.3
COX:	725		19,326			174	439	1	175	4.5
CTL:	1,299		33,275			299	446	1	300	7.7
Pole:	1,534		32,715			294	5,857	13	307	7.9
Totals	6,857		223,525			2,008	67,579	151	2,159	55.4

Detailed Load Components

Power:		Owner	Height (ft)	Horiz. Offset (in)	Cable Dia. (in)	Rotate Angle (deg)	Cable Weight (lbs/ft)	Lead/Span Length	Span Angle (deg)	Wire Length (ft)	Tension (lbs)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Primary	AAC 954.0 KCM 61 STRAND	NVE	49.90	29.73	1.1260	-	0.895	187.0	270.0	187.0	10,140	76,947	310	9,818	87,074
Primary	AAC 954.0 KCM 61 STRAND	NVE	49.90	29.73	1.1260	-	0.895	184.0	90.0	184.0	10,140	-76,947	305	9,660	-66,982
Primary	AAC 954.0 KCM 61 STRAND	NVE	46.50	30.29	1.1260	-	0.895	184.0	90.0	184.0	10,140	-71,709	310	9,003	-62,396
Primary	AAC 954.0 KCM 61 STRAND	NVE	46.50	30.29	1.1260	-	0.895	187.0	270.0	187.0	10,140	71,709	315	9,149	81,174
Primary	AAC 954.0 KCM 61 STRAND	NVE	42.10	30.96	1.1260	-	0.895	187.0	270.0	187.0	10,140	64,930	322	8,285	73,537
Primary	AAC 954.0 KCM 61 STRAND	NVE	42.10	30.96	1.1260	-	0.895	184.0	90.0	184.0	10,140	-64,930	317	8,152	-56,461
Neutral	AAC 2/0 AWG 7 STRAND ASTER	NVE	36.00	19.25	0.4140	-	0.125	184.0	90.0	184.0	1,506	-8,237	-1	2,560	-5,678
Other	144ct, 24ct 5/16" MESS	ZFS	30.86	24.05	1.1400	-	0.657	184.0	90.0	184.0	1,500	-7,033	-181	6,043	-1,171
Other	144ct, 24ct x 2 5/16" MESS	ZFS	30.86	24.05	1.1700	-	0.799	187.0	270.0	187.1	1,500	7,033	-224	6,303	13,113
Other	144ct 1/4" MESS	TWT	29.20	10.03	0.9900	-	0.431	184.0	90.0	184.0	1,500	-6,655	-49	4,965	-1,739
Other	144ct 1/4" MESS	TWT	29.20	10.03	0.9900	-	0.431	187.0	270.0	187.0	1,500	6,655	-50	5,046	11,651
Neutral	AAC 2/0 AWG 7 STRAND ASTER	NVE	35.60	19.31	0.4140	-	0.125	187.0	270.0	187.0	1,506	8,146	1	2,573	10,719
Secondary	#4 AL TPX	NVE	35.30	19.36	0.6400	-	0.160	187.0	270.0	187.0	484	2,596	1	3,944	6,541
Primary	AAC 954.0 KCM 61 STRAND	NVE	49.90	29.78	1.1260	-	0.895	187.0	270.0	187.0	10,140	76,874	4	9,809	86,687
Primary	AAC 954.0 KCM 61 STRAND	NVE	46.50	30.29	1.1260	-	0.895	187.0	270.0	187.0	10,140	71,636	5	9,140	80,781
Primary	AAC 954.0 KCM 61 STRAND	NVE	42.10	30.96	1.1260	-	0.895	187.0	270.0	187.0	10,140	64,858	5	8,275	73,139
											Totals:	215,873	1,391	112,725	329,989

Comm:		Owner	Height (ft)	Horiz. Offset (in)	Cable Dia. (in)	Rotate Angle (deg)	Cable Weight (lbs/ft)	Lead/Span Length	Span Angle (deg)	Wire Length (ft)	Tension (lbs)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
CATV	.75"cx, 288ct, 24ct X 2 1/4" MESS	COX	27.90	10.22	1.9300	-	1.422	184.0	90.0	184.3	1,500	-6,358	-166	9,249	2,724
CATV	.75"cx, 288ct, 24ct X 2 1/4" MESS	COX	27.90	10.22	1.9300	-	1.422	187.0	270.0	187.3	1,500	6,358	-169	9,400	15,589
Telco	1.25" 1/4"MESS	CTL	26.70	10.41	1.5000	-	0.727	184.0	90.0	184.0	1,500	-6,085	-87	6,879	708
Telco	1.25" 1/4"MESS	CTL	26.70	10.41	1.5000	-	0.727	187.0	270.0	187.1	1,500	6,085	-88	6,991	12,988
Telco	2" 1/4"MESS	CTL	25.40	10.60	2.2500	-	0.821	184.0	90.0	184.1	1,500	-5,789	-100	9,816	3,928
Telco	2" 1/4"MESS	CTL	25.40	10.60	2.2500	-	0.821	187.0	270.0	187.1	1,500	5,789	-101	9,977	15,664

											Totals:	0	-711	52,313	51,602

PowerEquipment:		Owner	Height (ft)	Horiz. Offset (in)	Offset Angle (deg)	Rotate Angle (deg)	Unit Weight (lbs)	Unit Height (in)	Unit Depth (in)	Unit Diameter (in)	Unit Length (in)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Transformer	1PH-25KVA	NVE	37.00	23.35	270.0	270.0	365.00	39.00	-	22.00	-	-	98	4,939	5,037
											Totals:	0	98	4,939	5,037

Riser:		Owner	Height (ft)	Horiz. Offset (in)	Offset Angle (deg)	Rotate Angle (deg)	Unit Weight (lbs)	Unit Height (in)	Unit Depth (in)	Unit Diameter (in)	Unit Length (in)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
2" Riser	2" Riser	NVE	33.20	12.75	250.0	250.0	2.49	398.40	-	0.00	-	-	-8	2,965	2,958
2" Riser	2" Riser	ZFS	29.70	12.75	315.0	315.0	2.23	356.40	-	0.00	-	-	20	1,786	1,806
2" Riser	2" Riser	COX	26.40	12.75	330.0	330.0	1.98	316.80	-	0.00	-	-	21	998	1,019
											Totals:	0	34	5,748	5,783

Insulator:		Owner	Height (ft)	Horiz. Offset (in)	Offset Angle (deg)	Rotate Angle (deg)	Unit Weight (lbs)	Unit Height (in)	Unit Depth (in)	Unit Diameter (in)	Unit Length (in)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Post	Post Insulator - 69 kV	NVE	49.90	4.35	0.0	0.0	54.00	25.38	-	7.25	-	-	200	1,459	1,658
Post	Post Insulator - 69 kV	NVE	46.50	4.92	0.0	0.0	54.00	25.38	-	7.25	-	-	204	1,361	1,565
Post	Post Insulator - 69 kV	NVE	42.10	5.58	0.0	0.0	54.00	25.38	-	7.25	-	-	208	1,235	1,443
Deadend	Deadend Insulator - 15 kV	NVE	36.00	6.50	90.0	90.0	3.00	12.75	-	3.80	-	-	-1	271	271
Davit	Three Bolt	ZFS	30.30	7.36	180.0	90.0	5.00	18.00	-	3.00	-	-	-15	255	240
Bolt	Three Bolt	TWT	29.20	7.53	180.0	90.0	5.00	0.00	-	3.00	-	-	-6	0	-6
Bolt	Three Bolt	COX	27.90	7.72	180.0	90.0	5.00	0.00	-	3.00	-	-	-6	0	-6
Bolt	Three Bolt	CTL	26.70	7.91	180.0	90.0	5.00	0.00	-	3.00	-	-	-6	0	-6
Bolt	Three Bolt	CTL	25.40	8.10	180.0	90.0	5.00	0.00	-	3.00	-	-	-7	0	-7
Deadend	Deadend Insulator - 15 kV	NVE	35.60	6.56	270.0	270.0	3.00	12.75	-	3.80	-	-	1	268	269
Deadend	Deadend Insulator - 15 kV	NVE	35.30	6.61	270.0	270.0	3.00	12.75	-	3.80	-	-	1	266	267
Deadend	Post Insulator - 69 kV	NVE	49.90	4.40	270.0	270.0	54.00	25.38	-	7.25	-	-	19	1,428	1,447
Deadend	Post Insulator - 69 kV	NVE	46.50	4.92	270.0	270.0	54.00	25.38	-	7.25	-	-	19	1,331	1,350
Deadend	Post Insulator - 69 kV	NVE	42.10	5.58	270.0	270.0	54.00	25.38	-	7.25	-	-	19	1,205	1,224
											Totals:	0	628	9,080	9,708

Guy Wire and Brace:		Owner	Attach Height (ft)	End Height (ft)	Lead/Span Length (ft)	Wire Dia. (in)	Percent Solid (%)	Lead Angle (deg)	Incline Angle (deg)	Wire Weight (lbs/ft)	Rest Length (ft)	Stretch Length (in)
Guy 1: EHS 7/16	Down	NVE	49.90	0.00	40.00	0.438	75.0	90.0	51.3	0.399	62.45	9.88
Guy 2: EHS 7/16	Down	NVE	42.10	0.00	40.00	0.438	75.0	90.0	46.5	0.399	56.57	8.72
Guy 3: EHS 5/16	Down	NVE	35.70	0.00	40.00	0.312	75.0	90.0	41.7	0.205	52.11	4.99

Guy Wire and Brace (Loads and Reactions)		Elastic Modulus (psi)	Rated Tensile Strength (lbs)	Guy Strength Factor	Allowable Tension (lbs)	Initial Tension (lbs)	Required Tension[2] (lbs)	Required Tension[3] (lbs)	Applied Tension[3] (lbs)	Vertical Load[3] (lbs)	Shear Load in Guy Dir[3] (lbs)	Shear Load at Report Angle[3] (lbs)	Moment at GL[3] (ft-lb)*
Guy 1: EHS 7/16	Down	23,000,000	20,800	0.90	18,720	700	34,297	34,182	34,182	26,671	21,379	-1,969	-97,266
Guy 2: EHS 7/16	Down	23,000,000	20,800	0.90	18,720	700	33,838	33,323	33,323	24,158	22,953	-2,113	-88,475
Guy 3: EHS 5/16	Down	23,000,000	11,200	0.90	10,080	700	11,154	10,562	10,562	7,033	7,880	-726	-25,547
									Totals:	57,861	52,212	-4,808	-

Version: 4.2 / 4.06
* includes Load Factor(s)

[2] Worst Wind per Guy Wire
[3] Wind at 0.0°

Anchor/Rod Load Summary:	Owner	Rod Length AGL (in)	Lead Length (ft)	Lead Angle (deg)	Strength of Assembly (lbs)	Anchor/Rod Strength Factor	Allowable Load (lbs)	Max Load[2] (lbs)	Load at Pole MCU[3] (lbs)	Max Required Capacity[2] (%)
Single Helix Anchor	NVE	18.00	40.00	90.0	20,000	1.00	20,000	79,132	77,912	395.7

Pole Buckling

Buckling	Buckling (ft)	Buckling Section (% Buckling Col. Hgt.)	Buckling (in)	Min. Buckling (in)	Diameter (in)	Diameter (in)	Modulus of (psi)	Pole (pcf)	Ice Density (pcf)	Pole Tip (ft)	Buckling Load (lbs)	Buckling Load (lbs)	Buckling Load
0.71	43.18	38.19	18.89	60.76	8.60	23.89	1,000,000	50.00	57.00	50.60	298,991	**67,579**	**4.42**

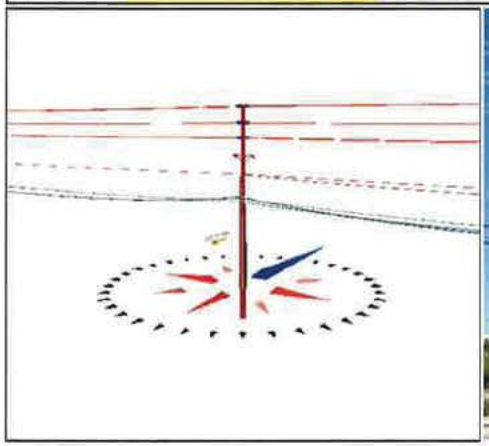
Version: 4 2 / 4.06
* includes Load Factor(s)

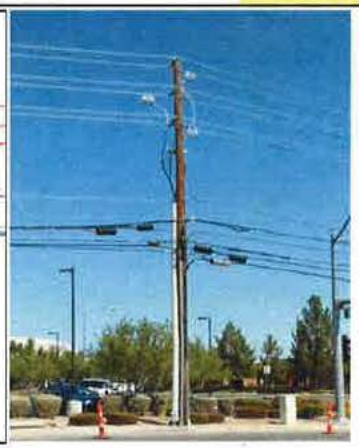
[2] Worst Wind per Guy Wire
[3] Wind at 0.0°

O-Calc® Pro *Analysis Report*

Monday, October 13, 2014 4:08:02 PM

File Name:	**P82135 GRADE B**	Pole Length / Class:	**60 / H2**	Code:	**NESC**	Structure Type:	**Unguyed**
Pole Num:	**P82135**	Pole Species:	**WESTERN RED CEDAR**	NESC Rule:	**Rule 250B**	Status:	**N/A**
Aux Data	**Warm Springs & Amigo**	Setting Depth (ft):	**9.40**	Construction Grade:	**B**	Pole Strength Factor:	**0.65**
Aux Data	**Cox**	G/L Circumference (in):	**62.00**	Loading District:	**Light**	Transverse Wind LF:	**2.50**
Aux Data	**Unset**	G/L Fiber Stress (psi):	**6,000**	Ice Thickness (in):	**0.00**	Wire Tension LF:	**1.10**
Aux Data	**Unset**	Allowable Stress (psi):	**3,900**	Wind Speed (mph):	**59.29**	Vertical LF:	**1.50**
Aux Data	**Unset**	Fiber Stress Ht. Reduction:	**No**	Wind Pressure (psf):	**9.00**		





Pole Capacity Utilization		Height	Wind Angle
Maximum:	**97.6%**	0.0 ft	178.6°
Groundline:	**97.6%**	0.0 ft	178.6°
Vertical:	**13.1%**	29.3 ft	178.6°

Pole Moments		Load Angle	Wind Angle
Max Capac. Util:	**237,564 ft-lb**	175.6°	178.6°
Groundline:	**237,564 ft-lb**	175.6°	178.6°

GROUNDLINE LOAD SUMMARY:*Wind at 178.6°, Applied Moment 237,564 ft-lb at 175.6°, Allowable Moment 245,250 ft-lb

	Shear Load (lbs)*	Percent Applied Load	Bending Moment (ft-lb)	Percent of Applied Moment**	Percent of Pole Capacity	Bending Stress (+/- psi)	Vertical Load (lbs)	Vertical Stress (psi)	Total Stress (psi)	Percent of Pole Capacity
Powers:	3,364	45.4	**136,846**	21.9	**21.2**	**2,176**	1,866	6	**2,182**	**56.0**
Comms:	1,787	24.1	**46,131**	5.4	**5.3**	**734**	793	3	**736**	**18.9**
Pole:	1,402	18.9	**31,539**	13.3	**12.9**	**502**	4,703	15	**517**	**13.3**
Crossarms:	81	1.1	**2,957**	1.2	**1.2**	**47**	60	0	**47**	**1.2**
Risers:	551	7.4	**10,289**	0.0	**0.0**	**164**	392	1	**165**	**4.2**
Insulators:	224	3.0	**9,803**	0.5	**0.5**	**156**	546	2	**158**	**4.0**
Pole Load:	7,410	100.0	**237,564**	100.0	**96.9**	**3,778**	8,359	27	**3,805**	**97.6**
Pole Reserve Capacity:			**7,686**		**3.1**	**122**			**95**	**2.4**

LOAD SUMMARY BY OWNER

NVE:	3,238	**135,323**	**2,152**	2,302	8	**2,159**	**55.4**
ZFS:	410	**11,888**	**189**	245	1	**190**	**4.9**
TWT:	421	**10,180**	**162**	197	1	**163**	**4.2**

Version: 4.2 / 4.06
* Includes Load Factor(s)

² Worst Wind per Guy Wire
³ Wind at 178.6°

COX:	793	20,561	327	475	2	329	8.4
CTL:	1,146	28,073	446	437	1	448	11.5
Pole:	1,402	31,539	502	4,703	15	517	13.3
Totals	7,410	237,564	3,778	8,359	27	3,805	97.6

Detailed Load Components

Power:		Owner	Height (ft)	Horiz. Offset (in)	Cable Dia. (in)	Rotate Angle (deg)	Cable Weight (lbs/ft)	Lead/Span Length	Span Angle (deg)	Wire Length (ft)	Tension (lbs)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Primary	AAC 954.0 KCM 61 STRAND	NVE	50.00	30.36	1.1260	-	0.895	187.0	90.0	187.0	10,140	42,509	-317	9,848	52,040
Primary	AAC 954.0 KCM 61 STRAND	NVE	50.00	30.36	1.1260	-	0.895	182.0	270.0	182.0	10,140	-42,509	-308	9,584	-33,233
Primary	AAC 954.0 KCM 61 STRAND	NVE	50.00	30.36	1.1260	-	0.895	187.0	90.0	187.0	10,140	42,509	317	9,848	52,674
Primary	AAC 954.0 KCM 61 STRAND	NVE	50.00	30.36	1.1260	-	0.895	182.0	270.0	182.0	10,140	-42,509	308	9,584	-32,617
Primary	AAC 954.0 KCM 61 STRAND	NVE	45.80	30.71	1.1260	-	0.895	187.0	90.0	187.0	10,140	38,942	-320	9,021	47,643
Primary	AAC 954.0 KCM 61 STRAND	NVE	45.80	30.71	1.1260	-	0.895	182.0	270.0	182.0	10,140	-38,942	-312	8,780	-30,474
Primary	AAC 954.0 KCM 61 STRAND	NVE	45.80	30.71	1.1260	-	0.895	187.0	90.0	187.0	10,140	38,942	320	9,021	48,283
Primary	AAC 954.0 KCM 61 STRAND	NVE	45.80	30.71	1.1260	-	0.895	182.0	270.0	182.0	10,140	-38,942	312	8,780	-29,850
Primary	AAC 954.0 KCM 61 STRAND	NVE	41.80	31.05	1.1260	-	0.895	187.0	90.0	187.0	10,140	35,544	-324	8,234	43,455
Primary	AAC 954.0 KCM 61 STRAND	NVE	41.80	31.05	1.1260	-	0.895	182.0	270.0	182.0	10,140	-35,544	-315	8,014	-27,845
Primary	AAC 954.0 KCM 61 STRAND	NVE	41.80	31.05	1.1260	-	0.895	187.0	90.0	187.0	10,140	35,544	324	8,234	44,102
Primary	AAC 954.0 KCM 61 STRAND	NVE	41.80	31.05	1.1260	-	0.895	182.0	270.0	182.0	10,140	-35,544	315	8,014	-27,215
Neutral	AAC 2/0 AWG 7 STRAND ASTER	NVE	31.70	19.27	0.4140	-	0.125	187.0	90.0	187.0	1,506	4,001	-28	2,295	6,268
Neutral	AAC 2/0 AWG 7 STRAND ASTER	NVE	31.70	19.27	0.4140	-	0.125	182.0	270.0	182.0	1,506	-4,001	-27	2,233	-1,795
Secondary	#4 AL TPX	NVE	31.70	19.27	0.6400	-	0.180	187.0	90.0	187.1	484	1,285	1	3,545	4,832
Other	144ct, 24ct 5/16" MESS	ZFS	28.16	23.56	1.1400	-	0.657	187.0	90.0	187.1	1,500	3,539	160	5,610	9,329
Other	144ct, 24ct x 2 5/16" MESS	ZFS	28.16	23.56	1.1700	-	0.799	182.0	270.0	182.1	1,500	-3,539	213	5,604	2,279
Other	144ct 1/4" MESS	TWT	26.00	9.50	0.9900	-	0.431	187.0	90.0	187.0	1,500	3,267	48	4,498	7,813
Other	144ct 1/4" MESS	TWT	26.00	9.50	0.9900	-	0.431	182.0	270.0	182.0	1,500	-3,267	46	4,378	1,157
											Totals:	1,285	434	135,127	136,846

Comm:		Owner	Height (ft)	Horiz. Offset (in)	Cable Dia. (in)	Rotate Angle (deg)	Cable Weight (lbs/ft)	Lead/Span Length	Span Angle (deg)	Wire Length (ft)	Tension (lbs)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
CATV	.75"cx, 288ct, 24ct X 3 1/4" MESS	COX	25.97	18.16	2.0500	-	1.564	187.0	90.0	187.4	1,500	3,264	331	9,305	12,900
CATV	.75"cx, 288ct, 24ct X 3 1/4" MESS	COX	25.97	18.16	2.0500	-	1.564	182.0	270.0	182.4	1,500	-3,264	322	9,056	6,115
Telco	1.25" 1/4"MESS	CTL	25.30	9.56	1.5000	-	0.727	187.0	90.0	187.1	1,500	3,179	81	6,632	9,892
Telco	1.25" 1/4"MESS	CTL	25.30	9.56	1.5000	-	0.727	182.0	270.0	182.1	1,500	-3,179	79	6,454	3,354
Telco	2" 1/4"MESS	CTL	24.40	9.63	2.2500	-	0.821	187.0	90.0	187.1	1,500	3,066	92	9,594	12,752
Telco	.75" 1/4" MESS	CTL	24.40	9.63	1.0000	-	0.318	182.0	270.0	182.0	1,500	-3,066	35	4,150	1,119
											Totals:	0	940	45,191	46,131

Crossarm:		Owner	Height (ft)	Horiz. Offset (in)	Offset Angle (deg)	Rotate Angle (deg)	Unit Weight (lbs)	Unit Height (in)	Unit Depth (in)	Unit Diameter (in)	Unit Length (in)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Normal	Arrestor Bracket	NVE	37.10	7.82	0.0	0.0	40.00	4.50	3.50	-	72.00	-	-39	2,996	2,957
											Totals:	0	-39	2,996	2,957

Version: 4.2 / 4.06
* includes Load Factor(s)

² Worst Wind per Guy Wire
³ Wind at 178.6°

Riser:		Owner	Height (ft)	Horiz. Offset (in)	Offset Angle (deg)	Rotate Angle (deg)	Unit Weight (lbs)	Unit Height (in)	Unit Depth (in)	Unit Diameter (in)	Unit Length (in)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
2" Riser 0.0°	2" Riser	ZFS	27.25	10.39	0.0	0.0	2.04	327.00	-	0.00	-	-	-20	52	32
3" Riser 30.0°	3" Riser	TWT	23.30	10.39	30.0	30.0	3.88	279.60	-	0.00	-	-	-32	1,236	1,204
3" Riser	3" Riser	CTL	20.90	10.39	150.0	150.0	3.48	250.80	-	0.00	-	-	31	913	944
2" Riser	2" Riser	COX	25.75	10.39	225.0	225.0	1.93	309.00	-	0.00	-	-	12	1,379	1,391
5" Riser	5" Riser	NVE	31.30	10.39	270.0	270.0	10.43	375.60	-	0.00	-	-	-8	6,724	6,717
											Totals:	0	-16	10,305	10,289

Insulator:		Owner	Height (ft)	Horiz. Offset (in)	Offset Angle (deg)	Rotate Angle (deg)	Unit Weight (lbs)	Unit Height (in)	Unit Depth (in)	Unit Diameter (in)	Unit Length (in)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Post	Post Insulator - 69 kV	NVE	50.00	4.98	0.0	0.0	54.00	25.38	-	7.25	-	-	-204	1,466	1,261
Post	Post Insulator - 69 kV	NVE	50.00	4.98	180.0	180.0	54.00	25.38	-	7.25	-	-	204	1,466	1,670
Post	Post Insulator - 69 kV	NVE	45.80	5.34	0.0	0.0	54.00	25.38	-	7.25	-	-	-207	1,345	1,138
Post	Post Insulator - 69 kV	NVE	45.80	5.34	180.0	180.0	54.00	25.38	-	7.25	-	-	207	1,345	1,552
Post	Post Insulator - 69 kV	NVE	41.80	5.67	0.0	0.0	54.00	25.38	-	7.25	-	-	-209	1,230	1,021
Post	Post Insulator - 69 kV	NVE	41.80	5.67	180.0	180.0	54.00	25.38	-	7.25	-	-	209	1,230	1,439
Deadend	Equipment	NVE	37.10	32.00	76.3	0.0	3.00	12.75	-	3.80	-	-	-5	280	275
Deadend	Equipment	NVE	37.10	-32.00	283.7	0.0	3.00	12.75	-	3.80	-	-	-7	280	274
Deadend	Equipment	NVE	37.10	0.00	0.0	0.0	3.00	12.75	-	3.80	-	-	-6	280	274
Post	Deadend Insulator - 15 kV	NVE	31.70	6.52	0.0	0.0	3.00	12.75	-	3.80	-	-	-7	244	236
Deadend	Deadend Insulator - 15 kV	NVE	31.70	6.52	90.0	90.0	3.00	12.75	-	3.80	-	-	1	240	240
Davit	Three Bolt	ZFS	27.60	6.87	180.0	90.0	5.00	18.00	-	3.00	-	-	15	233	247
Bolt	Three Bolt	TWT	26.00	7.00	180.0	90.0	5.00	0.00	-	3.00	-	-	6	0	6
Davit	Three Bolt	COX	25.60	7.03	180.0	90.0	5.00	12.00	-	3.00	-	-	11	144	155
Bolt	Three Bolt	CTL	25.30	7.06	180.0	90.0	5.00	0.00	-	3.00	-	-	6	0	6
Bolt	Three Bolt	CTL	24.40	7.13	180.0	90.0	5.00	0.00	-	3.00	-	-	6	0	6
											Totals:	0	19	9,783	9,803

Pole Buckling

Buckling	Buckling (ft)	Buckling Section (% Buckling Col. Hgt.)	Buckling (in)	Min. Buckling (in)	Diameter (in)	Diameter (in)	Modulus of (psi)	Pole (pcf)	Ice Density (pcf)	Pole Tip (ft)	Buckling Load (lbs)	Buckling Load (lbs)	Buckling Load
2.00	29.28	34.34	17.77	30.42	9.87	19.75	1,000,000	50.00	57.00	50.60	63,643	8,359	7.61

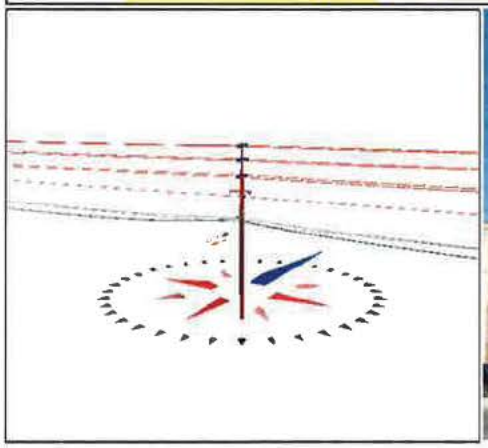
Version: 4.2 / 4.06
* includes Load Factor(s)

[2] Worst Wind per Guy Wire
[3] Wind at 178.6°

O-Calc® Pro *Analysis Report*

Wednesday, October 01, 2014 1:03:40 PM

File Name:	**P82134 GRADE B**	Pole Length / Class:	**50 / 2**	Code:	**NESC**	Structure Type:	**Unguyed**
Pole Num:	**P82134**	Pole Species:	**WESTERN RED CEDAR**	NESC Rule:	**Rule 250B**	Status:	**N/A**
Aux Data	**Warm Springs & Amigo**	Setting Depth (ft):	**8.00**	Construction Grade:	**B**	Pole Strength Factor:	**0.65**
Aux Data	**Cox**	G/L Circumference (in):	**41.00**	Loading District:	**Light**	Transverse Wind LF:	**2.50**
Aux Data	**Unset**	G/L Fiber Stress (psi):	**6,000**	Ice Thickness (in):	**0.00**	Wire Tension LF:	**1.10**
Aux Data	**Unset**	Allowable Stress (psi):	**3,900**	Wind Speed (mph):	**59.29**	Vertical LF:	**1.50**
Aux Data	**Unset**	Fiber Stress Ht. Reduction:	**No**	Wind Pressure (psf):	**9.00**		



Pole Capacity Utilization		Height	Wind Angle
Maximum:	**235.7%**	0.0 ft	177.9°
Groundline:	**235.7%**	0.0 ft	177.9°
Vertical:	**36.2%**	27.7 ft	177.9°

Pole Moments		Load Angle	Wind Angle
Max Capac. Util:	**166,428 ft-lb**	179.6°	177.9°
Groundline:	**166,428 ft-lb**	179.6°	177.9°

GROUNDLINE LOAD SUMMARY:*Wind at 177.9°, Applied Moment 166,428 ft-lb at 179.6°, Allowable Moment 70,923 ft-lb

	Shear Load (lbs)*	Percent Applied Load	Bending Moment (ft-lb)	Percent of Applied Moment**	Percent of Pole Capacity	Bending Stress (+/- psi)	Vertical Load (lbs)	Vertical Stress (psi)	Total Stress (psi)	Percent of Pole Capacity
Powers:	3,110	53.2	**104,734**	6.7	**15.7**	**5,759**	1,762	13	**5,772**	**148.0**
Comms:	1,509	25.8	**33,734**	3.5	**8.3**	**1,855**	675	5	**1,860**	**47.7**
Pole:	827	14.2	**15,961**	9.6	**22.5**	**878**	1,933	14	**892**	**22.9**
Crossarms:	85	1.5	**2,542**	1.4	**3.4**	**140**	102	1	**141**	**3.6**
Risers:	102	1.7	**1,746**	0.0	**0.1**	**96**	181	1	**97**	**2.5**
Insulators:	210	3.6	**7,711**	0.6	**1.4**	**424**	542	4	**428**	**11.0**
Pole Load:	5,843	100.0	**166,428**	100.0	**234.7**	**9,152**	5,195	39	**9,191**	**235.7**
Pole Reserve Capacity:			**-95,506**		**-134.7**	**-5,252**			**-5,291**	**-135.7**

LOAD SUMMARY BY OWNER

NVE:	2,780	**99,629**	**5,479**	2,187	16	**5,495**	**140.9**
ZFS:	387	**9,406**	**517**	183	1	**519**	**13.3**
TWT:	331	**7,429**	**409**	123	1	**409**	**10.5**

Version: 4.2 / 4.06
* includes Load Factor(s)

² Worst Wind per Guy Wire
³ Wind at 177.9°

CTL:	836	17,816	980	295	2	982	25.2
COX:	683	16,188	890	474	4	894	22.9
Pole:	827	15,961	878	1,933	14	892	22.9
Totals	5,843	166,428	9,152	5,195	39	9,191	235.7

Detailed Load Components

Power:		Owner	Height (ft)	Horiz. Offset (in)	Cable Dia. (in)	Rotate Angle (deg)	Cable Weight (lbs/ft)	Lead/Span Length	Span Angle (deg)	Wire Length (ft)	Tension (lbs)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Primary	AAC 954.0 KCM 61 STRAND	NVE	41.20	29.40	1.1260	-	0.895	182.0	90.0	182.0	10,140	3,546	-299	7,919	11,166
Primary	AAC 954.0 KCM 61 STRAND	NVE	41.20	29.40	1.1260	-	0.895	175.0	270.0	175.0	10,140	-3,546	-288	7,614	3,780
Primary	AAC 954.0 KCM 61 STRAND	NVE	41.20	29.40	1.1260	-	0.895	182.0	90.0	182.0	10,140	3,546	299	7,919	11,765
Primary	AAC 954.0 KCM 61 STRAND	NVE	41.20	29.40	1.1260	-	0.895	175.0	270.0	175.0	10,140	-3,546	288	7,614	4,356
Primary	AAC 954.0 KCM 61 STRAND	NVE	37.60	29.62	1.1260	-	0.895	182.0	90.0	182.0	10,140	3,237	-301	7,228	10,163
Primary	AAC 954.0 KCM 61 STRAND	NVE	37.60	29.62	1.1260	-	0.895	175.0	270.0	175.0	10,140	-3,237	-290	6,950	3,423
Primary	AAC 954.0 KCM 61 STRAND	NVE	37.60	29.62	1.1260	-	0.895	182.0	90.0	182.0	10,140	3,237	301	7,228	10,766
Primary	AAC 954.0 KCM 61 STRAND	NVE	37.60	29.62	1.1260	-	0.895	175.0	270.0	175.0	10,140	-3,237	290	6,950	4,003
Primary	AAC 954.0 KCM 61 STRAND	NVE	33.00	29.90	1.1260	-	0.895	182.0	90.0	182.0	10,140	2,841	-304	6,345	8,882
Primary	AAC 954.0 KCM 61 STRAND	NVE	33.00	29.90	1.1260	-	0.895	175.0	270.0	175.0	10,140	-2,841	-293	6,101	2,967
Primary	AAC 954.0 KCM 61 STRAND	NVE	33.00	29.90	1.1260	-	0.895	182.0	90.0	182.0	10,140	2,841	304	6,345	9,490
Primary	AAC 954.0 KCM 61 STRAND	NVE	33.00	29.90	1.1260	-	0.895	175.0	270.0	175.0	10,140	-2,841	293	6,101	3,552
Neutral	AAC 2/0 AWG 7 STRAND ASTER	NVE	27.30	17.62	0.4140	-	0.125	182.0	90.0	182.0	1,506	349	-25	1,928	2,252
Neutral	AAC 2/0 AWG 7 STRAND ASTER	NVE	27.30	17.62	0.4140	-	0.125	175.0	270.0	175.0	1,506	-349	-24	1,854	1,481
Other	144ct, 24ct 5/16" MESS	ZFS	23.67	16.24	1.1400	-	0.657	182.0	90.0	182.1	1,500	301	121	4,602	5,024
Other	144ct, 24ct 5/16" MESS	ZFS	23.67	16.24	1.1400	-	0.657	175.0	270.0	175.1	1,500	-301	117	4,425	4,240
Other	144ct 1/4" MESS	TWT	22.20	7.68	0.9900	-	0.431	182.0	90.0	182.0	1,500	282	38	3,747	4,067
Other	144ct 1/4" MESS	TWT	22.20	7.68	0.9900	-	0.431	175.0	270.0	175.0	1,500	-282	36	3,603	3,357
											Totals:	0	263	104,471	104,734

Comm:		Owner	Height (ft)	Horiz. Offset (in)	Cable Dia. (in)	Rotate Angle (deg)	Cable Weight (lbs/ft)	Lead/Span Length	Span Angle (deg)	Wire Length (ft)	Tension (lbs)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Telco	1.25" 1/4"MESS	CTL	21.60	7.72	1.5000	-	0.727	182.0	90.0	182.1	1,500	275	64	5,524	5,863
Telco	1.25" 1/4"MESS	CTL	21.60	7.72	1.5000	-	0.727	175.0	270.0	175.1	1,500	-275	61	5,312	5,098
Telco	.75" 1/4" MESS	CTL	20.30	7.79	1.0000	-	0.318	182.0	90.0	182.0	1,500	258	28	3,461	3,748
Telco	.75" 1/4" MESS	CTL	20.30	7.79	1.0000	-	0.318	175.0	270.0	175.0	1,500	-258	27	3,328	3,097
CATV	.50"cx, 288ct, 24ct X 3 1/4" MESS	COX	21.68	42.57	1.9300	-	1.404	182.0	90.0	182.3	1,500	275	672	7,108	8,054
CATV	.50"cx X 2, 288ct, 24ct X 3 1/4"	COX	21.68	42.57	2.1000	-	1.554	175.0	270.0	175.3	1,500	-275	715	7,434	7,874
											Totals:	0	1,567	32,167	33,734

Crossarm:		Owner	Height (ft)	Horiz. Offset (in)	Offset Angle (deg)	Rotate Angle (deg)	Unit Weight (lbs)	Unit Height (in)	Unit Depth (in)	Unit Diameter (in)	Unit Length (in)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Normal	Arrestor Bracket	NVE	29.10	6.51	180.0	180.0	40.00	4.50	3.50	-	72.00	-	33	2,355	2,388
Offset	CROSSARM 3-1/2 X 4-1/2 X 4 -	COX	22.20	6.93	90.0	90.0	28.00	4.50	3.50	-	48.00	-	66	88	154
											Totals:	0	99	2,443	2,542

Version: 4.2 / 4.06
* includes Load Factor(s)

² Worst Wind per Guy Wire
³ Wind at 177.9°

Riser:		Owner	Height (ft)	Horiz. Offset (in)	Offset Angle (deg)	Rotate Angle (deg)	Unit Weight (lbs)	Unit Height (in)	Unit Depth (in)	Unit Diameter (in)	Unit Length (in)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
2" Riser 0.0°	2" Riser	COX	21.70	6.77	0.0	0.0	1.63	260.40	-	0.00	-	-	-11	50	39
5" Riser	5" Riser	NVE	25.30	6.77	200.0	200.0	8.43	303.60	-	0.00	-	-	52	1,656	1,707
											Totals:	0	41	1,705	1,746

Insulator:		Owner	Height (ft)	Horiz. Offset (in)	Offset Angle (deg)	Rotate Angle (deg)	Unit Weight (lbs)	Unit Height (in)	Unit Depth (in)	Unit Diameter (in)	Unit Length (in)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Post	Post Insulator - 69 kV	NVE	41.20	4.03	0.0	0.0	54.00	25.38	-	7.25	-	-	-198	1,214	1,016
Post	Post Insulator - 69 kV	NVE	41.20	4.03	180.0	180.0	54.00	25.38	-	7.25	-	-	198	1,214	1,413
Post	Post Insulator - 69 kV	NVE	37.60	4.25	0.0	0.0	54.00	25.38	-	7.25	-	-	-200	1,111	911
Post	Post Insulator - 69 kV	NVE	37.60	4.25	180.0	180.0	54.00	25.38	-	7.25	-	-	200	1,111	1,311
Post	Post Insulator - 69 kV	NVE	33.00	4.52	0.0	0.0	54.00	25.38	-	7.25	-	-	-202	979	777
Post	Post Insulator - 69 kV	NVE	33.00	4.52	180.0	180.0	54.00	25.38	-	7.25	-	-	202	979	1,180
Deadend	Equipment	NVE	29.10	32.00	258.5	0.0	3.00	12.75	-	3.80	-	-	5	220	226
Deadend	Equipment	NVE	29.10	-32.00	101.5	0.0	3.00	12.75	-	3.80	-	-	6	220	226
Deadend	Equipment	NVE	29.10	0.00	180.0	0.0	3.00	12.75	-	3.80	-	-	6	220	226
Post	Deadend Insulator - 15 kV	NVE	27.30	4.87	0.0	0.0	3.00	12.75	-	3.80	-	-	-7	211	204
Davit	Three Bolt	ZFS	23.30	5.11	180.0	90.0	5.00	12.00	-	3.00	-	-	10	131	141
Bolt	Three Bolt	TWT	22.20	5.18	180.0	90.0	5.00	0.00	-	3.00	-	-	5	0	5
Bolt	Three Bolt	CTL	21.60	5.22	180.0	90.0	5.00	0.00	-	3.00	-	-	5	0	5
Bolt	Three Bolt	CTL	20.30	5.29	180.0	90.0	5.00	0.00	-	3.00	-	-	5	0	5
Underhung	Three Bolt	COX	22.01	42.00	170.6	0.0	5.00	4.00	-	3.00	-	-	26	41	68
											Totals:	0	61	7,650	7,711

Pole Buckling

Buckling [illegible]	Buckling [illegible] (ft)	Buckling Section [illegible] (% Buckling Col. Hgt.)	Buckling [illegible] (in)	Min. Buckling [illegible] (in)	Diameter [illegible] (in)	Diameter [illegible] (in)	Modulus of [illegible] (psi)	Pole [illegible] (pcf)	Ice Density (pcf)	Pole Tip [illegible] (ft)	Buckling Load [illegible] (lbs)	Buckling Load [illegible] (lbs)	Buckling Load [illegible]
2.00	27.70	33.86	11.91	23.02	7.96	13.06	1,000,000	50.00	57.00	42.00	14,358	5,195	2.76

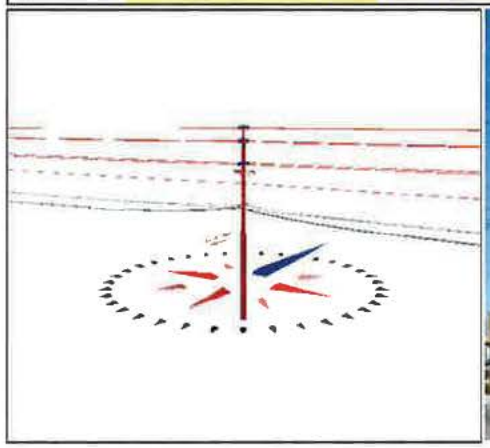
Version: 4.2 / 4.06
* includes Load Factor(s)

² Worst Wind per Guy Wire
³ Wind at 177.9°

O-Calc® Pro *Analysis Report*

Monday, October 13, 2014 4:04:58 PM

File Name:	**P82133 GRADE B**	Pole Length / Class:	**55 / 2**	Code:	**NESC**	Structure Type:	**Unguyed**
Pole Num:	**P82133**	Pole Species:	**WESTERN RED CEDAR**	NESC Rule:	**Rule 250B**	Status:	**N/A**
Aux Data	**Warm Springs & Amigo**	Setting Depth (ft):	**10.80**	Construction Grade:	**B**	Pole Strength Factor:	**0.65**
Aux Data	**Cox**	G/L Circumference (in):	**59.00**	Loading District:	**Light**	Transverse Wind LF:	**2.50**
Aux Data	**Unset**	G/L Fiber Stress (psi):	**6,000**	Ice Thickness (in):	**0.00**	Wire Tension LF:	**1.10**
Aux Data	**Unset**	Allowable Stress (psi):	**3,900**	Wind Speed (mph):	**59.29**	Vertical LF:	**1.50**
Aux Data	**Unset**	Fiber Stress Ht. Reduction:	**No**	Wind Pressure (psf):	**9.00**		



Pole Capacity Utilization		Height	Wind Angle
Maximum:	**86.5%**	6.7 ft	180.7°
Groundline:	**85.2%**	0.0 ft	180.0°
Vertical:	**11.3%**	26.4 ft	180.0°

Pole Moments		Load Angle	Wind Angle
Max Capac. Util:	**138,356 ft-lb**	179.9°	180.7°
Groundline:	**178,771 ft-lb**	179.9°	180.0°

GROUNDLINE LOAD SUMMARY:*Wind at 180.0°, Applied Moment 178,771 ft-lb at 179.9°, Allowable Moment 211,344 ft-lb

	Shear Load (lbs)*	Percent Applied Load	Bending Moment (ft-lb)	Percent of Applied Moment**	Percent of Pole Capacity	Bending Stress (+/- psi)	Vertical Load (lbs)	Vertical Stress (psi)	Total Stress (psi)	Percent of Pole Capacity
Powers:	3,121	50.5	**109,503**	6.4	**4.2**	**2,021**	1,767	6	**2,027**	**52.0**
Comms:	1,544	25.0	**35,509**	6.0	**3.9**	**655**	698	3	**658**	**16.9**
Pole:	1,108	17.9	**21,182**	15.3	**10.0**	**391**	3,408	12	**403**	**10.3**
Crossarms:	85	1.4	**2,678**	0.1	**0.1**	**49**	102	0	**50**	**1.3**
Risers:	109	1.8	**1,841**	1.3	**0.9**	**34**	77	0	**34**	**0.9**
Insulators:	210	3.4	**8,059**	0.8	**0.5**	**149**	542	2	**151**	**3.9**
Pole Load:	6,177	100.0	**178,771**	129.2	**84.6**	**3,299**	6,594	24	**3,323**	**85.2**
Pole Reserve Capacity:			**32,572**		**15.4**	**601**			**577**	**14.8**

LOAD SUMMARY BY OWNER

NVE:	2,799	**104,591**	**1,930**	2,116	8	**1,938**	**49.7**
ZFS:	388	**9,567**	**177**	184	1	**177**	**4.5**
TWT:	332	**7,688**	**142**	123	0	**142**	**3.6**

Version: 4.2 / 4.06
* includes Load Factor(s)

² Worst Wind per Guy Wire
³ Wind at 180.0°

COX:	711	**17,113**	**316**	467	2	**317**	**8.1**
CTL:	839	**18,630**	**344**	296	1	**345**	**8.8**
Pole:	1,108	**21,182**	**391**	3,408	12	**403**	**10.3**
Totals	6,177	**178,771**	**3,299**	6,594	24	**3,323**	**85.2**

Detailed Load Components

Power:		Owner	Height (ft)	Horiz. Offset (in)	Cable Dia. (in)	Rotate Angle (deg)	Cable Weight (lbs/ft)	Lead/Span Length	Span Angle (deg)	Wire Length (ft)	Tension (lbs)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Primary	AAC 954.0 KCM 61 STRAND	NVE	43.40	29.41	1.1260	-	0.895	175.0	90.0	175.0	10,140	1,140	-288	8,026	8,878
Primary	AAC 954.0 KCM 61 STRAND	NVE	43.40	29.41	1.1260	-	0.895	183.0	270.0	183.0	10,140	-1,140	-301	8,393	6,952
Primary	AAC 954.0 KCM 61 STRAND	NVE	43.40	29.41	1.1260	-	0.895	175.0	90.0	175.0	10,140	1,140	288	8,026	9,454
Primary	AAC 954.0 KCM 61 STRAND	NVE	43.40	29.41	1.1260	-	0.895	183.0	270.0	183.0	10,140	-1,140	301	8,393	7,554
Primary	AAC 954.0 KCM 61 STRAND	NVE	39.70	29.86	1.1260	-	0.895	175.0	90.0	175.0	10,140	1,043	-292	7,343	8,093
Primary	AAC 954.0 KCM 61 STRAND	NVE	39.70	29.86	1.1260	-	0.895	183.0	270.0	183.0	10,140	-1,043	-306	7,678	6,330
Primary	AAC 954.0 KCM 61 STRAND	NVE	39.70	29.86	1.1260	-	0.895	175.0	90.0	175.0	10,140	1,043	292	7,343	8,678
Primary	AAC 954.0 KCM 61 STRAND	NVE	39.70	29.86	1.1260	-	0.895	183.0	270.0	183.0	10,140	-1,043	306	7,678	6,941
Primary	AAC 954.0 KCM 61 STRAND	NVE	33.90	30.50	1.1260	-	0.895	175.0	90.0	175.0	10,140	891	-299	6,271	6,863
Primary	AAC 954.0 KCM 61 STRAND	NVE	33.90	30.50	1.1260	-	0.895	183.0	270.0	183.0	10,140	-891	-312	6,558	5,355
Primary	AAC 954.0 KCM 61 STRAND	NVE	33.90	30.50	1.1260	-	0.895	175.0	90.0	175.0	10,140	891	299	6,271	7,460
Primary	AAC 954.0 KCM 61 STRAND	NVE	33.90	30.50	1.1260	-	0.895	183.0	270.0	183.0	10,140	-891	312	6,558	5,979
Neutral	AAC 2/0 AWG 7 STRAND ASTER	NVE	28.20	18.51	0.4140	-	0.125	175.0	90.0	175.0	1,506	110	-25	1,917	2,001
Neutral	AAC 2/0 AWG 7 STRAND ASTER	NVE	28.20	18.51	0.4140	-	0.125	183.0	270.0	183.0	1,506	-110	-26	2,004	1,868
Other	144ct, 24ct 5/16" MESS	ZFS	24.30	8.70	1.1400	-	0.657	175.0	90.0	175.1	1,500	94	63	4,545	4,702
Other	144ct, 24ct 5/16" MESS	ZFS	24.30	8.70	1.1400	-	0.657	183.0	270.0	183.1	1,500	-94	65	4,753	4,724
Other	144ct 1/4" MESS	TWT	22.31	29.16	0.9900	-	0.431	175.0	90.0	175.0	1,500	86	132	3,617	3,836
Other	144ct 1/4" MESS	TWT	22.31	29.16	0.9900	-	0.431	183.0	270.0	183.0	1,500	-86	138	3,783	3,834
											Totals:	0	346	109,156	109,503

Comm:		Owner	Height (ft)	Horiz. Offset (in)	Cable Dia. (in)	Rotate Angle (deg)	Cable Weight (lbs/ft)	Lead/Span Length	Span Angle (deg)	Wire Length (ft)	Tension (lbs)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
CATV	.50"cx X 2, 288ct, 24ct X 3 1/4"	COX	21.98	42.78	2.1000	-	1.554	175.0	90.0	175.3	1,500	85	714	7,542	8,341
CATV	.50"cx X 2, 288ct, 24ct X 3 1/4"	COX	21.98	42.78	2.1000	-	1.554	183.0	270.0	183.4	1,500	-85	747	7,887	8,549
Telco	1.25" 1/4"MESS	CTL	22.30	8.92	1.5000	-	0.727	175.0	90.0	175.1	1,500	87	71	5,488	5,645
Telco	1.25" 1/4"MESS	CTL	22.30	8.92	1.5000	-	0.727	183.0	270.0	183.1	1,500	-87	74	5,739	5,726
Telco	.75" 1/4" MESS	CTL	21.40	9.02	1.0000	-	0.318	175.0	90.0	175.0	1,500	83	31	3,511	3,625
Telco	.75" 1/4" MESS	CTL	21.40	9.02	1.0000	-	0.318	183.0	270.0	183.0	1,500	-83	33	3,671	3,621
											Totals:	0	1,670	33,838	35,509

Crossarm:		Owner	Height (ft)	Horiz. Offset (in)	Offset Angle (deg)	Rotate Angle (deg)	Unit Weight (lbs)	Unit Height (in)	Unit Depth (in)	Unit Diameter (in)	Unit Length (in)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Offset	CROSSARM 3-1/2 X 4-1/2 X 4 -	COX	22.50	8.15	90.0	90.0	28.00	4.50	3.50	-	48.00	-	66	89	154
Normal	CROSSARM 3-1/2 X 4-1/2 X 6 -	NVE	31.60	7.14	0.0	0.0	40.00	4.50	3.50	-	72.00	-	-36	2,560	2,524
											Totals:	0	30	2,648	2,678

Riser:		Owner	Height (ft)	Horiz. Offset (in)	Offset Angle (deg)	Rotate Angle (deg)	Unit Weight (lbs)	Unit Height (in)	Unit Depth (in)	Unit Diameter (in)	Unit Length (in)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
3" Riser	3" Riser	NVE	25.80	10.22	320.0	320.0	4.30	309.60	-	0.00	-	-	-31	1,872	1,841
											Totals:	0	-31	1,872	1,841

Insulator:		Owner	Height (ft)	Horiz. Offset (in)	Offset Angle (deg)	Rotate Angle (deg)	Unit Weight (lbs)	Unit Height (in)	Unit Depth (in)	Unit Diameter (in)	Unit Length (in)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Post	Post Insulator - 69 kV	NVE	43.40	4.04	0.0	0.0	54.00	25.38	-	7.25	-	-	-199	1,278	1,079
Post	Post Insulator - 69 kV	NVE	43.40	4.04	180.0	180.0	54.00	25.38	-	7.25	-	-	199	1,278	1,476
Post	Post Insulator - 69 kV	NVE	39.70	4.48	0.0	0.0	54.00	25.38	-	7.25	-	-	-202	1,172	970
Post	Post Insulator - 69 kV	NVE	39.70	4.48	180.0	180.0	54.00	25.38	-	7.25	-	-	202	1,172	1,373
Post	Post Insulator - 69 kV	NVE	33.90	5.13	0.0	0.0	54.00	25.38	-	7.25	-	-	-206	1,005	799
Post	Post Insulator - 69 kV	NVE	33.90	5.13	180.0	180.0	54.00	25.38	-	7.25	-	-	206	1,005	1,211
Post	Deadend Insulator - 15 kV	NVE	28.20	5.76	0.0	0.0	3.00	12.75	-	3.80	-	-	-7	218	211
Bolt	Three Bolt	ZFS	24.30	6.20	180.0	90.0	5.00	12.00	-	3.00	-	-	5	137	142
Underhung	Three Bolt	COX	22.31	42.00	169.0	0.0	5.00	4.00	-	3.00	-	-	26	42	68
Underhung	Three Bolt	TWT	22.31	28.00	163.8	0.0	5.00	0.00	-	3.00	-	-	18	0	18
Bolt	Three Bolt	CTL	22.30	6.42	180.0	90.0	5.00	0.00	-	3.00	-	-	6	0	6
Bolt	Three Bolt	CTL	21.40	6.52	180.0	90.0	5.00	0.00	-	3.00	-	-	6	0	6
Deadend	CUTOUT	NVE	31.60	32.00	77.4	0.0	3.00	12.75	-	3.80	-	-	-6	239	233
Deadend	CUTOUT	NVE	31.60	-32.00	282.6	0.0	3.00	12.75	-	3.80	-	-	-6	239	233
Deadend	CUTOUT	NVE	31.60	-18.00	291.6	0.0	3.00	12.75	-	3.80	-	-	-6	239	233
											Totals:	0	36	8,022	8,059

Pole Buckling

Buckling [illegible]	Buckling [illegible] (ft)	Buckling Section [illegible] (% Buckling Col. Hgt.)	Buckling [illegible] (in)	Min. Buckling [illegible] (in)	Diameter [illegible] (in)	Diameter [illegible] (in)	Modulus of [illegible] (psi)	Pole [illegible] (pcf)	Ice Density (pcf)	Pole Tip [illegible] (ft)	Buckling Load [illegible] (lbs)	Buckling Load [illegible] (lbs)	Buckling Load [illegible]
2.00	26.39	35.16	16.51	25.52	7.96	18.79	1,000,000	50.00	57.00	44.20	58,280	6,594	8.84

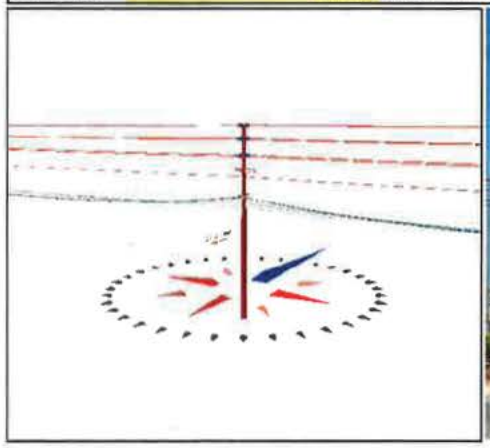
Version: 4.2 / 4.06
* includes Load Factor(s)

² Worst Wind per Guy Wire
³ Wind at 180.0°

O-Calc® Pro *Analysis Report*

Monday, October 13, 2014 4:01:15 PM

File Name:	P82132 GRADE B	Pole Length / Class:	55 / H2	Code:	NESC	Structure Type:	Unguyed
Pole Num:	P82132	Pole Species:	WESTERN RED CEDAR	NESC Rule:	Rule 250B	Status:	N/A
Aux Data	Warm Springs & Amigo	Setting Depth (ft):	8.60	Construction Grade:	B	Pole Strength Factor:	0.65
Aux Data	Cox	G/L Circumference (in):	60.00	Loading District:	Light	Transverse Wind LF:	2.50
Aux Data	Unset	G/L Fiber Stress (psi):	6,000	Ice Thickness (in):	0.00	Wire Tension LF:	1.10
Aux Data	Unset	Allowable Stress (psi):	3,900	Wind Speed (mph):	59.29	Vertical LF:	1.50
Aux Data	Unset	Fiber Stress Ht. Reduction:	No	Wind Pressure (psf):	9.00		



Pole Capacity Utilization		Height	Wind Angle
Maximum:	96.0%	0.0 ft	180.0°
Groundline:	96.0%	0.0 ft	180.0°
Vertical:	12.6%	28.2 ft	180.0°

Pole Moments		Load Angle	Wind Angle
Max Capac. Util:	211,941 ft-lb	179.9°	180.0°
Groundline:	211,941 ft-lb	179.9°	180.0°

GROUNDLINE LOAD SUMMARY:*Wind at 180.0°, Applied Moment 211,941 ft-lb at 179.9°, Allowable Moment 222,273 ft-lb

	Shear Load (lbs)*	Percent Applied Load	Bending Moment (ft-lb)	Percent of Applied Moment**	Percent of Pole Capacity	Bending Stress (+/- psi)	Vertical Load (lbs)	Vertical Stress (psi)	Total Stress (psi)	Percent of Pole Capacity
Powers:	3,339	49.6	128,148	4.4	4.2	2,248	1,891	7	2,255	57.8
Comms:	1,652	24.6	42,564	4.6	4.4	747	747	3	749	19.2
Pole:	1,260	18.7	26,127	12.3	11.8	458	4,116	14	473	12.1
Crossarms:	85	1.3	2,896	1.3	1.2	51	102	0	51	1.3
Risers:	181	2.7	3,525	1.4	1.3	62	127	0	62	1.6
Insulators:	210	3.1	8,682	0.5	0.5	152	542	2	154	4.0
Pole Load:	6,727	100.0	211,941	100.0	95.4	3,719	7,524	26	3,745	96.0
Pole Reserve Capacity:			10,332		4.6	181			155	4.0

LOAD SUMMARY BY OWNER

NVE:	3,000	120,676	2,117	2,234	8	2,125	54.5
TWT:	355	9,912	174	131	0	174	4.5
ZFS:	415	11,832	208	238	1	208	5.3

Version: 4.2 / 4.06
* includes Load Factor(s)

² Worst Wind per Guy Wire
³ Wind at 180.0°

COX:	798	21,222	372	489	2	374	9.6
CTL:	898	22,171	389	315	1	390	10.0
Pole:	1,260	26,127	458	4,116	14	473	12.1
Totals	6,727	211,941	3,719	7,524	26	3,745	96.0

Detailed Load Components

Power:		Owner	Height (ft)	Horiz. Offset (in)	Cable Dia. (in)	Rotate Angle (deg)	Cable Weight (lbs/ft)	Lead/Span Length	Span Angle (deg)	Wire Length (ft)	Tension (lbs)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Primary	AAC 954.0 KCM 61 STRAND	NVE	46.00	30.35	1.1260	-	0.895	183.0	90.0	183.0	10,140	679	-311	8,895	9,263
Primary	AAC 954.0 KCM 61 STRAND	NVE	46.00	30.35	1.1260	-	0.895	200.0	270.0	200.0	10,140	-679	-339	9,722	8,704
Primary	AAC 954.0 KCM 61 STRAND	NVE	46.00	30.35	1.1260	-	0.895	183.0	90.0	183.0	10,140	679	311	8,895	9,884
Primary	AAC 954.0 KCM 61 STRAND	NVE	46.00	30.35	1.1260	-	0.895	200.0	270.0	200.0	10,140	-679	339	9,722	9,383
Primary	AAC 954.0 KCM 61 STRAND	NVE	42.20	30.71	1.1260	-	0.895	183.0	90.0	183.0	10,140	623	-314	8,161	8,469
Primary	AAC 954.0 KCM 61 STRAND	NVE	42.20	30.71	1.1260	-	0.895	200.0	270.0	200.0	10,140	-623	-344	8,919	7,953
Primary	AAC 954.0 KCM 61 STRAND	NVE	42.20	30.71	1.1260	-	0.895	183.0	90.0	183.0	10,140	623	314	8,161	9,098
Primary	AAC 954.0 KCM 61 STRAND	NVE	42.20	30.71	1.1260	-	0.895	200.0	270.0	200.0	10,140	-623	344	8,919	8,640
Primary	AAC 954.0 KCM 61 STRAND	NVE	37.80	31.13	1.1260	-	0.895	183.0	90.0	183.0	10,140	558	-319	7,311	7,550
Primary	AAC 954.0 KCM 61 STRAND	NVE	37.80	31.13	1.1260	-	0.895	200.0	270.0	200.0	10,140	-558	-348	7,990	7,084
Primary	AAC 954.0 KCM 61 STRAND	NVE	37.80	31.13	1.1260	-	0.895	183.0	90.0	183.0	10,140	558	319	7,311	8,188
Primary	AAC 954.0 KCM 61 STRAND	NVE	37.80	31.13	1.1260	-	0.895	200.0	270.0	200.0	10,140	-558	348	7,990	7,781
Neutral	AAC 2/0 AWG 7 STRAND ASTER	NVE	31.80	19.09	0.4140	-	0.125	183.0	90.0	183.0	1,506	70	-27	2,260	2,302
Neutral	AAC 2/0 AWG 7 STRAND ASTER	NVE	31.80	19.09	0.4140	-	0.125	200.0	270.0	200.0	1,506	-70	-30	2,470	2,370
Other	144ct 1/4" MESS	TWT	27.06	29.27	0.9900	-	0.431	183.0	90.0	183.0	1,500	59	138	4,589	4,786
Other	144ct 1/4" MESS	TWT	27.06	29.27	0.9900	-	0.431	200.0	270.0	200.0	1,500	-59	151	5,016	5,108
Other	144ct, 24ct 5/16" MESS	ZFS	26.73	42.86	1.1400	-	0.657	183.0	90.0	183.1	1,500	58	316	5,218	5,592
Other	144ct, 24ct 5/16" MESS	ZFS	26.73	42.86	1.1400	-	0.657	200.0	270.0	200.1	1,500	-58	345	5,703	5,990
											Totals:	0	893	127,255	128,148

Comm:		Owner	Height (ft)	Horiz. Offset (in)	Cable Dia. (in)	Rotate Angle (deg)	Cable Weight (lbs/ft)	Lead/Span Length	Span Angle (deg)	Wire Length (ft)	Tension (lbs)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
CATV	.50"cx X 2, 288ct, 24ct X 3 1/4"	COX	26.60	9.34	2.1000	-	1.554	183.0	90.0	183.4	1,500	58	166	9,583	9,807
CATV	.50"cx X 2, 288ct, 24ct X 3 1/4"	COX	26.60	9.34	2.1000	-	1.554	200.0	270.0	200.5	1,500	-58	181	10,474	10,597
Telco	1.25" 1/4"MESS	CTL	24.90	9.50	1.5000	-	0.727	183.0	90.0	183.1	1,500	54	79	6,408	6,541
Telco	1.25" 1/4"MESS	CTL	24.90	9.50	1.5000	-	0.727	200.0	270.0	200.1	1,500	-54	86	7,003	7,035
Telco	.75" 1/4" MESS	CTL	23.70	9.61	1.0000	-	0.318	183.0	90.0	183.0	1,500	52	35	4,066	4,153
Telco	.75" 1/4" MESS	CTL	23.70	9.61	1.0000	-	0.318	200.0	270.0	200.0	1,500	-52	38	4,444	4,430
											Totals:	0	586	41,978	42,564

Crossarm:		Owner	Height (ft)	Horiz. Offset (in)	Offset Angle (deg)	Rotate Angle (deg)	Unit Weight (lbs)	Unit Height (in)	Unit Depth (in)	Unit Diameter (in)	Unit Length (in)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Normal	CROSSARM 3-1/2 X 4-1/2 X 6 -	NVE	34.10	7.87	0.0	0.0	40.00	4.50	3.50	-	72.00	-	-39	2,762	2,723
Offset	CROSSARM 3-1/2 X 4-1/2 X 4 -	ZFS	27.25	8.52	90.0	90.0	28.00	4.50	3.50	-	48.00	-	66	107	173
											Totals:	0	26	2,869	2,896

Version: 4.2 / 4.06
* includes Load Factor(s)

² Worst Wind per Guy Wire
³ Wind at 180.0°

Riser:		Owner	Height (ft)	Horiz. Offset (in)	Offset Angle (deg)	Rotate Angle (deg)	Unit Weight (lbs)	Unit Height (in)	Unit Depth (in)	Unit Diameter (in)	Unit Length (in)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
3" Riser	3" Riser	NVE	30.60	10.01	315.0	315.0	5.10	367.20	-	0.00	-	-	-34	2,897	2,862
2" Riser 20.0°	2" Riser	COX	26.30	10.01	20.0	20.0	1.97	315.60	-	0.00	-	-	-18	680	662
											Totals:	0	-52	3,577	3,525

Insulator:		Owner	Height (ft)	Horiz. Offset (in)	Offset Angle (deg)	Rotate Angle (deg)	Unit Weight (lbs)	Unit Height (in)	Unit Depth (in)	Unit Diameter (in)	Unit Length (in)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Post	Post Insulator - 69 kV	NVE	46.00	4.97	0.0	0.0	54.00	25.38	-	7.25	-	-	-205	1,353	1,148
Post	Post Insulator - 69 kV	NVE	46.00	4.97	180.0	180.0	54.00	25.38	-	7.25	-	-	205	1,353	1,558
Post	Post Insulator - 69 kV	NVE	42.20	5.34	0.0	0.0	54.00	25.38	-	7.25	-	-	-207	1,243	1,036
Post	Post Insulator - 69 kV	NVE	42.20	5.34	180.0	180.0	54.00	25.38	-	7.25	-	-	207	1,243	1,451
Post	Post Insulator - 69 kV	NVE	37.80	5.76	0.0	0.0	54.00	25.38	-	7.25	-	-	-210	1,117	907
Post	Post Insulator - 69 kV	NVE	37.80	5.76	180.0	180.0	54.00	25.38	-	7.25	-	-	210	1,117	1,327
Deadend	CUTOUT	NVE	34.10	32.00	76.2	0.0	3.00	12.75	-	3.80	-	-	-6	258	252
Deadend	CUTOUT	NVE	34.10	-32.00	283.8	0.0	3.00	12.75	-	3.80	-	-	-6	258	252
Deadend	CUTOUT	NVE	34.10	-18.00	293.6	0.0	3.00	12.75	-	3.80	-	-	-6	258	252
Post	Deadend Insulator - 15 kV	NVE	31.80	6.34	0.0	0.0	3.00	12.75	-	3.80	-	-	-7	245	238
Bolt	Three Bolt	COX	26.60	6.84	180.0	90.0	5.00	12.00	-	3.00	-	-	6	150	155
Underhung	Three Bolt	TWT	27.06	28.00	163.1	0.0	5.00	0.00	-	3.00	-	-	18	0	18
Underhung	Three Bolt	ZFS	27.06	42.00	168.5	0.0	5.00	4.00	-	3.00	-	-	26	51	77
Bolt	Three Bolt	CTL	24.90	7.00	180.0	90.0	5.00	0.00	-	3.00	-	-	6	0	6
Bolt	Three Bolt	CTL	23.70	7.11	180.0	90.0	5.00	0.00	-	3.00	-	-	6	0	6
											Totals:	0	36	8,646	8,682

Pole Buckling

Buckling [illegible]	Buckling [illegible] (ft)	Buckling Section [illegible] (% Buckling Col. Hgt.)	Buckling [illegible] (in)	Min. Buckling [illegible] (in)	Diameter [illegible] (in)	Diameter [illegible] (in)	Modulus of [illegible] (psi)	Pole [illegible] (pcf)	Ice Density (pcf)	Pole Tip [illegible] (ft)	Buckling Load [illegible] (lbs)	Buckling Load [illegible] (lbs)	Buckling Load [illegible]
2.00	28.24	34.41	17.16	28.25	9.87	19.11	1,000,000	50.00	57.00	46.40	59,494	7,524	7.91

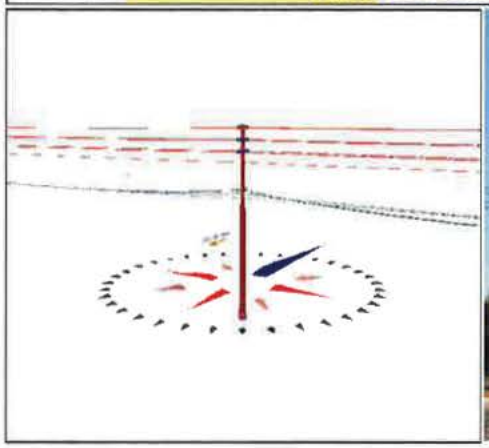
Version: 4.2 / 4.06
* includes Load Factor(s)

² Worst Wind per Guy Wire
³ Wind at 180.0°

O-Calc® Pro *Analysis Report*

Wednesday, October 01, 2014 12:01:03 PM

File Name:	P82131 GRADE B	Pole Length / Class:	55 / H2	Code:	NESC	Structure Type:	Unguyed
Pole Num:	P82131	Pole Species:	WESTERN RED CEDAR	NESC Rule:	Rule 250B	Status:	N/A
Aux Data	Warm Springs & Amigo	Setting Depth (ft):	10.60	Construction Grade:	B	Pole Strength Factor:	0.65
Aux Data	Cox	G/L Circumference (in):	63.00	Loading District:	Light	Transverse Wind LF:	2.50
Aux Data	Unset	G/L Fiber Stress (psi):	6,000	Ice Thickness (in):	0.00	Wire Tension LF:	1.10
Aux Data	Unset	Allowable Stress (psi):	3,900	Wind Speed (mph):	59.29	Vertical LF:	1.50
Aux Data	Unset	Fiber Stress Ht. Reduction:	No	Wind Pressure (psf):	9.00		



Pole Capacity Utilization		Height	Wind Angle
Maximum:	75.4%	0.0 ft	180.0°
Groundline:	75.4%	0.0 ft	180.0°
Vertical:	9.4%	27.0 ft	180.0°

Pole Moments		Load Angle	Wind Angle
Max Capac. Util:	191,265 ft-lb	179.9°	180.0°
Groundline:	191,265 ft-lb	179.9°	180.0°

GROUNDLINE LOAD SUMMARY:*Wind at 180.0°, Applied Moment 191,265 ft-lb at 179.9°, Allowable Moment 257,309 ft-lb

	Shear Load (lbs)*	Percent Applied Load	Bending Moment (ft-lb)	Percent of Applied Moment**	Percent of Pole Capacity	Bending Stress (+/- psi)	Vertical Load (lbs)	Vertical Stress (psi)	Total Stress (psi)	Percent of Pole Capacity
Powers:	3,156	51.3	117,536	5.0	3.8	1,781	1,787	6	1,787	45.8
Comms:	1,561	25.4	41,385	5.7	4.2	627	706	2	630	16.1
Pole:	1,245	20.2	24,512	12.8	9.5	372	4,222	13	385	9.9
Crossarms:	4	0.1	172	0.1	0.1	3	42	0	3	0.1
Insulators:	188	3.0	7,659	0.6	0.4	116	528	2	118	3.0
Pole Load:	6,154	100.0	191,265	100.0	74.3	2,899	7,285	23	2,922	74.9
Pole Reserve Capacity:			66,044		25.7	1,001			978	25.1

LOAD SUMMARY BY OWNER

NVE:	2,613	104,741	1,588	1,982	6	1,594	40.9
TWT:	336	9,319	141	125	0	142	3.6
ZFS:	393	11,138	169	228	1	170	4.3
COX:	718	19,732	299	429	1	300	7.7

Version: 4.2 / 4.06
* includes Load Factor(s)

² Worst Wind per Guy Wire
³ Wind at 180.0°

CTL:	848	21,823	331	299	1	332	8.5
Pole:	1,245	24,512	372	4,222	13	385	9.9
Totals	6,154	191,265	2,899	7,285	23	2,922	74.9

Detailed Load Components

Power:		Owner	Height (ft)	Horiz. Offset (in)	Cable Dia. (in)	Rotate Angle (deg)	Cable Weight (lbs/ft)	Lead/Span Length	Span Angle (deg)	Wire Length (ft)	Tension (lbs)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Primary	AAC 954.0 KCM 61 STRAND	NVE	43.60	30.40	1.1260	-	0.895	200.0	90.0	200.0	10,140	781	-340	9,215	9,656
Primary	AAC 954.0 KCM 61 STRAND	NVE	43.60	30.40	1.1260	-	0.895	162.0	270.0	162.0	10,140	-781	-275	7,464	6,407
Primary	AAC 954.0 KCM 61 STRAND	NVE	43.60	30.40	1.1260	-	0.895	200.0	90.0	200.0	10,140	781	340	9,215	10,336
Primary	AAC 954.0 KCM 61 STRAND	NVE	43.60	30.40	1.1260	-	0.895	162.0	270.0	162.0	10,140	-781	275	7,464	6,958
Primary	AAC 954.0 KCM 61 STRAND	NVE	40.20	30.71	1.1260	-	0.895	200.0	90.0	200.0	10,140	721	-344	8,497	8,874
Primary	AAC 954.0 KCM 61 STRAND	NVE	40.20	30.71	1.1260	-	0.895	162.0	270.0	162.0	10,140	-721	-278	6,883	5,884
Primary	AAC 954.0 KCM 61 STRAND	NVE	40.20	30.71	1.1260	-	0.895	200.0	90.0	200.0	10,140	721	344	8,497	9,561
Primary	AAC 954.0 KCM 61 STRAND	NVE	40.20	30.71	1.1260	-	0.895	162.0	270.0	162.0	10,140	-721	278	6,883	6,440
Primary	AAC 954.0 KCM 61 STRAND	NVE	37.20	31.13	1.1260	-	0.895	200.0	90.0	200.0	10,140	667	-348	7,864	8,182
Primary	AAC 954.0 KCM 61 STRAND	NVE	37.20	31.13	1.1260	-	0.895	162.0	270.0	162.0	10,140	-667	-282	6,370	5,421
Primary	AAC 954.0 KCM 61 STRAND	NVE	37.20	31.13	1.1260	-	0.895	200.0	90.0	200.0	10,140	667	348	7,864	8,879
Primary	AAC 954.0 KCM 61 STRAND	NVE	37.20	31.13	1.1260	-	0.895	162.0	270.0	162.0	10,140	-667	282	6,370	5,985
Neutral	AAC 2/0 AWG 7 STRAND ASTER	NVE	34.25	18.85	0.4140	-	0.125	200.0	90.0	200.0	1,506	91	-29	2,660	2,722
Neutral	AAC 2/0 AWG 7 STRAND ASTER	NVE	34.25	18.85	0.4140	-	0.125	162.0	270.0	162.0	1,506	-91	-24	2,155	2,040
Other	144ct 1/4" MESS	TWT	26.91	29.31	0.9900	-	0.431	200.0	90.0	200.0	1,500	71	151	4,988	5,210
Other	144ct 1/4" MESS	TWT	26.91	29.31	0.9900	-	0.431	162.0	270.0	162.0	1,500	-71	122	4,040	4,091
Other	144ct, 24ct 5/16" MESS	ZFS	26.58	42.89	1.1400	-	0.657	200.0	90.0	200.1	1,500	70	345	5,671	6,086
Other	144ct, 24ct 5/16" MESS	ZFS	26.58	42.89	1.1400	-	0.657	162.0	270.0	162.1	1,500	-70	279	4,594	4,803
											Totals:	0	844	116,692	117,536

Comm:		Owner	Height (ft)	Horiz. Offset (in)	Cable Dia. (in)	Rotate Angle (deg)	Cable Weight (lbs/ft)	Lead/Span Length	Span Angle (deg)	Wire Length (ft)	Tension (lbs)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
CATV	.50"cx X 2, 288ct, 24ct X 3 1/4"	COX	27.00	9.43	2.1000	-	1.554	200.0	90.0	200.5	1,500	72	183	10,631	10,886
CATV	.50"cx X 2, 288ct, 24ct X 3 1/4"	COX	27.00	9.43	2.1000	-	1.554	162.0	270.0	162.3	1,500	-72	148	8,611	8,688
Telco	1.25" 1/4"MESS	CTL	25.90	9.56	1.5000	-	0.727	200.0	90.0	200.1	1,500	69	87	7,284	7,440
Telco	1.25" 1/4"MESS	CTL	25.90	9.56	1.5000	-	0.727	162.0	270.0	162.1	1,500	-69	70	5,900	5,902
Telco	.75" 1/4" MESS	CTL	24.75	9.69	1.0000	-	0.318	200.0	90.0	200.0	1,500	66	39	4,641	4,745
Telco	.75" 1/4" MESS	CTL	24.75	9.69	1.0000	-	0.318	162.0	270.0	162.0	1,500	-66	31	3,759	3,725
											Totals:	0	558	40,827	41,385

Crossarm:		Owner	Height (ft)	Horiz. Offset (in)	Offset Angle (deg)	Rotate Angle (deg)	Unit Weight (lbs)	Unit Height (in)	Unit Depth (in)	Unit Diameter (in)	Unit Length (in)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Offset	CROSSARM 3-1/2 X 4-1/2 X 4 -	ZFS	27.10	8.67	90.0	90.0	28.00	4.50	3.50	-	48.00	-	66	107	172
											Totals:	0	66	107	172

Insulator:		Owner	Height (ft)	Horiz. Offset (in)	Offset Angle (deg)	Rotate Angle (deg)	Unit Weight (lbs)	Unit Height (in)	Unit Depth (in)	Unit Diameter (in)	Unit Length (in)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Post	Post Insulator - 69 kV	NVE	43.60	5.03	0.0	0.0	54.00	25.38	-	7.25	-	-	-205	1,284	1,078

Version: 4.2 / 4.06
* includes Load Factor(s)

² Worst Wind per Guy Wire
³ Wind at 180.0°

Post	Post Insulator - 69 kV	NVE	43.60	5.03	180.0	180.0	54.00	25.38	-	7.25	-	-	205	1,284	1,489
Post	Post Insulator - 69 kV	NVE	40.20	5.34	0.0	0.0	54.00	25.38	-	7.25	-	-	-207	1,186	979
Post	Post Insulator - 69 kV	NVE	40.20	5.34	180.0	180.0	54.00	25.38	-	7.25	-	-	207	1,186	1,393
Post	Post Insulator - 69 kV	NVE	37.20	5.76	0.0	0.0	54.00	25.38	-	7.25	-	-	-210	1,100	890
Post	Post Insulator - 69 kV	NVE	37.20	5.76	180.0	180.0	54.00	25.38	-	7.25	-	-	210	1,100	1,310
Post	Deadend Insulator - 15 kV	NVE	34.25	6.10	0.0	0.0	3.00	12.75	-	3.80	-	-	-7	263	256
Bolt	Three Bolt	COX	27.00	6.93	180.0	90.0	5.00	12.00	-	3.00	-	-	6	152	158
Underhung	Three Bolt	TWT	26.91	28.00	162.8	0.0	5.00	0.00	-	3.00	-	-	18	0	18
Underhung	Three Bolt	ZFS	26.91	42.00	168.3	0.0	5.00	4.00	-	3.00	-	-	26	50	77
Bolt	Three Bolt	CTL	25.90	7.06	180.0	90.0	5.00	0.00	-	3.00	-	-	6	0	6
Bolt	Three Bolt	CTL	24.75	7.19	180.0	90.0	5.00	0.00	-	3.00	-	-	6	0	6
											Totals:	0	55	7,604	7,659

Pole Buckling

Buckling	Buckling (ft)	Buckling Section (% Buckling Col. Hgt.)	Buckling (in)	Min. Buckling (in)	Diameter (in)	Diameter (in)	Modulus of (psi)	Pole (pcf)	Ice Density (pcf)	Pole Tip (ft)	Buckling Load (lbs)	Buckling Load (lbs)	Buckling Load
2.00	26.97	34.63	17.91	27.20	9.67	20.06	1,000,000	50.00	57.00	44.40	77,357	7,285	10.62

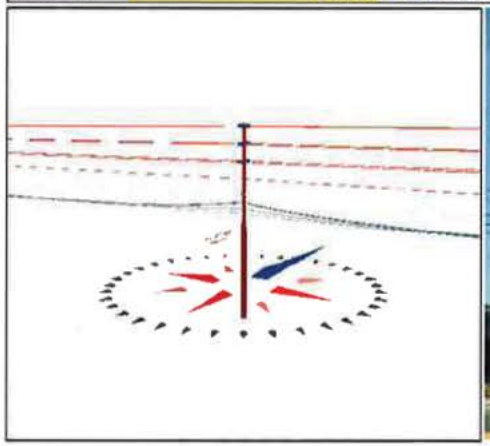
Version: 4.2 / 4.06
* includes Load Factor(s)

[2] Worst Wind per Guy Wire
[3] Wind at 180.0°

O-Calc® Pro *Analysis Report*

Wednesday, October 01, 2014 11:23:23 AM

File Name:	P82130 GRADE B	Pole Length / Class:		55 / H2	Code:		NESC	Structure Type:	Unguyed
Pole Num:	P82130	Pole Species:	WESTERN RED CEDAR		NESC Rule:		Rule 250B	Status:	N/A
Aux Data	Warm Springs & Amigo	Setting Depth (ft):		9.40	Construction Grade:		B	Pole Strength Factor:	0.65
Aux Data	Cox	G/L Circumference (in):		58.00	Loading District:		Light	Transverse Wind LF:	2.50
Aux Data	Unset	G/L Fiber Stress (psi):		6,000	Ice Thickness (in):		0.00	Wire Tension LF:	1.10
Aux Data	Unset	Allowable Stress (psi):		3,900	Wind Speed (mph):		59.29	Vertical LF:	1.50
Aux Data	Unset	Fiber Stress Ht. Reduction:		No	Wind Pressure (psf):		9.00		



Pole Capacity Utilization		Height	Wind Angle
Maximum:	88.5%	0.0 ft	180.0°
Groundline:	88.5%	0.0 ft	180.0°
Vertical:	11.7%	27.2 ft	180.0°

Pole Moments		Load Angle	Wind Angle
Max Capac. Util:	176,414 ft-lb	180.0°	180.0°
Groundline:	176,414 ft-lb	180.0°	180.0°

GROUNDLINE LOAD SUMMARY:*Wind at 180.0°, Applied Moment 176,414 ft-lb at 180.0°, Allowable Moment 200,779 ft-lb

	Shear Load (lbs)*	Percent Applied Load	Bending Moment (ft-lb)	Percent of Applied Moment**	Percent of Pole Capacity	Bending Stress (+/- psi)	Vertical Load (lbs)	Vertical Stress (psi)	Total Stress (psi)	Percent of Pole Capacity
Powers:	2,991	50.9	109,591	4.2	3.7	2,129	1,693	6	2,135	54.7
Comms:	1,479	25.2	34,280	4.4	3.9	666	669	2	668	17.1
Pole:	1,211	20.6	24,821	14.1	12.4	482	3,857	14	497	12.7
Insulators:	194	3.3	7,723	0.6	0.6	150	528	2	152	3.9
Pole Load:	5,875	100.0	176,414	100.0	87.9	3,427	6,747	25	3,452	88.5
Pole Reserve Capacity:			24,364		12.1	473			448	11.5

LOAD SUMMARY BY OWNER

NVE:	2,486	98,542	1,914	1,904	7	1,921	49.3
TWT:	318	8,131	158	118	0	158	4.1
ZFS:	375	10,489	204	177	1	204	5.2
COX:	681	16,663	324	407	2	325	8.3
CTL:	804	17,770	345	284	1	346	8.9

Version: 4.2 / 4.06
* includes Load Factor(s)

² Worst Wind per Guy Wire
³ Wind at 180.0°

Pole:	1,211	24,821	482	3,857	14	497	12.7
Totals	5,875	176,414	3,427	6,747	25	3,452	88.5

Detailed Load Components

Power:		Owner	Height (ft)	Horiz. Offset (in)	Cable Dia. (in)	Rotate Angle (deg)	Cable Weight (lbs/ft)	Lead/Span Length	Span Angle (deg)	Wire Length (ft)	Tension (lbs)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Primary	AAC 954.0 KCM 61 STRAND	NVE	44.90	30.37	1.1260	-	0.895	162.0	90.0	162.0	10,140	0	-275	7,686	7,411
Primary	AAC 954.0 KCM 61 STRAND	NVE	44.90	30.37	1.1260	-	0.895	181.0	270.0	181.0	10,140	0	-307	8,588	8,280
Primary	AAC 954.0 KCM 61 STRAND	NVE	44.90	30.37	1.1260	-	0.895	162.0	90.0	162.0	10,140	0	275	7,686	7,962
Primary	AAC 954.0 KCM 61 STRAND	NVE	44.90	30.37	1.1260	-	0.895	181.0	270.0	181.0	10,140	0	307	8,588	8,895
Primary	AAC 954.0 KCM 61 STRAND	NVE	40.00	30.84	1.1260	-	0.895	162.0	90.0	162.0	10,140	0	-279	6,848	6,569
Primary	AAC 954.0 KCM 61 STRAND	NVE	40.00	30.84	1.1260	-	0.895	181.0	270.0	181.0	10,140	0	-312	7,652	7,340
Primary	AAC 954.0 KCM 61 STRAND	NVE	40.00	30.84	1.1260	-	0.895	162.0	90.0	162.0	10,140	0	279	6,848	7,128
Primary	AAC 954.0 KCM 61 STRAND	NVE	40.00	30.84	1.1260	-	0.895	181.0	270.0	181.0	10,140	0	312	7,652	7,964
Primary	AAC 954.0 KCM 61 STRAND	NVE	35.40	31.27	1.1260	-	0.895	162.0	90.0	162.0	10,140	0	-283	6,062	5,779
Primary	AAC 954.0 KCM 61 STRAND	NVE	35.40	31.27	1.1260	-	0.895	181.0	270.0	181.0	10,140	0	-317	6,773	6,456
Primary	AAC 954.0 KCM 61 STRAND	NVE	35.40	31.27	1.1260	-	0.895	162.0	90.0	162.0	10,140	0	283	6,062	6,345
Primary	AAC 954.0 KCM 61 STRAND	NVE	35.40	31.27	1.1260	-	0.895	181.0	270.0	181.0	10,140	0	317	6,773	7,089
Neutral	AAC 2/0 AWG 7 STRAND ASTER	NVE	30.40	19.12	0.4140	-	0.125	162.0	90.0	162.0	1,506	0	-24	1,913	1,888
Neutral	AAC 2/0 AWG 7 STRAND ASTER	NVE	30.40	19.12	0.4140	-	0.125	181.0	270.0	181.0	1,506	0	-27	2,137	2,110
Other	144ct 1/4" MESS	TWT	25.25	9.35	0.9900	-	0.431	162.0	90.0	162.0	1,500	0	41	3,796	3,837
Other	144ct 1/4" MESS	TWT	25.25	9.35	0.9900	-	0.431	181.0	270.0	181.0	1,500	0	46	4,242	4,287
Other	144ct, 24ct 5/16" MESS	ZFS	27.06	23.42	1.1400	-	0.657	162.0	90.0	162.1	1,500	0	156	4,685	4,841
Other	144ct, 24ct 5/16" MESS	ZFS	27.06	23.42	1.1400	-	0.657	181.0	270.0	181.1	1,500	0	174	5,235	5,409
											Totals:	0	365	109,226	109,591

Comm:		Owner	Height (ft)	Horiz. Offset (in)	Cable Dia. (in)	Rotate Angle (deg)	Cable Weight (lbs/ft)	Lead/Span Length	Span Angle (deg)	Wire Length (ft)	Tension (lbs)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
CATV	.50"cx X 2, 288ct, 24ct X 3 1/4"	COX	24.00	9.47	2.1000	-	1.554	162.0	90.0	162.3	1,500	0	149	7,655	7,803
CATV	.50"cx X 2, 288ct, 24ct X 3 1/4"	COX	24.00	9.47	2.1000	-	1.554	181.0	270.0	181.4	1,500	0	166	8,552	8,719
Telco	1.25" 1/4"MESS	CTL	22.30	9.63	1.5000	-	0.727	162.0	90.0	162.1	1,500	0	71	5,080	5,151
Telco	1.25" 1/4"MESS	CTL	22.30	9.63	1.5000	-	0.727	181.0	270.0	181.1	1,500	0	79	5,676	5,755
Telco	.75" 1/4" MESS	CTL	21.10	9.74	1.0000	-	0.318	162.0	90.0	162.0	1,500	0	31	3,205	3,236
Telco	.75" 1/4" MESS	CTL	21.10	9.74	1.0000	-	0.318	181.0	270.0	181.0	1,500	0	35	3,580	3,615
											Totals:	0	532	33,748	34,280

Insulator:		Owner	Height (ft)	Horiz. Offset (in)	Offset Angle (deg)	Rotate Angle (deg)	Unit Weight (lbs)	Unit Height (in)	Unit Depth (in)	Unit Diameter (in)	Unit Length (in)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Post	Post Insulator - 69 kV	NVE	44.90	5.00	0.0	0.0	54.00	25.38	-	7.25	-	-	-205	1,321	1,116
Post	Post Insulator - 69 kV	NVE	44.90	5.00	180.0	180.0	54.00	25.38	-	7.25	-	-	205	1,321	1,526
Post	Post Insulator - 69 kV	NVE	40.00	5.46	0.0	0.0	54.00	25.38	-	7.25	-	-	-208	1,180	972
Post	Post Insulator - 69 kV	NVE	40.00	5.46	180.0	180.0	54.00	25.38	-	7.25	-	-	208	1,180	1,388
Post	Post Insulator - 69 kV	NVE	35.40	5.90	0.0	0.0	54.00	25.38	-	7.25	-	-	-211	1,048	837
Post	Post Insulator - 69 kV	NVE	35.40	5.90	180.0	180.0	54.00	25.38	-	7.25	-	-	211	1,048	1,259
Post	Deadend Insulator - 15 kV	NVE	30.40	6.37	0.0	0.0	3.00	12.75	-	3.80	-	-	-7	234	227

Version: 4.2 / 4.06
* includes Load Factor(s)

[2] Worst Wind per Guy Wire
[3] Wind at 180.0°

Bolt	Three Bolt	COX	24.00	6.97	180.0	90.0	5.00	12.00	-	3.00	-	-	6	135	141
Bolt	Three Bolt	CTL	22.30	7.13	180.0	90.0	5.00	0.00	-	3.00	-	-	6	0	6
Bolt	Three Bolt	CTL	21.10	7.24	180.0	90.0	5.00	0.00	-	3.00	-	-	6	0	6
Bolt	Three Bolt	TWT	25.25	6.85	180.0	90.0	5.00	0.00	-	3.00	-	-	6	0	6
Davit	Three Bolt	ZFS	26.50	6.73	180.0	90.0	5.00	18.00	-	3.00	-	-	15	224	238
											Totals:	0	31	7,691	7,723

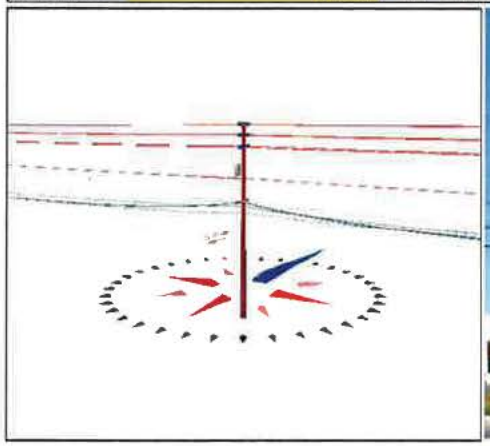
Pole Buckling

Buckling	Buckling (ft)	Buckling Section (% Buckling Col. Hgt.)	Buckling (in)	Min. Buckling (in)	Diameter (in)	Diameter (in)	Modulus of (psi)	Pole (pcf)	Ice Density (pcf)	Pole Tip (ft)	Buckling Load (lbs)	Buckling Load (lbs)	Buckling Load
2.00	27.17	34.16	16.71	26.31	9.87	18.47	1,000,000	50.00	57.00	45.60	57,754	6,747	8.56

O-Calc® Pro *Analysis Report*

Wednesday, October 01, 2014 11:17:49 AM

File Name:	P82129 GRADE B	Pole Length / Class:	55 / H2	Code:	NESC	Structure Type:	Unguyed
Pole Num:	P82129	Pole Species:	WESTERN RED CEDAR	NESC Rule:	Rule 250B	Status:	N/A
Aux Data	Warm Springs & Amigo	Setting Depth (ft):	8.30	Construction Grade:	B	Pole Strength Factor:	0.65
Aux Data	Cox	G/L Circumference (in):	54.00	Loading District:	Light	Transverse Wind LF:	2.50
Aux Data	Unset	G/L Fiber Stress (psi):	6,000	Ice Thickness (in):	0.00	Wire Tension LF:	1.10
Aux Data	Unset	Allowable Stress (psi):	3,900	Wind Speed (mph):	59.29	Vertical LF:	1.50
Aux Data	Unset	Fiber Stress Ht. Reduction:	No	Wind Pressure (psf):	9.00		



Pole Capacity Utilization		Height	Wind Angle
Maximum:	133.7%	0.0 ft	181.2°
Groundline:	133.7%	0.0 ft	181.2°
Vertical:	20.3%	29.7 ft	181.2°

Pole Moments		Load Angle	Wind Angle
Max Capac. Util:	215,322 ft-lb	184.8°	181.2°
Groundline:	215,322 ft-lb	184.8°	181.2°

GROUNDLINE LOAD SUMMARY:*Wind at 181.2°, Applied Moment 215,322 ft-lb at 184.8°, Allowable Moment 162,037 ft-lb

	Shear Load (lbs)*	Percent Applied Load	Bending Moment (ft-lb)	Percent of Applied Moment**	Percent of Pole Capacity	Bending Stress (+/- psi)	Vertical Load (lbs)	Vertical Stress (psi)	Total Stress (psi)	Percent of Pole Capacity
Powers:	3,418	50.2	132,696	-16.4	-21.8	3,194	1,877	8	3,202	82.1
Comms:	1,714	25.2	42,156	1.3	1.7	1,015	798	3	1,018	26.1
Power Equipment:	134	2.0	4,624	2.1	2.9	111	548	2	114	2.9
Pole:	1,182	17.4	25,115	11.7	15.5	604	3,581	15	620	15.9
Crossarms:	4	0.1	162	0.1	0.1	4	42	0	4	0.1
Risers:	166	2.4	2,323	0.6	0.8	56	118	1	56	1.4
Insulators:	191	2.8	8,246	0.5	0.7	198	530	2	201	5.1
Pole Load:	6,809	100.0	215,322	100.0	132.9	5,182	7,493	32	5,215	133.7
Pole Reserve Capacity:			-53,285		-32.9	-1,282			-1,315	-33.7

LOAD SUMMARY BY OWNER

NVE:	3,110	126,684	3,049	2,668	11	3,061	78.5
TWT:	347	9,333	225	129	1	225	5.8

Version: 4.2 / 4.06
* includes Load Factor(s)

² Worst Wind per Guy Wire
³ Wind at 181.2°

ZFS:	408	**11,208**	**270**	192	1	**271**	**6.9**
CTL:	1,008	**23,316**	**561**	429	2	**563**	**14.4**
COX:	754	**19,667**	**473**	494	2	**475**	**12.2**
Pole:	1,182	**25,115**	**604**	3,581	15	**620**	**15.9**
Totals	6,809	**215,322**	**5,182**	7,493	32	**5,215**	**133.7**

Detailed Load Components

Power:		Owner	Height (ft)	Horiz. Offset (in)	Cable Dia. (in)	Rotate Angle (deg)	Cable Weight (lbs/ft)	Lead/Span Length	Span Angle (deg)	Wire Length (ft)	Tension (lbs)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Primary	AAC 954.0 KCM 61 STRAND	NVE	46.40	30.33	1.1260	-	0.895	181.0	90.0	181.0	10,140	-43,797	-306	8,841	-35,262
Primary	AAC 954.0 KCM 61 STRAND	NVE	46.40	30.33	1.1260	-	0.895	194.0	270.0	194.0	10,140	43,797	-328	9,476	52,944
Primary	AAC 954.0 KCM 61 STRAND	NVE	46.40	30.33	1.1260	-	0.895	181.0	90.0	181.0	10,140	-43,797	306	8,841	-34,650
Primary	AAC 954.0 KCM 61 STRAND	NVE	46.40	30.33	1.1260	-	0.895	194.0	270.0	194.0	10,140	43,797	328	9,476	53,600
Primary	AAC 954.0 KCM 61 STRAND	NVE	43.40	30.57	1.1260	-	0.895	181.0	90.0	181.0	10,140	-40,968	-308	8,270	-33,006
Primary	AAC 954.0 KCM 61 STRAND	NVE	43.40	30.57	1.1260	-	0.895	194.0	270.0	194.0	10,140	40,968	-330	8,864	49,501
Primary	AAC 954.0 KCM 61 STRAND	NVE	43.40	30.57	1.1260	-	0.895	181.0	90.0	181.0	10,140	-40,968	308	8,270	-32,390
Primary	AAC 954.0 KCM 61 STRAND	NVE	43.40	30.57	1.1260	-	0.895	194.0	270.0	194.0	10,140	40,968	330	8,864	50,162
Primary	AAC 954.0 KCM 61 STRAND	NVE	40.40	30.80	1.1260	-	0.895	181.0	90.0	181.0	10,140	-38,139	-311	7,699	-30,751
Primary	AAC 954.0 KCM 61 STRAND	NVE	40.40	30.80	1.1260	-	0.895	194.0	270.0	194.0	10,140	38,139	-333	8,252	46,058
Primary	AAC 954.0 KCM 61 STRAND	NVE	40.40	30.80	1.1260	-	0.895	181.0	90.0	181.0	10,140	-38,139	311	7,699	-30,130
Primary	AAC 954.0 KCM 61 STRAND	NVE	40.40	30.80	1.1260	-	0.895	194.0	270.0	194.0	10,140	38,139	333	8,252	46,724
Neutral	AAC 2/0 AWG 7 STRAND ASTER	NVE	31.60	18.87	0.4140	-	0.125	181.0	90.0	181.0	1,506	-4,428	-27	2,213	-2,242
Neutral	AAC 2/0 AWG 7 STRAND ASTER	NVE	31.60	18.87	0.4140	-	0.125	194.0	270.0	194.0	1,506	4,428	-28	2,372	6,771
Secondary	#4 AL TPX	NVE	31.60	8.37	0.6400	-	0.180	194.0	270.0	194.0	484	1,422	2	3,664	5,086
Other	144ct 1/4" MESS	TWT	25.94	33.55	0.9900	-	0.431	181.0	90.0	181.0	1,500	-3,618	154	4,341	877
Other	144ct 1/4" MESS	TWT	25.94	33.55	0.9900	-	0.431	194.0	270.0	194.0	1,500	3,618	166	4,652	8,436
Other	144ct, 24ct 5/16" MESS	ZFS	25.94	41.35	1.1400	-	0.657	181.0	90.0	181.1	1,500	-3,618	295	4,998	1,675
Other	144ct, 24ct 5/16" MESS	ZFS	25.94	41.35	1.1400	-	0.657	194.0	270.0	194.1	1,500	3,618	316	5,357	9,291
											Totals:	**1,422**	**877**	**130,396**	**132,696**

Comm:		Owner	Height (ft)	Horiz. Offset (in)	Cable Dia. (in)	Rotate Angle (deg)	Cable Weight (lbs/ft)	Lead/Span Length	Span Angle (deg)	Wire Length (ft)	Tension (lbs)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Telco	1.25" 1/4"MESS	CTL	24.00	9.21	1.5000	-	0.727	181.0	90.0	181.1	1,500	-3,348	75	6,085	2,813
Telco	1.25" 1/4"MESS	CTL	24.00	9.21	1.5000	-	0.727	194.0	270.0	194.1	1,500	3,348	81	6,523	9,951
Telco	.75" 1/4" MESS	CTL	22.30	9.35	1.0000	-	0.318	181.0	90.0	181.0	1,500	-3,111	34	3,770	693
Telco	.75" X 2, 24ct X 2 1/4"MESS	CTL	22.30	9.35	1.5000	-	0.727	194.0	270.0	194.1	1,500	3,111	82	6,060	9,253
CATV	.50"cx X 2, 288ct, 24ct X 3 1/4"	COX	25.23	19.83	2.1000	-	1.554	181.0	90.0	181.4	1,500	-3,507	303	8,925	5,721
CATV	.50"cx X 2, 432ct, 144ct, 72ct 1/4"	COX	25.23	19.83	2.1700	-	1.603	194.0	270.0	194.5	1,500	3,507	335	9,884	13,725
											Totals:	**0**	**910**	**41,247**	**42,156**

PowerEquipment:		Owner	Height (ft)	Horiz. Offset (in)	Offset Angle (deg)	Rotate Angle (deg)	Unit Weight (lbs)	Unit Height (in)	Unit Depth (in)	Unit Diameter (in)	Unit Length (in)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Transformer	1PH-25KVA	NVE	33.90	22.94	270.0	270.0	365.00	39.00	-	22.00	-	-	88	4,536	4,624
											Totals:	**0**	**88**	**4,536**	**4,624**

Version: 4.2 / 4.06
* includes Load Factor(s)

² Worst Wind per Guy Wire
³ Wind at 181.2°

Crossarm:		Owner	Height (ft)	Horiz. Offset (in)	Offset Angle (deg)	Rotate Angle (deg)	Unit Weight (lbs)	Unit Height (in)	Unit Depth (in)	Unit Diameter (in)	Unit Length (in)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Offset	CROSSARM 3-1/2 X 4-1/2 X 4 -	COX	25.75	8.33	90.0	90.0	28.00	4.50	3.50	-	48.00	-	58	104	162
											Totals:	0	58	104	162

Riser:		Owner	Height (ft)	Horiz. Offset (in)	Offset Angle (deg)	Rotate Angle (deg)	Unit Weight (lbs)	Unit Height (in)	Unit Depth (in)	Unit Diameter (in)	Unit Length (in)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
2" Riser	2" Riser	NVE	21.20	8.93	280.0	280.0	1.59	254.40	-	0.00	-	-	-1	1,275	1,273
2" Riser	2" Riser	NVE	21.20	8.93	340.0	340.0	1.59	254.40	-	0.00	-	-	-12	467	455
3" Riser	3" Riser	CTL	20.10	8.93	200.0	200.0	3.35	241.20	-	0.00	-	-	28	567	595
											Totals:	0	14	2,309	2,323

Insulator:		Owner	Height (ft)	Horiz. Offset (in)	Offset Angle (deg)	Rotate Angle (deg)	Unit Weight (lbs)	Unit Height (in)	Unit Depth (in)	Unit Diameter (in)	Unit Length (in)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Post	Post Insulator - 69 kV	NVE	46.40	4.96	0.0	0.0	54.00	25.38	-	7.25	-	-	-204	1,361	1,157
Post	Post Insulator - 69 kV	NVE	46.40	4.96	180.0	180.0	54.00	25.38	-	7.25	-	-	204	1,361	1,565
Post	Post Insulator - 69 kV	NVE	43.40	5.19	0.0	0.0	54.00	25.38	-	7.25	-	-	-206	1,275	1,070
Post	Post Insulator - 69 kV	NVE	43.40	5.19	180.0	180.0	54.00	25.38	-	7.25	-	-	206	1,275	1,481
Post	Post Insulator - 69 kV	NVE	40.40	5.43	0.0	0.0	54.00	25.38	-	7.25	-	-	-207	1,189	982
Post	Post Insulator - 69 kV	NVE	40.40	5.43	180.0	180.0	54.00	25.38	-	7.25	-	-	207	1,189	1,397
Post	Deadend Insulator - 15 kV	NVE	31.60	6.12	0.0	0.0	3.00	12.75	-	3.80	-	-	-7	243	236
Bolt	Three Bolt	CTL	24.00	6.71	180.0	90.0	5.00	0.00	-	3.00	-	-	6	0	6
Bolt	Three Bolt	CTL	22.30	6.85	180.0	90.0	5.00	0.00	-	3.00	-	-	6	0	6
Spool	Spool Insulator - 20 kV	NVE	31.60	6.12	270.0	180.0	1.00	2.12	-	2.50	-	-	0	26	26
Underhung	Three Bolt	COX	25.56	18.00	155.2	0.0	5.00	4.00	-	3.00	-	-	11	48	59
Bolt	Three Bolt	TWT	25.94	30.00	164.5	0.0	5.00	0.00	-	3.00	-	-	20	0	20
Bolt	Three Bolt	ZFS	25.94	38.00	167.6	0.0	5.00	18.00	-	3.00	-	-	25	217	242
											Totals:	0	60	8,186	8,246

Pole Buckling

Buckling [illegible]	Buckling [illegible] (ft)	Buckling Section Height (% Buckling Col. Hgt.)	Buckling [illegible] (in)	Min. Buckling [illegible] (in)	Diameter at Tip (in)	Diameter at GL (in)	Modulus of Elasticity (psi)	Pole Density (pcf)	Ice Density (pcf)	Pole Tip Height (ft)	Buckling Load [illegible] (lbs)	Buckling Load [illegible] (lbs)	Buckling Load [illegible]
2.00	29.67	34.06	15.60	28.77	9.87	17.20	1,000,000	50.00	57.00	46.70	36,821	7,493	4.91

Version: 4.2 / 4.06
* includes Load Factor(s)

[2] Worst Wind per Guy Wire
[3] Wind at 181.2°

October 14, 2014
(Cox, NFAA 10, Warm Springs, Placid to Haven, Part 2)

NFAA 10, Warm Springs and Amigo

Grade B - light	1 - p82128		2 - 52127		3 - p82126		4 - p82125		5 - p82124	
	Existing	Proposed	Existing	Proposed	Existing	Proposed	Existing	Proposed	Existing	Proposed
Maximum Pole Capacity Utilization Percent	133.1%	134.2%	67.6%	68.7%	91.0%	91.0%	64.9%	64.1%	95.8%	97.3%

Grade B - light	6 - p82123		7 - p82122		8 - p82121		9 - p82120		10 - p98621	
	Existing	Proposed	Existing	Proposed	Existing	Proposed	Existing	Proposed	Existing	Proposed
Maximum Pole Capacity Utilization Percent	121.1%	122.8%	97.1%	98.1%	Steel pole		83.6%	85.0%	89.3%	90.6%

Grade B - light	11 - p22425		12 - p62991		13 - p76068		14 - p76067		15 - p76066	
	Existing	Proposed	Existing	Proposed	Existing	Proposed	Existing	Proposed	Existing	Proposed
Maximum Pole Capacity Utilization Percent	125.8%	127.9%	125.2%	127.0%	143.2%	145.0%	90.7%	92.2%	64.9%	65.5%

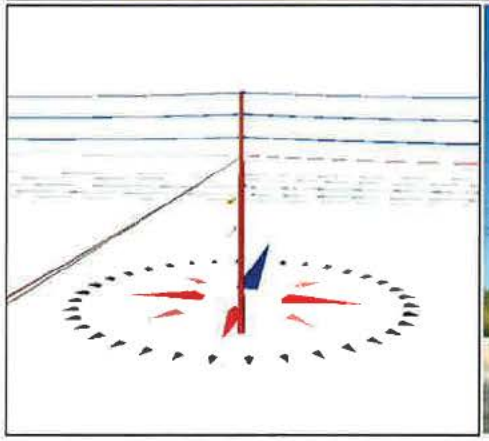
Grade B - light	16 - p76064		17 - p82578							
	Existing	Proposed	Existing	Proposed	Existing	Proposed	Existing	Proposed	Existing	Proposed
Maximum Pole Capacity Utilization Percent	79.1%	80.0%	76.9%	79.0%						

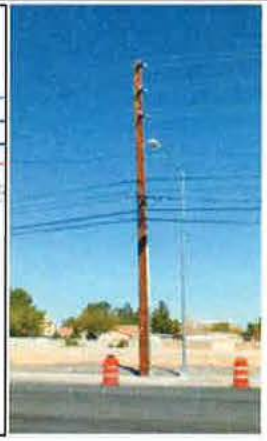
Grade B - light										
	Existing	Proposed	Existing	Proposed	Existing	Proposed	Existing	Proposed	Existing	Proposed
Maximum Pole Capacity Utilization Percent										

O-Calc® Pro *Analysis Report*

Monday, September 29, 2014 6:00:09 PM

File Name:	21 - p82128 Propos	Pole Length / Class:	55 / H1	Code:	NESC	Structure Type:	Unguyed
Pole Num:	21 - p82128	Pole Species:	WESTERN RED CEDAR	NESC Rule:	Rule 250B	Status:	N/A
Permit #:	Unset	Setting Depth (ft):	8.00	Const. Grade:	B	Pole Strength Factor:	0.65
Owner:	Unset	G/L Circumference (in):	55.00	Load District:	Light	Transverse Wind LF:	2.50
Latitude:	Unset	G/L Fiber Stress (psi):	6,000	Ice Thickness (in):	0.00	Wire Tension LF:	1.10
Longitude:	Unset	Allowable Stress (psi):	3,900	Wind Speed (mph):	59.29	Vertical LF:	1.50
Emp #:	Unset	Fiber Stress Ht. Reduction:	No	Wind Pressure (psf):	9.00		





Pole Capacity Utilization		Height	Wind Angle
Maximum:	155.6%	0.0 ft	181.2°
Groundline:	155.6%	0.0 ft	181.2°
Vertical:	14.2%	27.9 ft	181.2°

Pole Moments		Load Angle	Wind Angle
Max Capac. Util:	265,277 ft-lb	186.1°	181.2°
Groundline:	265,277 ft-lb	186.1°	181.2°

GROUNDLINE LOAD SUMMARY:*Wind at 181.2°, Applied Moment 265,277 ft-lb at 186.1°, Allowable Moment 171,207 ft-lb

	Shear Load (lbs)*	Percent Applied Load	Bending Moment (ft-lb)	Percent of Applied Moment	Percent of Pole Capacity	Bending Stress (+/- psi)	Vertical Load (lbs)	Vertical Stress (psi)	Total Stress (psi)	Percent of Pole Capacity
Powers:	4,729	57.5	177,370	66.9	103.6	4,040	1,568	7	4,047	103.8
Comms:	2,273	27.6	60,772	22.9	35.5	1,384	936	4	1,388	35.6
Pole:	1,174	14.3	24,743	9.3	14.5	564	3,546	15	578	14.8
Crossarms:	3	0.0	124	0.0	0.1	3	42	0	3	0.1
Insulators:	53	0.6	2,269	0.9	1.3	52	140	1	52	1.3
Pole Load:	8,231	100.0	265,277	100.0	154.9	6,043	6,232	26	6,069	155.6
Pole Reserve Capacity:			-94,070		-54.9	-2,143			-2,169	-55.6

LOAD SUMMARY BY OWNER

NVE:	5,955	204,332		4,655	5,216	22	4,676	119.9
ZFS:	398	11,231		256	135	1	256	6.6

[1] Worst Wind Per Guy Wire

(Guy LF)

[2] Worst Wind per Guy Wire

(Pole LF)

[4] See Legend

[3] Wind at 181.2°

(Guy LF)

Version: 4.11.1/4.11

* includes Load Factor(s)

TWT:	339	9,901	226	98	0	226	5.8
COX:	555	15,578	355	245	1	356	9.1
CTL:	984	24,234	552	537	2	554	14.2
Totals	8,231	265,277	6,043	6,232	26	6,069	155.6

Detailed Load Components

Power:		Owner	Height (ft)	Horiz. Offset (in)	Cable Dia. (in)	Sag at Max Temp	Cable Weight (lbs/ft)	Lead / Span Length	Span Angle (deg)	Wire Length (ft)	Tension (lbs)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Primary	AAC 954.0 KCM 37 STRAND	NVE	46.83	12.40	1.1240	2.58	0.895	174.0	270.0	174.0	3,068	16,677	-116	8,545	25,107
Primary	AAC 954.0 KCM 37 STRAND	NVE	46.83	12.40	1.1240	2.98	0.895	194.0	90.0	194.0	3,068	-16,677	-129	9,527	-7,280
Primary	AAC 954.0 KCM 37 STRAND	NVE	46.83	12.40	1.1240	2.58	0.895	174.0	270.0	174.0	3,068	16,677	106	8,545	25,329
Primary	AAC 954.0 KCM 37 STRAND	NVE	46.83	12.40	1.1240	2.98	0.895	194.0	90.0	194.0	3,068	-16,677	119	9,527	-7,031
Primary	AAC 954.0 KCM 37 STRAND	NVE	42.08	12.56	1.1240	2.58	0.895	174.0	270.0	174.0	3,068	14,988	-116	7,679	22,550
Primary	AAC 954.0 KCM 37 STRAND	NVE	42.08	12.56	1.1240	2.98	0.895	194.0	90.0	194.0	3,068	-14,988	-130	8,562	-6,555
Primary	AAC 954.0 KCM 37 STRAND	NVE	42.08	12.56	1.1240	2.58	0.895	174.0	270.0	174.0	3,068	14,988	106	7,679	22,773
Primary	AAC 954.0 KCM 37 STRAND	NVE	42.08	12.56	1.1240	2.98	0.895	194.0	90.0	194.0	3,068	-14,988	118	8,562	-6,307
Primary	AAC 954.0 KCM 37 STRAND	NVE	37.17	12.74	1.1240	2.58	0.895	174.0	270.0	174.0	3,068	13,241	-117	6,784	19,908
Primary	AAC 954.0 KCM 37 STRAND	NVE	37.17	12.74	1.1240	2.98	0.895	194.0	90.0	194.0	3,068	-13,241	-130	7,564	-5,807
Primary	AAC 954.0 KCM 37 STRAND	NVE	37.17	12.74	1.1240	2.58	0.895	174.0	270.0	174.0	3,068	13,241	106	6,784	20,130
Primary	AAC 954.0 KCM 37 STRAND	NVE	37.17	12.74	1.1240	2.98	0.895	194.0	90.0	194.0	3,068	-13,241	118	7,564	-5,559
Neutral	ACSR 2/0 AWG 6/1 QUAIL	NVE	33.17	8.08	0.4470	1.21	0.183	174.0	180.0	174.0	1,355	49,164	-16	6	49,154
Neutral	ACSR 2/0 AWG 6/1 QUAIL	NVE	33.17	8.08	0.4470	1.43	0.183	194.0	270.0	194.0	1,355	5,212	-18	2,681	7,875
Secondary	TRIPLEX 4 AWG	NVE	33.17	8.08	0.6800	1.19	0.164	103.0	180.0	103.0	585	21,226	8	5	21,239
Secondary	TRIPLEX 4 AWG	NVE	33.17	8.08	0.6800	2.56	0.164	194.0	90.0	194.0	585	-2,250	16	4,078	1,844
											Totals:	73,352	-75	104,093	177,370

Comm:		Owner	Height (ft)	Horiz. Offset (in)	Cable Dia. (in)	Sag at Max Temp	Cable Weight (lbs/ft)	Lead / Span Length	Span Angle (deg)	Wire Length (ft)	Tension (lbs)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Bundle	5/16" EHS	ZFS	28.00	8.79	0.3125	1.54	0.205	174.0	270.0	174.0	1,500	4,870	19	1,756	6,646
Telco	BELOPTIX DT144 - 144 FIBERS -	ZFS	27.96	8.92	0.7560	-	0.208	174.0	270.0	174.0		0	20	1,753	1,774
Telco	24ct Fiber	ZFS	27.98	8.71	0.3900	-	0.049	174.0	270.0	174.0		0	5	1,754	1,759
Bundle	5/16" EHS	ZFS	28.00	8.79	0.3125	1.89	0.205	194.0	90.0	194.0	1,500	-4,870	22	1,957	-2,891
Telco	BELOPTIX DT144 - 144 FIBERS -	ZFS	27.96	8.92	0.7560	-	0.208	194.0	90.0	194.0		0	22	1,955	1,977
Telco	24ct Fiber	ZFS	27.98	8.71	0.3900	-	0.049	194.0	90.0	194.0		0	5	1,956	1,961
Bundle	1/4" EHS	TWT	29.00	8.70	0.2500	1.02	0.121	174.0	270.0	174.0	1,500	5,044	11	2,326	7,381
Telco	BELOPTIX DT144 - 144 FIBERS -	TWT	28.96	8.70	0.7560	-	0.208	174.0	270.0	174.0		0	20	2,322	2,342
Bundle	1/4" EHS	TWT	29.00	8.70	0.2500	1.27	0.121	194.0	90.0	194.0	1,500	-5,044	13	2,593	-2,439
Telco	BELOPTIX DT144 - 144 FIBERS -	TWT	28.96	8.70	0.7560	-	0.208	194.0	90.0	194.0		0	22	2,589	2,611
Bundle	1/4" EHS	COX	26.69	44.36	0.2500	3.19	0.121	194.0	90.0	194.0	1,500	-4,642	63	1,281	-3,298
Telco	432ct Fiber	COX	26.64	44.37	0.8300	-	0.159	194.0	90.0	194.0		0	83	1,279	1,362
Telco	BELOPTIX DT096 - 72 FIBERS -	COX	26.65	44.20	0.5160	-	0.097	194.0	90.0	194.0		0	50	1,279	1,330
Telco	BELOPTIX DT144 - 144 FIBERS -	COX	26.70	44.24	0.7560	-	0.208	194.0	90.0	194.0		0	108	1,282	1,390
Telco	P3-500CA	COX	26.74	44.36	0.5000	-	0.072	194.0	90.0	194.0		0	38	1,283	1,321
Telco	P3-500CA	COX	26.65	44.55	0.5000	-	0.072	194.0	90.0	194.0		0	38	1,279	1,317
Telco	432ct Fiber	COX	26.70	44.50	0.8300	-	0.159	194.0	90.0	194.0		0	84	1,282	1,365

[1] Worst Wind Per Guy Wire

(Guy LF)
[2] Worst Wind per Guy Wire

(Pole LF)

[4] See Legend
[3] Wind at 181.2°

(Guy LF)

Version: 4.11.1/4.11
* includes Load Factor(s)

Bundle	1/4" EHS	COX	26.69	44.36	0.2500	1.56	0.121	174.0	270.0	174.0	1,500	4,642	57	1,442	6,140
Telco	432ct Fiber	COX	26.66	44.48	0.8300	-	0.159	174.0	270.0	174.0		0	75	1,440	1,515
Telco	P3-500CA	COX	26.67	44.30	0.5000	-	0.072	174.0	270.0	174.0		0	34	1,440	1,474
Telco	432ct Fiber	COX	26.61	44.34	0.8300	-	0.159	174.0	270.0	174.0		0	75	1,437	1,512
Bundle	1/4" EHS	CTL	24.75	9.07	0.2500	4.02	0.121	174.0	270.0	174.0	1,500	4,305	12	3,468	7,785
Telco	26 GA 600 PR (1.52)	CTL	24.68	9.07	1.5200	-	1.330	174.0	270.0	174.0		0	131	3,458	3,589
Bundle	1/4" EHS	CTL	24.75	9.07	0.2500	4.94	0.121	194.0	90.0	194.0	1,500	-4,305	13	3,866	-425
Telco	26 GA 600 PR (1.52)	CTL	24.68	9.07	1.5200	-	1.330	194.0	90.0	194.0		0	146	3,856	4,001
Bundle	1/4" EHS	CTL	23.50	9.18	0.2500	1.35	0.121	174.0	270.0	174.0	1,500	4,088	12	1,448	5,548
Telco	26 GA 100 PR (0.74)	CTL	23.47	9.32	0.7400	-	0.270	174.0	270.0	174.0		0	27	1,446	1,473
Telco	24ct Fiber	CTL	23.48	9.11	0.3900	-	0.049	174.0	270.0	174.0		0	5	1,447	1,452
Bundle	1/4" EHS	CTL	23.50	9.18	0.2500	1.67	0.121	194.0	90.0	194.0	1,500	-4,088	13	1,614	-2,460
Telco	26 GA 100 PR (0.74)	CTL	23.47	9.32	0.7400	-	0.270	194.0	90.0	194.0		0	30	1,612	1,643
Telco	24ct Fiber	CTL	23.48	9.11	0.3900	-	0.049	194.0	90.0	194.0		0	5	1,613	1,618
											Totals:	0	1,258	59,514	60,772

Crossarm:		Owner	Height (ft)	Horiz. Offset (in)	Offset Angle (deg)	Rotate Angle (deg)	Unit Weight (lbs)	Unit Height (in)	Unit Depth (in)	Unit Diameter (in)	Unit Length (in)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Offset	CROSSARM 3-1/2 X 4-1/2 X 4	COX	26.50	8.17	90.0	90.0	28.00	4.50	-	0.00	-	-	57	67	124
											Totals:	0	57	67	124

Insulator/Attachment:		Owner	Height (ft)	Horiz. Offset (in)	Offset Angle (deg)	Rotate Angle (deg)	Unit Weight (lbs)	Dim 1[4] (in)	Dim 2[4] (in)				Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Post	Post Insulator - 15 kV	NVE	46.83	4.63	90.0	90.0	11.00	11.50	4.75	-	-	-	-16	402	386
Post	Post Insulator - 15 kV	NVE	46.83	4.63	90.0	90.0	11.00	11.50	4.75	-	-	-	15	402	417
Post	Post Insulator - 15 kV	NVE	42.08	5.05	90.0	90.0	11.00	11.50	4.75	-	-	-	-16	362	346
Post	Post Insulator - 15 kV	NVE	42.08	5.05	90.0	90.0	11.00	11.50	4.75	-	-	-	15	362	377
Post	Post Insulator - 15 kV	NVE	37.17	5.48	90.0	90.0	11.00	11.50	4.75	-	-	-	-17	320	304
Post	Post Insulator - 15 kV	NVE	37.17	5.48	90.0	90.0	11.00	11.50	4.75	-	-	-	15	320	335
Spool	Spool Insulator - 20 kV	NVE	33.17	5.83	0.0	0.0	1.00	2.12	2.50	-	-	-	-1	27	26
Spool	Spool Insulator - 20 kV	NVE	33.17	5.83	180.0	180.0	1.00	2.12	2.50	-	-	-	1	27	28
Bolt	Three Bolt	ZFS	28.00	6.29	180.0	180.0	5.00	0.00	3.00	-	-	-	5	0	5
Bolt	Three Bolt	TWT	29.00	6.20	180.0	180.0	5.00	0.00	3.00	-	-	-	5	0	5
Bolt	Three Bolt	COX	26.69	44.00	169.5	180.0	5.00	0.00	3.00	-	-	-	27	0	27
Bolt	Three Bolt	CTL	24.75	6.57	180.0	180.0	5.00	0.00	3.00	-	-	-	6	0	6
Bolt	Three Bolt	CTL	23.50	6.68	180.0	180.0	5.00	0.00	3.00	-	-	-	6	0	6
											Totals:	0	45	2,224	2,269

Pole Buckling

Buckling [illegible]	Buckling [illegible] (ft)	Buckling Section [illegible] (% Buckling Col. Hgt.)	Buckling [illegible] (in)	Min. Buckling [illegible] (in)	Diameter [illegible] (in)	Diameter [illegible] (in)	Modulus of [illegible] (psi)	Pole [illegible] (pcf)	Ice Density (pcf)	Pole Tip [illegible] (ft)	Buckling Load [illegible] (lbs)	Buckling Load [illegible] (lbs)	Buckling Load [illegible]
2.00	27.93	34.21	15.82	25.63	9.24	17.52	1,000,000	50.00	57.00	47.00	43,961	6,232	7.05

Legend

[1] Worst Wind Per Guy Wire

(Guy LF)

[2] Worst Wind per Guy Wire

(Pole LF)

[4] See Legend

[3] Wind at 181.2°

(Guy LF)

Version: 4.11.1/4.11

* Includes Load Factor(s)

Insulators/Attachment dimensions		Dimension 1	Dimension 2
	Pin	Body Length	Diameter
	Post	Body Length	Diameter
	Underhung	Body Length	Diameter

[1] Worst Wind Per Guy Wire

(Guy LF)

[2] Worst Wind per Guy Wire

(Pole LF)

[4] See Legend

[3] Wind at 181.2°

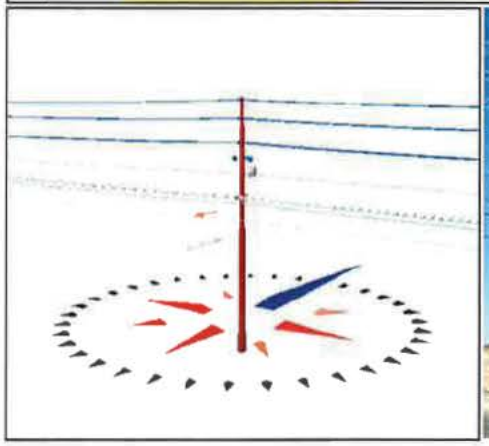
(Guy LF)

* includes Load Factor(s)

O-Calc® Pro *Analysis Report*

Tuesday, September 30, 2014 5:37:44 PM

File Name:	22 - p82127 Propos	Pole Length / Class:	55 / H2	Code:	NESC	Structure Type:	Unguyed
Pole Num:	22 - p82127	Pole Species:	WESTERN RED CEDAR	NESC Rule:	Rule 250B	Status:	N/A
Permit #:	Unset	Setting Depth (ft):	7.42	Const. Grade:	B	Pole Strength Factor:	0.65
Owner:	Unset	G/L Circumference (in):	65.00	Load District:	Light	Transverse Wind LF:	2.50
Latitude:	Unset	G/L Fiber Stress (psi):	6,000	Ice Thickness (in):	0.00	Wire Tension LF:	1.10
Longitude:	Unset	Allowable Stress (psi):	3,900	Wind Speed (mph):	59.29	Vertical LF:	1.50
Emp #:	Unset	Fiber Stress Ht. Reduction:	No	Wind Pressure (psf):	9.00		



Pole Capacity Utilization		Height	Wind Angle
Maximum:	68.7%	0.0 ft	180.0°
Groundline:	68.7%	0.0 ft	180.0°
Vertical:	8.6%	27.0 ft	180.0°

Pole Moments		Load Angle	Wind Angle
Max Capac. Util:	192,344 ft-lb	180.1°	180.0°
Groundline:	192,344 ft-lb	180.1°	180.0°

GROUNDLINE LOAD SUMMARY:*Wind at 180.0°, Applied Moment 192,344 ft-lb at 180.1°, Allowable Moment 282,601 ft-lb

	Shear Load (lbs)*	Percent Applied Load	Bending Moment (ft-lb)	Percent of Applied Moment	Percent of Pole Capacity	Bending Stress (+/- psi)	Vertical Load (lbs)	Vertical Stress (psi)	Total Stress (psi)	Percent of Pole Capacity
Powers:	2,380	38.9	100,219	52.1	35.5	1,383	1,469	4	1,387	35.6
Comms:	2,147	35.1	56,545	29.4	20.0	780	734	2	783	20.1
Generic Equipment:	45	0.7	1,529	0.8	0.5	21	68	0	21	0.5
Power Equipment:	129	2.1	3,012	1.6	1.1	42	525	2	43	1.1
Pole:	1,363	22.3	28,599	14.9	10.1	395	4,734	14	409	10.5
Crossarms:	2	0.0	132	0.1	0.0	2	42	0	2	0.1
Insulators:	52	0.9	2,307	1.2	0.8	32	138	0	32	0.8
Pole Load:	6,118	100.0	192,344	100.0	68.1	2,654	7,709	23	2,677	68.6
Pole Reserve Capacity:			90,257		31.9	1,246			1,223	31.4

LOAD SUMMARY BY OWNER

[1] Worst Wind Per Guy Wire

(Guy LF)
[2] Worst Wind per Guy Wire

(Pole LF)

[4] See Legend
[3] Wind at 180.0°

(Guy LF)

Version: 4.11.1/4.11
* includes Load Factor(s)

NVE:	3,969	135,600	1,871	6,896	21	1,892	48.5
ZFS:	386	11,133	154	172	1	154	4.0
TWT:	327	9,226	127	95	0	128	3.3
COX:	555	14,856	205	143	0	205	5.3
CTL:	881	21,529	297	404	1	298	7.6
Totals	6,118	192,344	2,654	7,709	23	2,677	68.6

Detailed Load Components

Power:		Owner	Height (ft)	Horiz. Offset (in)	Cable Dia. (in)	Sag at Max Temp	Cable Weight (lbs/ft)	Lead / Span Length	Span Angle (deg)	Wire Length (ft)	Tension (lbs)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Primary	AAC 954.0 KCM 37 STRAND	NVE	47.00	12.54	1.1240	2.67	0.895	179.0	270.0	179.0	3,068	406	115	8,874	9,396
Primary	AAC 954.0 KCM 37 STRAND	NVE	47.00	12.54	1.1240	2.58	0.895	174.0	90.0	174.0	3,068	-406	112	8,626	8,332
Primary	AAC 954.0 KCM 37 STRAND	NVE	47.00	12.54	1.1240	2.67	0.895	179.0	270.0	179.0	3,068	406	-115	8,874	9,165
Primary	AAC 954.0 KCM 37 STRAND	NVE	47.00	12.54	1.1240	2.58	0.895	174.0	90.0	174.0	3,068	-406	-112	8,626	8,108
Primary	AAC 954.0 KCM 37 STRAND	NVE	43.17	12.72	1.1240	2.67	0.895	179.0	270.0	179.0	3,068	373	115	8,152	8,640
Primary	AAC 954.0 KCM 37 STRAND	NVE	43.17	12.72	1.1240	2.58	0.895	174.0	90.0	174.0	3,068	-373	112	7,924	7,663
Primary	AAC 954.0 KCM 37 STRAND	NVE	43.17	12.72	1.1240	2.67	0.895	179.0	270.0	179.0	3,068	373	-115	8,152	8,410
Primary	AAC 954.0 KCM 37 STRAND	NVE	43.17	12.72	1.1240	2.58	0.895	174.0	90.0	174.0	3,068	-373	-112	7,924	7,439
Primary	AAC 954.0 KCM 37 STRAND	NVE	38.17	12.97	1.1240	2.67	0.895	179.0	270.0	179.0	3,068	330	115	7,208	7,654
Primary	AAC 954.0 KCM 37 STRAND	NVE	38.17	12.97	1.1240	2.58	0.895	174.0	90.0	174.0	3,068	-330	112	7,007	6,789
Primary	AAC 954.0 KCM 37 STRAND	NVE	38.17	12.97	1.1240	2.67	0.895	179.0	270.0	179.0	3,068	330	-115	7,208	7,424
Primary	AAC 954.0 KCM 37 STRAND	NVE	38.17	12.97	1.1240	2.58	0.895	174.0	90.0	174.0	3,068	-330	-112	7,007	6,565
Neutral	ACSR 2/0 AWG 6/1 QUAIL	NVE	31.58	9.00	0.4470	1.25	0.183	179.0	270.0	179.0	1,355	120	-18	2,369	2,471
Neutral	ACSR 2/0 AWG 6/1 QUAIL	NVE	31.58	9.00	0.4470	1.20	0.183	174.0	90.0	174.0	1,355	-120	-18	2,303	2,164
											Totals:	0	-35	100,254	100,219

Comm:		Owner	Height (ft)	Horiz. Offset (in)	Cable Dia. (in)	Sag at Max Temp	Cable Weight (lbs/ft)	Lead / Span Length	Span Angle (deg)	Wire Length (ft)	Tension (lbs)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Bundle	5/16" EHS	ZFS	27.44	44.48	0.3125	1.60	0.205	179.0	270.0	179.0	1,500	116	101	1,780	1,997
Telco	BELOPTIX DT144 - 144 FIBERS -	ZFS	27.40	44.56	0.7560	-	0.208	179.0	270.0	179.0		0	103	1,778	1,881
Telco	24ct Fiber	ZFS	27.42	44.42	0.3900	-	0.049	179.0	270.0	179.0		0	24	1,779	1,803
Bundle	5/16" EHS	ZFS	27.44	44.48	0.3125	1.51	0.205	174.0	90.0	174.0	1,500	-116	98	1,730	1,713
Telco	BELOPTIX DT144 - 144 FIBERS -	ZFS	27.40	44.56	0.7560	-	0.208	174.0	90.0	174.0		0	100	1,728	1,828
Telco	24ct Fiber	ZFS	27.42	44.42	0.3900	-	0.049	174.0	90.0	174.0		0	23	1,729	1,752
Bundle	1/4" EHS	TWT	27.44	32.65	0.2500	1.06	0.121	179.0	270.0	179.0	1,500	116	43	2,277	2,436
Telco	BELOPTIX DT144 - 144 FIBERS -	TWT	27.40	32.65	0.7560	-	0.208	179.0	270.0	179.0		0	74	2,273	2,346
Bundle	1/4" EHS	TWT	27.44	32.65	0.2500	1.00	0.121	174.0	90.0	174.0	1,500	-116	42	2,213	2,139
Telco	BELOPTIX DT144 - 144 FIBERS -	TWT	27.40	32.65	0.7560	-	0.208	174.0	90.0	174.0		0	72	2,210	2,282
Bundle	1/4" EHS	COX	26.58	9.82	0.2500	1.61	0.121	179.0	270.0	179.0	1,500	112	13	1,871	1,996
Telco	432ct Fiber	COX	26.56	10.00	0.8300	-	0.159	179.0	270.0	179.0		0	18	1,869	1,887
Telco	P3-500CA	COX	26.56	9.73	0.5000	-	0.072	179.0	270.0	179.0		0	8	1,869	1,877
Telco	432ct Fiber	COX	26.50	9.79	0.8300	-	0.159	179.0	270.0	179.0		0	17	1,865	1,883
Bundle	1/4" EHS	COX	26.58	9.82	0.2500	1.53	0.121	174.0	90.0	174.0	1,500	-112	13	1,818	1,719
Telco	432ct Fiber	COX	26.56	10.00	0.8300	-	0.159	174.0	90.0	174.0		0	17	1,817	1,834
Telco	P3-500CA	COX	26.56	9.73	0.5000	-	0.072	174.0	90.0	174.0		0	8	1,817	1,824

[1] Worst Wind Per Guy Wire

(Guy LF)

[2] Worst Wind per Guy Wire

(Pole LF)

[4] See Legend

[3] Wind at 180.0°

(Guy LF)

Version: 4.11.1/4.11

* includes Load Factor(s)

Telco	432ct Fiber	COX	26.50	9.79	0.8300	-	0.159	174.0	90.0	174.0		0	17	1,813	1,830
Bundle	1/4" EHS	CTL	25.58	9.94	0.2500	3.10	0.121	179.0	270.0	179.0	1,500	108	13	3,266	3,386
Telco	26 GA 400 PR (1.30)	CTL	25.52	9.94	1.3000	-	0.910	179.0	270.0	179.0		0	101	3,259	3,360
Bundle	1/4" EHS	CTL	25.58	9.94	0.2500	2.93	0.121	174.0	90.0	174.0	1,500	-108	13	3,175	3,080
Telco	26 GA 400 PR (1.30)	CTL	25.52	9.94	1.3000	-	0.910	174.0	90.0	174.0		0	98	3,168	3,266
Bundle	1/4" EHS	CTL	22.08	10.33	0.2500	1.40	0.121	179.0	270.0	179.0	1,500	93	14	1,408	1,515
Telco	26 GA 100 PR (0.74)	CTL	22.05	10.46	0.7400	-	0.270	179.0	270.0	179.0		0	32	1,406	1,437
Telco	24ct Fiber	CTL	22.06	10.26	0.3900	-	0.049	179.0	270.0	179.0		0	6	1,407	1,412
Bundle	1/4" EHS	CTL	22.08	10.33	0.2500	1.32	0.121	174.0	90.0	174.0	1,500	-93	14	1,368	1,289
Telco	26 GA 100 PR (0.74)	CTL	22.05	10.46	0.7400	-	0.270	174.0	90.0	174.0		0	31	1,366	1,397
Telco	24ct Fiber	CTL	22.06	10.26	0.3900	-	0.049	174.0	90.0	174.0		0	5	1,367	1,373
											Totals:	0	1,119	55,426	56,545

GenericEquipment:		Owner	Height (ft)	Horiz. Offset (in)	Offset Angle (deg)	Rotate Angle (deg)	Unit Weight (lbs)	Unit Height (in)	Unit Depth (in)	Unit Diameter (in)	Unit Length (in)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Box	Fuse Cutout	NVE	34.92	22.37	0.0	0.0	15.00	12.00	-	8.00	-	-	-42	524	482
Box	Fuse Cutout	NVE	34.92	22.37	90.0	0.0	15.00	12.00	-	8.00	-	-	0	524	524
Box	Fuse Cutout	NVE	34.92	22.37	270.0	0.0	15.00	12.00	-	8.00	-	-	0	524	524
											Totals:	0	-42	1,571	1,529

PowerEquipment:		Owner	Height (ft)	Horiz. Offset (in)	Offset Angle (deg)	Rotate Angle (deg)	Unit Weight (lbs)	Unit Height (in)	Unit Depth (in)	Unit Diameter (in)	Unit Length (in)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Box	1200 KVAR Cap Bank	NVE	31.92	29.21	0.0	0.0	350.00	25.00	-	33.00	-	-	-1,103	4,115	3,012
											Totals:	0	-1,103	4,115	3,012

Crossarm:		Owner	Height (ft)	Horiz. Offset (in)	Offset Angle (deg)	Rotate Angle (deg)	Unit Weight (lbs)	Unit Height (in)	Unit Depth (in)	Unit Diameter (in)	Unit Length (in)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Offset	CROSSARM 3-1/2 X 4-1/2 X 4	ZFS	27.25	9.00	90.0	90.0	28.00	4.50	-	0.00	-	-	65	67	132
											Totals:	0	65	67	132

Insulator/Attachment:		Owner	Height (ft)	Horiz. Offset (in)	Offset Angle (deg)	Rotate Angle (deg)	Unit Weight (lbs)	Dim 1[4] (in)	Dim 2[4] (in)				Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Post	Post Insulator - 15 kV	NVE	47.00	5.00	270.0	270.0	11.00	11.50	4.75	-	-	-	16	405	421
Post	Post Insulator - 15 kV	NVE	47.00	5.00	270.0	270.0	11.00	11.50	4.75	-	-	-	-16	405	389
Post	Post Insulator - 15 kV	NVE	43.17	5.44	270.0	270.0	11.00	11.50	4.75	-	-	-	16	373	388
Post	Post Insulator - 15 kV	NVE	43.17	5.44	270.0	270.0	11.00	11.50	4.75	-	-	-	-16	373	357
Post	Post Insulator - 15 kV	NVE	38.17	6.00	270.0	270.0	11.00	11.50	4.75	-	-	-	16	330	346
Post	Post Insulator - 15 kV	NVE	38.17	6.00	270.0	270.0	11.00	11.50	4.75	-	-	-	-16	330	314
Spool	Spool Insulator - 20 kV	NVE	31.58	6.75	0.0	0.0	1.00	2.12	2.50	-	-	-	-1	26	25
Bolt	Three Bolt	ZFS	27.44	44.00	168.4	180.0	5.00	0.00	3.00	-	-	-	27	0	27
Bolt	Three Bolt	TWT	27.44	32.00	164.3	180.0	5.00	0.00	3.00	-	-	-	20	0	20
Bolt	Three Bolt	COX	26.58	7.32	180.0	180.0	5.00	0.00	3.00	-	-	-	6	0	6
Bolt	Three Bolt	CTL	25.58	7.44	180.0	180.0	5.00	0.00	3.00	-	-	-	6	0	6
Bolt	Three Bolt	CTL	22.08	7.83	180.0	180.0	5.00	0.00	3.00	-	-	-	6	0	6
											Totals:	0	65	2,241	2,307

[1] Worst Wind Per Guy Wire

(Guy LF)

[2] Worst Wind per Guy Wire

(Pole LF)

[4] See Legend

[3] Wind at 180.0°

(Guy LF)

Version: 4.11.1/4.11

* includes Load Factor(s)

Pole Buckling

Buckling	Buckling (ft)	Buckling Section (% Buckling Col. Hgt.)	Buckling (in)	Min. Buckling (in)	Diameter (in)	Diameter (in)	Modulus of (psi)	Pole (pcf)	Ice Density (pcf)	Pole Tip (ft)	Buckling Load (lbs)	Buckling Load (lbs)	Buckling Load
2.00	27.01	34.45	18.57	28.15	9.87	20.70	1,000,000	50.00	57.00	47.58	89,189	**7,709**	**11.57**

Legend

Insulators/Attachment dimensions

	Dimension 1	Dimension 2
Pin	Body Length	Diameter
Post	Body Length	Diameter
Underhung	Body Length	Diameter

[1] Worst Wind Per Guy Wire

(Guy LF)

[2] Worst Wind per Guy Wire

(Pole LF)

[4] See Legend

[3] Wind at 180.0°

(Guy LF)

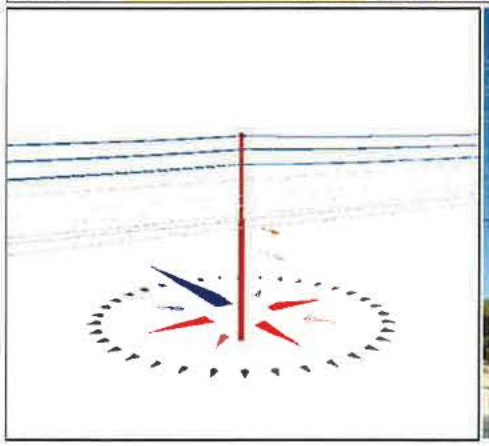
Version: 4.11.1/4.11

* includes Load Factor(s)

O-Calc® Pro *Analysis Report*

Tuesday, September 30, 2014 4:53:36 PM

File Name:	23 - p82126 Propos	Pole Length / Class:	55 / H2	Code:	NESC	Structure Type:	Unguyed
Pole Num:	23 - p82126	Pole Species:	WESTERN RED CEDAR	NESC Rule:	Rule 250B	Status:	N/A
Permit #:	Unset	Setting Depth (ft):	7.08	Const. Grade:	B	Pole Strength Factor:	0.65
Owner:	Unset	G/L Circumference (in):	59.00	Load District:	Light	Transverse Wind LF:	2.50
Latitude:	Unset	G/L Fiber Stress (psi):	6,000	Ice Thickness (in):	0.00	Wire Tension LF:	1.10
Longitude:	Unset	Allowable Stress (psi):	3,900	Wind Speed (mph):	59.29	Vertical LF:	1.50
Emp #:	Unset	Fiber Stress Ht. Reduction:	No	Wind Pressure (psf):	9.00		



Pole Capacity Utilization		Height	Wind Angle
Maximum:	91.0%	0.0 ft	180.0°
Groundline:	91.0%	0.0 ft	180.0°
Vertical:	11.0%	27.9 ft	180.0°

Pole Moments		Load Angle	Wind Angle
Max Capac. Util:	191,137 ft-lb	179.8°	180.0°
Groundline:	191,137 ft-lb	179.8°	180.0°

GROUNDLINE LOAD SUMMARY:*Wind at 180.0°, Applied Moment 191,137 ft-lb at 179.8°, Allowable Moment 211,344 ft-lb

	Shear Load (lbs)*	Percent Applied Load	Bending Moment (ft-lb)	Percent of Applied Moment	Percent of Pole Capacity	Bending Stress (+/- psi)	Vertical Load (lbs)	Vertical Stress (psi)	Total Stress (psi)	Percent of Pole Capacity
Powers:	2,333	39.8	100,762	52.7	47.7	1,859	1,440	5	1,865	47.8
Comms:	2,193	37.4	60,420	31.6	28.6	1,115	720	3	1,118	28.7
Pole:	1,287	21.9	27,639	14.5	13.1	510	4,152	15	525	13.5
Insulators:	52	0.9	2,317	1.2	1.1	43	138	0	43	1.1
Pole Load:	5,864	100.0	191,137	100.0	90.4	3,527	6,449	23	3,550	91.0
Pole Reserve Capacity:			20,207		9.6	373			350	9.0

LOAD SUMMARY BY OWNER

NVE:	3,672	130,688	2,412	5,692	21	2,432	62.4
ZFS:	376	12,221	226	127	0	226	5.8
TWT:	321	9,528	176	93	0	176	4.5

[1] Worst Wind Per Guy Wire

(Guy LF)

[2] Worst Wind per Guy Wire

(Pole LF)

[4] See Legend

[3] Wind at 180.0°

(Guy LF)

Version: 4.11.1/4.11

* includes Load Factor(s)

COX:	432	11,907	220	140	1	220	5.6
CTL:	1,064	26,793	494	397	1	496	12.7
Totals	5,864	191,137	3,527	6,449	23	3,550	91.0

Detailed Load Components

Power:		Owner	Height (ft)	Horiz. Offset (in)	Cable Dia. (in)	Sag at Max Temp	Cable Weight (lbs/ft)	Lead / Span Length	Span Angle (deg)	Wire Length (ft)	Tension (lbs)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Primary	AAC 954.0 KCM 37 STRAND	NVE	47.08	12.54	1.1240	2.44	0.895	167.0	270.0	167.0	3,068	-550	-107	8,293	7,636
Primary	AAC 954.0 KCM 37 STRAND	NVE	47.08	12.54	1.1240	2.67	0.895	179.0	90.0	179.0	3,068	550	-115	8,889	9,324
Primary	AAC 954.0 KCM 37 STRAND	NVE	47.08	12.54	1.1240	2.44	0.895	167.0	270.0	167.0	3,068	-550	108	8,293	7,851
Primary	AAC 954.0 KCM 37 STRAND	NVE	47.08	12.54	1.1240	2.67	0.895	179.0	90.0	179.0	3,068	550	115	8,889	9,554
Primary	AAC 954.0 KCM 37 STRAND	NVE	43.83	12.67	1.1240	2.44	0.895	167.0	270.0	167.0	3,068	-512	-107	7,721	7,102
Primary	AAC 954.0 KCM 37 STRAND	NVE	43.83	12.67	1.1240	2.67	0.895	179.0	90.0	179.0	3,068	512	-115	8,276	8,673
Primary	AAC 954.0 KCM 37 STRAND	NVE	43.83	12.67	1.1240	2.44	0.895	167.0	270.0	167.0	3,068	-512	108	7,721	7,317
Primary	AAC 954.0 KCM 37 STRAND	NVE	43.83	12.67	1.1240	2.67	0.895	179.0	90.0	179.0	3,068	512	115	8,276	8,903
Primary	AAC 954.0 KCM 37 STRAND	NVE	40.00	12.82	1.1240	2.44	0.895	167.0	270.0	167.0	3,068	-467	-107	7,047	6,473
Primary	AAC 954.0 KCM 37 STRAND	NVE	40.00	12.82	1.1240	2.67	0.895	179.0	90.0	179.0	3,068	467	-115	7,554	7,906
Primary	AAC 954.0 KCM 37 STRAND	NVE	40.00	12.82	1.1240	2.44	0.895	167.0	270.0	167.0	3,068	-467	108	7,047	6,688
Primary	AAC 954.0 KCM 37 STRAND	NVE	40.00	12.82	1.1240	2.67	0.895	179.0	90.0	179.0	3,068	467	115	7,554	8,136
Neutral	ACSR 2/0 AWG 6/1 QUAIL	NVE	36.08	8.28	0.4470	1.12	0.183	167.0	270.0	167.0	1,355	-186	-16	2,525	2,323
Neutral	ACSR 2/0 AWG 6/1 QUAIL	NVE	36.08	8.28	0.4470	1.25	0.183	179.0	90.0	179.0	1,355	186	-17	2,706	2,875
											Totals:	0	-31	100,792	100,762

Comm:		Owner	Height (ft)	Horiz. Offset (in)	Cable Dia. (in)	Sag at Max Temp	Cable Weight (lbs/ft)	Lead / Span Length	Span Angle (deg)	Wire Length (ft)	Tension (lbs)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Bundle	5/16" EHS	ZFS	32.25	8.89	0.3125	1.40	0.205	167.0	270.0	167.0	1,500	-184	19	1,952	1,787
Telco	BELOPTIX DT144 - 144 FIBERS -	ZFS	32.21	9.03	0.7560	-	0.208	167.0	270.0	167.0		0	20	1,950	1,970
Telco	24ct Fiber	ZFS	32.23	8.81	0.3900	-	0.049	167.0	270.0	167.0		0	5	1,951	1,955
Bundle	5/16" EHS	ZFS	32.25	8.89	0.3125	1.60	0.205	179.0	90.0	179.0	1,500	184	20	2,092	2,297
Telco	BELOPTIX DT144 - 144 FIBERS -	ZFS	32.21	9.03	0.7560	-	0.208	179.0	90.0	179.0		0	21	2,090	2,111
Telco	24ct Fiber	ZFS	32.23	8.81	0.3900	-	0.049	179.0	90.0	179.0		0	5	2,091	2,096
Bundle	1/4" EHS	TWT	29.50	9.15	0.2500	0.92	0.121	167.0	270.0	167.0	1,500	-168	12	2,284	2,127
Telco	BELOPTIX DT144 - 144 FIBERS -	TWT	29.46	9.15	0.7560	-	0.208	167.0	270.0	167.0		0	20	2,281	2,301
Bundle	1/4" EHS	TWT	29.50	9.15	0.2500	1.06	0.121	179.0	90.0	179.0	1,500	168	12	2,448	2,629
Telco	BELOPTIX DT144 - 144 FIBERS -	TWT	29.46	9.15	0.7560	-	0.208	179.0	90.0	179.0		0	21	2,445	2,466
Bundle	1/4" EHS	COX	27.33	9.35	0.2500	1.41	0.121	167.0	270.0	167.0	1,500	-156	12	1,425	1,281
Telco	432ct Fiber	COX	27.31	9.53	0.8300	-	0.159	167.0	270.0	167.0		0	16	1,424	1,440
Telco	P3-500CA	COX	27.31	9.26	0.5000	-	0.072	167.0	270.0	167.0		0	7	1,424	1,431
Telco	432ct Fiber	COX	27.25	9.31	0.8300	-	0.159	167.0	270.0	167.0		0	15	1,421	1,437
Bundle	1/4" EHS	COX	27.33	9.35	0.2500	1.61	0.121	179.0	90.0	179.0	1,500	156	13	1,528	1,696
Telco	432ct Fiber	COX	27.31	9.53	0.8300	-	0.159	179.0	90.0	179.0		0	17	1,526	1,543
Telco	P3-500CA	COX	27.31	9.26	0.5000	-	0.072	179.0	90.0	179.0		0	7	1,526	1,534
Telco	432ct Fiber	COX	27.25	9.31	0.8300	-	0.159	179.0	90.0	179.0		0	17	1,523	1,540
Bundle	1/4" EHS	CTL	26.08	9.46	0.2500	2.71	0.121	167.0	270.0	167.0	1,500	-149	12	3,107	2,970
Telco	26 GA 400 PR (1.30)	CTL	26.02	9.46	1.3000	-	0.910	167.0	270.0	167.0		0	90	3,100	3,190

[1] Worst Wind Per Guy Wire

(Guy LF)

[2] Worst Wind per Guy Wire

(Pole LF)

[4] See Legend

[3] Wind at 180.0°

(Guy LF)

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Bundle	1/4" EHS	CTL	26.08	9.46	0.2500	3.10	0.121	179.0	90.0	179.0	1,500	149	13	3,330	3,492
Telco	26 GA 400 PR (1.30)	CTL	26.02	9.46	1.3000	-	0.910	179.0	90.0	179.0		0	96	3,322	3,419
Bundle	1/4" EHS	CTL	23.95	9.58	0.2500	1.22	0.121	167.0	270.0	167.0	1,500	-137	12	2,196	2,071
Telco	26 GA 100 PR (0.74)	CTL	23.91	9.58	0.7400	-	0.270	167.0	270.0	167.0		0	27	2,193	2,220
Telco	24ct Fiber	CTL	23.83	9.58	0.3900	-	0.049	167.0	270.0	167.0		0	5	2,185	2,190
Bundle	1/4" EHS	CTL	23.95	9.58	0.2500	1.40	0.121	179.0	90.0	179.0	1,500	137	13	2,354	2,503
Telco	26 GA 100 PR (0.74)	CTL	23.91	9.58	0.7400	-	0.270	179.0	90.0	179.0		0	29	2,350	2,379
Telco	24ct Fiber	CTL	23.83	9.58	0.3900	-	0.049	179.0	90.0	179.0		0	5	2,342	2,347
											Totals:	0	560	59,859	60,420

Insulator/Attachment:		Owner	Height (ft)	Horiz. Offset (in)	Offset Angle (deg)	Rotate Angle (deg)	Unit Weight (lbs)	Dim 1[4] (in)	Dim 2[4] (in)				Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Post	Post Insulator - 15 kV	NVE	47.08	5.01	90.0	90.0	11.00	11.50	4.75	-	-	-	-16	406	390
Post	Post Insulator - 15 kV	NVE	47.08	5.01	90.0	90.0	11.00	11.50	4.75	-	-	-	16	406	422
Post	Post Insulator - 15 kV	NVE	43.83	5.31	90.0	90.0	11.00	11.50	4.75	-	-	-	-16	378	362
Post	Post Insulator - 15 kV	NVE	43.83	5.31	90.0	90.0	11.00	11.50	4.75	-	-	-	16	378	394
Post	Post Insulator - 15 kV	NVE	40.00	5.67	90.0	90.0	11.00	11.50	4.75	-	-	-	-16	345	330
Post	Post Insulator - 15 kV	NVE	40.00	5.67	90.0	90.0	11.00	11.50	4.75	-	-	-	16	345	361
Spool	Spool Insulator - 20 kV	NVE	36.08	6.03	0.0	0.0	1.00	2.12	2.50	-	-	-	-1	30	29
Bolt	Three Bolt	ZFS	32.25	6.39	180.0	180.0	5.00	0.00	3.00	-	-	-	6	0	6
Bolt	Three Bolt	TWT	29.50	6.65	180.0	180.0	5.00	0.00	3.00	-	-	-	6	0	6
Bolt	Three Bolt	COX	27.33	6.85	180.0	180.0	5.00	0.00	3.00	-	-	-	6	0	6
Bolt	Three Bolt	CTL	26.08	6.96	180.0	180.0	5.00	0.00	3.00	-	-	-	6	0	6
Bolt	Three Bolt	CTL	23.95	7.08	180.0	180.0	5.00	0.00	3.00	-	-	-	6	0	6
											Totals:	0	28	2,289	2,317

Pole Buckling

Buckling	Buckling (ft)	Buckling Section (% Buckling Col. Hgt.)	Buckling (in)	Min. Buckling (in)	Diameter (in)	Diameter (in)	Modulus of (psi)	Pole (pcf)	Ice Density (pcf)	Pole Tip (ft)	Buckling Load (lbs)	Buckling Load (lbs)	Buckling Load
2.00	27.90	34.15	17.01	26.19	9.67	18.79	1,000,000	50.00	57.00	47.92	58,756	6,449	9.11

Legend

Insulators/Attachment dimensions

	Dimension 1	Dimension 2
Pin	Body Length	Diameter
Post	Body Length	Diameter
Underhung	Body Length	Diameter

[1] Worst Wind Per Guy Wire

(Guy LF)

[2] Worst Wind per Guy Wire

(Pole LF)

[4] See Legend

[3] Wind at 180.0°

(Guy LF)

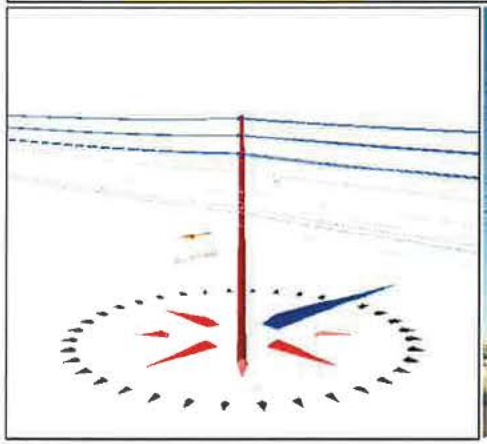
Version: 4.11.1/4.11

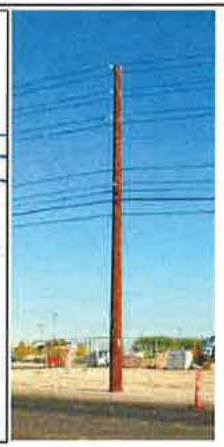
* includes Load Factor(s)

O-Calc® Pro *Analysis Report*

Tuesday, September 30, 2014 5:07:02 PM

File Name:	24 - p82125 Propos	Pole Length / Class:	55 / H2	Code:	NESC	Structure Type:	Unguyed
Pole Num:	24 - p82125	Pole Species:	WESTERN RED CEDAR	NESC Rule:	Rule 250B	Status:	N/A
Permit #:	Unset	Setting Depth (ft):	6.08	Const. Grade:	B	Pole Strength Factor:	0.65
Owner:	Unset	G/L Circumference (in):	69.00	Load District:	Light	Transverse Wind LF:	2.50
Latitude:	Unset	G/L Fiber Stress (psi):	6,000	Ice Thickness (in):	0.00	Wire Tension LF:	1.10
Longitude:	Unset	Allowable Stress (psi):	3,900	Wind Speed (mph):	59.29	Vertical LF:	1.50
Emp #:	Unset	Fiber Stress Ht. Reduction:	No	Wind Pressure (psf):	9.00		





Pole Capacity Utilization		Height	Wind Angle
Maximum:	64.1%	8.7 ft	180.0°
Groundline:	62.7%	0.0 ft	180.0°
Vertical:	7.2%	27.4 ft	180.0°

Pole Moments		Load Angle	Wind Angle
Max Capac. Util:	157,722 ft-lb	180.3°	180.0°
Groundline:	210,268 ft-lb	180.2°	180.0°

GROUNDLINE LOAD SUMMARY:*Wind at 180.0°, Applied Moment 210,268 ft-lb at 180.2°, Allowable Moment 338,050 ft-lb

	Shear Load (lbs)*	Percent Applied Load	Bending Moment (ft-lb)	Percent of Applied Moment	Percent of Pole Capacity	Bending Stress (+/- psi)	Vertical Load (lbs)	Vertical Stress (psi)	Total Stress (psi)	Percent of Pole Capacity
Powers:	2,515	40.3	111,388	53.0	33.0	1,285	1,553	4	1,289	33.1
Comms:	2,209	35.4	65,319	31.1	19.3	754	762	2	756	19.4
Pole:	1,460	23.4	31,185	14.8	9.2	360	5,313	14	374	9.6
Insulators:	52	0.8	2,377	1.1	0.7	27	138	0	28	0.7
Pole Load:	6,236	100.0	210,268	100.0	62.2	2,426	7,765	20	2,446	62.7
Pole Reserve Capacity:			127,782		37.8	1,474			1,454	37.3

LOAD SUMMARY BY OWNER

NVE:	4,026	144,918	1,672	6,966	18	1,690	43.3
ZFS:	406	13,416	155	137	0	155	4.0
TWT:	346	10,594	122	100	0	122	3.1

[1] Worst Wind Per Guy Wire

(Guy LF)

[2] Worst Wind per Guy Wire

(Pole LF)

[4] See Legend

[3] Wind at 180.0°

(Guy LF)

Version: 4.11.1/4.11

* includes Load Factor(s)

COX:	587	17,311	200	150	0	200	5.1
CTL:	871	24,029	277	413	1	278	7.1
Totals	6,236	210,268	2,426	7,765	20	2,446	62.7

Detailed Load Components

Power:		Owner	Height (ft)	Horiz. Offset (in)	Cable Dia. (in)	Sag at Max Temp	Cable Weight (lbs/ft)	Lead / Span Length	Span Angle (deg)	Wire Length (ft)	Tension (lbs)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Primary	AAC 954.0 KCM 37 STRAND	NVE	48.42	12.54	1.1240	3.23	0.895	206.0	270.0	206.0	3,068	567	133	10,521	11,220
Primary	AAC 954.0 KCM 37 STRAND	NVE	48.42	12.54	1.1240	2.44	0.895	167.0	90.0	167.0	3,068	-567	108	8,529	8,070
Primary	AAC 954.0 KCM 37 STRAND	NVE	48.42	12.54	1.1240	3.23	0.895	206.0	270.0	206.0	3,068	567	-132	10,521	10,955
Primary	AAC 954.0 KCM 37 STRAND	NVE	48.42	12.54	1.1240	2.44	0.895	167.0	90.0	167.0	3,068	-567	-107	8,529	7,855
Primary	AAC 954.0 KCM 37 STRAND	NVE	44.92	12.72	1.1240	3.23	0.895	206.0	270.0	206.0	3,068	526	133	9,761	10,420
Primary	AAC 954.0 KCM 37 STRAND	NVE	44.92	12.72	1.1240	2.44	0.895	167.0	90.0	167.0	3,068	-526	108	7,913	7,495
Primary	AAC 954.0 KCM 37 STRAND	NVE	44.92	12.72	1.1240	3.23	0.895	206.0	270.0	206.0	3,068	526	-132	9,761	10,155
Primary	AAC 954.0 KCM 37 STRAND	NVE	44.92	12.72	1.1240	2.44	0.895	167.0	90.0	167.0	3,068	-526	-107	7,913	7,280
Primary	AAC 954.0 KCM 37 STRAND	NVE	40.92	12.94	1.1240	3.23	0.895	206.0	270.0	206.0	3,068	479	133	8,893	9,505
Primary	AAC 954.0 KCM 37 STRAND	NVE	40.92	12.94	1.1240	2.44	0.895	167.0	90.0	167.0	3,068	-479	108	7,209	6,837
Primary	AAC 954.0 KCM 37 STRAND	NVE	40.92	12.94	1.1240	3.23	0.895	206.0	270.0	206.0	3,068	479	-132	8,893	9,240
Primary	AAC 954.0 KCM 37 STRAND	NVE	40.92	12.94	1.1240	2.44	0.895	167.0	90.0	167.0	3,068	-479	-107	7,209	6,623
Neutral	ACSR 2/0 AWG 6/1 QUAIL	NVE	36.92	8.67	0.4470	1.55	0.183	206.0	90.0	206.0	1,355	-191	-20	3,187	2,976
Neutral	ACSR 2/0 AWG 6/1 QUAIL	NVE	36.92	8.67	0.4470	1.12	0.183	167.0	270.0	167.0	1,355	191	-17	2,584	2,758
											Totals:	0	-35	111,422	111,388

Comm:		Owner	Height (ft)	Horiz. Offset (in)	Cable Dia. (in)	Sag at Max Temp	Cable Weight (lbs/ft)	Lead / Span Length	Span Angle (deg)	Wire Length (ft)	Tension (lbs)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Bundle	5/16" EHS	ZFS	32.83	9.42	0.3125	2.08	0.205	206.0	270.0	206.0	1,500	188	25	2,451	2,664
Telco	BELOPTIX DT144 - 144 FIBERS -	ZFS	32.80	9.56	0.7560	-	0.208	206.0	270.0	206.0		0	26	2,449	2,474
Telco	24ct Fiber	ZFS	32.81	9.34	0.3900	-	0.049	206.0	270.0	206.0		0	6	2,450	2,456
Bundle	5/16" EHS	ZFS	32.83	9.42	0.3125	1.40	0.205	167.0	90.0	167.0	1,500	-188	20	1,987	1,820
Telco	BELOPTIX DT144 - 144 FIBERS -	ZFS	32.80	9.56	0.7560	-	0.208	167.0	90.0	167.0		0	21	1,985	2,006
Telco	24ct Fiber	ZFS	32.81	9.34	0.3900	-	0.049	167.0	90.0	167.0		0	5	1,986	1,991
Bundle	1/4" EHS	TWT	30.42	9.72	0.2500	1.39	0.121	206.0	270.0	206.0	1,500	174	15	2,905	3,094
Telco	BELOPTIX DT144 - 144 FIBERS -	TWT	30.38	9.72	0.7560	-	0.208	206.0	270.0	206.0		0	26	2,901	2,927
Bundle	1/4" EHS	TWT	30.42	9.72	0.2500	0.92	0.121	167.0	90.0	167.0	1,500	-174	12	2,355	2,193
Telco	BELOPTIX DT144 - 144 FIBERS -	TWT	30.38	9.72	0.7560	-	0.208	167.0	90.0	167.0		0	21	2,352	2,373
Bundle	1/4" EHS	COX	29.33	9.86	0.2500	2.12	0.121	206.0	270.0	206.0	1,500	168	15	2,375	2,559
Telco	432ct Fiber	COX	29.31	10.04	0.8300	-	0.159	206.0	270.0	206.0		0	21	2,374	2,394
Telco	P3-500CA	COX	29.31	9.76	0.5000	-	0.072	206.0	270.0	206.0		0	9	2,374	2,383
Telco	432ct Fiber	COX	29.25	9.82	0.8300	-	0.159	206.0	270.0	206.0		0	20	2,369	2,389
Bundle	1/4" EHS	COX	29.33	9.86	0.2500	1.41	0.121	167.0	90.0	167.0	1,500	-168	12	1,926	1,770
Telco	432ct Fiber	COX	29.31	10.04	0.8300	-	0.159	167.0	90.0	167.0		0	17	1,924	1,941
Telco	P3-500CA	COX	29.31	9.76	0.5000	-	0.072	167.0	90.0	167.0		0	7	1,924	1,932
Telco	432ct Fiber	COX	29.25	9.82	0.8300	-	0.159	167.0	90.0	167.0		0	16	1,921	1,937
Bundle	1/4" EHS	CTL	28.25	9.99	0.2500	4.05	0.121	206.0	270.0	206.0	1,500	162	16	4,151	4,328
Telco	26 GA 400 PR (1.30)	CTL	28.19	9.99	1.3000	-	0.910	206.0	270.0	206.0		0	117	4,142	4,259

[1] Worst Wind Per Guy Wire

(Guy LF)

[2] Worst Wind per Guy Wire

(Pole LF)

[4] See Legend

[3] Wind at 180.0°

(Guy LF)

Version: 4.11.1/4.11

* includes Load Factor(s)

Bundle	1/4" EHS	CTL	28.25	9.99	0.2500	2.71	0.121	167.0	90.0	167.0	1,500	-162	13	3,365	3,216
Telco	26 GA 400 PR (1.30)	CTL	28.19	9.99	1.3000	-	0.910	167.0	90.0	167.0		0	95	3,358	3,453
Bundle	1/4" EHS	CTL	25.58	10.32	0.2500	1.65	0.121	206.0	270.0	206.0	1,500	146	16	2,395	2,557
Telco	26 GA 100 PR (0.74)	CTL	25.54	10.32	0.7400	-	0.270	206.0	270.0	206.0		0	36	2,391	2,427
Bundle	1/4" EHS	CTL	25.58	10.32	0.2500	1.09	0.121	167.0	90.0	167.0	1,500	-146	13	1,941	1,808
Telco	26 GA 100 PR (0.74)	CTL	25.54	10.32	0.7400	-	0.270	167.0	90.0	167.0		0	29	1,938	1,967
											Totals:	0	628	64,691	65,319

Insulator/Attachment:		Owner	Height (ft)	Horiz. Offset (in)	Offset Angle (deg)	Rotate Angle (deg)	Unit Weight (lbs)	Dim 1[4] (in)	Dim 2[4] (in)				Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Post	Post Insulator - 15 kV	NVE	48.42	5.00	270.0	270.0	11.00	11.50	4.75	-	-	-	16	417	433
Post	Post Insulator - 15 kV	NVE	48.42	5.00	270.0	270.0	11.00	11.50	4.75	-	-	-	-16	417	402
Post	Post Insulator - 15 kV	NVE	44.92	5.43	270.0	270.0	11.00	11.50	4.75	-	-	-	16	387	403
Post	Post Insulator - 15 kV	NVE	44.92	5.43	270.0	270.0	11.00	11.50	4.75	-	-	-	-16	387	372
Post	Post Insulator - 15 kV	NVE	40.92	5.92	270.0	270.0	11.00	11.50	4.75	-	-	-	16	353	369
Post	Post Insulator - 15 kV	NVE	40.92	5.92	270.0	270.0	11.00	11.50	4.75	-	-	-	-16	353	338
Spool	Spool Insulator - 20 kV	NVE	36.92	6.42	0.0	0.0	1.00	2.12	2.50	-	-	-	-1	31	29
Bolt	Three Bolt	ZFS	32.83	6.92	180.0	180.0	5.00	0.00	3.00	-	-	-	6	0	6
Bolt	Three Bolt	TWT	30.42	7.22	180.0	180.0	5.00	0.00	3.00	-	-	-	6	0	6
Bolt	Three Bolt	COX	29.33	7.36	180.0	180.0	5.00	0.00	3.00	-	-	-	6	0	6
Bolt	Three Bolt	CTL	28.25	7.49	180.0	180.0	5.00	0.00	3.00	-	-	-	6	0	6
Bolt	Three Bolt	CTL	25.58	7.82	180.0	180.0	5.00	0.00	3.00	-	-	-	6	0	6
											Totals:	0	30	2,347	2,377

Pole Buckling

Buckling	Buckling (ft)	Buckling Section (% Buckling Col. Hgt.)	Buckling (in)	Min. Buckling (in)	Diameter (in)	Diameter (in)	Modulus of (psi)	Pole (pcf)	Ice Density (pcf)	Pole Tip (ft)	Buckling Load (lbs)	Buckling Load (lbs)	Buckling Load
2.00	27.35	34.62	19.62	28.54	9.87	21.97	1,000,000	50.00	57.00	48.92	108,313	7,765	13.95

Legend

Insulators/Attachment dimensions

	Dimension 1	Dimension 2
Pin	Body Length	Diameter
Post	Body Length	Diameter
Underhung	Body Length	Diameter

[1] Worst Wind Per Guy Wire

(Guy LF)

[2] Worst Wind per Guy Wire

(Pole LF)

[4] See Legend

[3] Wind at 180.0°

(Guy LF)

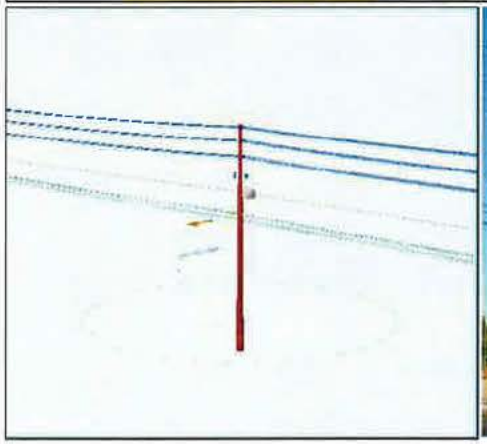
Version: 4.11.1/4.11

* includes Load Factor(s)

O-Calc® Pro *Analysis Report*

Monday, October 13, 2014 11:25:48 AM

File Name:	25 - p82124 Propos	Pole Length / Class:	55 / H2	Code:	NESC	Structure Type:	Unguyed
Pole Num:	25 - p82124	Pole Species:	WESTERN RED CEDAR	NESC Rule:	Rule 250B	Status:	N/A
Permit #:	Unset	Setting Depth (ft):	8.33	Construction Grade:	B	Pole Strength Factor:	0.65
Owner:	Unset	G/L Circumference (in):	59.50	Loading District:	Light	Transverse Wind LF:	2.50
Latitude:	Unset	G/L Fiber Stress (psi):	6,000	Ice Thickness (in):	0.00	Wire Tension LF:	1.10
Longitude:	Unset	Allowable Stress (psi):	3,900	Wind Speed (mph):	59.29	Vertical LF:	1.50
Emp #:	Unset	Fiber Stress Ht. Reduction:	No	Wind Pressure (psf):	9.00		



Pole Capacity Utilization		Height	Wind Angle
Maximum:	97.3%	0.0 ft	180.0°
Groundline:	97.3%	0.0 ft	180.0°
Vertical:	12.4%	28.0 ft	180.0°

Pole Moments		Load Angle	Wind Angle
Max Capac. Util:	209,551 ft-lb	179.7°	180.0°
Groundline:	209,551 ft-lb	179.7°	180.0°

GROUNDLINE LOAD SUMMARY:*Wind at 180.0°, Applied Moment 209,551 ft-lb at 179.7°, Allowable Moment 216,763 ft-lb

	Shear Load (lbs)*	Percent Applied Load	Bending Moment (ft-lb)	Percent of Applied Moment	Percent of Pole Capacity	Bending Stress (+/- psi)	Vertical Load (lbs)	Vertical Stress (psi)	Total Stress (psi)	Percent of Pole Capacity
Powers:	2,717	41.0	114,027	54.4	52.6	2,052	1,677	6	2,058	52.8
Comms:	2,387	36.0	61,417	29.3	28.3	1,105	823	3	1,108	28.4
Generic Equipment:	72	1.1	2,531	1.2	1.2	46	68	0	46	1.2
Power Equipment:	129	1.9	2,782	1.3	1.3	50	525	2	52	1.3
Pole:	1,260	19.0	26,324	12.6	12.1	474	4,092	15	488	12.5
Crossarms:	4	0.1	169	0.1	0.1	3	42	0	3	0.1
Insulators:	52	0.8	2,301	1.1	1.1	41	138	0	42	1.1
Pole Load:	6,621	100.0	209,551	100.0	96.7	3,770	7,365	26	3,796	97.3
Pole Reserve Capacity:			7,212		3.3	130			104	2.7

LOAD SUMMARY BY OWNER

NVE:	4,230	147,899		2,661	6,462	23	2,684	68.8
ZFS:	442	12,212		220	189	1	220	5.7
TWT:	374	10,093		182	107	0	182	4.7
COX:	634	16,218		292	162	1	292	7.5
CTL:	941	23,129		416	445	2	418	10.7
Totals	6,621	209,551		3,770	7,365	26	3,796	97.3

Detailed Load Components

Power:		Owner	Height (ft)	Horiz. Offset (in)	Cable Dia. (in)	Sag at Max Temp	Cable Weight (lbs/ft)	Lead/Span Length	Span Angle (deg)	Wire Length (ft)	Tension (lbs)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Primary	AAC 954.0 KCM 37 STRAND	NVE	46.08	12.54	1.1240	3.04	0.895	197.0	270.0	197.0	3,068	-722	-126	9,575	8,727
Primary	AAC 954.0 KCM 37 STRAND	NVE	46.08	12.54	1.1240	3.23	0.895	206.0	90.0	206.0	3,068	722	-132	10,013	10,602
Primary	AAC 954.0 KCM 37 STRAND	NVE	46.08	12.54	1.1240	3.04	0.895	197.0	270.0	197.0	3,068	-722	127	9,575	8,980
Primary	AAC 954.0 KCM 37 STRAND	NVE	46.08	12.54	1.1240	3.23	0.895	206.0	90.0	206.0	3,068	722	133	10,013	10,867
Primary	AAC 954.0 KCM 37 STRAND	NVE	42.83	12.66	1.1240	3.04	0.895	197.0	270.0	197.0	3,068	-671	-126	8,901	8,103
Primary	AAC 954.0 KCM 37 STRAND	NVE	42.83	12.66	1.1240	3.23	0.895	206.0	90.0	206.0	3,068	671	-132	9,307	9,846
Primary	AAC 954.0 KCM 37 STRAND	NVE	42.83	12.66	1.1240	3.04	0.895	197.0	270.0	197.0	3,068	-671	127	8,901	8,357
Primary	AAC 954.0 KCM 37 STRAND	NVE	42.83	12.66	1.1240	3.23	0.895	206.0	90.0	206.0	3,068	671	133	9,307	10,111
Primary	AAC 954.0 KCM 37 STRAND	NVE	39.17	12.80	1.1240	3.04	0.895	197.0	270.0	197.0	3,068	-614	-126	8,141	7,401
Primary	AAC 954.0 KCM 37 STRAND	NVE	39.17	12.80	1.1240	3.23	0.895	206.0	90.0	206.0	3,068	614	-132	8,513	8,994
Primary	AAC 954.0 KCM 37 STRAND	NVE	39.17	12.80	1.1240	3.04	0.895	197.0	270.0	197.0	3,068	-614	127	8,141	7,654
Primary	AAC 954.0 KCM 37 STRAND	NVE	39.17	12.80	1.1240	3.23	0.895	206.0	90.0	206.0	3,068	614	133	8,513	9,259
Neutral	ACSR 2/0 AWG 6/1 QUAIL	NVE	30.58	8.67	0.4470	1.45	0.183	197.0	270.0	197.0	1,355	-211	-20	2,525	2,294
Neutral	ACSR 2/0 AWG 6/1 QUAIL	NVE	30.58	8.67	0.4470	1.55	0.183	206.0	90.0	206.0	1,355	211	-20	2,640	2,831
											Totals:	0	-37	114,064	114,027

Comm:		Owner	Height (ft)	Horiz. Offset (in)	Cable Dia. (in)	Sag at Max Temp	Cable Weight (lbs/ft)	Lead/Span Length	Span Angle (deg)	Wire Length (ft)	Tension (lbs)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Overlashed	5/16" EHS	ZFS	26.27	44.43	0.3125	1.91	0.205	197.0	270.0	197.0	1,500	-201	111	1,876	1,786
Telco	BELOPTIX DT144 - 144 FIBERS -	ZFS	26.23	44.52	0.7560	-	0.208	197.0	270.0	197.0		0	113	1,873	1,986
Telco	24ct Fiber	ZFS	26.25	44.38	0.3900	-	0.049	197.0	270.0	197.0		0	27	1,874	1,901
Overlashed	5/16" EHS	ZFS	26.27	44.43	0.3125	2.08	0.205	206.0	90.0	206.0	1,500	201	116	1,961	2,278
Telco	BELOPTIX DT144 - 144 FIBERS -	ZFS	26.23	44.52	0.7560	-	0.208	206.0	90.0	206.0		0	118	1,959	2,077
Telco	24ct Fiber	ZFS	26.25	44.38	0.3900	-	0.049	206.0	90.0	206.0		0	28	1,960	1,987
Overlashed	1/4" EHS	TWT	26.27	32.59	0.2500	1.28	0.121	197.0	270.0	197.0	1,500	-201	48	2,399	2,246
Telco	BELOPTIX DT144 - 144 FIBERS -	TWT	26.23	32.59	0.7560	-	0.208	197.0	270.0	197.0		0	82	2,395	2,477
Overlashed	1/4" EHS	TWT	26.27	32.59	0.2500	1.39	0.121	206.0	90.0	206.0	1,500	201	50	2,508	2,759
Telco	BELOPTIX DT144 - 144 FIBERS -	TWT	26.23	32.59	0.7560	-	0.208	206.0	90.0	206.0		0	86	2,505	2,590
Overlashed	1/4" EHS	COX	25.42	9.39	0.2500	1.95	0.121	197.0	270.0	197.0	1,500	-194	14	1,969	1,788
Telco	432ct Fiber	COX	25.40	9.57	0.8300	-	0.159	197.0	270.0	197.0		0	19	1,967	1,986
Telco	P3-500CA	COX	25.40	9.30	0.5000	-	0.072	197.0	270.0	197.0		0	8	1,967	1,975
Telco	432ct Fiber	COX	25.34	9.36	0.8300	-	0.159	197.0	270.0	197.0		0	18	1,963	1,981
Overlashed	1/4" EHS	COX	25.42	9.39	0.2500	2.12	0.121	206.0	90.0	206.0	1,500	194	15	2,059	2,268
Telco	432ct Fiber	COX	25.40	9.57	0.8300	-	0.159	206.0	90.0	206.0		0	20	2,057	2,076
Telco	P3-500CA	COX	25.40	9.30	0.5000	-	0.072	206.0	90.0	206.0		0	9	2,057	2,066

Telco	432ct Fiber	COX	25.34	9.36	0.8300	-	0.159	206.0	90.0	206.0		0	19	2,053	2,072
Overlashed	1/4" EHS	CTL	24.42	9.48	0.2500	3.72	0.121	197.0	270.0	197.0	1,500	-187	14	3,432	3,259
Telco	26 GA 400 PR (1.30)	CTL	24.36	9.48	1.3000	-	0.910	197.0	270.0	197.0		0	106	3,423	3,529
Overlashed	1/4" EHS	CTL	24.42	9.48	0.2500	4.05	0.121	206.0	90.0	206.0	1,500	187	15	3,588	3,790
Telco	26 GA 400 PR (1.30)	CTL	24.36	9.48	1.3000	-	0.910	206.0	90.0	206.0		0	111	3,580	3,691
Overlashed	1/4" EHS	CTL	23.92	9.53	0.2500	1.51	0.121	197.0	270.0	197.0	1,500	-183	14	2,141	1,973
Telco	26 GA 100 PR (0.74)	CTL	23.88	9.53	0.7400	-	0.270	197.0	270.0	197.0		0	32	2,138	2,170
Overlashed	1/4" EHS	CTL	23.92	9.53	0.2500	1.65	0.121	206.0	90.0	206.0	1,500	183	15	2,239	2,437
Telco	26 GA 100 PR (0.74)	CTL	23.88	9.53	0.7400	-	0.270	206.0	90.0	206.0		0	33	2,236	2,269
											Totals:	0	1,240	60,178	61,417

GenericEquipment:		Owner	Height (ft)	Horiz. Offset (in)	Offset Angle (deg)	Rotate Angle (deg)	Unit Weight (lbs)	Unit Height (in)	Unit Depth (in)	Unit Diameter (in)	Unit Length (in)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Box	Fuse Cutout	NVE	34.58	22.09	180.0	0.0	15.00	12.00	8.00	-	8.00	-	41	830	871
Box	Fuse Cutout	NVE	34.58	22.09	90.0	0.0	15.00	12.00	8.00	-	8.00	-	0	830	830
Box	Fuse Cutout	NVE	34.58	22.09	270.0	0.0	15.00	12.00	8.00	-	8.00	-	0	830	830
											Totals:	0	41	2,490	2,531

PowerEquipment:		Owner	Height (ft)	Horiz. Offset (in)	Offset Angle (deg)	Rotate Angle (deg)	Unit Weight (lbs)	Unit Height (in)	Unit Depth (in)	Unit Diameter (in)	Unit Length (in)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Box	1200 KVAR Cap Bank	NVE	30.08	28.96	0.0	0.0	350.00	25.00	25.00	-	33.00	-	-1,096	3,877	2,782
											Totals:	0	-1,096	3,877	2,782

Crossarm:		Owner	Height (ft)	Horiz. Offset (in)	Offset Angle (deg)	Rotate Angle (deg)	Unit Weight (lbs)	Unit Height (in)	Unit Depth (in)	Unit Diameter (in)	Unit Length (in)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Offset	CROSSARM 3-1/2 X 4-1/2 X 4	ZFS	26.08	8.68	90.0	90.0	28.00	4.50	3.50	-	48.00	-	66	103	169
											Totals:	0	66	103	169

Insulator:		Owner	Height (ft)	Horiz. Offset (in)	Offset Angle (deg)	Rotate Angle (deg)	Unit Weight (lbs)	Unit Height (in)	Unit Depth (in)	Unit Diameter (in)	Unit Length (in)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Post	Post Insulator - 15 kV	NVE	46.08	4.99	90.0	90.0	11.00	11.50	-	4.75	-	-	-16	397	382
Post	Post Insulator - 15 kV	NVE	46.08	4.99	90.0	90.0	11.00	11.50	-	4.75	-	-	16	397	413
Post	Post Insulator - 15 kV	NVE	42.83	5.29	90.0	90.0	11.00	11.50	-	4.75	-	-	-16	370	354
Post	Post Insulator - 15 kV	NVE	42.83	5.29	90.0	90.0	11.00	11.50	-	4.75	-	-	16	370	385
Post	Post Insulator - 15 kV	NVE	39.17	5.62	90.0	90.0	11.00	11.50	-	4.75	-	-	-16	338	323
Post	Post Insulator - 15 kV	NVE	39.17	5.62	90.0	90.0	11.00	11.50	-	4.75	-	-	16	338	354
Spool	Spool Insulator - 20 kV	NVE	30.58	6.42	0.0	0.0	1.00	2.12	-	2.50	-	-	-1	25	24
Bolt	Three Bolt	ZFS	26.27	44.00	168.8	180.0	5.00	0.00	-	3.00	-	-	28	0	28
Bolt	Three Bolt	TWT	26.27	32.00	164.8	180.0	5.00	0.00	-	3.00	-	-	20	0	20
Bolt	Three Bolt	COX	25.42	6.89	180.0	180.0	5.00	0.00	-	3.00	-	-	6	0	6
Bolt	Three Bolt	CTL	24.42	6.98	180.0	180.0	5.00	0.00	-	3.00	-	-	6	0	6
Bolt	Three Bolt	CTL	23.92	7.03	180.0	180.0	5.00	0.00	-	3.00	-	-	6	0	6
											Totals:	0	64	2,236	2,301

Pole Buckling

Buckling	Buckling (ft)	Buckling Section (% Buckling Col. Hgt.)	Buckling (in)	Min. Buckling (in)	Diameter (in)	Diameter (in)	Modulus of (psi)	Pole (pcf)	Ice Density (pcf)	Pole Tip (ft)	Buckling Load (lbs)	Buckling Load (lbs)	Buckling Load
2.00	27.95	34.30	17.08	27.84	9.87	18.95	1,000,000	50.00	57.00	46.67	59,495	**7,365**	**8.08**

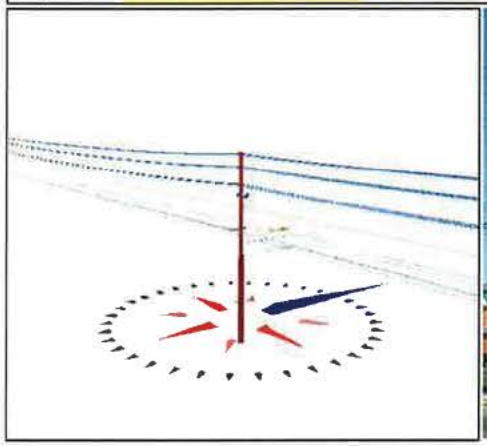
Version: 5.0 / 5.00
* includes Load Factor(s)

² Worst Wind per Guy Wire
³ Wind at 180.0°

O-Calc® Pro *Analysis Report*

Tuesday, September 30, 2014 6:23:16 PM

File Name:	26 - p82123 Propos	Pole Length / Class:	55 / H2	Code:	NESC	Structure Type:	Unguyed
Pole Num:	26 - p82123	Pole Species:	WESTERN RED CEDAR	NESC Rule:	Rule 250B	Status:	N/A
Permit #:	Unset	Setting Depth (ft):	7.17	Const. Grade:	B	Pole Strength Factor:	0.65
Owner:	Unset	G/L Circumference (in):	58.00	Load District:	Light	Transverse Wind LF:	2.50
Latitude:	Unset	G/L Fiber Stress (psi):	6,000	Ice Thickness (in):	0.00	Wire Tension LF:	1.10
Longitude:	Unset	Allowable Stress (psi):	3,900	Wind Speed (mph):	59.29	Vertical LF:	1.50
Emp #:	Unset	Fiber Stress Ht. Reduction:	No	Wind Pressure (psf):	9.00		



Pole Capacity Utilization		Height	Wind Angle
Maximum:	122.8%	0.0 ft	1.3°
Groundline:	122.8%	0.0 ft	1.3°
Vertical:	13.9%	28.8 ft	1.3°

Pole Moments		Load Angle	Wind Angle
Max Capac. Util:	245,151 ft-lb	0.0°	1.3°
Groundline:	245,151 ft-lb	0.0°	1.3°

GROUNDLINE LOAD SUMMARY:*Wind at 1.3°, Applied Moment 245,151 ft-lb at 0.0°, Allowable Moment 200,779 ft-lb

	Shear Load (lbs)*	Percent Applied Load	Bending Moment (ft-lb)	Percent of Applied Moment	Percent of Pole Capacity	Bending Stress (+/- psi)	Vertical Load (lbs)	Vertical Stress (psi)	Total Stress (psi)	Percent of Pole Capacity
Powers:	2,912	37.4	124,684	50.9	62.1	2,422	1,798	7	2,429	62.3
Comms:	3,468	44.6	88,504	36.1	44.1	1,719	937	4	1,723	44.2
Generic Equipment:	45	0.6	1,664	0.7	0.8	32	68	0	33	0.8
Pole:	1,270	16.3	27,301	11.1	13.6	530	4,046	15	545	14.0
Crossarms:	2	0.0	1	0.0	0.0	0	42	0	0	0.0
Risers:	35	0.4	765	0.3	0.4	15	71	0	15	0.4
Insulators:	52	0.7	2,231	0.9	1.1	43	146	1	44	1.1
Pole Load:	7,784	100.0	245,151	100.0	122.1	4,762	7,108	27	4,788	122.8
Pole Reserve Capacity:			-44,372		-22.1	-862			-888	-22.8

LOAD SUMMARY BY OWNER

[1] Worst Wind Per Guy Wire

(Guy LF)

[2] Worst Wind per Guy Wire

(Pole LF)

[4] See Legend

[3] Wind at 1.3°

(Guy LF)

Version: 4.11.1/4.11

* includes Load Factor(s)

NVE:	4,313	**156,691**		**3,044**	6,083	23	**3,066**	**78.6**
ZFS:	470	**13,571**		**264**	157	1	**264**	**6.8**
TWT:	400	**11,085**		**215**	114	0	**216**	**5.5**
COX:	767	**19,893**		**386**	266	1	**387**	**9.9**
CTL:	1,834	**43,912**		**853**	487	2	**855**	**21.9**
Totals	7,784	**245,151**		**4,762**	7,108	27	**4,788**	**122.8**

Detailed Load Components

Power:		Owner	Height (ft)	Horiz. Offset (in)	Cable Dia. (in)	Sag at Max Temp	Cable Weight (lbs/ft)	Lead / Span Length	Span Angle (deg)	Wire Length (ft)	Tension (lbs)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Primary	AAC 954.0 KCM 37 STRAND	NVE	47.33	12.53	1.1240	**3.87**	**0.895**	**235.0**	**270.0**	**235.1**	**3,068**	-63	-151	11,729	11,515
Primary	AAC 954.0 KCM 37 STRAND	NVE	47.33	12.53	1.1240	3.04	0.895	197.0	90.0	197.0	3,068	63	-127	9,833	9,769
Primary	AAC 954.0 KCM 37 STRAND	NVE	47.33	12.53	1.1240	3.87	0.895	235.0	270.0	235.1	3,068	-63	151	11,729	11,817
Primary	AAC 954.0 KCM 37 STRAND	NVE	47.33	12.53	1.1240	3.04	0.895	197.0	90.0	197.0	3,068	63	127	9,833	10,022
Primary	AAC 954.0 KCM 37 STRAND	NVE	43.92	12.66	1.1240	3.87	0.895	235.0	270.0	235.1	3,068	-58	-151	10,885	10,676
Primary	AAC 954.0 KCM 37 STRAND	NVE	43.92	12.66	1.1240	3.04	0.895	197.0	90.0	197.0	3,068	58	-127	9,125	9,056
Primary	AAC 954.0 KCM 37 STRAND	NVE	43.92	12.66	1.1240	3.87	0.895	235.0	270.0	235.1	3,068	-58	151	10,885	10,978
Primary	AAC 954.0 KCM 37 STRAND	NVE	43.92	12.66	1.1240	3.04	0.895	197.0	90.0	197.0	3,068	58	127	9,125	9,310
Primary	AAC 954.0 KCM 37 STRAND	NVE	39.00	12.85	1.1240	3.87	0.895	235.0	270.0	235.1	3,068	-52	-151	9,667	9,464
Primary	AAC 954.0 KCM 37 STRAND	NVE	39.00	12.85	1.1240	3.04	0.895	197.0	90.0	197.0	3,068	52	-127	8,104	8,029
Primary	AAC 954.0 KCM 37 STRAND	NVE	39.00	12.85	1.1240	3.87	0.895	235.0	270.0	235.1	3,068	-52	151	9,667	9,766
Primary	AAC 954.0 KCM 37 STRAND	NVE	39.00	12.85	1.1240	3.04	0.895	197.0	90.0	197.0	3,068	52	127	8,104	8,282
Neutral	ACSR 2/0 AWG 6/1 QUAIL	NVE	32.92	8.52	0.4470	1.92	0.183	235.0	270.0	235.0	1,355	-19	23	3,241	3,245
Neutral	ACSR 2/0 AWG 6/1 QUAIL	NVE	32.92	8.52	0.4470	1.46	0.183	197.0	90.0	197.0	1,355	19	19	2,717	2,756
											Totals:	**0**	**42**	**124,643**	**124,684**

Comm:		Owner	Height (ft)	Horiz. Offset (in)	Cable Dia. (in)	Sag at Max Temp	Cable Weight (lbs/ft)	Lead / Span Length	Span Angle (deg)	Wire Length (ft)	Tension (lbs)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Bundle	**5/16" EHS**	ZFS	29.17	9.11	0.3125	2.70	0.205	235.0	270.0	235.0	1,500	-19	-27	2,484	2,436
Telco	BELOPTIX DT144 - 144 FIBERS -	ZFS	29.13	9.25	0.7560	-	0.208	235.0	270.0	235.0		0	-28	2,481	2,453
Telco	24ct Fiber	ZFS	29.15	9.03	0.3900	-	0.049	235.0	270.0	235.0		0	-6	2,482	2,476
Bundle	5/16" EHS	ZFS	29.17	9.11	0.3125	1.94	0.205	197.0	90.0	197.0	1,500	19	-23	2,082	2,078
Telco	BELOPTIX DT144 - 144 FIBERS -	ZFS	29.13	9.25	0.7560	-	0.208	197.0	90.0	197.0		0	-24	2,080	2,056
Telco	24ct Fiber	ZFS	29.15	9.03	0.3900	-	0.049	197.0	90.0	197.0		0	-5	2,081	2,075
Bundle	1/4" EHS	TWT	27.92	9.22	0.2500	1.84	0.121	235.0	270.0	235.0	1,500	-18	-16	3,041	3,006
Telco	BELOPTIX DT144 - 144 FIBERS -	TWT	27.88	9.22	0.7560	-	0.208	235.0	270.0	235.0		0	-28	3,037	3,008
Bundle	1/4" EHS	TWT	27.92	9.22	0.2500	1.30	0.121	197.0	90.0	197.0	1,500	18	-14	2,549	2,554
Telco	BELOPTIX DT144 - 144 FIBERS -	TWT	27.88	9.22	0.7560	-	0.208	197.0	90.0	197.0		0	-24	2,546	2,522
Bundle	1/4" EHS	COX	27.11	44.42	0.2500	4.18	0.121	235.0	270.0	235.0	1,500	-18	-78	1,541	1,445
Telco	432ct Fiber	COX	27.11	44.28	0.8300	-	0.159	235.0	270.0	235.0		0	-102	1,541	1,439
Telco	P3-500CA	COX	27.05	44.31	0.5000	-	0.072	235.0	270.0	235.0		0	-46	1,538	1,492
Telco	P3-500CA	COX	27.16	44.31	0.5000	-	0.072	235.0	270.0	235.0		0	-46	1,544	1,498
Telco	P3-500CA	COX	27.08	44.42	0.5000	-	0.072	235.0	270.0	235.0		0	-47	1,539	1,493
Telco	P3-500CA	COX	27.14	44.42	0.5000	-	0.072	235.0	270.0	235.0		0	-47	1,543	1,496
Telco	P3-500CA	COX	27.05	44.53	0.5000	-	0.072	235.0	270.0	235.0		0	-47	1,538	1,491

[1] Worst Wind Per Guy Wire

(Guy LF)
[2] Worst Wind per Guy Wire

(Pole LF)

[4] See Legend
[3] Wind at 1.3"

(Guy LF)

Version: 4.11.1/4.11
* includes Load Factor(s)

Telco	432ct Fiber	COX	27.11	44.56	0.8300	-	0.159	235.0	270.0	235.0		0	-103	1,541	1,438
Bundle	1/4" EHS	COX	27.11	44.42	0.2500	1.99	0.121	197.0	90.0	197.0	1,500	18	-66	2,099	2,051
Telco	432ct Fiber	COX	27.08	44.53	0.8300	-	0.159	197.0	90.0	197.0		0	-86	2,097	2,011
Telco	P3-500CA	COX	27.09	44.35	0.5000	-	0.072	197.0	90.0	197.0		0	-39	2,097	2,058
Telco	432ct Fiber	COX	27.03	44.39	0.8300	-	0.159	197.0	90.0	197.0		0	-86	2,093	2,007
Bundle	1/4" EHS	CTL	26.00	9.40	0.2500	5.23	0.121	235.0	270.0	235.0	1,500	-17	-17	4,358	4,324
Telco	26 GA 400 PR (1.30)	CTL	25.94	9.40	1.3000	-	0.910	235.0	270.0	235.0		0	-126	4,347	4,222
Bundle	1/4" EHS	CTL	26.00	9.40	0.2500	3.74	0.121	197.0	90.0	197.0	1,500	17	-14	3,653	3,656
Telco	26 GA 400 PR (1.30)	CTL	25.94	9.40	1.3000	-	0.910	197.0	90.0	197.0		0	-105	3,644	3,539
Bundle	1/4" EHS	CTL	24.92	9.49	0.2500	2.16	0.121	235.0	270.0	235.0	1,500	-16	-17	2,661	2,628
Telco	26 GA 100 PR (0.74)	CTL	24.88	9.49	0.7400	-	0.270	235.0	270.0	235.0		0	-38	2,657	2,619
Bundle	1/4" EHS	CTL	24.92	9.49	0.2500	1.53	0.121	197.0	90.0	197.0	1,500	16	-14	2,230	2,232
Telco	26 GA 100 PR (0.74)	CTL	24.88	9.49	0.7400	-	0.270	197.0	90.0	197.0		0	-32	2,227	2,195
Bundle	1/4" EHS	CTL	22.42	9.72	0.2500	0.04	0.121	25.0	0.0	25.0	750	18,499	2	0	18,501
Telco	26 GA 25 PR (0.50)	CTL	22.39	9.72	0.5000	-	0.100	25.0	0.0	25.0		0	2	0	2
											Totals:	18,499	-1,348	71,353	88,504

GenericEquipment:		Owner	Height (ft)	Horiz. Offset (in)	Offset Angle (deg)	Rotate Angle (deg)	Unit Weight (lbs)	Unit Height (in)	Unit Depth (in)	Unit Diameter (in)	Unit Length (in)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Box	Fuse Cutout	NVE	36.08	21.99	0.0	0.0	15.00	12.00	-	8.00	-	-	41	541	582
Box	Fuse Cutout	NVE	36.08	21.99	90.0	0.0	15.00	12.00	-	8.00	-	-	0	541	541
Box	Fuse Cutout	NVE	36.08	21.99	270.0	0.0	15.00	12.00	-	8.00	-	-	0	541	541
											Totals:	0	41	1,623	1,664

Crossarm:		Owner	Height (ft)	Horiz. Offset (in)	Offset Angle (deg)	Rotate Angle (deg)	Unit Weight (lbs)	Unit Height (in)	Unit Depth (in)	Unit Diameter (in)	Unit Length (in)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Offset	CROSSARM 3-1/2 X 4-1/2 X 4	COX	26.92	8.56	90.0	90.0	28.00	4.50	-	0.00	-	-	-66	66	1
											Totals:	0	-66	66	1

Riser:		Owner	Height (ft)	Horiz. Offset (in)	Offset Angle (deg)	Rotate Angle (deg)	Unit Weight (lbs)	Unit Height (in)	Unit Depth (in)	Unit Diameter (in)	Unit Length (in)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Riser 350.0*	Riser	NVE	31.58	9.52	350.0	350.0	3.95	378.96	-	3.00	-	-	36	729	765
											Totals:	0	36	729	765

Insulator/Attachment:		Owner	Height (ft)	Horiz. Offset (in)	Offset Angle (deg)	Rotate Angle (deg)	Unit Weight (lbs)	Dim 1[4] (in)	Dim 2[4] (in)				Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Post	Post Insulator - 15 kV	NVE	47.33	4.98	270.0	270.0	11.00	11.50	4.75	-	-	-	-16	408	392
Post	Post Insulator - 15 kV	NVE	47.33	4.98	270.0	270.0	11.00	11.50	4.75	-	-	-	16	408	424
Post	Post Insulator - 15 kV	NVE	43.92	5.29	270.0	270.0	11.00	11.50	4.75	-	-	-	-16	379	363
Post	Post Insulator - 15 kV	NVE	43.92	5.29	270.0	270.0	11.00	11.50	4.75	-	-	-	16	379	395
Post	Post Insulator - 15 kV	NVE	39.00	5.73	270.0	270.0	11.00	11.50	4.75	-	-	-	-16	337	321
Post	Post Insulator - 15 kV	NVE	39.00	5.73	270.0	270.0	11.00	11.50	4.75	-	-	-	16	337	353
Spool	Spool Insulator - 20 kV	NVE	32.92	6.27	0.0	0.0	1.00	2.12	2.50	-	-	-	1	27	28
Bolt	Three Bolt	ZFS	29.17	6.61	180.0	180.0	5.00	0.00	3.00	-	-	-	-6	0	-6
Bolt	Three Bolt	TWT	27.92	6.72	180.0	180.0	5.00	0.00	3.00	-	-	-	-6	0	-6
Bolt	Three Bolt	COX	27.11	44.00	169.0	180.0	5.00	0.00	3.00	-	-	-	-27	0	-27

[1] Worst Wind Per Guy Wire

(Guy LF)

[2] Worst Wind per Guy Wire

(Pole LF)

[4] See Legend

[3] Wind at 1.3"

(Guy LF)

Version: 4.11.1/4.11

* includes Load Factor(s)

Bolt	Three Bolt	CTL	26.00	6.90	180.0	180.0	5.00	0.00	3.00	-	-	-	-6	0	-6
Bolt	Three Bolt	CTL	24.92	6.99	180.0	180.0	5.00	0.00	3.00	-	-	-	-6	0	-6
Bolt	Single Bolt	CTL	22.42	7.22	0.0	0.0	5.00	0.00	3.00	-	-	-	6	0	6
											Totals:	0	-44	2,275	2,231

Pole Buckling

Buckling	Buckling (ft)	Buckling Section (% Buckling Col. Hgt.)	Buckling (in)	Min. Buckling (in)	Diameter (in)	Diameter (in)	Modulus of (psi)	Pole (pcf)	Ice Density (pcf)	Pole Tip (ft)	Buckling Load (lbs)	Buckling Load (lbs)	Buckling Load
2.00	28.84	34.21	16.69	27.80	9.87	18.47	1,000,000	50.00	57.00	47.83	50,976	7,108	7.17

Legend

Insulators/Attachment dimensions

	Dimension 1	Dimension 2
Pin	Body Length	Diameter
Post	Body Length	Diameter
Underhung	Body Length	Diameter

[1] Worst Wind Per Guy Wire

(Guy LF)

[2] Worst Wind per Guy Wire

(Pole LF)

[4] See Legend

[3] Wind at 1.3°

(Guy LF)

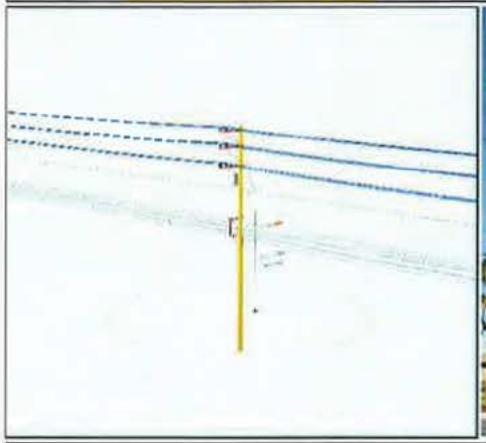
Version: 4.11.1/4.11

* includes Load Factor(s)

O-Calc® Pro *Analysis Report*

Monday, October 13, 2014 11:22:10 AM

File Name:	27 - p82122 Propos	Pole Length / Class:	65 / H2	Code:	NESC	Structure Type:	Guyed
Pole Num:	27 - p82122	Pole Species:	WESTERN RED CEDAR	NESC Rule:	Rule 250B	Status:	N/A
Permit #:	Unset	Setting Depth (ft):	10.50	Construction Grade:	B	Pole Strength Factor:	0.65
Owner:	Unset	G/L Circumference (in):	60.50	Loading District:	Light	Transverse Wind LF:	2.50
Latitude:	Unset	G/L Fiber Stress (psi):	6,000	Ice Thickness (in):	0.00	Wire Tension LF:	1.65
Longitude:	Unset	Allowable Stress (psi):	3,900	Wind Speed (mph):	59.29	Vertical LF:	1.50
Emp #:	Unset	Fiber Stress Ht. Reduction:	No	Wind Pressure (psf):	9.00		



Pole Capacity Utilization		Height	Wind Angle
Maximum:	98.1%	0.0 ft	1.3°
Groundline:	98.1%	0.0 ft	1.3°
Vertical:	2.1%	31.8 ft	180.0°

Pole Moments		Load Angle	Wind Angle
Max Capac. Util:	221,836 ft-lb	0.6°	1.3°
Groundline:	221,836 ft-lb	0.6°	1.3°

Guys Capacity Summary: Adequate

Guy Summary		Guy Tensions		Maximum Guy Tensions	
	Attach Height (ft)	% Allowable Tension	Wind Angle	% Allowable Tension	Wind Angle
Guy 1	50.0	78.9%	1.3°	130.1%	180.0°

Anchor Summary

	Lead Length (ft)	Lead Angle	Max. % Allow. Capacity
Anchor 1	5.5	0.0°	59.1%

Strut Summary

	Attach Height (ft)	Lead Angle	% Allowed Capacity
Strut 1	35.4	0.0°	0.0%

GROUNDLINE LOAD SUMMARY:*Wind at 1.3°, Applied Moment 221,836 ft-lb at 0.6°, Allowable Moment 227,877 ft-lb

	Shear Load (lbs)*	Percent Applied Load	Bending Moment (ft-lb)	Percent of Applied Moment	Percent of Pole Capacity	Bending Stress (+/- psi)	Vertical Load (lbs)	Vertical Stress (psi)	Total Stress (psi)	Percent of Pole Capacity
Powers:	2,608	38.2	116,630	52.6	51.2	1,996	1,611	6	2,002	51.3
Comms:	2,325	34.1	58,454	26.3	25.7	1,000	800	3	1,003	25.7

Version: 5.0 / 5.00
* includes Load Factor(s)

² Worst Wind per Guy Wire
³ Wind at 1.3°

Guys/Braces:	0	0.0	6	0.0	0.0	0	25	0	0	0.0
Power Equipment:	134	2.0	5,227	2.4	2.3	89	548	2	91	2.3
Pole:	1,488	21.8	36,191	16.3	15.9	619	4,892	17	636	16.3
Crossarms:	87	1.3	1,523	0.7	0.7	26	364	1	27	0.7
Risers:	133	1.9	2,077	0.9	0.9	36	72	0	36	0.9
Insulators:	52	0.8	1,728	0.8	0.8	30	138	0	30	0.8
Pole Load:	6,828	100.0	221,836	100.0	97.3	3,797	8,449	29	3,826	98.1
Pole Reserve Capacity:			6,040		2.7	103			74	1.9

LOAD SUMMARY BY OWNER

NVE:	4,297	159,839	2,736	7,434	26	2,761	70.8
ZFS:	425	11,662	200	184	1	200	5.1
TWT:	534	14,105	241	145	0	242	6.2
COX:	665	15,548	266	217	1	267	6.8
CTL:	908	20,681	354	470	2	356	9.1
Totals	6,828	221,836	3,797	8,449	29	3,826	98.1

Detailed Load Components

Power:		Owner	Height (ft)	Horiz. Offset (in)	Cable Dia. (in)	Sag at Max Temp	Cable Weight (lbs/ft)	Lead/Span Length	Span Angle (deg)	Wire Length (ft)	Tension (lbs)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Primary	AAC 954.0 KCM 37 STRAND	NVE	54.23	92.25	1.1240	2.16	0.895	152.0	270.0	152.0	3,068	-3,065	-781	8,690	4,844
Primary	AAC 954.0 KCM 37 STRAND	NVE	54.23	92.25	1.1240	3.87	0.895	235.0	90.0	235.1	3,068	3,065	-1,208	13,436	15,293
Primary	AAC 954.0 KCM 37 STRAND	NVE	54.23	68.34	1.1240	2.16	0.895	152.0	270.0	152.0	3,068	-3,065	-577	8,690	5,048
Primary	AAC 954.0 KCM 37 STRAND	NVE	54.23	68.34	1.1240	3.87	0.895	235.0	90.0	235.1	3,068	3,065	-892	13,436	15,608
Primary	AAC 954.0 KCM 37 STRAND	NVE	49.65	92.28	1.1240	2.16	0.895	152.0	270.0	152.0	3,068	-2,806	-781	7,957	4,369
Primary	AAC 954.0 KCM 37 STRAND	NVE	49.65	92.28	1.1240	3.87	0.895	235.0	90.0	235.1	3,068	2,806	-1,208	12,302	13,901
Primary	AAC 954.0 KCM 37 STRAND	NVE	49.65	68.38	1.1240	2.16	0.895	152.0	270.0	152.0	3,068	-2,806	-577	7,957	4,573
Primary	AAC 954.0 KCM 37 STRAND	NVE	49.65	68.38	1.1240	3.87	0.895	235.0	90.0	235.1	3,068	2,806	-892	12,302	14,216
Primary	AAC 954.0 KCM 37 STRAND	NVE	44.48	92.31	1.1240	2.16	0.895	152.0	270.0	152.0	3,068	-2,514	-781	7,129	3,834
Primary	AAC 954.0 KCM 37 STRAND	NVE	44.48	92.31	1.1240	3.87	0.895	235.0	90.0	235.1	3,068	2,514	-1,208	11,022	12,329
Primary	AAC 954.0 KCM 37 STRAND	NVE	44.48	68.42	1.1240	2.16	0.895	152.0	270.0	152.0	3,068	-2,514	-577	7,129	4,038
Primary	AAC 954.0 KCM 37 STRAND	NVE	44.48	68.42	1.1240	3.87	0.895	235.0	90.0	235.1	3,068	2,514	-892	11,022	12,644
Neutral	ACSR 2/0 AWG 6/1 QUAIL	NVE	36.83	8.63	0.4470	0.98	0.183	152.0	270.0	152.0	1,355	-919	-15	2,345	1,412
Neutral	ACSR 2/0 AWG 6/1 QUAIL	NVE	36.83	8.63	0.4470	1.92	0.183	235.0	90.0	235.0	1,355	919	-23	3,626	4,521
											Totals:	0	-10,412	127,042	116,630

Comm:		Owner	Height (ft)	Horiz. Offset (in)	Cable Dia. (in)	Sag at Max Temp	Cable Weight (lbs/ft)	Lead/Span Length	Span Angle (deg)	Wire Length (ft)	Tension (lbs)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Overlashed	5/16" EHS	ZFS	28.86	44.45	0.3125	1.19	0.205	152.0	270.0	152.0	1,500	-797	-86	1,589	707
Telco	BELOPTIX DT144 - 144 FIBERS -	ZFS	28.82	44.53	0.7560	-	0.208	152.0	270.0	152.0		0	-87	1,587	1,500
Telco	24ct Fiber	ZFS	28.84	44.39	0.3900	-	0.049	152.0	270.0	152.0		0	-20	1,588	1,568
Overlashed	5/16" EHS	ZFS	28.86	44.45	0.3125	2.70	0.205	235.0	90.0	235.0	1,500	797	-132	2,457	3,122
Telco	BELOPTIX DT144 - 144 FIBERS -	ZFS	28.82	44.53	0.7560	-	0.208	235.0	90.0	235.0		0	-135	2,454	2,320
Telco	24ct Fiber	ZFS	28.84	44.39	0.3900	-	0.049	235.0	90.0	235.0		0	-32	2,455	2,424

Version: 5.0 / 5.00
* includes Load Factor(s)

[2] Worst Wind per Guy Wire
[3] Wind at 1.3°

Overlashed	1/4" EHS	TWT	27.67	45.50	0.2500	0.79	0.121	152.0	270.0	152.0	1,500	-764	-52	2,534	1,717
Telco	BELOPTIX DT144 - 144 FIBERS -	TWT	27.61	45.50	0.7560	-	0.208	152.0	270.0	152.0		0	-90	2,528	2,438
Overlashed	1/4" EHS	TWT	27.67	45.50	0.2500	1.85	0.121	235.0	90.0	235.0	1,500	764	-81	3,917	4,600
Telco	BELOPTIX DT144 - 144 FIBERS -	TWT	27.61	45.50	0.7560	-	0.208	235.0	90.0	235.0		0	-139	3,908	3,769
Overlashed	1/4" EHS	COX	26.50	45.50	0.2500	1.82	0.121	152.0	270.0	152.0	1,500	-732	-52	953	169
Telco	432ct Fiber	COX	26.50	45.27	0.8300	-	0.159	152.0	270.0	152.0		0	-68	953	885
Telco	P3-500CA	COX	26.45	45.35	0.5000	-	0.072	152.0	270.0	152.0		0	-31	951	920
Telco	P3-500CA	COX	26.56	45.34	0.5000	-	0.072	152.0	270.0	152.0		0	-31	955	924
Telco	P3-500CA	COX	26.53	45.49	0.5000	-	0.072	152.0	270.0	152.0		0	-31	954	923
Telco	P3-500CA	COX	26.56	45.65	0.5000	-	0.072	152.0	270.0	152.0		0	-31	955	924
Telco	P3-500CA	COX	26.48	45.49	0.5000	-	0.072	152.0	270.0	152.0		0	-31	952	921
Telco	432ct Fiber	COX	26.50	45.72	0.8300	-	0.159	152.0	270.0	152.0		0	-69	953	884
Overlashed	1/4" EHS	COX	26.50	45.50	0.2500	1.36	0.121	152.0	90.0	152.0	1,500	732	-52	1,310	1,990
Telco	432ct Fiber	COX	26.46	45.48	0.8300	-	0.159	152.0	90.0	152.0		0	-69	1,308	1,239
Telco	P3-500CA	COX	26.51	45.36	0.5000	-	0.072	152.0	90.0	152.0		0	-31	1,310	1,279
Telco	P3-500CA	COX	26.54	45.49	0.5000	-	0.072	152.0	90.0	152.0		0	-31	1,312	1,281
Telco	432ct Fiber	COX	26.51	45.71	0.8300	-	0.159	152.0	90.0	152.0		0	-69	1,310	1,241
Overlashed	1/4" EHS	CTL	25.17	45.50	0.2500	2.28	0.121	152.0	270.0	152.0	1,500	-695	-52	2,728	1,981
Telco	26 GA 400 PR (1.30)	CTL	25.11	45.50	1.3000	-	0.910	152.0	270.0	152.0		0	-393	2,722	2,328
Overlashed	1/4" EHS	CTL	25.17	45.50	0.2500	5.23	0.121	235.0	90.0	235.0	1,500	695	-81	4,218	4,832
Telco	26 GA 400 PR (1.30)	CTL	25.11	45.50	1.3000	-	0.910	235.0	90.0	235.0		0	-608	4,208	3,600
Overlashed	1/4" EHS	CTL	23.86	44.51	0.2500	0.92	0.121	152.0	270.0	152.0	1,500	-659	-50	1,647	938
Telco	26 GA 100 PR (0.74)	CTL	23.82	44.51	0.7400	-	0.270	152.0	270.0	152.0		0	-113	1,645	1,532
Overlashed	1/4" EHS	CTL	23.86	44.51	0.2500	2.16	0.121	235.0	90.0	235.0	1,500	659	-78	2,547	3,128
Telco	26 GA 100 PR (0.74)	CTL	23.82	44.51	0.7400	-	0.270	235.0	90.0	235.0		0	-174	2,543	2,369
											Totals:	0	-3,001	61,455	58,454

PowerEquipment:		Owner	Height (ft)	Horiz. Offset (in)	Offset Angle (deg)	Rotate Angle (deg)	Unit Weight (lbs)	Unit Height (in)	Unit Depth (in)	Unit Diameter (in)	Unit Length (in)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Transformer	1PH-25KVA	NVE	39.08	23.19	270.0	270.0	365.00	39.00	-	22.00	-	-	-12	5,239	5,227
											Totals:	0	-12	5,239	5,227

Crossarm:		Owner	Height (ft)	Horiz. Offset (in)	Offset Angle (deg)	Rotate Angle (deg)	Unit Weight (lbs)	Unit Height (in)	Unit Depth (in)	Unit Diameter (in)	Unit Length (in)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Offset	CROSSARM 3-1/2 X 4-1/2 X 8	NVE	53.08	6.80	90.0	90.0	53.00	4.50	3.50	-	96.00	-	-246	210	-35
Offset	CROSSARM 3-1/2 X 4-1/2 X 8	NVE	48.50	7.17	90.0	90.0	53.00	4.50	3.50	-	96.00	-	-246	192	-53
Offset	CROSSARM 3-1/2 X 4-1/2 X 8	NVE	43.33	7.60	90.0	90.0	53.00	4.50	3.50	-	96.00	-	-246	172	-74
Offset	CROSSARM 3-1/2 X 4-1/2 X 4	ZFS	28.67	8.80	90.0	90.0	28.00	4.50	3.50	-	48.00	-	-65	113	49
Pole	Offset 5ft	TWT	26.17	45.00	180.0	180.0	28.00	60.00	3.50	-	4.50	-	-157	1,766	1,609
Offset	CROSSARM 3-1/2 X 4-1/2 X 4	CTL	23.67	9.20	90.0	90.0	28.00	4.50	3.50	-	48.00	-	-65	93	29
											Totals:	0	-1,024	2,547	1,523

Riser:		Owner	Height (ft)	Horiz. Offset (in)	Offset Angle (deg)	Rotate Angle (deg)	Unit Weight (lbs)	Unit Height (in)	Unit Depth (in)	Unit Diameter (in)	Unit Length (in)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Riser 0.0°	Riser	NVE	35.58	10.19	0.0	0.0	1.11	426.96	-	0.00	-	-	11	69	80
Riser 90.0°	Riser	COX	23.08	10.19	90.0	90.0	2.89	276.96	-	0.00	-	-	0	1,997	1,997

											Totals:	0	11	2,066	2,077

Insulator:		Owner	Height (ft)	Horiz. Offset (in)	Offset Angle (deg)	Rotate Angle (deg)	Unit Weight (lbs)	Unit Height (in)	Unit Depth (in)	Unit Diameter (in)	Unit Length (in)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Post	Post Insulator - 15 kV	NVE	53.27	92.00	175.8	0.0	11.00	11.50	-	4.75	-	-	-126	457	331
Post	Post Insulator - 15 kV	NVE	53.27	68.00	174.3	0.0	11.00	11.50	-	4.75	-	-	-93	457	364
Post	Post Insulator - 15 kV	NVE	48.69	92.00	175.5	0.0	11.00	11.50	-	4.75	-	-	-126	418	292
Post	Post Insulator - 15 kV	NVE	48.69	68.00	174.0	0.0	11.00	11.50	-	4.75	-	-	-93	418	325
Post	Post Insulator - 15 kV	NVE	43.52	92.00	175.3	0.0	11.00	11.50	-	4.75	-	-	-126	374	248
Post	Post Insulator - 15 kV	NVE	43.52	68.00	173.6	0.0	11.00	11.50	-	4.75	-	-	-93	374	281
Spool	Spool Insulator - 20 kV	NVE	36.83	6.38	180.0	180.0	1.00	2.12	-	2.50	-	-	-1	30	29
Bolt	Three Bolt	ZFS	28.86	44.00	168.7	180.0	5.00	0.00	-	3.00	-	-	-27	0	-27
Bolt	Three Bolt	TWT	27.67	-48.00	180.0	180.0	5.00	0.00	-	3.00	-	-	-28	0	-28
Bolt	Three Bolt	COX	26.50	-48.00	180.0	180.0	5.00	0.00	-	3.00	-	-	-28	0	-28
Bolt	Three Bolt	CTL	25.17	-48.00	180.0	180.0	5.00	0.00	-	3.00	-	-	-28	0	-28
Bolt	Three Bolt	CTL	23.86	44.00	168.2	180.0	5.00	0.00	-	3.00	-	-	-27	0	-27
											Totals:	0	-801	2,529	1,728

Guy Wire and Brace:		Owner	Attach Height (ft)	End Height (ft)	Lead/Span Length (ft)	Wire Dia. (in)	Percent Solid (%)	Lead Angle (deg)	Incline Angle (deg)	Wire Weight (lbs/ft)	Rest Length (ft)	Stretch Length (in)
Guy 1: EHS 7/16	Sidewalk	NVE	50.00	0.00	5.47	0.438	75.0	0.0	71.1	0.399	50.70	0.00

Guy Wire and Brace (Loads and Reactions)		Elastic Modulus (psi)	Rated Tensile Strength (lbs)	Guy Strength Factor	Allowable Tension (lbs)	Initial Tension (lbs)	Required Tension[2] (lbs)	Required Tension[3] (lbs)	Applied Tension[3] (lbs)	Vertical Load[3] (lbs)	Shear Load In Guy Dir[3] (lbs)	Shear Load at Report Angle[3] (lbs)	Moment at GL[3] (ft-lb)*
Guy 1: EHS 7/16	Sidewalk	23,000,000	20,800	0.90	18,720	700	24,361	14,764	0	0	0	0	6
									Totals:	0	0	0	6

Anchor/Rod Load Summary:	Owner	Rod Length AGL (in)	Lead Length (ft)	Lead Angle (deg)	Strength of Assembly (lbs)	Anchor/Rod Strength Factor	Allowable Load (lbs)	Max Load[2] (lbs)	Load at Pole MCU[3] (lbs)	Max Required Capacity[2] (%)
Single - 12" - Soil Class 4	NVE	0.00	5.47	0.0	25,000	1.00	25,000	14,764	0	59.1

Pole Buckling

Buckling [illegible]	Buckling [illegible] (ft)	Buckling Section [illegible] (% Buckling Col. Hgt.)	Buckling [illegible] (in)	Min. Buckling [illegible] (in)	Diameter [illegible] (in)	Diameter [illegible] (in)	Modulus of [illegible] (psi)	Pole [illegible] (pcf)	Ice Density (pcf)	Pole Tip [illegible] (ft)	Buckling Load [illegible] (lbs)	Buckling Load [illegible] (lbs)	Buckling Load [illegible]
0.71	31.83	34.27	17.38	18.97	9.87	19.27	1,000,000	50.00	57.00	54.50	393,689	8,449	46.59

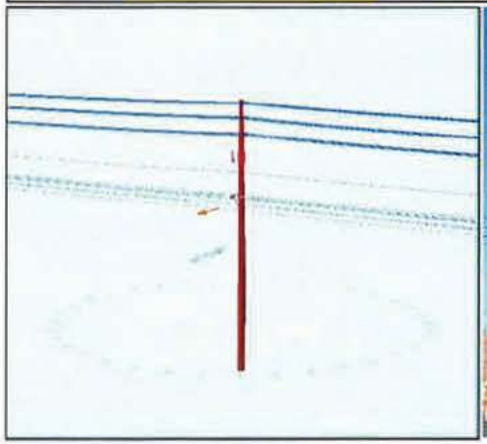
Version: 5 0 / 5.00
* includes Load Factor(s)

[2] Worst Wind per Guy Wire
[3] Wind at 1.3°

O-Calc® Pro *Analysis Report*

Thursday, October 02, 2014 4:21:49 PM

File Name:	29 - p82120 Propos	Pole Length / Class:	55 / H2	Code:	NESC	Structure Type:	Unguyed
Pole Num:	29 - p82120	Pole Species:	WESTERN RED CEDAR	NESC Rule:	Rule 250B	Status:	N/A
Permit #:	Unset	Setting Depth (ft):	9.92	Construction Grade:	B	Pole Strength Factor:	0.65
Owner:	Unset	G/L Circumference (in):	53.00	Loading District:	Light	Transverse Wind LF:	2.50
Latitude:	Unset	G/L Fiber Stress (psi):	6,000	Ice Thickness (in):	0.00	Wire Tension LF:	1.10
Longitude:	Unset	Allowable Stress (psi):	3,900	Wind Speed (mph):	59.29	Vertical LF:	1.50
Emp #:	Unset	Fiber Stress Ht. Reduction:	No	Wind Pressure (psf):	9.00		



Pole Capacity Utilization		Height	Wind Angle
Maximum:	116.2%	0.0 ft	178.6°
Groundline:	116.2%	0.0 ft	178.6°
Vertical:	15.0%	27.6 ft	178.6°

Pole Moments		Load Angle	Wind Angle
Max Capac. Util:	176,902 ft-lb	179.8°	178.6°
Groundline:	176,902 ft-lb	179.8°	178.6°

GROUNDLINE LOAD SUMMARY:*Wind at 178.6°, Applied Moment 176,902 ft-lb at 179.8°, Allowable Moment 153,201 ft-lb

	Shear Load (lbs)*	Percent Applied Load	Bending Moment (ft-lb)	Percent of Applied Moment	Percent of Pole Capacity	Bending Stress (+/- psi)	Vertical Load (lbs)	Vertical Stress (psi)	Total Stress (psi)	Percent of Pole Capacity
Powers:	2,291	40.5	93,609	53.2	61.1	2,383	1,415	6	2,389	61.3
Comms:	2,031	35.9	52,865	30.1	34.5	1,346	713	3	1,349	34.6
Power Equipment:	49	0.9	1,938	1.1	1.3	49	248	1	50	1.3
Pole:	1,130	20.0	23,242	13.2	15.2	592	3,371	15	607	15.6
Crossarms:	4	0.1	163	0.1	0.1	4	84	0	5	0.1
Risers:	97	1.7	1,799	1.0	1.2	46	122	1	46	1.2
Insulators:	52	0.9	2,242	1.3	1.5	57	138	1	58	1.5
Pole Load:	5,655	100.0	175,859	100.0	114.8	4,477	6,091	27	4,504	115.5
Pole Reserve Capacity:			-22,658		-14.8	-577			-604	-15.5

LOAD SUMMARY BY OWNER

NVE:	3,619	122,762	3,125	5,256	24	3,149	80.7
ZFS:	374	10,500	267	167	1	268	6.9
TWT:	315	8,658	220	91	0	221	5.7
COX:	553	14,516	370	198	1	370	9.5
CTL:	794	19,424	494	378	2	496	12.7
Totals	5,655	175,859	4,477	6,091	27	4,504	115.5

Detailed Load Components

Power:		Owner	Height (ft)	Horiz. Offset (in)	Cable Dia. (in)	Sag at Max Temp	Cable Weight (lbs/ft)	Lead/Span Length	Span Angle (deg)	Wire Length (ft)	Tension (lbs)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Primary	AAC 954.0 KCM 37 STRAND	NVE	44.50	12.53	1.1240	2.00	0.895	143.0	270.0	143.0	3,068	-650	-92	6,711	5,969
Primary	AAC 954.0 KCM 37 STRAND	NVE	44.50	12.53	1.1240	3.04	0.895	197.0	90.0	197.0	3,068	650	-126	9,245	9,768
Primary	AAC 954.0 KCM 37 STRAND	NVE	44.50	12.53	1.1240	2.00	0.895	143.0	270.0	143.0	3,068	-650	92	6,711	6,152
Primary	AAC 954.0 KCM 37 STRAND	NVE	44.50	12.53	1.1240	3.04	0.895	197.0	90.0	197.0	3,068	650	127	9,245	10,022
Primary	AAC 954.0 KCM 37 STRAND	NVE	41.58	12.64	1.1240	2.00	0.895	143.0	270.0	143.0	3,068	-608	-92	6,271	5,571
Primary	AAC 954.0 KCM 37 STRAND	NVE	41.58	12.64	1.1240	3.04	0.895	197.0	90.0	197.0	3,068	608	-126	8,639	9,120
Primary	AAC 954.0 KCM 37 STRAND	NVE	41.58	12.64	1.1240	2.00	0.895	143.0	270.0	143.0	3,068	-608	92	6,271	5,755
Primary	AAC 954.0 KCM 37 STRAND	NVE	41.58	12.64	1.1240	3.04	0.895	197.0	90.0	197.0	3,068	608	127	8,639	9,373
Primary	AAC 954.0 KCM 37 STRAND	NVE	38.42	12.75	1.1240	2.00	0.895	143.0	270.0	143.0	3,068	-561	-92	5,795	5,141
Primary	AAC 954.0 KCM 37 STRAND	NVE	38.42	12.75	1.1240	3.04	0.895	197.0	90.0	197.0	3,068	561	-126	7,983	8,418
Primary	AAC 954.0 KCM 37 STRAND	NVE	38.42	12.75	1.1240	2.00	0.895	143.0	270.0	143.0	3,068	-561	92	5,795	5,325
Primary	AAC 954.0 KCM 37 STRAND	NVE	38.42	12.75	1.1240	3.04	0.895	197.0	90.0	197.0	3,068	561	127	7,983	8,671
Neutral	ACSR 2/0 AWG 6/1 QUAIL	NVE	30.58	8.43	0.4470	0.89	0.183	143.0	270.0	143.0	1,355	-197	-14	1,832	1,621
Neutral	ACSR 2/0 AWG 6/1 QUAIL	NVE	30.58	8.43	0.4470	1.46	0.183	197.0	90.0	197.0	1,355	197	-19	2,524	2,702
											Totals:	0	-30	93,639	93,609

Comm:		Owner	Height (ft)	Horiz. Offset (in)	Cable Dia. (in)	Sag at Max Temp	Cable Weight (lbs/ft)	Lead/Span Length	Span Angle (deg)	Wire Length (ft)	Tension (lbs)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Overlashed	5/16" EHS	ZFS	26.77	44.06	0.3125	1.06	0.205	143.0	270.0	143.0	1,500	-191	81	1,387	1,277
Telco	BELOPTIX DT144 - 144 FIBERS -	ZFS	26.73	44.21	0.7560	-	0.208	143.0	270.0	143.0		0	82	1,385	1,467
Telco	24ct Fiber	ZFS	26.75	43.97	0.3900	-	0.049	143.0	270.0	143.0		0	19	1,386	1,405
Overlashed	5/16" EHS	ZFS	26.77	44.06	0.3125	1.95	0.205	197.0	90.0	197.0	1,500	191	111	1,911	2,213
Telco	BELOPTIX DT144 - 144 FIBERS -	ZFS	26.73	44.21	0.7560	-	0.208	197.0	90.0	197.0		0	113	1,908	2,021
Telco	24ct Fiber	ZFS	26.75	43.97	0.3900	-	0.049	197.0	90.0	197.0		0	26	1,909	1,936
Overlashed	1/4" EHS	TWT	26.77	30.09	0.2500	0.70	0.121	143.0	270.0	143.0	1,500	-191	32	1,774	1,615
Telco	BELOPTIX DT144 - 144 FIBERS -	TWT	26.73	30.09	0.7560	-	0.208	143.0	270.0	143.0		0	56	1,771	1,827
Overlashed	1/4" EHS	TWT	26.77	30.09	0.2500	1.31	0.121	197.0	90.0	197.0	1,500	191	45	2,444	2,679
Telco	BELOPTIX DT144 - 144 FIBERS -	TWT	26.73	30.09	0.7560	-	0.208	197.0	90.0	197.0		0	77	2,440	2,517
Overlashed	1/4" EHS	COX	25.83	17.61	0.2500	1.21	0.121	143.0	270.0	143.0	1,500	-184	19	1,201	1,036
Telco	432ct Fiber	COX	25.78	17.59	0.8300	-	0.159	143.0	270.0	143.0		0	25	1,199	1,224
Telco	P3-500CA	COX	25.83	17.42	0.5000	-	0.072	143.0	270.0	143.0		0	11	1,201	1,212
Telco	P3-500CA	COX	25.86	17.60	0.5000	-	0.072	143.0	270.0	143.0		0	11	1,203	1,214
Telco	432ct Fiber	COX	25.83	17.89	0.8300	-	0.159	143.0	270.0	143.0		0	25	1,201	1,226
Overlashed	1/4" EHS	COX	25.83	17.61	0.2500	2.25	0.121	197.0	90.0	197.0	1,500	184	26	1,655	1,865
Telco	432ct Fiber	COX	25.78	17.59	0.8300	-	0.159	197.0	90.0	197.0		0	34	1,652	1,686

Version: 5.0 / 5.00
* includes Load Factor(s)

² Worst Wind per Guy Wire
³ Wind at 178.6°

Telco	P3-500CA	COX	25.83	17.42	0.5000	-	0.072	197.0	90.0	197.0		0	15	1,655	1,670
Telco	P3-500CA	COX	25.86	17.60	0.5000	-	0.072	197.0	90.0	197.0		0	15	1,657	1,672
Telco	432ct Fiber	COX	25.83	17.89	0.8300	-	0.159	197.0	90.0	197.0		0	35	1,655	1,690
Overlashed	1/4" EHS	CTL	24.58	9.20	0.2500	2.03	0.121	143.0	270.0	143.0	1,500	-175	10	2,507	2,341
Telco	26 GA 400 PR (1.30)	CTL	24.52	9.20	1.3000	-	0.910	143.0	270.0	143.0		0	75	2,500	2,575
Overlashed	1/4" EHS	CTL	24.58	9.20	0.2500	3.74	0.121	197.0	90.0	197.0	1,500	175	14	3,453	3,642
Telco	26 GA 400 PR (1.30)	CTL	24.52	9.20	1.3000	-	0.910	197.0	90.0	197.0		0	103	3,445	3,548
Overlashed	1/4" EHS	CTL	23.42	9.30	0.2500	0.82	0.121	143.0	270.0	143.0	1,500	-167	10	1,521	1,364
Telco	26 GA 100 PR (0.74)	CTL	23.38	9.30	0.7400	-	0.270	143.0	270.0	143.0		0	22	1,519	1,541
Overlashed	1/4" EHS	CTL	23.42	9.30	0.2500	1.54	0.121	197.0	90.0	197.0	1,500	167	14	2,096	2,277
Telco	26 GA 100 PR (0.74)	CTL	23.38	9.30	0.7400	-	0.270	197.0	90.0	197.0		0	31	2,093	2,123
											Totals:	0	1,137	51,728	52,865

PowerEquipment:		Owner	Height (ft)	Horiz. Offset (in)	Offset Angle (deg)	Rotate Angle (deg)	Unit Weight (lbs)	Unit Height (in)	Unit Depth (in)	Unit Diameter (in)	Unit Length (in)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Switch	3Ø Disconnect Switch	NVE	33.92	13.89	180.0	180.0	55.00	26.00	-	4.00	-	-	285	1,653	1,938
											Totals:	0	285	1,653	1,938

Crossarm:		Owner	Height (ft)	Horiz. Offset (in)	Offset Angle (deg)	Rotate Angle (deg)	Unit Weight (lbs)	Unit Height (in)	Unit Depth (in)	Unit Diameter (in)	Unit Length (in)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Offset	CROSSARM 3-1/2 X 4-1/2 X 4	ZFS	26.58	0.12	90.0	90.0	28.00	4.50	3.50	-	36.00	-	49	105	154
Standoff	CROSSARM 3-1/2 X 4-1/2 X 1	COX	25.83	7.18	90.0	90.0	28.00	4.50	-	0.00	-	-	0	9	9
											Totals:	0	49	114	163

Riser:		Owner	Height (ft)	Horiz. Offset (in)	Offset Angle (deg)	Rotate Angle (deg)	Unit Weight (lbs)	Unit Height (in)	Unit Depth (in)	Unit Diameter (in)	Unit Length (in)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Riser 20.0"	Riser	NVE	28.50	8.90	20.0	20.0	6.77	342.00	-	0.00	-	-	-54	1,852	1,799
											Totals:	0	-54	1,852	1,799

Insulator:		Owner	Height (ft)	Horiz. Offset (in)	Offset Angle (deg)	Rotate Angle (deg)	Unit Weight (lbs)	Unit Height (in)	Unit Depth (in)	Unit Diameter (in)	Unit Length (in)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Post	Post Insulator - 15 kV	NVE	44.50	4.98	90.0	90.0	11.00	11.50	-	4.75	-	-	-16	384	368
Post	Post Insulator - 15 kV	NVE	44.50	4.98	90.0	90.0	11.00	11.50	-	4.75	-	-	16	384	400
Post	Post Insulator - 15 kV	NVE	41.58	5.24	90.0	90.0	11.00	11.50	-	4.75	-	-	-16	359	343
Post	Post Insulator - 15 kV	NVE	41.58	5.24	90.0	90.0	11.00	11.50	-	4.75	-	-	16	359	375
Post	Post Insulator - 15 kV	NVE	38.42	5.51	90.0	90.0	11.00	11.50	-	4.75	-	-	-16	332	316
Post	Post Insulator - 15 kV	NVE	38.42	5.51	90.0	90.0	11.00	11.50	-	4.75	-	-	16	332	348
Spool	Spool Insulator - 20 kV	NVE	30.58	6.18	0.0	0.0	1.00	2.12	-	2.50	-	-	-1	25	24
Bolt	Three Bolt	ZFS	26.77	44.00	179.8	180.0	5.00	0.00	-	3.00	-	-	27	0	27
Bolt	Three Bolt	TWT	26.77	30.00	179.8	180.0	5.00	0.00	-	3.00	-	-	19	0	19
Bolt	Three Bolt	COX	25.83	0.00	180.0	180.0	5.00	0.00	-	3.00	-	-	11	0	11
Bolt	Three Bolt	CTL	24.58	6.70	180.0	180.0	5.00	0.00	-	3.00	-	-	6	0	6
Bolt	Three Bolt	CTL	23.42	6.80	180.0	180.0	5.00	0.00	-	3.00	-	-	6	0	6
											Totals:	0	68	2,175	2,242

Version: 5.0 / 5.00
* includes Load Factor(s)

² Worst Wind per Guy Wire
³ Wind at 178.6°

Pole Buckling

Buckling	Buckling (ft)	Buckling Section (% Buckling Col. Hgt.)	Buckling (in)	Min. Buckling (in)	Diameter (in)	Diameter (in)	Modulus of (psi)	Pole (pcf)	Ice Density (pcf)	Pole Tip (ft)	Buckling Load (lbs)	Buckling Load (lbs)	Buckling Load
2.00	27.59	33.61	15.42	25.14	9.87	16.86	1,000,000	50.00	57.00	45.08	40,628	6,091	6.67

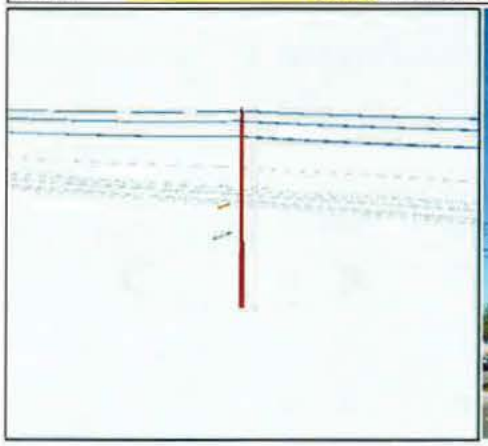
Version: 5.0 / 5.00
* Includes Load Factor(s)

Worst Wind per Guy Wire
Wind at 178.6"

O-Calc® Pro *Analysis Report*

Thursday, October 02, 2014 4:50:31 PM

File Name:	30 - p98621 Propos	Pole Length / Class:	65 / H2	Code:	NESC	Structure Type:	Unguyed
Pole Num:	30 - p98621	Pole Species:	WESTERN RED CEDAR	NESC Rule:	Rule 250B	Status:	N/A
Permit #:	Unset	Setting Depth (ft):	10.58	Construction Grade:	B	Pole Strength Factor:	0.65
Owner:	Unset	G/L Circumference (in):	61.00	Loading District:	Light	Transverse Wind LF:	2.50
Latitude:	Unset	G/L Fiber Stress (psi):	6,000	Ice Thickness (in):	0.00	Wire Tension LF:	1.10
Longitude:	Unset	Allowable Stress (psi):	3,900	Wind Speed (mph):	59.29	Vertical LF:	1.50
Emp #:	Unset	Fiber Stress Ht. Reduction:	No	Wind Pressure (psf):	9.00		



Pole Capacity Utilization		Height	Wind Angle
Maximum:	90.6%	0.0 ft	180.0°
Groundline:	90.6%	0.0 ft	180.0°
Vertical:	12.3%	30.0 ft	180.0°

Pole Moments		Load Angle	Wind Angle
Max Capac. Util:	210,170 ft-lb	180.0°	180.0°
Groundline:	210,170 ft-lb	180.0°	180.0°

GROUNDLINE LOAD SUMMARY:*Wind at 180.0°, Applied Moment 210,170 ft-lb at 180.0°, Allowable Moment 233,573 ft-lb

	Shear Load (lbs)*	Percent Applied Load	Bending Moment (ft-lb)	Percent of Applied Moment	Percent of Pole Capacity	Bending Stress (+/- psi)	Vertical Load (lbs)	Vertical Stress (psi)	Total Stress (psi)	Percent of Pole Capacity
Powers:	2,252	37.7	110,111	52.9	47.1	1,839	1,390	5	1,843	47.3
Comms:	2,174	36.4	59,010	28.4	25.3	985	700	2	988	25.3
Pole:	1,494	25.0	36,235	17.4	15.5	605	4,942	17	622	15.9
Crossarms:	0	0.0	10	0.0	0.0	0	42	0	0	0.0
Insulators:	52	0.9	2,637	1.3	1.1	44	138	0	44	1.1
Pole Load:	5,972	100.0	208,001	100.0	89.1	3,473	7,212	24	3,497	89.7
Pole Reserve Capacity:			25,572		10.9	427			403	10.3

LOAD SUMMARY BY OWNER

NVE:	3,798	148,946	2,487	6,433	22	2,509	64.3
ZFS:	363	10,897	182	123	0	182	4.7

Version: 5.0 / 5.00
* includes Load Factor(s)

² Worst Wind per Guy Wire
³ Wind at 180.0°

TWT:	310	8,945	149	90	0	150	3.8
COX:	544	15,183	254	196	1	254	6.5
CTL:	958	24,031	401	371	1	402	10.3
Totals	5,972	208,001	3,473	7,212	24	3,497	89.7

Detailed Load Components

Power:		Owner	Height (ft)	Horiz. Offset (in)	Cable Dia. (in)	Sag at Max Temp	Cable Weight (lbs/ft)	Lead/Span Length	Span Angle (deg)	Wire Length (ft)	Tension (lbs)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Primary	AAC 954.0 KCM 37 STRAND	NVE	53.42	12.55	1.1240	2.91	0.895	191.0	270.0	191.0	3,068	71	-123	10,761	10,710
Primary	AAC 954.0 KCM 37 STRAND	NVE	53.42	12.55	1.1240	2.00	0.895	143.0	90.0	143.0	3,068	-71	-92	8,057	7,893
Primary	AAC 954.0 KCM 37 STRAND	NVE	53.42	12.55	1.1240	2.91	0.895	191.0	270.0	191.0	3,068	71	123	10,761	10,955
Primary	AAC 954.0 KCM 37 STRAND	NVE	53.42	12.55	1.1240	2.00	0.895	143.0	90.0	143.0	3,068	-71	92	8,057	8,077
Primary	AAC 954.0 KCM 37 STRAND	NVE	50.42	12.65	1.1240	2.91	0.895	191.0	270.0	191.0	3,068	67	-123	10,157	10,102
Primary	AAC 954.0 KCM 37 STRAND	NVE	50.42	12.65	1.1240	2.00	0.895	143.0	90.0	143.0	3,068	-67	-92	7,605	7,445
Primary	AAC 954.0 KCM 37 STRAND	NVE	50.42	12.65	1.1240	2.91	0.895	191.0	270.0	191.0	3,068	67	123	10,157	10,347
Primary	AAC 954.0 KCM 37 STRAND	NVE	50.42	12.65	1.1240	2.00	0.895	143.0	90.0	143.0	3,068	-67	92	7,605	7,629
Primary	AAC 954.0 KCM 37 STRAND	NVE	45.42	12.82	1.1240	2.91	0.895	191.0	270.0	191.0	3,068	61	-123	9,151	9,089
Primary	AAC 954.0 KCM 37 STRAND	NVE	45.42	12.82	1.1240	2.00	0.895	143.0	90.0	143.0	3,068	-61	-92	6,851	6,699
Primary	AAC 954.0 KCM 37 STRAND	NVE	45.42	12.82	1.1240	2.91	0.895	191.0	270.0	191.0	3,068	61	123	9,151	9,334
Primary	AAC 954.0 KCM 37 STRAND	NVE	45.42	12.82	1.1240	2.00	0.895	143.0	90.0	143.0	3,068	-61	92	6,851	6,883
Neutral	ACSR 2/0 AWG 6/1 QUAIL	NVE	35.58	8.73	0.4470	1.38	0.183	191.0	270.0	191.0	1,355	21	-19	2,848	2,850
Neutral	ACSR 2/0 AWG 6/1 QUAIL	NVE	35.58	8.73	0.4470	0.88	0.183	143.0	90.0	143.0	1,355	-21	-14	2,132	2,097
											Totals:	0	-33	110,144	110,111

Comm:		Owner	Height (ft)	Horiz. Offset (in)	Cable Dia. (in)	Sag at Max Temp	Cable Weight (lbs/ft)	Lead/Span Length	Span Angle (deg)	Wire Length (ft)	Tension (lbs)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Overlashed	5/16" EHS	ZFS	29.75	9.60	0.3125	1.81	0.205	191.0	270.0	191.0	1,500	19	23	2,060	2,102
Telco	BELOPTIX DT144 - 144 FIBERS -	ZFS	29.72	9.73	0.7560	-	0.208	191.0	270.0	191.0		0	24	2,057	2,081
Telco	24ct Fiber	ZFS	29.73	9.52	0.3900	-	0.049	191.0	270.0	191.0		0	6	2,058	2,064
Overlashed	5/16" EHS	ZFS	29.75	9.60	0.3125	1.04	0.205	143.0	90.0	143.0	1,500	-19	18	1,542	1,540
Telco	BELOPTIX DT144 - 144 FIBERS -	ZFS	29.72	9.73	0.7560	-	0.208	143.0	90.0	143.0		0	18	1,540	1,558
Telco	24ct Fiber	ZFS	29.73	9.52	0.3900	-	0.049	143.0	90.0	143.0		0	4	1,541	1,545
Overlashed	1/4" EHS	TWT	28.67	9.69	0.2500	1.20	0.121	191.0	270.0	191.0	1,500	19	14	2,539	2,571
Telco	BELOPTIX DT144 - 144 FIBERS -	TWT	28.63	9.69	0.7560	-	0.208	191.0	270.0	191.0		0	24	2,535	2,559
Overlashed	1/4" EHS	TWT	28.67	9.69	0.2500	0.68	0.121	143.0	90.0	143.0	1,500	-19	10	1,901	1,892
Telco	BELOPTIX DT144 - 144 FIBERS -	TWT	28.63	9.69	0.7560	-	0.208	143.0	90.0	143.0		0	18	1,898	1,916
Overlashed	1/4" EHS	COX	27.50	18.47	0.2500	2.07	0.121	191.0	270.0	191.0	1,500	18	26	1,709	1,753
Telco	432ct Fiber	COX	27.45	18.45	0.8300	-	0.159	191.0	270.0	191.0		0	35	1,706	1,741
Telco	P3-500CA	COX	27.50	18.28	0.5000	-	0.072	191.0	270.0	191.0		0	16	1,709	1,724
Telco	P3-500CA	COX	27.53	18.46	0.5000	-	0.072	191.0	270.0	191.0		0	16	1,711	1,726
Telco	432ct Fiber	COX	27.50	18.75	0.8300	-	0.159	191.0	270.0	191.0		0	35	1,709	1,744
Overlashed	1/4" EHS	COX	27.50	18.47	0.2500	1.18	0.121	143.0	90.0	143.0	1,500	-18	20	1,279	1,281
Telco	432ct Fiber	COX	27.45	18.45	0.8300	-	0.159	143.0	90.0	143.0		0	26	1,277	1,303
Telco	P3-500CA	COX	27.50	18.28	0.5000	-	0.072	143.0	90.0	143.0		0	12	1,279	1,291
Telco	P3-500CA	COX	27.53	18.46	0.5000	-	0.072	143.0	90.0	143.0		0	12	1,281	1,293

Telco	432ct Fiber	COX	27.50	18.75	0.8300	-	0.159	143.0	90.0	143.0		0	26	1,279	1,306
Overlashed	1/4" EHS	CTL	25.17	10.00	0.2500	3.50	0.121	191.0	270.0	191.0	1,500	16	14	4,711	4,742
Telco	26 GA 400 PR (1.30)	CTL	25.06	10.00	1.3000	-	0.910	191.0	270.0	191.0		0	109	4,691	4,799
Overlashed	1/4" EHS	CTL	25.17	10.00	0.2500	2.01	0.121	143.0	90.0	143.0	1,500	-16	11	3,527	3,521
Telco	26 GA 400 PR (1.30)	CTL	25.06	10.00	1.3000	-	0.910	143.0	90.0	143.0		0	81	3,512	3,593
Overlashed	1/4" EHS	CTL	24.00	10.10	0.2500	1.42	0.121	191.0	270.0	191.0	1,500	16	15	2,083	2,113
Telco	26 GA 100 PR (0.74)	CTL	23.96	10.10	0.7400	-	0.270	191.0	270.0	191.0		0	33	2,080	2,112
Overlashed	1/4" EHS	CTL	24.00	10.10	0.2500	0.80	0.121	143.0	90.0	143.0	1,500	-16	11	1,560	1,555
Telco	26 GA 100 PR (0.74)	CTL	23.96	10.10	0.7400	-	0.270	143.0	90.0	143.0		0	24	1,557	1,582
											Totals:	0	680	58,329	59,010

Crossarm:		Owner	Height (ft)	Horiz. Offset (in)	Offset Angle (deg)	Rotate Angle (deg)	Unit Weight (lbs)	Unit Height (in)	Unit Depth (in)	Unit Diameter (in)	Unit Length (in)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Standoff	12" Fiber Arm	COX	27.50	8.05	90.0	90.0	28.00	4.50	-	0.00	-	-	0	10	10
											Totals:	0	0	10	10

Insulator:		Owner	Height (ft)	Horiz. Offset (in)	Offset Angle (deg)	Rotate Angle (deg)	Unit Weight (lbs)	Unit Height (in)	Unit Depth (in)	Unit Diameter (in)	Unit Length (in)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Post	Post Insulator - 15 kV	NVE	53.42	5.02	270.0	270.0	11.00	11.50	-	4.75	-	-	-16	460	444
Post	Post Insulator - 15 kV	NVE	53.42	5.02	270.0	270.0	11.00	11.50	-	4.75	-	-	16	460	476
Post	Post Insulator - 15 kV	NVE	50.42	5.26	270.0	270.0	11.00	11.50	-	4.75	-	-	-16	434	419
Post	Post Insulator - 15 kV	NVE	50.42	5.26	270.0	270.0	11.00	11.50	-	4.75	-	-	16	434	450
Post	Post Insulator - 15 kV	NVE	45.42	5.67	270.0	270.0	11.00	11.50	-	4.75	-	-	-16	392	376
Post	Post Insulator - 15 kV	NVE	45.42	5.67	270.0	270.0	11.00	11.50	-	4.75	-	-	16	392	408
Spool	Spool Insulator - 20 kV	NVE	35.58	6.46	0.0	0.0	1.00	2.12	-	2.50	-	-	-1	29	28
Bolt	Three Bolt	ZFS	29.75	7.10	180.0	180.0	5.00	0.00	-	3.00	-	-	6	0	6
Bolt	Three Bolt	TWT	28.67	7.19	180.0	180.0	5.00	0.00	-	3.00	-	-	6	0	6
Bolt	Three Bolt	COX	27.50	5.48	180.0	180.0	5.00	0.00	-	3.00	-	-	11	0	11
Bolt	Three Bolt	CTL	25.17	7.50	180.0	180.0	5.00	0.00	-	3.00	-	-	6	0	6
Bolt	Three Bolt	CTL	24.00	7.60	180.0	180.0	5.00	0.00	-	3.00	-	-	6	0	6
											Totals:	0	35	2,602	2,637

Pole Buckling

Buckling [illegible]	Buckling [illegible] (ft)	Buckling Section [illegible] (% Buckling Col. Hgt.)	Buckling [illegible] (in)	Min. Buckling [illegible] (in)	Diameter [illegible] (in)	Diameter [illegible] (in)	Modulus of [illegible] (psi)	Pole [illegible] (pcf)	Ice Density (pcf)	Pole Tip [illegible] (ft)	Buckling Load [illegible] (lbs)	Buckling Load [illegible] (lbs)	Buckling Load [illegible]
2.00	30.02	34.07	17.62	28.88	9.87	19.43	1,000,000	50.00	57.00	54.42	58,483	7,212	8.11

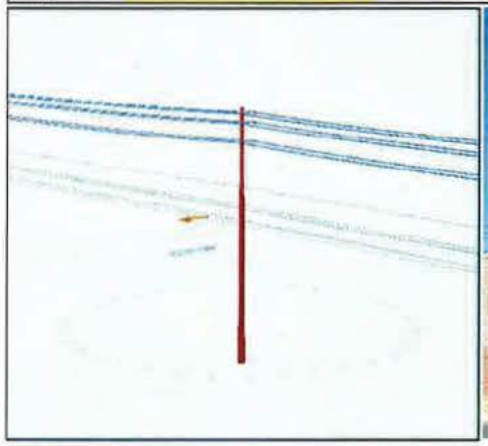
Version: 5.0 / 5.00
* includes Load Factor(s)

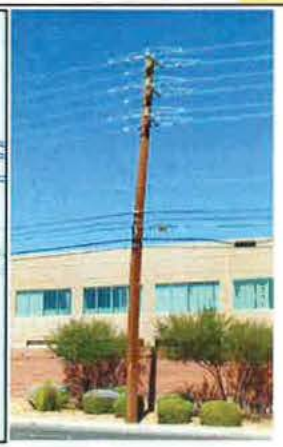
² Worst Wind per Guy Wire
³ Wind at 180.0°

O-Calc® Pro *Analysis Report*

Thursday, October 02, 2014 5:29:24 PM

File Name:	31 - p22425 Propos	Pole Length / Class:	55 / 1	Code:	NESC	Structure Type:	Unguyed
Pole Num:	31 - p22425	Pole Species:	PONDEROSA PINE	NESC Rule:	Rule 250B	Status:	N/A
Permit #:	Unset	Setting Depth (ft):	8.17	Construction Grade:	B	Pole Strength Factor:	0.65
Owner:	Unset	G/L Circumference (in):	51.00	Loading District:	Light	Transverse Wind LF:	2.50
Latitude:	Unset	G/L Fiber Stress (psi):	6,600	Ice Thickness (in):	0.00	Wire Tension LF:	1.10
Longitude:	Unset	Allowable Stress (psi):	4,290	Wind Speed (mph):	59.29	Vertical LF:	1.50
Emp #:	Unset	Fiber Stress Ht. Reduction:	No	Wind Pressure (psf):	9.00		





Pole Capacity Utilization		Height	Wind Angle
Maximum:	127.9%	0.0 ft	180.7°
Groundline:	127.9%	0.0 ft	180.7°
Vertical:	19.2%	29.1 ft	180.7°

Pole Moments		Load Angle	Wind Angle
Max Capac. Util:	191,088 ft-lb	179.9°	180.7°
Groundline:	191,088 ft-lb	179.9°	180.7°

GROUNDLINE LOAD SUMMARY:*Wind at 180.7°, Applied Moment 191,088 ft-lb at 179.9°, Allowable Moment 150,154 ft-lb

	Shear Load (lbs)*	Percent Applied Load	Bending Moment (ft-lb)	Percent of Applied Moment	Percent of Pole Capacity	Bending Stress (+/- psi)	Vertical Load (lbs)	Vertical Stress (psi)	Total Stress (psi)	Percent of Pole Capacity
Powers:	2,508	42.1	106,013	55.8	70.6	3,029	1,548	7	3,036	70.8
Comms:	2,235	37.5	56,210	29.6	37.4	1,606	788	4	1,610	37.5
Pole:	1,090	18.3	22,903	12.1	15.3	654	3,045	15	669	15.6
Crossarms:	12	0.2	519	0.3	0.3	15	168	1	16	0.4
Risers:	17	0.3	276	0.1	0.2	8	14	0	8	0.2
Insulators:	92	1.6	3,999	2.1	2.7	114	94	0	115	2.7
Pole Load:	5,955	100.0	189,920	100.0	126.5	5,426	5,658	27	5,453	127.1
Pole Reserve Capacity:			-39,766		-26.5	-1,136			-1,163	-27.1

LOAD SUMMARY BY OWNER

NVE:	3,702		133,392			3,811	4,777	23	3,834	89.4

Version: 5.0 / 5.00
* includes Load Factor(s)

² Worst Wind per Guy Wire
³ Wind at 180.7°

ZFS:	404	10,840	310	136	1	310	7.2
TWT:	345	8,944	256	99	0	256	6.0
COX:	635	16,536	472	234	1	474	11.0
CTL:	869	20,207	577	412	2	579	13.5
Totals	5,955	189,920	5,426	5,658	27	5,453	127.1

Detailed Load Components

Power:		Owner	Height (ft)	Horiz. Offset (in)	Cable Dia. (in)	Sag at Max Temp	Cable Weight (lbs/ft)	Lead/Span Length	Span Angle (deg)	Wire Length (ft)	Tension (lbs)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Primary	AAC 954.0 KCM 37 STRAND	NVE	45.74	21.07	1.1240	2.72	0.895	181.0	270.0	181.0	3,068	-317	42	8,723	8,448
Primary	AAC 954.0 KCM 37 STRAND	NVE	45.74	21.07	1.1240	2.72	0.895	181.0	270.0	181.0	3,068	-317	-42	8,723	8,364
Primary	AAC 954.0 KCM 37 STRAND	NVE	45.74	27.50	1.1240	2.92	0.895	191.0	90.0	191.0	3,068	317	34	9,205	9,556
Primary	AAC 954.0 KCM 37 STRAND	NVE	45.74	30.54	1.1240	2.92	0.895	191.0	90.0	191.0	3,068	317	-37	9,205	9,485
Primary	AAC 954.0 KCM 37 STRAND	NVE	43.74	21.02	1.1240	2.72	0.895	181.0	270.0	181.0	3,068	-303	44	8,341	8,082
Primary	AAC 954.0 KCM 37 STRAND	NVE	43.74	21.02	1.1240	2.72	0.895	181.0	270.0	181.0	3,068	-303	-44	8,341	7,994
Primary	AAC 954.0 KCM 37 STRAND	NVE	43.74	27.62	1.1240	2.92	0.895	191.0	90.0	191.0	3,068	303	35	8,802	9,141
Primary	AAC 954.0 KCM 37 STRAND	NVE	43.74	30.64	1.1240	2.92	0.895	191.0	90.0	191.0	3,068	303	-38	8,802	9,067
Primary	AAC 954.0 KCM 37 STRAND	NVE	39.74	20.92	1.1240	2.72	0.895	181.0	270.0	181.0	3,068	-275	47	7,578	7,350
Primary	AAC 954.0 KCM 37 STRAND	NVE	39.74	20.92	1.1240	2.72	0.895	181.0	270.0	181.0	3,068	-275	-47	7,578	7,256
Primary	AAC 954.0 KCM 37 STRAND	NVE	39.74	27.84	1.1240	2.92	0.895	191.0	90.0	191.0	3,068	275	37	7,997	8,310
Primary	AAC 954.0 KCM 37 STRAND	NVE	39.74	30.84	1.1240	2.92	0.895	191.0	90.0	191.0	3,068	275	-40	7,997	8,232
Neutral	ACSR 2/0 AWG 6/1 QUAIL	NVE	30.33	7.89	0.4470	1.28	0.183	181.0	270.0	181.0	1,355	-93	0	2,300	2,207
Neutral	ACSR 2/0 AWG 6/1 QUAIL	NVE	30.33	7.89	0.4470	1.39	0.183	191.0	90.0	191.0	1,355	93	0	2,427	2,520
											Totals:	0	-9	106,021	106,013

Comm:		Owner	Height (ft)	Horiz. Offset (in)	Cable Dia. (in)	Sag at Max Temp	Cable Weight (lbs/ft)	Lead/Span Length	Span Angle (deg)	Wire Length (ft)	Tension (lbs)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Overlashed	5/16" EHS	ZFS	26.58	8.45	0.3125	1.64	0.205	181.0	270.0	181.0	1,500	-90	20	1,744	1,673
Telco	BELOPTIX DT144 - 144 FIBERS -	ZFS	26.54	8.58	0.7560	-	0.208	181.0	270.0	181.0		0	20	1,741	1,762
Telco	24ct Fiber	ZFS	26.56	8.37	0.3900	-	0.049	181.0	270.0	181.0		0	5	1,742	1,747
Overlashed	5/16" EHS	ZFS	26.58	8.45	0.3125	1.82	0.205	191.0	90.0	191.0	1,500	90	21	1,840	1,951
Telco	BELOPTIX DT144 - 144 FIBERS -	ZFS	26.54	8.58	0.7560	-	0.208	191.0	90.0	191.0		0	21	1,838	1,859
Telco	24ct Fiber	ZFS	26.56	8.37	0.3900	-	0.049	191.0	90.0	191.0		0	5	1,838	1,843
Overlashed	1/4" EHS	TWT	25.75	8.52	0.2500	1.09	0.121	181.0	270.0	181.0	1,500	-87	12	2,160	2,085
Telco	BELOPTIX DT144 - 144 FIBERS -	TWT	25.71	8.52	0.7560	-	0.208	181.0	270.0	181.0		0	20	2,157	2,177
Overlashed	1/4" EHS	TWT	25.75	8.52	0.2500	1.22	0.121	191.0	90.0	191.0	1,500	87	12	2,280	2,379
Telco	BELOPTIX DT144 - 144 FIBERS -	TWT	25.71	8.52	0.7560	-	0.208	191.0	90.0	191.0		0	21	2,276	2,297
Overlashed	1/4" EHS	COX	25.92	17.19	0.2500	2.09	0.121	191.0	90.0	191.0	1,500	88	25	1,610	1,723
Telco	432ct Fiber	COX	25.87	17.17	0.8300	-	0.159	191.0	90.0	191.0		0	32	1,608	1,640
Telco	P3-500CA	COX	25.92	17.00	0.5000	-	0.072	191.0	90.0	191.0		0	14	1,611	1,625
Telco	P3-500CA	COX	25.95	17.18	0.5000	-	0.072	191.0	90.0	191.0		0	15	1,612	1,627
Telco	432ct Fiber	COX	25.92	17.47	0.8300	-	0.159	191.0	90.0	191.0		0	33	1,611	1,643
Overlashed	1/4" EHS	COX	25.92	17.19	0.2500	2.18	0.121	191.0	270.0	191.0	1,500	-88	25	1,589	1,526
Telco	432ct Fiber	COX	25.87	17.17	0.8300	-	0.159	191.0	270.0	191.0		0	32	1,587	1,619
Telco	P3-500CA	COX	25.92	16.99	0.5000	-	0.072	191.0	270.0	191.0		0	14	1,590	1,604

Telco	BELOPTIX DT096 - 72 FIBERS -	COX	25.95	17.17	0.5160	-	0.097	191.0	270.0	191.0		0	20	1,591	1,611
Telco	432ct Fiber	COX	25.92	17.47	0.8300	-	0.159	191.0	270.0	191.0		0	33	1,590	1,622
Overlashed	1/4" EHS	CTL	23.33	8.71	0.2500	3.17	0.121	181.0	270.0	181.0	1,500	-79	12	3,012	2,945
Telco	26 GA 400 PR (1.30)	CTL	23.27	8.71	1.3000	-	0.910	181.0	270.0	181.0		0	90	3,004	3,094
Overlashed	1/4" EHS	CTL	23.33	8.71	0.2500	3.52	0.121	191.0	90.0	191.0	1,500	79	13	3,178	3,270
Telco	26 GA 400 PR (1.30)	CTL	23.27	8.71	1.3000	-	0.910	191.0	90.0	191.0		0	95	3,170	3,265
Overlashed	1/4" EHS	CTL	22.33	8.80	0.2500	1.29	0.121	181.0	270.0	181.0	1,500	-76	12	1,837	1,773
Telco	26 GA 100 PR (0.74)	CTL	22.29	8.80	0.7400	-	0.270	181.0	270.0	181.0		0	27	1,833	1,860
Overlashed	1/4" EHS	CTL	22.33	8.80	0.2500	1.43	0.121	191.0	90.0	191.0	1,500	76	13	1,938	2,026
Telco	26 GA 100 PR (0.74)	CTL	22.29	8.80	0.7400	-	0.270	191.0	90.0	191.0		0	28	1,935	1,963
											Totals:	0	687	55,523	56,210

Crossarm:		Owner	Height (ft)	Horiz. Offset (in)	Offset Angle (deg)	Rotate Angle (deg)	Unit Weight (lbs)	Unit Height (in)	Unit Depth (in)	Unit Diameter (in)	Unit Length (in)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Normal	CROSSARM 3-1/2 X 4-1/2 X 4	NVE	45.83	6.13	90.0	90.0	28.00	4.50	3.50	-	48.00	-	0	180	180
Normal	CROSSARM 3-1/2 X 4-1/2 X 4	NVE	43.83	6.29	90.0	90.0	28.00	4.50	3.50	-	48.00	-	0	173	173
Normal	CROSSARM 3-1/2 X 4-1/2 X 4	NVE	39.83	6.62	90.0	90.0	28.00	4.50	3.50	-	48.00	-	0	157	157
Standoff	12" Fiber Arm	COX	25.92	6.75	90.0	90.0	28.00	4.50	-	0.00	-	-	0	9	9
											Totals:	0	0	519	519

Riser:		Owner	Height (ft)	Horiz. Offset (in)	Offset Angle (deg)	Rotate Angle (deg)	Unit Weight (lbs)	Unit Height (in)	Unit Depth (in)	Unit Diameter (in)	Unit Length (in)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Riser 350.0°	Riser	COX	24.67	8.46	350.0	350.0	0.77	296.04	-	0.00	-	-	-6	283	276
											Totals:	0	-6	283	276

Insulator:		Owner	Height (ft)	Horiz. Offset (in)	Offset Angle (deg)	Rotate Angle (deg)	Unit Weight (lbs)	Unit Height (in)	Unit Depth (in)	Unit Diameter (in)	Unit Length (in)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Deadend	Deadend Insulator - 15 kV	NVE	45.83	20.00	163.0	180.0	3.00	12.75	-	3.80	-	-	7	347	354
Deadend	Deadend Insulator - 15 kV	NVE	45.83	-20.00	17.0	180.0	3.00	12.75	-	3.80	-	-	-8	347	339
Deadend	Deadend Insulator - 15 kV	NVE	45.83	20.00	163.0	0.0	3.00	12.75	-	3.80	-	-	8	347	354
Deadend	Deadend Insulator - 15 kV	NVE	45.83	-24.00	14.3	0.0	3.00	12.75	-	3.80	-	-	-9	347	338
Deadend	Deadend Insulator - 15 kV	NVE	43.83	20.00	162.5	180.0	3.00	12.75	-	3.80	-	-	7	332	339
Deadend	Deadend Insulator - 15 kV	NVE	43.83	-20.00	17.5	180.0	3.00	12.75	-	3.80	-	-	-8	332	324
Deadend	Deadend Insulator - 15 kV	NVE	43.83	20.00	162.5	0.0	3.00	12.75	-	3.80	-	-	8	332	339
Deadend	Deadend Insulator - 15 kV	NVE	43.83	-24.00	14.7	0.0	3.00	12.75	-	3.80	-	-	-9	332	323
Deadend	Deadend Insulator - 15 kV	NVE	39.83	20.00	161.7	180.0	3.00	12.75	-	3.80	-	-	7	301	309
Deadend	Deadend Insulator - 15 kV	NVE	39.83	-20.00	18.3	180.0	3.00	12.75	-	3.80	-	-	-8	301	294
Deadend	Deadend Insulator - 15 kV	NVE	39.83	20.00	161.7	0.0	3.00	12.75	-	3.80	-	-	8	301	309
Deadend	Deadend Insulator - 15 kV	NVE	39.83	-24.00	15.4	0.0	3.00	12.75	-	3.80	-	-	-9	301	293
Spool	Spool Insulator - 20 kV	NVE	30.33	5.64	270.0	270.0	1.00	2.12	-	2.50	-	-	0	25	25
Spool	Spool Insulator - 20 kV	NVE	30.33	5.64	90.0	90.0	1.00	2.12	-	2.50	-	-	0	25	25
Bolt	Three Bolt	ZFS	26.58	5.95	180.0	180.0	5.00	0.00	-	3.00	-	-	5	0	5
Bolt	Three Bolt	TWT	25.75	6.02	180.0	180.0	5.00	0.00	-	3.00	-	-	5	0	5
Bolt	Three Bolt	COX	25.92	0.00	180.0	180.0	5.00	0.00	-	3.00	-	-	11	0	11
Bolt	Three Bolt	CTL	23.33	6.21	180.0	180.0	5.00	0.00	-	3.00	-	-	5	0	5
Bolt	Three Bolt	CTL	22.33	6.30	180.0	180.0	5.00	0.00	-	3.00	-	-	5	0	5

Version: 5.0 / 5.00
* includes Load Factor(s)

[2] Worst Wind per Guy Wire
[3] Wind at 180.7°

Totals:	0	28	3,971	3,999

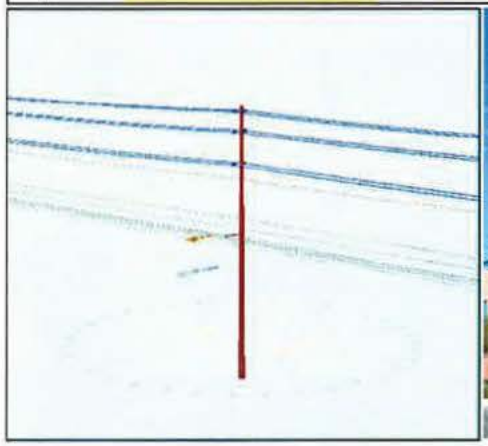
Pole Buckling

Buckling	Buckling (ft)	Buckling Section (% Buckling Col. Hgt.)	Buckling (in)	Min. Buckling (in)	Diameter (in)	Diameter (in)	Modulus of (psi)	Pole (pcf)	Ice Density (pcf)	Pole Tip (ft)	Buckling Load (lbs)	Buckling Load (lbs)	Buckling Load
2.00	29.05	34.38	14.60	24.82	8.60	16.24	1,000,000	50.00	57.00	46.83	29,462	5,658	5.21

O-Calc® Pro *Analysis Report*

Thursday, October 02, 2014 6:15:17 PM

File Name:	32 - p62991 Propos	Pole Length / Class:	60 / 1	Code:	NESC	Structure Type:	Unguyed
Pole Num:	32 - p62991	Pole Species:	PONDEROSA PINE	NESC Rule:	Rule 250B	Status:	N/A
Permit #:	Unset	Setting Depth (ft):	8.42	Construction Grade:	B	Pole Strength Factor:	0.65
Owner:	Unset	G/L Circumference (in):	52.00	Loading District:	Light	Transverse Wind LF:	2.50
Latitude:	Unset	G/L Fiber Stress (psi):	6,600	Ice Thickness (in):	0.00	Wire Tension LF:	1.10
Longitude:	Unset	Allowable Stress (psi):	4,290	Wind Speed (mph):	59.29	Vertical LF:	1.50
Emp #:	Unset	Fiber Stress Ht. Reduction:	No	Wind Pressure (psf):	9.00		



Pole Capacity Utilization		Height	Wind Angle
Maximum:	127.0%	0.0 ft	180.0°
Groundline:	127.0%	0.0 ft	180.0°
Vertical:	20.6%	30.4 ft	180.0°

Pole Moments		Load Angle	Wind Angle
Max Capac. Util:	201,148 ft-lb	180.1°	180.0°
Groundline:	201,148 ft-lb	180.1°	180.0°

GROUNDLINE LOAD SUMMARY:*Wind at 180.0°, Applied Moment 201,148 ft-lb at 180.1°, Allowable Moment 159,161 ft-lb

	Shear Load (lbs)*	Percent Applied Load	Bending Moment (ft-lb)	Percent of Applied Moment	Percent of Pole Capacity	Bending Stress (+/- psi)	Vertical Load (lbs)	Vertical Stress (psi)	Total Stress (psi)	Percent of Pole Capacity
Powers:	2,393	39.8	109,342	54.8	68.7	2,947	1,478	7	2,954	68.9
Comms:	2,322	38.6	57,965	29.1	36.4	1,562	818	4	1,566	36.5
Pole:	1,216	20.2	28,052	14.1	17.6	756	3,447	16	772	18.0
Crossarms:	7	0.1	294	0.1	0.2	8	168	1	9	0.2
Insulators:	78	1.3	3,741	1.9	2.4	101	189	1	102	2.4
Pole Load:	6,016	100.0	199,394	100.0	125.3	5,374	6,100	28	5,403	125.9
Pole Reserve Capacity:			-40,233		-25.3	-1,084			-1,113	-25.9

LOAD SUMMARY BY OWNER

NVE:	3,691	141,219	3,806	5,202	24	3,831	89.3
ZFS:	386	10,799	291	131	1	292	6.8

Version: 5.0 / 5.00
* includes Load Factor(s)

² Worst Wind per Guy Wire
³ Wind at 180.0°

TWT:	428	11,000	297	95	0	297	6.9
COX:	683	17,495	472	278	1	473	11.0
CTL:	829	18,881	509	394	2	511	11.9
Totals	6,016	199,394	5,374	6,100	28	5,403	125.9

Detailed Load Components

Power:		Owner	Height (ft)	Horiz. Offset (in)	Cable Dia. (in)	Sag at Max Temp	Cable Weight (lbs/ft)	Lead/Span Length	Span Angle (deg)	Wire Length (ft)	Tension (lbs)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Primary	AAC 954.0 KCM 37 STRAND	NVE	50.58	32.87	1.1240	2.58	0.895	174.0	270.0	174.0	3,068	166	320	9,283	9,768
Primary	AAC 954.0 KCM 37 STRAND	NVE	50.58	32.87	1.1240	2.71	0.895	181.0	90.0	181.0	3,068	-166	333	9,656	9,823
Primary	AAC 954.0 KCM 37 STRAND	NVE	50.58	12.30	1.1240	2.58	0.895	174.0	270.0	174.0	3,068	166	-42	9,283	9,406
Primary	AAC 954.0 KCM 37 STRAND	NVE	50.58	12.30	1.1240	2.71	0.895	181.0	90.0	181.0	3,068	-166	-44	9,656	9,446
Primary	AAC 954.0 KCM 37 STRAND	NVE	46.50	33.19	1.1240	2.58	0.895	174.0	270.0	174.0	3,068	152	323	8,534	9,010
Primary	AAC 954.0 KCM 37 STRAND	NVE	46.50	33.19	1.1240	2.71	0.895	181.0	90.0	181.0	3,068	-152	336	8,878	9,061
Primary	AAC 954.0 KCM 37 STRAND	NVE	46.50	12.42	1.1240	2.58	0.895	174.0	270.0	174.0	3,068	152	-46	8,534	8,641
Primary	AAC 954.0 KCM 37 STRAND	NVE	46.50	12.42	1.1240	2.71	0.895	181.0	90.0	181.0	3,068	-152	-48	8,878	8,678
Primary	AAC 954.0 KCM 37 STRAND	NVE	39.50	33.73	1.1240	2.58	0.895	174.0	270.0	174.0	3,068	129	328	7,251	7,709
Primary	AAC 954.0 KCM 37 STRAND	NVE	39.50	33.73	1.1240	2.71	0.895	181.0	90.0	181.0	3,068	-129	341	7,543	7,755
Primary	AAC 954.0 KCM 37 STRAND	NVE	39.50	12.63	1.1240	2.58	0.895	174.0	270.0	174.0	3,068	129	-51	7,251	7,330
Primary	AAC 954.0 KCM 37 STRAND	NVE	39.50	12.63	1.1240	2.71	0.895	181.0	90.0	181.0	3,068	-129	-53	7,543	7,360
Neutral	ACSR 2/0 AWG 6/1 QUAIL	NVE	36.00	7.75	0.4470	1.20	0.183	174.0	270.0	174.0	1,355	52	0	2,625	2,677
Neutral	ACSR 2/0 AWG 6/1 QUAIL	NVE	36.00	7.75	0.4470	1.27	0.183	181.0	90.0	181.0	1,355	-52	0	2,731	2,679
											Totals:	0	1,697	107,645	109,342

Comm:		Owner	Height (ft)	Horiz. Offset (in)	Cable Dia. (in)	Sag at Max Temp	Cable Weight (lbs/ft)	Lead/Span Length	Span Angle (deg)	Wire Length (ft)	Tension (lbs)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Overlashed	5/16" EHS	ZFS	27.75	8.64	0.3125	1.51	0.205	174.0	270.0	174.0	1,500	44	19	1,750	1,814
Telco	BELOPTIX DT144 - 144 FIBERS -	ZFS	27.72	8.77	0.7560	-	0.208	174.0	270.0	174.0		0	20	1,748	1,768
Telco	24ct Fiber	ZFS	27.73	8.55	0.3900	-	0.049	174.0	270.0	174.0		0	5	1,749	1,753
Overlashed	5/16" EHS	ZFS	27.75	8.64	0.3125	1.63	0.205	181.0	90.0	181.0	1,500	-44	20	1,821	1,796
Telco	BELOPTIX DT144 - 144 FIBERS -	ZFS	27.72	8.77	0.7560	-	0.208	181.0	90.0	181.0		0	21	1,818	1,839
Telco	24ct Fiber	ZFS	27.73	8.55	0.3900	-	0.049	181.0	90.0	181.0		0	5	1,819	1,824
Overlashed	1/4" EHS	TWT	25.58	8.80	0.2500	1.00	0.121	174.0	270.0	174.0	1,500	41	12	2,682	2,735
Telco	BELOPTIX DT144 - 144 FIBERS -	TWT	25.52	8.80	0.7560	-	0.208	174.0	270.0	174.0		0	20	2,675	2,695
Overlashed	1/4" EHS	TWT	25.58	8.80	0.2500	1.08	0.121	181.0	90.0	181.0	1,500	-41	12	2,790	2,761
Telco	BELOPTIX DT144 - 144 FIBERS -	TWT	25.52	8.80	0.7560	-	0.208	181.0	90.0	181.0		0	21	2,783	2,804
Overlashed	1/4" EHS	COX	24.27	45.20	0.2500	1.94	0.121	181.0	90.0	181.0	1,500	-39	60	1,410	1,432
Telco	432ct Fiber	COX	24.22	45.17	0.8300	-	0.159	181.0	90.0	181.0		0	79	1,408	1,487
Telco	P3-500CA	COX	24.27	44.98	0.5000	-	0.072	181.0	90.0	181.0		0	36	1,410	1,446
Telco	BELOPTIX DT096 - 72 FIBERS -	COX	24.30	45.18	0.5160	-	0.097	181.0	90.0	181.0		0	48	1,412	1,460
Telco	432ct Fiber	COX	24.27	45.52	0.8300	-	0.159	181.0	90.0	181.0		0	80	1,410	1,490
Overlashed	1/4" EHS	COX	24.27	45.20	0.2500	3.16	0.121	174.0	270.0	174.0	1,500	39	58	1,177	1,274
Telco	432ct Fiber	COX	24.22	45.20	0.8300	-	0.159	174.0	270.0	174.0		0	76	1,175	1,251
Telco	P3-500CA	COX	24.22	44.82	0.5000	-	0.072	174.0	270.0	174.0		0	34	1,175	1,209
Telco	BELOPTIX DT096 - 72 FIBERS -	COX	24.21	45.59	0.5160	-	0.097	174.0	270.0	174.0		0	47	1,175	1,221

Telco	BELOPTIX DT096 - 72 FIBERS -	COX	24.32	44.83	0.5160	-	0.097	174.0	270.0	174.0		0	46	1,180	1,226
Telco	BELOPTIX DT144 - 144 FIBERS -	COX	24.31	45.20	0.7560	-	0.208	174.0	270.0	174.0		0	100	1,180	1,279
Telco	BELOPTIX DT144 - 144 FIBERS -	COX	24.27	44.89	0.7560	-	0.208	174.0	270.0	174.0		0	99	1,177	1,277
Telco	432ct Fiber	COX	24.27	45.55	0.8300	-	0.159	174.0	270.0	174.0		0	76	1,177	1,254
Overlashed	1/4" EHS	CTL	22.83	9.01	0.2500	2.93	0.121	174.0	270.0	174.0	1,500	37	12	2,834	2,882
Telco	26 GA 400 PR (1.30)	CTL	22.77	9.01	1.3000	-	0.910	174.0	270.0	174.0		0	89	2,826	2,915
Overlashed	1/4" EHS	CTL	22.83	9.01	0.2500	3.16	0.121	181.0	90.0	181.0	1,500	-37	12	2,948	2,924
Telco	26 GA 400 PR (1.30)	CTL	22.77	9.01	1.3000	-	0.910	181.0	90.0	181.0		0	93	2,940	3,033
Overlashed	1/4" EHS	CTL	21.83	9.09	0.2500	1.18	0.121	174.0	270.0	174.0	1,500	35	12	1,726	1,773
Telco	26 GA 100 PR (0.74)	CTL	21.79	9.09	0.7400	-	0.270	174.0	270.0	174.0		0	27	1,723	1,750
Overlashed	1/4" EHS	CTL	21.83	9.09	0.2500	1.28	0.121	181.0	90.0	181.0	1,500	-35	12	1,796	1,773
Telco	26 GA 100 PR (0.74)	CTL	21.79	9.09	0.7400	-	0.270	181.0	90.0	181.0		0	28	1,792	1,820
											Totals:	0	1,278	56,688	57,965

Crossarm:		Owner	Height (ft)	Horiz. Offset (in)	Offset Angle (deg)	Rotate Angle (deg)	Unit Weight (lbs)	Unit Height (in)	Unit Depth (in)	Unit Diameter (in)	Unit Length (in)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft lb)*	Moment at GL (ft-lb)*
Standoff	CROSSARM 3-1/2 X 4-1/2 X 4	NVE	50.58	5.62	90.0	90.0	28.00	4.50	-	0.00	-	-	0	49	49
Standoff	CROSSARM 3-1/2 X 4-1/2 X 4	NVE	46.50	5.94	90.0	90.0	28.00	4.50	-	0.00	-	-	0	45	45
Standoff	CROSSARM 3-1/2 X 4-1/2 X 4	NVE	39.50	6.48	90.0	90.0	28.00	4.50	-	0.00	-	-	0	39	39
Offset	CROSSARM 3-1/2 X 4-1/2 X 4	COX	24.08	-7.83	90.0	90.0	28.00	4.50	3.50	-	48.00	-	66	95	160
											Totals:	0	66	228	294

Insulator:		Owner	Height (ft)	Horiz. Offset (in)	Offset Angle (deg)	Rotate Angle (deg)	Unit Weight (lbs)	Unit Height (in)	Unit Depth (in)	Unit Diameter (in)	Unit Length (in)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft lb)*	Moment at GL (ft-lb)*
Post	Post Insulator - 15 kV	NVE	50.58	0.00	180.0	270.0	11.00	11.50	-	4.75	-	-	45	436	481
Post	Post Insulator - 15 kV	NVE	50.58	4.37	0.0	0.0	11.00	11.50	-	4.75	-	-	-6	436	430
Post	Post Insulator - 15 kV	NVE	50.58	4.37	0.0	0.0	11.00	11.50	-	4.75	-	-	-6	436	430
Post	Post Insulator - 15 kV	NVE	46.50	0.00	180.0	270.0	11.00	11.50	-	4.75	-	-	46	401	447
Post	Post Insulator - 15 kV	NVE	46.50	4.69	0.0	0.0	11.00	11.50	-	4.75	-	-	-6	401	395
Post	Post Insulator - 15 kV	NVE	46.50	4.69	0.0	0.0	11.00	11.50	-	4.75	-	-	-6	401	395
Post	Post Insulator - 15 kV	NVE	39.50	0.00	180.0	270.0	11.00	11.50	-	4.75	-	-	46	341	388
Post	Post Insulator - 15 kV	NVE	39.50	5.23	0.0	0.0	11.00	11.50	-	4.75	-	-	-7	341	334
Post	Post Insulator - 15 kV	NVE	39.50	5.23	0.0	0.0	11.00	11.50	-	4.75	-	-	-7	341	334
Spool	Spool Insulator - 20 kV	NVE	36.00	5.50	270.0	270.0	1.00	2.12	-	2.50	-	-	0	30	30
Spool	Spool Insulator - 20 kV	NVE	36.00	5.50	90.0	90.0	1.00	2.12	-	2.50	-	-	0	30	30
Bolt	Three Bolt	ZFS	27.75	6.14	180.0	180.0	5.00	0.00	-	3.00	-	-	5	0	5
Bolt	Suspension Shoe	TWT	25.58	6.30	180.0	180.0	5.00	0.00	-	3.00	-	-	6	0	6
Bolt	Three Bolt	COX	24.27	44.00	190.1	180.0	5.00	0.00	-	3.00	-	-	28	0	28
Bolt	Three Bolt	CTL	22.83	6.51	180.0	180.0	5.00	0.00	-	3.00	-	-	6	0	6
Bolt	Three Bolt	CTL	21.83	6.59	180.0	180.0	5.00	0.00	-	3.00	-	-	6	0	6
											Totals:	0	148	3,594	3,741

Pole Buckling

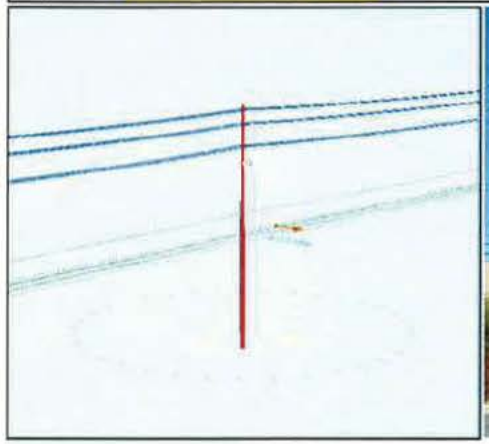
Buckling	Buckling	Buckling Section	Buckling	Min. Buckling	Diameter	Diameter	Modulus of	Pole	Ice Density	Pole Tip	Buckling Load	Buckling Load	Buckling Load

	(ft)	(% Buckling Col. Hgt.)	(in)	(in)	(in)	(in)	(psi)	(pcf)	(pcf)	(ft)	(lbs)	(lbs)	
2.00	30.36	34.25	14.95	26.44	8.60	16.56	1,000,000	50.00	57.00	51.58	29,607	**6,100**	**4.85**

O-Calc® Pro *Analysis Report*

Thursday, October 02, 2014 6:50:24 PM

File Name:	33 - p76068 Propos	Pole Length / Class:	55 / 2	Code:	NESC	Structure Type:	Unguyed
Pole Num:	33 - p76068	Pole Species:	WESTERN RED CEDAR	NESC Rule:	Rule 250B	Status:	N/A
Permit #:	Unset	Setting Depth (ft):	4.50	Construction Grade:	B	Pole Strength Factor:	0.65
Owner:	Unset	G/L Circumference (in):	50.00	Loading District:	Light	Transverse Wind LF:	2.50
Latitude:	Unset	G/L Fiber Stress (psi):	6,000	Ice Thickness (in):	0.00	Wire Tension LF:	1.10
Longitude:	Unset	Allowable Stress (psi):	3,900	Wind Speed (mph):	59.29	Vertical LF:	1.50
Emp #:	Unset	Fiber Stress Ht. Reduction:	No	Wind Pressure (psf):	9.00		



Pole Capacity Utilization		Height	Wind Angle
Maximum:	153.7%	0.0 ft	179.3°
Groundline:	153.7%	0.0 ft	179.3°
Vertical:	24.1%	30.0 ft	179.3°

Pole Moments		Load Angle	Wind Angle
Max Capac. Util:	196,650 ft-lb	179.9°	179.3°
Groundline:	196,650 ft-lb	179.9°	179.3°

GROUNDLINE LOAD SUMMARY:*Wind at 179.3°, Applied Moment 196,650 ft-lb at 179.9°, Allowable Moment 128,630 ft-lb

	Shear Load (lbs)*	Percent Applied Load	Bending Moment (ft-lb)	Percent of Applied Moment	Percent of Pole Capacity	Bending Stress (+/- psi)	Vertical Load (lbs)	Vertical Stress (psi)	Total Stress (psi)	Percent of Pole Capacity
Powers:	2,194	34.9	100,650	51.5	78.2	3,052	1,397	7	3,059	78.4
Comms:	2,370	37.7	54,702	28.0	42.5	1,659	868	4	1,663	42.6
Power Equipment:	67	1.1	2,907	1.5	2.3	88	375	2	90	2.3
Pole:	1,130	18.0	25,367	13.0	19.7	769	3,052	15	784	20.1
Crossarms:	0	0.0	8	0.0	0.0	0	42	0	0	0.0
Risers:	471	7.5	9,317	4.8	7.2	282	253	1	284	7.3
Insulators:	52	0.8	2,430	1.2	1.9	74	138	1	74	1.9
Pole Load:	6,284	100.0	195,382	100.0	151.9	5,924	6,125	31	5,955	152.7
Pole Reserve Capacity:			-66,751		-51.9	-2,024			-2,055	-52.7

LOAD SUMMARY BY OWNER

NVE:	3,914	140,638	4,264	5,178	26	4,290	110.0
ZFS:	377	10,205	309	128	1	310	7.9
TWT:	418	9,638	292	93	0	293	7.5
COX:	764	17,669	536	341	2	537	13.8
CTL:	810	17,231	522	385	2	524	13.4
Totals	6,284	195,382	5,924	6,125	31	5,955	152.7

Detailed Load Components

Power:		Owner	Height (ft)	Horiz. Offset (in)	Cable Dia. (in)	Sag at Max Temp	Cable Weight (lbs/ft)	Lead/Span Length	Span Angle (deg)	Wire Length (ft)	Tension (lbs)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft lb)*	Moment at GL (ft-lb)*
Primary	AAC 954.0 KCM 37 STRAND	NVE	49.50	12.19	1.1240	2.56	0.895	173.0	270.0	173.0	3,068	-417	-111	9,032	8,503
Primary	AAC 954.0 KCM 37 STRAND	NVE	49.50	12.19	1.1240	2.58	0.895	174.0	90.0	174.0	3,068	417	-112	9,084	9,389
Primary	AAC 954.0 KCM 37 STRAND	NVE	49.50	12.19	1.1240	2.56	0.895	173.0	270.0	173.0	3,068	-417	111	9,032	8,726
Primary	AAC 954.0 KCM 37 STRAND	NVE	49.50	12.19	1.1240	2.58	0.895	174.0	90.0	174.0	3,068	417	112	9,084	9,613
Primary	AAC 954.0 KCM 37 STRAND	NVE	46.50	12.28	1.1240	2.56	0.895	173.0	270.0	173.0	3,068	-392	-111	8,485	7,982
Primary	AAC 954.0 KCM 37 STRAND	NVE	46.50	12.28	1.1240	2.58	0.895	174.0	90.0	174.0	3,068	392	-112	8,534	8,814
Primary	AAC 954.0 KCM 37 STRAND	NVE	46.50	12.28	1.1240	2.56	0.895	173.0	270.0	173.0	3,068	-392	111	8,485	8,204
Primary	AAC 954.0 KCM 37 STRAND	NVE	46.50	12.28	1.1240	2.58	0.895	174.0	90.0	174.0	3,068	392	112	8,534	9,038
Primary	AAC 954.0 KCM 37 STRAND	NVE	41.50	12.42	1.1240	2.56	0.895	173.0	270.0	173.0	3,068	-350	-111	7,573	7,112
Primary	AAC 954.0 KCM 37 STRAND	NVE	41.50	12.42	1.1240	2.58	0.895	174.0	90.0	174.0	3,068	350	-112	7,617	7,855
Primary	AAC 954.0 KCM 37 STRAND	NVE	41.50	12.42	1.1240	2.56	0.895	173.0	270.0	173.0	3,068	-350	111	7,573	7,335
Primary	AAC 954.0 KCM 37 STRAND	NVE	41.50	12.42	1.1240	2.58	0.895	174.0	90.0	174.0	3,068	350	112	7,617	8,079
											Totals:	0	1	100,649	100,650

Comm:		Owner	Height (ft)	Horiz. Offset (in)	Cable Dia. (in)	Sag at Max Temp	Cable Weight (lbs/ft)	Lead/Span Length	Span Angle (deg)	Wire Length (ft)	Tension (lbs)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft lb)*	Moment at GL (ft-lb)*
Overlashed	5/16" EHS	ZFS	26.83	8.34	0.3125	1.51	0.205	173.0	270.0	173.0	1,500	-110	18	1,682	1,590
Telco	BELOPTIX DT144 - 144 FIBERS -	ZFS	26.80	8.48	0.7560	-	0.208	173.0	270.0	173.0		0	19	1,680	1,699
Telco	24ct Fiber	ZFS	26.81	8.26	0.3900	-	0.049	173.0	270.0	173.0		0	4	1,681	1,685
Overlashed	5/16" EHS	ZFS	26.83	8.34	0.3125	1.53	0.205	174.0	90.0	174.0	1,500	110	19	1,692	1,821
Telco	BELOPTIX DT144 - 144 FIBERS -	ZFS	26.80	8.48	0.7560	-	0.208	174.0	90.0	174.0		0	19	1,690	1,709
Telco	24ct Fiber	ZFS	26.81	8.26	0.3900	-	0.049	174.0	90.0	174.0		0	4	1,691	1,695
Overlashed	1/4" EHS	TWT	22.92	8.65	0.2500	1.00	0.121	173.0	270.0	173.0	1,500	-94	11	2,389	2,306
Telco	BELOPTIX DT144 - 144 FIBERS -	TWT	22.86	8.65	0.7560	-	0.208	173.0	270.0	173.0		0	19	2,383	2,402
Overlashed	1/4" EHS	TWT	22.92	8.65	0.2500	1.02	0.121	174.0	90.0	174.0	1,500	94	11	2,403	2,509
Telco	BELOPTIX DT144 - 144 FIBERS -	TWT	22.86	8.65	0.7560	-	0.208	174.0	90.0	174.0		0	20	2,396	2,416
Overlashed	1/4" EHS	COX	22.50	19.39	0.2500	3.15	0.121	173.0	270.0	173.0	1,500	-93	25	1,071	1,004
Telco	432ct Fiber	COX	22.45	19.40	0.8300	-	0.159	173.0	270.0	173.0		0	33	1,069	1,102
Telco	BELOPTIX DT144 - 144 FIBERS -	COX	22.54	19.38	0.7560	-	0.208	173.0	270.0	173.0		0	43	1,073	1,116
Telco	BELOPTIX DT144 - 144 FIBERS -	COX	22.50	19.11	0.7560	-	0.208	173.0	270.0	173.0		0	43	1,071	1,114
Telco	BELOPTIX DT096 - 72 FIBERS -	COX	22.56	19.69	0.5160	-	0.097	173.0	270.0	173.0		0	20	1,074	1,094
Telco	BELOPTIX DT096 - 72 FIBERS -	COX	22.45	19.75	0.5160	-	0.097	173.0	270.0	173.0		0	20	1,068	1,089
Telco	P3-500CA	COX	22.45	19.08	0.5000	-	0.072	173.0	270.0	173.0		0	15	1,069	1,083
Telco	432ct Fiber	COX	22.50	19.69	0.8300	-	0.159	173.0	270.0	173.0		0	33	1,071	1,105
Overlashed	1/4" EHS	COX	22.50	19.39	0.2500	3.18	0.121	174.0	90.0	174.0	1,500	93	25	1,077	1,195

Telco	432ct Fiber	COX	22.45	19.40	0.6300	-	0.159	174.0	90.0	174.0		0	33	1,075	1,108
Telco	BELOPTIX DT144 - 144 FIBERS -	COX	22.54	19.38	0.7560	-	0.208	174.0	90.0	174.0		0	43	1,079	1,123
Telco	BELOPTIX DT144 - 144 FIBERS -	COX	22.50	19.11	0.7560	-	0.208	174.0	90.0	174.0		0	43	1,077	1,120
Telco	BELOPTIX DT096 - 72 FIBERS -	COX	22.56	19.69	0.5160	-	0.097	174.0	90.0	174.0		0	21	1,080	1,101
Telco	BELOPTIX DT096 - 72 FIBERS -	COX	22.45	19.75	0.5160	-	0.097	174.0	90.0	174.0		0	21	1,075	1,095
Telco	P3-500CA	COX	22.45	19.08	0.5000	-	0.072	174.0	90.0	174.0		0	15	1,075	1,090
Telco	432ct Fiber	COX	22.50	19.69	0.6300	-	0.159	174.0	90.0	174.0		0	34	1,077	1,111
Overlashed	1/4" EHS	CTL	21.33	8.78	0.2500	2.91	0.121	173.0	270.0	173.0	1,500	-88	11	2,632	2,556
Telco	26 GA 400 PR (1.30)	CTL	21.27	8.78	1.3000	-	0.910	173.0	270.0	173.0		0	88	2,625	2,711
Overlashed	1/4" EHS	CTL	21.33	8.78	0.2500	2.94	0.121	174.0	90.0	174.0	1,500	88	12	2,647	2,747
Telco	26 GA 400 PR (1.30)	CTL	21.27	8.78	1.3000	-	0.910	174.0	90.0	174.0		0	87	2,640	2,727
Overlashed	1/4" EHS	CTL	20.33	8.86	0.2500	1.18	0.121	173.0	270.0	173.0	1,500	-84	12	1,598	1,526
Telco	26 GA 100 PR (0.74)	CTL	20.29	8.86	0.7400	-	0.270	173.0	270.0	173.0		0	26	1,595	1,621
Overlashed	1/4" EHS	CTL	20.33	8.86	0.2500	1.19	0.121	174.0	90.0	174.0	1,500	84	12	1,607	1,703
Telco	26 GA 100 PR (0.74)	CTL	20.29	8.86	0.7400	-	0.270	174.0	90.0	174.0		0	26	1,604	1,630
											Totals:	0	885	53,817	54,702

PowerEquipment:		Owner	Height (ft)	Horiz. Offset (in)	Offset Angle (deg)	Rotate Angle (deg)	Unit Weight (lbs)	Unit Height (in)	Unit Depth (in)	Unit Diameter (in)	Unit Length (in)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Box	Arrester Bracket	NVE	38.00	22.96	180.0	180.0	250.00	12.00	12.00	-	36.00	-	343	2,565	2,907
											Totals:	0	343	2,565	2,907

Crossarm:		Owner	Height (ft)	Horiz. Offset (in)	Offset Angle (deg)	Rotate Angle (deg)	Unit Weight (lbs)	Unit Height (in)	Unit Depth (in)	Unit Diameter (in)	Unit Length (in)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Standoff	14" Fiber Arm	COX	22.50	6.93	90.0	90.0	28.00	4.50	-	0.00	-	-	0	8	8
											Totals:	0	0	8	8

Riser:		Owner	Height (ft)	Horiz. Offset (in)	Offset Angle (deg)	Rotate Angle (deg)	Unit Weight (lbs)	Unit Height (in)	Unit Depth (in)	Unit Diameter (in)	Unit Length (in)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Riser 225.0°	Riser	NVE	29.58	8.00	225.0	225.0	7.03	354.96	-	0.00	-	-	39	3,914	3,953
Riser 280.0°	Riser	NVE	29.58	8.00	280.0	280.0	7.03	354.96	-	0.00	-	-	-10	5,373	5,363
											Totals:	0	30	9,287	9,317

Insulator:		Owner	Height (ft)	Horiz. Offset (in)	Offset Angle (deg)	Rotate Angle (deg)	Unit Weight (lbs)	Unit Height (in)	Unit Depth (in)	Unit Diameter (in)	Unit Length (in)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Post	Post Insulator - 15 kV	NVE	49.50	4.06	90.0	90.0	11.00	11.50	-	4.75	-	-	-16	427	411
Post	Post Insulator - 15 kV	NVE	49.50	4.06	90.0	90.0	11.00	11.50	-	4.75	-	-	16	427	442
Post	Post Insulator - 15 kV	NVE	46.50	4.29	90.0	90.0	11.00	11.50	-	4.75	-	-	-16	401	385
Post	Post Insulator - 15 kV	NVE	46.50	4.29	90.0	90.0	11.00	11.50	-	4.75	-	-	16	401	417
Post	Post Insulator - 15 kV	NVE	41.50	4.69	90.0	90.0	11.00	11.50	-	4.75	-	-	-16	358	342
Post	Post Insulator - 15 kV	NVE	41.50	4.69	90.0	90.0	11.00	11.50	-	4.75	-	-	16	358	374
Spool	Spool Insulator - 20 kV	NVE	31.50	5.48	0.0	0.0	1.00	2.12	-	2.50	-	-	-1	26	25
Bolt	Three Bolt	ZFS	26.83	5.84	180.0	180.0	5.00	0.00	-	3.00	-	-	5	0	5
Bolt	Suspension Shoe	TWT	22.92	6.15	180.0	180.0	5.00	0.00	-	3.00	-	-	5	0	5
Bolt	Three Bolt	COX	22.50	5.48	180.0	180.0	5.00	0.00	-	3.00	-	-	12	0	12
Bolt	Three Bolt	CTL	21.33	6.28	180.0	180.0	5.00	0.00	-	3.00	-	-	5	0	5

Bolt	Three Bolt	CTL	20.33	6.36	180.0	180.0	5.00	0.00	-	3.00	-	-	6	0	6
											Totals:	0	33	2,398	2,430

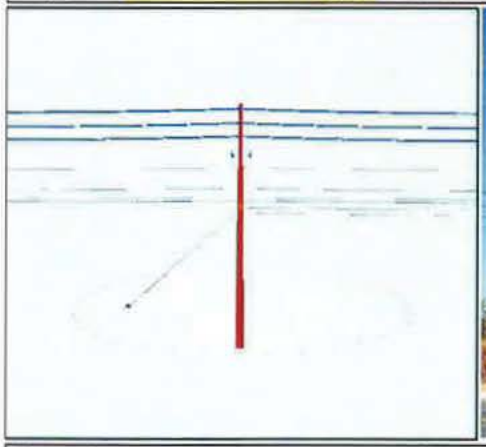
Pole Buckling

Buckling (ft)	Buckling (ft)	Buckling Section (% Buckling Col. Hgt.)	Buckling (in)	Min. Buckling (in)	Diameter (in)	Diameter (in)	Modulus of (psi)	Pole (pcf)	Ice Density (pcf)	Pole Tip (ft)	Buckling Load (lbs)	Buckling Load (lbs)	Buckling Load
2.00	29.95	34.45	14.29	26.22	7.96	15.92	1,000,000	50.00	57.00	50.50	25,408	6,125	4.15

O-Calc® Pro *Analysis Report*

Thursday, October 02, 2014 7:24:00 PM

File Name:	34 - p76067 Propos	Pole Length / Class:	55 / H1	Code:	NESC	Structure Type:	Guyed
Pole Num:	34 - p76067	Pole Species:	WESTERN RED CEDAR	NESC Rule:	Rule 250B	Status:	N/A
Permit #:	Unset	Setting Depth (ft):	9.50	Construction Grade:	B	Pole Strength Factor:	0.65
Owner:	Unset	G/L Circumference (in):	57.00	Loading District:	Light	Transverse Wind LF:	2.50
Latitude:	Unset	G/L Fiber Stress (psi):	6,000	Ice Thickness (in):	0.00	Wire Tension LF:	1.65
Longitude:	Unset	Allowable Stress (psi):	3,900	Wind Speed (mph):	59.29	Vertical LF:	1.50
Emp #:	Unset	Fiber Stress Ht. Reduction:	No	Wind Pressure (psf):	9.00		



Pole Capacity Utilization		Height	Wind Angle
Maximum:	92.2%	0.0 ft	179.3°
Groundline:	92.2%	0.0 ft	179.3°
Vertical:	1.4%	26.7 ft	90.0°

Pole Moments		Load Angle	Wind Angle
Max Capac. Util:	174,515 ft-lb	174.0°	179.3°
Groundline:	174,515 ft-lb	174.0°	179.3°

Guys Capacity Summary: Adequate

Guy Summary		Guy Tensions		Maximum Guy Tensions	
	Attach Height (ft)	% Allowable Tension	Wind Angle	% Allowable Tension	Wind Angle
Guy 1	22.8	37.7%	179.3°	62.1%	90.0°
Guy 2	21.5	35.8%	179.3°	59.0%	90.0°

Anchor Summary

	Lead Length (ft)	Lead Angle	Max. % Allow. Capacity
Anchor 1	23.0	270.0°	29.6%

GROUNDLINE LOAD SUMMARY:*Wind at 179.3°, Applied Moment 174,515 ft-lb at 174.0°, Allowable Moment 190,572 ft-lb

	Shear Load (lbs)*	Percent Applied Load	Bending Moment (ft-lb)	Percent of Applied Moment	Percent of Pole Capacity	Bending Stress (+/- psi)	Vertical Load (lbs)	Vertical Stress (psi)	Total Stress (psi)	Percent of Pole Capacity
Powers:	2,253	36.6	92,082	50.5	48.3	1,884	1,399	5	1,890	48.5
Comms:	2,419	39.3	58,714	32.2	30.8	1,202	666	3	1,204	30.9
Guys/Braces:	18	0.3	406	0.2	0.2	8	9	0	8	0.2
Generic Equipment:	72	1.2	2,433	1.3	1.3	50	68	0	50	1.3

Pole:	1,163	18.9	23,582	12.9	12.4	483	3,610	14	497	12.7
Risers:	183	3.0	2,948	1.6	1.5	60	92	0	61	1.6
Insulators:	52	0.8	2,179	1.2	1.1	45	138	1	45	1.2
Pole Load:	6,160	100.0	182,345	100.0	95.7	3,732	5,982	23	3,755	96.3
Pole Reserve Capacity:			8,227		4.3	168			145	3.7

LOAD SUMMARY BY OWNER

NVE:	3,673	122,511	2,507	5,257	20	2,527	64.8
ZFS:	363	9,986	204	124	0	205	5.3
TWT:	403	10,256	210	90	0	210	5.4
COX:	735	18,120	371	290	1	372	9.5
CTL:	986	21,473	439	220	1	440	11.3
Totals	6,160	182,345	3,732	5,982	23	3,755	96.3

Detailed Load Components

Power:		Owner	Height (ft)	Horiz. Offset (in)	Cable Dia. (in)	Sag at Max Temp	Cable Weight (lbs/ft)	Lead/Span Length	Span Angle (deg)	Wire Length (ft)	Tension (lbs)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Primary	AAC 954.0 KCM 37 STRAND	NVE	44.50	12.43	1.1240	2.37	0.895	163.0	270.0	163.0	3,068	-23,512	100	7,609	-15,803
Primary	AAC 954.0 KCM 37 STRAND	NVE	44.50	12.43	1.1240	2.56	0.895	173.0	90.0	173.0	3,068	23,512	106	8,076	31,694
Primary	AAC 954.0 KCM 37 STRAND	NVE	44.50	12.43	1.1240	2.37	0.895	163.0	270.0	163.0	3,068	-23,512	-109	7,609	-16,011
Primary	AAC 954.0 KCM 37 STRAND	NVE	44.50	12.43	1.1240	2.56	0.895	173.0	90.0	173.0	3,068	23,512	-115	8,076	31,472
Primary	AAC 954.0 KCM 37 STRAND	NVE	41.50	12.54	1.1240	2.37	0.895	163.0	270.0	163.0	3,068	-21,928	99	7,097	-14,732
Primary	AAC 954.0 KCM 37 STRAND	NVE	41.50	12.54	1.1240	2.56	0.895	173.0	90.0	173.0	3,068	21,928	106	7,532	29,566
Primary	AAC 954.0 KCM 37 STRAND	NVE	41.50	12.54	1.1240	2.37	0.895	163.0	270.0	163.0	3,068	-21,928	-109	7,097	-14,941
Primary	AAC 954.0 KCM 37 STRAND	NVE	41.50	12.54	1.1240	2.56	0.895	173.0	90.0	173.0	3,068	21,928	-116	7,532	29,345
Primary	AAC 954.0 KCM 37 STRAND	NVE	38.50	12.66	1.1240	2.37	0.895	163.0	270.0	163.0	3,068	-20,345	99	6,584	-13,662
Primary	AAC 954.0 KCM 37 STRAND	NVE	38.50	12.66	1.1240	2.56	0.895	173.0	90.0	173.0	3,068	20,345	105	6,988	27,439
Primary	AAC 954.0 KCM 37 STRAND	NVE	38.50	12.66	1.1240	2.37	0.895	163.0	270.0	163.0	3,068	-20,345	-109	6,584	-13,870
Primary	AAC 954.0 KCM 37 STRAND	NVE	38.50	12.66	1.1240	2.56	0.895	173.0	90.0	173.0	3,068	20,345	-116	6,988	27,217
Neutral	ACSR 2/0 AWG 6/1 QUAIL	NVE	31.42	8.24	0.4470	1.09	0.183	163.0	270.0	163.0	1,355	-7,324	-15	2,134	-5,205
Neutral	ACSR 2/0 AWG 6/1 QUAIL	NVE	31.42	8.24	0.4470	1.19	0.183	173.0	90.0	173.0	1,355	7,324	-16	2,265	9,573
											Totals:	0	-90	92,172	92,082

Comm:		Owner	Height (ft)	Horiz. Offset (in)	Cable Dia. (in)	Sag at Max Temp	Cable Weight (lbs/ft)	Lead/Span Length	Span Angle (deg)	Wire Length (ft)	Tension (lbs)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Overlashed	5/16" EHS	ZFS	27.25	8.90	0.3125	1.35	0.205	163.0	270.0	163.0	1,500	-7,032	18	1,601	-5,412
Telco	BELOPTIX DT144 - 144 FIBERS -	ZFS	27.22	9.04	0.7560	-	0.208	163.0	270.0	163.0		0	19	1,599	1,618
Telco	24ct Fiber	ZFS	27.23	8.82	0.3900	-	0.049	163.0	270.0	163.0		0	4	1,600	1,604
Overlashed	5/16" EHS	ZFS	27.25	8.90	0.3125	1.51	0.205	173.0	90.0	173.0	1,500	7,032	20	1,699	8,751
Telco	BELOPTIX DT144 - 144 FIBERS -	ZFS	27.22	9.04	0.7560	-	0.208	173.0	90.0	173.0		0	20	1,697	1,717
Telco	24ct Fiber	ZFS	27.23	8.82	0.3900	-	0.049	173.0	90.0	173.0		0	5	1,698	1,703
Overlashed	1/4" EHS	TWT	25.33	9.09	0.2500	0.89	0.121	163.0	270.0	163.0	1,500	-6,536	11	2,474	-4,051
Telco	BELOPTIX DT144 - 144 FIBERS -	TWT	25.27	9.09	0.7560	-	0.208	163.0	270.0	163.0		0	19	2,468	2,487
Overlashed	1/4" EHS	TWT	25.33	9.09	0.2500	1.00	0.121	173.0	90.0	173.0	1,500	6,536	12	2,626	9,174

Version: 5.0 / 5.00
* includes Load Factor(s)

[2] Worst Wind per Guy Wire
[3] Wind at 179.3°

Telco	BELOPTIX DT144 - 144 FIBERS -	TWT	25.27	9.09	0.7560	-	0.208	173.0	90.0	173.0		0	20	2,619	2,640
Overlashed	1/4" EHS	COX	24.33	9.19	0.2500	2.81	0.121	163.0	270.0	163.0	1,500	-6,278	11	1,085	-5,182
Telco	432ct Fiber	COX	24.28	9.18	0.8300	-	0.159	163.0	270.0	163.0		0	15	1,083	1,098
Telco	BELOPTIX DT144 - 144 FIBERS -	COX	24.33	8.99	0.7560	-	0.208	163.0	270.0	163.0		0	19	1,085	1,104
Telco	BELOPTIX DT144 - 144 FIBERS -	COX	24.38	9.19	0.7560	-	0.208	163.0	270.0	163.0		0	19	1,087	1,106
Telco	BELOPTIX DT096 - 72 FIBERS -	COX	24.27	9.45	0.5160	-	0.097	163.0	270.0	163.0		0	9	1,083	1,092
Telco	BELOPTIX DT096 - 72 FIBERS -	COX	24.39	9.45	0.5160	-	0.097	163.0	270.0	163.0		0	9	1,088	1,097
Telco	P3-500CA	COX	24.39	8.97	0.5000	-	0.072	163.0	270.0	163.0		0	7	1,088	1,094
Telco	432ct Fiber	COX	24.33	9.42	0.8300	-	0.159	163.0	270.0	163.0		0	15	1,085	1,100
Overlashed	1/4" EHS	COX	24.33	9.19	0.2500	3.15	0.121	173.0	90.0	173.0	1,500	6,278	12	1,152	7,442
Telco	432ct Fiber	COX	24.28	9.18	0.8300	-	0.159	173.0	90.0	173.0		0	16	1,149	1,165
Telco	BELOPTIX DT144 - 144 FIBERS -	COX	24.33	8.99	0.7560	-	0.208	173.0	90.0	173.0		0	20	1,152	1,172
Telco	BELOPTIX DT144 - 144 FIBERS -	COX	24.38	9.19	0.7560	-	0.208	173.0	90.0	173.0		0	21	1,154	1,174
Telco	BELOPTIX DT096 - 72 FIBERS -	COX	24.27	9.45	0.5160	-	0.097	173.0	90.0	173.0		0	10	1,149	1,159
Telco	BELOPTIX DT096 - 72 FIBERS -	COX	24.39	9.45	0.5160	-	0.097	173.0	90.0	173.0		0	10	1,154	1,164
Telco	P3-500CA	COX	24.39	8.97	0.5000	-	0.072	173.0	90.0	173.0		0	7	1,154	1,161
Telco	432ct Fiber	COX	24.33	9.42	0.8300	-	0.159	173.0	90.0	173.0		0	16	1,152	1,168
Overlashed	1/4" EHS	CTL	22.75	9.34	0.2500	2.91	0.121	173.0	90.0	173.0	1,500	5,871	1	2,792	8,664
Telco	26 GA 400 PR (1.30)	CTL	22.69	9.34	1.3000	-	0.910	173.0	90.0	173.0		0	10	2,785	2,794
Overlashed	1/4" EHS	CTL	21.50	9.47	0.2500	1.18	0.121	173.0	90.0	173.0	1,500	5,548	1	1,681	7,230
Telco	26 GA 100 PR (0.74)	CTL	21.46	9.47	0.7400	-	0.270	173.0	90.0	173.0		0	3	1,678	1,681
											Totals:	11,419	379	46,916	58,714

GenericEquipment:		Owner	Height (ft)	Horiz. Offset (in)	Offset Angle (deg)	Rotate Angle (deg)	Unit Weight (lbs)	Unit Height (in)	Unit Depth (in)	Unit Diameter (in)	Unit Length (in)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Box	Fuse Cutout	NVE	34.50	21.69	0.0	0.0	15.00	12.00	8.00	-	8.00	-	-40	824	784
Box	Fuse Cutout	NVE	34.50	21.69	90.0	0.0	15.00	12.00	8.00	-	8.00	-	4	824	829
Box	Fuse Cutout	NVE	34.50	21.69	270.0	0.0	15.00	12.00	8.00	-	8.00	-	-4	824	820
											Totals:	0	-40	2,473	2,433

Riser:		Owner	Height (ft)	Horiz. Offset (in)	Offset Angle (deg)	Rotate Angle (deg)	Unit Weight (lbs)	Unit Height (in)	Unit Depth (in)	Unit Diameter (in)	Unit Length (in)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Riser 225.0°	Riser	NVE	25.00	9.61	225.0	225.0	4.48	300.00	-	0.00	-	-	26	2,227	2,253
Riser 320.0°	Riser	CTL	21.08	9.61	320.0	320.0	0.66	252.96	-	0.00	-	-	-5	701	696
											Totals:	0	21	2,928	2,948

Insulator:		Owner	Height (ft)	Horiz. Offset (in)	Offset Angle (deg)	Rotate Angle (deg)	Unit Weight (lbs)	Unit Height (in)	Unit Depth (in)	Unit Diameter (in)	Unit Length (in)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Post	Post Insulator - 15 kV	NVE	44.50	4.71	270.0	270.0	11.00	11.50	-	4.75	-	-	15	382	397
Post	Post Insulator - 15 kV	NVE	44.50	4.71	270.0	270.0	11.00	11.50	-	4.75	-	-	-16	382	366
Post	Post Insulator - 15 kV	NVE	41.50	5.01	270.0	270.0	11.00	11.50	-	4.75	-	-	15	357	372
Post	Post Insulator - 15 kV	NVE	41.50	5.01	270.0	270.0	11.00	11.50	-	4.75	-	-	-16	357	340
Post	Post Insulator - 15 kV	NVE	38.50	5.30	270.0	270.0	11.00	11.50	-	4.75	-	-	15	331	346
Post	Post Insulator - 15 kV	NVE	38.50	5.30	270.0	270.0	11.00	11.50	-	4.75	-	-	-16	331	315
Spool	Spool Insulator - 20 kV	NVE	31.42	5.99	0.0	0.0	1.00	2.12	-	2.50	-	-	-1	26	25
Bolt	Three Bolt	ZFS	27.25	6.40	180.0	180.0	5.00	0.00	-	3.00	-	-	6	0	6

Version: 5.0 / 5.00
* includes Load Factor(s)

² Worst Wind per Guy Wire
³ Wind at 179.3°

Bolt	Suspension Shoe	TWT	25.33	6.59	180.0	180.0	5.00	0.00	-	3.00	-	-	6	0	6
Bolt	Three Bolt	COX	24.33	6.69	180.0	180.0	5.00	0.00	-	3.00	-	-	6	0	6
Bolt	Single Bolt	CTL	22.75	6.84	90.0	90.0	5.00	0.00	-	3.00	-	-	1	0	1
Bolt	Single Bolt	CTL	21.50	6.97	90.0	90.0	5.00	0.00	-	3.00	-	-	1	0	1
											Totals:	0	13	2,167	2,179

Guy Wire and Brace:		Owner	Attach Height (ft)	End Height (ft)	Lead/Span Length (ft)	Wire Dia. (in)	Percent Solid (%)	Lead Angle (deg)	Incline Angle (deg)	Wire Weight (lbs/ft)	Rest Length (ft)	Stretch Length (in)
Guy 1: EHS 5/16	Down	CTL	22.75	0.00	23.00	0.312	75.0	270.0	44.7	0.205	31.95	0.82
Guy 2: EHS 5/16	Down	CTL	21.50	0.00	23.00	0.312	75.0	270.0	43.1	0.205	31.06	0.78

Guy Wire and Brace (Loads and Reactions)		Elastic Modulus (psi)	Rated Tensile Strength (lbs)	Guy Strength Factor	Allowable Tension (lbs)	Initial Tension (lbs)	Required Tension[2] (lbs)	Required Tension[3] (lbs)	Applied Tension[3] (lbs)	Vertical Load[3] (lbs)	Shear Load in Guy Dir[3] (lbs)	Shear Load at Report Angle[3] (lbs)	Moment at GL[3] (ft-lb)*
Guy 1: EHS 5/16	Down	23,000,000	11,200	0.90	10,080	700	6,265	3,797	2,835	1,994	2,016	-210	212
Guy 2: EHS 5/16	Down	23,000,000	11,200	0.90	10,080	700	5,951	3,607	2,756	1,882	2,013	-210	195
									Totals:	3,876	4,029	-420	406

Anchor/Rod Load Summary:	Owner	Rod Length AGL (in)	Lead Length (ft)	Lead Angle (deg)	Strength of Assembly (lbs)	Anchor/Rod Strength Factor	Allowable Load (lbs)	Max Load[2] (lbs)	Load at Pole MCU[3] (lbs)	Max Required Capacity[2] (%)
Single - 12" - Soil Class 4	CTL	0.00	23.00	270.0	25,000	1.00	25,000	7,403	5,590	29.6

Pole Buckling

Buckling [illegible]	Buckling [illegible] (ft)	Buckling Section [illegible] (% Buckling Col. Hgt.)	Buckling [illegible] (in)	Min. Buckling [illegible] (in)	Diameter [illegible] (in)	Diameter [illegible] (in)	Modulus of [illegible] (psi)	Pole [illegible] (pcf)	Ice Density (pcf)	Pole Tip [illegible] (ft)	Buckling Load [illegible] (lbs)	Buckling Load [illegible] (lbs)	Buckling Load [illegible]
0.71	26.69	34.32	16.35	14.63	9.24	18.15	1,000,000	50.00	57.00	45.50	438,513	5,982	73.31

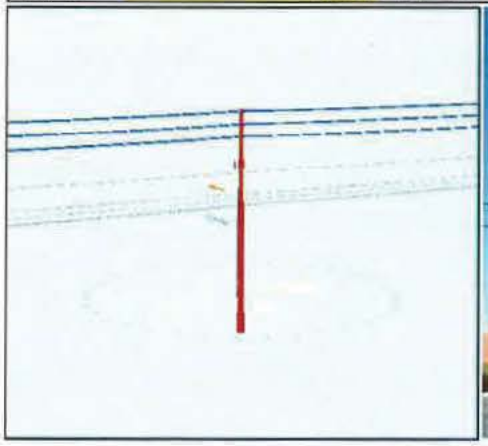
Version: 5.0 / 5.00
* includes Load Factor(s)

[2] Worst Wind per Guy Wire
[3] Wind at 179.3°

O-Calc® Pro *Analysis Report*

Thursday, October 02, 2014 7:48:53 PM

File Name:	35 - p76066 Propos	Pole Length / Class:	55 / 1	Code:	NESC	Structure Type:	Unguyed
Pole Num:	35 - p76066	Pole Species:	PONDEROSA PINE	NESC Rule:	Rule 250B	Status:	N/A
Permit #:	Unset	Setting Depth (ft):	9.50	Construction Grade:	B	Pole Strength Factor:	0.65
Owner:	Unset	G/L Circumference (in):	56.00	Loading District:	Light	Transverse Wind LF:	2.50
Latitude:	Unset	G/L Fiber Stress (psi):	6,600	Ice Thickness (in):	0.00	Wire Tension LF:	1.10
Longitude:	Unset	Allowable Stress (psi):	4,290	Wind Speed (mph):	59.29	Vertical LF:	1.50
Emp #:	Unset	Fiber Stress Ht. Reduction:	No	Wind Pressure (psf):	9.00		



Pole Capacity Utilization		Height	Wind Angle
Maximum:	65.5%	0.0 ft	0.0°
Groundline:	65.5%	0.0 ft	0.0°
Vertical:	9.9%	25.7 ft	0.0°

Pole Moments		Load Angle	Wind Angle
Max Capac. Util:	129,216 ft-lb	0.0°	0.0°
Groundline:	129,216 ft-lb	0.0°	0.0°

GROUNDLINE LOAD SUMMARY:*Wind at 0.0°, Applied Moment 129,216 ft-lb at 0.0°, Allowable Moment 198,788 ft-lb

	Shear Load (lbs)*	Percent Applied Load	Bending Moment (ft-lb)	Percent of Applied Moment	Percent of Pole Capacity	Bending Stress (+/- psi)	Vertical Load (lbs)	Vertical Stress (psi)	Total Stress (psi)	Percent of Pole Capacity
Powers:	1,652	37.7	68,381	53.7	34.4	1,476	1,020	4	1,480	34.5
Comms:	975	22.2	22,928	18.0	11.5	495	322	1	496	11.6
Power Equipment:	49	1.1	1,846	1.5	0.9	40	248	1	41	1.0
Pole:	1,127	25.7	22,652	17.8	11.4	489	3,380	14	502	11.7
Risers:	528	12.1	9,252	7.3	4.7	200	278	1	201	4.7
Insulators:	52	1.2	2,198	1.7	1.1	47	130	1	48	1.1
Pole Load:	4,383	100.0	127,258	100.0	64.0	2,746	5,377	22	2,768	64.5
Pole Reserve Capacity:			71,530		36.0	1,544			1,522	35.5

LOAD SUMMARY BY OWNER

NVE:	3,346	103,407	2,232	4,976	20	2,252	52.5

ZFS:	266	6,779	146	100	0	147	3.4
TWT:	227	5,415	117	68	0	117	2.7
COX:	543	11,657	252	234	1	253	5.9
Totals	4,383	127,258	2,746	5,377	22	2,768	64.5

Detailed Load Components

Power:		Owner	Height (ft)	Horiz. Offset (in)	Cable Dia. (in)	Sag at Max Temp	Cable Weight (lbs/ft)	Lead/Span Length	Span Angle (deg)	Wire Length (ft)	Tension (lbs)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft lb)*	Moment at GL (ft-lb)*
Primary	AAC 954.0 KCM 37 STRAND	NVE	45.08	12.29	1.1240	1.64	0.895	122.0	270.0	122.0	3,068	-36	78	5,801	5,844
Primary	AAC 954.0 KCM 37 STRAND	NVE	45.08	12.29	1.1240	1.65	0.895	123.0	90.0	123.0	3,068	36	79	5,849	5,964
Primary	AAC 954.0 KCM 37 STRAND	NVE	45.08	12.29	1.1240	1.64	0.895	122.0	270.0	122.0	3,068	-36	-78	5,801	5,687
Primary	AAC 954.0 KCM 37 STRAND	NVE	45.08	12.29	1.1240	1.65	0.895	123.0	90.0	123.0	3,068	36	-79	5,849	5,806
Primary	AAC 954.0 KCM 37 STRAND	NVE	42.08	12.40	1.1240	1.64	0.895	122.0	270.0	122.0	3,068	-33	78	5,416	5,461
Primary	AAC 954.0 KCM 37 STRAND	NVE	42.08	12.40	1.1240	1.65	0.895	123.0	90.0	123.0	3,068	33	79	5,460	5,572
Primary	AAC 954.0 KCM 37 STRAND	NVE	42.08	12.40	1.1240	1.64	0.895	122.0	270.0	122.0	3,068	-33	-78	5,416	5,304
Primary	AAC 954.0 KCM 37 STRAND	NVE	42.08	12.40	1.1240	1.65	0.895	123.0	90.0	123.0	3,068	33	-79	5,460	5,414
Primary	AAC 954.0 KCM 37 STRAND	NVE	39.08	12.52	1.1240	1.64	0.895	122.0	270.0	122.0	3,068	-31	78	5,030	5,078
Primary	AAC 954.0 KCM 37 STRAND	NVE	39.08	12.52	1.1240	1.65	0.895	123.0	90.0	123.0	3,068	31	79	5,071	5,181
Primary	AAC 954.0 KCM 37 STRAND	NVE	39.08	12.52	1.1240	1.64	0.895	122.0	270.0	122.0	3,068	-31	-78	5,030	4,921
Primary	AAC 954.0 KCM 37 STRAND	NVE	39.08	12.52	1.1240	1.65	0.895	123.0	90.0	123.0	3,068	31	-79	5,071	5,023
Neutral	ACSR 2/0 AWG 6/1 QUAIL	NVE	30.67	8.05	0.4470	0.69	0.183	122.0	270.0	122.0	1,355	-11	-11	1,568	1,546
Neutral	ACSR 2/0 AWG 6/1 QUAIL	NVE	30.67	8.05	0.4470	0.70	0.183	123.0	90.0	123.0	1,355	11	-11	1,581	1,580
											Totals:	0	-22	68,404	68,381

Comm:		Owner	Height (ft)	Horiz. Offset (in)	Cable Dia. (in)	Sag at Max Temp	Cable Weight (lbs/ft)	Lead/Span Length	Span Angle (deg)	Wire Length (ft)	Tension (lbs)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft lb)*	Moment at GL (ft-lb)*
Overlashed	5/16" EHS	ZFS	25.33	8.84	0.3125	0.77	0.205	122.0	270.0	122.0	1,500	-10	14	1,120	1,124
Telco	BELOPTIX DT144 - 144 FIBERS -	ZFS	25.30	8.72	0.7560	-	0.208	122.0	270.0	122.0		0	14	1,119	1,132
Telco	24ct Fiber	ZFS	25.31	8.93	0.3900	-	0.049	122.0	270.0	122.0		0	3	1,119	1,122
Overlashed	5/16" EHS	ZFS	25.33	8.84	0.3125	0.78	0.205	123.0	90.0	123.0	1,500	10	0	1,129	1,139
Telco	BELOPTIX DT144 - 144 FIBERS -	ZFS	25.30	8.53	0.7560	-	0.208	123.0	90.0	123.0		0	0	1,128	1,128
Telco	24ct Fiber	ZFS	25.31	9.05	0.3900	-	0.049	123.0	90.0	123.0		0	0	1,128	1,128
Overlashed	1/4" EHS	TWT	24.08	8.97	0.2500	0.49	0.121	122.0	270.0	122.0	1,500	-9	-8	1,362	1,344
Telco	BELOPTIX DT144 - 144 FIBERS -	TWT	24.04	8.97	0.7560	-	0.208	122.0	270.0	122.0		0	-14	1,360	1,345
Overlashed	1/4" EHS	TWT	24.08	8.97	0.2500	0.50	0.121	123.0	90.0	123.0	1,500	9	-8	1,373	1,374
Telco	BELOPTIX DT144 - 144 FIBERS -	TWT	24.04	8.97	0.7560	-	0.208	123.0	90.0	123.0		0	-14	1,371	1,356
Overlashed	1/4" EHS	COX	22.58	9.12	0.2500	1.46	0.121	122.0	270.0	122.0	1,500	-9	-8	704	687
Telco	432ct Fiber	COX	22.57	8.93	0.8300	-	0.159	122.0	270.0	122.0		0	-11	704	693
Telco	BELOPTIX DT144 - 144 FIBERS -	COX	22.62	9.12	0.7560	-	0.208	122.0	270.0	122.0		0	-14	706	691
Telco	BELOPTIX DT096 - 72 FIBERS -	COX	22.52	9.03	0.5160	-	0.097	122.0	270.0	122.0		0	-7	702	696
Telco	BELOPTIX DT096 - 72 FIBERS -	COX	22.63	8.90	0.5160	-	0.097	122.0	270.0	122.0		0	-7	706	699
Telco	P3-500CA	COX	22.63	9.38	0.5000	-	0.072	122.0	270.0	122.0		0	-5	706	701
Telco	BELOPTIX DT096 - 72 FIBERS -	COX	22.52	9.23	0.5160	-	0.097	122.0	270.0	122.0		0	-7	702	696
Telco	432ct Fiber	COX	22.57	9.35	0.8300	-	0.159	122.0	270.0	122.0		0	-11	704	693
Overlashed	1/4" EHS	COX	22.58	9.12	0.2500	1.35	0.121	123.0	90.0	123.0	1,500	9	-8	748	748

Version: 5.0 / 5.00
* includes Load Factor(s)

² Worst Wind per Guy Wire
³ Wind at 0.0°

Telco	432ct Fiber	COX	22.56	8.94	0.8300	-	0.159	123.0	90.0	123.0		0	-11	747	736
Telco	BELOPTIX DT144 - 144 FIBERS -	COX	22.63	9.12	0.7560	-	0.208	123.0	90.0	123.0		0	-15	749	734
Telco	BELOPTIX DT096 - 72 FIBERS -	COX	22.62	8.90	0.5160	-	0.097	123.0	90.0	123.0		0	-7	749	742
Telco	BELOPTIX DT096 - 72 FIBERS -	COX	22.52	9.12	0.5160	-	0.097	123.0	90.0	123.0		0	-7	746	739
Telco	P3-500CA	COX	22.62	9.36	0.5000	-	0.072	123.0	90.0	123.0		0	-5	749	744
Telco	432ct Fiber	COX	22.56	9.32	0.8300	-	0.159	123.0	90.0	123.0		0	-11	747	736
											Totals:	0	-149	23,077	22,928

PowerEquipment:		Owner	Height (ft)	Horiz. Offset (in)	Offset Angle (deg)	Rotate Angle (deg)	Unit Weight (lbs)	Unit Height (in)	Unit Depth (in)	Unit Diameter (in)	Unit Length (in)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Switch	3Ø Disconnect Switch	NVE	32.08	13.66	0.0	0.0	55.00	26.00	-	4.00	-	-	282	1,564	1,846
											Totals:	0	282	1,564	1,846

Riser:		Owner	Height (ft)	Horiz. Offset (in)	Offset Angle (deg)	Rotate Angle (deg)	Unit Weight (lbs)	Unit Height (in)	Unit Depth (in)	Unit Diameter (in)	Unit Length (in)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Riser 270.0°	Riser	NVE	26.67	9.47	270.0	270.0	6.33	320.04	-	0.00	-	-	0	4,446	4,446
Riser 300.0°	Riser	NVE	26.67	9.47	300.0	300.0	6.33	320.04	-	0.00	-	-	28	3,850	3,878
Riser 30.0°	Riser	COX	22.00	9.47	30.0	30.0	2.75	264.00	-	0.00	-	-	21	907	929
											Totals:	0	49	9,203	9,252

Insulator:		Owner	Height (ft)	Horiz. Offset (in)	Offset Angle (deg)	Rotate Angle (deg)	Unit Weight (lbs)	Unit Height (in)	Unit Depth (in)	Unit Diameter (in)	Unit Length (in)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Post	Post Insulator - 15 kV	NVE	45.08	4.34	90.0	90.0	11.00	11.50	-	4.75	-	-	16	389	405
Post	Post Insulator - 15 kV	NVE	45.08	4.34	90.0	90.0	11.00	11.50	-	4.75	-	-	-16	389	373
Post	Post Insulator - 15 kV	NVE	42.08	4.64	90.0	90.0	11.00	11.50	-	4.75	-	-	16	363	379
Post	Post Insulator - 15 kV	NVE	42.08	4.64	90.0	90.0	11.00	11.50	-	4.75	-	-	-16	363	347
Post	Post Insulator - 15 kV	NVE	39.08	4.95	90.0	90.0	11.00	11.50	-	4.75	-	-	16	338	353
Post	Post Insulator - 15 kV	NVE	39.08	4.95	90.0	90.0	11.00	11.50	-	4.75	-	-	-16	338	322
Spool	Spool Insulator - 20 kV	NVE	30.67	5.80	180.0	180.0	1.00	2.12	-	2.50	-	-	-1	25	24
Bolt	Single Bolt	ZFS	25.33	6.34	0.0	360.0	5.00	0.00	-	3.00	-	-	6	0	6
Bolt	Single Bolt	ZFS	25.33	6.34	90.0	90.0	5.00	0.00	-	3.00	-	-	0	0	0
Bolt	Three Bolt	TWT	24.08	6.47	180.0	180.0	5.00	0.00	-	3.00	-	-	-6	0	-6
Bolt	Three Bolt	COX	22.58	6.62	180.0	180.0	5.00	0.00	-	3.00	-	-	-6	0	-6
											Totals:	0	-7	2,205	2,198

Pole Buckling

Buckling	Buckling (ft)	Buckling Section (% Buckling Col. Hgt.)	Buckling (in)	Min. Buckling (in)	Diameter (in)	Diameter (in)	Modulus of (psi)	Pole (pcf)	Ice Density (pcf)	Pole Tip (ft)	Buckling Load (lbs)	Buckling Load (lbs)	Buckling Load
2.00	25.72	34.39	16.03	22.98	8.60	17.83	1,000,000	50.00	57.00	45.50	54,573	5,377	10.15

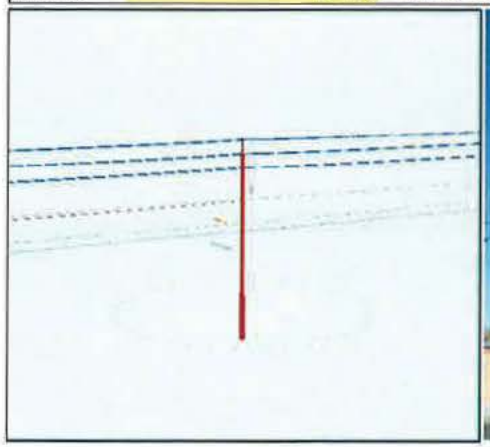
Version: 5.0 / 5.00
* Includes Load Factor(s)

* Worst Wind per Guy Wire
* Wind at 0.0°

O-Calc® Pro *Analysis Report*

Friday, October 03, 2014 5:28:13 AM

File Name:	36 - p76064 Propos	Pole Length / Class:	60 / 1	Code:	NESC	Structure Type:	Unguyed
Pole Num:	36 - p76064	Pole Species:	PONDEROSA PINE	NESC Rule:	Rule 250B	Status:	N/A
Permit #:	Unset	Setting Depth (ft):	9.17	Construction Grade:	B	Pole Strength Factor:	0.65
Owner:	Unset	G/L Circumference (in):	53.00	Loading District:	Light	Transverse Wind LF:	2.50
Latitude:	Unset	G/L Fiber Stress (psi):	6,600	Ice Thickness (in):	0.00	Wire Tension LF:	1.10
Longitude:	Unset	Allowable Stress (psi):	4,290	Wind Speed (mph):	59.29	Vertical LF:	1.50
Emp #:	Unset	Fiber Stress Ht. Reduction:	No	Wind Pressure (psf):	9.00		



Pole Capacity Utilization		Height	Wind Angle
Maximum:	80.0%	0.0 ft	356.3°
Groundline:	80.0%	0.0 ft	356.3°
Vertical:	15.6%	29.2 ft	356.3°

Pole Moments		Load Angle	Wind Angle
Max Capac. Util:	133,782 ft-lb	349.8°	356.3°
Groundline:	133,782 ft-lb	349.8°	356.3°

GROUNDLINE LOAD SUMMARY:*Wind at 356.3°, Applied Moment 133,782 ft-lb at 349.8°, Allowable Moment 168,521 ft-lb

	Shear Load (lbs)*	Percent Applied Load	Bending Moment (ft-lb)	Percent of Applied Moment	Percent of Pole Capacity	Bending Stress (+/- psi)	Vertical Load (lbs)	Vertical Stress (psi)	Total Stress (psi)	Percent of Pole Capacity
Powers:	1,689	42.6	75,009	57.1	44.5	1,909	962	4	1,914	44.6
Comms:	798	20.1	20,095	15.3	11.9	512	267	1	513	12.0
Power Equipment:	133	3.4	4,681	3.6	2.8	119	548	2	122	2.8
Pole:	1,206	30.4	27,323	20.8	16.2	696	3,489	16	711	16.6
Risers:	85	2.1	1,853	1.4	1.1	47	19	0	47	1.1
Insulators:	53	1.3	2,441	1.9	1.4	62	132	1	63	1.5
Pole Load:	3,963	100.0	131,401	100.0	78.0	3,345	5,416	24	3,369	78.5
Pole Reserve Capacity:			37,120		22.0	945			921	21.5

LOAD SUMMARY BY OWNER

NVE:	3,165	111,318	2,834	5,119	23	2,857	66.6

Version: 5.0 / 5.00
* includes Load Factor(s)

² Worst Wind per Guy Wire
³ Wind at 356.3°

ZFS:	74	2,109	54	50	0	54	1.3
TWT:	270	7,108	181	80	0	181	4.2
COX:	454	10,867	277	167	1	277	6.5
Totals	3,963	131,401	3,345	5,416	24	3,369	78.5

Detailed Load Components

Power:		Owner	Height (ft)	Horiz. Offset (in)	Cable Dia. (in)	Sag at Max Temp	Cable Weight (lbs/ft)	Lead/Span Length	Span Angle (deg)	Wire Length (ft)	Tension (lbs)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft lb)*	Moment at GL (ft-lb)*
Primary	AAC 954.0 KCM 37 STRAND	NVE	50.50	12.29	1.1240	1.37	0.895	105.0	270.0	105.0	3,068	30,119	71	5,494	35,683
Primary	AAC 954.0 KCM 37 STRAND	NVE	50.50	12.29	1.1240	1.66	0.895	123.0	90.0	123.0	3,068	-30,119	83	6,435	-23,600
Primary	AAC 954.0 KCM 37 STRAND	NVE	50.50	12.29	1.1240	1.37	0.895	105.0	270.0	105.0	3,068	30,119	-62	5,494	35,550
Primary	AAC 954.0 KCM 37 STRAND	NVE	50.50	12.29	1.1240	1.66	0.895	123.0	90.0	123.0	3,068	-30,119	-73	6,435	-23,756
Primary	AAC 954.0 KCM 37 STRAND	NVE	46.50	12.40	1.1240	1.37	0.895	105.0	270.0	105.0	3,068	27,735	71	5,059	32,865
Primary	AAC 954.0 KCM 37 STRAND	NVE	46.50	12.40	1.1240	1.66	0.895	123.0	90.0	123.0	3,068	-27,735	83	5,926	-21,726
Primary	AAC 954.0 KCM 37 STRAND	NVE	46.50	12.40	1.1240	1.37	0.895	105.0	270.0	105.0	3,068	27,735	-62	5,059	32,732
Primary	AAC 954.0 KCM 37 STRAND	NVE	46.50	12.40	1.1240	1.66	0.895	123.0	90.0	123.0	3,068	-27,735	-72	5,926	-21,881
Primary	AAC 954.0 KCM 37 STRAND	NVE	42.50	12.53	1.1240	1.37	0.895	105.0	270.0	105.0	3,068	25,352	72	4,624	30,047
Primary	AAC 954.0 KCM 37 STRAND	NVE	42.50	12.53	1.1240	1.66	0.895	123.0	90.0	123.0	3,068	-25,352	84	5,417	-19,851
Primary	AAC 954.0 KCM 37 STRAND	NVE	42.50	12.53	1.1240	1.37	0.895	105.0	270.0	105.0	3,068	25,352	-61	4,624	29,914
Primary	AAC 954.0 KCM 37 STRAND	NVE	42.50	12.53	1.1240	1.66	0.895	123.0	90.0	123.0	3,068	-25,352	-72	5,417	-20,007
Neutral	ACSR 2/0 AWG 6/1 QUAIL	NVE	33.25	7.98	0.4470	0.56	0.183	105.0	270.0	105.0	1,355	8,750	9	1,437	10,197
Neutral	ACSR 2/0 AWG 6/1 QUAIL	NVE	33.25	7.98	0.4470	0.72	0.183	123.0	90.0	123.0	1,355	-8,750	11	1,683	-7,056
Secondary	TRIPLEX 4 AWG	NVE	32.92	8.01	0.6800	1.22	0.164	105.0	270.0	105.0	585	3,740	-8	2,165	5,896
											Totals:	3,740	75	71,194	75,009

Comm:		Owner	Height (ft)	Horiz. Offset (in)	Cable Dia. (in)	Sag at Max Temp	Cable Weight (lbs/ft)	Lead/Span Length	Span Angle (deg)	Wire Length (ft)	Tension (lbs)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft lb)*	Moment at GL (ft-lb)*
Overlashed	5/16" EHS	ZFS	28.67	8.60	0.3125	0.27	0.205	105.0	270.0	105.0	1,500	8,352	2	971	9,326
Overlashed	5/16" EHS	ZFS	28.67	8.60	0.3125	0.37	0.205	123.0	90.0	123.0	1,500	-8,352	-2	1,138	-7,217
Overlashed	1/4" EHS	TWT	26.58	8.77	0.2500	0.51	0.121	105.0	270.0	105.0	1,500	7,743	-7	1,101	8,837
Telco	BELOPTIX DT144 - 144 FIBERS -	TWT	26.55	8.91	0.7560	-	0.208	105.0	270.0	105.0		0	-12	1,099	1,088
Telco	BELOPTIX DT096 - 72 FIBERS -	TWT	26.56	8.67	0.5160	-	0.097	105.0	270.0	105.0		0	-5	1,100	1,094
Overlashed	1/4" EHS	TWT	26.58	8.77	0.2500	0.69	0.121	123.0	90.0	123.0	1,500	-7,743	-8	1,289	-6,462
Telco	BELOPTIX DT144 - 144 FIBERS -	TWT	26.55	8.91	0.7560	-	0.208	123.0	90.0	123.0		0	-14	1,288	1,274
Telco	BELOPTIX DT096 - 72 FIBERS -	TWT	26.56	8.67	0.5160	-	0.097	123.0	90.0	123.0		0	-6	1,288	1,282
Overlashed	1/4" EHS	COX	24.17	8.97	0.2500	1.05	0.121	105.0	270.0	105.0	1,500	7,041	-7	722	7,757
Telco	P3-750CA	COX	24.13	8.96	0.7500	-	0.161	105.0	270.0	105.0		0	-9	721	712
Telco	P3-750CA	COX	24.17	8.76	0.7500	-	0.161	105.0	270.0	105.0		0	-9	722	713
Telco	P3-500CA	COX	24.23	8.72	0.5000	-	0.072	105.0	270.0	105.0		0	-4	724	720
Telco	432ct Fiber	COX	24.22	8.95	0.8300	-	0.159	105.0	270.0	105.0		0	-9	724	715
Telco	BELOPTIX DT096 - 72 FIBERS -	COX	24.23	9.22	0.5160	-	0.097	105.0	270.0	105.0		0	-6	724	718
Telco	432ct Fiber	COX	24.17	9.20	0.8300	-	0.159	105.0	270.0	105.0		0	-9	723	713
Overlashed	1/4" EHS	COX	24.17	8.97	0.2500	1.43	0.121	123.0	90.0	123.0	1,500	-7,041	-8	846	-6,203
Telco	P3-750CA	COX	24.13	8.96	0.7500	-	0.161	123.0	90.0	123.0		0	-11	845	834
Telco	P3-750CA	COX	24.17	8.76	0.7500	-	0.161	123.0	90.0	123.0		0	-11	846	836

Version: 5.0 / 5.00
* Includes Load Factor(s)

[2] Worst Wind per Guy Wire
[3] Wind at 356.3°

Telco	P3-500CA	COX	24.23	8.72	0.5000	-	0.072	123.0	90.0	123.0		0	-5	848	843
Telco	432ct Fiber	COX	24.22	8.95	0.8300	-	0.159	123.0	90.0	123.0		0	-11	848	837
Telco	BELOPTIX DT096 - 72 FIBERS -	COX	24.23	9.22	0.5160	-	0.097	123.0	90.0	123.0		0	-7	848	842
Telco	432ct Fiber	COX	24.17	9.20	0.8300	-	0.159	123.0	90.0	123.0		0	-11	846	835
											Totals:	0	-170	20,264	20,095

PowerEquipment:		Owner	Height (ft)	Horiz. Offset (in)	Offset Angle (deg)	Rotate Angle (deg)	Unit Weight (lbs)	Unit Height (in)	Unit Depth (in)	Unit Diameter (in)	Unit Length (in)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft lb)*	Moment at GL (ft-lb)*
Transformer	1PH-25KVA	NVE	36.50	22.46	90.0	90.0	365.00	39.00	-	22.00	-	-	-181	4,862	4,681
											Totals:	0	-181	4,862	4,681

Riser:		Owner	Height (ft)	Horiz. Offset (in)	Offset Angle (deg)	Rotate Angle (deg)	Unit Weight (lbs)	Unit Height (in)	Unit Depth (in)	Unit Diameter (in)	Unit Length (in)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft lb)*	Moment at GL (ft-lb)*
Riser 220.0°	Riser	NVE	32.92	8.86	220.0	220.0	1.03	395.04	-	0.00	-	-	-6	1,859	1,853
											Totals:	0	-6	1,859	1,853

Insulator:		Owner	Height (ft)	Horiz. Offset (in)	Offset Angle (deg)	Rotate Angle (deg)	Unit Weight (lbs)	Unit Height (in)	Unit Depth (in)	Unit Diameter (in)	Unit Length (in)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft lb)*	Moment at GL (ft-lb)*
Post	Post Insulator - 15 kV	NVE	50.50	4.32	270.0	270.0	11.00	11.50	-	4.75	-	-	17	432	449
Post	Post Insulator - 15 kV	NVE	50.50	4.32	270.0	270.0	11.00	11.50	-	4.75	-	-	-15	432	418
Post	Post Insulator - 15 kV	NVE	46.50	4.65	270.0	270.0	11.00	11.50	-	4.75	-	-	17	398	415
Post	Post Insulator - 15 kV	NVE	46.50	4.65	270.0	270.0	11.00	11.50	-	4.75	-	-	-14	398	384
Post	Post Insulator - 15 kV	NVE	42.50	4.98	270.0	270.0	11.00	11.50	-	4.75	-	-	17	364	381
Post	Post Insulator - 15 kV	NVE	42.50	4.98	270.0	270.0	11.00	11.50	-	4.75	-	-	-14	364	350
Spool	Spool Insulator - 20 kV	NVE	33.25	5.73	0.0	0.0	1.00	2.12	-	2.50	-	-	1	27	28
Spool	Spool Insulator - 20 kV	NVE	32.92	5.76	180.0	180.0	1.00	2.12	-	2.50	-	-	-1	27	26
Bolt	Single Bolt	ZFS	28.67	6.10	270.0	270.0	5.00	0.00	-	3.00	-	-	1	0	1
Bolt	Single Bolt	ZFS	28.67	6.10	90.0	90.0	5.00	0.00	-	3.00	-	-	-1	0	-1
Bolt	Suspension Shoe	TWT	26.58	6.27	180.0	180.0	5.00	0.00	-	3.00	-	-	-5	0	-5
Bolt	Three Bolt	COX	24.17	6.47	180.0	180.0	5.00	0.00	-	3.00	-	-	-6	0	-6
											Totals:	0	-4	2,445	2,441

Pole Buckling

Buckling	Buckling (ft)	Buckling Section (% Buckling Col. Hgt.)	Buckling (in)	Min. Buckling (in)	Diameter (in)	Diameter (in)	Modulus of (psi)	Pole (pcf)	Ice Density (pcf)	Pole Tip (ft)	Buckling Load (lbs)	Buckling Load (lbs)	Buckling Load
2.00	29.18	34.22	15.24	24.56	8.60	16.88	1,000,000	50.00	57.00	50.83	34,672	5,416	6.40

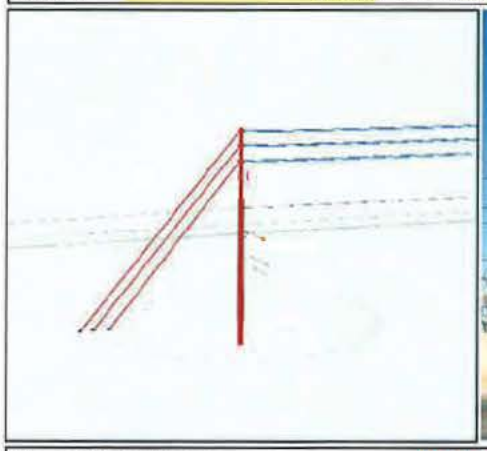
Version: 5.0 / 5.00
* includes Load Factor(s)

² Worst Wind per Guy Wire
³ Wind at 356.3°

O-Calc® Pro *Analysis Report*

Friday, October 03, 2014 6:53:56 AM

File Name:	37 - p82578 Propos	Pole Length / Class:	60 / H1	Code:	NESC	Structure Type:	Guyed
Pole Num:	37 - p82578	Pole Species:	WESTERN RED CEDAR	NESC Rule:	Rule 250B	Status:	N/A
Permit #:	Unset	Setting Depth (ft):	7.50	Construction Grade:	B	Pole Strength Factor:	0.65
Owner:	Unset	G/L Circumference (in):	53.00	Loading District:	Light	Transverse Wind LF:	2.50
Latitude:	Unset	G/L Fiber Stress (psi):	6,000	Ice Thickness (in):	0.00	Wire Tension LF:	1.65
Longitude:	Unset	Allowable Stress (psi):	3,900	Wind Speed (mph):	59.29	Vertical LF:	1.50
Emp #:	Unset	Fiber Stress Ht. Reduction:	No	Wind Pressure (psf):	9.00		



Pole Capacity Utilization		Height	Wind Angle
Maximum:	79.0%	0.0 ft	175.6°
Groundline:	79.0%	0.0 ft	175.6°
Vertical:	1.4%	26.0 ft	90.0°

Pole Moments		Load Angle	Wind Angle
Max Capac. Util:	120,128 ft-lb	153.9°	175.6°
Groundline:	120,128 ft-lb	153.9°	175.6°

Guys Capacity Summary: Inadequate

Guy Summary		Guy Tensions		Maximum Guy Tensions	
	Attach Height (ft)	% Allowable Tension	Wind Angle	% Allowable Tension	Wind Angle
Guy 1	51.5	154.4%	175.6°	254.7%	90.0°
Guy 2	47.5	164.6%	175.6°	271.6%	80.0°
Guy 3	43.5	171.9%	175.6°	283.7%	70.0°

Anchor Summary

	Lead Length (ft)	Lead Angle	Max. % Allow. Capacity
Anchor 1	40.0	270.0°	62.2%
Anchor 2	37.0	270.0°	66.4%
Anchor 3	33.0	270.0°	69.3%

GROUNDLINE LOAD SUMMARY: *Wind at 175.6°, Applied Moment 120,128 ft-lb at 153.9°, Allowable Moment 153,201 ft-lb

	Shear Load (lbs)*	Percent Applied Load	Bending Moment (ft-lb)	Percent of Applied Moment	Percent of Pole Capacity	Bending Stress (+/- psi)	Vertical Load (lbs)	Vertical Stress (psi)	Total Stress (psi)	Percent of Pole Capacity
Powers:	14,302	82.6	668,471	89.8	436.3	17,017	306	1	17,018	436.4

Version: 5.0 / 5.00
* includes Load Factor(s)

² Worst Wind per Guy Wire
³ Wind at 175.6°

Comms:	981	5.7	25,760	3.5	16.8	656	328	1	657	16.9
Guys/Braces:	47	0.3	2,245	0.3	1.5	57	24	0	57	1.5
Power Equipment:	45	0.3	2,040	0.3	1.3	52	248	1	53	1.4
Pole:	1,193	6.9	28,271	3.8	18.5	720	3,762	17	737	18.9
Crossarms:	21	0.1	955	0.1	0.6	24	168	1	25	0.6
Risers:	682	3.9	14,912	2.0	9.7	380	301	1	381	9.8
Insulators:	43	0.2	2,066	0.3	1.3	53	44	0	53	1.4
Pole Load:	17,315	100.0	744,720	100.0	486.1	18,958	5,181	23	18,981	486.7
Pole Reserve Capacity:			-591,519		-386.1	-15,058			-15,081	-386.7

LOAD SUMMARY BY OWNER

NVE:	16,329	718,703	18,296	4,796	21	18,317	469.7
TWT:	348	9,360	238	111	0	239	6.1
COX:	638	16,658	424	275	1	425	10.9
Totals	17,315	744,720	18,958	5,181	23	18,981	486.7

Detailed Load Components

Power:		Owner	Height (ft)	Horiz. Offset (in)	Cable Dia. (in)	Sag at Max Temp	Cable Weight (lbs/ft)	Lead/Span Length	Span Angle (deg)	Wire Length (ft)	Tension (lbs)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Primary	AAC 954.0 KCM 37 STRAND	NVE	51.41	20.97	1.1240	0.75	0.895	63.0	90.0	63.0	3,068	114,497	-12	3,056	117,540
Primary	AAC 954.0 KCM 37 STRAND	NVE	51.41	20.97	1.1240	0.75	0.895	63.0	90.0	63.0	3,068	114,497	16	3,056	117,569
Primary	AAC 954.0 KCM 37 STRAND	NVE	47.41	20.89	1.1240	0.75	0.895	63.0	90.0	63.0	3,068	105,588	-13	2,818	108,393
Primary	AAC 954.0 KCM 37 STRAND	NVE	47.41	20.89	1.1240	0.75	0.895	63.0	90.0	63.0	3,068	105,588	17	2,818	108,423
Primary	AAC 954.0 KCM 37 STRAND	NVE	43.41	20.80	1.1240	0.75	0.895	63.0	90.0	63.0	3,068	96,679	-14	2,580	99,245
Primary	AAC 954.0 KCM 37 STRAND	NVE	43.41	20.80	1.1240	0.75	0.895	63.0	90.0	63.0	3,068	96,679	18	2,580	99,277
Neutral	ACSR 2/0 AWG 6/1 QUAIL	NVE	30.92	8.44	0.4470	2.20	0.183	260.0	270.0	260.0	1,355	-30,415	23	3,017	-27,376
Neutral	ACSR 2/0 AWG 6/1 QUAIL	NVE	30.92	8.44	0.4470	0.24	0.183	63.0	90.0	63.0	1,355	30,415	5	731	31,152
Secondary	TRIPLEX 4 AWG	NVE	30.92	8.44	0.6800	0.70	0.164	63.0	90.0	63.0	585	13,131	5	1,112	14,248
											Totals:	646,657	46	21,767	668,471

Comm:		Owner	Height (ft)	Horiz. Offset (in)	Cable Dia (in)	Sag at Max Temp	Cable Weight (lbs/ft)	Lead/Span Length	Span Angle (deg)	Wire Length (ft)	Tension (lbs)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Overlashed	1/4" EHS	TWT	26.67	8.99	0.2500	2.99	0.121	260.0	270.0	260.0	1,500	-29,042	16	2,493	-26,533
Telco	BELOPTIX DT144 - 144 FIBERS -	TWT	26.64	9.13	0.7560	-	0.208	260.0	270.0	260.0		0	27	2,490	2,517
Telco	BELOPTIX DT096 - 72 FIBERS -	TWT	26.65	8.90	0.5160	-	0.097	260.0	270.0	260.0		0	13	2,491	2,504
Overlashed	1/4" EHS	TWT	26.67	8.99	0.2500	0.19	0.121	63.0	90.0	63.0	1,500	29,042	4	604	29,650
Telco	BELOPTIX DT144 - 144 FIBERS -	TWT	26.64	9.13	0.7560	-	0.208	63.0	90.0	63.0		0	7	603	610
Telco	BELOPTIX DT096 - 72 FIBERS -	TWT	26.65	8.90	0.5160	-	0.097	63.0	90.0	63.0		0	3	604	607
Overlashed	1/4" EHS	COX	24.69	44.39	0.2500	5.93	0.121	260.0	270.0	260.0	1,500	-26,883	83	1,795	-25,005
Telco	P3-750CA	COX	24.64	44.39	0.7500	-	0.161	260.0	270.0	260.0		0	110	1,792	1,902
Telco	P3-750CA	COX	24.69	44.26	0.7500	-	0.161	260.0	270.0	260.0		0	110	1,796	1,906
Telco	P3-500CA	COX	24.64	44.24	0.5000	-	0.072	260.0	270.0	260.0		0	49	1,792	1,841
Telco	432ct Fiber	COX	24.74	44.39	0.8300	-	0.159	260.0	270.0	260.0		0	109	1,799	1,908
Telco	BELOPTIX DT096 - 72 FIBERS -	COX	24.74	44.57	0.5160	-	0.097	260.0	270.0	260.0		0	66	1,800	1,866

Version: 5.0 / 5.00
* includes Load Factor(s)

² Worst Wind per Guy Wire
³ Wind at 175.6°

Telco	432ct Fiber	COX	24.69	44.55	0.8300	-	0.159	260.0	270.0	260.0		0	109	1,796	1,904
Overlashed	1/4" EHS	COX	24.69	44.39	0.2500	0 39	0.121	63.0	90.0	63.0	1,500	26,883	20	435	27,338
Telco	P3-750CA	COX	24.64	44.39	0.7500	-	0.161	63.0	90.0	63.0		0	27	434	461
Telco	P3-750CA	COX	24.69	44.26	0.7500	-	0.161	63.0	90.0	63.0		0	27	435	462
Telco	P3-500CA	COX	24.64	44.24	0.5000	-	0.072	63.0	90.0	63.0		0	12	434	446
Telco	432ct Fiber	COX	24.74	44.39	0.8300	-	0.159	63.0	90.0	63.0		0	26	436	462
Telco	BELOPTIX DT096 - 72 FIBERS -	COX	24.74	44.57	0.5160	-	0.097	63.0	90.0	63.0		0	16	436	452
Telco	432ct Fiber	COX	24.69	44.55	0.8300	-	0.159	63.0	90.0	63.0		0	26	435	461
											Totals:	0	860	24,900	25,760

PowerEquipment:		Owner	Height (ft)	Horiz. Offset (in)	Offset Angle (deg)	Rotate Angle (deg)	Unit Weight (lbs)	Unit Height (in)	Unit Depth (in)	Unit Diameter (in)	Unit Length (in)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Switch	3Ø Disconnect Switch	NVE	39.50	13.56	180.0	180.0	55.00	26.00	-	4.00	-	-	251	1,789	2,040
											Totals:	0	251	1,789	2,040

Crossarm:		Owner	Height (ft)	Horiz. Offset (in)	Offset Angle (deg)	Rotate Angle (deg)	Unit Weight (lbs)	Unit Height (in)	Unit Depth (in)	Unit Diameter (in)	Unit Length (in)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Normal	CROSSARM 3-1/2 X 4-1/2 X 4	NVE	51.50	6.44	270.0	270.0	28.00	4.50	3.50	-	48.00	-	-10	275	265
Normal	CROSSARM 3-1/2 X 4-1/2 X 4	NVE	47.50	6.73	270.0	270.0	28.00	4.50	3.50	-	48.00	-	-10	254	243
Normal	CROSSARM 3-1/2 X 4-1/2 X 4	NVE	43.50	7.02	270.0	270.0	28.00	4.50	3.50	-	48.00	-	-11	232	221
Offset	CROSSARM 3-1/2 X 4-1/2 X 4	COX	24.50	8.40	90.0	90.0	26.00	4.50	3.50	-	48.00	-	95	131	226
											Totals:	0	64	891	955

Riser:		Owner	Height (ft)	Horiz. Offset (in)	Offset Angle (deg)	Rotate Angle (deg)	Unit Weight (lbs)	Unit Height (in)	Unit Depth (in)	Unit Diameter (in)	Unit Length (in)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Riser 90.0°	Riser	NVE	33.25	8.69	90.0	90.0	7.90	399.00	-	0.00	-	-	29	6,400	6,429
Riser 270.0°	Riser	NVE	33.25	8.69	270.0	270.0	7.90	399.00	-	0.00	-	-	-29	6,400	6,371
Riser 90.0°	Riser	NVE	30.17	8.69	90.0	90.0	0.94	362.04	-	0.00	-	-	3	2,108	2,111
											Totals:	0	3	14,908	14,912

Insulator:		Owner	Height (ft)	Horiz. Offset (in)	Offset Angle (deg)	Rotate Angle (deg)	Unit Weight (lbs)	Unit Height (in)	Unit Depth (in)	Unit Diameter (in)	Unit Length (in)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Deadend	Deadend Insulator - 15 kV	NVE	51.50	20.00	342.2	180.0	3.00	12.75	-	3.80	-	-	-6	362	356
Deadend	Deadend Insulator - 15 kV	NVE	51.50	-20.00	197.8	180.0	3.00	12.75	-	3.80	-	-	8	362	370
Deadend	Deadend Insulator - 15 kV	NVE	47.50	20.00	341.4	180.0	3.00	12.75	-	3.80	-	-	-6	334	328
Deadend	Deadend Insulator - 15 kV	NVE	47.50	-20.00	198.6	180.0	3.00	12.75	-	3.80	-	-	8	334	342
Deadend	Deadend Insulator - 15 kV	NVE	43.50	20.00	340.7	180.0	3.00	12.75	-	3.80	-	-	-6	306	300
Deadend	Deadend Insulator - 15 kV	NVE	43.50	-20.00	199.3	180.0	3.00	12.75	-	3.80	-	-	8	306	314
Spool	Spool Insulator - 20 kV	NVE	30.92	6.19	180.0	180.0	1.00	2.12	-	2.50	-	-	1	24	25
Bolt	Suspension Shoe	TWT	26.67	6.49	180.0	180.0	5.00	0.00	-	3.00	-	-	5	0	5
Bolt	Three Bolt	COX	24.69	44.00	169.2	180.0	5.00	0.00	-	3.00	-	-	26	0	26
											Totals:	0	38	2,028	2,066

Guy Wire and Brace:	Owner	Attach Height (ft)	End Height (ft)	Lead/Span Length (ft)	Wire Dia. (in)	Percent Solid (%)	Lead Angle (deg)	Incline Angle (deg)	Wire Weight (lbs/ft)	Rest Length (ft)	Stretch Length (in)

Version: 5.0 / 5.00
* includes Load Factor(s)

² Worst Wind per Guy Wire
³ Wind at 175.6°

Guy 1: EHS 5/16	Down	NVE	51.50	0.00	40.00	0.312	75.0	270.0	52.2	0.205	64.97	9.07
Guy 2: EHS 5/16	Down	NVE	47.50	0.00	37.00	0.312	75.0	270.0	52.1	0.205	59.96	8.82
Guy 3: EHS 5/16	Down	NVE	43.50	0.00	33.00	0.312	75.0	270.0	52.8	0.205	54.34	8.24

Guy Wire and Brace (Loads and Reactions)		Elastic Modulus (psi)	Rated Tensile Strength (lbs)	Guy Strength Factor	Allowable Tension (lbs)	Initial Tension (lbs)	Required Tension[2] (lbs)	Required Tension[3] (lbs)	Applied Tension[2] (lbs)	Vertical Load[3] (lbs)	Shear Load in Guy Dir[3] (lbs)	Shear Load at Report Angle[3] (lbs)	Moment at GL[3] (ft-lb)[4]
Guy 1: EHS 5/16	Down	23,000,000	11,200	0.90	10,080	700	25,677	15,562	15,391	12,155	9,441	-4,154	878
Guy 2: EHS 5/16	Down	23,000,000	11,200	0.90	10,080	700	27,373	16,590	16,221	12,796	9,968	-4,386	747
Guy 3: EHS 5/16	Down	23,000,000	11,200	0.90	10,080	700	28,597	17,331	16,714	13,316	10,102	-4,444	620
									Totals:	38,268	29,510	-12,984	2,245

Anchor/Rod Load Summary:	Owner	Rod Length AGL (in)	Lead Length (ft)	Lead Angle (deg)	Strength of Assembly (lbs)	Anchor/Rod Strength Factor	Allowable Load (lbs)	Max Load[2] (lbs)	Load at Pole MCU[3] (lbs)	Max Required Capacity[2] (%)
Single - 12" - Soil Class 4	NVE	0.00	40.00	270.0	25,000	1.00	25,000	15,562	15,391	62.2
Single - 12" - Soil Class 4	NVE	0.00	37.00	270.0	25,000	1.00	25,000	16,590	16,221	66.4
Single - 12" - Soil Class 4	NVE	0.00	33.00	270.0	25,000	1.00	25,000	17,331	16,714	69.3

Pole Buckling

Buckling [illegible]	Buckling [illegible] (ft)	Buckling Section [illegible] (% Buckling Col. Hgt.)	Buckling [illegible] (in)	Min. Buckling [illegible] (in)	Diameter [illegible] (in)	Diameter [illegible] (in)	Modulus of [illegible] (psi)	Pole [illegible] (pcf)	Ice Density (pcf)	Pole Tip [illegible] (ft)	Buckling Load [illegible] (lbs)	Buckling Load [illegible] (lbs)	Buckling Load [illegible]
0.71	26.02	33.37	15.61	13.71	9.24	16.88	1,000,000	50.00	57.00	52.50	383,355	5,181	73.99

Version: 5.0 / 5.00
* includes Load Factor(s)

[3] Worst Wind per Guy Wire
[4] Wind at 175.6°

November 5, 2014 (3295 Fremont, Fremont/Sahara)

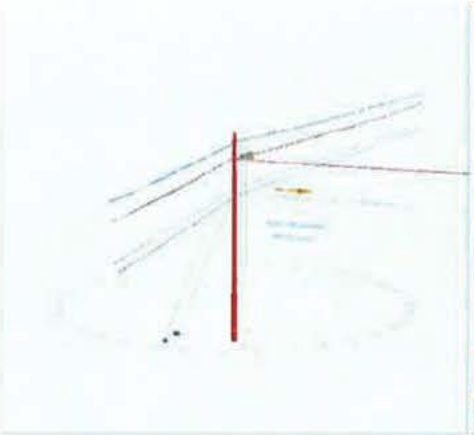
3295 Fremont, Fremont & Sahara

Grade B - light	p66845	
	Existing	Proposed
Maximum Pole Capacity Utilization Percent	214.2%	215.6%

O-Calc® Pro *Analysis Report*

Wednesday, October 29, 2014 2:15:12 PM

File Name:	1 - p66845 Propose	Pole Length / Class:	45 / 4	Code:	NESC	Structure Type:	Guyed
Pole Num:	1 - p66845	Pole Species:	WESTERN RED CEDAR	NESC Rule:	Rule 250B	Status:	N/A
Permit #:	Unset	Setting Depth (ft):	8.58	Construction Grade:	B	Pole Strength Factor:	0.65
Owner:	Unset	G/L Circumference (in):	38.00	Loading District:	Light	Transverse Wind LF:	2.50
Latitude:	Unset	G/L Fiber Stress (psi):	6,000	Ice Thickness (in):	0.00	Wire Tension LF:	1.65
Longitude:	Unset	Allowable Stress (psi):	3,900	Wind Speed (mph):	59.29	Vertical LF:	1.50
Emp #:	Unset	Fiber Stress Ht. Reduction:	No	Wind Pressure (psf):	9.00		



Pole Capacity Utilization		Height	Wind Angle
Maximum:	215.6%	0.0 ft	176.3°
Groundline:	215.6%	0.0 ft	176.3°
Vertical:	0.9%	18.8 ft	90.0°

Pole Moments		Load Angle	Wind Angle
Max Capac. Util:	121,517 ft-lb	178.6°	176.3°
Groundline:	121,517 ft-lb	178.6°	176.3°

Guys Capacity Summary: Adequate

Guy Summary	Attach Height (ft)	Guy Tensions % Allowable Tension	Guy Tensions Wind Angle	Maximum Guy Tensions % Allowable Tension	Maximum Guy Tensions Wind Angle
Guy 1	33.4	16.6%	176.3°	27.5%	90.0°
Guy 2	30.1	20.9%	176.3°	34.5%	90.0°
Guy 3	24.8	26.1%	176.3°	43.1%	90.0°
Guy 4	23.5	24.8%	176.3°	40.9%	90.0°

Anchor Summary

	Lead Length (ft)	Lead Angle	Max. % Allow. Capacity
Anchor 1	30.3	270.0°	15.1%
Anchor 2	25.5	270.0°	16.3%

GROUNDLINE LOAD SUMMARY:*Wind at 176.3°, Applied Moment 121,517 ft-lb at 178.6°, Allowable Moment 56,466 ft-lb

	Shear Load (lbs)*	Percent Applied Load	Bending Moment (ft-lb)	Percent of Applied Moment	Percent of Pole Capacity	Bending Stress (+/- psi)	Vertical Load (lbs)	Vertical Stress (psi)	Total Stress (psi)	Percent of Pole Capacity
Powers:	1,738	35.8	54,181	43.7	96.0	3,742	92	1	3,743	96.0

Version: 5.0 / 5.00
* Includes Load Factor(s)

² Worst Wind per Guy Wire
³ Wind at 176.3°

Comms:	2,187	45.1	**52,049**	42.0	**92.2**	**3,595**	175	2	**3,596**	**92.2**
Guys/Braces:	44	0.9	**1,253**	1.0	**2.2**	**87**	19	0	**87**	**2.2**
Generic Equipment:	24	0.5	**782**	0.6	**1.4**	**54**	22	0	**54**	**1.4**
Pole:	641	13.2	**10,547**	8.5	**18.7**	**728**	1,350	12	**740**	**19.0**
Streetlights:	58	1.2	**1,678**	1.4	**3.0**	**116**	68	1	**117**	**3.0**
Risers:	140	2.9	**2,792**	2.3	**4.9**	**193**	46	0	**193**	**5.0**
Insulators:	18	0.4	**631**	0.5	**1.1**	**44**	38	0	**44**	**1.1**
Pole Load:	4,851	100.0	**123,913**	100.0	**219.4**	**8,559**	1,810	16	**8,574**	**219.9**
Pole Reserve Capacity:			**-67,448**		**-119.4**	**-4,659**			**-4,674**	**-119.9**

LOAD SUMMARY BY OWNER

NVE:	2,640	**71,334**	**4,927**	1,592	14	**4,941**	**126.7**
COX:	442	**10,963**	**757**	60	1	**758**	**19.4**
CTL:	1,770	**41,616**	**2,874**	158	1	**2,876**	**73.7**
Totals	4,851	**123,913**	**8,559**	1,810	16	**8,574**	**219.9**

Detailed Load Components

Power:

		Owner	Height (ft)	Horiz. Offset (in)	Cable Dia. (in)	Sag at Max Temp	Cable Weight (lbs/ft)	Lead/Span Length	Span Angle (deg)	Wire Length (ft)	Tension (lbs)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Primary	ACSR 4 AWG 6/1 SWAN	NVE	34.42	16.24	0.2500	0.77	0.057	71.0	260.0	71.0	141	1,192	0	563	1,755
Primary	ACSR 4 AWG 6/1 SWAN	NVE	34.42	16.24	0.2500	1.21	0.057	133.0	90.0	133.0	282	402	0	1,070	1,473
Neutral	ACSR 4 AWG 6/1 SWAN	NVE	31.33	5.97	0.2500	0.77	0.057	71.0	260.0	71.0	141	1,085	0	512	1,598
Secondary	TRIPLEX 4 AWG	NVE	31.33	5.97	0.6800	0.90	0.164	71.0	260.0	71.0	293	2,255	1	1,394	3,649
Neutral	ACSR 4 AWG 6/1 SWAN	NVE	31.33	5.97	0.2500	1.21	0.057	133.0	90.0	133.0	282	366	0	974	1,341
Secondary	TRIPLEX 1/0	NVE	30.92	6.00	1.0300	1.11	0.399	86.0	180.0	86.0	754	38,455	13	4	38,472
Secondary	TRIPLEX 1/0	NVE	30.92	6.00	1.0300	1.57	0.399	133.0	90.0	133.0	1,507	1,931	0	3,962	5,893
											Totals:	**45,687**	**14**	**8,479**	**54,181**

Comm:

		Owner	Height (ft)	Horiz. Offset (in)	Cable Dia. (in)	Sag at Max Temp	Cable Weight (lbs/ft)	Lead/Span Length	Span Angle (deg)	Wire Length (ft)	Tension (lbs)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Overlashed	1/4" EHS	COX	24.83	6.70	0.2500	0.47	0.121	133.0	90.0	133.0	1,500	1,544	0	927	2,470
Telco	P3-500CA	COX	24.81	6.48	0.5000	-	0.072	133.0	90.0	133.0		0	0	926	926
Telco	24ct Fiber	COX	24.81	6.90	0.3900	-	0.049	133.0	90.0	133.0		0	0	926	926
Overlashed	1/4" EHS	COX	24.83	6.70	0.2500	0.44	0.121	71.0	260.0	71.0	750	4,574	1	620	5,195
Telco	24ct Fiber	COX	24.81	6.91	0.3900	-	0.049	71.0	260.0	71.0		0	0	620	620
Telco	P3-750CA	COX	24.80	6.38	0.7500	-	0.161	71.0	260.0	71.0		0	1	619	620
Overlashed	5/16" EHS	CTL	23.50	6.80	0.3125	1.50	0.205	133.0	90.0	133.0	1,500	1,461	12	1,028	2,500
Telco	26 GA 200 PR (0.94)	CTL	23.47	7.00	0.9400	-	0.480	133.0	90.0	133.0		0	28	1,026	1,054
Telco	24ct Fiber	CTL	23.48	6.72	0.3900	-	0.049	133.0	90.0	133.0		0	3	1,027	1,029
Telco	24ct Fiber	CTL	23.45	6.75	0.3900	-	0.049	133.0	90.0	133.0		0	3	1,025	1,028
Overlashed	5/16" EHS	CTL	23.50	6.80	0.3125	0.97	0.205	71.0	260.0	71.0	750	4,329	6	450	4,785
Telco	26 GA 200 PR (0.94)	CTL	23.44	6.81	0.9400	-	0.480	71.0	260.0	71.0		0	14	449	463
Telco	24ct Fiber	CTL	23.49	6.68	0.3900	-	0.049	71.0	260.0	71.0		0	1	450	451
Telco	24ct Fiber	CTL	23.49	6.93	0.3900	-	0.049	71.0	260.0	71.0		0	2	450	451

Telco	24ct Fiber	CTL	23.47	7.05	0.3900	-	0.049	71.0	260.0	71.0		0	2	449	451
Overlashed	1/4" EHS	CTL	23.50	6.80	0.2500	0.35	0.121	86.0	180.0	86.0	750	29,072	4	1	29,077
Telco	24ct Fiber	CTL	23.48	6.80	0.3900	-	0.049	86.0	180.0	86.0		0	2	1	3
											Totals:	**40,980**	**78**	**10,992**	**52,049**

GenericEquipment:

		Owner	Height (ft)	Horiz. Offset (in)	Offset Angle (deg)	Rotate Angle (deg)	Unit Weight (lbs)	Unit Height (in)	Unit Depth (in)	Unit Diameter (in)	Unit Length (in)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Box	Fuse Cutout	NVE	31.50	19.71	135.0	0.0	15.00	12.00	8.00	-	8.00	-	27	755	782
											Totals:	**0**	**27**	**755**	**782**

Streetlight:

		Owner	Height (ft)	Horiz. Offset (in)	Offset Angle (deg)	Rotate Angle (deg)	Unit Weight (lbs)	Unit Height (in)	Unit Depth (in)	Unit Diameter (in)	Unit Length (in)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
General	Light	NVE	31.33	3.72	180.0	180.0	45.00	6.00	-	3.00	-	-	-141	1,820	1,678
											Totals:	**0**	**-141**	**1,820**	**1,678**

Riser:

		Owner	Height (ft)	Horiz. Offset (in)	Offset Angle (deg)	Rotate Angle (deg)	Unit Weight (lbs)	Unit Height (in)	Unit Depth (in)	Unit Diameter (in)	Unit Length (in)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Riser 45.0°	Riser	NVE	31.00	6.39	45.0	45.0	0.97	372.00	-	0.00	-	-	-4	1,803	1,799
Riser 150.0°	Riser	NVE	28.58	6.39	150.0	150.0	0.89	342.96	-	0.00	-	-	5	905	910
Riser 180.0°	Riser	CTL	22.25	6.39	180.0	180.0	0.70	267.00	-	0.00	-	-	4	79	83
											Totals:	**0**	**5**	**2,787**	**2,792**

Insulator:

		Owner	Height (ft)	Horiz. Offset (in)	Offset Angle (deg)	Rotate Angle (deg)	Unit Weight (lbs)	Unit Height (in)	Unit Depth (in)	Unit Diameter (in)	Unit Length (in)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Deadend	Deadend Insulator - 15 kV	NVE	34.42	3.49	260.0	260.0	3.00	12.75	-	3.80	-	-	1	260	261
Deadend	Deadend Insulator - 15 kV	NVE	34.42	3.49	90.0	90.0	3.00	12.75	-	3.80	-	-	0	260	261
Spool	Spool Insulator - 20 kV	NVE	31.33	3.72	260.0	260.0	1.00	2.12	-	2.50	-	-	0	26	26
Spool	Spool Insulator - 20 kV	NVE	31.33	3.72	90.0	90.0	1.00	2.12	-	2.50	-	-	0	26	26
Spool	Spool Insulator - 20 kV	NVE	30.92	3.75	180.0	180.0	1.00	2.12	-	2.50	-	-	1	26	26
Spool	Spool Insulator - 20 kV	NVE	30.92	3.75	90.0	90.0	1.00	2.12	-	2.50	-	-	0	26	26
Bolt	Single Bolt	COX	24.83	4.20	90.0	90.0	5.00	0.00	-	3.00	-	-	0	0	0
Bolt	Single Bolt	COX	24.83	4.20	260.0	260.0	5.00	0.00	-	3.00	-	-	1	0	1
Bolt	Three Bolt	CTL	23.50	4.30	180.0	180.0	5.00	0.00	-	3.00	-	-	4	0	4
											Totals:	**0**	**7**	**624**	**631**

Guy Wire and Brace:

		Owner	Attach Height (ft)	End Height (ft)	Lead/Span Length (ft)	Wire Dia. (in)	Percent Solid (%)	Lead Angle (deg)	Incline Angle (deg)	Wire Weight (lbs/ft)	Rest Length (ft)	Stretch Length (in)
Guy 1: EHS 5/16	Down	NVE	33.42	0.00	30.25	0.312	75.0	270.0	47.9	0.205	44.88	0.62
Guy 2: EHS 5/16	Down	NVE	30.08	0.00	30.25	0.312	75.0	270.0	44.8	0.205	42.44	0.74
Guy 3: EHS 1/4	Down	COX	24.83	0.00	25.50	0.250	75.0	270.0	44.2	0.121	35.34	0.68
Guy 4: EHS 5/16	Down	CTL	23.50	0.00	25.50	0.312	75.0	270.0	42.7	0.205	34.41	0.66

Guy Wire and Brace (Loads and Reactions)

		Elastic Modulus (psi)	Rated Tensile Strength (lbs)	Guy Strength Factor	Allowable Tension (lbs)	Initial Tension (lbs)	Required Tension[2] (lbs)	Required Tension[3] (lbs)	Applied Tension[3] (lbs)	Vertical Load[3] (lbs)	Shear Load in Guy Dir[3] (lbs)	Shear Load at Report Angle[3] (lbs)	Moment at GL[3] (ft-lb)*
Guy 1: EHS 5/16	Down	23,000,000	11,200	0.90	10,080	700	2,768	1,678	1,522	1,129	1,022	-26	438

Version: 5.0 / 5.00
* includes Load Factor(s)

[2] Worst Wind per Guy Wire
[3] Wind at 176.3°

Guy 2: EHS 5/16	Down	23,000,000	11,200	0.90	10,080	700	3,479	2,108	1,912	1,348	1,356	-34	373
Guy 3: EHS 1/4	Down	23,000,000	6,650	0.90	5,985	700	2,581	1,564	1,358	947	973	-24	205
Guy 4: EHS 5/16	Down	23,000,000	11,200	0.90	10,080	700	4,123	2,499	2,118	1,435	1,557	-39	236
									Totals:	**4,859**	**4,907**	**-123**	**1,253**

Anchor/Rod Load Summary:

	Owner	Rod Length AGL (in)	Lead Length (ft)	Lead Angle (deg)	Strength of Assembly (lbs)	Anchor/Rod Strength Factor	Allowable Load (lbs)	Max Load[2] (lbs)	Load at Pole MCU[3] (lbs)	Max Required Capacity[2] (%)
Single - 12" - Soil Class 4	NVE	0.00	30.25	270.0	25,000	1.00	25,000	3,785	3,433	15.1
Single - 12" - Soil Class 4	COX	0.00	25.50	270.0	25,000	1.00	25,000	4,063	3,475	16.3

Pole Buckling

Buckling Constant	Buckling Col. Hgt. (ft)	Buckling Section Height (% Buckling Col. Hgt.)	Buckling Section Diam. (in)	Min. Buckling Diam. at Ch. (in)	Diameter at Tip (in)	Diameter at Ch. (in)	Modulus of Elasticity (psi)	Pole Density (pcf)	Ice Density (pcf)	Pole Tip Height (ft)	Buckling Load Capacity at Hgt. (lbs)	Buckling Load Applied at Hgt. (lbs)	Buckling Load Factor at Defect
0.71	18.75	33.45	11.16	6.87	6.69	12.10	1,000,000	50.00	57.00	36.42	193,237	**1,810**	**106.76**

November 5, 2014 (Marisa USA Inc., 3745 Losee Rd, Losee & Colton)

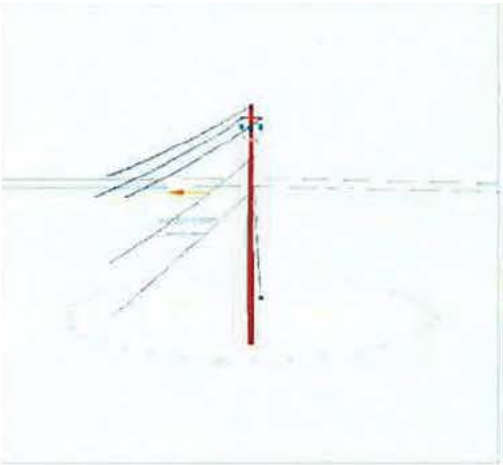
Marisa USA Inc, 3745 Losee Rd, Losee & Colton

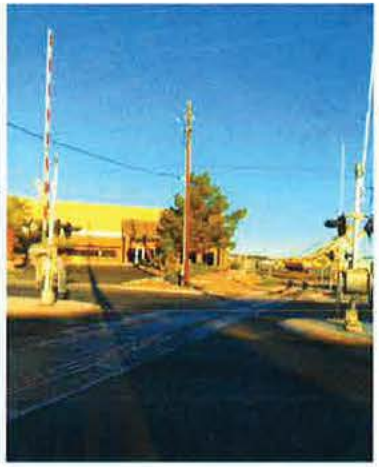
Grade B - light	1 - p75252	
	Existing	Proposed
Maximum Pole Capacity Utilization Percent	116.0%	37.6%

O-Calc® Pro *Analysis Report*

Thursday, October 30, 2014 2:51:04 PM

File Name:	**1 - p75252 Propose**	Pole Length / Class:	**50 / 3**	Code:	**NESC**	Structure Type:	**Guyed**
Pole Num:	**1 - p75252**	Pole Species:	**WESTERN RED CEDAR**	NESC Rule:	**Rule 250B**	Status:	**N/A**
Permit #:	**Unset**	Setting Depth (ft):	**7.08**	Construction Grade:	**B**	Pole Strength Factor:	**0.65**
Owner:	**Unset**	G/L Circumference (in):	**44.00**	Loading District:	**Light**	Transverse Wind LF:	**2.50**
Latitude:	**Unset**	G/L Fiber Stress (psi):	**6,000**	Ice Thickness (in):	**0.00**	Wire Tension LF:	**1.65**
Longitude:	**Unset**	Allowable Stress (psi):	**3,900**	Wind Speed (mph):	**59.29**	Vertical LF:	**1.50**
Emp #:	**Unset**	Fiber Stress Ht. Reduction:	**No**	Wind Pressure (psf):	**9.00**		





Pole Capacity Utilization		Height	Wind Angle
Maximum:	**37.6%**	0.0 ft	261.2°
Groundline:	**37.6%**	0.0 ft	261.2°
Vertical:	**1.3%**	23.1 ft	180.0°

Pole Moments		Load Angle	Wind Angle
Max Capac. Util:	**32,573 ft-lb**	259.8°	261.2°
Groundline:	**32,573 ft-lb**	259.8°	261.2°

Guys Capacity Summary: Adequate

Guy Summary	Attach Height (ft)	**Guy Tensions % Allowable Tension**	Wind Angle	**Maximum Guy Tensions % Allowable Tension**	Wind Angle
Guy 1	40.0	**32.0%**	261.2°	**52.8%**	180.0°
Guy 2	32.0	**33.5%**	261.2°	**55.3%**	180.0°
Guy 3	25.3	**37.5%**	261.2°	**61.9%**	180.0°

Anchor Summary

	Lead Length (ft)	Lead Angle	**Max. % Allow. Capacity**
Anchor 1	12.0	0.0°	**41.5%**

GROUNDLINE LOAD SUMMARY:*Wind at 261.2°, Applied Moment 32,573 ft-lb at 259.8°, Allowable Moment 87,658 ft-lb

	Shear Load (lbs)*	**Percent Applied Load**	**Bending Moment (ft-lb)**	**Percent of Applied Moment**	**Percent of Pole Capacity**	**Bending Stress (+/- psi)**	**Vertical Load (lbs)**	**Vertical Stress (psi)**	**Total Stress (psi)**	**Percent of Pole Capacity**
Powers:	349	19.9	**13,484**	29.3	**15.4**	**600**	31	0	**600**	**15.4**

Version: 5.0 / 5.00
* includes Load Factor(s)

² Worst Wind per Guy Wire
³ Wind at 261.2°

Comms:	319	18.2	**8,112**	17.6	**9.3**	**361**	231	1	**362**	**9.3**
Guys/Braces:	29	1.7	**985**	2.1	**1.1**	**44**	14	0	**44**	**1.1**
Generic Equipment:	72	4.1	**2,766**	6.0	**3.2**	**123**	68	0	**123**	**3.2**
Power Equipment:	67	3.9	**2,486**	5.4	**2.8**	**111**	375	2	**113**	**2.9**
Pole:	858	49.0	**16,486**	35.8	**18.8**	**733**	2,062	13	**747**	**19.2**
Crossarms:	5	0.3	**208**	0.5	**0.2**	**9**	42	0	**10**	**0.2**
Risers:	27	1.6	**612**	1.3	**0.7**	**27**	72	0	**28**	**0.7**
Insulators:	24	1.3	**959**	2.1	**1.1**	**43**	38	0	**43**	**1.1**
Pole Load:	1,751	100.0	**46,097**	100.0	**52.6**	**2,051**	2,932	19	**2,070**	**53.1**
Pole Reserve Capacity:			**41,561**		**47.4**	**1,849**			**1,830**	**46.9**

LOAD SUMMARY BY OWNER

NVE:	1,424	**37,783**	**1,681**	2,675	17	**1,698**	**43.5**
ZFS:	9	**248**	**11**	77	1	**12**	**0.3**
COX:	13	**359**	**16**	147	1	**17**	**0.4**
CTL:	305	**7,707**	**343**	33	0	**343**	**8.8**
Totals	1,751	**46,097**	**2,051**	2,932	19	**2,070**	**53.1**

Detailed Load Components

Power:

		Owner	Height (ft)	Horiz. Offset (in)	Cable Dia. (in)	Sag at Max Temp	Cable Weight (lbs/ft)	Lead/Span Length	Span Angle (deg)	Wire Length (ft)	Tension (lbs)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Primary	ACSR 2 AWG 7/1 SPARATE	NVE	42.58	16.44	0.3250	1.34	0.107	98.0	180.0	98.0	199	2,482	0	1,237	3,719
Primary	ACSR 2 AWG 7/1 SPARATE	NVE	39.91	21.23	0.3250	1.34	0.107	98.0	180.0	98.0	199	2,326	-2	1,159	3,483
Primary	ACSR 2 AWG 7/1 SPARATE	NVE	39.91	21.23	0.3250	1.34	0.107	98.0	180.0	98.0	199	2,326	3	1,159	3,487
Neutral	ACSR 2 AWG 7/1 SPARATE	NVE	32.00	6.76	0.3250	1.34	0.107	98.0	180.0	98.0	199	1,865	1	929	2,795
											Totals:	**8,998**	**2**	**4,484**	**13,484**

Comm:

		Owner	Height (ft)	Horiz. Offset (in)	Cable Dia. (in)	Sag at Max Temp	Cable Weight (lbs/ft)	Lead/Span Length	Span Angle (deg)	Wire Length (ft)	Tension (lbs)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Telco	BELOPTIX DT144 - 144 FIBERS -	ZFS	28.00	7.32	0.7560	0.67	0.208	66.0	90.0	66.0	1,500	-68,200	1	35	-68,163
Telco	BELOPTIX DT144 - 144 FIBERS -	ZFS	28.00	7.32	0.7560	6.30	0.208	382.0	270.0	382.1	1,500	68,200	6	205	68,411
Overlashed	5/16" EHS	COX	26.42	7.45	0.3125	0.40	0.205	66.0	90.0	66.0	1,500	-64,351	1	17	-64,333
Telco	24ct Fiber	COX	26.40	7.53	0.3900	-	0.049	66.0	90.0	66.0		0	0	17	17
Telco	P3-750CA	COX	26.39	7.33	0.7500	-	0.161	66.0	90.0	66.0		0	1	17	18
Overlashed	5/16" EHS	COX	26.42	7.45	0.3125	8.28	0.205	382.0	270.0	382.1	1,500	64,351	6	98	64,455
Telco	24ct Fiber	COX	26.40	7.53	0.3900	-	0.049	382.0	270.0	382.1		0	2	98	99
Telco	P3-750CA	COX	26.39	7.33	0.7500	-	0.161	382.0	270.0	382.1		0	4	98	101
Overlashed	1/4" EHS	CTL	25.25	7.54	0.2500	1.11	0.121	98.0	180.0	98.0	750	5,546	1	653	6,200
Telco	12ct Fiber	CTL	25.23	7.47	0.3640	-	0.068	98.0	180.0	98.0		0	0	652	653
Telco	26 GA 25 PR (0.50)	CTL	25.23	7.63	0.5000	-	0.100	98.0	180.0	98.0		0	1	652	653
											Totals:	**5,546**	**24**	**2,541**	**8,112**

GenericEquipment:

		Owner	Height (ft)	Horiz. Offset (in)	Offset Angle (deg)	Rotate Angle (deg)	Unit Weight (lbs)	Unit Height (in)	Unit Depth (in)	Unit Diameter (in)	Unit Length (in)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Box	Fuse Cutout	NVE	38.33	20.02	90.0	0.0	15.00	12.00	8.00	-	8.00	-	-37	920	883
Box	Fuse Cutout	NVE	38.33	20.02	180.0	0.0	15.00	12.00	8.00	-	8.00	-	7	920	926
Box	Fuse Cutout	NVE	38.33	20.02	270.0	0.0	15.00	12.00	8.00	-	8.00	-	37	920	957
											Totals:	**0**	**7**	**2,759**	**2,766**

PowerEquipment:

		Owner	Height (ft)	Horiz. Offset (in)	Offset Angle (deg)	Rotate Angle (deg)	Unit Weight (lbs)	Unit Height (in)	Unit Depth (in)	Unit Diameter (in)	Unit Length (in)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Box	Arrester Bracket	NVE	36.00	22.20	180.0	180.0	250.00	12.00	12.00	-	36.00	-	57	2,429	2,486
											Totals:	**0**	**57**	**2,429**	**2,486**

Crossarm:

		Owner	Height (ft)	Horiz. Offset (in)	Offset Angle (deg)	Rotate Angle (deg)	Unit Weight (lbs)	Unit Height (in)	Unit Depth (in)	Unit Diameter (in)	Unit Length (in)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Normal	CROSSARM 3-1/2 X 4-1/2 X 4	NVE	40.00	5.64	0.0	0.0	28.00	4.50	3.50	-	48.00	-	-4	212	208
											Totals:	**0**	**-4**	**212**	**208**

Riser:

		Owner	Height (ft)	Horiz. Offset (in)	Offset Angle (deg)	Rotate Angle (deg)	Unit Weight (lbs)	Unit Height (in)	Unit Depth (in)	Unit Diameter (in)	Unit Length (in)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Riser 270.0°	Riser	NVE	32.00	7.24	270.0	270.0	4.00	384.00	-	0.00	-	-	28	584	612
											Totals:	**0**	**28**	**584**	**612**

Insulator:

		Owner	Height (ft)	Horiz. Offset (in)	Offset Angle (deg)	Rotate Angle (deg)	Unit Weight (lbs)	Unit Height (in)	Unit Depth (in)	Unit Diameter (in)	Unit Length (in)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Deadend	Deadend Insulator - 15 kV	NVE	42.58	3.69	180.0	180.0	3.00	12.75	-	3.80	-	-	1	322	323
Deadend	Deadend Insulator - 15 kV	NVE	40.00	20.00	74.3	180.0	3.00	12.75	-	3.80	-	-	-7	303	296
Deadend	Deadend Insulator - 15 kV	NVE	40.00	-20.00	285.7	180.0	3.00	12.75	-	3.80	-	-	8	303	311
Spool	Spool Insulator - 20 kV	NVE	32.00	4.51	180.0	180.0	1.00	2.12	-	2.50	-	-	0	26	27
Bolt	Three Bolt	ZFS	28.00	4.82	180.0	180.0	5.00	0.00	-	3.00	-	-	1	0	1
Bolt	Three Bolt	COX	26.42	4.95	180.0	180.0	5.00	0.00	-	3.00	-	-	1	0	1
Bolt	Single Bolt	CTL	25.25	5.04	180.0	180.0	5.00	0.00	-	3.00	-	-	1	0	1
											Totals:	**0**	**5**	**954**	**959**

Guy Wire and Brace:

		Owner	Attach Height (ft)	End Height (ft)	Lead/Span Length (ft)	Wire Dia. (in)	Percent Solid (%)	Lead Angle (deg)	Incline Angle (deg)	Wire Weight (lbs/ft)	Rest Length (ft)	Stretch Length (in)
Guy 1: EHS 5/16	Down	NVE	40.00	0.00	12.00	0.312	75.0	0.0	73.3	0.205	41.67	0.95
Guy 2: EHS 5/16	Down	NVE	32.00	0.00	12.00	0.312	75.0	0.0	69.4	0.205	34.05	0.71
Guy 3: EHS 5/16	Down	CTL	25.25	0.00	12.00	0.312	75.0	0.0	64.6	0.205	27.78	0.58

Guy Wire and Brace (Loads and Reactions)

		Elastic Modulus (psi)	Rated Tensile Strength (lbs)	Guy Strength Factor	Allowable Tension (lbs)	Initial Tension (lbs)	Required Tension[2] (lbs)	Required Tension[3] (lbs)	Applied Tension[3] (lbs)	Vertical Load[3] (lbs)	Shear Load in Guy Dir[3] (lbs)	Shear Load at Report Angle[3] (lbs)	Moment at GL[3] (ft-lb)*
Guy 1: EHS 5/16	Down	23,000,000	11,200	0.90	10,080	700	5,322	3,225	2,503	2,398	719	-128	475

Version: 5.0 / 5.00
* includes Load Factor(s)

[2] Worst Wind per Guy Wire
[3] Wind at 261.2°

Guy 2: EHS 5/16	Down	23,000,000	11,200	0.90	10,080	700	5,574	3,378	2,308	2,161	810	-144	310
Guy 3: EHS 5/16	Down	23,000,000	11,200	0.90	10,080	700	6,242	3,783	2,319	2,095	996	-177	200
									Totals:	**6,653**	**2,525**	**-448**	**985**

Anchor/Rod Load Summary:

	Owner	Rod Length AGL (in)	Lead Length (ft)	Lead Angle (deg)	Strength of Assembly (lbs)	Anchor/Rod Strength Factor	Allowable Load (lbs)	Max Load[2] (lbs)	Load at Pole MCU[3] (lbs)	Max Required Capacity[2] (%)
Single - 12" - Soil Class 4	NVE	0.00	12.00	0.0	25,000	1.00	25,000	10,366	7,116	41.5

Pole Buckling

Buckling Constant	Buckling Column Unit (ft)	Buckling Section Height (% Buckling Col. Hgt.)	Buckling Section Diam. (in)	Min Buckling (in)	Diameter at Tip (in)	Diameter at Gl (in)	Modulus of Elasticity (psi)	Pole Density (pcf)	Ice Density (pcf)	Pole Tip Height (ft)	Buckling Load Capacity at Unit (lbs)	Buckling Load Applied at Unit (lbs)	Buckling Load Factor of Safety
0.71	23.05	33.85	12.79	9.63	7.32	14.01	1,000,000	50.00	57.00	42.92	220,226	**2,932**	**75.12**

November 5, 2014 (3660 Cinder Lane, Cinder Lane & Highland Dr)

COX, 3660 Cinder Lane, Cinder Lane & Highland Dr

Grade B - light	1 - p50584		2 - p81532		3 - p65689	
	Existing	Proposed	Existing	Proposed	Existing	Proposed
Maximum Pole Capacity Utilization Percent	128.6%	129.6%	64.2%	65.3%	105.7%	105.8%

O-Calc® Pro *Analysis Report*

Thursday, October 30, 2014 2:13:32 PM

File Name:	**1 - p50584 Propose**	Pole Length / Class:	**45 / 4**	Code:	**NESC**	Structure Type:	**Unguyed**
Pole Num:	**1 - p50584**	Pole Species:	**WESTERN RED CEDAR**	NESC Rule:	**Rule 250B**	Status:	**N/A**
Permit #:	**Unset**	Setting Depth (ft):	**8.58**	Construction Grade:	**B**	Pole Strength Factor:	**0.65**
Owner:	**Unset**	G/L Circumference (in):	**41.00**	Loading District:	**Light**	Transverse Wind LF:	**2.50**
Latitude:	**Unset**	G/L Fiber Stress (psi):	**6,000**	Ice Thickness (in):	**0.00**	Wire Tension LF:	**1.10**
Longitude:	**Unset**	Allowable Stress (psi):	**3,900**	Wind Speed (mph):	**59.29**	Vertical LF:	**1.50**
Emp #:	**Unset**	Fiber Stress Ht. Reduction:	**No**	Wind Pressure (psf):	**9.00**		

s

Pole Capacity Utilization		Height	Wind Angle
Maximum:	**129.6%**	0.0 ft	180.7°
Groundline:	**129.6%**	0.0 ft	180.7°
Vertical:	**22.9%**	24.5 ft	180.7°

Pole Moments		Load Angle	Wind Angle
Max Capac. Util:	**91,378 ft-lb**	188.3°	180.7°
Groundline:	**91,378 ft-lb**	188.3°	180.7°

GROUNDLINE LOAD SUMMARY:*Wind at 180.7°, Applied Moment 91,378 ft-lb at 188.3°, Allowable Moment 70,923 ft-lb

	Shear Load (lbs)*	Percent Applied Load	Bending Moment (ft-lb)	Percent of Applied Moment	Percent of Pole Capacity	Bending Stress (+/- psi)	Vertical Load (lbs)	Vertical Stress (psi)	Total Stress (psi)	Percent of Pole Capacity
Powers:	836	23.4	**32,405**	35.5	**45.7**	**1,782**	341	3	**1,784**	**45.8**
Comms:	1,740	48.6	**38,532**	42.2	**54.3**	**2,119**	684	5	**2,124**	**54.5**
Power Equipment:	175	4.9	**5,061**	5.5	**7.1**	**278**	960	7	**285**	**7.3**
Pole:	668	18.7	**10,854**	11.9	**15.3**	**597**	1,501	11	**608**	**15.6**
Crossarms:	63	1.8	**2,306**	2.5	**3.3**	**127**	117	1	**128**	**3.3**
Risers:	71	2.0	**1,209**	1.3	**1.7**	**66**	39	0	**67**	**1.7**
Insulators:	27	0.8	**1,011**	1.1	**1.4**	**56**	90	1	**56**	**1.4**
Pole Load:	3,579	100.0	**91,378**	100.0	**128.8**	**5,025**	3,732	28	**5,053**	**129.6**
Pole Reserve Capacity:			**-20,455**		**-28.8**	**-1,125**			**-1,153**	**-29.6**

LOAD SUMMARY BY OWNER

NVE:	1,839	**52,827**	**2,905**	2,968	22	**2,927**	**75.1**
ZFS:	719	**16,690**	**918**	125	1	**919**	**23.6**
COX:	310	**6,408**	**352**	140	1	**353**	**9.1**
CTL:	711	**15,452**	**850**	499	4	**853**	**21.9**
Totals	3,579	**91,378**	**5,025**	3,732	28	**5,053**	**129.6**

Detailed Load Components

Power:

		Owner	Height (ft)	Horiz. Offset (in)	Cable Dia. (in)	Sag at Max Temp	Cable Weight (lbs/ft)	Lead/Span Length	Span Angle (deg)	Wire Length (ft)	Tension (lbs)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Primary	AAC 336.4 KCM 19 STRAND TULIP	NVE	40.88	5.09	0.6660	2.53	0.316	177.0	270.0	177.0	1,165	7,591	-3	4,473	12,062
Primary	AAC 336.4 KCM 19 STRAND TULIP	NVE	40.88	5.09	0.6660	2.68	0.316	185.0	90.0	185.0	1,165	-7,591	-3	4,675	-2,919
Primary	AAC 336.4 KCM 19 STRAND TULIP	NVE	39.92	14.66	0.6660	2.53	0.316	177.0	270.0	177.0	1,165	7,414	45	4,368	11,826
Primary	AAC 336.4 KCM 19 STRAND TULIP	NVE	39.92	14.66	0.6660	2.68	0.316	185.0	90.0	185.0	1,165	-7,414	47	4,565	-2,801
Primary	AAC 336.4 KCM 19 STRAND TULIP	NVE	39.92	14.66	0.6660	2.53	0.316	177.0	270.0	177.0	1,165	7,414	-50	4,368	11,731
Primary	AAC 336.4 KCM 19 STRAND TULIP	NVE	39.92	14.66	0.6660	2.68	0.316	185.0	90.0	185.0	1,165	-7,414	-52	4,565	-2,900
Neutral	ACSR 2/0 AWG 6/1 QUAIL	NVE	33.33	5.84	0.4470	1.23	0.183	177.0	270.0	177.0	1,355	7,194	-12	2,446	9,628
Neutral	ACSR 2/0 AWG 6/1 QUAIL	NVE	33.33	5.84	0.4470	1.32	0.183	185.0	90.0	185.0	1,355	-7,194	-12	2,557	-4,650
Secondary	TRIPLEX 2 AWG	NVE	28.67	6.20	0.8060	2.51	0.248	185.0	90.0	185.0	774	-3,535	-3	3,965	428
											Totals:	**-3,535**	**-42**	**35,982**	**32,405**

Comm:

		Owner	Height (ft)	Horiz. Offset (in)	Cable Dia. (in)	Sag at Max Temp	Cable Weight (lbs/ft)	Lead/Span Length	Span Angle (deg)	Wire Length (ft)	Tension (lbs)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Telco	24ct Fiber	ZFS	23.91	6.82	0.3900	0.20	0.049	177.0	270.0	177.0	1,500	5,714	1	1,531	7,245
Telco	432ct Fiber	ZFS	22.74	6.91	0.8300	1.97	0.159	177.0	270.0	177.0	1,500	5,434	2	3,099	8,535
Overlashed	1/4" EHS	ZFS	22.83	6.91	0.2500	1.82	0.121	185.0	90.0	185.0	1,500	-5,455	-1	1,595	-3,862
Telco	432ct Fiber	ZFS	22.80	6.52	0.8300	-	0.159	185.0	90.0	185.0		0	-1	1,593	1,591
Telco	BELOPTIX DT144 - 144 FIBERS -	ZFS	22.80	7.25	0.7560	-	0.208	185.0	90.0	185.0		0	-3	1,593	1,590
Telco	24ct Fiber	ZFS	22.76	6.92	0.3900	-	0.049	185.0	90.0	185.0		0	-1	1,590	1,590
Overlashed	5/16" EHS	COX	20.25	15.81	0.3125	1.25	0.205	185.0	90.0	185.0	1,500	-4,839	37	1,049	-3,752
Telco	P3-500CA	COX	20.22	15.93	0.5000	-	0.072	185.0	90.0	185.0		0	13	1,047	1,061
Telco	24ct Fiber	COX	20.23	15.70	0.3900	-	0.049	185.0	90.0	185.0		0	9	1,048	1,056
Overlashed	5/16" EHS	COX	20.25	15.81	0.3125	1.25	0.205	185.0	270.0	185.0	1,500	4,839	37	1,044	5,921
Telco	24ct Fiber	COX	20.23	15.92	0.3900	-	0.049	185.0	270.0	185.0		0	9	1,043	1,052
Telco	P3-500CA	COX	20.22	15.69	0.5000	-	0.072	185.0	270.0	185.0		0	13	1,043	1,056
Overlashed	1/4" EHS	CTL	21.33	7.03	0.2500	5.07	0.121	177.0	270.0	177.0	1,500	5,097	9	2,472	7,578
Telco	22 GA 300 PR (1.72)	CTL	21.27	7.32	1.7200	-	1.640	177.0	270.0	177.0		0	133	2,465	2,598
Telco	24ct Fiber	CTL	21.31	6.95	0.3900	-	0.049	177.0	270.0	177.0		0	4	2,470	2,474
Overlashed	1/4" EHS	CTL	21.33	7.03	0.2500	5.52	0.121	185.0	90.0	185.0	1,500	-5,097	10	2,584	-2,503
Telco	22 GA 300 PR (1.72)	CTL	21.27	7.32	1.7200	-	1.640	185.0	90.0	185.0		0	139	2,576	2,715
Telco	24ct Fiber	CTL	21.31	6.95	0.3900	-	0.049	185.0	90.0	185.0		0	4	2,582	2,586
											Totals:	**5,693**	**413**	**32,426**	**38,532**

PowerEquipment:

		Owner	Height (ft)	Horiz. Offset (in)	Offset Angle (deg)	Rotate Angle (deg)	Unit Weight (lbs)	Unit Height (in)	Unit Depth (in)	Unit Diameter (in)	Unit Length (in)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Transformer	1PH-50KVA	NVE	30.42	21.81	90.0	90.0	640.00	47.00	-	24.00	-	-	-253	5,314	5,061

Version: 5.0 / 5.00
* Includes Load Factor(s)

² Worst Wind per Guy Wire
³ Wind at 180.7°

											Totals:	0	-253	5,314	5,061

Crossarm:

		Owner	Height (ft)	Horiz. Offset (in)	Offset Angle (deg)	Rotate Angle (deg)	Unit Weight (lbs)	Unit Height (in)	Unit Depth (in)	Unit Diameter (in)	Unit Length (in)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Pole	Pole Top Extension	NVE	36.92	5.09	90.0	90.0	50.00	72.00	3.50	-	4.50	-	-5	2,307	2,302
Standoff	CROSSARM 3-1/2 X 4-1/2 X 4	COX	20.25	5.36	90.0	90.0	28.00	4.50	-	0.00	-	-	-3	7	4
											Totals:	0	-7	2,314	2,306

Riser:

		Owner	Height (ft)	Horiz. Offset (in)	Offset Angle (deg)	Rotate Angle (deg)	Unit Weight (lbs)	Unit Height (in)	Unit Depth (in)	Unit Diameter (in)	Unit Length (in)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Riser 30.0"	Riser	NVE	25.92	6.93	30.0	30.0	2.16	311.04	-	0.00	-	-	-13	1,222	1,209
											Totals:	0	-13	1,222	1,209

Insulator:

		Owner	Height (ft)	Horiz. Offset (in)	Offset Angle (deg)	Rotate Angle (deg)	Unit Weight (lbs)	Unit Height (in)	Unit Depth (in)	Unit Diameter (in)	Unit Length (in)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Post	Post Insulator - 15 kV	NVE	39.92	0.00	90.0	0.0	11.00	11.50	-	4.75	-	-	-1	316	315
Post	Post Insulator - 15 kV	NVE	39.92	2.25	113.8	0.0	11.00	11.50	-	4.75	-	-	18	316	334
Post	Post Insulator - 15 kV	NVE	39.92	-2.25	66.2	0.0	11.00	11.50	-	4.75	-	-	-20	316	297
Spool	Spool Insulator - 20 kV	NVE	33.33	3.59	0.0	0.0	1.00	2.12	-	2.50	-	-	-1	27	27
Spool	Spool Insulator - 20 kV	NVE	28.67	3.95	90.0	90.0	1.00	2.12	-	2.50	-	-	0	24	23
Bolt	Single Bolt	ZFS	24.00	4.32	270.0	270.0	5.00	0.00	-	3.00	-	-	1	0	1
Bolt	Single Bolt	ZFS	22.83	4.41	270.0	270.0	5.00	0.00	-	3.00	-	-	1	0	1
Bolt	Single Bolt	ZFS	22.83	4.41	90.0	90.0	5.00	0.00	-	3.00	-	-	-1	0	-1
Bolt	Three Bolt	COX	20.25	5.48	180.0	180.0	5.00	0.00	-	3.00	-	-	10	0	10
Bolt	Three Bolt	CTL	21.33	4.53	180.0	180.0	5.00	0.00	-	3.00	-	-	4	0	4
											Totals:	0	11	1,000	1,011

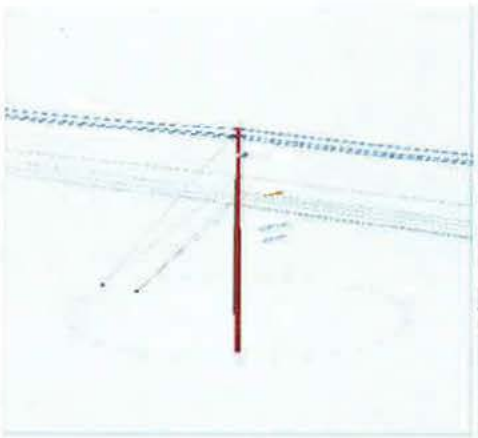
Pole Buckling

Buckling	Buckling (ft)	Buckling Section (% Buckling Col. Hgt.)	Buckling (in)	Min. Buckling (in)	Diameter (in)	Diameter (in)	Modulus of (psi)	Pole (pcf)	Ice Density (pcf)	Pole Tip (ft)	Buckling Load (lbs)	Buckling Load (lbs)	Buckling Load
2.00	24.47	34.92	11.56	18.34	6.69	13.06	1,000,000	50.00	57.00	36.42	16,281	3,732	4.36

O-Calc® Pro *Analysis Report*

Sunday, October 26, 2014 10:50:37 PM

File Name:	2 - p81532 Propose	Pole Length / Class:	50 / 2	Code:	NESC	Structure Type:	Guyed
Pole Num:	2 - p81532	Pole Species:	WESTERN RED CEDAR	NESC Rule:	Rule 250B	Status:	N/A
Permit #:	Unset	Setting Depth (ft):	8.92	Construction Grade:	B	Pole Strength Factor:	0.65
Owner:	Unset	G/L Circumference (in):	48.00	Loading District:	Light	Transverse Wind LF:	2.50
Latitude:	Unset	G/L Fiber Stress (psi):	6,000	Ice Thickness (in):	0.00	Wire Tension LF:	1.65
Longitude:	Unset	Allowable Stress (psi):	3,900	Wind Speed (mph):	59.29	Vertical LF:	1.50
Emp #:	Unset	Fiber Stress Ht. Reduction:	No	Wind Pressure (psf):	9.00		



Pole Capacity Utilization		Height	Wind Angle
Maximum:	65.3%	0.0 ft	358.6°
Groundline:	65.3%	0.0 ft	358.6°
Vertical:	1.2%	22.7 ft	90.0°

Pole Moments		Load Angle	Wind Angle
Max Capac. Util:	73,702 ft-lb	2.3°	358.6°
Groundline:	73,702 ft-lb	2.3°	358.6°

Guys Capacity Summary: Adequate

Guy Summary	Attach Height (ft)	Guy Tensions % Allowable Tension	Guy Tensions Wind Angle	Maximum Guy Tensions % Allowable Tension	Maximum Guy Tensions Wind Angle
Guy 1	40.7	1.9%	358.6°	3.1%	90.0°
Guy 2	30.6	7.6%	358.6°	12.6%	90.0°
Guy 3	26.7	10.0%	358.6°	16.6%	100.0°
Guy 4	25.8	10.4%	358.6°	17.2%	100.0°
Guy 5	24.3	10.9%	358.6°	17.9%	100.0°

Anchor Summary

	Lead Length (ft)	Lead Angle	Max. % Allow. Capacity
Anchor 1	39.2	270.0°	4.5%
Anchor 2	28.7	270.0°	12.6%

GROUNDLINE LOAD SUMMARY:*Wind at 358.6°, Applied Moment 73,702 ft-lb at 2.3°, Allowable Moment 113,804 ft-lb

	Shear Load (lbs)*	Percent Applied Load	Bending Moment (ft-lb)	Percent of Applied Moment	Percent of Pole Capacity	Bending Stress (+/- psi)	Vertical Load (lbs)	Vertical Stress (psi)	Total Stress (psi)	Percent of Pole Capacity

Powers:	568	19.8	**21,555**	29.0	**18.9**	**739**	210	1	**740**	**19.0**
Comms:	993	34.6	**25,290**	34.0	**22.2**	**867**	372	2	**869**	**22.3**
Guys/Braces:	71	2.5	**2,235**	3.0	**2.0**	**77**	37	0	**77**	**2.0**
Power Equipment:	67	2.3	**2,393**	3.2	**2.1**	**82**	375	2	**84**	**2.2**
Pole:	893	31.1	**16,417**	22.1	**14.4**	**563**	2,343	13	**575**	**14.8**
Crossarms:	4	0.1	**151**	0.2	**0.1**	**5**	42	0	**5**	**0.1**
Risers:	224	7.8	**4,398**	5.9	**3.9**	**151**	184	1	**152**	**3.9**
Insulators:	47	1.6	**1,849**	2.5	**1.6**	**63**	82	0	**64**	**1.6**
Pole Load:	2,868	100.0	**74,288**	100.0	**65.3**	**2,546**	3,647	20	**2,566**	**65.8**
Pole Reserve Capacity:			**39,516**		**34.7**	**1,354**			**1,334**	**34.2**

LOAD SUMMARY BY OWNER

NVE:	1,820	**47,769**	**1,637**	3,150	17	**1,654**	**42.4**
ZFS:	376	**9,874**	**338**	121	1	**339**	**8.7**
COX:	221	**5,678**	**195**	81	0	**195**	**5.0**
CTL:	451	**10,967**	**376**	295	2	**377**	**9.7**
Totals	2,868	**74,288**	**2,546**	3,647	20	**2,566**	**65.8**

Detailed Load Components

Power:

		Owner	Height (ft)	Horiz. Offset (in)	Cable Dia. (in)	Sag at Max Temp	Cable Weight (lbs/ft)	Lead/Span Length	Span Angle (deg)	Wire Length (ft)	Tension (lbs)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Primary	AAC 336.4 KCM 19 STRAND	NVE	40.67	16.77	0.6660	0.81	0.316	71.0	270.0	71.0	1,165	-3,087	0	1,801	-1,286
Primary	AAC 336.4 KCM 19 STRAND	NVE	40.67	16.77	0.6660	2.54	0.316	177.0	90.0	177.0	1,165	3,087	1	4,490	7,577
Primary	AAC 336.4 KCM 19 STRAND	NVE	39.08	27.35	0.6660	0.81	0.316	71.0	270.0	71.0	1,165	-2,966	4	1,730	-1,231
Primary	AAC 336.4 KCM 19 STRAND	NVE	39.08	27.35	0.6660	0.81	0.316	71.0	270.0	71.0	1,165	-2,966	-4	1,730	-1,240
Primary	AAC 336.4 KCM 19 STRAND	NVE	39.08	21.14	0.6660	2.54	0.316	177.0	90.0	177.0	1,165	2,966	14	4,314	7,294
Primary	AAC 336.4 KCM 19 STRAND	NVE	39.08	21.14	0.6660	2.54	0.316	177.0	90.0	177.0	1,165	2,966	-14	4,314	7,266
Neutral	ACSR 2/0 AWG 6/1 QUAIL	NVE	30.58	7.16	0.4470	0.29	0.183	71.0	270.0	71.0	1,355	-2,700	0	909	-1,791
Neutral	ACSR 2/0 AWG 6/1 QUAIL	NVE	30.58	7.16	0.4470	1.24	0.183	177.0	90.0	177.0	1,355	2,700	1	2,266	4,966
											Totals:	**0**	**1**	**21,554**	**21,555**

Comm:

		Owner	Height (ft)	Horiz. Offset (in)	Cable Dia. (in)	Sag at Max Temp	Cable Weight (lbs/ft)	Lead/Span Length	Span Angle (deg)	Wire Length (ft)	Tension (lbs)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Telco	24ct Fiber	ZFS	27.24	7.70	0.3900	0.21	0.049	177.0	90.0	177.0	1,500	2,662	0	1,761	4,424
Overlashed	1/4" EHS	ZFS	27.33	7.70	0.2500	0.09	0.121	71.0	270.0	71.0	1,500	-2,671	0	595	-2,076
Telco	24ct Fiber	ZFS	27.30	7.70	0.3900	-	0.049	71.0	270.0	71.0		0	0	595	594
Telco	432ct Fiber	ZFS	26.58	7.76	0.8300	1.98	0.159	177.0	90.0	177.0	1,500	2,598	1	3,657	6,256
Overlashed	5/16" EHS	COX	25.75	7.84	0.3125	0.19	0.205	71.0	270.0	71.0	1,500	-2,516	0	515	-2,002
Telco	24ct Fiber	COX	25.73	8.04	0.3900	-	0.049	71.0	270.0	71.0		0	0	514	514
Telco	P3-500CA	COX	25.72	7.63	0.5000	-	0.072	71.0	270.0	71.0		0	0	514	514
Overlashed	5/16" EHS	COX	25.75	7.84	0.3125	1.16	0.205	177.0	90.0	177.0	1,500	2,516	1	1,283	3,800
Telco	24ct Fiber	COX	25.73	7.65	0.3900	-	0.049	177.0	90.0	177.0		0	0	1,282	1,282
Telco	P3-500CA	COX	25.72	8.06	0.5000	-	0.072	177.0	90.0	177.0		0	0	1,282	1,282
Overlashed	1/4" EHS	CTL	24.33	7.97	0.2500	5.08	0.121	177.0	90.0	177.0	1,500	2,378	0	2,847	5,225

Telco	22 GA 300 PR (1.72)	CTL	24.27	7.34	1.7200	-	1.640	177.0	90.0	177.0		0	0	2,840	2,840
Telco	24ct Fiber	CTL	24.31	8.17	0.3900	-	0.049	177.0	90.0	177.0		0	0	2,845	2,845
Overlashed	1/4" EHS	CTL	24.33	7.97	0.2500	0.34	0.121	71.0	270.0	71.0	1,500	-2,378	0	724	-1,654
Telco	26 GA 200 PR (0.94)	CTL	24.29	8.35	0.9400	-	0.480	71.0	270.0	71.0		0	-1	723	722
Telco	24ct Fiber	CTL	24.31	7.78	0.3900	-	0.049	71.0	270.0	71.0		0	0	723	723
											Totals:	**2,589**	**1**	**22,699**	**25,290**

PowerEquipment:

		Owner	Height (ft)	Horiz. Offset (in)	Offset Angle (deg)	Rotate Angle (deg)	Unit Weight (lbs)	Unit Height (in)	Unit Depth (in)	Unit Diameter (in)	Unit Length (in)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Box	Arrester Bracket	NVE	35.33	22.49	90.0	90.0	250.00	12.00	12.00	-	36.00	-	13	2,380	2,393
											Totals:	**0**	**13**	**2,380**	**2,393**

Crossarm:

		Owner	Height (ft)	Horiz. Offset (in)	Offset Angle (deg)	Rotate Angle (deg)	Unit Weight (lbs)	Unit Height (in)	Unit Depth (in)	Unit Diameter (in)	Unit Length (in)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Normal	CROSSARM 3-1/2 X 4-1/2 X 4	NVE	39.17	5.90	270.0	270.0	28.00	4.50	3.50	-	48.00	-	-1	152	151
											Totals:	**0**	**-1**	**152**	**151**

Riser:

		Owner	Height (ft)	Horiz. Offset (in)	Offset Angle (deg)	Rotate Angle (deg)	Unit Weight (lbs)	Unit Height (in)	Unit Depth (in)	Unit Diameter (in)	Unit Length (in)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Riser 225.0°	Riser	NVE	30.00	8.08	225.0	225.0	7.13	360.00	-	0.00	-	-	-40	4,066	4,026
Riser 350.0°	Riser	ZFS	25.00	8.08	350.0	350.0	3.13	300.00	-	0.00	-	-	23	350	373
											Totals:	**0**	**-17**	**4,415**	**4,398**

Insulator:

		Owner	Height (ft)	Horiz. Offset (in)	Offset Angle (deg)	Rotate Angle (deg)	Unit Weight (lbs)	Unit Height (in)	Unit Depth (in)	Unit Diameter (in)	Unit Length (in)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Deadend	Deadend Insulator - 15 kV	NVE	40.67	4.02	270.0	270.0	3.00	12.75	-	3.80	-	-	0	307	307
Deadend	Deadend Insulator - 15 kV	NVE	40.67	4.02	90.0	90.0	3.00	12.75	-	3.80	-	-	0	307	308
Deadend	Deadend Insulator - 15 kV	NVE	39.17	20.00	343.6	0.0	3.00	12.75	-	3.80	-	-	7	296	303
Deadend	Deadend Insulator - 15 kV	NVE	39.17	-20.00	196.4	0.0	3.00	12.75	-	3.80	-	-	-8	296	288
Deadend	Deadend Insulator - 15 kV	NVE	39.17	20.00	343.6	180.0	3.00	12.75	-	3.80	-	-	8	296	304
Deadend	Deadend Insulator - 15 kV	NVE	39.17	-20.00	196.4	180.0	3.00	12.75	-	3.80	-	-	-7	296	289
Spool	Spool Insulator - 20 kV	NVE	30.58	4.91	270.0	270.0	1.00	2.12	-	2.50	-	-	0	25	25
Spool	Spool Insulator - 20 kV	NVE	30.58	4.91	90.0	90.0	1.00	2.12	-	2.50	-	-	0	25	25
Bolt	Single Bolt	ZFS	27.33	5.20	90.0	90.0	5.00	0.00	-	3.00	-	-	0	0	0
Bolt	Single Bolt	ZFS	27.33	5.20	270.0	270.0	5.00	0.00	-	3.00	-	-	0	0	0
Bolt	Single Bolt	ZFS	26.67	5.26	90.0	90.0	5.00	0.00	-	3.00	-	-	0	0	0
Bolt	Single Bolt	COX	25.75	5.34	270.0	270.0	5.00	0.00	-	3.00	-	-	0	0	0
Bolt	Single Bolt	COX	25.75	5.34	90.0	90.0	5.00	0.00	-	3.00	-	-	0	0	0
Bolt	Single Bolt	CTL	24.33	5.47	90.0	90.0	5.00	0.00	-	3.00	-	-	0	0	0
Bolt	Single Bolt	CTL	24.33	5.47	270.0	270.0	5.00	0.00	-	3.00	-	-	0	0	0
											Totals:	**0**	**0**	**1,849**	**1,849**

Guy Wire and Brace:

		Owner	Attach Height (ft)	End Height (ft)	Lead/Span Length (ft)	Wire Dia. (in)	Percent Solid (%)	Lead Angle (deg)	Incline Angle (deg)	Wire Weight (lbs/ft)	Rest Length (ft)	Stretch Length (in)
Guy 1: EHS 7/16	Down	NVE	40.67	0.00	39.17	0.438	75.0	270.0	46.1	0.399	56.23	0.02

Guy 2: EHS 5/16	Down	NVE	30.58	0.00	39.17	0.312	75.0	270.0	38.0	0.205	49.37	0.26
Guy 3: EHS 5/16	Down	ZFS	26.67	0.00	28.67	0.312	75.0	270.0	42.9	0.205	38.84	0.27
Guy 4: EHS 5/16	Down	COX	25.75	0.00	28.67	0.312	75.0	270.0	41.9	0.205	38.21	0.27
Guy 5: EHS 5/16	Down	CTL	24.33	0.00	28.67	0.312	75.0	270.0	40.3	0.205	37.26	0.27

Guy Wire and Brace (Loads and Reactions)

		Elastic Modulus (psi)	Rated Tensile Strength (lbs)	Guy Strength Factor	Allowable Tension (lbs)	Initial Tension (lbs)	Required Tension[2] (lbs)	Required Tension[3] (lbs)	Applied Tension[3] (lbs)	Vertical Load[3] (lbs)	Shear Load in Guy Dir[3] (lbs)	Shear Load at Report Angle[3] (lbs)	Moment at GL[3] (ft-lb)*
Guy 1: EHS 7/16	Down	23,000,000	20,800	0.90	18,720	700	587	356	87	62	60	-2	937
Guy 2: EHS 5/16	Down	23,000,000	11,200	0.90	10,080	700	1,267	768	575	354	453	-18	442
Guy 3: EHS 5/16	Down	23,000,000	11,200	0.90	10,080	700	1,671	1,013	772	526	565	-22	303
Guy 4: EHS 5/16	Down	23,000,000	11,200	0.90	10,080	700	1,735	1,051	791	529	589	-23	288
Guy 5: EHS 5/16	Down	23,000,000	11,200	0.90	10,080	700	1,809	1,097	800	517	610	-24	265
									Totals:	**1,988**	**2,277**	**-90**	**2,235**

Anchor/Rod Load Summary:

	Owner	Rod Length AGL (in)	Lead Length (ft)	Lead Angle (deg)	Strength of Assembly (lbs)	Anchor/Rod Strength Factor	Allowable Load (lbs)	Max Load[2] (lbs)	Load at Pole MCU[3] (lbs)	Max Required Capacity[2] (%)
Single - 12" - Soil Class 4	NVE	0.00	39.17	270.0	25,000	1.00	25,000	1,120	660	4.5
Single - 12" - Soil Class 4	ZFS	0.00	28.67	270.0	25,000	1.00	25,000	3,160	2,362	12.6

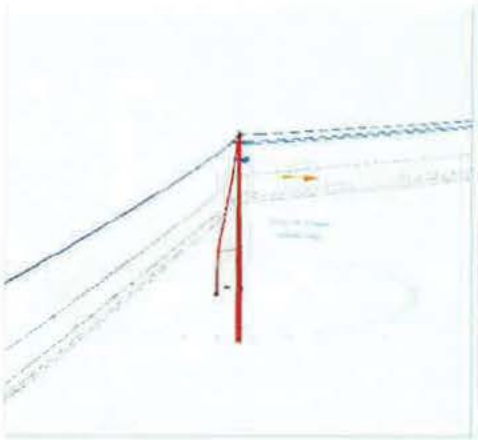
Pole Buckling

Buckling Constant	Buckling Column Hgt. (ft)	Buckling Section Height (% Buckling Col. Hgt.)	Buckling Section Diam. (in)	Min. Buckling Diam. at CL (in)	Diameter at Tip (in)	Diameter at CL (in)	Modulus of Elasticity (psi)	Pole Density (pcf)	Ice Density (pcf)	Pole Tip Height (ft)	Buckling Load Capacity at Hgt. (lbs)	Buckling Load Applied at Hgt. (lbs)	Buckling Load Factor of Safety
0.71	22.74	33.98	13.90	10.60	7.96	15.29	1,000,000	50.00	57.00	41.08	315,948	**3,647**	**86.63**

O-Calc® Pro *Analysis Report*

Wednesday, November 05, 2014 10:55:31 AM

File Name:	**3 - p65689 Propose**	Pole Length / Class:	**45 / 4**	Code:	**NESC**	Structure Type:	**Angle**
Pole Num:	**3 - p65689**	Pole Species:	**WESTERN RED CEDAR**	NESC Rule:	**Rule 250B**	Status:	**N/A**
Permit #:	**Unset**	Setting Depth (ft):	**11.00**	Construction Grade:	**B**	Pole Strength Factor:	**0.65**
Owner:	**Unset**	G/L Circumference (in):	**42.00**	Loading District:	**Light**	Transverse Wind LF:	**2.50**
Latitude:	**Unset**	G/L Fiber Stress (psi):	**6,000**	Ice Thickness (in):	**0.00**	Wire Tension LF:	**1.65**
Longitude:	**Unset**	Allowable Stress (psi):	**3,900**	Wind Speed (mph):	**59.29**	Vertical LF:	**1.50**
Emp #:	**Unset**	Fiber Stress Ht. Reduction:	**No**	Wind Pressure (psf):	**9.00**		



Pole Capacity Utilization		Height	Wind Angle
Maximum:	**105.8%**	0.0 ft	135.6°
Groundline:	**105.8%**	0.0 ft	135.6°
Vertical:	**0.6%**	17.4 ft	135.0°

Pole Moments		Load Angle	Wind Angle
Max Capac. Util:	**80,403 ft-lb**	135.7°	135.6°
Groundline:	**80,403 ft-lb**	135.7°	135.6°

Guys Capacity Summary: Inadequate

Guy Summary	Attach Height (ft)	**Guy Tensions % Allowable Tension**	Wind Angle	**Maximum Guy Tensions % Allowable Tension**	Wind Angle
Guy 1	31.9	**116.7%**	135.6°	**192.5%**	100.0°
Guy 2	31.9	**73.3%**	135.6°	**120.9%**	160.0°

Anchor Summary

	Lead Length (ft)	Lead Angle	**Max. % Allow. Capacity**
Anchor 1	5.3	270.0°	**47.0%**
Anchor 2	4.5	0.0°	**54.9%**

Strut Summary

	Attach Height (ft)	Lead Angle	**% Allowed Capacity**
Strut 1	9.4	270.0°	**83.5%**

GROUNDLINE LOAD SUMMARY:*Wind at 135.6°, Applied Moment 80,403 ft-lb at 135.7°, Allowable Moment 76,240 ft-lb

Shear Load (lbs)*	**Percent Applied Load**	**Bending Moment (ft-lb)**	**Percent of Applied Moment**	**Percent of Pole Capacity**	**Bending Stress (+/- psi)**	**Vertical Load (lbs)**	**Vertical Stress (psi)**	**Total Stress (psi)**	**Percent of Pole Capacity**

Version: 5.0 / 5.00
* Includes Load Factor(s)

² Worst Wind per Guy Wire
³ Wind at 180.7°

Powers:	3,095	43.0	**93,837**	54.1	**123.1**	**4,800**	130	1	**4,801**	**123.1**
Comms:	3,104	43.2	**62,548**	36.0	**82.0**	**3,200**	153	1	**3,201**	**82.1**
Guys/Braces:	17	0.2	**413**	0.2	**0.5**	**21**	24	0	**21**	**0.5**
Generic Equipment:	72	1.0	**2,066**	1.2	**2.7**	**106**	68	0	**106**	**2.7**
Pole:	639	8.9	**9,659**	5.6	**12.7**	**494**	1,450	10	**504**	**12.9**
Crossarms:	28	0.4	**893**	0.5	**1.2**	**46**	42	0	**46**	**1.2**
Risers:	202	2.8	**3,073**	1.8	**4.0**	**157**	121	1	**158**	**4.1**
Insulators:	32	0.4	**1,049**	0.6	**1.4**	**54**	66	0	**54**	**1.4**
Pole Load:	7,190	100.0	**173,538**	100.0	**227.6**	**8,877**	2,053	15	**8,892**	**228.0**
Pole Reserve Capacity:			**-97,298**		**-127.6**	**-4,977**			**-4,992**	**-128.0**

LOAD SUMMARY BY OWNER

NVE:	4,086	**110,981**	**5,677**	1,855	13	**5,690**	**145.9**
ZFS:	1,040	**21,929**	**1,122**	56	0	**1,122**	**28.8**
COX:	1,028	**20,744**	**1,061**	67	0	**1,062**	**27.2**
CTL:	1,036	**19,884**	**1,017**	74	1	**1,018**	**26.1**
Totals	7,190	**173,538**	**8,877**	2,053	15	**8,892**	**228.0**

Detailed Load Components

Power:

		Owner	Height (ft)	Horiz. Offset (in)	Cable Dia. (in)	Sag at Max Temp	Cable Weight (lbs/ft)	Lead/Span Length	Span Angle (deg)	Wire Length (ft)	Tension (lbs)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Primary	AAC 336.4 KCM 19 STRAND	NVE	33.42	16.14	0.6660	3.64	0.316	177.0	225.0	177.1	583	399	0	3,693	4,092
Primary	AAC 336.4 KCM 19 STRAND	NVE	33.42	16.14	0.6660	1.21	0.316	75.0	90.0	75.0	583	22,448	4	801	23,252
Primary	AAC 336.4 KCM 19 STRAND	NVE	31.83	21.34	0.6660	1.21	0.316	75.0	90.0	75.0	583	21,378	-2	763	22,139
Primary	AAC 336.4 KCM 19 STRAND	NVE	31.83	21.34	0.6660	1.21	0.316	75.0	90.0	75.0	583	21,378	5	763	22,146
Neutral	ACSR 2/0 AWG 6/1 QUAIL	NVE	25.08	6.30	0.4470	2.23	0.183	177.0	225.0	177.0	678	349	0	1,860	2,209
Neutral	ACSR 2/0 AWG 6/1 QUAIL	NVE	25.08	6.30	0.4470	0.74	0.183	75.0	90.0	75.0	678	19,591	4	403	19,998
											Totals:	**85,544**	**10**	**8,282**	**93,837**

Comm:

		Owner	Height (ft)	Horiz. Offset (in)	Cable Dia. (in)	Sag at Max Temp	Cable Weight (lbs/ft)	Lead/Span Length	Span Angle (deg)	Wire Length (ft)	Tension (lbs)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Overlashed	1/4" EHS	ZFS	21.08	6.87	0.2500	2.36	0.121	177.0	225.0	177.0	750	324	0	927	1,251
Telco	24ct Fiber	ZFS	21.06	7.05	0.3900	-	0.049	177.0	225.0	177.0		0	0	926	926
Telco	24ct Fiber	ZFS	21.06	6.69	0.3900	-	0.049	177.0	225.0	177.0		0	0	926	926
Overlashed	1/4" EHS	ZFS	21.08	6.87	0.2500	0.54	0.121	75.0	90.0	75.0	750	18,215	3	201	18,419
Telco	24ct Fiber	ZFS	21.06	6.70	0.3900	-	0.049	75.0	90.0	75.0		0	1	201	202
Telco	24ct Fiber	ZFS	21.06	7.06	0.3900	-	0.049	75.0	90.0	75.0		0	1	201	202
Overlashed	5/16" EHS	COX	20.17	6.94	0.3125	2.48	0.205	177.0	225.0	177.0	750	310	0	1,171	1,481
Telco	24ct Fiber	COX	20.14	6.94	0.3900	-	0.049	177.0	225.0	177.0		0	0	1,169	1,170
Overlashed	5/16" EHS	COX	20.17	6.94	0.3125	0.74	0.205	75.0	90.0	75.0	750	17,429	5	218	17,652
Telco	24ct Fiber	COX	20.15	6.75	0.3900	-	0.049	75.0	90.0	75.0		0	1	218	219
Telco	P3-500CA	COX	20.14	7.16	0.5000	-	0.072	75.0	90.0	75.0		0	2	218	219
Overlashed	1/4" EHS	CTL	19.17	7.02	0.2500	1.03	0.121	75.0	90.0	75.0	750	16,565	3	309	16,876
Telco	26 GA 200 PR (0.94)	CTL	19.13	6.65	0.9400	-	0.480	75.0	90.0	75.0		0	11	308	319

Telco	24ct Fiber	CTL	19.15	7.22	0.3900	-	0.049	75.0	90.0	75.0		0	1	308	309
Overlashed	1/4" EHS	CTL	19.17	7.02	0.2500	2.03	0.121	177.0	225.0	177.0	750	295	0	1,042	1,336
Telco	24ct Fiber	CTL	19.14	7.02	0.3900	-	0.049	177.0	225.0	177.0		0	0	1,040	1,040
											Totals:	**53,138**	**28**	**9,382**	**62,548**

GenericEquipment:

		Owner	Height (ft)	Horiz. Offset (in)	Offset Angle (deg)	Rotate Angle (deg)	Unit Weight (lbs)	Unit Height (in)	Unit Depth (in)	Unit Diameter (in)	Unit Length (in)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Box	Fuse Cutout	NVE	28.33	19.90	0.0	0.0	15.00	12.00	8.00	-	8.00	-	-27	680	653
Box	Fuse Cutout	NVE	28.33	19.90	90.0	0.0	15.00	12.00	8.00	-	8.00	-	26	680	706
Box	Fuse Cutout	NVE	28.33	19.90	180.0	0.0	15.00	12.00	8.00	-	8.00	-	27	680	707
											Totals:	**0**	**26**	**2,040**	**2,066**

Crossarm:

		Owner	Height (ft)	Horiz. Offset (in)	Offset Angle (deg)	Rotate Angle (deg)	Unit Weight (lbs)	Unit Height (in)	Unit Depth (in)	Unit Diameter (in)	Unit Length (in)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Normal	CROSSARM 3-1/2 X 4-1/2 X 4	NVE	31.92	5.30	270.0[3]	270.0	28.00	4.50	3.50	-	48.00	-	-13	906	893
											Totals:	**0**	**-13**	**906**	**893**

Riser:

		Owner	Height (ft)	Horiz. Offset (in)	Offset Angle (deg)	Rotate Angle (deg)	Unit Weight (lbs)	Unit Height (in)	Unit Depth (in)	Unit Diameter (in)	Unit Length (in)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Riser 0.0°	Riser	NVE	26.08	7.37	0.0	0.0	4.67	312.96	-	0.00	-	-	-22	2,378	2,356
Riser 90.0°	Riser	NVE	16.25	7.37	90.0	90.0	2.03	195.00	-	0.00	-	-	9	708	717
											Totals:	**0**	**-13**	**3,086**	**3,073**

Insulator:

		Owner	Height (ft)	Horiz. Offset (in)	Offset Angle (deg)	Rotate Angle (deg)	Unit Weight (lbs)	Unit Height (in)	Unit Depth (in)	Unit Diameter (in)	Unit Length (in)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Deadend	Deadend Insulator - 15 kV	NVE	33.42	3.39	225.0	225.0	3.00	12.75	-	3.80	-	-	0	253	253
Deadend	Deadend Insulator - 15 kV	NVE	33.42	3.39	90.0	90.0	3.00	12.75	-	3.80	-	-	4	253	257
Deadend	Deadend Insulator - 15 kV	NVE	31.92	20.00	345.2	180.0	3.00	12.75	-	3.80	-	-	-3	242	238
Deadend	Deadend Insulator - 15 kV	NVE	31.92	-20.00	194.8	180.0	3.00	12.75	-	3.80	-	-	7	242	249
Spool	Spool Insulator - 20 kV	NVE	25.08	4.05	225.0	225.0	1.00	2.12	-	2.50	-	-	0	21	21
Spool	Spool Insulator - 20 kV	NVE	25.08	4.05	90.0	90.0	1.00	2.12	-	2.50	-	-	1	21	21
Bolt	Single Bolt	ZFS	21.08	4.37	225.0	225.0	5.00	0.00	-	3.00	-	-	0	0	0
Bolt	Single Bolt	ZFS	21.08	4.37	90.0	90.0	5.00	0.00	-	3.00	-	-	3	0	3
Bolt	Single Bolt	COX	20.17	4.44	225.0	225.0	5.00	0.00	-	3.00	-	-	0	0	0
Bolt	Single Bolt	COX	20.17	4.44	90.0	90.0	5.00	0.00	-	3.00	-	-	3	0	3
Bolt	Single Bolt	CTL	19.17	4.52	90.0	90.0	5.00	0.00	-	3.00	-	-	3	0	3
Bolt	Single Bolt	CTL	19.17	4.52	225.0	225.0	5.00	0.00	-	3.00	-	-	0	0	0
											Totals:	**0**	**18**	**1,031**	**1,049**

Guy Wire and Brace:

		Owner	Attach Height (ft)	End Height (ft)	Lead/Span Length (ft)	Wire Dia. (in)	Percent Solid (%)	Lead Angle (deg)	Incline Angle (deg)	Wire Weight (lbs/ft)	Rest Length (ft)	Stretch Length (in)
Guy 1: EHS 5/16	Sidewalk	NVE	31.92	0.00	5.33	0.312	75.0	270.0	77.5	0.205	32.41	3.35
Guy 2: EHS 7/16	Down	NVE	31.92	0.00	4.50	0.438	75.0	0.0	82.0	0.399	32.20	1.97

Version: 5.0 / 5.00
* includes Load Factor(s)

[2] Worst Wind per Guy Wire
[3] Wind at 180.7°

Guy Wire and Brace (Loads and Reactions)

		Elastic Modulus (psi)	Rated Tensile Strength (lbs)	Guy Strength Factor	Allowable Tension (lbs)	Initial Tension (lbs)	Required Tension[2] (lbs)	Required Tension[3] (lbs)	Applied Tension[3] (lbs)	Vertical Load[3] (lbs)	Shear Load in Guy Dir[3] (lbs)	Shear Load at Report Angle[3] (lbs)	Moment at GL[3] (ft-lb)[3]
Guy 1: EHS 5/16	Sidewalk	23,000,000	11,200	0.90	10,080	700	19,408	11,762	11,441	11,168	2,482	-1,733	208
Guy 2: EHS 7/16	Down	23,000,000	20,800	0.90	18,720	700	22,628	13,714	13,238	13,109	1,848	-1,323	206
									Totals:	**24,277**	**4,330**	**-3,056**	**413**

Anchor/Rod Load Summary:

	Owner	Rod Length AGL (in)	Lead Length (ft)	Lead Angle (deg)	Strength of Assembly (lbs)	Anchor/Rod Strength Factor	Allowable Load (lbs)	Max Load[2] (lbs)	Load at Pole MCU[3] (lbs)	Max Required Capacity[3] (%)
Single - 12" - Soil Class 4	NVE	0.00	5.33	270.0	25,000	1.00	25,000	11,762	11,441	47.0
Single - 12" - Soil Class 4	NVE	0.00	4.50	0.0	25,000	1.00	25,000	13,714	13,238	54.9

Pole Buckling

Buckling [illegible]	Buckling [illegible] (ft)	Buckling Section [illegible] (% Buckling Col. Hgt.)	Buckling [illegible] (in)	Min. Buckling [illegible] (in)	Diameter [illegible] (in)	Diameter [illegible] (in)	Modulus of [illegible] (psi)	Pole [illegible] (pcf)	Ice Density (pcf)	Pole Tip [illegible] (ft)	Buckling Load [illegible] (lbs)	Buckling Load [illegible] (lbs)	Buckling Load [illegible]
0.71	17.44	33.85	12.21	7.03	6.69	13.38	1,000,000	50.00	57.00	34.00	319,348	**2,053**	**155.57**

November 20, 2014 (COX, Nellis & Tropicana)

Nellis & Tropicana O/B 144CT

Grade B - light	1 - p75431		2 - p66592		3 - p87951		4 - p28697		5 - p28699	
	Existing	Proposed	Existing	Proposed	Existing	Proposed	Existing	Proposed	Existing	Proposed
Maximum Pole Capacity Utilization Percent	96.4%	97.8%	85.7%	87.1%	89.6%	90.7%	36.8%	36.8%	89.8%	90.4%

Grade B - light	6 - p28700		7 - p28701		8 - p74984		9 - p27879		10 - p27886	
	Existing	Proposed	Existing	Proposed	Existing	Proposed	Existing	Proposed	Existing	Proposed
Maximum Pole Capacity Utilization Percent	119.6%	120.2%	116.3%	117.1%	154.9%	155.9%	97.9%	99.3%	172.9%	173.3%

Grade B - light	11 - p63220		12 - p27885		13 - p27884		14 - p27883		15 - p27790	
	Existing	Proposed	Existing	Proposed	Existing	Proposed	Existing	Proposed	Existing	Proposed
Maximum Pole Capacity Utilization Percent	94.1%	95.1%	154.8%	156.4%	124.9%	127.3%	151.9%	154.3%	260.2%	262.9%

Grade B - light	16 - p27882		17 - p55291		18 - p6068		19 - p55289		20 - p55288	
	Existing	Proposed	Existing	Proposed	Existing	Proposed	Existing	Proposed	Existing	Proposed
Maximum Pole Capacity Utilization Percent	157.2%	161.2%	57.2%	57.4%	86.9%	87.9%	89.4%	91.3%	96.1%	98.2%

Grade B - light	21 - p55287		22 - p55286		23 - p101684		24 - p101683		25 - p101808	
	Existing	Proposed	Existing	Proposed	Existing	Proposed	Existing	Proposed	Existing	Proposed
Maximum Pole Capacity Utilization Percent	102.6%	104.6%	76.8%	78.3%	Steel		Steel		56.9%	57.9%

Grade B - light	26 - p101638		27 - p101639		28 - p101404		29 - p71927	
	Existing	Proposed	Existing	Proposed	Existing	Proposed	Existing	Proposed
Maximum Pole Capacity Utilization Percent	73.7%	74.8%	111.3%	113.1%	Steel		26.0%	26.6%