NVE:	2,392	67,967	2,646	3,131	19	2,665	68.3
ZFS:	314	7,781	303	89	1	304	7.8
COX:	554	12,903	502	232	1	504	12.9
CTL:	1,187	26,028	1,013	602	4	1,017	26.1
Totals	4,448	114,679	4,465	4,055	24	4,489	115.1

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 636.0 KCM 37 STRAND	NVE	34.98	56.30	1.1240	2.98	0.596	189.0	270.0	189.0	2,204	606	395	6,973	7,974
Primary	AAC 636.0 KCM 37 STRAND	NVE	34.98	56.30	1.1240	2.96	0.596	188.0	90.0	188.0	2,204	-606	392	6,937	6,723
Primary	AAC 636.0 KCM 37 STRAND	NVE	34.98	19.86	1.1240	2.98	0.596	189.0	270.0	189.0	2,204	606	134	6,973	7,714
Primary	AAC 636.0 KCM 37 STRAND	NVE	34.98	19.86	1.1240	2.96	0.596	188.0	90.0	188.0	2,204	-606	133	6,937	6,464
Neutral	AAC 336.4 KCM 19 STRAND TULIP	NVE	34.98	19.86	0.6660	2.77	0.316	189.0	270.0	189.0	1,165	320	-71	4,130	4,379
Neutral	AAC 336.4 KCM 19 STRAND TULIP	NVE	34.98	19.86	0.6660	2.75	0.316	188.0	90.0	188.0	1,165	-320	-70	4,108	3,717
Primary	AAC 636.0 KCM 37 STRAND	NVE	34.98	56.30	1.1240	2.98	0.596	189.0	270.0	189.0	2,204	606	-394	6,973	7,186
Primary	AAC 636.0 KCM 37 STRAND	NVE	34.98	56.30	1.1240	2.96	0.596	188.0	90.0	188.0	2,204	-606	-392	6,937	5,939
											Totals:	0	128	49,968	50,095

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 DT288 - 288 FIBERS -	ZFS	24.92	7.41	0.8900	2.49	0.289	189.0	270.0	189.0	1,500	293	-25	3,929	4,197
Telco	BELOPTIX DT288 - 288 FIBERS -	ZFS	24.92	7.41	0.8900	2.47	0.289	188.0	90.0	188.0	1,500	-293	-25	3,908	3,589
Overlashed	1/4" EHS	COX	23.83	7.52	0.2500	1.62	0.121	189.0	270.0	189.0	1,500	281	-11	1,351	1,621
Telco	P3-500CA	COX	23.81	7.62	0.5000	-	0.072	189.0	270.0	189.0		0	-6	1,350	1,344
Telco	BELOPTIX DT144 - 144 FIBERS -	COX	23.80	7.39	0.7560	-	0.208	189.0	270.0	189.0		0	-18	1,350	1,331
Telco	24ct Fiber	COX	23.76	7.52	0.3900	-	0.049	189.0	270.0	189.0		0	-4	1,348	1,343
Overlashed	1/4" EHS	COX	23.83	7.52	0.2500	2.14	0.121	188.0	90.0	188.0	1,500	-281	-11	1,467	1,175
Telco	P3-750CA	COX	23.79	7.53	0.7500	-	0.161	188.0	90.0	188.0		0	-14	1,464	1,450
Telco	P3-500CA	COX	23.83	7.38	0.5000	-	0.072	188.0	90.0	188.0		0	-6	1,467	1,461
Telco	BELOPTIX DT144 - 144 FIBERS -	COX	23.87	7.53	0.7560	-	0.208	188.0	90.0	188.0		0	-18	1,469	1,451
Telco	24ct Fiber	COX	23.83	7.65	0.3900	-	0.049	188.0	90.0	188.0		0	-4	1,467	1,462
Overlashed	5/16" EHS	CTL	22.50	7.65	0.3125	5.19	0.205	189.0	270.0	189.0	1,500	265	-19	2,968	3,214
Telco	26 GA 200 PR (0.94)	CTL	22.46	7.85	0.9400	-	0.480	189.0	270.0	189.0		0	-44	2,963	2,918
Telco	26 GA 400 PR (1.30)	CTL	22.45	7.44	1.3000	-	0.910	189.0	270.0	189.0		0	-60	2,961	2,881
Overlashed	5/16" EHS	CTL	22.50	7.65	0.3125	5.13	0.205	188.0	90.0	188.0	1,500	-265	-18	2,952	2,669
Telco	26 GA 200 PR (0.94)	CTL	22.46	7.85	0.9400	-	0.480	188.0	90.0	188.0		0	-44	2,947	2,903
Telco	26 GA 400 PR (1.30)	CTL	22.45	7.44	1.3000	-	0.910	188.0	90.0	188.0		0	-79	2,945	2,866
Overlashed	3/8" EHS	CTL	21.83	7.71	0.3750	2.01	0.273	189.0	270.0	189.0	1,500	257	-25	2,176	2,409
Telco	BELOPTIX DT144 - 144 FIBERS -	CTL	21.79	7.71	0.7560	-	0.208	189.0	270.0	189.0		0	-19	2,172	2,153
Overlashed	3/8" EHS	CTL	21.83	7.71	0.3750	1.99	0.273	188.0	90.0	188.0	1,500	-257	-25	2,165	1,883
Telco	BELOPTIX DT144 - 144 FIBERS -	CTL	21.79	7.71	0.7560	-	0.208	188.0	90.0	188.0		0	-19	2,161	2,142
											Totals:	0	-516	46,978	46,462

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

² Worst Wind per Guy Wire
³ Wind at 358.6°

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-15KVA	NVE	29.92	21.43	90.0	90.0	335.00	34.00	-	22.00	-	-	-6	3,496	3,490
											Totals:	0	-6	3,496	3,490

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 10	NVE	34.00	5.78	270.0	270.0	66.00	4.50	3.50	-	120.00	-	0	135	135
											Totals:	0	0	135	135

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	28.83	7.94	270.0	270.0	0.90	345.96	-	0.00	-	-	0	1,298	1,298
Riser 185.0°	Riser	COX	23.17	7.94	185.0	185.0	4.15	278.04	-	0.00	-	-	-30	299	269
											Totals:	0	-30	1,598	1,567

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)*
Pin	Pin Insulator - 15 kV	NVE	34.19	56.00	354.1	0.0	10.00	9.50	-	7.50	-	-	70	383	453
Pin	Pin Insulator - 15 kV	NVE	34.19	19.00	343.1	0.0	10.00	9.50	-	7.50	-	-	24	383	407
Pin	Pin Insulator - 15 kV	NVE	34.19	-19.00	196.9	0.0	10.00	9.50	-	7.50	-	-	-24	383	359
Pin	Pin Insulator - 15 kV	NVE	34.19	-56.00	185.9	0.0	10.00	9.50	-	7.50	-	-	-70	383	313
Bolt	Three Bolt	ZFS	24.92	4.91	180.0	180.0	5.00	0.00	-	3.00	-	-	-5	0	-5
Bolt	Three Bolt	COX	23.83	5.02	180.0	180.0	5.00	0.00	-	3.00	-	-	-5	0	-5
Bolt	Three Bolt	CTL	22.50	5.15	180.0	180.0	5.00	0.00	-	3.00	-	-	-5	0	-5
Bolt	Three Bolt	CTL	21.83	5.21	180.0	180.0	5.00	0.00	-	3.00	-	-	-5	0	-5
											Totals:	0	-19	1,531	1,513

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	23.27	34.61	13.09	18.68	7.96	14.65	1,000,000	50.00	57.00	34.58	29,594	4,055	7.30

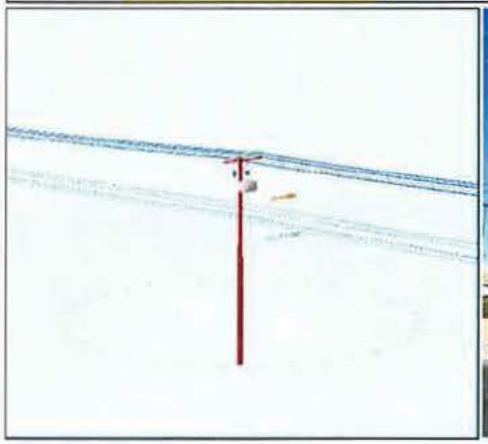
Version: 5.0 / 5.00
* includes Load Factor(s)

² Worst Wind per Guy Wire
³ Wind at 358.6°

O-Calc® Pro *Analysis Report*

Tuesday, November 04, 2014 3:28:35 PM

File Name:	21 - p55287 Existi	Pole Length / Class:	45 / 2	Code:	NESC	Structure Type:	Unguyed
Pole Num:	21 - p55287	Pole Species:	WESTERN RED CEDAR	NESC Rule:	Rule 250B	Status:	N/A
Permit #:	Unset	Setting Depth (ft):	10.08	Construction Grade:	B	Pole Strength Factor:	0.65
Owner:	Unset	G/L Circumference (in):	45.00	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:	122.9%	0.0 ft	0.0°
Groundline:	122.9%	0.0 ft	0.0°
Vertical:	15.1%	23.7 ft	0.0°

Pole Moments		Load Angle	Wind Angle
Max Capac. Util:	114,634 ft-lb	0.2°	0.0°
Groundline:	114,634 ft-lb	0.2°	0.0°

GROUNDLINE LOAD SUMMARY:*Wind at 0.0°, Applied Moment 114,634 ft-lb at 0.2°, 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:	1,427	33.4	50,581	44.8	53.9	2,104	595	4	2,107	54.0
Comms:	1,873	43.8	43,163	38.2	46.0	1,795	771	5	1,800	46.2
Generic Equipment:	72	1.7	2,262	2.0	2.4	94	68	0	95	2.4
Power Equipment:	129	3.0	3,731	3.3	4.0	155	525	3	158	4.1
Pole:	729	17.0	11,523	10.2	12.3	479	1,821	11	491	12.6
Crossarms:	4	0.1	135	0.1	0.1	6	99	1	6	0.2
Insulators:	45	1.0	1,532	1.4	1.6	64	98	1	64	1.6
Pole Load:	4,279	100.0	112,928	100.0	120.4	4,697	3,976	25	4,721	121.1
Pole Reserve Capacity:			-19,157		-20.4	-797			-821	-21.1

LOAD SUMMARY BY OWNER

NVE:	2,406	69,780	2,902	3,167	20	2,922	74.9
ZFS:	315	7,941	330	89	1	331	8.5
COX:	371	8,903	370	118	1	371	9.5
CTL:	1,187	26,304	1,094	602	4	1,098	28.1
Totals	4,279	112,928	4,697	3,976	25	4,721	121.1

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 636.0 KCM 37 STRAND	NVE	35.31	56.30	1.1240	2.95	0.596	188.0	270.0	188.0	2,204	-300	-392	7,004	6,312
Primary	AAC 636.0 KCM 37 STRAND	NVE	35.31	56.30	1.1240	2.97	0.596	189.0	90.0	189.0	2,204	300	-394	7,041	6,947
Neutral	AAC 336.4 KCM 19 STRAND TULIP	NVE	35.31	19.86	0.6660	2.74	0.316	188.0	270.0	188.0	1,165	-158	-70	4,148	3,919
Neutral	AAC 336.4 KCM 19 STRAND TULIP	NVE	35.31	19.86	0.6660	2.76	0.316	189.0	90.0	189.0	1,165	158	-71	4,170	4,258
Primary	AAC 636.0 KCM 37 STRAND	NVE	35.31	19.86	1.1240	2.95	0.596	188.0	270.0	188.0	2,204	-300	133	7,004	6,838
Primary	AAC 636.0 KCM 37 STRAND	NVE	35.31	19.86	1.1240	2.97	0.596	189.0	90.0	189.0	2,204	300	134	7,041	7,475
Primary	AAC 636.0 KCM 37 STRAND	NVE	35.31	56.30	1.1240	2.95	0.596	188.0	270.0	188.0	2,204	-300	392	7,004	7,097
Primary	AAC 636.0 KCM 37 STRAND	NVE	35.31	56.30	1.1240	2.97	0.596	189.0	90.0	189.0	2,204	300	394	7,041	7,736
											Totals:	0	127	50,455	50,581

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 DT288 - 288 FIBERS -	ZFS	25.42	7.34	0.8900	2.47	0.289	188.0	270.0	188.0	1,500	-147	-25	3,987	3,816
Telco	BELOPTIX DT288 - 288 FIBERS -	ZFS	25.42	7.34	0.8900	2.48	0.289	189.0	90.0	189.0	1,500	147	-25	4,009	4,130
Overlashed	1/4" EHS	COX	24.00	7.47	0.2500	1.28	0.121	188.0	270.0	188.0	1,500	-138	0	1,111	972
Telco	P3-500CA	COX	23.98	7.72	0.5000	-	0.072	188.0	270.0	188.0		0	0	1,110	1,110
Telco	48ct Fiber	COX	23.98	7.23	0.5130	-	0.121	188.0	270.0	188.0		0	0	1,110	1,110
Telco	24ct Fiber	COX	23.95	7.48	0.3900	-	0.049	188.0	270.0	188.0		0	0	1,109	1,109
Overlashed	1/4" EHS	COX	24.00	7.47	0.2500	1.29	0.121	189.0	90.0	189.0	1,500	138	0	1,117	1,255
Telco	P3-500CA	COX	23.98	7.23	0.5000	-	0.072	189.0	90.0	189.0		0	0	1,116	1,116
Telco	48ct Fiber	COX	23.98	7.72	0.5130	-	0.121	189.0	90.0	189.0		0	0	1,116	1,116
Telco	24ct Fiber	COX	23.95	7.47	0.3900	-	0.049	189.0	90.0	189.0		0	0	1,115	1,115
Overlashed	5/16" EHS	CTL	22.75	7.59	0.3125	5.12	0.205	188.0	270.0	188.0	1,500	-131	-18	2,986	2,836
Telco	26 GA 200 PR (0.94)	CTL	22.71	7.79	0.9400	-	0.480	188.0	270.0	188.0		0	-44	2,981	2,937
Telco	26 GA 400 PR (1.30)	CTL	22.70	7.38	1.3000	-	0.910	188.0	270.0	188.0		0	-79	2,979	2,900
Overlashed	5/16" EHS	CTL	22.75	7.59	0.3125	5.17	0.205	189.0	90.0	189.0	1,500	131	-18	3,002	3,114
Telco	26 GA 200 PR (0.94)	CTL	22.71	7.79	0.9400	-	0.480	189.0	90.0	189.0		0	-44	2,997	2,953
Telco	26 GA 400 PR (1.30)	CTL	22.70	7.38	1.3000	-	0.910	189.0	90.0	189.0		0	-79	2,995	2,916
Overlashed	3/8" EHS	CTL	22.00	7.66	0.3750	1.96	0.273	188.0	270.0	188.0	1,500	-127	-25	2,182	2,031
Telco	BELOPTIX DT144 - 144 FIBERS -	CTL	21.96	7.66	0.7560	-	0.208	188.0	270.0	188.0		0	-19	2,178	2,159
Overlashed	3/8" EHS	CTL	22.00	7.66	0.3750	1.98	0.273	189.0	90.0	189.0	1,500	127	-25	2,194	2,296
Telco	BELOPTIX DT144 - 144 FIBERS -	CTL	21.96	7.66	0.7560	-	0.208	189.0	90.0	189.0		0	-19	2,190	2,171
											Totals:	0	-419	43,582	43,163

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)*

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

² Worst Wind per Guy Wire
³ Wind at 0.0°

Box	Fuse Cutout	NVE	31.42	20.30	270.0	0.0	15.00	12.00	8.00	-	8.00	-	0	754	754
Box	Fuse Cutout	NVE	31.42	20.30	0.0	0.0	15.00	12.00	8.00	-	8.00	-	38	754	792
Box	Fuse Cutout	NVE	31.42	20.30	180.0	0.0	15.00	12.00	8.00	-	8.00	-	-38	754	716
											Totals:	0	0	2,262	2,262

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	28.92	27.03	90.0	90.0	350.00	25.00	25.00	-	33.00	-	4	3,728	3,731
											Totals:	0	4	3,728	3,731

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 10	NVE	34.33	5.78	90.0	90.0	66.00	4.50	3.50	-	120.00	-	0	135	135
											Totals:	0	0	135	135

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)*
Pin	Pin Insulator - 15 kV	NVE	34.52	56.00	174.1	0.0	10.00	9.50	-	7.50	-	-	-70	387	317
Pin	Pin Insulator - 15 kV	NVE	34.52	19.00	163.1	0.0	10.00	9.50	-	7.50	-	-	-24	387	363
Pin	Pin Insulator - 15 kV	NVE	34.52	-19.00	16.9	0.0	10.00	9.50	-	7.50	-	-	24	387	410
Pin	Pin Insulator - 15 kV	NVE	34.52	-56.00	5.9	0.0	10.00	9.50	-	7.50	-	-	70	387	457
Bolt	Three Bolt	ZFS	25.42	4.84	180.0	180.0	5.00	0.00	-	3.00	-	-	-5	0	-5
Bolt	Single Bolt	COX	24.00	4.97	270.0	270.0	5.00	0.00	-	3.00	-	-	0	0	0
Bolt	Single Bolt	COX	24.00	4.97	90.0	90.0	5.00	0.00	-	3.00	-	-	0	0	0
Bolt	Three Bolt	CTL	22.75	5.09	180.0	180.0	5.00	0.00	-	3.00	-	-	-5	0	-5
Bolt	Three Bolt	CTL	22.00	5.16	180.0	180.0	5.00	0.00	-	3.00	-	-	-5	0	-5
											Totals:	0	-14	1,546	1,532

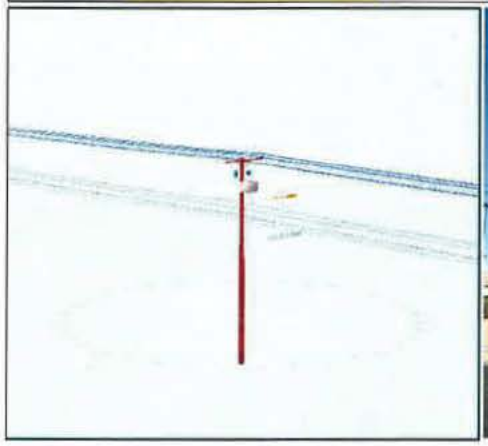
Pole Buckling

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	23.72	34.53	12.83	18.67	7.96	14.33	1,000,000	50.00	57.00	34.92	26,330	3,976	6.62

O-Calc® Pro *Analysis Report*

Tuesday, November 04, 2014 3:27:09 PM

File Name:	21 - p55287 Propos	Pole Length / Class:	45 / 2	Code:	NESC	Structure Type:	Unguyed
Pole Num:	21 - p55287	Pole Species:	WESTERN RED CEDAR	NESC Rule:	Rule 250B	Status:	N/A
Permit #:	Unset	Setting Depth (ft):	10.08	Construction Grade:	B	Pole Strength Factor:	0.65
Owner:	Unset	G/L Circumference (in):	45.00	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:	125.0%	0.0 ft	0.0°
Groundline:	125.0%	0.0 ft	0.0°
Vertical:	15.2%	23.7 ft	0.0°

Pole Moments		Load Angle	Wind Angle
Max Capac. Util:	116,584 ft-lb	0.2°	0.0°
Groundline:	116,584 ft-lb	0.2°	0.0°

GROUNDLINE LOAD SUMMARY:*Wind at 0.0°, Applied Moment 116,584 ft-lb at 0.2°, 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:	1,427	32.7	50,581	44.0	53.9	2,104	595	4	2,107	54.0
Comms:	1,955	44.8	45,109	39.3	48.1	1,876	796	5	1,881	48.2
Generic Equipment:	72	1.7	2,262	2.0	2.4	94	68	0	95	2.4
Power Equipment:	129	3.0	3,731	3.2	4.0	155	525	3	158	4.1
Pole:	729	16.7	11,523	10.0	12.3	479	1,821	11	491	12.6
Crossarms:	4	0.1	135	0.1	0.1	6	99	1	6	0.2
Insulators:	45	1.0	1,532	1.3	1.6	64	98	1	64	1.6
Pole Load:	4,361	100.0	114,874	100.0	122.5	4,778	4,001	25	4,802	123.1
Pole Reserve Capacity:			-21,103		-22.5	-878			-902	-23.1

LOAD SUMMARY BY OWNER

NVE:	2,406	69,780	2,902	3,167	20	2,922	74.9
ZFS:	315	7,941	330	89	1	331	8.5
COX:	453	10,849	451	142	1	452	11.6
CTL:	1,187	26,304	1,094	602	4	1,098	28.1
Totals	4,361	114,874	4,778	4,001	25	4,802	123.1

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 636.0 KCM 37 STRAND	NVE	35.31	56.30	1.1240	2.95	0.596	188.0	270.0	188.0	2,204	-295	-392	7,004	6,317
Primary	AAC 636.0 KCM 37 STRAND	NVE	35.31	56.30	1.1240	2.97	0.596	189.0	90.0	189.0	2,204	295	-394	7,041	6,942
Neutral	AAC 336.4 KCM 19 STRAND TULIP	NVE	35.31	19.86	0.6660	2.74	0.316	188.0	270.0	188.0	1,165	-156	-70	4,148	3,922
Neutral	AAC 336.4 KCM 19 STRAND TULIP	NVE	35.31	19.86	0.6660	2.76	0.316	189.0	90.0	189.0	1,165	156	-71	4,170	4,255
Primary	AAC 636.0 KCM 37 STRAND	NVE	35.31	19.86	1.1240	2.95	0.596	188.0	270.0	188.0	2,204	-295	133	7,004	6,843
Primary	AAC 636.0 KCM 37 STRAND	NVE	35.31	19.86	1.1240	2.97	0.596	189.0	90.0	189.0	2,204	295	134	7,041	7,470
Primary	AAC 636.0 KCM 37 STRAND	NVE	35.31	56.30	1.1240	2.95	0.596	188.0	270.0	188.0	2,204	-295	392	7,004	7,102
Primary	AAC 636.0 KCM 37 STRAND	NVE	35.31	56.30	1.1240	2.97	0.596	189.0	90.0	189.0	2,204	295	394	7,041	7,731
											Totals:	0	127	50,455	50,581

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 DT288 - 288 FIBERS -	ZFS	25.42	7.34	0.8900	2.47	0.289	188.0	270.0	188.0	1,500	-144	-25	3,987	3,818
Telco	BELOPTIX DT288 - 288 FIBERS -	ZFS	25.42	7.34	0.8900	2.48	0.289	189.0	90.0	189.0	1,500	144	-25	4,009	4,128
Overlashed	1/4" EHS	COX	24.00	7.47	0.2500	1.57	0.121	188.0	270.0	188.0	1,500	-136	0	1,354	1,218
Telco	P3-500CA	COX	23.98	7.72	0.5000	-	0.072	188.0	270.0	188.0		0	0	1,353	1,353
Telco	BELOPTIX DT144 - 144 FIBERS -	COX	23.97	7.14	0.7560	-	0.208	188.0	270.0	188.0		0	0	1,352	1,353
Telco	24ct Fiber	COX	23.93	7.48	0.3900	-	0.049	188.0	270.0	188.0		0	0	1,350	1,350
Overlashed	1/4" EHS	COX	24.00	7.47	0.2500	1.59	0.121	189.0	90.0	189.0	1,500	136	0	1,361	1,498
Telco	P3-500CA	COX	23.98	7.23	0.5000	-	0.072	189.0	90.0	189.0		0	0	1,360	1,360
Telco	BELOPTIX DT144 - 144 FIBERS -	COX	23.97	7.81	0.7560	-	0.208	189.0	90.0	189.0		0	0	1,360	1,360
Telco	24ct Fiber	COX	23.93	7.47	0.3900	-	0.049	189.0	90.0	189.0		0	0	1,358	1,358
Overlashed	5/16" EHS	CTL	22.75	7.59	0.3125	5.12	0.205	188.0	270.0	188.0	1,500	-129	-18	2,986	2,838
Telco	26 GA 200 PR (0.94)	CTL	22.71	7.79	0.9400	-	0.480	188.0	270.0	188.0		0	-44	2,981	2,937
Telco	26 GA 400 PR (1.30)	CTL	22.70	7.38	1.3000	-	0.910	188.0	270.0	188.0		0	-79	2,979	2,900
Overlashed	5/16" EHS	CTL	22.75	7.59	0.3125	5.17	0.205	189.0	90.0	189.0	1,500	129	-18	3,002	3,112
Telco	26 GA 200 PR (0.94)	CTL	22.71	7.79	0.9400	-	0.480	189.0	90.0	189.0		0	-44	2,997	2,953
Telco	26 GA 400 PR (1.30)	CTL	22.70	7.38	1.3000	-	0.910	189.0	90.0	189.0		0	-79	2,995	2,916
Overlashed	3/8" EHS	CTL	22.00	7.66	0.3750	1.96	0.273	188.0	270.0	188.0	1,500	-125	-25	2,182	2,033
Telco	BELOPTIX DT144 - 144 FIBERS -	CTL	21.96	7.66	0.7560	-	0.208	188.0	270.0	188.0		0	-19	2,178	2,159
Overlashed	3/8" EHS	CTL	22.00	7.66	0.3750	1.98	0.273	189.0	90.0	189.0	1,500	125	-25	2,194	2,294
Telco	BELOPTIX DT144 - 144 FIBERS -	CTL	21.96	7.66	0.7560	-	0.208	189.0	90.0	189.0		0	-19	2,190	2,171
											Totals:	0	-419	45,527	45,109

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)*

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

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

Box	Fuse Cutout	NVE	31.42	20.30	270.0	0.0	15.00	12.00	8.00	-	8.00	-	0	754	754
Box	Fuse Cutout	NVE	31.42	20.30	0.0	0.0	15.00	12.00	8.00	-	8.00	-	38	754	792
Box	Fuse Cutout	NVE	31.42	20.30	180.0	0.0	15.00	12.00	8.00	-	8.00	-	-38	754	716
											Totals:	0	0	2,262	2,262

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	28.92	27.03	90.0	90.0	350.00	25.00	25.00	-	33.00	-	3	3,728	3,731
											Totals:	0	3	3,728	3,731

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 10	NVE	34.33	5.78	90.0	90.0	66.00	4.50	3.50	-	120.00	-	0	135	135
											Totals:	0	0	135	135

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)*
Pin	Pin Insulator - 15 kV	NVE	34.52	56.00	174.1	0.0	10.00	9.50	-	7.50	-	-	-70	387	317
Pin	Pin Insulator - 15 kV	NVE	34.52	19.00	163.1	0.0	10.00	9.50	-	7.50	-	-	-24	387	363
Pin	Pin Insulator - 15 kV	NVE	34.52	-19.00	16.9	0.0	10.00	9.50	-	7.50	-	-	24	387	410
Pin	Pin Insulator - 15 kV	NVE	34.52	-56.00	5.9	0.0	10.00	9.50	-	7.50	-	-	70	387	457
Bolt	Three Bolt	ZFS	25.42	4.84	180.0	180.0	5.00	0.00	-	3.00	-	-	-5	0	-5
Bolt	Single Bolt	COX	24.00	4.97	270.0	270.0	5.00	0.00	-	3.00	-	-	0	0	0
Bolt	Single Bolt	COX	24.00	4.97	90.0	90.0	5.00	0.00	-	3.00	-	-	0	0	0
Bolt	Three Bolt	CTL	22.75	5.09	180.0	180.0	5.00	0.00	-	3.00	-	-	-5	0	-5
Bolt	Three Bolt	CTL	22.00	5.16	180.0	180.0	5.00	0.00	-	3.00	-	-	-5	0	-5
											Totals:	0	-14	1,546	1,532

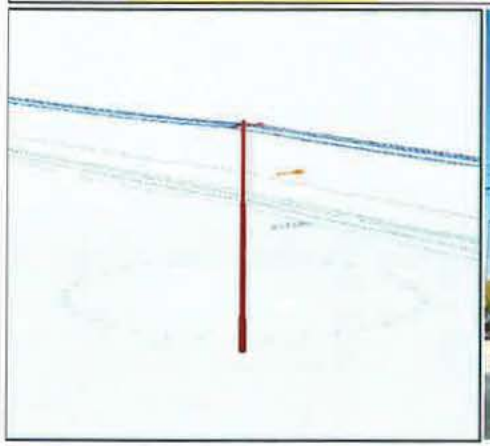
Pole Buckling

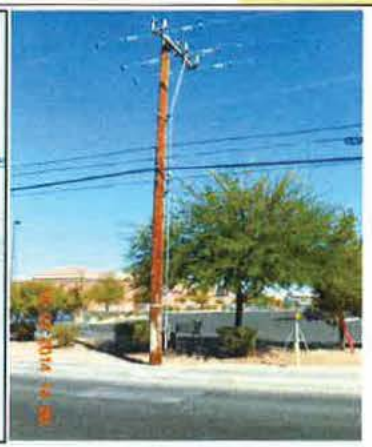
Buckling	Buckling (ft)	Buckling Section (% Buckling Col. Hgt.)	Buckling (in)	Min. Buckling (in)	Diameter (in)	Diameter (in)	Modulus of (psi)	Pole (pcf)	Ice Density (pcf)	Pole Tip (ft)	Buckling Load (lbs)	Buckling Load (lbs)	Buckling Load
2.00	23.72	34.53	12.83	18.73	7.96	14.33	1,000,000	50.00	57.00	34.92	26,326	4,001	6.58

O-Calc® Pro *Analysis Report*

Tuesday, November 04, 2014 3:40:05 PM

File Name:	22 - p55286 Existi	Pole Length / Class:	50 / 2	Code:	NESC	Structure Type:	Deadend
Pole Num:	22 - p55286	Pole Species:	WESTERN RED CEDAR	NESC Rule:	Rule 250B	Status:	N/A
Permit #:	Unset	Setting Depth (ft):	12.83	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:	93.8%	0.0 ft	0.0°
Groundline:	93.8%	0.0 ft	0.0°
Vertical:	8.4%	21.5 ft	0.0°

Pole Moments		Load Angle	Wind Angle
Max Capac. Util:	106,154 ft-lb	0.1°	0.0°
Groundline:	106,154 ft-lb	0.1°	0.0°

GROUNDLINE LOAD SUMMARY:*Wind at 0.0°, Applied Moment 106,154 ft-lb at 0.1°, 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:	1,445	34.4	49,798	47.9	43.8	1,707	614	3	1,710	43.8
Comms:	1,897	45.1	38,908	37.4	34.2	1,333	782	4	1,338	34.3
Pole:	810	19.3	13,468	13.0	11.8	462	2,120	12	473	12.1
Crossarms:	4	0.1	143	0.1	0.1	5	80	0	5	0.1
Insulators:	46	1.1	1,656	1.6	1.5	57	58	0	57	1.5
Pole Load:	4,201	100.0	103,972	100.0	91.4	3,563	3,654	20	3,583	91.9
Pole Reserve Capacity:			9,832		8.6	337			317	8.1

LOAD SUMMARY BY OWNER

NVE:	2,305	65,085	2,230	2,842	16	2,246	57.6
ZFS:	317	7,100	243	90	0	244	6.3

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

² Worst Wind per Guy Wire
³ Wind at 0.0°

COX:	374	7,994	274	111	1	275	7.0
CTL:	1,205	23,793	815	611	3	819	21.0
Totals	4,201	103,972	3,563	3,654	20	3,583	91.9

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 636.0 KCM 37 STRAND	NVE	36.08	44.54	1.1240	3.03	0.596	192.0	270.0	192.0	2,204	-320	-29	7,299	6,951
Primary	AAC 636.0 KCM 37 STRAND	NVE	36.08	47.76	1.1240	2.95	0.596	188.0	90.0	188.0	2,204	320	-26	7,147	7,440
Primary	AAC 636.0 KCM 37 STRAND	NVE	36.08	17.43	1.1240	3.03	0.596	192.0	270.0	192.0	2,204	-320	27	7,299	7,006
Primary	AAC 636.0 KCM 37 STRAND	NVE	36.08	24.52	1.1240	2.95	0.596	188.0	90.0	188.0	2,204	320	19	7,147	7,486
Primary	AAC 636.0 KCM 37 STRAND	NVE	36.08	44.54	1.1240	3.03	0.596	192.0	270.0	192.0	2,204	-320	29	7,299	7,008
Primary	AAC 636.0 KCM 37 STRAND	NVE	36.08	47.76	1.1240	2.95	0.596	188.0	90.0	188.0	2,204	320	26	7,147	7,493
Neutral	ACSR 336.4 KCM 18/1 MERLIN	NVE	26.58	7.27	0.6840	2.25	0.365	192.0	270.0	192.0	1,470	-157	-32	3,273	3,084
Neutral	ACSR 336.4 KCM 18/1 MERLIN	NVE	26.58	7.27	0.6840	2.19	0.365	188.0	90.0	188.0	1,470	157	-31	3,204	3,330
											Totals:	0	-17	49,816	49,798

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 DT288 - 288 FIBERS -	ZFS	22.58	7.92	0.8900	2.53	0.289	192.0	270.0	192.0	1,500	-136	-27	3,617	3,454
Telco	BELOPTIX DT288 - 288 FIBERS -	ZFS	22.58	7.92	0.8900	2.47	0.289	188.0	90.0	188.0	1,500	136	-27	3,542	3,651
Overlashed	1/4" EHS	COX	21.58	8.01	0.2500	1.33	0.121	192.0	270.0	192.0	1,500	-130	-12	1,020	878
Telco	P3-500CA	COX	21.56	8.12	0.5000	-	0.072	192.0	270.0	192.0		0	-7	1,019	1,012
Telco	48ct Fiber	COX	21.56	7.92	0.5130	-	0.121	192.0	270.0	192.0		0	-11	1,019	1,008
Telco	24ct Fiber	COX	21.53	8.02	0.3900	-	0.049	192.0	270.0	192.0		0	-5	1,018	1,013
Overlashed	1/4" EHS	COX	21.58	8.01	0.2500	1.28	0.121	188.0	90.0	188.0	1,500	130	-11	999	1,118
Telco	P3-500CA	COX	21.56	8.12	0.5000	-	0.072	188.0	90.0	188.0		0	-7	998	991
Telco	48ct Fiber	COX	21.56	7.92	0.5130	-	0.121	188.0	90.0	188.0		0	-11	998	987
Telco	24ct Fiber	COX	21.53	8.02	0.3900	-	0.049	188.0	90.0	188.0		0	-5	997	992
Overlashed	5/16" EHS	CTL	20.58	8.11	0.3125	5.33	0.205	192.0	270.0	192.0	1,500	-124	-20	2,758	2,614
Telco	26 GA 200 PR (0.94)	CTL	20.54	8.31	0.9400	-	0.480	192.0	270.0	192.0		0	-48	2,753	2,706
Telco	26 GA 400 PR (1.30)	CTL	20.53	7.90	1.3000	-	0.910	192.0	270.0	192.0		0	-88	2,751	2,665
Overlashed	5/16" EHS	CTL	20.58	8.11	0.3125	5.33	0.205	192.0	90.0	192.0	1,500	124	-20	2,758	2,863
Telco	26 GA 200 PR (0.94)	CTL	20.54	8.31	0.9400	-	0.480	192.0	90.0	192.0		0	-48	2,753	2,706
Telco	26 GA 400 PR (1.30)	CTL	20.53	7.90	1.3000	-	0.910	192.0	90.0	192.0		0	-88	2,751	2,665
Overlashed	3/8" EHS	CTL	19.17	8.25	0.3750	2.04	0.273	192.0	270.0	192.0	1,500	-116	-27	1,942	1,800
Telco	BELOPTIX DT144 - 144 FIBERS -	CTL	19.13	8.25	0.7560	-	0.208	192.0	270.0	192.0		0	-21	1,938	1,917
Overlashed	3/8" EHS	CTL	19.17	8.25	0.3750	1.96	0.273	188.0	90.0	188.0	1,500	116	-26	1,902	1,991
Telco	BELOPTIX DT144 - 144 FIBERS -	CTL	19.13	8.25	0.7560	-	0.208	188.0	90.0	188.0		0	-20	1,897	1,877
											Totals:	0	-525	39,433	38,908

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 8	NVE	36.17	5.83	90.0	90.0	53.00	4.50	3.50	-	96.00	-	0	142	143
											Totals:	0	0	142	143

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

² Worst Wind per Guy Wire
³ Wind at 0.0°

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	36.17	44.00	172.5	180.0	3.00	12.75	-	3.80	-	-	-17	274	257
Deadend	Deadend Insulator - 15 kV	NVE	36.17	44.00	172.5	0.0	3.00	12.75	-	3.80	-	-	-16	274	257
Deadend	Deadend Insulator - 15 kV	NVE	36.17	-16.00	20.0	180.0	3.00	12.75	-	3.80	-	-	6	274	280
Deadend	Deadend Insulator - 15 kV	NVE	36.17	-16.00	20.0	0.0	3.00	12.75	-	3.80	-	-	6	274	280
Deadend	Deadend Insulator - 15 kV	NVE	36.17	-44.00	7.5	180.0	3.00	12.75	-	3.80	-	-	16	274	290
Deadend	Deadend Insulator - 15 kV	NVE	36.17	-44.00	7.5	0.0	3.00	12.75	-	3.80	-	-	17	274	290
Spool	Spool Insulator - 20 kV	NVE	26.58	5.02	180.0	180.0	1.00	2.12	-	2.50	-	-	-1	22	21
Bolt	Three Bolt	ZFS	22.58	5.42	180.0	180.0	5.00	0.00	-	3.00	-	-	-5	0	-5
Bolt	Three Bolt	COX	21.58	5.51	180.0	180.0	5.00	0.00	-	3.00	-	-	-5	0	-5
Bolt	Three Bolt	CTL	20.58	5.61	180.0	180.0	5.00	0.00	-	3.00	-	-	-5	0	-5
Bolt	Three Bolt	CTL	19.17	5.75	180.0	180.0	5.00	0.00	-	3.00	-	-	-5	0	-5
											Totals:	0	-9	1,665	1,656

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	21.50	34.16	13.83	17.25	7.96	15.29	1,000,000	50.00	57.00	37.17	43,292	3,654	11.85

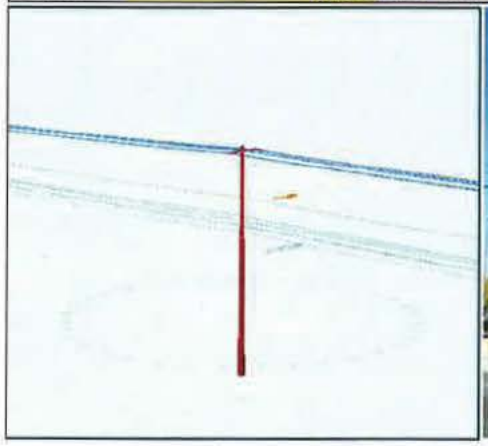
Version: 5.0 / 5.00
* includes Load Factor(s)

² Worst Wind per Guy Wire
³ Wind at 0.0°

O-Calc® Pro *Analysis Report*

Tuesday, November 04, 2014 3:42:23 PM

File Name:	22 - p55286 Propos	Pole Length / Class:	50 / 2	Code:	NESC	Structure Type:	Deadend
Pole Num:	22 - p55286	Pole Species:	WESTERN RED CEDAR	NESC Rule:	Rule 250B	Status:	N/A
Permit #:	Unset	Setting Depth (ft):	12.83	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:	95.3%	0.0 ft	0.0°
Groundline:	95.3%	0.0 ft	0.0°
Vertical:	8.5%	21.5 ft	0.0°

Pole Moments		Load Angle	Wind Angle
Max Capac. Util:	107,922 ft-lb	0.1°	0.0°
Groundline:	107,922 ft-lb	0.1°	0.0°

GROUNDLINE LOAD SUMMARY:*Wind at 0.0°, Applied Moment 107,922 ft-lb at 0.1°, 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:	1,445	33.7	49,798	47.1	43.8	1,707	614	3	1,710	43.8
Comms:	1,978	46.2	40,654	38.5	35.7	1,393	807	4	1,398	35.8
Pole:	810	18.9	13,468	12.7	11.8	462	2,120	12	473	12.1
Crossarms:	4	0.1	143	0.1	0.1	5	80	0	5	0.1
Insulators:	46	1.1	1,656	1.6	1.5	57	58	0	57	1.5
Pole Load:	4,283	100.0	105,719	100.0	92.9	3,623	3,679	20	3,643	93.4
Pole Reserve Capacity:			8,085		7.1	277			257	6.6

LOAD SUMMARY BY OWNER

NVE:	2,305	65,085	2,230	2,842	16	2,246	57.6
ZFS:	317	7,100	243	90	0	244	6.3

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

² Worst Wind per Guy Wire
³ Wind at 0.0°

COX:	456	9,741	334	136	1	335	8.6
CTL:	1,205	23,793	815	611	3	819	21.0
Totals	4,283	105,719	3,623	3,679	20	3,643	93.4

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 636.0 KCM 37 STRAND	NVE	36.08	44.54	1.1240	3.03	0.596	192.0	270.0	192.0	2,204	-315	-29	7,299	6,956
Primary	AAC 636.0 KCM 37 STRAND	NVE	36.08	47.76	1.1240	2.95	0.596	188.0	90.0	188.0	2,204	315	-26	7,147	7,435
Primary	AAC 636.0 KCM 37 STRAND	NVE	36.08	17.43	1.1240	3.03	0.596	192.0	270.0	192.0	2,204	-315	27	7,299	7,011
Primary	AAC 636.0 KCM 37 STRAND	NVE	36.08	24.52	1.1240	2.95	0.596	188.0	90.0	188.0	2,204	315	19	7,147	7,480
Primary	AAC 636.0 KCM 37 STRAND	NVE	36.08	44.54	1.1240	3.03	0.596	192.0	270.0	192.0	2,204	-315	29	7,299	7,013
Primary	AAC 636.0 KCM 37 STRAND	NVE	36.08	47.76	1.1240	2.95	0.596	188.0	90.0	188.0	2,204	315	26	7,147	7,488
Neutral	ACSR 336.4 KCM 18/1 MERLIN	NVE	26.58	7.27	0.6840	2.25	0.365	192.0	270.0	192.0	1,470	-155	-32	3,273	3,086
Neutral	ACSR 336.4 KCM 18/1 MERLIN	NVE	26.58	7.27	0.6840	2.19	0.365	188.0	90.0	188.0	1,470	155	-31	3,204	3,328
											Totals:	0	-17	49,816	49,798

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 DT288 - 288 FIBERS -	ZFS	22.58	7.92	0.8900	2.53	0.289	192.0	270.0	192.0	1,500	-134	-27	3,617	3,456
Telco	BELOPTIX DT288 - 288 FIBERS -	ZFS	22.58	7.92	0.8900	2.47	0.289	188.0	90.0	188.0	1,500	134	-27	3,542	3,649
Overlashed	1/4" EHS	COX	21.58	8.01	0.2500	1.64	0.121	192.0	270.0	192.0	1,500	-128	-12	1,243	1,104
Telco	P3-500CA	COX	21.56	8.12	0.5000	-	0.072	192.0	270.0	192.0		0	-7	1,242	1,235
Telco	BELOPTIX DT144 - 144 FIBERS -	COX	21.55	7.88	0.7560	-	0.208	192.0	270.0	192.0		0	-20	1,242	1,222
Telco	24ct Fiber	COX	21.51	8.02	0.3900	-	0.049	192.0	270.0	192.0		0	-5	1,240	1,235
Overlashed	1/4" EHS	COX	21.58	8.01	0.2500	1.57	0.121	188.0	90.0	188.0	1,500	128	-11	1,218	1,334
Telco	P3-500CA	COX	21.56	8.12	0.5000	-	0.072	188.0	90.0	188.0		0	-7	1,216	1,209
Telco	BELOPTIX DT144 - 144 FIBERS -	COX	21.55	7.88	0.7560	-	0.208	188.0	90.0	188.0		0	-19	1,216	1,197
Telco	24ct Fiber	COX	21.51	8.02	0.3900	-	0.049	188.0	90.0	188.0		0	-5	1,214	1,209
Overlashed	5/16" EHS	CTL	20.58	8.11	0.3125	5.33	0.205	192.0	270.0	192.0	1,500	-122	-20	2,758	2,616
Telco	26 GA 200 PR (0.94)	CTL	20.54	8.31	0.9400	-	0.480	192.0	270.0	192.0		0	-48	2,753	2,706
Telco	26 GA 400 PR (1.30)	CTL	20.53	7.90	1.3000	-	0.910	192.0	270.0	192.0		0	-86	2,751	2,665
Overlashed	5/16" EHS	CTL	20.58	8.11	0.3125	5.33	0.205	192.0	90.0	192.0	1,500	122	-20	2,758	2,861
Telco	26 GA 200 PR (0.94)	CTL	20.54	8.31	0.9400	-	0.480	192.0	90.0	192.0		0	-48	2,753	2,706
Telco	26 GA 400 PR (1.30)	CTL	20.53	7.90	1.3000	-	0.910	192.0	90.0	192.0		0	-86	2,751	2,665
Overlashed	3/8" EHS	CTL	19.17	8.25	0.3750	2.04	0.273	192.0	270.0	192.0	1,500	-114	-27	1,942	1,801
Telco	BELOPTIX DT144 - 144 FIBERS -	CTL	19.13	8.25	0.7560	-	0.208	192.0	270.0	192.0		0	-21	1,938	1,917
Overlashed	3/8" EHS	CTL	19.17	8.25	0.3750	1.96	0.273	188.0	90.0	188.0	1,500	114	-26	1,902	1,989
Telco	BELOPTIX DT144 - 144 FIBERS -	CTL	19.13	8.25	0.7560	-	0.208	188.0	90.0	188.0		0	-20	1,897	1,877
											Totals:	0	-541	41,196	40,654

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 8	NVE	36.17	5.83	90.0	90.0	53.00	4.50	3.50	-	96.00	-	0	142	143
											Totals:	0	0	142	143

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

² Worst Wind per Guy Wire
³ Wind at 0.0°

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	36.17	44.00	172.5	180.0	3.00	12.75	-	3.80	-	-	-17	274	257
Deadend	Deadend Insulator - 15 kV	NVE	36.17	44.00	172.5	0.0	3.00	12.75	-	3.80	-	-	-16	274	257
Deadend	Deadend Insulator - 15 kV	NVE	36.17	-16.00	20.0	180.0	3.00	12.75	-	3.80	-	-	6	274	280
Deadend	Deadend Insulator - 15 kV	NVE	36.17	-16.00	20.0	0.0	3.00	12.75	-	3.80	-	-	6	274	280
Deadend	Deadend Insulator - 15 kV	NVE	36.17	-44.00	7.5	180.0	3.00	12.75	-	3.80	-	-	16	274	290
Deadend	Deadend Insulator - 15 kV	NVE	36.17	-44.00	7.5	0.0	3.00	12.75	-	3.80	-	-	17	274	290
Spool	Spool Insulator - 20 kV	NVE	26.58	5.02	180.0	180.0	1.00	2.12	-	2.50	-	-	-1	22	21
Bolt	Three Bolt	ZFS	22.58	5.42	180.0	180.0	5.00	0.00	-	3.00	-	-	-5	0	-5
Bolt	Three Bolt	COX	21.58	5.51	180.0	180.0	5.00	0.00	-	3.00	-	-	-5	0	-5
Bolt	Three Bolt	CTL	20.58	5.61	180.0	180.0	5.00	0.00	-	3.00	-	-	-5	0	-5
Bolt	Three Bolt	CTL	19.17	5.75	180.0	180.0	5.00	0.00	-	3.00	-	-	-5	0	-5
											Totals:	0	-9	1,665	1,656

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	21.50	34.16	13.83	17.31	7.96	15.29	1,000,000	50.00	57.00	37.17	43,291	3,679	11.77

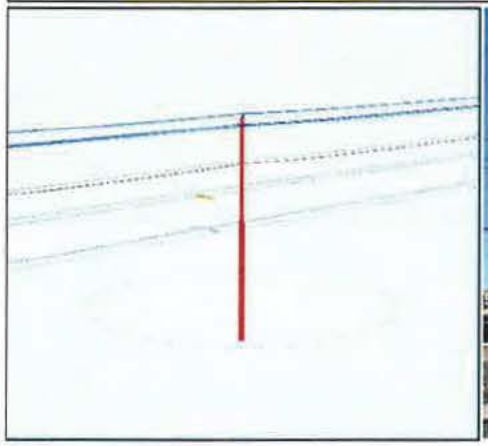
Version: 5.0 / 5.00
* includes Load Factor(s)

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

O-Calc® Pro *Analysis Report*

Tuesday, November 04, 2014 4:07:50 PM

File Name:	25 - p101808 Propo	Pole Length / Class:	55 / 1	Code:	NESC	Structure Type:	Unguyed
Pole Num:	25 - p101808	Pole Species:	WESTERN RED CEDAR	NESC Rule:	Rule 250B	Status:	N/A
Permit #:	Unset	Setting Depth (ft):	9.33	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:	67.9%	0.0 ft	0.0°
Groundline:	67.9%	0.0 ft	0.0°
Vertical:	7.1%	23.0 ft	0.0°

Pole Moments		Load Angle	Wind Angle
Max Capac. Util:	103,344 ft-lb	0.0°	0.0°
Groundline:	103,344 ft-lb	0.0°	0.0°

GROUNDLINE LOAD SUMMARY:*Wind at 0.0°, Applied Moment 103,344 ft-lb at 0.0°, 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:	1,113	31.6	46,574	46.4	30.4	1,186	432	2	1,188	30.5
Comms:	1,288	36.6	30,306	30.2	19.8	772	523	2	774	19.8
Pole:	1,090	31.0	22,200	22.1	14.5	565	3,135	14	579	14.9
Insulators:	28	0.8	1,217	1.2	0.8	31	84	0	31	0.8
Pole Load:	3,519	100.0	100,298	100.0	65.5	2,553	4,174	19	2,572	65.9
Pole Reserve Capacity:			52,903		34.5	1,347			1,328	34.1

LOAD SUMMARY BY OWNER

NVE:	2,231	70,013	1,782	3,621	16	1,799	46.1
ZFS:	204	6,040	154	61	0	154	3.9
COX:	312	8,832	225	96	0	225	5.8

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

² Worst Wind per Guy Wire
³ Wind at 0.0°

CTL:	772	15,413	392	396	2	394	10.1
Totals	3,519	100,298	2,553	4,174	19	2,572	65.9

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 636.0 KCM 37 STRAND	NVE	46.63	4.30	1.1240	1.37	0.596	98.0	270.0	98.0	2,204	-5	0	4,820	4,815
Primary	AAC 636.0 KCM 37 STRAND	NVE	46.63	4.30	1.1240	2.19	0.596	147.0	90.0	147.0	2,204	5	0	7,230	7,235
Primary	AAC 636.0 KCM 37 STRAND	NVE	44.00	15.95	1.1240	1.37	0.596	98.0	270.0	98.0	2,204	-5	58	4,549	4,602
Primary	AAC 636.0 KCM 37 STRAND	NVE	44.00	15.95	1.1240	2.19	0.596	147.0	90.0	147.0	2,204	5	87	6,823	6,915
Primary	AAC 636.0 KCM 37 STRAND	NVE	44.00	15.95	1.1240	1.37	0.596	98.0	270.0	98.0	2,204	-5	-58	4,549	4,486
Primary	AAC 636.0 KCM 37 STRAND	NVE	44.00	15.95	1.1240	2.19	0.596	147.0	90.0	147.0	2,204	5	-87	6,823	6,740
Neutral	AAC 336.4 KCM 19 STRAND TULIP	NVE	35.50	7.47	0.6660	1.19	0.316	98.0	270.0	98.0	1,165	-2	-14	2,172	2,156
Neutral	AAC 336.4 KCM 19 STRAND TULIP	NVE	35.50	7.47	0.6660	1.99	0.316	147.0	90.0	147.0	1,165	2	-22	3,258	3,239
Secondary	TRIPLEX 2 AWG	NVE	34.50	7.56	0.6060	1.15	0.248	98.0	270.0	98.0	774	-1	0	2,555	2,553
Secondary	TRIPLEX 2 AWG	NVE	34.50	7.56	0.6060	1.87	0.248	147.0	90.0	147.0	774	1	0	3,832	3,833
											Totals:	0	-36	46,611	46,574

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 DT288 - 288 FIBERS -	ZFS	29.75	8.24	0.8900	1.15	0.289	98.0	270.0	98.0	1,500	-2	-15	2,433	2,416
Telco	BELOPTIX DT288 - 288 FIBERS -	ZFS	29.75	8.24	0.8900	1.84	0.289	147.0	90.0	147.0	1,500	2	-22	3,649	3,629
Overlashed	1/4" EHS	COX	28.50	8.35	0.2500	1.07	0.121	147.0	90.0	147.0	1,500	2	-9	1,110	1,103
Telco	P3-500CA	COX	28.47	8.36	0.5000	-	0.072	147.0	90.0	147.0		0	-6	1,109	1,103
Telco	BELOPTIX DT144 - 144 FIBERS -	COX	28.50	8.18	0.7560	-	0.208	147.0	90.0	147.0		0	-16	1,110	1,094
Telco	24ct Fiber	COX	28.52	8.36	0.3900	-	0.049	147.0	90.0	147.0		0	-4	1,111	1,107
Telco	24ct Fiber	COX	28.50	8.48	0.3900	-	0.049	147.0	90.0	147.0		0	-4	1,110	1,106
Overlashed	1/4" EHS	COX	28.50	8.35	0.2500	0.44	0.121	98.0	270.0	98.0	1,500	-2	-6	838	830
Telco	P3-500CA	COX	28.48	8.46	0.5000	-	0.072	98.0	270.0	98.0		0	-4	838	834
Telco	BELOPTIX DT144 - 144 FIBERS -	COX	28.47	8.22	0.7560	-	0.208	98.0	270.0	98.0		0	-10	837	827
Telco	24ct Fiber	COX	28.43	8.36	0.3900	-	0.049	98.0	270.0	98.0		0	-3	836	834
Overlashed	5/16" EHS	CTL	20.92	9.04	0.3125	1.52	0.205	98.0	270.0	98.0	1,500	-2	-11	1,431	1,418
Telco	26 GA 200 PR (0.94)	CTL	20.88	9.24	0.9400	-	0.480	98.0	270.0	98.0		0	-27	1,429	1,401
Telco	26 GA 400 PR (1.30)	CTL	20.87	8.83	1.3000	-	0.910	98.0	270.0	98.0		0	-49	1,428	1,379
Overlashed	5/16" EHS	CTL	20.92	9.04	0.3125	3.23	0.205	147.0	90.0	147.0	1,500	2	-17	2,147	2,131
Telco	26 GA 200 PR (0.94)	CTL	20.88	9.24	0.9400	-	0.480	147.0	90.0	147.0		0	-41	2,143	2,102
Telco	26 GA 400 PR (1.30)	CTL	20.87	8.83	1.3000	-	0.910	147.0	90.0	147.0		0	-74	2,141	2,068
Overlashed	3/8" EHS	CTL	19.33	9.18	0.3750	0.60	0.273	98.0	270.0	98.0	1,500	-1	-15	1,000	983
Telco	BELOPTIX DT144 - 144 FIBERS -	CTL	19.29	9.18	0.7560	-	0.208	98.0	270.0	98.0		0	-12	997	986
Overlashed	3/8" EHS	CTL	19.33	9.18	0.3750	1.26	0.273	147.0	90.0	147.0	1,500	1	-23	1,499	1,478
Telco	BELOPTIX DT144 - 144 FIBERS -	CTL	19.29	9.18	0.7560	-	0.208	147.0	90.0	147.0		0	-18	1,496	1,478
											Totals:	0	-384	30,690	30,306

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: 5.0 / 5.00
* Includes Load Factor(s)

² Worst Wind per Guy Wire
³ Wind at 0.0°

Post	Post Insulator - 15 kV	NVE	45.67	4.30	90.0	90.0	11.00	11.50	-	4.75	-	-	0	394	394
Post	Post Insulator - 15 kV	NVE	44.00	4.45	0.0	0.0	11.00	11.50	-	4.75	-	-	22	380	402
Post	Post Insulator - 15 kV	NVE	44.00	4.45	180.0	180.0	11.00	11.50	-	4.75	-	-	-22	380	358
Spool	Spool Insulator - 20 kV	NVE	35.50	5.22	180.0	180.0	1.00	2.12	-	2.50	-	-	-1	29	28
Spool	Spool Insulator - 20 kV	NVE	34.50	5.31	270.0	270.0	1.00	2.12	-	2.50	-	-	0	29	29
Spool	Spool Insulator - 20 kV	NVE	34.50	5.31	90.0	90.0	1.00	2.12	-	2.50	-	-	0	29	29
Bolt	Three Bolt	ZFS	29.75	5.74	180.0	180.0	5.00	0.00	-	3.00	-	-	-5	0	-5
Bolt	Three Bolt	COX	28.50	5.85	180.0	180.0	5.00	0.00	-	3.00	-	-	-5	0	-5
Bolt	Three Bolt	CTL	20.92	6.54	180.0	180.0	5.00	0.00	-	3.00	-	-	-6	0	-6
Bolt	Three Bolt	CTL	19.33	6.68	180.0	180.0	5.00	0.00	-	3.00	-	-	-6	0	-6
											Totals:	0	-23	1,240	1,217

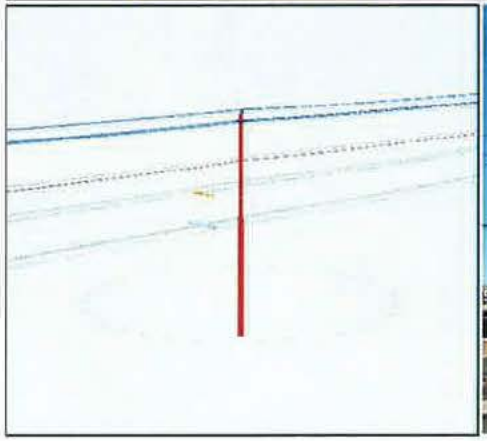
Pole Buckling

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	23.05	33.71	15.46	19.46	8.60	16.88	1,000,000	50.00	57.00	45.67	58,842	4,174	14.10

O-Calc® Pro *Analysis Report*

Tuesday, November 04, 2014 4:06:07 PM

File Name:	25 - p101808 Exist	Pole Length / Class:	55 / 1	Code:	NESC	Structure Type:	Unguyed
Pole Num:	25 - p101808	Pole Species:	WESTERN RED CEDAR	NESC Rule:	Rule 250B	Status:	N/A
Permit #:	Unset	Setting Depth (ft):	9.33	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:	66.9%	0.0 ft	0.0°
Groundline:	66.9%	0.0 ft	0.0°
Vertical:	7.0%	23.0 ft	0.0°

Pole Moments		Load Angle	Wind Angle
Max Capac. Util:	101,806 ft-lb	0.0°	0.0°
Groundline:	101,806 ft-lb	0.0°	0.0°

GROUNDLINE LOAD SUMMARY:*Wind at 0.0°, Applied Moment 101,806 ft-lb at 0.0°, 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:	1,113	32.1	46,574	47.2	30.4	1,186	432	2	1,188	30.5
Comms:	1,234	35.6	28,781	29.1	18.8	733	507	2	735	18.8
Pole:	1,090	31.5	22,200	22.5	14.5	565	3,135	14	579	14.9
Insulators:	28	0.8	1,217	1.2	0.8	31	84	0	31	0.8
Pole Load:	3,465	100.0	98,772	100.0	64.5	2,514	4,158	19	2,533	64.9
Pole Reserve Capacity:			54,429		35.5	1,386			1,367	35.1

LOAD SUMMARY BY OWNER

NVE:	2,231	70,013	1,782	3,621	16	1,799	46.1
ZFS:	204	6,040	154	61	0	154	3.9
COX:	258	7,306	186	80	0	186	4.8

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

² Worst Wind per Guy Wire
³ Wind at 0.0°

CTL:	772	15,413	392	396	2	394	10.1
Totals	3,465	98,772	2,514	4,158	19	2,533	64.9

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 636.0 KCM 37 STRAND	NVE	46.63	4.30	1.1240	1.37	0.596	98.0	270.0	98.0	2,204	-5	0	4,820	4,815
Primary	AAC 636.0 KCM 37 STRAND	NVE	46.63	4.30	1.1240	2.19	0.596	147.0	90.0	147.0	2,204	5	0	7,230	7,235
Primary	AAC 636.0 KCM 37 STRAND	NVE	44.00	15.95	1.1240	1.37	0.596	98.0	270.0	98.0	2,204	-5	58	4,549	4,602
Primary	AAC 636.0 KCM 37 STRAND	NVE	44.00	15.95	1.1240	2.19	0.596	147.0	90.0	147.0	2,204	5	87	6,823	6,915
Primary	AAC 636.0 KCM 37 STRAND	NVE	44.00	15.95	1.1240	1.37	0.596	98.0	270.0	98.0	2,204	-5	-58	4,549	4,486
Primary	AAC 636.0 KCM 37 STRAND	NVE	44.00	15.95	1.1240	2.19	0.596	147.0	90.0	147.0	2,204	5	-87	6,823	6,740
Neutral	AAC 336.4 KCM 19 STRAND TULIP	NVE	35.50	7.47	0.6660	1.19	0.316	98.0	270.0	98.0	1,165	-2	-14	2,172	2,156
Neutral	AAC 336.4 KCM 19 STRAND TULIP	NVE	35.50	7.47	0.6660	1.99	0.316	147.0	90.0	147.0	1,165	2	-22	3,258	3,239
Secondary	TRIPLEX 2 AWG	NVE	34.50	7.56	0.6060	1.15	0.248	98.0	270.0	98.0	774	-1	0	2,555	2,553
Secondary	TRIPLEX 2 AWG	NVE	34.50	7.56	0.6060	1.87	0.248	147.0	90.0	147.0	774	1	0	3,832	3,833
											Totals:	0	-36	46,611	46,574

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 DT288 - 288 FIBERS -	ZFS	29.75	8.24	0.8900	1.15	0.289	98.0	270.0	98.0	1,500	-2	-15	2,433	2,416
Telco	BELOPTIX DT288 - 288 FIBERS -	ZFS	29.75	8.24	0.8900	1.84	0.289	147.0	90.0	147.0	1,500	2	-22	3,649	3,629
Overlashed	1/4" EHS	COX	28.50	8.35	0.2500	0.89	0.121	147.0	90.0	147.0	1,500	2	-9	923	915
Telco	P3-500CA	COX	28.47	8.36	0.5000	-	0.072	147.0	90.0	147.0		0	-6	922	916
Telco	48ct Fiber	COX	28.50	8.22	0.5130	-	0.121	147.0	90.0	147.0		0	-9	923	913
Telco	24ct Fiber	COX	28.53	8.35	0.3900	-	0.049	147.0	90.0	147.0		0	-4	923	920
Telco	24ct Fiber	COX	28.50	8.48	0.3900	-	0.049	147.0	90.0	147.0		0	-4	923	919
Overlashed	1/4" EHS	COX	28.50	8.35	0.2500	0.35	0.121	98.0	270.0	98.0	1,500	-2	-6	688	679
Telco	P3-500CA	COX	28.48	8.46	0.5000	-	0.072	98.0	270.0	98.0		0	-4	687	683
Telco	48ct Fiber	COX	28.48	8.26	0.5130	-	0.121	98.0	270.0	98.0		0	-6	687	681
Telco	24ct Fiber	COX	28.45	8.36	0.3900	-	0.049	98.0	270.0	98.0		0	-3	686	684
Overlashed	5/16" EHS	CTL	20.92	9.04	0.3125	1.52	0.205	98.0	270.0	98.0	1,500	-2	-11	1,431	1,418
Telco	26 GA 200 PR (0.94)	CTL	20.88	9.24	0.9400	-	0.480	98.0	270.0	98.0		0	-27	1,429	1,401
Telco	26 GA 400 PR (1.30)	CTL	20.87	8.83	1.3000	-	0.910	98.0	270.0	98.0		0	-49	1,428	1,379
Overlashed	5/16" EHS	CTL	20.92	9.04	0.3125	3.23	0.205	147.0	90.0	147.0	1,500	2	-17	2,147	2,131
Telco	26 GA 200 PR (0.94)	CTL	20.88	9.24	0.9400	-	0.480	147.0	90.0	147.0		0	-41	2,143	2,102
Telco	26 GA 400 PR (1.30)	CTL	20.87	8.83	1.3000	-	0.910	147.0	90.0	147.0		0	-74	2,141	2,068
Overlashed	3/8" EHS	CTL	19.33	9.18	0.3750	0.60	0.273	98.0	270.0	98.0	1,500	-1	-15	1,000	983
Telco	BELOPTIX DT144 - 144 FIBERS -	CTL	19.29	9.18	0.7560	-	0.208	98.0	270.0	98.0		0	-12	997	986
Overlashed	3/8" EHS	CTL	19.33	9.18	0.3750	1.26	0.273	147.0	90.0	147.0	1,500	1	-23	1,499	1,478
Telco	BELOPTIX DT144 - 144 FIBERS -	CTL	19.29	9.18	0.7560	-	0.208	147.0	90.0	147.0		0	-18	1,496	1,478
											Totals:	0	-373	29,154	28,781

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	45.67	4.30	90.0	90.0	11.00	11.50	-	4.75	-	-	0	394	394
Post	Post Insulator - 15 kV	NVE	44.00	4.45	0.0	0.0	11.00	11.50	-	4.75	-	-	22	380	402
Post	Post Insulator - 15 kV	NVE	44.00	4.45	180.0	180.0	11.00	11.50	-	4.75	-	-	-22	380	358
Spool	Spool Insulator - 20 kV	NVE	35.50	5.22	180.0	180.0	1.00	2.12	-	2.50	-	-	-1	29	28
Spool	Spool Insulator - 20 kV	NVE	34.50	5.31	270.0	270.0	1.00	2.12	-	2.50	-	-	0	29	29
Spool	Spool Insulator - 20 kV	NVE	34.50	5.31	90.0	90.0	1.00	2.12	-	2.50	-	-	0	29	29
Bolt	Three Bolt	ZFS	29.75	5.74	180.0	180.0	5.00	0.00	-	3.00	-	-	-5	0	-5
Bolt	Three Bolt	COX	28.50	5.85	180.0	180.0	5.00	0.00	-	3.00	-	-	-5	0	-5
Bolt	Three Bolt	CTL	20.92	6.54	180.0	180.0	5.00	0.00	-	3.00	-	-	-6	0	-6
Bolt	Three Bolt	CTL	19.33	6.68	180.0	180.0	5.00	0.00	-	3.00	-	-	-6	0	-6
											Totals:	0	-23	1,240	1,217

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	23.02	33.71	15.46	19.42	8.60	16.88	1,000,000	50.00	57.00	45.67	58,985	4,158	14.19

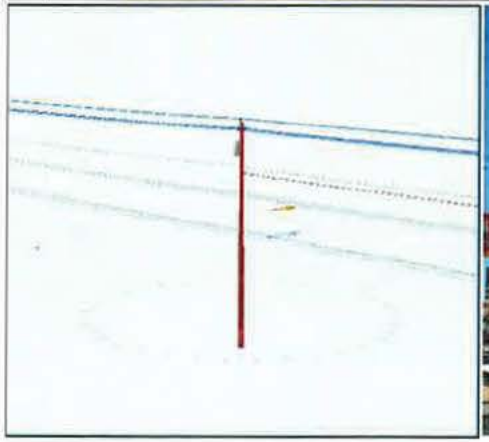
Version: 5.0 / 5.00
* includes Load Factor(s)

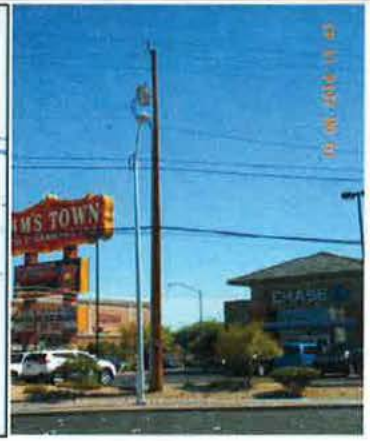
² Worst Wind per Guy Wire
³ Wind at 0.0°

O-Calc® Pro *Analysis Report*

Tuesday, November 04, 2014 4:40:02 PM

File Name:	26 - p101638 Exist	Pole Length / Class:	55 / 1	Code:	NESC	Structure Type:	Unguyed
Pole Num:	26 - p101638	Pole Species:	WESTERN RED CEDAR	NESC Rule:	Rule 250B	Status:	N/A
Permit #:	Unset	Setting Depth (ft):	8.00	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):	6,000	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:	84.9%	0.0 ft	6.3°
Groundline:	84.9%	0.0 ft	6.3°
Vertical:	12.5%	26.5 ft	6.3°

Pole Moments		Load Angle	Wind Angle
Max Capac. Util:	115,134 ft-lb	17.2°	6.3°
Groundline:	115,134 ft-lb	17.2°	6.3°

GROUNDLINE LOAD SUMMARY:*Wind at 6.3°, Applied Moment 115,134 ft-lb at 17.2°, 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:	1,227	32.7	51,726	46.3	37.9	1,478	416	2	1,480	37.9
Comms:	1,037	27.6	25,282	22.6	18.5	722	436	2	724	18.6
Power Equipment:	132	3.5	5,062	4.5	3.7	145	548	3	147	3.8
Pole:	1,075	28.6	22,661	20.3	16.6	647	3,056	15	662	17.0
Risers:	255	6.8	5,885	5.3	4.3	168	112	1	169	4.3
Insulators:	27	0.7	1,203	1.1	0.9	34	82	0	35	0.9
Pole Load:	3,752	100.0	111,818	100.0	81.9	3,195	4,650	22	3,217	82.5
Pole Reserve Capacity:			24,686		18.1	705			683	17.5

LOAD SUMMARY BY OWNER

NVE:	2,715	86,557	2,473	4,184	20	2,493	63.9

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

² Worst Wind per Guy Wire
³ Wind at 6.3°

ZFS:	200	6,016	172	62	0	172	4.4
COX:	236	6,917	198	76	0	198	5.1
CTL:	601	12,328	352	328	2	354	9.1
Totals	3,752	111,818	3,195	4,650	22	3,217	82.5

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 636.0 KCM 37 STRAND	NVE	47.96	4.30	1.1240	2.33	0.596	154.0	270.0	154.0	2,204	-34,332	-7	7,398	-26,941
Primary	AAC 636.0 KCM 37 STRAND	NVE	47.96	4.30	1.1240	1.37	0.596	98.0	90.0	98.0	2,204	34,332	-5	4,708	39,036
Primary	AAC 636.0 KCM 37 STRAND	NVE	45.42	15.93	1.1240	2.33	0.596	154.0	270.0	154.0	2,204	-32,517	87	7,007	-25,423
Primary	AAC 636.0 KCM 37 STRAND	NVE	45.42	15.93	1.1240	1.37	0.596	98.0	90.0	98.0	2,204	32,517	56	4,459	37,032
Primary	AAC 636.0 KCM 37 STRAND	NVE	45.42	15.93	1.1240	2.33	0.596	154.0	270.0	154.0	2,204	-32,517	-87	7,007	-25,597
Primary	AAC 636.0 KCM 37 STRAND	NVE	45.42	15.93	1.1240	1.37	0.596	98.0	90.0	98.0	2,204	32,517	-56	4,459	36,920
Neutral	AAC 336.4 KCM 19 STRAND TULIP	NVE	36.67	7.39	0.6660	2.14	0.316	154.0	270.0	154.0	1,165	-13,862	-21	3,349	-10,535
Neutral	AAC 336.4 KCM 19 STRAND TULIP	NVE	36.67	7.39	0.6660	1.21	0.316	98.0	90.0	98.0	1,165	13,862	-14	2,131	15,980
Secondary	TRIPLEX 2 AWG	NVE	35.00	7.52	0.8060	1.16	0.248	98.0	90.0	98.0	774	8,790	3	2,461	11,255
											Totals:	8,790	-44	42,979	51,726

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 DT288 - 288 FIBERS -	ZFS	30.33	8.15	0.8900	1.97	0.289	154.0	270.0	154.0	1,500	-14,763	-22	3,701	-11,083
Telco	BELOPTIX DT288 - 288 FIBERS -	ZFS	30.33	8.15	0.8900	1.16	0.289	98.0	90.0	98.0	1,500	14,763	-14	2,355	17,104
Overlashed	1/4" EHS	COX	29.58	8.21	0.2500	0.96	0.121	154.0	270.0	154.0	1,500	-14,398	-9	1,065	-13,342
Telco	P3-500CA	COX	29.56	8.32	0.5000	-	0.072	154.0	270.0	154.0		0	-6	1,064	1,059
Telco	48ct Fiber	COX	29.56	8.12	0.5130	-	0.121	154.0	270.0	154.0		0	-9	1,064	1,056
Telco	24ct Fiber	COX	29.53	8.22	0.3900	-	0.049	154.0	270.0	154.0		0	-4	1,063	1,060
Overlashed	1/4" EHS	COX	29.58	8.21	0.2500	0.39	0.121	98.0	90.0	98.0	1,500	14,398	-6	678	15,070
Telco	P3-500CA	COX	29.56	8.32	0.5000	-	0.072	98.0	90.0	98.0		0	-4	677	674
Telco	48ct Fiber	COX	29.56	8.12	0.5130	-	0.121	98.0	90.0	98.0		0	-5	677	672
Telco	24ct Fiber	COX	29.53	8.22	0.3900	-	0.049	98.0	90.0	98.0		0	-2	677	674
Overlashed	5/16" EHS	CTL	21.25	8.89	0.3125	1.71	0.205	103.0	270.0	103.0	1,500	-10,343	-11	1,451	-8,903
Telco	26 GA 200 PR (0.94)	CTL	21.21	9.09	0.9400	-	0.480	103.0	270.0	103.0		0	-27	1,448	1,421
Telco	26 GA 400 PR (1.30)	CTL	21.20	8.68	1.3000	-	0.910	103.0	270.0	103.0		0	-47	1,448	1,400
Overlashed	5/16" EHS	CTL	21.25	8.89	0.3125	1.56	0.205	98.0	90.0	98.0	1,500	10,343	-11	1,381	11,713
Telco	26 GA 200 PR (0.94)	CTL	21.21	9.09	0.9400	-	0.480	98.0	90.0	98.0		0	-26	1,378	1,352
Telco	26 GA 400 PR (1.30)	CTL	21.20	8.68	1.3000	-	0.910	98.0	90.0	98.0		0	-45	1,377	1,332
Overlashed	3/8" EHS	CTL	20.25	8.97	0.3750	0.70	0.273	103.0	270.0	103.0	1,500	-9,856	-15	1,045	-8,826
Telco	BELOPTIX DT144 - 144 FIBERS -	CTL	20.21	8.97	0.7560	-	0.208	103.0	270.0	103.0		0	-11	1,043	1,031
Overlashed	3/8" EHS	CTL	20.25	8.97	0.3750	0.64	0.273	98.0	90.0	98.0	1,500	9,856	-14	994	10,837
Telco	BELOPTIX DT144 - 144 FIBERS -	CTL	20.21	8.97	0.7560	-	0.208	98.0	90.0	98.0		0	-11	992	981
											Totals:	0	-300	25,581	25,282

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)*

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

[2] Worst Wind per Guy Wire
[3] Wind at 6.3°

Transformer	1PH-25KVA	NVE	40.67	21.81	270.0	270.0	365.00	39.00	-	22.00	-	-	-294	5,355	5,062
											Totals:	0	-294	5,355	5,062

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 280.0°	Riser	NVE	34.67	8.44	280.0	280.0	6.21	416.04	-	0.00	-	-	-6	5,891	5,885
											Totals:	0	-6	5,891	5,885

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	47.00	4.30	270.0	270.0	11.00	11.50	-	4.75	-	-	-2	398	396
Post	Post Insulator - 15 kV	NVE	45.42	4.43	0.0	0.0	11.00	11.50	-	4.75	-	-	21	385	406
Post	Post Insulator - 15 kV	NVE	45.42	4.43	180.0	180.0	11.00	11.50	-	4.75	-	-	-21	385	364
Spool	Spool Insulator - 20 kV	NVE	36.67	5.14	180.0	180.0	1.00	2.12	-	2.50	-	-	-1	30	29
Spool	Spool Insulator - 20 kV	NVE	35.00	5.27	90.0	90.0	1.00	2.12	-	2.50	-	-	0	28	29
Bolt	Three Bolt	ZFS	30.33	5.65	180.0	180.0	5.00	0.00	-	3.00	-	-	-5	0	-5
Bolt	Three Bolt	COX	29.58	5.71	180.0	180.0	5.00	0.00	-	3.00	-	-	-5	0	-5
Bolt	Three Bolt	CTL	21.25	6.39	180.0	180.0	5.00	0.00	-	3.00	-	-	-5	0	-5
Bolt	Three Bolt	CTL	20.25	6.47	180.0	180.0	5.00	0.00	-	3.00	-	-	-5	0	-5
											Totals:	0	-23	1,226	1,203

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	26.46	33.97	14.77	21.72	8.60	16.24	1,000,000	50.00	57.00	47.00	37,199	4,650	8.00

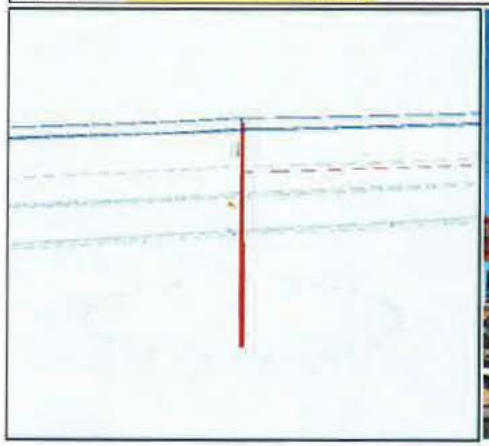
Version: 5.0 / 5.00
* includes Load Factor(s)

[2] Worst Wind per Guy Wire
[3] Wind at 6.3°

O-Calc® Pro *Analysis Report*

Tuesday, November 04, 2014 4:41:06 PM

File Name:	26 - p101638 Propo	Pole Length / Class:	55 / 1	Code:	NESC	Structure Type:	Unguyed
Pole Num:	26 - p101638	Pole Species:	WESTERN RED CEDAR	NESC Rule:	Rule 250B	Status:	N/A
Permit #:	Unset	Setting Depth (ft):	8.00	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):	6,000	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:	86.0%	0.0 ft	6.3°
Groundline:	86.0%	0.0 ft	6.3°
Vertical:	12.6%	26.5 ft	6.3°

Pole Moments		Load Angle	Wind Angle
Max Capac. Util:	116,660 ft-lb	16.9°	6.3°
Groundline:	116,660 ft-lb	16.9°	6.3°

GROUNDLINE LOAD SUMMARY:*Wind at 6.3°, Applied Moment 116,660 ft-lb at 16.9°, 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:	1,225	32.2	51,664	45.6	37.8	1,476	416	2	1,478	37.9
Comms:	1,090	28.6	26,827	23.7	19.7	766	453	2	769	19.7
Power Equipment:	132	3.5	5,070	4.5	3.7	145	548	3	147	3.8
Pole:	1,075	28.3	22,678	20.0	16.6	648	3,056	15	663	17.0
Risers:	255	6.7	5,889	5.2	4.3	168	112	1	169	4.3
Insulators:	27	0.7	1,204	1.1	0.9	34	82	0	35	0.9
Pole Load:	3,804	100.0	113,333	100.0	83.0	3,238	4,667	23	3,261	83.6
Pole Reserve Capacity:			23,171		17.0	662			639	16.4

LOAD SUMMARY BY OWNER

NVE:	2,714	86,526	2,472	4,184	20	2,492	63.9

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

² Worst Wind per Guy Wire
³ Wind at 6.3°

ZFS:	200	6,023	172	62	0	172	4.4		
COX:	288	8,440	241	93	0	242	6.2		
CTL:	602	12,343	353	328	2	354	9.1		
Totals	3,804	113,333	3,238	4,667	23	3,261	83.6		

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 636.0 KCM 37 STRAND	NVE	47.96	4.30	1.1240	2.33	0.596	154.0	270.0	154.0	2,204	-33,883	-7	7,407	-26,483
Primary	AAC 636.0 KCM 37 STRAND	NVE	47.96	4.30	1.1240	1.37	0.596	98.0	90.0	98.0	2,204	33,883	-5	4,714	38,592
Primary	AAC 636.0 KCM 37 STRAND	NVE	45.42	15.93	1.1240	2.33	0.596	154.0	270.0	154.0	2,204	-32,091	87	7,016	-24,988
Primary	AAC 636.0 KCM 37 STRAND	NVE	45.42	15.93	1.1240	1.37	0.596	98.0	90.0	98.0	2,204	32,091	56	4,464	36,612
Primary	AAC 636.0 KCM 37 STRAND	NVE	45.42	15.93	1.1240	2.33	0.596	154.0	270.0	154.0	2,204	-32,091	-87	7,016	-25,163
Primary	AAC 636.0 KCM 37 STRAND	NVE	45.42	15.93	1.1240	1.37	0.596	98.0	90.0	98.0	2,204	32,091	-56	4,464	36,500
Neutral	AAC 336.4 KCM 19 STRAND TULIP	NVE	36.67	7.39	0.6660	2.14	0.316	154.0	270.0	154.0	1,165	-13,681	-21	3,353	-10,350
Neutral	AAC 336.4 KCM 19 STRAND TULIP	NVE	36.67	7.39	0.6660	1.21	0.316	98.0	90.0	98.0	1,165	13,681	-14	2,134	15,801
Secondary	TRIPLEX 2 AWG	NVE	35.00	7.52	0.8060	1.16	0.248	98.0	90.0	98.0	774	8,675	3	2,464	11,143
											Totals:	8,675	-44	43,032	51,664

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 DT288 - 288 FIBERS -	ZFS	30.33	8.15	0.8900	1.97	0.289	154.0	270.0	154.0	1,500	-14,570	-22	3,706	-10,886
Telco	BELOPTIX DT288 - 288 FIBERS -	ZFS	30.33	8.15	0.8900	1.16	0.289	98.0	90.0	98.0	1,500	14,570	-14	2,358	16,914
Overlashed	1/4" EHS	COX	29.58	8.21	0.2500	1.17	0.121	154.0	270.0	154.0	1,500	-14,209	-9	1,300	-12,919
Telco	P3-500CA	COX	29.56	8.32	0.5000	-	0.072	154.0	270.0	154.0		0	-6	1,299	1,293
Telco	BELOPTIX DT144 - 144 FIBERS -	COX	29.55	8.08	0.7560	-	0.208	154.0	270.0	154.0		0	-15	1,299	1,283
Telco	24ct Fiber	COX	29.51	8.22	0.3900	-	0.049	154.0	270.0	154.0		0	-4	1,297	1,293
Overlashed	1/4" EHS	COX	29.58	8.21	0.2500	0.48	0.121	98.0	90.0	98.0	1,500	14,209	-6	827	15,031
Telco	P3-500CA	COX	29.56	8.32	0.5000	-	0.072	98.0	90.0	98.0		0	-4	827	823
Telco	BELOPTIX DT144 - 144 FIBERS -	COX	29.55	8.08	0.7560	-	0.208	98.0	90.0	98.0		0	-10	826	817
Telco	24ct Fiber	COX	29.51	8.22	0.3900	-	0.049	98.0	90.0	98.0		0	-2	825	823
Overlashed	5/16" EHS	CTL	21.25	8.89	0.3125	1.71	0.205	103.0	270.0	103.0	1,500	-10,208	-11	1,453	-8,766
Telco	26 GA 200 PR (0.94)	CTL	21.21	9.09	0.9400	-	0.480	103.0	270.0	103.0		0	-27	1,450	1,423
Telco	26 GA 400 PR (1.30)	CTL	21.20	8.68	1.3000	-	0.910	103.0	270.0	103.0		0	-48	1,449	1,402
Overlashed	5/16" EHS	CTL	21.25	8.89	0.3125	1.56	0.205	98.0	90.0	98.0	1,500	10,208	-11	1,382	11,579
Telco	26 GA 200 PR (0.94)	CTL	21.21	9.09	0.9400	-	0.480	98.0	90.0	98.0		0	-26	1,380	1,354
Telco	26 GA 400 PR (1.30)	CTL	21.20	8.68	1.3000	-	0.910	98.0	90.0	98.0		0	-45	1,379	1,334
Overlashed	3/8" EHS	CTL	20.25	8.97	0.3750	0.70	0.273	103.0	270.0	103.0	1,500	-9,727	-15	1,047	-8,696
Telco	BELOPTIX DT144 - 144 FIBERS -	CTL	20.21	8.97	0.7560	-	0.208	103.0	270.0	103.0		0	-11	1,044	1,033
Overlashed	3/8" EHS	CTL	20.25	8.97	0.3750	0.64	0.273	98.0	90.0	98.0	1,500	9,727	-14	996	10,709
Telco	BELOPTIX DT144 - 144 FIBERS -	CTL	20.21	8.97	0.7560	-	0.208	98.0	90.0	98.0		0	-11	994	983
											Totals:	0	-310	27,138	26,827

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)*

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

² Worst Wind per Guy Wire
* Wind at 6.3*

Transformer	1PH-25KVA	NVE	40.67	21.81	270.0	270.0	365.00	39.00	-	22.00	-	-	-290	5,359	5,070
											Totals:	0	-290	5,359	5,070

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 280.0°	Riser	NVE	34.67	8.44	280.0	280.0	6.21	416.04	-	0.00	-	-	-6	5,895	5,889
											Totals:	0	-6	5,895	5,889

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	47.00	4.30	270.0	270.0	11.00	11.50	-	4.75	-	-	-2	398	397
Post	Post Insulator - 15 kV	NVE	45.42	4.43	0.0	0.0	11.00	11.50	-	4.75	-	-	21	385	406
Post	Post Insulator - 15 kV	NVE	45.42	4.43	180.0	180.0	11.00	11.50	-	4.75	-	-	-21	385	364
Spool	Spool Insulator - 20 kV	NVE	36.67	5.14	180.0	180.0	1.00	2.12	-	2.50	-	-	-1	30	29
Spool	Spool Insulator - 20 kV	NVE	35.00	5.27	90.0	90.0	1.00	2.12	-	2.50	-	-	0	28	29
Bolt	Three Bolt	ZFS	30.33	5.65	180.0	180.0	5.00	0.00	-	3.00	-	-	-5	0	-5
Bolt	Three Bolt	COX	29.58	5.71	180.0	180.0	5.00	0.00	-	3.00	-	-	-5	0	-5
Bolt	Three Bolt	CTL	21.25	6.39	180.0	180.0	5.00	0.00	-	3.00	-	-	-5	0	-5
Bolt	Three Bolt	CTL	20.25	6.47	180.0	180.0	5.00	0.00	-	3.00	-	-	-5	0	-5
											Totals:	0	-23	1,227	1,204

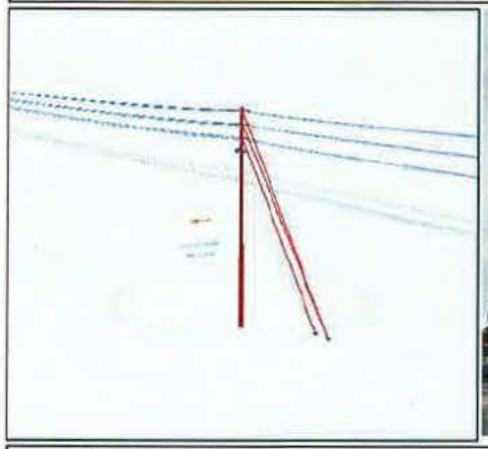
Pole Buckling

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	26.47	33.98	14.77	21.76	8.60	16.24	1,000,000	50.00	57.00	47.00	37,159	4,667	7.96

O-Calc® Pro *Analysis Report*

Tuesday, November 04, 2014 4:50:46 PM

File Name:	27 - p101639 Exist	Pole Length / Class:	65 / H1	Code:	NESC	Structure Type:	Deadend
Pole Num:	27 - p101639	Pole Species:	WESTERN RED CEDAR	NESC Rule:	Rule 250B	Status:	N/A
Permit #:	Unset	Setting Depth (ft):	8.50	Construction Grade:	B	Pole Strength Factor:	0.65
Owner:	Unset	G/L Circumference (in):	58.00	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:	117.9%	0.0 ft	181.2°
Groundline:	117.9%	0.0 ft	181.2°
Vertical:	2.3%	33.3 ft	270.0°

Pole Moments		Load Angle	Wind Angle
Max Capac. Util:	234,146 ft-lb	177.2°	181.2°
Groundline:	234,146 ft-lb	177.2°	181.2°

Guys Capacity Summary: Inadequate

Guy Summary		Guy Tensions		Maximum Guy Tensions	
	Attach Height (ft)	% Allowable Tension	Wind Angle	% Allowable Tension	Wind Angle
Guy 1	55.5	150.2%	181.2°	247.9%	280.0°
Guy 2	51.7	145.2%	181.2°	239.6%	270.0°
Guy 3	47.7	128.2%	181.2°	211.5%	270.0°
Guy 4	37.1	59.1%	181.2°	97.4%	260.0°

Anchor Summary

	Lead Length (ft)	Lead Angle	Max. % Allow. Capacity
Anchor 1	41.0	90.0°	221.2%
Anchor 2	36.0	90.0°	139.9%

GROUNDLINE LOAD SUMMARY:*Wind at 181.2°, Applied Moment 234,146 ft-lb at 177.2°, 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:	271	8.8	10,207	10.6	5.1	198	1,658	6	204	5.2

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

² Worst Wind per Guy Wire
³ Wind at 181.2°

Comms:	883	28.6	31,521	32.7	15.7	612	238	1	613	15.7
Guys/Braces:	100	3.3	4,894	5.1	2.4	95	65	0	95	2.4
Generic Equipment:	72	2.3	3,224	3.3	1.6	63	68	0	63	1.6
Pole:	1,463	47.4	36,743	38.1	18.3	714	4,595	17	731	18.7
Crossarms:	12	0.4	603	0.6	0.3	12	126	0	12	0.3
Risers:	216	7.0	5,715	5.9	2.8	111	129	0	112	2.9
Insulators:	69	2.2	3,547	3.7	1.8	69	64	0	69	1.8
Pole Load:	3,086	100.0	96,455	100.0	48.0	1,874	6,943	26	1,900	48.7
Pole Reserve Capacity:			104,324		52.0	2,026			2,000	51.3

LOAD SUMMARY BY OWNER

NVE:	2,203	64,928	1,261	6,683	25	1,286	33.0
ZFS:	405	14,729	286	113	0	287	7.3
COX:	478	16,798	326	147	1	327	8.4
Totals	3,086	96,455	1,874	6,943	26	1,900	48.7

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 636.0 KCM 37 STRAND	NVE	55.41	19.20	1.1240	2.32	0.596	154.0	90.0	154.0	2,204	9,839	1	8,979	18,819
Primary	AAC 954.0 KCM 37 STRAND	NVE	55.41	20.97	1.1240	3.71	0.895	332.0	270.0	332.0	6,509	-29,058	82	19,356	-9,620
Primary	AAC 954.0 KCM 37 STRAND	NVE	55.41	20.97	1.1240	3.71	0.895	332.0	270.0	332.0	6,509	-29,058	-84	19,356	-9,786
Primary	AAC 636.0 KCM 37 STRAND	NVE	51.58	19.51	1.1240	2.32	0.596	154.0	90.0	154.0	2,204	9,159	1	8,358	17,518
Primary	AAC 954.0 KCM 37 STRAND	NVE	51.58	20.88	1.1240	3.71	0.895	332.0	270.0	332.0	6,509	-27,050	88	18,018	-8,944
Primary	AAC 954.0 KCM 37 STRAND	NVE	51.58	20.88	1.1240	3.71	0.895	332.0	270.0	332.0	6,509	-27,050	-90	18,018	-9,122
Primary	AAC 636.0 KCM 37 STRAND	NVE	47.58	19.84	1.1240	2.32	0.596	154.0	90.0	154.0	2,204	8,449	1	7,710	16,160
Primary	AAC 954.0 KCM 37 STRAND	NVE	47.58	20.79	1.1240	3.71	0.895	332.0	270.0	332.0	6,509	-24,952	94	16,621	-8,237
Primary	AAC 954.0 KCM 37 STRAND	NVE	47.58	20.79	1.1240	3.71	0.895	332.0	270.0	332.0	6,509	-24,952	-97	16,621	-8,428
Neutral	AAC 336.4 KCM 19 STRAND	NVE	38.83	8.31	0.6660	2.11	0.316	154.0	90.0	154.0	1,165	3,645	25	3,728	7,398
Neutral	AAC 336.4 KCM 19 STRAND	NVE	38.83	8.31	0.6660	6.09	0.316	332.0	270.0	332.2	1,165	-3,645	54	8,038	4,447
											Totals:	-	76	144,803	10,207

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 DT288 - 288 FIBERS -	ZFS	36.17	8.78	0.8900	1.94	0.289	154.0	90.0	154.0	1,500	4,371	24	4,641	9,037
Telco	BELOPTIX DT288 - 288 FIBERS -	ZFS	36.17	8.78	0.8900	5.14	0.289	332.0	270.0	332.1	1,500	-4,371	53	10,005	5,686
Overlashed	1/4" EHS	COX	35.17	8.86	0.2500	0.88	0.121	154.0	90.0	154.0	1,500	4,251	1	1,332	5,583
Telco	P3-500CA	COX	35.15	8.62	0.5000	-	0.072	154.0	90.0	154.0		0	0	1,331	1,331
Telco	48ct Fiber	COX	35.15	9.10	0.5130	-	0.121	154.0	90.0	154.0		0	0	1,331	1,331
Telco	24ct Fiber	COX	35.12	8.85	0.3900	-	0.049	154.0	90.0	154.0		0	0	1,330	1,330
Overlashed	1/4" EHS	COX	35.17	8.86	0.2500	3.95	0.121	332.0	270.0	332.0	1,500	-4,251	-1	2,871	-1,381
Telco	P3-500CA	COX	35.15	9.10	0.5000	-	0.072	332.0	270.0	332.0		0	-1	2,869	2,869
Telco	48ct Fiber	COX	35.15	8.62	0.5130	-	0.121	332.0	270.0	332.0		0	-1	2,869	2,868
Telco	24ct Fiber	COX	35.12	8.87	0.3900	-	0.049	332.0	270.0	332.0		0	0	2,867	2,866

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

² Worst Wind per Guy Wire
³ Wind at 181.2°

											Totals:	0	75	31,446	31,521

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	44.33	21.61	90.0	0.0	15.00	12.00	8.00	-	8.00	-	2	1,061	1,063
Box	Fuse Cutout	NVE	44.33	21.61	180.0	0.0	15.00	12.00	8.00	-	8.00	-	40	1,061	1,102
Box	Fuse Cutout	NVE	44.33	21.61	270.0	0.0	15.00	12.00	8.00	-	8.00	-	-2	1,061	1,059
											Totals:	0	40	3,184	3,224

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	55.50	6.45	90.0	90.0	28.00	4.50	3.50	-	48.00	-	1	215	216
Normal	CROSSARM 3-1/2 X 4-1/2 X 4	NVE	51.67	6.76	90.0	90.0	28.00	4.50	3.50	-	48.00	-	1	200	201
Normal	CROSSARM 3-1/2 X 4-1/2 X 4	NVE	47.67	7.09	90.0	90.0	28.00	4.50	3.50	-	48.00	-	1	185	186
											Totals:	0	3	600	603

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 315.0°	Riser	NVE	40.00	9.60	315.0	315.0	7.17	480.00	-	0.00	-	-	-49	5,764	5,715
											Totals:	0	-49	5,764	5,715

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	55.50	0.00	90.0	0.0	3.00	12.75	-	3.80	-	-	0	419	419
Deadend	Deadend Insulator - 15 kV	NVE	55.50	20.00	162.1	180.0	3.00	12.75	-	3.80	-	-	7	419	426
Deadend	Deadend Insulator - 15 kV	NVE	55.50	-20.00	17.9	180.0	3.00	12.75	-	3.80	-	-	-8	419	411
Deadend	Deadend Insulator - 15 kV	NVE	51.67	0.00	90.0	0.0	3.00	12.75	-	3.80	-	-	0	390	391
Deadend	Deadend Insulator - 15 kV	NVE	51.67	20.00	161.3	180.0	3.00	12.75	-	3.80	-	-	7	390	398
Deadend	Deadend Insulator - 15 kV	NVE	51.67	-20.00	18.7	180.0	3.00	12.75	-	3.80	-	-	-8	390	383
Deadend	Deadend Insulator - 15 kV	NVE	47.67	0.00	90.0	0.0	3.00	12.75	-	3.80	-	-	0	360	360
Deadend	Deadend Insulator - 15 kV	NVE	47.67	20.00	160.5	180.0	3.00	12.75	-	3.80	-	-	7	360	367
Deadend	Deadend Insulator - 15 kV	NVE	47.67	-20.00	19.5	180.0	3.00	12.75	-	3.80	-	-	-8	360	352
Spool	Spool Insulator - 20 kV	NVE	38.83	6.06	180.0	180.0	1.00	2.12	-	2.50	-	-	1	32	33
Bolt	Three Bolt	ZFS	36.17	6.28	180.0	180.0	5.00	0.00	-	3.00	-	-	5	0	5
Bolt	Single Bolt	COX	35.17	6.36	90.0	90.0	5.00	0.00	-	3.00	-	-	0	0	0
Bolt	Single Bolt	COX	35.17	6.36	270.0	270.0	5.00	0.00	-	3.00	-	-	0	0	0
											Totals:	0	7	3,540	3,547

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	55.50	0.00	41.00	0.438	75.0	90.0	53.5	0.399	68.77	8.90
Guy 2: EHS 7/16	Down	NVE	51.67	0.00	41.00	0.438	75.0	90.0	51.6	0.399	65.70	8.18
Guy 3: EHS 7/16	Down	NVE	47.67	0.00	36.00	0.438	75.0	90.0	52.9	0.399	59.47	6.49
Guy 4: EHS 7/16	Down	NVE	37.08	0.00	36.00	0.438	75.0	90.0	45.8	0.399	51.32	2.41

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

² Worst Wind per Guy Wire
³ Wind at 181.2°

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	46,407	28,126	27,958	22,487	16,612	811	1,563
Guy 2: EHS 7/16	Down	23,000,000	20,800	0.90	18,720	700	44,859	27,187	26,911	21,081	16,728	817	1,390
Guy 3: EHS 7/16	Down	23,000,000	20,800	0.90	18,720	700	39,597	23,998	23,595	18,829	14,219	694	1,161
Guy 4: EHS 7/16	Down	23,000,000	20,800	0.90	18,720	700	18,240	11,055	10,157	7,288	7,075	346	779
									Totals:	69,685	54,635	2,668	4,894

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	41.00	90.0	25,000	1.00	25,000	55,305	54,861	221.2
Single - 12" - Soil Class 4	NVE	0.00	36.00	90.0	25,000	1.00	25,000	34,986	33,687	139.9

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	33.32	34.42	16.59	17.65	9.24	18.47	1,000,000	50.00	57.00	56.50	298,300	6,943	42.96

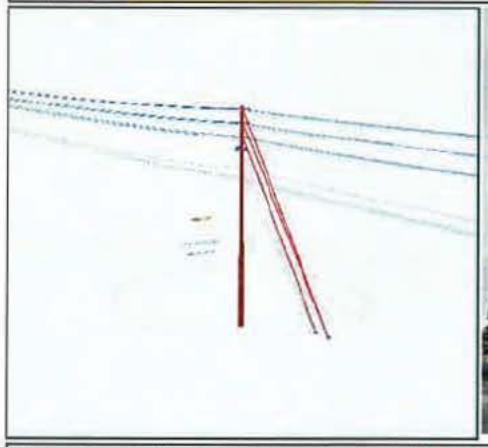
Version: 5.0 / 5.00
* Includes Load Factor(s)

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

O-Calc® Pro *Analysis Report*

Tuesday, November 04, 2014 4:52:42 PM

File Name:	27 - p101639 Propo	Pole Length / Class:	65 / H1	Code:	NESC	Structure Type:	Deadend
Pole Num:	27 - p101639	Pole Species:	WESTERN RED CEDAR	NESC Rule:	Rule 250B	Status:	N/A
Permit #:	Unset	Setting Depth (ft):	8.50	Construction Grade:	B	Pole Strength Factor:	0.65
Owner:	Unset	G/L Circumference (in):	58.00	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:	119.7%	0.0 ft	181.2°
Groundline:	119.7%	0.0 ft	181.2°
Vertical:	2.3%	33.3 ft	270.0°

Pole Moments		Load Angle	Wind Angle
Max Capac. Util:	237,825 ft-lb	177.2°	181.2°
Groundline:	237,825 ft-lb	177.2°	181.2°

Guys Capacity Summary: Inadequate

Guy Summary		Guy Tensions		Maximum Guy Tensions	
	Attach Height (ft)	% Allowable Tension	Wind Angle	% Allowable Tension	Wind Angle
Guy 1	55.5	150.2%	181.2°	247.9%	280.0°
Guy 2	51.7	145.2%	181.2°	239.6%	270.0°
Guy 3	47.7	128.2%	181.2°	211.5%	270.0°
Guy 4	37.1	59.1%	181.2°	97.4%	260.0°

Anchor Summary

	Lead Length (ft)	Lead Angle	Max. % Allow. Capacity
Anchor 1	41.0	90.0°	221.2%
Anchor 2	36.0	90.0°	139.9%

GROUNDLINE LOAD SUMMARY:*Wind at 181.2°, Applied Moment 237,825 ft-lb at 177.2°, 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:	312	9.6	12,297	12.0	6.1	239	1,658	6	245	6.3

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

² Worst Wind per Guy Wire
³ Wind at 181.2°

Comms:	988	30.6	35,195	34.4	17.5	684	269	1	685	17.6
Guys/Braces:	100	3.1	4,894	4.8	2.4	95	65	0	95	2.4
Generic Equipment:	72	2.2	3,224	3.2	1.6	63	68	0	63	1.6
Pole:	1,463	45.3	36,745	35.9	18.3	714	4,595	17	731	18.7
Crossarms:	12	0.4	603	0.6	0.3	12	126	0	12	0.3
Risers:	216	6.7	5,716	5.6	2.8	111	129	0	112	2.9
Insulators:	69	2.1	3,547	3.5	1.8	69	64	0	69	1.8
Pole Load:	3,232	100.0	102,221	100.0	50.9	1,986	6,975	26	2,012	51.6
Pole Reserve Capacity:			98,558		49.1	1,914			1,888	48.4

LOAD SUMMARY BY OWNER

NVE:	2,244	67,021	1,302	6,683	25	1,327	34.0
ZFS:	405	14,729	286	113	0	287	7.3
COX:	583	20,471	398	179	1	398	10.2
Totals	3,232	102,221	1,986	6,975	26	2,012	51.6

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 636.0 KCM 37 STRAND	NVE	55.41	19.20	1.1240	2.32	0.596	154.0	90.0	154.0	2,204	9,687	1	8,979	18,667
Primary	AAC 954.0 KCM 37 STRAND	NVE	55.41	20.97	1.1240	3.71	0.895	332.0	270.0	332.0	6,509	-28,609	82	19,357	-9,170
Primary	AAC 954.0 KCM 37 STRAND	NVE	55.41	20.97	1.1240	3.71	0.895	332.0	270.0	332.0	6,509	-28,609	-84	19,357	-9,336
Primary	AAC 636.0 KCM 37 STRAND	NVE	51.58	19.51	1.1240	2.32	0.596	154.0	90.0	154.0	2,204	9,017	1	8,358	17,377
Primary	AAC 954.0 KCM 37 STRAND	NVE	51.58	20.88	1.1240	3.71	0.895	332.0	270.0	332.0	6,509	-26,631	88	18,019	-8,524
Primary	AAC 954.0 KCM 37 STRAND	NVE	51.58	20.88	1.1240	3.71	0.895	332.0	270.0	332.0	6,509	-26,631	-90	18,019	-8,702
Primary	AAC 636.0 KCM 37 STRAND	NVE	47.58	19.84	1.1240	2.32	0.596	154.0	90.0	154.0	2,204	8,318	1	7,710	16,030
Primary	AAC 954.0 KCM 37 STRAND	NVE	47.58	20.79	1.1240	3.71	0.895	332.0	270.0	332.0	6,509	-24,566	94	16,622	-7,850
Primary	AAC 954.0 KCM 37 STRAND	NVE	47.58	20.79	1.1240	3.71	0.895	332.0	270.0	332.0	6,509	-24,566	-97	16,622	-8,041
Neutral	AAC 336.4 KCM 19 STRAND	NVE	38.83	8.31	0.6660	2.11	0.316	154.0	90.0	154.0	1,165	3,588	25	3,728	7,342
Neutral	AAC 336.4 KCM 19 STRAND	NVE	38.83	8.31	0.6660	6.09	0.316	332.0	270.0	332.2	1,165	-3,588	54	8,038	4,504
											Totals:	-	76	144,808	12,297

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 DT288 - 288 FIBERS -	ZFS	36.17	8.78	0.8900	1.94	0.289	154.0	90.0	154.0	1,500	4,304	24	4,641	8,969
Telco	BELOPTIX DT288 - 288 FIBERS -	ZFS	36.17	8.78	0.8900	5.14	0.289	332.0	270.0	332.1	1,500	-4,304	53	10,006	5,754
Overlashed	1/4" EHS	COX	35.17	8.86	0.2500	1.09	0.121	154.0	90.0	154.0	1,500	4,185	0	1,623	5,809
Telco	P3-500CA	COX	35.15	8.62	0.5000	-	0.072	154.0	90.0	154.0		0	0	1,622	1,623
Telco	BELOPTIX DT144 - 144 FIBERS -	COX	35.14	9.19	0.7560	-	0.208	154.0	90.0	154.0		0	1	1,622	1,622
Telco	24ct Fiber	COX	35.10	8.85	0.3900	-	0.049	154.0	90.0	154.0		0	0	1,620	1,620
Overlashed	1/4" EHS	COX	35.17	8.86	0.2500	4.80	0.121	332.0	270.0	332.0	1,500	-4,185	-1	3,499	-686
Telco	P3-500CA	COX	35.15	9.10	0.5000	-	0.072	332.0	270.0	332.0		0	-1	3,497	3,497
Telco	BELOPTIX DT144 - 144 FIBERS -	COX	35.14	8.53	0.7560	-	0.208	332.0	270.0	332.0		0	-2	3,497	3,494
Telco	24ct Fiber	COX	35.10	8.87	0.3900	-	0.049	332.0	270.0	332.0		0	0	3,493	3,492

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

² Worst Wind per Guy Wire
³ Wind at 181.2°

											Totals:	0	74	35,120	35,195

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	44.33	21.61	90.0	0.0	15.00	12.00	8.00	-	8.00	-	2	1,061	1,063
Box	Fuse Cutout	NVE	44.33	21.61	180.0	0.0	15.00	12.00	8.00	-	8.00	-	40	1,061	1,102
Box	Fuse Cutout	NVE	44.33	21.61	270.0	0.0	15.00	12.00	8.00	-	8.00	-	-2	1,061	1,059
											Totals:	0	40	3,184	3,224

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	55.50	6.45	90.0	90.0	28.00	4.50	3.50	-	48.00	-	1	215	216
Normal	CROSSARM 3-1/2 X 4-1/2 X 4	NVE	51.67	6.76	90.0	90.0	28.00	4.50	3.50	-	48.00	-	1	200	201
Normal	CROSSARM 3-1/2 X 4-1/2 X 4	NVE	47.67	7.09	90.0	90.0	28.00	4.50	3.50	-	48.00	-	1	185	186
											Totals:	0	3	600	603

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 315.0°	Riser	NVE	40.00	9.60	315.0	315.0	7.17	480.00	-	0.00	-	-	-49	5,765	5,716
											Totals:	0	-49	5,765	5,716

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	55.50	0.00	90.0	0.0	3.00	12.75	-	3.80	-	-	0	419	419
Deadend	Deadend Insulator - 15 kV	NVE	55.50	20.00	162.1	180.0	3.00	12.75	-	3.80	-	-	7	419	427
Deadend	Deadend Insulator - 15 kV	NVE	55.50	-20.00	17.9	180.0	3.00	12.75	-	3.80	-	-	-8	419	412
Deadend	Deadend Insulator - 15 kV	NVE	51.67	0.00	90.0	0.0	3.00	12.75	-	3.80	-	-	0	390	391
Deadend	Deadend Insulator - 15 kV	NVE	51.67	20.00	161.3	180.0	3.00	12.75	-	3.80	-	-	7	390	398
Deadend	Deadend Insulator - 15 kV	NVE	51.67	-20.00	18.7	180.0	3.00	12.75	-	3.80	-	-	-8	390	383
Deadend	Deadend Insulator - 15 kV	NVE	47.67	0.00	90.0	0.0	3.00	12.75	-	3.80	-	-	0	360	360
Deadend	Deadend Insulator - 15 kV	NVE	47.67	20.00	160.5	180.0	3.00	12.75	-	3.80	-	-	7	360	367
Deadend	Deadend Insulator - 15 kV	NVE	47.67	-20.00	19.5	180.0	3.00	12.75	-	3.80	-	-	-8	360	352
Spool	Spool Insulator - 20 kV	NVE	38.83	6.06	180.0	180.0	1.00	2.12	-	2.50	-	-	1	32	33
Bolt	Three Bolt	ZFS	36.17	6.28	180.0	180.0	5.00	0.00	-	3.00	-	-	5	0	5
Bolt	Single Bolt	COX	35.17	6.36	90.0	90.0	5.00	0.00	-	3.00	-	-	0	0	0
Bolt	Single Bolt	COX	35.17	6.36	270.0	270.0	5.00	0.00	-	3.00	-	-	0	0	0
											Totals:	0	7	3,540	3,547

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	55.50	0.00	41.00	0.438	75.0	90.0	53.5	0.399	68.77	8.90
Guy 2: EHS 7/16	Down	NVE	51.67	0.00	41.00	0.438	75.0	90.0	51.6	0.399	65.70	8.18
Guy 3: EHS 7/16	Down	NVE	47.67	0.00	36.00	0.438	75.0	90.0	52.9	0.399	59.47	6.49
Guy 4: EHS 7/16	Down	NVE	37.08	0.00	36.00	0.438	75.0	90.0	45.8	0.399	51.32	2.41

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

² Worst Wind per Guy Wire
³ Wind at 181.2°

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	46,407	28,126	27,958	22,487	16,612	799	1,563
Guy 2: EHS 7/16	Down	23,000,000	20,800	0.90	18,720	700	44,859	27,187	26,911	21,081	15,728	804	1,390
Guy 3: EHS 7/16	Down	23,000,000	20,800	0.90	18,720	700	39,597	23,998	23,595	18,829	14,219	684	1,161
Guy 4: EHS 7/16	Down	23,000,000	20,800	0.90	18,720	700	18,240	11,055	10,157	7,288	7,075	340	779
									Totals:	69,685	54,635	2,627	4,894

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	41.00	90.0	25,000	1.00	25,000	55,305	54,861	221.2
Single - 12" - Soil Class 4	NVE	0.00	36.00	90.0	25,000	1.00	25,000	34,985	33,687	139.9

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	33.33	34.42	16.59	17.69	9.24	18.47	1,000,000	50.00	57.00	56.50	298,110	6,975	42.74

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

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

O-Calc® Pro *Analysis Report*

Wednesday, November 05, 2014 9:08:32 AM

File Name:	29 - p71927 Existi	Pole Length / Class:	34.17 / 2	Code:	NESC	Structure Type:	Guyed
Pole Num:	29 - p71927	Pole Species:	WESTERN RED CEDAR	NESC Rule:	Rule 250B	Status:	N/A
Permit #:	Unset	Setting Depth (ft):	7.00	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:	26.0%	0.0 ft	178.6°
Groundline:	26.0%	0.0 ft	178.6°
Vertical:	0.3%	14.3 ft	270.0°

Pole Moments		Load Angle	Wind Angle
Max Capac. Util:	29,217 ft-lb	193.7°	178.6°
Groundline:	29,217 ft-lb	193.7°	178.6°

Guys Capacity Summary: Adequate

Guy Summary		Guy Tensions		Maximum Guy Tensions	
	Attach Height (ft)	% Allowable Tension	Wind Angle	% Allowable Tension	Wind Angle
Guy 1	21.9	15.9%	178.6°	26.3%	270.0°
Guy 2	20.2	16.5%	178.6°	27.3%	270.0°

Anchor Summary

	Lead Length (ft)	Lead Angle	Max. % Allow. Capacity
Anchor 1	21.0	90.0°	13.1%

GROUNDLINE LOAD SUMMARY:*Wind at 178.6°, Applied Moment 29,217 ft-lb at 193.7°, 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
Comms:	1,391	66.2	29,175	76.3	25.6	1,000	448	2	1,002	25.7
Guys/Braces:	17	0.8	352	0.9	0.3	12	8	0	12	0.3
Pole:	632	30.1	8,044	21.0	7.1	276	1,857	10	286	7.3
Risers:	60	2.9	665	1.7	0.6	23	52	0	23	0.6

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

² Worst Wind per Guy Wire
³ Wind at 178.6°

Insulators:	0	0.0	12	0.0	0.0	0	45	0	1	0.0
Pole Load:	2,100	100.0	38,248	100.0	33.6	1,311	2,410	13	1,324	33.9
Pole Reserve Capacity:			75,556		66.4	2,589			2,576	66.1

LOAD SUMMARY BY OWNER

ZFS:	99	2,647	91	45	0	91	2.3
COX:	180	4,151	142	61	0	143	3.7
CTL:	1,189	23,406	802	448	2	805	20.6
NVE:	632	8,044	276	1,857	10	286	7.3
Totals	2,100	38,248	1,311	2,410	13	1,324	33.9

Detailed Load Components

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	25.25	7.88	0.3125	0.36	0.205	110.0	270.0	110.0	1,500	14,827	3	885	15,714
Telco	24ct Fiber	ZFS	25.22	7.88	0.3900	-	0.049	110.0	270.0	110.0		0	1	884	885
Overlashed	5/16" EHS	ZFS	25.00	7.90	0.3125	0.06	0.205	45.0	90.0	45.0	1,500	-14,680	4	358	-14,317
Telco	24ct Fiber	ZFS	24.97	7.90	0.3900	-	0.049	45.0	90.0	45.0		0	1	358	359
Overlashed	1/4" EHS	COX	22.83	8.10	0.2500	0.57	0.121	110.0	270.0	110.0	1,500	13,406	7	584	13,996
Telco	P3-500CA	COX	22.80	8.10	0.5000	-	0.072	110.0	270.0	110.0		0	4	583	587
Telco	BELOPTIX DT096 - 72 FIBERS -	COX	22.83	7.97	0.5160	-	0.097	110.0	270.0	110.0		0	5	584	589
Telco	48ct Fiber	COX	22.86	8.10	0.5130	-	0.121	110.0	270.0	110.0		0	7	584	591
Telco	24ct Fiber	COX	22.83	8.22	0.3900	-	0.049	110.0	270.0	110.0		0	3	584	586
Overlashed	1/4" EHS	COX	22.83	8.10	0.2500	0.10	0.121	45.0	90.0	45.0	1,500	-13,406	3	239	-13,164
Telco	P3-500CA	COX	22.80	8.10	0.5000	-	0.072	45.0	90.0	45.0		0	2	238	240
Telco	BELOPTIX DT096 - 72 FIBERS -	COX	22.83	7.97	0.5160	-	0.097	45.0	90.0	45.0		0	2	239	241
Telco	48ct Fiber	COX	22.86	8.10	0.5130	-	0.121	45.0	90.0	45.0		0	3	239	242
Telco	24ct Fiber	COX	22.83	8.22	0.3900	-	0.049	45.0	90.0	45.0		0	1	239	240
Overlashed	1/4" EHS	CTL	21.67	8.20	0.2500	0.24	0.121	45.0	90.0	45.0	1,500	-12,725	-1	225	-12,501
Telco	26 GA 200 PR (0.94)	CTL	21.62	8.17	0.9400	-	0.480	45.0	90.0	45.0		0	-3	224	222
Telco	26 GA 25 PR (0.50)	CTL	21.65	8.78	0.5000	-	0.100	45.0	90.0	45.0		0	-1	225	224
Telco	BELOPTIX DT096 - 72 FIBERS -	CTL	21.69	8.83	0.5160	-	0.097	45.0	90.0	45.0		0	-1	225	224
Telco	BELOPTIX DT096 - 72 FIBERS -	CTL	21.72	8.48	0.5160	-	0.097	45.0	90.0	45.0		0	-1	225	225
Telco	BELOPTIX DT096 - 72 FIBERS -	CTL	21.71	8.00	0.5160	-	0.097	45.0	90.0	45.0		0	0	225	225
Telco	BELOPTIX DT096 - 72 FIBERS -	CTL	21.69	7.59	0.5160	-	0.097	45.0	90.0	45.0		0	0	225	225
Telco	BELOPTIX DT096 - 72 FIBERS -	CTL	21.65	7.60	0.5160	-	0.097	45.0	90.0	45.0		0	0	225	224
Overlashed	1/4" EHS	CTL	21.08	8.26	0.2500	0.63	0.121	110.0	270.0	110.0	1,500	12,378	2	545	12,925
Telco	26 GA 25 PR (0.50)	CTL	21.05	8.26	0.5000	-	0.100	110.0	270.0	110.0		0	1	544	546
Telco	BELOPTIX DT096 - 72 FIBERS -	CTL	21.08	7.91	0.5160	-	0.097	110.0	270.0	110.0		0	1	545	546
Telco	BELOPTIX DT096 - 72 FIBERS -	CTL	21.11	8.26	0.5160	-	0.097	110.0	270.0	110.0		0	1	546	547
Telco	BELOPTIX DT096 - 72 FIBERS -	CTL	21.08	8.60	0.5160	-	0.097	110.0	270.0	110.0		0	1	545	547
Overlashed	1/4" EHS	CTL	20.17	8.34	0.2500	3.67	0.121	110.0	270.0	110.0	1,500	11,844	2	1,051	12,897
Telco	26 GA 200 PR (0.94)	CTL	20.11	8.17	0.9400	-	0.480	110.0	270.0	110.0		0	6	1,048	1,054
Telco	BELOPTIX DT096 - 72 FIBERS -	CTL	20.17	7.93	0.5160	-	0.097	110.0	270.0	110.0		0	1	1,051	1,052
Telco	BELOPTIX DT096 - 72 FIBERS -	CTL	20.21	8.03	0.5160	-	0.097	110.0	270.0	110.0		0	1	1,053	1,054

Telco	BELOPTIX DT096 - 72 FIBERS -	CTL	20.20	8.50	0.5160	-	0.097	110.0	270.0	110.0		0	1	1,053	1,054
Telco	26 GA 1200 PR (2.08)	CTL	20.14	9.52	2.0800	-	2.540	110.0	270.0	110.0		0	48	1,050	1,097
											Totals:	11,644	103	17,427	29,175

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 210.0°	Riser	CTL	16.00	7.91	210.0	210.0	2.87	192.00	-	0.00	-	-	21	644	665
											Totals:	0	21	644	665

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)*
Bolt	Three Bolt	ZFS	25.25	5.38	270.0	270.0	5.00	0.00	-	3.00	-	-	1	0	1
Bolt	Three Bolt	ZFS	25.00	5.40	180.0	180.0	5.00	0.00	-	3.00	-	-	5	0	5
Bolt	Three Bolt	COX	22.83	5.60	180.0	180.0	5.00	0.00	-	3.00	-	-	5	0	5
Bolt	Single Bolt	CTL	21.67	5.70	90.0	90.0	5.00	0.00	-	3.00	-	-	-1	0	-1
Bolt	Single Bolt	CTL	21.08	5.76	270.0	270.0	5.00	0.00	-	3.00	-	-	1	0	1
Bolt	Single Bolt	CTL	20.17	5.84	270.0	270.0	5.00	0.00	-	3.00	-	-	1	0	1
											Totals:	0	12	0	12

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	21.92	0.00	21.00	0.312	75.0	90.0	46.2	0.205	30.03	0.37
Guy 2: EHS 5/16	Down	CTL	20.17	0.00	21.00	0.312	75.0	90.0	43.8	0.205	28.77	0.37

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 Load² (lbs)	Shear Load in Guy Dir² (lbs)	Shear Load at Report Angle³ (lbs)	Moment at GL² (ft-lb)*
Guy 1: EHS 5/16	Down	23,000,000	11,200	0.90	10,080	700	2,649	1,606	1,349	974	933	-221	187
Guy 2: EHS 5/16	Down	23,000,000	11,200	0.90	10,080	700	2,750	1,667	1,401	971	1,011	-240	165
									Totals:	1,945	1,944	-461	352

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 - 12" - Soil Class 4	CTL	0.00	21.00	90.0	25,000	1.00	25,000	3,272	2,750	13.1

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	14.32	32.51	14.45	6.93	10.43	15.29	1,000,000	50.00	57.00	27.17	928,565	2,410	385.27

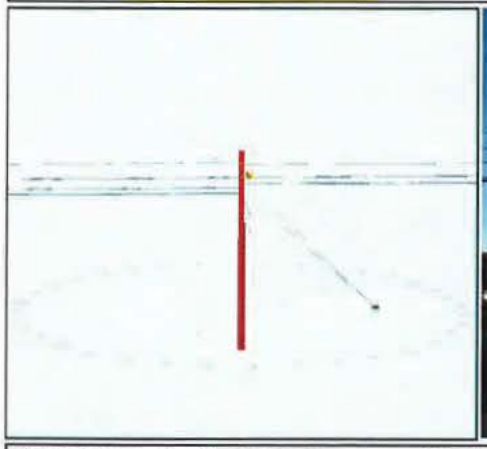
Version: 5.0 / 5.00
* includes Load Factor(s)

² Worst Wind per Guy Wire
³ Wind at 178.6°

O-Calc® Pro *Analysis Report*

Wednesday, November 05, 2014 9:11:32 AM

File Name:	29 - p71927 Propos	Pole Length / Class:	34.17 / 2	Code:	NESC	Structure Type:	Guyed
Pole Num:	29 - p71927	Pole Species:	WESTERN RED CEDAR	NESC Rule:	Rule 250B	Status:	N/A
Permit #:	Unset	Setting Depth (ft):	7.00	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:	26.6%	0.0 ft	178.6°
Groundline:	26.6%	0.0 ft	178.6°
Vertical:	0.3%	14.4 ft	270.0°

Pole Moments		Load Angle	Wind Angle
Max Capac. Util:	29,913 ft-lb	193.4°	178.6°
Groundline:	29,913 ft-lb	193.4°	178.6°

Guys Capacity Summary: Adequate

Guy Summary		Guy Tensions		Maximum Guy Tensions	
	Attach Height (ft)	% Allowable Tension	Wind Angle	% Allowable Tension	Wind Angle
Guy 1	21.9	15.9%	178.6°	26.3%	270.0°
Guy 2	20.2	16.5%	178.6°	27.3%	270.0°

Anchor Summary

	Lead Length (ft)	Lead Angle	Max. % Allow. Capacity
Anchor 1	21.0	90.0°	13.1%

GROUNDLINE LOAD SUMMARY:*Wind at 178.6°, Applied Moment 29,913 ft-lb at 193.4°, 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
Comms:	1,409	66.5	29,631	76.5	26.0	1,015	459	3	1,018	26.1
Guys/Braces:	17	0.8	353	0.9	0.3	12	8	0	12	0.3
Pole:	633	29.9	8,056	20.8	7.1	276	1,857	10	286	7.3
Risers:	60	2.9	666	1.7	0.6	23	52	0	23	0.6

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

² Worst Wind per Guy Wire
³ Wind at 178.6°

Insulators:	0	0.0	12	0.0	0.0	0	45	0	1	0.0
Pole Load:	2,119	100.0	38,718	100.0	34.0	1,327	2,420	13	1,340	34.4
Pole Reserve Capacity:			75,086		66.0	2,573			2,560	65.6

LOAD SUMMARY BY OWNER

ZFS:	99		2,647			91	45	0	91	2.3
COX:	211		4,861			167	71	0	167	4.3
CTL:	1,176		23,153			793	448	2	796	20.4
NVE:	633		8,056			276	1,857	10	286	7.3
Totals	2,119		38,718			1,327	2,420	13	1,340	34.4

Detailed Load Components

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	25.25	7.88	0.3125	0.36	0.205	110.0	270.0	110.0	1,500	14,482	3	886	15,371
Telco	24ct Fiber	ZFS	25.22	7.88	0.3900	-	0.049	110.0	270.0	110.0		0	1	885	886
Overlashed	5/16" EHS	ZFS	25.00	7.90	0.3125	0.06	0.205	45.0	90.0	45.0	1,500	-14,338	4	359	-13,975
Telco	24ct Fiber	ZFS	24.97	7.90	0.3900	-	0.049	45.0	90.0	45.0		0	1	359	360
Overlashed	1/4" EHS	COX	22.83	8.10	0.2500	0.68	0.121	110.0	270.0	110.0	1,500	13,094	7	683	13,784
Telco	P3-500CA	COX	22.80	8.11	0.5000	-	0.072	110.0	270.0	110.0		0	4	682	686
Telco	BELOPTIX DT096 - 72 FIBERS -	COX	22.83	7.97	0.5160	-	0.097	110.0	270.0	110.0		0	5	683	688
Telco	BELOPTIX DT144 - 144 FIBERS -	COX	22.87	8.11	0.7560	-	0.208	110.0	270.0	110.0		0	11	685	696
Telco	24ct Fiber	COX	22.83	8.22	0.3900	-	0.049	110.0	270.0	110.0		0	3	683	686
Overlashed	1/4" EHS	COX	22.83	8.10	0.2500	0.12	0.121	45.0	90.0	45.0	1,500	-13,094	3	280	-12,812
Telco	P3-500CA	COX	22.80	8.11	0.5000	-	0.072	45.0	90.0	45.0		0	2	279	281
Telco	BELOPTIX DT096 - 72 FIBERS -	COX	22.83	7.97	0.5160	-	0.097	45.0	90.0	45.0		0	2	280	282
Telco	BELOPTIX DT144 - 144 FIBERS -	COX	22.87	8.11	0.7560	-	0.208	45.0	90.0	45.0		0	5	280	285
Telco	24ct Fiber	COX	22.83	8.22	0.3900	-	0.049	45.0	90.0	45.0		0	1	280	281
Overlashed	1/4" EHS	CTL	21.67	8.20	0.2500	0.24	0.121	45.0	90.0	45.0	1,500	-12,429	-1	225	-12,204
Telco	26 GA 200 PR (0.94)	CTL	21.62	8.17	0.9400	-	0.480	45.0	90.0	45.0		0	-3	225	222
Telco	26 GA 25 PR (0.50)	CTL	21.65	8.78	0.5000	-	0.100	45.0	90.0	45.0		0	-1	225	224
Telco	BELOPTIX DT096 - 72 FIBERS -	CTL	21.69	8.83	0.5160	-	0.097	45.0	90.0	45.0		0	-1	225	225
Telco	BELOPTIX DT096 - 72 FIBERS -	CTL	21.72	8.48	0.5160	-	0.097	45.0	90.0	45.0		0	-1	226	225
Telco	BELOPTIX DT096 - 72 FIBERS -	CTL	21.71	8.00	0.5160	-	0.097	45.0	90.0	45.0		0	0	226	225
Telco	BELOPTIX DT096 - 72 FIBERS -	CTL	21.69	7.59	0.5160	-	0.097	45.0	90.0	45.0		0	0	225	225
Telco	BELOPTIX DT096 - 72 FIBERS -	CTL	21.65	7.60	0.5160	-	0.097	45.0	90.0	45.0		0	0	225	225
Overlashed	1/4" EHS	CTL	21.08	8.26	0.2500	0.63	0.121	110.0	270.0	110.0	1,500	12,090	2	546	12,638
Telco	26 GA 25 PR (0.50)	CTL	21.05	8.26	0.5000	-	0.100	110.0	270.0	110.0		0	1	545	546
Telco	BELOPTIX DT096 - 72 FIBERS -	CTL	21.08	7.91	0.5160	-	0.097	110.0	270.0	110.0		0	1	546	547
Telco	BELOPTIX DT096 - 72 FIBERS -	CTL	21.11	8.26	0.5160	-	0.097	110.0	270.0	110.0		0	1	547	548
Telco	BELOPTIX DT096 - 72 FIBERS -	CTL	21.08	8.60	0.5160	-	0.097	110.0	270.0	110.0		0	1	546	547
Overlashed	1/4" EHS	CTL	20.17	8.34	0.2500	3.67	0.121	110.0	270.0	110.0	1,500	11,568	2	1,053	12,622
Telco	26 GA 200 PR (0.94)	CTL	20.11	8.17	0.9400	-	0.480	110.0	270.0	110.0		0	6	1,049	1,055
Telco	BELOPTIX DT096 - 72 FIBERS -	CTL	20.17	7.93	0.5160	-	0.097	110.0	270.0	110.0		0	1	1,052	1,054
Telco	BELOPTIX DT096 - 72 FIBERS -	CTL	20.21	8.03	0.5160	-	0.097	110.0	270.0	110.0		0	1	1,055	1,056

Telco	BELOPTIX DT096 - 72 FIBERS -	CTL	20.20	8.50	0.5160	-	0.097	110.0	270.0	110.0		0	1	1,054	1,056
Telco	26 GA 1200 PR (2.08)	CTL	20.14	9.52	2.0800	-	2.540	110.0	270.0	110.0		0	47	1,051	1,098
											Totals:	11,373	109	18,149	29,631

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 210.0°	Riser	CTL	16.00	7.91	210.0	210.0	2.87	192.00	-	0.00	-	-	21	645	666
											Totals:	0	21	645	666

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)*
Bolt	Three Bolt	ZFS	25.25	5.38	270.0	270.0	5.00	0.00	-	3.00	-	-	1	0	1
Bolt	Three Bolt	ZFS	25.00	5.40	180.0	180.0	5.00	0.00	-	3.00	-	-	5	0	5
Bolt	Three Bolt	COX	22.83	5.60	180.0	180.0	5.00	0.00	-	3.00	-	-	5	0	5
Bolt	Single Bolt	CTL	21.67	5.70	90.0	90.0	5.00	0.00	-	3.00	-	-	-1	0	-1
Bolt	Single Bolt	CTL	21.08	5.76	270.0	270.0	5.00	0.00	-	3.00	-	-	1	0	1
Bolt	Single Bolt	CTL	20.17	5.84	270.0	270.0	5.00	0.00	-	3.00	-	-	1	0	1
											Totals:	0	12	0	12

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	21.92	0.00	21.00	0.312	75.0	90.0	46.2	0.205	30.03	0.37
Guy 2: EHS 5/16	Down	CTL	20.17	0.00	21.00	0.312	75.0	90.0	43.8	0.205	28.77	0.37

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)*
Guy 1: EHS 5/16	Down	23,000,000	11,200	0.90	10,080	700	2,649	1,606	1,349	974	933	-216	188
Guy 2: EHS 5/16	Down	23,000,000	11,200	0.90	10,080	700	2,750	1,667	1,401	971	1,011	-234	165
									Totals:	1,945	1,944	-450	353

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	CTL	0.00	21.00	90.0	25,000	1.00	25,000	3,272	2,750	13.1

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	14.37	32.52	14.44	6.96	10.43	15.29	1,000,000	50.00	57.00	27.17	921,839	2,420	380.88

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

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

November 19, 2014 (COX, United Health Care- 540 N Nellis Blvd, Nellis & Stewart)

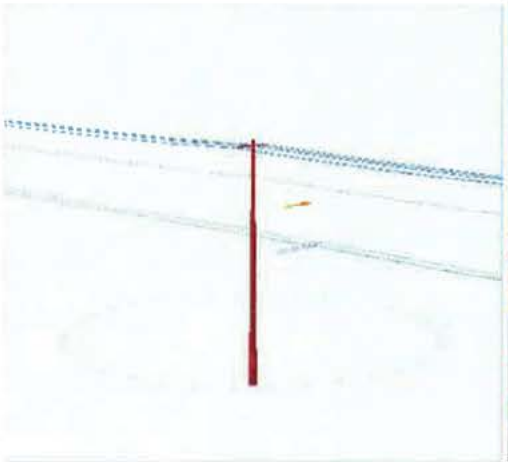
COX, United Health Care- 540 N Nellis Blvd, Nellis & Stewart

Grade B - light	1 - p90698		2 - p75097		3 - p78474	
	Existing	Proposed	Existing	Proposed	Existing	Proposed
Maximum Pole Capacity Utilization Percent	41.0%	41.2%	253.5%	253.5%	230.9%	230.9%

O-Calc® Pro *Analysis Report*

Friday, November 07, 2014 10:26:00 AM

File Name:	**1 - p90698 Propose**	Pole Length / Class:	**50 / 1**	Code:	**NESC**	Structure Type:	**Deadend**
Pole Num:	**1 - p90698**	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):	**51.00**	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:	**41.2%**	0.0 ft	0.0°
Groundline:	**41.2%**	0.0 ft	0.0°
Vertical:	**5.3%**	20.6 ft	0.0°

Pole Moments		Load Angle	Wind Angle
Max Capac. Util:	**55,612 ft-lb**	359.8°	0.0°
Groundline:	**55,612 ft-lb**	359.8°	0.0°

GROUNDLINE LOAD SUMMARY:*Wind at 0.0°, Applied Moment 55,612 ft-lb at 359.8°, 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:	451	19.4	**16,446**	30.7	**12.0**	**470**	359	2	**472**	**12.1**
Comms:	909	39.0	**18,992**	35.5	**13.9**	**543**	326	2	**544**	**14.0**
Pole:	918	39.4	**16,230**	30.3	**11.9**	**464**	2,563	12	**476**	**12.2**
Crossarms:	4	0.2	**150**	0.3	**0.1**	**4**	80	0	**5**	**0.1**
Insulators:	46	2.0	**1,752**	3.3	**1.3**	**50**	44	0	**50**	**1.3**
Pole Load:	2,328	100.0	**53,571**	100.0	**39.2**	**1,531**	3,371	16	**1,547**	**39.7**
Pole Reserve Capacity:			**82,933**		**60.8**	**2,369**			**2,353**	**60.3**

LOAD SUMMARY BY OWNER

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

² Worst Wind per Guy Wire
³ Wind at 0.0°

NVE:	1,419	**34,589**	**988**	3,030	15	**1,003**	**25.7**
ZFS:	450	**9,621**	**275**	161	1	**276**	**7.1**
COX:	459	**9,361**	**267**	180	1	**268**	**6.9**
Totals	2,328	**53,571**	**1,531**	3,371	16	**1,547**	**39.7**

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	2/0 COPPER 7 STRAND	NVE	37.91	47.90	0.4137	1.52	0.411	142.0	270.0	142.0	1,180	197	15	2,088	2,300
Primary	2/0 COPPER 7 STRAND	NVE	37.91	24.15	0.4137	1.52	0.411	142.0	270.0	142.0	1,180	197	10	2,088	2,295
Primary	2/0 COPPER 7 STRAND	NVE	37.91	47.90	0.4137	1.52	0.411	142.0	270.0	142.0	1,180	197	-15	2,088	2,270
Primary	2/0 COPPER 7 STRAND	NVE	37.91	44.49	0.4137	1.65	0.411	149.0	90.0	149.0	1,180	-197	17	2,191	2,010
Primary	2/0 COPPER 7 STRAND	NVE	37.91	16.38	0.4137	1.65	0.411	149.0	90.0	149.0	1,180	-197	16	2,191	2,009
Primary	2/0 COPPER 7 STRAND	NVE	37.91	44.49	0.4137	1.65	0.411	149.0	90.0	149.0	1,180	-197	-17	2,191	1,976
Neutral	2/0 COPPER 7 STRAND WP	NVE	32.25	7.24	0.4137	1.28	0.411	142.0	270.0	142.0	1,390	198	-26	1,776	1,948
Neutral	2/0 COPPER 7 STRAND WP	NVE	32.25	7.24	0.4137	1.39	0.411	149.0	90.0	149.0	1,390	-198	-28	1,864	1,638
											Totals:	**0**	**-28**	**16,475**	**16,446**

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	21.67	8.52	0.3125	1.49	0.205	142.0	270.0	142.0	1,500	144	-15	1,585	1,713
Telco	BELOPTIX DT144 - 144 FIBERS -	ZFS	21.64	8.67	0.7560	-	0.208	142.0	270.0	142.0		0	-16	1,583	1,567
Telco	BELOPTIX DT288 - 288 FIBERS -	ZFS	21.63	8.36	0.8900	-	0.289	142.0	270.0	142.0		0	-21	1,582	1,561
Overlashed	5/16" EHS	ZFS	21.67	8.52	0.3125	1.64	0.205	149.0	90.0	149.0	1,500	-144	-16	1,663	1,504
Telco	BELOPTIX DT144 - 144 FIBERS -	ZFS	21.64	8.67	0.7560	-	0.208	149.0	90.0	149.0		0	-17	1,661	1,644
Telco	BELOPTIX DT288 - 288 FIBERS -	ZFS	21.63	8.36	0.8900	-	0.289	149.0	90.0	149.0		0	-22	1,660	1,638
Overlashed	1/4" EHS	COX	20.67	8.61	0.2500	1.46	0.121	142.0	270.0	142.0	1,500	137	-9	1,134	1,261
Telco	BELOPTIX DT144 - 144 FIBERS -	COX	20.64	8.77	0.7560	-	0.208	142.0	270.0	142.0		0	-16	1,132	1,116
Telco	BELOPTIX DT288 - 288 FIBERS -	COX	20.64	8.46	0.8900	-	0.289	142.0	270.0	142.0		0	-22	1,132	1,110
Telco	48ct Fiber	COX	20.59	8.62	0.5130	-	0.121	142.0	270.0	142.0		0	-9	1,129	1,120
Overlashed	1/4" EHS	COX	20.67	8.61	0.2500	1.73	0.121	142.0	90.0	142.0	1,500	-137	-9	827	681
Telco	BELOPTIX DT144 - 144 FIBERS -	COX	20.62	8.64	0.7560	-	0.208	142.0	90.0	142.0		0	-16	825	809
Telco	BELOPTIX DT288 - 288 FIBERS -	COX	20.66	8.39	0.8900	-	0.289	142.0	90.0	142.0		0	-21	827	805
Telco	BELOPTIX DT096 - 72 FIBERS -	COX	20.70	8.54	0.5160	-	0.097	142.0	90.0	142.0		0	-7	828	821
Telco	18ct Fiber	COX	20.70	8.70	0.3900	-	0.049	142.0	90.0	142.0		0	-4	828	824
Telco	48ct Fiber	COX	20.66	8.80	0.5130	-	0.121	142.0	90.0	142.0		0	-9	827	817
											Totals:	**0**	**-232**	**19,224**	**18,992**

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 8	NVE	38.00	6.18	270.0	270.0	53.00	4.50	3.50	-	96.00	-	0	150	150
											Totals:	**0**	**0**	**150**	**150**

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

² Worst Wind per Guy Wire
³ Wind at 0.0°

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	38.00	44.00	352.0	0.0	3.00	12.75	-	3.80	-	-	17	288	304
Deadend	Deadend Insulator - 15 kV	NVE	38.00	15.00	337.6	0.0	3.00	12.75	-	3.80	-	-	6	288	293
Deadend	Deadend Insulator - 15 kV	NVE	38.00	-44.00	188.0	0.0	3.00	12.75	-	3.80	-	-	-16	288	271
Deadend	Deadend Insulator - 15 kV	NVE	38.00	44.00	352.0	180.0	3.00	12.75	-	3.80	-	-	16	288	304
Deadend	Deadend Insulator - 15 kV	NVE	38.00	15.00	337.6	180.0	3.00	12.75	-	3.80	-	-	6	288	293
Deadend	Deadend Insulator - 15 kV	NVE	38.00	-44.00	188.0	180.0	3.00	12.75	-	3.80	-	-	-17	288	271
Spool	Spool Insulator - 20 kV	NVE	32.25	4.99	180.0	180.0	1.00	2.12	-	2.50	-	-	-1	27	26
Bolt	Three Bolt	ZFS	21.67	6.02	180.0	180.0	5.00	0.00	-	3.00	-	-	-5	0	-5
Bolt	Three Bolt	COX	20.67	6.11	180.0	180.0	5.00	0.00	-	3.00	-	-	-5	0	-5
											Totals:	**0**	**0**	**1,753**	**1,752**

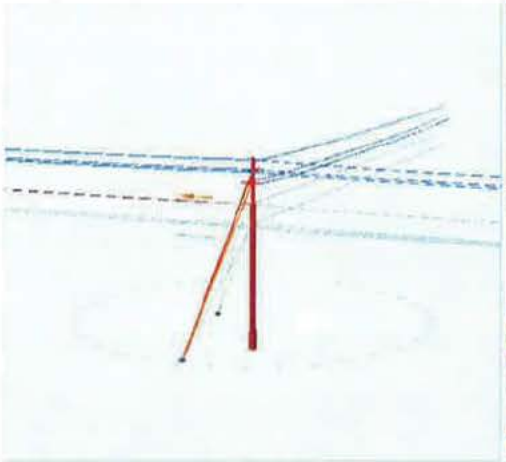
Pole Buckling

Buckling Constant	Buckling Column Unit (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 Unit (lbs)	Buckling Load Applied at Unit (lbs)	Buckling Load Factor of Safety
2.00	20.57	33.68	14.89	16.49	8.60	16.24	1,000,000	50.00	57.00	39.42	63,520	**3,371**	**18.84**

O-Calc® Pro *Analysis Report*

Friday, November 07, 2014 10:45:55 AM

File Name:	**2 - p75097 Propose**	Pole Length / Class:	**40.92 / 1**	Code:	**NESC**	Structure Type:	**Junction**
Pole Num:	**2 - p75097**	Pole Species:	**WESTERN RED CEDAR**	NESC Rule:	**Rule 250B**	Status:	**N/A**
Permit #:	**Unset**	Setting Depth (ft):	**7.00**	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):	**6,000**	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:	**253.5%**	0.0 ft	270.7°
Groundline:	**253.5%**	0.0 ft	270.7°
Vertical:	**0.6%**	19.8 ft	45.0°

Pole Moments		Load Angle	Wind Angle
Max Capac. Util:	**366,013 ft-lb**	273.4°	270.7°
Groundline:	**366,013 ft-lb**	273.4°	270.7°

Guys Capacity Summary: Inadequate

Guy Summary	Attach Height (ft)	**Guy Tensions % Allowable Tension**	Wind Angle	**Maximum Guy Tensions % Allowable Tension**	Wind Angle
Guy 1	30.8	**109.0%**	270.7°	**179.9%**	0.0°
Guy 2	29.4	**0.0%**	270.7°	**0.0%**	0.0°
Guy 3	28.6	**102.2%**	270.7°	**168.7%**	0.0°
Guy 4	20.1	**66.4%**	270.7°	**109.6%**	0.0°
Guy 5	19.6	**0.0%**	270.7°	**0.0%**	0.0°

Anchor Summary

	Lead Length (ft)	Lead Angle	**Max. % Allow. Capacity**
Anchor 1	31.9	180.0°	**111.6%**
Anchor 2	7.4	270.0°	**0.0%**

GROUNDLINE LOAD SUMMARY:*Wind at 270.7°, Applied Moment 366,013 ft-lb at 273.4°, 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:	12,120	90.8	**374,206**	94.3	**258.6**	**10,086**	757	4	**10,090**	**258.7**
Comms:	220	1.6	**4,410**	1.1	**3.0**	**119**	283	1	**120**	**3.1**
Guys/Braces:	36	0.3	**970**	0.2	**0.7**	**26**	27	0	**26**	**0.7**
Pole:	846	6.3	**13,179**	3.3	**9.1**	**355**	2,507	12	**367**	**9.4**
Crossarms:	58	0.4	**1,778**	0.4	**1.2**	**48**	84	0	**48**	**1.2**
Insulators:	71	0.5	**2,206**	0.6	**1.5**	**59**	69	0	**60**	**1.5**
Pole Load:	13,351	100.0	**396,749**	100.0	**274.2**	**10,694**	3,727	17	**10,711**	**274.6**
Pole Reserve Capacity:			**-252,057**		**-174.2**	**-6,794**			**-6,811**	**-174.6**

LOAD SUMMARY BY OWNER

NVE:	13,120	**392,120**	**10,569**	3,414	16	**10,585**	**271.4**
ZFS:	231	**4,630**	**125**	164	1	**126**	**3.2**
COX:	0	**-2**	**0**	149	1	**1**	**0.0**
Totals	13,351	**396,749**	**10,694**	3,727	17	**10,711**	**274.6**

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	33.42	17.83	1.1240	1.53	0.895	110.0	270.0	110.0	3,068	168,881	31	3	168,915
Primary	2/0 COPPER 7 STRAND	NVE	33.42	17.83	0.4137	1.75	0.411	142.0	90.0	142.0	1,180	-64,954	-19	1	-64,971
Primary	AAC 954.0 KCM 37 STRAND	NVE	33.00	17.87	1.1240	2.29	0.895	151.0	0.0	151.0	3,068	9,907	3	5,241	15,151
Primary	AAC 954.0 KCM 37 STRAND	NVE	31.27	20.80	1.1240	1.53	0.895	110.0	270.0	110.0	3,068	157,997	7	3	158,007
Primary	AAC 954.0 KCM 37 STRAND	NVE	31.27	20.80	1.1240	1.53	0.895	110.0	270.0	110.0	3,068	157,997	11	3	158,011
Primary	2/0 COPPER 7 STRAND	NVE	31.27	28.13	0.4137	1.75	0.411	142.0	90.0	142.0	1,180	-60,768	-14	1	-60,781
Primary	2/0 COPPER 7 STRAND	NVE	31.27	28.13	0.4137	1.75	0.411	142.0	90.0	142.0	1,180	-60,768	-13	1	-60,780
Primary	AAC 954.0 KCM 37 STRAND	NVE	28.49	20.73	1.1240	2.29	0.895	151.0	0.0	151.0	3,068	8,553	46	4,524	13,123
Primary	AAC 954.0 KCM 37 STRAND	NVE	28.49	20.73	1.1240	2.29	0.895	151.0	0.0	151.0	3,068	8,553	-44	4,524	13,033
Neutral	ACSR 2/0 AWG 6/1 QUAIL	NVE	24.42	8.19	0.4470	1.28	0.183	151.0	0.0	151.0	1,355	3,238	1	1,542	4,781
Secondary	TRIPLEX 2 AWG	NVE	24.42	8.19	0.8060	1.38	0.246	110.0	270.0	110.0	774	31,132	-1	1	31,133
Neutral	ACSR 2/0 AWG 6/1 QUAIL	NVE	24.25	8.21	0.4470	0.80	0.183	110.0	270.0	110.0	1,355	54,122	10	1	54,133
Neutral	2/0 COPPER 7 STRAND WP	NVE	24.25	8.21	0.4137	1.53	0.411	142.0	90.0	142.0	1,390	-55,519	-30	1	-55,548
											Totals:	**358,37**	**-12**	**15,848**	**374,206**

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	20.25	8.84	0.3125	1.42	0.205	110.0	270.0	110.0	1,500	50,031	-1	1	50,031
Telco	BELOPTIX DT144 - 144 FIBERS -	ZFS	20.22	9.00	0.7560	-	0.208	110.0	270.0	110.0		0	0	1	1
Telco	BELOPTIX DT288 - 288 FIBERS -	ZFS	20.21	8.69	0.8900	-	0.289	110.0	270.0	110.0		0	-2	1	-1
Overlashed	5/16" EHS	ZFS	20.25	8.84	0.3125	2.19	0.205	142.0	90.0	142.0	1,500	-50,031	-1	1	-50,030

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

² Worst Wind per Guy Wire
³ Wind at 270.7°

Telco	BELOPTIX DT144 - 144 FIBERS -	ZFS	20.22	9.00	0.7560	-	0.208	142.0	90.0	142.0		0	0	1	1
Telco	BELOPTIX DT288 - 288 FIBERS -	ZFS	20.21	8.69	0.8900	-	0.289	142.0	90.0	142.0		0	-2	1	-1
Telco	BELOPTIX DT096 - 72 FIBERS -	ZFS	20.08	8.86	0.5160	1.06	0.097	151.0	0.0	151.0	1,500	2,947	0	1,464	4,412
Overlashed	1/4" EHS	COX	19.58	8.91	0.2500	1.43	0.121	110.0	270.0	110.0	1,500	48,375	0	1	48,375
Telco	BELOPTIX DT144 - 144 FIBERS -	COX	19.55	9.06	0.7560	-	0.208	110.0	270.0	110.0		0	0	1	0
Telco	BELOPTIX DT288 - 288 FIBERS -	COX	19.55	8.75	0.8900	-	0.289	110.0	270.0	110.0		0	-2	1	-1
Telco	48ct Fiber	COX	19.50	8.91	0.5130	-	0.121	110.0	270.0	110.0		0	0	1	0
Overlashed	1/4" EHS	COX	19.58	8.91	0.2500	2.25	0.121	142.0	90.0	142.0	1,500	-48,375	-1	1	-48,375
Telco	BELOPTIX DT144 - 144 FIBERS -	COX	19.55	9.06	0.7560	-	0.208	142.0	90.0	142.0		0	0	1	0
Telco	BELOPTIX DT288 - 288 FIBERS -	COX	19.55	8.75	0.8900	-	0.289	142.0	90.0	142.0		0	-2	1	-2
Telco	48ct Fiber	COX	19.50	8.91	0.5130	-	0.121	142.0	90.0	142.0		0	-1	1	0
											Totals:	**2,947**	**-13**	**1,475**	**4,410**

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	31.36	7.03	90.0	90.0	28.00	4.50	3.50	-	48.00	-	-25	1,690	1,666
Normal	CROSSARM 3-1/2 X 4-1/2 X 4	NVE	28.58	7.30	180.0	180.0	28.00	4.50	3.50	-	48.00	-	-2	113	112
											Totals:	**0**	**-26**	**1,804**	**1,778**

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	5.08	270.0	270.0	3.00	12.75	-	3.80	-	-	7	253	259
Deadend	Deadend Insulator - 15 kV	NVE	33.42	5.08	90.0	90.0	3.00	12.75	-	3.80	-	-	-7	253	246
Deadend	Deadend Insulator - 15 kV	NVE	33.00	5.12	0.0	0.0	3.00	12.75	-	3.80	-	-	0	250	250
Deadend	Deadend Insulator - 15 kV	NVE	31.36	20.00	160.6	180.0	3.00	12.75	-	3.80	-	-	2	237	239
Deadend	Deadend Insulator - 15 kV	NVE	31.36	-20.00	19.4	180.0	3.00	12.75	-	3.80	-	-	3	237	240
Deadend	Deadend Insulator - 15 kV	NVE	31.36	20.00	160.6	0.0	3.00	12.75	-	3.80	-	-	-8	237	229
Deadend	Deadend Insulator - 15 kV	NVE	31.36	-20.00	19.4	0.0	3.00	12.75	-	3.80	-	-	-7	237	230
Deadend	Deadend Insulator - 15 kV	NVE	28.58	20.00	250.0	180.0	3.00	12.75	-	3.80	-	-	8	216	224
Deadend	Deadend Insulator - 15 kV	NVE	28.58	-20.00	110.0	180.0	3.00	12.75	-	3.80	-	-	-7	216	209
Spool	Spool Insulator - 20 kV	NVE	24.42	5.94	0.0	0.0	1.00	2.12	-	2.50	-	-	0	20	20
Spool	Spool Insulator - 20 kV	NVE	24.42	5.94	180.0	180.0	1.00	2.12	-	2.50	-	-	0	20	20
Spool	Spool Insulator - 20 kV	NVE	24.25	5.96	270.0	270.0	1.00	2.12	-	2.50	-	-	1	20	21
Spool	Spool Insulator - 20 kV	NVE	24.25	5.96	90.0	90.0	1.00	2.12	-	2.50	-	-	-1	20	19
Bolt	Three Bolt	ZFS	20.25	6.34	180.0	180.0	5.00	0.00	-	3.00	-	-	0	0	0
Bolt	Single Bolt	ZFS	20.08	6.36	0.0	0.0	5.00	0.00	-	3.00	-	-	0	0	0
Bolt	Three Bolt	COX	19.58	6.41	180.0	180.0	5.00	0.00	-	3.00	-	-	0	0	0
											Totals:	**0**	**-10**	**2,216**	**2,206**

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	30.75	0.00	31.92	0.312	75.0	180.0	43.9	0.205	44.00	4.08
Guy 2: EHS 7/16	Down	NVE	29.42	0.00	7.42	0.438	75.0	270.0	75.8	0.399	30.23	0.00

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

² Worst Wind per Guy Wire
³ Wind at 270.7°

Guy 3: EHS 5/16	Down	NVE	28.58	0.00	31.92	0.312	75.0	180.0	41.8	0.205	42.50	3.67
Guy 4: EHS 5/16	Down	ZFS	20.08	0.00	31.92	0.312	75.0	180.0	32.2	0.205	37.26	2.00
Guy 5: EHS 1/4	Down	COX	19.58	0.00	7.42	0.250	75.0	270.0	69.2	0.121	20.76	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[2] (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	18,129	10,987	10,214	7,086	7,356	-436	396
Guy 2: EHS 7/16	Down	23,000,000	20,800	0.90	18,720	700		0	0	0	0	0	0
Guy 3: EHS 5/16	Down	23,000,000	11,200	0.90	10,080	700	17,006	10,307	9,528	6,356	7,099	-421	355
Guy 4: EHS 5/16	Down	23,000,000	11,200	0.90	10,080	700	11,046	6,694	5,908	3,146	5,001	-297	219
Guy 5: EHS 1/4	Down	23,000,000	6,650	0.90	5,985	700		0	0	0	0	0	0
									Totals:	**16,588**	**19,456**	**-1,154**	**970**

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[2] (lbs)	Max Required Capacity[2] (%)
Single - 12" - Soil Class 4	NVE	0.00	31.92	180.0	25,000	1.00	25,000	27,891	25,562	111.6
Single - 12" - Soil Class 4	NVE	0.00	7.42	270.0	25,000	1.00	25,000		0	0.0

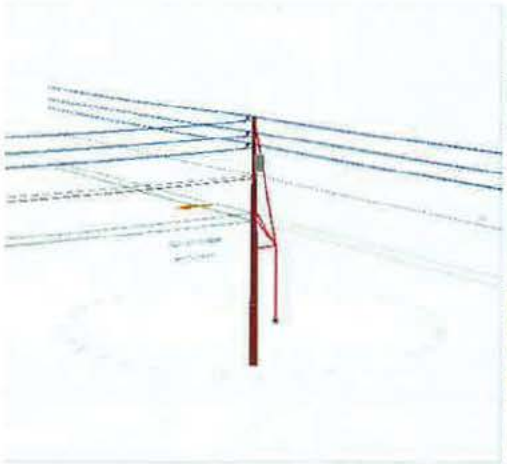
Pole Buckling

Buckling Constant	Buckling Column Hgt (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 Hgt (lbs)	Buckling Load Applied at Hgt (lbs)	Buckling Load Factor of Safety
0.71	19.83	33.43	15.29	10.00	10.08	16.56	1,000,000	50.00	57.00	33.92	607,291	**3,727**	**162.95**

O-Calc® Pro *Analysis Report*

Friday, November 07, 2014 11:23:22 AM

File Name:	**3 - p78474 Propose**	Pole Length / Class:	**50 / 1**	Code:	**NESC**	Structure Type:	**Junction**
Pole Num:	**3 - p78474**	Pole Species:	**WESTERN RED CEDAR**	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):	**54.00**	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:	**230.9%**	23.0 ft	91.2°
Groundline:	**210.8%**	0.0 ft	87.0°
Vertical:	**1.1%**	24.2 ft	90.0°

Pole Moments		Load Angle	Wind Angle
Max Capac. Util:	**139,486 ft-lb**	90.1°	91.2°
Groundline:	**341,554 ft-lb**	90.2°	87.0°

Guys Capacity Summary: Strut Fail

Guy Summary	Attach Height (ft)	**Guy Tensions % Allowable Tension**	Wind Angle	**Maximum Guy Tensions % Allowable Tension**	Wind Angle
Guy 1	39.4	**365.6%**	87.0°	**603.3%**	90.0°
Guy 2	22.7	**323.5%**	87.0°	**533.8%**	88.4°
Guy 3	21.2	**330.6%**	87.0°	**545.4%**	87.7°

Anchor Summary

	Lead Length (ft)	Lead Angle	**Max. % Allow. Capacity**
Anchor 1	5.0	270.0°	**347.8%**

Strut Summary

	Attach Height (ft)	Lead Angle	**% Allowed Capacity**
Strut 1	15.5	270.0°	**785.2%**

GROUNDLINE LOAD SUMMARY:*Wind at 87.0°, Applied Moment 341,554 ft-lb at 90.2°, 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:	19,286	74.6	**707,444**	83.3	**436.6**	**17,027**	609	3	**17,030**	**436.7**
Comms:	5,278	20.4	**115,779**	13.6	**71.5**	**2,787**	236	1	**2,788**	**71.5**
Guys/Braces:	0	0.0	**-17**	0.0	**0.0**	**0**	45	0	**0**	**0.0**
Power Equipment:	134	0.5	**4,409**	0.5	**2.7**	**106**	548	2	**108**	**2.8**
Pole:	1,005	3.9	**18,570**	2.2	**11.5**	**447**	2,931	13	**460**	**11.8**
Crossarms:	1	0.0	**40**	0.0	**0.0**	**1**	126	1	**2**	**0.0**
Risers:	83	0.3	**1,219**	0.1	**0.8**	**29**	28	0	**29**	**0.8**
Insulators:	51	0.2	**2,043**	0.2	**1.3**	**49**	112	0	**50**	**1.3**
Pole Load:	25,839	100.0	**849,488**	100.0	**524.3**	**20,446**	4,636	20	**20,466**	**524.8**
Pole Reserve Capacity:			**-687,451**		**-424.3**	**-16,546**			**-16,566**	**-424.8**

LOAD SUMMARY BY OWNER

NVE:	20,494	**732,815**	**17,638**	4,315	19	**17,656**	**452.7**
ZFS:	2,637	**59,823**	**1,440**	153	1	**1,441**	**36.9**
COX:	2,708	**56,850**	**1,368**	167	1	**1,369**	**35.1**
Totals	25,839	**849,488**	**20,446**	4,636	20	**20,466**	**524.8**

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	41.96	15.36	1.1240	1.18	0.895	89.0	180.0	89.0	3,068	719	76	3,938	4,734
Primary	AAC 954.0 KCM 37 STRAND	NVE	41.96	15.36	1.1240	0.96	0.895	75.0	0.0	75.0	3,068	-719	64	3,319	2,664
Primary	AAC 954.0 KCM 37 STRAND	NVE	40.91	28.11	1.1240	1.53	0.895	110.0	90.0	110.0	3,068	207,080	27	0	207,107
Primary	AAC 954.0 KCM 37 STRAND	NVE	39.04	15.66	1.1240	1.18	0.895	89.0	180.0	89.0	3,068	669	78	3,665	4,412
Primary	AAC 954.0 KCM 37 STRAND	NVE	39.04	15.66	1.1240	0.96	0.895	75.0	0.0	75.0	3,068	-669	66	3,068	2,485
Primary	AAC 954.0 KCM 37 STRAND	NVE	37.99	28.41	1.1240	1.53	0.895	110.0	90.0	110.0	3,068	192,299	29	0	192,328
Primary	AAC 954.0 KCM 37 STRAND	NVE	36.63	15.91	1.1240	1.18	0.895	89.0	180.0	89.0	3,068	628	79	3,439	4,146
Primary	AAC 954.0 KCM 37 STRAND	NVE	36.63	15.91	1.1240	0.96	0.895	75.0	0.0	75.0	3,068	-628	67	2,898	2,336
Primary	AAC 954.0 KCM 37 STRAND	NVE	35.58	28.66	1.1240	1.53	0.895	110.0	90.0	110.0	3,068	180,099	30	0	180,129
Neutral	ACSR 2/0 AWG 6/1 QUAIL	NVE	30.08	7.74	0.4470	0.58	0.183	89.0	180.0	89.0	1,355	228	-8	1,122	1,341
Neutral	ACSR 2/0 AWG 6/1 QUAIL	NVE	30.08	7.74	0.4470	0.45	0.183	75.0	0.0	75.0	1,355	-228	-7	945	711
Neutral	ACSR 2/0 AWG 6/1 QUAIL	NVE	30.08	7.74	0.4470	0.80	0.183	110.0	90.0	110.0	1,355	67,251	10	0	67,261
Secondary	TRIPLEX 2 AWG	NVE	29.58	7.79	0.8060	1.38	0.248	110.0	90.0	110.0	774	37,776	13	0	37,790
											Totals:	**684,50**	**525**	**22,415**	**707,444**

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	22.67	8.75	0.3125	0.22	0.205	75.0	0.0	75.0	1,500	-190	0	556	369
Overlashed	5/16" EHS	ZFS	22.67	8.75	0.3125	0.99	0.205	89.0	180.0	89.0	1,500	190	0	1,039	1,229

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

² Worst Wind per Guy Wire
³ Wind at 67.0°

Telco	BELOPTIX DT144 - 144 FIBERS -	ZFS	22.64	8.91	0.7560	-	0.208	89.0	180.0	89.0		0	0	1,038	1,037
Telco	BELOPTIX DT288 - 288 FIBERS -	ZFS	22.63	8.60	0.8900	-	0.289	89.0	180.0	89.0		0	1	1,037	1,038
Overlashed	5/16" EHS	ZFS	22.67	8.75	0.3125	1.42	0.205	110.0	90.0	110.0	1,500	56,108	12	0	56,120
Telco	BELOPTIX DT144 - 144 FIBERS -	ZFS	22.64	8.39	0.7560	-	0.208	110.0	90.0	110.0		0	12	0	12
Telco	BELOPTIX DT288 - 288 FIBERS -	ZFS	22.63	9.15	0.8900	-	0.289	110.0	90.0	110.0		0	18	0	18
Overlashed	1/4" EHS	COX	21.17	8.91	0.2500	0.13	0.121	75.0	0.0	75.0	1,500	-177	0	417	240
Overlashed	1/4" EHS	COX	21.17	8.91	0.2500	1.02	0.121	89.0	180.0	89.0	1,500	177	0	776	953
Telco	P3-750CA	COX	21.14	9.06	0.7500	-	0.161	89.0	180.0	89.0		0	0	775	774
Telco	BELOPTIX DT144 - 144 FIBERS -	COX	21.14	8.77	0.7560	-	0.208	89.0	180.0	89.0		0	0	775	775
Telco	BELOPTIX DT288 - 288 FIBERS -	COX	21.08	8.91	0.8900	-	0.289	89.0	180.0	89.0		0	0	772	772
Overlashed	1/4" EHS	COX	21.17	8.91	0.2500	1.43	0.121	110.0	90.0	110.0	1,500	52,395	7	0	52,403
Telco	BELOPTIX DT144 - 144 FIBERS -	COX	21.14	8.56	0.7560	-	0.208	110.0	90.0	110.0		0	12	0	12
Telco	BELOPTIX DT288 - 288 FIBERS -	COX	21.14	9.31	0.8900	-	0.289	110.0	90.0	110.0		0	19	0	19
Telco	48ct Fiber	COX	21.09	8.90	0.5130	-	0.121	110.0	90.0	110.0		0	7	0	7
											Totals:	**108,50**	**89**	**7,187**	**115,779**

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	32.92	22.19	0.0	0.0	365.00	39.00	-	22.00	-	-	-3	4,413	4,409
											Totals:	**0**	**-3**	**4,413**	**4,409**

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	41.00	5.11	0.0	0.0	28.00	4.50	-	0.00	-	-	0	14	14
Standoff	CROSSARM 3-1/2 X 4-1/2 X 4	NVE	38.08	5.41	0.0	0.0	28.00	4.50	-	0.00	-	-	0	13	13
Standoff	CROSSARM 3-1/2 X 4-1/2 X 4	NVE	35.67	5.66	0.0	0.0	28.00	4.50	-	0.00	-	-	0	13	12
											Totals:	**0**	**0**	**40**	**40**

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 280.0°	Riser	NVE	29.58	9.05	280.0	280.0	0.92	354.96	-	0.00	-	-	-8	333	325
Riser 30.0°	Riser	COX	20.17	9.05	30.0	30.0	0.63	242.04	-	0.00	-	-	3	892	894
											Totals:	**0**	**-5**	**1,224**	**1,219**

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	41.00	0.00	90.0	0.0	11.00	11.50	-	4.75	-	-	21	354	375
Deadend	Deadend Insulator - 15 kV	NVE	41.00	-6.00	90.0	90.0	3.00	12.75	-	3.80	-	-	11	310	321
Post	Post Insulator - 15 kV	NVE	38.08	0.00	90.0	0.0	11.00	11.50	-	4.75	-	-	22	329	351
Deadend	Deadend Insulator - 15 kV	NVE	38.08	-6.00	90.0	90.0	3.00	12.75	-	3.80	-	-	11	288	299
Post	Post Insulator - 15 kV	NVE	35.67	0.00	90.0	0.0	11.00	11.50	-	4.75	-	-	22	308	330
Deadend	Deadend Insulator - 15 kV	NVE	35.67	-6.00	90.0	90.0	3.00	12.75	-	3.80	-	-	11	270	281
Spool	Spool Insulator - 20 kV	NVE	30.08	5.49	270.0	270.0	1.00	2.12	-	2.50	-	-	-1	25	24

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

[2] Worst Wind per Guy Wire
[3] Wind at 87.0°

Spool	Spool Insulator - 20 kV	NVE	30.08	5.49	90.0	90.0	1.00	2.12	-	2.50	-	-	1	25	26
Spool	Spool Insulator - 20 kV	NVE	29.58	5.54	90.0	90.0	1.00	2.12	-	2.50	-	-	1	24	25
Bolt	Single Bolt	ZFS	22.67	6.25	0.0	0.0	5.00	0.00	-	3.00	-	-	0	0	0
Bolt	Single Bolt	ZFS	22.67	6.25	180.0	180.0	5.00	0.00	-	3.00	-	-	0	0	0
Bolt	Single Bolt	ZFS	22.67	6.25	90.0	90.0	5.00	0.00	-	3.00	-	-	5	0	5
Bolt	Single Bolt	COX	21.17	6.41	0.0	0.0	5.00	0.00	-	3.00	-	-	0	0	0
Bolt	Single Bolt	COX	21.17	6.41	180.0	180.0	5.00	0.00	-	3.00	-	-	0	0	0
Bolt	Single Bolt	COX	21.17	6.41	90.0	90.0	5.00	0.00	-	3.00	-	-	6	0	6
											Totals:	**0**	**108**	**1,934**	**2,043**

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	39.42	0.00	5.00	0.312	75.0	270.0	78.2	0.205	39.86	13.22
Guy 2: EHS 5/16	Sidewalk	ZFS	22.67	0.00	5.00	0.312	75.0	270.0	55.1	0.205	23.95	6.26
Guy 3: EHS 1/4	Sidewalk	COX	21.17	0.00	5.00	0.250	75.0	270.0	48.6	0.121	22.72	5.28

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	Sidewalk	23,000,000	11,200	0.90	10,080	700	60,812	36,856	36,855	36,075	7,541	-7,541	-6
Guy 2: EHS 5/16	Sidewalk	23,000,000	11,200	0.90	10,080	700	53,806	32,609	32,606	26,745	18,651	-18,651	-6
Guy 3: EHS 1/4	Sidewalk	23,000,000	6,650	0.90	5,985	700	32,643	19,784	19,782	14,837	13,084	-13,084	-6
									Totals:	**77,657**	**39,275**	**-39,275**	**-17**

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	5.00	270.0	25,000	1.00	25,000	86,945	86,939	347.8

Pole Buckling

Buckling Constant	Buckling Column Hgt (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 Hgt (lbs)	Buckling Load Applied at Hgt (lbs)	Buckling Load Factor of Safety
0.71	24.16	34.36	15.47	12.27	8.60	17.20	1,000,000	50.00	57.00	41.58	429,304	**4,636**	**92.61**

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

[2] Worst Wind per Guy Wire
[3] Wind at 87.0°

November 19, 2014 (Goodwill Industries, 2509 E Lake Mead Blvd, Lake Mead & Eastern)

Goodwill Industries, 2509 E Lake Mead Blvd, Lake Mead & Eastern

Grade B - light	1 - p88766		2 - p88767		3 - p88768		4 - p88769		5 - p88770	
	Existing	Proposed	Existing	Proposed	Existing	Proposed	Existing	Proposed	Existing	Proposed
Maximum Pole Capacity Utilization Percent	64.2%	64.2%	132.4%	132.4%	99.4%	99.4%	122.3%	122.9%	144.5%	145.6%

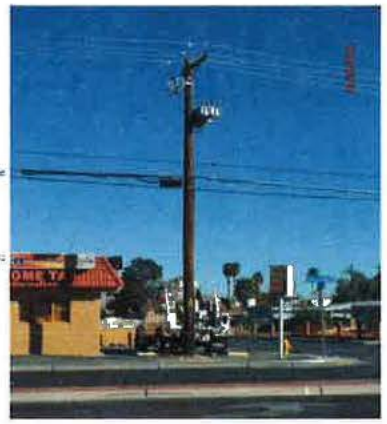
Grade B - light	6 - p88771		7 - p88772		8 - p88773		9 - p88774		10 - p40284	
	Existing	Proposed	Existing	Proposed	Existing	Proposed	Existing	Proposed	Existing	Proposed
Maximum Pole Capacity Utilization Percent	192.9%	195.4%	84.3%	84.8%	138.4%	138.9%	68.0%	68.4%	114.5%	114.7%

Grade B - light	11 - p66758		12 - p40282		13 - p40281		14 - p40280	
	Existing	Proposed	Existing	Proposed	Existing	Proposed	Existing	Proposed
Maximum Pole Capacity Utilization Percent	85.7%	86.2%	143.8%	144.1%	96.2%	96.3%	126.4%	127.0%

O-Calc® Pro *Analysis Report*

Tuesday, November 11, 2014 7:54:46 AM

File Name:	**P88766 GRADE B**	Pole Length / Class:	**45 / 1**	Code:	**NESC**	Structure Type:	**Unguyed**
Pole Num:	**P88766**	Pole Species:	**WESTERN RED CEDAR**	NESC Rule:	**Rule 250B**	Status:	**N/A**
Aux Data	**COX**	Setting Depth (ft):	**6.50**	Construction Grade:	**B**	Pole Strength Factor:	**0.65**
Aux Data	**LAKE MEAD &**	G/L Circumference (in):	**49.00**	Loading District:	**Light**	Transverse Wind LF:	**2.50**
Aux Data	**GOODWILL**	G/L Fiber Stress (psi):	**6,000**	Ice Thickness (in):	**0.00**	Wire Tension LF:	**1.10**
Aux Data	**2509 E LAKE MEAD**	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:	**64.2%**	0.0 ft	178.6°
Groundline:	**64.2%**	0.0 ft	178.6°
Vertical:	**15.1%**	24.7 ft	178.6°

Pole Moments		Load Angle	Wind Angle
Max Capac. Util:	**76,857 ft-lb**	176.6°	178.6°
Groundline:	**76,857 ft-lb**	176.6°	178.6°

GROUNDLINE LOAD SUMMARY:*Wind at 178.6°, Applied Moment 76,857 ft-lb at 176.6°, 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:	979	33.3	**34,801**	11.8	**7.5**	**1,121**	415	2	**1,123**	**28.8**
Comms:	875	29.8	**19,866**	13.0	**8.3**	**640**	585	3	**643**	**16.5**
Power Equipment:	135	4.6	**4,239**	5.5	**3.5**	**137**	1,650	9	**145**	**3.7**
Pole:	873	29.7	**15,177**	19.7	**12.5**	**489**	2,369	12	**501**	**12.9**
Crossarms:	8	0.3	**295**	0.2	**0.1**	**9**	159	1	**10**	**0.3**
Insulators:	67	2.3	**2,479**	0.6	**0.4**	**80**	96	1	**80**	**2.1**
Pole Load:	2,937	100.0	**76,857**	100.0	**63.5**	**2,476**	5,273	28	**2,503**	**64.2**
Pole Reserve Capacity:			**44,209**		**36.5**	**1,424**			**1,397**	**35.8**

LOAD SUMMARY BY OWNER

NVE:	981		**36,606**			**1,179**	2,230	12	**1,191**	**30.5**
ZFS:	208		**5,198**			**167**	75	0	**168**	**4.3**

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

² Worst Wind per Guy Wire
³ Wind at 178.6°

COX:	497	**11,647**	**375**	398	2	**377**	**9.7**
CTL:	378	**8,229**	**265**	202	1	**266**	**6.8**
Pole:	873	**15,177**	**489**	2,369	12	**501**	**12.9**
Totals	2,937	**76,857**	**2,476**	5,273	28	**2,503**	**64.2**

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	477 AAC	NVE	38.38	54.35	0.7950	-	0.447	172.0	90.0	172.0	1,540	3,887	261	4,914	9,061
Primary	477 AAC	NVE	38.38	54.35	0.7950	-	0.447	87.0	270.0	87.0	1,540	-3,887	132	2,486	-1,269
Primary	477 AAC	NVE	38.38	19.02	0.7950	-	0.447	172.0	90.0	172.0	1,540	3,887	-85	4,914	8,716
Primary	477 AAC	NVE	38.38	19.02	0.7950	-	0.447	87.0	270.0	87.0	1,540	-3,887	-43	2,486	-1,444
Primary	477 AAC	NVE	38.38	19.02	0.7950	-	0.447	172.0	90.0	172.0	1,540	3,887	88	4,914	8,889
Primary	477 AAC	NVE	38.38	19.02	0.7950	-	0.447	87.0	270.0	87.0	1,540	-3,887	45	2,486	-1,357
Primary	477 AAC	NVE	38.38	54.35	0.7950	-	0.447	172.0	90.0	172.0	1,540	3,887	-257	4,914	8,544
Primary	477 AAC	NVE	38.38	54.35	0.7950	-	0.447	87.0	270.0	87.0	1,540	-3,887	-130	2,486	-1,531
Other	288ct SELF SUPPORT	ZFS	24.70	8.05	0.8600	-	0.350	172.0	90.0	172.0	1,500	2,434	30	3,418	5,883
Other	288ct SELF SUPPORT	ZFS	24.70	8.05	0.8600	-	0.350	87.0	270.0	87.0	1,500	-2,434	15	1,729	-690
											Totals:	**0**	**56**	**34,745**	**34,801**

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 X 2, 432ct, 72ct X 2, 18ct X 3	COX	22.90	8.22	2.0500	-	2.010	172.0	90.0	172.5	1,500	2,257	177	7,554	9,988
CATV	.75"cx X 2, 432ct, 72ct X 2, 18ct X 3	COX	22.90	8.22	2.0500	-	2.010	87.0	270.0	87.1	1,500	-2,257	90	3,821	1,654
Telco	1.25" 5/16"MESS	CTL	21.40	8.35	1.5600	-	1.000	172.0	90.0	172.1	1,500	2,109	90	5,372	7,571
Telco	1.25" 5/16"MESS	CTL	21.40	8.35	1.5600	-	1.000	87.0	270.0	87.0	1,500	-2,109	45	2,717	653
											Totals:	**0**	**402**	**19,464**	**19,866**

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	29.80	31.09	90.0	90.0	1,100.00	18.00	39.00	-	48.00	-	218	4,021	4,239
											Totals:	**0**	**218**	**4,021**	**4,239**

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 10 -	NVE	37.40	6.15	90.0	90.0	66.00	4.50	3.50	-	120.00	-	3	154	157
Normal	CUTOUT BRACKET	NVE	34.40	6.42	270.0	270.0	40.00	4.50	3.50	-	72.00	-	-2	139	137
											Totals:	**0**	**1**	**294**	**295**

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)*
Pin	Pin Insulator - 15 kV	NVE	37.59	54.00	173.5	0.0	10.00	9.50	-	7.50	-	-	68	421	488
Pin	Pin Insulator - 15 kV	NVE	37.59	-18.00	18.9	0.0	10.00	9.50	-	7.50	-	-	-22	421	399
Pin	Pin Insulator - 15 kV	NVE	37.59	18.00	161.1	0.0	10.00	9.50	-	7.50	-	-	23	421	443
Pin	Pin Insulator - 15 kV	NVE	37.59	-54.00	6.5	0.0	10.00	9.50	-	7.50	-	-	-67	421	354

Deadend	CUTOUT	NVE	34.40	32.00	348.7	0.0	3.00	12.75	-	3.80	-	-	-12	260	248
Deadend	CUTOUT	NVE	34.40	0.00	270.0	0.0	3.00	12.75	-	3.80	-	-	0	260	260
Deadend	CUTOUT	NVE	34.40	-32.00	191.3	0.0	3.00	12.75	-	3.80	-	-	12	260	272
Bolt	Three Bolt	ZFS	24.70	5.55	180.0	90.0	5.00	0.00	-	3.00	-	-	5	0	5
Bolt	Three Bolt	COX	22.90	5.72	180.0	90.0	5.00	0.00	-	3.00	-	-	5	0	5
Bolt	Three Bolt	CTL	21.40	5.85	180.0	90.0	5.00	0.00	-	3.00	-	-	5	0	5
											Totals:	0	16	2,463	2,479

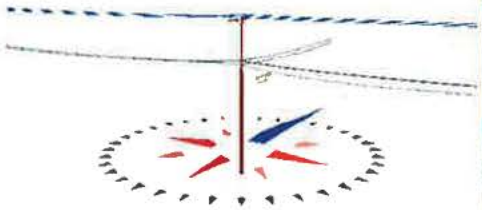
Pole Buckling

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	24.69	34.32	14.06	21.98	8.60	15.61	1,000,000	50.00	57.00	38.50	35,004	**5,273**	6.64

O-Calc® Pro *Analysis Report*

Tuesday, November 11, 2014 8:04:34 AM

File Name:	**P88767 GRADE B**	Pole Length / Class:	**45 / 4**	Code:	**NESC**	Structure Type:	**Unguyed**
Pole Num:	**P88767**	Pole Species:	**WESTERN RED CEDAR**	NESC Rule:	**Rule 250B**	Status:	**N/A**
Aux Data	**COX**	Setting Depth (ft):	**6.90**	Construction Grade:	**B**	Pole Strength Factor:	**0.65**
Aux Data	**LAKE MEAD &**	G/L Circumference (in):	**40.00**	Loading District:	**Light**	Transverse Wind LF:	**2.50**
Aux Data	**GOODWILL**	G/L Fiber Stress (psi):	**6,000**	Ice Thickness (in):	**0.00**	Wire Tension LF:	**1.10**
Aux Data	**2509 E LAKE MEAD**	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:	**132.4%**	0.0 ft	0.0°
Groundline:	**132.4%**	0.0 ft	0.0°
Vertical:	**14.6%**	23.2 ft	0.0°

Pole Moments		Load Angle	Wind Angle
Max Capac. Util:	**86,826 ft-lb**	359.9°	0.0°
Groundline:	**86,826 ft-lb**	359.9°	0.0°

GROUNDLINE LOAD SUMMARY:*Wind at 0.0°, Applied Moment 86,826 ft-lb at 359.9°, Allowable Moment 65,859 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:	776	23.4	**27,902**	4.2	**5.6**	**1,652**	329	3	**1,655**	**42.4**
Comms:	1,802	54.3	**45,275**	4.8	**6.3**	**2,681**	547	4	**2,685**	**68.9**
Pole:	694	20.9	**11,840**	13.6	**18.0**	**701**	1,516	12	**713**	**18.3**
Crossarms:	4	0.1	**147**	0.2	**0.2**	**9**	99	1	**9**	**0.2**
Insulators:	45	1.3	**1,661**	0.6	**0.7**	**98**	82	1	**99**	**2.5**
Pole Load:	3,320	100.0	**86,826**	100.0	**131.8**	**5,142**	2,573	20	**5,162**	**132.4**
Pole Reserve Capacity:			**-20,967**		**-31.8**	**-1,242**			**-1,262**	**-32.4**

LOAD SUMMARY BY OWNER

NVE:	660	**25,175**	**1,491**	434	3	**1,494**	**38.3**
ZFS:	165	**4,544**	**269**	61	0	**270**	**6.9**
COX:	952	**24,354**	**1,442**	352	3	**1,445**	**37.1**

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

² Worst Wind per Guy Wire
³ Wind at 178.6°

CTL:	850	**20,912**	**1,238**	209	2	**1,240**	**31.8**
Pole:	694	**11,840**	**701**	1,516	12	**713**	**18.3**
Totals	3,320	**86,826**	**5,142**	2,573	20	**5,162**	**132.4**

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	477 AAC	NVE	38.18	54.25	0.7950	-	0.447	118.0	270.0	118.0	1,540	139	178	3,361	3,678
Primary	477 AAC	NVE	38.18	54.25	0.7950	-	0.447	87.0	90.0	87.0	1,540	-139	131	2,478	2,470
Primary	477 AAC	NVE	38.18	18.73	0.7950	-	0.447	118.0	270.0	118.0	1,540	139	-59	3,361	3,441
Primary	477 AAC	NVE	38.18	18.73	0.7950	-	0.447	87.0	90.0	87.0	1,540	-139	-44	2,478	2,295
Primary	477 AAC	NVE	38.18	18.73	0.7950	-	0.447	118.0	270.0	118.0	1,540	139	59	3,361	3,559
Primary	477 AAC	NVE	38.18	18.73	0.7950	-	0.447	87.0	90.0	87.0	1,540	-139	44	2,478	2,382
Primary	477 AAC	NVE	38.18	54.25	0.7950	-	0.447	118.0	270.0	118.0	1,540	139	-178	3,361	3,322
Primary	477 AAC	NVE	38.18	54.25	0.7950	-	0.447	87.0	90.0	87.0	1,540	-139	-131	2,478	2,207
Other	288ct SELF SUPPORT	ZFS	27.70	6.67	0.8600	-	0.350	87.0	90.0	87.0	1,500	-98	-13	1,943	1,832
Other	288ct SELF SUPPORT	ZFS	27.70	6.67	0.8600	-	0.350	118.0	270.0	118.0	1,500	98	-17	2,635	2,716
											Totals:	**0**	**-30**	**27,932**	**27,902**

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 X 2, 432ct, 72ct X 2, 18ct X 3	COX	25.80	6.82	2.0500	-	2.010	87.0	90.0	87.1	1,500	-92	-75	4,314	4,148
CATV	.75"cx X 2, .50"cx, 432ct, 72ct X 2,	COX	25.80	6.82	2.1200	-	2.018	118.0	270.0	118.2	1,500	92	-101	6,051	6,041
CATV	.75"cx, .50"cx, 18ct 1/4" MESS	COX	25.80	6.82	1.2500	-	0.730	64.0	0.0	64.0	500	14,190	-20	0	14,170
Telco	1.25" 5/16"MESS	CTL	24.75	6.90	1.5600	-	1.000	87.0	90.0	87.3	1,500	-88	-38	3,149	3,024
Telco	1.25" 5/16"MESS	CTL	24.75	6.90	1.5600	-	1.000	118.0	270.0	118.0	1,500	88	-51	4,271	4,308
Telco	1.25" 1/4" MESS (SLACK)	CTL	24.75	6.90	1.5000	-	1.000	64.0	0.0	64.1	500	13,612	-28	0	13,585
											Totals:	**27,802**	**-312**	**17,785**	**45,275**

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 10 -	NVE	37.20	5.16	270.0	270.0	66.00	4.50	3.50	-	120.00	-	0	146	147
											Totals:	**0**	**0**	**146**	**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)*
Pin	Pin Insulator - 15 kV	NVE	37.39	54.00	354.5	0.0	10.00	9.50	-	7.50	-	-	68	419	486
Pin	Pin Insulator - 15 kV	NVE	37.39	-18.00	196.0	0.0	10.00	9.50	-	7.50	-	-	-22	419	396
Pin	Pin Insulator - 15 kV	NVE	37.39	18.00	344.0	0.0	10.00	9.50	-	7.50	-	-	23	419	441
Pin	Pin Insulator - 15 kV	NVE	37.39	-54.00	185.5	0.0	10.00	9.50	-	7.50	-	-	-67	419	351
Bolt	Three Bolt	ZFS	27.70	4.17	180.0	90.0	5.00	0.00	-	3.00	-	-	-4	0	-4
Bolt	Three Bolt	COX	25.80	4.32	180.0	90.0	5.00	0.00	-	3.00	-	-	-4	0	-4
Bolt	Three Bolt	CTL	24.75	4.40	180.0	90.0	5.00	0.00	-	3.00	-	-	-4	0	-4
											Totals:	**0**	**-13**	**1,674**	**1,661**

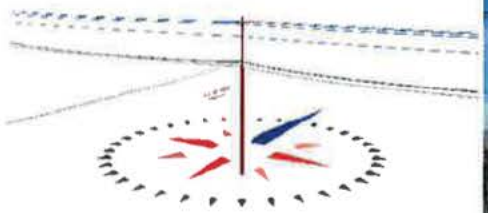
Pole Buckling

Buckling Constant	Buckling Column 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 of Safety
2.00	23.19	34.34	11.47	15.00	6.69	12.74	1,000,000	50.00	57.00	38.10	17,583	**2,573**	**6.83**

O-Calc® Pro *Analysis Report*

Tuesday, November 11, 2014 8:06:57 AM

File Name:	**P88768 GRADE B**	Pole Length / Class:	**45 / 4**	Code:	**NESC**	Structure Type:	**Unguyed**
Pole Num:	**P88768**	Pole Species:	**WESTERN RED CEDAR**	NESC Rule:	**Rule 250B**	Status:	**N/A**
Aux Data	**COX**	Setting Depth (ft):	**6.70**	Construction Grade:	**B**	Pole Strength Factor:	**0.65**
Aux Data	**LAKE MEAD &**	G/L Circumference (in):	**41.50**	Loading District:	**Light**	Transverse Wind LF:	**2.50**
Aux Data	**GOODWILL**	G/L Fiber Stress (psi):	**6,000**	Ice Thickness (in):	**0.00**	Wire Tension LF:	**1.10**
Aux Data	**2509 E LAKE MEAD**	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:	**99.4%**	0.0 ft	180.0°
Groundline:	**99.4%**	0.0 ft	180.0°
Vertical:	**11.4%**	22.1 ft	180.0°

Pole Moments		Load Angle	Wind Angle
Max Capac. Util:	**72,747 ft-lb**	179.9°	180.0°
Groundline:	**72,747 ft-lb**	179.9°	180.0°

GROUNDLINE LOAD SUMMARY:*Wind at 180.0°, Applied Moment 72,747 ft-lb at 179.9°, Allowable Moment 73,549 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:	776	27.7	**26,373**	4.5	**4.5**	**1,398**	329	2	**1,401**	**35.9**
Comms:	1,257	44.9	**32,357**	8.5	**8.4**	**1,716**	484	4	**1,719**	**44.1**
Pole:	714	25.5	**12,184**	16.7	**16.6**	**646**	1,606	12	**658**	**16.9**
Crossarms:	4	0.1	**144**	0.2	**0.2**	**8**	99	1	**8**	**0.2**
Insulators:	46	1.7	**1,690**	0.4	**0.4**	**90**	51	0	**90**	**2.3**
Pole Load:	2,798	100.0	**72,747**	100.0	**98.9**	**3,857**	2,568	19	**3,876**	**99.4**
Pole Reserve Capacity:			**802**		**1.1**	**43**			**24**	**0.6**

LOAD SUMMARY BY OWNER

NVE:	661	**23,585**	**1,251**	402	3	**1,254**	**32.1**
ZFS:	165	**4,613**	**245**	61	0	**245**	**6.3**
COX:	957	**24,896**	**1,320**	337	2	**1,323**	**33.9**

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

² Worst Wind per Guy Wire
³ Wind at 178.6°

CTL:	300	**7,470**	**396**	161	1	**397**	**10.2**
Pole:	714	**12,184**	**646**	1,606	12	**658**	**16.9**
Totals	2,798	**72,747**	**3,857**	2,568	19	**3,876**	**99.4**

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	477 AAC	NVE	36.51	56.92	0.7950	-	0.447	118.0	90.0	118.0	1,540	55	11	3,211	3,277
Primary	477 AAC	NVE	36.51	25.45	0.7950	-	0.447	118.0	90.0	118.0	1,540	55	-8	3,211	3,258
Primary	477 AAC	NVE	36.51	56.92	0.7950	-	0.447	118.0	90.0	118.0	1,540	55	-11	3,211	3,255
Primary	477 AAC	NVE	36.51	54.52	0.7950	-	0.447	87.0	270.0	87.0	1,540	-55	8	2,367	2,321
Primary	477 AAC	NVE	36.51	19.50	0.7950	-	0.447	87.0	270.0	87.0	1,540	-55	-8	2,367	2,304
Primary	477 AAC	NVE	36.51	54.52	0.7950	-	0.447	87.0	270.0	87.0	1,540	-55	-8	2,367	2,304
Other	288ct SELF SUPPORT	ZFS	27.70	6.75	0.8600	-	0.350	118.0	90.0	118.0	1,500	41	17	2,635	2,693
Other	288ct SELF SUPPORT	ZFS	27.70	6.75	0.8600	-	0.350	87.0	270.0	87.0	1,500	-41	13	1,943	1,915
Primary	477 AAC	NVE	32.80	6.06	0.7950	-	0.447	118.0	90.0	118.0	1,540	49	20	2,885	2,954
Primary	477 AAC	NVE	32.80	6.06	0.7950	-	0.447	87.0	270.0	87.0	1,540	-49	15	2,127	2,092
											Totals:	**0**	**49**	**26,324**	**26,373**

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 X 2, .50"cx, 432ct, 72ct X 2,	COX	25.80	6.91	2.1200	-	2.018	118.0	90.0	118.2	1,500	38	103	6,051	6,191
CATV	.75"cx X 2, .50"cx, 432ct, 72ct X 2,	COX	25.80	6.91	2.1200	-	2.018	87.0	270.0	87.1	1,500	-38	76	4,461	4,499
CATV	.50"cx 1/4" MESS (SLACK)	COX	25.80	6.91	0.7500	-	0.271	97.0	180.0	97.0	500	14,190	11	0	14,201
Telco	1.25" 5/16"MESS	CTL	24.60	7.01	1.5600	-	1.000	118.0	90.0	118.2	1,500	36	52	4,245	4,333
Telco	1.25" 5/16"MESS	CTL	24.60	7.01	1.5600	-	1.000	87.0	270.0	87.0	1,500	-36	38	3,130	3,132
											Totals:	**14,190**	**280**	**17,887**	**32,357**

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 10 -	NVE	36.60	5.24	90.0	90.0	66.00	4.50	3.50	-	120.00	-	0	144	144
											Totals:	**0**	**0**	**144**	**144**

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	36.60	54.00	174.5	0.0	3.00	12.75	-	3.80	-	-	20	277	297
Deadend	Deadend Insulator - 15 kV	NVE	36.60	-18.00	16.2	0.0	3.00	12.75	-	3.80	-	-	-7	277	270
Deadend	Deadend Insulator - 15 kV	NVE	36.60	-54.00	5.5	0.0	3.00	12.75	-	3.80	-	-	-20	277	257
Deadend	Deadend Insulator - 15 kV	NVE	36.60	54.00	174.5	180.0	3.00	12.75	-	3.80	-	-	20	277	297
Deadend	Deadend Insulator - 15 kV	NVE	36.60	-18.00	16.2	180.0	3.00	12.75	-	3.80	-	-	-7	277	270
Deadend	Deadend Insulator - 15 kV	NVE	36.60	-54.00	5.5	180.0	3.00	12.75	-	3.80	-	-	-20	277	257
Bolt	Three Bolt	ZFS	27.70	4.25	180.0	90.0	5.00	0.00	-	3.00	-	-	4	0	4
Bolt	Three Bolt	COX	25.80	4.41	180.0	90.0	5.00	0.00	-	3.00	-	-	4	0	4
Bolt	Three Bolt	CTL	24.60	4.51	180.0	90.0	5.00	0.00	-	3.00	-	-	4	0	4
Spool	Spool Insulator - 20 kV	NVE	32.80	3.81	180.0	180.0	1.00	2.12	-	2.50	-	-	1	27	28

Totals:	0	0	1,690	1,690

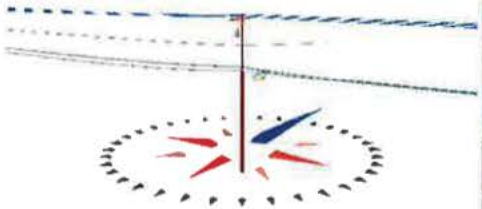
Pole Buckling

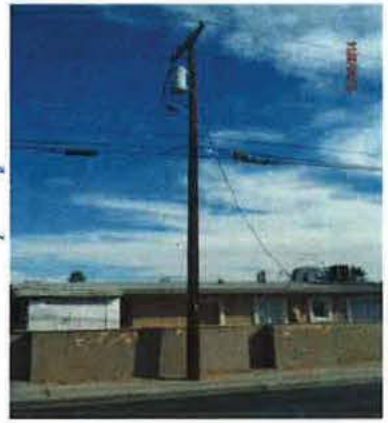
Buckling Constant	Buckling Column Unit (ft)	Buckling Section Height (% Buckling Col. Hgt.)	Buckling Section Diam. (in)	Min. Buckling Diam. at Ch. (in)	Diameter at Tip (in)	Diameter at Ch. (in)	Modulus of Elasticity (psi)	Pole Density (pcf)	Ice Density (pcf)	Pole Tip Height (ft)	Buckling Load Capacity at Unit (lbs)	Buckling Load Applied at Unit (lbs)	Buckling Load Factor of Safety
2.00	22.10	34.28	11.92	14.70	6.69	13.22	1,000,000	50.00	57.00	38.30	22,583	**2,568**	**8.79**

O-Calc® Pro *Analysis Report*

Tuesday, November 11, 2014 8:09:53 AM

File Name:	**P88769 GRADE B**	Pole Length / Class:	**45 / 4**	Code:	**NESC**	Structure Type:	**Unguyed**
Pole Num:	**P88769**	Pole Species:	**WESTERN RED CEDAR**	NESC Rule:	**Rule 250B**	Status:	**N/A**
Aux Data	**COX**	Setting Depth (ft):	**6.30**	Construction Grade:	**B**	Pole Strength Factor:	**0.65**
Aux Data	**LAKE MEAD &**	G/L Circumference (in):	**39.50**	Loading District:	**Light**	Transverse Wind LF:	**2.50**
Aux Data	**GOODWILL**	G/L Fiber Stress (psi):	**6,000**	Ice Thickness (in):	**0.00**	Wire Tension LF:	**1.10**
Aux Data	**2509 E LAKE MEAD**	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:	**122.9%**	0.0 ft	355.6°
Groundline:	**122.9%**	0.0 ft	355.6°
Vertical:	**24.9%**	25.7 ft	355.6°

Pole Moments		Load Angle	Wind Angle
Max Capac. Util:	**77,500 ft-lb**	347.5°	355.6°
Groundline:	**77,500 ft-lb**	347.5°	355.6°

GROUNDLINE LOAD SUMMARY:*Wind at 355.6°, Applied Moment 77,500 ft-lb at 347.5°, Allowable Moment 63,420 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:	1,323	46.3	**43,990**	22.6	**27.6**	**2,705**	358	3	**2,708**	**69.4**
Comms:	713	24.9	**16,701**	-6.0	**-7.3**	**1,027**	463	4	**1,031**	**26.4**
Power Equipment:	78	2.7	**2,853**	3.7	**4.5**	**175**	738	6	**181**	**4.7**
Pole:	692	24.2	**12,020**	15.5	**19.0**	**739**	1,513	12	**751**	**19.3**
Crossarms:	6	0.2	**235**	0.3	**0.4**	**14**	99	1	**15**	**0.4**
Insulators:	46	1.6	**1,700**	0.6	**0.8**	**105**	86	1	**105**	**2.7**
Pole Load:	2,857	100.0	**77,500**	100.0	**122.2**	**4,766**	3,257	26	**4,792**	**122.9**
Pole Reserve Capacity:			**-14,080**		**-22.2**	**-866**			**-892**	**-22.9**

LOAD SUMMARY BY OWNER

NVE:	1,290	**44,691**	**2,748**	1,203	10	**2,758**	**70.7**
ZFS:	163	**4,096**	**252**	62	1	**252**	**6.5**

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

² Worst Wind per Guy Wire
³ Wind at 178.6°

COX:	360	**8,618**	**530**	251	2	**532**	**13.6**
CTL:	352	**8,075**	**497**	227	2	**498**	**12.8**
Pole:	692	**12,020**	**739**	1,513	12	**751**	**19.3**
Totals	2,857	**77,500**	**4,766**	3,257	26	**4,792**	**122.9**

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	477 AAC	NVE	38.18	54.25	0.7950	-	0.447	121.0	270.0	121.0	1,540	13,993	182	3,355	17,530
Primary	477 AAC	NVE	38.18	54.25	0.7950	-	0.447	87.0	90.0	87.0	1,540	-13,993	131	2,412	-11,450
Primary	477 AAC	NVE	38.18	18.74	0.7950	-	0.447	121.0	270.0	121.0	1,540	13,993	-56	3,355	17,292
Primary	477 AAC	NVE	38.18	18.74	0.7950	-	0.447	87.0	90.0	87.0	1,540	-13,993	-40	2,412	-11,621
Primary	477 AAC	NVE	38.18	18.74	0.7950	-	0.447	121.0	270.0	121.0	1,540	13,993	63	3,355	17,411
Primary	477 AAC	NVE	38.18	18.74	0.7950	-	0.447	87.0	90.0	87.0	1,540	-13,993	45	2,412	-11,535
Primary	477 AAC	NVE	38.18	54.25	0.7950	-	0.447	121.0	270.0	121.0	1,540	13,993	-174	3,355	17,173
Primary	477 AAC	NVE	38.18	54.25	0.7950	-	0.447	87.0	90.0	87.0	1,540	-13,993	-125	2,412	-11,706
Other	288ct SELF SUPPORT	ZFS	25.30	6.86	0.8600	-	0.350	87.0	90.0	87.0	1,500	-9,024	-13	1,728	-7,309
Other	288ct SELF SUPPORT	ZFS	25.30	6.86	0.8600	-	0.350	121.0	270.0	121.0	1,500	9,024	-18	2,403	11,409
Secondary	#2 AL TPX	NVE	30.20	6.24	0.6400	-	0.237	121.0	270.0	121.0	761	5,465	2	2,134	7,602
Service	#4 AL TPX (SLACK)	NVE	30.20	6.24	0.6400	-	0.180	23.0	45.0	23.0	500	8,928	0	267	9,195
											Totals:	**14,393**	**-2**	**29,599**	**43,990**

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 X 2, .50"cx, 432ct, 72ct X 2,	COX	24.30	6.94	2.1200	-	2.018	87.0	90.0	87.1	1,500	-8,667	-74	4,090	-4,651
CATV	.50"cx X 2, 432ct, 72ct, 18ct 1/4"	COX	24.30	6.94	1.7400	-	1.234	121.0	270.0	121.1	1,500	8,667	-63	4,669	13,273
Telco	1.25" 1/4" MESS	CTL	23.30	7.01	1.5000	-	1.000	87.0	90.0	87.0	1,500	-8,311	-37	2,775	-5,573
Telco	1.25" 288ct 1/4"MESS	CTL	23.30	7.01	2.1100	-	1.700	121.0	270.0	121.1	1,500	8,311	-88	5,429	13,652
											Totals:	**0**	**-263**	**16,964**	**16,701**

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	37.5 KVA	NVE	33.40	18.75	270.0	270.0	492.00	28.00	-	18.00	-	-	249	2,604	2,853
											Totals:	**0**	**249**	**2,604**	**2,853**

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 10 -	NVE	37.20	5.21	270.0	270.0	66.00	4.50	3.50	-	120.00	-	9	225	235
											Totals:	**0**	**9**	**225**	**235**

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)*
Pin	Pin Insulator - 15 kV	NVE	37.39	54.00	354.5	0.0	10.00	9.50	-	7.50	-	-	67	414	482
Pin	Pin Insulator - 15 kV	NVE	37.39	-18.00	196.1	0.0	10.00	9.50	-	7.50	-	-	-21	414	394
Pin	Pin Insulator - 15 kV	NVE	37.39	18.00	343.9	0.0	10.00	9.50	-	7.50	-	-	23	414	438

Pin	Pin Insulator - 15 kV	NVE	37.39	-54.00	185.5	0.0	10.00	9.50	-	7.50	-	-	-64	414	350
Bolt	Three Bolt	ZFS	25.30	4.36	180.0	90.0	5.00	0.00	-	3.00	-	-	-4	0	-4
Bolt	Three Bolt	COX	24.30	4.44	180.0	90.0	5.00	0.00	-	3.00	-	-	-4	0	-4
Bolt	Three Bolt	CTL	23.30	4.51	180.0	90.0	5.00	0.00	-	3.00	-	-	-4	0	-4
Spool	Spool Insulator - 20 kV	NVE	30.20	3.99	270.0	180.0	1.00	2.12	-	2.50	-	-	0	25	25
Spool	Spool Insulator - 20 kV	NVE	30.20	3.99	90.0	0.0	1.00	2.12	-	2.50	-	-	0	25	25
											Totals:	0	-7	1,707	1,700

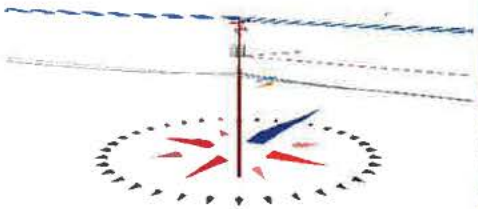
Pole Buckling

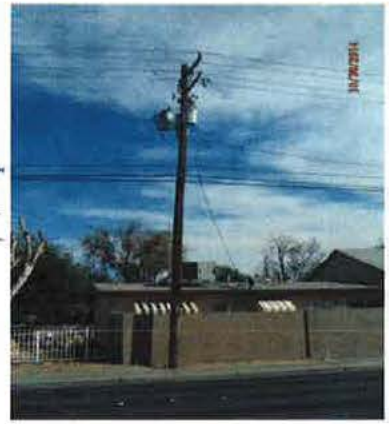
Buckling Constant	Buckling Column Hgt. (ft)	Buckling Section Height (% Buckling Col. Hgt.)	Buckling Section Diam. (in)	Min. Buckling Diam. at Gl. (in)	Diameter at Tip (in)	Diameter at Gl. (in)	Modulus of Elasticity (psi)	Pole Density (pcf)	Ice Density (pcf)	Pole Tip Height (ft)	Buckling Load Capacity at Hgt. (lbs)	Buckling Load Applied at Hgt. (lbs)	Buckling Load Factor of Safety
2.00	25.71	34.67	11.22	17.61	6.69	12.58	1,000,000	50.00	57.00	38.70	13,090	**3,257**	**4.02**

O-Calc® Pro *Analysis Report*

Tuesday, November 11, 2014 8:13:10 AM

File Name:	**P88770 GRADE B**	Pole Length / Class:	**45 / 4**	Code:	**NESC**	Structure Type:	**Unguyed**
Pole Num:	**P88770**	Pole Species:	**WESTERN RED CEDAR**	NESC Rule:	**Rule 250B**	Status:	**N/A**
Aux Data	**COX**	Setting Depth (ft):	**7.60**	Construction Grade:	**B**	Pole Strength Factor:	**0.65**
Aux Data	**LAKE MEAD &**	G/L Circumference (in):	**41.50**	Loading District:	**Light**	Transverse Wind LF:	**2.50**
Aux Data	**GOODWILL**	G/L Fiber Stress (psi):	**6,000**	Ice Thickness (in):	**0.00**	Wire Tension LF:	**1.10**
Aux Data	**2509 E LAKE MEAD**	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:	**145.6%**	0.0 ft	7.0°
Groundline:	**145.6%**	0.0 ft	7.0°
Vertical:	**28.7%**	25.4 ft	7.0°

Pole Moments		Load Angle	Wind Angle
Max Capac. Util:	**106,177 ft-lb**	18.5°	7.0°
Groundline:	**106,177 ft-lb**	18.5°	7.0°

GROUNDLINE LOAD SUMMARY:*Wind at 7.0°, Applied Moment 106,177 ft-lb at 18.5°, Allowable Moment 73,549 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:	1,957	48.9	**61,421**	21.9	**31.6**	**3,257**	513	4	**3,261**	**83.6**
Comms:	885	22.1	**19,363**	15.0	**21.7**	**1,027**	509	4	**1,030**	**26.4**
Power Equipment:	394	9.8	**11,008**	3.3	**4.7**	**584**	1,642	12	**596**	**15.3**
Pole:	684	17.1	**11,387**	10.7	**15.5**	**604**	1,568	11	**615**	**15.8**
Crossarms:	16	0.4	**586**	0.3	**0.5**	**31**	159	1	**32**	**0.8**
Insulators:	67	1.7	**2,412**	0.3	**0.5**	**128**	98	1	**129**	**3.3**
Pole Load:	4,003	100.0	**106,177**	100.0	**144.4**	**5,630**	4,489	33	**5,663**	**145.2**
Pole Reserve Capacity:			**-32,628**		**-44.4**	**-1,730**			**-1,763**	**-45.2**

LOAD SUMMARY BY OWNER

NVE:	2,203		**70,016**			**3,713**	2,309	17	**3,729**	**95.6**
ZFS:	231		**5,419**			**287**	87	1	**288**	**7.4**

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

² Worst Wind per Guy Wire
³ Wind at 178.6°

COX:	467	**10,387**	**551**	289	2	**553**	**14.2**
CTL:	419	**8,968**	**476**	236	2	**477**	**12.2**
Pole:	684	**11,387**	**604**	1,568	11	**615**	**15.8**
Totals	4,003	**106,177**	**5,630**	4,489	33	**5,663**	**145.2**

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	477 AAC	NVE	37.58	54.25	0.7950	-	0.447	121.0	90.0	121.0	1,540	20,196	-168	3,193	23,221
Primary	477 AAC	NVE	37.58	54.25	0.7950	-	0.447	183.0	270.0	183.0	1,540	-20,196	-253	4,829	-15,621
Primary	477 AAC	NVE	37.58	18.73	0.7950	-	0.447	121.0	90.0	121.0	1,540	20,196	63	3,193	23,452
Primary	477 AAC	NVE	37.58	18.73	0.7950	-	0.447	183.0	270.0	183.0	1,540	-20,196	96	4,829	-15,272
Primary	477 AAC	NVE	37.58	18.73	0.7950	-	0.447	121.0	90.0	121.0	1,540	20,196	-52	3,193	23,337
Primary	477 AAC	NVE	37.58	18.73	0.7950	-	0.447	183.0	270.0	183.0	1,540	-20,196	-79	4,829	-15,446
Primary	477 AAC	NVE	37.58	54.25	0.7950	-	0.447	121.0	90.0	121.0	1,540	20,196	179	3,193	23,567
Primary	477 AAC	NVE	37.58	54.25	0.7950	-	0.447	183.0	270.0	183.0	1,540	-20,196	270	4,829	-15,097
Other	288ct SELF SUPPORT	ZFS	23.70	7.04	0.8600	-	0.350	121.0	90.0	121.0	1,500	12,395	-18	2,176	14,554
Other	288ct SELF SUPPORT	ZFS	23.70	7.04	0.8600	-	0.350	183.0	270.0	183.0	1,500	-12,395	-27	3,292	-9,130
Secondary	#2 AL TPX	NVE	27.30	6.47	0.6400	-	0.237	121.0	90.0	121.0	761	7,244	4	1,866	9,113
Service	#2 AL TPX (SLACK)	NVE	27.30	6.47	0.7600	-	0.270	19.0	30.0	19.0	500	14,713	1	29	14,742
											Totals:	**21,956**	**16**	**39,449**	**61,421**

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, 432ct, 72ct, 18ct 1/4"	COX	22.60	7.13	1.7400	-	1.234	121.0	90.0	121.1	1,500	11,820	-63	4,199	15,956
CATV	.50"cx X 2, 432ct, 72ct, 18ct 1/4"	COX	22.60	7.13	1.7400	-	1.234	183.0	270.0	183.2	1,500	-11,820	-95	6,351	-5,565
Telco	1.25" 5/16"MESS	CTL	21.75	7.21	1.5600	-	1.000	121.0	90.0	121.0	1,500	11,375	-52	3,623	14,947
Telco	1.25" 5/16"MESS	CTL	21.75	7.21	1.5600	-	1.000	183.0	270.0	183.0	1,500	-11,375	-78	5,479	-5,974
											Totals:	**0**	**-289**	**19,652**	**19,363**

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	28.70	21.10	270.0	270.0	365.00	39.00	-	22.00	-	-	-305	3,771	3,466
Transformer	1PH-25KVA	NVE	28.70	21.10	0.0	0.0	365.00	39.00	-	22.00	-	-	913	3,771	4,684
Transformer	1PH-25KVA	NVE	28.70	21.10	180.0	180.0	365.00	39.00	-	22.00	-	-	-913	3,771	2,858
											Totals:	**0**	**-305**	**11,313**	**11,008**

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 10 -	NVE	36.60	5.16	90.0	90.0	66.00	4.50	3.50	-	120.00	-	13	327	341
Normal	CUTOUT BRACKET	NVE	34.50	5.35	90.0	90.0	40.00	4.50	3.50	-	72.00	-	8	236	245
											Totals:	**0**	**22**	**564**	**586**

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)*

Pin	Pin Insulator - 15 kV	NVE	36.79	54.00	174.5	0.0	10.00	9.50	-	7.50	-	-	-62	404	342
Pin	Pin Insulator - 15 kV	NVE	36.79	-18.00	16.0	0.0	10.00	9.50	-	7.50	-	-	23	404	427
Pin	Pin Insulator - 15 kV	NVE	36.79	18.00	164.0	0.0	10.00	9.50	-	7.50	-	-	-19	404	384
Pin	Pin Insulator - 15 kV	NVE	36.79	-54.00	5.5	0.0	10.00	9.50	-	7.50	-	-	66	404	470
Bolt	Three Bolt	ZFS	23.70	4.54	180.0	90.0	5.00	0.00	-	3.00	-	-	-4	0	-4
Bolt	Three Bolt	COX	22.60	4.63	180.0	90.0	5.00	0.00	-	3.00	-	-	-4	0	-4
Bolt	Three Bolt	CTL	21.75	4.71	180.0	90.0	5.00	0.00	-	3.00	-	-	-4	0	-4
Spool	Spool Insulator - 20 kV	NVE	27.30	4.22	90.0	0.0	1.00	2.12	-	2.50	-	-	0	22	22
Deadend	CUTOUT	NVE	34.50	32.00	170.5	0.0	3.00	12.75	-	3.80	-	-	-10	256	246
Deadend	CUTOUT	NVE	34.50	-18.00	16.5	0.0	3.00	12.75	-	3.80	-	-	8	256	264
Deadend	CUTOUT	NVE	34.50	-32.00	9.5	0.0	3.00	12.75	-	3.80	-	-	13	256	269
											Totals:	0	7	2,405	2,412

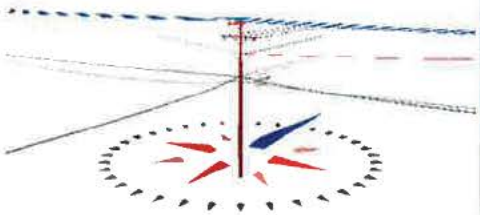
Pole Buckling

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	25.42	35.04	11.66	20.45	6.69	13.22	1,000,000	50.00	57.00	37.40	15,616	**4,489**	**3.48**

O-Calc® Pro *Analysis Report*

Tuesday, November 11, 2014 8:15:58 AM

File Name:	**P88771 GRADE B**	Pole Length / Class:	**45 / 3**	Code:	**NESC**	Structure Type:	**Unguyed**
Pole Num:	**P88771**	Pole Species:	**WESTERN RED CEDAR**	NESC Rule:	**Rule 250B**	Status:	**N/A**
Aux Data	**COX**	Setting Depth (ft):	**6.30**	Construction Grade:	**B**	Pole Strength Factor:	**0.65**
Aux Data	**LAKE MEAD &**	G/L Circumference (in):	**41.50**	Loading District:	**Light**	Transverse Wind LF:	**2.50**
Aux Data	**GOODWILL**	G/L Fiber Stress (psi):	**6,000**	Ice Thickness (in):	**0.00**	Wire Tension LF:	**1.10**
Aux Data	**2509 E LAKE MEAD**	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:	**195.4%**	0.0 ft	0.0°
Groundline:	**195.4%**	0.0 ft	0.0°
Vertical:	**15.2%**	23.7 ft	0.0°

Pole Moments		Load Angle	Wind Angle
Max Capac. Util:	**143,298 ft-lb**	0.4°	0.0°
Groundline:	**143,298 ft-lb**	0.4°	0.0°

GROUNDLINE LOAD SUMMARY:*Wind at 0.0°, Applied Moment 143,298 ft-lb at 0.4°, Allowable Moment 73,549 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:	2,734	52.4	**89,588**	4.2	**8.2**	**4,750**	484	4	**4,754**	**121.9**
Comms:	1,388	26.6	**30,477**	4.9	**9.6**	**1,616**	497	4	**1,620**	**41.5**
Pole:	745	14.3	**13,035**	9.1	**17.7**	**691**	1,714	13	**704**	**18.0**
Crossarms:	139	2.7	**4,663**	0.1	**0.2**	**247**	198	1	**249**	**6.4**
Risers:	121	2.3	**2,297**	1.6	**3.1**	**122**	38	0	**122**	**3.1**
Insulators:	91	1.7	**3,237**	0.3	**0.7**	**172**	111	1	**172**	**4.4**
Pole Load:	5,218	100.0	**143,298**	100.0	**194.8**	**7,598**	3,043	22	**7,621**	**195.4**
Pole Reserve Capacity:			**-69,748**		**-94.8**	**-3,698**			**-3,721**	**-95.4**

LOAD SUMMARY BY OWNER

NVE:	2,862	**94,258**	**4,998**	737	5	**5,003**	**128.3**
ZFS:	223	**5,537**	**294**	80	1	**294**	**7.5**

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

² Worst Wind per Guy Wire
³ Wind at 178.6°

COX:	435	**9,819**	**521**	286	2	**523**	**13.4**
CTL:	954	**20,648**	**1,095**	226	2	**1,097**	**28.1**
Pole:	745	**13,035**	**691**	1,714	13	**704**	**18.0**
Totals	5,218	**143,298**	**7,598**	3,043	22	**7,621**	**195.4**

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	477 AAC	NVE	38.73	54.28	0.7950	-	0.447	183.0	90.0	183.0	1,540	471	276	5,287	6,034
Primary	477 AAC	NVE	38.73	54.28	0.7950	-	0.447	93.0	270.0	93.0	1,540	-471	140	2,687	2,356
Primary	477 AAC	NVE	38.73	18.82	0.7950	-	0.447	183.0	90.0	183.0	1,540	471	-92	5,287	5,666
Primary	477 AAC	NVE	38.73	18.82	0.7950	-	0.447	93.0	270.0	93.0	1,540	-471	-47	2,687	2,169
Primary	477 AAC	NVE	38.73	18.82	0.7950	-	0.447	183.0	90.0	183.0	1,540	471	92	5,287	5,850
Primary	477 AAC	NVE	38.73	18.82	0.7950	-	0.447	93.0	270.0	93.0	1,540	-471	47	2,687	2,262
Primary	477 AAC	NVE	38.73	54.28	0.7950	-	0.447	183.0	90.0	183.0	1,540	471	-276	5,287	5,482
Primary	477 AAC	NVE	38.73	54.28	0.7950	-	0.447	93.0	270.0	93.0	1,540	-471	-140	2,687	2,075
Service	#2 AL TPX (SLACK)	NVE	29.25	6.63	0.7600	-	0.270	55.0	70.0	55.0	500	5,611	6	1,009	6,626
Secondary	1/0 AL TPX (SLACK)	NVE	29.25	6.63	0.9900	-	0.390	59.0	0.0	59.0	500	16,087	10	0	16,097
Service	#4 AL TPX (SLACK)	NVE	29.25	6.63	0.6400	-	0.180	60.0	300.0	60.0	500	7,944	4	793	8,741
Other	288ct SELF SUPPORT	ZFS	25.10	7.20	0.8600	-	0.350	183.0	90.0	183.0	1,500	297	-29	3,703	3,972
Other	288ct SELF SUPPORT	ZFS	25.10	7.20	0.8600	-	0.350	93.0	270.0	93.0	1,500	-297	-15	1,882	1,570
Primary	4 AAC (SLACK)	NVE	33.71	54.45	0.2320	-	0.039	59.0	360.0	59.0	186	6,896	0	0	6,896
Primary	4 AAC (SLACK)	NVE	33.71	54.45	0.2320	-	0.039	59.0	360.0	59.0	186	6,896	0	0	6,896
Primary	4 AAC (SLACK)	NVE	33.71	6.97	0.2320	-	0.039	59.0	360.0	59.0	186	6,896	1	0	6,897
											Totals:	**50,330**	**-24**	**39,281**	**89,588**

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, 432ct, 72ct, 18ct 1/4"	COX	23.00	7.36	1.7400	-	1.234	183.0	90.0	183.2	1,500	272	-104	6,866	7,034
CATV	.50"cx, 18ct 1/4" MESS 24ct PROP	COX	23.00	7.36	1.5600	-	0.562	93.0	270.0	93.0	1,500	-272	-24	3,128	2,832
CATV	.50"cx, 432ct, 72ct 1/4" MESS	COX	23.00	7.36	1.3900	-	0.800	96.0	180.0	96.1	500	-12,650	-35	0	-12,685
CATV	.50"cx 1/4" MESS (SLACK)	COX	23.00	7.36	0.7500	-	0.271	59.0	0.0	59.0	500	12,650	-7	0	12,642
Telco	1.25" 5/16"MESS	CTL	21.80	7.45	1.5600	-	1.000	183.0	90.0	183.0	1,500	258	-85	5,834	6,007
Telco	1.25" 5/16"MESS	CTL	21.80	7.45	1.5600	-	1.000	93.0	270.0	93.3	1,500	-258	-43	2,965	2,664
Telco	.50"cx 1/4" MESS (SLACK)	CTL	21.80	7.45	0.7500	-	0.271	59.0	0.0	59.0	500	11,990	-7	0	11,982
											Totals:	**11,990**	**-306**	**18,793**	**30,477**

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 10 -	NVE	37.75	5.48	270.0	270.0	66.00	4.50	3.50	-	120.00	-	0	149	148
Normal	CROSSARM 3-1/2 X 4-1/2 X 10 -	NVE	33.80	5.78	180.0	180.0	66.00	4.50	3.50	-	120.00	-	-48	4,563	4,515
											Totals:	**0**	**-48**	**4,712**	**4,663**

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	28.50	6.78	260.0	260.0	2.14	342.00	-	0.00	-	-	-3	2,300	2,297
											Totals:	0	-3	2,300	2,297

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)*
Pin	Pin Insulator - 15 kV	NVE	37.94	54.00	354.2	0.0	10.00	9.50	-	7.50	-	-	67	425	492
Pin	Pin Insulator - 15 kV	NVE	37.94	-18.00	196.9	0.0	10.00	9.50	-	7.50	-	-	-23	425	402
Pin	Pin Insulator - 15 kV	NVE	37.94	18.00	343.1	0.0	10.00	9.50	-	7.50	-	-	22	425	447
Pin	Pin Insulator - 15 kV	NVE	37.94	-54.00	185.8	0.0	10.00	9.50	-	7.50	-	-	-68	425	357
Spool	Spool Insulator - 20 kV	NVE	29.25	4.38	0.0	270.0	1.00	2.12	-	2.50	-	-	1	24	25
Bolt	Three Bolt	ZFS	25.10	4.70	180.0	90.0	5.00	0.00	-	3.00	-	-	-4	0	-4
Bolt	Three Bolt	COX	23.00	4.88	180.0	90.0	5.00	0.00	-	3.00	-	-	-5	0	-5
Bolt	Three Bolt	CTL	21.80	4.95	180.0	90.0	5.00	0.00	-	3.00	-	-	-5	0	-5
Deadend	Deadend Insulator - 15 kV	NVE	33.80	54.00	263.9	180.0	3.00	12.75	-	3.80	-	-	2	256	258
Deadend	Deadend Insulator - 15 kV	NVE	33.80	-54.00	96.1	180.0	3.00	12.75	-	3.80	-	-	3	256	259
Deadend	Deadend Insulator - 15 kV	NVE	33.80	0.00	180.0	180.0	3.00	12.75	-	3.80	-	-	3	256	258
Deadend	CUTOUT	NVE	33.80	48.00	263.1	0.0	3.00	12.75	-	3.80	-	-	-5	256	250
Deadend	CUTOUT	NVE	33.80	-24.00	103.5	0.0	3.00	12.75	-	3.80	-	-	-5	256	251
Deadend	CUTOUT	NVE	33.80	-54.00	96.1	0.0	3.00	12.75	-	3.80	-	-	-5	256	251
											Totals:	0	-21	3,258	3,237

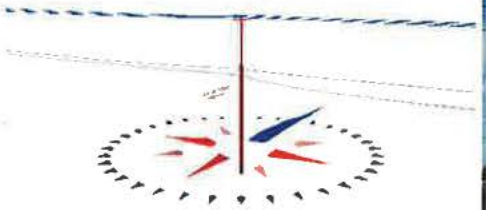
Pole Buckling

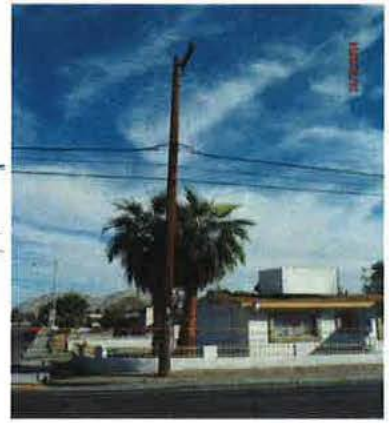
Buckling Constant	Buckling Col. Hgt. (ft)	Buckling Section Height (% Buckling Col. Hgt.)	Buckling Section Diam. (in)	Min. Buckling Diam. at GL (in)	Diameter at Tip (in)	Diameter at GL (in)	Modulus of Elasticity (psi)	Pole Density (pcf)	Ice Density (pcf)	Pole Tip Height (ft)	Buckling Load Capacity at Hgt. (lbs)	Buckling Load Applied at Hgt. (lbs)	Buckling Load Factor of Safety
2.00	23.74	34.10	11.98	16.49	7.32	13.22	1,000,000	50.00	57.00	38.70	19,970	3,043	6.56

O-Calc® Pro *Analysis Report*

Tuesday, November 11, 2014 8:39:41 AM

File Name:	**P88772 GRADE B**	Pole Length / Class:	**45 / 4**	Code:	**NESC**	Structure Type:	**Unguyed**
Pole Num:	**P88772**	Pole Species:	**WESTERN RED CEDAR**	NESC Rule:	**Rule 250B**	Status:	**N/A**
Aux Data	**COX**	Setting Depth (ft):	**7.10**	Construction Grade:	**B**	Pole Strength Factor:	**0.65**
Aux Data	**LAKE MEAD &**	G/L Circumference (in):	**41.25**	Loading District:	**Light**	Transverse Wind LF:	**2.50**
Aux Data	**GOODWILL**	G/L Fiber Stress (psi):	**6,000**	Ice Thickness (in):	**0.00**	Wire Tension LF:	**1.10**
Aux Data	**2509 E LAKE MEAD**	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:	**84.8%**	0.0 ft	180.0°
Groundline:	**84.8%**	0.0 ft	180.0°
Vertical:	**11.9%**	22.6 ft	180.0°

Pole Moments		Load Angle	Wind Angle
Max Capac. Util:	**60,834 ft-lb**	179.8°	180.0°
Groundline:	**60,834 ft-lb**	179.8°	180.0°

GROUNDLINE LOAD SUMMARY:*Wind at 180.0°, Applied Moment 60,834 ft-lb at 179.8°, Allowable Moment 72,228 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:	954	41.5	**33,661**	7.4	**6.2**	**1,818**	404	3	**1,821**	**46.7**
Comms:	595	25.9	**13,458**	3.5	**2.9**	**727**	295	2	**729**	**18.7**
Pole:	704	30.6	**11,895**	19.6	**16.5**	**642**	1,575	12	**654**	**16.8**
Crossarms:	4	0.2	**145**	0.2	**0.2**	**8**	99	1	**9**	**0.2**
Insulators:	45	1.9	**1,674**	0.8	**0.7**	**90**	82	1	**91**	**2.3**
Pole Load:	2,302	100.0	**60,834**	100.0	**84.2**	**3,285**	2,456	18	**3,303**	**84.7**
Pole Reserve Capacity:			**11,394**		**15.8**	**615**			**597**	**15.3**

LOAD SUMMARY BY OWNER

NVE:	800	**30,289**	**1,635**	497	4	**1,639**	**42.0**
ZFS:	203	**5,183**	**280**	74	1	**280**	**7.2**
COX:	227	**5,352**	**289**	114	1	**290**	**7.4**

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

² Worst Wind per Guy Wire
³ Wind at 178.6°

CTL:	369	**8,116**	**438**	197	1	**440**	**11.3**
Pole:	704	**11,895**	**642**	1,575	12	**654**	**16.8**
Totals	2,302	**60,834**	**3,285**	2,456	18	**3,303**	**84.7**

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	477 AAC	NVE	37.88	54.25	0.7950	-	0.447	159.0	270.0	159.0	1,540	-226	240	4,493	4,506
Primary	477 AAC	NVE	37.88	54.25	0.7950	-	0.447	93.0	90.0	93.0	1,540	226	140	2,628	2,994
Primary	477 AAC	NVE	37.88	18.73	0.7950	-	0.447	159.0	270.0	159.0	1,540	-226	-80	4,493	4,187
Primary	477 AAC	NVE	37.88	18.73	0.7950	-	0.447	93.0	90.0	93.0	1,540	226	-47	2,628	2,807
Primary	477 AAC	NVE	37.88	18.73	0.7950	-	0.447	159.0	270.0	159.0	1,540	-226	80	4,493	4,346
Primary	477 AAC	NVE	37.88	18.73	0.7950	-	0.447	93.0	90.0	93.0	1,540	226	47	2,628	2,901
Primary	477 AAC	NVE	37.88	54.25	0.7950	-	0.447	159.0	270.0	159.0	1,540	-226	-240	4,493	4,027
Primary	477 AAC	NVE	37.88	54.25	0.7950	-	0.447	93.0	90.0	93.0	1,540	226	-140	2,628	2,714
Other	288ct SELF SUPPORT	ZFS	25.30	6.91	0.8600	-	0.350	93.0	90.0	93.0	1,500	147	14	1,897	2,058
Other	288ct SELF SUPPORT	ZFS	25.30	6.91	0.8600	-	0.350	159.0	270.0	159.0	1,500	-147	24	3,243	3,120
											Totals:	**0**	**39**	**33,623**	**33,661**

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, 18ct 1/4" MESS 24ct PROP	COX	23.30	7.08	0.9600	-	0.562	93.0	90.0	93.0	1,500	135	23	1,950	2,109
CATV	.50"cx, 18ct 1/4" MESS 24ct PROP	COX	23.30	7.08	0.9600	-	0.562	159.0	270.0	159.0	1,500	-135	40	3,334	3,238
Telco	1.25" 5/16"MESS	CTL	21.70	7.22	1.5600	-	1.000	93.0	90.0	93.3	1,500	126	42	2,951	3,120
Telco	1.25" 5/16"MESS	CTL	21.70	7.22	1.5600	-	1.000	159.0	270.0	159.0	1,500	-126	72	5,046	4,992
											Totals:	**0**	**176**	**13,282**	**13,458**

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 10 -	NVE	36.90	5.18	90.0	90.0	66.00	4.50	3.50	-	120.00	-	0	145	145
											Totals:	**0**	**0**	**145**	**145**

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)*
Pin	Pin Insulator - 15 kV	NVE	37.09	54.00	174.5	0.0	10.00	9.50	-	7.50	-	-	68	415	483
Pin	Pin Insulator - 15 kV	NVE	37.09	-18.00	16.0	0.0	10.00	9.50	-	7.50	-	-	-22	415	393
Pin	Pin Insulator - 15 kV	NVE	37.09	18.00	164.0	0.0	10.00	9.50	-	7.50	-	-	23	415	438
Pin	Pin Insulator - 15 kV	NVE	37.09	-54.00	5.5	0.0	10.00	9.50	-	7.50	-	-	-67	415	348
Bolt	Three Bolt	ZFS	25.30	4.41	180.0	90.0	5.00	0.00	-	3.00	-	-	4	0	4
Bolt	Three Bolt	COX	23.30	4.58	180.0	90.0	5.00	0.00	-	3.00	-	-	4	0	4
Bolt	Three Bolt	CTL	21.70	4.72	180.0	90.0	5.00	0.00	-	3.00	-	-	5	0	5
											Totals:	**0**	**13**	**1,661**	**1,674**

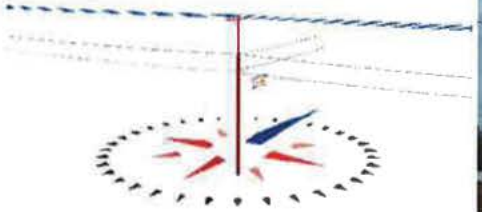
Pole Buckling

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	22.64	34.40	11.81	14.53	6.69	13.14	1,000,000	50.00	57.00	37.90	20,724	**2,456**	**8.44**

O-Calc® Pro *Analysis Report*

Tuesday, November 11, 2014 8:43:15 AM

File Name:	**P88773 GRADE B**	Pole Length / Class:	**45 / 3**	Code:	**NESC**	Structure Type:	**Guyed**
Pole Num:	**P88773**	Pole Species:	**WESTERN RED CEDAR**	NESC Rule:	**Rule 250B**	Status:	**N/A**
Aux Data	**COX**	Setting Depth (ft):	**6.90**	Construction Grade:	**B**	Pole Strength Factor:	**0.65**
Aux Data	**LAKE MEAD &**	G/L Circumference (in):	**42.00**	Loading District:	**Light**	Transverse Wind LF:	**2.50**
Aux Data	**GOODWILL**	G/L Fiber Stress (psi):	**6,000**	Ice Thickness (in):	**0.00**	Wire Tension LF:	**1.65**
Aux Data	**2509 E LAKE MEAD**	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:	**138.9%**	0.0 ft	0.0°
Groundline:	**138.9%**	0.0 ft	0.0°
Vertical:	**2.5%**	22.9 ft	90.0°

Pole Moments		Load Angle	Wind Angle
Max Capac. Util:	**105,245 ft-lb**	358.6°	0.0°
Groundline:	**105,245 ft-lb**	358.6°	0.0°

Guy Summary

	Attach Height (ft)	**Guy Tensions** % Allowable Tension	Wind Angle	**Maximum Guy Tensions** % Allowable Tension	Wind Angle
Guy 1	22.7	**25.6%**	0.0°	**35.9%**	80.0°

Anchor Summary

	Lead Length (ft)	**Max. % Allow. Capacity**
Anchor 1	20.4	**18.1%**

GROUNDLINE LOAD SUMMARY:*Wind at 0.0°, Applied Moment 105,245 ft-lb at 358.6°, 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:	950	24.1	**34,655**	2.3	**3.1**	**1,773**	402	3	**1,776**	**45.5**
Comms:	2,153	54.6	**54,886**	2.1	**2.9**	**2,808**	314	2	**2,810**	**72.0**
Guys/Braces:	51	1.3	**1,179**	1.1	**1.5**	**60**	1,942	14	**74**	**1.9**
Pole:	739	18.7	**12,703**	12.1	**16.7**	**650**	1,715	12	**662**	**17.0**
Crossarms:	4	0.1	**148**	0.1	**0.2**	**8**	99	1	**8**	**0.2**
Insulators:	45	1.1	**1,673**	0.5	**0.6**	**86**	98	1	**86**	**2.2**

Pole Load:	3,942	100.0	**105,245**	100.0	**138.0**	**5,384**	4,570	33	**5,416**	**138.9**
Pole Reserve Capacity:			**-29,005**		**-38.0**	**-1,484**			**-1,516**	**-38.9**

LOAD SUMMARY BY OWNER

NVE:	797	**30,491**	**1,560**	495	4	**1,563**	**40.1**
ZFS:	202	**5,987**	**306**	73	1	**307**	**7.9**
COX:	1,051	**29,133**	**1,490**	125	1	**1,491**	**38.2**
CTL:	1,154	**26,931**	**1,378**	2,161	15	**1,393**	**35.7**
Pole:	739	**12,703**	**650**	1,715	12	**662**	**17.0**
Totals	3,942	**105,245**	**5,384**	4,570	33	**5,416**	**138.9**

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	477 AAC	NVE	38.28	54.28	0.7950	-	0.447	159.0	90.0	159.0	1,540	-2,409	240	4,539	2,370
Primary	477 AAC	NVE	38.28	54.28	0.7950	-	0.447	92.0	270.0	92.0	1,540	2,409	139	2,626	5,174
Primary	477 AAC	NVE	38.28	18.81	0.7950	-	0.447	159.0	90.0	159.0	1,540	-2,409	-79	4,539	2,051
Primary	477 AAC	NVE	38.28	18.81	0.7950	-	0.447	92.0	270.0	92.0	1,540	2,409	-46	2,626	4,989
Primary	477 AAC	NVE	38.28	18.81	0.7950	-	0.447	159.0	90.0	159.0	1,540	-2,409	80	4,539	2,211
Primary	477 AAC	NVE	38.28	18.81	0.7950	-	0.447	92.0	270.0	92.0	1,540	2,409	47	2,626	5,082
Primary	477 AAC	NVE	38.28	54.28	0.7950	-	0.447	159.0	90.0	159.0	1,540	-2,409	-239	4,539	1,891
Primary	477 AAC	NVE	38.28	54.28	0.7950	-	0.447	92.0	270.0	92.0	1,540	2,409	-138	2,626	4,897
Other	288ct SELF SUPPORT	ZFS	29.80	6.82	0.8600	-	0.350	159.0	90.0	159.0	1,500	-1,825	-24	3,819	1,970
Other	288ct SELF SUPPORT	ZFS	29.80	6.82	0.8600	-	0.350	92.0	270.0	92.0	1,500	1,825	-14	2,210	4,021
											Totals:	**0**	**-34**	**34,689**	**34,655**

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, 18ct 1/4" MESS 24ct PROP	COX	27.80	6.98	0.9600	-	0.562	159.0	90.0	159.0	1,500	-1,702	-39	3,977	2,236
CATV	.50"cx, 18ct 1/4" MESS 24ct PROP	COX	27.80	6.98	0.9600	-	0.562	92.0	270.0	92.0	1,500	1,702	-23	2,301	3,981
CATV	.50"cx 1/4" MESS (SLACK)	COX	27.80	6.98	0.7500	-	0.271	59.0	0.0	59.0	500	22,928	-7	0	22,921
Telco	1.25" 5/16"MESS	CTL	22.70	4.88	1.5600	-	1.000	159.0	90.0	159.0	1,500	-1,390	-1	5,277	3,886
Telco	.75", .50" 1/4" MESS (SLACK)	CTL	23.50	4.82	1.2500	-	1.000	59.0	0.0	59.0	500	19,382	18	0	19,399
Telco	.75" 1/4" MESS (SLACK)	CTL	23.10	4.85	1.0000	-	0.469	92.0	270.0	92.0	500	472	0	1,992	2,464
											Totals:	**41,391**	**-52**	**13,547**	**54,886**

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 10 -	NVE	37.30	5.47	270.0	270.0	66.00	4.50	3.50	-	120.00	-	1	147	148
											Totals:	**0**	**1**	**147**	**148**

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)*
Pin	Pin Insulator - 15 kV	NVE	37.49	54.00	354.2	0.0	10.00	9.50	-	7.50	-	-	68	420	487
Pin	Pin Insulator - 15 kV	NVE	37.49	-18.00	196.9	0.0	10.00	9.50	-	7.50	-	-	-22	420	397

Pin	Pin Insulator - 15 kV	NVE	37.49	18.00	343.1	0.0	10.00	9.50	-	7.50	-	-	23	420	442
Pin	Pin Insulator - 15 kV	NVE	37.49	-54.00	185.8	0.0	10.00	9.50	-	7.50	-	-	-67	420	352
Bolt	Three Bolt	ZFS	29.80	4.32	180.0	90.0	5.00	0.00	-	3.00	-	-	-4	0	-4
Bolt	Three Bolt	COX	27.80	4.48	180.0	90.0	5.00	0.00	-	3.00	-	-	-4	0	-4
Deadend	Three Bolt	CTL	22.70	4.88	90.0	90.0	5.00	0.00	-	3.00	-	-	0	0	0
Deadend	Three Bolt	CTL	23.50	4.82	0.0	0.0	5.00	0.00	-	3.00	-	-	3	0	3
Deadend	Three Bolt	CTL	23.10	4.85	270.0	270.0	5.00	0.00	-	3.00	-	-	0	0	0
											Totals:	0	-5	1,678	1,673

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	22.70	0.00	20.40	0.312	75.0	270.0	48.1	0.205	29.02	0.68

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[2] (lbs)	Shear Load in Guy Dir[3] (lbs)	Shear Load at Report Angle[3] (lbs)	Moment at GL[2] (ft-lb)*
Guy 1: EHS 5/16	Down	23,000,000	11,200	0.90	10,080	700	3,617	2,583	2,583	1,921	1,726	43	1,179
									Totals:	1,921	1,726	43	1,179

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	CTL	18.00	20.40	270.0	20,000	1.00	20,000	3,617	2,583	18.1

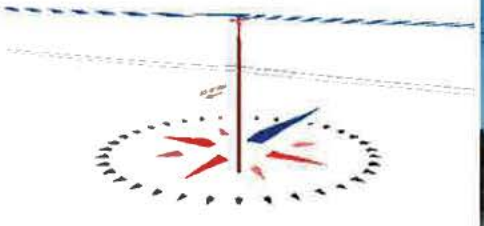
Pole Buckling

Buckling Constant	Buckling Column Hgt. (ft)	Buckling Section Height (% Buckling Col. Hgt.)	Buckling Bending 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 Hgt. (lbs)	Buckling Load Applied Hgt. (lbs)	Buckling Load Factor of Safety
0.71	22.93	34.08	12.13	11.71	7.32	13.38	1,000,000	50.00	57.00	38.10	179,915	4,570	39.37

O-Calc® Pro *Analysis Report*

Tuesday, November 11, 2014 8:46:38 AM

File Name:	P88774 GRADE B	Pole Length / Class:	45 / 2	Code:	NESC	Structure Type:	Unguyed
Pole Num:	P88774	Pole Species:	WESTERN RED CEDAR	NESC Rule:	Rule 250B	Status:	N/A
Aux Data	COX	Setting Depth (ft):	6.60	Construction Grade:	B	Pole Strength Factor:	0.65
Aux Data	LAKE MEAD &	G/L Circumference (in):	44.20	Loading District:	Light	Transverse Wind LF:	2.50
Aux Data	GOODWILL	G/L Fiber Stress (psi):	6,000	Ice Thickness (in):	0.00	Wire Tension LF:	1.10
Aux Data	2509 E LAKE MEAD	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:	68.4%	0.0 ft	180.0°
Groundline:	68.4%	0.0 ft	180.0°
Vertical:	9.1%	22.3 ft	180.0°

Pole Moments		Load Angle	Wind Angle
Max Capac. Util:	60,390 ft-lb	179.8°	180.0°
Groundline:	60,390 ft-lb	179.8°	180.0°

GROUNDLINE LOAD SUMMARY:*Wind at 180.0°, Applied Moment 60,390 ft-lb at 179.8°, Allowable Moment 88,857 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:	947	42.1	33,802	7.4	5.0	1,484	401	3	1,486	38.1
Comms:	459	20.4	10,935	3.6	2.5	480	193	1	481	12.3
Pole:	793	35.3	13,817	22.9	15.5	606	1,954	13	619	15.9
Crossarms:	4	0.2	147	0.2	0.2	6	99	1	7	0.2
Insulators:	45	2.0	1,689	0.8	0.5	74	82	1	75	1.9
Pole Load:	2,248	100.0	60,390	100.0	68.0	2,651	2,730	18	2,668	68.4
Pole Reserve Capacity:			28,467		32.0	1,249			1,232	31.6

LOAD SUMMARY BY OWNER

NVE:	794	30,301	1,330	494	3	1,333	34.2
ZFS:	202	5,326	234	73	0	234	6.0
COX:	225	5,517	242	113	1	243	6.2

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

² Worst Wind per Guy Wire
³ Wind at 178.6°

CTL:	234	**5,428**	**238**	95	1	**239**	**6.1**
Pole:	793	**13,817**	**606**	1,954	13	**619**	**15.9**
Totals	2,248	**60,390**	**2,651**	2,730	18	**2,668**	**68.4**

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	477 AAC	NVE	38.18	54.31	0.7950	-	0.447	158.0	270.0	158.0	1,540	-257	238	4,500	4,481
Primary	477 AAC	NVE	38.18	54.31	0.7950	-	0.447	92.0	90.0	92.0	1,540	257	139	2,620	3,016
Primary	477 AAC	NVE	38.18	18.92	0.7950	-	0.447	158.0	270.0	158.0	1,540	-257	-79	4,500	4,164
Primary	477 AAC	NVE	38.18	18.92	0.7950	-	0.447	92.0	90.0	92.0	1,540	257	-46	2,620	2,831
Primary	477 AAC	NVE	38.18	18.92	0.7950	-	0.447	158.0	270.0	158.0	1,540	-257	80	4,500	4,323
Primary	477 AAC	NVE	38.18	18.92	0.7950	-	0.447	92.0	90.0	92.0	1,540	257	46	2,620	2,923
Primary	477 AAC	NVE	38.18	54.31	0.7950	-	0.447	158.0	270.0	158.0	1,540	-257	-238	4,500	4,005
Primary	477 AAC	NVE	38.18	54.31	0.7950	-	0.447	92.0	90.0	92.0	1,540	257	-139	2,620	2,738
Other	288ct SELF SUPPORT	ZFS	26.20	7.45	0.8600	-	0.350	92.0	90.0	92.0	1,500	171	15	1,943	2,130
Other	288ct SELF SUPPORT	ZFS	26.20	7.45	0.8600	-	0.350	158.0	270.0	158.0	1,500	-171	26	3,338	3,192
											Totals:	**0**	**41**	**33,761**	**33,802**

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, 18ct 1/4" MESS 24ct PROP	COX	24.20	7.61	0.9600	-	0.562	92.0	90.0	92.0	1,500	158	25	2,004	2,187
CATV	.50"cx, 18ct 1/4" MESS 24ct PROP	COX	24.20	7.61	0.9600	-	0.562	158.0	270.0	158.0	1,500	-158	42	3,441	3,325
Telco	.75" 1/4" MESS	CTL	22.90	7.71	1.0000	-	0.469	92.0	90.0	92.0	1,500	150	21	1,975	2,146
Telco	.75" 1/4" MESS	CTL	22.90	7.71	1.0000	-	0.469	158.0	270.0	158.0	1,500	-150	36	3,392	3,278
											Totals:	**0**	**123**	**10,812**	**10,935**

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 10 -	NVE	37.20	5.82	90.0	90.0	66.00	4.50	3.50	-	120.00	-	0	146	147
											Totals:	**0**	**0**	**146**	**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)*
Pin	Pin Insulator - 15 kV	NVE	37.39	54.00	173.9	0.0	10.00	9.50	-	7.50	-	-	68	419	486
Pin	Pin Insulator - 15 kV	NVE	37.39	-18.00	17.9	0.0	10.00	9.50	-	7.50	-	-	-22	419	396
Pin	Pin Insulator - 15 kV	NVE	37.39	18.00	162.1	0.0	10.00	9.50	-	7.50	-	-	23	419	441
Pin	Pin Insulator - 15 kV	NVE	37.39	-54.00	6.1	0.0	10.00	9.50	-	7.50	-	-	-67	419	351
Bolt	Three Bolt	ZFS	26.20	4.95	180.0	90.0	5.00	0.00	-	3.00	-	-	5	0	5
Bolt	Three Bolt	COX	24.20	5.11	180.0	90.0	5.00	0.00	-	3.00	-	-	5	0	5
Bolt	Three Bolt	CTL	22.90	5.21	180.0	90.0	5.00	0.00	-	3.00	-	-	5	0	5
											Totals:	**0**	**14**	**1,674**	**1,689**

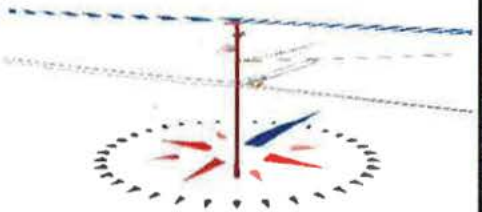
Pole Buckling

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	22.33	33.79	12.87	15.31	7.96	14.08	1,000,000	50.00	57.00	38.40	30,058	**2,730**	**11.01**

O-Calc® Pro *Analysis Report*

Tuesday, November 11, 2014 8:52:38 AM

File Name:	**P40284 GRADE B**	Pole Length / Class:	**45 / 1**	Code:	**NESC**	Structure Type:	**Unguyed**
Pole Num:	**P40284**	Pole Species:	**WESTERN RED CEDAR**	NESC Rule:	**Rule 250B**	Status:	**N/A**
Aux Data	**COX**	Setting Depth (ft):	**7.10**	Construction Grade:	**B**	Pole Strength Factor:	**0.65**
Aux Data	**LAKE MEAD &**	G/L Circumference (in):	**46.92**	Loading District:	**Light**	Transverse Wind LF:	**2.50**
Aux Data	**GOODWILL**	G/L Fiber Stress (psi):	**6,000**	Ice Thickness (in):	**0.00**	Wire Tension LF:	**1.10**
Aux Data	**2509 E LAKE MEAD**	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:	**114.7%**	0.0 ft	358.6°
Groundline:	**114.7%**	0.0 ft	358.6°
Vertical:	**16.4%**	24.9 ft	358.6°

Pole Moments		Load Angle	Wind Angle
Max Capac. Util:	**121,218 ft-lb**	357.7°	358.6°
Groundline:	**121,218 ft-lb**	357.7°	358.6°

GROUNDLINE LOAD SUMMARY:*Wind at 358.6°, Applied Moment 121,218 ft-lb at 357.7°, Allowable Moment 106,306 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:	2,303	46.7	**68,223**	4.3	**4.9**	**2,503**	432	2	**2,505**	**64.2**
Comms:	1,578	32.0	**31,656**	1.3	**1.5**	**1,161**	285	2	**1,163**	**29.8**
Power Equipment:	135	2.7	**4,193**	3.5	**3.9**	**154**	1,650	9	**163**	**4.2**
Pole:	836	17.0	**14,418**	11.9	**13.6**	**529**	2,198	13	**542**	**13.9**
Crossarms:	8	0.2	**287**	0.1	**0.1**	**11**	159	1	**11**	**0.3**
Insulators:	68	1.4	**2,441**	0.4	**0.5**	**90**	98	1	**90**	**2.3**
Pole Load:	4,928	100.0	**121,218**	100.0	**114.0**	**4,447**	4,821	28	**4,475**	**114.7**
Pole Reserve Capacity:			**-14,912**		**-14.0**	**-547**			**-575**	**-14.7**

LOAD SUMMARY BY OWNER

NVE:	2,314	**70,812**	**2,598**	2,250	13	**2,611**	**66.9**
ZFS:	201	**4,342**	**159**	73	0	**160**	**4.1**

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

² Worst Wind per Guy Wire
³ Wind at 178.6°

COX:	773	**15,925**	**584**	124	1	**585**	**15.0**
CTL:	804	**15,720**	**577**	176	1	**578**	**14.8**
Pole:	836	**14,418**	**529**	2,198	13	**542**	**13.9**
Totals	4,928	**121,218**	**4,447**	4,821	28	**4,475**	**114.7**

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	477 AAC	NVE	37.88	54.35	0.7950	-	0.447	91.0	270.0	91.0	1,540	2,534	138	2,569	5,240
Primary	477 AAC	NVE	37.88	54.35	0.7950	-	0.447	158.0	90.0	158.0	1,540	-2,534	239	4,460	2,165
Primary	477 AAC	NVE	37.88	19.02	0.7950	-	0.447	91.0	270.0	91.0	1,540	2,534	-45	2,569	5,057
Primary	477 AAC	NVE	37.88	19.02	0.7950	-	0.447	158.0	90.0	158.0	1,540	-2,534	-78	4,460	1,848
Primary	477 AAC	NVE	37.88	19.02	0.7950	-	0.447	91.0	270.0	91.0	1,540	2,534	46	2,569	5,149
Primary	477 AAC	NVE	37.88	19.02	0.7950	-	0.447	158.0	90.0	158.0	1,540	-2,534	80	4,460	2,006
Primary	477 AAC	NVE	37.88	54.35	0.7950	-	0.447	91.0	270.0	91.0	1,540	2,534	-137	2,569	4,966
Primary	477 AAC	NVE	37.88	54.35	0.7950	-	0.447	158.0	90.0	158.0	1,540	-2,534	-237	4,460	1,689
Other	288ct SELF SUPPORT	ZFS	21.90	8.14	0.8600	-	0.350	158.0	90.0	158.0	1,500	-1,426	-28	2,787	1,333
Other	288ct SELF SUPPORT	ZFS	21.90	8.14	0.8600	-	0.350	91.0	270.0	91.0	1,500	1,426	-16	1,605	3,015
Secondary	1/0 AL TPX (SLACK)	NVE	26.25	7.52	0.9900	-	0.390	59.0	0.0	59.0	500	14,426	11	1	14,438
Service	#4 AL TPX (SLACK)	NVE	26.25	7.52	0.6400	-	0.180	49.0	315.0	49.0	500	10,604	4	361	10,969
Service	#4 AL TPX (SLACK)	NVE	26.25	7.52	0.6400	-	0.180	65.0	45.0	65.0	500	9,798	5	545	10,348
											Totals:	**34,828**	**-17**	**33,412**	**68,223**

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, 18ct 1/4" MESS 24ct PROP	COX	20.70	8.24	0.9600	-	0.562	158.0	90.0	158.0	1,500	-1,348	-46	2,940	1,547
CATV	.50"cx, 18ct 1/4" MESS 24ct PROP	COX	20.70	8.24	0.9600	-	0.562	91.0	270.0	91.0	1,500	1,348	-26	1,693	3,015
CATV	.50"cx 1/4" MESS (SLACK)	COX	20.70	8.24	0.7500	-	0.271	59.0	0.0	59.0	500	11,376	-8	1	11,369
Telco	.75" 1/4" MESS	CTL	19.70	8.32	1.0000	-	0.469	158.0	90.0	158.0	1,500	-1,282	-38	2,915	1,594
Telco	.75", .50" 1/4" MESS	CTL	19.70	8.32	1.2500	-	1.000	91.0	270.0	91.0	1,500	1,282	-47	2,099	3,334
Telco	.75", .50" 1/4" MESS (SLACK)	CTL	19.70	8.32	1.2500	-	1.000	59.0	0.0	59.0	500	10,827	-31	1	10,797
											Totals:	**22,203**	**-197**	**9,649**	**31,656**

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	30.00	30.96	270.0	270.0	1,100.00	18.00	39.00	-	48.00	-	144	4,050	4,193
											Totals:	**0**	**144**	**4,050**	**4,193**

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 10 -	NVE	36.90	6.13	270.0	270.0	66.00	4.50	3.50	-	120.00	-	2	150	152
Normal	CUTOUT BRACKET	NVE	34.00	6.37	90.0	90.0	40.00	4.50	3.50	-	72.00	-	-1	136	135
											Totals:	**0**	**1**	**286**	**287**

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)*
Pin	Pin Insulator - 15 kV	NVE	37.09	54.00	353.5	0.0	10.00	9.50	-	7.50	-	-	68	415	483
Pin	Pin Insulator - 15 kV	NVE	37.09	-18.00	198.8	0.0	10.00	9.50	-	7.50	-	-	-22	415	393
Pin	Pin Insulator - 15 kV	NVE	37.09	18.00	341.2	0.0	10.00	9.50	-	7.50	-	-	23	415	438
Pin	Pin Insulator - 15 kV	NVE	37.09	-54.00	186.5	0.0	10.00	9.50	-	7.50	-	-	-67	415	348
Bolt	Three Bolt	ZFS	21.90	5.64	180.0	90.0	5.00	0.00	-	3.00	-	-	-5	0	-5
Bolt	Three Bolt	COX	20.70	5.74	180.0	90.0	5.00	0.00	-	3.00	-	-	-5	0	-5
Bolt	Three Bolt	CTL	19.70	5.82	180.0	90.0	5.00	0.00	-	3.00	-	-	-5	0	-5
Deadend	CUTOUT	NVE	34.00	32.00	168.7	0.0	3.00	12.75	-	3.80	-	-	-12	257	245
Deadend	CUTOUT	NVE	34.00	0.00	90.0	0.0	3.00	12.75	-	3.80	-	-	0	257	257
Deadend	CUTOUT	NVE	34.00	-32.00	11.3	0.0	3.00	12.75	-	3.80	-	-	12	257	269
Spool	Spool Insulator - 20 kV	NVE	26.25	5.27	0.0	270.0	1.00	2.12	-	2.50	-	-	1	22	23
											Totals:	**0**	**-14**	**2,454**	**2,441**

Pole Buckling

Buckling Constant	Buckling Pole Length (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	24.88	34.18	13.51	21.09	8.60	14.94	1,000,000	50.00	57.00	37.90	29,445	**4,821**	**6.11**

O-Calc® Pro *Analysis Report*

Tuesday, November 11, 2014 8:56:00 AM

File Name:	**P66758 GRADE B**	Pole Length / Class:	**45 / 4**	Code:	**NESC**	Structure Type:	**Unguyed**
Pole Num:	**P66758**	Pole Species:	**WESTERN RED CEDAR**	NESC Rule:	**Rule 250B**	Status:	**N/A**
Aux Data	**COX**	Setting Depth (ft):	**7.10**	Construction Grade:	**B**	Pole Strength Factor:	**0.65**
Aux Data	**LAKE MEAD &**	G/L Circumference (in):	**40.00**	Loading District:	**Light**	Transverse Wind LF:	**2.50**
Aux Data	**GOODWILL**	G/L Fiber Stress (psi):	**6,000**	Ice Thickness (in):	**0.00**	Wire Tension LF:	**1.10**
Aux Data	**2509 E LAKE MEAD**	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:	**86.2%**	0.0 ft	180.0°
Groundline:	**86.2%**	0.0 ft	180.0°
Vertical:	**12.4%**	22.5 ft	180.0°

Pole Moments		Load Angle	Wind Angle
Max Capac. Util:	**56,423 ft-lb**	180.2°	180.0°
Groundline:	**56,423 ft-lb**	180.2°	180.0°

GROUNDLINE LOAD SUMMARY:*Wind at 180.0°, Applied Moment 56,423 ft-lb at 180.2°, Allowable Moment 65,859 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:	920	42.6	**31,819**	3.8	**3.3**	**1,884**	390	3	**1,887**	**48.4**
Comms:	503	23.3	**11,098**	3.0	**2.6**	**657**	285	2	**659**	**16.9**
Pole:	690	31.9	**11,716**	20.8	**17.8**	**694**	1,509	12	**706**	**18.1**
Crossarms:	4	0.2	**143**	0.3	**0.2**	**8**	99	1	**9**	**0.2**
Insulators:	45	2.1	**1,647**	0.6	**0.5**	**98**	82	1	**98**	**2.5**
Pole Load:	2,162	100.0	**56,423**	100.0	**85.7**	**3,341**	2,364	19	**3,360**	**86.1**
Pole Reserve Capacity:			**9,436**		**14.3**	**559**			**540**	**13.9**

LOAD SUMMARY BY OWNER

NVE:	773		**28,808**			**1,706**	485	4	**1,710**	**43.8**
ZFS:	196		**4,792**			**284**	71	1	**284**	**7.3**
COX:	219		**4,942**			**293**	110	1	**294**	**7.5**

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

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

CTL:	285	**6,165**	**365**	190	1	**367**	**9.4**
Pole:	690	**11,716**	**694**	1,509	12	**706**	**18.1**
Totals	2,162	**56,423**	**3,341**	2,364	19	**3,360**	**86.1**

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	477 AAC	NVE	37.28	54.25	0.7950	-	0.447	91.0	90.0	91.0	1,540	-236	-137	2,531	2,157
Primary	477 AAC	NVE	37.28	54.25	0.7950	-	0.447	152.0	270.0	152.0	1,540	236	-229	4,227	4,234
Primary	477 AAC	NVE	37.28	18.74	0.7950	-	0.447	91.0	90.0	91.0	1,540	-236	46	2,531	2,340
Primary	477 AAC	NVE	37.28	18.74	0.7950	-	0.447	152.0	270.0	152.0	1,540	236	76	4,227	4,540
Primary	477 AAC	NVE	37.28	18.74	0.7950	-	0.447	91.0	90.0	91.0	1,540	-236	-46	2,531	2,249
Primary	477 AAC	NVE	37.28	18.74	0.7950	-	0.447	152.0	270.0	152.0	1,540	236	-76	4,227	4,387
Primary	477 AAC	NVE	37.28	54.25	0.7950	-	0.447	91.0	90.0	91.0	1,540	-236	137	2,531	2,432
Primary	477 AAC	NVE	37.28	54.25	0.7950	-	0.447	152.0	270.0	152.0	1,540	236	229	4,227	4,692
Other	288ct SELF SUPPORT	ZFS	24.25	6.93	0.8600	-	0.350	91.0	90.0	91.0	1,500	-150	14	1,779	1,643
Other	288ct SELF SUPPORT	ZFS	24.25	6.93	0.8600	-	0.350	152.0	270.0	152.0	1,500	150	23	2,972	3,144
											Totals:	**0**	**37**	**31,781**	**31,819**

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, 18ct 1/4" MESS 24ct PROP	COX	22.30	7.09	0.9600	-	0.562	91.0	90.0	91.0	1,500	-137	23	1,826	1,712
CATV	.50"cx, 18ct 1/4" MESS 24ct PROP	COX	22.30	7.09	0.9600	-	0.562	152.0	270.0	152.0	1,500	137	38	3,051	3,226
Telco	.75", .50" 1/4" MESS	CTL	21.25	7.17	1.2500	-	1.000	91.0	90.0	91.2	1,500	-131	41	2,266	2,176
Telco	.75", .50" 1/4" MESS	CTL	21.25	7.17	1.2500	-	1.000	152.0	270.0	152.0	1,500	131	68	3,785	3,984
											Totals:	**0**	**169**	**10,928**	**11,098**

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 10 -	NVE	36.30	5.22	270.0	270.0	66.00	4.50	3.50	-	120.00	-	0	143	143
											Totals:	**0**	**0**	**143**	**143**

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)*
Pin	Pin Insulator - 15 kV	NVE	36.49	54.00	354.5	0.0	10.00	9.50	-	7.50	-	-	-67	409	341
Pin	Pin Insulator - 15 kV	NVE	36.49	-18.00	196.2	0.0	10.00	9.50	-	7.50	-	-	23	409	431
Pin	Pin Insulator - 15 kV	NVE	36.49	18.00	343.8	0.0	10.00	9.50	-	7.50	-	-	-22	409	386
Pin	Pin Insulator - 15 kV	NVE	36.49	-54.00	185.5	0.0	10.00	9.50	-	7.50	-	-	68	409	476
Bolt	Three Bolt	ZFS	24.25	4.43	180.0	90.0	5.00	0.00	-	3.00	-	-	4	0	4
Bolt	Three Bolt	COX	22.30	4.59	180.0	90.0	5.00	0.00	-	3.00	-	-	4	0	4
Bolt	Three Bolt	CTL	21.25	4.67	180.0	90.0	5.00	0.00	-	3.00	-	-	4	0	4
											Totals:	**0**	**13**	**1,634**	**1,647**

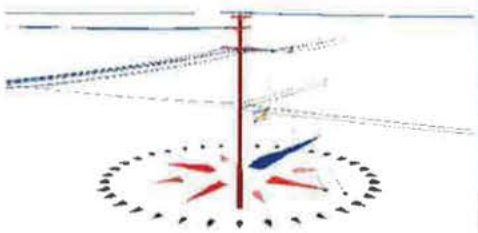
Pole Buckling

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	22.46	34.22	11.51	14.21	6.69	12.74	1,000,000	50.00	57.00	37.90	18,993	**2,364**	**8.03**

O-Calc® Pro *Analysis Report*

Tuesday, November 11, 2014 9:01:09 AM

File Name:	**P40282 GRADE B**	Pole Length / Class:	**55 / 1**	Code:	**NESC**	Structure Type:	**Junction**
Pole Num:	**P40282**	Pole Species:	**WESTERN RED CEDAR**	NESC Rule:	**Rule 250B**	Status:	**N/A**
Aux Data	**COX**	Setting Depth (ft):	**9.60**	Construction Grade:	**B**	Pole Strength Factor:	**0.65**
Aux Data	**LAKE MEAD &**	G/L Circumference (in):	**49.70**	Loading District:	**Light**	Transverse Wind LF:	**2.50**
Aux Data	**GOODWILL**	G/L Fiber Stress (psi):	**6,000**	Ice Thickness (in):	**0.00**	Wire Tension LF:	**1.65**
Aux Data	**2509 E LAKE MEAD**	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:	**144.1%**	0.0 ft	0.0°
Groundline:	**144.1%**	0.0 ft	0.0°
Vertical:	**14.1%**	36.3 ft	270.0°

Pole Moments		Load Angle	Wind Angle
Max Capac. Util:	**179,242 ft-lb**	9.8°	0.0°
Groundline:	**179,242 ft-lb**	9.8°	0.0°

Guy Summary		**Guy Tensions**		**Maximum Guy Tensions**	
	Attach Height (ft)	**% Allowable Tension**	Wind Angle	**% Allowable Tension**	Wind Angle
Guy 1	39.2	**47.3%**	0.0°	**59.8%**	271.2°
Guy 2	39.2	**57.6%**	0.0°	**59.2%**	330.0°
Guy 3	19.5	**17.7%**	0.0°	**18.0%**	10.0°

Anchor Summary	Lead Length (ft)	**Max. % Allow. Capacity**
Anchor 1	29.0	**41.5%**
Anchor 2	24.0	**41.0%**
Anchor 3	162.0	**5.4%**

GROUNDLINE LOAD SUMMARY:*Wind at 0.0°, Applied Moment 179,242 ft-lb at 9.8°, Allowable Moment 126,329 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:	234	3.3	**8,935**	-8.1	**-11.5**	**276**	802	4	**280**	**7.2**
Comms:	4,126	58.7	**81,773**	6.4	**9.1**	**2,524**	306	2	**2,526**	**64.8**

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

² Worst Wind per Guy Wire
³ Wind at 178.6°

Guys/Braces:	1,246	17.7	**52,466**	14.9	**21.2**	**1,620**	12,160	62	**1,682**	**43.1**
Pole:	1,024	14.6	**20,952**	11.7	**16.6**	**647**	2,848	14	**661**	**17.0**
Crossarms:	278	3.9	**10,072**	0.1	**0.1**	**311**	495	3	**313**	**8.0**
Insulators:	126	1.8	**5,043**	0.2	**0.3**	**156**	132	1	**156**	**4.0**
Pole Load:	7,034	100.0	**179,242**	100.0	**141.9**	**5,534**	16,743	85	**5,619**	**144.1**
Pole Reserve Capacity:			**-52,913**		**-41.9**	**-1,634**			**-1,719**	**-44.1**

LOAD SUMMARY BY OWNER

NVE:	1,777	**73,657**	**2,274**	13,474	69	**2,342**	**60.1**
ZFS:	249	**5,650**	**174**	90	0	**175**	**4.5**
COX:	1,092	**22,703**	**701**	153	1	**702**	**18.0**
CTL:	2,892	**56,279**	**1,737**	179	1	**1,738**	**44.6**
Pole:	1,024	**20,952**	**647**	2,848	14	**661**	**17.0**
Totals	7,034	**179,242**	**5,534**	16,743	85	**5,619**	**144.1**

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	477 AAC	NVE	45.48	54.35	0.7950	-	0.447	162.0	270.0	162.0	1,540	-19,645	-236	5,415	-14,465
Primary	477 AAC	NVE	45.48	54.35	0.7950	-	0.447	152.0	90.0	152.0	1,540	19,645	-221	5,081	24,504
Primary	477 AAC	NVE	45.48	19.01	0.7950	-	0.447	162.0	270.0	162.0	1,540	-19,645	85	5,415	-14,145
Primary	477 AAC	NVE	45.48	19.01	0.7950	-	0.447	152.0	90.0	152.0	1,540	19,645	80	5,081	24,806
Primary	477 AAC	NVE	45.48	19.01	0.7950	-	0.447	162.0	270.0	162.0	1,540	-19,645	-76	5,415	-14,305
Primary	477 AAC	NVE	45.48	19.01	0.7950	-	0.447	152.0	90.0	152.0	1,540	19,645	-71	5,081	24,655
Primary	477 AAC	NVE	45.48	54.35	0.7950	-	0.447	162.0	270.0	162.0	1,540	-19,645	245	5,415	-13,984
Primary	477 AAC	NVE	45.48	54.35	0.7950	-	0.447	152.0	90.0	152.0	1,540	19,645	230	5,081	24,956
Other	286ct SELF SUPPORT	ZFS	22.90	8.59	0.8600	-	0.350	152.0	90.0	152.0	1,500	9,628	-28	2,766	12,365
Other	286ct SELF SUPPORT	ZFS	22.90	8.59	0.8600	-	0.350	162.0	270.0	162.0	1,500	-9,628	-30	2,948	-6,710
Primary	477 AAC	NVE	41.31	57.28	0.7950	-	0.447	162.0	270.0	162.0	1,540	-17,830	18	4,915	-12,897
Primary	477 AAC	NVE	41.31	26.26	0.7950	-	0.447	162.0	270.0	162.0	1,540	-17,830	12	4,915	-12,903
Primary	477 AAC	NVE	41.31	57.28	0.7950	-	0.447	162.0	270.0	162.0	1,540	-17,830	-21	4,915	-12,935
Primary	336 AAC (SLACK)	NVE	36.01	57.43	0.6660	-	0.316	63.0	0.0	63.2	500	29,274	3	0	29,277
Primary	4/0 AAC (SLACK)	NVE	36.01	26.57	0.5220	-	0.198	63.0	0.0	63.1	500	29,274	3	0	29,278
Primary	336 AAC (SLACK)	NVE	36.01	57.43	0.6660	-	0.316	63.0	0.0	63.2	500	29,274	1	0	29,275
Primary	336 AAC (SLACK)	NVE	36.01	26.57	0.6660	-	0.316	63.0	0.0	63.2	500	29,274	4	0	29,278
Primary	336 AAC (SLACK)	NVE	36.01	57.43	0.6660	-	0.316	95.0	180.0	95.2	500	-29,274	-2	0	-29,276
Primary	4/0 AAC (SLACK)	NVE	36.01	26.57	0.5220	-	0.198	95.0	180.0	95.1	500	-29,274	-4	0	-29,278
Primary	336 AAC (SLACK)	NVE	36.01	26.57	0.6660	-	0.316	95.0	180.0	95.2	500	-29,274	-8	0	-29,282
Primary	336 AAC (SLACK)	NVE	36.01	57.43	0.6660	-	0.316	95.0	180.0	95.2	500	-29,274	-5	0	-29,279
											Totals:	**-53,489**	**-19**	**62,444**	**8,935**

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, 18ct 1/4" MESS 24ct PROP	COX	20.90	8.75	0.9600	-	0.562	152.0	90.0	152.0	1,500	8,787	-46	2,818	11,558

CATV	.50"cx, 18ct 1/4" MESS 24ct PROP	COX	20.90	8.75	0.9600	-	0.562	162.0	270.0	162.0	1,500	-8,787	-49	3,003	-5,833
CATV	.50"cx 1/4" MESS (SLACK)	COX	20.90	8.75	0.7500	-	0.271	63.0	0.0	63.0	500	16,992	-9	0	16,983
Telco	.75", .50" 1/4" MESS	CTL	19.50	8.86	1.2500	-	1.000	152.0	90.0	152.0	1,500	8,198	-83	3,423	11,538
Telco	.75", .50" 1/4" MESS (SLACK)	CTL	19.50	8.86	1.2500	-	1.000	63.0	0.0	63.0	1,500	47,561	-34	0	47,527
											Totals:	**72,751**	**-222**	**9,243**	**81,773**

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 10 -	NVE	44.50	6.12	90.0	90.0	66.00	4.50	3.50	-	120.00	-	9	173	181
Normal	CROSSARM 3-1/2 X 4-1/2 X 10 -	NVE	41.40	6.37	270.0	270.0	66.00	4.50	3.50	-	120.00	-	-36	321	266
Normal	CROSSARM 3-1/2 X 4-1/2 X 10 -	NVE	36.10	6.79	0.0	0.0	66.00	4.50	3.50	-	120.00	-	0	9,605	9,605
											Totals:	**0**	**-27**	**10,099**	**10,072**

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)*
Pin	Pin Insulator - 15 kV	NVE	44.69	54.00	173.5	0.0	10.00	9.50	-	7.50	-	-	-65	493	427
Pin	Pin Insulator - 15 kV	NVE	44.69	-18.00	18.8	0.0	10.00	9.50	-	7.50	-	-	23	493	516
Pin	Pin Insulator - 15 kV	NVE	44.69	18.00	161.2	0.0	10.00	9.50	-	7.50	-	-	-21	493	472
Pin	Pin Insulator - 15 kV	NVE	44.69	-54.00	6.5	0.0	10.00	9.50	-	7.50	-	-	68	493	560
Bolt	Three Bolt	ZFS	22.90	6.09	180.0	90.0	5.00	0.00	-	3.00	-	-	-5	0	-5
Bolt	Three Bolt	COX	20.90	6.25	180.0	90.0	5.00	0.00	-	3.00	-	-	-5	0	-5
Bolt	Three Bolt	CTL	19.50	6.36	180.0	90.0	5.00	0.00	-	3.00	-	-	-5	0	-5
Deadend	Deadend Insulator - 15 kV	NVE	41.40	54.00	353.3	0.0	3.00	12.75	-	3.80	-	-	19	309	328
Deadend	Deadend Insulator - 15 kV	NVE	41.40	18.00	340.5	0.0	3.00	12.75	-	3.80	-	-	5	309	314
Deadend	Deadend Insulator - 15 kV	NVE	41.40	-54.00	186.7	0.0	3.00	12.75	-	3.80	-	-	-21	309	288
Deadend	Deadend Insulator - 15 kV	NVE	36.10	54.00	82.8	0.0	3.00	12.75	-	3.80	-	-	11	269	280
Deadend	Deadend Insulator - 15 kV	NVE	36.10	18.00	69.3	0.0	3.00	12.75	-	3.80	-	-	8	269	278
Deadend	Deadend Insulator - 15 kV	NVE	36.10	-54.00	277.2	0.0	3.00	12.75	-	3.80	-	-	4	269	273
Deadend	Deadend Insulator - 15 kV	NVE	36.10	-18.00	290.7	0.0	3.00	12.75	-	3.80	-	-	6	269	275
Deadend	Deadend Insulator - 15 kV	NVE	36.10	54.00	97.2	180.0	3.00	12.75	-	3.80	-	-	-4	269	266
Deadend	Deadend Insulator - 15 kV	NVE	36.10	18.00	110.7	180.0	3.00	12.75	-	3.80	-	-	-6	269	263
Deadend	Deadend Insulator - 15 kV	NVE	36.10	-18.00	249.3	180.0	3.00	12.75	-	3.80	-	-	-8	269	261
Deadend	Deadend Insulator - 15 kV	NVE	36.10	-54.00	262.8	180.0	3.00	12.75	-	3.80	-	-	-11	269	259
											Totals:	**0**	**-8**	**5,051**	**5,043**

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 3/8	Down	NVE	39.20	0.00	29.00	0.375	75.0	90.0	53.5	0.273	47.26	1.95
Guy 2: EHS 3/8	Down	NVE	39.20	0.00	24.00	0.375	75.0	90.0	58.5	0.273	44.46	2.23
Guy 3: EHS 1/4	Span/Head	CTL	19.50	19.50	162.00	0.250	75.0	270.0	0.0	0.121	160.67	2.41

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 3/8	Down	23,000,000	15,400	0.90	13,860	700	8,294	6,560	6,560	5,274	3,901	663	26,764
Guy 2: EHS 3/8	Down	23,000,000	15,400	0.90	13,860	700	8,207	7,977	7,977	6,803	4,165	708	28,481

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

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

Guy 3: EHS 1/4	Span/Head	23,000,000	8,650	0.90	5,985	700	1,079	1,059	1,059	0	1,059	-180	-2,780
									Totals:	**12,076**	**9,125**	**1,190**	**52,466**

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	29.00	90.0	20,000	1.00	20,000	8,294	6,560	41.5
Single Helix Anchor	NVE	18.00	24.00	90.0	20,000	1.00	20,000	8,207	7,977	41.0
Anchor	CTL	30.00	162.00	270.0	20,000	1.00	20,000	1,079	1,059	5.4

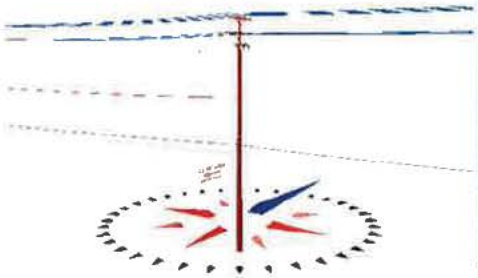
Pole Buckling

Buckling Constant	Buckling Column 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 of Safety
0.71	36.35	35.49	13.77	27.83	8.60	15.83	1,000,000	50.00	57.00	45.40	118,924	**16,743**	**7.10**

O-Calc® Pro *Analysis Report*

Tuesday, November 11, 2014 9:05:08 AM

File Name:	**P40281 GRADE B**	Pole Length / Class:	**65 / 3**	Code:	**NESC**	Structure Type:	**Guyed**
Pole Num:	**P40281**	Pole Species:	**WESTERN RED CEDAR**	NESC Rule:	**Rule 250B**	Status:	**N/A**
Aux Data	**COX**	Setting Depth (ft):	**8.90**	Construction Grade:	**B**	Pole Strength Factor:	**0.65**
Aux Data	**LAKE MEAD &**	G/L Circumference (in):	**52.00**	Loading District:	**Light**	Transverse Wind LF:	**2.50**
Aux Data	**GOODWILL**	G/L Fiber Stress (psi):	**6,000**	Ice Thickness (in):	**0.00**	Wire Tension LF:	**1.65**
Aux Data	**2509 E LAKE MEAD**	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:	**96.3%**	9.7 ft	184.4°
Groundline:	**94.9%**	0.0 ft	184.1°
Vertical:	**2.4%**	31.6 ft	0.0°

Pole Moments		Load Angle	Wind Angle
Max Capac. Util:	**102,402 ft-lb**	189.3°	184.4°
Groundline:	**136,521 ft-lb**	187.3°	184.1°

Guy Summary

	Attach Height (ft)	**Guy Tensions** % Allowable Tension	Wind Angle	**Maximum Guy Tensions** % Allowable Tension	Wind Angle
Guy 1	19.3	**0.0%**	184.1°	**21.7%**	80.0°
Guy 2	19.3	**14.5%**	184.1°	**40.8%**	260.0°

Anchor Summary

	Lead Length (ft)	**Max. % Allow. Capacity**
Anchor 1	96.0	**6.5%**
Anchor 2	162.0	**12.2%**

GROUNDLINE LOAD SUMMARY:*Wind at 184.1°, Applied Moment 136,521 ft-lb at 187.3°, 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:	1,710	46.5	**83,888**	-10.9	**-7.8**	**2,261**	692	3	**2,264**	**58.1**
Comms:	230	6.2	**5,135**	-3.6	**-2.6**	**138**	109	1	**139**	**3.6**
Guys/Braces:	-51	-1.4	**-982**	0.4	**0.3**	**-26**	16	0	**-26**	**-0.7**
Pole:	1,254	34.1	**30,631**	29.6	**21.2**	**826**	3,433	16	**842**	**21.6**

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

² Worst Wind per Guy Wire
³ Wind at 178.6°

Crossarms:	20	0.5	**1,058**	0.3	**0.2**	**29**	357	2	**30**	**0.8**
Risers:	405	11.0	**10,804**	7.0	**5.0**	**291**	177	1	**292**	**7.5**
Insulators:	113	3.1	**5,987**	0.7	**0.5**	**161**	117	1	**162**	**4.2**
Pole Load:	3,681	100.0	**136,521**	131.9	**94.4**	**3,680**	4,900	23	**3,703**	**94.9**
Pole Reserve Capacity:			**8,171**		**5.6**	**220**			**197**	**5.1**

LOAD SUMMARY BY OWNER

NVE:	2,042	**96,697**	**2,606**	1,260	6	**2,612**	**67.0**
ZFS:	206	**5,035**	**136**	75	0	**136**	**3.5**
COX:	230	**5,140**	**139**	116	1	**139**	**3.6**
CTL:	-51	**-982**	**-26**	16	0	**-26**	**-0.7**
Pole:	1,254	**30,631**	**826**	3,433	16	**842**	**21.6**
Totals	3,681	**136,521**	**3,680**	4,900	23	**3,703**	**94.9**

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	477 AAC	NVE	56.68	54.27	0.7950	-	0.447	162.0	90.0	162.0	1,540	-18,319	239	6,775	-11,305
Primary	477 AAC	NVE	56.68	54.27	0.7950	-	0.447	96.0	270.0	96.0	1,540	18,319	142	4,015	22,476
Primary	477 AAC	NVE	56.68	18.81	0.7950	-	0.447	162.0	90.0	162.0	1,540	-18,319	-84	6,775	-11,628
Primary	477 AAC	NVE	56.68	18.81	0.7950	-	0.447	96.0	270.0	96.0	1,540	18,319	-50	4,015	22,284
Primary	477 AAC	NVE	56.68	18.81	0.7950	-	0.447	162.0	90.0	162.0	1,540	-18,319	78	6,775	-11,467
Primary	477 AAC	NVE	56.68	18.81	0.7950	-	0.447	96.0	270.0	96.0	1,540	18,319	46	4,015	22,380
Primary	477 AAC	NVE	56.68	54.27	0.7950	-	0.447	162.0	90.0	162.0	1,540	-18,319	-245	6,775	-11,790
Primary	477 AAC	NVE	56.68	54.27	0.7950	-	0.447	96.0	270.0	96.0	1,540	18,319	-145	4,015	22,188
Primary	477 AAC	NVE	52.01	57.08	0.7950	-	0.447	96.0	270.0	96.0	1,540	16,799	-10	3,682	20,471
Primary	477 AAC	NVE	52.01	25.80	0.7950	-	0.447	96.0	270.0	96.0	1,540	16,799	-6	3,682	20,475
Primary	477 AAC	NVE	52.01	57.08	0.7950	-	0.447	96.0	270.0	96.0	1,540	16,799	10	3,682	20,492
Primary	477 AAC	NVE	52.01	57.08	0.7950	-	0.447	162.0	90.0	162.0	1,540	-16,799	-18	6,213	-10,604
Primary	477 AAC	NVE	52.01	25.80	0.7950	-	0.447	162.0	90.0	162.0	1,540	-16,799	-14	6,213	-10,601
Primary	477 AAC	NVE	52.01	57.08	0.7950	-	0.447	162.0	90.0	162.0	1,540	-16,799	16	6,213	-10,570
Other	288ct SELF SUPPORT	ZFS	24.20	8.79	0.8600	-	0.350	162.0	90.0	162.0	1,500	-7,614	31	3,127	-4,456
Other	288ct SELF SUPPORT	ZFS	24.20	8.79	0.8600	-	0.350	96.0	270.0	96.0	1,500	7,614	18	1,853	9,486
Service	#2 AL TPX (SLACK)	NVE	35.10	7.64	0.7600	-	0.270	96.0	270.0	96.0	500	3,681	2	2,375	6,058
											Totals:	**3,681**	**10**	**80,198**	**83,888**

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, 18ct 1/4" MESS 24ct PROP	COX	22.00	8.97	0.9600	-	0.562	162.0	90.0	162.0	1,500	-6,922	51	3,174	-3,698
CATV	.50"cx, 18ct 1/4" MESS 24ct PROP	COX	22.00	8.97	0.9600	-	0.562	96.0	270.0	96.0	1,500	6,922	30	1,881	8,832
											Totals:	**0**	**81**	**5,054**	**5,135**

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 10 -	NVE	55.70	5.44	90.0	90.0	66.00	4.50	3.50	-	120.00	-	-6	285	279
Normal	CROSSARM 3-1/2 X 4-1/2 X 10 -	NVE	52.10	5.74	270.0	270.0	66.00	4.50	3.50	-	120.00	-	24	533	557
Normal	CUTOUT BRACKET	NVE	48.90	6.00	90.0	90.0	40.00	4.50	3.50	-	72.00	-	-4	226	222
											Totals:	**0**	**15**	**1,044**	**1,058**

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	43.10	8.68	300.0	300.0	7.18	517.20	-	0.00	-	-	-23	7,297	7,274
2" Riser	2" Riser	NVE	35.10	8.68	270.0	270.0	2.63	421.20	-	0.00	-	-	3	3,527	3,530
											Totals:	**0**	**-20**	**10,824**	**10,804**

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)*
Pin	Pin Insulator - 15 kV	NVE	55.89	54.00	174.2	0.0	10.00	9.50	-	7.50	-	-	66	624	690
Pin	Pin Insulator - 15 kV	NVE	55.89	-18.00	16.8	0.0	10.00	9.50	-	7.50	-	-	-23	624	600
Pin	Pin Insulator - 15 kV	NVE	55.89	18.00	163.2	0.0	10.00	9.50	-	7.50	-	-	21	624	645
Pin	Pin Insulator - 15 kV	NVE	55.89	-54.00	5.8	0.0	10.00	9.50	-	7.50	-	-	-68	624	556
Deadend	Deadend Insulator - 15 kV	NVE	52.10	54.00	353.9	0.0	3.00	12.75	-	3.80	-	-	-19	394	375
Deadend	Deadend Insulator - 15 kV	NVE	52.10	18.00	342.3	0.0	3.00	12.75	-	3.80	-	-	-6	394	388
Deadend	Deadend Insulator - 15 kV	NVE	52.10	-54.00	186.1	0.0	3.00	12.75	-	3.80	-	-	21	394	415
Deadend	Deadend Insulator - 15 kV	NVE	52.10	54.00	6.1	180.0	3.00	12.75	-	3.80	-	-	-21	394	373
Deadend	Deadend Insulator - 15 kV	NVE	52.10	18.00	17.7	180.0	3.00	12.75	-	3.80	-	-	-8	394	386
Deadend	Deadend Insulator - 15 kV	NVE	52.10	-54.00	173.9	180.0	3.00	12.75	-	3.80	-	-	19	394	413
Bolt	Three Bolt	ZFS	24.20	6.29	180.0	90.0	5.00	0.00	-	3.00	-	-	5	0	5
Bolt	Three Bolt	COX	22.00	6.47	180.0	90.0	5.00	0.00	-	3.00	-	-	6	0	6
Deadend	CUTOUT	NVE	48.90	32.00	169.4	0.0	3.00	12.75	-	3.80	-	-	11	370	381
Deadend	CUTOUT	NVE	48.90	0.00	90.0	0.0	3.00	12.75	-	3.80	-	-	-1	370	369
Deadend	CUTOUT	NVE	48.90	-32.00	10.6	0.0	3.00	12.75	-	3.80	-	-	-13	370	357
Spool	Spool Insulator - 20 kV	NVE	35.10	5.39	270.0	180.0	1.00	2.12	-	2.50	-	-	0	29	29
											Totals:	**0**	**-8**	**5,995**	**5,987**

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	Span/Head	CTL	19.30	19.30	96.00	0.250	75.0	270.0	0.0	0.121	95.42	0.00
Guy 2: EHS 1/4	Span/Head	CTL	19.30	19.30	162.00	0.250	75.0	90.0	0.0	0.121	160.65	1.98

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	Span/Head	23,000,000	6,650	0.90	5,985	700	1,297	0	0	0	0	0	427
Guy 2: EHS 1/4	Span/Head	23,000,000	6,650	0.90	5,985	700	2,440	869	869	0	869	-110	-1,409
									Totals:	**0**	**869**	**-110**	**-982**

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 (%)
Anchor	CTL	30.00	96.00	270.0	20,000	1.00	20,000	1,297	0	6.5

Anchor			CTL	30.00	162.00	90.0	20,000	1.00	20,000	2,440	869	12.2

Pole Buckling

Buckling Constant	Buckling Column 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 of Safety
0.71	31.62	34.71	14.75	14.49	7.32	16.56	1,000,000	50.00	57.00	56.10	206,883	**4,900**	**42.22**

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*

Tuesday, November 11, 2014 9:09:31 AM

File Name:	**P40280 GRADE B**	Pole Length / Class:	**65 / 3**	Code:	**NESC**	Structure Type:	**Guyed**
Pole Num:	**P40280**	Pole Species:	**WESTERN RED CEDAR**	NESC Rule:	**Rule 250B**	Status:	**N/A**
Aux Data	**COX**	Setting Depth (ft):	**8.40**	Construction Grade:	**B**	Pole Strength Factor:	**0.65**
Aux Data	**LAKE MEAD &**	G/L Circumference (in):	**46.98**	Loading District:	**Light**	Transverse Wind LF:	**2.50**
Aux Data	**GOODWILL**	G/L Fiber Stress (psi):	**6,000**	Ice Thickness (in):	**0.00**	Wire Tension LF:	**1.65**
Aux Data	**2509 E LAKE MEAD**	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:	**127.0%**	0.0 ft	2.7°
Groundline:	**127.0%**	0.0 ft	2.7°
Vertical:	**7.2%**	31.2 ft	0.0°

Pole Moments		Load Angle	Wind Angle
Max Capac. Util:	**133,141 ft-lb**	7.9°	2.7°
Groundline:	**133,141 ft-lb**	7.9°	2.7°

Guy Summary

	Attach Height (ft)	**Guy Tensions** % Allowable Tension	Wind Angle	**Maximum Guy Tensions** % Allowable Tension	Wind Angle
Guy 1	21.9	**46.4%**	2.7°	**72.0%**	90.0°
Guy 2	18.8	**0.0%**	2.7°	**23.9%**	270.0°

Anchor Summary

	Lead Length (ft)	**Max. % Allow. Capacity**
Anchor 1	96.0	**7.2%**
Anchor 2	4.4	**36.3%**

GROUNDLINE LOAD SUMMARY:*Wind at 2.7°, Applied Moment 133,141 ft-lb at 7.9°, Allowable Moment 106,723 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:	1,498	43.8	**74,467**	17.7	**22.1**	**2,721**	596	3	**2,725**	**69.9**
Comms:	197	5.8	**3,880**	6.3	**7.9**	**142**	79	0	**142**	**3.6**
Guys/Braces:	-79	-2.3	**-2,281**	0.3	**0.4**	**-83**	4,606	26	**-57**	**-1.5**
Power Equipment:	378	11.0	**18,491**	10.1	**12.6**	**676**	2,048	12	**687**	**17.6**

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

² Worst Wind per Guy Wire
³ Wind at 178.6°

Pole:	1,177	34.4	**29,508**	22.2	**27.6**	**1,078**	2,985	17	**1,095**	**28.1**
Crossarms:	10	0.3	**525**	0.2	**0.3**	**19**	198	1	**20**	**0.5**
Risers:	144	4.2	**3,521**	0.6	**0.7**	**129**	157	1	**130**	**3.3**
Insulators:	94	2.7	**5,028**	0.4	**0.5**	**184**	130	1	**184**	**4.7**
Pole Load:	3,417	100.0	**133,141**	100.0	**124.8**	**4,865**	10,798	61	**4,927**	**126.3**
Pole Reserve Capacity:			**-26,418**		**-24.8**	**-965**			**-1,027**	**-26.3**

LOAD SUMMARY BY OWNER

NVE:	1,946	**98,170**	**3,587**	3,055	17	**3,605**	**92.4**
ZFS:	75	**1,171**	**43**	4,665	27	**69**	**1.8**
COX:	197	**3,875**	**142**	87	0	**142**	**3.6**
CTL:	22	**416**	**15**	6	0	**15**	**0.4**
Pole:	1,177	**29,508**	**1,078**	2,985	17	**1,095**	**28.1**
Totals	3,417	**133,141**	**4,865**	10,798	61	**4,927**	**126.3**

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	477 AAC	NVE	56.68	54.28	0.7950	-	0.447	96.0	90.0	96.0	1,540	19,707	-141	4,015	23,581
Primary	477 AAC	NVE	56.68	54.28	0.7950	-	0.447	125.0	270.0	125.0	1,540	-19,707	-184	5,228	-14,663
Primary	477 AAC	NVE	56.68	18.81	0.7950	-	0.447	96.0	90.0	96.0	1,540	19,707	50	4,015	23,772
Primary	477 AAC	NVE	56.68	18.81	0.7950	-	0.447	125.0	270.0	125.0	1,540	-19,707	65	5,228	-14,414
Primary	477 AAC	NVE	56.68	18.81	0.7950	-	0.447	96.0	90.0	96.0	1,540	19,707	-46	4,015	23,677
Primary	477 AAC	NVE	56.68	18.81	0.7950	-	0.447	125.0	270.0	125.0	1,540	-19,707	-60	5,228	-14,539
Primary	477 AAC	NVE	56.68	54.28	0.7950	-	0.447	96.0	90.0	96.0	1,540	19,707	145	4,015	23,868
Primary	477 AAC	NVE	56.68	54.28	0.7950	-	0.447	125.0	270.0	125.0	1,540	-19,707	189	5,228	-14,290
Primary	477 AAC	NVE	53.18	54.30	0.7950	-	0.447	96.0	90.0	96.0	1,540	18,491	-141	3,768	22,117
Primary	477 AAC	NVE	53.18	54.30	0.7950	-	0.447	125.0	270.0	125.0	1,540	-18,491	-184	4,906	-13,769
Primary	477 AAC	NVE	53.18	18.88	0.7950	-	0.447	96.0	90.0	96.0	1,540	18,491	50	3,768	22,308
Primary	477 AAC	NVE	53.18	18.88	0.7950	-	0.447	125.0	270.0	125.0	1,540	-18,491	65	4,906	-13,520
Primary	477 AAC	NVE	53.18	54.30	0.7950	-	0.447	96.0	90.0	96.0	1,540	18,491	145	3,768	22,404
Primary	477 AAC	NVE	53.18	54.30	0.7950	-	0.447	125.0	270.0	125.0	1,540	-18,491	189	4,906	-13,396
Other	288ct SELF SUPPORT	ZFS	22.20	8.48	0.8600	-	0.350	96.0	90.0	96.0	1,500	7,514	-18	1,700	9,197
Other	288ct SELF SUPPORT	ZFS	22.20	8.48	0.8600	-	0.350	125.0	270.0	125.0	1,500	-7,514	-23	2,214	-5,323
Service	#2 AL TPX (SLACK)	NVE	41.30	6.94	0.7600	-	0.270	96.0	90.0	96.0	500	4,660	2	2,795	7,457
											Totals:	**4,660**	**104**	**69,703**	**74,467**

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, 18ct 1/4" MESS 24ct PROP	COX	20.00	8.63	0.9600	-	0.562	96.0	90.0	96.0	1,500	6,769	-29	1,710	8,451
CATV	18ct 1/4" MESS 24ct PROP	COX	20.00	8.63	0.9600	-	0.412	125.0	270.0	125.0	1,500	-6,769	-28	2,226	-4,570
											Totals:	**0**	**-56**	**3,936**	**3,880**

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-100KVA	NVE	45.10	24.44	45.0	45.0	1,000.0	56.00	-	28.00	-	-	2,435	11,004	13,439
Transformer	1PH-25KVA	NVE	45.10	21.44	180.0	180.0	365.00	39.00	-	22.00	-	-	-969	6,021	5,052
											Totals:	**0**	**1,466**	**17,025**	**18,491**

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 10 -	NVE	55.70	5.47	90.0	90.0	66.00	4.50	3.50	-	120.00	-	6	265	271
Normal	CROSSARM 3-1/2 X 4-1/2 X 10 -	NVE	52.20	5.71	90.0	90.0	66.00	4.50	3.50	-	120.00	-	6	248	254
											Totals:	**0**	**13**	**513**	**525**

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 10.0°	3" Riser	NVE	36.00	7.77	10.0	10.0	6.00	432.00	-	0.00	-	-	45	722	767
2" Riser	2" Riser	NVE	36.00	7.77	315.0	315.0	2.70	432.00	-	0.00	-	-	12	2,743	2,755
											Totals:	**0**	**57**	**3,464**	**3,521**

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)*
Pin	Pin Insulator - 15 kV	NVE	55.89	54.00	174.2	0.0	10.00	9.50	-	7.50	-	-	-66	622	556
Pin	Pin Insulator - 15 kV	NVE	55.89	-18.00	16.9	0.0	10.00	9.50	-	7.50	-	-	23	622	645
Pin	Pin Insulator - 15 kV	NVE	55.89	18.00	163.1	0.0	10.00	9.50	-	7.50	-	-	-21	622	601
Pin	Pin Insulator - 15 kV	NVE	55.89	-54.00	5.8	0.0	10.00	9.50	-	7.50	-	-	68	622	690
Pin	Pin Insulator - 15 kV	NVE	52.39	54.00	174.0	0.0	10.00	9.50	-	7.50	-	-	-66	583	517
Pin	Pin Insulator - 15 kV	NVE	52.39	-18.00	17.6	0.0	10.00	9.50	-	7.50	-	-	23	583	606
Pin	Pin Insulator - 15 kV	NVE	52.39	-54.00	6.0	0.0	10.00	9.50	-	7.50	-	-	68	583	651
Bolt	Three Bolt	ZFS	22.20	5.98	180.0	90.0	5.00	0.00	-	3.00	-	-	-5	0	-5
Bolt	Three Bolt	COX	20.00	6.13	180.0	90.0	5.00	0.00	-	3.00	-	-	-5	0	-5
Spool	Spool Insulator - 20 kV	NVE	41.30	4.69	90.0	0.0	1.00	2.12	-	2.50	-	-	0	34	34
Deadend	CUTOUT	NVE	48.90	4.18	45.0	45.0	3.00	12.75	-	3.80	-	-	4	369	373
Deadend	CUTOUT	NVE	48.90	4.18	135.0	135.0	3.00	12.75	-	3.80	-	-	-3	369	366
											Totals:	**0**	**19**	**5,008**	**5,028**

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	ZFS	21.90	0.00	4.36	0.312	75.0	270.0	78.8	0.205	20.83	0.88
Guy 2: EHS 1/4	Span/Head	CTL	18.80	18.80	96.00	0.250	75.0	90.0	0.0	0.121	95.32	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 5/16	Sidewalk	23,000,000	11,200	0.90	10,080	700	7,262	4,677	4,677	4,588	912	-125	-2,697
Guy 2: EHS 1/4	Span/Head	23,000,000	6,650	0.90	5,985	700	1,432	0	0	0	0	0	416
									Totals:	**4,588**	**912**	**-125**	**-2,281**

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] (%)
Anchor	CTL	30.00	96.00	90.0	20,000	1.00	20,000	1,432	0	7.2
Single Helix Anchor	ZFS	18.00	4.36	270.0	20,000	1.00	20,000	7,262	4,677	36.3

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	31.20	34.22	13.52	20.94	7.32	14.96	1,000,000	50.00	57.00	56.60	149,907	**10,798**	**13.88**

GLENDA MILLS
EXHIBIT 4

June 25, 2014

Glenda Mills
Cox Communications
1700 Vegas Drive
Las Vegas, Nevada 89106

Re: Joint Use License Application Requirements
Pole Attachment Agreement # (PAC1001)

Dear Ms. Mills,

NV Energy has appreciated the several opportunities to meet with you and the Cox Communications' (Cox) team to discuss ways in which NV Energy and Cox can move the pole attachment application process forward and still meet each company's goals and expectations. NV Energy, as it has expressed, ultimately expects that its electric distribution system produce safe and reliable power to its customers. We also know that Cox aims to provide the best service to its customers.

NV Energy has considered the comments and suggestions received from Cox, including Cox's assertions that NV Energy is not providing equal access for Cox to its distribution poles, with the focus on NV Energy's agreement(s) with Century Link. NV Energy, while disagreeing with this assertion, has revised its pole attachment application process with what is identified as the Joint Use License Application Requirements (attached) to the operative pole attachment agreement between Cox and NV Energy. You will note that NV Energy is continuing with its client driven process, requiring Cox, the Applicant, to perform the structural engineering aspect of distribution pole attachment licensing. However, the requirement of obtaining a Professional Engineering stamp has been removed, which removes any and all perceived discrepancies in the requirements for Century Link to apply for attachment to NV Energy poles, and the requirements for Cox or any other competitive local exchange carrier to apply for attachment to NV Energy poles.

This change in process does not eliminate Cox's responsibility to ensure the structural integrity and NESC compliance of its company's proposed attachment(s) to NV Energy infrastructure.

Pursuant to NV Energy's pole attachment application requirements, NV Energy requires all entities seeking to attach to its distribution poles to ensure they have performed a complete structural analysis on each particular pole in compliance with all of the standards set forth in NV Energy's Joint Use Attachment License Application Requirements. This analysis is vital to maintaining a safe and reliable infrastructure.

By submitting the license application, you represent and warrant that you have met the contractual obligations of your Pole Attachment Agreement and are thereby affirming you performed a complete structural analysis of the effects of the proposed attachment(s) to NV

Energy poles and have reached the conclusion that said poles will adequately and safely support such proposed attachment(s) pursuant to applicable engineering standards.

The engineering review of transmission structure attachment applications will remain with the NV Energy Transmission Engineering Department.

Sincerely,

Patricia Ortwein
Manager, Rule 9 Contract and Joint Use Administration

Cc: Colin Harlow
Tracy Brecke
Larry Luna
Elmer Herndon
Tania Jarquin

Attachment:
Joint Use License Application Requirements

NV ENERGY JOINT USE LICENSE APPLICATION REQUIREMENTS

Distribution Applications

To ensure the integrity of NV Energy's overhead plant, Applicant must assure itself that each Distribution pole in the application will have adequate strength to support the addition of Applicant's facilities. The information below shall serve as a guide to Applicant for completing its own structural analysis, but this information does not need to be submitted to NV Energy. The Applicant must still provide their proposed attachment details as requesting in the license application (cable specifications, height of attachment, make-ready solutions, etc.).

- Gather all pole data related to performing a complete structural analysis for each pole. This includes field information for facilities in the power space and communications space, alike. See ***Appendix A*** for a detailed list of the pole data requirements.
- Determine conventional, industry recognized make-ready solutions for facilities in both the power space and communications space. Compliance with all applicable NESC standards and clearances must be maintained at all times. Applicant is encouraged to favor the common, power space make-ready solutions listed in ***Appendix B***, as doing so will facilitate acceptance by NV Energy and speed cost estimation. ***Appendix C*** lists anchor and down-guy sharing guidelines to assist in the make-ready determinations.
- Perform structural analysis calculations for each pole in the application following all applicable standards outlined in the latest NESC edition. Load analyses must reflect make-ready solutions, apply overload and strength reduction factors for Grade B construction, and include calculations and results specifying "pass" or "fail" for:
    - Overturning moment of the pole at ground line
    - Down-guy strengths [***Appendix D*** lists typical guy wire sizes and guy strengths used by NV Energy. ***Appendices E and F*** list typical working strengths for NV Energy conductors used in Northern and Southern Nevada, respectively.]
    - Buckling using the Euler Method (for anchored poles and as necessary for tangent poles)

  The analyses must also include verification of the following:
    - Summation of down-guy tensions does not exceed the ultimate holding strength of the anchor(s). ***Appendices G and H*** list typical holding strengths for NV Energy anchors used in Northern Nevada and Southern Nevada, respectively. Also, see ***Appendix C*** for anchor and down-guy sharing guidelines.

  See ***Appendix I*** for a sample distribution report showing pole data, make-ready notes, and structural analysis reports.

Transmission Applications

NV Energy will perform the structural analysis for each Transmission pole in the application. For these applications, it is the Applicant's responsibility to:

- Gather all pole data related to performing a complete structural analysis for each pole. This includes field information for facilities in the power space and communications space, alike. See ***Appendix A (page 3)*** for a detailed list of the pole data requirements.
- Determine conventional, industry recognized make-ready solutions for facilities in both the power space and communications space. Compliance with all applicable NESC standards and clearances must be maintained at all times. Applicant is encouraged to favor the common, power space make-ready solutions listed in ***Appendix B (page 6)***, as doing so will facilitate acceptance by NV Energy and speed cost estimation. ***Appendix C*** lists anchor and down-guy sharing guidelines to assist in the make-ready determinations.
- Submit all pole data and make-ready solutions to be used by NV Energy in the analysis. This information is subject to verification by NV Energy (see ***Audit Process*** below for more details). ***Appendix J*** shows a sample template for submitting the pole data and make-ready notes.

EXCEPTIONS: An application is not needed for RISER ONLY installations, but if there are any cable storage attachments associated with the riser then an application must be submitted describing the length, size, and location of the attachments.

Audit Process

The validity of the information submitted in the application is subject to verification by NV Energy. If the application is found to contain pervasive errors or omissions, then the application will be rejected and returned to the Application with a brief explanation as to the nature of the denial. The explanation will be sufficient to guide the Applicant in their corrections; however, detailed information will not be provided as the Applicant is responsible for the quality assurance of its submissions. Applicant is advised that rejected applications will constitute an increase in the auditing frequency, which may cause processing delays for future submissions.

Appendix A

Pole Data Requirements

Applicant must collect the following information for each pole in the application:

- Pole Information
  - Route map
    - Show pole locations in relationship to streets, roads, and other geographical landmarks
    - Pole data list in application shall match and be in the same order as those appearing in the map
  - Pole number
  - Pole type (Transmission, Distribution, Wood, Steel)
    - For wood poles, wood species (e.g. Western Red Cedar, Douglas Fir, etc.)
    - For steel poles, data on name plate (welded ~ 5' above ground)
  - Pole length*
  - Height of top of pole* *(feet and inches)*
  - Pole class
  - Ground line circumference *(inches)*
  - Pictures of pole
    - Provide a minimum of one picture showing pole from ground line to top that can be utilized to scale attachment and equipment locations on pole
- Existing Attachment Information (for ALL attachments on pole, NVE and 3rd Party)
  - Cable Information
    - Size
      1. For 3rd Party Lines, specify the Owner and the Effective (cable + strand) Bundle Diameter (e.g. "TEL 1 inch overall diameter")
    - Span lengths, ahead and back *(feet)*
    - Attachment height* *(feet and inches)*
    - Direction of attachment**
  - Riser Information
    1. Riser thickness out from face of pole (e.g. "3 inch u-guard")
    2. Distance from grade to the top of riser* *(feet and inches)*
    3. Location on pole**
  - Equipment Information
    - NVE Equipment
      1. Type and Name (e.g. "75 KVA transformer number HHH1234")
      2. Distance from grade to the top of equipment* *(feet and inches)*
      3. Location on pole**
    - 3rd Party Equipment
      1. Owner and Type (e.g. "CATV Splice Can")
      2. Dimensions: length, width, and height *(inches)*
      3. Distance from grade to the top of equipment *(feet and inches)*
      4. Location on pole**

***All measurements above the communications space must be made by remote means, such as optical surveying or laser range finding. In <u>no event</u> shall mechanical devices, such as measuring sticks, be used to collect power space data. Applicant is expected to follow these guidelines. NV Energy will not be held responsible for the acts or omissions of Applicant in completing its survey. Applicant proceeds in its survey assuming all risks of injury, death, or other damages.**
****Use compass directions: North (N)= 0° or 360°, Northeast (NE)= 45°, East (E)= 90°, Southeast (SE)= 135°, South (S)= 180°, Southwest (SW)= 225°, West (W)= 270°, Northwest (NW)= 315°**

Continued from previous page:

- Existing Anchor/Guying Information (for all guys/anchors, NVE and 3rd Party)
    - D-guy diameter *(inches)*
    - Height of D-guy attachment* *(feet and inches)*
    - Lead from pole to anchor *(feet and inches)*
    - Direction of D-guy lead**
    - Anchor rod diameter *(inches)*
- Proposed Attachment and Additional Attachment (Overlash) Information
    - Cable Information
        - Effective (cable + strand) bundle diameter *(inches)*
        - Weight *(lb/ft)*
        - Total line tension under NESC loading conditions *(lbs)*
            1. For Southern Nevada (NESC Light Loading District) these are 30 deg Fahrenheit with no ice and a 9 # wind load
            2. For Northern Nevada (NESC Medium Loading District) these are 15 deg Fahrenheit with ¼" radial ice and a 4 # wind load
        - Attachment height *(feet and inches)*
        - Direction of attachment**
    - Equipment Information
        - Total "projected area" of the equipment *(square feet)*
        - Distance from grade to the top of equipment *(feet and inches)*
        - Location on pole**
    - Riser Information
        - Riser thickness out from face of pole (e.g. "3 inch u-guard")
        - Distance from grade to the top of riser *(feet and inches)*
        - Location on pole**
- Anchoring-Guying Information (for each proposed guy and anchor)
    - D-guy diameter *(inches)*
    - Height of D-guy attachment *(feet and inches)*
    - Lead from pole to anchor *(feet and inches)*
    - Direction of D-guy lead**
    - Anchor Assembly (e.g. "24 inch plate, 1 inch rod triple eye")

***All measurements above the communications space must be made by remote means, such as optical surveying or laser range finding. In <u>no event</u> shall mechanical devices, such as measuring sticks, be used to collect power space data. Applicant is expected to follow these guidelines. NV Energy will not be held responsible for the acts or omissions of Applicant in completing its survey. Applicant proceeds in its survey assuming all risks of injury, death, or other damages.**
****Use compass directions: North (N)= 0° or 360°, Northeast (NE)= 45°, East (E)= 90°, Southeast (SE)= 135°, South (S)= 180°, Southwest (SW)= 225°, West (W)= 270°, Northwest (NW)= 315°**

Appendix B

Common Make-Ready Solutions

Common NV Energy Make-Ready Solutions for Telecom Attachments:

General Pole Issues

-Reframe 3 phase Delta Primary [tangent] to a horizontal configuration with Neutral and phases up on arm.

Primary on Pole

-Move [tangent] power Neutral higher up on pole without need of other power facilities reframing.

+ Move transformer higher up on pole.
+ Move fused cut-out assembly higher up on pole.

Secondary on Pole

-Move up Secondary power [triplex] dead-end.

-Fold up and tape in-place Secondary drip loops [to increase separation above communications attachment].

Primary in Span

-Re-sag Primary and Neutral to achieve increased separation from communications cables below. (30" radial separation needed)

Secondary in Span

-Retire open Secondary and replace with triplex, including replacement of 3-spool rack with single dead-end spool, shackle & eyebolt.

-Retire/remove abandoned span of secondary.

-Re-sag Secondary to achieve increased separation from communications cables below. (30" radial separation needed)

Risers

-Extend/add U-guard over Secondary riser cable.

+ If possible, splice and extend Secondary riser cable to allow such upward extension of U-guard cover below transformer, drip loops, etc.
+ Otherwise, change-out secondary riser cable to allow such upward extension of U-guard cover below new splice connectors, transformer, etc.

Grounding

-Replace/reattach lower [6'-10'] segment of pole ground wire [stolen] and cover with ¾" WOOD U-guard, heavily stapled to pole.

Anchoring & Down Guys

-Install NVE spec plate anchor w 3-knuckle eye [in open ground].

+ Pull up sidewalk slab and then repour.
+ Relocate down-guy(s) to new anchor.

-Re-tension down guy(s).

Note:

- ***Highlighted items usually occur together***
- ***Cost estimates are available for these items; however, Applicant Purchase Orders must commit to payment of ACTUAL NV Energy cost incurred, not the estimated values.***
- ***Applicant is in no way restricted to these make-ready options. Other make-ready solutions may be appropriate but will require a specific design and cost estimate.***

Appendix C

Anchor & Down-Guy Sharing Guidelines

Anchor Guidelines:

To minimize repeated disruption of NV Energy and public infrastructure, NV Energy reserves the right to require installation of anchors with holding strength in excess of that needed for Applicant's attachments alone. All new anchor installations shall be of current NV Energy standard specification [3-knuckle eye, 1"x10' rod, 24" plate] absent specific NV Energy authorization to the contrary. NV Energy authorization for lesser capacity anchors shall not be unreasonably withheld for those locations where it is unlikely that other users will request attachment space in the future, and where there is no significant risk of undermining adjacent anchor installations or necessity of demolishing and reconstructing paved surfaces.

Down-Guy Sharing Guidelines:

Telecommunications down-guy load sharing through strand upgrade and rearrangement of existing down-guy attachments on the pole will be approved subject to case specific, documented, engineering design, and concurrence among the affected telecommunications users. Installation of more than 4 telecommunications down-guys or more than two anchors in any lead is to be avoided, as is the use of bolt-on auxiliary anchor eyes. However, NV Energy approval of such will not be unreasonably withheld.

Appendix D

Typical Guy Wire Sizes and Guy Strengths used by NV Energy

NORTHERN NEVADA	
Guy Wire Size*	**Strength** (lb)**
3/8" EHS Zinc Coated	13,860
3/8" EHS	13,860
1/2" EHS	24,210
*Older installations may have used ¼" EHS and 5/16" EHS (90% of Rated Breaking Strength=5,985 lb, and 10,080 lb), but these are no longer used and should not be proposed as part of make-ready solutions.	
**90% of Rated Breaking Strength	

SOUTHERN NEVADA	
Guy Wire Size	**Strength* (lb)**
1/4"EHS	5,985
5/16" EHS	10,080
7/16" EHS	18,720
9/16" EHS	31,500
*90% of Rated Breaking Strength	

***Note**: These values are only approximations and will vary based on field conditions. The Applicant's Engineer is responsible for determining the appropriate guy strengths for their analyses.*

Appendix E

Typical Working Strengths for NV Energy Conductors (Northern Nevada)

Conductor Strengths			
Conductor AWG or KCMIL	Code Name	Breaking Strength (lbs.)	Working Strength (lbs)
Primary Conductors			
#2 ACSR	Sparrow	2,850	1,425
1/0 ACSR	Raven	4,380	2,190
2/0 AA	Aster	2,510	1,255
2/0 ACSR	Quail	5,310	2,655
4/0 AA	Oxlip	3,830	1,915
4/0 ACSR	Penguin	8,350	4,175
397.5 AA	Canna	7,110	3,555
397.5 ACSR	Ibis	16,300	8,150
477 ACSR	Hawk	19,430	9,715
636 AA	Orchid	11,400	5,700
636 ACSR	Grosbeak	25,200	12,600
795 AA	Arbutus	13,900	6,950
Secondary Conductors			
#2 TRIPLEX	Cockle	1,860	930
#2 QUADRUPLEX	Palomino	2,850	1,425
2/0 TRIPLEX	Clio	3,550	1,775
2/0 TRIPLEX	Runcina	5,310	2,655
2/0 QUADRUPLEX	Grullo	5,310	2,655
4/0 TRIPLEX	Zuzara	8,350	4,175
4/0 QUADRUPLEX	Appaloosa	8,350	4,175

***Note:** These values are only approximations and will vary based on field conditions. The Applicant's Engineer is responsible for determining the appropriate working strengths for their analyses.*

Appendix F

Typical Working Strengths for NV Energy Conductors (Southern Nevada)

SHORT SPAN
225' ruling Span – 300' max

LONG SPAN
(a) 350' Ruling Span – 550' max
(b) 500' ruling Span – 625' max
(c) 800' ruling span – 1000' max

Total Line Tension Under Maximum Loading Conditions

Type and Size of Conductors			NESC Light Loading District						
			Short Span				Long Span (a)		
			Number of Conductors						
			1	2	3	4	1	2	3
Bare Primary Conductors	ACSR	4	282	564	846		603	1,206	1,809
		2	397	794	1,191		822	1,644	2,466
		2/0	1,355 (a)	2,710	4,065		1,355	2,710	4,065
		4/0	1,000	2,000	3,000		2,500	5,000	7,500
		336.4	1,470	2,940	4,410		3,850	7,700	11,550
		477	1,965	3,930	5,895		5,250	10,500	15,750
		636					6,963 (b)	13,926	20,888 (b)
		9000					9,000 (c)	18,000 (c)	27,000 (c)
	AA	2	460	920	1,380				
		2/0	565	1,130	1,695				
		4/0	811	1,622	2,433		1,060	2,120	3,180
		336.4	1,165	2,330	3,495		1,450	2,900	4,350
		477	1,540	3,080	4,620		1,865	3,730	5,595
		*556.5	*3,390	6,780	10,170				
		636	2,204	4,408	6,612		2,310	4,620	6,930
		*715.5	*2,401	4,802	7,203		*3,110	6,220	9,330
		954	3,068	6,136	9,204		6,509 (b)	13,118 (b)	19,527 (b)
	CU	6	275	550	825		520	1,040	1,560
		4	420	840	1,260		880	1,760	2,640
		2	625	1,250	1,875		1,130	2,260	3,390
		2/0	1,180	2,360	3,540		2,030	4,060	6,090
		4/0	1,825	3,650	5,475		3,000	6,000	9,000
Secondary Conductors	Multiplex	4			585	826			
		2			774	1,098			
		2/0			1,507	1,872			
		4/0			1,803	2,645			

* Formerly C.P. National: Henderson & Laughlin Service Areas

Note: These values are only approximations and will vary based on field conditions. The Applicant's Engineer is responsible for determining the appropriate working strengths for their analyses.

Appendix G

Typical Holding Strengths for NV Energy Anchors (Northern Nevada)

TABLE 1 ANCHOR ROD STRENGTHS		
Rod Size	Breaking Strength	Working Strength
1" x 7'	36,000	18,000
1" x 8'	36,000	18,000

TABLE 2 ANCHOR HOLDING POWER					
Anchor @ 7'-0" Depth	Soil Type Classification*				
	1 thru 3	4	5	6	7
Expanding 12" – 8 Way w/ 1 ¼" Rod	20,000	17,000	13,250	10,750	8,000
Crossplate 20" w/ 1" Rod	17,000	14,500	12,000	9,500	7,000
Crossplate 24" w/ 1" Rod	22,500	18,500	15,000	11,750	9,000
Rock ¾" x 30" No Rod Required	11,500	N/A	N/A	N/A	N/A
Rock 1" x 53" No Rod Required	18,000	N/A	N/A	N/A	N/A
* For Soil Classification Descriptions, Refer To Table 4					

Note:

- ***These values are only approximations and will vary based on field conditions. The Applicant's Engineer is responsible for determining the appropriate holding strengths for their anchor analyses.***
- ***New installations utilize helix anchors, but older installations may have utilized cross plate, rock anchors, or other types.***

TABLE 3-A MID-STRENGTH SCREW ANCHORS				
Installing Torque	Shear Pins Required	Twin 4" Helices	Twin 8" Helices	Twin 10" Helices
1,500	3	*	18,000	18,000
2,000	4	*	20,000	20,000
3,000	6	26,000	26,000	26,000
4,000	8	33,000	33,000	33,000
5,000	10	36,000	36,000	36,000
6,000	12	36,000	36,000	36,000
* Do Not Use This Anchor At This Torque				

The above screw anchors are used with 7' x 1" galvanized steel rod with a triple strand-eye nut. 3-½' x 1" rod extensions with couplings are used to set anchors deeper.

Anchor holding power of 36,000 pounds is limited only by minimum yield strength of the 1" anchored rod.

TABLE 3-B HIGH-STRENGTH SCREW ANCHORS						
Installing Torque	Shear Pins Required	6" Helix	8" Helix	10" Helix	12" Helix	14" Helix
1,500	3	*	11,500	12,500	16,000	16,000
2,000	4	*	14,000	15,000	20,000	20,000
3,000	6	18,500	20,000	22,500	24,000	24,000
4,000	8	25,000	27,000	28,000	30,000	30,000
4,500	9	28,000	29,000	32,000	33,000	33,000
5,000	10	31,000	32,000	34,000	36,000	36,000
5,500	11	35,000	36,000	36,000	*	*
6,000	12	36,000	*	*	*	*
* Do Not Use This Size Anchor At This Torque						

Note:

- ***These values are only approximations and will vary based on field conditions. The Applicant's Engineer is responsible for determining the appropriate holding strengths for their anchor analyses.***
- ***New installations utilize helix anchors, but older installations may have utilized cross plate, rock anchors, or other types.***

TABLE 4 SOIL CLASSIFICATIONS		
Class	Usual Consistency	Possible Soil Characteristics or Composition
1	Solid	Hard Rock
2	Solid or In Layers	Laminated Rock, Shale, Sandstone, Slate
3	Hard, Dry	Hard Pan, Broken Bedrock, Compact Clay-Gravel Mixture
4	Crumbly, Damp	Clay Pan, Compact Sand-Gravel Mixture
5	Firm, Moist	Firm Clay, Loose Sand-Gravel Mixture, Compact Coarse Sand
6	Plastic, Wet	Soft Plastic Clay, Clayey Silt, Loose Coarse Sand, Compact Fine Sand. Areas Seasonally Wet And Usually Fairly Flat
7	Loose Dry or Loose Wet	Wet Clay, Silt, Mud, Loose Fine Sand
8	Marshy	Marshes And Swamps. Install Anchor Deep Enough To Penetrate Class 5, 6, Or 7 Soils.

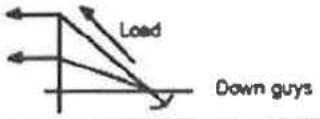
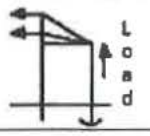
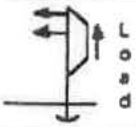
TABLE 5 STRUT SELECTION CHART			
Total Pull (Ps) Exerted On Pole (lbs.)	Length of Strut	I.D. Size Of Strut	
		2"	2½"
Under 6,000	6' - 12'	X	
6,000 - 8,000	6' - 10'	X	
	10' - 12'		X
8,000 - 10,000	6' - 8'	X	
	8' - 12'		X
10,000 - 12,000	6' - 8'	X	
	8' - 12'		X

Note:

- ***These values are only approximations and will vary based on field conditions. The Applicant's Engineer is responsible for determining the appropriate holding strengths for their anchor analyses.***
- ***New installations utilize helix anchors, but older installations may have utilized cross plate, rock anchors, or other types.***

Appendix H

Typical Holding Strengths for NV Energy Anchors (Southern Nevada)

Ultimate Holding Strength of Anchors and Strut Guys in Pounds						
Soil Classification						Owner
	Anchor Assembly			Sidewalk	Strut-Guy	
	1 16" plate, 3/4" or 5/8" rod twin eye	2* 20" plate, 3/4" CW rod twin eye	3 24" plate, 1" rod triple eye	24" plate, 1" rod triple eye	24" plate, 1" rod	
3 HARD PAN Dry, requires use of a digging bar; dense clayey sands & gravel hard silts & clays	12,000	15,900	27,000	27,000	4,440	NVE
	8,000	10,600	18,800	18,800	2,960	Century Link
	20,000 (16,000)**	26,500	45,000 (36,000)**	45,000 (36,000)**	***7,400	Not joint use
5 AVG. FIRM Predominant type in L.V.; md dense coarse sand, sandy gravels stiff silts & clays	12,000	15,900	21,000	21,000	4,440	NVE
	8,000	10,600	14,000	14,000	2,960	Century Link
	20,000 (16,000)**	26,500	35,000	35,000	***7,400	Not joint use
7 LOOSE DRY Loose, fine sand & gravel; lack of clay or bonding material	6,600	8,400	11,400	11,400	4,400	NVE
	4,400	5,600	7,600	7,600	2,960	Century Link
	11,000	14,000	19,000	19,000	***7,400	Not joint use

***Anchor size no longer used, but may be encountered in the field.**
****Limiting factor: Rated breaking strength of galvanized anchor eyes used with CU plated (CW) rods prior to 96.**
*****Limiting factor: Rated breaking strength of struts. Use of strut guys is generally not recommended as they only keep the pole (class 3 max.) straight and do not add to the strength of the pole.**

Note:

- ***Joint use anchor holding strength allocation: NVE – 60%, Century Link – 40%.***
- ***These values are only approximations and will vary based on field conditions. The Applicant's Engineer is responsible for determining the appropriate holding strengths for their anchor analyses.***

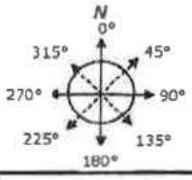
Appendix I

Distribution Sample Report

NVEnergy

Pole Inspection Sheet

Pole # In Field	P12345
Class	4
Length	40
Wood	Western Ponderosa Pine
Gl. Circum	42"
Type	Distribution



Pole # In License	P12345
Date	6/7/2012
Job Name	CATV Attachment
Location	ABC Street and XYZ Way

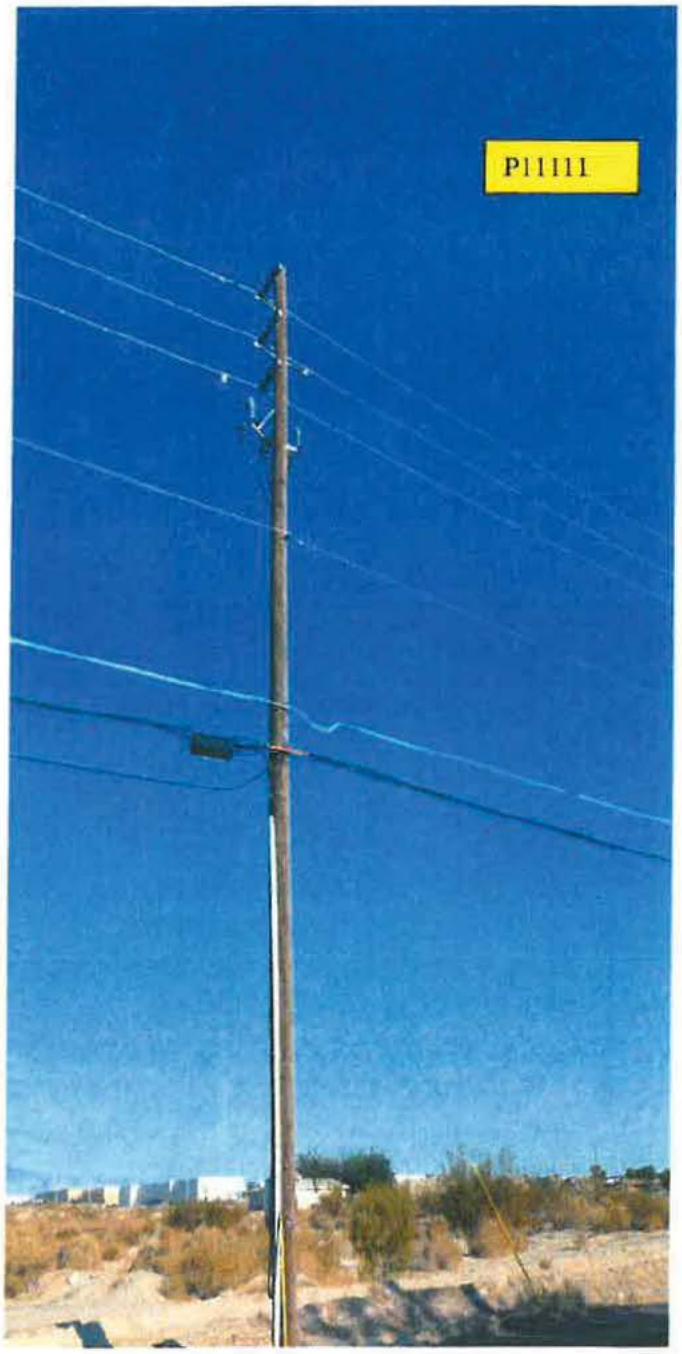
Guy #	Entity	Attachments					Span Length		Direction		Bundle diameter
		Type	# of wires	Size	Height ft	Height in	Ahead ft	Back ft	Ahead deg	Back deg	in
				Top of Pole	32	11					
	NVE	Pri- Tri	3	954 aa	32	4	158'	182'	270°	90°	
1	NVE	Pri- 1 Ø	1	#4 acsr	30	11	155'		0°		
	NVE	2Ø Cutout Brkt		1/0 ug	27	8			270°		
	NVE	Riser		4" u-guard	25	6			45°		
	NVE	Pri- neut	1	#4 acsr	24	5	155'		0°		
	NVE	Pri- neut	1	2/0 acsr	24	5	158'	182'	270°	90°	
	NVE	Sec- svc	1	#4 triplex	24	5	158'		270°		
	NVE	Pal light			23	7			0°		
	COM	3 bolt		5/16"ehs, 144ct	19	0	158'	182'	270°	90°	1.06"
	CATV	3 bolt		1/4 ehs, 2-750cx, 48ct	18	0	158'	182'	270°	90°	1.50"
2	CATV	DE		1/4"ehs, 500cx	18	0	155'		0°		0.75"
	CATV	Proposed		ADD 48ct	18	0	155'		0°		0.98"
	CATV	Riser		2" u-guard	17	0				135°	
	TEL	3 bolt		5/16"ehs, 2.50"cu	14	5	158'	182'	270°	90°	2.82"

Entity	Equipment							Make-Ready Notes (Communications Space)
	Type	Description	Dimensions in	Dimensions in	Height ft	Height in	Location deg	Extend CATV riser, trim trees off CATV midspan, reframe CATV.
CATV	LE	-	12	8	18	0	270°	

Guy #	Entity	Guy Size	Anchor #	Anchor Size & Description	Location deg	Height ft	Height in	Lead ft	Lead in	Make-Ready Notes (Power Space)
1	NVE	5/16"	1	3 eye, 1" rod	180°	30	11	20	0	
2	CATV	5/16"	1	3 eye, 1" rod	180°	18	0	20	0	

Additional Comments:

See attached for picture of pole.


P11111

LICENSEE: [redacted]
APPLICATION: [redacted]
MAP NUMBER: 1 THRU 10

JOB DETAIL (MAKE READY) WORK SHEET

PREPARED BY: [redacted]
CONTACT # [redacted]
FIELDED BY: CFA
DATA ENTRY: CFA

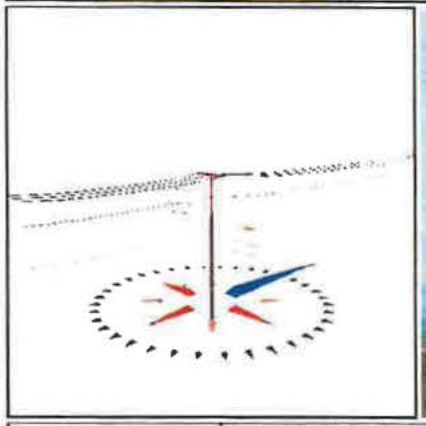
POLE NUMBER	LEAD CODE / MAX GR / POLE ID	LOCATION	POWER WORK	CATV WORK	TELCO WORK	OTHER WORK	OWNER PWR	OWNER TEL	OWNER JP	OWNER CATV
17	273798 45	39 DEG 7.469' N 119 DEG 47.570' W	PRI = 29' 0". 3/8" DG TO 5/8" ANC 19' S. 3/8" DG TO 5/8" ANC 19' S. ***POWER FAILS WIND LOAD.***	ATTACH CATV @ HOA 23' 0". PL 1/4" DG TO NEW 5/8" ANC 15' S. P=16. PL GUY GUARD.			X			
18	36945 40	39 DEG 7.472' N 119 DEG 47.677' W	PRI = 26' 0".	ATTACH CATV @ HOA 21' 0". ***CATV FAILS WIND LOAD.***			X			
19	36946 40	39 DEG 7.475' N 119 DEG 47.766' W	PRI = 24' 0".	ATTACH CATV @ HOA 20' 6".			X			
20	36947 40	39 DEG 7.477' N 119 DEG 47.807' W	PRI = 23' 0".	ATTACH CATV @ HOA 19' 6".			X			
21	36948 40	39 DEG 7.479' N 119 DEG 47.891' W	PRI = 25' 6". EXISTING POLE TOP EXTENSION. TOP OF POLE = 31' 0".	ATTACH CATV @ HOA 21' 0".			X			
22	273797 50	39 DEG 7.481' N 119 DEG 47.977' W	PRI = 31' 6".	ATTACH CATV @ HOA 26' 0". ***CATV FAILS WIND LOAD.***			X			
23	273796 50	39 DEG 7.484' N 119 DEG 48.078' W	PRI = 32' 0". ***POWER FAILS WIND LOAD.***	ATTACH CATV @ HOA 26' 0". PL VGR.			X			
24	273795 50	39 DEG 7.487' N 119 DEG 48.168' W	PRI = 32' 0".	ATTACH CATV @ HOA 26' 0".			X			
25	273794 55	39 DEG 7.490' N 119 DEG 48.226' W	PRI = 29' 9". 3/8" DG TO 1" ANC 30' SE.	ATTACH CATV @ HOA 26' 3".			X			
26	36953 40	39 DEG 7.492' N 119 DEG 48.309' W	PRI = 25' 4".	ATTACH CATV @ HOA 21' 0".			X			

[redacted]

O-Calc® Pro *Analysis Report*

Monday, April 22, 2013 10:26:34 AM

File Name:	198100.pplx	Pole Length / Class:	45 / 3	Code:	NESC	Structure Type:	Guyed
Pole Num:	198100	Pole Species:	DOUGLAS FIR	NESC Rule:	Rule 250B	Status:	N/A
Aux Data	Unset	Setting Depth (ft):	6.00	Construction Grade:	B	Pole Strength Factor:	0.65
Aux Data	Unset	G/L Circumference (in):	41.00	Loading District:	Medium	Transverse Wind LF:	2.50
Aux Data	Unset	G/L Fiber Stress (psi):	8,000	Ice Thickness (in):	0.25	Wire Tension LF:	1.65
Aux Data	Unset	Allowable Stress (psi):	5,200	Wind Speed (mph):	39.53	Vertical LF:	1.50
Aux Data	Unset	Fiber Stress Ht. Reduction:	No	Wind Pressure	4.00		



Pole Capacity Utilization		Height	Wind Angle
Maximum:	23.7%	23.0 ft	263.4°
Groundline:	13.1%	0.0 ft	87.2°
Vertical:	7.3%	30.7 ft	50.0°

Pole Moments		Load Angle	Wind Angle
Max Capac. Util:	8,588 ft-lb	309.8°	263.4°
Groundline:	11,157 ft-lb	89.2°	87.2°

Guy Summary		Guy Tensions		Maximum Guy Tensions	
	Attach Height (ft)	% Allowable Tension	Wind Angle	% Allowable Tension	Wind Angle
Guy 1	38.5	32.9%	87.2°	33.9%	58.4°
Guy 2	23.0	56.5%	87.2°	56.6%	86.5°

Anchor Summary			
	Lead Length (ft)	Lead Angle	Max. % Allow. Capacity
Anchor 1	23.0	180.0°	23.5%
Anchor 2	16.0	280.0°	15.3%

Version: 4.8 / 4.08 * Includes Load Factor(s) Page 1 of 4 ² Worst Wind per Guy Wire ³ Wind at 87.2°

O-Calc® Pro *Analysis Report*

GROUNDLINE LOAD SUMMARY:*Wind at 87.2°, Applied Moment 11,157 ft-lb at 89.2°, Allowable Moment 94,564 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:	397	112.9	**14,688**	131.6	**15.5**	**808**	265	2	**810**	**15.6**
Comms:	1,290	367.3	**29,746**	266.6	**31.6**	**1,636**	112	1	**1,637**	**31.5**
Guys/Braces:	-1,696	-482.7	**-40,252**	-360.8	**-42.6**	**-2,213**	6,465	48	**-2,165**	**-41.6**
Pole:	331	94.2	**5,846**	52.4	**6.2**	**321**	2,039	15	**337**	**6.5**
Crossarms:	6	1.8	**237**	2.1	**0.3**	**13**	342	3	**16**	**0.3**
Insulators:	23	6.6	**891**	8.0	**0.9**	**49**	108	1	**50**	**1.0**
Pole Load:	351	100.0	**11,157**	100.0	**11.8**	**614**	9,331	70	**683**	**13.1**
Pole Reserve Capacity:			**83,407**		**88.2**	**4,586**			**4,517**	**86.9**

LOAD SUMMARY BY OWNER

NVE:	742		**21,058**			**1,158**	6,683	50	**1,208**	**23.2**
[redacted]	-390		**-9,902**			**-544**	2,648	20	**-525**	**-10.1**
Totals	351		**11,157**			**614**	9,331	70	**683**	**13.1**

* includes Load Factor(s)

² Worst Wind per Guy Wire

³ Wind at 87.2°

O-Calc® Pro *Analysis Report*

Detailed Load Components

Power:		Owner	Height (ft)	Horiz. Offset (in)	Cable Dia. (in)	Sag at Max Temp (ft)	Cable Weight (lbs/ft)	Lead/Span Length (ft)	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 4/0 AWG 7 STRAND OXLIP	NVE	38.42	56.79	0.5220	3.74	0.198	163.0	0.0	163.2	788	680	16	2,663	3,359
Primary	AAC 4/0 AWG 7 STRAND OXLIP	NVE	38.42	17.57	0.5220	3.74	0.198	163.0	0.0	163.2	788	680	0	2,663	3,343
Primary	AAC 4/0 AWG 7 STRAND OXLIP	NVE	38.42	56.79	0.5220	3.74	0.198	163.0	0.0	163.2	788	680	-16	2,663	3,327
Primary	AAC 4/0 AWG 7 STRAND OXLIP	NVE	38.42	56.79	0.5220	1.43	0.198	57.0	180.0	57.1	278	-240	5	931	697
Primary	AAC 4/0 AWG 7 STRAND OXLIP	NVE	38.42	17.57	0.5220	1.43	0.198	57.0	180.0	57.1	278	-240	0	931	692
Primary	AAC 4/0 AWG 7 STRAND OXLIP	NVE	38.42	56.79	0.5220	1.43	0.198	57.0	180.0	57.1	278	-240	-6	931	686
Neutral	AAC 1/0 AWG 7 STRAND POPPY	NVE	32.00	6.42	0.3680	3.82	0.099	163.0	0.0	163.2	477	343	-19	1,884	2,208
Neutral	AAC 1/0 AWG 7 STRAND POPPY	NVE	32.00	6.42	0.3680	1.07	0.099	57.0	180.0	57.0	384	-276	-7	659	376
											Totals:	1,387	-25	13,326	14,698

Comm:		Owner	Height (ft)	Horiz. Offset (in)	Cable Dia. (in)	Sag at Max Temp (ft)	Cable Weight (lbs/ft)	Lead/Span Length (ft)	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)*
Fiber	BELOPTIX DT096 - 72 FIBERS - DIELECTRIC (0.516)	[redacted]	23.00	7.34	1.0400	5.92	0.196	194.0	100.0	194.5	774	28,921	53	119	29,093
Fiber	BELOPTIX DT096 - 72 FIBERS - DIELECTRIC (0.516)	[redacted]	23.00	7.34	1.0400	1.37	0.196	57.0	180.0	57.1	392	-203	16	840	653
											Totals:	28,719	69	959	29,746

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 4-3/4 X 5-3/4 X 10 HD	NVE	38.50	6.07	0.0	0.0	114.00	5.75	4.75	-	120.00	-	0	237	237
											Totals:	0	0	237	237

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)*
Suspension	Suspension Insulator - 15 kV	NVE	38.50	54.00	83.6	0.0	11.00	11.50	-	4.75	-	-	75	146	221
Suspension	Suspension Insulator - 15 kV	NVE	38.50	0.00	0.0	0.0	11.00	11.50	-	4.75	-	-	0	146	146
Suspension	Suspension Insulator - 15 kV	NVE	38.50	-54.00	276.4	0.0	11.00	11.50	-	4.75	-	-	-74	146	72
Suspension	Suspension Insulator - 15 kV	NVE	38.50	54.00	96.4	180.0	11.00	11.50	-	4.75	-	-	74	146	220
Suspension	Suspension Insulator - 15 kV	NVE	38.50	0.00	180.0	180.0	11.00	11.50	-	4.75	-	-	0	146	146
Suspension	Suspension Insulator - 15 kV	NVE	38.50	-54.00	263.6	180.0	11.00	11.50	-	4.75	-	-	-75	146	71
Spool	Spool Insulator - 20 kV	NVE	32.00	4.17	270.0	0.0	1.00	2.12	-	2.50	-	-	-1	12	11
Bolt	Single Bolt	[redacted]	23.00	4.84	90.0	0.0	5.00	0.00	-	3.00	-	-	5	0	5
											Totals:	0	4	887	891

* Includes Load Factor(s)

Worst Wind per Guy Wire

Wind at 87.2°

Pole ID: 198100.pplx (198100)

O-Calc® Pro *Analysis Report*

Monday, April 22, 2013 10:26:34 AM

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 3/8	Down	NVE	38.50	0.00	23.00	0.375	75.0	180.0	59.1	0.273	43.35	1.24
Guy 2: 6M	Down	[redacted]	23.00	0.00	16.00	0.242	75.0	280.0	55.2	0.104	26.52	1.22

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[1] (lbs)	Vertical Load[2] (lbs)	Shear Load in Guy Dir[3] (lbs)	Shear Load at Report Angle[3] (lbs)	Moment at GL[3] (ft-lb)*
Guy 1: EHS 3/8	Down	23,000,000	15,400	0.90	13,860	700	4,703	4,554	4,554	3,909	2,335	-32	-600
Guy 2: 6M	Down	23,000,000	6,000	0.90	5,400	700	3,057	3,049	3,049	2,503	1,741	-1,710	-39,652
									Totals:	6,412	4,076	-1,742	-40,252

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	23.00	180.0	20,000	1.00	20,000	4,703	4,554	23.5
Single Helix Anchor	[redacted]	18.00	16.00	280.0	20,000	1.00	20,000	3,057	3,049	15.3

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
0.71	30.67	35.18	11.47	17.00	7.32	13.06	1,600,000	60.00	57.00	39.00	128,538	9,331	13.78

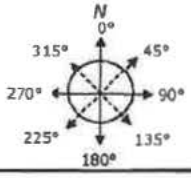
Appendix J

Transmission Sample Templates

NVEnergy

Pole Inspection Sheet

Pole # In Field	X12345
Class	N/A
Length	
Wood	
GL Circum	11'11"
Type	Steel Transmission



Pole # In License	X12345
Date	6/7/2012
Job Name	CATV Attachment
Location	ABC Street and XYZ Way

Guy #	Entity	Attachments			Height		Span Length		Direction		Bundle diameter
		Type	# of wires	Size	ft	in	Ahead ft	Back ft	Ahead deg	Back deg	in
				Top of Pole	128	5					
	NVE	Static	2	West arm- 5/16" ehs, East arm- 5/16" ehs	128	5	474'	499'	270°	90°	
	NVE	Trans- 230 KV	2	West strut post- 954 acsr	118	1	474'	499'	270°	90°	
	NVE	Trans- 230 KV	1	East strut post- 954 acsr	118	1	474'	499'	270°	90°	
	NVE	Trans- 230 KV	2	West strut post- 954 acsr	105	1	474'	499'	270°	90°	
	NVE	Trans- 230 KV	1	East strut post- 954 acsr	105	1	474'	499'	272°	90°	
	NVE	Trans- 230 KV	2	West strut post- 954 acsr	92	1	474'	499'	270°	90°	
	NVE	Trans- 230 KV	1	East strut post- 954 acsr	92	1	474'	499'	270°	90°	
	NVE	Trans- 138 KV	1	West post ins- 954 acsr	76	6	474'	499'	270°	90°	
	NVE	Trans- 138 KV	1	West post ins- 954 acsr	70	6	474'	499'	270°	90°	
	NVE	Trans- 138 KV	1	West post ins- 954 acsr	64	6	474'	499'	270°	90°	
	NVE	Pri- X arm	3	954 acsr	54	6	474'	499'	270°	90°	
	NVE	3Ø Cutout Brkt		1/0 ug, jckt	51	4			180°		
	NVE	Riser		3" u-guard	46	5			225°		
	NVE	Pri- neut	1	West side, shoe- 2/0 acsr, 48 ct	44	2	474'	499'	270°	90°	
	NVE	Sec	1	East side, DE- 2/0 triplex	41	5		499'		90°	
	NVE	Riser		2" u-guard	38	3				45°	
	ZFS	ADSS Block		ADSS 144ct	38	4	474'	499'	270°	90°	0.76"
	COX	Tangent		1/4" ehs, 72 ct, 750cx	37	0	474'	499'	270°	90°	1.25"
	COX	Proposed		ADD 144ct, REMOVE 72ct	37	0	474'	499'	270°	90°	1.55"

Entity	Equipment		Dimensions		Height		Location	Make-Ready Notes (Communications Space)
	Type	Description	in	in	ft	in	deg	Adjust existing communications vangs for 40" clearance.

Guy #	Entity	Guy Size	Anchor							Make-Ready Notes (Power Space)
			#	Size & Description	Location deg	Height ft	Height in	Lead ft	Lead in	Weld new NVE spec vang, add rod & shoe.

Additional Comments:

See attached for picture of pole.

X12345

Revisions Index

Revision #1 (2-4-2013)

- Moved statement "Compliance with all applicable NESC standards and clearances must be maintained at all times" from Structural Analysis Requirements section to section discussing determination of make-ready solutions

Revision #2 (5-21-2013)

- Added "Exceptions" note for riser only installations
- Updated Distribution Sample Report Appendix to show O-Calc reports

Revision #3 (12-24-2013)

- Added Appendix D "Typical Guy Wire Sizes and Guy Strengths used by NV Energy"
- Adjusted Appendix letters and page reference numbers to accommodate new Appendix D

Revision #4 (6-25-2014)

- Removed Applicant requirement of submitting pole data, make-ready notes, and Professional Engineer stamped structural analysis reports for Distribution applications
- Modified verbiage in remainder of document accordingly

GLENDA MILLS

EXHIBIT 5

From: Ortwein, Patricia [mailto:POrtwein@nvenergy.com]
Sent: Thursday, November 20, 2014 10:04 AM
To: Mills, Glenda (CCI-Southwest); Herndon, Elmer; Quartucci, Eugene (CCI-Southwest)
Subject: RE: Licensing of poles

Hello Glenda,
We can proceed with the poles that passed, however we will not allow attachments to our facilities where the pole has failed analysis. We are working diligently to replace the poles that have been identified as needing to be upgraded and will inform you as soon as that work is complete so a license can be issued immediately after.
Thanks, Trisha

From: Mills, Glenda (CCI-Southwest) [mailto:Glenda.Mills2@cox.com]
Sent: Thursday, November 20, 2014 9:58 AM
To: Herndon, Elmer; Quartucci, Eugene (Cox)
Cc: Ortwein, Patricia
Subject: RE: Licensing of poles

Yes please proceed with the license for the ones that passed. Is there any way we can get clearance to proceed with the attachment with the poles that did not pass knowing that you will put them on your replacement schedule?

COX

Glenda Mills Manager, Construction Services 702.545.1701 **off** 702.210.7212 **cell**
1700 Vegas Dr. Las Vegas, NV 89106
Designing, building and maintaining The Network that delivers The Future today. Dream Big!

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From: Herndon, Elmer [mailto:EHerndon@nvenergy.com]
Sent: Thursday, November 20, 2014 9:22 AM
To: Mills, Glenda (CCI-Southwest); Quartucci, Eugene (CCI-Southwest)
Cc: Ortwein, Patricia
Subject: Licensing of poles

Glenda, I am touching base with you on our conversation last week regarding the applications for Warm Springs – Pollock to Placid and Warm Springs – Placid to Haven. When we spoke you were going to get back with me on the poles that passed analysis and indicate if you want me to proceed with licensing those poles. NV Energy is in the process of designing the poles that failed analysis and will replace them as soon as possible. Please let me know if you want to move forward with a license for the poles that passed analysis or if you intend on waiting until the entire application can be approved.
Thank you,
Elmer

****
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