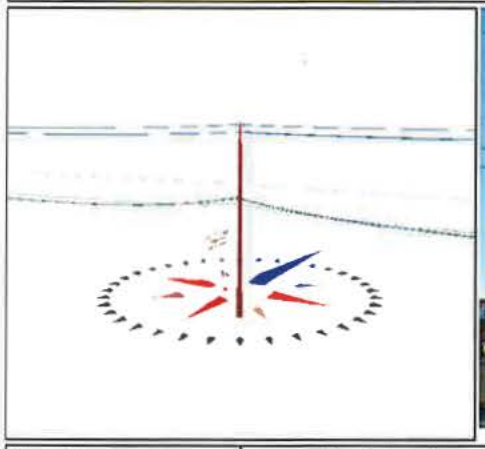
O-Calc® Pro *Analysis Report*

Wednesday, November 05, 2014 2:22:51 PM

File Name:	P75431 GRADE B	Pole Length / Class:	55 / 2	Code:	NESC	Structure Type:	Guyed
Pole Num:	P75431	Pole Species:	PONDEROSA PINE	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	NELLIS & TROPICANA	G/L Circumference (in):	49.00	Loading District:	Light	Transverse Wind LF:	2.50
Aux Data	O/B 144CT	G/L Fiber Stress (psi):	6,600	Ice Thickness (in):	0.00	Wire Tension LF:	1.65
Aux Data	Unset	Allowable Stress (psi):	4,290	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:	96.4%	0.0 ft	176.9°
Groundline:	96.4%	0.0 ft	176.9°
Vertical:	4.4%	27.0 ft	0.0°

Pole Moments		Load Angle	Wind Angle
Max Capac. Util:	126,633 ft-lb	161.1°	176.9°
Groundline:	126,633 ft-lb	161.1°	176.9°

Guy Summary		Guy Tensions		Maximum Guy Tensions	
	Attach Height (ft)	% Allowable Tension	Wind Angle	% Allowable Tension	Wind Angle
Guy 1	44.7	0.0%	176.9°	0.0%	0.0°
Guy 2	27.8	61.1%	176.9°	63.9%	150.0°

Anchor Summary		
	Lead Length (ft)	Max. % Allow. Capacity
Anchor 1	19.9	0.0%
Anchor 2	4.5	32.2%

GROUNDLINE LOAD SUMMARY:*Wind at 176.9°, Applied Moment 126,633 ft-lb at 161.1°, Allowable Moment 133,173 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:	2,185	51.9	77,860	48.9	46.5	2,508	748	4	2,512	58.6
Comms:	1,241	29.4	33,654	24.6	23.4	1,084	796	4	1,088	25.4
Guys/Braces:	-272	-6.5	-8,555	0.5	0.5	-276	6,098	32	-244	-5.7
Pole:	1,007	23.9	21,293	16.8	16.0	686	2,784	15	701	16.3

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

² Worst Wind per Guy Wire
³ Wind at 176.9°

Crossarms:	9	0.2	349	0.2	0.2	11	63	0	12	0.3
Insulators:	45	1.1	2,032	0.3	0.3	65	51	0	66	1.5
Pole Load:	4,214	100.0	126,633	100.0	95.1	4,079	10,540	55	4,135	96.4
Pole Reserve Capacity:			6,539		4.9	211			155	3.6

LOAD SUMMARY BY OWNER

NVE:	1,160		50,416			1,624	649	3	1,628	37.9
ZFS:	802		21,119			680	6,275	33	713	16.6
COX:	734		20,734			668	563	3	671	15.6
CTL:	511		13,071			421	269	1	422	9.8
Pole:	1,007		21,293			686	2,784	15	701	16.3
Totals	4,214		126,633			4,079	10,540	55	4,135	96.4

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	636 AAC	NVE	46.80	16.78	0.9180	-	0.596	179.0	90.0	179.0	2,204	55,092	9	6,811	61,912
Primary	636 AAC	NVE	46.80	16.78	0.9180	-	0.596	208.0	270.0	208.0	2,204	-55,092	-10	7,915	-47,188
Primary	636 AAC	NVE	44.61	27.38	0.9180	-	0.596	179.0	90.0	179.0	2,204	52,511	26	6,492	59,029
Primary	636 AAC	NVE	44.61	27.38	0.9180	-	0.596	179.0	90.0	179.0	2,204	52,511	-13	6,492	58,990
Primary	636 AAC	NVE	44.61	21.12	0.9180	-	0.596	208.0	270.0	208.0	2,204	-52,511	26	7,544	-44,942
Primary	636 AAC	NVE	44.61	21.12	0.9180	-	0.596	208.0	270.0	208.0	2,204	-52,511	-33	7,544	-45,000
Neutral	2/0 ACSR	NVE	31.00	7.55	0.4470	-	0.183	179.0	90.0	179.0	1,355	22,436	15	2,197	24,647
Neutral	2/0 ACSR	NVE	31.00	7.55	0.4470	-	0.183	208.0	270.0	208.0	1,355	-22,436	17	2,553	-19,866
Other	288ct, 144ct X 2, 24ct 5/16" MESS	ZFS	27.80	5.56	1.8100	-	1.310	179.0	90.0	179.2	1,500	22,273	26	7,977	30,276
											Totals:	22,273	62	55,526	77,860

Comm:		Owner	Height (ft)	Horiz. Offset (in)	Cable Dia. (in)	Rotate Angle (deg)	Cable Weight (lbs/ft)	Lead/Span Length	Span Angle (deg)	Wire Length (ft)	Tension (lbs)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
CATV	288ct, 144ct X 3, 48ct, 8ct X 2 1/4"	COX	26.99	20.55	2.1300	-	1.843	179.0	90.0	179.5	1,500	21,622	409	9,113	31,144
CATV	288ct, 144ct X 3, 48ct, 8ct X 2 1/4"	COX	26.99	20.55	2.1300	-	1.843	208.0	270.0	208.8	1,500	-21,622	475	10,590	-10,556
Telco	.75" 144ct 5/16"MESS	CTL	25.25	8.26	1.4900	-	0.900	179.0	90.0	179.1	1,500	20,230	79	5,965	26,273
Telco	.75" 144ct 5/16"MESS	CTL	25.25	8.26	1.4900	-	0.900	208.0	270.0	208.2	1,500	-20,230	91	6,931	-13,207
											Totals:	0	1,055	32,599	33,654

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 4 -	NVE	44.70	5.95	90.0	90.0	28.00	4.50	3.50	-	48.00	-	7	209	216
Offset	CROSSARM 3-1/2 X 4-1/2 X 2 -	COX	26.80	1.39	90.0	90.0	14.00	4.50	3.50	-	24.00	-	21	112	133
											Totals:	0	27	321	349

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	46.80	4.03	90.0	90.0	3.00	12.75	-	3.80	-	-	2	341	343
Deadend	Deadend Insulator - 15 kV	NVE	46.80	4.03	270.0	270.0	3.00	12.75	-	3.80	-	-	-2	341	339

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

² Worst Wind per Guy Wire
³ Wind at 176.9°

Deadend	Deadend Insulator - 15 kV	NVE	44.70	20.00	163.4	0.0	3.00	12.75	-	3.80	-	-	9	326	335
Deadend	Deadend Insulator - 15 kV	NVE	44.70	-20.00	16.6	0.0	3.00	12.75	-	3.80	-	-	-5	326	321
Deadend	Deadend Insulator - 15 kV	NVE	44.70	20.00	163.4	180.0	3.00	12.75	-	3.80	-	-	6	326	332
Deadend	Deadend Insulator - 15 kV	NVE	44.70	-20.00	16.6	180.0	3.00	12.75	-	3.80	-	-	-8	326	318
Spool	Spool Insulator - 20 kV	NVE	31.00	5.30	180.0	90.0	1.00	2.12	-	2.50	-	-	1	25	26
Deadend	Three Bolt	ZFS	27.80	5.56	90.0	90.0	5.00	0.00	-	3.00	-	-	1	0	1
Bolt	Three Bolt	COX	26.99	18.00	175.6	0.0	5.00	0.00	-	3.00	-	-	12	0	12
Bolt	Three Bolt	CTL	25.25	5.76	180.0	90.0	5.00	0.00	-	3.00	-	-	5	0	5
												Totals:	0	22	2,009	2,032

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	44.70	0.00	19.90	0.312	75.0	90.0	66.0	0.205	47.43	0.00
Guy 2: EHS 5/16	Sidewalk	ZFS	27.80	0.00	4.54	0.312	75.0	270.0	80.7	0.205	26.67	1.49

Guy Wire and Brace (Loads and Reactions)		Elastic Modulus (psi)	Rated Tensile Strength (lbs)	Guy Strength Factor	Allowable Tension (lbs)	Initial Tension (lbs)	Required Tension[2] (lbs)	Required Tension[3] (lbs)	Applied Tension[3] (lbs)	Vertical Load[3] (lbs)	Shear Load in Guy Dir[3] (lbs)	Shear Load at Report Angle[3] (lbs)	Moment at GL[3] (ft-lb)*
Guy 1: EHS 5/16	Down	23,000,000	11,200	0.90	10,080	700		0	0	0	0	0	604
Guy 2: EHS 5/16	Sidewalk	23,000,000	11,200	0.90	10,080	700	6,444	6,158	6,158	6,078	993	-321	-9,158
									Totals:	6,078	993	-321	-8,555

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	19.90	90.0	20,000	1.00	20,000		0	0.0
Single Helix Anchor	ZFS	18.00	4.54	270.0	20,000	1.00	20,000	6,444	6,158	32.2

Pole Buckling

Buckling	Buckling (ft)	Buckling Section (% Buckling Col. Hgt.)	Buckling (in)	Min. Buckling (in)	Diameter (in)	Diameter (in)	Modulus of (psi)	Pole (pcf)	Ice Density (pcf)	Pole Tip (ft)	Buckling Load (lbs)	Buckling Load (lbs)	Buckling Load
0.71	26.99	34.18	14.11	19.21	7.96	15.61	1,000,000	50.00	57.00	47.40	238,024	10,540	22.58

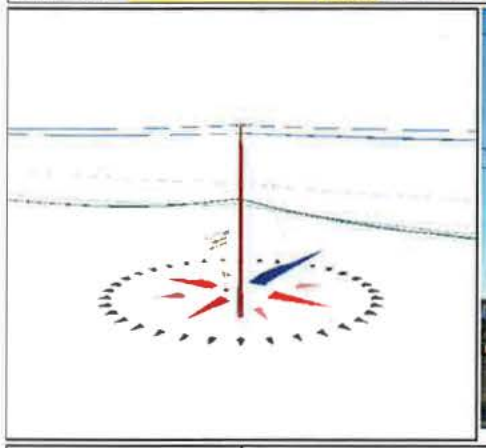
Version: 4.2 / 4.06
* Includes Load Factor(s)

[2] Worst Wind per Guy Wire
[3] Wind at 176.9°

O-Calc® Pro *Analysis Report*

Wednesday, November 05, 2014 2:24:22 PM

File Name:	P75431 GRADE B	Pole Length / Class:	55 / 2	Code:	NESC	Structure Type:	Guyed
Pole Num:	P75431	Pole Species:	PONDEROSA PINE	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	NELLIS & TROPICANA	G/L Circumference (in):	49.00	Loading District:	Light	Transverse Wind LF:	2.50
Aux Data	O/B 144CT	G/L Fiber Stress (psi):	6,600	Ice Thickness (in):	0.00	Wire Tension LF:	1.65
Aux Data	Unset	Allowable Stress (psi):	4,290	Wind Speed (mph):	59.29	Vertical LF:	1.50
Aux Data	Unset	Fiber Stress Ht. Reduction:	No	Wind Pressure (psf):	9.00		



Pole Capacity Utilization		Height	Wind Angle
Maximum:	97.8%	0.0 ft	176.9°
Groundline:	97.8%	0.0 ft	176.9°
Vertical:	4.5%	27.0 ft	0.0°

Pole Moments		Load Angle	Wind Angle
Max Capac. Util:	128,468 ft-lb	161.5°	176.9°
Groundline:	128,468 ft-lb	161.5°	176.9°

Guy Summary		Guy Tensions		Maximum Guy Tensions	
	Attach Height (ft)	% Allowable Tension	Wind Angle	% Allowable Tension	Wind Angle
Guy 1	44.7	0.0%	176.9°	0.0%	0.0°
Guy 2	27.8	61.6%	176.9°	64.3%	150.0°

Anchor Summary		
	Lead Length (ft)	Max. % Allow. Capacity
Anchor 1	19.9	0.0%
Anchor 2	4.5	32.4%

GROUNDLINE LOAD SUMMARY:*Wind at 176.9°, Applied Moment 128,468 ft-lb at 161.5°, Allowable Moment 133,173 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:	2,172	50.8	77,539	47.3	45.7	2,498	748	4	2,502	58.3
Comms:	1,312	30.7	35,650	24.6	23.7	1,148	834	4	1,153	26.9
Guys/Braces:	-269	-6.3	-8,439	0.5	0.5	-272	6,150	32	-240	-5.6
Pole:	1,009	23.6	21,335	16.6	16.0	687	2,784	15	702	16.4

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

[2] Worst Wind per Guy Wire
[3] Wind at 176.9°

Crossarms:	9	0.2	348	0.2	0.2	11	63	0	12	0.3
Insulators:	45	1.0	2,035	0.3	0.3	66	51	0	66	1.5
Pole Load:	4,279	100.0	128,468	100.0	96.5	4,138	10,630	56	4,194	97.8
Pole Reserve Capacity:			4,705		3.5	152			96	2.2

LOAD SUMMARY BY OWNER

NVE:	1,163	50,532	1,628	649	3	1,631	38.0
ZFS:	790	20,801	670	6,326	33	703	16.4
COX:	805	22,699	731	601	3	734	17.1
CTL:	512	13,101	422	269	1	423	9.9
Pole:	1,009	21,335	687	2,784	15	702	16.4
Totals	4,279	128,468	4,138	10,630	56	4,194	97.8

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	636 AAC	NVE	46.80	16.78	0.9180	-	0.596	179.0	90.0	179.0	2,204	53,978	9	6,827	60,814
Primary	636 AAC	NVE	46.80	16.78	0.9180	-	0.596	208.0	270.0	208.0	2,204	-53,978	-10	7,933	-46,054
Primary	636 AAC	NVE	44.61	27.38	0.9180	-	0.596	179.0	90.0	179.0	2,204	51,449	25	6,507	57,982
Primary	636 AAC	NVE	44.61	27.38	0.9180	-	0.596	179.0	90.0	179.0	2,204	51,449	-13	6,507	57,943
Primary	636 AAC	NVE	44.61	21.12	0.9180	-	0.596	208.0	270.0	208.0	2,204	-51,449	26	7,562	-43,861
Primary	636 AAC	NVE	44.61	21.12	0.9180	-	0.596	208.0	270.0	208.0	2,204	-51,449	-33	7,562	-43,920
Neutral	2/0 ACSR	NVE	31.00	7.55	0.4470	-	0.183	179.0	90.0	179.0	1,355	21,982	15	2,202	24,198
Neutral	2/0 ACSR	NVE	31.00	7.55	0.4470	-	0.183	208.0	270.0	208.0	1,355	-21,982	17	2,559	-19,406
Other	288ct, 144ct X 2, 24ct 5/16" MESS	ZFS	27.80	5.56	1.8100	-	1.310	179.0	90.0	179.2	1,500	21,822	26	7,996	29,844
											Totals:	21,822	62	55,656	77,539

Comm:		Owner	Height (ft)	Horiz. Offset (in)	Cable Dia. (in)	Rotate Angle (deg)	Cable Weight (lbs/ft)	Lead/Span Length	Span Angle (deg)	Wire Length (ft)	Tension (lbs)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
CATV	288ct, 144ct X 3, 48ct, 8ct X 2 1/4"	COX	26.99	20.55	2.3300	-	1.974	179.0	90.0	179.6	1,500	21,184	439	9,993	31,616
CATV	288ct, 144ct X 3, 48ct, 8ct X 2 1/4"	COX	26.99	20.55	2.3300	-	1.974	208.0	270.0	208.9	1,500	-21,184	510	11,611	-9,062
Telco	.75" 144ct 5/16"MESS	CTL	25.25	8.26	1.4900	-	0.900	179.0	90.0	179.1	1,500	19,820	79	5,979	25,878
Telco	.75" 144ct 5/16"MESS	CTL	25.25	8.26	1.4900	-	0.900	208.0	270.0	208.2	1,500	-19,820	92	6,947	-12,781
											Totals:	0	1,120	34,530	35,650

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	44.70	5.95	90.0	90.0	28.00	4.50	3.50	-	48.00	-	7	208	215
Offset	CROSSARM 3-1/2 X 4-1/2 X 2 -	COX	26.80	1.39	90.0	90.0	14.00	4.50	3.50	-	24.00	-	20	112	133
											Totals:	0	27	321	348

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	46.80	4.03	90.0	90.0	3.00	12.75	-	3.80	-	-	2	342	344
Deadend	Deadend Insulator - 15 kV	NVE	46.80	4.03	270.0	270.0	3.00	12.75	-	3.80	-	-	-2	342	340

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

² Worst Wind per Guy Wire
³ Wind at 176.9°

Deadend	Deadend Insulator - 15 kV	NVE	44.70	20.00	163.4	0.0	3.00	12.75	-	3.80	-	-	9	326	336
Deadend	Deadend Insulator - 15 kV	NVE	44.70	-20.00	16.6	0.0	3.00	12.75	-	3.80	-	-	-5	326	321
Deadend	Deadend Insulator - 15 kV	NVE	44.70	20.00	163.4	180.0	3.00	12.75	-	3.80	-	-	6	326	333
Deadend	Deadend Insulator - 15 kV	NVE	44.70	-20.00	16.6	180.0	3.00	12.75	-	3.80	-	-	-8	326	318
Spool	Spool Insulator - 20 kV	NVE	31.00	5.30	180.0	90.0	1.00	2.12	-	2.50	-	-	1	25	26
Deadend	Three Bolt	ZFS	27.80	5.56	90.0	90.0	5.00	0.00	-	3.00	-	-	1	0	1
Bolt	Three Bolt	COX	26.99	18.00	175.6	0.0	5.00	0.00	-	3.00	-	-	12	0	12
Bolt	Three Bolt	CTL	25.25	5.76	180.0	90.0	5.00	0.00	-	3.00	-	-	5	0	5
											Totals:	0	22	2,013	2,035

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	44.70	0.00	19.90	0.312	75.0	90.0	66.0	0.205	47.43	0.00
Guy 2: EHS 5/16	Sidewalk	ZFS	27.80	0.00	4.54	0.312	75.0	270.0	80.7	0.205	26.67	1.50

Guy Wire and Brace (Loads and Reactions)		Elastic Modulus (psi)	Rated Tensile Strength (lbs)	Guy Strength Factor	Allowable Tension (lbs)	Initial Tension (lbs)	Required Tension[2] (lbs)	Required Tension[3] (lbs)	Applied Tension[3] (lbs)	Vertical Load[3] (lbs)	Shear Load in Guy Dir[3] (lbs)	Shear Load at Report Angle[3] (lbs)	Moment at GL[3] (ft-lb)*
Guy 1: EHS 5/16	Down	23,000,000	11,200	0.90	10,080	700		0	0	0	0	0	605
Guy 2: EHS 5/16	Sidewalk	23,000,000	11,200	0.90	10,080	700	6,485	6,211	6,211	6,130	1,001	-318	-9,044
									Totals:	6,130	1,001	-318	-8,439

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	19.90	90.0	20,000	1.00	20,000		0	0.0
Single Helix Anchor	ZFS	18.00	4.54	270.0	20,000	1.00	20,000	6,485	6,211	32.4

Pole Buckling

Buckling	Buckling (ft)	Buckling Section (% Buckling Col. Hgt.)	Buckling (in)	Min. Buckling (in)	Diameter (in)	Diameter (in)	Modulus of (psi)	Pole (pcf)	Ice Density (pcf)	Pole Tip (ft)	Buckling Load (lbs)	Buckling Load (lbs)	Buckling Load
0.71	26.99	34.18	14.11	19.29	7.96	15.61	1,000,000	50.00	57.00	47.40	237,937	10,630	22.38

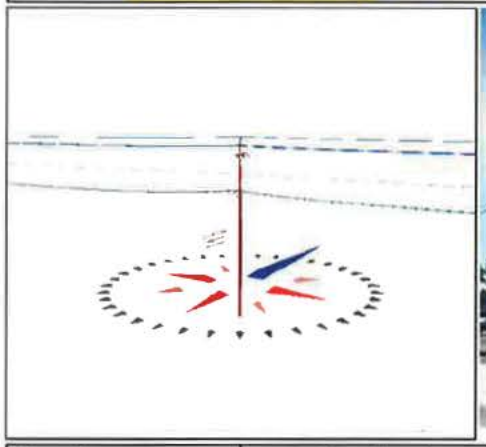
Version: 4 2 / 4.06
* includes Load Factor(s)

[2] Worst Wind per Guy Wire
[3] Wind at 176.9°

O-Calc® Pro *Analysis Report*

Wednesday, November 05, 2014 2:26:58 PM

File Name:	P66592 GRADE B	Pole Length / Class:	50 / 2	Code:	NESC	Structure Type:	Guyed
Pole Num:	P66592	Pole Species:	PONDEROSA PINE	NESC Rule:	Rule 250B	Status:	N/A
Aux Data	COX	Setting Depth (ft):	9.00	Construction Grade:	B	Pole Strength Factor:	0.65
Aux Data	NELLIS & TROPICANA	G/L Circumference (in):	44.00	Loading District:	Light	Transverse Wind LF:	2.50
Aux Data	O/B 144CT	G/L Fiber Stress (psi):	6,600	Ice Thickness (in):	0.00	Wire Tension LF:	1.65
Aux Data	Unset	Allowable Stress (psi):	4,290	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:	85.7%	0.0 ft	180.0°
Groundline:	85.7%	0.0 ft	180.0°
Vertical:	1.6%	24.3 ft	90.0°

Pole Moments		Load Angle	Wind Angle
Max Capac. Util:	82,165 ft-lb	180.3°	180.0°
Groundline:	82,165 ft-lb	180.3°	180.0°

Guy Summary		Guy Tensions		Maximum Guy Tensions	
	Attach Height (ft)	% Allowable Tension	Wind Angle	% Allowable Tension	Wind Angle
Guy 1	26.6	0.1%	180.0°	6.9%	100.0°

Anchor Summary		
	Lead Length (ft)	Max. % Allow. Capacity
Anchor 1	179.0	3.5%

GROUNDLINE LOAD SUMMARY:*Wind at 180.0°, Applied Moment 82,165 ft-lb at 180.3°, Allowable Moment 96,424 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:	1,221	42.6	44,853	4.8	4.1	1,996	563	4	1,999	46.6
Comms:	484	16.9	13,693	10.4	8.9	609	263	2	611	14.2
Guys/Braces:	52	1.8	1,393	1.7	1.4	62	18	0	62	1.4
Pole:	844	29.5	15,718	19.1	16.3	699	2,074	13	713	16.6
Crossarms:	8	0.3	255	0.2	0.2	11	102	1	12	0.3
Risers:	201	7.0	4,096	5.0	4.2	182	92	1	183	4.3

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

² Worst Wind per Guy Wire
³ Wind at 180.0°

Insulators:	55	1.9	2,156	0.5	0.4	96	80	1	96	2.2
Pole Load:	2,865	100.0	82,165	100.0	85.2	3,656	3,192	21	3,676	85.7
Pole Reserve Capacity:			14,259		14.8	634			614	14.3

LOAD SUMMARY BY OWNER

NVE:	1,181	42,574	1,894	670	4	1,899	44.3
ZFS:	300	8,668	386	117	1	386	9.0
COX:	488	13,811	614	313	2	616	14.4
CTL:	52	1,393	62	18	0	62	1.4
Pole:	844	15,718	699	2,074	13	713	16.6
Totals	2,865	82,165	3,656	3,192	21	3,676	85.7

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	636 AAC	NVE	42.17	3.98	0.9180	-	0.596	128.0	90.0	128.0	2,204	-701	0	4,649	3,948
Primary	636 AAC	NVE	42.17	3.98	0.9180	-	0.596	179.0	270.0	179.0	2,204	701	0	6,502	7,203
Primary	636 AAC	NVE	39.60	18.08	0.9180	-	0.596	128.0	90.0	128.0	2,204	-659	-86	4,367	3,622
Primary	636 AAC	NVE	39.60	18.08	0.9180	-	0.596	179.0	270.0	179.0	2,204	659	-121	6,106	6,644
Primary	636 AAC	NVE	39.60	18.08	0.9180	-	0.596	128.0	90.0	128.0	2,204	-659	86	4,367	3,794
Primary	636 AAC	NVE	39.60	18.08	0.9180	-	0.596	179.0	270.0	179.0	2,204	659	121	6,106	6,885
Neutral	2/0 ACSR	NVE	32.00	6.89	0.4470	-	0.183	128.0	90.0	128.0	1,355	-327	-10	1,716	1,379
Neutral	2/0 ACSR	NVE	32.00	6.89	0.4470	-	0.183	179.0	270.0	179.0	1,355	327	-14	2,400	2,713
Other	288ct 5/16" MESS	ZFS	28.70	7.39	1.1700	-	0.562	179.0	270.0	179.0	1,500	325	46	5,635	6,006
Other	288ct SELF SUPPORT	ZFS	28.70	7.39	0.8600	-	0.350	128.0	90.0	128.0	1,500	-325	21	2,962	2,658
											Totals:	0	43	44,810	44,853

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, 144ct X 2, 48ct 1/4" MESS	COX	27.59	16.90	1.7400	-	1.216	179.0	270.0	179.2	1,500	312	211	8,055	8,579
CATV	.75"cx, 144ct X 2 1/4" MESS	COX	27.59	16.90	1.6000	-	1.044	128.0	90.0	128.1	1,500	-312	130	5,297	5,114
											Totals:	0	341	13,352	13,693

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	CUTOUT BRACKET	NVE	37.40	5.99	90.0	90.0	40.00	4.50	3.50	-	72.00	-	0	147	147
Normal	CROSSARM 3-1/2 X 4-1/2 X 4 -	COX	27.40	6.73	270.0	270.0	28.00	4.50	3.50	-	48.00	-	0	108	108
											Totals:	0	0	255	255

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 90.0°	3" Riser	NVE	30.60	7.37	90.0	90.0	5.10	367.20	-	0.00	-	-	0	4,097	4,096
											Totals:	0	0	4,097	4,096

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	3.98	90.0	90.0	11.00	14.00	-	4.75	-	-	0	432	432
Post	Post Insulator - 15 kV	NVE	39.60	4.08	0.0	0.0	11.00	14.00	-	4.75	-	-	-25	418	393
Post	Post Insulator - 15 kV	NVE	39.60	4.08	180.0	180.0	11.00	14.00	-	4.75	-	-	25	418	442
Deadend	CUTOUT	NVE	37.40	32.00	169.4	0.0	3.00	12.75	-	3.80	-	-	12	283	295
Deadend	CUTOUT	NVE	37.40	0.00	90.0	0.0	3.00	12.75	-	3.80	-	-	0	283	283
Deadend	CUTOUT	NVE	37.40	-32.00	10.6	0.0	3.00	12.75	-	3.80	-	-	-12	283	271
Spool	Spool Insulator - 20 kV	NVE	32.00	4.64	0.0	270.0	1.00	2.12	-	2.50	-	-	-1	26	26
Bolt	Three Bolt	ZFS	28.70	4.89	180.0	90.0	5.00	0.00	-	3.00	-	-	5	0	5
Bolt	Three Bolt	COX	27.59	-18.00	200.5	0.0	5.00	0.00	-	3.00	-	-	10	0	10
											Totals:	0	13	2,143	2,156

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	Span/Head	CTL	26.60	26.60	179.00	0.312	75.0	270.0	0.0	0.205	178.47	0.02

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[3] (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	Span/Head	23,000,000	11,200	0.90	10,080	700	699	12	12	0	12	0	1,393
									Totals:	0	12	0	1,393

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	179.00	270.0	20,000	1.00	20,000	699	12	3.5

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	24.25	33.83	12.80	10.21	7.96	14.01	1,000,000	50.00	57.00	41.00	199,333	3,192	62.45

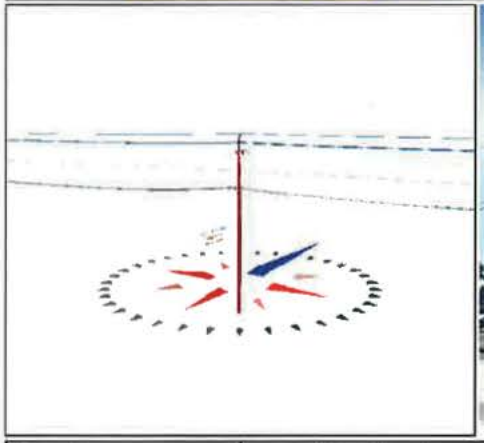
Version: 4.2 / 4.06
* includes Load Factor(s)

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

O-Calc® Pro *Analysis Report*

Wednesday, November 05, 2014 2:27:49 PM

File Name:	P66592 GRADE B	Pole Length / Class:	50 / 2	Code:	NESC	Structure Type:	Guyed
Pole Num:	P66592	Pole Species:	PONDEROSA PINE	NESC Rule:	Rule 250B	Status:	N/A
Aux Data	COX	Setting Depth (ft):	9.00	Construction Grade:	B	Pole Strength Factor:	0.65
Aux Data	NELLIS & TROPICANA	G/L Circumference (in):	44.00	Loading District:	Light	Transverse Wind LF:	2.50
Aux Data	O/B 144CT	G/L Fiber Stress (psi):	6,600	Ice Thickness (in):	0.00	Wire Tension LF:	1.65
Aux Data	Unset	Allowable Stress (psi):	4,290	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:	87.1%	0.0 ft	180.0°
Groundline:	87.1%	0.0 ft	180.0°
Vertical:	1.6%	24.3 ft	90.0°

Pole Moments		Load Angle	Wind Angle
Max Capac. Util:	83,530 ft-lb	180.3°	180.0°
Groundline:	83,530 ft-lb	180.3°	180.0°

Guy Summary		Guy Tensions		Maximum Guy Tensions	
	Attach Height (ft)	% Allowable Tension	Wind Angle	% Allowable Tension	Wind Angle
Guy 1	26.6	0.1%	180.0°	6.9%	100.0°

Anchor Summary		
	Lead Length (ft)	Max. % Allow. Capacity
Anchor 1	179.0	3.5%

GROUNDLINE LOAD SUMMARY:*Wind at 180.0°, Applied Moment 83,530 ft-lb at 180.3°, Allowable Moment 96,424 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:	1,221	41.9	44,853	4.7	4.1	1,996	563	4	1,999	46.6
Comms:	533	18.3	15,058	11.9	10.3	670	281	2	672	15.7
Guys/Braces:	52	1.8	1,393	1.7	1.4	62	18	0	62	1.4
Pole:	844	29.0	15,718	18.8	16.3	699	2,074	13	713	16.6
Crossarms:	8	0.3	255	0.2	0.2	11	102	1	12	0.3
Risers:	201	6.9	4,096	4.9	4.2	182	92	1	183	4.3

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

² Worst Wind per Guy Wire
³ Wind at 180.0°

Insulators:	55	1.9	2,156	0.5	0.4	96	80	1	96	2.2
Pole Load:	2,913	100.0	83,530	100.0	86.6	3,716	3,209	21	3,737	87.1
Pole Reserve Capacity:			12,894		13.4	574			553	12.9

LOAD SUMMARY BY OWNER

NVE:	1,181	42,574	1,894	670	4	1,899	44.3
ZFS:	300	8,668	386	117	1	386	9.0
COX:	537	15,176	675	331	2	677	15.8
CTL:	52	1,393	62	18	0	62	1.4
Pole:	844	15,718	699	2,074	13	713	16.6
Totals	2,913	83,530	3,716	3,209	21	3,737	87.1

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	636 AAC	NVE	42.17	3.98	0.9180	-	0.596	128.0	90.0	128.0	2,204	-708	0	4,649	3,941
Primary	636 AAC	NVE	42.17	3.98	0.9180	-	0.596	179.0	270.0	179.0	2,204	708	0	6,502	7,209
Primary	636 AAC	NVE	39.60	18.08	0.9180	-	0.596	128.0	90.0	128.0	2,204	-665	-86	4,367	3,615
Primary	636 AAC	NVE	39.60	18.08	0.9180	-	0.596	179.0	270.0	179.0	2,204	665	-121	6,106	6,651
Primary	636 AAC	NVE	39.60	18.08	0.9180	-	0.596	128.0	90.0	128.0	2,204	-665	86	4,367	3,788
Primary	636 AAC	NVE	39.60	18.08	0.9180	-	0.596	179.0	270.0	179.0	2,204	665	121	6,106	6,892
Neutral	2/0 ACSR	NVE	32.00	6.89	0.4470	-	0.183	128.0	90.0	128.0	1,355	-330	-10	1,716	1,376
Neutral	2/0 ACSR	NVE	32.00	6.89	0.4470	-	0.183	179.0	270.0	179.0	1,355	330	-14	2,400	2,716
Other	288ct 5/16" MESS	ZFS	28.70	7.39	1.1700	-	0.562	179.0	270.0	179.0	1,500	328	46	5,635	6,009
Other	288ct SELF SUPPORT	ZFS	28.70	7.39	0.8600	-	0.350	128.0	90.0	128.0	1,500	-328	21	2,962	2,655
											Totals:	0	43	44,810	44,853

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, 144ct X 2, 48ct 1/4" MESS	COX	27.59	16.90	2.0300	-	1.347	179.0	270.0	179.3	1,500	315	234	9,398	9,947
CATV	.75"cx, 144ct X 2 1/4" MESS	COX	27.59	16.90	1.6000	-	1.044	128.0	90.0	128.1	1,500	-315	130	5,297	5,112
											Totals:	0	364	14,695	15,058

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	CUTOUT BRACKET	NVE	37.40	5.99	90.0	90.0	40.00	4.50	3.50	-	72.00	-	0	147	147
Normal	CROSSARM 3-1/2 X 4-1/2 X 4 -	COX	27.40	6.73	270.0	270.0	28.00	4.50	3.50	-	48.00	-	0	108	108
											Totals:	0	0	255	255

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 90.0°	3" Riser	NVE	30.60	7.37	90.0	90.0	5.10	367.20	-	0.00	-	-	0	4,097	4,096
											Totals:	0	0	4,097	4,096

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	3.98	90.0	90.0	11.00	14.00	-	4.75	-	-	0	432	432
Post	Post Insulator - 15 kV	NVE	39.60	4.08	0.0	0.0	11.00	14.00	-	4.75	-	-	-25	418	393
Post	Post Insulator - 15 kV	NVE	39.60	4.08	180.0	180.0	11.00	14.00	-	4.75	-	-	25	418	442
Deadend	CUTOUT	NVE	37.40	32.00	169.4	0.0	3.00	12.75	-	3.80	-	-	12	283	295
Deadend	CUTOUT	NVE	37.40	0.00	90.0	0.0	3.00	12.75	-	3.80	-	-	0	283	283
Deadend	CUTOUT	NVE	37.40	-32.00	10.6	0.0	3.00	12.75	-	3.80	-	-	-12	283	271
Spool	Spool Insulator - 20 kV	NVE	32.00	4.64	0.0	270.0	1.00	2.12	-	2.50	-	-	-1	26	26
Bolt	Three Bolt	ZFS	28.70	4.89	180.0	90.0	5.00	0.00	-	3.00	-	-	5	0	5
Bolt	Three Bolt	COX	27.59	-18.00	200.5	0.0	5.00	0.00	-	3.00	-	-	10	0	10
											Totals:	0	13	2,143	2,156

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	Span/Head	CTL	26.60	26.60	179.00	0.312	75.0	270.0	0.0	0.205	178.47	0.02

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	Span/Head	23,000,000	11,200	0.90	10,080	700	698	12	12	0	12	0	1,393
									Totals:	0	12	0	1,393

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	179.00	270.0	20,000	1.00	20,000	698	12	3.5

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	24.27	33.83	12.79	10.24	7.96	14.01	1,000,000	50.00	57.00	41.00	198,945	3,209	61.99

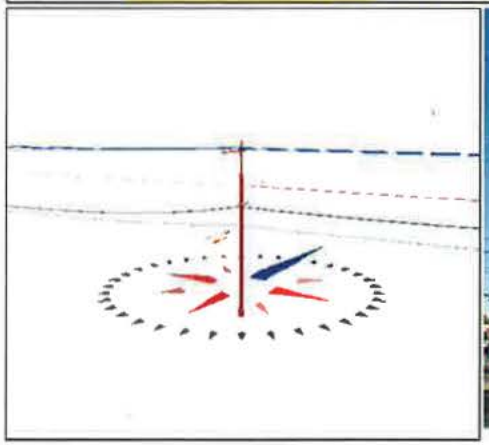
Version: 4.2 / 4.06
* Includes Load Factor(s)

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

O-Calc® Pro *Analysis Report*

Wednesday, November 05, 2014 2:30:41 PM

File Name:	P87951 GRADE B	Pole Length / Class:	50 / 3	Code:	NESC	Structure Type:	Unguyed
Pole Num:	P87951	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	NELLIS & TROPICANA	G/L Circumference (in):	45.50	Loading District:	Light	Transverse Wind LF:	2.50
Aux Data	O/B 144CT	G/L Fiber Stress (psi):	6,000	Ice Thickness (in):	0.00	Wire Tension LF:	1.10
Aux Data	Unset	Allowable Stress (psi):	3,900	Wind Speed (mph):	59.29	Vertical LF:	1.50
Aux Data	Unset	Fiber Stress Ht. Reduction:	No	Wind Pressure (psf):	9.00		



Pole Capacity Utilization		Height	Wind Angle
Maximum:	89.6%	0.0 ft	177.0°
Groundline:	89.6%	0.0 ft	177.0°
Vertical:	11.0%	22.8 ft	177.0°

Pole Moments		Load Angle	Wind Angle
Max Capac. Util:	86,341 ft-lb	167.9°	177.0°
Groundline:	86,341 ft-lb	167.9°	177.0°

GROUNDLINE LOAD SUMMARY:*Wind at 177.0°, Applied Moment 86,341 ft-lb at 167.9°, Allowable Moment 96,932 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:	1,290	40.0	46,155	25.8	23.0	1,857	574	3	1,860	47.7
Comms:	939	29.1	20,199	12.4	11.1	813	551	3	816	20.9
Pole:	830	25.7	15,182	17.6	15.7	611	2,070	13	623	16.0
Crossarms:	10	0.3	768	0.8	0.7	31	141	1	32	0.8
Risers:	120	3.7	2,439	2.8	2.5	98	41	0	98	2.5
Insulators:	34	1.0	1,599	0.7	0.6	64	69	0	65	1.7
Pole Load:	3,222	100.0	86,341	100.0	89.1	3,474	3,447	21	3,495	89.6
Pole Reserve Capacity:			10,591		10.9	426			405	10.4

LOAD SUMMARY BY OWNER

NVE:	1,152	43,380	1,745	620	4	1,749	44.8
ZFS:	302	7,571	305	190	1	306	7.8
COX:	550	13,000	523	366	2	525	13.5

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

² Worst Wind per Guy Wire
³ Wind at 177.0°

CTL:	389	7,209	290	200	1	291	7.5
Pole:	830	15,182	611	2,070	13	623	16.0
Totals	3,222	86,341	3,474	3,447	21	3,495	89.6

Detailed Load Components

Power:		Owner	Height (ft)	Horiz. Offset (in)	Cable Dia. (in)	Rotate Angle (deg)	Cable Weight (lbs/ft)	Lead/Span Length	Span Angle (deg)	Wire Length (ft)	Tension (lbs)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Primary	636 AAC	NVE	39.48	112.14	0.9180	-	0.596	61.0	90.0	61.0	2,204	20,017	252	2,026	22,294
Primary	636 AAC	NVE	39.48	112.14	0.9180	-	0.596	224.0	270.0	224.0	2,204	-20,017	924	7,440	-11,653
Primary	636 AAC	NVE	39.48	72.22	0.9180	-	0.596	61.0	90.0	61.0	2,204	20,017	163	2,026	22,206
Primary	636 AAC	NVE	39.48	72.22	0.9180	-	0.596	224.0	270.0	224.0	2,204	-20,017	597	7,440	-11,979
Primary	636 AAC	NVE	39.48	32.49	0.9180	-	0.596	61.0	90.0	61.0	2,204	20,017	74	2,026	22,117
Primary	636 AAC	NVE	39.48	32.49	0.9180	-	0.596	224.0	270.0	224.0	2,204	-20,017	271	7,440	-12,306
Neutral	2/0 ACSR	NVE	29.20	6.95	0.4470	-	0.183	61.0	90.0	61.0	1,355	9,093	5	729	9,827
Neutral	2/0 ACSR	NVE	29.20	6.95	0.4470	-	0.183	224.0	270.0	224.0	1,355	-9,093	17	2,677	-6,399
Service	#2 AL TPX (SLACK)	NVE	29.20	6.95	0.7600	-	0.270	61.0	90.0	61.0	500	3,355	7	1,239	4,602
Other	144ct, 24ct 5/16" MESS	ZFS	24.19	21.63	1.1400	-	0.657	61.0	90.0	61.0	1,500	8,338	54	1,540	9,932
Other	144ct, 24ct 5/16" MESS	ZFS	24.19	21.63	1.1400	-	0.657	224.0	270.0	224.1	1,500	-8,338	198	5,655	-2,486
											Totals:	3,355	2,561	40,239	46,155

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, 288ct, 144ct, 8ct 1/4"	COX	23.20	7.72	2.0700	-	1.543	61.0	90.0	61.0	1,500	7,998	44	2,682	10,724
CATV	.75"cx X 2, 288ct, 144ct, 48ct, 8ct	COX	23.20	7.72	2.1200	-	1.715	224.0	270.0	224.8	1,500	-7,998	181	10,087	2,271
Telco	.75" 144ct 5/16"MESS	CTL	18.20	8.16	1.4900	-	0.900	61.0	90.0	61.0	1,500	6,274	27	1,515	7,816
Telco	.75" 144ct 5/16"MESS	CTL	18.20	8.16	1.4900	-	0.900	224.0	270.0	224.2	1,500	-6,274	100	5,562	-612
											Totals:	0	354	19,845	20,199

Crossarm:		Owner	Height (ft)	Horiz. Offset (in)	Offset Angle (deg)	Rotate Angle (deg)	Unit Weight (lbs)	Unit Height (in)	Unit Depth (in)	Unit Diameter (in)	Unit Length (in)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Offset	CROSSARM 3-1/2 X 4-1/2 X 10 -	NVE	38.50	5.64	90.0	90.0	66.00	4.50	3.50	-	120.00	-	452	204	657
Normal	CROSSARM 3-1/2 X 4-1/2 X 4 -	ZFS	24.00	6.90	90.0	90.0	28.00	4.50	3.50	-	48.00	-	5	106	111
											Totals:	0	457	311	768

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	30.60	7.67	290.0	290.0	2.30	367.20	-	0.00	-	-	-9	2,447	2,439
											Totals:	0	-9	2,447	2,439

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	38.69	112.00	177.1	0.0	10.00	9.50	-	7.50	-	-	138	428	566
Pin	Pin Insulator - 15 kV	NVE	38.69	72.00	175.5	0.0	10.00	9.50	-	7.50	-	-	89	428	517
Pin	Pin Insulator - 15 kV	NVE	38.69	32.00	170.0	0.0	10.00	9.50	-	7.50	-	-	41	428	468
Spool	Spool Insulator - 20 kV	NVE	29.20	4.70	180.0	90.0	1.00	2.12	-	2.50	-	-	1	24	25

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

² Worst Wind per Guy Wire
³ Wind at 177.0°

Bolt	Three Bolt	ZFS	24.19	18.00	159.0	0.0	5.00	0.00	-	3.00	-	-	13	0	13
Bolt	Three Bolt	COX	23.20	5.22	180.0	90.0	5.00	0.00	-	3.00	-	-	5	0	5
Bolt	Three Bolt	CTL	18.20	5.66	180.0	90.0	5.00	0.00	-	3.00	-	-	5	0	5
											Totals:	0	292	1,307	1,599

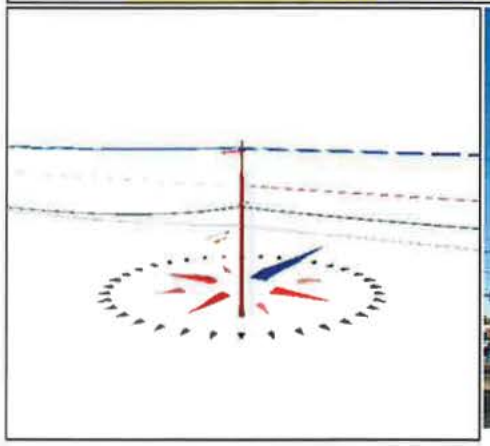
Pole Buckling

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	22.80	34.11	13.13	17.31	7.32	14.49	1,000,000	50.00	57.00	41.10	31,235	3,447	9.06

O-Calc® Pro *Analysis Report*

Wednesday, November 05, 2014 2:31:28 PM

File Name:	P87951 GRADE B	Pole Length / Class:	50 / 3	Code:	NESC	Structure Type:	Unguyed
Pole Num:	P87951	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	NELLIS & TROPICANA	G/L Circumference (in):	45.50	Loading District:	Light	Transverse Wind LF:	2.50
Aux Data	O/B 144CT	G/L Fiber Stress (psi):	6,000	Ice Thickness (in):	0.00	Wire Tension LF:	1.10
Aux Data	Unset	Allowable Stress (psi):	3,900	Wind Speed (mph):	59.29	Vertical LF:	1.50
Aux Data	Unset	Fiber Stress Ht. Reduction:	No	Wind Pressure (psf):	9.00		



Pole Capacity Utilization		Height	Wind Angle
Maximum:	90.7%	0.0 ft	177.0°
Groundline:	90.7%	0.0 ft	177.0°
Vertical:	11.1%	22.8 ft	177.0°

Pole Moments		Load Angle	Wind Angle
Max Capac. Util:	87,402 ft-lb	168.1°	177.0°
Groundline:	87,402 ft-lb	168.1°	177.0°

GROUNDLINE LOAD SUMMARY:*Wind at 177.0°, Applied Moment 87,402 ft-lb at 168.1°, Allowable Moment 96,932 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:	1,289	39.5	46,137	25.2	22.8	1,856	574	3	1,860	47.7
Comms:	985	30.1	21,271	12.2	11.0	856	573	3	859	22.0
Pole:	830	25.4	15,188	17.4	15.7	611	2,070	13	624	16.0
Crossarms:	10	0.3	767	0.7	0.7	31	141	1	32	0.8
Risers:	120	3.7	2,440	2.8	2.5	98	41	0	98	2.5
Insulators:	34	1.0	1,600	0.6	0.6	64	69	0	65	1.7
Pole Load:	3,268	100.0	87,402	100.0	90.2	3,517	3,469	21	3,538	90.7
Pole Reserve Capacity:			9,530		9.8	383			362	9.3

LOAD SUMMARY BY OWNER

NVE:	1,151	43,358	1,744	620	4	1,748	44.8
ZFS:	302	7,575	305	190	1	306	7.8
COX:	596	14,068	566	388	2	568	14.6

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

** Worst Wind per Guy Wire
* Wind at 177.0°

CTL:	389	7,213	290	200	1	291	7.5
Pole:	830	15,188	611	2,070	13	624	16.0
Totals	3,268	87,402	3,517	3,469	21	3,538	90.7

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	636 AAC	NVE	39.48	112.14	0.9180	-	0.596	61.0	90.0	61.0	2,204	19,774	252	2,027	22,053
Primary	636 AAC	NVE	39.48	112.14	0.9180	-	0.596	224.0	270.0	224.0	2,204	-19,774	924	7,444	-11,406
Primary	636 AAC	NVE	39.48	72.22	0.9180	-	0.596	61.0	90.0	61.0	2,204	19,774	163	2,027	21,964
Primary	636 AAC	NVE	39.48	72.22	0.9180	-	0.596	224.0	270.0	224.0	2,204	-19,774	598	7,444	-11,732
Primary	636 AAC	NVE	39.48	32.49	0.9180	-	0.596	61.0	90.0	61.0	2,204	19,774	74	2,027	21,875
Primary	636 AAC	NVE	39.48	32.49	0.9180	-	0.596	224.0	270.0	224.0	2,204	-19,774	271	7,444	-12,059
Neutral	2/0 ACSR	NVE	29.20	6.95	0.4470	-	0.183	61.0	90.0	61.0	1,355	8,983	5	729	9,717
Neutral	2/0 ACSR	NVE	29.20	6.95	0.4470	-	0.183	224.0	270.0	224.0	1,355	-8,983	17	2,678	-6,287
Service	#2 AL TPX (SLACK)	NVE	29.20	6.95	0.7600	-	0.270	61.0	90.0	61.0	500	3,315	7	1,240	4,562
Other	144ct, 24ct 5/16" MESS	ZFS	24.19	21.63	1.1400	-	0.657	61.0	90.0	61.0	1,500	8,237	54	1,541	9,832
Other	144ct, 24ct 5/16" MESS	ZFS	24.19	21.63	1.1400	-	0.657	224.0	270.0	224.1	1,500	-8,237	198	5,658	-2,381
											Totals:	3,315	2,561	40,261	46,137

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, 288ct, 144ct, 8ct 1/4"	COX	23.20	7.72	2.0700	-	1.543	61.0	90.0	61.0	1,500	7,901	44	2,684	10,629
CATV	.75"cx X 2, 288ct, 144ct, 48ct, 8ct	COX	23.20	7.72	2.3400	-	1.846	224.0	270.0	225.0	1,500	-7,901	195	11,140	3,435
Telco	.75" 144ct 5/16"MESS	CTL	18.20	8.16	1.4900	-	0.900	61.0	90.0	61.0	1,500	6,198	27	1,515	7,741
Telco	.75" 144ct 5/16"MESS	CTL	18.20	8.16	1.4900	-	0.900	224.0	270.0	224.2	1,500	-6,198	101	5,565	-533
											Totals:	0	368	20,904	21,271

Crossarm:		Owner	Height (ft)	Horiz. Offset (in)	Offset Angle (deg)	Rotate Angle (deg)	Unit Weight (lbs)	Unit Height (in)	Unit Depth (in)	Unit Diameter (in)	Unit Length (in)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Offset	CROSSARM 3-1/2 X 4-1/2 X 10 -	NVE	38.50	5.64	90.0	90.0	66.00	4.50	3.50	-	120.00	-	452	204	655
Normal	CROSSARM 3-1/2 X 4-1/2 X 4 -	ZFS	24.00	6.90	90.0	90.0	28.00	4.50	3.50	-	48.00	-	5	106	111
											Totals:	0	457	310	767

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	30.60	7.67	290.0	290.0	2.30	367.20	-	0.00	-	-	-9	2,448	2,440
											Totals:	0	-9	2,448	2,440

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	38.69	112.00	177.1	0.0	10.00	9.50	-	7.50	-	-	138	428	566
Pin	Pin Insulator - 15 kV	NVE	38.69	72.00	175.5	0.0	10.00	9.50	-	7.50	-	-	90	428	517
Pin	Pin Insulator - 15 kV	NVE	38.69	32.00	170.0	0.0	10.00	9.50	-	7.50	-	-	41	428	468
Spool	Spool Insulator - 20 kV	NVE	29.20	4.70	180.0	90.0	1.00	2.12	-	2.50	-	-	1	24	25

Bolt	Three Bolt	ZFS	24.19	18.00	159.0	0.0	5.00	0.00	-	3.00	-	-	13	0	13
Bolt	Three Bolt	COX	23.20	5.22	180.0	90.0	5.00	0.00	-	3.00	-	-	5	0	5
Bolt	Three Bolt	CTL	18.20	5.66	180.0	90.0	5.00	0.00	-	3.00	-	-	5	0	5
											Totals:	0	293	1,307	1,600

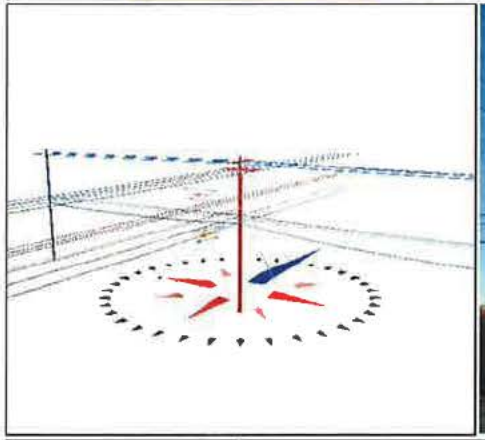
Pole Buckling

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	22.80	34.12	13.13	17.37	7.32	14.49	1,000,000	50.00	57.00	41.10	31,226	3,469	9.00

O-Calc® Pro *Analysis Report*

Wednesday, November 05, 2014 2:34:58 PM

File Name:	**P28697 GRADE B**	Pole Length / Class:	**45 / 2**	Code:	**NESC**	Structure Type:	**Junction**
Pole Num:	**P28697**	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	**NELLIS & TROPICANA**	G/L Circumference (in):	**46.00**	Loading District:	**Light**	Transverse Wind LF:	**2.50**
Aux Data	**O/B 144CT**	G/L Fiber Stress (psi):	**6,000**	Ice Thickness (in):	**0.00**	Wire Tension LF:	**1.65**
Aux Data	**Unset**	Allowable Stress (psi):	**3,900**	Wind Speed (mph):	**59.29**	Vertical LF:	**1.50**
Aux Data	**Unset**	Fiber Stress Ht. Reduction:	**No**	Wind Pressure (psf):	**9.00**		



Pole Capacity Utilization		Height	Wind Angle
Maximum:	**36.9%**	22.0 ft	271.2°
Groundline:	**18.2%**	0.0 ft	190.0°
Vertical:	**15.5%**	29.5 ft	116.6°

Pole Moments		Load Angle	Wind Angle
Max Capac. Util:	**13,312 ft-lb**	260.9°	271.2°
Groundline:	**14,974 ft-lb**	181.5°	190.0°

Guy Summary		Guy Tensions		Maximum Guy Tensions	
	Attach Height (ft)	% Allowable Tension	Wind Angle	% Allowable Tension	Wind Angle
Guy 1	36.2	**0.0%**	190.0°	**6.5%**	90.0°
Guy 2	36.2	**0.0%**	190.0°	**6.6%**	100.0°
Guy 3	33.5	**81.0%**	190.0°	**81.3%**	180.0°
Guy 4	33.5	**65.2%**	190.0°	**65.4%**	180.5°
Guy 5	24.3	**0.0%**	190.0°	**0.0%**	0.0°
Guy 6	23.9	**55.0%**	190.0°	**55.4%**	178.4°
Guy 7	21.9	**0.0%**	190.0°	**10.1%**	90.0°

Anchor Summary		
	Lead Length (ft)	Max. % Allow. Capacity
Anchor 1	26.6	**4.5%**
Anchor 2	20.7	**4.6%**
Anchor 3	31.5	**41.0%**
Anchor 4	17.3	**60.7%**
Anchor 5	92.0	**0.0%**
Anchor 6	69.0	**3.0%**
Anchor 7	13.0	**24.2%**

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

² Worst Wind per Guy Wire
³ Wind at 190.0°

Guy 8	21.9	5.9%	190.0°	29.0%	268.4°
Guy 9	20.6	3.1%	190.0°	22.4%	272.0°

GROUNDLINE LOAD SUMMARY:*Wind at 190.0°, Applied Moment 14,974 ft-lb at 181.5°, Allowable Moment 100,163 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:	10,249	1028.8	327,884	26.8	2.6	12,767	615	4	12,770	327.4
Comms:	1,182	118.7	25,345	36.8	3.6	987	826	5	992	25.4
Guys/Braces:	-11,666	-1171.1	-366,646	5.7	0.6	-14,276	17,100	102	-14,174	-363.4
Pole:	811	81.4	14,147	143.7	14.1	551	2,080	12	563	14.4
Crossarms:	275	27.6	9,554	3.3	0.3	372	396	2	374	9.6
Risers:	21	2.1	232	2.4	0.2	9	55	0	9	0.2
Insulators:	125	12.5	4,459	3.0	0.3	174	134	1	174	4.5
Pole Load:	996	100.0	14,974	152.1	14.9	583	21,206	126	709	18.2
Pole Reserve Capacity:			85,189		85.1	3,317			3,191	81.8

LOAD SUMMARY BY OWNER

NVE:	-529	-11,146	-434	12,892	77	-357	-9.2
ZFS:	-508	-14,026	-546	4,627	27	-519	-13.3
COX:	315	7,153	279	201	1	280	7.2
CTL:	907	18,847	734	1,405	8	742	19.0
Pole:	811	14,147	551	2,080	12	563	14.4
Totals	996	14,974	583	21,206	126	709	18.2

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	636 AAC	NVE	37.01	57.12	0.9180	-	0.596	199.0	90.0	199.0	2,204	-3,632	29	6,239	2,636
Primary	636 AAC	NVE	37.01	57.12	0.9180	-	0.596	199.0	90.0	199.0	2,204	-3,632	-29	6,239	2,578
Primary	636 AAC	NVE	37.01	25.90	0.9180	-	0.596	199.0	90.0	199.0	2,204	-3,632	-22	6,239	2,585
Primary	636 AAC	NVE	37.01	57.12	0.9180	-	0.596	69.0	270.0	69.0	2,204	3,632	10	2,163	5,806
Primary	636 AAC	NVE	37.01	57.12	0.9180	-	0.596	69.0	270.0	69.0	2,204	3,632	-10	2,163	5,786
Primary	636 AAC	NVE	37.01	25.90	0.9180	-	0.596	69.0	270.0	69.0	2,204	3,632	-7	2,163	5,789
Neutral	2/0 ACSR	NVE	37.01	25.90	0.4470	-	0.183	69.0	270.0	69.0	1,355	2,233	2	1,053	3,289
Neutral	2/0 ACSR	NVE	37.01	25.90	0.4470	-	0.183	199.0	90.0	199.0	1,355	-2,233	6	3,038	811
Primary	2 AAC	NVE	34.61	57.19	0.2920	-	0.062	78.0	0.0	78.0	460	-26,257	0	3	-26,254
Primary	2 AAC	NVE	34.61	57.19	0.2920	-	0.062	78.0	0.0	78.0	460	-26,257	0	3	-26,254
Primary	2 AAC	NVE	34.61	26.05	0.2920	-	0.062	78.0	0.0	78.0	460	-26,257	-1	3	-26,255
Primary	336 AAC	NVE	34.61	57.19	0.6660	-	0.316	92.0	180.0	92.0	1,470	83,910	2	9	83,921
Primary	336 AAC	NVE	34.61	57.19	0.6660	-	0.316	92.0	180.0	92.0	1,470	83,910	3	9	83,922
Primary	336 AAC	NVE	34.61	26.05	0.6660	-	0.316	92.0	180.0	92.0	1,470	83,910	6	9	83,925
Neutral	2/0 ACSR	NVE	34.61	26.05	0.4470	-	0.183	92.0	180.0	92.0	1,355	77,345	3	6	77,355

Primary	#4 ACSR	NVE	34.61	26.05	0.2500	-	0.057	78.0	0.0	78.0	282	-16,097	-1	3	-16,095
Secondary	#4 WP AL	NVE	27.70	7.18	0.2320	-	0.039	78.0	0.0	78.0	325	-14,849	-1	2	-14,848
Secondary	1/0 WP AL	NVE	27.20	7.22	0.5250	-	0.170	78.0	0.0	78.0	590	-26,470	-6	5	-26,471
Secondary	1/0 WP AL	NVE	26.70	7.27	0.5250	-	0.170	78.0	0.0	78.0	590	-25,983	-6	5	-25,984
Secondary	#4 WP AL	NVE	27.70	7.18	0.2320	-	0.039	92.0	180.0	92.0	325	14,849	2	3	14,853
Secondary	1/0 WP AL	NVE	27.20	7.22	0.5250	-	0.170	92.0	180.0	92.0	590	26,470	7	6	26,482
Secondary	1/0 WP AL	NVE	26.70	7.27	0.5250	-	0.170	92.0	180.0	92.0	590	25,983	7	6	25,996
Other	288ct SELF SUPPORT	ZFS	24.10	7.74	0.8600	-	0.350	199.0	90.0	199.0	1,500	-1,610	34	3,807	2,230
Other	288ct SELF SUPPORT	ZFS	24.10	7.74	0.8600	-	0.350	69.0	270.0	69.0	1,500	1,610	12	1,320	2,941
Other	24ct SELF SUPPORT	ZFS	23.90	7.76	0.4000	-	0.110	92.0	180.0	92.0	1,500	59,131	5	4	59,140
											Totals:	293,336	43	34,504	327,884

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, 48ct 1/4" MESS	COX	22.40	7.89	1.2300	-	0.610	199.0	90.0	199.1	1,500	-1,496	60	5,060	3,624
CATV	.75"cx, .50"cx, 48ct X 2 1/4" MESS	COX	22.40	7.89	1.3900	-	0.932	69.0	270.0	69.0	1,500	1,496	32	1,983	3,511
CATV	.50"cx 1/4" MESS	COX	22.30	7.90	0.7500	-	0.271	78.0	0.0	78.0	1,500	-55,172	0	6	-55,167
CATV	.50"cx, 48ct 1/4" MESS	COX	22.30	7.90	0.9800	-	0.450	92.0	180.0	92.0	1,500	55,172	-1	9	55,181
Telco	144ct 5/16"MESS	CTL	21.50	7.96	1.0500	-	0.515	199.0	90.0	199.1	1,500	-1,436	51	4,146	2,761
Telco	144ct 5/16"MESS	CTL	21.50	7.96	1.0500	-	0.515	69.0	270.0	69.0	1,500	1,436	18	1,438	2,892
Telco	1.0" 3/8"MESS	CTL	20.60	8.04	1.3800	-	1.000	78.0	0.0	78.0	1,500	-50,966	-1	10	-50,958
Telco	1.0" 3/8"MESS	CTL	20.60	8.04	1.3800	-	1.000	92.0	180.0	92.0	1,500	50,966	-1	11	50,977
Telco	1.75" 3/8" MESS	CTL	20.20	8.08	2.1300	-	1.700	199.0	90.0	199.6	1,500	-1,349	171	7,902	6,724
Telco	3.0" 3/8" MESS	CTL	20.20	8.08	3.3800	-	3.000	69.0	270.0	69.1	1,500	1,349	104	4,348	5,802
											Totals:	0	432	24,913	25,345

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	37.10	5.87	90.0	90.0	66.00	4.50	3.50	-	120.00	-	-5	335	329
Normal	CROSSARM 3-1/2 X 4-1/2 X 10 -	NVE	34.70	6.07	0.0	0.0	66.00	4.50	3.50	-	120.00	-	0	9,225	9,225
											Totals:	0	-5	9,559	9,554

Riser:		Owner	Height (ft)	Horiz. Offset (in)	Offset Angle (deg)	Rotate Angle (deg)	Unit Weight (lbs)	Unit Height (in)	Unit Depth (in)	Unit Diameter (in)	Unit Length (in)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
3" Riser 0.0°	3" Riser	CTL	18.40	7.52	0.0	0.0	3.07	220.80	-	0.00	-	-	-22	254	232
											Totals:	0	-22	254	232

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	37.10	54.00	173.8	0.0	3.00	12.75	-	3.80	-	-	20	278	298
Deadend	Deadend Insulator - 15 kV	NVE	37.10	-54.00	6.2	0.0	3.00	12.75	-	3.80	-	-	-20	278	257
Deadend	Deadend Insulator - 15 kV	NVE	37.10	-18.00	18.1	0.0	3.00	12.75	-	3.80	-	-	-7	278	271
Deadend	Deadend Insulator - 15 kV	NVE	37.10	54.00	186.2	180.0	3.00	12.75	-	3.80	-	-	20	278	298
Deadend	Deadend Insulator - 15 kV	NVE	37.10	-54.00	353.8	180.0	3.00	12.75	-	3.80	-	-	-20	278	258
Deadend	Deadend Insulator - 15 kV	NVE	37.10	-18.00	341.9	180.0	3.00	12.75	-	3.80	-	-	-7	278	271
Deadend	Deadend Insulator - 15 kV	NVE	37.10	18.00	198.1	180.0	3.00	12.75	-	3.80	-	-	7	278	285

Deadend	Deadend Insulator - 15 kV	NVE	37.10	18.00	161.9	0.0	3.00	12.75	-	3.80	-	-	7	278	284
Deadend	Deadend Insulator - 15 kV	NVE	34.70	54.00	83.6	0.0	3.00	12.75	-	3.80	-	-	-8	260	252
Deadend	Deadend Insulator - 15 kV	NVE	34.70	-54.00	276.4	0.0	3.00	12.75	-	3.80	-	-	-7	260	253
Deadend	Deadend Insulator - 15 kV	NVE	34.70	-18.00	288.6	0.0	3.00	12.75	-	3.80	-	-	-7	260	253
Deadend	Deadend Insulator - 15 kV	NVE	34.70	54.00	96.4	180.0	3.00	12.75	-	3.80	-	-	7	260	266
Deadend	Deadend Insulator - 15 kV	NVE	34.70	-54.00	263.6	180.0	3.00	12.75	-	3.80	-	-	8	260	267
Deadend	Deadend Insulator - 15 kV	NVE	34.70	-18.00	251.4	180.0	3.00	12.75	-	3.80	-	-	7	260	267
Deadend	Deadend Insulator - 15 kV	NVE	34.70	18.00	108.6	180.0	3.00	12.75	-	3.80	-	-	7	260	267
Deadend	Deadend Insulator - 15 kV	NVE	34.70	18.00	71.4	0.0	3.00	12.75	-	3.80	-	-	-7	260	253
Spool	Spool Insulator - 20 kV	NVE	27.70	4.93	0.0	270.0	1.00	2.12	-	2.50	-	-	-1	23	22
Spool	Spool Insulator - 20 kV	NVE	27.20	4.97	0.0	270.0	1.00	2.12	-	2.50	-	-	-1	22	21
Spool	Spool Insulator - 20 kV	NVE	26.70	5.02	0.0	270.0	1.00	2.12	-	2.50	-	-	-1	22	21
Spool	Spool Insulator - 20 kV	NVE	27.70	4.93	180.0	90.0	1.00	2.12	-	2.50	-	-	1	23	24
Spool	Spool Insulator - 20 kV	NVE	27.20	4.97	180.0	90.0	1.00	2.12	-	2.50	-	-	1	22	23
Spool	Spool Insulator - 20 kV	NVE	26.70	5.02	180.0	90.0	1.00	2.12	-	2.50	-	-	1	22	23
Bolt	Three Bolt	ZFS	24.10	5.24	180.0	90.0	5.00	0.00	-	3.00	-	-	5	0	5
Bolt	Three Bolt	ZFS	23.90	5.26	180.0	90.0	5.00	0.00	-	3.00	-	-	5	0	5
Bolt	Three Bolt	COX	22.40	5.39	180.0	90.0	5.00	0.00	-	3.00	-	-	5	0	5
Bolt	Three Bolt	COX	22.30	5.40	90.0	0.0	5.00	0.00	-	3.00	-	-	0	0	0
Bolt	Three Bolt	CTL	21.50	5.46	180.0	90.0	5.00	0.00	-	3.00	-	-	5	0	5
Bolt	Three Bolt	CTL	20.60	5.54	90.0	0.0	5.00	0.00	-	3.00	-	-	0	0	0
Bolt	Three Bolt	CTL	20.20	5.58	180.0	90.0	5.00	0.00	-	3.00	-	-	5	0	5
											Totals:	0	24	4,435	4,459

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	36.20	0.00	26.60	0.375	75.0	270.0	53.7	0.273	43.42	0.00
Guy 2: EHS 3/8	Down	NVE	36.20	0.00	20.70	0.375	75.0	270.0	60.2	0.273	40.20	0.00
Guy 3: EHS 5/16	Down	NVE	33.50	0.00	31.50	0.312	75.0	0.0	46.8	0.205	44.48	3.30
Guy 4: EHS 5/16	Down	NVE	33.50	0.00	17.30	0.312	75.0	0.0	62.7	0.205	36.20	2.16
Guy 5: EHS 1/4	Span/Head	NVE	24.30	24.30	92.00	0.250	75.0	180.0	0.0	0.121	92.66	0.00
Guy 6: EHS 5/16	Down	ZFS	23.90	0.00	17.30	0.312	75.0	0.0	54.1	0.205	28.00	1.41
Guy 7: EHS 1/4	Span/Head	CTL	21.90	21.90	69.00	0.250	75.0	270.0	0.0	0.121	69.89	0.00
Guy 8: EHS 1/4	Down	CTL	21.90	0.00	13.00	0.250	75.0	90.0	59.3	0.121	23.97	0.12
Guy 9: EHS 3/8	Down	CTL	20.60	0.00	13.00	0.375	75.0	90.0	57.7	0.273	22.86	0.06

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[4] (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	897	0	0	0	0	0	560
Guy 2: EHS 3/8	Down	23,000,000	15,400	0.90	13,860	700	916	0	0	0	0	0	520
Guy 3: EHS 5/16	Down	23,000,000	11,200	0.90	10,080	700	8,192	8,169	8,169	5,951	5,596	-5,594	-188,416
Guy 4: EHS 5/16	Down	23,000,000	11,200	0.90	10,080	700	6,595	6,568	6,568	5,836	3,014	-3,013	-101,374
Guy 5: EHS 1/4	Span/Head	23,000,000	6,650	0.90	5,985	700		0	0	0	0	0	2
Guy 6: EHS 5/16	Down	23,000,000	11,200	0.90	10,080	700	5,585	5,545	5,545	4,491	3,251	-3,250	-78,348
Guy 7: EHS 1/4	Span/Head	23,000,000	6,650	0.90	5,985	700	604	0	0	0	0	0	346

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

[2] Worst Wind per Guy Wire
[3] Wind at 190.0°

Guy 8: EHS 1/4	Down	23,000,000	6,650	0.90	5,985	700	1,736	351	351	302	179	-5	21
Guy 9: EHS 3/8	Down	23,000,000	15,400	0.90	13,860	700	3,108	436	436	369	233	-6	41
									Totals:	16,949	12,272	-11,867	-

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	26.60	270.0	20,000	1.00	20,000	897	0	4.5
Single Helix Anchor	NVE	18.00	20.70	270.0	20,000	1.00	20,000	916	0	4.6
Single Helix Anchor	NVE	18.00	31.50	0.0	20,000	1.00	20,000	8,192	8,169	41.0
Single Helix Anchor	NVE	18.00	17.30	0.0	20,000	1.00	20,000	12,147	12,079	60.7
Anchor	NVE	30.00	92.00	180.0	20,000	1.00	20,000		0	0.0
Anchor	CTL	30.00	69.00	270.0	20,000	1.00	20,000	604	0	3.0
Single Helix Anchor	CTL	18.00	13.00	90.0	20,000	1.00	20,000	4,844	787	24.2

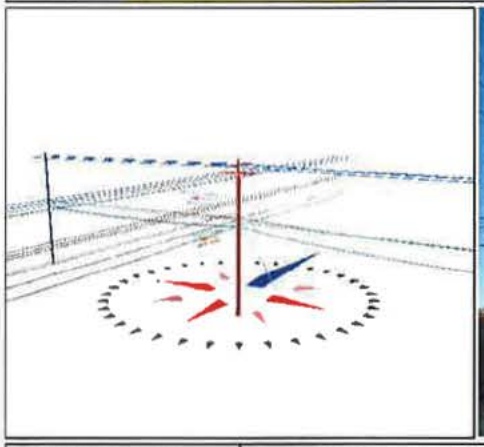
Pole Buckling

Buckling	Buckling (ft)	Buckling Section (% Buckling Col. Hgt.)	Buckling (in)	Min. Buckling (in)	Diameter (in)	Diameter (in)	Modulus of (psi)	Pole (pcf)	Ice Density (pcf)	Pole Tip (ft)	Buckling Load (lbs)	Buckling Load (lbs)	Buckling Load
0.71	29.52	35.22	12.85	28.18	7.96	14.65	1,000,000	50.00	57.00	38.70	136,695	21,206	6.45

O-Calc® Pro *Analysis Report*

Wednesday, November 05, 2014 2:35:58 PM

File Name:	P28697 GRADE B	Pole Length / Class:	45 / 2	Code:	NESC	Structure Type:	Junction
Pole Num:	P28697	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	NELLIS & TROPICANA	G/L Circumference (in):	46.00	Loading District:	Light	Transverse Wind LF:	2.50
Aux Data	O/B 144CT	G/L Fiber Stress (psi):	6,000	Ice Thickness (in):	0.00	Wire Tension LF:	1.65
Aux Data	Unset	Allowable Stress (psi):	3,900	Wind Speed (mph):	59.29	Vertical LF:	1.50
Aux Data	Unset	Fiber Stress Ht. Reduction:	No	Wind Pressure (psf):	9.00		



Pole Capacity Utilization		Height	Wind Angle
Maximum:	36.9%	22.0 ft	270.0°
Groundline:	18.4%	0.0 ft	186.9°
Vertical:	15.5%	29.6 ft	116.6°

Pole Moments		Load Angle	Wind Angle
Max Capac. Util:	13,309 ft-lb	261.1°	270.0°
Groundline:	15,267 ft-lb	181.1°	186.9°

Guy Summary		Guy Tensions		Maximum Guy Tensions	
	Attach Height (ft)	% Allowable Tension	Wind Angle	% Allowable Tension	Wind Angle
Guy 1	36.2	0.0%	186.9°	6.5%	90.0°
Guy 2	36.2	0.0%	186.9°	6.6%	100.0°
Guy 3	33.5	81.2%	186.9°	81.3%	180.5°
Guy 4	33.5	65.3%	186.9°	65.6%	180.5°
Guy 5	24.3	0.0%	186.9°	0.0%	0.0°
Guy 6	23.9	55.7%	186.9°	55.9%	181.2°
Guy 7	21.9	0.0%	186.9°	9.9%	90.0°

Anchor Summary		
	Lead Length (ft)	Max. % Allow. Capacity
Anchor 1	26.6	4.5%
Anchor 2	20.7	4.6%
Anchor 3	31.5	41.0%
Anchor 4	17.3	61.0%
Anchor 5	92.0	0.0%
Anchor 6	69.0	3.0%
Anchor 7	13.0	24.2%

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

² Worst Wind per Guy Wire
³ Wind at 186.9°

Guy 8	21.9	4.2%	186.9°	29.0%	268.6°
Guy 9	20.6	2.0%	186.9°	22.4%	267.2°

GROUNDLINE LOAD SUMMARY:*Wind at 186.9°, Applied Moment 15,267 ft-lb at 181.1°, Allowable Moment 100,163 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:	10,257	1010.0	328,181	37.3	3.7	12,778	615	4	12,782	327.7
Comms:	1,246	122.7	26,768	52.3	5.2	1,042	843	5	1,047	26.9
Guys/Braces:	-11,720	-1154.0	-368,161	5.7	0.6	-14,335	16,959	101	-14,234	-365.0
Pole:	816	80.3	14,230	144.2	14.2	554	2,080	12	566	14.5
Crossarms:	276	27.2	9,610	3.1	0.3	374	396	2	377	9.7
Risers:	14	1.4	154	1.6	0.2	6	55	0	6	0.2
Insulators:	125	12.4	4,485	3.0	0.3	175	134	1	175	4.5
Pole Load:	1,016	100.0	15,267	154.7	15.2	594	21,082	125	720	18.5
Pole Reserve Capacity:			84,896		84.8	3,306			3,180	81.5

LOAD SUMMARY BY OWNER

NVE:	-540	-11,489	-447	12,917	77	-371	-9.5
ZFS:	-546	-14,945	-582	4,683	28	-554	-14.2
COX:	372	8,438	329	218	1	330	8.5
CTL:	913	19,033	741	1,184	7	748	19.2
Pole:	816	14,230	554	2,080	12	566	14.5
Totals	1,016	15,267	594	21,082	125	720	18.5

Detailed Load Components

Power:		Owner	Height (ft)	Horiz. Offset (in)	Cable Dia. (in)	Rotate Angle (deg)	Cable Weight (lbs/ft)	Lead/Span Length	Span Angle (deg)	Wire Length (ft)	Tension (lbs)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Primary	636 AAC	NVE	37.01	57.12	0.9180	-	0.596	199.0	90.0	199.0	2,204	-2,642	29	6,291	3,678
Primary	636 AAC	NVE	37.01	57.12	0.9180	-	0.596	199.0	90.0	199.0	2,204	-2,642	-29	6,291	3,620
Primary	636 AAC	NVE	37.01	25.90	0.9180	-	0.596	199.0	90.0	199.0	2,204	-2,642	-22	6,291	3,627
Primary	636 AAC	NVE	37.01	57.12	0.9180	-	0.596	69.0	270.0	69.0	2,204	2,642	10	2,181	4,834
Primary	636 AAC	NVE	37.01	57.12	0.9180	-	0.596	69.0	270.0	69.0	2,204	2,642	-10	2,181	4,814
Primary	636 AAC	NVE	37.01	25.90	0.9180	-	0.596	69.0	270.0	69.0	2,204	2,642	-7	2,181	4,816
Neutral	2/0 ACSR	NVE	37.01	25.90	0.4470	-	0.183	69.0	270.0	69.0	1,355	1,624	2	1,062	2,689
Neutral	2/0 ACSR	NVE	37.01	25.90	0.4470	-	0.183	199.0	90.0	199.0	1,355	-1,624	6	3,063	1,445
Primary	2 AAC	NVE	34.61	57.19	0.2920	-	0.062	78.0	0.0	78.0	460	-26,262	0	2	-26,261
Primary	2 AAC	NVE	34.61	57.19	0.2920	-	0.062	78.0	0.0	78.0	460	-26,262	0	2	-26,261
Primary	2 AAC	NVE	34.61	26.05	0.2920	-	0.062	78.0	0.0	78.0	460	-26,262	-1	2	-26,261
Primary	336 AAC	NVE	34.61	57.19	0.6660	-	0.316	92.0	180.0	92.0	1,470	83,924	2	5	83,931
Primary	336 AAC	NVE	34.61	57.19	0.6660	-	0.316	92.0	180.0	92.0	1,470	83,924	3	5	83,931
Primary	336 AAC	NVE	34.61	26.05	0.6660	-	0.316	92.0	180.0	92.0	1,470	83,924	6	5	83,935
Neutral	2/0 ACSR	NVE	34.61	26.05	0.4470	-	0.183	92.0	180.0	92.0	1,355	77,359	3	3	77,365

Primary	#4 ACSR	NVE	34.61	26.05	0.2500	-	0.057	78.0	0.0	78.0	282	-16,100	-1	1	-16,099
Secondary	#4 WP AL	NVE	27.70	7.18	0.2320	-	0.039	78.0	0.0	78.0	325	-14,851	-1	1	-14,852
Secondary	1/0 WP AL	NVE	27.20	7.22	0.5250	-	0.170	78.0	0.0	78.0	590	-26,474	-6	2	-26,478
Secondary	1/0 WP AL	NVE	26.70	7.27	0.5250	-	0.170	78.0	0.0	78.0	590	-25,987	-6	2	-25,991
Secondary	#4 WP AL	NVE	27.70	7.18	0.2320	-	0.039	92.0	180.0	92.0	325	14,851	2	1	14,854
Secondary	1/0 WP AL	NVE	27.20	7.22	0.5250	-	0.170	92.0	180.0	92.0	590	26,474	7	3	26,484
Secondary	1/0 WP AL	NVE	26.70	7.27	0.5250	-	0.170	92.0	180.0	92.0	590	25,987	7	3	25,997
Other	288ct SELF SUPPORT	ZFS	24.10	7.74	0.8600	-	0.350	199.0	90.0	199.0	1,500	-1,171	34	3,838	2,701
Other	288ct SELF SUPPORT	ZFS	24.10	7.74	0.8600	-	0.350	69.0	270.0	69.0	1,500	1,171	12	1,331	2,514
Other	24ct SELF SUPPORT	ZFS	23.90	7.76	0.4000	-	0.110	92.0	180.0	92.0	1,500	58,141	5	2	59,148
											Totals:	293,386	44	34,751	328,181

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, 48ct 1/4" MESS PROP RMV	COX	22.40	7.89	1.4900	-	0.734	199.0	90.0	199.1	1,500	-1,088	72	6,181	5,164
CATV	.75"cx, .50"cx, 48ct X 2 1/4" MESS	COX	22.40	7.89	1.4900	-	0.891	69.0	270.0	69.0	1,500	1,088	30	2,143	3,262
CATV	.50"cx 1/4" MESS	COX	22.30	7.90	0.7500	-	0.271	78.0	0.0	78.0	1,500	-55,182	0	3	-55,179
CATV	.50"cx, 48ct 1/4" MESS	COX	22.30	7.90	0.9800	-	0.450	92.0	180.0	92.0	1,500	55,182	0	4	55,186
Telco	144ct 5/16"MESS	CTL	21.50	7.96	1.0500	-	0.515	199.0	90.0	199.1	1,500	-1,045	51	4,181	3,187
Telco	144ct 5/16"MESS	CTL	21.50	7.96	1.0500	-	0.515	69.0	270.0	69.0	1,500	1,045	18	1,450	2,512
Telco	1.0" 3/8"MESS	CTL	20.60	8.04	1.3800	-	1.000	78.0	0.0	78.0	1,500	-50,975	-1	5	-50,971
Telco	1.0" 3/8"MESS	CTL	20.60	8.04	1.3800	-	1.000	92.0	180.0	92.0	1,500	50,975	-1	6	50,980
Telco	1.75" 3/8" MESS	CTL	20.20	8.08	2.1300	-	1.700	199.0	90.0	199.6	1,500	-982	171	7,968	7,157
Telco	3.0" 3/8" MESS	CTL	20.20	8.08	3.3800	-	3.000	69.0	270.0	69.1	1,500	982	104	4,384	5,470
											Totals:	0	444	26,324	26,768

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	37.10	5.87	90.0	90.0	66.00	4.50	3.50	-	120.00	-	-4	314	310
Normal	CROSSARM 3-1/2 X 4-1/2 X 10 -	NVE	34.70	6.07	0.0	0.0	66.00	4.50	3.50	-	120.00	-	0	9,300	9,300
											Totals:	0	-4	9,614	9,610

Riser:		Owner	Height (ft)	Horiz. Offset (in)	Offset Angle (deg)	Rotate Angle (deg)	Unit Weight (lbs)	Unit Height (in)	Unit Depth (in)	Unit Diameter (in)	Unit Length (in)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
3" Riser 0.0"	3" Riser	CTL	18.40	7.52	0.0	0.0	3.07	220.80	-	0.00	-	-	-22	176	154
											Totals:	0	-22	176	154

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	37.10	54.00	173.8	0.0	3.00	12.75	-	3.80	-	-	20	279	300
Deadend	Deadend Insulator - 15 kV	NVE	37.10	-54.00	6.2	0.0	3.00	12.75	-	3.80	-	-	-20	279	259
Deadend	Deadend Insulator - 15 kV	NVE	37.10	-18.00	18.1	0.0	3.00	12.75	-	3.80	-	-	-7	279	273
Deadend	Deadend Insulator - 15 kV	NVE	37.10	54.00	186.2	180.0	3.00	12.75	-	3.80	-	-	20	279	300
Deadend	Deadend Insulator - 15 kV	NVE	37.10	-54.00	353.8	180.0	3.00	12.75	-	3.80	-	-	-20	279	259
Deadend	Deadend Insulator - 15 kV	NVE	37.10	-18.00	341.9	180.0	3.00	12.75	-	3.80	-	-	-7	279	273
Deadend	Deadend Insulator - 15 kV	NVE	37.10	18.00	198.1	180.0	3.00	12.75	-	3.80	-	-	7	279	286

Deadend	Deadend Insulator - 15 kV	NVE	37.10	18.00	161.9	0.0	3.00	12.75	-	3.80	-	-	7	279	286
Deadend	Deadend Insulator - 15 kV	NVE	34.70	54.00	83.6	0.0	3.00	12.75	-	3.80	-	-	-7	261	254
Deadend	Deadend Insulator - 15 kV	NVE	34.70	-54.00	276.4	0.0	3.00	12.75	-	3.80	-	-	-7	261	255
Deadend	Deadend Insulator - 15 kV	NVE	34.70	-18.00	288.6	0.0	3.00	12.75	-	3.80	-	-	-7	261	254
Deadend	Deadend Insulator - 15 kV	NVE	34.70	54.00	96.4	180.0	3.00	12.75	-	3.80	-	-	7	261	268
Deadend	Deadend Insulator - 15 kV	NVE	34.70	-54.00	263.6	180.0	3.00	12.75	-	3.80	-	-	7	261	269
Deadend	Deadend Insulator - 15 kV	NVE	34.70	-18.00	251.4	180.0	3.00	12.75	-	3.80	-	-	7	261	269
Deadend	Deadend Insulator - 15 kV	NVE	34.70	18.00	108.6	180.0	3.00	12.75	-	3.80	-	-	7	261	268
Deadend	Deadend Insulator - 15 kV	NVE	34.70	18.00	71.4	0.0	3.00	12.75	-	3.80	-	-	-7	261	254
Spool	Spool Insulator - 20 kV	NVE	27.70	4.93	0.0	270.0	1.00	2.12	-	2.50	-	-	-1	23	22
Spool	Spool Insulator - 20 kV	NVE	27.20	4.97	0.0	270.0	1.00	2.12	-	2.50	-	-	-1	22	22
Spool	Spool Insulator - 20 kV	NVE	26.70	5.02	0.0	270.0	1.00	2.12	-	2.50	-	-	-1	22	21
Spool	Spool Insulator - 20 kV	NVE	27.70	4.93	180.0	90.0	1.00	2.12	-	2.50	-	-	1	23	24
Spool	Spool Insulator - 20 kV	NVE	27.20	4.97	180.0	90.0	1.00	2.12	-	2.50	-	-	1	22	23
Spool	Spool Insulator - 20 kV	NVE	26.70	5.02	180.0	90.0	1.00	2.12	-	2.50	-	-	1	22	23
Bolt	Three Bolt	ZFS	24.10	5.24	180.0	90.0	5.00	0.00	-	3.00	-	-	5	0	5
Bolt	Three Bolt	ZFS	23.90	5.26	180.0	90.0	5.00	0.00	-	3.00	-	-	5	0	5
Bolt	Three Bolt	COX	22.40	5.39	180.0	90.0	5.00	0.00	-	3.00	-	-	5	0	5
Bolt	Three Bolt	COX	22.30	5.40	90.0	0.0	5.00	0.00	-	3.00	-	-	0	0	0
Bolt	Three Bolt	CTL	21.50	5.46	180.0	90.0	5.00	0.00	-	3.00	-	-	5	0	5
Bolt	Three Bolt	CTL	20.60	5.54	90.0	0.0	5.00	0.00	-	3.00	-	-	0	0	0
Bolt	Three Bolt	CTL	20.20	5.58	180.0	90.0	5.00	0.00	-	3.00	-	-	5	0	5
											Totals:	0	24	4,461	4,485

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	36.20	0.00	26.60	0.375	75.0	270.0	53.7	0.273	43.42	0.00
Guy 2: EHS 3/8	Down	NVE	36.20	0.00	20.70	0.375	75.0	270.0	60.2	0.273	40.20	0.00
Guy 3: EHS 5/16	Down	NVE	33.50	0.00	31.50	0.312	75.0	0.0	46.8	0.205	44.48	3.30
Guy 4: EHS 5/16	Down	NVE	33.50	0.00	17.30	0.312	75.0	0.0	62.7	0.205	36.20	2.16
Guy 5: EHS 1/4	Span/Head	NVE	24.30	24.30	92.00	0.250	75.0	180.0	0.0	0.121	92.66	0.00
Guy 6: EHS 5/16	Down	ZFS	23.90	0.00	17.30	0.312	75.0	0.0	54.1	0.205	28.00	1.43
Guy 7: EHS 1/4	Span/Head	CTL	21.90	21.90	69.00	0.250	75.0	270.0	0.0	0.121	69.89	0.00
Guy 8: EHS 1/4	Down	CTL	21.90	0.00	13.00	0.250	75.0	90.0	59.3	0.121	23.97	0.08
Guy 9: EHS 3/8	Down	CTL	20.60	0.00	13.00	0.375	75.0	90.0	57.7	0.273	22.86	0.04

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	895	0	0	0	0	0	565
Guy 2: EHS 3/8	Down	23,000,000	15,400	0.90	13,860	700	916	0	0	0	0	0	525
Guy 3: EHS 5/16	Down	23,000,000	11,200	0.90	10,080	700	8,199	8,187	8,187	5,965	5,609	-5,608	-188,887
Guy 4: EHS 5/16	Down	23,000,000	11,200	0.90	10,080	700	6,608	6,581	6,581	5,847	3,019	-3,019	-101,583
Guy 5: EHS 1/4	Span/Head	23,000,000	6,650	0.90	5,985	700		0	0	0	0	0	1
Guy 6: EHS 5/16	Down	23,000,000	11,200	0.90	10,080	700	5,631	5,612	5,612	4,546	3,291	-3,290	-79,317
Guy 7: EHS 1/4	Span/Head	23,000,000	6,650	0.90	5,985	700	594	0	0	0	0	0	349

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

[2] Worst Wind per Guy Wire
[3] Wind at 186.9°

Guy 8: EHS 1/4	Down	23,000,000	6,650	0.90	5,985	700	1,736	249	249	214	127	-2	73
Guy 9: EHS 3/8	Down	23,000,000	15,400	0.90	13,860	700	3,100	281	281	238	150	-3	112
									Totals:	16,809	12,196	-11,922	-

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	26.60	270.0	20,000	1.00	20,000	895	0	4.5
Single Helix Anchor	NVE	18.00	20.70	270.0	20,000	1.00	20,000	916	0	4.6
Single Helix Anchor	NVE	18.00	31.50	0.0	20,000	1.00	20,000	8,199	8,187	41.0
Single Helix Anchor	NVE	18.00	17.30	0.0	20,000	1.00	20,000	12,205	12,158	61.0
Anchor	NVE	30.00	92.00	180.0	20,000	1.00	20,000		0	0.0
Anchor	CTL	30.00	69.00	270.0	20,000	1.00	20,000	594	0	3.0
Single Helix Anchor	CTL	18.00	13.00	90.0	20,000	1.00	20,000	4,835	530	24.2

Pole Buckling

Buckling	Buckling (ft)	Buckling Section (% Buckling Col. Hgt.)	Buckling (in)	Min. Buckling (in)	Diameter (in)	Diameter (in)	Modulus of (psi)	Pole (pcf)	Ice Density (pcf)	Pole Tip (ft)	Buckling Load (lbs)	Buckling Load (lbs)	Buckling Load
0.71	29.58	35.23	12.84	28.12	7.96	14.65	1,000,000	50.00	57.00	38.70	135,937	21,082	6.45

Community	State	Franchise Expiration Date	Consent to Assign	Consent to Change of Control	Note
Anthon	IA	10/17/2024	N	N	
Blencoe	IA	2/1/2019	Y	N	
Correntionville	IA	12/9/2021	Y	N	
Danbury	IA				7/1/1998 Franchise Agreement not provided.
Holstein	IA	11/13/2011	Y	N	
Ida Grove	IA	9/10/2011	Y	N	
Logan	IA	11/22/2020	Y	N	
Magnolia	IA	10/16/2004	N	N	
Missouri Valley	IA	1/15/2025	Y	Y	
Moorhead	IA	Signature Page not provided	N	N	
Onawa	IA	1/31/2026	Y	Y	
Orange City	IA	9/23/2024	Y - per Draft Franchise	Y - per Draft Franchise	Only draft franchise provided
Salix	IA	Letter confirming year 2020 with no day or date	Y - per Ordinance	N - per Ordinance	Ordinance provided not Franchise Agreement.
Sergeant Bluff	IA	11/2/2026	Y	N	
Sloan	IA	12/31/2020	Y - per Ordinance	N - per Ordinance	Ordinance provided not Franchise Agreement.
Whiting	IA	4/6/2018	Y	N	
Woodbine	IA	Term of 20 year franchise expired in 2002 but 2004 Assignment and Assumption indicates it was renewed on 11/1/2002. Does not indicate new expiration date.	Y - per Ordinance	Y - per Ordinance	Ordinance provided not Franchise Agreement (Described as Ordinance No. 82-5)
South Sioux City	NE	10/1/2026	Y	Y	
Dakota Dunes	SD	9/14/2013	Y	N	Additional 10 years can be negotiated after expiration.
Jefferson	SD	2/6/2027	Y	N	

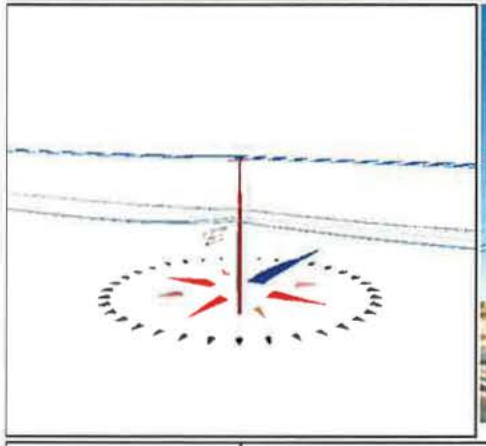
Community	State	Franchise Expiration Date	Consent to Assign	Consent to Change of Control	Note
Anthon	IA	10/17/2024	N	N	
Blencoe	IA	2/1/2019	Y	N	
Correntionville	IA	12/9/2021	Y	N	
Danbury	IA				7/1/1998 Franchise Agreement not provided.
Holstein	IA	11/13/2011	Y	N	
Ida Grove	IA	9/10/2011	Y	N	
Logan	IA	11/22/2020	Y	N	
Magnolia	IA	10/16/2004	N	N	
Missouri Valley	IA	1/15/2025	Y	Y	
Moorhead	IA	Signature Page not provided	N	N	
Onawa	IA	1/31/2026	Y	Y	
Orange City	IA	9/23/2024	Y - per Draft Franchise	Y - per Draft Franchise	Only draft franchise provided
Salix	IA	Letter confirming year 2020 with no day or date	Y - per Ordinance	N - per Ordinance	Ordinance provided not Franchise Agreement.
Sergeant Bluff	IA	11/2/2026	Y	N	
Sloan	IA	12/31/2020	Y - per Ordinance	N - per Ordinance	Ordinance provided not Franchise Agreement.
Whiting	IA	4/6/2018	Y	N	
Woodbine	IA	Term of 20 year franchise expired in 2002 but 2004 Assignment and Assumption indicates it was renewed on 11/1/2002. Does not indicate new expiration date.	Y - per Ordinance	Y - per Ordinance	Ordinance provided not Franchise Agreement (Described as Ordinance No. 82-5)
South Sioux City	NE	10/1/2026	Y	Y	
Dakota Dunes	SD	9/14/2013	Y	N	Additional 10 years can be negotiated after expiration.
Jefferson	SD	2/6/2027	Y	N	

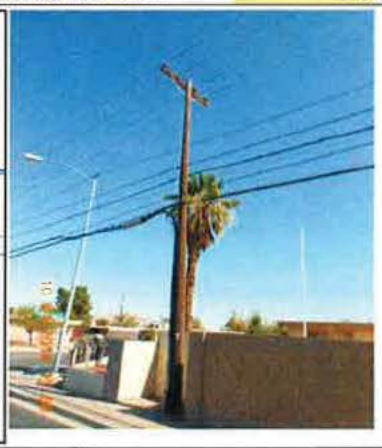
Community	State	Franchise Expiration Date	Consent to Assign	Consent to Change of Control	Note
Anthon	IA	10/17/2024	N	N	
Blencoe	IA	2/1/2019	Y	N	
Correntionville	IA	12/9/2021	Y	N	
Danbury	IA				7/1/1998 Franchise Agreement not provided.
Holstein	IA	11/13/2011	Y	N	
Ida Grove	IA	9/10/2011	Y	N	
Logan	IA	11/22/2020	Y	N	
Magnolia	IA	10/16/2004	N	N	
Missouri Valley	IA	1/15/2025	Y	Y	
Moorhead	IA	Signature Page not provided	N	N	
Onawa	IA	1/31/2026	Y	Y	
Orange City	IA	9/23/2024	Y - per Draft Franchise	Y - per Draft Franchise	Only draft franchise provided
Salix	IA	Letter confirming year 2020 with no day or date	Y - per Ordinance	N - per Ordinance	Ordinance provided not Franchise Agreement.
Sergeant Bluff	IA	11/2/2026	Y	N	
Sloan	IA	12/31/2020	Y - per Ordinance	N - per Ordinance	Ordinance provided not Franchise Agreement.
Whiting	IA	4/6/2018	Y	N	
Woodbine	IA	Term of 20 year franchise expired in 2002 but 2004 Assignment and Assumption indicates it was renewed on 11/1/2002. Does not indicate new expiration date.	Y - per Ordinance	Y - per Ordinance	Ordinance provided not Franchise Agreement (Described as Ordinance No. 82-5)
South Sioux City	NE	10/1/2026	Y	Y	
Dakota Dunes	SD	9/14/2013	Y	N	Additional 10 years can be negotiated after expiration.
Jefferson	SD	2/6/2027	Y	N	

O-Calc® Pro *Analysis Report*

Wednesday, November 05, 2014 2:45:24 PM

File Name:	P28699 GRADE B	Pole Length / Class:	45 / 3	Code:	NESC	Structure Type:	Guyed
Pole Num:	P28699	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	NELLIS & TROPICANA	G/L Circumference (in):	44.00	Loading District:	Light	Transverse Wind LF:	2.50
Aux Data	O/B 144CT	G/L Fiber Stress (psi):	6,000	Ice Thickness (in):	0.00	Wire Tension LF:	1.65
Aux Data	Unset	Allowable Stress (psi):	3,900	Wind Speed (mph):	59.29	Vertical LF:	1.50
Aux Data	Unset	Fiber Stress Ht. Reduction:	No	Wind Pressure (psf):	9.00		





Pole Capacity Utilization		Height	Wind Angle
Maximum:	93.9%	0.0 ft	180.0°
Groundline:	93.9%	0.0 ft	180.0°
Vertical:	1.5%	22.2 ft	0.0°

Pole Moments		Load Angle	Wind Angle
Max Capac. Util:	81,852 ft-lb	179.5°	180.0°
Groundline:	81,852 ft-lb	179.5°	180.0°

Guy Summary		Guy Tensions		Maximum Guy Tensions	
	Attach Height (ft)	% Allowable Tension	Wind Angle	% Allowable Tension	Wind Angle
Guy 1	22.5	1.8%	180.0°	13.4%	270.0°
Guy 2	22.5	1.2%	180.0°	10.5%	90.0°

Anchor Summary		
	Lead Length (ft)	Max. % Allow. Capacity
Anchor 1	69.0	4.0%
Anchor 2	168.0	3.1%

GROUNDLINE LOAD SUMMARY:*Wind at 180.0°, Applied Moment 81,852 ft-lb at 179.5°, Allowable Moment 87,658 ft-lb

	Shear Load (lbs)*	Percent Applied Load	Bending Moment (ft-lb)	Percent of Applied Moment**	Percent of Pole Capacity	Bending Stress (+/- psi)	Vertical Load (lbs)	Vertical Stress (psi)	Total Stress (psi)	Percent of Pole Capacity
Powers:	951	28.7	33,653	5.0	4.7	1,497	436	3	1,500	38.5
Comms:	1,424	43.0	31,315	3.4	3.2	1,393	888	6	1,399	35.9
Guys/Braces:	56	1.7	1,252	0.5	0.4	56	14	0	56	1.4
Pole:	762	23.0	12,995	15.9	14.8	578	1,830	12	590	15.1

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

² Worst Wind per Guy Wire
³ Wind at 180.0°

Crossarms:	4	0.1	146	0.2	0.2	6	99	1	7	0.2
Risers:	70	2.1	802	1.0	0.9	36	23	0	36	0.9
Insulators:	45	1.3	1,688	0.4	0.4	75	90	1	76	1.9
Pole Load:	3,310	100.0	81,852	100.0	93.4	3,642	3,381	22	3,664	93.9
Pole Reserve Capacity:			5,806		6.6	258			236	6.1

LOAD SUMMARY BY OWNER

NVE:	808		30,701			1,366	533	3	1,369	35.1
ZFS:	191		4,772			212	70	0	213	5.5
COX:	331		7,948			354	166	1	355	9.1
CTL:	1,218		25,435			1,132	783	5	1,137	29.1
Pole:	762		12,995			578	1,830	12	590	15.1
Totals	3,310		81,852			3,642	3,381	22	3,664	93.9

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	636 AAC	NVE	38.08	54.28	0.9180	-	0.596	168.0	270.0	168.0	2,204	-1,096	-338	5,511	4,077
Primary	636 AAC	NVE	38.08	54.28	0.9180	-	0.596	69.0	90.0	69.0	2,204	1,096	-139	2,263	3,221
Primary	636 AAC	NVE	38.08	18.82	0.9180	-	0.596	168.0	270.0	168.0	2,204	-1,096	-113	5,511	4,302
Primary	636 AAC	NVE	38.08	18.82	0.9180	-	0.596	69.0	90.0	69.0	2,204	1,096	-46	2,263	3,313
Primary	636 AAC	NVE	38.08	54.28	0.9180	-	0.596	168.0	270.0	168.0	2,204	-1,096	338	5,511	4,752
Primary	636 AAC	NVE	38.08	54.28	0.9180	-	0.596	69.0	90.0	69.0	2,204	1,096	139	2,263	3,498
Primary	336 AAC	NVE	38.08	18.82	0.6660	-	0.316	168.0	270.0	168.0	1,470	-731	59	3,997	3,326
Primary	336 AAC	NVE	38.08	18.82	0.6660	-	0.316	69.0	90.0	69.0	1,470	731	24	1,642	2,397
Other	288ct SELF SUPPORT	ZFS	24.75	7.33	0.8600	-	0.350	69.0	90.0	69.0	1,500	484	11	1,377	1,872
Other	288ct SELF SUPPORT	ZFS	24.75	7.33	0.8600	-	0.350	168.0	270.0	168.0	1,500	-484	27	3,352	2,895
											Totals:	0	-38	33,691	33,653

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, .50"cx, 48ct X 2 1/4" MESS	COX	23.70	7.42	1.4900	-	0.891	69.0	90.0	69.0	1,500	464	29	2,284	2,777
CATV	.75"cx, .50"cx, 48ct X 2 1/4" MESS	COX	23.70	7.42	1.4900	-	0.891	168.0	270.0	168.1	1,500	-464	69	5,562	5,167
Telco	144ct 5/16"MESS	CTL	21.50	7.62	1.0500	-	0.515	69.0	90.0	69.0	1,500	421	17	1,460	1,898
Telco	2.0" 144ct 5/16"MESS	CTL	21.50	7.62	2.7400	-	2.350	168.0	270.0	168.7	1,500	-421	188	9,278	9,045
Telco	3.0" 3/8" MESS	CTL	20.50	7.70	3.3800	-	3.000	69.0	90.0	69.1	1,500	401	100	4,482	4,983
Telco	2.0" 3/8" MESS	CTL	20.50	7.70	2.3800	-	2.000	168.0	270.0	168.5	1,500	-401	162	7,684	7,445
											Totals:	0	564	30,750	31,315

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	37.10	5.50	270.0	270.0	66.00	4.50	3.50	-	120.00	-	0	146	146
											Totals:	0	0	146	146

Riser:		Owner	Height (ft)	Horiz. Offset (in)	Offset Angle (deg)	Rotate Angle (deg)	Unit Weight (lbs)	Unit Height (in)	Unit Depth (in)	Unit Diameter (in)	Unit Length (in)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
2" Riser	2" Riser	CTL	17.20	7.26	250.0	250.0	1.29	206.40	-	0.00	-	-	3	799	802
											Totals:	0	3	799	802

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	37.29	54.00	354.2	0.0	10.00	9.50	-	7.50	-	-	-68	417	350
Pin	Pin Insulator - 15 kV	NVE	37.29	18.00	343.0	0.0	10.00	9.50	-	7.50	-	-	-23	417	395
Pin	Pin Insulator - 15 kV	NVE	37.29	-54.00	185.8	0.0	10.00	9.50	-	7.50	-	-	67	417	485
Pin	Pin Insulator - 15 kV	NVE	37.29	-18.00	197.0	0.0	10.00	9.50	-	7.50	-	-	22	417	440
Bolt	Three Bolt	ZFS	24.75	4.83	180.0	90.0	5.00	0.00	-	3.00	-	-	5	0	5
Bolt	Three Bolt	COX	23.70	4.92	180.0	90.0	5.00	0.00	-	3.00	-	-	5	0	5
Bolt	Three Bolt	CTL	21.50	5.12	180.0	90.0	5.00	0.00	-	3.00	-	-	5	0	5
Bolt	Three Bolt	CTL	20.50	5.20	180.0	90.0	5.00	0.00	-	3.00	-	-	5	0	5
											Totals:	0	19	1,670	1,688

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	22.50	22.50	69.00	0.250	75.0	90.0	0.0	0.121	70.08	0.11
Guy 2: EHS 1/4	Span/Head	CTL	22.50	22.50	168.00	0.250	75.0	270.0	0.0	0.121	167.00	0.17

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 1/4	Span/Head	23,000,000	6,650	0.90	5,985	700	800	110	110	0	110	1	381
Guy 2: EHS 1/4	Span/Head	23,000,000	6,650	0.90	5,985	700	626	70	70	0	70	-1	871
									Totals:	0	180	0	1,252

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] (%)
Anchor	CTL	30.00	69.00	90.0	20,000	1.00	20,000	800	110	4.0
Anchor	CTL	30.00	168.00	270.0	20,000	1.00	20,000	626	70	3.1

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	22.15	34.16	12.68	10.00	7.32	14.01	1,000,000	50.00	57.00	38.10	230,197	3,381	68.08

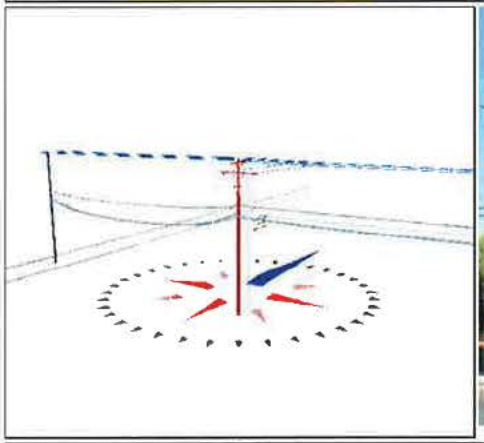
Version: 4 2 / 4.06
* includes Load Factor(s)

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

O-Calc® Pro *Analysis Report*

Wednesday, November 05, 2014 2:48:03 PM

File Name:	**P28700 GRADE B**	Pole Length / Class:	**45 / 3**	Code:	**NESC**	Structure Type:	**Junction**
Pole Num:	**P28700**	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	**NELLIS & TROPICANA**	G/L Circumference (in):	**44.00**	Loading District:	**Light**	Transverse Wind LF:	**2.50**
Aux Data	**O/B 144CT**	G/L Fiber Stress (psi):	**6,000**	Ice Thickness (in):	**0.00**	Wire Tension LF:	**1.65**
Aux Data	**Unset**	Allowable Stress (psi):	**3,900**	Wind Speed (mph):	**59.29**	Vertical LF:	**1.50**
Aux Data	**Unset**	Fiber Stress Ht. Reduction:	**No**	Wind Pressure (psf):	**9.00**		



Pole Capacity Utilization		Height	Wind Angle
Maximum:	123.2%	0.0 ft	0.0°
Groundline:	123.2%	0.0 ft	0.0°
Vertical:	1.8%	23.4 ft	0.0°

Pole Moments		Load Angle	Wind Angle
Max Capac. Util:	**107,479 ft-lb**	359.3°	0.0°
Groundline:	**107,479 ft-lb**	359.3°	0.0°

Guy Summary		Guy Tensions		Maximum Guy Tensions	
	Attach Height (ft)	% Allowable Tension	Wind Angle	% Allowable Tension	Wind Angle
Guy 1	24.3	3.5%	0.0°	16.0%	270.0°
Guy 2	24.3	4.5%	0.0°	19.5%	90.0°

Anchor Summary		
	Lead Length (ft)	Max. % Allow. Capacity
Anchor 1	168.0	4.8%
Anchor 2	68.0	5.8%

GROUNDLINE LOAD SUMMARY:*Wind at 0.0°, Applied Moment 107,479 ft-lb at 359.3°, Allowable Moment 87,658 ft-lb

	Shear Load (lbs)*	Percent Applied Load	Bending Moment (ft-lb)	Percent of Applied Moment**	Percent of Pole Capacity	Bending Stress (+/- psi)	Vertical Load (lbs)	Vertical Stress (psi)	Total Stress (psi)	Percent of Pole Capacity
Powers:	1,561	39.8	55,292	3.3	4.1	2,460	437	3	2,463	63.1
Comms:	1,332	33.9	30,345	4.4	5.4	1,350	927	6	1,356	34.8
Guys/Braces:	56	1.4	1,354	0.8	1.0	60	14	0	60	1.5
Pole:	768	19.6	13,200	12.3	15.1	587	1,845	12	599	15.4

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

² Worst Wind per Guy Wire
³ Wind at 0.0°

Crossarms:	143	3.6	4,850	0.1	0.2	216	240	2	217	5.6
Insulators:	67	1.7	2,439	0.3	0.4	109	104	1	109	2.8
Pole Load:	3,926	100.0	107,479	100.0	122.6	4,782	3,566	23	4,805	123.2
Pole Reserve Capacity:			-19,821		-22.6	-882			-905	-23.2

LOAD SUMMARY BY OWNER

NVE:	1,580	57,365	2,552	689	4	2,557	65.6
ZFS:	190	5,229	233	69	0	233	6.0
COX:	308	7,650	340	213	1	342	8.8
CTL:	1,080	24,034	1,069	750	5	1,074	27.5
Pole:	768	13,200	587	1,845	12	599	15.4
Totals	3,926	107,479	4,782	3,566	23	4,805	123.2

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	636 AAC	NVE	38.28	54.28	0.9180	-	0.596	168.0	90.0	168.0	2,204	-1,621	-338	5,540	3,580
Primary	636 AAC	NVE	38.28	54.28	0.9180	-	0.596	68.0	270.0	68.0	2,204	1,621	-137	2,242	3,727
Primary	636 AAC	NVE	38.28	18.82	0.9180	-	0.596	168.0	90.0	168.0	2,204	-1,621	112	5,540	4,031
Primary	636 AAC	NVE	38.28	18.82	0.9180	-	0.596	68.0	270.0	68.0	2,204	1,621	45	2,242	3,909
Primary	636 AAC	NVE	38.28	54.28	0.9180	-	0.596	168.0	90.0	168.0	2,204	-1,621	338	5,540	4,256
Primary	636 AAC	NVE	38.28	54.28	0.9180	-	0.596	68.0	270.0	68.0	2,204	1,621	137	2,242	4,000
Primary	336 AAC	NVE	38.28	18.82	0.6660	-	0.316	168.0	90.0	168.0	1,470	-1,081	-60	4,018	2,877
Primary	336 AAC	NVE	38.28	18.82	0.6660	-	0.316	68.0	270.0	68.0	1,470	1,081	-24	1,826	2,683
Other	288ct SELF SUPPORT	ZFS	27.70	7.09	0.8600	-	0.350	168.0	90.0	168.0	1,500	-798	-26	3,752	2,928
Other	288ct SELF SUPPORT	ZFS	27.70	7.09	0.8600	-	0.350	68.0	270.0	68.0	1,500	798	-11	1,519	2,306
Primary	4 AAC (SLACK)	NVE	34.21	54.45	0.2320	-	0.039	47.0	360.0	47.0	186	10,498	0	0	10,498
Primary	4 AAC (SLACK)	NVE	34.21	54.45	0.2320	-	0.039	47.0	360.0	47.0	186	10,498	0	0	10,498
											Totals:	20,995	36	34,261	55,292

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, .50"cx, 48ct X 2 1/4" MESS	COX	25.30	7.30	1.3900	-	0.932	168.0	90.0	168.0	1,500	-729	-71	5,538	4,738
CATV	.75"cx, .50"cx, 48ct X 2 1/4" MESS	COX	25.30	7.30	1.3900	-	0.932	68.0	270.0	68.3	1,500	729	-29	2,242	2,941
CATV	.50"cx 1/4" MESS	COX	25.30	7.30	0.7500	-	0.271	154.0	180.0	154.0	1,500	-62,613	-19	0	-62,632
CATV	.50"cx 1/4" MESS	COX	25.30	7.30	0.7500	-	0.271	47.0	0.0	47.0	1,500	62,613	-6	0	62,607
Telco	144ct 5/16"MESS	CTL	23.20	7.48	1.0500	-	0.515	168.0	90.0	168.0	1,500	-668	-40	3,836	3,128
Telco	2.0" 144ct 5/16"MESS	CTL	23.20	7.48	2.7400	-	2.350	68.0	270.0	69.6	1,500	668	-75	4,052	4,646
Telco	.50" X 2 5/16" MESS	CTL	23.20	7.48	1.0000	-	0.400	154.0	180.0	154.0	1,500	-57,416	-29	0	-57,445
Telco	.50" 5/16" MESS	CTL	23.20	7.48	0.8100	-	0.277	47.0	0.0	47.0	1,500	57,416	-6	0	57,410
Telco	3.0" 3/8" MESS	CTL	22.30	7.56	3.3800	-	3.000	168.0	90.0	168.0	1,500	-642	-238	11,871	10,990
Telco	2.0" 3/8" MESS	CTL	22.30	7.56	2.3800	-	2.000	68.0	270.0	69.2	1,500	642	-64	3,383	3,961
											Totals:	0	-578	30,923	30,345

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	5.51	90.0	90.0	66.00	4.50	3.50	-	120.00	-	-1	147	146
Normal	CROSSARM 3-1/2 X 4-1/2 X 10 -	NVE	34.30	5.77	180.0	180.0	66.00	4.50	3.50	-	120.00	-	-48	4,630	4,583
Normal	CROSSARM 3-1/2 X 4-1/2 X 4 -	NVE	30.60	6.09	270.0	270.0	28.00	4.50	3.50	-	48.00	-	0	120	121
											Totals:	0	-48	4,898	4,850

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	174.2	0.0	10.00	9.50	-	7.50	-	-	-68	420	352
Pin	Pin Insulator - 15 kV	NVE	37.49	-18.00	17.0	0.0	10.00	9.50	-	7.50	-	-	22	420	442
Pin	Pin Insulator - 15 kV	NVE	37.49	-54.00	5.8	0.0	10.00	9.50	-	7.50	-	-	67	420	487
Pin	Pin Insulator - 15 kV	NVE	37.49	18.00	163.0	0.0	10.00	9.50	-	7.50	-	-	-23	420	397
Bolt	Three Bolt	ZFS	27.70	4.59	180.0	90.0	5.00	0.00	-	3.00	-	-	-4	0	-4
Bolt	Three Bolt	COX	25.30	4.80	180.0	90.0	5.00	0.00	-	3.00	-	-	-5	0	-5
Bolt	Three Bolt	CTL	23.20	4.98	180.0	90.0	5.00	0.00	-	3.00	-	-	-5	0	-5
Bolt	Three Bolt	CTL	22.30	5.06	180.0	90.0	5.00	0.00	-	3.00	-	-	-5	0	-5
Deadend	Deadend Insulator - 15 kV	NVE	34.30	54.00	263.9	180.0	3.00	12.75	-	3.80	-	-	3	260	262
Deadend	Deadend Insulator - 15 kV	NVE	34.30	-54.00	96.1	180.0	3.00	12.75	-	3.80	-	-	2	260	262
Deadend	CUTOUT	NVE	34.30	48.00	263.1	0.0	3.00	12.75	-	3.80	-	-	-5	260	255
											Totals:	0	-19	2,457	2,439

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	24.25	24.25	168.00	0.250	75.0	90.0	0.0	0.121	167.24	0.50
Guy 2: EHS 1/4	Span/Head	CTL	24.25	24.25	68.00	0.250	75.0	270.0	0.0	0.121	69.89	0.27

Guy Wire and Brace (Loads and Reactions)		Elastic Modulus (psi)	Rated Tensile Strength (lbs)	Guy Strength Factor	Allowable Tension (lbs)	Initial Tension (lbs)	Required Tension[2] (lbs)	Required Tension[3] (lbs)	Applied Tension[3] (lbs)	Vertical Load[3] (lbs)	Shear Load in Guy Dir[3] (lbs)	Shear Load at Report Angle[3] (lbs)	Moment at GL[3] (ft-lb)*
Guy 1: EHS 1/4	Span/Head	23,000,000	6,650	0.90	5,985	700	955	210	210	0	210	-2	893
Guy 2: EHS 1/4	Span/Head	23,000,000	6,650	0.90	5,985	700	1,168	270	270	0	270	3	460
									Totals:	0	480	1	1,354

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	168.00	90.0	20,000	1.00	20,000	955	210	4.8
Anchor	CTL	30.00	68.00	270.0	20,000	1.00	20,000	1,168	270	5.8

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	23.39	34.36	12.61	10.51	7.32	14.01	1,000,000	50.00	57.00	38.40	201,852	3,566	56.61

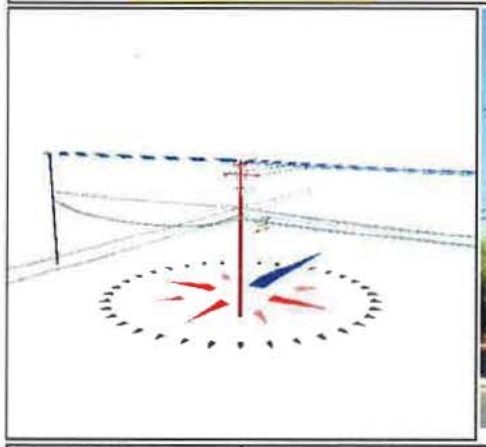
Version: 4.2 / 4.06
* includes Load Factor(s)

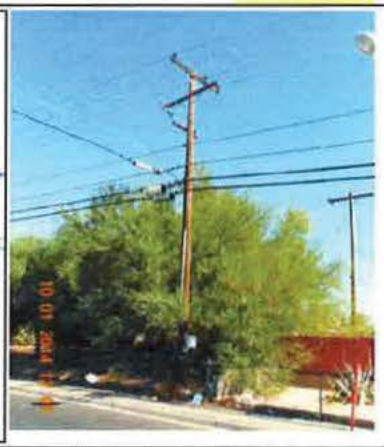
[2] Worst Wind per Guy Wire
[3] Wind at 0.0°

O-Calc® Pro *Analysis Report*

Wednesday, November 05, 2014 2:48:43 PM

File Name:	P28700 GRADE B	Pole Length / Class:	45 / 3	Code:	NESC	Structure Type:	Junction
Pole Num:	P28700	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	NELLIS & TROPICANA	G/L Circumference (in):	44.00	Loading District:	Light	Transverse Wind LF:	2.50
Aux Data	O/B 144CT	G/L Fiber Stress (psi):	6,000	Ice Thickness (in):	0.00	Wire Tension LF:	1.65
Aux Data	Unset	Allowable Stress (psi):	3,900	Wind Speed (mph):	59.29	Vertical LF:	1.50
Aux Data	Unset	Fiber Stress Ht. Reduction:	No	Wind Pressure (psf):	9.00		





Pole Capacity Utilization		Height	Wind Angle
Maximum:	123.9%	0.0 ft	0.0°
Groundline:	123.9%	0.0 ft	0.0°
Vertical:	1.8%	23.4 ft	0.0°

Pole Moments		Load Angle	Wind Angle
Max Capac. Util:	108,043 ft-lb	359.3°	0.0°
Groundline:	108,043 ft-lb	359.3°	0.0°

Guy Summary		Guy Tensions		Maximum Guy Tensions	
	Attach Height (ft)	% Allowable Tension	Wind Angle	% Allowable Tension	Wind Angle
Guy 1	24.3	3.5%	0.0°	16.0%	270.0°
Guy 2	24.3	4.5%	0.0°	19.5%	90.0°

Anchor Summary		
	Lead Length (ft)	Max. % Allow. Capacity
Anchor 1	168.0	4.8%
Anchor 2	68.0	5.8%

GROUNDLINE LOAD SUMMARY:*Wind at 0.0°, Applied Moment 108,043 ft-lb at 359.3°, Allowable Moment 87,658 ft-lb

	Shear Load (lbs)*	Percent Applied Load	Bending Moment (ft-lb)	Percent of Applied Moment**	Percent of Pole Capacity	Bending Stress (+/- psi)	Vertical Load (lbs)	Vertical Stress (psi)	Total Stress (psi)	Percent of Pole Capacity
Powers:	1,561	39.5	55,292	3.3	4.1	2,460	437	3	2,463	63.1
Comms:	1,354	34.3	30,909	4.8	5.9	1,375	919	6	1,381	35.4
Guys/Braces:	56	1.4	1,353	0.8	1.0	60	14	0	60	1.5
Pole:	768	19.4	13,200	12.2	15.1	587	1,845	12	599	15.4

Crossarms:	143	3.6	4,850	0.1	0.2	216	240	2	217	5.6
Insulators:	67	1.7	2,439	0.3	0.4	109	104	1	109	2.8
Pole Load:	3,948	100.0	108,043	100.0	123.3	4,807	3,559	23	4,830	123.8
Pole Reserve Capacity:			-20,385		-23.3	-907			-930	-23.8

LOAD SUMMARY BY OWNER

NVE:	1,580	57,365	2,552	689	4	2,557	65.6
ZFS:	190	5,229	233	69	0	233	6.0
COX:	330	8,215	365	206	1	367	9.4
CTL:	1,080	24,034	1,069	750	5	1,074	27.5
Pole:	768	13,200	587	1,845	12	599	15.4
Totals	3,948	108,043	4,807	3,559	23	4,830	123.8

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	636 AAC	NVE	38.28	54.28	0.9180	-	0.596	168.0	90.0	168.0	2,204	-1,613	-338	5,540	3,589
Primary	636 AAC	NVE	38.28	54.28	0.9180	-	0.596	68.0	270.0	68.0	2,204	1,613	-137	2,242	3,718
Primary	636 AAC	NVE	38.28	18.82	0.9180	-	0.596	168.0	90.0	168.0	2,204	-1,613	112	5,540	4,039
Primary	636 AAC	NVE	38.28	18.82	0.9180	-	0.596	68.0	270.0	68.0	2,204	1,613	45	2,242	3,901
Primary	636 AAC	NVE	38.28	54.28	0.9180	-	0.596	168.0	90.0	168.0	2,204	-1,613	338	5,540	4,264
Primary	636 AAC	NVE	38.28	54.28	0.9180	-	0.596	68.0	270.0	68.0	2,204	1,613	137	2,242	3,992
Primary	336 AAC	NVE	38.28	18.82	0.6660	-	0.316	168.0	90.0	168.0	1,470	-1,075	-60	4,018	2,883
Primary	336 AAC	NVE	38.28	18.82	0.6660	-	0.316	68.0	270.0	68.0	1,470	1,075	-24	1,626	2,677
Other	288ct SELF SUPPORT	ZFS	27.70	7.09	0.8600	-	0.350	168.0	90.0	168.0	1,500	-793	-26	3,752	2,932
Other	288ct SELF SUPPORT	ZFS	27.70	7.09	0.8600	-	0.350	68.0	270.0	68.0	1,500	793	-11	1,519	2,302
Primary	4 AAC (SLACK)	NVE	34.21	54.45	0.2320	-	0.039	50.0	360.0	50.0	186	10,498	0	0	10,498
Primary	4 AAC (SLACK)	NVE	34.21	54.45	0.2320	-	0.039	50.0	360.0	50.0	186	10,498	0	0	10,498
											Totals:	20,995	36	34,261	55,292

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, .50"cx, 48ct X 2 1/4" MESS	COX	25.30	7.30	1.4900	-	0.891	168.0	90.0	168.1	1,500	-725	-68	5,937	5,144
CATV	.75"cx, .50"cx, 48ct X 2 1/4" MESS	COX	25.30	7.30	1.4900	-	0.891	68.0	270.0	68.0	1,500	725	-28	2,403	3,100
CATV	.50"cx 1/4" MESS	COX	25.30	7.30	0.7500	-	0.271	154.0	180.0	154.0	1,500	-62,613	-19	0	-62,632
CATV	.50"cx 1/4" MESS	COX	25.30	7.30	0.7500	-	0.271	47.0	0.0	47.0	1,500	62,613	-6	0	62,607
Telco	144ct 5/16"MESS	CTL	23.20	7.48	1.0500	-	0.515	168.0	90.0	168.0	1,500	-665	-40	3,836	3,131
Telco	2.0" 144ct 5/16"MESS	CTL	23.20	7.48	2.7400	-	2.350	68.0	270.0	69.6	1,500	665	-75	4,052	4,642
Telco	.50" X 2 5/16" MESS	CTL	23.20	7.48	1.0000	-	0.400	154.0	180.0	154.0	1,500	-57,416	-29	0	-57,445
Telco	.50" 5/16" MESS	CTL	23.20	7.48	0.8100	-	0.277	47.0	0.0	47.0	1,500	57,416	-6	0	57,410
Telco	3.0" 3/8" MESS	CTL	22.30	7.56	3.3800	-	3.000	168.0	90.0	168.0	1,500	-639	-238	11,871	10,994
Telco	2.0" 3/8" MESS	CTL	22.30	7.56	2.3800	-	2.000	68.0	270.0	69.2	1,500	639	-64	3,383	3,958
											Totals:	0	-573	31,482	30,909

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	5.51	90.0	90.0	66.00	4.50	3.50	-	120.00	-	-1	147	146
Normal	CROSSARM 3-1/2 X 4-1/2 X 10 -	NVE	34.30	5.77	180.0	180.0	66.00	4.50	3.50	-	120.00	-	-48	4,630	4,583
Normal	CROSSARM 3-1/2 X 4-1/2 X 4 -	NVE	30.60	6.09	270.0	270.0	28.00	4.50	3.50	-	48.00	-	0	120	121
											Totals:	0	-48	4,898	4,850

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	174.2	0.0	10.00	9.50	-	7.50	-	-	-68	420	352
Pin	Pin Insulator - 15 kV	NVE	37.49	-18.00	17.0	0.0	10.00	9.50	-	7.50	-	-	22	420	442
Pin	Pin Insulator - 15 kV	NVE	37.49	-54.00	5.8	0.0	10.00	9.50	-	7.50	-	-	67	420	487
Pin	Pin Insulator - 15 kV	NVE	37.49	18.00	163.0	0.0	10.00	9.50	-	7.50	-	-	-23	420	397
Bolt	Three Bolt	ZFS	27.70	4.59	180.0	90.0	5.00	0.00	-	3.00	-	-	-4	0	-4
Bolt	Three Bolt	COX	25.30	4.80	180.0	90.0	5.00	0.00	-	3.00	-	-	-5	0	-5
Bolt	Three Bolt	CTL	23.20	4.98	180.0	90.0	5.00	0.00	-	3.00	-	-	-5	0	-5
Bolt	Three Bolt	CTL	22.30	5.06	180.0	90.0	5.00	0.00	-	3.00	-	-	-5	0	-5
Deadend	Deadend Insulator - 15 kV	NVE	34.30	54.00	263.9	180.0	3.00	12.75	-	3.80	-	-	3	260	262
Deadend	Deadend Insulator - 15 kV	NVE	34.30	-54.00	96.1	180.0	3.00	12.75	-	3.80	-	-	2	260	262
Deadend	CUTOUT	NVE	34.30	48.00	263.1	0.0	3.00	12.75	-	3.80	-	-	-5	260	255
											Totals:	0	-19	2,457	2,439

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	24.25	24.25	168.00	0.250	75.0	90.0	0.0	0.121	167.24	0.50
Guy 2: EHS 1/4	Span/Head	CTL	24.25	24.25	68.00	0.250	75.0	270.0	0.0	0.121	69.69	0.27

Guy Wire and Brace (Loads and Reactions)		Elastic Modulus (psi)	Rated Tensile Strength (lbs)	Guy Strength Factor	Allowable Tension (lbs)	Initial Tension (lbs)	Required Tension[2] (lbs)	Required Tension[3] (lbs)	Applied Tension[3] (lbs)	Vertical Load[3] (lbs)	Shear Load in Guy Dir[3] (lbs)	Shear Load at Report Angle[3] (lbs)	Moment at GL[3] (ft-lb)*
Guy 1: EHS 1/4	Span/Head	23,000,000	6,650	0.90	5,985	700	957	210	210	0	210	-2	894
Guy 2: EHS 1/4	Span/Head	23,000,000	6,650	0.90	5,985	700	1,170	270	270	0	270	3	460
									Totals:	0	480	1	1,353

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[2] (%)
Anchor	CTL	30.00	168.00	90.0	20,000	1.00	20,000	957	210	4.8
Anchor	CTL	30.00	68.00	270.0	20,000	1.00	20,000	1,170	270	5.8

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	23.39	34.36	12.61	10.50	7.32	14.01	1,000,000	50.00	57.00	38.40	201,926	3,559	56.74

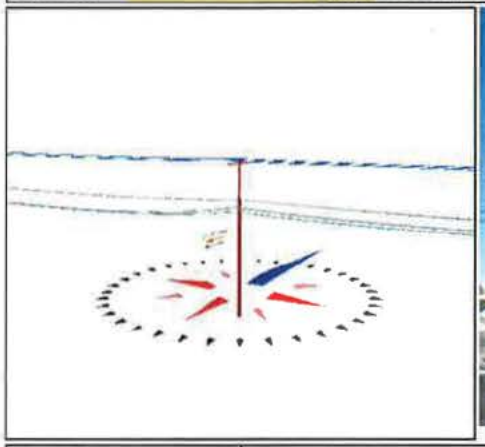
Version: 4.2 / 4.06
* includes Load Factor(s)

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

O-Calc® Pro *Analysis Report*

Wednesday, November 05, 2014 2:50:59 PM

File Name:	P28701 GRADE B	Pole Length / Class:	45 / 3	Code:	NESC	Structure Type:	Guyed
Pole Num:	P28701	Pole Species:	WESTERN RED CEDAR	NESC Rule:	Rule 250B	Status:	N/A
Aux Data	COX	Setting Depth (ft):	7.20	Construction Grade:	B	Pole Strength Factor:	0.65
Aux Data	NELLIS & TROPICANA	G/L Circumference (in):	42.00	Loading District:	Light	Transverse Wind LF:	2.50
Aux Data	O/B 144CT	G/L Fiber Stress (psi):	6,000	Ice Thickness (in):	0.00	Wire Tension LF:	1.65
Aux Data	Unset	Allowable Stress (psi):	3,900	Wind Speed (mph):	59.29	Vertical LF:	1.50
Aux Data	Unset	Fiber Stress Ht. Reduction:	No	Wind Pressure (psf):	9.00		



Pole Capacity Utilization		Height	Wind Angle
Maximum:	120.7%	0.0 ft	180.0°
Groundline:	120.7%	0.0 ft	180.0°
Vertical:	2.0%	23.6 ft	0.0°

Pole Moments		Load Angle	Wind Angle
Max Capac. Util:	91,547 ft-lb	179.2°	180.0°
Groundline:	91,547 ft-lb	179.2°	180.0°

Guy Summary		Guy Tensions		Maximum Guy Tensions	
	Attach Height (ft)	% Allowable Tension	Wind Angle	% Allowable Tension	Wind Angle
Guy 1	25.7	4.8%	180.0°	11.5%	270.0°
Guy 2	25.7	3.8%	180.0°	9.4%	90.0°

Anchor Summary		
	Lead Length (ft)	Max. % Allow. Capacity
Anchor 1	68.0	3.4%
Anchor 2	186.0	2.8%

GROUNDLINE LOAD SUMMARY:*Wind at 180.0°, Applied Moment 91,547 ft-lb at 179.2°, Allowable Moment 76,240 ft-lb

	Shear Load (lbs)*	Percent Applied Load	Bending Moment (ft-lb)	Percent of Applied Moment**	Percent of Pole Capacity	Bending Stress (+/- psi)	Vertical Load (lbs)	Vertical Stress (psi)	Total Stress (psi)	Percent of Pole Capacity
Powers:	1,019	29.9	36,868	4.1	4.9	1,886	467	3	1,889	48.4
Comms:	1,550	45.4	38,808	3.6	4.4	1,985	1,006	7	1,992	51.1
Guys/Braces:	60	1.8	1,547	0.6	0.7	79	15	0	79	2.0
Pole:	733	21.5	12,506	13.7	16.4	640	1,702	12	652	16.7

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

** Worst Wind per Guy Wire
* Wind at 180.0°

Crossarms:	4	0.1	144	0.2	0.2	7	99	1	8	0.2
Insulators:	45	1.3	1,674	0.4	0.5	86	90	1	86	2.2
Pole Load:	3,411	100.0	91,547	100.0	120.1	4,683	3,380	24	4,707	120.7
Pole Reserve Capacity:			-15,307		-20.1	-783			-807	-20.7

LOAD SUMMARY BY OWNER

NVE:	863		32,671			1,671	560	4	1,675	43.0
ZFS:	205		6,001			307	74	1	308	7.9
COX:	331		8,945			458	185	1	459	11.8
CTL:	1,279		31,423			1,607	859	6	1,614	41.4
Pole:	733		12,506			640	1,702	12	652	16.7
Totals	3,411		91,547			4,683	3,380	24	4,707	120.7

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	636 AAC	NVE	37.78	54.28	0.9180	-	0.596	186.0	270.0	186.0	2,204	-1,932	-375	6,053	3,747
Primary	636 AAC	NVE	37.78	54.28	0.9180	-	0.596	68.0	90.0	68.0	2,204	1,932	-137	2,213	4,008
Primary	636 AAC	NVE	37.78	18.82	0.9180	-	0.596	186.0	270.0	186.0	2,204	-1,932	124	6,053	4,245
Primary	636 AAC	NVE	37.78	18.82	0.9180	-	0.596	68.0	90.0	68.0	2,204	1,932	45	2,213	4,190
Primary	636 AAC	NVE	37.78	54.28	0.9180	-	0.596	186.0	270.0	186.0	2,204	-1,932	374	6,053	4,495
Primary	636 AAC	NVE	37.78	54.28	0.9180	-	0.596	68.0	90.0	68.0	2,204	1,932	137	2,213	4,281
Primary	336 AAC	NVE	37.78	18.82	0.6660	-	0.316	186.0	270.0	186.0	1,470	-1,288	-66	4,390	3,036
Primary	336 AAC	NVE	37.78	18.82	0.6660	-	0.316	68.0	90.0	68.0	1,470	1,288	-24	1,605	2,869
Other	288ct SELF SUPPORT	ZFS	29.10	6.86	0.8600	-	0.350	68.0	90.0	68.0	1,500	1,012	10	1,595	2,617
Other	288ct SELF SUPPORT	ZFS	29.10	6.86	0.8600	-	0.350	186.0	270.0	186.0	1,500	-1,012	28	4,363	3,380
											Totals:	0	116	36,752	36,868

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, .50"cx, 48ct X 2 1/4" MESS	COX	26.70	7.05	1.3900	-	0.932	68.0	90.0	68.0	1,500	928	28	2,366	3,322
CATV	.75"cx, .50"cx, 48ct X 2 1/4" MESS	COX	26.70	7.05	1.3900	-	0.932	186.0	270.0	186.1	1,500	-928	76	6,471	5,619
Telco	2.0" 144ct 5/16"MESS	CTL	24.60	7.22	2.7400	-	2.350	68.0	90.0	68.0	1,500	855	72	4,297	5,224
Telco	2.0" 144ct 5/16"MESS	CTL	24.60	7.22	2.7400	-	2.350	186.0	270.0	186.6	1,500	-855	197	11,752	11,094
Telco	2.0" 3/8" MESS	CTL	23.50	7.30	2.3800	-	2.000	68.0	90.0	68.0	1,500	817	62	3,565	4,444
Telco	2.0" 3/8" MESS	CTL	23.50	7.30	2.3800	-	2.000	186.0	270.0	186.4	1,500	-817	170	9,752	9,105
											Totals:	0	605	38,203	38,808

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	36.80	5.49	270.0	270.0	66.00	4.50	3.50	-	120.00	-	-1	145	144
											Totals:	0	-1	145	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)*

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

² Worst Wind per Guy Wire
³ Wind at 180.0°

Pin	Pin Insulator - 15 kV	NVE	36.99	54.00	354.2	0.0	10.00	9.50	-	7.50	-	-	-68	414	346
Pin	Pin Insulator - 15 kV	NVE	36.99	-18.00	197.0	0.0	10.00	9.50	-	7.50	-	-	22	414	436
Pin	Pin Insulator - 15 kV	NVE	36.99	-54.00	185.8	0.0	10.00	9.50	-	7.50	-	-	67	414	481
Pin	Pin Insulator - 15 kV	NVE	36.99	18.00	343.0	0.0	10.00	9.50	-	7.50	-	-	-23	414	391
Bolt	Three Bolt	ZFS	29.10	4.36	180.0	90.0	5.00	0.00	-	3.00	-	-	4	0	4
Bolt	Three Bolt	COX	26.70	4.55	180.0	90.0	5.00	0.00	-	3.00	-	-	4	0	4
Bolt	Three Bolt	CTL	24.60	4.72	180.0	90.0	5.00	0.00	-	3.00	-	-	5	0	5
Bolt	Three Bolt	CTL	23.50	4.80	180.0	90.0	5.00	0.00	-	3.00	-	-	5	0	5
											Totals:	0	17	1,656	1,674

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	25.70	25.70	68.00	0.250	75.0	90.0	0.0	0.121	70.19	0.29
Guy 2: EHS 1/4	Span/Head	CTL	25.70	25.70	186.00	0.250	75.0	270.0	0.0	0.121	185.27	0.60

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[3] (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 1/4	Span/Head	23,000,000	6,650	0.90	5,985	700	686	290	290	0	290	4	512
Guy 2: EHS 1/4	Span/Head	23,000,000	6,650	0.90	5,985	700	562	230	230	0	230	-3	1,035
									Totals:	0	520	1	1,547

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	68.00	90.0	20,000	1.00	20,000	686	290	3.4
Anchor	CTL	30.00	186.00	270.0	20,000	1.00	20,000	562	230	2.8

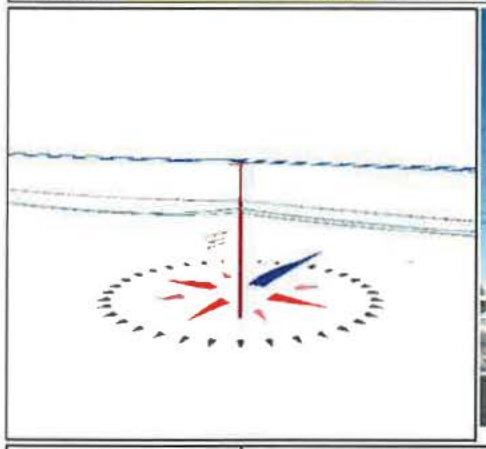
Pole Buckling

Buckling [illegible]	Buckling [illegible] (ft)	Buckling Section [illegible] (% Buckling Col. HgL)	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	23.61	34.24	12.08	10.27	7.32	13.38	1,000,000	50.00	57.00	37.80	166,805	3,380	49.35

O-Calc® Pro *Analysis Report*

Wednesday, November 05, 2014 2:51:58 PM

File Name:	P28701 GRADE B	Pole Length / Class:	45 / 3	Code:	NESC	Structure Type:	Guyed
Pole Num:	P28701	Pole Species:	WESTERN RED CEDAR	NESC Rule:	Rule 250B	Status:	N/A
Aux Data	COX	Setting Depth (ft):	7.20	Construction Grade:	B	Pole Strength Factor:	0.65
Aux Data	NELLIS & TROPICANA	G/L Circumference (in):	42.00	Loading District:	Light	Transverse Wind LF:	2.50
Aux Data	O/B 144CT	G/L Fiber Stress (psi):	6,000	Ice Thickness (in):	0.00	Wire Tension LF:	1.65
Aux Data	Unset	Allowable Stress (psi):	3,900	Wind Speed (mph):	59.29	Vertical LF:	1.50
Aux Data	Unset	Fiber Stress Ht. Reduction:	No	Wind Pressure (psf):	9.00		



Pole Capacity Utilization		Height	Wind Angle
Maximum:	121.5%	0.0 ft	180.0°
Groundline:	121.5%	0.0 ft	180.0°
Vertical:	2.0%	23.6 ft	0.0°

Pole Moments		Load Angle	Wind Angle
Max Capac. Util:	92,178 ft-lb	179.2°	180.0°
Groundline:	92,178 ft-lb	179.2°	180.0°

Guy Summary		Guy Tensions		Maximum Guy Tensions	
	Attach Height (ft)	% Allowable Tension	Wind Angle	% Allowable Tension	Wind Angle
Guy 1	25.7	4.8%	180.0°	11.5%	270.0°
Guy 2	25.7	3.8%	180.0°	9.4%	90.0°

Anchor Summary		
	Lead Length (ft)	Max. % Allow. Capacity
Anchor 1	68.0	3.4%
Anchor 2	186.0	2.8%

GROUNDLINE LOAD SUMMARY:*Wind at 180.0°, Applied Moment 92,178 ft-lb at 179.2°, Allowable Moment 76,240 ft-lb

	Shear Load (lbs)*	Percent Applied Load	Bending Moment (ft-lb)	Percent of Applied Moment**	Percent of Pole Capacity	Bending Stress (+/- psi)	Vertical Load (lbs)	Vertical Stress (psi)	Total Stress (psi)	Percent of Pole Capacity
Powers:	1,019	29.7	36,868	4.1	4.9	1,886	467	3	1,889	48.4
Comms:	1,574	45.8	39,439	3.8	4.6	2,017	998	7	2,025	51.9
Guys/Braces:	60	1.8	1,547	0.6	0.7	79	15	0	79	2.0
Pole:	733	21.3	12,506	13.6	16.4	640	1,702	12	652	16.7

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

* Worst Wind per Guy Wire
* Wind at 180.0°

Crossarms:	4	0.1	144	0.2	0.2	7	99	1	8	0.2
Insulators:	45	1.3	1,674	0.4	0.5	86	90	1	86	2.2
Pole Load:	3,435	100.0	92,178	100.0	120.9	4,715	3,372	24	4,739	121.5
Pole Reserve Capacity:			-15,938		-20.9	-815			-839	-21.5

LOAD SUMMARY BY OWNER

NVE:	863		32,671			1,671	560	4	1,675	43.0
ZFS:	205		6,001			307	74	1	308	7.9
COX:	355		9,576			490	177	1	491	12.6
CTL:	1,279		31,423			1,607	859	6	1,614	41.4
Pole:	733		12,506			640	1,702	12	652	16.7
Totals	3,435		92,178			4,715	3,372	24	4,739	121.5

Detailed Load Components

Power:		Owner	Height (ft)	Horiz. Offset (in)	Cable Dia. (in)	Rotate Angle (deg)	Cable Weight (lbs/ft)	Lead/Span Length	Span Angle (deg)	Wire Length (ft)	Tension (lbs)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Primary	636 AAC	NVE	37.78	54.28	0.9180	-	0.596	186.0	270.0	186.0	2,204	-1,919	-375	6,053	3,760
Primary	636 AAC	NVE	37.78	54.28	0.9180	-	0.596	68.0	90.0	68.0	2,204	1,919	-137	2,213	3,995
Primary	636 AAC	NVE	37.78	18.82	0.9180	-	0.596	186.0	270.0	186.0	2,204	-1,919	124	6,053	4,259
Primary	636 AAC	NVE	37.78	18.82	0.9180	-	0.596	68.0	90.0	68.0	2,204	1,919	45	2,213	4,177
Primary	636 AAC	NVE	37.78	54.28	0.9180	-	0.596	186.0	270.0	186.0	2,204	-1,919	374	6,053	4,508
Primary	636 AAC	NVE	37.78	54.28	0.9180	-	0.596	68.0	90.0	68.0	2,204	1,919	137	2,213	4,268
Primary	336 AAC	NVE	37.78	18.82	0.6660	-	0.316	186.0	270.0	186.0	1,470	-1,279	-66	4,390	3,045
Primary	336 AAC	NVE	37.78	18.82	0.6660	-	0.316	68.0	90.0	68.0	1,470	1,279	-24	1,605	2,860
Other	288ct SELF SUPPORT	ZFS	29.10	6.86	0.8600	-	0.350	68.0	90.0	68.0	1,500	1,005	10	1,595	2,610
Other	288ct SELF SUPPORT	ZFS	29.10	6.86	0.8600	-	0.350	186.0	270.0	186.0	1,500	-1,005	28	4,363	3,387
											Totals:	0	116	36,752	36,868

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, .50"cx, 48ct X 2 1/4" MESS	COX	26.70	7.05	1.4900	-	0.891	68.0	90.0	68.0	1,500	922	27	2,536	3,484
CATV	.75"cx, .50"cx, 48ct X 2 1/4" MESS	COX	26.70	7.05	1.4900	-	0.891	186.0	270.0	186.1	1,500	-922	73	6,936	6,088
Telco	2.0" 144ct 5/16"MESS	CTL	24.60	7.22	2.7400	-	2.350	68.0	90.0	68.0	1,500	849	72	4,297	5,218
Telco	2.0" 144ct 5/16"MESS	CTL	24.60	7.22	2.7400	-	2.350	186.0	270.0	186.6	1,500	-849	197	11,752	11,100
Telco	2.0" 3/8" MESS	CTL	23.50	7.30	2.3800	-	2.000	68.0	90.0	68.0	1,500	811	62	3,565	4,439
Telco	2.0" 3/8" MESS	CTL	23.50	7.30	2.3800	-	2.000	186.0	270.0	186.4	1,500	-811	170	9,752	9,110
											Totals:	0	601	38,838	39,439

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	36.80	5.49	270.0	270.0	66.00	4.50	3.50	-	120.00	-	-1	145	144
											Totals:	0	-1	145	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)*

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

² Worst Wind per Guy Wire
³ Wind at 180.0°

Pin	Pin Insulator - 15 kV	NVE	36.99	54.00	354.2	0.0	10.00	9.50	-	7.50	-	-	-68	414	346
Pin	Pin Insulator - 15 kV	NVE	36.99	-18.00	197.0	0.0	10.00	9.50	-	7.50	-	-	22	414	436
Pin	Pin Insulator - 15 kV	NVE	36.99	-54.00	185.8	0.0	10.00	9.50	-	7.50	-	-	67	414	481
Pin	Pin Insulator - 15 kV	NVE	36.99	18.00	343.0	0.0	10.00	9.50	-	7.50	-	-	-23	414	391
Bolt	Three Bolt	ZFS	29.10	4.36	180.0	90.0	5.00	0.00	-	3.00	-	-	4	0	4
Bolt	Three Bolt	COX	26.70	4.55	180.0	90.0	5.00	0.00	-	3.00	-	-	4	0	4
Bolt	Three Bolt	CTL	24.60	4.72	180.0	90.0	5.00	0.00	-	3.00	-	-	5	0	5
Bolt	Three Bolt	CTL	23.50	4.80	180.0	90.0	5.00	0.00	-	3.00	-	-	5	0	5
											Totals:	0	17	1,656	1,674

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	25.70	25.70	68.00	0.250	75.0	90.0	0.0	0.121	70.19	0.29
Guy 2: EHS 1/4	Span/Head	CTL	25.70	25.70	186.00	0.250	75.0	270.0	0.0	0.121	185.27	0.60

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[3] (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 1/4	Span/Head	23,000,000	6,650	0.90	5,985	700	686	290	290	0	290	4	511
Guy 2: EHS 1/4	Span/Head	23,000,000	6,650	0.90	5,985	700	562	230	230	0	230	-3	1,035
									Totals:	0	520	1	1,547

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	68.00	90.0	20,000	1.00	20,000	686	290	3.4
Anchor	CTL	30.00	186.00	270.0	20,000	1.00	20,000	562	230	2.8

Pole Buckling

Buckling	Buckling (ft)	Buckling Section (% Buckling Col. Hgt.)	Buckling (in)	Min. Buckling (in)	Diameter (in)	Diameter (in)	Modulus of (psi)	Pole (pcf)	Ice Density (pcf)	Pole Tip (ft)	Buckling Load (lbs)	Buckling Load (lbs)	Buckling Load
0.71	23.60	34.24	12.08	10.25	7.32	13.38	1,000,000	50.00	57.00	37.80	166,939	3,372	49.51

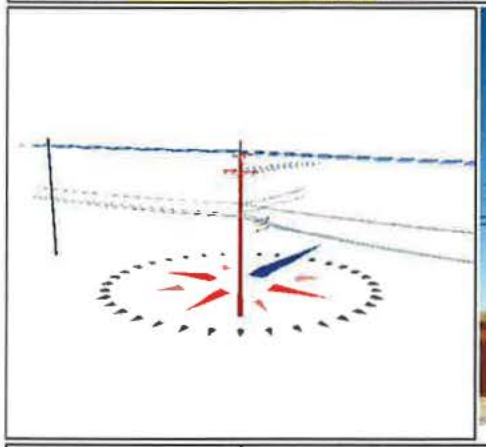
Version: 4.2 / 4.06
* includes Load Factor(s)

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

O-Calc® Pro *Analysis Report*

Wednesday, November 05, 2014 2:54:33 PM

File Name:	P74984 GRADE B	Pole Length / Class:	50 / 2	Code:	NESC	Structure Type:	Guyed
Pole Num:	P74984	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	NELLIS & TROPICANA	G/L Circumference (in):	47.00	Loading District:	Light	Transverse Wind LF:	2.50
Aux Data	O/B 144CT	G/L Fiber Stress (psi):	6,000	Ice Thickness (in):	0.00	Wire Tension LF:	1.65
Aux Data	Unset	Allowable Stress (psi):	3,900	Wind Speed (mph):	59.29	Vertical LF:	1.50
Aux Data	Unset	Fiber Stress Ht. Reduction:	No	Wind Pressure (psf):	9.00		



Pole Capacity Utilization		Height	Wind Angle
Maximum:	158.1%	0.0 ft	0.0°
Groundline:	158.1%	0.0 ft	0.0°
Vertical:	1.3%	22.3 ft	0.0°

Pole Moments		Load Angle	Wind Angle
Max Capac. Util:	168,306 ft-lb	359.4°	0.0°
Groundline:	168,306 ft-lb	359.4°	0.0°

Guy Summary		Guy Tensions		Maximum Guy Tensions	
	Attach Height (ft)	% Allowable Tension	Wind Angle	% Allowable Tension	Wind Angle
Guy 1	21.9	3.0%	0.0°	13.4%	270.0°
Guy 2	21.9	4.6%	0.0°	18.7%	90.0°

Anchor Summary		
	Lead Length (ft)	Max. % Allow. Capacity
Anchor 1	168.0	4.0%
Anchor 2	68.0	5.6%

GROUNDLINE LOAD SUMMARY:*Wind at 0.0°, Applied Moment 168,306 ft-lb at 359.4°, Allowable Moment 106,838 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:	2,279	34.5	76,309	2.5	3.9	2,786	487	3	2,788	71.5
Comms:	3,172	48.0	67,277	11.4	17.9	2,456	1,045	6	2,462	63.1
Guys/Braces:	56	0.8	1,228	0.5	0.8	45	14	0	45	1.2
Pole:	868	13.1	15,747	9.4	14.7	575	2,238	13	588	15.1

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

² Worst Wind per Guy Wire
³ Wind at 0.0°

Crossarms:	139	2.1	4,424	0.1	0.1	161	198	1	163	4.2
Insulators:	98	1.5	3,321	0.2	0.3	121	122	1	122	3.1
Pole Load:	6,611	100.0	168,306	100.0	157.5	6,144	4,104	23	6,167	158.1
Pole Reserve Capacity:			-61,468		-57.5	-2,244			-2,267	-58.1

LOAD SUMMARY BY OWNER

NVE:	2,304		78,732			2,874	708	4	2,878	73.8
ZFS:	211		5,337			195	76	0	195	5.0
COX:	1,143		26,380			963	202	1	964	24.7
CTL:	2,085		42,110			1,537	881	5	1,542	39.5
Pole:	868		15,747			575	2,238	13	588	15.1
Totals	6,611		168,306			6,144	4,104	23	6,167	158.1

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	636 AAC	NVE	37.58	54.34	0.9180	-	0.596	186.0	90.0	186.0	2,204	-1,438	-375	6,021	4,209
Primary	636 AAC	NVE	37.58	54.34	0.9180	-	0.596	76.0	270.0	76.0	2,204	1,438	-153	2,460	3,745
Primary	636 AAC	NVE	37.58	18.99	0.9180	-	0.596	186.0	90.0	186.0	2,204	-1,438	124	6,021	4,708
Primary	636 AAC	NVE	37.58	18.99	0.9180	-	0.596	76.0	270.0	76.0	2,204	1,438	51	2,460	3,949
Primary	636 AAC	NVE	37.58	54.34	0.9180	-	0.596	186.0	90.0	186.0	2,204	-1,438	374	6,021	4,957
Primary	636 AAC	NVE	37.58	54.34	0.9180	-	0.596	76.0	270.0	76.0	2,204	1,438	153	2,460	4,051
Primary	336 AAC	NVE	37.58	18.99	0.6660	-	0.316	186.0	90.0	186.0	1,470	-959	-66	4,367	3,342
Primary	336 AAC	NVE	37.58	18.99	0.6660	-	0.316	76.0	270.0	76.0	1,470	959	-27	1,784	2,716
Primary	4 AAC (SLACK)	NVE	32.01	54.37	0.2320	-	0.039	41.0	360.0	41.0	186	9,823	0	0	9,823
Primary	4 AAC (SLACK)	NVE	32.01	54.37	0.2320	-	0.039	41.0	360.0	41.0	186	9,823	0	0	9,823
Primary	4 AAC (SLACK)	NVE	32.01	19.07	0.2320	-	0.039	41.0	360.0	41.0	186	9,823	0	0	9,823
Primary	4 AAC (SLACK)	NVE	32.01	19.07	0.2320	-	0.039	41.0	360.0	41.0	186	9,823	0	0	9,823
Other	288ct SELF SUPPORT	ZFS	25.50	7.77	0.8600	-	0.350	186.0	90.0	186.0	1,500	-663	-32	3,824	3,129
Other	288ct SELF SUPPORT	ZFS	25.50	7.77	0.8600	-	0.350	76.0	270.0	76.0	1,500	663	-13	1,562	2,213
											Totals:	39,290	36	36,983	76,309

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, .50"cx, 48ct X 2 1/4" MESS	COX	23.20	7.97	1.3900	-	0.932	41.0	0.0	41.0	500	19,139	-19	0	19,120
CATV	.75"cx, .50"cx, 48ct X 2 1/4" MESS	COX	23.20	7.97	1.3900	-	0.932	186.0	90.0	186.1	1,500	-604	-86	5,623	4,933
CATV	.50"cx, 48ct X 2 1/4" MESS	COX	23.20	7.97	1.0600	-	0.622	76.0	270.0	76.0	1,500	604	-24	1,752	2,332
Telco	1.0" 5/16" MESS (SLACK)	CTL	20.70	8.19	1.3100	-	1.000	41.0	0.0	41.0	500	17,077	-21	0	17,056
Telco	2.0" 144ct 5/16"MESS	CTL	20.70	8.19	2.7400	-	2.350	186.0	90.0	186.9	1,500	-538	-224	9,890	9,128
Telco	1.25" 144ct 5/16"MESS	CTL	20.70	8.19	1.9900	-	1.750	76.0	270.0	76.0	1,500	538	-68	2,935	3,405
Telco	2.0" 3/8" MESS	CTL	19.80	8.26	2.3800	-	2.000	186.0	90.0	186.7	1,500	-515	-192	8,217	7,510
Telco	2.0" 3/8" MESS	CTL	19.80	8.26	2.3800	-	2.000	76.0	270.0	76.0	1,500	515	-79	3,357	3,794
											Totals:	36,215	-712	31,774	67,277

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	6.06	90.0	90.0	66.00	4.50	3.50	-	120.00	-	-1	144	144
Normal	CROSSARM 3-1/2 X 4-1/2 X 10 -	NVE	32.10	6.45	180.0	180.0	66.00	4.50	3.50	-	120.00	-	-53	4,333	4,280
											Totals:	0	-54	4,477	4,424

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	173.6	0.0	10.00	9.50	-	7.50	-	-	-68	412	344
Pin	Pin Insulator - 15 kV	NVE	36.79	-18.00	18.6	0.0	10.00	9.50	-	7.50	-	-	22	412	434
Pin	Pin Insulator - 15 kV	NVE	36.79	-54.00	6.4	0.0	10.00	9.50	-	7.50	-	-	67	412	479
Pin	Pin Insulator - 15 kV	NVE	36.79	18.00	161.4	0.0	10.00	9.50	-	7.50	-	-	-23	412	389
Deadend	CUTOUT	NVE	32.10	48.00	262.3	0.0	3.00	12.75	-	3.80	-	-	-5	243	238
Deadend	Deadend Insulator - 15 kV	NVE	32.10	54.00	263.2	180.0	3.00	12.75	-	3.80	-	-	3	243	246
Deadend	Deadend Insulator - 15 kV	NVE	32.10	-54.00	96.8	180.0	3.00	12.75	-	3.80	-	-	2	243	245
Deadend	CUTOUT	NVE	32.10	24.00	255.0	0.0	3.00	12.75	-	3.80	-	-	-5	243	238
Deadend	CUTOUT	NVE	32.10	-48.00	97.7	0.0	3.00	12.75	-	3.80	-	-	-6	243	237
Deadend	Deadend Insulator - 15 kV	NVE	32.10	18.00	250.3	180.0	3.00	12.75	-	3.80	-	-	2	243	245
Deadend	Deadend Insulator - 15 kV	NVE	32.10	-18.00	109.7	180.0	3.00	12.75	-	3.80	-	-	2	243	245
Bolt	Three Bolt	ZFS	25.50	5.27	180.0	90.0	5.00	0.00	-	3.00	-	-	-5	0	-5
Bolt	Three Bolt	COX	23.20	5.47	180.0	90.0	5.00	0.00	-	3.00	-	-	-5	0	-5
Bolt	Three Bolt	CTL	20.70	5.69	180.0	90.0	5.00	0.00	-	3.00	-	-	-5	0	-5
Bolt	Three Bolt	CTL	19.80	5.76	180.0	90.0	5.00	0.00	-	3.00	-	-	-5	0	-5
											Totals:	0	-27	3,348	3,321

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	21.90	21.90	168.00	0.250	75.0	90.0	0.0	0.121	166.92	0.43
Guy 2: EHS 1/4	Span/Head	CTL	21.90	21.90	68.00	0.250	75.0	270.0	0.0	0.121	68.94	0.27

Guy Wire and Brace (Loads and Reactions)		Elastic Modulus (psi)	Rated Tensile Strength (lbs)	Guy Strength Factor	Allowable Tension (lbs)	Initial Tension (lbs)	Required Tension[2] (lbs)	Required Tension[3] (lbs)	Applied Tension[3] (lbs)	Vertical Load[3] (lbs)	Shear Load in Guy Dir[3] (lbs)	Shear Load at Report Angle[3] (lbs)	Moment at GL[3] (ft-lb)*
Guy 1: EHS 1/4	Span/Head	23,000,000	6,650	0.90	5,985	700	803	180	180	0	180	-2	818
Guy 2: EHS 1/4	Span/Head	23,000,000	6,650	0.90	5,985	700	1,117	274	274	0	274	3	410
									Totals:	0	454	1	1,228

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	168.00	90.0	20,000	1.00	20,000	803	180	4.0
Anchor	CTL	30.00	68.00	270.0	20,000	1.00	20,000	1,117	274	5.6

Pole Buckling

Buckling [illegible]	Buckling [illegible] (ft)	Buckling Section [illegible] (% Buckling Col. Hgt.)	Buckling [illegible] (in)	Min. Buckling [illegible] (in)	Diameter [illegible] (in)	Diameter [illegible] (in)	Modulus of [illegible] (psi)	Pole [illegible] (pcf)	Ice Density (pcf)	Pole Tip [illegible] (ft)	Buckling Load [illegible] (lbs)	Buckling Load [illegible] (lbs)	Buckling Load [illegible]
0.71	22.34	33.88	13.65	11.09	7.96	14.97	1,000,000	50.00	57.00	40.40	304,034	4,104	74.09

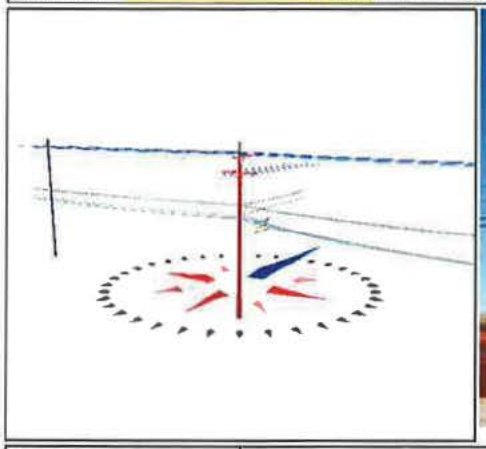
Version: 4.2 / 4.06
* includes Load Factor(s)

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

O-Calc® Pro *Analysis Report*

Wednesday, November 05, 2014 2:55:28 PM

File Name:	P74984 GRADE B	Pole Length / Class:	50 / 2	Code:	NESC	Structure Type:	Guyed
Pole Num:	P74984	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	NELLIS & TROPICANA	G/L Circumference (in):	47.00	Loading District:	Light	Transverse Wind LF:	2.50
Aux Data	O/B 144CT	G/L Fiber Stress (psi):	6,000	Ice Thickness (in):	0.00	Wire Tension LF:	1.65
Aux Data	Unset	Allowable Stress (psi):	3,900	Wind Speed (mph):	59.29	Vertical LF:	1.50
Aux Data	Unset	Fiber Stress Ht. Reduction:	No	Wind Pressure (psf):	9.00		



Pole Capacity Utilization		Height	Wind Angle
Maximum:	159.2%	0.0 ft	0.0°
Groundline:	159.2%	0.0 ft	0.0°
Vertical:	1.3%	22.3 ft	0.0°

Pole Moments		Load Angle	Wind Angle
Max Capac. Util:	169,427 ft-lb	359.4°	0.0°
Groundline:	169,427 ft-lb	359.4°	0.0°

Guy Summary		Guy Tensions		Maximum Guy Tensions	
	Attach Height (ft)	% Allowable Tension	Wind Angle	% Allowable Tension	Wind Angle
Guy 1	21.9	3.0%	0.0°	13.4%	270.0°
Guy 2	21.9	4.6%	0.0°	18.7%	90.0°

Anchor Summary		
	Lead Length (ft)	Max. % Allow. Capacity
Anchor 1	168.0	4.0%
Anchor 2	68.0	5.6%

GROUNDLINE LOAD SUMMARY:*Wind at 0.0°, Applied Moment 169,427 ft-lb at 359.4°, Allowable Moment 106,838 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:	2,279	34.2	76,309	2.5	3.9	2,786	487	3	2,788	71.5
Comms:	3,220	48.4	68,398	11.3	17.9	2,497	1,037	6	2,503	64.2
Guys/Braces:	56	0.8	1,228	0.5	0.8	45	14	0	45	1.2
Pole:	868	13.0	15,747	9.3	14.7	575	2,238	13	588	15.1

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

² Worst Wind per Guy Wire
³ Wind at 0.0°

Crossarms:	139	2.1	4,424	0.1	0.1	161	198	1	163	4.2
Insulators:	98	1.5	3,321	0.2	0.3	121	122	1	122	3.1
Pole Load:	6,659	100.0	169,427	100.0	158.6	6,185	4,096	23	6,208	159.2
Pole Reserve Capacity:			-62,589		-58.6	-2,285			-2,308	-59.2

LOAD SUMMARY BY OWNER

NVE:	2,304	78,732	2,874	708	4	2,878	73.8
ZFS:	211	5,337	195	76	0	195	5.0
COX:	1,191	27,501	1,004	194	1	1,005	25.8
CTL:	2,085	42,110	1,537	881	5	1,542	39.5
Pole:	868	15,747	575	2,238	13	588	15.1
Totals	6,659	169,427	6,185	4,096	23	6,208	159.2

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	636 AAC	NVE	37.58	54.34	0.9180	-	0.596	186.0	90.0	186.0	2,204	-1,439	-375	6,021	4,208
Primary	636 AAC	NVE	37.58	54.34	0.9180	-	0.596	76.0	270.0	76.0	2,204	1,439	-153	2,460	3,746
Primary	636 AAC	NVE	37.58	18.99	0.9180	-	0.596	186.0	90.0	186.0	2,204	-1,439	124	6,021	4,707
Primary	636 AAC	NVE	37.58	18.99	0.9180	-	0.596	76.0	270.0	76.0	2,204	1,439	51	2,460	3,950
Primary	636 AAC	NVE	37.58	54.34	0.9180	-	0.596	186.0	90.0	186.0	2,204	-1,439	374	6,021	4,956
Primary	636 AAC	NVE	37.58	54.34	0.9180	-	0.596	76.0	270.0	76.0	2,204	1,439	153	2,460	4,052
Primary	336 AAC	NVE	37.58	18.99	0.6660	-	0.316	186.0	90.0	186.0	1,470	-959	-66	4,367	3,342
Primary	336 AAC	NVE	37.58	18.99	0.6660	-	0.316	76.0	270.0	76.0	1,470	959	-27	1,784	2,717
Primary	4 AAC (SLACK)	NVE	32.01	54.37	0.2320	-	0.039	41.0	360.0	41.0	186	9,823	0	0	9,823
Primary	4 AAC (SLACK)	NVE	32.01	54.37	0.2320	-	0.039	41.0	360.0	41.0	186	9,823	0	0	9,823
Primary	4 AAC (SLACK)	NVE	32.01	19.07	0.2320	-	0.039	41.0	360.0	41.0	186	9,823	0	0	9,823
Primary	4 AAC (SLACK)	NVE	32.01	19.07	0.2320	-	0.039	41.0	360.0	41.0	186	9,823	0	0	9,823
Other	288ct SELF SUPPORT	ZFS	25.50	7.77	0.8600	-	0.350	186.0	90.0	186.0	1,500	-664	-32	3,824	3,128
Other	288ct SELF SUPPORT	ZFS	25.50	7.77	0.8600	-	0.350	76.0	270.0	76.0	1,500	664	-13	1,562	2,213
											Totals:	39,290	36	36,983	76,309

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, .50"cx, 48ct X 2 1/4" MESS	COX	23.20	7.97	1.3900	-	0.932	41.0	0.0	41.0	500	19,139	-19	0	19,120
CATV	.75"cx, .50"cx, 48ct X 2 1/4" MESS	COX	23.20	7.97	1.4900	-	0.891	186.0	90.0	186.1	1,500	-604	-83	6,027	5,341
CATV	.50"cx, 48ct X 2 1/4" MESS PROP	COX	23.20	7.97	1.4900	-	0.581	76.0	270.0	76.0	1,500	604	-22	2,463	3,045
Telco	1.0" 5/16" MESS (SLACK)	CTL	20.70	8.19	1.3100	-	1.000	41.0	0.0	41.0	500	17,077	-21	0	17,056
Telco	2.0" 144ct 5/16"MESS	CTL	20.70	8.19	2.7400	-	2.350	186.0	90.0	186.9	1,500	-539	-224	9,890	9,127
Telco	1.25" 144ct 5/16"MESS	CTL	20.70	8.19	1.9900	-	1.750	76.0	270.0	76.0	1,500	539	-68	2,935	3,406
Telco	2.0" 3/8" MESS	CTL	19.80	8.26	2.3800	-	2.000	186.0	90.0	186.7	1,500	-515	-192	8,217	7,509
Telco	2.0" 3/8" MESS	CTL	19.80	8.26	2.3800	-	2.000	76.0	270.0	76.0	1,500	515	-79	3,357	3,794
											Totals:	36,215	-707	32,889	68,398

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

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

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	6.06	90.0	90.0	66.00	4.50	3.50	-	120.00	-	-1	144	144
Normal	CROSSARM 3-1/2 X 4-1/2 X 10 -	NVE	32.10	6.45	180.0	180.0	66.00	4.50	3.50	-	120.00	-	-53	4,333	4,280
											Totals:	0	-54	4,477	4,424

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	173.6	0.0	10.00	9.50	-	7.50	-	-	-68	412	344
Pin	Pin Insulator - 15 kV	NVE	36.79	-18.00	18.6	0.0	10.00	9.50	-	7.50	-	-	22	412	434
Pin	Pin Insulator - 15 kV	NVE	36.79	-54.00	6.4	0.0	10.00	9.50	-	7.50	-	-	67	412	479
Pin	Pin Insulator - 15 kV	NVE	36.79	18.00	161.4	0.0	10.00	9.50	-	7.50	-	-	-23	412	389
Deadend	CUTOUT	NVE	32.10	48.00	262.3	0.0	3.00	12.75	-	3.80	-	-	-5	243	238
Deadend	Deadend Insulator - 15 kV	NVE	32.10	54.00	263.2	180.0	3.00	12.75	-	3.80	-	-	3	243	246
Deadend	Deadend Insulator - 15 kV	NVE	32.10	-54.00	96.8	180.0	3.00	12.75	-	3.80	-	-	2	243	245
Deadend	CUTOUT	NVE	32.10	24.00	255.0	0.0	3.00	12.75	-	3.80	-	-	-5	243	238
Deadend	CUTOUT	NVE	32.10	-48.00	97.7	0.0	3.00	12.75	-	3.80	-	-	-6	243	237
Deadend	Deadend Insulator - 15 kV	NVE	32.10	18.00	250.3	180.0	3.00	12.75	-	3.80	-	-	2	243	245
Deadend	Deadend Insulator - 15 kV	NVE	32.10	-18.00	109.7	180.0	3.00	12.75	-	3.80	-	-	2	243	245
Bolt	Three Bolt	ZFS	25.50	5.27	180.0	90.0	5.00	0.00	-	3.00	-	-	-5	0	-5
Bolt	Three Bolt	COX	23.20	5.47	180.0	90.0	5.00	0.00	-	3.00	-	-	-5	0	-5
Bolt	Three Bolt	CTL	20.70	5.69	180.0	90.0	5.00	0.00	-	3.00	-	-	-5	0	-5
Bolt	Three Bolt	CTL	19.80	5.76	180.0	90.0	5.00	0.00	-	3.00	-	-	-5	0	-5
											Totals:	0	-27	3,348	3,321

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	21.90	21.90	168.00	0.250	75.0	90.0	0.0	0.121	166.92	0.43
Guy 2: EHS 1/4	Span/Head	CTL	21.90	21.90	68.00	0.250	75.0	270.0	0.0	0.121	68.94	0.27

Guy Wire and Brace (Loads and Reactions)		Elastic Modulus (psi)	Rated Tensile Strength (lbs)	Guy Strength Factor	Allowable Tension (lbs)	Initial Tension (lbs)	Required Tension[2] (lbs)	Required Tension[3] (lbs)	Applied Tension[3] (lbs)	Vertical Load[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 1/4	Span/Head	23,000,000	6,650	0.90	5,985	700	803	180	180	0	180	-2	818
Guy 2: EHS 1/4	Span/Head	23,000,000	6,650	0.90	5,985	700	1,117	274	274	0	274	3	410
									Totals:	0	454	1	1,228

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	168.00	90.0	20,000	1.00	20,000	803	180	4.0
Anchor	CTL	30.00	68.00	270.0	20,000	1.00	20,000	1,117	274	5.6

Pole Buckling

Buckling [illegible]	Buckling [illegible] (ft)	Buckling Section [illegible] (% Buckling Col. Hgt.)	Buckling [illegible] (in)	Min. Buckling [illegible] (in)	Diameter [illegible] (in)	Diameter [illegible] (in)	Modulus of [illegible] (psi)	Pole [illegible] (pcf)	Ice Density (pcf)	Pole Tip [illegible] (ft)	Buckling Load [illegible] (lbs)	Buckling Load [illegible] (lbs)	Buckling Load [illegible]
0.71	22.34	33.88	13.65	11.08	7.96	14.97	1,000,000	50.00	57.00	40.40	304,091	4,096	74.25

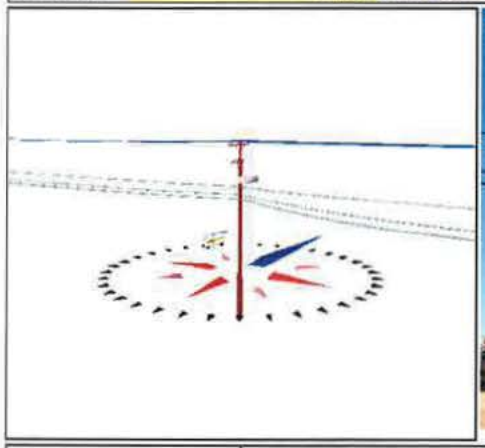
Version: 4.2 / 4.06
* includes Load Factor(s)

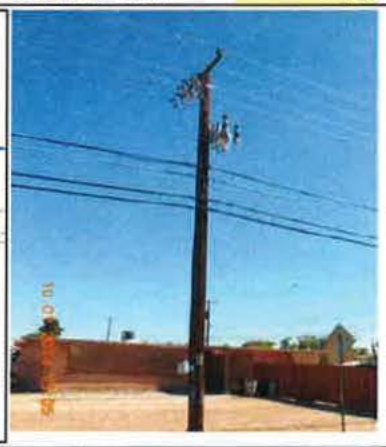
[2] Worst Wind per Guy Wire
[3] Wind at 0.0°

O-Calc® Pro *Analysis Report*

Wednesday, November 05, 2014 2:57:55 PM

File Name:	P27879 GRADE B	Pole Length / Class:	50 / 2	Code:	NESC	Structure Type:	Guyed
Pole Num:	P27879	Pole Species:	WESTERN RED CEDAR	NESC Rule:	Rule 250B	Status:	N/A
Aux Data	COX	Setting Depth (ft):	13.00	Construction Grade:	B	Pole Strength Factor:	0.65
Aux Data	NELLIS & TROPICANA	G/L Circumference (in):	48.00	Loading District:	Light	Transverse Wind LF:	2.50
Aux Data	O/B 144CT	G/L Fiber Stress (psi):	6,000	Ice Thickness (in):	0.00	Wire Tension LF:	1.65
Aux Data	Unset	Allowable Stress (psi):	3,900	Wind Speed (mph):	59.29	Vertical LF:	1.50
Aux Data	Unset	Fiber Stress Ht. Reduction:	No	Wind Pressure (psf):	9.00		





Pole Capacity Utilization		Height	Wind Angle
Maximum:	101.5%	0.0 ft	180.0°
Groundline:	101.5%	0.0 ft	180.0°
Vertical:	2.3%	24.0 ft	0.0°

Pole Moments		Load Angle	Wind Angle
Max Capac. Util:	114,606 ft-lb	180.3°	180.0°
Groundline:	114,606 ft-lb	180.3°	180.0°

Guy Summary		Guy Tensions		Maximum Guy Tensions	
	Attach Height (ft)	% Allowable Tension	Wind Angle	% Allowable Tension	Wind Angle
Guy 1	23.7	0.0%	180.0°	9.9%	270.0°
Guy 2	23.7	2.7%	180.0°	14.8%	90.0°

Anchor Summary		
	Lead Length (ft)	Max. % Allow. Capacity
Anchor 1	182.0	3.0%
Anchor 2	181.0	4.4%

GROUNDLINE LOAD SUMMARY:*Wind at 180.0°, Applied Moment 114,606 ft-lb at 180.3°, Allowable Moment 113,804 ft-lb

	Shear Load (lbs)*	Percent Applied Load	Bending Moment (ft-lb)	Percent of Applied Moment**	Percent of Pole Capacity	Bending Stress (+/- psi)	Vertical Load (lbs)	Vertical Stress (psi)	Total Stress (psi)	Percent of Pole Capacity
Powers:	1,457	33.1	50,578	5.3	5.3	1,733	668	4	1,737	44.5
Comms:	1,848	41.9	42,419	3.7	3.7	1,454	1,190	6	1,460	37.4
Guys/Braces:	86	1.9	2,030	0.9	0.9	70	22	0	70	1.8
Power Equipment:	135	3.1	3,600	3.1	3.2	123	1,650	9	132	3.4

Pole:	806	18.3	13,345	11.6	11.7	457	2,111	12	469	12.0
Crossarms:	8	0.2	268	0.1	0.1	9	159	1	10	0.3
Insulators:	67	1.5	2,365	0.3	0.3	81	104	1	82	2.1
Pole Load:	4,406	100.0	114,606	100.0	100.7	3,927	5,903	32	3,960	101.5
Pole Reserve Capacity:			-802		-0.7	-27			-60	-1.5

LOAD SUMMARY BY OWNER

NVE:	1,374	49,180	1,685	2,455	13	1,699	43.6
ZFS:	293	7,616	261	103	1	262	6.7
COX:	361	9,041	310	177	1	311	8.0
CTL:	1,573	35,423	1,214	1,058	6	1,220	31.3
Pole:	806	13,345	457	2,111	12	469	12.0
Totals	4,406	114,606	3,927	5,903	32	3,960	101.5

Detailed Load Components

Power:		Owner	Height (ft)	Horiz. Offset (in)	Cable Dia. (in)	Rotate Angle (deg)	Cable Weight (lbs/ft)	Lead/Span Length	Span Angle (deg)	Wire Length (ft)	Tension (lbs)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Primary	636 AAC	NVE	36.98	54.31	0.9180	-	0.596	181.0	270.0	181.0	2,204	670	-364	5,766	6,073
Primary	636 AAC	NVE	36.98	54.31	0.9180	-	0.596	182.0	90.0	182.0	2,204	-670	-366	5,798	4,762
Primary	636 AAC	NVE	36.98	18.92	0.9180	-	0.596	181.0	270.0	181.0	2,204	670	-121	5,766	6,315
Primary	636 AAC	NVE	36.98	18.92	0.9180	-	0.596	182.0	90.0	182.0	2,204	-670	-122	5,798	5,006
Primary	636 AAC	NVE	36.98	54.31	0.9180	-	0.596	181.0	270.0	181.0	2,204	670	364	5,766	6,801
Primary	636 AAC	NVE	36.98	54.31	0.9180	-	0.596	182.0	90.0	182.0	2,204	-670	366	5,798	5,494
Primary	336 AAC	NVE	36.98	18.92	0.6660	-	0.316	181.0	270.0	181.0	1,470	447	64	4,182	4,694
Primary	336 AAC	NVE	36.98	18.92	0.6660	-	0.316	182.0	90.0	182.0	1,470	-447	65	4,205	3,823
Other	288ct SELF SUPPORT	ZFS	25.80	7.59	0.8600	-	0.350	182.0	90.0	182.0	1,500	-318	30	3,786	3,498
Other	288ct SELF SUPPORT	ZFS	25.80	7.59	0.8600	-	0.350	181.0	270.0	181.0	1,500	318	30	3,765	4,113
											Totals:	0	-53	50,631	50,578

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, 48ct X 2 1/4" MESS	COX	24.75	7.69	1.0600	-	0.622	182.0	90.0	182.1	1,500	-305	54	4,476	4,226
CATV	.50"cx, 48ct X 2 1/4" MESS	COX	24.75	7.69	1.0600	-	0.622	181.0	270.0	181.0	1,500	305	54	4,452	4,811
Telco	1.25" 144ct 5/16"MESS	CTL	22.70	7.89	1.9900	-	1.750	182.0	90.0	182.5	1,500	-280	157	7,708	7,585
Telco	1.25" 144ct 5/16"MESS	CTL	22.70	7.89	1.9900	-	1.750	181.0	270.0	181.0	1,500	280	156	7,665	8,101
Telco	2.0" 3/8" MESS	CTL	21.40	8.02	2.3800	-	2.000	182.0	90.0	182.7	1,500	-264	183	8,690	8,609
Telco	2.0" 3/8" MESS	CTL	21.40	8.02	2.3800	-	2.000	181.0	270.0	181.0	1,500	264	182	8,642	9,088
											Totals:	0	786	41,633	42,419

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	26.80	30.99	90.0	90.0	1,100.0	18.00	39.00	-	48.00	-	-18	3,618	3,600
											Totals:	0	-18	3,618	3,600

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

² Worst Wind per Guy Wire
³ Wind at 180.0°

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	36.00	5.83	270.0	270.0	66.00	4.50	3.50	-	120.00	-	0	142	142
Normal	CUTOUT BRACKET	NVE	31.90	6.23	270.0	270.0	40.00	4.50	3.50	-	72.00	-	0	126	126
											Totals:	0	0	267	268

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	36.19	54.00	353.8	0.0	10.00	9.50	-	7.50	-	-	-67	405	338
Pin	Pin Insulator - 15 kV	NVE	36.19	18.00	342.1	0.0	10.00	9.50	-	7.50	-	-	-22	405	383
Pin	Pin Insulator - 15 kV	NVE	36.19	-54.00	186.2	0.0	10.00	9.50	-	7.50	-	-	68	405	473
Pin	Pin Insulator - 15 kV	NVE	36.19	-18.00	197.9	0.0	10.00	9.50	-	7.50	-	-	23	405	428
Bolt	Three Bolt	ZFS	25.80	5.09	180.0	90.0	5.00	0.00	-	3.00	-	-	5	0	5
Bolt	Three Bolt	COX	24.75	5.19	180.0	90.0	5.00	0.00	-	3.00	-	-	5	0	5
Bolt	Three Bolt	CTL	22.70	5.39	180.0	90.0	5.00	0.00	-	3.00	-	-	5	0	5
Bolt	Three Bolt	CTL	21.40	5.52	180.0	90.0	5.00	0.00	-	3.00	-	-	5	0	5
Deadend	CUTOUT	NVE	31.90	32.00	349.0	0.0	3.00	12.75	-	3.80	-	-	-12	241	230
Deadend	CUTOUT	NVE	31.90	0.00	270.0	0.0	3.00	12.75	-	3.80	-	-	0	241	242
Deadend	CUTOUT	NVE	31.90	-32.00	191.0	0.0	3.00	12.75	-	3.80	-	-	12	241	254
											Totals:	0	20	2,345	2,365

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	23.70	23.70	182.00	0.250	75.0	90.0	0.0	0.121	181.04	0.00
Guy 2: EHS 1/4	Span/Head	CTL	23.70	23.70	181.00	0.250	75.0	270.0	0.0	0.121	180.05	0.41

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 1/4	Span/Head	23,000,000	6,650	0.90	5,985	700	594	0	0	0	0	0	1,008
Guy 2: EHS 1/4	Span/Head	23,000,000	6,650	0.90	5,985	700	886	161	161	0	161	1	1,022
									Totals:	0	161	1	2,030

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[1] (lbs)	Max Required Capacity[2] (%)
Anchor	CTL	30.00	182.00	90.0	20,000	1.00	20,000	594	0	3.0
Anchor	CTL	30.00	181.00	270.0	20,000	1.00	20,000	886	161	4.4

Pole Buckling

Buckling	Buckling (ft)	Buckling Section (% Buckling Col. Hgt.)	Buckling (in)	Min. Buckling (in)	Diameter (in)	Diameter (in)	Modulus of (psi)	Pole (pcf)	Ice Density (pcf)	Pole Tip (ft)	Buckling Load (lbs)	Buckling Load (lbs)	Buckling Load
0.71	24.01	34.66	13.63	13.57	7.96	15.29	1,000,000	50.00	57.00	37.00	262,112	5,903	44.40

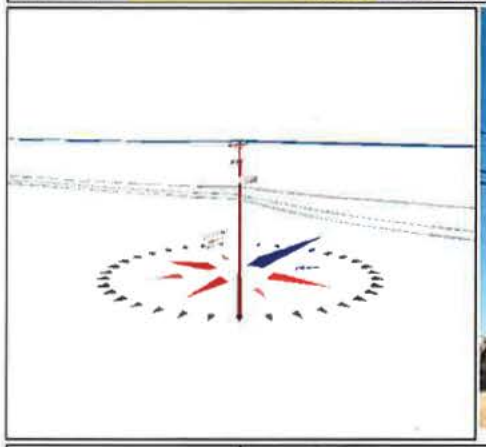
Version: 4.2 / 4.06
* includes Load Factor(s)

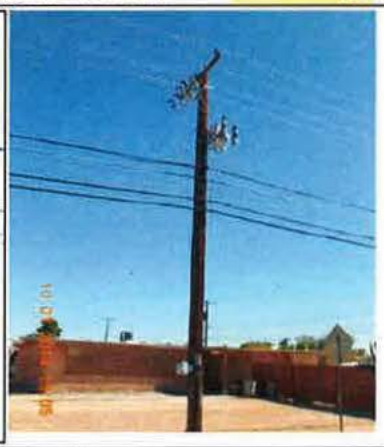
[2] Worst Wind per Guy Wire
[3] Wind at 180.0°

O-Calc® Pro *Analysis Report*

Wednesday, November 05, 2014 2:58:36 PM

File Name:	P27879 GRADE B	Pole Length / Class:	50 / 2	Code:	NESC	Structure Type:	Guyed
Pole Num:	P27879	Pole Species:	WESTERN RED CEDAR	NESC Rule:	Rule 250B	Status:	N/A
Aux Data	COX	Setting Depth (ft):	13.00	Construction Grade:	B	Pole Strength Factor:	0.65
Aux Data	NELLIS & TROPICANA	G/L Circumference (in):	48.00	Loading District:	Light	Transverse Wind LF:	2.50
Aux Data	O/B 144CT	G/L Fiber Stress (psi):	6,000	Ice Thickness (in):	0.00	Wire Tension LF:	1.65
Aux Data	Unset	Allowable Stress (psi):	3,900	Wind Speed (mph):	59.29	Vertical LF:	1.50
Aux Data	Unset	Fiber Stress Ht. Reduction:	No	Wind Pressure (psf):	9.00		





Pole Capacity Utilization		Height	Wind Angle
Maximum:	102.9%	0.0 ft	180.0°
Groundline:	102.9%	0.0 ft	180.0°
Vertical:	2.2%	24.0 ft	0.0°

Pole Moments		Load Angle	Wind Angle
Max Capac. Util:	116,115 ft-lb	180.3°	180.0°
Groundline:	116,115 ft-lb	180.3°	180.0°

Guy Summary		Guy Tensions		Maximum Guy Tensions	
	Attach Height (ft)	% Allowable Tension	Wind Angle	% Allowable Tension	Wind Angle
Guy 1	23.7	0.0%	180.0°	9.9%	270.0°
Guy 2	23.7	2.7%	180.0°	14.8%	90.0°

Anchor Summary		
	Lead Length (ft)	Max. % Allow. Capacity
Anchor 1	182.0	3.0%
Anchor 2	181.0	4.4%

GROUNDLINE LOAD SUMMARY:*Wind at 180.0°, Applied Moment 116,115 ft-lb at 180.3°, Allowable Moment 113,804 ft-lb

	Shear Load (lbs)*	Percent Applied Load	Bending Moment (ft-lb)	Percent of Applied Moment**	Percent of Pole Capacity	Bending Stress (+/- psi)	Vertical Load (lbs)	Vertical Stress (psi)	Total Stress (psi)	Percent of Pole Capacity
Powers:	1,457	32.6	50,578	5.2	5.3	1,733	668	4	1,737	44.5
Comms:	1,909	42.7	43,928	4.3	4.4	1,505	1,179	6	1,512	38.8
Guys/Braces:	86	1.9	2,030	0.9	0.9	70	22	0	70	1.8
Power Equipment:	135	3.0	3,600	3.1	3.2	123	1,650	9	132	3.4

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

* Worst Wind per Guy Wire
* Wind at 180.0°

Pole:	806	18.0	13,345	11.5	11.7	457	2,111	12	469	12.0
Crossarms:	8	0.2	268	0.1	0.1	9	159	1	10	0.3
Insulators:	67	1.5	2,365	0.3	0.3	81	104	1	82	2.1
Pole Load:	4,467	100.0	116,115	100.0	102.0	3,979	5,892	32	4,011	102.9
Pole Reserve Capacity:			-2,311		-2.0	-79			-111	-2.9

LOAD SUMMARY BY OWNER

NVE:	1,374		49,180			1,685	2,455	13	1,699	43.6
ZFS:	293		7,616			261	103	1	262	6.7
COX:	422		10,550			362	166	1	362	9.3
CTL:	1,573		35,423			1,214	1,058	6	1,220	31.3
Pole:	806		13,345			457	2,111	12	469	12.0
Totals	4,467		116,115			3,979	5,892	32	4,011	102.9

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	636 AAC	NVE	36.98	54.31	0.9180	-	0.596	181.0	270.0	181.0	2,204	669	-364	5,766	6,071
Primary	636 AAC	NVE	36.98	54.31	0.9180	-	0.596	182.0	90.0	182.0	2,204	-669	-366	5,798	4,763
Primary	636 AAC	NVE	36.98	18.92	0.9180	-	0.596	181.0	270.0	181.0	2,204	669	-121	5,766	6,314
Primary	636 AAC	NVE	36.98	18.92	0.9180	-	0.596	182.0	90.0	182.0	2,204	-669	-122	5,798	5,007
Primary	636 AAC	NVE	36.98	54.31	0.9180	-	0.596	181.0	270.0	181.0	2,204	669	364	5,766	6,799
Primary	636 AAC	NVE	36.98	54.31	0.9180	-	0.596	182.0	90.0	182.0	2,204	-669	366	5,798	5,495
Primary	336 AAC	NVE	36.98	18.92	0.6660	-	0.316	181.0	270.0	181.0	1,470	446	64	4,182	4,693
Primary	336 AAC	NVE	36.98	18.92	0.6660	-	0.316	182.0	90.0	182.0	1,470	-446	65	4,205	3,824
Other	288ct SELF SUPPORT	ZFS	25.80	7.59	0.8600	-	0.350	182.0	90.0	182.0	1,500	-317	30	3,766	3,499
Other	288ct SELF SUPPORT	ZFS	25.80	7.59	0.8600	-	0.350	181.0	270.0	181.0	1,500	317	30	3,765	4,112
											Totals:	0	-53	50,631	50,578

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, 48ct X 2 1/4" MESS PROP	COX	24.75	7.69	1.2400	-	0.581	182.0	90.0	182.1	1,500	-304	51	5,236	4,983
CATV	.50"cx, 48ct X 2 1/4" MESS PROP	COX	24.75	7.69	1.2400	-	0.581	181.0	270.0	181.1	1,500	304	51	5,208	5,563
Telco	1.25" 144ct 5/16"MESS	CTL	22.70	7.69	1.9900	-	1.750	182.0	90.0	182.5	1,500	-279	157	7,708	7,586
Telco	1.25" 144ct 5/16"MESS	CTL	22.70	7.89	1.9900	-	1.750	181.0	270.0	181.0	1,500	279	156	7,665	8,101
Telco	2.0" 3/8" MESS	CTL	21.40	8.02	2.3800	-	2.000	182.0	90.0	182.7	1,500	-263	183	8,690	8,609
Telco	2.0" 3/8" MESS	CTL	21.40	8.02	2.3800	-	2.000	181.0	270.0	181.0	1,500	263	182	8,642	9,087
											Totals:	0	779	43,149	43,928

PowerEquipment:		Owner	Height (ft)	Horiz. Offset (in)	Offset Angle (deg)	Rotate Angle (deg)	Unit Weight (lbs)	Unit Height (in)	Unit Depth (in)	Unit Diameter (in)	Unit Length (in)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Box	1200 KVAr CAPACITOR BANK	NVE	26.80	30.99	90.0	90.0	1,100.0	18.00	39.00	-	48.00	-	-18	3,618	3,600
											Totals:	0	-18	3,618	3,600

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

² Worst Wind per Guy Wire
³ Wind at 180.0°

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	36.00	5.83	270.0	270.0	66.00	4.50	3.50	-	120.00	-	0	142	142
Normal	CUTOUT BRACKET	NVE	31.90	6.23	270.0	270.0	40.00	4.50	3.50	-	72.00	-	0	126	126
											Totals:	0	0	267	268

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	36.19	54.00	353.8	0.0	10.00	9.50	-	7.50	-	-	-67	405	338
Pin	Pin Insulator - 15 kV	NVE	36.19	18.00	342.1	0.0	10.00	9.50	-	7.50	-	-	-22	405	383
Pin	Pin Insulator - 15 kV	NVE	36.19	-54.00	186.2	0.0	10.00	9.50	-	7.50	-	-	68	405	473
Pin	Pin Insulator - 15 kV	NVE	36.19	-18.00	197.9	0.0	10.00	9.50	-	7.50	-	-	23	405	428
Bolt	Three Bolt	ZFS	25.80	5.09	180.0	90.0	5.00	0.00	-	3.00	-	-	5	0	5
Bolt	Three Bolt	COX	24.75	5.19	180.0	90.0	5.00	0.00	-	3.00	-	-	5	0	5
Bolt	Three Bolt	CTL	22.70	5.39	180.0	90.0	5.00	0.00	-	3.00	-	-	5	0	5
Bolt	Three Bolt	CTL	21.40	5.52	180.0	90.0	5.00	0.00	-	3.00	-	-	5	0	5
Deadend	CUTOUT	NVE	31.90	32.00	349.0	0.0	3.00	12.75	-	3.80	-	-	-12	241	230
Deadend	CUTOUT	NVE	31.90	0.00	270.0	0.0	3.00	12.75	-	3.80	-	-	0	241	242
Deadend	CUTOUT	NVE	31.90	-32.00	191.0	0.0	3.00	12.75	-	3.80	-	-	12	241	254
											Totals:	0	20	2,345	2,365

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	23.70	23.70	182.00	0.250	75.0	90.0	0.0	0.121	181.04	0.00
Guy 2: EHS 1/4	Span/Head	CTL	23.70	23.70	181.00	0.250	75.0	270.0	0.0	0.121	180.05	0.41

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[2] (ft-lb)*
Guy 1: EHS 1/4	Span/Head	23,000,000	6,650	0.90	5,985	700	594	0	0	0	0	0	1,008
Guy 2: EHS 1/4	Span/Head	23,000,000	6,650	0.90	5,985	700	886	161	161	0	161	1	1,022
									Totals:	0	161	1	2,030

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	182.00	90.0	20,000	1.00	20,000	594	0	3.0
Anchor	CTL	30.00	181.00	270.0	20,000	1.00	20,000	886	161	4.4

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	24.00	34.66	13.63	13.56	7.96	15.29	1,000,000	50.00	57.00	37.00	262,152	5,892	44.49

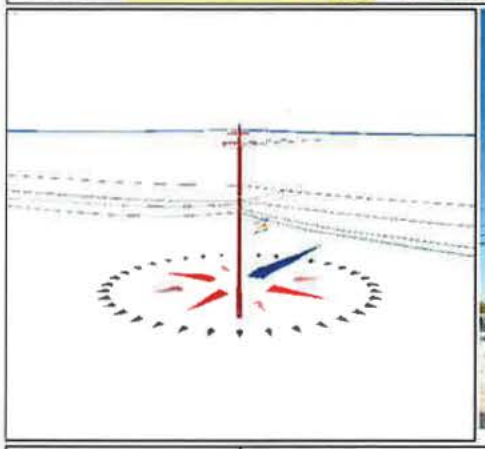
Version: 4.2 / 4.06
* includes Load Factor(s)

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

O-Calc® Pro *Analysis Report*

Wednesday, November 05, 2014 3:00:52 PM

File Name:	P27886 GRADE B	Pole Length / Class:	55 / 2	Code:	NESC	Structure Type:	Guyed
Pole Num:	P27886	Pole Species:	WESTERN RED CEDAR	NESC Rule:	Rule 250B	Status:	N/A
Aux Data	COX	Setting Depth (ft):	9.80	Construction Grade:	B	Pole Strength Factor:	0.65
Aux Data	NELLIS & TROPICANA	G/L Circumference (in):	48.00	Loading District:	Light	Transverse Wind LF:	2.50
Aux Data	O/B 144CT	G/L Fiber Stress (psi):	6,000	Ice Thickness (in):	0.00	Wire Tension LF:	1.65
Aux Data	Unset	Allowable Stress (psi):	3,900	Wind Speed (mph):	59.29	Vertical LF:	1.50
Aux Data	Unset	Fiber Stress Ht. Reduction:	No	Wind Pressure (psf):	9.00		



Pole Capacity Utilization		Height	Wind Angle
Maximum:	177.8%	0.0 ft	0.0°
Groundline:	177.8%	0.0 ft	0.0°
Vertical:	2.0%	25.5 ft	0.0°

Pole Moments		Load Angle	Wind Angle
Max Capac. Util:	201,589 ft-lb	0.2°	0.0°
Groundline:	201,589 ft-lb	0.2°	0.0°

Guy Summary		Guy Tensions		Maximum Guy Tensions	
	Attach Height (ft)	% Allowable Tension	Wind Angle	% Allowable Tension	Wind Angle
Guy 1	23.4	3.2%	0.0°	16.9%	270.0°
Guy 2	22.3	0.4%	0.0°	8.7%	90.0°

Anchor Summary		
	Lead Length (ft)	Max. % Allow. Capacity
Anchor 1	181.0	5.1%
Anchor 2	186.0	4.4%

GROUNDLINE LOAD SUMMARY:*Wind at 0.0°, Applied Moment 201,589 ft-lb at 0.2°, 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:	2,307	32.1	89,901	3.8	6.7	3,081	727	4	3,085	79.1
Comms:	3,591	50.0	81,227	2.2	3.9	2,784	1,242	7	2,790	71.5
Guys/Braces:	97	1.4	2,213	0.5	0.9	76	30	0	76	1.9
Pole:	985	13.7	19,916	9.9	17.5	683	2,578	14	697	17.9

Crossarms:	139	1.9	5,504	0.1	0.1	189	198	1	190	4.9
Insulators:	68	0.9	2,828	0.3	0.5	97	112	1	98	2.5
Pole Load:	7,187	100.0	201,589	100.0	177.1	6,908	4,888	27	6,935	177.8
Pole Reserve Capacity:			-87,785		-77.1	-3,008			-3,035	-77.8

LOAD SUMMARY BY OWNER

NVE:	2,218	90,748	3,110	904	5	3,115	79.9
ZFS:	296	7,505	257	104	1	258	6.6
COX:	1,263	30,533	1,046	229	1	1,048	26.9
CTL:	2,426	52,886	1,812	1,072	6	1,818	46.6
Pole:	985	19,916	683	2,578	14	697	17.9
Totals	7,187	201,589	6,908	4,888	27	6,935	177.8

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	636 AAC	NVE	43.78	54.32	0.9180	-	0.596	181.0	90.0	181.0	2,204	469	364	6,826	7,659
Primary	636 AAC	NVE	43.78	54.32	0.9180	-	0.596	186.0	270.0	186.0	2,204	-469	374	7,014	6,919
Primary	636 AAC	NVE	43.78	18.95	0.9180	-	0.596	181.0	90.0	181.0	2,204	469	121	6,826	7,416
Primary	636 AAC	NVE	43.78	18.95	0.9180	-	0.596	186.0	270.0	186.0	2,204	-469	125	7,014	6,669
Primary	636 AAC	NVE	43.78	54.32	0.9180	-	0.596	181.0	90.0	181.0	2,204	469	-364	6,826	6,931
Primary	636 AAC	NVE	43.78	54.32	0.9180	-	0.596	186.0	270.0	186.0	2,204	-469	-374	7,014	6,170
Primary	336 AAC	NVE	43.78	18.95	0.6660	-	0.316	181.0	90.0	181.0	1,470	313	-64	4,951	5,199
Primary	336 AAC	NVE	43.78	18.95	0.6660	-	0.316	186.0	270.0	186.0	1,470	-313	-66	5,087	4,708
Other	288ct SELF SUPPORT	ZFS	25.60	8.07	0.8600	-	0.350	181.0	90.0	181.0	1,500	187	-32	3,736	3,891
Other	288ct SELF SUPPORT	ZFS	25.60	8.07	0.8600	-	0.350	186.0	270.0	186.0	1,500	-187	-33	3,839	3,620
Primary	4 AAC (SLACK)	NVE	39.81	54.40	0.2320	-	0.039	44.0	360.0	44.0	186	12,217	0	0	12,217
Primary	4 AAC (SLACK)	NVE	39.81	54.40	0.2320	-	0.039	44.0	360.0	44.0	186	12,217	0	0	12,217
Secondary	#4 AL TPX	NVE	28.40	7.59	0.6400	-	0.180	186.0	270.0	186.1	484	-67	16	3,169	3,118
Secondary	#4 AL TPX	NVE	28.40	7.59	0.6400	-	0.180	181.0	90.0	181.0	484	67	15	3,084	3,167
											Totals:	24,434	82	65,386	89,901

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, 48ct X 2 1/4" MESS	COX	24.30	8.17	1.0600	-	0.622	181.0	90.0	181.1	1,500	177	-57	4,371	4,490
CATV	.50"cx X 3, 48ct X 2 1/4" MESS	COX	24.30	8.17	1.4800	-	0.922	186.0	270.0	186.1	1,500	-177	-88	6,271	6,006
CATV	.50"cx 1/4" MESS (SLACK)	COX	24.30	8.17	0.7500	-	0.271	44.0	0.0	44.0	500	20,047	-6	0	20,041
Telco	1.25" 144ct 5/16"MESS	CTL	22.30	8.33	1.9900	-	1.750	181.0	90.0	181.5	1,500	163	-165	7,530	7,528
Telco	.50" 1/4" MESS (SLACK)	CTL	22.30	8.33	0.7500	-	0.250	44.0	0.0	44.0	500	18,397	-6	0	18,392
Telco	2.0" 3/8" MESS	CTL	21.20	8.42	2.3800	-	2.000	181.0	90.0	181.6	1,500	155	-191	8,562	8,526
Telco	2.0" 3/8" MESS	CTL	21.20	8.42	2.3800	-	2.000	186.0	270.0	186.6	1,500	-155	-196	8,798	8,448
Telco	1.25" 144ct 1/4"MESS	CTL	23.40	8.24	1.9900	-	1.600	186.0	270.0	186.4	1,500	-171	-153	8,120	7,796
											Totals:	38,437	-862	43,652	81,227

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

² Worst Wind per Guy Wire
³ Wind at 0.0°

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	42.80	5.92	270.0	270.0	66.00	4.50	3.50	-	120.00	-	0	169	168
Normal	CROSSARM 3-1/2 X 4-1/2 X 10 -	NVE	39.90	6.16	180.0	180.0	66.00	4.50	3.50	-	120.00	-	-51	5,386	5,336
											Totals:	0	-51	5,555	5,504

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	42.99	54.00	353.7	0.0	10.00	9.50	-	7.50	-	-	67	481	548
Pin	Pin Insulator - 15 kV	NVE	42.99	18.00	341.8	0.0	10.00	9.50	-	7.50	-	-	22	481	503
Pin	Pin Insulator - 15 kV	NVE	42.99	-54.00	186.3	0.0	10.00	9.50	-	7.50	-	-	-68	481	413
Pin	Pin Insulator - 15 kV	NVE	42.99	-18.00	198.2	0.0	10.00	9.50	-	7.50	-	-	-23	481	458
Bolt	Three Bolt	ZFS	25.60	5.57	180.0	90.0	5.00	0.00	-	3.00	-	-	-5	0	-5
Bolt	Three Bolt	COX	24.30	5.67	180.0	90.0	5.00	0.00	-	3.00	-	-	-5	0	-5
Bolt	Three Bolt	CTL	22.30	5.83	180.0	90.0	5.00	0.00	-	3.00	-	-	-5	0	-5
Bolt	Three Bolt	CTL	21.20	5.92	180.0	90.0	5.00	0.00	-	3.00	-	-	-5	0	-5
Bolt	Three Bolt	CTL	23.40	5.74	180.0	90.0	5.00	0.00	-	3.00	-	-	-5	0	-5
Deadend	Deadend Insulator - 15 kV	NVE	39.90	54.00	263.5	180.0	3.00	12.75	-	3.80	-	-	2	302	304
Deadend	Deadend Insulator - 15 kV	NVE	39.90	-54.00	96.5	180.0	3.00	12.75	-	3.80	-	-	3	302	305
Deadend	CUTOUT	NVE	39.90	48.00	262.7	0.0	3.00	12.75	-	3.80	-	-	-5	302	297
Spool	Spool Insulator - 20 kV	NVE	28.40	5.34	0.0	270.0	1.00	2.12	-	2.50	-	-	1	24	24
											Totals:	0	-25	2,853	2,828

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	23.40	23.40	181.00	0.250	75.0	90.0	0.0	0.121	180.01	0.49
Guy 2: EHS 5/16	Span/Head	CTL	22.30	22.30	186.00	0.312	75.0	270.0	0.0	0.205	184.83	0.06

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	1,011	194	194	0	194	1	1,003
Guy 2: EHS 5/16	Span/Head	23,000,000	11,200	0.90	10,080	700	880	38	38	0	38	0	1,210
									Totals:	0	231	0	2,213

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	181.00	90.0	20,000	1.00	20,000	1,011	194	5.1
Anchor	CTL	30.00	186.00	270.0	20,000	1.00	20,000	880	38	4.4

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	25.54	34.06	13.87	12.91	7.96	15.29	1,000,000	50.00	57.00	45.20	248,244	4,888	50.79

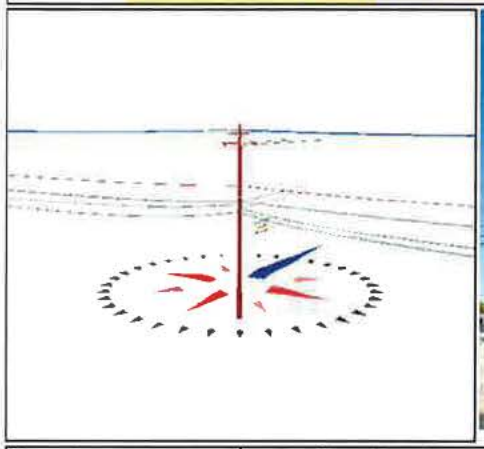
Version: 4.2 / 4.06
* Includes Load Factor(s)

² Worst Wind per Guy Wire
³ Wind at 0.0°

O-Calc® Pro *Analysis Report*

Wednesday, November 05, 2014 3:01:36 PM

File Name:	P27886 GRADE B	Pole Length / Class:	55 / 2	Code:	NESC	Structure Type:	Guyed
Pole Num:	P27886	Pole Species:	WESTERN RED CEDAR	NESC Rule:	Rule 250B	Status:	N/A
Aux Data	COX	Setting Depth (ft):	9.80	Construction Grade:	B	Pole Strength Factor:	0.65
Aux Data	NELLIS & TROPICANA	G/L Circumference (in):	48.00	Loading District:	Light	Transverse Wind LF:	2.50
Aux Data	O/B 144CT	G/L Fiber Stress (psi):	6,000	Ice Thickness (in):	0.00	Wire Tension LF:	1.65
Aux Data	Unset	Allowable Stress (psi):	3,900	Wind Speed (mph):	59.29	Vertical LF:	1.50
Aux Data	Unset	Fiber Stress Ht. Reduction:	No	Wind Pressure (psf):	9.00		



Pole Capacity Utilization		Height	Wind Angle
Maximum:	178.3%	0.0 ft	0.0°
Groundline:	178.3%	0.0 ft	0.0°
Vertical:	2.0%	25.5 ft	0.0°

Pole Moments		Load Angle	Wind Angle
Max Capac. Util:	202,128 ft-lb	0.2°	0.0°
Groundline:	202,128 ft-lb	0.2°	0.0°

Guy Summary		Guy Tensions		Maximum Guy Tensions	
	Attach Height (ft)	% Allowable Tension	Wind Angle	% Allowable Tension	Wind Angle
Guy 1	23.4	3.2%	0.0°	16.9%	270.0°
Guy 2	22.3	0.4%	0.0°	8.7%	90.0°

Anchor Summary		
	Lead Length (ft)	Max. % Allow. Capacity
Anchor 1	181.0	5.1%
Anchor 2	186.0	4.4%

GROUNDLINE LOAD SUMMARY:*Wind at 0.0°, Applied Moment 202,128 ft-lb at 0.2°, 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:	2,307	32.0	89,901	3.8	6.7	3,081	727	4	3,085	79.1
Comms:	3,613	50.1	81,766	2.6	4.6	2,802	1,229	7	2,809	72.0
Guys/Braces:	97	1.3	2,213	0.5	0.9	76	30	0	76	1.9
Pole:	985	13.7	19,916	9.9	17.5	683	2,578	14	697	17.9

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

² Worst Wind per Guy Wire
³ Wind at 0.0°

Crossarms:	139	1.9	5,504	0.1	0.1	189	198	1	190	4.9
Insulators:	68	0.9	2,828	0.3	0.5	97	112	1	98	2.5
Pole Load:	7,209	100.0	202,128	100.0	177.6	6,927	4,876	27	6,953	178.3
Pole Reserve Capacity:			-88,324		-77.6	-3,027			-3,053	-78.3

LOAD SUMMARY BY OWNER

NVE:	2,218	90,748	3,110	904	5	3,115	79.9
ZFS:	296	7,505	257	104	1	258	6.6
COX:	1,285	31,072	1,065	217	1	1,066	27.3
CTL:	2,426	52,886	1,812	1,072	6	1,818	46.6
Pole:	985	19,916	683	2,578	14	697	17.9
Totals	7,209	202,128	6,927	4,876	27	6,953	178.3

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	636 AAC	NVE	43.78	54.32	0.9180	-	0.596	181.0	90.0	181.0	2,204	471	364	6,826	7,660
Primary	636 AAC	NVE	43.78	54.32	0.9180	-	0.596	186.0	270.0	186.0	2,204	-471	374	7,014	6,918
Primary	636 AAC	NVE	43.78	18.95	0.9180	-	0.596	181.0	90.0	181.0	2,204	471	121	6,826	7,417
Primary	636 AAC	NVE	43.78	18.95	0.9180	-	0.596	186.0	270.0	186.0	2,204	-471	125	7,014	6,668
Primary	636 AAC	NVE	43.78	54.32	0.9180	-	0.596	181.0	90.0	181.0	2,204	471	-364	6,826	6,932
Primary	636 AAC	NVE	43.78	54.32	0.9180	-	0.596	186.0	270.0	186.0	2,204	-471	-374	7,014	6,169
Primary	336 AAC	NVE	43.78	18.95	0.6660	-	0.316	181.0	90.0	181.0	1,470	314	-64	4,951	5,200
Primary	336 AAC	NVE	43.78	18.95	0.6660	-	0.316	186.0	270.0	186.0	1,470	-314	-66	5,087	4,708
Other	288ct SELF SUPPORT	ZFS	25.60	8.07	0.8600	-	0.350	181.0	90.0	181.0	1,500	187	-32	3,736	3,891
Other	288ct SELF SUPPORT	ZFS	25.60	8.07	0.8600	-	0.350	186.0	270.0	186.0	1,500	-187	-33	3,839	3,619
Primary	4 AAC (SLACK)	NVE	39.81	54.40	0.2320	-	0.039	44.0	360.0	44.0	186	12,217	0	0	12,217
Primary	4 AAC (SLACK)	NVE	39.81	54.40	0.2320	-	0.039	44.0	360.0	44.0	186	12,217	0	0	12,217
Secondary	#4 AL TPX	NVE	28.40	7.59	0.6400	-	0.180	186.0	270.0	186.1	484	-67	16	3,169	3,118
Secondary	#4 AL TPX	NVE	28.40	7.59	0.6400	-	0.180	181.0	90.0	181.0	484	67	15	3,084	3,167
											Totals:	24,434	82	65,386	89,901

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, 48ct X 2 1/4" MESS PROP	COX	24.30	8.17	1.2400	-	0.581	181.0	90.0	181.1	1,500	178	-54	5,113	5,237
CATV	.50"cx X 3, 48ct X 2 1/4" MESS	COX	24.30	8.17	1.4300	-	0.874	186.0	270.0	186.1	1,500	-178	-83	6,059	5,799
CATV	.50"cx 1/4" MESS (SLACK)	COX	24.30	8.17	0.7500	-	0.271	44.0	0.0	44.0	500	20,047	-6	0	20,041
Telco	1.25" 144ct 5/16"MESS	CTL	22.30	8.33	1.9900	-	1.750	181.0	90.0	181.5	1,500	163	-165	7,530	7,528
Telco	.50" 1/4" MESS (SLACK)	CTL	22.30	8.33	0.7500	-	0.250	44.0	0.0	44.0	500	18,397	-6	0	18,392
Telco	2.0" 3/8" MESS	CTL	21.20	8.42	2.3800	-	2.000	181.0	90.0	181.6	1,500	155	-191	8,562	8,526
Telco	2.0" 3/8" MESS	CTL	21.20	8.42	2.3800	-	2.000	186.0	270.0	186.6	1,500	-155	-196	8,798	8,447
Telco	1.25" 144ct 1/4"MESS	CTL	23.40	8.24	1.9900	-	1.600	186.0	270.0	186.4	1,500	-171	-153	8,120	7,796
											Totals:	38,437	-853	44,182	81,766

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	42.80	5.92	270.0	270.0	66.00	4.50	3.50	-	120.00	-	0	169	168
Normal	CROSSARM 3-1/2 X 4-1/2 X 10 -	NVE	39.90	6.16	180.0	180.0	66.00	4.50	3.50	-	120.00	-	-51	5,386	5,336
											Totals:	0	-51	5,555	5,504

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	42.99	54.00	353.7	0.0	10.00	9.50	-	7.50	-	-	67	481	548
Pin	Pin Insulator - 15 kV	NVE	42.99	18.00	341.8	0.0	10.00	9.50	-	7.50	-	-	22	481	503
Pin	Pin Insulator - 15 kV	NVE	42.99	-54.00	186.3	0.0	10.00	9.50	-	7.50	-	-	-68	481	413
Pin	Pin Insulator - 15 kV	NVE	42.99	-18.00	198.2	0.0	10.00	9.50	-	7.50	-	-	-23	481	458
Bolt	Three Bolt	ZFS	25.60	5.57	180.0	90.0	5.00	0.00	-	3.00	-	-	-5	0	-5
Bolt	Three Bolt	COX	24.30	5.67	180.0	90.0	5.00	0.00	-	3.00	-	-	-5	0	-5
Bolt	Three Bolt	CTL	22.30	5.83	180.0	90.0	5.00	0.00	-	3.00	-	-	-5	0	-5
Bolt	Three Bolt	CTL	21.20	5.92	180.0	90.0	5.00	0.00	-	3.00	-	-	-5	0	-5
Bolt	Three Bolt	CTL	23.40	5.74	180.0	90.0	5.00	0.00	-	3.00	-	-	-5	0	-5
Deadend	Deadend Insulator - 15 kV	NVE	39.90	54.00	263.5	180.0	3.00	12.75	-	3.80	-	-	2	302	304
Deadend	Deadend Insulator - 15 kV	NVE	39.90	-54.00	96.5	180.0	3.00	12.75	-	3.80	-	-	3	302	305
Deadend	CUTOUT	NVE	39.90	48.00	262.7	0.0	3.00	12.75	-	3.80	-	-	-5	302	297
Spool	Spool Insulator - 20 kV	NVE	28.40	5.34	0.0	270.0	1.00	2.12	-	2.50	-	-	1	24	24
											Totals:	0	-25	2,853	2,828

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	23.40	23.40	181.00	0.250	75.0	90.0	0.0	0.121	180.01	0.49
Guy 2: EHS 5/16	Span/Head	CTL	22.30	22.30	186.00	0.312	75.0	270.0	0.0	0.205	184.83	0.06

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[2] (lbs)	Shear Load in Guy Dir[2] (lbs)	Shear Load at Report Angle[3] (lbs)	Moment at GL[2] (ft-lb)*
Guy 1: EHS 1/4	Span/Head	23,000,000	6,650	0.90	5,985	700	1,011	194	194	0	194	1	1,003
Guy 2: EHS 5/16	Span/Head	23,000,000	11,200	0.90	10,080	700	880	38	38	0	38	0	1,210
									Totals:	0	231	0	2,213

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	181.00	90.0	20,000	1.00	20,000	1,011	194	5.1
Anchor	CTL	30.00	186.00	270.0	20,000	1.00	20,000	880	38	4.4

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	25.54	34.06	13.87	12.90	7.96	15.29	1,000,000	50.00	57.00	45.20	248,171	4,876	50.90

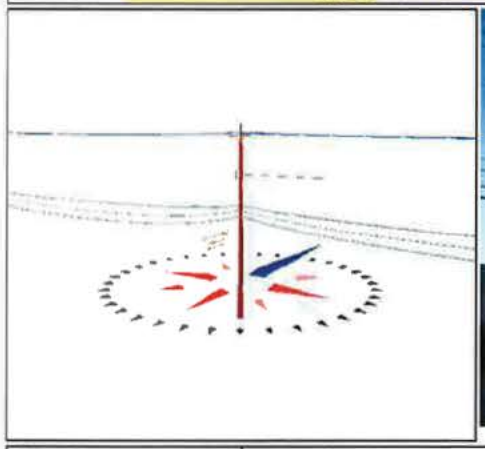
Version: 4.2 / 4.06
* includes Load Factor(s)

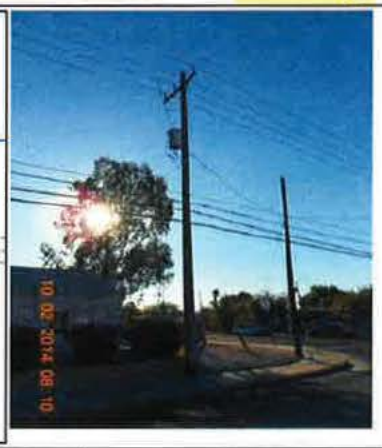
[2] Worst Wind per Guy Wire
[3] Wind at 0.0°

O-Calc® Pro *Analysis Report*

Wednesday, November 05, 2014 3:14:41 PM

File Name:	P63220 GRADE B	Pole Length / Class:	55 / 2	Code:	NESC	Structure Type:	Guyed
Pole Num:	P63220	Pole Species:	WESTERN RED CEDAR	NESC Rule:	Rule 250B	Status:	N/A
Aux Data	COX	Setting Depth (ft):	10.20	Construction Grade:	B	Pole Strength Factor:	0.65
Aux Data	NELLIS & TROPICANA	G/L Circumference (in):	48.00	Loading District:	Light	Transverse Wind LF:	2.50
Aux Data	O/B 144CT	G/L Fiber Stress (psi):	6,000	Ice Thickness (in):	0.00	Wire Tension LF:	1.65
Aux Data	Unset	Allowable Stress (psi):	3,900	Wind Speed (mph):	59.29	Vertical LF:	1.50
Aux Data	Unset	Fiber Stress Ht. Reduction:	No	Wind Pressure (psf):	9.00		





Pole Capacity Utilization		Height	Wind Angle
Maximum:	98.0%	0.0 ft	180.0°
Groundline:	98.0%	0.0 ft	180.0°
Vertical:	2.0%	25.0 ft	0.0°

Pole Moments		Load Angle	Wind Angle
Max Capac. Util:	110,698 ft-lb	178.4°	180.0°
Groundline:	110,698 ft-lb	178.4°	180.0°

Guy Summary		Guy Tensions		Maximum Guy Tensions	
	Attach Height (ft)	% Allowable Tension	Wind Angle	% Allowable Tension	Wind Angle
Guy 1	21.2	0.0%	180.0°	1.5%	270.0°
Guy 2	21.2	9.8%	180.0°	21.1%	90.0°

Anchor Summary		
	Lead Length (ft)	Max. % Allow. Capacity
Anchor 1	186.0	0.8%
Anchor 2	114.0	10.6%

GROUNDLINE LOAD SUMMARY:*Wind at 180.0°, Applied Moment 110,698 ft-lb at 178.4°, 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
Powers:	1,240	29.7	47,817	9.8	9.5	1,639	556	3	1,642	42.1
Comms:	1,645	39.4	35,119	6.7	6.6	1,204	1,017	6	1,209	31.0
Guys/Braces:	60	1.4	1,263	1.0	1.0	43	31	0	43	1.1
Power Equipment:	79	1.9	2,413	2.2	2.1	83	738	4	87	2.2

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

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

Pole:	976	23.4	19,557	17.7	17.2	670	2,556	14	684	17.5
Crossarms:	4	0.1	162	0.1	0.1	6	99	1	6	0.2
Risers:	126	3.0	2,451	2.2	2.2	84	39	0	84	2.2
Insulators:	45	1.1	1,915	0.4	0.4	66	92	0	66	1.7
Pole Load:	4,173	100.0	110,698	100.0	97.3	3,794	5,128	28	3,822	98.0
Pole Reserve Capacity:			3,106		2.7	106			78	2.0

LOAD SUMMARY BY OWNER

NVE:	1,252	48,930	1,677	1,415	8	1,685	43.2
ZFS:	242	5,813	199	86	0	200	5.1
COX:	416	9,511	326	215	1	327	8.4
CTL:	1,288	26,887	921	856	5	926	23.7
Pole:	976	19,557	670	2,556	14	684	17.5
Totals	4,173	110,698	3,794	5,128	28	3,822	98.0

Detailed Load Components

Power:		Owner	Height (ft)	Horiz. Offset (in)	Cable Dia. (in)	Rotate Angle (deg)	Cable Weight (lbs/ft)	Lead/Span Length	Span Angle (deg)	Wire Length (ft)	Tension (lbs)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Primary	636 AAC	NVE	42.58	54.33	0.9180	-	0.596	186.0	90.0	186.0	2,204	4,383	-375	6,819	10,827
Primary	636 AAC	NVE	42.58	54.33	0.9180	-	0.596	114.0	270.0	114.0	2,204	-4,383	-230	4,180	-433
Primary	636 AAC	NVE	42.58	18.97	0.9180	-	0.596	186.0	90.0	186.0	2,204	4,383	-126	6,819	11,076
Primary	636 AAC	NVE	42.58	18.97	0.9180	-	0.596	114.0	270.0	114.0	2,204	-4,383	-77	4,180	-280
Primary	636 AAC	NVE	42.58	54.33	0.9180	-	0.596	186.0	90.0	186.0	2,204	4,383	373	6,819	11,575
Primary	636 AAC	NVE	42.58	54.33	0.9180	-	0.596	114.0	270.0	114.0	2,204	-4,383	228	4,180	26
Primary	336 AAC	NVE	42.58	18.97	0.6660	-	0.316	186.0	90.0	186.0	1,470	2,922	65	4,946	7,934
Primary	336 AAC	NVE	42.58	18.97	0.6660	-	0.316	114.0	270.0	114.0	1,470	-2,922	40	3,031	149
Other	288ct SELF SUPPORT	ZFS	23.80	8.19	0.8600	-	0.350	186.0	90.0	186.0	1,500	1,666	33	3,568	5,267
Other	288ct SELF SUPPORT	ZFS	23.80	8.19	0.8600	-	0.350	114.0	270.0	114.0	1,500	-1,666	20	2,187	541
Secondary	#2 AL TPX (SLACK)	NVE	31.10	7.35	0.6400	-	0.237	22.0	90.0	22.0	500	726	0	410	1,136
											Totals:	726	-47	47,139	47,817

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 3, 48ct X 2 1/4" MESS	COX	22.50	8.30	1.4800	-	0.922	186.0	90.0	186.1	1,500	1,575	89	5,804	7,468
CATV	.50"cx X 3, 48ct X 2 1/4" MESS	COX	22.50	8.30	1.4800	-	0.922	114.0	270.0	114.2	1,500	-1,575	55	3,558	2,037
Telco	1.25" 144ct 1/4"MESS	CTL	21.20	8.41	1.9900	-	1.600	186.0	90.0	186.4	1,500	1,484	156	7,354	8,994
Telco	1.25" 144ct 1/4"MESS	CTL	21.20	8.41	1.9900	-	1.600	114.0	270.0	114.6	1,500	-1,484	96	4,507	3,119
Telco	2.0" 3/8" MESS	CTL	19.70	8.53	2.3800	-	2.000	186.0	90.0	186.6	1,500	1,379	198	8,172	9,749
Telco	2.0" 3/8" MESS	CTL	19.70	8.53	2.3800	-	2.000	114.0	270.0	114.9	1,500	-1,379	122	5,009	3,752
											Totals:	0	715	34,404	35,119

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	37KVA	NVE	31.10	20.10	270.0	270.0	492.00	28.00	-	18.00	-	-	-35	2,448	2,413

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

² Worst Wind per Guy Wire
³ Wind at 180.0°

											Totals:	0	-35	2,448	2,413

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	41.60	5.99	270.0	270.0	66.00	4.50	3.50	-	120.00	-	-1	164	162
											Totals:	0	-1	164	162

Riser:		Owner	Height (ft)	Horiz. Offset (in)	Offset Angle (deg)	Rotate Angle (deg)	Unit Weight (lbs)	Unit Height (in)	Unit Depth (in)	Unit Diameter (in)	Unit Length (in)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
2" Riser 90.0°	2" Riser	NVE	29.20	8.15	90.0	90.0	2.19	350.40	-	0.00	-	-	0	2,450	2,451
											Totals:	0	0	2,450	2,451

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	41.79	54.00	353.7	0.0	10.00	9.50	-	7.50	-	-	-68	467	400
Pin	Pin Insulator - 15 kV	NVE	41.79	18.00	341.6	0.0	10.00	9.50	-	7.50	-	-	-23	467	445
Pin	Pin Insulator - 15 kV	NVE	41.79	-54.00	186.3	0.0	10.00	9.50	-	7.50	-	-	67	467	535
Pin	Pin Insulator - 15 kV	NVE	41.79	-18.00	198.4	0.0	10.00	9.50	-	7.50	-	-	22	467	490
Bolt	Three Bolt	ZFS	23.80	5.69	180.0	90.0	5.00	0.00	-	3.00	-	-	5	0	5
Bolt	Three Bolt	COX	22.50	5.80	180.0	90.0	5.00	0.00	-	3.00	-	-	5	0	5
Bolt	Three Bolt	CTL	21.20	5.91	180.0	90.0	5.00	0.00	-	3.00	-	-	5	0	5
Bolt	Three Bolt	CTL	19.70	6.03	180.0	90.0	5.00	0.00	-	3.00	-	-	5	0	5
Spool	Spool Insulator - 20 kV	NVE	31.10	5.10	90.0	0.0	1.00	2.12	-	2.50	-	-	0	26	26
											Totals:	0	20	1,895	1,915

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	Span/Head	CTL	21.20	21.20	186.00	0.312	75.0	90.0	0.0	0.205	184.70	0.00
Guy 2: EHS 5/16	Span/Head	CTL	21.20	21.20	114.00	0.312	75.0	270.0	0.0	0.205	113.45	1.02

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	Span/Head	23,000,000	11,200	0.90	10,080	700	155	0	0	0	0	0	1,152
Guy 2: EHS 5/16	Span/Head	23,000,000	11,200	0.90	10,080	700	2,126	990	990	0	990	-28	111
									Totals:	0	990	-28	1,263

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	186.00	90.0	20,000	1.00	20,000	155	0	0.8
Anchor	CTL	30.00	114.00	270.0	20,000	1.00	20,000	2,126	990	10.6

Pole Buckling

Buckling [illegible]	Buckling [illegible] (ft)	Buckling Section [illegible] (% Buckling Col. Hgt.)	Buckling [illegible] (in)	Min. Buckling [illegible] (in)	Diameter [illegible] (in)	Diameter [illegible] (in)	Modulus of [illegible] (psi)	Pole [illegible] (pcf)	Ice Density (pcf)	Pole Tip [illegible] (ft)	Buckling Load [illegible] (lbs)	Buckling Load [illegible] (lbs)	Buckling Load [illegible]
0.71	24.98	34.01	13.89	13.07	7.96	15.29	1,000,000	50.00	57.00	44.80	261,036	5,128	50.91

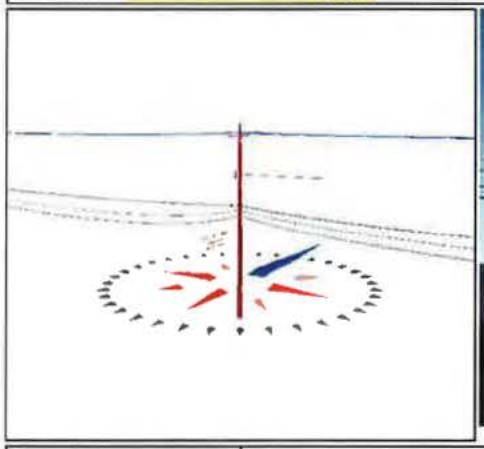
Version: 4.2 / 4.06
* includes Load Factor(s)

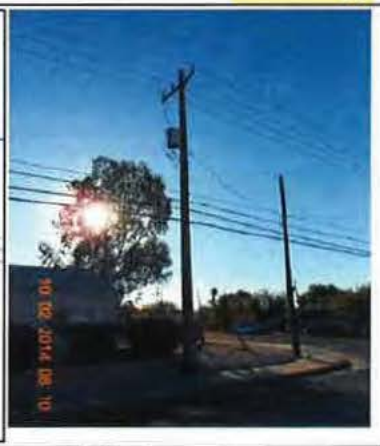
[2] Worst Wind per Guy Wire
[3] Wind at 180.0°

O-Calc® Pro *Analysis Report*

Wednesday, November 05, 2014 3:15:46 PM

File Name:	P63220 GRADE B	Pole Length / Class:	55 / 2	Code:	NESC	Structure Type:	Guyed
Pole Num:	P63220	Pole Species:	WESTERN RED CEDAR	NESC Rule:	Rule 250B	Status:	N/A
Aux Data	COX	Setting Depth (ft):	10.20	Construction Grade:	B	Pole Strength Factor:	0.65
Aux Data	NELLIS & TROPICANA	G/L Circumference (in):	48.00	Loading District:	Light	Transverse Wind LF:	2.50
Aux Data	O/B 144CT	G/L Fiber Stress (psi):	6,000	Ice Thickness (in):	0.00	Wire Tension LF:	1.65
Aux Data	Unset	Allowable Stress (psi):	3,900	Wind Speed (mph):	59.29	Vertical LF:	1.50
Aux Data	Unset	Fiber Stress Ht. Reduction:	No	Wind Pressure (psf):	9.00		





Pole Capacity Utilization		Height	Wind Angle
Maximum:	99.0%	0.0 ft	180.0°
Groundline:	99.0%	0.0 ft	180.0°
Vertical:	2.0%	25.0 ft	0.0°

Pole Moments		Load Angle	Wind Angle
Max Capac. Util:	111,793 ft-lb	178.4°	180.0°
Groundline:	111,793 ft-lb	178.4°	180.0°

Guy Summary		Guy Tensions		Maximum Guy Tensions	
	Attach Height (ft)	% Allowable Tension	Wind Angle	% Allowable Tension	Wind Angle
Guy 1	21.2	0.0%	180.0°	1.5%	270.0°
Guy 2	21.2	9.8%	180.0°	21.1%	90.0°

Anchor Summary		
	Lead Length (ft)	Max. % Allow. Capacity
Anchor 1	186.0	0.8%
Anchor 2	114.0	10.6%

GROUNDLINE LOAD SUMMARY:*Wind at 180.0°, Applied Moment 111,793 ft-lb at 178.4°, 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
Powers:	1,240	29.4	47,809	9.6	9.5	1,638	556	3	1,641	42.1
Comms:	1,692	40.1	36,215	7.3	7.1	1,241	1,047	6	1,247	32.0
Guys/Braces:	60	1.4	1,270	1.0	1.0	44	31	0	44	1.1
Power Equipment:	79	1.9	2,414	2.2	2.1	83	738	4	87	2.2

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

* Worst Wind per Guy Wire
* Wind at 180.0°

Pole:	976	23.1	19,557	17.5	17.2	670	2,556	14	684	17.5
Crossarms:	4	0.1	162	0.1	0.1	6	99	1	6	0.2
Risers:	126	3.0	2,451	2.2	2.2	84	39	0	84	2.2
Insulators:	45	1.1	1,915	0.4	0.4	66	92	0	66	1.7
Pole Load:	4,221	100.0	111,793	100.0	98.2	3,831	5,157	28	3,859	99.0
Pole Reserve Capacity:			2,011		1.8	69			41	1.0

LOAD SUMMARY BY OWNER

NVE:	1,252		48,922			1,677	1,415	8	1,684	43.2
ZFS:	242		5,813			199	86	0	200	5.1
COX:	464		10,606			363	244	1	365	9.4
CTL:	1,288		26,895			922	856	5	926	23.8
Pole:	976		19,557			670	2,556	14	684	17.5
Totals	4,221		111,793			3,831	5,157	28	3,859	99.0

Detailed Load Components

Power:		Owner	Height (ft)	Horiz. Offset (in)	Cable Dia. (in)	Rotate Angle (deg)	Cable Weight (lbs/ft)	Lead/Span Length	Span Angle (deg)	Wire Length (ft)	Tension (lbs)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Primary	636 AAC	NVE	42.58	54.33	0.9180	-	0.596	186.0	90.0	186.0	2,204	4,328	-375	6,819	10,773
Primary	636 AAC	NVE	42.58	54.33	0.9180	-	0.596	114.0	270.0	114.0	2,204	-4,328	-230	4,180	-379
Primary	636 AAC	NVE	42.58	18.97	0.9180	-	0.596	186.0	90.0	186.0	2,204	4,328	-126	6,819	11,022
Primary	636 AAC	NVE	42.58	18.97	0.9180	-	0.596	114.0	270.0	114.0	2,204	-4,328	-77	4,180	-226
Primary	636 AAC	NVE	42.58	54.33	0.9180	-	0.596	186.0	90.0	186.0	2,204	4,328	373	6,819	11,521
Primary	636 AAC	NVE	42.58	54.33	0.9180	-	0.596	114.0	270.0	114.0	2,204	-4,328	229	4,180	80
Primary	336 AAC	NVE	42.58	18.97	0.6660	-	0.316	186.0	90.0	186.0	1,470	2,886	65	4,946	7,898
Primary	336 AAC	NVE	42.58	18.97	0.6660	-	0.316	114.0	270.0	114.0	1,470	-2,886	40	3,032	185
Other	288ct SELF SUPPORT	ZFS	23.80	8.19	0.8600	-	0.350	186.0	90.0	186.0	1,500	1,645	33	3,568	5,246
Other	288ct SELF SUPPORT	ZFS	23.80	8.19	0.8600	-	0.350	114.0	270.0	114.0	1,500	-1,645	20	2,187	562
Secondary	#2 AL TPX (SLACK)	NVE	31.10	7.35	0.6400	-	0.237	22.0	90.0	22.0	500	717	0	410	1,127
											Totals:	717	-47	47,139	47,809

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 3, 48ct X 2 1/4" MESS	COX	22.50	8.30	1.6500	-	1.053	186.0	90.0	186.2	1,500	1,555	102	6,471	8,128
CATV	.50"cx X 3, 48ct X 2 1/4" MESS	COX	22.50	8.30	1.6500	-	1.053	114.0	270.0	114.0	1,500	-1,555	62	3,966	2,473
Telco	1.25" 144ct 1/4"MESS	CTL	21.20	8.41	1.9900	-	1.600	186.0	90.0	186.4	1,500	1,465	156	7,354	8,975
Telco	1.25" 144ct 1/4"MESS	CTL	21.20	8.41	1.9900	-	1.600	114.0	270.0	114.6	1,500	-1,465	96	4,507	3,137
Telco	2.0" 3/8" MESS	CTL	19.70	8.53	2.3800	-	2.000	186.0	90.0	186.6	1,500	1,362	198	8,173	9,733
Telco	2.0" 3/8" MESS	CTL	19.70	8.53	2.3800	-	2.000	114.0	270.0	114.9	1,500	-1,362	122	5,009	3,769
											Totals:	0	736	35,480	36,215

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	37KVA	NVE	31.10	20.10	270.0	270.0	492.00	28.00	-	18.00	-	-	-35	2,448	2,414

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

² Worst Wind per Guy Wire
³ Wind at 180.0°

											Totals:	0	-35	2,448	2,414

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	41.60	5.99	270.0	270.0	66.00	4.50	3.50	-	120.00	-	-1	164	162
											Totals:	0	-1	164	162

Riser:		Owner	Height (ft)	Horiz. Offset (in)	Offset Angle (deg)	Rotate Angle (deg)	Unit Weight (lbs)	Unit Height (in)	Unit Depth (in)	Unit Diameter (in)	Unit Length (in)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
2" Riser 90.0°	2" Riser	NVE	29.20	8.15	90.0	90.0	2.19	350.40	-	0.00	-	-	0	2,450	2,451
											Totals:	0	0	2,450	2,451

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	41.79	54.00	353.7	0.0	10.00	9.50	-	7.50	-	-	-68	467	400
Pin	Pin Insulator - 15 kV	NVE	41.79	18.00	341.6	0.0	10.00	9.50	-	7.50	-	-	-23	467	445
Pin	Pin Insulator - 15 kV	NVE	41.79	-54.00	186.3	0.0	10.00	9.50	-	7.50	-	-	67	467	535
Pin	Pin Insulator - 15 kV	NVE	41.79	-18.00	198.4	0.0	10.00	9.50	-	7.50	-	-	22	467	490
Bolt	Three Bolt	ZFS	23.80	5.69	180.0	90.0	5.00	0.00	-	3.00	-	-	5	0	5
Bolt	Three Bolt	COX	22.50	5.80	180.0	90.0	5.00	0.00	-	3.00	-	-	5	0	5
Bolt	Three Bolt	CTL	21.20	5.91	180.0	90.0	5.00	0.00	-	3.00	-	-	5	0	5
Bolt	Three Bolt	CTL	19.70	6.03	180.0	90.0	5.00	0.00	-	3.00	-	-	5	0	5
Spool	Spool Insulator - 20 kV	NVE	31.10	5.10	90.0	0.0	1.00	2.12	-	2.50	-	-	0	26	26
											Totals:	0	20	1,895	1,915

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	Span/Head	CTL	21.20	21.20	186.00	0.312	75.0	90.0	0.0	0.205	184.70	0.00
Guy 2: EHS 5/16	Span/Head	CTL	21.20	21.20	114.00	0.312	75.0	270.0	0.0	0.205	113.45	1.02

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	Span/Head	23,000,000	11,200	0.90	10,080	700	155	0	0	0	0	0	1,152
Guy 2: EHS 5/16	Span/Head	23,000,000	11,200	0.90	10,080	700	2,126	991	991	0	991	-28	118
									Totals:	0	991	-28	1,270

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] (%)
Anchor	CTL	30.00	186.00	90.0	20,000	1.00	20,000	155	0	0.8
Anchor	CTL	30.00	114.00	270.0	20,000	1.00	20,000	2,126	991	10.6

Pole Buckling

Buckling [illegible]	Buckling [illegible] (ft)	Buckling Section [illegible] (% Buckling Col. Hgt.)	Buckling [illegible] (in)	Min. Buckling [illegible] (in)	Diameter [illegible] (in)	Diameter [illegible] (in)	Modulus of [illegible] (psi)	Pole [illegible] (pcf)	Ice Density (pcf)	Pole Tip [illegible] (ft)	Buckling Load [illegible] (lbs)	Buckling Load [illegible] (lbs)	Buckling Load [illegible]
0.71	24.96	34.00	13.89	13.10	7.96	15.29	1,000,000	50.00	57.00	44.80	261,381	5,157	50.68

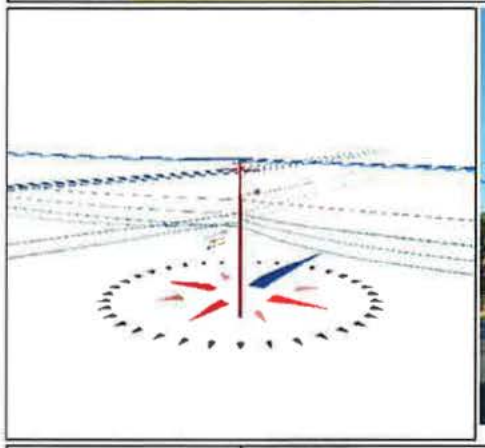
Version: 4.2 / 4.06
* Includes Load Factor(s)

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

O-Calc® Pro *Analysis Report*

Wednesday, November 05, 2014 3:18:58 PM

File Name:	P27885 GRADE B	Pole Length / Class:	45 / 3	Code:	NESC	Structure Type:	Guyed
Pole Num:	P27885	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	NELLIS & TROPICANA	G/L Circumference (in):	43.00	Loading District:	Light	Transverse Wind LF:	2.50
Aux Data	O/B 144CT	G/L Fiber Stress (psi):	6,000	Ice Thickness (in):	0.00	Wire Tension LF:	1.65
Aux Data	Unset	Allowable Stress (psi):	3,900	Wind Speed (mph):	59.29	Vertical LF:	1.50
Aux Data	Unset	Fiber Stress Ht. Reduction:	No	Wind Pressure (psf):	9.00		



Pole Capacity Utilization		Height	Wind Angle
Maximum:	160.1%	0.0 ft	178.6°
Groundline:	160.1%	0.0 ft	178.6°
Vertical:	2.5%	24.2 ft	20.0°

Pole Moments		Load Angle	Wind Angle
Max Capac. Util:	130,009 ft-lb	181.7°	178.6°
Groundline:	130,009 ft-lb	181.7°	178.6°

Guy Summary		Guy Tensions		Maximum Guy Tensions	
	Attach Height (ft)	% Allowable Tension	Wind Angle	% Allowable Tension	Wind Angle
Guy 1	35.0	0.0%	178.6°	18.7%	0.0°
Guy 2	22.4	0.0%	178.6°	0.0%	0.0°
Guy 3	21.3	28.0%	178.6°	49.5%	320.0°
Guy 4	21.2	0.0%	178.6°	23.4%	350.0°

Anchor Summary		
	Lead Length (ft)	Max. % Allow. Capacity
Anchor 1	114.0	24.9%
Anchor 2	203.0	0.0%
Anchor 3	96.0	17.4%

GROUNDLINE LOAD SUMMARY:*Wind at 178.6°, Applied Moment 130,009 ft-lb at 181.7°, Allowable Moment 81,816 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:	1,868	41.7	70,708	8.8	13.9	3,370	672	5	3,375	86.5

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

* Worst Wind per Guy Wire
* Wind at 178.6°

Comms:	1,434	32.0	31,217	1.6	2.5	1,488	1,218	8	1,496	38.4
Guys/Braces:	1	0.0	108	-0.9	-1.4	5	39	0	5	0.1
Pole:	753	16.8	12,967	10.0	15.8	618	1,782	12	630	16.2
Crossarms:	274	6.1	9,720	0.1	0.2	463	297	2	465	11.9
Streetlights:	64	1.4	1,893	1.5	2.3	90	68	0	91	2.3
Insulators:	92	2.1	3,396	0.4	0.6	162	136	1	163	4.2
Pole Load:	4,486	100.0	130,009	100.0	158.9	6,197	4,212	29	6,226	159.6
Pole Reserve Capacity:			-48,193		-58.9	-2,297			-2,326	-59.6

LOAD SUMMARY BY OWNER

NVE:	2,045	79,451	3,787	1,050	7	3,794	97.3
ZFS:	255	6,338	302	91	1	303	7.8
COX:	246	5,983	285	237	2	287	7.4
CTL:	1,186	25,272	1,205	1,052	7	1,212	31.1
Pole:	753	12,967	618	1,782	12	630	16.2
Totals	4,486	130,009	6,197	4,212	29	6,226	159.6

Detailed Load Components

Power:		Owner	Height (ft)	Horiz. Offset (in)	Cable Dia. (in)	Rotate Angle (deg)	Cable Weight (lbs/ft)	Lead/Span Length	Span Angle (deg)	Wire Length (ft)	Tension (lbs)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Primary	636 AAC	NVE	38.58	54.28	0.9180	-	0.596	203.0	270.0	203.0	2,204	4,249	407	6,742	11,397
Primary	636 AAC	NVE	38.58	54.28	0.9180	-	0.596	114.0	90.0	114.0	2,204	-4,249	229	3,786	-234
Primary	636 AAC	NVE	38.58	18.81	0.9180	-	0.596	203.0	270.0	203.0	2,204	4,249	-137	6,742	10,853
Primary	636 AAC	NVE	38.58	18.81	0.9180	-	0.596	114.0	90.0	114.0	2,204	-4,249	-77	3,786	-540
Primary	636 AAC	NVE	38.58	54.28	0.9180	-	0.596	203.0	270.0	203.0	2,204	4,249	-409	6,742	10,581
Primary	636 AAC	NVE	38.58	54.28	0.9180	-	0.596	114.0	90.0	114.0	2,204	-4,249	-230	3,786	-693
Primary	336 AAC	NVE	38.58	18.81	0.6660	-	0.316	203.0	270.0	203.0	1,470	2,833	71	4,890	7,794
Primary	336 AAC	NVE	38.58	18.81	0.6660	-	0.316	114.0	90.0	114.0	1,470	-2,833	40	2,746	-47
Secondary	#2 AL TPX (SLACK)	NVE	28.50	6.73	0.6400	-	0.237	125.0	0.0	125.0	500	-23,502	-12	-2	-23,516
Other	288ct SELF SUPPORT	ZFS	24.60	7.30	0.8600	-	0.350	114.0	90.0	114.0	1,500	-1,842	18	2,259	436
Other	288ct SELF SUPPORT	ZFS	24.60	7.30	0.8600	-	0.350	203.0	270.0	203.0	1,500	1,842	32	4,023	5,898
Primary	4 AAC	NVE	35.41	57.05	0.2320	-	0.039	125.0	0.0	125.0	282	-16,468	0	-1	-16,469
Primary	4 AAC	NVE	35.41	57.05	0.2320	-	0.039	125.0	0.0	125.0	282	-16,468	0	-1	-16,469
Primary	4 AAC	NVE	35.41	18.39	0.2320	-	0.039	125.0	0.0	125.0	282	-16,468	-1	-1	-16,469
Primary	2 AAC	NVE	35.41	52.68	0.2920	-	0.062	96.0	200.0	96.0	460	25,520	0	106	25,627
Primary	2 AAC	NVE	35.41	60.96	0.2920	-	0.062	96.0	200.0	96.0	460	25,520	0	106	25,627
Primary	2 AAC	NVE	35.41	36.85	0.2920	-	0.062	96.0	200.0	96.0	460	25,520	1	106	25,627
Primary	4 AAC	NVE	35.69	26.34	0.2320	-	0.039	96.0	200.0	96.0	282	15,769	1	85	15,855
Secondary	TRIPLEX 4 AWG	NVE	27.10	6.84	0.6800	-	0.164	114.0	90.0	114.0	585	-791	-8	1,968	1,169
Secondary	TRIPLEX 4 AWG	NVE	27.10	6.84	0.6800	-	0.164	203.0	270.0	203.0	585	791	-14	3,504	4,282
											Totals:	19,424	-90	51,374	70,708

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 3, 48ct X 2 1/4" MESS	COX	23.70	7.37	1.4800	-	0.922	114.0	90.0	114.2	1,500	-1,775	48	3,746	2,020
CATV	.50"cx, 48ct X 2 1/4" MESS	COX	23.70	7.37	1.0600	-	0.622	203.0	270.0	203.1	1,500	1,775	58	4,777	6,610
CATV	.50"cx 1/4" MESS	COX	23.70	7.37	0.7500	-	0.271	125.0	0.0	125.0	1,500	-58,631	16	-2	-58,617
CATV	.50"cx X 2 1/4" MESS	COX	23.70	7.37	1.0000	-	0.428	96.0	200.0	96.0	1,500	55,702	19	244	55,965
Telco	1.25" 144ct 1/4"MESS	CTL	22.40	7.48	1.9900	-	1.600	114.0	90.0	114.7	1,500	-1,677	85	4,760	3,168
Telco	2.0" 3/8" MESS	CTL	20.20	7.66	2.3800	-	2.000	114.0	90.0	115.1	1,500	-1,513	109	5,134	3,731
Telco	2.0" 3/8" MESS	CTL	20.20	7.66	2.3800	-	2.000	203.0	270.0	203.1	1,500	1,513	194	9,143	10,849
Telco	1.25" 144ct 5/16"MESS	CTL	21.30	7.57	1.9900	-	1.750	203.0	270.0	203.6	1,500	1,595	168	8,061	9,824
Telco	1.0" 5/16" MESS	CTL	21.20	7.58	1.3100	-	1.000	96.0	200.0	96.0	1,500	49,826	1	286	50,113
Telco	.25" 5/16" MESS	CTL	21.20	7.58	0.6300	-	0.402	125.0	360.0	125.0	1,500	-52,446	1	-1	-52,446
											Totals:	-5,631	700	36,148	31,217

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	37.60	5.47	90.0	90.0	66.00	4.50	3.50	-	120.00	-	-1	144	143
Normal	CROSSARM 3-1/2 X 4-1/2 X 10 -	NVE	35.50	5.64	0.0	0.0	66.00	4.50	3.50	-	120.00	-	0	9,578	9,578
											Totals:	0	-1	9,722	9,720

Streetlight:		Owner	Height (ft)	Horiz. Offset (in)	Offset Angle (deg)	Rotate Angle (deg)	Unit Weight (lbs)	Unit Height (in)	Unit Depth (in)	Unit Diameter (in)	Unit Length (in)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
General	Streetlight - 3 ft. Arm	NVE	27.70	4.54	45.0	45.0	45.00	0.00	-	0.00	-	-	130	1,763	1,893
											Totals:	0	130	1,763	1,893

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	37.79	54.00	174.2	0.0	10.00	9.50	-	7.50	-	-	67	422	490
Pin	Pin Insulator - 15 kV	NVE	37.79	-18.00	16.9	0.0	10.00	9.50	-	7.50	-	-	-23	422	400
Pin	Pin Insulator - 15 kV	NVE	37.79	-54.00	5.8	0.0	10.00	9.50	-	7.50	-	-	-68	422	355
Pin	Pin Insulator - 15 kV	NVE	37.79	18.00	163.1	0.0	10.00	9.50	-	7.50	-	-	22	422	445
Spool	Spool Insulator - 20 kV	NVE	28.50	4.48	0.0	270.0	1.00	2.12	-	2.50	-	-	-1	24	23
Bolt	Three Bolt	ZFS	24.60	4.80	180.0	90.0	5.00	0.00	-	3.00	-	-	5	0	5
Bolt	Three Bolt	COX	23.70	4.87	180.0	90.0	5.00	0.00	-	3.00	-	-	5	0	5
Bolt	Three Bolt	CTL	22.40	4.98	180.0	90.0	5.00	0.00	-	3.00	-	-	5	0	5
Bolt	Three Bolt	CTL	20.20	5.16	180.0	90.0	5.00	0.00	-	3.00	-	-	5	0	5
Deadend	Deadend Insulator - 15 kV	NVE	35.50	54.00	84.0	0.0	3.00	12.75	-	3.80	-	-	-8	268	261
Deadend	Deadend Insulator - 15 kV	NVE	35.50	-54.00	276.0	0.0	3.00	12.75	-	3.80	-	-	-6	268	262
Deadend	Deadend Insulator - 15 kV	NVE	35.50	0.00	0.0	0.0	3.00	12.75	-	3.80	-	-	-7	268	261
Deadend	Deadend Insulator - 15 kV	NVE	35.50	54.00	96.0	200.0	3.00	12.75	-	3.80	-	-	6	268	274
Deadend	Deadend Insulator - 15 kV	NVE	35.50	-54.00	264.0	200.0	3.00	12.75	-	3.80	-	-	7	268	276
Deadend	Deadend Insulator - 15 kV	NVE	35.50	-28.00	258.6	200.0	3.00	12.75	-	3.80	-	-	7	268	275
Spool	Spool Insulator - 20 kV	NVE	35.69	28.00	101.4	200.0	1.00	2.12	-	2.50	-	-	1	29	30
Spool	Spool Insulator - 20 kV	NVE	27.10	4.59	0.0	270.0	1.00	2.12	-	2.50	-	-	-1	22	22
Bolt	Three Bolt	CTL	21.30	5.07	180.0	90.0	5.00	0.00	-	3.00	-	-	5	0	5
Bolt	Three Bolt	CTL	21.20	5.08	270.0	180.0	5.00	0.00	-	3.00	-	-	0	0	0
											Totals:	0	21	3,375	3,396

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

² Worst Wind per Guy Wire
³ Wind at 178.6°

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	NVE	35.00	35.00	96.00	0.250	75.0	200.0	0.0	0.121	99.68	0.00
Guy 2: EHS 1/4	Span/Head	CTL	22.40	22.40	203.00	0.250	75.0	270.0	0.0	0.121	201.73	0.00
Guy 3: EHS 5/16	Span/Head	CTL	21.30	21.30	114.00	0.312	75.0	90.0	0.0	0.205	113.47	2.91
Guy 4: EHS 5/16	Span/Head	CTL	21.20	21.20	96.00	0.312	75.0	200.0	0.0	0.205	95.81	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 1/4	Span/Head	23,000,000	6,650	0.90	5,985	700	1,118	0	0	0	0	0	90
Guy 2: EHS 1/4	Span/Head	23,000,000	6,650	0.90	5,985	700		0	0	0	0	0	1,063
Guy 3: EHS 5/16	Span/Head	23,000,000	11,200	0.90	10,080	700	4,988	2,826	2,826	0	2,826	-85	-1,113
Guy 4: EHS 5/16	Span/Head	23,000,000	11,200	0.90	10,080	700	2,358	0	0	0	0	0	68
									Totals:	0	2,826	-85	108

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	114.00	90.0	20,000	1.00	20,000	4,988	2,826	24.9
Anchor	CTL	30.00	203.00	270.0	20,000	1.00	20,000		0	0.0
Anchor	NVE	30.00	96.00	200.0	20,000	1.00	20,000	3,477	0	17.4

Pole Buckling

Buckling	Buckling (ft)	Buckling Section (% Buckling Col. Hgt.)	Buckling (in)	Min. Buckling (in)	Diameter (in)	Diameter (in)	Modulus of (psi)	Pole (pcf)	Ice Density (pcf)	Pole Tip (ft)	Buckling Load (lbs)	Buckling Load (lbs)	Buckling Load
0.71	24.23	34.41	12.30	11.56	7.32	13.69	1,000,000	50.00	57.00	38.30	170,608	4,212	40.50

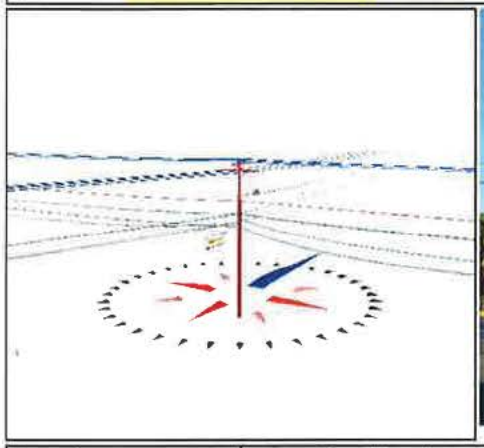
Version: 4.2 / 4.06
* includes Load Factor(s)

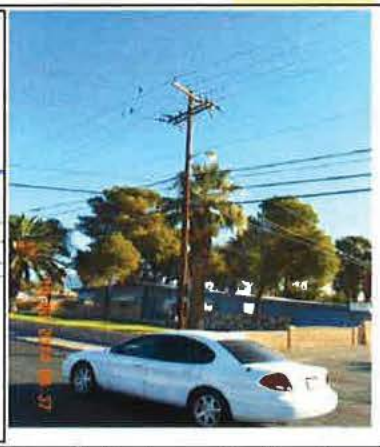
[2] Worst Wind per Guy Wire
[3] Wind at 178.6°

O-Calc® Pro *Analysis Report*

Wednesday, November 05, 2014 3:19:43 PM

File Name:	P27885 GRADE B	Pole Length / Class:	45 / 3	Code:	NESC	Structure Type:	Guyed
Pole Num:	P27885	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	NELLIS & TROPICANA	G/L Circumference (in):	43.00	Loading District:	Light	Transverse Wind LF:	2.50
Aux Data	O/B 144CT	G/L Fiber Stress (psi):	6,000	Ice Thickness (in):	0.00	Wire Tension LF:	1.65
Aux Data	Unset	Allowable Stress (psi):	3,900	Wind Speed (mph):	59.29	Vertical LF:	1.50
Aux Data	Unset	Fiber Stress Ht. Reduction:	No	Wind Pressure (psf):	9.00		





Pole Capacity Utilization		Height	Wind Angle
Maximum:	161.7%	0.0 ft	178.6°
Groundline:	161.7%	0.0 ft	178.6°
Vertical:	2.5%	24.2 ft	20.0°

Pole Moments		Load Angle	Wind Angle
Max Capac. Util:	131,404 ft-lb	181.7°	178.6°
Groundline:	131,404 ft-lb	181.7°	178.6°

Guy Summary		Guy Tensions		Maximum Guy Tensions	
	Attach Height (ft)	% Allowable Tension	Wind Angle	% Allowable Tension	Wind Angle
Guy 1	35.0	0.0%	178.6°	18.8%	0.0°
Guy 2	22.4	0.0%	178.6°	0.0%	0.0°
Guy 3	21.3	28.0%	178.6°	49.6%	320.0°
Guy 4	21.2	0.0%	178.6°	23.7%	0.0°

Anchor Summary		
	Lead Length (ft)	Max. % Allow. Capacity
Anchor 1	114.0	25.0%
Anchor 2	203.0	0.0%
Anchor 3	96.0	17.5%

GROUNDLINE LOAD SUMMARY:*Wind at 178.6°, Applied Moment 131,404 ft-lb at 181.7°, Allowable Moment 81,816 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:	1,868	41.1	70,692	8.6	13.8	3,370	672	5	3,374	86.5

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

² Worst Wind per Guy Wire
³ Wind at 178.6°

Comms:	1,491	32.8	32,595	1.9	3.0	1,554	1,248	8	1,562	40.1
Guys/Braces:	2	0.1	139	-0.8	-1.3	7	39	0	7	0.2
Pole:	753	16.6	12,967	9.9	15.8	618	1,782	12	630	16.2
Crossarms:	274	6.0	9,721	0.1	0.2	463	297	2	465	11.9
Streetlights:	64	1.4	1,893	1.4	2.3	90	68	0	91	2.3
Insulators:	92	2.0	3,396	0.4	0.6	162	136	1	163	4.2
Pole Load:	4,544	100.0	131,404	100.0	160.6	6,264	4,242	29	6,293	161.3
Pole Reserve Capacity:			-49,588		-60.6	-2,364			-2,393	-61.3

LOAD SUMMARY BY OWNER

NVE:	2,045	79,435	3,787	1,050	7	3,794	97.3
ZFS:	255	6,338	302	91	1	303	7.8
COX:	304	7,368	351	267	2	353	9.1
CTL:	1,187	25,296	1,206	1,052	7	1,213	31.1
Pole:	753	12,967	618	1,782	12	630	16.2
Totals	4,544	131,404	6,264	4,242	29	6,293	161.3

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	636 AAC	NVE	38.58	54.28	0.9180	-	0.596	203.0	270.0	203.0	2,204	4,174	407	6,742	11,323
Primary	636 AAC	NVE	38.58	54.28	0.9180	-	0.596	114.0	90.0	114.0	2,204	-4,174	229	3,786	-160
Primary	636 AAC	NVE	38.58	18.81	0.9180	-	0.596	203.0	270.0	203.0	2,204	4,174	-137	6,742	10,779
Primary	636 AAC	NVE	38.58	18.81	0.9180	-	0.596	114.0	90.0	114.0	2,204	-4,174	-77	3,786	-465
Primary	636 AAC	NVE	38.58	54.28	0.9180	-	0.596	203.0	270.0	203.0	2,204	4,174	-409	6,742	10,506
Primary	636 AAC	NVE	38.58	54.28	0.9180	-	0.596	114.0	90.0	114.0	2,204	-4,174	-230	3,786	-618
Primary	336 AAC	NVE	38.58	18.81	0.6660	-	0.316	203.0	270.0	203.0	1,470	2,783	71	4,890	7,744
Primary	336 AAC	NVE	38.58	18.81	0.6660	-	0.316	114.0	90.0	114.0	1,470	-2,783	40	2,746	3
Secondary	#2 AL TPX (SLACK)	NVE	28.50	6.73	0.6400	-	0.237	125.0	0.0	125.0	500	-23,502	-12	-2	-23,516
Other	288ct SELF SUPPORT	ZFS	24.60	7.30	0.8600	-	0.350	114.0	90.0	114.0	1,500	-1,810	18	2,259	468
Other	288ct SELF SUPPORT	ZFS	24.60	7.30	0.8600	-	0.350	203.0	270.0	203.0	1,500	1,810	32	4,023	5,865
Primary	4 AAC	NVE	35.41	57.05	0.2320	-	0.039	125.0	0.0	125.0	282	-16,468	0	-1	-16,469
Primary	4 AAC	NVE	35.41	57.05	0.2320	-	0.039	125.0	0.0	125.0	282	-16,468	0	-1	-16,469
Primary	4 AAC	NVE	35.41	18.39	0.2320	-	0.039	125.0	0.0	125.0	282	-16,468	-1	-1	-16,470
Primary	2 AAC	NVE	35.41	52.68	0.2920	-	0.062	96.0	200.0	96.0	460	25,516	0	107	25,623
Primary	2 AAC	NVE	35.41	60.96	0.2920	-	0.062	96.0	200.0	96.0	460	25,516	0	107	25,623
Primary	2 AAC	NVE	35.41	36.85	0.2920	-	0.062	96.0	200.0	96.0	460	25,516	1	107	25,623
Primary	4 AAC	NVE	35.69	26.34	0.2320	-	0.039	96.0	200.0	96.0	282	15,766	1	85	15,852
Secondary	TRIPLEX 4 AWG	NVE	27.10	6.84	0.6800	-	0.164	114.0	90.0	114.0	585	-777	-8	1,968	1,183
Secondary	TRIPLEX 4 AWG	NVE	27.10	6.84	0.6800	-	0.164	203.0	270.0	203.0	585	777	-14	3,504	4,268
											Totals:	19,407	-90	51,375	70,692

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 3, 48ct X 2 1/4" MESS	COX	23.70	7.37	1.6500	-	1.053	114.0	90.0	114.0	1,500	-1,743	55	4,176	2,488
CATV	.50"cx, 48ct X 2 1/4" MESS PROP	COX	23.70	7.37	1.2700	-	0.746	203.0	270.0	203.1	1,500	1,743	70	5,724	7,537
CATV	.50"cx 1/4" MESS	COX	23.70	7.37	0.7500	-	0.271	125.0	0.0	125.0	1,500	-58,632	16	-2	-58,617
CATV	.50"cx X 2 1/4" MESS	COX	23.70	7.37	1.0000	-	0.428	96.0	200.0	96.0	1,500	55,692	19	244	55,955
Telco	1.25" 144ct 1/4"MESS	CTL	22.40	7.48	1.9900	-	1.600	114.0	90.0	114.7	1,500	-1,648	85	4,761	3,198
Telco	2.0" 3/8" MESS	CTL	20.20	7.66	2.3800	-	2.000	114.0	90.0	115.1	1,500	-1,486	109	5,134	3,758
Telco	2.0" 3/8" MESS	CTL	20.20	7.66	2.3800	-	2.000	203.0	270.0	203.1	1,500	1,486	194	9,143	10,823
Telco	1.25" 144ct 5/16"MESS	CTL	21.30	7.57	1.9900	-	1.750	203.0	270.0	203.6	1,500	1,567	168	8,061	9,796
Telco	1.0" 5/16" MESS	CTL	21.20	7.58	1.3100	-	1.000	96.0	200.0	96.0	1,500	49,817	1	286	50,105
Telco	.25" 5/16" MESS	CTL	21.20	7.58	0.6300	-	0.402	125.0	360.0	125.0	1,500	-52,447	1	-1	-52,447
											Totals:	-5,650	719	37,527	32,595

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	37.60	5.47	90.0	90.0	66.00	4.50	3.50	-	120.00	-	-1	144	143
Normal	CROSSARM 3-1/2 X 4-1/2 X 10 -	NVE	35.50	5.64	0.0	0.0	66.00	4.50	3.50	-	120.00	-	0	9,578	9,578
											Totals:	0	-1	9,722	9,721

Streetlight:		Owner	Height (ft)	Horiz. Offset (in)	Offset Angle (deg)	Rotate Angle (deg)	Unit Weight (lbs)	Unit Height (in)	Unit Depth (in)	Unit Diameter (in)	Unit Length (in)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
General	Streetlight - 3 ft. Arm	NVE	27.70	4.54	45.0	45.0	45.00	0.00	-	0.00	-	-	130	1,763	1,893
											Totals:	0	130	1,763	1,893

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	37.79	54.00	174.2	0.0	10.00	9.50	-	7.50	-	-	67	422	490
Pin	Pin Insulator - 15 kV	NVE	37.79	-18.00	16.9	0.0	10.00	9.50	-	7.50	-	-	-23	422	400
Pin	Pin Insulator - 15 kV	NVE	37.79	-54.00	5.8	0.0	10.00	9.50	-	7.50	-	-	-68	422	355
Pin	Pin Insulator - 15 kV	NVE	37.79	18.00	163.1	0.0	10.00	9.50	-	7.50	-	-	22	422	445
Spool	Spool Insulator - 20 kV	NVE	28.50	4.48	0.0	270.0	1.00	2.12	-	2.50	-	-	-1	24	23
Bolt	Three Bolt	ZFS	24.60	4.80	180.0	90.0	5.00	0.00	-	3.00	-	-	5	0	5
Bolt	Three Bolt	COX	23.70	4.87	180.0	90.0	5.00	0.00	-	3.00	-	-	5	0	5
Bolt	Three Bolt	CTL	22.40	4.98	180.0	90.0	5.00	0.00	-	3.00	-	-	5	0	5
Bolt	Three Bolt	CTL	20.20	5.16	180.0	90.0	5.00	0.00	-	3.00	-	-	5	0	5
Deadend	Deadend Insulator - 15 kV	NVE	35.50	54.00	84.0	0.0	3.00	12.75	-	3.80	-	-	-7	268	261
Deadend	Deadend Insulator - 15 kV	NVE	35.50	-54.00	276.0	0.0	3.00	12.75	-	3.80	-	-	-6	268	262
Deadend	Deadend Insulator - 15 kV	NVE	35.50	0.00	0.0	0.0	3.00	12.75	-	3.80	-	-	-7	268	261
Deadend	Deadend Insulator - 15 kV	NVE	35.50	54.00	96.0	200.0	3.00	12.75	-	3.80	-	-	6	268	274
Deadend	Deadend Insulator - 15 kV	NVE	35.50	-54.00	264.0	200.0	3.00	12.75	-	3.80	-	-	7	268	276
Deadend	Deadend Insulator - 15 kV	NVE	35.50	-28.00	258.6	200.0	3.00	12.75	-	3.80	-	-	7	268	275
Spool	Spool Insulator - 20 kV	NVE	35.69	28.00	101.4	200.0	1.00	2.12	-	2.50	-	-	1	29	30
Spool	Spool Insulator - 20 kV	NVE	27.10	4.59	0.0	270.0	1.00	2.12	-	2.50	-	-	-1	22	22
Bolt	Three Bolt	CTL	21.30	5.07	180.0	90.0	5.00	0.00	-	3.00	-	-	5	0	5
Bolt	Three Bolt	CTL	21.20	5.08	270.0	180.0	5.00	0.00	-	3.00	-	-	0	0	0
											Totals:	0	21	3,375	3,396

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

² Worst Wind per Guy Wire
³ Wind at 178.6°

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	NVE	35.00	35.00	96.00	0.250	75.0	200.0	0.0	0.121	99.68	0.00
Guy 2: EHS 1/4	Span/Head	CTL	22.40	22.40	203.00	0.250	75.0	270.0	0.0	0.121	201.73	0.00
Guy 3: EHS 5/16	Span/Head	CTL	21.30	21.30	114.00	0.312	75.0	90.0	0.0	0.205	113.47	2.91
Guy 4: EHS 5/16	Span/Head	CTL	21.20	21.20	96.00	0.312	75.0	200.0	0.0	0.205	95.81	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 1/4	Span/Head	23,000,000	6,650	0.90	5,985	700	1,124	0	0	0	0	0	90
Guy 2: EHS 1/4	Span/Head	23,000,000	6,650	0.90	5,985	700		0	0	0	0	0	1,063
Guy 3: EHS 5/16	Span/Head	23,000,000	11,200	0.90	10,080	700	5,003	2,827	2,827	0	2,827	-84	-1,082
Guy 4: EHS 5/16	Span/Head	23,000,000	11,200	0.90	10,080	700	2,385	0	0	0	0	0	68
									Totals:	0	2,827	-84	139

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	114.00	90.0	20,000	1.00	20,000	5,003	2,827	25.0
Anchor	CTL	30.00	203.00	270.0	20,000	1.00	20,000		0	0.0
Anchor	NVE	30.00	96.00	200.0	20,000	1.00	20,000	3,509	0	17.5

Pole Buckling

Buckling	Buckling (ft)	Buckling Section (% Buckling Col. Hgt.)	Buckling (in)	Min. Buckling (in)	Diameter (in)	Diameter (in)	Modulus of (psi)	Pole (pcf)	Ice Density (pcf)	Pole Tip (ft)	Buckling Load (lbs)	Buckling Load (lbs)	Buckling Load
0.71	24.23	34.41	12.30	11.60	7.32	13.69	1,000,000	50.00	57.00	38.30	170,674	4,242	40.23

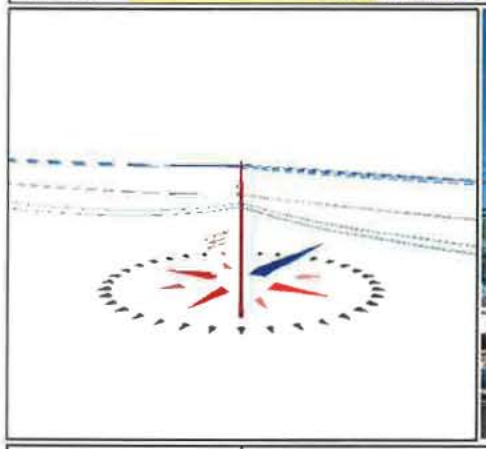
Version: 4.2 / 4.06
* includes Load Factor(s)

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

O-Calc® Pro *Analysis Report*

Wednesday, November 05, 2014 3:22:06 PM

File Name:	P27884 GRADE B	Pole Length / Class:	45 / 2	Code:	NESC	Structure Type:	Guyed
Pole Num:	P27884	Pole Species:	WESTERN RED CEDAR	NESC Rule:	Rule 250B	Status:	N/A
Aux Data	COX	Setting Depth (ft):	10.30	Construction Grade:	B	Pole Strength Factor:	0.65
Aux Data	NELLIS & TROPICANA	G/L Circumference (in):	45.00	Loading District:	Light	Transverse Wind LF:	2.50
Aux Data	O/B 144CT	G/L Fiber Stress (psi):	6,000	Ice Thickness (in):	0.00	Wire Tension LF:	1.65
Aux Data	Unset	Allowable Stress (psi):	3,900	Wind Speed (mph):	59.29	Vertical LF:	1.50
Aux Data	Unset	Fiber Stress Ht. Reduction:	No	Wind Pressure (psf):	9.00		



Pole Capacity Utilization		Height	Wind Angle
Maximum:	130.1%	0.0 ft	180.0°
Groundline:	130.1%	0.0 ft	180.0°
Vertical:	1.8%	22.5 ft	0.0°

Pole Moments		Load Angle	Wind Angle
Max Capac. Util:	121,383 ft-lb	179.9°	180.0°
Groundline:	121,383 ft-lb	179.9°	180.0°

Guy Summary		Guy Tensions		Maximum Guy Tensions	
	Attach Height (ft)	% Allowable Tension	Wind Angle	% Allowable Tension	Wind Angle
Guy 1	24.0	1.2%	180.0°	9.1%	270.0°
Guy 2	24.0	0.9%	180.0°	8.5%	90.0°

Anchor Summary		
	Lead Length (ft)	Max. % Allow. Capacity
Anchor 1	203.0	2.7%
Anchor 2	221.0	2.5%

GROUNDLINE LOAD SUMMARY:*Wind at 180.0°, Applied Moment 121,383 ft-lb at 179.9°, 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:	1,701	36.0	54,859	3.7	4.8	2,282	780	5	2,286	58.6
Comms:	2,131	45.1	50,338	7.4	9.6	2,094	1,390	9	2,102	53.9
Guys/Braces:	99	2.1	2,381	0.9	1.2	99	26	0	99	2.5
Pole:	725	15.3	11,378	9.4	12.1	473	1,810	11	484	12.4

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

² Worst Wind per Guy Wire
³ Wind at 180.0°

Crossarms:	12	0.2	374	0.1	0.1	16	141	1	16	0.4
Insulators:	61	1.3	2,052	0.2	0.3	85	66	0	86	2.2
Pole Load:	4,728	100.0	121,383	100.0	129.4	5,048	4,213	26	5,075	130.1
Pole Reserve Capacity:			-27,611		-29.4	-1,148			-1,175	-30.1

LOAD SUMMARY BY OWNER

NVE:	1,424	47,267	1,966	804	5	1,971	50.5
ZFS:	346	9,879	411	140	1	412	10.6
CTL:	1,808	41,525	1,727	1,233	8	1,735	44.5
COX:	425	11,333	471	226	1	473	12.1
Pole:	725	11,378	473	1,810	11	484	12.4
Totals	4,728	121,383	5,048	4,213	26	5,075	130.1

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	336 AAC	NVE	33.21	25.88	0.6660	-	0.316	221.0	270.0	221.0	1,470	-118	12	4,582	4,476
Primary	636 AAC	NVE	33.21	57.11	0.9180	-	0.596	221.0	270.0	221.0	2,204	-177	-32	6,316	6,107
Primary	636 AAC	NVE	33.21	54.44	0.9180	-	0.596	203.0	90.0	203.0	2,204	177	-31	5,802	5,948
Primary	636 AAC	NVE	33.21	25.88	0.9180	-	0.596	221.0	270.0	221.0	2,204	-177	-24	6,316	6,115
Primary	636 AAC	NVE	33.21	19.28	0.9180	-	0.596	203.0	90.0	203.0	2,204	177	-29	5,802	5,950
Primary	636 AAC	NVE	33.21	57.11	0.9180	-	0.596	221.0	270.0	221.0	2,204	-177	32	6,316	6,171
Primary	636 AAC	NVE	33.21	54.44	0.9180	-	0.596	203.0	90.0	203.0	2,204	177	31	5,802	6,010
Primary	336 AAC	NVE	33.21	19.28	0.6660	-	0.316	203.0	90.0	203.0	1,470	118	15	4,209	4,342
Other	288ct SELF SUPPORT	ZFS	27.94	21.26	0.8600	-	0.350	203.0	90.0	203.0	1,500	101	91	4,572	4,765
Other	288ct SELF SUPPORT	ZFS	27.94	21.26	0.8600	-	0.350	221.0	270.0	221.0	1,500	-101	99	4,978	4,976
											Totals:	0	165	54,694	54,859

Comm:		Owner	Height (ft)	Horiz. Offset (in)	Cable Dia. (in)	Rotate Angle (deg)	Cable Weight (lbs/ft)	Lead/Span Length	Span Angle (deg)	Wire Length (ft)	Tension (lbs)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Telco	1.25" 144ct 5/16"MESS	CTL	23.00	7.41	1.9900	-	1.750	203.0	90.0	203.6	1,500	83	165	8,711	8,959
Telco	1.25" 144ct 5/16"MESS	CTL	23.00	7.41	1.9900	-	1.750	221.0	270.0	221.8	1,500	-83	179	9,463	9,579
Telco	2.0" 5/16" MESS	CTL	22.00	7.49	2.3100	-	2.000	203.0	90.0	203.8	1,500	80	190	9,672	9,942
Telco	2.0" 5/16" MESS	CTL	22.00	7.49	2.3100	-	2.000	221.0	270.0	222.1	1,500	-80	207	10,529	10,656
CATV	.50"cx, 48ct X 2 1/4" MESS	COX	25.79	21.21	1.0600	-	0.622	203.0	90.0	203.1	1,500	94	162	5,202	5,457
CATV	.50"cx, 48ct X 2 1/4" MESS	COX	25.79	21.21	1.0600	-	0.622	221.0	270.0	221.1	1,500	-94	176	5,663	5,746
											Totals:	0	1,078	49,260	50,338

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	33.30	5.84	270.0	270.0	66.00	4.50	3.50	-	120.00	-	0	131	131
Offset	CROSSARM 3-1/2 X 4-1/2 X 2 -	ZFS	27.75	-5.63	90.0	90.0	14.00	4.50	3.50	-	24.00	-	16	109	126
Offset	CROSSARM 3-1/2 X 4-1/2 X 2 -	COX	25.60	-5.44	90.0	90.0	14.00	4.50	3.50	-	24.00	-	16	101	117
											Totals:	0	33	341	374

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

² Worst Wind per Guy Wire
³ Wind at 180.0°

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	33.30	-18.00	198.0	0.0	3.00	12.75	-	3.80	-	-	7	252	259
Deadend	Deadend Insulator - 15 kV	NVE	33.30	54.00	353.8	0.0	3.00	12.75	-	3.80	-	-	-20	252	232
Deadend	Deadend Insulator - 15 kV	NVE	33.30	54.00	353.8	180.0	3.00	12.75	-	3.80	-	-	-20	252	232
Deadend	Deadend Insulator - 15 kV	NVE	33.30	18.00	342.0	0.0	3.00	12.75	-	3.80	-	-	-7	252	245
Deadend	Deadend Insulator - 15 kV	NVE	33.30	18.00	342.0	180.0	3.00	12.75	-	3.80	-	-	-7	252	245
Deadend	Deadend Insulator - 15 kV	NVE	33.30	-54.00	166.2	0.0	3.00	12.75	-	3.80	-	-	20	252	272
Deadend	Deadend Insulator - 15 kV	NVE	33.30	-54.00	166.2	180.0	3.00	12.75	-	3.80	-	-	20	252	272
Deadend	Deadend Insulator - 15 kV	NVE	33.30	-18.00	198.0	180.0	3.00	12.75	-	3.80	-	-	7	252	259
Bolt	Three Bolt	CTL	23.00	4.91	180.0	90.0	5.00	0.00	-	3.00	-	-	5	0	5
Bolt	Three Bolt	CTL	22.00	4.99	180.0	90.0	5.00	0.00	-	3.00	-	-	5	0	5
Bolt	Three Bolt	ZFS	27.94	18.00	197.4	0.0	5.00	0.00	-	3.00	-	-	13	0	13
Bolt	Three Bolt	COX	25.79	18.00	196.8	0.0	5.00	0.00	-	3.00	-	-	13	0	13
												Totals:	0	35	2,017	2,052

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	24.00	24.00	203.00	0.250	75.0	90.0	0.0	0.121	201.91	0.20
Guy 2: EHS 1/4	Span/Head	CTL	24.00	24.00	221.00	0.250	75.0	270.0	0.0	0.121	219.80	0.16

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 1/4	Span/Head	23,000,000	6,650	0.90	5,985	700	547	70	70	0	70	0	1,142
Guy 2: EHS 1/4	Span/Head	23,000,000	6,650	0.90	5,985	700	507	52	52	0	52	0	1,239
									Totals:	0	122	0	2,381

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	203.00	90.0	20,000	1.00	20,000	547	70	2.7
Anchor	CTL	30.00	221.00	270.0	20,000	1.00	20,000	507	52	2.5

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	22.50	34.32	12.91	11.14	7.96	14.33	1,000,000	50.00	57.00	34.70	239,826	4,213	56.93

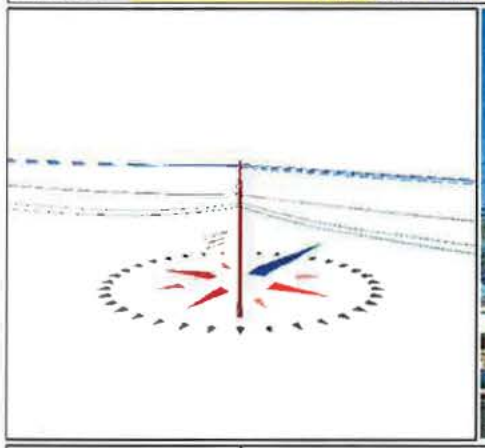
Version: 4 2 / 4 06
* includes Load Factor(s)

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

O-Calc® Pro *Analysis Report*

Wednesday, November 05, 2014 3:23:31 PM

File Name:	P27884 GRADE B	Pole Length / Class:	45 / 2	Code:	NESC	Structure Type:	Guyed
Pole Num:	P27884	Pole Species:	WESTERN RED CEDAR	NESC Rule:	Rule 250B	Status:	N/A
Aux Data	COX	Setting Depth (ft):	10.30	Construction Grade:	B	Pole Strength Factor:	0.65
Aux Data	NELLIS & TROPICANA	G/L Circumference (in):	45.00	Loading District:	Light	Transverse Wind LF:	2.50
Aux Data	O/B 144CT	G/L Fiber Stress (psi):	6,000	Ice Thickness (in):	0.00	Wire Tension LF:	1.65
Aux Data	Unset	Allowable Stress (psi):	3,900	Wind Speed (mph):	59.29	Vertical LF:	1.50
Aux Data	Unset	Fiber Stress Ht. Reduction:	No	Wind Pressure (psf):	9.00		



Pole Capacity Utilization		Height	Wind Angle
Maximum:	132.5%	0.0 ft	180.0°
Groundline:	132.5%	0.0 ft	180.0°
Vertical:	1.8%	22.5 ft	0.0°

Pole Moments		Load Angle	Wind Angle
Max Capac. Util:	123,603 ft-lb	179.9°	180.0°
Groundline:	123,603 ft-lb	179.9°	180.0°

Guy Summary		Guy Tensions		Maximum Guy Tensions	
	Attach Height (ft)	% Allowable Tension	Wind Angle	% Allowable Tension	Wind Angle
Guy 1	24.0	1.2%	180.0°	9.2%	270.0°
Guy 2	24.0	0.9%	180.0°	8.5%	90.0°

Anchor Summary		
	Lead Length (ft)	Max. % Allow. Capacity
Anchor 1	203.0	2.7%
Anchor 2	221.0	2.5%

GROUNDLINE LOAD SUMMARY:*Wind at 180.0°, Applied Moment 123,603 ft-lb at 179.9°, 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:	1,701	35.4	54,859	3.6	4.7	2,282	780	5	2,286	58.6
Comms:	2,214	46.0	52,558	7.3	9.6	2,186	1,430	9	2,195	56.3
Guys/Braces:	99	2.1	2,381	0.9	1.2	99	26	0	99	2.5
Pole:	725	15.1	11,378	9.2	12.1	473	1,810	11	484	12.4

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

² Worst Wind per Guy Wire
³ Wind at 180.0°

Crossarms:	12	0.2	374	0.1	0.1	16	141	1	16	0.4
Insulators:	61	1.3	2,052	0.2	0.3	85	66	0	86	2.2
Pole Load:	4,812	100.0	123,603	100.0	131.8	5,141	4,252	26	5,167	132.5
Pole Reserve Capacity:			-29,831		-31.8	-1,241			-1,267	-32.5

LOAD SUMMARY BY OWNER

NVE:	1,424	47,267	1,966	804	5	1,971	50.5
ZFS:	346	9,879	411	140	1	412	10.6
CTL:	1,808	41,526	1,727	1,233	8	1,735	44.5
COX:	509	13,553	564	266	2	565	14.5
Pole:	725	11,378	473	1,810	11	484	12.4
Totals	4,812	123,603	5,141	4,252	26	5,167	132.5

Detailed Load Components

Power:		Owner	Height (ft)	Horiz. Offset (in)	Cable Dia. (in)	Rotate Angle (deg)	Cable Weight (lbs/ft)	Lead/Span Length	Span Angle (deg)	Wire Length (ft)	Tension (lbs)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Primary	336 AAC	NVE	33.21	25.88	0.6660	-	0.316	221.0	270.0	221.0	1,470	-143	12	4,582	4,451
Primary	636 AAC	NVE	33.21	57.11	0.9180	-	0.596	221.0	270.0	221.0	2,204	-215	-32	6,316	6,069
Primary	636 AAC	NVE	33.21	54.44	0.9180	-	0.596	203.0	90.0	203.0	2,204	215	-31	5,802	5,986
Primary	636 AAC	NVE	33.21	25.88	0.9180	-	0.596	221.0	270.0	221.0	2,204	-215	-24	6,316	6,077
Primary	636 AAC	NVE	33.21	19.28	0.9180	-	0.596	203.0	90.0	203.0	2,204	215	-29	5,802	5,988
Primary	636 AAC	NVE	33.21	57.11	0.9180	-	0.596	221.0	270.0	221.0	2,204	-215	32	6,316	6,133
Primary	636 AAC	NVE	33.21	54.44	0.9180	-	0.596	203.0	90.0	203.0	2,204	215	31	5,802	6,048
Primary	336 AAC	NVE	33.21	19.28	0.6660	-	0.316	203.0	90.0	203.0	1,470	143	15	4,209	4,368
Other	288ct SELF SUPPORT	ZFS	27.94	21.26	0.8600	-	0.350	203.0	90.0	203.0	1,500	123	91	4,572	4,787
Other	288ct SELF SUPPORT	ZFS	27.94	21.26	0.8600	-	0.350	221.0	270.0	221.0	1,500	-123	99	4,978	4,954
											Totals:	0	165	54,694	54,859

Comm:		Owner	Height (ft)	Horiz. Offset (in)	Cable Dia. (in)	Rotate Angle (deg)	Cable Weight (lbs/ft)	Lead/Span Length	Span Angle (deg)	Wire Length (ft)	Tension (lbs)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Telco	1.25" 144ct 5/16"MESS	CTL	23.00	7.41	1.9900	-	1.750	203.0	90.0	203.6	1,500	101	165	8,711	8,977
Telco	1.25" 144ct 5/16"MESS	CTL	23.00	7.41	1.9900	-	1.750	221.0	270.0	221.8	1,500	-101	179	9,483	9,561
Telco	2.0" 5/16" MESS	CTL	22.00	7.49	2.3100	-	2.000	203.0	90.0	203.8	1,500	97	190	9,672	9,959
Telco	2.0" 5/16" MESS	CTL	22.00	7.49	2.3100	-	2.000	221.0	270.0	222.1	1,500	-97	207	10,529	10,639
CATV	.50"cx, 48ct X 2 1/4" MESS PROP	COX	25.79	21.21	1.2700	-	0.746	203.0	90.0	203.1	1,500	114	194	6,233	6,540
CATV	.50"cx, 48ct X 2 1/4" MESS PROP	COX	25.79	21.21	1.2700	-	0.746	221.0	270.0	221.2	1,500	-114	211	6,785	6,883
											Totals:	0	1,146	51,413	52,558

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	33.30	5.84	270.0	270.0	66.00	4.50	3.50	-	120.00	-	0	131	131
Offset	CROSSARM 3-1/2 X 4-1/2 X 2 -	ZFS	27.75	-5.63	90.0	90.0	14.00	4.50	3.50	-	24.00	-	16	109	126
Offset	CROSSARM 3-1/2 X 4-1/2 X 2 -	COX	25.60	-5.44	90.0	90.0	14.00	4.50	3.50	-	24.00	-	16	101	117
											Totals:	0	33	341	374

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

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

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	33.30	-18.00	198.0	0.0	3.00	12.75	-	3.80	-	-	7	252	259
Deadend	Deadend Insulator - 15 kV	NVE	33.30	54.00	353.8	0.0	3.00	12.75	-	3.80	-	-	-20	252	232
Deadend	Deadend Insulator - 15 kV	NVE	33.30	54.00	353.8	180.0	3.00	12.75	-	3.80	-	-	-20	252	232
Deadend	Deadend Insulator - 15 kV	NVE	33.30	18.00	342.0	0.0	3.00	12.75	-	3.80	-	-	-7	252	245
Deadend	Deadend Insulator - 15 kV	NVE	33.30	18.00	342.0	180.0	3.00	12.75	-	3.80	-	-	-7	252	245
Deadend	Deadend Insulator - 15 kV	NVE	33.30	-54.00	186.2	0.0	3.00	12.75	-	3.80	-	-	20	252	272
Deadend	Deadend Insulator - 15 kV	NVE	33.30	-54.00	186.2	180.0	3.00	12.75	-	3.80	-	-	20	252	272
Deadend	Deadend Insulator - 15 kV	NVE	33.30	-18.00	198.0	180.0	3.00	12.75	-	3.80	-	-	7	252	259
Bolt	Three Bolt	CTL	23.00	4.91	180.0	90.0	5.00	0.00	-	3.00	-	-	5	0	5
Bolt	Three Bolt	CTL	22.00	4.99	180.0	90.0	5.00	0.00	-	3.00	-	-	5	0	5
Bolt	Three Bolt	ZFS	27.94	18.00	197.4	0.0	5.00	0.00	-	3.00	-	-	13	0	13
Bolt	Three Bolt	COX	25.79	18.00	196.8	0.0	5.00	0.00	-	3.00	-	-	13	0	13
											Totals:	0	35	2,017	2,052

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	24.00	24.00	203.00	0.250	75.0	90.0	0.0	0.121	201.91	0.21
Guy 2: EHS 1/4	Span/Head	CTL	24.00	24.00	221.00	0.250	75.0	270.0	0.0	0.121	219.80	0.16

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[3] (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 1/4	Span/Head	23,000,000	6,650	0.90	5,985	700	548	72	72	0	72	0	1,143
Guy 2: EHS 1/4	Span/Head	23,000,000	6,650	0.90	5,985	700	506	52	52	0	52	0	1,239
									Totals:	0	125	0	2,381

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	203.00	90.0	20,000	1.00	20,000	548	72	2.7
Anchor	CTL	30.00	221.00	270.0	20,000	1.00	20,000	506	52	2.5

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	22.53	34.33	12.90	11.19	7.96	14.33	1,000,000	50.00	57.00	34.70	238,958	4,252	56.20

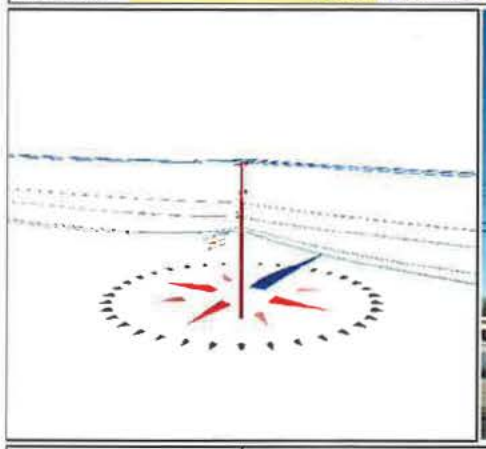
Version: 4.2 / 4.06
* includes Load Factor(s)

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

O-Calc® Pro *Analysis Report*

Wednesday, November 05, 2014 3:26:51 PM

File Name:	P27883 GRADE B	Pole Length / Class:	45 / 3	Code:	NESC	Structure Type:	Guyed
Pole Num:	P27883	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	NELLIS & TROPICANA	G/L Circumference (in):	42.00	Loading District:	Light	Transverse Wind LF:	2.50
Aux Data	O/B 144CT	G/L Fiber Stress (psi):	6,000	Ice Thickness (in):	0.00	Wire Tension LF:	1.65
Aux Data	Unset	Allowable Stress (psi):	3,900	Wind Speed (mph):	59.29	Vertical LF:	1.50
Aux Data	Unset	Fiber Stress Ht. Reduction:	No	Wind Pressure (psf):	9.00		



Pole Capacity Utilization		Height	Wind Angle
Maximum:	158.6%	0.0 ft	180.0°
Groundline:	158.6%	0.0 ft	180.0°
Vertical:	2.4%	23.7 ft	0.0°

Pole Moments		Load Angle	Wind Angle
Max Capac. Util:	120,376 ft-lb	180.1°	180.0°
Groundline:	120,376 ft-lb	180.1°	180.0°

Guy Summary		Guy Tensions		Maximum Guy Tensions	
	Attach Height (ft)	% Allowable Tension	Wind Angle	% Allowable Tension	Wind Angle
Guy 1	21.4	1.0%	180.0°	11.9%	270.0°
Guy 2	21.4	1.3%	180.0°	13.1%	90.0°

Anchor Summary		
	Lead Length (ft)	Max. % Allow. Capacity
Anchor 1	211.0	3.6%
Anchor 2	176.0	3.9%

GROUNDLINE LOAD SUMMARY:*Wind at 180.0°, Applied Moment 120,376 ft-lb at 180.1°, Allowable Moment 76,240 ft-lb

	Shear Load (lbs)*	Percent Applied Load	Bending Moment (ft-lb)	Percent of Applied Moment**	Percent of Pole Capacity	Bending Stress (+/- psi)	Vertical Load (lbs)	Vertical Stress (psi)	Total Stress (psi)	Percent of Pole Capacity
Powers:	1,785	38.4	62,009	4.2	6.6	3,172	764	5	3,177	81.5
Comms:	1,970	42.4	41,278	4.1	6.5	2,112	1,269	9	2,121	54.4
Guys/Braces:	91	1.9	1,938	0.9	1.4	99	23	0	99	2.5
Pole:	745	16.0	12,908	10.7	16.9	660	1,729	12	673	17.2

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

² Worst Wind per Guy Wire
³ Wind at 180.0°

Crossarms:	16	0.3	487	0.1	0.2	25	183	1	26	0.7
Insulators:	45	1.0	1,757	0.4	0.6	90	92	1	91	2.3
Pole Load:	4,652	100.0	120,376	100.0	157.9	6,158	4,060	29	6,187	158.6
Pole Reserve Capacity:			-44,137		-57.9	-2,258			-2,287	-58.6

LOAD SUMMARY BY OWNER

NVE:	1,526	56,200	2,875	865	6	2,881	73.9
ZFS:	316	7,923	405	130	1	406	10.4
COX:	389	9,385	480	209	1	482	12.3
CTL:	1,676	33,961	1,737	1,127	8	1,745	44.8
Pole:	745	12,908	660	1,729	12	673	17.2
Totals	4,652	120,376	6,158	4,060	29	6,187	158.6

Detailed Load Components

Power:		Owner	Height (ft)	Horiz. Offset (in)	Cable Dia. (in)	Rotate Angle (deg)	Cable Weight (lbs/ft)	Lead/Span Length	Span Angle (deg)	Wire Length (ft)	Tension (lbs)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Primary	336 AAC	NVE	38.78	18.81	0.6660	-	0.316	211.0	90.0	211.0	1,470	-144	75	5,113	5,044
Primary	336 AAC	NVE	38.78	18.81	0.6660	-	0.316	176.0	270.0	176.0	1,470	144	62	4,264	4,471
Primary	636 AAC	NVE	38.78	54.28	0.9180	-	0.596	211.0	90.0	211.0	2,204	-215	424	7,049	7,258
Primary	636 AAC	NVE	38.78	54.28	0.9180	-	0.596	176.0	270.0	176.1	2,204	215	354	5,880	6,449
Primary	636 AAC	NVE	38.78	18.81	0.9180	-	0.596	211.0	90.0	211.0	2,204	-215	-142	7,049	6,692
Primary	636 AAC	NVE	38.78	18.81	0.9180	-	0.596	176.0	270.0	176.1	2,204	215	-118	5,880	5,977
Primary	636 AAC	NVE	38.78	54.28	0.9180	-	0.596	211.0	90.0	211.0	2,204	-215	-424	7,049	6,409
Primary	636 AAC	NVE	38.78	54.28	0.9180	-	0.596	176.0	270.0	176.1	2,204	215	-354	5,880	5,741
Other	288ct SELF SUPPORT	ZFS	24.44	21.22	0.8600	-	0.350	211.0	90.0	211.0	1,500	-92	95	4,157	4,160
Other	288ct SELF SUPPORT	ZFS	24.44	21.22	0.8600	-	0.350	176.0	270.0	176.0	1,500	92	79	3,468	3,639
Secondary	#4 AL TPX	NVE	26.70	6.83	0.6400	-	0.180	176.0	270.0	176.0	484	33	-14	2,820	2,839
Secondary	#4 AL TPX	NVE	26.70	6.83	0.6400	-	0.180	211.0	90.0	211.1	484	-33	-16	3,380	3,331
											Totals:	0	21	61,987	62,009

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, 48ct X 2 1/4" MESS	COX	23.29	21.20	1.0600	-	0.622	211.0	90.0	211.1	1,500	-88	168	4,883	4,963
CATV	.50"cx, 48ct X 2 1/4" MESS	COX	23.29	21.20	1.0600	-	0.622	176.0	270.0	176.1	1,500	88	140	4,073	4,301
Telco	1.25" 144ct 5/16"MESS	CTL	20.30	7.59	1.9900	-	1.750	211.0	90.0	211.6	1,500	-77	175	7,991	8,089
Telco	1.25" 144ct 5/16"MESS	CTL	20.30	7.59	1.9900	-	1.750	176.0	270.0	177.0	1,500	77	146	6,665	6,888
Telco	2.0" 3/8" MESS	CTL	19.30	7.66	2.3800	-	2.000	211.0	90.0	211.9	1,500	-73	202	9,086	9,216
Telco	2.0" 3/8" MESS	CTL	19.30	7.66	2.3800	-	2.000	176.0	270.0	176.6	1,500	73	169	7,579	7,821
											Totals:	0	1,000	40,278	41,278

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	37.80	5.46	90.0	90.0	66.00	4.50	3.50	-	120.00	-	0	149	149
Offset	CROSSARM 3-1/2 X 4-1/2 X 2 -	ZFS	24.25	-5.48	90.0	90.0	14.00	4.50	3.50	-	24.00	-	16	95	112
Offset	CROSSARM 3-1/2 X 4-1/2 X 2 -	COX	23.10	-5.38	90.0	90.0	14.00	4.50	3.50	-	24.00	-	16	91	107

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

² Worst Wind per Guy Wire
³ Wind at 180.0°

Normal	CROSSARM 3-1/2 X 4-1/2 X 4 -	NVE	30.20	6.06	90.0	90.0	28.00	4.50	3.50	-	48.00	-	0	119	119
											Totals:	0	33	454	487

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	37.99	18.00	163.1	0.0	10.00	9.50	-	7.50	-	-	22	425	448
Pin	Pin Insulator - 15 kV	NVE	37.99	54.00	174.2	0.0	10.00	9.50	-	7.50	-	-	67	425	493
Pin	Pin Insulator - 15 kV	NVE	37.99	-18.00	16.9	0.0	10.00	9.50	-	7.50	-	-	-23	425	403
Pin	Pin Insulator - 15 kV	NVE	37.99	-54.00	5.8	0.0	10.00	9.50	-	7.50	-	-	-68	425	358
Bolt	Three Bolt	ZFS	24.44	18.00	196.9	0.0	5.00	0.00	-	3.00	-	-	13	0	13
Bolt	Three Bolt	COX	23.29	18.00	196.7	0.0	5.00	0.00	-	3.00	-	-	13	0	13
Bolt	Three Bolt	CTL	20.30	5.09	180.0	90.0	5.00	0.00	-	3.00	-	-	5	0	5
Bolt	Three Bolt	CTL	19.30	5.16	180.0	90.0	5.00	0.00	-	3.00	-	-	5	0	5
Spool	Spool Insulator - 20 kV	NVE	26.70	4.58	0.0	270.0	1.00	2.12	-	2.50	-	-	-1	22	21
											Totals:	0	34	1,723	1,757

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	21.40	21.40	211.00	0.250	75.0	90.0	0.0	0.121	209.58	0.18
Guy 2: EHS 1/4	Span/Head	CTL	21.40	21.40	176.00	0.250	75.0	270.0	0.0	0.121	174.80	0.20

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 1/4	Span/Head	23,000,000	6,650	0.90	5,985	700	710	60	60	0	60	0	1,054
Guy 2: EHS 1/4	Span/Head	23,000,000	6,650	0.90	5,985	700	786	80	80	0	80	0	883
									Totals:	0	140	0	1,938

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	211.00	90.0	20,000	1.00	20,000	710	60	3.6
Anchor	CTL	30.00	176.00	270.0	20,000	1.00	20,000	786	80	3.9

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	23.68	34.18	12.09	11.23	7.32	13.38	1,000,000	50.00	57.00	38.40	166,855	4,060	41.10

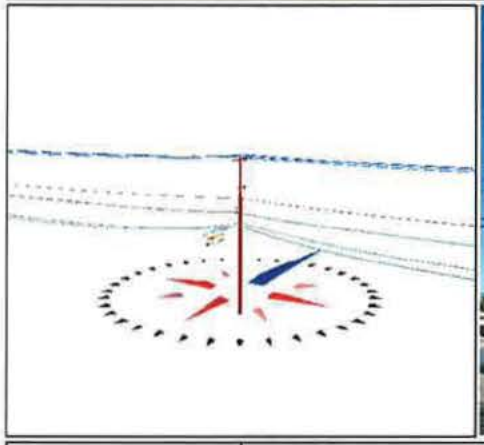
Version: 4.2 / 4.06
* includes Load Factor(s)

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

O-Calc® Pro *Analysis Report*

Wednesday, November 05, 2014 3:27:43 PM

File Name:	P27883 GRADE B	Pole Length / Class:	45 / 3	Code:	NESC	Structure Type:	Guyed
Pole Num:	P27883	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	NELLIS & TROPICANA	G/L Circumference (in):	42.00	Loading District:	Light	Transverse Wind LF:	2.50
Aux Data	O/B 144CT	G/L Fiber Stress (psi):	6,000	Ice Thickness (in):	0.00	Wire Tension LF:	1.65
Aux Data	Unset	Allowable Stress (psi):	3,900	Wind Speed (mph):	59.29	Vertical LF:	1.50
Aux Data	Unset	Fiber Stress Ht. Reduction:	No	Wind Pressure (psf):	9.00		



Pole Capacity Utilization		Height	Wind Angle
Maximum:	161.0%	0.0 ft	180.0°
Groundline:	161.0%	0.0 ft	180.0°
Vertical:	2.5%	23.7 ft	0.0°

Pole Moments		Load Angle	Wind Angle
Max Capac. Util:	122,212 ft-lb	180.1°	180.0°
Groundline:	122,212 ft-lb	180.1°	180.0°

Guy Summary		Guy Tensions		Maximum Guy Tensions	
	Attach Height (ft)	% Allowable Tension	Wind Angle	% Allowable Tension	Wind Angle
Guy 1	21.4	1.0%	180.0°	11.9%	270.0°
Guy 2	21.4	1.3%	180.0°	13.1%	90.0°

Anchor Summary		
	Lead Length (ft)	Max. % Allow. Capacity
Anchor 1	211.0	3.6%
Anchor 2	176.0	3.9%

GROUNDLINE LOAD SUMMARY:*Wind at 180.0°, Applied Moment 122,212 ft-lb at 180.1°, Allowable Moment 76,240 ft-lb

	Shear Load (lbs)*	Percent Applied Load	Bending Moment (ft-lb)	Percent of Applied Moment**	Percent of Pole Capacity	Bending Stress (+/- psi)	Vertical Load (lbs)	Vertical Stress (psi)	Total Stress (psi)	Percent of Pole Capacity
Powers:	1,785	37.8	62,009	4.1	6.6	3,172	764	5	3,177	81.5
Comms:	2,046	43.3	43,114	4.9	7.8	2,205	1,305	9	2,215	56.8
Guys/Braces:	91	1.9	1,938	0.9	1.4	99	23	0	99	2.5
Pole:	745	15.8	12,908	10.6	16.9	660	1,729	12	673	17.2

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

* Worst Wind per Guy Wire
* Wind at 180.0°

Crossarms:	16	0.3	487	0.1	0.2	25	183	1	26	0.7
Insulators:	45	1.0	1,757	0.4	0.6	90	92	1	91	2.3
Pole Load:	4,728	100.0	122,212	100.0	160.3	6,252	4,096	29	6,281	161.0
Pole Reserve Capacity:			-45,972		-60.3	-2,352			-2,381	-61.0

LOAD SUMMARY BY OWNER

NVE:	1,526	56,200	2,875	865	6	2,881	73.9
ZFS:	316	7,923	405	130	1	406	10.4
COX:	465	11,220	574	245	2	576	14.8
CTL:	1,676	33,961	1,737	1,127	8	1,745	44.8
Pole:	745	12,908	660	1,729	12	673	17.2
Totals	4,728	122,212	6,252	4,096	29	6,281	161.0

Detailed Load Components

Power:		Owner	Height (ft)	Horiz. Offset (in)	Cable Dia. (in)	Rotate Angle (deg)	Cable Weight (lbs/ft)	Lead/Span Length	Span Angle (deg)	Wire Length (ft)	Tension (lbs)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Primary	336 AAC	NVE	38.78	18.81	0.6660	-	0.316	211.0	90.0	211.0	1,470	-154	75	5,113	5,033
Primary	336 AAC	NVE	38.78	18.81	0.6660	-	0.316	176.0	270.0	176.0	1,470	154	62	4,264	4,481
Primary	636 AAC	NVE	38.78	54.28	0.9180	-	0.596	211.0	90.0	211.0	2,204	-231	424	7,049	7,242
Primary	636 AAC	NVE	38.78	54.28	0.9180	-	0.596	176.0	270.0	176.1	2,204	231	354	5,880	6,465
Primary	636 AAC	NVE	38.78	18.81	0.9180	-	0.596	211.0	90.0	211.0	2,204	-231	-142	7,049	6,676
Primary	636 AAC	NVE	38.78	18.81	0.9180	-	0.596	176.0	270.0	176.1	2,204	231	-118	5,880	5,992
Primary	636 AAC	NVE	38.78	54.28	0.9180	-	0.596	211.0	90.0	211.0	2,204	-231	-424	7,049	6,394
Primary	636 AAC	NVE	38.78	54.28	0.9180	-	0.596	176.0	270.0	176.1	2,204	231	-354	5,880	5,756
Other	288ct SELF SUPPORT	ZFS	24.44	21.22	0.8600	-	0.350	211.0	90.0	211.0	1,500	-99	95	4,157	4,153
Other	288ct SELF SUPPORT	ZFS	24.44	21.22	0.8600	-	0.350	176.0	270.0	176.0	1,500	99	79	3,468	3,646
Secondary	#4 AL TPX	NVE	26.70	6.83	0.6400	-	0.180	176.0	270.0	176.0	484	35	-14	2,820	2,841
Secondary	#4 AL TPX	NVE	26.70	6.83	0.6400	-	0.180	211.0	90.0	211.1	484	-35	-16	3,380	3,329
											Totals:	0	21	61,987	62,009

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, 48ct X 2 1/4" MESS PROP	COX	23.29	21.20	1.2700	-	0.746	211.0	90.0	211.1	1,500	-94	202	5,850	5,958
CATV	.50"cx, 48ct X 2 1/4" MESS PROP	COX	23.29	21.20	1.2700	-	0.746	176.0	270.0	176.1	1,500	94	168	4,880	5,142
Telco	1.25" 144ct 5/16"MESS	CTL	20.30	7.59	1.9900	-	1.750	211.0	90.0	211.6	1,500	-82	175	7,991	8,084
Telco	1.25" 144ct 5/16"MESS	CTL	20.30	7.59	1.9900	-	1.750	176.0	270.0	177.0	1,500	82	146	6,665	6,894
Telco	2.0" 3/8" MESS	CTL	19.30	7.66	2.3800	-	2.000	211.0	90.0	211.9	1,500	-78	202	9,086	9,210
Telco	2.0" 3/8" MESS	CTL	19.30	7.66	2.3800	-	2.000	176.0	270.0	176.6	1,500	78	169	7,579	7,826
											Totals:	0	1,062	42,052	43,114

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	37.80	5.46	90.0	90.0	66.00	4.50	3.50	-	120.00	-	0	149	149
Offset	CROSSARM 3-1/2 X 4-1/2 X 2 -	ZFS	24.25	-5.48	90.0	90.0	14.00	4.50	3.50	-	24.00	-	16	95	112
Offset	CROSSARM 3-1/2 X 4-1/2 X 2 -	COX	23.10	-5.38	90.0	90.0	14.00	4.50	3.50	-	24.00	-	16	91	107

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

² Worst Wind per Guy Wire
³ Wind at 180.0°

Normal	CROSSARM 3-1/2 X 4-1/2 X 4 -	NVE	30.20	6.06	90.0	90.0	28.00	4.50	3.50	-	48.00	-	0	119	119
											Totals:	0	33	454	487

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	37.99	18.00	163.1	0.0	10.00	9.50	-	7.50	-	-	22	425	448
Pin	Pin Insulator - 15 kV	NVE	37.99	54.00	174.2	0.0	10.00	9.50	-	7.50	-	-	67	425	493
Pin	Pin Insulator - 15 kV	NVE	37.99	-18.00	16.9	0.0	10.00	9.50	-	7.50	-	-	-23	425	403
Pin	Pin Insulator - 15 kV	NVE	37.99	-54.00	5.8	0.0	10.00	9.50	-	7.50	-	-	-68	425	358
Bolt	Three Bolt	ZFS	24.44	18.00	196.9	0.0	5.00	0.00	-	3.00	-	-	13	0	13
Bolt	Three Bolt	COX	23.29	18.00	196.7	0.0	5.00	0.00	-	3.00	-	-	13	0	13
Bolt	Three Bolt	CTL	20.30	5.09	180.0	90.0	5.00	0.00	-	3.00	-	-	5	0	5
Bolt	Three Bolt	CTL	19.30	5.16	180.0	90.0	5.00	0.00	-	3.00	-	-	5	0	5
Spool	Spool Insulator - 20 kV	NVE	26.70	4.58	0.0	270.0	1.00	2.12	-	2.50	-	-	-1	22	21
											Totals:	0	34	1,723	1,757

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	21.40	21.40	211.00	0.250	75.0	90.0	0.0	0.121	209.58	0.18
Guy 2: EHS 1/4	Span/Head	CTL	21.40	21.40	176.00	0.250	75.0	270.0	0.0	0.121	174.80	0.20

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 1/4	Span/Head	23,000,000	6,650	0.90	5,985	700	714	60	60	0	60	0	1,054
Guy 2: EHS 1/4	Span/Head	23,000,000	6,650	0.90	5,985	700	785	80	80	0	80	0	883
									Totals:	0	140	0	1,938

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	211.00	90.0	20,000	1.00	20,000	714	60	3.6
Anchor	CTL	30.00	176.00	270.0	20,000	1.00	20,000	785	80	3.9

Pole Buckling

Buckling Coefficient	Buckling Col. Hgt. (ft)	Buckling Section Height (% Buckling Col. Hgt.)	Buckling Critical Diameter (in)	Min. Buckling Diameter 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	23.68	34.18	12.09	11.28	7.32	13.38	1,000,000	50.00	57.00	38.40	166,915	4,096	40.75

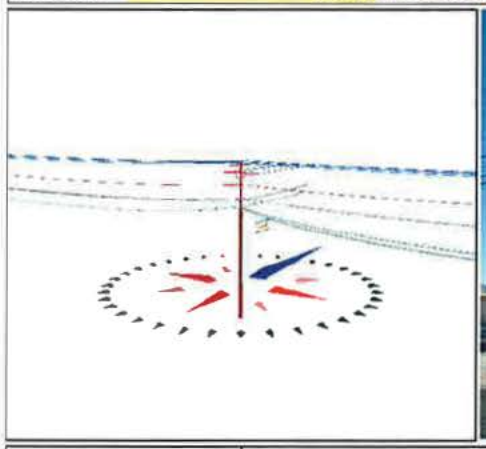
Version: 4.2 / 4.06
* includes Load Factor(s)

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

O-Calc® Pro *Analysis Report*

Wednesday, November 05, 2014 3:30:57 PM

File Name:	P27790 GRADE B	Pole Length / Class:	45 / 4	Code:	NESC	Structure Type:	Guyed
Pole Num:	P27790	Pole Species:	WESTERN RED CEDAR	NESC Rule:	Rule 250B	Status:	N/A
Aux Data	COX	Setting Depth (ft):	9.50	Construction Grade:	B	Pole Strength Factor:	0.65
Aux Data	NELLIS & TROPICANA	G/L Circumference (in):	40.00	Loading District:	Light	Transverse Wind LF:	2.50
Aux Data	O/B 144CT	G/L Fiber Stress (psi):	6,000	Ice Thickness (in):	0.00	Wire Tension LF:	1.65
Aux Data	Unset	Allowable Stress (psi):	3,900	Wind Speed (mph):	59.29	Vertical LF:	1.50
Aux Data	Unset	Fiber Stress Ht. Reduction:	No	Wind Pressure (psf):	9.00		



Pole Capacity Utilization		Height	Wind Angle
Maximum:	266.6%	0.0 ft	0.0°
Groundline:	266.6%	0.0 ft	0.0°
Vertical:	2.7%	23.7 ft	0.0°

Pole Moments		Load Angle	Wind Angle
Max Capac. Util:	174,770 ft-lb	0.2°	0.0°
Groundline:	174,770 ft-lb	0.2°	0.0°

Guy Summary		Guy Tensions		Maximum Guy Tensions	
	Attach Height (ft)	% Allowable Tension	Wind Angle	% Allowable Tension	Wind Angle
Guy 1	24.1	12.5%	0.0°	17.2%	270.0°
Guy 2	22.3	4.2%	0.0°	5.7%	40.0°

Anchor Summary		
	Lead Length (ft)	Max. % Allow. Capacity
Anchor 1	176.0	5.2%
Anchor 2	150.0	4.0%

GROUNDLINE LOAD SUMMARY:*Wind at 0.0°, Applied Moment 174,770 ft-lb at 0.2°, 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:	2,424	36.3	78,866	1.7	4.5	4,670	647	5	4,675	119.9
Comms:	3,212	48.1	75,449	2.6	6.9	4,468	1,033	8	4,476	114.8
Guys/Braces:	94	1.4	2,180	0.6	1.6	129	31	0	129	3.3
Pole:	646	9.7	10,279	5.9	15.6	609	1,413	11	620	15.9

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

² Worst Wind per Guy Wire
³ Wind at 0.0°

Crossarms:	143	2.1	4,472	0.1	0.2	265	240	2	267	6.8
Risers:	93	1.4	1,244	0.4	1.1	74	43	0	74	1.9
Insulators:	68	1.0	2,278	0.2	0.6	135	120	1	136	3.5
Pole Load:	6,681	100.0	174,770	100.0	265.4	10,349	3,527	28	10,377	266.1
Pole Reserve Capacity:			-108,911		-165.4	-6,449			-6,477	-166.1

LOAD SUMMARY BY OWNER

NVE:	2,369	79,210	4,691	835	7	4,697	120.4
ZFS:	267	6,421	380	135	1	381	9.8
COX:	1,211	29,925	1,772	236	2	1,774	45.5
CTL:	2,189	48,934	2,898	909	7	2,905	74.5
Pole:	646	10,279	609	1,413	11	620	15.9
Totals	6,681	174,770	10,349	3,527	28	10,377	266.1

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	336 AAC	NVE	35.48	18.73	0.6660	-	0.316	150.0	270.0	150.0	1,470	-298	-53	3,325	2,974
Primary	336 AAC	NVE	35.48	18.73	0.6660	-	0.316	176.0	90.0	176.0	1,470	298	-63	3,902	4,137
Primary	636 AAC	NVE	35.48	54.25	0.9180	-	0.596	150.0	270.0	150.1	2,204	-447	302	4,585	4,440
Primary	636 AAC	NVE	35.48	54.25	0.9180	-	0.596	176.0	90.0	176.0	2,204	447	354	5,380	6,180
Primary	636 AAC	NVE	35.48	18.73	0.9180	-	0.596	150.0	270.0	150.1	2,204	-447	100	4,585	4,239
Primary	636 AAC	NVE	35.48	18.73	0.9180	-	0.596	176.0	90.0	176.0	2,204	447	118	5,380	5,944
Primary	636 AAC	NVE	35.48	54.25	0.9180	-	0.596	150.0	270.0	150.1	2,204	-447	-302	4,585	3,836
Primary	636 AAC	NVE	35.48	54.25	0.9180	-	0.596	176.0	90.0	176.0	2,204	447	-354	5,380	5,472
Secondary	#4 AL TPX	NVE	29.10	6.14	0.6400	-	0.180	150.0	270.0	150.1	484	-80	-10	2,619	2,528
Secondary	#4 AL TPX	NVE	29.10	6.14	0.6400	-	0.180	176.0	90.0	176.0	484	80	-12	3,073	3,141
Other	288ct SELF SUPPORT	ZFS	25.44	38.96	0.8600	-	0.350	176.0	90.0	176.0	1,500	218	-148	3,610	3,679
Other	288ct SELF SUPPORT	ZFS	25.44	38.96	0.8600	-	0.350	150.0	270.0	150.0	1,500	-218	-126	3,076	2,732
Primary	4 AAC (SLACK)	NVE	32.11	54.50	0.2320	-	0.039	41.0	360.0	41.0	186	9,854	0	0	9,854
Primary	4 AAC (SLACK)	NVE	32.11	28.96	0.2320	-	0.039	41.0	360.0	41.0	186	9,854	0	0	9,854
Primary	4 AAC (SLACK)	NVE	32.11	54.50	0.2320	-	0.039	41.0	360.0	41.0	186	9,854	0	0	9,854
											Totals:	29,561	-195	49,500	78,866

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, 48ct X 2 1/4" MESS	COX	25.44	21.35	1.0600	-	0.622	176.0	90.0	176.1	1,500	218	-140	4,449	4,527
CATV	.75"cx X 2, .50"cx, 48ct 1/4" MESS	COX	25.44	21.35	1.5000	-	1.070	150.0	270.0	150.2	1,500	-218	-205	5,366	4,942
Telco	1.25" 144ct 5/16"MESS	CTL	22.90	6.92	1.9900	-	1.750	176.0	90.0	176.9	1,500	196	-133	7,519	7,582
Telco	1.25" 144ct 5/16"MESS	CTL	22.90	6.92	1.9900	-	1.750	150.0	270.0	150.5	1,500	-196	-113	6,408	6,099
Telco	1.25" 5/16"MESS (SLACK)	CTL	22.90	6.92	1.5600	-	1.000	41.0	0.0	41.0	500	18,892	-18	0	18,875
Telco	2.0" 3/8" MESS	CTL	22.25	4.47	2.3800	-	2.000	176.0	90.0	177.1	1,500	190	0	8,738	8,928
CATV	.75"cx, .50"cx 1/4" MESS (SLACK)	COX	24.80	4.25	1.2500	-	0.588	41.0	0.0	41.0	500	20,460	6	0	20,466
Telco	1.0" 1/4" MESS	CTL	24.10	4.31	1.2500	-	0.800	150.0	270.0	150.1	1,500	-206	0	4,236	4,030

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

² Worst Wind per Guy Wire
³ Wind at 0.0°

											Totals:	39,336	-603	36,716	75,449

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	34.50	5.18	270.0	270.0	66.00	4.50	3.50	-	120.00	-	0	136	136
Offset	CROSSARM 3-1/2 X 4-1/2 X 4 -	ZFS	25.25	5.97	90.0	90.0	28.00	4.50	3.50	-	48.00	-	-65	99	34
Normal	CROSSARM 3-1/2 X 4-1/2 X 10 -	NVE	32.20	5.37	180.0	180.0	66.00	4.50	3.50	-	120.00	-	-44	4,347	4,303
											Totals:	0	-110	4,582	4,472

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)*
1.25" Riser	1.25" Riser	CTL	20.25	6.83	100.0	100.0	1.18	243.00	-	0.00	-	-	-1	757	756
1.25" Riser	1.25" Riser	CTL	20.25	6.83	140.0	140.0	1.18	243.00	-	0.00	-	-	-6	494	488
											Totals:	0	-7	1,251	1,244

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	34.69	-18.00	196.0	0.0	10.00	9.50	-	7.50	-	-	-23	388	366
Pin	Pin Insulator - 15 kV	NVE	34.69	54.00	354.5	0.0	10.00	9.50	-	7.50	-	-	67	388	456
Pin	Pin Insulator - 15 kV	NVE	34.69	18.00	344.0	0.0	10.00	9.50	-	7.50	-	-	22	388	411
Pin	Pin Insulator - 15 kV	NVE	34.69	-54.00	185.5	0.0	10.00	9.50	-	7.50	-	-	-68	388	321
Spool	Spool Insulator - 20 kV	NVE	29.10	3.89	180.0	90.0	1.00	2.12	-	2.50	-	-	-1	24	23
Bolt	Three Bolt	ZFS	25.44	36.00	170.6	0.0	5.00	0.00	-	3.00	-	-	-24	0	-24
Bolt	Three Bolt	COX	25.44	18.00	161.7	0.0	5.00	0.00	-	3.00	-	-	-13	0	-13
Bolt	Three Bolt	CTL	22.90	4.42	180.0	90.0	5.00	0.00	-	3.00	-	-	-4	0	-4
Deadend	Three Bolt	CTL	22.25	4.47	90.0	90.0	5.00	0.00	-	3.00	-	-	0	0	0
Deadend	Deadend Insulator - 15 kV	NVE	32.20	54.00	264.3	180.0	3.00	12.75	-	3.80	-	-	3	244	246
Deadend	Deadend Insulator - 15 kV	NVE	32.20	28.00	259.1	180.0	3.00	12.75	-	3.80	-	-	3	244	246
Deadend	Deadend Insulator - 15 kV	NVE	32.20	-54.00	95.7	180.0	3.00	12.75	-	3.80	-	-	3	244	247
Deadend	Three Bolt	COX	24.80	4.25	0.0	0.0	5.00	0.00	-	3.00	-	-	3	0	3
Deadend	Three Bolt	CTL	24.10	4.31	270.0	270.0	5.00	0.00	-	3.00	-	-	0	0	0
											Totals:	0	-31	2,309	2,278

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	24.10	24.10	176.00	0.250	75.0	90.0	0.0	0.121	175.14	1.86
Guy 2: EHS 3/8	Span/Head	CTL	22.25	22.25	150.00	0.375	75.0	270.0	0.0	0.273	149.14	0.54

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 1/4	Span/Head	23,000,000	6,650	0.90	5,985	700	1,031	748	748	0	748	3	1,054
Guy 2: EHS 3/8	Span/Head	23,000,000	15,400	0.90	13,860	700	792	578	578	0	578	-2	1,126
									Totals:	0	1,326	1	2,180

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

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

Anchor/Rod Load Summary:	Owner	Rod Length AGL (in)	Lead Length (ft)	Lead Angle (deg)	Strength of Assembly (lbs)	Anchor/Rod Strength Factor	Allowable Load (lbs)	Max Load[3] (lbs)	Load at Pole MCU[1] (lbs)	Max Required Capacity[2] (%)
Anchor	CTL	30.00	176.00	90.0	20,000	1.00	20,000	1,031	748	5.2
Anchor	CTL	30.00	150.00	270.0	20,000	1.00	20,000	792	576	4.0

Pole Buckling

Buckling	Buckling (ft)	Buckling Section (% Buckling Col. Hgt.)	Buckling (in)	Min. Buckling (in)	Diameter (in)	Diameter (in)	Modulus of (psi)	Pole (pcf)	Ice Density (pcf)	Pole Tip (ft)	Buckling Load (lbs)	Buckling Load (lbs)	Buckling Load
0.71	23.70	34.76	11.33	10.43	6.69	12.74	1,000,000	50.00	57.00	35.50	128,322	3,527	36.38

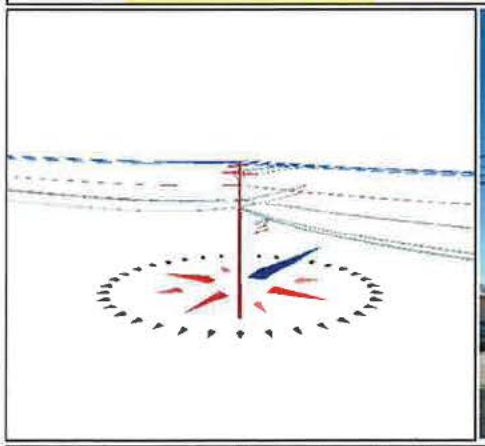
Version: 4.2 / 4.06
* includes Load Factor(s)

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

O-Calc® Pro *Analysis Report*

Wednesday, November 05, 2014 3:31:53 PM

File Name:	P27790 GRADE B	Pole Length / Class:	45 / 4	Code:	NESC	Structure Type:	Guyed
Pole Num:	P27790	Pole Species:	WESTERN RED CEDAR	NESC Rule:	Rule 250B	Status:	N/A
Aux Data	COX	Setting Depth (ft):	9.50	Construction Grade:	B	Pole Strength Factor:	0.65
Aux Data	NELLIS & TROPICANA	G/L Circumference (in):	40.00	Loading District:	Light	Transverse Wind LF:	2.50
Aux Data	O/B 144CT	G/L Fiber Stress (psi):	6,000	Ice Thickness (in):	0.00	Wire Tension LF:	1.65
Aux Data	Unset	Allowable Stress (psi):	3,900	Wind Speed (mph):	59.29	Vertical LF:	1.50
Aux Data	Unset	Fiber Stress Ht. Reduction:	No	Wind Pressure (psf):	9.00		



Pole Capacity Utilization		Height	Wind Angle
Maximum:	269.3%	0.0 ft	0.0°
Groundline:	269.3%	0.0 ft	0.0°
Vertical:	2.8%	23.7 ft	0.0°

Pole Moments		Load Angle	Wind Angle
Max Capac. Util:	176,565 ft-lb	0.3°	0.0°
Groundline:	176,565 ft-lb	0.3°	0.0°

Guy Summary		Guy Tensions		Maximum Guy Tensions	
	Attach Height (ft)	% Allowable Tension	Wind Angle	% Allowable Tension	Wind Angle
Guy 1	24.1	13.0%	0.0°	17.2%	270.0°
Guy 2	22.3	4.3%	0.0°	5.8%	40.0°

Anchor Summary		
	Lead Length (ft)	Max. % Allow. Capacity
Anchor 1	176.0	5.2%
Anchor 2	150.0	4.0%

GROUNDLINE LOAD SUMMARY:*Wind at 0.0°, Applied Moment 176,565 ft-lb at 0.3°, 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:	2,424	35.9	78,866	1.6	4.4	4,670	647	5	4,675	119.9
Comms:	3,285	48.6	77,238	3.1	8.3	4,574	1,064	8	4,582	117.5
Guys/Braces:	95	1.4	2,187	0.6	1.6	130	31	0	130	3.3
Pole:	646	9.6	10,279	5.8	15.6	609	1,413	11	620	15.9

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

² Worst Wind per Guy Wire
³ Wind at 0.0°

Crossarms:	143	2.1	4,472	0.1	0.2	265	240	2	267	6.8
Risers:	93	1.4	1,244	0.4	1.1	74	43	0	74	1.9
Insulators:	68	1.0	2,278	0.2	0.6	135	120	1	136	3.5
Pole Load:	6,754	100.0	176,565	100.0	268.1	10,456	3,558	28	10,484	268.8
Pole Reserve Capacity:			-110,706		-168.1	-6,556			-6,584	-168.8

LOAD SUMMARY BY OWNER

NVE:	2,369	79,209	4,691	835	7	4,697	120.4
ZFS:	267	6,422	380	135	1	381	9.8
COX:	1,283	31,719	1,878	267	2	1,880	48.2
CTL:	2,189	48,936	2,898	909	7	2,905	74.5
Pole:	646	10,279	609	1,413	11	620	15.9
Totals	6,754	176,565	10,456	3,558	28	10,484	268.8

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	336 AAC	NVE	35.48	18.73	0.6660	-	0.316	150.0	270.0	150.0	1,470	-393	-53	3,325	2,879
Primary	336 AAC	NVE	35.48	18.73	0.6660	-	0.316	176.0	90.0	176.0	1,470	393	-63	3,902	4,233
Primary	636 AAC	NVE	35.48	54.25	0.9180	-	0.596	150.0	270.0	150.1	2,204	-590	302	4,585	4,297
Primary	636 AAC	NVE	35.48	54.25	0.9180	-	0.596	176.0	90.0	176.0	2,204	590	354	5,380	6,323
Primary	636 AAC	NVE	35.48	18.73	0.9180	-	0.596	150.0	270.0	150.1	2,204	-590	100	4,585	4,096
Primary	636 AAC	NVE	35.48	18.73	0.9180	-	0.596	176.0	90.0	176.0	2,204	590	118	5,380	6,087
Primary	636 AAC	NVE	35.48	54.25	0.9180	-	0.596	150.0	270.0	150.1	2,204	-590	-302	4,585	3,693
Primary	636 AAC	NVE	35.48	54.25	0.9180	-	0.596	176.0	90.0	176.0	2,204	590	-354	5,380	5,615
Secondary	#4 AL TPX	NVE	29.10	6.14	0.6400	-	0.180	150.0	270.0	150.1	484	-106	-10	2,619	2,502
Secondary	#4 AL TPX	NVE	29.10	6.14	0.6400	-	0.180	176.0	90.0	176.0	484	106	-12	3,073	3,167
Other	288ct SELF SUPPORT	ZFS	25.44	38.96	0.8600	-	0.350	176.0	90.0	176.0	1,500	287	-148	3,610	3,749
Other	288ct SELF SUPPORT	ZFS	25.44	38.96	0.8600	-	0.350	150.0	270.0	150.0	1,500	-287	-126	3,076	2,663
Primary	4 AAC (SLACK)	NVE	32.11	54.50	0.2320	-	0.039	41.0	360.0	41.0	186	9,854	0	0	9,854
Primary	4 AAC (SLACK)	NVE	32.11	28.96	0.2320	-	0.039	41.0	360.0	41.0	186	9,854	0	0	9,854
Primary	4 AAC (SLACK)	NVE	32.11	54.50	0.2320	-	0.039	41.0	360.0	41.0	186	9,854	0	0	9,854
											Totals:	29,561	-195	49,499	78,866

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, 48ct X 2 1/4" MESS PROP	COX	25.44	21.35	1.2700	-	0.746	176.0	90.0	176.2	1,500	287	-168	5,330	5,450
CATV	.75"cx X 2, .50"cx, 48ct 1/4" MESS	COX	25.44	21.35	1.7700	-	1.201	150.0	270.0	150.2	1,500	-287	-231	6,331	5,813
Telco	1.25" 144ct 5/16"MESS	CTL	22.90	6.92	1.9900	-	1.750	176.0	90.0	176.9	1,500	259	-133	7,519	7,645
Telco	1.25" 144ct 5/16"MESS	CTL	22.90	6.92	1.9900	-	1.750	150.0	270.0	150.5	1,500	-259	-113	6,408	6,036
Telco	1.25" 5/16"MESS (SLACK)	CTL	22.90	6.92	1.5600	-	1.000	41.0	0.0	41.0	500	18,892	-18	0	18,875
Telco	2.0" 3/8" MESS	CTL	22.25	4.47	2.3800	-	2.000	176.0	90.0	177.1	1,500	251	0	8,737	8,989
CATV	.75"cx, .50"cx 1/4" MESS (SLACK)	COX	24.80	4.25	1.2500	-	0.588	41.0	0.0	41.0	500	20,460	6	0	20,466
Telco	1.0" 1/4" MESS	CTL	24.10	4.31	1.2500	-	0.800	150.0	270.0	150.1	1,500	-272	0	4,236	3,964

											Totals:	39,331	-656	38,563	77,238

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	34.50	5.18	270.0	270.0	66.00	4.50	3.50	-	120.00	-	0	136	136
Offset	CROSSARM 3-1/2 X 4-1/2 X 4 -	ZFS	25.25	5.97	90.0	90.0	28.00	4.50	3.50	-	48.00	-	-65	99	34
Normal	CROSSARM 3-1/2 X 4-1/2 X 10 -	NVE	32.20	5.37	180.0	180.0	66.00	4.50	3.50	-	120.00	-	-44	4,347	4,303
											Totals:	0	-110	4,582	4,472

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)*
1.25" Riser	1.25" Riser	CTL	20.25	6.83	100.0	100.0	1.18	243.00	-	0.00	-	-	-1	757	756
1.25" Riser	1.25" Riser	CTL	20.25	6.83	140.0	140.0	1.18	243.00	-	0.00	-	-	-6	494	488
											Totals:	0	-7	1,251	1,244

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	34.69	-18.00	196.0	0.0	10.00	9.50	-	7.50	-	-	-23	388	366
Pin	Pin Insulator - 15 kV	NVE	34.69	54.00	354.5	0.0	10.00	9.50	-	7.50	-	-	67	388	456
Pin	Pin Insulator - 15 kV	NVE	34.69	18.00	344.0	0.0	10.00	9.50	-	7.50	-	-	22	388	411
Pin	Pin Insulator - 15 kV	NVE	34.69	-54.00	165.5	0.0	10.00	9.50	-	7.50	-	-	-68	388	321
Spool	Spool Insulator - 20 kV	NVE	29.10	3.89	180.0	90.0	1.00	2.12	-	2.50	-	-	-1	24	23
Bolt	Three Bolt	ZFS	25.44	36.00	170.6	0.0	5.00	0.00	-	3.00	-	-	-24	0	-24
Bolt	Three Bolt	COX	25.44	18.00	161.7	0.0	5.00	0.00	-	3.00	-	-	-13	0	-13
Bolt	Three Bolt	CTL	22.90	4.42	180.0	90.0	5.00	0.00	-	3.00	-	-	-4	0	-4
Deadend	Three Bolt	CTL	22.25	4.47	90.0	90.0	5.00	0.00	-	3.00	-	-	0	0	0
Deadend	Deadend Insulator - 15 kV	NVE	32.20	54.00	264.3	180.0	3.00	12.75	-	3.80	-	-	3	244	246
Deadend	Deadend Insulator - 15 kV	NVE	32.20	28.00	259.1	180.0	3.00	12.75	-	3.80	-	-	3	244	246
Deadend	Deadend Insulator - 15 kV	NVE	32.20	-54.00	95.7	180.0	3.00	12.75	-	3.80	-	-	3	244	247
Deadend	Three Bolt	COX	24.80	4.25	0.0	0.0	5.00	0.00	-	3.00	-	-	3	0	3
Deadend	Three Bolt	CTL	24.10	4.31	270.0	270.0	5.00	0.00	-	3.00	-	-	0	0	0
											Totals:	0	-31	2,309	2,278

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	24.10	24.10	176.00	0.250	75.0	90.0	0.0	0.121	175.14	1.93
Guy 2: EHS 3/8	Span/Head	CTL	22.25	22.25	150.00	0.375	75.0	270.0	0.0	0.273	149.14	0.56

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	1,030	777	777	0	777	4	1,078
Guy 2: EHS 3/8	Span/Head	23,000,000	15,400	0.90	13,860	700	805	600	600	0	600	-3	1,109
									Totals:	0	1,377	1	2,187

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

² Worst Wind per Guy Wire
³ Wind at 0.0°

Anchor/Rod Load Summary:	Owner	Rod Length AGL (in)	Lead Length (ft)	Lead Angle (deg)	Strength of Assembly (lbs)	Anchor/Rod Strength Factor	Allowable Load (lbs)	Max Load[3] (lbs)	Load at Pole MCU[3] (lbs)	Max Required Capacity[2] (%)
Anchor	CTL	30.00	176.00	90.0	20,000	1.00	20,000	1,030	777	5.2
Anchor	CTL	30.00	150.00	270.0	20,000	1.00	20,000	805	600	4.0

Pole Buckling

Buckling	Buckling (ft)	Buckling Section (% Buckling Col. Hgt.)	Buckling (in)	Min. Buckling (in)	Diameter (in)	Diameter (in)	Modulus of (psi)	Pole (pcf)	Ice Density (pcf)	Pole Tip (ft)	Buckling Load (lbs)	Buckling Load (lbs)	Buckling Load
0.71	23.71	34.76	11.33	10.48	6.69	12.74	1,000,000	50.00	57.00	35.50	128,103	3,558	36.00

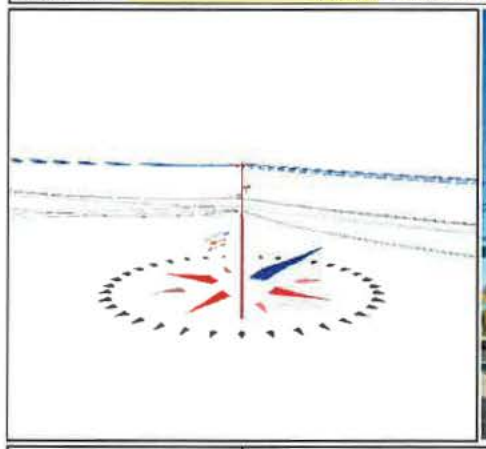
Version: 4.2 / 4.06
* includes Load Factor(s)

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

O-Calc® Pro *Analysis Report*

Wednesday, November 05, 2014 3:34:42 PM

File Name:	P27882 GRADE B	Pole Length / Class:	45 / 4	Code:	NESC	Structure Type:	Guyed
Pole Num:	P27882	Pole Species:	WESTERN RED CEDAR	NESC Rule:	Rule 250B	Status:	N/A
Aux Data	COX	Setting Depth (ft):	9.40	Construction Grade:	B	Pole Strength Factor:	0.65
Aux Data	NELLIS & TROPICANA	G/L Circumference (in):	39.00	Loading District:	Light	Transverse Wind LF:	2.50
Aux Data	O/B 144CT	G/L Fiber Stress (psi):	6,000	Ice Thickness (in):	0.00	Wire Tension LF:	1.65
Aux Data	Unset	Allowable Stress (psi):	3,900	Wind Speed (mph):	59.29	Vertical LF:	1.50
Aux Data	Unset	Fiber Stress Ht. Reduction:	No	Wind Pressure (psf):	9.00		



Pole Capacity Utilization		Height	Wind Angle
Maximum:	169.0%	0.0 ft	179.3°
Groundline:	169.0%	0.0 ft	179.3°
Vertical:	3.0%	23.9 ft	45.0°

Pole Moments		Load Angle	Wind Angle
Max Capac. Util:	102,713 ft-lb	180.5°	179.3°
Groundline:	102,713 ft-lb	180.5°	179.3°

Guy Summary		Guy Tensions		Maximum Guy Tensions	
	Attach Height (ft)	% Allowable Tension	Wind Angle	% Allowable Tension	Wind Angle
Guy 1	23.3	0.0%	179.3°	39.8%	0.0°
Guy 2	22.3	0.0%	179.3°	35.6%	0.0°
Guy 3	21.5	0.0%	179.3°	13.6%	340.0°
Guy 4	21.5	9.8%	179.3°	17.1%	100.0°

Anchor Summary		
	Lead Length (ft)	Max. % Allow. Capacity
Anchor 1	150.0	9.4%
Anchor 2	210.0	11.8%
Anchor 3	246.0	22.6%

GROUNDLINE LOAD SUMMARY:*Wind at 179.3°, Applied Moment 102,713 ft-lb at 180.5°, Allowable Moment 61,042 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:	1,417	36.0	46,794	3.2	5.3	2,990	659	5	2,995	76.8

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

² Worst Wind per Guy Wire
³ Wind at 179.3°

Comms:	1,600	40.7	38,693	4.9	8.3	2,472	977	8	2,480	63.6
Guys/Braces:	197	5.0	4,302	1.1	1.9	275	79	1	276	7.1
Pole:	637	16.2	10,209	9.9	16.7	652	1,368	11	664	17.0
Crossarms:	20	0.5	586	0.3	0.4	37	282	2	40	1.0
Insulators:	61	1.5	2,129	0.2	0.4	136	66	1	137	3.5
Pole Load:	3,931	100.0	102,713	100.0	168.3	6,562	3,431	28	6,591	169.0
Pole Reserve Capacity:			-41,671		-68.3	-2,662			-2,691	-69.0

LOAD SUMMARY BY OWNER

NVE:	1,199	41,300	2,639	840	7	2,646	67.8
ZFS:	294	8,070	516	123	1	517	13.2
COX:	510	13,678	874	317	3	877	22.5
CTL:	1,290	29,455	1,882	782	6	1,888	48.4
Pole:	637	10,209	652	1,368	11	664	17.0
Totals	3,931	102,713	6,562	3,431	28	6,591	169.0

Detailed Load Components

Power:		Owner	Height (ft)	Horiz. Offset (in)	Cable Dia. (in)	Rotate Angle (deg)	Cable Weight (lbs/ft)	Lead/Span Length	Span Angle (deg)	Wire Length (ft)	Tension (lbs)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Primary	636 AAC	NVE	34.51	56.90	0.9180	-	0.596	150.0	90.0	150.0	2,204	-1,183	-18	4,454	3,253
Primary	636 AAC	NVE	34.51	25.40	0.9180	-	0.596	150.0	90.0	150.0	2,204	-1,183	-14	4,454	3,258
Primary	636 AAC	NVE	34.51	56.90	0.9180	-	0.596	150.0	90.0	150.0	2,204	-1,183	18	4,454	3,290
Primary	336 AAC	NVE	34.51	25.40	0.6660	-	0.316	150.0	90.0	150.0	1,470	-789	7	3,231	2,450
Primary	4/0 ACSR	NVE	34.51	25.40	0.5630	-	0.291	210.0	270.0	210.0	1,000	537	9	3,824	4,370
Primary	636 AAC	NVE	34.51	56.90	0.9180	-	0.596	210.0	270.0	210.0	2,204	1,183	-25	6,236	7,393
Primary	636 AAC	NVE	34.51	25.40	0.9180	-	0.596	210.0	270.0	210.0	2,204	1,183	-19	6,236	7,400
Primary	636 AAC	NVE	34.51	56.90	0.9180	-	0.596	210.0	270.0	210.0	2,204	1,183	26	6,236	7,444
Other	288ct SELF SUPPORT	ZFS	26.79	21.41	0.8600	-	0.350	150.0	90.0	150.0	1,500	-625	67	3,239	2,682
Other	288ct SELF SUPPORT	ZFS	26.79	21.41	0.8600	-	0.350	210.0	270.0	210.0	1,500	625	94	4,535	5,254
											Totals:	-252	146	46,900	46,794

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, 48ct 1/4" MESS	COX	25.79	21.42	1.5000	-	1.070	150.0	90.0	150.1	1,500	-601	206	5,439	5,044
CATV	.75"cx X 2, .50"cx, 48ct 1/4" MESS	COX	25.79	21.42	1.5000	-	1.070	210.0	270.0	210.3	1,500	601	289	7,614	8,505
Telco	1.25" 144ct 5/16"MESS	CTL	22.25	6.92	1.9900	-	1.750	150.0	90.0	150.9	1,500	-519	113	6,226	5,820
Telco	1.25" 144ct 5/16"MESS	CTL	22.25	6.92	1.9900	-	1.750	210.0	270.0	210.9	1,500	519	159	8,716	9,394
Telco	1.0" 1/4" MESS	CTL	23.25	6.84	1.2500	-	0.800	150.0	90.0	150.1	1,500	-542	51	4,086	3,595
Telco	1.0" 1/4" MESS	CTL	23.25	6.84	1.2500	-	0.800	210.0	270.0	210.2	1,500	542	72	5,721	6,335
											Totals:	0	890	37,803	38,693

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	34.60	5.17	270.0	270.0	66.00	4.50	3.50	-	120.00	-	2	271	273

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

² Worst Wind per Guy Wire
³ Wind at 179.3°

Offset	CROSSARM 3-1/2 X 4-1/2 X 2 -	ZFS	26.60	-6.18	90.0	90.0	14.00	4.50	3.50	-	24.00	-	16	105	121
Offset	CROSSARM 3-1/2 X 4-1/2 X 2 -	COX	25.60	-6.19	90.0	90.0	14.00	4.50	3.50	-	24.00	-	16	101	117
Offset	CROSSARM 3-1/2 X 4-1/2 X 4 -	NVE	28.50	-6.34	270.0	270.0	28.00	4.50	3.50	-	48.00	-	-38	112	74
											Totals:	0	-3	589	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)*
Deadend	Deadend Insulator - 15 kV	NVE	34.60	54.00	5.5	180.0	3.00	12.75	-	3.80	-	-	-20	262	242
Deadend	Deadend Insulator - 15 kV	NVE	34.60	18.00	16.0	180.0	3.00	12.75	-	3.80	-	-	-7	262	255
Deadend	Deadend Insulator - 15 kV	NVE	34.60	-54.00	174.5	180.0	3.00	12.75	-	3.80	-	-	20	262	282
Deadend	Deadend Insulator - 15 kV	NVE	34.60	-18.00	164.0	180.0	3.00	12.75	-	3.80	-	-	7	262	269
Deadend	Deadend Insulator - 15 kV	NVE	34.60	-18.00	196.0	0.0	3.00	12.75	-	3.80	-	-	7	262	269
Deadend	Deadend Insulator - 15 kV	NVE	34.60	54.00	354.5	0.0	3.00	12.75	-	3.80	-	-	-20	262	242
Deadend	Deadend Insulator - 15 kV	NVE	34.60	18.00	344.0	0.0	3.00	12.75	-	3.80	-	-	-7	262	255
Deadend	Deadend Insulator - 15 kV	NVE	34.60	-54.00	185.5	0.0	3.00	12.75	-	3.80	-	-	20	262	282
Bolt	Three Bolt	ZFS	26.79	18.00	199.0	0.0	5.00	0.00	-	3.00	-	-	13	0	13
Bolt	Three Bolt	COX	25.79	18.00	199.0	0.0	5.00	0.00	-	3.00	-	-	13	0	13
Bolt	Three Bolt	CTL	22.25	4.42	180.0	90.0	5.00	0.00	-	3.00	-	-	4	0	4
Bolt	Three Bolt	CTL	23.25	4.34	180.0	90.0	5.00	0.00	-	3.00	-	-	4	0	4
											Totals:	0	34	2,095	2,129

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	23.25	23.25	246.00	0.250	75.0	225.0	0.0	0.121	244.60	0.00
Guy 2: EHS 1/4	Span/Head	CTL	22.25	22.25	246.00	0.250	75.0	225.0	0.0	0.121	244.50	0.00
Guy 3: EHS 3/8	Span/Head	CTL	21.50	21.50	150.00	0.375	75.0	90.0	0.0	0.273	149.03	0.00
Guy 4: EHS 3/8	Span/Head	CTL	21.50	21.50	210.00	0.375	75.0	270.0	0.0	0.273	208.60	1.78

Guy Wire and Brace (Loads and Reactions)		Elastic Modulus (psi)	Rated Tensile Strength (lbs)	Guy Strength Factor	Allowable Tension (lbs)	Initial Tension (lbs)	Required Tension[2] (lbs)	Required Tension[3] (lbs)	Applied Tension[2] (lbs)	Vertical Load[2] (lbs)	Shear Load in Guy Dir[2] (lbs)	Shear Load at Report Angle[2] (lbs)	Moment at GL[2] (ft-lb)*
Guy 1: EHS 1/4	Span/Head	23,000,000	6,650	0.90	5,985	700	2,380	0	0	0	0	0	671
Guy 2: EHS 1/4	Span/Head	23,000,000	6,650	0.90	5,985	700	2,130	0	0	0	0	0	642
Guy 3: EHS 3/8	Span/Head	23,000,000	15,400	0.90	13,860	700	1,887	0	0	0	0	0	1,131
Guy 4: EHS 3/8	Span/Head	23,000,000	15,400	0.90	13,860	700	2,365	1,352	1,352	0	1,352	13	1,858
									Totals:	0	1,352	13	4,302

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	150.00	90.0	20,000	1.00	20,000	1,887	0	9.4
Anchor	CTL	30.00	210.00	270.0	20,000	1.00	20,000	2,365	1,352	11.8
Anchor	CTL	30.00	246.00	225.0	20,000	1.00	20,000	4,510	0	22.6

Pole Buckling

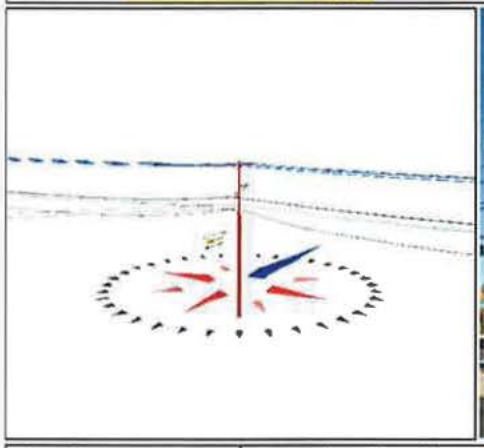
Buckling	Buckling (ft)	Buckling Section (% Buckling Col. Hgt.)	Buckling (in)	Min. Buckling (in)	Diameter (in)	Diameter (in)	Modulus of (psi)	Pole (pcf)	Ice Density (pcf)	Pole Tip (ft)	Buckling Load (lbs)	Buckling Load (lbs)	Buckling Load

0.71	23.92	34.65	11.08	10.33	6.69	12.42	1,000,000	50.00	57.00	35.60	115,230	3,431	33.59

O-Calc® Pro *Analysis Report*

Wednesday, November 05, 2014 3:35:33 PM

File Name:	P27882 GRADE B	Pole Length / Class:	45 / 4	Code:	NESC	Structure Type:	Guyed
Pole Num:	P27882	Pole Species:	WESTERN RED CEDAR	NESC Rule:	Rule 250B	Status:	N/A
Aux Data	COX	Setting Depth (ft):	9.40	Construction Grade:	B	Pole Strength Factor:	0.65
Aux Data	NELLIS & TROPICANA	G/L Circumference (in):	39.00	Loading District:	Light	Transverse Wind LF:	2.50
Aux Data	O/B 144CT	G/L Fiber Stress (psi):	6,000	Ice Thickness (in):	0.00	Wire Tension LF:	1.65
Aux Data	Unset	Allowable Stress (psi):	3,900	Wind Speed (mph):	59.29	Vertical LF:	1.50
Aux Data	Unset	Fiber Stress Ht. Reduction:	No	Wind Pressure (psf):	9.00		



Pole Capacity Utilization		Height	Wind Angle
Maximum:	173.0%	0.0 ft	179.3°
Groundline:	173.0%	0.0 ft	179.3°
Vertical:	3.0%	23.9 ft	45.0°

Pole Moments		Load Angle	Wind Angle
Max Capac. Util:	105,123 ft-lb	180.5°	179.3°
Groundline:	105,123 ft-lb	180.5°	179.3°

Guy Summary		Guy Tensions		Maximum Guy Tensions	
	Attach Height (ft)	% Allowable Tension	Wind Angle	% Allowable Tension	Wind Angle
Guy 1	23.3	0.0%	179.3°	40.6%	0.0°
Guy 2	22.3	0.0%	179.3°	36.4%	0.0°
Guy 3	21.5	0.0%	179.3°	14.1%	340.0°
Guy 4	21.5	9.8%	179.3°	17.1%	100.0°

Anchor Summary		
	Lead Length (ft)	Max. % Allow. Capacity
Anchor 1	150.0	9.8%
Anchor 2	210.0	11.8%
Anchor 3	246.0	23.0%

GROUNDLINE LOAD SUMMARY:*Wind at 179.3°, Applied Moment 105,123 ft-lb at 180.5°, Allowable Moment 61,042 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:	1,417	35.2	46,793	3.1	5.3	2,990	659	5	2,995	76.8

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

* Worst Wind per Guy Wire
* Wind at 179.3°

Comms:	1,691	42.0	41,103	5.8	9.9	2,626	1,013	8	2,634	67.6
Guys/Braces:	197	4.9	4,303	1.1	1.9	275	79	1	276	7.1
Pole:	637	15.8	10,209	9.7	16.7	652	1,368	11	664	17.0
Crossarms:	20	0.5	586	0.3	0.4	37	282	2	40	1.0
Insulators:	61	1.5	2,129	0.2	0.4	136	66	1	137	3.5
Pole Load:	4,022	100.0	105,123	100.0	172.2	6,716	3,466	29	6,745	172.9
Pole Reserve Capacity:			-44,081		-72.2	-2,816			-2,845	-72.9

LOAD SUMMARY BY OWNER

NVE:	1,199	41,299	2,639	840	7	2,646	67.8
ZFS:	294	8,070	516	123	1	517	13.2
COX:	601	16,088	1,028	353	3	1,031	26.4
CTL:	1,290	29,456	1,882	782	6	1,888	48.4
Pole:	637	10,209	652	1,368	11	664	17.0
Totals	4,022	105,123	6,716	3,466	29	6,745	172.9

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	636 AAC	NVE	34.51	56.90	0.9180	-	0.596	150.0	90.0	150.0	2,204	-1,185	-18	4,454	3,251
Primary	636 AAC	NVE	34.51	25.40	0.9180	-	0.596	150.0	90.0	150.0	2,204	-1,185	-14	4,454	3,256
Primary	636 AAC	NVE	34.51	56.90	0.9180	-	0.596	150.0	90.0	150.0	2,204	-1,185	18	4,454	3,287
Primary	336 AAC	NVE	34.51	25.40	0.6660	-	0.316	150.0	90.0	150.0	1,470	-790	7	3,231	2,448
Primary	4/0 ACSR	NVE	34.51	25.40	0.5630	-	0.291	210.0	270.0	210.0	1,000	538	9	3,824	4,371
Primary	636 AAC	NVE	34.51	56.90	0.9180	-	0.596	210.0	270.0	210.0	2,204	1,185	-25	6,236	7,395
Primary	636 AAC	NVE	34.51	25.40	0.9180	-	0.596	210.0	270.0	210.0	2,204	1,185	-19	6,236	7,402
Primary	636 AAC	NVE	34.51	56.90	0.9180	-	0.596	210.0	270.0	210.0	2,204	1,185	26	6,236	7,446
Other	288ct SELF SUPPORT	ZFS	26.79	21.41	0.8600	-	0.350	150.0	90.0	150.0	1,500	-626	67	3,239	2,681
Other	288ct SELF SUPPORT	ZFS	26.79	21.41	0.8600	-	0.350	210.0	270.0	210.0	1,500	626	94	4,535	5,255
											Totals:	-253	146	46,900	46,793

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, 48ct 1/4" MESS	COX	25.79	21.42	1.7700	-	1.201	150.0	90.0	150.1	1,500	-603	231	6,418	6,047
CATV	.75"cx X 2, .50"cx, 48ct 1/4" MESS	COX	25.79	21.42	1.7700	-	1.201	210.0	270.0	210.3	1,500	603	324	8,985	9,912
Telco	1.25" 144ct 5/16"MESS	CTL	22.25	6.92	1.9900	-	1.750	150.0	90.0	150.9	1,500	-520	113	6,226	5,819
Telco	1.25" 144ct 5/16"MESS	CTL	22.25	6.92	1.9900	-	1.750	210.0	270.0	210.9	1,500	520	159	8,716	9,395
Telco	1.0" 1/4" MESS	CTL	23.25	6.84	1.2500	-	0.800	150.0	90.0	150.1	1,500	-543	51	4,086	3,594
Telco	1.0" 1/4" MESS	CTL	23.25	6.84	1.2500	-	0.800	210.0	270.0	210.2	1,500	543	72	5,721	6,336
											Totals:	0	951	40,152	41,103

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	34.60	5.17	270.0	270.0	66.00	4.50	3.50	-	120.00	-	2	271	273

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

² Worst Wind per Guy Wire
³ Wind at 179.3°

Offset	CROSSARM 3-1/2 X 4-1/2 X 2 -	ZFS	26.60	-6.18	90.0	90.0	14.00	4.50	3.50	-	24.00	-	16	105	121
Offset	CROSSARM 3-1/2 X 4-1/2 X 2 -	COX	25.60	-6.19	90.0	90.0	14.00	4.50	3.50	-	24.00	-	16	101	117
Offset	CROSSARM 3-1/2 X 4-1/2 X 4 -	NVE	28.50	-6.34	270.0	270.0	28.00	4.50	3.50	-	48.00	-	-38	112	74
											Totals:	0	-3	589	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)*
Deadend	Deadend Insulator - 15 kV	NVE	34.60	54.00	5.5	180.0	3.00	12.75	-	3.80	-	-	-20	262	242
Deadend	Deadend Insulator - 15 kV	NVE	34.60	18.00	16.0	180.0	3.00	12.75	-	3.80	-	-	-7	262	255
Deadend	Deadend Insulator - 15 kV	NVE	34.60	-54.00	174.5	180.0	3.00	12.75	-	3.80	-	-	20	262	282
Deadend	Deadend Insulator - 15 kV	NVE	34.60	-18.00	164.0	180.0	3.00	12.75	-	3.80	-	-	7	262	269
Deadend	Deadend Insulator - 15 kV	NVE	34.60	-18.00	196.0	0.0	3.00	12.75	-	3.80	-	-	7	262	269
Deadend	Deadend Insulator - 15 kV	NVE	34.60	54.00	354.5	0.0	3.00	12.75	-	3.80	-	-	-20	262	242
Deadend	Deadend Insulator - 15 kV	NVE	34.60	18.00	344.0	0.0	3.00	12.75	-	3.80	-	-	-7	262	255
Deadend	Deadend Insulator - 15 kV	NVE	34.60	-54.00	185.5	0.0	3.00	12.75	-	3.80	-	-	20	262	282
Bolt	Three Bolt	ZFS	26.79	18.00	199.0	0.0	5.00	0.00	-	3.00	-	-	13	0	13
Bolt	Three Bolt	COX	25.79	18.00	199.0	0.0	5.00	0.00	-	3.00	-	-	13	0	13
Bolt	Three Bolt	CTL	22.25	4.42	180.0	90.0	5.00	0.00	-	3.00	-	-	4	0	4
Bolt	Three Bolt	CTL	23.25	4.34	180.0	90.0	5.00	0.00	-	3.00	-	-	4	0	4
											Totals:	0	34	2,095	2,129

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	23.25	23.25	246.00	0.250	75.0	225.0	0.0	0.121	244.60	0.00
Guy 2: EHS 1/4	Span/Head	CTL	22.25	22.25	246.00	0.250	75.0	225.0	0.0	0.121	244.50	0.00
Guy 3: EHS 3/8	Span/Head	CTL	21.50	21.50	150.00	0.375	75.0	90.0	0.0	0.273	149.03	0.00
Guy 4: EHS 3/8	Span/Head	CTL	21.50	21.50	210.00	0.375	75.0	270.0	0.0	0.273	208.60	1.78

Guy Wire and Brace (Loads and Reactions)		Elastic Modulus (psi)	Rated Tensile Strength (lbs)	Guy Strength Factor	Allowable Tension (lbs)	Initial Tension (lbs)	Required Tension[2] (lbs)	Required Tension[3] (lbs)	Applied Tension[3] (lbs)	Vertical Load[3] (lbs)	Shear Load in Guy Dir[3] (lbs)	Shear Load at Report Angle[3] (lbs)	Moment at GL[3] (ft-lb)*
Guy 1: EHS 1/4	Span/Head	23,000,000	6,650	0.90	5,985	700	2,432	0	0	0	0	0	671
Guy 2: EHS 1/4	Span/Head	23,000,000	6,650	0.90	5,985	700	2,177	0	0	0	0	0	642
Guy 3: EHS 3/8	Span/Head	23,000,000	15,400	0.90	13,860	700	1,955	0	0	0	0	0	1,131
Guy 4: EHS 3/8	Span/Head	23,000,000	15,400	0.90	13,860	700	2,367	1,352	1,352	0	1,352	13	1,859
									Totals:	0	1,352	13	4,303

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	150.00	90.0	20,000	1.00	20,000	1,955	0	9.8
Anchor	CTL	30.00	210.00	270.0	20,000	1.00	20,000	2,367	1,352	11.8
Anchor	CTL	30.00	246.00	225.0	20,000	1.00	20,000	4,610	0	23.0

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

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

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

0.71	23.94	34.66	11.08	10.39	6.69	12.42	1,000,000	50.00	57.00	35.60	114,987	**3,466**	**33.18**

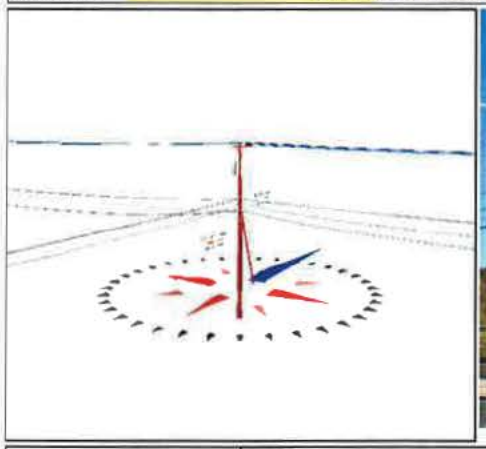
Version: 4.2 / 4.06
* includes Load Factor(s)

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

O-Calc® Pro *Analysis Report*

Wednesday, November 05, 2014 3:38:05 PM

File Name:	P55291 GRADE B	Pole Length / Class:	50 / 3	Code:	NESC	Structure Type:	Guyed
Pole Num:	P55291	Pole Species:	WESTERN RED CEDAR	NESC Rule:	Rule 250B	Status:	N/A
Aux Data	COX	Setting Depth (ft):	8.70	Construction Grade:	B	Pole Strength Factor:	0.65
Aux Data	NELLIS & TROPICANA	G/L Circumference (in):	46.00	Loading District:	Light	Transverse Wind LF:	2.50
Aux Data	O/B 144CT	G/L Fiber Stress (psi):	6,000	Ice Thickness (in):	0.00	Wire Tension LF:	1.65
Aux Data	Unset	Allowable Stress (psi):	3,900	Wind Speed (mph):	59.29	Vertical LF:	1.50
Aux Data	Unset	Fiber Stress Ht. Reduction:	No	Wind Pressure (psf):	9.00		



Pole Capacity Utilization		Height	Wind Angle
Maximum:	71.6%	26.0 ft	0.0°
Groundline:	58.4%	0.0 ft	180.7°
Vertical:	22.1%	28.0 ft	180.0°

Pole Moments		Load Angle	Wind Angle
Max Capac. Util:	22,804 ft-lb	356.4°	0.0°
Groundline:	53,255 ft-lb	182.8°	180.7°

Guy Summary		Guy Tensions		Maximum Guy Tensions	
	Attach Height (ft)	% Allowable Tension	Wind Angle	% Allowable Tension	Wind Angle
Guy 1	39.7	73.2%	180.7°	73.2%	180.0°
Guy 2	24.4	7.6%	180.7°	37.1%	100.0°
Guy 3	24.3	146.6%	180.7°	146.6%	180.0°
Guy 4	22.9	0.5%	180.7°	9.1%	260.0°
Guy 5	22.3	134.2%	180.7°	134.3%	180.0°

Anchor Summary		
	Lead Length (ft)	Max. % Allow. Capacity
Anchor 1	206.0	4.6%
Anchor 2	7.0	148.2%
Anchor 3	20.7	11.1%

GROUNDLINE LOAD SUMMARY:*Wind at 180.7°, Applied Moment 53,255 ft-lb at 182.8°, Allowable Moment 100,163 ft-lb

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

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

² Worst Wind per Guy Wire
³ Wind at 180.7°

Powers:	1,529	66.5	58,372	2.3	1.2	2,273	712	4	2,277	58.4
Comms:	6,673	290.3	165,448	6.8	3.6	6,442	992	6	6,448	165.3
Guys/Braces:	-7,250	-315.4	-198,991	2.5	1.3	-7,748	29,109	173	-7,575	-194.2
Power Equipment:	176	7.7	6,128	11.5	6.1	239	960	6	244	6.3
Pole:	850	37.0	15,599	29.3	15.6	607	2,113	13	620	15.9
Crossarms:	4	0.2	159	0.3	0.2	6	99	1	7	0.2
Risers:	273	11.9	4,717	5.2	2.7	184	105	1	184	4.7
Insulators:	45	1.9	1,823	0.9	0.5	71	105	1	72	1.8
Pole Load:	2,299	100.0	53,255	100.0	53.2	2,074	34,196	203	2,277	58.4
Pole Reserve Capacity:			46,908		46.8	1,826			1,623	41.6

LOAD SUMMARY BY OWNER

NVE:	349	9,862	384	9,053	54	438	11.2
ZFS:	315	8,475	330	110	1	331	8.5
COX:	2,959	76,809	2,991	263	2	2,992	76.7
CTL:	-2,174	-57,489	-2,238	22,658	135	-2,104	-53.9
Pole:	850	15,599	607	2,113	13	620	15.9
Totals	2,299	53,255	2,074	34,196	203	2,277	58.4

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	4/0 ACSR	NVE	41.18	18.82	0.5630	-	0.291	206.0	90.0	206.0	1,000	-3,312	66	4,474	1,229
Primary	4/0 ACSR	NVE	41.18	18.82	0.5630	-	0.291	185.0	270.0	185.1	1,000	3,312	60	4,018	7,369
Primary	636 AAC	NVE	41.18	54.28	0.9180	-	0.596	206.0	90.0	206.0	2,204	-7,301	412	7,298	409
Primary	636 AAC	NVE	41.18	54.28	0.9180	-	0.596	185.0	270.0	185.0	2,204	7,301	370	6,554	14,225
Primary	636 AAC	NVE	41.18	18.82	0.9180	-	0.596	206.0	90.0	206.0	2,204	-7,301	-140	7,298	-143
Primary	636 AAC	NVE	41.18	18.82	0.9180	-	0.596	185.0	270.0	185.0	2,204	7,301	-126	6,554	13,730
Primary	636 AAC	NVE	41.18	54.28	0.9180	-	0.596	206.0	90.0	206.0	2,204	-7,301	-416	7,298	-419
Primary	636 AAC	NVE	41.18	54.28	0.9180	-	0.596	185.0	270.0	185.0	2,204	7,301	-374	6,554	13,482
Other	288ct SELF SUPPORT	ZFS	26.70	7.45	0.8600	-	0.350	206.0	90.0	206.0	1,500	-3,219	34	4,429	1,244
Other	288ct SELF SUPPORT	ZFS	26.70	7.45	0.8600	-	0.350	185.0	270.0	185.0	1,500	3,219	30	3,977	7,226
											Totals:	0	-84	58,456	58,372

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 3, 48ct 1/4" MESS	COX	25.90	7.53	1.3400	-	0.750	206.0	90.0	206.0	1,500	-3,122	73	6,694	3,644
CATV	.50"cx X 2, 48ct X 2 1/4" MESS	COX	25.90	7.53	1.3200	-	0.772	185.0	270.0	185.2	1,500	3,122	67	5,922	9,112
CATV	.50"cx, 48ct 1/4" MESS	COX	25.90	7.53	0.9800	-	0.450	96.0	180.0	96.0	1,500	64,026	20	1	64,048
Telco	1.25" 1/4" MESS	CTL	24.40	5.16	1.5000	-	1.000	206.0	90.0	206.2	1,500	-2,942	-3	7,059	4,115
Telco	1.50" 1/4"MESS	CTL	22.90	7.79	1.7500	-	1.350	206.0	90.0	206.4	1,500	-2,761	135	7,730	5,104
Telco	1.50", 1.0" 1/4"MESS	CTL	22.90	7.79	2.5000	-	2.050	185.0	270.0	185.7	1,500	2,761	184	9,917	12,862
Telco	.50" 1/4" MESS	CTL	24.20	5.18	0.7500	-	0.250	96.0	180.0	96.0	1,500	59,824	8	1	59,833
Telco	144ct 5/16"MESS	CTL	22.25	5.35	1.0500	-	0.515	185.0	270.0	185.0	1,500	2,682	2	4,047	6,731

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

² Worst Wind per Guy Wire
³ Wind at 180.7°

											Totals:	123,591	486	41,371	165,448

PowerEquipment:		Owner	Height (ft)	Horiz. Offset (in)	Offset Angle (deg)	Rotate Angle (deg)	Unit Weight (lbs)	Unit Height (in)	Unit Depth (in)	Unit Diameter (in)	Unit Length (in)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Transformer	1PH-50KVA	NVE	34.30	22.28	270.0	270.0	640.00	47.00	-	24.00	-	-	87	6,041	6,128
											Totals:	0	87	6,041	6,128

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	40.20	5.51	90.0	90.0	66.00	4.50	3.50	-	120.00	-	-2	161	159
											Totals:	0	-2	161	159

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	30.90	7.74	270.0	270.0	2.32	370.80	-	0.00	-	-	1	2,743	2,744
3" Riser 90.0°	3" Riser	CTL	21.25	7.74	90.0	90.0	3.54	255.00	-	0.00	-	-	-1	1,974	1,973
											Totals:	0	0	4,717	4,717

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	40.39	18.00	163.0	0.0	10.00	9.50	-	7.50	-	-	22	452	474
Pin	Pin Insulator - 15 kV	NVE	40.39	54.00	174.2	0.0	10.00	9.50	-	7.50	-	-	67	452	519
Pin	Pin Insulator - 15 kV	NVE	40.39	-18.00	17.0	0.0	10.00	9.50	-	7.50	-	-	-23	452	429
Pin	Pin Insulator - 15 kV	NVE	40.39	-54.00	5.8	0.0	10.00	9.50	-	7.50	-	-	-68	452	384
Bolt	Three Bolt	ZFS	26.70	4.95	180.0	90.0	5.00	0.00	-	3.00	-	-	5	0	5
Bolt	Three Bolt	COX	25.90	5.03	180.0	90.0	5.00	0.00	-	3.00	-	-	5	0	5
Deadend	Three Bolt	CTL	24.40	5.16	90.0	90.0	5.00	0.00	-	3.00	-	-	0	0	0
Bolt	Three Bolt	CTL	22.90	5.29	180.0	90.0	5.00	0.00	-	3.00	-	-	5	0	5
Deadend	Three Bolt	CTL	24.20	5.18	180.0	180.0	5.00	0.00	-	3.00	-	-	3	0	3
Deadend	Three Bolt	CTL	22.25	5.35	270.0	270.0	5.00	0.00	-	3.00	-	-	0	0	0
											Totals:	0	16	1,807	1,823

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	39.70	0.00	7.00	0.312	75.0	0.0	80.0	0.205	38.81	2.60
Guy 2: EHS 1/4	Down	CTL	24.40	0.00	20.70	0.250	75.0	270.0	49.7	0.121	30.50	0.20
Guy 3: EHS 1/4	Down	CTL	24.30	0.00	7.00	0.250	75.0	0.0	73.9	0.121	23.79	2.96
Guy 4: EHS 5/16	Span/Head	CTL	22.90	22.90	206.00	0.312	75.0	90.0	0.0	0.205	204.77	0.09
Guy 5: EHS 5/16	Down	CTL	22.25	0.00	7.00	0.312	75.0	0.0	72.5	0.205	21.83	2.68

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[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	7,379	7,379	7,379	7,267	1,281	-1,280	-50,877
Guy 2: EHS 1/4	Down	23,000,000	6,650	0.90	5,985	700	2,223	453	453	346	293	14	533
Guy 3: EHS 1/4	Down	23,000,000	6,650	0.90	5,985	700	8,773	8,773	8,773	8,430	2,428	-2,426	-59,212

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

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

Guy 4: EHS 5/16	Span/Head	23,000,000	11,200	0.90	10,080	700	917	51	51	0	51	-2	1,321
Guy 5: EHS 5/16	Down	23,000,000	11,200	0.90	10,080	700	13,533	13,532	13,532	12,908	4,061	-4,056	-90,758
									Totals:	28,951	8,115	-7,750	-

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	206.00	90.0	20,000	1.00	20,000	917	51	4.6
Single Helix Anchor	NVE	18.00	7.00	0.0	20,000	1.00	20,000	29,641	29,640	148.2
Single Helix Anchor	CTL	18.00	20.70	270.0	20,000	1.00	20,000	2,223	453	11.1

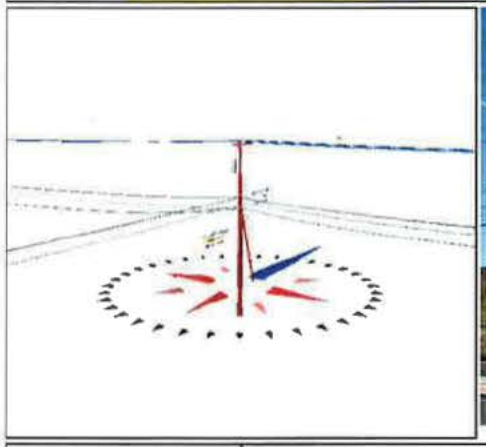
Pole Buckling

Buckling	Buckling (ft)	Buckling Section (% Buckling Col. Hgt.)	Buckling (in)	Min. Buckling (in)	Diameter (in)	Diameter (in)	Modulus of (psi)	Pole (pcf)	Ice Density (pcf)	Pole Tip (ft)	Buckling Load (lbs)	Buckling Load (lbs)	Buckling Load
0.71	28.00	35.08	12.90	34.82	7.32	14.65	1,000,000	50.00	57.00	41.30	154,558	34,196	4.52

O-Calc® Pro *Analysis Report*

Wednesday, November 05, 2014 3:39:11 PM

File Name:	P55291 GRADE B	Pole Length / Class:	50 / 3	Code:	NESC	Structure Type:	Guyed
Pole Num:	P55291	Pole Species:	WESTERN RED CEDAR	NESC Rule:	Rule 250B	Status:	N/A
Aux Data	COX	Setting Depth (ft):	8.70	Construction Grade:	B	Pole Strength Factor:	0.65
Aux Data	NELLIS & TROPICANA	G/L Circumference (in):	46.00	Loading District:	Light	Transverse Wind LF:	2.50
Aux Data	O/B 144CT	G/L Fiber Stress (psi):	6,000	Ice Thickness (in):	0.00	Wire Tension LF:	1.65
Aux Data	Unset	Allowable Stress (psi):	3,900	Wind Speed (mph):	59.29	Vertical LF:	1.50
Aux Data	Unset	Fiber Stress Ht. Reduction:	No	Wind Pressure (psf):	9.00		



Pole Capacity Utilization		Height	Wind Angle
Maximum:	71.6%	26.0 ft	358.6°
Groundline:	58.5%	0.0 ft	180.0°
Vertical:	22.2%	28.0 ft	180.0°

Pole Moments		Load Angle	Wind Angle
Max Capac. Util:	53,402 ft-lb	356.0°	358.6°
Groundline:	53,402 ft-lb	182.7°	180.0°

Guy Summary		Guy Tensions		Maximum Guy Tensions	
	Attach Height (ft)	% Allowable Tension	Wind Angle	% Allowable Tension	Wind Angle
Guy 1	39.7	73.3%	180.0°	73.3%	180.0°
Guy 2	24.4	7.9%	180.0°	37.1%	100.0°
Guy 3	24.3	147.2%	180.0°	147.2%	180.0°
Guy 4	22.9	0.5%	180.0°	9.1%	260.0°
Guy 5	22.3	134.7%	180.0°	134.7%	177.2°

Anchor Summary		
	Lead Length (ft)	Max. % Allow. Capacity
Anchor 1	206.0	4.6%
Anchor 2	7.0	148.7%
Anchor 3	20.7	11.1%

GROUNDLINE LOAD SUMMARY:*Wind at 180.0°, Applied Moment 53,402 ft-lb at 182.7°, Allowable Moment 100,163 ft-lb

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

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

² Worst Wind per Guy Wire
³ Wind at 180.0°

Powers:	1,529	66.4	58,379	2.4	1.3	2,273	712	4	2,277	58.4
Comms:	6,703	290.9	166,240	7.6	4.1	6,473	1,031	6	6,479	166.1
Guys/Braces:	-7,274	-315.8	-199,626	2.5	1.3	-7,773	29,216	174	-7,599	-194.9
Power Equipment:	176	7.6	6,124	11.5	6.1	238	960	6	244	6.3
Pole:	849	36.9	15,592	29.2	15.6	607	2,113	13	620	15.9
Crossarms:	4	0.2	156	0.3	0.2	6	99	1	7	0.2
Risers:	272	11.8	4,715	5.1	2.7	184	105	1	184	4.7
Insulators:	44	1.9	1,822	0.9	0.5	71	105	1	72	1.8
Pole Load:	2,304	100.0	53,402	100.0	53.3	2,079	34,341	204	2,283	58.5
Pole Reserve Capacity:			46,761		46.7	1,821			1,617	41.5

LOAD SUMMARY BY OWNER

NVE:	346	9,767	380	9,065	54	434	11.1
ZFS:	315	8,476	330	110	1	331	8.5
COX:	2,988	77,590	3,021	301	2	3,023	77.5
CTL:	-2,195	-58,022	-2,259	22,751	135	-2,124	-54.5
Pole:	849	15,592	607	2,113	13	620	15.9
Totals	2,304	53,402	2,079	34,341	204	2,283	58.5

Detailed Load Components

Power:		Owner	Height (ft)	Horiz. Offset (in)	Cable Dia. (in)	Rotate Angle (deg)	Cable Weight (lbs/ft)	Lead/Span Length	Span Angle (deg)	Wire Length (ft)	Tension (lbs)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Primary	4/0 ACSR	NVE	41.18	18.82	0.5630	-	0.291	206.0	90.0	206.0	1,000	-3,243	66	4,475	1,298
Primary	4/0 ACSR	NVE	41.18	18.82	0.5630	-	0.291	185.0	270.0	185.1	1,000	3,243	60	4,019	7,321
Primary	636 AAC	NVE	41.18	54.28	0.9180	-	0.596	206.0	90.0	206.0	2,204	-7,150	412	7,299	561
Primary	636 AAC	NVE	41.18	54.28	0.9180	-	0.596	185.0	270.0	185.0	2,204	7,150	370	6,555	14,074
Primary	636 AAC	NVE	41.18	18.82	0.9180	-	0.596	206.0	90.0	206.0	2,204	-7,150	-140	7,299	10
Primary	636 AAC	NVE	41.18	18.82	0.9180	-	0.596	185.0	270.0	185.0	2,204	7,150	-126	6,555	13,579
Primary	636 AAC	NVE	41.18	54.28	0.9180	-	0.596	206.0	90.0	206.0	2,204	-7,150	-416	7,299	-266
Primary	636 AAC	NVE	41.18	54.28	0.9180	-	0.596	185.0	270.0	185.0	2,204	7,150	-374	6,555	13,331
Other	288ct SELF SUPPORT	ZFS	26.70	7.45	0.8600	-	0.350	206.0	90.0	206.0	1,500	-3,152	34	4,429	1,311
Other	288ct SELF SUPPORT	ZFS	26.70	7.45	0.8600	-	0.350	185.0	270.0	185.0	1,500	3,152	30	3,978	7,160
											Totals:	0	-84	58,463	58,379

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 3, 48ct 1/4" MESS PROP	COX	25.90	7.53	1.4100	-	0.881	206.0	90.0	206.2	1,500	-3,058	85	7,045	4,072
CATV	.50"cx X 2, 48ct X 2 1/4" MESS	COX	25.90	7.53	1.4100	-	0.903	185.0	270.0	185.1	1,500	3,058	78	6,327	9,463
CATV	.50"cx, 48ct 1/4" MESS	COX	25.90	7.53	0.9800	-	0.450	96.0	180.0	96.0	1,500	64,030	20	0	64,050
Telco	1.25" 1/4" MESS	CTL	24.40	5.16	1.5000	-	1.000	206.0	90.0	206.2	1,500	-2,880	-3	7,060	4,177
Telco	1.50" 1/4"MESS	CTL	22.90	7.79	1.7500	-	1.350	206.0	90.0	206.4	1,500	-2,703	135	7,731	5,163
Telco	1.50", 1.0" 1/4"MESS	CTL	22.90	7.79	2.5000	-	2.050	185.0	270.0	185.7	1,500	2,703	184	9,918	12,806
Telco	.50" 1/4" MESS	CTL	24.20	5.18	0.7500	-	0.250	96.0	180.0	96.0	1,500	59,827	8	0	59,835
Telco	144ct 5/16"MESS	CTL	22.25	5.35	1.0500	-	0.515	185.0	270.0	185.0	1,500	2,627	2	4,047	6,676

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

² Worst Wind per Guy Wire
³ Wind at 180.0°

											Totals:	123,603	510	42,128	166,240

PowerEquipment:		Owner	Height (ft)	Horiz. Offset (in)	Offset Angle (deg)	Rotate Angle (deg)	Unit Weight (lbs)	Unit Height (in)	Unit Depth (in)	Unit Diameter (in)	Unit Length (in)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Transformer	1PH-50KVA	NVE	34.30	22.28	270.0	270.0	640.00	47.00	-	24.00	-	-	85	6,038	6,124
											Totals:	0	85	6,038	6,124

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	40.20	5.51	90.0	90.0	66.00	4.50	3.50	-	120.00	-	-2	158	156
											Totals:	0	-2	158	156

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	30.90	7.74	270.0	270.0	2.32	370.80	-	0.00	-	-	1	2,742	2,743
3" Riser 90.0°	3" Riser	CTL	21.25	7.74	90.0	90.0	3.54	255.00	-	0.00	-	-	-1	1,973	1,972
											Totals:	0	0	4,715	4,715

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)*
Pin	Pin Insulator - 15 kV	NVE	40.39	18.00	163.0	0.0	10.00	9.50	-	7.50	-	-	22	451	474
Pin	Pin Insulator - 15 kV	NVE	40.39	54.00	174.2	0.0	10.00	9.50	-	7.50	-	-	67	451	519
Pin	Pin Insulator - 15 kV	NVE	40.39	-18.00	17.0	0.0	10.00	9.50	-	7.50	-	-	-23	451	429
Pin	Pin Insulator - 15 kV	NVE	40.39	-54.00	5.8	0.0	10.00	9.50	-	7.50	-	-	-68	451	384
Bolt	Three Bolt	ZFS	26.70	4.95	180.0	90.0	5.00	0.00	-	3.00	-	-	5	0	5
Bolt	Three Bolt	COX	25.90	5.03	180.0	90.0	5.00	0.00	-	3.00	-	-	5	0	5
Deadend	Three Bolt	CTL	24.40	5.16	90.0	90.0	5.00	0.00	-	3.00	-	-	0	0	0
Bolt	Three Bolt	CTL	22.90	5.29	180.0	90.0	5.00	0.00	-	3.00	-	-	5	0	5
Deadend	Three Bolt	CTL	24.20	5.18	180.0	180.0	5.00	0.00	-	3.00	-	-	3	0	3
Deadend	Three Bolt	CTL	22.25	5.35	270.0	270.0	5.00	0.00	-	3.00	-	-	0	0	0
											Totals:	0	16	1,806	1,822

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	39.70	0.00	7.00	0.312	75.0	0.0	80.0	0.205	38.81	2.60
Guy 2: EHS 1/4	Down	CTL	24.40	0.00	20.70	0.250	75.0	270.0	49.7	0.121	30.50	0.20
Guy 3: EHS 1/4	Down	CTL	24.30	0.00	7.00	0.250	75.0	0.0	73.9	0.121	23.79	2.97
Guy 4: EHS 5/16	Span/Head	CTL	22.90	22.90	205.00	0.312	75.0	90.0	0.0	0.205	204.77	0.08
Guy 5: EHS 5/16	Down	CTL	22.25	0.00	7.00	0.312	75.0	0.0	72.5	0.205	21.83	2.69

Guy Wire and Brace (Loads and Reactions)		Elastic Modulus (psi)	Rated Tensile Strength (lbs)	Guy Strength Factor	Allowable Tension (lbs)	Initial Tension (lbs)	Required Tension[2] (lbs)	Required Tension[3] (lbs)	Applied Tension[3] (lbs)	Vertical Load[3] (lbs)	Shear Load in Guy Dir[3] (lbs)	Shear Load at Report Angle[3] (lbs)	Moment at GL[3] (ft-lb)*
Guy 1: EHS 5/16	Down	23,000,000	11,200	0.90	10,080	700	7,392	7,392	7,392	7,280	1,284	-1,282	-50,968
Guy 2: EHS 1/4	Down	23,000,000	6,650	0.90	5,985	700	2,223	473	473	360	306	15	540
Guy 3: EHS 1/4	Down	23,000,000	6,650	0.90	5,985	700	8,810	8,810	8,810	8,466	2,439	-2,436	-59,468

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

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

Guy 4: EHS 5/16	Span/Head	23,000,000	11,200	0.90	10,080	700	917	46	46	0	46	-2	1,328
Guy 5: EHS 5/16	Down	23,000,000	11,200	0.90	10,080	700	13,577	13,576	13,576	12,950	4,074	-4,070	-91,057
									Totals:	29,057	8,148	-7,775	-

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	206.00	90.0	20,000	1.00	20,000	917	46	4.6
Single Helix Anchor	NVE	18.00	7.00	0.0	20,000	1.00	20,000	29,736	29,735	148.7
Single Helix Anchor	CTL	18.00	20.70	270.0	20,000	1.00	20,000	2,223	473	11.1

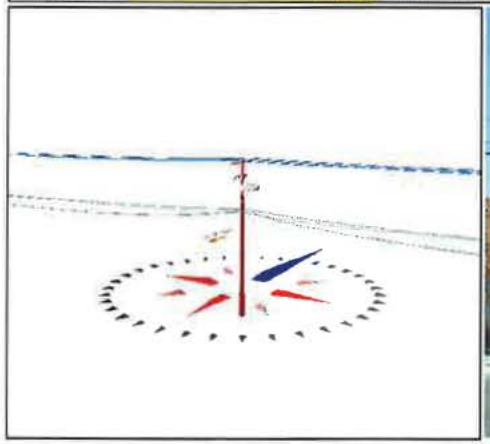
Pole Buckling

Buckling	Buckling (ft)	Buckling Section (% Buckling Col. Hgt.)	Buckling (in)	Min. Buckling (in)	Diameter (in)	Diameter (in)	Modulus of (psi)	Pole (pcf)	Ice Density (pcf)	Pole Tip (ft)	Buckling Load (lbs)	Buckling Load (lbs)	Buckling Load
0.71	27.99	35.08	12.90	34.89	7.32	14.65	1,000,000	50.00	57.00	41.30	154,661	34,341	4.50

O-Calc® Pro *Analysis Report*

Wednesday, November 05, 2014 3:41:57 PM

File Name:	P6068 GRADE B	Pole Length / Class:	45 / 4	Code:	NESC	Structure Type:	Unguyed
Pole Num:	P6068	Pole Species:	WESTERN RED CEDAR	NESC Rule:	Rule 250B	Status:	N/A
Aux Data	COX	Setting Depth (ft):	8.20	Construction Grade:	B	Pole Strength Factor:	0.65
Aux Data	NELLIS & TROPICANA	G/L Circumference (in):	48.00	Loading District:	Light	Transverse Wind LF:	2.50
Aux Data	O/B 144CT	G/L Fiber Stress (psi):	6,000	Ice Thickness (in):	0.00	Wire Tension LF:	1.10
Aux Data	Unset	Allowable Stress (psi):	3,900	Wind Speed (mph):	59.29	Vertical LF:	1.50
Aux Data	Unset	Fiber Stress Ht. Reduction:	No	Wind Pressure (psf):	9.00		



Pole Capacity Utilization		Height	Wind Angle
Maximum:	97.1%	8.7 ft	180.0°
Groundline:	93.3%	0.0 ft	180.0°
Vertical:	20.6%	25.0 ft	180.0°

Pole Moments		Load Angle	Wind Angle
Max Capac. Util:	71,636 ft-lb	177.5°	180.0°
Groundline:	105,358 ft-lb	178.3°	180.0°

GROUNDLINE LOAD SUMMARY:*Wind at 180.0°, Applied Moment 105,358 ft-lb at 178.3°, Allowable Moment 113,804 ft-lb

	Shear Load (lbs)*	Percent Applied Load	Bending Moment (ft-lb)	Percent of Applied Moment**	Percent of Pole Capacity	Bending Stress (+/- psi)	Vertical Load (lbs)	Vertical Stress (psi)	Total Stress (psi)	Percent of Pole Capacity
Powers:	1,429	35.6	49,331	3.3	2.1	1,691	665	4	1,694	43.4
Comms:	1,614	40.3	37,227	9.2	5.8	1,276	954	5	1,281	32.8
Power Equipment:	135	3.4	4,047	5.6	3.6	139	1,650	9	148	3.8
Pole:	757	18.9	12,118	16.9	10.6	415	1,908	10	426	10.9
Crossarms:	8	0.2	266	0.2	0.1	9	159	1	10	0.3
Insulators:	67	1.7	2,368	0.6	0.4	81	104	1	82	2.1
Pole Load:	4,010	100.0	105,358	147.1	92.6	3,611	5,439	30	3,640	93.3
Pole Reserve Capacity:			8,446		7.4	289			260	6.7

LOAD SUMMARY BY OWNER

NVE:	1,210	44,477	1,524	802	4	1,529	39.2
ZFS:	294	7,474	256	103	1	257	6.6
COX:	462	10,893	373	254	1	375	9.6

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

² Worst Wind per Guy Wire
³ Wind at 180.0°

CTL:	1,153	26,348	903	722	4	907	23.3
POWER:	135	4,047	139	1,650	9	148	3.8
Pole:	757	12,118	415	1,908	10	426	10.9
Totals	4,010	105,358	3,611	5,439	30	3,640	93.3

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	4/0 ACSR	NVE	36.98	18.73	0.5630	-	0.291	182.0	270.0	182.1	1,000	-1,228	59	3,553	2,384
Primary	4/0 ACSR	NVE	36.98	18.73	0.5630	-	0.291	183.0	90.0	183.0	1,000	1,228	59	3,572	4,860
Primary	636 AAC	NVE	36.98	54.25	0.9180	-	0.596	182.0	270.0	182.0	2,204	-2,708	-367	5,796	2,720
Primary	636 AAC	NVE	36.98	54.25	0.9180	-	0.596	183.0	90.0	183.0	2,204	2,708	-369	5,827	8,167
Primary	636 AAC	NVE	36.98	18.73	0.9180	-	0.596	182.0	270.0	182.0	2,204	-2,708	-123	5,796	2,964
Primary	636 AAC	NVE	36.98	18.73	0.9180	-	0.596	183.0	90.0	183.0	2,204	2,708	-124	5,827	8,412
Primary	636 AAC	NVE	36.98	54.25	0.9180	-	0.596	182.0	270.0	182.0	2,204	-2,708	365	5,796	3,452
Primary	636 AAC	NVE	36.98	54.25	0.9180	-	0.596	183.0	90.0	183.0	2,204	2,708	367	5,827	8,903
Other	288ct SELF SUPPORT	ZFS	25.20	7.20	0.8600	-	0.350	183.0	90.0	183.0	1,500	1,255	29	3,716	5,000
Other	288ct SELF SUPPORT	ZFS	25.20	7.20	0.8600	-	0.350	182.0	270.0	182.0	1,500	-1,255	29	3,696	2,470
											Totals:	0	-75	49,407	49,331

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, .50"cx, 48ct, 24ct 1/4" MESS	COX	23.25	7.42	1.3500	-	0.902	183.0	90.0	183.1	1,500	1,158	77	5,382	6,617
CATV	.75"cx, .50"cx, 48ct, 24ct 1/4" MESS	COX	23.25	7.42	1.3500	-	0.902	182.0	270.0	182.1	1,500	-1,158	76	5,353	4,272
Telco	1.25", 1.0" 5/16" MESS	CTL	22.70	7.49	2.2500	-	2.000	183.0	90.0	183.6	1,500	1,130	171	8,759	10,060
Telco	1.25", 1.0" 5/16" MESS	CTL	22.70	7.49	2.2500	-	2.000	182.0	270.0	182.6	1,500	-1,130	170	8,711	7,751
Telco	144ct 3/8"MESS	CTL	22.00	7.57	1.1200	-	0.583	183.0	90.0	183.1	1,500	1,095	50	4,225	5,371
Telco	144ct 3/8"MESS	CTL	22.00	7.57	1.1200	-	0.583	182.0	270.0	182.1	1,500	-1,095	50	4,202	3,157
											Totals:	0	595	36,632	37,227

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	POWER	29.20	30.23	90.0	90.0	1,100.00	18.00	39.00	-	48.00	-	107	3,940	4,047
											Totals:	0	107	3,940	4,047

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	36.00	5.19	270.0	270.0	66.00	4.50	3.50	-	120.00	-	-1	142	140
Normal	CUTOUT BRACKET	NVE	32.20	5.63	270.0	270.0	40.00	4.50	3.50	-	72.00	-	-1	127	126
											Totals:	0	-2	268	266

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	36.19	-18.00	196.1	0.0	10.00	9.50	-	7.50	-	-	22	405	427
Pin	Pin Insulator - 15 kV	NVE	36.19	54.00	354.5	0.0	10.00	9.50	-	7.50	-	-	-68	405	337

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

² Worst Wind per Guy Wire
³ Wind at 180.0°

Pin	Pin Insulator - 15 kV	NVE	36.19	18.00	343.9	0.0	10.00	9.50	-	7.50	-	-	-23	405	382
Pin	Pin Insulator - 15 kV	NVE	36.19	-54.00	185.5	0.0	10.00	9.50	-	7.50	-	-	67	405	472
Bolt	Three Bolt	ZFS	25.20	4.70	180.0	90.0	5.00	0.00	-	3.00	-	-	4	0	4
Bolt	Three Bolt	COX	23.25	4.92	180.0	90.0	5.00	0.00	-	3.00	-	-	5	0	5
Bolt	Three Bolt	CTL	22.70	4.99	180.0	90.0	5.00	0.00	-	3.00	-	-	5	0	5
Bolt	Three Bolt	CTL	22.00	5.07	180.0	90.0	5.00	0.00	-	3.00	-	-	5	0	5
Deadend	CUTOUT	NVE	32.20	32.00	350.0	0.0	3.00	12.75	-	3.80	-	-	-12	244	232
Deadend	CUTOUT	NVE	32.20	0.00	270.0	0.0	3.00	12.75	-	3.80	-	-	0	244	243
Deadend	CUTOUT	NVE	32.20	-32.00	190.0	0.0	3.00	12.75	-	3.80	-	-	12	244	255
											Totals:	0	17	2,351	2,368

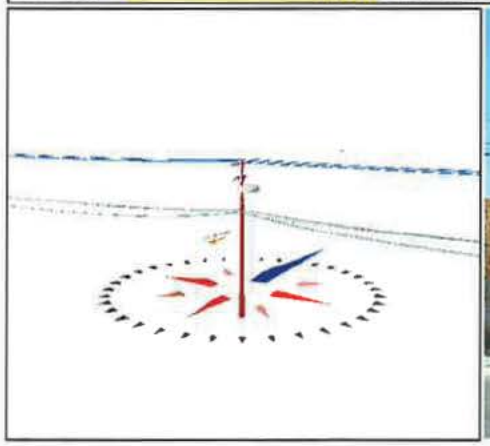
Pole Buckling

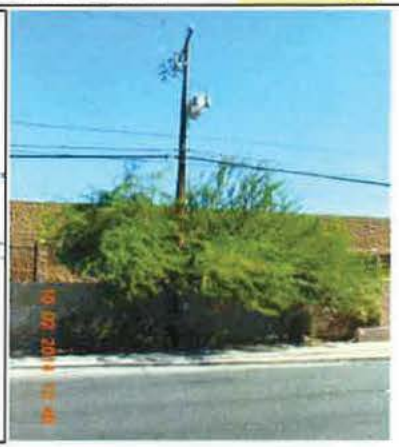
Buckling	Buckling (ft)	Buckling Section (% Buckling Col. Hgt.)	Buckling (in)	Min. Buckling (in)	Diameter (in)	Diameter (in)	Modulus of (psi)	Pole (pcf)	Ice Density (pcf)	Pole Tip (ft)	Buckling Load (lbs)	Buckling Load (lbs)	Buckling Load
2.00	25.02	35.74	13.19	22.32	6.69	15.29	1,000,000	50.00	57.00	36.60	26,434	5,439	4.86

O-Calc® Pro *Analysis Report*

Wednesday, November 05, 2014 3:42:39 PM

File Name:	P6068 GRADE B	Pole Length / Class:	45 / 4	Code:	NESC	Structure Type:	Unguyed
Pole Num:	P6068	Pole Species:	WESTERN RED CEDAR	NESC Rule:	Rule 250B	Status:	N/A
Aux Data	COX	Setting Depth (ft):	8.20	Construction Grade:	B	Pole Strength Factor:	0.65
Aux Data	NELLIS & TROPICANA	G/L Circumference (in):	48.00	Loading District:	Light	Transverse Wind LF:	2.50
Aux Data	O/B 144CT	G/L Fiber Stress (psi):	6,000	Ice Thickness (in):	0.00	Wire Tension LF:	1.10
Aux Data	Unset	Allowable Stress (psi):	3,900	Wind Speed (mph):	59.29	Vertical LF:	1.50
Aux Data	Unset	Fiber Stress Ht. Reduction:	No	Wind Pressure (psf):	9.00		





Pole Capacity Utilization		Height	Wind Angle
Maximum:	98.1%	8.7 ft	179.3°
Groundline:	94.3%	0.0 ft	180.0°
Vertical:	20.7%	25.0 ft	180.0°

Pole Moments		Load Angle	Wind Angle
Max Capac. Util:	72,360 ft-lb	177.3°	179.3°
Groundline:	106,494 ft-lb	178.3°	180.0°

GROUNDLINE LOAD SUMMARY:*Wind at 180.0°, Applied Moment 106,494 ft-lb at 178.3°, Allowable Moment 113,804 ft-lb

	Shear Load (lbs)*	Percent Applied Load	Bending Moment (ft-lb)	Percent of Applied Moment**	Percent of Pole Capacity	Bending Stress (+/- psi)	Vertical Load (lbs)	Vertical Stress (psi)	Total Stress (psi)	Percent of Pole Capacity
Powers:	1,429	35.2	49,332	3.3	2.1	1,691	665	4	1,694	43.4
Comms:	1,662	41.0	38,363	9.9	6.3	1,315	990	5	1,320	33.8
Power Equipment:	135	3.3	4,046	5.6	3.6	139	1,650	9	148	3.8
Pole:	757	18.7	12,118	16.7	10.6	415	1,908	10	426	10.9
Crossarms:	8	0.2	266	0.2	0.1	9	159	1	10	0.3
Insulators:	67	1.7	2,368	0.6	0.4	81	104	1	82	2.1
Pole Load:	4,058	100.0	106,494	147.2	93.6	3,649	5,475	30	3,679	94.3
Pole Reserve Capacity:			7,310		6.4	251			221	5.7

LOAD SUMMARY BY OWNER

NVE:	1,210	44,478	1,524	802	4	1,529	39.2
ZFS:	294	7,475	256	103	1	257	6.6
COX:	510	12,028	412	290	2	414	10.6

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

² Worst Wind per Guy Wire
³ Wind at 180.0°

CTL:	1,153	26,349	903	722	4	907	23.3
POWER:	135	4,046	139	1,650	9	148	3.8
Pole:	757	12,118	415	1,908	10	426	10.9
Totals	4,058	106,494	3,649	5,475	30	3,679	94.3

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	4/0 ACSR	NVE	36.98	18.73	0.5630	-	0.291	182.0	270.0	182.1	1,000	-1,215	59	3,553	2,397
Primary	4/0 ACSR	NVE	36.98	18.73	0.5630	-	0.291	183.0	90.0	183.0	1,000	1,215	59	3,572	4,847
Primary	636 AAC	NVE	36.98	54.25	0.9180	-	0.596	182.0	270.0	182.0	2,204	-2,679	-367	5,796	2,749
Primary	636 AAC	NVE	36.98	54.25	0.9180	-	0.596	183.0	90.0	183.0	2,204	2,679	-369	5,827	8,138
Primary	636 AAC	NVE	36.98	18.73	0.9180	-	0.596	182.0	270.0	182.0	2,204	-2,679	-123	5,796	2,993
Primary	636 AAC	NVE	36.98	18.73	0.9180	-	0.596	183.0	90.0	183.0	2,204	2,679	-124	5,827	8,383
Primary	636 AAC	NVE	36.98	54.25	0.9180	-	0.596	182.0	270.0	182.0	2,204	-2,679	365	5,796	3,481
Primary	636 AAC	NVE	36.98	54.25	0.9180	-	0.596	183.0	90.0	183.0	2,204	2,679	367	5,827	8,874
Other	288ct SELF SUPPORT	ZFS	25.20	7.20	0.8600	-	0.350	183.0	90.0	183.0	1,500	1,241	29	3,716	4,987
Other	288ct SELF SUPPORT	ZFS	25.20	7.20	0.8600	-	0.350	182.0	270.0	182.0	1,500	-1,241	29	3,696	2,483
											Totals:	0	-75	49,407	49,332

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, .50"cx, 48ct, 24ct 1/4" MESS	COX	23.25	7.42	1.4900	-	1.033	183.0	90.0	183.2	1,500	1,145	88	5,941	7,174
CATV	.75"cx, .50"cx, 48ct, 24ct 1/4" MESS	COX	23.25	7.42	1.4900	-	1.033	182.0	270.0	182.2	1,500	-1,145	87	5,908	4,850
Telco	1.25", 1.0" 5/16" MESS	CTL	22.70	7.49	2.2500	-	2.000	183.0	90.0	183.6	1,500	1,118	171	8,759	10,048
Telco	1.25", 1.0" 5/16" MESS	CTL	22.70	7.49	2.2500	-	2.000	182.0	270.0	182.6	1,500	-1,118	170	8,711	7,763
Telco	144ct 3/8"MESS	CTL	22.00	7.57	1.1200	-	0.583	183.0	90.0	183.1	1,500	1,084	50	4,225	5,360
Telco	144ct 3/8"MESS	CTL	22.00	7.57	1.1200	-	0.583	182.0	270.0	182.1	1,500	-1,084	50	4,202	3,169
											Totals:	0	617	37,746	38,363

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)*
Box	1200 KVAr CAPACITOR BANK	POWER	29.20	30.23	90.0	90.0	1,100.00	18.00	39.00	-	48.00	-	106	3,940	4,046
											Totals:	0	106	3,940	4,046

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	36.00	5.19	270.0	270.0	66.00	4.50	3.50	-	120.00	-	-1	142	140
Normal	CUTOUT BRACKET	NVE	32.20	5.63	270.0	270.0	40.00	4.50	3.50	-	72.00	-	-1	127	126
											Totals:	0	-2	268	266

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	36.19	-18.00	196.1	0.0	10.00	9.50	-	7.50	-	-	22	405	427
Pin	Pin Insulator - 15 kV	NVE	36.19	54.00	354.5	0.0	10.00	9.50	-	7.50	-	-	-68	405	337

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

² Worst Wind per Guy Wire
³ Wind at 180.0°

Pin	Pin Insulator - 15 kV	NVE	36.19	18.00	343.9	0.0	10.00	9.50	-	7.50	-	-	-23	405	382
Pin	Pin Insulator - 15 kV	NVE	36.19	-54.00	185.5	0.0	10.00	9.50	-	7.50	-	-	67	405	472
Bolt	Three Bolt	ZFS	25.20	4.70	180.0	90.0	5.00	0.00	-	3.00	-	-	4	0	4
Bolt	Three Bolt	COX	23.25	4.92	180.0	90.0	5.00	0.00	-	3.00	-	-	5	0	5
Bolt	Three Bolt	CTL	22.70	4.99	180.0	90.0	5.00	0.00	-	3.00	-	-	5	0	5
Bolt	Three Bolt	CTL	22.00	5.07	180.0	90.0	5.00	0.00	-	3.00	-	-	5	0	5
Deadend	CUTOUT	NVE	32.20	32.00	350.0	0.0	3.00	12.75	-	3.80	-	-	-12	244	232
Deadend	CUTOUT	NVE	32.20	0.00	270.0	0.0	3.00	12.75	-	3.80	-	-	0	244	244
Deadend	CUTOUT	NVE	32.20	-32.00	190.0	0.0	3.00	12.75	-	3.80	-	-	12	244	255
											Totals:	0	17	2,351	2,368

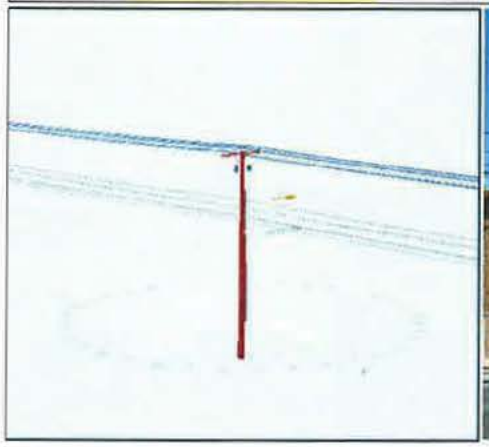
Pole Buckling

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	25.01	35.73	13.19	22.38	6.69	15.29	1,000,000	50.00	57.00	36.80	26,466	5,475	4.83

O-Calc® Pro *Analysis Report*

Tuesday, November 04, 2014 3:17:47 PM

File Name:	19 - p55289 Existi	Pole Length / Class:	45 / 1	Code:	NESC	Structure Type:	Unguyed
Pole Num:	19 - p55289	Pole Species:	WESTERN RED CEDAR	NESC Rule:	Rule 250B	Status:	N/A
Permit #:	Unset	Setting Depth (ft):	8.58	Construction Grade:	B	Pole Strength Factor:	0.65
Owner:	Unset	G/L Circumference (in):	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:	1.10
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:	106.5%	0.0 ft	358.6°
Groundline:	106.5%	0.0 ft	358.6°
Vertical:	10.2%	22.9 ft	358.6°

Pole Moments		Load Angle	Wind Angle
Max Capac. Util:	120,567 ft-lb	359.5°	358.6°
Groundline:	120,567 ft-lb	359.5°	358.6°

GROUNDLINE LOAD SUMMARY:*Wind at 358.6°, Applied Moment 120,567 ft-lb at 359.5°, 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:	1,400	31.2	51,727	43.5	45.5	1,773	584	3	1,776	45.5
Comms:	1,992	44.4	46,597	39.2	40.9	1,597	802	4	1,601	41.1
Generic Equipment:	72	1.6	2,352	2.0	2.1	81	68	0	81	2.1
Pole:	815	18.2	13,456	11.3	11.8	461	2,178	12	473	12.1
Crossarms:	4	0.1	142	0.1	0.1	5	99	1	5	0.1
Risers:	154	3.4	2,933	2.5	2.6	101	91	0	101	2.6
Insulators:	45	1.0	1,593	1.3	1.4	55	90	0	55	1.4
Pole Load:	4,481	100.0	118,801	100.0	104.4	4,071	3,911	21	4,093	104.9
Pole Reserve Capacity:			-4,998		-4.4	-171			-193	-4.9

LOAD SUMMARY BY OWNER

NVE:	2,490	**72,225**	**2,475**	3,080	17	**2,492**	**63.9**
ZFS:	309	**8,069**	**277**	88	0	**277**	**7.1**
COX:	518	**12,591**	**431**	153	1	**432**	**11.1**
CTL:	1,165	**25,916**	**888**	591	3	**891**	**22.9**
Totals	4,481	**118,801**	**4,071**	3,911	21	**4,093**	**104.9**

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	36.81	56.33	1.1240	2.96	0.596	188.0	270.0	188.0	2,204	727	393	7,299	8,418
Primary	AAC 636.0 KCM 37 STRAND	NVE	36.81	56.33	1.1240	2.84	0.596	182.0	90.0	182.0	2,204	-727	380	7,066	6,719
Primary	AAC 636.0 KCM 37 STRAND	NVE	36.81	19.96	1.1240	2.96	0.596	188.0	270.0	188.0	2,204	727	133	7,299	8,159
Primary	AAC 636.0 KCM 37 STRAND	NVE	36.81	19.96	1.1240	2.84	0.596	182.0	90.0	182.0	2,204	-727	129	7,066	6,468
Neutral	AAC 336.4 KCM 19 STRAND TULIP	NVE	36.81	19.96	0.6660	2.75	0.316	188.0	270.0	188.0	1,165	384	-70	4,323	4,636
Neutral	AAC 336.4 KCM 19 STRAND TULIP	NVE	36.81	19.96	0.6660	2.63	0.316	182.0	90.0	182.0	1,165	-384	-68	4,185	3,733
Primary	AAC 636.0 KCM 37 STRAND	NVE	36.81	56.33	1.1240	2.96	0.596	188.0	270.0	188.0	2,204	727	-392	7,299	7,634
Primary	AAC 636.0 KCM 37 STRAND	NVE	36.81	56.33	1.1240	2.84	0.596	182.0	90.0	182.0	2,204	-727	-379	7,066	5,960
											Totals:	0	126	51,602	51,727

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	26.33	7.72	0.8900	2.47	0.289	188.0	270.0	188.0	1,500	353	-26	4,129	4,456
Telco	BELOPTIX DT288 - 288 FIBERS -	ZFS	26.33	7.72	0.8900	2.38	0.289	182.0	90.0	182.0	1,500	-353	-25	3,997	3,618
Overlashed	1/4" EHS	COX	24.50	7.89	0.2500	1.86	0.121	188.0	270.0	188.0	1,500	329	-11	1,290	1,607
Telco	P3-750CA	COX	24.46	7.90	0.7500	-	0.161	188.0	270.0	188.0		0	-15	1,288	1,273
Telco	P3-500CA	COX	24.50	7.76	0.5000	-	0.072	188.0	270.0	188.0		0	-7	1,290	1,283
Telco	48ct Fiber	COX	24.53	7.89	0.5130	-	0.121	188.0	270.0	188.0		0	-11	1,291	1,280
Telco	24ct Fiber	COX	24.50	8.01	0.3900	-	0.049	188.0	270.0	188.0		0	-5	1,290	1,285
Overlashed	1/4" EHS	COX	24.50	7.89	0.2500	1.74	0.121	182.0	90.0	182.0	1,500	-329	-11	1,249	909
Telco	P3-750CA	COX	24.46	7.90	0.7500	-	0.161	182.0	90.0	182.0		0	-14	1,247	1,232
Telco	P3-500CA	COX	24.50	7.76	0.5000	-	0.072	182.0	90.0	182.0		0	-6	1,249	1,242
Telco	48ct Fiber	COX	24.53	7.89	0.5130	-	0.121	182.0	90.0	182.0		0	-11	1,250	1,239
Telco	24ct Fiber	COX	24.50	8.01	0.3900	-	0.049	182.0	90.0	182.0		0	-4	1,249	1,244
Overlashed	5/16" EHS	CTL	22.92	8.04	0.3125	5.13	0.205	188.0	270.0	188.0	1,500	308	-19	3,007	3,295
Telco	26 GA 200 PR (0 94)	CTL	22.88	8.24	0.9400	-	0.480	188.0	270.0	188.0		0	-46	3,002	2,956
Telco	26 GA 400 PR (1.30)	CTL	22.87	7.82	1.3000	-	0.910	188.0	270.0	188.0		0	-83	3,000	2,917
Overlashed	5/16" EHS	CTL	22.92	8.04	0.3125	4.83	0.205	182.0	90.0	182.0	1,500	-308	-19	2,911	2,585
Telco	26 GA 200 PR (0.94)	CTL	22.88	8.24	0.9400	-	0.480	182.0	90.0	182.0		0	-45	2,906	2,861
Telco	26 GA 400 PR (1.30)	CTL	22.87	7.82	1.3000	-	0.910	182.0	90.0	182.0		0	-81	2,904	2,824
Overlashed	3/8" EHS	CTL	22.00	8.12	0.3750	1.99	0.273	188.0	270.0	188.0	1,500	295	-26	2,182	2,451
Telco	BELOPTIX DT144 - 144 FIBERS -	CTL	21.96	8.12	0.7560	-	0.208	188.0	270.0	188.0		0	-20	2,177	2,158
Overlashed	3/8" EHS	CTL	22.00	8.12	0.3750	1.87	0.273	182.0	90.0	182.0	1,500	-295	-25	2,112	1,792
Telco	BELOPTIX DT144 - 144 FIBERS -	CTL	21.96	8.12	0.7560	-	0.208	182.0	90.0	182.0		0	-19	2,108	2,089
											Totals:	0	-531	47,128	46,597

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

[2] Worst Wind per Guy Wire
[3] Wind at 358.6°

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	32.67	20.64	0.0	0.0	15.00	12.00	8.00	-	8.00	-	39	784	823
Box	Fuse Cutout	NVE	32.67	20.64	270.0	0.0	15.00	12.00	8.00	-	8.00	-	0	784	784
Box	Fuse Cutout	NVE	32.67	20.64	180.0	0.0	15.00	12.00	8.00	-	8.00	-	-39	784	745
											Totals:	0	0	2,352	2,352

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	35.83	6.10	270.0	270.0	66.00	4.50	3.50	-	120.00	-	0	142	142
											Totals:	0	0	142	142

Riser:		Owner	Height (ft)	Horiz. Offset (in)	Offset Angle (deg)	Rotate Angle (deg)	Unit Weight (lbs)	Unit Height (in)	Unit Depth (in)	Unit Diameter (in)	Unit Length (in)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft lb)*	Moment at GL (ft-lb)*
Riser 45.0°	Riser	NVE	28.33	8.06	45.0	45.0	5.08	339.96	-	0.00	-	-	27	2,906	2,933
											Totals:	0	27	2,906	2,933

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	36.02	56.00	353.8	0.0	10.00	9.50	-	7.50	-	-	70	403	473
Pin	Pin Insulator - 15 kV	NVE	36.02	19.00	342.2	0.0	10.00	9.50	-	7.50	-	-	24	403	427
Pin	Pin Insulator - 15 kV	NVE	36.02	-19.00	197.8	0.0	10.00	9.50	-	7.50	-	-	-24	403	380
Pin	Pin Insulator - 15 kV	NVE	36.02	-56.00	186.2	0.0	10.00	9.50	-	7.50	-	-	-70	403	333
Bolt	Three Bolt	ZFS	26.33	5.22	180.0	180.0	5.00	0.00	-	3.00	-	-	-5	0	-5
Bolt	Three Bolt	COX	24.50	5.39	180.0	180.0	5.00	0.00	-	3.00	-	-	-5	0	-5
Bolt	Three Bolt	CTL	22.92	5.54	180.0	180.0	5.00	0.00	-	3.00	-	-	-5	0	-5
Bolt	Three Bolt	CTL	22.00	5.62	180.0	180.0	5.00	0.00	-	3.00	-	-	-5	0	-5
											Totals:	0	-20	1,613	1,593

Pole Buckling

Buckling	Bucking (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	22.85	34.12	13.85	18.31	8.60	15.29	1,000,000	50.00	57.00	36.42	38,491	3,911	9.84

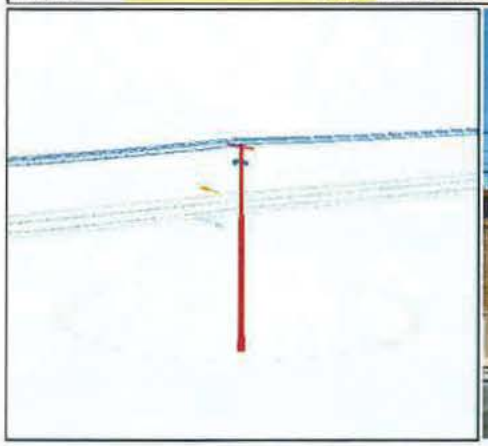
Version: 5.0 / 5.00
* includes Load Factor(s)

² Worst Wind per Guy Wire
³ Wind at 358.6°

O-Calc® Pro *Analysis Report*

Tuesday, November 04, 2014 3:18:49 PM

File Name:	19 - p55289 Propos	Pole Length / Class:	45 / 1	Code:	NESC	Structure Type:	Unguyed
Pole Num:	19 - p55289	Pole Species:	WESTERN RED CEDAR	NESC Rule:	Rule 250B	Status:	N/A
Permit #:	Unset	Setting Depth (ft):	8.58	Construction Grade:	B	Pole Strength Factor:	0.65
Owner:	Unset	G/L Circumference (in):	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:	1.10
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:	108.4%	0.0 ft	358.6°
Groundline:	108.4%	0.0 ft	358.6°
Vertical:	10.2%	22.9 ft	358.6°

Pole Moments		Load Angle	Wind Angle
Max Capac. Util:	122,714 ft-lb	359.5°	358.6°
Groundline:	122,714 ft-lb	359.5°	358.6°

GROUNDLINE LOAD SUMMARY:*Wind at 358.6°, Applied Moment 122,714 ft-lb at 359.5°, 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:	1,400	30.6	51,728	42.8	45.5	1,773	584	3	1,776	45.5
Comms:	2,079	45.5	48,729	40.3	42.8	1,670	826	5	1,674	42.9
Generic Equipment:	72	1.6	2,352	1.9	2.1	81	68	0	81	2.1
Pole:	815	17.8	13,456	11.1	11.8	461	2,178	12	473	12.1
Crossarms:	4	0.1	142	0.1	0.1	5	99	1	5	0.1
Risers:	154	3.4	2,933	2.4	2.6	101	91	0	101	2.6
Insulators:	45	1.0	1,593	1.3	1.4	55	90	0	55	1.4
Pole Load:	4,569	100.0	120,933	100.0	106.3	4,144	3,936	21	4,166	106.8
Pole Reserve Capacity:			-7,130		-6.3	-244			-266	-6.8

LOAD SUMMARY BY OWNER

NVE:	2,490	72,225	2,475	3,080	17	2,492	63.9
ZFS:	309	8,069	277	88	0	277	7.1
COX:	606	14,723	505	177	1	506	13.0
CTL:	1,165	25,916	888	591	3	891	22.9
Totals	4,569	120,933	4,144	3,936	21	4,166	106.8

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 636.0 KCM 37 STRAND	NVE	36.81	56.33	1.1240	2.96	0.596	188.0	270.0	188.0	2,204	714	392	7,299	8,406
Primary	AAC 636.0 KCM 37 STRAND	NVE	36.81	56.33	1.1240	2.84	0.596	182.0	90.0	182.0	2,204	-714	380	7,066	6,732
Primary	AAC 636.0 KCM 37 STRAND	NVE	36.81	19.96	1.1240	2.96	0.596	188.0	270.0	188.0	2,204	714	133	7,299	8,146
Primary	AAC 636.0 KCM 37 STRAND	NVE	36.81	19.96	1.1240	2.84	0.596	182.0	90.0	182.0	2,204	-714	129	7,066	6,481
Neutral	AAC 336.4 KCM 19 STRAND TULIP	NVE	36.81	19.96	0.6660	2.75	0.316	188.0	270.0	188.0	1,165	377	-70	4,323	4,630
Neutral	AAC 336.4 KCM 19 STRAND TULIP	NVE	36.81	19.96	0.6660	2.63	0.316	182.0	90.0	182.0	1,165	-377	-68	4,185	3,739
Primary	AAC 636.0 KCM 37 STRAND	NVE	36.81	56.33	1.1240	2.96	0.596	188.0	270.0	188.0	2,204	714	-392	7,299	7,621
Primary	AAC 636.0 KCM 37 STRAND	NVE	36.81	56.33	1.1240	2.84	0.596	182.0	90.0	182.0	2,204	-714	-379	7,066	5,973
											Totals:	0	126	51,602	51,728

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	26.33	7.72	0.8900	2.47	0.289	188.0	270.0	188.0	1,500	347	-26	4,129	4,450
Telco	BELOPTIX DT288 - 288 FIBERS -	ZFS	26.33	7.72	0.8900	2.38	0.289	182.0	90.0	182.0	1,500	-347	-25	3,997	3,624
Overlashed	1/4" EHS	COX	24.50	7.89	0.2500	2.14	0.121	188.0	270.0	188.0	1,500	323	-11	1,508	1,820
Telco	P3-750CA	COX	24.46	7.90	0.7500	-	0.161	188.0	270.0	188.0		0	-15	1,505	1,491
Telco	P3-500CA	COX	24.50	7.76	0.5000	-	0.072	188.0	270.0	188.0		0	-7	1,508	1,501
Telco	BELOPTIX DT144 - 144 FIBERS -	COX	24.54	7.90	0.7560	-	0.208	188.0	270.0	188.0		0	-19	1,511	1,491
Telco	24ct Fiber	COX	24.50	8.02	0.3900	-	0.049	188.0	270.0	188.0		0	-5	1,508	1,503
Overlashed	1/4" EHS	COX	24.50	7.89	0.2500	2.01	0.121	182.0	90.0	182.0	1,500	-323	-11	1,460	1,126
Telco	P3-750CA	COX	24.46	7.90	0.7500	-	0.161	182.0	90.0	182.0		0	-14	1,457	1,443
Telco	P3-500CA	COX	24.50	7.76	0.5000	-	0.072	182.0	90.0	182.0		0	-6	1,460	1,454
Telco	BELOPTIX DT144 - 144 FIBERS -	COX	24.54	7.90	0.7560	-	0.208	182.0	90.0	182.0		0	-19	1,462	1,444
Telco	24ct Fiber	COX	24.50	8.02	0.3900	-	0.049	182.0	90.0	182.0		0	-4	1,460	1,455
Overlashed	5/16" EHS	CTL	22.92	8.04	0.3125	5.13	0.205	188.0	270.0	188.0	1,500	302	-19	3,007	3,290
Telco	26 GA 200 PR (0.94)	CTL	22.88	8.24	0.9400	-	0.480	188.0	270.0	188.0		0	-46	3,002	2,956
Telco	26 GA 400 PR (1.30)	CTL	22.87	7.82	1.3000	-	0.910	188.0	270.0	188.0		0	-83	3,000	2,917
Overlashed	5/16" EHS	CTL	22.92	8.04	0.3125	4.83	0.205	182.0	90.0	182.0	1,500	-302	-19	2,911	2,590
Telco	26 GA 200 PR (0.94)	CTL	22.88	8.24	0.9400	-	0.480	182.0	90.0	182.0		0	-45	2,906	2,861
Telco	26 GA 400 PR (1.30)	CTL	22.87	7.82	1.3000	-	0.910	182.0	90.0	182.0		0	-81	2,904	2,824
Overlashed	3/8" EHS	CTL	22.00	8.12	0.3750	1.99	0.273	188.0	270.0	188.0	1,500	290	-26	2,182	2,446
Telco	BELOPTIX DT144 - 144 FIBERS -	CTL	21.96	8.12	0.7560	-	0.208	188.0	270.0	188.0		0	-20	2,177	2,158
Overlashed	3/8" EHS	CTL	22.00	8.12	0.3750	1.87	0.273	182.0	90.0	182.0	1,500	-290	-25	2,112	1,797
Telco	BELOPTIX DT144 - 144 FIBERS -	CTL	21.96	8.12	0.7560	-	0.208	182.0	90.0	182.0		0	-19	2,108	2,089
											Totals:	0	-547	49,276	48,729

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

² Worst Wind per Guy Wire
³ Wind at 358.6°

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	32.67	20.64	0.0	0.0	15.00	12.00	8.00	-	8.00	-	39	784	823
Box	Fuse Cutout	NVE	32.67	20.64	270.0	0.0	15.00	12.00	8.00	-	8.00	-	0	784	784
Box	Fuse Cutout	NVE	32.67	20.64	180.0	0.0	15.00	12.00	8.00	-	8.00	-	-39	784	745
											Totals:	0	0	2,352	2,352

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	35.83	6.10	270.0	270.0	66.00	4.50	3.50	-	120.00	-	0	142	142
											Totals:	0	0	142	142

Riser:		Owner	Height (ft)	Horiz. Offset (in)	Offset Angle (deg)	Rotate Angle (deg)	Unit Weight (lbs)	Unit Height (in)	Unit Depth (in)	Unit Diameter (in)	Unit Length (in)	Tension Moment (ft-lb)*	Offset Moment (ft-lb)*	Wind Moment (ft-lb)*	Moment at GL (ft-lb)*
Riser 45.0°	Riser	NVE	28.33	8.06	45.0	45.0	5.08	339.96	-	0.00	-	-	27	2,906	2,933
											Totals:	0	27	2,906	2,933

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	36.02	56.00	353.8	0.0	10.00	9.50	-	7.50	-	-	70	403	473
Pin	Pin Insulator - 15 kV	NVE	36.02	19.00	342.2	0.0	10.00	9.50	-	7.50	-	-	24	403	427
Pin	Pin Insulator - 15 kV	NVE	36.02	-19.00	197.8	0.0	10.00	9.50	-	7.50	-	-	-24	403	380
Pin	Pin Insulator - 15 kV	NVE	36.02	-56.00	186.2	0.0	10.00	9.50	-	7.50	-	-	-70	403	333
Bolt	Three Bolt	ZFS	26.33	5.22	180.0	180.0	5.00	0.00	-	3.00	-	-	-5	0	-5
Bolt	Three Bolt	COX	24.50	5.39	180.0	180.0	5.00	0.00	-	3.00	-	-	-5	0	-5
Bolt	Three Bolt	CTL	22.92	5.54	180.0	180.0	5.00	0.00	-	3.00	-	-	-5	0	-5
Bolt	Three Bolt	CTL	22.00	5.62	180.0	180.0	5.00	0.00	-	3.00	-	-	-5	0	-5
											Totals:	0	-20	1,613	1,593

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	22.86	34.12	13.85	18.37	8.60	15.29	1,000,000	50.00	57.00	36.42	38,446	3,936	9.77

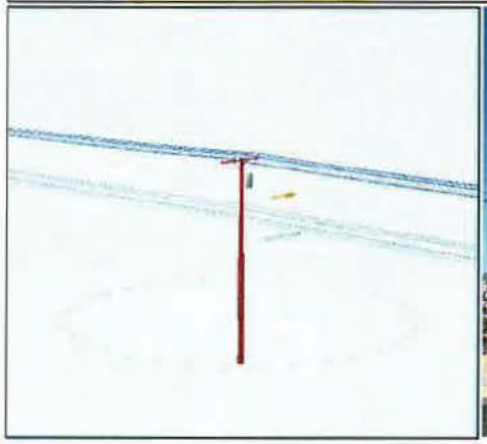
Version: 5.0 / 5.00
* includes Load Factor(s)

² Worst Wind per Guy Wire
³ Wind at 358.6°

O-Calc® Pro *Analysis Report*

Tuesday, November 04, 2014 3:19:47 PM

File Name:	20 - p55288 Existi	Pole Length / Class:	45 / 2	Code:	NESC	Structure Type:	Unguyed
Pole Num:	20 - p25588	Pole Species:	WESTERN RED CEDAR	NESC Rule:	Rule 250B	Status:	N/A
Permit #:	Unset	Setting Depth (ft):	10.42	Construction Grade:	B	Pole Strength Factor:	0.65
Owner:	Unset	G/L Circumference (in):	46.00	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:	115.0%	0.0 ft	358.6°
Groundline:	115.0%	0.0 ft	358.6°
Vertical:	13.6%	23.3 ft	358.6°

Pole Moments		Load Angle	Wind Angle
Max Capac. Util:	114,553 ft-lb	359.6°	358.6°
Groundline:	114,553 ft-lb	359.6°	358.6°

GROUNDLINE LOAD SUMMARY:*Wind at 358.6°, Applied Moment 114,553 ft-lb at 359.6°, Allowable Moment 100,163 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	50,095	44.5	50.0	1,951	595	4	1,954	50.1
Comms:	1,951	44.7	44,447	39.5	44.4	1,731	794	5	1,735	44.5
Power Equipment:	117	2.7	3,490	3.1	3.5	136	502	3	139	3.6
Pole:	733	16.8	11,417	10.1	11.4	445	1,859	11	456	11.7
Crossarms:	4	0.1	135	0.1	0.1	5	99	1	6	0.1
Risers:	87	2.0	1,567	1.4	1.6	61	91	1	62	1.6
Insulators:	45	1.0	1,513	1.3	1.5	59	90	1	59	1.5
Pole Load:	4,362	100.0	112,664	100.0	112.5	4,387	4,030	24	4,411	113.1
Pole Reserve Capacity:			-12,502		-12.5	-487			-511	-13.1

LOAD SUMMARY BY OWNER

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:	469	10,889	424	208	1	425	10.9
CTL:	1,187	26,028	1,013	602	4	1,017	26.1
Totals	4,362	112,664	4,387	4,030	24	4,411	113.1

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	617	395	6,973	7,985
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	-617	392	6,937	6,712
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	617	134	6,973	7,724
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	-617	133	6,937	6,453
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	326	-71	4,130	4,385
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	-326	-70	4,108	3,712
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	617	-394	6,973	7,196
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	-617	-392	6,937	5,928
											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	299	-25	3,929	4,202
Telco	BELOPTIX DT288 - 288 FIBERS -	ZFS	24.92	7.41	0.8900	2.47	0.289	188.0	90.0	188.0	1,500	-299	-25	3,908	3,584
Overlashed	1/4" EHS	COX	23.83	7.52	0.2500	1.32	0.121	189.0	270.0	189.0	1,500	286	-11	1,109	1,384
Telco	P3-500CA	COX	23.81	7.62	0.5000	-	0.072	189.0	270.0	189.0		0	-6	1,108	1,101
Telco	48ct Fiber	COX	23.81	7.42	0.5130	-	0.121	189.0	270.0	189.0		0	-11	1,108	1,097
Telco	24ct Fiber	COX	23.78	7.52	0.3900	-	0.049	189.0	270.0	189.0		0	-4	1,106	1,102
Overlashed	1/4" EHS	COX	23.83	7.52	0.2500	1.86	0.121	188.0	90.0	188.0	1,500	-286	-11	1,255	958
Telco	P3-750CA	COX	23.79	7.53	0.7500	-	0.161	188.0	90.0	188.0		0	-14	1,252	1,238
Telco	P3-500CA	COX	23.83	7.38	0.5000	-	0.072	188.0	90.0	188.0		0	-6	1,255	1,248
Telco	48ct Fiber	COX	23.86	7.52	0.5130	-	0.121	188.0	90.0	188.0		0	-11	1,256	1,245
Telco	24ct Fiber	COX	23.83	7.64	0.3900	-	0.049	188.0	90.0	188.0		0	-4	1,255	1,250
Overlashed	5/16" EHS	CTL	22.50	7.65	0.3125	5.19	0.205	189.0	270.0	189.0	1,500	270	-19	2,968	3,219
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	-80	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	-270	-18	2,952	2,664
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	262	-25	2,176	2,413
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	-262	-25	2,165	1,879
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	-501	44,948	44,447

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	-	-	-7	3,496	3,490
											Totals:	0	-7	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 [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	23.27	34.61	13.09	18.63	7.96	14.65	1,000,000	50.00	57.00	34.58	29,605	4,030	7.35

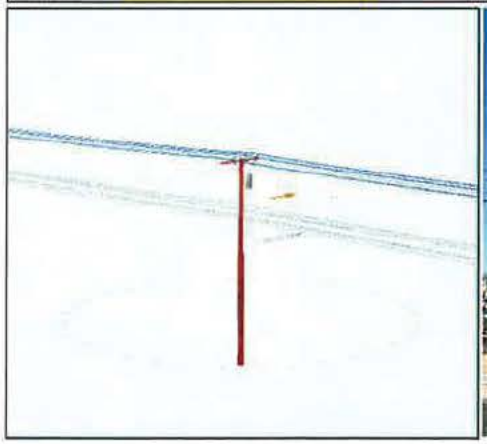
Version: 5.0 / 5.00
* includes Load Factor(s)

² Worst Wind per Guy Wire
³ Wind at 358.6°

O-Calc® Pro *Analysis Report*

Tuesday, November 04, 2014 3:20:52 PM

File Name:	20 - p55288 Propos	Pole Length / Class:	45 / 2	Code:	NESC	Structure Type:	Unguyed
Pole Num:	20 - p25588	Pole Species:	WESTERN RED CEDAR	NESC Rule:	Rule 250B	Status:	N/A
Permit #:	Unset	Setting Depth (ft):	10.42	Construction Grade:	B	Pole Strength Factor:	0.65
Owner:	Unset	G/L Circumference (in):	46.00	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:	117.0%	0.0 ft	358.6°
Groundline:	117.0%	0.0 ft	358.6°
Vertical:	13.7%	23.3 ft	358.6°

Pole Moments		Load Angle	Wind Angle
Max Capac. Util:	116,584 ft-lb	359.6°	358.6°
Groundline:	116,584 ft-lb	359.6°	358.6°

GROUNDLINE LOAD SUMMARY:*Wind at 358.6°, Applied Moment 116,584 ft-lb at 359.6°, Allowable Moment 100,163 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	32.1	50,095	43.7	50.0	1,951	595	4	1,954	50.1
Comms:	2,036	45.8	46,462	40.5	46.4	1,809	819	5	1,814	46.5
Power Equipment:	117	2.6	3,490	3.0	3.5	136	502	3	139	3.6
Pole:	733	16.5	11,417	10.0	11.4	445	1,859	11	456	11.7
Crossarms:	4	0.1	135	0.1	0.1	5	99	1	6	0.1
Risers:	87	2.0	1,567	1.4	1.6	61	91	1	62	1.6
Insulators:	45	1.0	1,513	1.3	1.5	59	90	1	59	1.5
Pole Load:	4,448	100.0	114,679	100.0	114.5	4,465	4,055	24	4,489	115.1
Pole Reserve Capacity:			-14,516		-14.5	-565			-589	-15.1

LOAD SUMMARY BY OWNER

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

² Worst Wind per Guy Wire
³ Wind at 358.6°