



**Transmission Station Projects
Cost Estimate - 230 kV Equipment**

Project Name Elie Wind Collector Station Option #2 (3 Breakers)
Estimate Updated 2006 02 15

Equipment	Component or Task	Department	Units	Material/Expenses		Labour		Grand Total	
				Total		Total Hours	Total		
High Bus Structures									
Strain Buswork including conductor strain insulators and hardware. 1272 ASC conductor	Buswork (Insulators + Conductors)	Structure, Equip & Grounding	1	\$29,930		0	\$0	\$29,930	
	Miscellaneous Improvements	Structure, Equip & Grounding	1	\$706		0	\$0	\$706	
	Install Buswork	Brandon O/H Construction	1			400	\$50,147	\$50,147	
	E&C assemble material	Electrical Construction	1	\$0		80	\$6,686	\$6,686	
	Subtotals				\$30,636		480	\$56,833	\$87,469
Intermediate Bus Structures									
Tubular aluminum bus on post insulators. 6" Al sch 80 pipe bus	Buswork (Insulators + Conductors)	Structure, Equip & Grounding	1	\$71,972		0	\$0	\$71,972	
	Miscellaneous Improvements	Structure, Equip & Grounding	1	\$706		0	\$0	\$706	
	Install Buswork	Brandon O/H Construction	1			400	\$50,147	\$50,147	
	E&C assemble material	Electrical Construction	1	\$0		80	\$6,686	\$6,686	
	Subtotals				\$72,678		480	\$56,833	\$129,511
Low Bus Structures									
Strain Buswork including conductor strain insulators and hardware 2 X 3500 mcm	Buswork (Insulators + Conductors)	Structure, Equip & Grounding	1	\$95,658		0	\$0	\$95,658	
	Miscellaneous Improvements	Structure, Equip & Grounding	1	\$1,584		0	\$0	\$1,584	
	Install Buswork	Brandon O/H Construction	1	\$9,504		2152	\$269,790	\$279,294	
	E&C assemble material	Electrical Construction	1	\$0		80	\$6,686	\$6,686	
	Subtotals				\$106,746		2232	\$276,476	\$383,222
Transformers									
Civil Design									
Foundations, cable trenches, oil containment, steel structures, site improvements, buildings structure	Foundations Design	Civil Design (structural)	1	\$42,165		48	\$5,257	\$47,422	
	Foundations Drafting	Civil Design (Drafting)	1	\$0		168	\$14,525	\$14,525	
	Cable Trench Design	Civil Design (structural)	1	\$51,535		48	\$5,257	\$56,792	
	Cable Trench Drafting	Civil Design (Drafting)	1	\$0		0	\$0	\$0	
	Oil Containment Design	Civil Design (structural)	1	\$0		0	\$0	\$0	
	Oil Containment Drafting	Civil Design (Drafting)	1	\$0		0	\$0	\$0	
	Steel Structures Design	Civil Design (structural)	1	\$380,380		250	\$27,379	\$407,759	
	Steel Structures Drafting	Civil Design (Drafting)	1	\$0		275	\$23,777	\$23,777	
	Inspector	Civil Design	1	\$0		80	\$8,727	\$8,727	
	Install Steel Struct	Brandon O/H Construction	1	\$5,500		1672	\$209,614	\$215,114	
	Site Improvements & Bldg	Civil Design (structural)	1	\$0		120	\$13,142	\$13,142	
	Site Improvements & Bldg	Civil Design (Drafting)	1	\$0		156	\$13,488	\$13,488	
	Building Mechanical	Civil Design (structural)	1	\$0		100	\$10,952	\$10,952	
	Acministration	Civil Design	1	\$0		33	\$3,600	\$3,600	
	Subtotals				\$479,580		2950	\$335,716	\$815,296
Breakers and Circuit Switchers									
Breaker 230 kV 3000A 50 kA interrupting capability, 1050kV BIL live tank circuit breaker HPL245B1	Procurement	Apparatus	3	\$677,655		360	\$44,463	\$722,118	
	Station Layout and Bus Connections	Structure, Equip & Grounding		\$6,442		75	\$7,010	\$13,451	
	Cabling	Protection Control & Metering		\$17,312		120	\$13,445	\$30,756	
	Grounding	Structure, Equip & Grounding		\$6,442		45	\$4,206	\$10,647	
	Civil Design - Foundations	Civil Design		\$545		0	\$0	\$545	
	Civil Work - Foundations	Civil Construction		\$1,931		0	\$0	\$1,931	
	Testing the breaker	Insulation testing		\$0		12	\$1,383	\$1,383	
	Installation	Electrical Construction		\$0		1860	\$155,455	\$155,455	
	Commissioning	Commissioning		\$0		0	\$0	\$0	
	Subtotals				\$710,325		2472	\$225,961	\$936,286
	Disconnects and Switches								
Disconnect 230 kV 3000A, 70 kA centre break switch, 3PST, GO	Procurement	Apparatus	8	\$117,216		256	\$7,205	\$124,421	
	Station Layout and Bus Connections	Structure, Equip & Grounding		\$5,744		120	\$11,216	\$16,959	
	Cabling	Protection Control & Metering		\$2,308		80	\$8,963	\$11,271	
	Grounding	Structure, Equip & Grounding		\$3,489		80	\$7,477	\$10,966	
	Civil Design - Foundations	Civil Design		\$748		0	\$0	\$748	
	Civil Design - Structures	Civil Design		\$49,280		0	\$0	\$49,280	
	Civil Work - Foundations	Civil Construction		\$2,640		0	\$0	\$2,640	
	Installation - Structure	Electrical Construction		\$0		628	\$52,487	\$52,487	
	Installation - Switch	Electrical Construction		\$0		600	\$50,147	\$50,147	
	Commissioning	Commissioning		\$0		0	\$0	\$0	
	Subtotals				\$181,425		1764	\$137,494	\$318,920
Disconnect 230 kV 2000A, centre break switch, 3PST, GO. Southern states disconnect includes 7% PST.	Procurement	Apparatus	3	\$73,260		0	\$0	\$73,260	
	Station Layout and Bus Connections	Structure, Equip & Grounding		\$2,154		45	\$4,206	\$6,360	
	Cabling	Protection Control & Metering		\$866		30	\$3,361	\$4,227	
	Grounding	Structure, Equip & Grounding		\$1,308		30	\$2,804	\$4,112	
	Civil Design - Foundations	Civil Design		\$281		0	\$0	\$281	
	Civil Design - Structures	Civil Design		\$18,480		0	\$0	\$18,480	
	Civil Work - Foundations	Civil Construction		\$990		0	\$0	\$990	
	Installation - Structure	Electrical Construction		\$0		236	\$19,683	\$19,683	
	Installation - Switch	Electrical Construction		\$0		225	\$18,805	\$18,805	
	Commissioning	Commissioning		\$0		0	\$0	\$0	
	Subtotals				\$97,338		566	\$48,859	\$146,197
Ground Switch 230 kV 61 kA momentary, 3PST, GO. Ground switch price includes 7% for the PST.	Procurement	Apparatus	3	\$22,026		0	\$0	\$22,026	
	Cabling	Protection Control & Metering		\$866		45	\$5,042	\$5,907	
	Grounding	Structure, Equip & Grounding		\$1,308		30	\$2,804	\$4,112	
	Installation	Electrical Construction		\$0		150	\$12,537	\$12,537	
	Commissioning	Commissioning		\$0		0	\$0	\$0	
	Subtotals				\$24,200		225	\$20,382	\$44,582
Auxilliary Switches	Procurement	Apparatus	4	\$1,832		58	\$7,163	\$8,995	
	Cabling	Protection Control & Metering		\$1,154		60	\$6,722	\$7,876	
	Grounding	Structure, Equip & Grounding		\$1,745		40	\$3,739	\$5,483	
	Installation	Electrical Construction		\$0		200	\$16,716	\$16,716	
	Commissioning	Commissioning		\$0		0	\$0	\$0	
	Subtotals				\$4,730		358	\$34,340	\$39,070
Motor operated mechanism for	Procurement	Apparatus	3	\$17,949		0	\$0	\$17,949	



**Transmission Station Projects
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Estimate Updated 2006 02 15

Equipment	Component or Task	Department	Units	Material/Expenses		Labour		Grand Total
				Total		Total Hours	Total	
various switches. Motor operated disconnect price includes 7% PST.	Cabling	Protection Control & Metering		\$866		90	\$10,083	\$10,949
	Installation	Electrical Construction		\$0		300	\$25,073	\$25,073
	Commissioning	Commissioning		\$0		0	\$0	\$0
	Subtotals				\$18,814		390	\$35,157
PTs and CVTs								
245kV Voltage Transformer (R,RM) (138000V). Pricewe include 7% pst.	Procurement	Apparatus	9	\$76,923		360	\$44,463	\$121,386
	Station Layout and Bus Connections	Structure, Equip & Grounding		\$6,462		540	\$50,470	\$56,932
	Cabling	Protection Control & Metering		\$20,533		450	\$50,417	\$70,950
	Grounding	Structure, Equip & Grounding		\$3,925		90	\$8,412	\$12,337
	Civil Design - Foundations	Civil Design		\$743		0	\$0	\$743
	Civil Design - Structures	Civil Design		\$8,415		0	\$0	\$8,415
	Civil Work - Foundations	Civil Construction		\$2,475		0	\$0	\$2,475
	Installation - Structure	Electrical Construction		\$0		153	\$12,787	\$12,787
	Testing the PT	Insulation testing		\$0		36	\$4,150	\$4,150
	Installation - PT	Electrical Construction		\$0		360	\$30,088	\$30,088
	Shop test PT	Apparatus Mtce shop (Quality A		\$0		54	\$5,291	\$5,291
	Subtotals				\$119,475		2043	\$206,079
Current Transformers								
245kV Current Transformer (R,RM) (4000A) prices include 7% pst.	Procurement	Apparatus	9	\$186,813		120	\$14,821	\$201,634
	Station Layout and Bus Connections	Structure, Equip & Grounding		\$6,462		630	\$58,882	\$65,344
	Cabling	Protection Control & Metering		\$20,533		720	\$80,667	\$101,200
	Grounding	Structure, Equip & Grounding		\$3,925		90	\$8,412	\$12,337
	Civil Design - Foundations	Civil Design		\$990		0	\$0	\$990
	Civil Design - Structures	Civil Design		\$44,550		0	\$0	\$44,550
	Civil Work - Foundations	Civil Construction		\$3,317		0	\$0	\$3,317
	Installation - Structure	Electrical Construction		\$0		153	\$12,787	\$12,787
	Testing the CT	Insulation testing		\$0		36	\$4,150	\$4,150
	Installation - CT	Electrical Construction		\$0		315	\$26,327	\$26,327
	Shop test CT	Apparatus Mtce shop (Quality A		\$0		54	\$5,291	\$5,291
	Subtotals				\$266,589		2118	\$211,338
Surge Arrestors								
Surge Arrestor - 230 kV Station Class (per phase)	Procurement	Apparatus	9	\$36,005		88	\$10,869	\$46,873
	Station Layout and Bus Connections	Structure, Equip & Grounding		\$6,462		540	\$50,470	\$56,932
	Grounding	Structure, Equip & Grounding		\$3,925		90	\$8,412	\$12,337
	Civil Design - Foundations	Civil Design		\$396		0	\$0	\$396
	Civil Design - Structures	Civil Design		\$10,890		0	\$0	\$10,890
	Civil Work - Foundations	Civil Construction		\$1,485		0	\$0	\$1,485
	Crane E&C	Electrical Construction		\$1,980		0	\$0	\$1,980
	Installation - Structure	Electrical Construction		\$0		153	\$12,787	\$12,787
	Testing the Arrestors	Insulation testing		\$0		18	\$2,075	\$2,075
	Installation - Arrestor	Electrical Construction		\$0		315	\$26,327	\$26,327
	Commissioning	Commissioning		\$0		0	\$0	\$0
	Subtotals				\$61,143		1204	\$110,940
Commissioning								
	Commissioning	Commissioning	1	\$0		1456	\$180,436	\$180,436
	Apparatus Mtce East	Apparatus Mtce East		\$0		800	\$106,058	\$106,058
	System Support (Protection)	System Support (Protection)		\$0		528	\$57,824	\$57,824
	System Support (Recorder)	System Support (Recorder)		\$0		80	\$9,107	\$9,107
	System Support (Telecontrol)	System Support (Telecontrol)		\$0		36	\$3,943	\$3,943
	Central Telecontrol	Central Telecontrol		\$0		184	\$21,212	\$21,212
	Electrical Construction	Electrical Construction		\$0		332	\$27,748	\$27,748
	Subtotals				\$0		3416	\$406,327
Station Service 12kV Feeders								
	Line CT12-1	Selkirk Dist.and Planning	1	\$67,100		0	\$0	\$67,100
	Single Phase Dip	Selkirk Dist.and Planning	1	\$26,840		0	\$0	\$26,840
	300 KVA padmount transformer	Selkirk Dist.and Planning	1	\$46,970		0	\$0	\$46,970
	Single Phase Disconnect	Selkirk Dist.and Planning	1	\$5,368		0	\$0	\$5,368
	Line EE12-1	Selkirk Dist.and Planning	1	\$122,793		0	\$0	\$122,793
	Single Phase Dip	Selkirk Dist.and Planning	1	\$22,000		0	\$0	\$22,000
	300 KVA padmount transformer	Selkirk Dist.and Planning	1	\$38,500		0	\$0	\$38,500
	Single Phase Disconnect	Selkirk Dist.and Planning	1	\$4,400		0	\$0	\$4,400
Subtotals				\$333,971		0	\$0	\$333,971
Foundation / Grounding								
	Foundation install - labour material	Civil Construction	1	\$67,650		8945	\$812,054	\$879,704
	Foundation install - rental equipt	Civil Construction		\$95,953		0	\$0	\$95,953
	Grounding install - labour	Civil Construction		\$0		864	\$78,437	\$78,437
	Grounding install - equipt rental	Civil Construction		\$4,697		0	\$0	\$4,697
	Cable trench install - labour / material	Civil Construction		\$4,400		1540	\$139,806	\$144,206
	Cable trench install - equipt rental	Civil Construction		\$3,850		0	\$0	\$3,850



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Project Name Elie Wind Collector Station Option #2 (3 Breakers)
Estimate Updated 2006 02 15

Equipment	Component or Task	Department	Units	Material/Expenses	Labour		Grand Total
				Total	Total Hours	Total	
	Site surfacing - labour / material	Civil Construction		\$0	432	\$39,218	\$39,218
	Site surfacing - equipt rental	Civil Construction		\$3,300	0	\$0	\$3,300
	Civil Construction (Office)	Civil Construction (Office)		\$0	416	\$50,954	\$50,954
	Subtotals			\$179,850	12197	\$1,120,468	\$1,300,318
Structure, Equipment, Grounding SEG							
	SEG Design	Structure, Equip & Grounding	1	\$0	1,500	\$140,195	\$140,195
	SEG Drafting	Structure, Equip & Grounding		\$0	1500	\$140,195	\$140,195
	Cabling	Protection Control & Metering		\$1,141	20	\$2,241	\$3,381
	Civil Design - Foundations	Civil Design		\$55	30	\$3,273	\$3,328
	Civil Design - Structures	Civil Design		\$2,530	50	\$5,454	\$7,984
	Civil Work - Foundations	Civil Construction		\$193	11	\$999	\$1,191
	E&C cabling and wiring	Electrical Construction		\$0	800	\$66,862	\$66,862
		Electrical Construction		\$0	800	\$66,862	\$66,862
		Commissioning		\$0	0	\$0	\$0
	Subtotals			\$3,918	4711	\$426,081	\$429,999
Protection							
	Protection Design	Protection Design	1	\$63,074	490	\$53,663	\$116,737
	System Support (Protection)	System Support (Protection)	1	\$0	920	\$100,755	\$100,755
	System Support (Recorder)	System Support (Recorder)	1	\$0	200	\$22,768	\$22,768
	System Performance	System Performance	1	\$0	200	\$19,021	\$19,021
	Customer Metering	Customer Metering	1				
	System Support (Recorder)	System Support (Recorder)	1				
Station Automation PCM							
	PCM	Protection Control & Metering	1	\$464,132	1312	\$146,994	\$611,126
	PCM Consultant	PCM Contract	1	\$0	4048	\$478,320	\$478,320
	Customer Metering	Protection Control & Metering	1	\$20,130	100	\$11,204	\$31,334
	E & C cable & wire (customer station)	Electrical Construction	1		400	\$33,431	\$33,431
	E & C cable & wire (new station)	Electrical Construction	1	\$5,368	6100	\$509,826	\$515,194
SCADA/RTU							
	SCADA Design	SCADA Design	1	\$80,520	1,126	\$118,447	\$198,967
	SCADA Design	SCADA Design	1		0		
	EC install and wire	Electrical Construction	1	\$1,342	1,380	\$115,338	\$116,680
	System Support (Telecontrol)	System Support (Telecontrol)	1		0		
Communication							
	Communications	Communications (Engineering)	1	\$1,066,843	0	\$840,540	\$1,907,383
	Communications (Drafting)	Communications (Drafting)	1	\$0	0	\$0	\$0
	Electrical Construction	Electrical Construction	1	\$5,368	2,230	\$186,379	\$191,747
	Commissioning	Commissioning	1	\$0	100	\$12,393	\$12,393
Civil Contracts							
Site improvements, fencing, buildings etc.	Civil Contracts	Civil Contracts	1	\$946,000	760	\$93,089	\$1,039,089
	Civil Contracts	Civil Contracts	1	\$0	0	\$0	\$0
Grounding System Modeling							
	Activity A: System Testing	Structure, Equip & Grounding	1	\$47,113	0	\$0	\$47,113
	Activity B: System Modeling	Structure, Equip & Grounding	1	\$19,628	0	\$0	\$19,628
Other							
	Office and Field Administration	Elec. Construction (Office)	1	\$0	2400	\$342,382	\$342,382
	Haulage Services	Haulage Services	1	\$0	100	\$13,558	\$13,558
	Material Services	Material Services	1	\$0	150	\$12,545	\$12,545
	WSC shop test equipment	Apparatus Mtce shop (Quality A)	1	\$0	252	\$24,693	\$24,693
	Civil Contracts (Office)	Civil Contracts (Office)	1	\$0	160	\$23,978	\$23,978
	Apparatus Mtce West	Apparatus Mtce West	1	\$0	200	\$27,379	\$27,379
	Project Coordination	Project Coordination	1	\$0	3000	\$371,778	\$371,778
Totals				\$4,051,178	50,420	\$5,488,523	\$12,678,700