

APPENDIX D  
**SCADA REPORT**

# Regional District of Comox-Strathcona - SCADA System Implementation

PREPARED FOR: Graeme Faris - Regional District of Comox-Strathcona  
PREPARED BY: Trevor Jones/VBC  
COPIES: Mark Montgomery/OTT  
Gabor Vasarhelyi/VBC  
DATE: November 29, 2005  
PROJECT NUMBER: 332069

This memorandum presents the basis for and a concept level opinion of cost for implementing a SCADA system within the Regional District of Comox-Strathcona (Regional District).

## Background

The Regional District operates various wastewater collection and treatment facilities in and around the Comox and Courtenay areas and currently has no remote monitoring capabilities other than security alarms and other process related alarms. The facilities in question include:

- The Comox Valley Water Pollution Control Centre (CVWPCC).
- The Regional Biosolids Composting Facility near Pidgeon Lake.
- The Courtenay Sewage Pumping Station.
- The Comox Sewage Pumping Station.

The Regional District retained CH2M HILL to develop an opinion of cost for a system that would allow the Regional District to monitor conditions in the various facilities from a central location, namely the CVWPCC.

## Basis for Costs

The project would require the installation of a radio receiving station possibly located on Mount Geoffrey on Hornby Island. The supply and installation of this radio tower is not included in this cost estimate although an allowance has been made for specific equipment related to the wastewater SCADA system at this site.

Other assumptions include:

- Re-use of the Allen Bradley PLC's at the composting facility, Courtenay Pump Station and the CVWPCC.
- Installation of a new Allen Bradley PLC at the Comox Pump Station.
- GST and PST are included at full rate.
- Radio pathways between the sites are achievable.

## **Conclusion**

The attached sheets contain a summary of the equipment and labour needed to implement the system. The cost estimate is approximately \$420,000 and includes a contingency allowance of 30 percent.



**Pre-Design Estimate /  
Opinion of Cost**

PROJECT: Regional District of Comox-Strathcona  
 CLIENT: Courtenay Pump Station Forcemain Re-alignment Study  
 PROJ. NO.: 332069 DATE: 14-Nov-05  
 AUTHOR: G. Mark Montgomery, P.Eng. REV. NO.: 0  
 CHECKED: \_\_\_\_\_ DATE: \_\_\_\_\_  
 SUBJECT: SCADA System Implementation  
 NOTES: DRAFT  
 FILENAME: P:\RegDist\CmrStrathcona\332069\ForcemainAssmnt\700\Deliverables\701\Report\Final Report\PS SCADA Estimate R0.xls\Courtenay Capital - R0

REF NO	DESCRIPTION OF ITEM	QTY	UNIT	MATERIAL		% OF MAT'L (%)	LABOUR		TOTAL LABOUR & MAT'L (\$)	EST. TOTAL COST (\$)
				UNIT COST (\$)	TOTAL COST (\$)		or UNIT COST (\$)	TOTAL COST (\$)		
Misc.	All Sites									
	Radio Path Study (Desktop and Field)	1	L.S.	8,500	8,500				8,500	
	Courtenay Pump Station (Existing)									\$39,170
16900	Instrumentation & Controls									
	Field Instrumentation									
	Door Security Switch - Roll Up	1	ea.	350	350		100	100	450	
	Door Security Switch - Man Door	2	ea.	150	300		100	200	500	
	Room Temp. Indicator	1	ea.	500	500	15		75	575	
16991	Control Panels									
	Panel Internal Components									
	Serial Communication Module AB 1747-KE	1	ea.	660	660				660	
	RS-232 Communication Cable AB2711-NC13	1	ea.	150	150				150	
	Panelview 1000+ Colour Touch AB 2711P-T10C6B2	1	ea.	9,500	9,500				9,500	
	RSView ME Runtime 15D AB 9701VWWMR015AENE	1	ea.	1,500	1,500				1,500	
	900 MHz Spread Spectrum Radio MDS TransNET 900	1	ea.	2,600	2,600				2,600	
	Lightning Arrester	1	ea.	150	150				150	
	Coax Service Loop	1	ea.	75	75				75	
	13dB Yagi Antenna	1	ea.	350	350				350	
	Antenna Cabling	30	m	30	900	50		450	1,350	
	Hardware Installation & Commissioning									
	VFD / MCC Modications	1	L.S.	4,500	4,500	15		675	5,175	
	Commission Panel Changes (1 Person)	8	Hrs		0		50	400	400	
	Shop Drawings	1	L.S.	500	500				500	
	Record Drawings & O&M Manuals	1	L.S.	500	500				500	
	Supply, Install, Terminate & Test Analog I/O w/Conduit	1	ea.	230	230				230	
	Supply, Install, Terminate & Test Digital I/O w/Conduit	5	ea.	210	1,050				1,050	
	Miscellaneous Panel Terminations	1	L.S.	500	500				500	
	Software Programming & Commissioning									
	SLC and HMI Programming - DI	30	ea.	200	6,000				6,000	
	SLC and HMI Programming - DO	10	ea.	225	2,250				2,250	
	SLC and HMI Programming - AI	5	ea.	250	1,250				1,250	
	SLC and HMI Programming - AO	5	ea.	275	1,375				1,375	
	Software FAT (1 Person)	8	Hrs		0		65	520	520	
	Software SAT (1 Person)	24	Hrs		0		65	1,560	1,560	
					0			0	0	



**Pre-Design Estimate /  
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REF NO	DESCRIPTION OF ITEM	QTY	UNIT	MATERIAL		% OF MAT'L (%)	LABOUR		TOTAL LABOUR & MAT'L (\$)	EST. TOTAL COST (\$)
				UNIT COST (\$)	TOTAL COST (\$)		or UNIT COST (\$)	TOTAL COST (\$)		
	<b>Jane Street Pump Station (New)</b>									\$66,720
16900	<b>Instrumentation &amp; Controls</b>									
	<u>Field Instrumentation</u>									
	Ultrasonic Level Transmitter	1	ea.	3,500	3,500	15		525	4,025	
	Door Security Switch - Roll Up	1	ea.	350	350		100	100	450	
	Door Security Switch - Man Door	2	ea.	150	300		100	200	500	
	Room Temp. Indicator	1	ea.	500	500	15		75	575	
16991	<b>Control Panels</b>									
	<u>Panel Internal Components</u>									
	Panel incl. standard components & fabrication	1	L.S.	6,500	6,500			0	6,500	
	24 Volt Power Supply	1	ea.	300	300			0	300	
	SLC5/04 Processor AB 1747-L543	1	ea.	3,500	3,500			0	3,500	
	13 Slot Chassis AB 1746-A13	1	ea.	760	760			0	760	
	Serial Communication Module AB 1747-KE	1	ea.	660	660			0	660	
	Chassis Power Supply AB 1746-P4	1	ea.	815	815			0	815	
	RS-232 Communication Cable AB2711-NC13	1	ea.	150	150			0	150	
	Panelview 1000+ Colour Touch AB 2711P-T10C6B2	1	ea.	9,500	9,500			0	9,500	
	RSView ME Runtime 15D AB 9701VWMMR015AENE	1	ea.	1,500	1,500			0	1,500	
	16 Point 120 VAC Input Module AB 1746-IA16	2	ea.	345	690			0	690	
	16 Point Relay Output Module AB 1746-OW16	2	ea.	360	720			0	720	
	8 Point Analog Input Module AB 1746-NI8	1	ea.	1,065	1,065			0	1,065	
	4 Point Analog Output Module AB 1746-NO4I	1	ea.	980	980			0	980	
	Empty Slot Filler AB 1746-N2	6	ea.	25	150			0	150	
	900 MHz Spread Spectrum Radio MDS TransNET 900	1	ea.	2,600	2,600			0	2,600	
	Lightning Arrester	1	ea.	150	150			0	150	
	Coax Service Loop	1	ea.	75	75			0	75	
	13dB Yagi Antenna	1	ea.	350	350			0	350	
	Antenna Cabling	30	m	30	900	50		450	1,350	
	<u>Hardware Installation &amp; Commissioning</u>									
	Panel FAT at Factory	8	Hrs		0		50	400	400	
	Shipping	1	L.S.	300	300			0	300	
	Install Panel (1 Person)	16	Hrs		0		50	800	800	
	Commission Panel (1 Person)	8	Hrs		0		50	400	400	
	Concrete Floor Coring	2	ea.	200	400			0	400	
	Shop Drawings	1	L.S.	3,000	3,000			0	3,000	
	Record Drawings & O&M Manuals	1	L.S.	1,500	1,500			0	1,500	
	Supply, Install, Terminate & Test Analog I/O w/Conduit	10	ea.	230	2,300			0	2,300	
	Supply, Install, Terminate & Test Digital I/O w/Conduit	30	ea.	210	6,300			0	6,300	
	Miscellaneous Panel Terminations	1	L.S.	1,000	1,000			0	1,000	
	<u>Software Programming &amp; Commissioning</u>									
	SLC and HMI Programming - DI	30	ea.	200	6,000			0	6,000	
	SLC and HMI Programming - DO	10	ea.	225	2,250			0	2,250	
	SLC and HMI Programming - AI	5	ea.	250	1,250			0	1,250	
	SLC and HMI Programming - AO	5	ea.	275	1,375			0	1,375	
	Software FAT (1 Person)	8	Hrs		0		65	520	520	
	Software SAT (1 Person)	24	Hrs		0		65	1,560	1,560	
					0			0	0	



**Pre-Design Estimate /  
Opinion of Cost**

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REF NO	DESCRIPTION OF ITEM	QTY	UNIT	MATERIAL		% OF MAT'L (%)	LABOUR		TOTAL LABOUR & MAT'L (\$)	EST. TOTAL COST (\$)
				UNIT COST (\$)	TOTAL COST (\$)		or UNIT COST (\$)	TOTAL COST (\$)		
	<b>Composting Facility (Existing)</b>				0			0	0	\$33,190
					0			0	0	
16900	<b>Instrumentation &amp; Controls</b>				0			0	0	
	<u>Field Instrumentation</u>				0			0	0	
	Door Security Switch - Roll Up	1	ea.	350	350		100	100	450	
	Door Security Switch - Man Door	2	ea.	150	300		100	200	500	
16991	<b>Control Panels</b>				0			0	0	
	<u>Panel Internal Components</u>				0			0	0	
	Serial Communication Module AB 1747-KE	1	ea.	660	660			0	660	
	RS-232 Communication Cable AB2711-NC13	1	ea.	150	150			0	150	
	Panelview 1000+ Colour Touch AB 2711P-T10C6B2	1	ea.	9,500	9,500			0	9,500	
	RSView ME Runtime 15D AB 9701VWVR015AENE	1	ea.	1,500	1,500			0	1,500	
	900 MHz Spread Spectrum Radio MDS TransNET 900	1	ea.	2,600	2,600			0	2,600	
	Lightning Arrester	1	ea.	150	150			0	150	
	Coax Sevice Loop	1	ea.	75	75			0	75	
	13dB Yagi Antenna	1	ea.	350	350			0	350	
	Antenna Cabling	30	m	30	900	50		450	1,350	
	<u>Hardware Installation &amp; Commissioning</u>				0			0	0	
	Commission Panel Changes (1 Person)	8	Hrs		0		50	400	400	
	Shop Drawings	1	L.S.	500	500			0	500	
	Record Drawings & O&M Manuals	1	L.S.	500	500			0	500	
	Supply, Install, Terminate & Test Analog I/O w/Conduit	0	ea.	230	0			0	0	
	Supply, Install, Terminate & Test Digital I/O w/Conduit	5	ea.	210	1,050			0	1,050	
	Miscellaneous Panel Terminations	1	L.S.	500	500			0	500	
	<u>Software Programming &amp; Commissioning</u>				0			0	0	
	SLC and HMI Programming - DI	30	ea.	200	6,000			0	6,000	
	SLC and HMI Programming - DO	10	ea.	225	2,250			0	2,250	
	SLC and HMI Programming - AI	5	ea.	250	1,250			0	1,250	
	SLC and HMI Programming - AO	5	ea.	275	1,375			0	1,375	
	Software FAT (1 Person)	8	Hrs		0		65	520	520	
	Software SAT (1 Person)	24	Hrs		0		65	1,560	1,560	
					0			0	0	



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				UNIT COST (\$)	TOTAL COST (\$)		or UNIT COST (\$)	TOTAL COST (\$)		
	<b>Hornby Inland Repeater Station (New)</b>				0			0	0	\$11,125
					0			0	0	
16900	<b>Instrumentation &amp; Controls</b>				0			0	0	
	<u>Field Instrumentation</u>				0			0	0	
	-				0			0	0	
16991	<b>Control Panels</b>				0			0	0	
	<u>Panel Internal Components</u>				0			0	0	
	Panel incl. standard components & fabrication	1	ea.	1,500	1,500			0	1,500	
	24 Volt Power Supply	1	ea.	300	300			0	300	
	900 MHz Spread Spectrum Radio MDS TransNET 900	1	ea.	2,600	2,600			0	2,600	
	Lightning Arrester	1	ea.	150	150			0	150	
	Coax Service Loop	1	ea.	75	75			0	75	
	13dB Yagi Antenna	1	ea.	350	350			0	350	
	Antenna Cabling	30	m	30	900	50		450	1,350	
	<u>Hardware Installation &amp; Commissioning</u>				0			0	0	
	Panel FAT at Factory	8	Hrs		0		50	400	400	
	Shipping	1	L.S.	300	300			0	300	
	Install Panel (1 Person)	16	Hrs		0		50	800	800	
	Commission Panel (1 Person)	8	Hrs		0		50	400	400	
	Concrete Floor Coring	2	ea.	200	400			0	400	
	Shop Drawings	1	L.S.	1,500	1,500			0	1,500	
	Record Drawings & O&M Manuals	1	L.S.	500	500			0	500	
	Miscellaneous Panel Terminations	1	L.S.	500	500			0	500	
					0			0	0	



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REF NO	DESCRIPTION OF ITEM	QTY	UNIT	MATERIAL		% OF MAT'L (%)	LABOUR		TOTAL LABOUR & MAT'L (\$)	EST. TOTAL COST (\$)
				UNIT COST (\$)	TOTAL COST (\$)		or UNIT COST (\$)	TOTAL COST (\$)		
	<b>Comox Valley Water Pollution Control Centre (Existing)</b>				0			0	0	\$54,440
					0			0	0	
16900	<b>Instrumentation &amp; Controls</b>				0			0	0	
	<u>Field Instrumentation</u>				0			0	0	
	Door Security Switch - Roll Up	1	ea.	350	350		100	100	450	
	Door Security Switch - Man Door	2	ea.	150	300		100	200	500	
	Room Temp. Indicator	1	ea.	500	500	15		75	575	
16991	<b>Control Panels</b>				0			0	0	
	<u>Panel Internal Components</u>				0			0	0	
	Serial Communication Module AB 1747-KE	1	ea.	660	660			0	660	
	RS-232 Communication Cable AB2711-NC13	1	ea.	150	150			0	150	
	900 MHz Spread Spectrum Radio MDS TransNET 900	1	ea.	2,600	2,600			0	2,600	
	Lightning Arrester	1	ea.	150	150			0	150	
	Coax Sevice Loop	1	ea.	75	75			0	75	
	13dB Yagi Antenna	1	ea.	350	350			0	350	
	Antenna Cabling	30	m	30	900	50		450	1,350	
	<u>Hardware Installation &amp; Commissioning</u>				0			0	0	
	Commission Panel Changes (1 Person)	8	Hrs		0		50	400	400	
	Shop Drawings	1	L.S.	500	500			0	500	
	Record Drawings & O&M Manuals	1	L.S.	500	500			0	500	
	Supply, Install, Terminate & Test Analog I/O w/Conduit	1	ea.	230	230			0	230	
	Supply, Install, Terminate & Test Digital I/O w/Conduit	5	ea.	210	1,050			0	1,050	
	Miscellaneous Panel Terminations	1	L.S.	500	500			0	500	
	<u>Software Programming &amp; Commissioning</u>				0			0	0	
	SLC Programming - DI	60	L.S.	75	4,500			0	4,500	
	SLC Programming - DO	20	L.S.	100	2,000			0	2,000	
	SLC Programming - AI	10	L.S.	100	1,000			0	1,000	
	SLC Programming - AO	10	L.S.	125	1,250			0	1,250	
	SLC Software FAT (1 Person)	8	Hrs		0		65	520	520	
	SLC Software SAT (1 Person)	24	Hrs		0		65	1,560	1,560	
					0			0	0	
16992	<b>Computers and Software</b>				0			0	0	
	<u>Hardware &amp; Software</u>				0			0	0	
	PC Keyboard, Mouse, Monitor	1	ea.	3,000	3,000			0	3,000	
	RSView ME Runtime 75D AB 9701VWVR075AENE	1	ea.	2,700	2,700			0	2,700	
	<u>Installation &amp; Commissioning</u>				0			0	0	
	PC Setup & Configuration (1 Person)	8	Hrs		0		65	520	520	
	Shop Drawings	1	L.S.	1,000	1,000			0	1,000	
	SCADA System O&M Manual	1	L.S.	15,000	15,000			0	15,000	
	HMI Programming - DI	60	ea.	75	4,500			0	4,500	
	HMI Programming - DO	20	ea.	100	2,000			0	2,000	
	HMI Programming - AI	10	ea.	100	1,000			0	1,000	
	HMI Programming - AO	10	ea.	125	1,250			0	1,250	
	HMI Software FAT (1 Person)	8	Hrs		0		65	520	520	
	HMI Software SAT (1 Person)	32	Hrs		0		65	2,080	2,080	
					0			0	0	





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Opinion of Cost**

PROJECT: Regional District of Comox-Strathcona  
 CLIENT: Courtenay Pump Station Forcemain Re-alignment Study  
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REF NO	DESCRIPTION OF ITEM	QTY	UNIT	MATERIAL		LABOUR		TOTAL LABOUR & MAT'L (\$)	EST. TOTAL COST (\$)
				UNIT COST (\$)	TOTAL COST (\$)	% OF MAT'L (%)	or UNIT COST (\$)		
	<i>Sub-contractor's overhead and profit:</i>	10	%					O/H & P: 3,472	
								<i>Division 16 Total:</i> 216,617	\$216,700
								<i>SUB-TOTAL:</i>	\$216,700
<b>ALLOWANCES</b>									
			%					0	
								<i>Allowances Total:</i> 0	\$0
								<i>SUB-TOTAL:</i>	\$216,700
<b>GENERAL ITEMS</b>									
	Mobilization and demobilization	5	%					10,835	
	Bonds (perform. and maint., labour and material payment)	10	%					21,670	
	Insurance (all risk and liability)	5	%					10,835	
	General contractor's overhead and profit	10	%					21,670	
	Other costs		%					0	
								<i>General Items Total:</i> 65,010	\$65,100
								<i>SUB-TOTAL:</i>	\$281,800
<b>CONTINGENCY</b>									
	Construction lump sum contingency allowance (excluding allowances)	30	%					84,540	
			%					0	
								<i>Contingency Total:</i> 84,540	\$84,600
								<i>SUB-TOTAL:</i>	\$366,400
<b>TAXES</b>									
	Provincial sales tax	7	%					25,648	
	Federal goods and services tax (after rebate)	7	%					25,648	
	Other taxes, patent fees, import duties and foreign exch.	0	%					0	
								<i>Taxes Total:</i> 51,296	\$51,300
								<i>GRAND TOTAL:</i>	\$417,700
<b>No</b>	<b>REVISION</b>	<b>DATE</b>	<b>NOTES</b>						
0	Pre-Design Estimate (DRAFT)	11-Nov-05							
1									
2									
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