

**Stantec**

**SAMSUNG GRAND RENEWABLE ENERGY PARK**

NATURAL HERITAGE ASSESSMENT AND ENVIRONMENTAL IMPACT STUDY

## **Appendix J**

### **Conceptual Design - Culvert Estimations**



Grand River Energy Park

Appendix J: Conceptual Design - Culvert Estimations

Based on plans prepared by C.Coghlan

Figure No.	Turbine No.	Catchment Size (ha)	# of Culverts Required										
			400 mm Circular		600 mm Circular		900 mm Circular		1200 mm Circular		1500 mm Circular	2130 mm x 1220 mm box	
			Normal	Normal	Counter-sunk	Normal	Counter-sunk	Normal	Counter-sunk	Counter-sunk	Normal	Counter-sunk	
W1	33, 36		4	1	1								
W2	34, 41, 45	-		1									
		5.21		1									
		19.54				1							
		48.69											
W2	18	28.79				1							
		-	1	1									
W2	43	154.39									1		
W4	58	-	2	1									
		359.97		1									
W3	23, 28	-		1									
		64.81	5	1					1				
		244.34										1	
		17.64				1							
W3	46	-	1	1									
		47.17							1				
W4	24	202.54							1				
		-		1							1		
W4	20	49.37											
W5	13	-		1									
		22.22				1							
W5	48	-	3	1									
W5	16	12.09	2	1									
		-	4	1	1								
W6	10	-		1									
		10.8		1									
W7	25, 56	-	2	1	2								
		11.04		1									
W8	17	-		1									
W8	27, 44	-		1									
W7	29, 42	-	4	1	1								

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			Normal	Counter-sunk	Normal	Counter-sunk	Normal	Counter-sunk	Normal	Counter-sunk	Counter-sunk	Normal	Counter-sunk	
W7	22	- 1.64	1	1	1									
W8	52, 53	-	2	1	2									
W8	55	- 4.99	2	1	1									
W9	12	-	1	1										
W10	9	- 11.82	2	1			1							
W10	51	-	1	1										
W11	47	- 24.01	1	1		1								
W11	37, 68	-	3	1										
		11.34		1										
		10.38					1							
W11	35, 38	-	3	1										
W11	39, 40	-		2										
		7.66		1										
W12	11	-	1	1										
W13	14	-		1										
W10	21	-	1	1										
W10	5	-	3	1										
W18	4	-	2	1										
W18	2	-	1	1										
W14	19	-	4	1	1									
W13	57	-	4	1										
		605.23											2	
W13	30	-	2	1										
		43.88				1								
W14	26	-	1	1										
		13.53				1								
W14	7	-		1										
W15	6, 69, 8	-	3	2										

Figure No.	Turbine No.	Catchment Size (ha)	# of Culverts Required										
			400 mm Circular		600 mm Circular		900 mm Circular		1200 mm Circular		1500 mm Circular	2130 mm x 1220 mm box	
			Normal	Counter-sunk	Normal	Counter-sunk	Normal	Counter-sunk	Normal	Counter-sunk	Counter-sunk	Normal	Counter-sunk
W15	1, 3, 54	- 74.06	5	2						1			
W14	15, 49, 50	- 11.35	4	1			1						
W16	65, 66, 67	- 142.06	3	3							1		
W17	59, 60, 61, 62, 63, 64	-	3	1									
Total			81	55	8	8	3	4	1	1	4	2	
Total Requiring Rip-Rap			0	8	0	8	3	4	1	1	4	2	