



Carbon Based Environmental  
Pty Limited  
ABN 74 102 920 285

13 December 2011

Rocla Quarry Products  
Rocla Calga Quarry  
Mr Pat McCue  
PO Box 36  
GUILDFORD NSW 2161

Dear Pat,

**Six Monthly Calga Quarry Major Cations and Dissolved Metals  
Environmental Monitoring Report – August 2011**

Please find enclosed the final laboratory analysis report of 25 groundwater samples comprising the six monthly detailed water analysis for major cations and dissolved metals that is required by the Site Water Management Plan.

All sites (with the exception of CP8) were sampled on the 31 August 2011. CP8 could not be accessed during the August monitoring and was therefore sampled on the 1 December 2011. Comparison of results between the 1 April 2011 and the 31 August (or 1 December 2011) shows little apparent change in water quality.

Please do not hesitate to contact me if further information is required.

Yours Faithfully

Colin Davies  
Environmental Scientist  
Company Director

**Table 1: Comparison of analysis results between April 2011 and August 2011 sampling events.**

Species	Units	CQ1	CQ3	CQ4	CQ5	CQ6	CQ7	CQ8	CQ9	CQ10	CQ11S	CQ11D	CQ12
pH Value	pH units	-0.01	0.20	0.10	-0.23	-0.06	-0.19	0.07	-0.17	-0.01	0.10	-0.11	0.05
Electrical Conductivity @ 25°C	µS/cm	-68	60	-3	17	20	-5	-3	-54	-6	-75	-5	-3
Hydroxide Alkalinity as CaCO <sub>3</sub>	ppm	0	0	0	0	0	0	0	0	0	0	0	0
Carbonate Alkalinity as CaCO <sub>3</sub>	ppm	0	0	0	0	0	0	0	0	0	0	0	0
Bicarbonate Alkalinity as CaCO <sub>3</sub>	ppm	-3	16	1	0	0	0	1	0	0	0	0	0
Total Alkalinity as CaCO <sub>3</sub>	ppm	-3	16	1	0	0	0	1	0	0	0	0	0
Sulphate as SO <sub>4</sub> <sup>2-</sup>	ppm	2.0	0.0	0.0	-7.0	-1.0	-1.0	0.0	-1.0	-5.0	-1.0	0.0	1.0
Chloride	ppm	2.0	9.0	4.0	10.0	3.0	2.0	2.0	2.0	3.0	0.0	0.0	-1.0
Calcium	ppm	0	2	0	-4	-1	0	0	0	0	0	0	0
Magnesium	ppm	0	3	0	1	-1	0	0	0	-1	0	0	0
Sodium	ppm	1	4	0	3	0	-1	-1	-2	-5	0	1	-3
Potassium	ppm	1	-3	0	-3	0	0	0	0	0	0	1	0
Aluminium	ppm	-0.03	-0.09	0.01	0.49	-0.73	-0.04	0.00	-0.01	0.75	0.17	0.32	-0.13
Arsenic	ppm	0	0	0	0	0	0	0	0	0	0	0	0
Cadmium	ppm	0	0	0	0	-0.0006	0	0	0	0	0	0	0
Chromium	ppm	-0.003	-0.001	0	0	0	0	-0.002	0	0.001	0	0	0.001
Copper	ppm	0.001	-0.003	0	-0.003	-0.014	-0.002	0	-0.001	0.002	0	0.001	0.001
Lead	ppm	0.002	0	0.001	0.002	-0.003	-0.001	0.001	-0.001	0.001	-0.011	-0.003	-0.002
Manganese	ppm	0.005	1.107	-0.002	0	-0.034	-0.001	0	0	0.003	0.003	0.001	0
Nickel	ppm	-0.001	0	0	0	0	0	0	0	0.001	0	0	0.002
Selenium	ppm	0	0	0	0	0	0	0	0	0	0	0	0
Zinc	ppm	0.014	-0.030	-0.023	0.010	-0.158	-0.013	-0.006	0.001	0.008	-0.005	-0.012	0.083
Boron	ppm	0	0	0	0	0	0	0	0	0	0	0	0
Iron	ppm	0.01	2.12	0	0.07	-1.56	0.00	0.00	-0.11	0.21	0.15	0.15	-0.14
Mercury	ppm	-0.0001	0	-0.0001	-0.0003	0	0	0	0	-0.0002	-0.0002	-0.0001	0
Fluoride	ppm	0	0	0	0	0.1	0	0	0	0	0	0	0
Nitrite as N	ppm	0	0	0	0	0	0	0	0	0	0	0	0
Nitrate as N	ppm	0.07	1.06	-0.15	0.68	0.44	0.3	-0.09	-0.33	0.02	-0.22	0.07	-1.8
Nitrite + Nitrate as N	ppm	0.07	1.06	-0.15	0.68	0.44	0.3	-0.09	-0.33	0.02	-0.22	0.07	-1.8

Note: Results shown as below the limit of detection (<) have been taken as zero for the purposes of the comparison.

**Table 1 continued.**

Species	Units	CQ13	CP3	CP4	CP5	CP6	CP7	CP8	MW7	MW8	MW9	MW10	MW13	MW16
pH Value	pH units	0.09	0.09	1.36	0.08	0.07	-0.70	0.34	0.14	0.02	0.08	-0.09	0.07	0.05
Electrical Conductivity @ 25°C	µS/cm	-59	-71	9	-23	-38	-35	-1	-5	-3	-27	-16	-5	-6
Hydroxide Alkalinity as CaCO <sub>3</sub>	ppm	0	0	0	0	0	0	0	0	0	0	0	0	0
Carbonate Alkalinity as CaCO <sub>3</sub>	ppm	0	0	0	0	0	0	0	0	0	0	0	0	0
Bicarbonate Alkalinity as CaCO <sub>3</sub>	ppm	-3	2	2	0	0	-2	1	0	-1	2	0	0	0
Total Alkalinity as CaCO <sub>3</sub>	ppm	-3	2	2	0	0	-2	1	0	-1	2	0	0	0
Sulphate as SO <sub>4</sub> <sup>2-</sup>	ppm	0.0	-2.0	-3.0	3.0	2.0	-3.0	1.0	0.0	0.0	1.0	-1.0	0.0	-1.0
Chloride	ppm	5.0	4.0	6.0	12.0	11.0	3.0	-9.0	2.0	1.0	3.0	2.0	4.0	4.0
Calcium	ppm	0	0	0	-2	0	4	0	0	0	0	-1	0	0
Magnesium	ppm	0	0	-1	-8	-3	2	-1	0	0	1	-1	0	0
Sodium	ppm	0	-1	-2	3	4	0	-2	-1	0	1	0	0	0
Potassium	ppm	0	-1	-1	-2	1	0	0	0	0	0	0	0	0
Aluminium	ppm	-0.05	-0.01	-0.64	0.06	0.08	0.23	0.10	0.09	0.06	0.10	0.12	0.03	0.06
Arsenic	ppm	0	0	0	0	0	0	0	0	0	0	0	0	0
Cadmium	ppm	-0.0002	0	0.0007	0	-0.0005	0	0	0	-0.0001	0	0	0	0
Chromium	ppm	0	0	-0.025	0	0	0	0	-0.002	0	-0.001	0	-0.002	-0.002
Copper	ppm	0.001	0.036	0.2	0.012	0.024	0	-0.004	0.002	0	0	-0.002	0.001	0
Lead	ppm	-0.003	-0.001	0.021	0	0	0	0	0.004	0.002	0.001	0	0	0.001
Manganese	ppm	0.014	-0.002	0.169	0.002	0.003	-0.132	0	0.003	0.002	-0.003	-0.004	-0.004	-0.002
Nickel	ppm	0	-0.001	0.039	0.001	0	0	0	0	0	0.003	-0.001	-0.002	0
Selenium	ppm	0	0	0	0	0	0	0	0	0	0	0	0	0
Zinc	ppm	0.040	-0.065	3.373	0.037	0.033	-0.006	0.001	0.045	0.023	0.050	-0.056	-0.007	0.000
Boron	ppm	0	0	0	0	0	0	0	0	0	0	0	0	0
Iron	ppm	0.07	-0.17	0.29	0.00	0.00	-1.07	0.11	0.06	0.06	0.01	-0.06	0.00	0.01
Mercury	ppm	0	-0.0001	0	-0.0002	0	0	0	0	0	0	0	0	0
Fluoride	ppm	0	0	0	0	0	0	0	0	0	0	0	0	0
Nitrite as N	ppm	0	0	0	0	0	0.02	0	0	0	0	0	0	0
Nitrate as N	ppm	0.16	-0.45	-0.71	-11.01	-5.19	4.22	-0.28	-0.03	0.01	0.1	-0.02	-0.02	-0.04
Nitrite + Nitrate as N	ppm	0.16	-0.45	-0.71	-11.01	-5.19	4.22	-0.28	-0.03	0.01	0.1	-0.02	-0.02	-0.04

Note: Results shown as below the limit of detection (<) have been taken as zero for the purposes of the comparison.