

RICHMOND QUARRY
SURFACE WATER MONITORING RESULTS (MP1-MP6)

Monitoring Point	Date	Sampling Conditions	pH	Conductivity	Nitrate (NO ₃)	Aluminium (Al)	Total Arsenic (As)	Cadmium (Cd)	Total Chromium (Cr)	Copper (Cu)	Mercury (Hg)	Nickel (Ni)	Oil & Grease	Total Suspended Solids	Lead (Pb)	Zinc (Zn)
ANZECC 2000 Trigger Values ¹			6.5-8.5 ²	0.350 (dS/m)	0.7 (mg/L)	0.055 (mg/L)	0.024 (mg/L)	0.0002 (mg/L)	n/s (mg/L)	0.0014 (mg/L)	0.0006 (mg/L)	0.011 (mg/L)	No visible sheen or detectable odour	50 (mg/L) ³	0.0034 (mg/L)	0.008 (mg/L)
MP1	17/06/2014	Flow	5.85	0.157	<0.005	0.808	<0.001	<0.001	0.001	0.001	<0.0005	0.001	None	4	<0.001	0.004
	23/10/2014	Flow	7.13	0.159	0.014	0.1	<0.001	<0.001	<0.001	0.001	<0.0005	0.001	None	9	<0.001	<0.001
	22/01/2015	Flow	6.98	0.196	<0.005	0.11	<0.001	<0.001	<0.001	0.001	<0.0005	0.001	None	10	<0.001	0.002
	6/03/2015	Flow - following heavy rain	6.87	0.134	0.019	0.09	<0.001	<0.0001	<0.001	0.002	<0.0005	0.001	None	11	<0.001	0.002
	7/04/2015	Flow - following heavy rain	6.7	0.123	0.166	1.994	0.001	<0.0001	0.002	0.002	<0.0005	0.002	None	25	<0.001	0.005
	13/08/2015	Flow	7.25	0.152	0.024	0.119	<0.001	<0.0001	<0.001	<0.001	<0.0005	0.001	None	11	<0.001	0.002
	18/12/2015	Flow	6.18	0.153	0.02	0.281	<0.001	<0.0001	0.001	0.001	<0.0005	0.001	None	20	<0.001	0.006
	26/05/2016	Flow	7.01	0.152	0.049	0.108	<0.001	<0.0001	<0.001	0.001	<0.0005	<0.001	None	13	<0.001	0.001
	10/06/2016	Flow - following heavy rain	6.43	0.123	0.296	0.177	<0.001	<0.001	<0.001	0.001	<0.0005	0.001	None	8	<0.001	0.002
	16/11/2016	Flow	7.07	0.164	0.007	0.137	<0.001	<0.001	<0.001	0.001	<0.005	0.001	None	8	<0.001	0.004
	21/02/2017	Flow	7.35	0.188	0.006	1.31	<0.001	<0.001	0.001	0.001	<0.0005	0.001	None	19	<0.001	0.007
	8/06/2017	Flow	6.83	0.144	0.086	0.161	<0.001	<0.0001	<0.001	0.001	<0.0005	<0.001	None	18	<0.001	0.002
	6/09/2017	Flow	7	0.155	0.02	0.596	<0.001	<0.0001	0.001	0.001	<0.0005	0.001	None	11	<0.001	0.002
	7/12/2017	Flow	6.73	0.107	0.055	0.261	<0.001	<0.001	<0.001	0.002	<0.0005	0.001	None	19	<0.001	0.004
	22/03/2018	Flow	7.02	0.134	0.036	0.161	<0.001	<0.0001	<0.001	0.001	<0.0005	0.001	None	9	<0.001	0.005
	21/06/2018	Flow	6.94	0.158	0.042	0.117	<0.001	<0.0001	<0.001	0.001	<0.0005	0.001	None	8	<0.001	0.006
MP2	17/06/2014	No Discharge	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	23/10/2014	No Discharge	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	22/01/2015	No Discharge	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	6/03/2015	Flow - following heavy rain	6.08	0.185	0.031	0.284	0.001	<0.0001	0.001	0.002	<0.0005	0.003	None	13	<0.001	0.006
	7/04/2015	Flow - following heavy rain	6.38	0.111	0.035	2.894	<0.001	0	0.002	0.004	<0.0005	0.004	None	6	<0.001	0.025
	13/08/2015	Minimal flow	6.37	0.244	<0.005	0.554	<0.001	<0.0001	0.001	0.002	<0.0005	0.002	None	33	<0.001	0.006
	18/12/2015	Minimal flow	5.78	0.151	0.003	0.18	0.001	<0.0001	<0.001	0.001	<0.0005	0.001	None	24	<0.001	0.032
	26/05/2016	No Discharge	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	10/06/2016	Flow - following heavy rain	5.94	0.093	<0.005	0.992	<0.001	<0.001	0.001	0.002	<0.0005	0.001	None	17	<0.001	0.015
	16/11/2016	No Discharge	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	21/02/2017	No Discharge	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	8/06/2017	Flow	5.62	0.204	<0.005	0.434	<0.001	<0.0001	0.001	0.001	<0.0005	0.002	None	23	<0.001	0.008
	6/09/2017	No Discharge	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	7/12/2017	Flow	6.01	0.111	<0.005	0.532	<0.001	<0.001	0.001	0.002	<0.0005	0.003	None	12	<0.001	0.013
	22/03/2018	Flow	6.01	0.174	0.006	0.426	<0.001	<0.0001	0.001	0.002	<0.0005	0.002	None	41	<0.001	0.008
	21/06/2018	Flow	6.65	0.179	0.031	0.151	<0.001	<0.0001	<0.001	0.001	<0.0005	<0.001	None	10	<0.001	0.005

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ANZECC 2000 Trigger Values ¹			6.5-8.5 ²	0.350 (dS/m)	0.7 (mg/L)	0.055 (mg/L)	0.024 (mg/L)	0.0002 (mg/L)	n/s (mg/L)	0.0014 (mg/L)	0.0006 (mg/L)	0.011 (mg/L)	No visible sheen or detectable odour	50 (mg/L) ³	0.0034 (mg/L)	0.008 (mg/L)
MP3	17/06/2014	Insufficient Water Levels	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	23/10/2014	Insufficient Water Levels	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	22/01/2015	Insufficient Water Levels	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	6/03/2015	Insufficient Water Levels	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	7/04/2015	Flow - following heavy rain	5.88	0.098	0.015	1.475	<0.001	<0.0001	0.001	0.001	<0.0005	0.001	None	6	<0.001	0.006
	13/08/2015	Insufficient Water Levels	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	18/12/2015	Insufficient Water Levels	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	26/05/2016	Insufficient Water Levels	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	10/06/2016	Flow - following heavy rain	5	0.106	<0.005	0.256	<0.001	<0.001	<0.001	<0.001	<0.0005	<0.001	None	2	<0.001	0.007
	16/11/2016	Insufficient Water Levels	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	21/02/2017	Insufficient Water Levels	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	8/06/2017	Insufficient Water Levels	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	6/09/2017	Insufficient Water Levels	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	7/12/2017	Insufficient Water Levels	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MP4	22/03/2018	Insufficient Water Levels	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	21/06/2018	Insufficient Water Levels	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	17/06/2014	Insufficient Water Levels	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	23/10/2014	Insufficient Water Levels	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	22/01/2015	Insufficient Water Levels	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	6/03/2015	Insufficient Water Levels	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	7/04/2015	Insufficient Water Levels	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	13/08/2015	Insufficient Water Levels	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	18/12/2015	Insufficient Water Levels	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	26/05/2016	Insufficient Water Levels	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	10/06/2016	Flow - following heavy rain	5.45	0.137	0.005	0.197	<0.001	<0.001	<0.001	0.001	<0.0005	0.001	None	4	<0.001	0.004
	16/11/2016	Insufficient Water Levels	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	21/02/2017	Insufficient Water Levels	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	8/06/2017	Insufficient Water Levels	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	6/09/2017	Insufficient Water Levels	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	7/12/2017	Insufficient Water Levels	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	22/03/2018	Insufficient Water Levels	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	21/06/2018	Insufficient Water Levels	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Monitoring Point	Date	Sampling Conditions	pH	Conductivity	Nitrate (NO ₃)	Aluminium (Al)	Total Arsenic (As)	Cadmium (Cd)	Total Chromium (Cr)	Copper (Cu)	Mercury (Hg)	Nickel (Ni)	Oil & Grease	Total Suspended Solids	Lead (Pb)	Zinc (Zn)
ANZECC 2000 Trigger Values ¹			6.5-8.5 ²	0.350 (dS/m)	0.7 (mg/L)	0.055 (mg/L)	0.024 (mg/L)	0.0002 (mg/L)	n/s (mg/L)	0.0014 (mg/L)	0.0006 (mg/L)	0.011 (mg/L)	No visible sheen or detectable odour	50 (mg/L) ³	0.0034 (mg/L)	0.008 (mg/L)
MP5	17/06/2014	No discharge from WRD	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	23/10/2014	Yes	5.54	0.102	0.015	0.35	<0.001	<0.001	<0.001	<0.001	<0.0005	<0.001	None	44	<0.001	0.001
	22/01/2015	Yes	5.29	0.123	<0.005	0.184	<0.001	<0.001	<0.001	<0.001	<0.0005	<0.001	None	6	<0.001	0.002
	6/03/2015	Yes	5.74	0.076	0.005	0.445	<0.001	<0.0001	<0.001	<0.001	<0.0005	0.001	None	66	<0.001	0.002
	7/04/2015	Yes - following heavy rain	5.71	0.074	0.058	2.335	0.001	<0.0001	0.001	0.001	<0.0005	0.001	None	266	0.001	0.003
	13/08/115	Yes	5.47	0.059	0.119	1.552	<0.001	<0.0001	0.001	<0.001	<0.0005	<0.001	None	262	0.001	0.002
	18/12/2015	Yes	4.42	0.061	0.027	3.984	<0.001	<0.0001	0.003	<0.001	<0.0005	0.001	None	72	0.001	0.006
	26/05/2016	Yes	5.62	0.063	0.031	0.539	<0.001	<0.0001	<0.001	<0.001	<0.0005	<0.001	None	78	<0.001	0.001
	10/06/2016	Flow - following heavy rain	4.48	0.049	0.095	2.078	<0.001	<0.001	0.001	0.001	<0.0005	<0.001	None	478	0.002	0.003
	16/11/2016	Yes	5.55	0.066	0.041	0.419	<0.001	<0.001	<0.001	0.001	<0.005	<0.001	None	45	<0.001	0.004
	21/02/2017	Yes	5.55	0.067	<0.005	2.231	<0.001	<0.001	0.001	<0.001	<0.0005	<0.001	None	18	<0.001	0.004
	8/06/2017	Yes	4.99	0.045	0.268	1.153	<0.001	<0.0001	0.001	0.001	<0.0005	<0.001	None	141	0.001	0.003
	6/09/2017	Yes	5.46	0.043	0.188	2.463	<0.001	<0.0001	0.001	0.001	<0.0005	<0.001	None	236	0.002	0.003
	7/12/2017	Yes	5.71	0.05	<0.005	0.787	<0.001	<0.001	<0.001	0.001	<0.0005	<0.001	None	95	0.001	0.005
	22/03/2018	Yes	5.82	0.05	0.012	0.445	<0.001	<0.0001	<0.001	0.001	<0.0005	<0.001	None	69	<0.001	0.004
	21/06/2018	Yes	5.37	0.059	0.009	0.415	<0.001	<0.0001	<0.001	0.001	<0.0005	<0.001	None	76	0.001	0.004
MP6	17/06/2014	No Discharge	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	23/10/2014	No Discharge	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	22/01/2015	No Discharge	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	6/03/2015	No Discharge	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	7/04/2015	No Discharge	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	13/08/2015	No Discharge	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	18/12/2015	No Discharge	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	26/05/2016	No Discharge	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	10/06/2016	No Discharge	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	16/11/2016	No Discharge	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	21/02/2017	No Discharge	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	8/06/2017	No Discharge	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	6/09/2017	No Discharge	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	7/12/2017	No Discharge	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	22/03/2018	No Discharge	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	21/06/2018	No Discharge	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MP7 (pH Only)		SEE ALTERNATIVE TABLE														

1. Initially data will be compared against ANZECC Trigger Values with the aim to develop site specific trigger levels after 2 years of operations once a larger data set is available.

2. pH level required will be reviewed following collection of baseline monitoring data in accordance with the Project Approval. Specifically it is noted that the pH of nearby soil and receiving waters are mildly acidic pH4.5-pH5.3. The natural acidic soil conditions encountered at the Project Site and subsequent influence on run may require that maintenance of ambient condition is the preferred water quality goal.

3. Maximum level once the stormwater management system is constructed and operational as per EPL 20562. Exceedance permitted at overflow point for duration of overflow when wet weather overflow is occurring due to stormwater events $\geq$ 60.2mm in total falling over any consecutive 5 day period.

4. Data in **bold** indicates the data is outside the trigger levels.