

**RICHMOND QUARRY**  
**GROUNDWATER MONITORING RESULTS (MP8-MP12)**

Monitoring Point	Date	Sampling Conditions	pH	Conductivity (dS/m)	Nitrate (NO <sub>3</sub> ) (mg/L)	Aluminium (Al) (mg/L)	Total Arsenic (As) (mg/L)	Cadmium (Cd) (mg/L)	Total Chromium (Cr) (mg/L)	Copper (Cu) (mg/L)	Mercury (Hg) (mg/L)	Nickel (Ni) (mg/L)	Lead (Pb) (mg/L)	Zinc (Zn) (mg/L)	Recharge Rate (L/Hour)
ANZECC 2000 Trigger Values <sup>1</sup>			6.5 - 8.5 <sup>3</sup>	0.35	0.7	0.055	0.024	0.0002	n/s	0.0014	0.0006	0.011	0.0034	0.008	N/A
NHMRC Drinking Water Guidelines <sup>2</sup>			6.5 - 8.5 <sup>3</sup>	n/s	50	0.2	0.01	0.002	0.05	2	0.001	0.02	0.01	3	N/A
MP8	17/06/2014	Unable to Collect Sample	-	-	-	-	-	-	-	-	-	-	-	-	-
	2/10/2014	Unable to Collect Sample	-	-	-	-	-	-	-	-	-	-	-	-	-
	5/11/2014	Sample Collected	<b>3.66</b>	0.448	0.11	0.131	<0.001	<0.001	<0.001	0.002	<0.0005	0.007	0.002	0.044	0.86
	22/01/2015	Sample Collected	<b>3.81</b>	0.736	0.083	0.118	0.001	<0.001	0.001	0.002	<0.0005	0.01	0.001	<0.054	0.58
	9/04/2015	Sample Collected	<b>4.47</b>	0.509	0.897	0.089	<0.001	<0.001	<0.0001	0.002	<0.0005	0.007	0.001	0.039	0.71
	13/08/2015	Sample Collected	<b>3.49</b>	0.762	<0.005	0.083	0.001	<0.0001	<0.001	0.001	<0.0005	0.009	0.001	0.036	0.86
	18/12/2015	Sample Collected	<b>3.32</b>	0.563	<0.005	0.165	<0.001	<0.0001	<0.001	0.004	<0.0005	0.007	0.001	0.036	0.54
	26/05/2016	Sample Collected	<b>3.82</b>	0.613	<0.005	0.137	0.001	<0.0001	<0.001	0.002	<0.0005	0.008	0.001	0.031	0.33
	11/08/2016	Sample Collected	<b>4.00</b>	0.48	<0.005	0.088	<0.001	<0.0001	<0.001	0.001	<0.0005	0.006	<0.001	0.026	0.79
	16/11/2016	Sample Collected	<b>3.55</b>	0.66	0.014	0.14	<0.001	<0.001	0.001	0.005	<b>&lt;0.005</b>	0.007	0.001	0.036	0.75
	21/02/2017	Insufficient Water Levels	-	-	-	-	-	-	-	-	-	-	-	-	-
	8/06/2017	Sample Collected	<b>3.28</b>	0.599	0.01	0.189	<0.001	<0.0001	0.001	0.006	<0.0005	0.007	0.001	0.043	0.76
	6/09/2017	Sample Collected	<b>3.61</b>	0.702	0.009	0.141	<0.001	<0.0001	0.001	0.002	<0.0005	0.008	0.001	0.035	1.04
	7/12/2017	Sample Collected	<b>4.12</b>	0.524	0.021	0.146	<0.001	<0.001	0.001	0.004	<0.0005	0.007	0.001	0.043	0.83
	22/03/2018	Sample Collected	<b>4.47</b>	0.57	0.005	0.071	<0.001	<0.0001	<0.001	0.005	<0.0005	0.007	<0.001	0.03	0.54
21/06/2018	Insufficient Water Levels	-	-	-	-	-	-	-	-	-	-	-	-	-	
MP9	17/06/2014	Unable to Collect Sample	-	-	-	-	-	-	-	-	-	-	-	-	-
	2/10/2014	Unable to Collect Sample	-	-	-	-	-	-	-	-	-	-	-	-	-
	5/11/2014	Sample Collected	<b>5.38</b>	0.257	0.025	0.023	<0.001	<0.001	<0.001	0.001	<0.0005	0.001	<0.001	0.019	1.25
	22/01/2015	Sample Collected	<b>5.34</b>	0.317	0.033	0.036	<0.001	<0.001	<0.001	0.001	<0.0005	0.001	0.001	0.019	1.88
	9/04/2015	Sample Collected	<b>5.37</b>	0.247	0.174	0.042	<0.001	<0.001	<0.0001	0.003	<0.0005	0.002	<0.001	0.016	2.83
	13/08/2015	Sample Collected	<b>5.61</b>	0.252	0.091	0.034	<0.001	<0.0001	<0.001	0.001	<0.0005	0.001	<0.001	0.02	1.88
	18/12/2015	Sample Collected	<b>4.89</b>	0.26	0.068	0.015	<0.001	<0.0001	<0.001	0.001	<0.0005	0.001	<0.001	0.026	1.08
	26/05/2016	Sample Collected	<b>5.27</b>	0.284	0.029	0.009	<0.001	<0.0001	<0.001	0.001	<0.0005	0.001	<0.001	0.01	1.92
	11/08/2016	Sample Collected	<b>5.27</b>	0.265	0.09	0.02	<0.001	<0.0001	<0.001	0.001	<0.0005	0.001	<0.001	0.011	2.25
	16/11/2016	Sample Collected	<b>5.22</b>	0.286	0.13	0.024	<0.001	<0.001	<0.001	0.001	<b>&lt;0.005</b>	0.001	<0.001	0.013	1.42
	21/02/2017	Sample Collected	<b>5.20</b>	0.275	0.079	0.024	<0.001	<0.001	<0.001	<0.001	<0.0005	0.001	<0.001	0.014	0.96
	8/06/2017	Sample Collected	<b>5.02</b>	0.135	0.149	0.091	<0.001	<0.0001	<0.001	0.001	<0.0005	<0.001	<0.001	0.038	0.96
	6/09/2017	Sample Collected	<b>5.22</b>	0.193	0.234	0.146	<0.001	<0.0001	<0.001	0.001	<0.0005	0.001	<0.001	0.028	1.08
	7/12/2017	Sample Collected	<b>5.72</b>	0.077	0.17	0.181	<0.001	<0.001	<0.001	0.002	<0.0005	0.001	<0.001	0.042	0.75
	22/03/2018	Sample Collected	<b>5.45</b>	0.125	0.226	0.149	<0.001	<0.0001	<0.001	0.002	<0.0005	0.001	<0.001	0.054	1.16
21/06/2018	Sample Collected	<b>5.40</b>	0.246	0.114	0.174	<0.001	<0.001	<0.001	0.001	<0.0005	0.001	<0.001	0.019	0.43	
MP10	17/06/2014	Unable to Collect Sample	-	-	-	-	-	-	-	-	-	-	-	-	-
	2/10/2014	Unable to Collect Sample	-	-	-	-	-	-	-	-	-	-	-	-	-
	5/11/2014	Sample Collected	<b>6.10</b>	0.212	0.029	0.074	<0.001	<0.001	0.001	0.002	<0.0005	0.001	<0.001	0.01	0.92
	22/01/2015	Sample Collected	<b>4.91</b>	0.143	0.008	0.108	<0.001	<0.001	0.001	<0.001	<0.0005	0.002	0.001	0.015	1.29
	9/04/2015	Sample Collected	<b>4.48</b>	0.096	0.115	0.064	<0.001	<0.001	<0.0001	0.001	<0.0005	0.001	0.002	0.019	1.63
	13/08/2015	Sample Collected	<b>4.44</b>	0.105	0.126	0.094	<0.001	<0.0001	<0.001	0.002	<0.0005	0.001	0.001	0.012	1.54
	18/12/2015	Sample Collected	<b>3.80</b>	0.123	0.026	0.165	<0.001	<0.0001	<0.001	0.008	<0.0005	0.002	0.001	0.016	1.42
	26/05/2016	Sample Collected	<b>4.28</b>	0.128	0.021	0.159	0.001	<0.0001	<0.001	0.003	<0.0005	0.002	0.002	0.014	1.5
	11/08/2016	Sample Collected	<b>4.38</b>	0.101	0.717	0.149	<0.001	<0.0001	0.001	0.002	<0.0005	0.002	0.002	0.011	1.83
	16/11/2016	Sample Collected	<b>4.21</b>	0.135	0.419	0.117	<0.001	<0.001	<0.001	0.002	<b>&lt;0.005</b>	0.002	<0.001	0.013	1.5
	21/02/2017	Sample Collected	<b>4.23</b>	0.129	0.085	0.164	<0.001	<0.001	<0.001	0.004	<0.0005	0.002	<0.001	0.019	1.04
	8/06/2017	Sample Collected	<b>3.94</b>	0.095	0.036	0.143	<0.001	<0.0001	0.001	0.006	<0.0005	0.001	<0.001	0.018	1.2

Monitoring Point	Date	Sampling Conditions	pH	Conductivity (dS/m)	Nitrate (NO <sub>3</sub> ) (mg/L)	Aluminium (Al) (mg/L)	Total Arsenic (As) (mg/L)	Cadmium (Cd) (mg/L)	Total Chromium (Cr) (mg/L)	Copper (Cu) (mg/L)	Mercury (Hg) (mg/L)	Nickel (Ni) (mg/L)	Lead (Pb) (mg/L)	Zinc (Zn) (mg/L)	Recharge Rate (L/Hour)
ANZECC 2000 Trigger Values <sup>1</sup>			6.5 - 8.5 <sup>3</sup>	0.35	0.7	0.055	0.024	0.0002	n/s	0.0014	0.0006	0.011	0.0034	0.008	N/A
NHMRC Drinking Water Guidelines <sup>2</sup>			6.5 - 8.5 <sup>3</sup>	n/s	50	0.2	0.01	0.002	0.05	2	0.001	0.02	0.01	3	N/A
	6/09/2017	Sample Collected	<b>4.55</b>	0.094	0.098	0.146	<0.001	<0.0001	0.001	0.002	<0.0005	0.001	<0.001	0.014	1.42
	7/12/2017	Sample Collected	<b>4.59</b>	0.1	0.078	0.125	<0.001	<0.001	0.001	0.006	<0.0005	0.001	<0.001	0.022	1
	22/03/2018	Sample Collected	<b>4.46</b>	0.101	0.106	0.127	<0.001	<0.0001	0.001	0.002	<0.0005	0.001	<0.001	0.018	1.16
	21/06/2018	Sample Collected	<b>4.39</b>	0.118	0.036	0.174	<0.001	<0.001	0.001	0.002	<0.0005	0.001	<0.001	0.012	0.48
MP11	22/01/2015	Level Measured - 0.65m	-	-	-	-	-	-	-	-	-	-	-	-	-
	7/04/2015	Level Measured - 0.60m	-	-	-	-	-	-	-	-	-	-	-	-	-
	13/08/2015	Level Measured - 0.61m	-	-	-	-	-	-	-	-	-	-	-	-	-
	18/12/2015	Level Measured - 0.51m	-	-	-	-	-	-	-	-	-	-	-	-	-
	26/05/2016	Level Measured - 0.56m	-	-	-	-	-	-	-	-	-	-	-	-	-
	11/08/2016	Level Measured - 0.50m	-	-	-	-	-	-	-	-	-	-	-	-	-
	16/11/2016	Level Measured - 0.54m	-	-	-	-	-	-	-	-	-	-	-	-	-
	21/02/2017	Level Measured - 0.51m	-	-	-	-	-	-	-	-	-	-	-	-	-
	8/06/2017	Level Measured - 0.54m	-	-	-	-	-	-	-	-	-	-	-	-	-
	6/09/2017	Level Measured - 0.52m	-	-	-	-	-	-	-	-	-	-	-	-	-
	7/12/2017	Level Measured - 0.51m	-	-	-	-	-	-	-	-	-	-	-	-	-
22/03/2018	Level Measured - 0.54m	-	-	-	-	-	-	-	-	-	-	-	-	-	
21/06/2018	Site not accessible	-	-	-	-	-	-	-	-	-	-	-	-	-	
MP12	13/08/2015	Sample Collected	<b>10.10</b>	0.396	0.165	0.059	0.001	<0.0001	0.005	0.005	<0.0005	0.001	<0.001	0.001	0.29
	18/12/2015	Sample Collected	7.27	0.615	0.113	0.058	0.002	<0.0001	<0.001	0.001	<0.0005	0.001	0.001	0.002	0.25
	26/05/2016	Sample Collected	6.90	0.6	0.116	0.049	0.001	<0.0001	<0.001	0.001	<0.0005	0.001	0.001	0.005	0.38
	11/08/2016	Sample Collected	6.78	0.585	0.083	0.061	0.001	<0.0001	<0.001	0.001	<0.0005	0.001	0.001	0.005	0.21
	16/11/2016	Sample Collected	<b>6.48</b>	0.607	0.104	0.041	<0.001	<0.001	<0.001	0.001	<b>&lt;0.005</b>	0.001	0.001	0.008	0.25
	21/02/2017	Sample Collected	<b>6.29</b>	0.56	0.075	0.024	<0.001	<0.001	<0.001	0.001	<0.0005	0.001	<0.001	0.008	0.31
	8/06/2017	Sample Collected	<b>5.89</b>	0.552	0.035	0.025	<0.001	<0.0001	<0.001	0.001	<0.0005	0.001	<0.001	0.01	0.28
	6/09/2017	Sample Collected	<b>6.22</b>	0.559	0.037	0.031	<0.001	<0.0001	<0.001	0.001	<0.0005	0.001	<0.001	0.01	0.23
	7/12/2017	Sample Collected	<b>6.27</b>	0.514	0.027	0.041	<0.001	<0.001	<0.001	0.001	<0.0005	0.001	<0.001	0.011	0.25
	22/03/2018	Sample Collected	<b>6.19</b>	0.488	0.048	0.037	<0.001	<0.0001	<0.001	0.001	<0.0005	0.001	<0.001	0.01	0.29
	21/06/2018	Sample Collected	<b>6.14</b>	0.486	0.073	0.035	<0.001	<0.001	<0.001	0.001	<0.0005	0.003	<0.001	0.019	0.13

1. Initially data will be compared against ANZECC Trigger Values for with the aim to develop site specific trigger levels after 3 years of operations once a larger data set is available.

2. Initially data will be compared against NHMRC Drinking Water Guidelines with the aim to develop site specific trigger levels after 3 years of operations once a larger data set is available.

3. 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 runoff may require that maintenance of ambient condition is the preferred water quality goal.

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

5. Monitoring Point 11 measures levels only not water quality. Monitoring Point 11 was officially added to the monitoring regime in 2015.

6. Monitoring Point 12 was officially added to the monitoring regime in late 2015 but earlier results have been included.