

APPENDIX E
BLAST MONITORING RESULTS

(Source: Thiess, 2011)

Table E-1
Summary of Blast Monitoring Results

Date	Rock Art (Site 72)		Pit 2 Main Rail Culvert	Pit 2 Main Rail East	Pit 2 Main Rail West	Pit 1 Main Rail East Culvert	Pit 1 Main Rail West Embankment	Concrete Power Pole	Concrete Railway Antenna	Wilpinjong Rail Loop	Nearest privately owned residence - compliance monitoring	
	V1		R4			R1	R2	R3		R5		
	Vibration (mm/s)	Overpressure (dB)	Vibration (mm/s)	Vibration (mm/s)	Vibration (mm/s)	Vibration (mm/s)	Vibration (mm/s)	Vibration (mm/s)	Vibration (mm/s)	Vibration (mm/s)	Overpressure (dB))	Vibration (mm/s)
5-Jan-11	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.59	N/D	N/D
6-Jan-11	0.36	108	N/A	N/A	N/A	N/A	N/A	N/A	N/A	2.25	N/D	N/D
11-Jan-11	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/D	N/D	N/D
12-Jan-11	3.74	122	N/A	N/A	N/A	N/A	N/A	N/A	N/A	3.32	N/D	N/D
13-Jan-11	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.43	N/D	N/D
14-Jan-11	1.16	123	N/A	N/A	N/A	N/A	N/A	N/A	N/A	2.48	N/D	N/D
14-Jan-11	1.16	123	N/A	N/A	N/A	N/A	N/A	N/A	N/A	2.48	N/D	N/D
17-Jan-11	0.85	117.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.89	N/D	N/D
19-Jan-11	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1.53	N/D	N/D
20-Jan-11	1.84	122.13	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.82	N/D	N/D
28-Jan-11	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.05	N/D	N/D
31-Jan-11	1.43	122	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1.2	N/D	N/D
2-Feb-11	0.79	118	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1.4	N/D	N/D
3-Feb-11	2.24	119	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1.84	N/D	N/D
7-Feb-11	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	2.07	103.2	0.07
9-Feb-11	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.23	N/D	N/D
11-Feb-11	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1.25	N/D	N/D
15-Feb-11	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.05	N/D	N/D
21-Feb-11	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.43	101.1	0.32
22-Feb-11	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.79	97.2	0.17
24-Feb-11	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.41	N/D	N/D
28-Feb-11	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	3.11	N/D	N/D
1-Mar-11	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.05	N/D	N/D
3-Mar-11	3.76	116.13	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.29	105.34	0.25
4-Mar-11	1.39	128.47	N/A	N/A	N/A	N/A	N/A	N/A	N/A	5.26	108.6	0.12
9-Mar-11	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.05	102.07	0.08
10-Mar-11	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.26	81.29	0.07
15-Mar-11	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.05	102.87	0.07
16-Mar-11	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.61	83.32	0.16
21-Mar-11	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.51	93.44	0.07
22-Mar-11	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.05	96.92	0.2

Table E-1 (Continued)
Summary of Blast Monitoring Results

Date	Rock Art (Site 72)		Pit 2 Main Rail Culvert	Pit 2 Main Rail East	Pit 2 Main Rail West	Pit 1 Main Rail East Culvert	Pit 1 Main Rail West Embankment	Concrete Power Pole	Concrete Railway Antenna	Wilpinjong Rail Loop	Nearest privately owned residence - compliance monitoring	
	V1		R4			R1	R2	R3		R5		
	Vibration (mm/s)	Overpressure (dB)	Vibration (mm/s)	Vibration (mm/s)	Vibration (mm/s)	Vibration (mm/s)	Vibration (mm/s)	Vibration (mm/s)	Vibration (mm/s)	Vibration (mm/s)	Overpressure (dB))	Vibration (mm/s)
24-Mar-11	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.05	106.13	0.6
24-Mar-11	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.05	106.13	0.6
25-Mar-11	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/D	N/D
1-Apr-11	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/D	N/D
7-Apr-11	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/D	0.07
12-Apr-11	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.08	N/D	0.07
13-Apr-11	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.05	36	0.13
15-Apr-11	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	36	0.13
15-Apr-11	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	36	0.13
20-Apr-11	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.05	105.05	0.13
20-Apr-11	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.05	ND	0.07
29-Apr-11	N/D	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.05	56	0.13
4-May-11	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.69	N/R	N/R
10-May-11	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.05	ND	0.22
12-May-11	2.52	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.05	99.41	0.09
12-May-11	2.52	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.05	99.41	0.09
16-May-11	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.05	98.12	0.07
18-May-11	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.1	91.42	0.11
19-May-11	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.61	98.12	0.14
25-May-11	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.05	99.79	0.08
25-May-11	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.05	99.79	0.08
27-May-11	N/A	77.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.05	66	0.26
31-May-11	N/A	113.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.08	100.57	0.5
2-Jun-11	N/A	107.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.05	97.22	0.18
7-Jun-11	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	114.56	0.09
8-Jun-11	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.13	113.83	0.08
14-Jun-11	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	105	0.09
16-Jun-11	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	2.02	115.25	0.16
17-Jun-11	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	72	0.07
22-Jun-11	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.05	ND	0.27

Table E-1 (Continued)
Summary of Blast Monitoring Results

Date	Rock Art (Site 72)		Pit 2 Main Rail Culvert	Pit 2 Main Rail East	Pit 2 Main Rail West	Pit 1 Main Rail East Culvert	Pit 1 Main Rail West Embankment	Concrete Power Pole	Concrete Railway Antenna	Wilpinjong Rail Loop	Nearest privately owned residence - compliance monitoring	
	V1		R4			R1	R2	R3		R5		
	Vibration (mm/s)	Overpressure (dB)	Vibration (mm/s)	Vibration (mm/s)	Vibration (mm/s)	Vibration (mm/s)	Vibration (mm/s)	Vibration (mm/s)	Vibration (mm/s)	Vibration (mm/s)	Overpressure (dB))	Vibration (mm/s)
23-Jun-11	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.59	35	0.09
24-Jun-11	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.61	32	0.08
24-Jun-11	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.61	97.44	0.08
1-Jul-11	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.05	ND	0.08
5-Jul-11	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.05	14	0.09
7-Jul-11	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	4.06	108.76	0.39
8-Jul-11	1.42, 1.49	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/R	115.06	0.11
14-Jul-11	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.2	96	0.07
19-Jul-11	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.05	106	0.09
21-Jul-11	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	103	0.32
22-Jul-11	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.2	109.74	0.07
26-Jul-11	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	2.94	102.03	0.07
28-Jul-11	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.23	95.4	0.1
2-Aug-11	N/A	129	N/A	N/A	N/A	N/A	N/A	N/A	N/A	2.45	111.5	0.45
3-Aug-11	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.1	99.29	0.37
4-Aug-11	N/A	129.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	76	0.09
11-Aug-11	N/D	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	97	0.09
12-Aug-11	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	25	0.09
16-Aug-11	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	99.46	0.1
18-Aug-11	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.46	101.15	0.1
19-Aug-11	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	124.64	0.7
23-Aug-11	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	84	0.11
24-Aug-11	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.05	45	0.29
26-Aug-11	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	95.8	0.13
30-Aug-11	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.05	90.2	0.29
2-Sep-11	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.05	99.96	0.12
2-Sep-11	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.05	103.17	0.27
2-Sep-11	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.05	103.17	0.27
7-Sep-11	N/A	143.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.05	34	0.08
9-Sep-11	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	100.32	0.15

Table E-1 (Continued)
Summary of Blast Monitoring Results

Date	Rock Art (Site 72)		Pit 2 Main Rail Culvert	Pit 2 Main Rail East	Pit 2 Main Rail West	Pit 1 Main Rail East Culvert	Pit 1 Main Rail West Embankment	Concrete Power Pole	Concrete Railway Antenna	Wilpinjong Rail Loop	Nearest privately owned residence - compliance monitoring	
	V1		R4			R1	R2	R3		R5		
	Vibration (mm/s)	Overpressure (dB)	Vibration (mm/s)	Vibration (mm/s)	Vibration (mm/s)	Vibration (mm/s)	Vibration (mm/s)	Vibration (mm/s)	Vibration (mm/s)	Vibration (mm/s)	Overpressure (dB)	Vibration (mm/s)
12-Sep-11	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.05	100.06	0.07
14-Sep-11	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.05	91.3	0.1
14-Sep-11	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.05	91.3	0.1
15-Sep-11	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.23	90.03	0.07
20-Sep-11	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/D	100.37	0.07
28-Sep-11	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1.79	98.12	0.31
30-Sep-11	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.36	N/D	0.14
4-Oct-11	N/A	108.93	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.05	105.3	0.05
5-Oct-11	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.05	N/D	0.07
7-Oct-11	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.35	88.58	0.1
11-Oct-11	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.2	103.42	0.07
12-Oct-11	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1.05	104.1	0.08
13-Oct-11	N/A	126	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.05	N/D	0.08
18-Oct-11	1.08	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	7.84	87.08	0.09
18-Oct-11	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	3.68	N/D	0.12
20-Oct-11	N/A	115	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/R	N/R	N/R
24-Oct-11	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/D	0.24
24-Oct-11	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/D	0.24
25-Oct-11	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1.58	47	0.09
27-Oct-11	2.69	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1.86	108	0.15
1-Nov-11	N/A	109	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.05	96.4	0.09
3-Nov-11	N/A	126	N/A	N/A	N/A	N/A	N/A	N/A	N/A	2.88	100.82	0.17
4-Nov-11	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.18	N/D	0.07
9-Nov-11	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	87	0.08
9-Nov-11	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	87	0.08
11-Nov-11	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.08	111.27	0.17
16-Nov-11	N/A	134	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.2	104.24	0.09
21-Nov-11	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	5.74	N/D	N/D
23-Nov-11	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1.23	N/D	0.44
28-Nov-11	N/A	118	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.38	N/D	0.09
29-Nov-11	1.62	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1.76	N/D	0.09
1-Dec-11	N/A	80	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.05	24	0.08
5-Dec-11	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.71	35	0.1
8-Dec-11	N/A	89	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.05	58	0.26
12-Dec-11	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.36	83	0.19

Table E-1 (Continued)
Summary of Blast Monitoring Results

Date	Rock Art (Site 72)		Pit 2 Main Rail Culvert	Pit 2 Main Rail East	Pit 2 Main Rail West	Pit 1 Main Rail East Culvert	Pit 1 Main Rail West Embankment	Concrete Power Pole	Concrete Railway Antenna	Wilpinjong Rail Loop	Nearest privately owned residence - compliance monitoring	
	V1		R4			R1	R2	R3		R5		
	Vibration (mm/s)	Overpressure (dB)	Vibration (mm/s)	Vibration (mm/s)	Vibration (mm/s)	Vibration (mm/s)	Vibration (mm/s)	Vibration (mm/s)	Vibration (mm/s)	Vibration (mm/s)	Overpressure (dB)	Vibration (mm/s)
13-Dec-11	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1.1	105	0.13
15-Dec-11	N/A	123	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.05	101.94	0.06
16-Dec-11	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.05	93.98	0.16
20-Dec-11	1.06	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.82	107.99	0.17
21-Dec-11	N/A	128	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.05	102.98	0.09
22-Dec-11	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.05	66	0.22
30-Dec-11	N/A	112	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.05	103.84	0.7

Notes:

N/A: No monitoring required as blasting was not within the required distance specified in the *Wilpinjong Coal Project Blast Management and Monitoring Programme* (WCPL, 2006) i.e. within 3 km of private residences; 350 m of concrete power poles; 350 m of railway culverts/bridges; 100 m of railway lines; and 1 km of Aboriginal rock art sites 72, 152 and 153.

Vibration limits for public infrastructure as specified in the *Wilpinjong Coal Project Blast Management and Monitoring Programme* (WCPL, 2006): Concrete power poles: 50 mm/s; Railway culverts/bridges: 80 mm/s; Railway lines: 200 mm/s ground vibration.

A geological damage criterion for vibration at Aboriginal rock art sites is provided in the *Wilpinjong Coal Project Environmental Impact Statement* (WCPL, 2005): 80 mm/s (there is no Project related overpressure criterion for Aboriginal rock art sites).