

Noise Monitoring Assessment

Jandra Quarry, Possum Brush, NSW
Quarter 2 Ending June 2020.

Document Information

Noise Monitoring Assessment

Jandra Quarry, Possum Brush, NSW

Quarter 2 Ending June 2020

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1 Introduction

Muller Acoustic Consulting Pty Ltd (MAC) has been commissioned by Holcim (Australia) Pty Ltd (Holcim) to complete a Noise Monitoring Assessment (NMA) for the quarterly period ending June 2020 for Jandra Quarry (the 'quarry'), Possum Brush, NSW.

Noise monitoring has been conducted in accordance with the Jandra Noise and Blast Management Plan and in accordance with additional clarifications and requirements specified by the EPA in the recent variation (6 November 2019) of the EPL 2796 (EPL).

The following variations have been made to the licence:

- Amendment of condition M8.1 to clarify the requirement to undertake noise monitoring during quarrying operations and to update reference to the contemporary NSW Noise Policy for Industry;
- Amendment of condition M8.2 referencing the contemporary NSW Noise Policy for Industry; and
- Amendment to Condition R4.1 requires that noise monitoring reports contain details of all quarrying activities that were occurring during each of the monitoring periods.

Specifically, the amendment to M8.1 is reproduced below.

M8 Noise monitoring

M8.1 *To assess compliance with the noise limits of this licence, attend noise monitoring must be undertaken in accordance with the conditions of this licence and:*

- a) during a period of normal quarry operations;*
- b) at each one of the noise monitoring locations listed in the noise limits table of this licence;*
- c) occur quarterly in a reporting period, and*
- d) occur during the night period as defined in the NSW Industrial Noise Policy, and in conjunction with an asphalt campaign if any such campaign occurs within the quarterly monitoring period.*

The assessment has been conducted in accordance with the following documents:

- NSW Environment Protection Authority (EPA), Noise Policy for Industry (NPI), 2017;
- Environment Protection Licence (EPL), 2796 and Variation 6 November 2019;
- Jandra Quarry Conditions of Consent (CoC), 2015;
- Jandra Quarry Noise and Blast Management Plan (NBMP), 2015; and
- Australian Standard AS 1055:2018 - Acoustics - Description and measurement of environmental noise - General Procedures.

A glossary of terms, definitions and abbreviations used in this report is provided in **Appendix A**.

The operations log during the noise monitoring is provided in **Appendix B**.

A copy of the recent licence variation is provided in **Appendix C**.

2 Noise Criteria

Section L4 of the Jandra Environment Protection Licence (EPL 2796) presents noise criteria for residential receivers surrounding the quarry site, which are applicable for two different operational modes – quarrying and quarrying plus asphalt production.

Furthermore, Section 5 of the Jandra Noise and Blast Management Plan (NBMP) outlines that noise criteria do not apply at R1, R3, R8, R9, R10. Section 5 of the NBMP states:

- *'Holcim has executed a negotiated agreement with the property owner of R1 which excludes this receptor from the approved noise criteria';*
- *'R3 is not included in the approved noise criteria as this receiver represented road noise and the EA concluded that road noise impacts as a consequence of the development were below guideline thresholds and didn't warrant further assessment'; and*
- *'Receivers R8, R9 & R10 are Holcim owned residences and the approved criteria only apply to privately owned land'.*

Table 1 presents the criteria for the receivers R1 – R10 where compliance is required for both quarry operation and combined quarry and asphalt production operations.

Table 1 Noise Criteria				
Location	Quarry Operations	Quarry Operations and Asphalt Plant Production		
	6am – 10pm	6am – 10pm	10pm – 6am	10pm – 6am
	dB LAeq(15min)	dB LAeq(15min)	dB LAeq(15min)	dB LA1(1min)
EPA13 (R2)	36	40	35	48
EPA14 (R4)	36	40	39	51
EPA15 (R5)	40	41	39	51
EPA16 (R6)	36	40	35	48
EPA17 (R7)	35	36	35	48

Note 1: Noise criteria are not applicable to these receivers as per Section 5 of the NBMP.

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3 Methodology

3.1 Locality

The quarry is located at Possum Brush, NSW approximately 16km south of Taree, NSW. Receivers in the locality surrounding the quarry are primarily rural/residential. The Pacific Highway is situated to the west of the site, with highway traffic a dominant noise source at receivers within its' proximity. To the east, the quarry is bounded by rural properties with noise from The Lakes Way dominating the acoustic environment. The monitoring locations with respect to the quarry and assessed receivers are presented in the locality plan shown in **Figure 1**.

3.2 Noise Monitoring Locations

Noise measurements were conducted at five monitoring locations specified in the EPL on Wednesday 29 April 2020 and Thursday 30 April 2020 during the morning shoulder and daytime periods. The measurement locations are presented in **Figure 1**.

3.3 Assessment Methodology

Attended noise surveys were conducted in general accordance with the procedures described in Australian Standard AS 1055:2018, "Acoustics - Description and Measurement of Environmental Noise" and the EPL. The measurements were carried out using Svantek Type 1, 971 noise analyser on Wednesday 29 April 2020 and Thursday 30 April 2020. The acoustic instrumentation used carries current NATA calibration and complies with AS/NZS IEC 61672.1-2019-Electroacoustics - Sound level meters - Specifications. Calibration of all instrumentation was checked prior to and following measurements. Drift in calibration did not exceed ± 0.5 dBA.

Noise measurements were of 15 minutes in duration and where possible, throughout each survey the operator quantified the contribution of each significant noise source. One measurement was conducted at each of the EPL monitoring locations during the morning shoulder and daytime periods. Monitoring during the evening period was not conducted due to the quarry not being operational.

Extraneous noise sources were excluded from the analysis to determine the LAeq(15min) noise contribution for comparison against the relevant criteria. Where the quarry was inaudible, the contribution is estimated to be at least 10dB below the ambient noise level.

4 Results

4.1 Assessment Results

The monitored noise level contributions and observed meteorological conditions for each assessment period at location are presented in **Table 2** to **Table 6**.

Table 2 Operator-Attended Noise Survey Results – Location EPA13

Date	Time (hrs)	Descriptor (dBA re 20 µPa)			Meteorology	Description and SPL, dBA
		L _{Amax}	L _{Aeq}	L _{A90}		
29/04/2020	10:13 (Day)	70	46	41	WD: NE WS: 1.5m/s Rain: Nil	Birds 40-51
						Distant Traffic 37-44
						Wind 37-51
						Insects 37-40
						Residential Noise 37-70
						Quarry Not Audible
Jandra Quarry Contribution						<35dB L _{Aeq} (15min)
29/04/2020	06:05 (Morning Shoulder)	64	43	38	WD: N WS: <0.1m/s Rain: Nil	Birds 36-64
						Distant Traffic 36-43
						Dogs 38-44
						Quarry Not Audible
Jandra Quarry Contribution						<35dB L _{Aeq} (15min)
						<45dB L _{A1} (1min)

Note: Morning Shoulder – the period from 6am to 7am Monday to Saturday or 6am to 8am on Sundays and public holidays, Day - the period from 7am to 6pm Monday to Saturday or 8am to 6pm on Sundays and public holidays; Evening - the period from 6pm to 10pm; Night - the remaining periods.

Table 3 Operator-Attended Noise Survey Results – Location EPA16

Date	Time (hrs)	Descriptor (dBA re 20 µPa)			Meteorology	Description and SPL, dBA						
		L _{Amax}	L _{Aeq}	L _{A90}								
29/04/2020	10:29 (Day)	65	45	39	WD: NE WS: 1.5m/s Rain: Nil	Birds 38-65						
						Distant Traffic 36-43						
						Wind 33-48						
						Insects 33-38						
						Dogs 36-40						
Residential Noise 37-48												
Quarry Not Audible												
Jandra Quarry Contribution						<35dB L _{Aeq} (15min)						
29/04/2020	06:21 (Morning Shoulder)	60	43	37	WD: N WS: <0.1m/s Rain: Nil	Birds 34-60						
						Distant Traffic 34-48						
						Quarry noise <35 (multiple 1-2 second durations)						
						Jandra Quarry Contribution						<35dB L _{Aeq} (15min)
						Jandra Quarry Contribution						<45dB L _{A1} (1min)

Note: Morning Shoulder – the period from 6am to 7am Monday to Saturday or 6am to 8am on Sundays and public holidays, Day - the period from 7am to 6pm Monday to Saturday or 8am to 6pm on Sundays and public holidays; Evening - the period from 6pm to 10pm; Night - the remaining periods.

Table 4 Operator-Attended Noise Survey Results – Location EPA14

Date	Time (hrs)	Descriptor (dBA re 20 µPa)			Meteorology	Description and SPL, dBA						
		L _{Amax}	L _{Aeq}	L _{A90}								
29/04/2020	11:33 (Day)	80	55	47	WD: NE WS: 2.0m/s Rain: Nil	Highway Traffic 41-55						
						Wind 41-50						
						Residential Noise 43-80						
						Birds 46-50						
						Quarry Not Audible						
Jandra Quarry Contribution						<36dB L _{Aeq} (15min)						
30/04/2020	06:10 (Morning Shoulder)	71	60	47	WD: N WS: 0.5m/s Rain: Nil	Highway Traffic 40-71						
						Birds 40-50						
						Quarry Not Audible						
						Jandra Quarry Contribution						<36dB L _{Aeq} (15min)
						Jandra Quarry Contribution						<50 dB L _{A1} (1min)

Note: Morning Shoulder – the period from 6am to 7am Monday to Saturday or 6am to 8am on Sundays and public holidays, Day - the period from 7am to 6pm Monday to Saturday or 8am to 6pm on Sundays and public holidays; Evening - the period from 6pm to 10pm; Night - the remaining periods.

Table 5 Operator-Attended Noise Survey Results – Location EPA15

Date	Time (hrs)	Descriptor (dBA re 20 µPa)			Meteorology	Description and SPL, dBA
		L _{Amax}	L _{Aeq}	L _{A90}		
29/04/2020	11:49	60	48	44	WD: NE	Highway Traffic 38-48
	(Day)				WS: 2.0m/s	Birds 38-60
						Wind 38-54
						Rain: Nil
						Quarry Not Audible
Jandra Quarry Contribution						<35dB L _{Aeq} (15min)
30/04/2020	06:37	71	48	40	WD: N	Highway Traffic 36-48
	(Morning				WS: 0.5m/s	Birds 38-64
						Insects 36-48
						Rain: Nil
						Operator 71
						Quarry Not Audible
Jandra Quarry Contribution						<30dB L _{Aeq} (15min)
						<45dB L _{A1} (1min)

Note: Morning Shoulder – the period from 6am to 7am Monday to Saturday or 6am to 8am on Sundays and public holidays, Day - the period from 7am to 6pm Monday to Saturday or 8am to 6pm on Sundays and public holidays; Evening - the period from 6pm to 10pm; Night - the remaining periods.

Table 6 Operator-Attended Noise Survey Results – Location EPA17

Date	Time (hrs)	Descriptor (dBA re 20 µPa)			Meteorology	Description and SPL, dBA
		L _{Amax}	L _{Aeq}	L _{A90}		
29/04/2020	10:56	66	47	40	WD: NE	Wind 34-50
	(Day)				WS: 1.5m/s	Birds 38-54
						Distant Traffic 34-42
						Local Traffic 40-66
						Rain: Nil
						Dogs 42-55
						Residential Noise 38-56
						Quarry Not Audible
Jandra Quarry Contribution						<35dB L _{Aeq} (15min)
29/04/2020	06:45	54	41	38	WD: N	Birds 38-54
	(Morning				WS: <0.1m/s	Distant Traffic 35-44
						Quarry Not Audible
						Rain: Nil
Jandra Quarry Contribution						<35dB L _{Aeq} (15min)
						<45dB L _{A1} (1min)

Note: Morning Shoulder – the period from 6am to 7am Monday to Saturday or 6am to 8am on Sundays and public holidays, Day - the period from 7am to 6pm Monday to Saturday or 8am to 6pm on Sundays and public holidays; Evening - the period from 6pm to 10pm; Night - the remaining periods.

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5 Discussion

5.1 Discussion of Results - Location EPA13

Quarry noise was inaudible during the morning shoulder and daytime measurements conducted on Wednesday 29 April 2020. Quarry noise contributions were estimated to satisfy the morning shoulder and daytime noise limits. The quarry was not operational during the evening period and hence, no measurements were conducted for this period.

Non-quarry noise sources observed during the measurements included distant traffic, dogs barking, local residential noise, wind, insects and birds.

5.2 Discussion of Results - Location EPA16

Quarry noise was audible during the morning shoulder and inaudible during daytime measurement conducted on Wednesday 29 April 2020. Quarry noise contributions were estimated to satisfy the morning shoulder and daytime noise limits. The quarry was not operational during the evening period and hence, no measurements were conducted for this period.

Quarry noise sources observed during the measurement were general metal on metal impact noises. Non-quarry noise sources observed during the measurements included distant traffic, insects, birds, dogs barking, wind and local residential noise.

5.3 Discussion of Results - Location EPA14

Quarry noise was inaudible during the morning shoulder and daytime measurements conducted on Wednesday 29 April 2020 and Thursday 30 April 2020. Quarry noise contributions were estimated to satisfy the morning shoulder and daytime noise limits. The quarry was not operational during the evening period and hence, no measurements were conducted for this period.

Non quarry noise sources observed during the measurements included highway traffic, insects, birds, wind and local residential noise.

5.4 Discussion of Results - Location EPA15

Quarry noise was inaudible during the morning shoulder and daytime measurements conducted on Wednesday 29 April 2020 and Thursday 30 April 2020. Quarry noise contributions were estimated to satisfy the morning shoulder and daytime noise limits. The quarry was not operational during the evening period and hence, no measurements were conducted for this period.

Non quarry noise sources observed during the measurements included highway traffic, wind, insects, birds and operator noise.

5.5 Discussion of Results - Location EPA17

Quarry noise was inaudible during the morning shoulder and daytime measurements conducted on Wednesday 29 April 2020. Quarry noise contributions were estimated to satisfy the morning shoulder and daytime noise limits. The quarry was not operational during the evening period and hence, no measurements were conducted for this period.

Non-quarry noise sources observed during the measurements included distant and local traffic, insects, local residential noise, dogs barking, wind and birds.

6 Conclusion

Muller Acoustic Consulting Pty Ltd (MAC) has completed a Noise Monitoring Assessment (NMA) for Holcim (Australia) Pty Ltd at the Jandra Quarry, Possum Brush, NSW. The assessment was completed to determine compliance with the relevant noise criteria for the quarterly period ending June 2020.

Attended noise monitoring was completed on Wednesday 29 April 2020 and Thursday 30 April 2020 at five nominated EPL monitoring locations with quarry noise contributions compared against the relevant criteria. The assessment has identified that noise emissions generated by Holcim Jandra Quarry comply with relevant noise criteria specified in the EPL at all assessed locations.

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Appendix A – Glossary of Terms

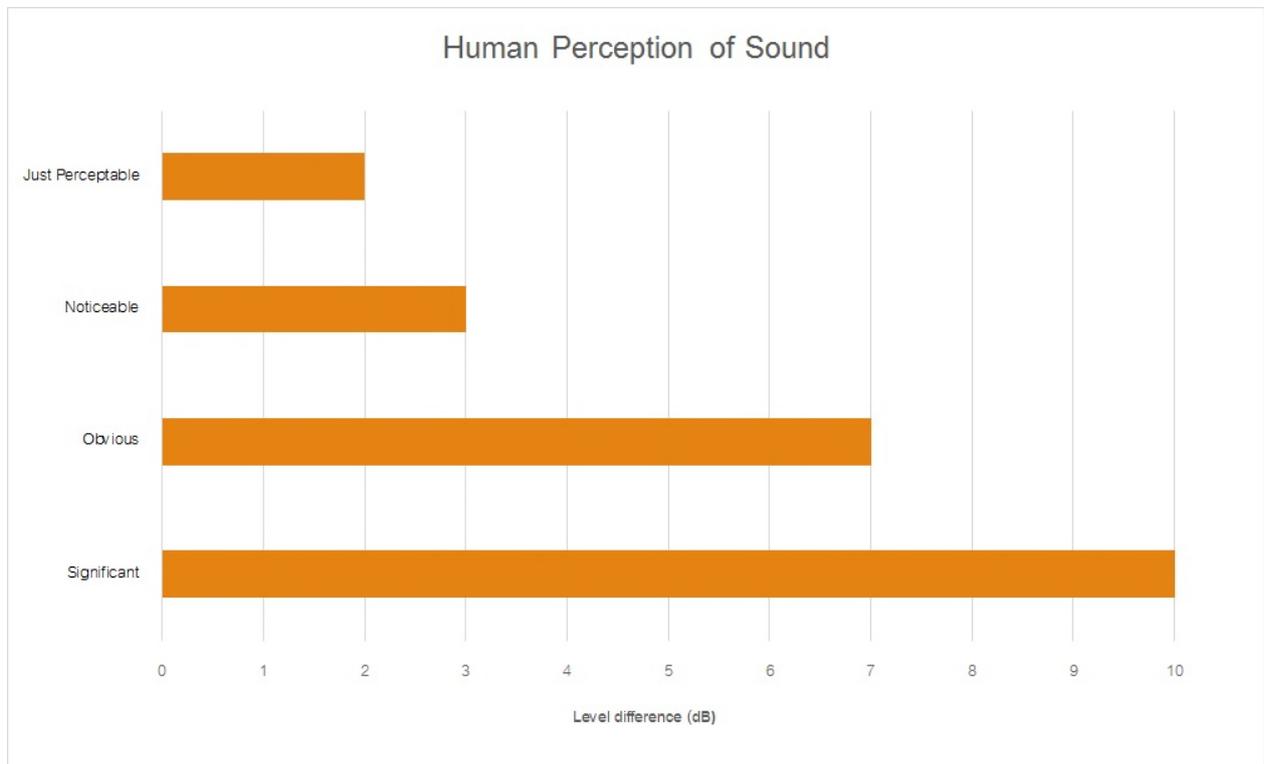
Table A1 provides a number of technical terms have been used in this report.

Table A1 Glossary of Terms	
Term	Description
1/3 Octave	Single octave bands divided into three parts
Octave	A division of the frequency range into bands, the upper frequency limit of each band being twice the lower frequency limit.
ABL	Assessment Background Level (ABL) is defined in the NPI as a single figure background level for each assessment period (day, evening and night). It is the tenth percentile of the measured LA90 statistical noise levels.
Adverse Weather	Weather effects that enhance noise (that is, wind and temperature inversions) that occur at a site for a significant period of time (that is, wind occurring more than 30% of the time in any assessment period in any season and/or temperature inversions occurring more than 30% of the nights in winter).
Ambient Noise	The noise associated with a given environment. Typically a composite of sounds from many sources located both near and far where no particular sound is dominant.
A Weighting	A standard weighting of the audible frequencies designed to reflect the response of the human ear to noise.
dBA	Noise is measured in units called decibels (dB). There are several scales for describing noise, the most common being the 'A-weighted' scale. This attempts to closely approximate the frequency response of the human ear.
dB(Z), dB(L)	Decibels Linear or decibels Z-weighted.
Hertz (Hz)	The measure of frequency of sound wave oscillations per second - 1 oscillation per second equals 1 hertz.
LA10	A noise level which is exceeded 10 % of the time. It is approximately equivalent to the average of maximum noise levels.
LA90	Commonly referred to as the background noise, this is the level exceeded 90 % of the time.
LAeq	The summation of noise over a selected period of time. It is the energy average noise from a source, and is the equivalent continuous sound pressure level over a given period.
LAm _{ax}	The maximum root mean squared (rms) sound pressure level received at the microphone during a measuring interval.
RBL	The Rating Background Level (RBL) is an overall single figure background level representing each assessment period over the whole monitoring period. The RBL is used to determine the intrusiveness criteria for noise assessment purposes and is the median of the ABL's.
Sound power level (LW)	This is a measure of the total power radiated by a source. The sound power of a source is a fundamental location of the source and is independent of the surrounding environment. Or a measure of the energy emitted from a source as sound and is given by : $= 10 \cdot \log_{10} (W/W_0)$ Where : W is the sound power in watts and W ₀ is the sound reference power at 10-12 watts.

Table A2 provides a list of common noise sources and their typical sound level.

Table A2 Common Noise Sources and Their Typical Sound Pressure Levels (SPL), dBA	
Source	Typical Sound Level
Threshold of pain	140
Jet engine	130
Hydraulic hammer	120
Chainsaw	110
Industrial workshop	100
Lawn-mower (operator position)	90
Heavy traffic (footpath)	80
Elevated speech	70
Typical conversation	60
Ambient suburban environment	40
Ambient rural environment	30
Bedroom (night with windows closed)	20
Threshold of hearing	0

Figure A1 – Human Perception of Sound



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Appendix B – Operations Log

Operations Log – Jandra Quarry 29 April 2020

Period ending	Pit	Plant
7:00	Load and haul – 1 excavator and 1 dump truck	Plant crushing rock General Sales – 1 x loader and numerous Road Trucks
7:15	Load and haul – 1 excavator and 1 dump truck	Plant crushing rock General Sales – 1 x loader and numerous Road Trucks
7:30	Load and haul – 1 excavator and 1 dump truck	Plant crushing rock General Sales – 1 x loader and numerous Road Trucks
7:45	Load and haul – 1 excavator and 1 dump truck	Plant crushing rock General Sales – 1 x loader and numerous Road Trucks
8:00	Load and haul – 1 excavator and 1 dump truck	Plant crushing rock General Sales – 1 x loader and numerous Road Trucks
8:15	Load and haul – 1 excavator and 1 dump truck	Plant crushing rock General Sales – 1 x loader and numerous Road Trucks
8:30	Load and haul – 1 excavator and 1 dump truck	Plant crushing rock General Sales – 1 x loader and numerous Road Trucks
8:45	Load and haul – 1 excavator and 1 dump truck	Plant crushing rock General Sales – 1 x loader and numerous Road Trucks
9:00	Load and haul – 1 excavator and 1 dump truck	Plant crushing rock General Sales – 1 x loader and numerous Road Trucks
9:15	Morning Tea	Plant crushing rock General Sales – 1 x loader and numerous Road Trucks
9:30	Morning Tea	Plant crushing rock General Sales – 1 x loader and numerous Road Trucks
9:45	Load and haul – 1 excavator and 1 dump truck	Plant crushing rock General Sales – 1 x loader and numerous Road Trucks
10:00	Load and haul – 1 excavator and 1 dump truck	Plant crushing rock General Sales – 1 x loader and numerous Road Trucks
10:15	Load and haul – 1 excavator and 1 dump truck	Plant crushing rock General Sales – 1 x loader and numerous Road Trucks
10:30	Load and haul – 1 excavator and 1 dump truck	Plant crushing rock General Sales – 1 x loader and numerous Road Trucks
10:45	Load and haul – 1 excavator and 1 dump truck	Plant crushing rock General Sales – 1 x loader and numerous Road Trucks
11:00	Load and haul – 1 excavator and 1 dump truck	Plant crushing rock General Sales – 1 x loader and numerous Road Trucks
11:15	Load and haul – 1 excavator and 1 dump truck	Plant crushing rock General Sales – 1 x loader and numerous Road Trucks

Period ending	Pit	Plant
11:30	Load and haul – 1 excavator and 1 dump truck	Plant crushing rock General Sales – 1 x loader and numerous Road Trucks
11:45	Load and haul – 1 excavator and 1 dump truck	Plant crushing rock General Sales – 1 x loader and numerous Road Trucks
12:00	Load and haul – 1 excavator and 1 dump truck	Plant crushing rock General Sales – 1 x loader and numerous Road Trucks
12:15	Load and haul – 1 excavator and 1 dump truck	Plant crushing rock General Sales – 1 x loader and numerous Road Trucks
12:30	Load and haul – 1 excavator and 1 dump truck	Plant crushing rock General Sales – 1 x loader and numerous Road Trucks
12:45	Load and haul – 1 excavator and 1 dump truck	Plant crushing rock General Sales – 1 x loader and numerous Road Trucks
13:00	Load and haul – 1 excavator and 1 dump truck	Plant crushing rock General Sales – 1 x loader and numerous Road Trucks
13:15	End of Shift	End of Shift

Operations Log – Jandra Quarry 30 April 2020

Period ending	Pit	Plant
7:00	Load and haul – 1 excavator and 1 dump truck	Non-operational maintenance
7:15	Load and haul – 1 excavator and 1 dump truck	Non-operational maintenance
7:30	Load and haul – 1 excavator and 1 dump truck	Plant crushing rock General Sales – 1 x loader and numerous Road Trucks
7:45	Load and haul – 1 excavator and 1 dump truck	Plant crushing rock General Sales – 1 x loader and numerous Road Trucks
8:00	Load and haul – 1 excavator and 1 dump truck	Plant crushing rock General Sales – 1 x loader and numerous Road Trucks
8:15	No load and haul in the pit	Plant crushing rock General Sales – 1 x loader and numerous Road Trucks
8:30	No load and haul in the pit	Plant crushing rock General Sales – 1 x loader and numerous Road Trucks
8:45	No load and haul in the pit	Plant crushing rock General Sales – 1 x loader and numerous Road Trucks
9:00	No load and haul in the pit	Plant crushing rock General Sales – 1 x loader and numerous Road Trucks
9:15	Morning Tea	Plant crushing rock General Sales – 1 x loader and numerous Road Trucks
9:30	Morning Tea	Plant crushing rock General Sales – 1 x loader and numerous Road Trucks
9:45	No load and haul in the pit	Plant crushing rock General Sales – 1 x loader and numerous Road Trucks
10:00	No load and haul in the pit	Plant crushing rock General Sales – 1 x loader and numerous Road Trucks
10:15	No load and haul in the pit	Plant crushing rock General Sales – 1 x loader and numerous Road Trucks
10:30	No load and haul in the pit	Plant crushing rock General Sales – 1 x loader and numerous Road Trucks
10:45	No load and haul in the pit	Plant crushing rock General Sales – 1 x loader and numerous Road Trucks
11:00	No load and haul in the pit	Plant crushing rock General Sales – 1 x loader and numerous Road Trucks
11:15	No load and haul in the pit	Plant crushing rock General Sales – 1 x loader and numerous Road Trucks
11:30	No load and haul in the pit	Plant crushing rock General Sales – 1 x loader and numerous Road Trucks

Period ending	Pit	Plant
11:45	No load and haul in the pit	Plant crushing rock General Sales – 1 x loader and numerous Road Trucks
12:00	No load and haul in the pit	Plant crushing rock General Sales – 1 x loader and numerous Road Trucks
12:15	No load and haul in the pit	Plant crushing rock General Sales – 1 x loader and numerous Road Trucks
12:30	No load and haul in the pit	Plant crushing rock General Sales – 1 x loader and numerous Road Trucks
12:45	No load and haul in the pit	Plant crushing rock General Sales – 1 x loader and numerous Road Trucks
13:00	No load and haul in the pit	Plant crushing rock General Sales – 1 x loader and numerous Road Trucks
13:15	End of Shift	End of Shift

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Appendix C – EPL Variation