

GLENCORE

BAAL BONE COLLIERY

April to June 2016
Environmental Monitoring Summary



1. Introduction

In accordance with Schedule 5, Condition 9 of Project Approval 09_0178 this report provides a summary of environmental monitoring results for Baal Bone Colliery, for the period **1 April 2016 to 30 June 2016**. Baal Bone's licensed discharge and monitoring locations are identified in **Drawing 1**.

2. Air quality

Monthly dust monitoring is carried out in accordance with Australian Standard AS3580.10.1, EPL requirements and Baal Bone's Air Quality Monitoring Program.

Monitoring is undertaken by the ALS Group Environmental Division, a NATA Accredited laboratory.

Baal Bone maintains a network of dust deposition gauges:

- Sample location DM1 (EPL monitoring point No. 7);
- Sample location DM2 (EPL monitoring point No. 13);
- Sample location DM3 (EPL monitoring point No. 14);
- Sample location DM4 (EPL monitoring point No. 15).

Locations of the dust deposition gauges are shown in **Drawing 1**.

Schedule 3, Condition 10 of Project Approval 09_0178 includes air quality impact assessment criteria for the project (summarised in **Table 1**). The pollutants to be monitored include deposited dust, TSP and PM¹⁰.

In accordance with the DoPI approved Air Quality Monitoring Program, monitoring for TSP and PM¹⁰ was discontinued in June 2012. The monitoring was discontinued following Baal Bone mining operations entering care and maintenance in September 2011, and the completion of coal washing and transporting of coal off-site in December 2011 and April 2012 respectively.

Table 1: Baal Bone Air Quality Impact Assessment Criteria

Pollutant	Averaging period	Criterion	
Deposited dust	Annual	Maximum increase	Maximum total
		2 g/m ² /month	4 g/m ² /month
TSP	Annual	90 µg/m ³	
PM ¹⁰	24 hour	50 µg/m ³	
	Annual	30 µg/m ³	

The monthly results for each of the monitoring locations are summarised in Table 2. **Figure 1** provides the monthly deposited dust results for the year to date. **Figure 2** provides the twelve month rolling average.

Table 2: Deposited dust monitoring results for 2016 (g/m²/month)

Month	DM1	DM2	DM3	DM4
January	0.5	0.8	0.9	0.6
February	0.9	1.0	0.8	0.5
March	0.8	7.5	0.6	0.4
April	0.5	0.8	0.3	0.3
May	0.4	0.2	0.4	0.2
June	0.3	0.2	0.2	0.1
July				
August				
September				
October				
November				
December				

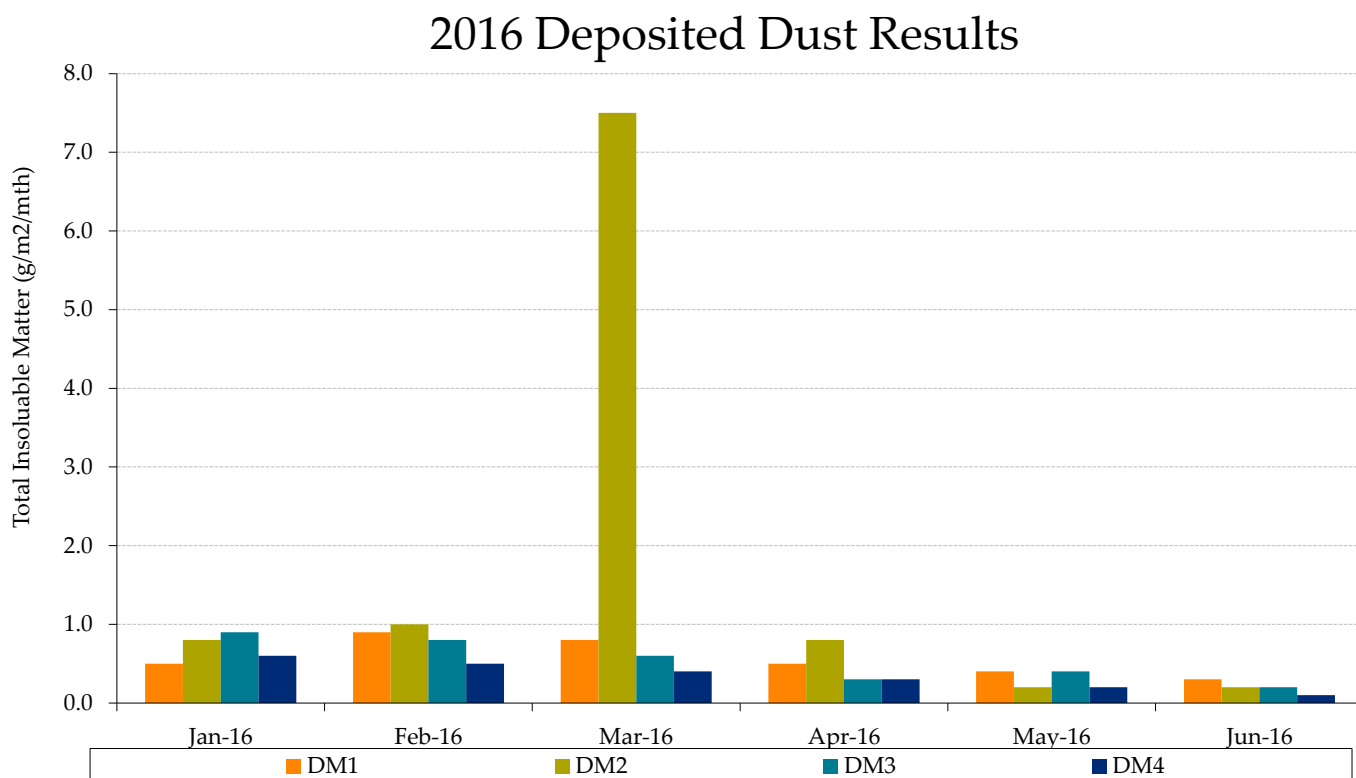


Figure 1: 2016 Monthly Total Insoluble Matter.

2016 Annual Average Deposited Dust

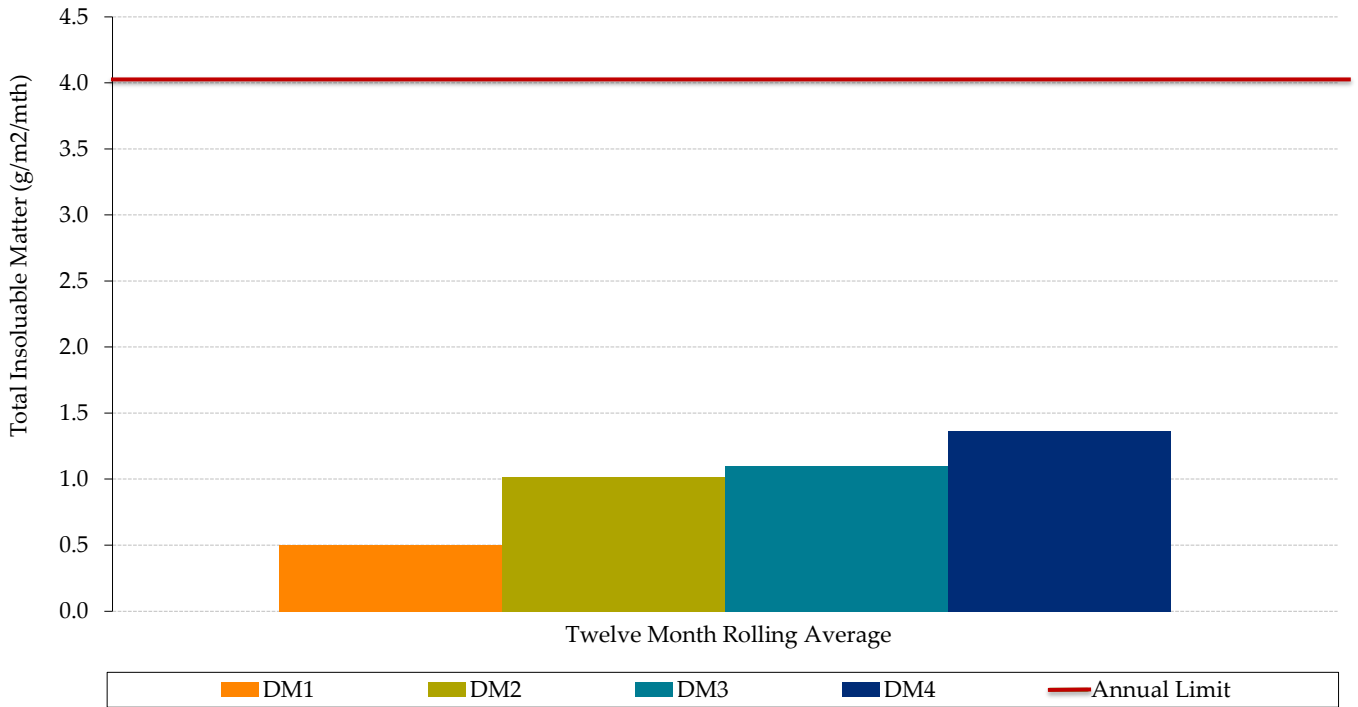


Figure 2: 2016 YTD Twelve Month Rolling Average Total Insoluble Matter.

3. Surface Water

Condition L2 of EPL 765 outlines water concentration limits for oil and grease, pH, total suspended solids and total iron. These limits are presented below in **Table 3**.

Table 3: EPL 765 concentration limits

	LD2	LDP1	WMP1
Oil and grease (mg/L)	-	10	-
pH	-	6.5-8.5	-
Total Suspended Solids (mg/L)	-	50	-
Total Iron (mg/L)	-	1.0	-

The monthly results for each of the monitoring locations are summarised in **Table 4**. **Figures 3 to 6** provide monthly results for each pollutant.

Table 4: EPL Water quality results for the 2016 YTD.

EPL Point	Month	EC uS/cm	O&G mg/L	SO ²⁻ ₄ mg/L	Fe mg/L	TSS mg/L	pH	BOD mg/L	Faecal Coliforms cos/100mls	N mg/L	P mg/L
LD2 ^a	Jan	-	-	-	-	-	-	-	-	-	-
	Feb	-	-	-	-	-	-	-	-	-	-
	Mar	-	-	-	-	-	-	-	-	-	-
	Apr										
	May										
	June										
LDP1	Jan	1080	<1	283	<0.05	4	8.1	-	-	-	-
	Feb	1060	<1	290	0.07	5	7.5	-	-	-	-
	Mar	1110	<2 ^c	296	<0.05	6	7.9	-	-	-	-
	Apr	1130	3	255	<0.05	6	8.1				
	May	1160	<2	270	0.23	2	8				
	June	990	<2	251	<0.05	15	8				
WMP1 ^b	Jan	-	-	-	-	-	-	-	-	-	-
	Feb	-	-	-	-	-	-	-	-	-	-
	Mar	-	-	-	-	-	-	-	-	-	-
	Apr										
	May										
	June										

Notes

- (a) No samples taken at LD2 during period as sample location was dry
- (b) No samples taken at WMP1 during period as sample location was dry
- (c) Limit of Reporting changed from <1 to <2.

Legend

- BOD = Biological oxygen demand
- EC = Electrical conductivity
- Fe = Iron
- N = Nitrogen
- O & G = Oil and Grease
- P = Phosphorus
- SO²⁻₄ = Sulfate₄
- TSS = Total suspended solids

2016 Dissolved Iron

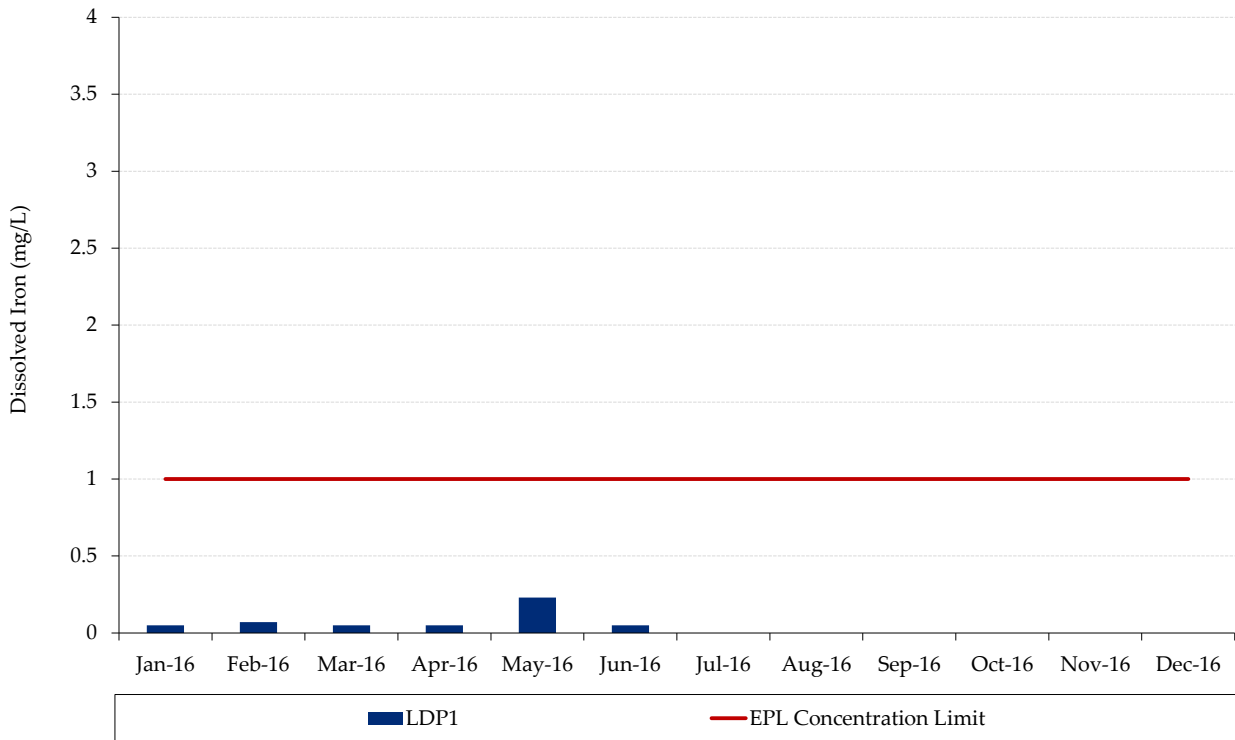


Figure 3: Total iron level

2016 Oil & Grease

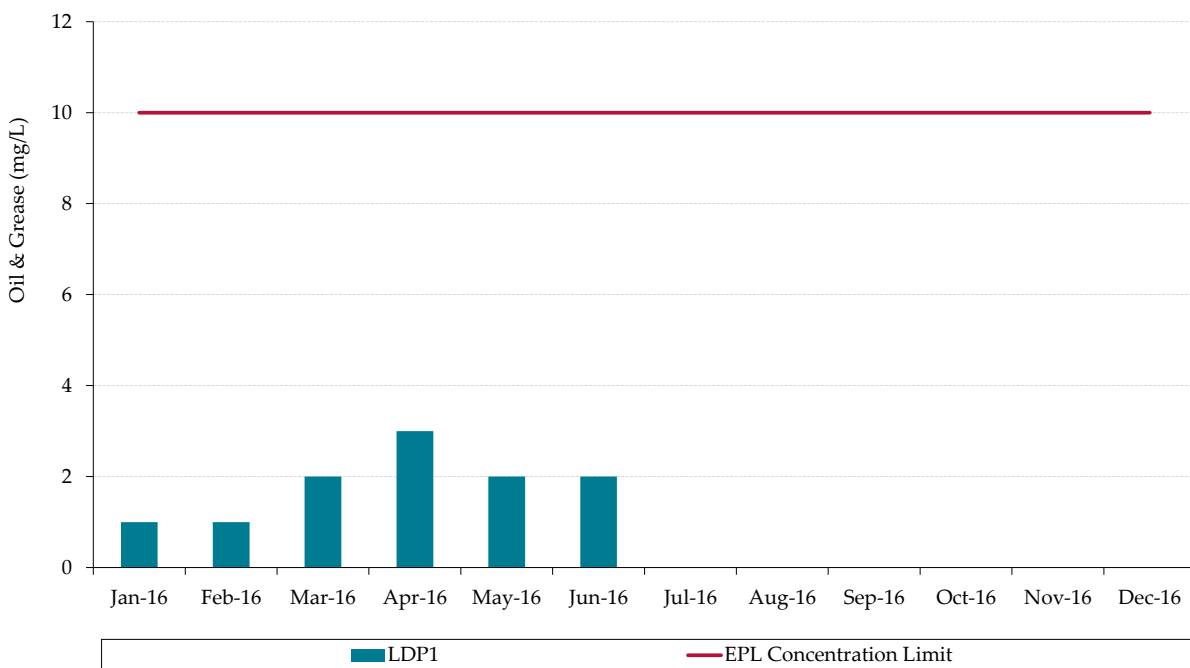


Figure 4: Oil and grease levels

2016 pH

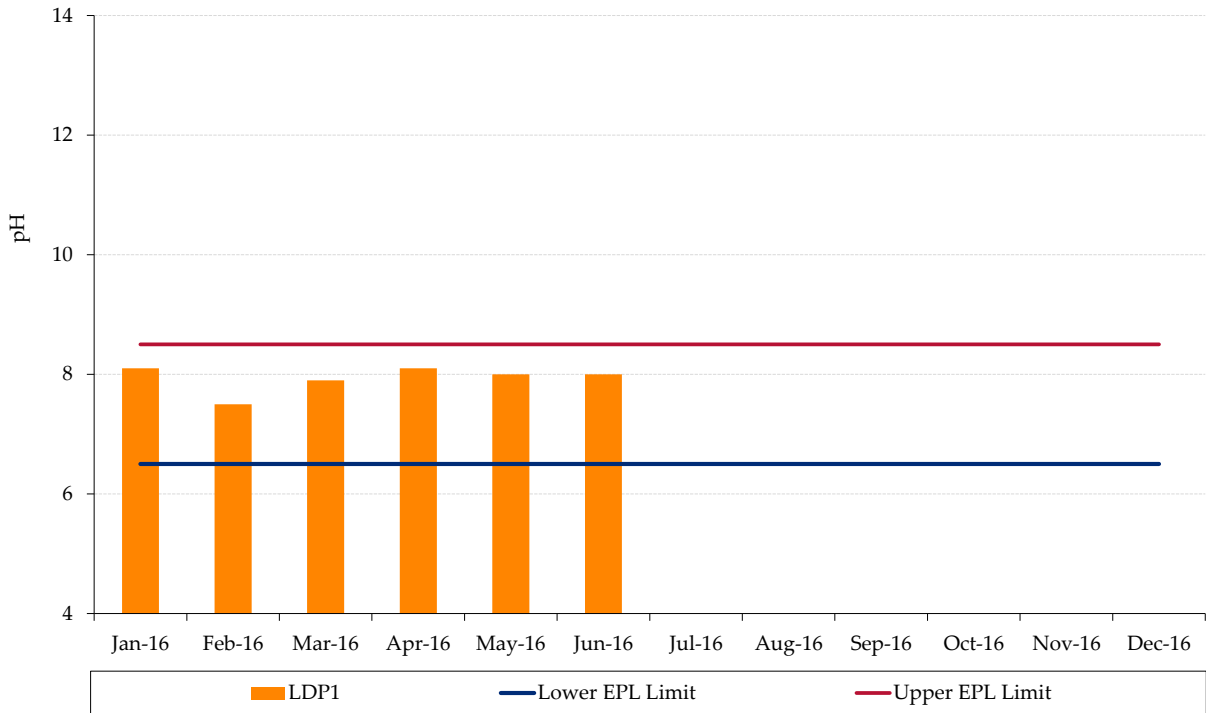


Figure 5: pH levels

2016 Total Suspended Solids

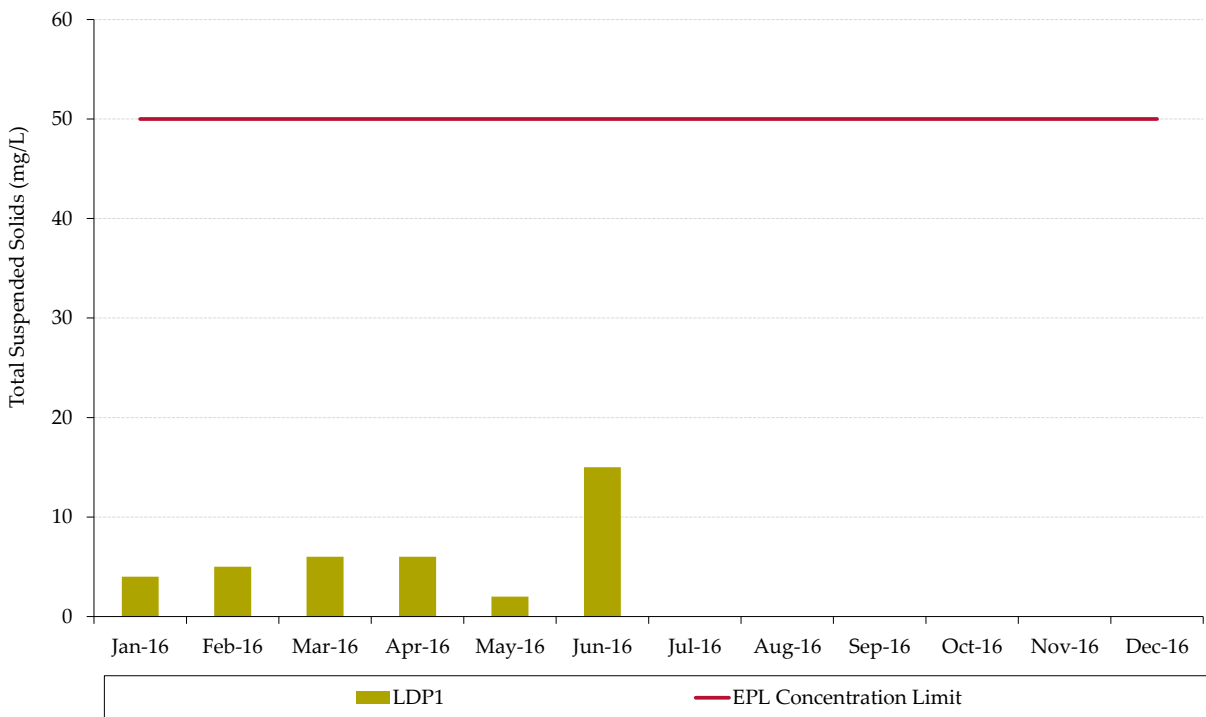


Figure 6: Total suspended solids levels

Monthly EPL reporting can be accessed at:

<http://www.glencore.com.au/EN/who-we-are/baal-bone/Pages/epl-reporting.aspx>

4. Noise

Noise Impact Assessment Criteria

Schedule 3, Condition 4 of Project Approval 09_0178 includes long term noise impact assessment criteria.

Table 5 outlines the assessment criteria.

Table 5: Long term noise impact assessment criteria

Location	All periods dB(a) $L_{Aeq}(15 \text{ min})$	Night dB(a) $L_{A1}(1 \text{ min})$
R1	46	47
R2	41	48
R3	41	48
All other privately-owned land	35	45

From 2013 onwards attended monitoring is undertaken on an annual basis at receptors R1 and R2/R3 (refer to Drawing 2).

Noise Audit Results

Atkins Acoustics carried out an environmental compliance noise audit at Baal Bone Colliery on Tuesday 11 August 2015 between 3.00pm and 11.45pm. The next noise audit is scheduled for mid 2016.

Table 6 summarises the results from the audit.

Table 6: Noise Audit Summary

Location (Start time)	Measured Predicted Colliery Noise	Limit	Unit	Comments
	L_{Aeq}			
Daytime Audit (1350-1505) – Tuesday 11 August 2015				
Location R1 (1600 hours)	<30	46	dB(A)	Mine ventilation fan <30dB(A); Dist road traffic 35/48dB(A); Birds 35/40dB(A)
Location R1 (1615 hours)	<30	46	dB(A)	Mine ventilation fan <30dB(A); Birds 55/58dB(A); Dist road traffic 35/8dB(A)
Location R2/3 (1648 hours)	<30	41	dB(A)	Breeze in trees, Dist road traffic 40/45dB(A), Birds 38/45dB(A)
Location R2/3 (1648 hours)	<30	41	dB(A)	Breeze in trees, Dist road traffic 38/45dB(A), Birds 35/48dB(A)

Location (Start time)	Measured Predicted Colliery Noise	Limit	Unit	Comments
	L _{Aeq}			
Evening Audit (2000 to 2130) - Tuesday 11 August 2015				
Location R1 (1840 hours)	<30	46	dBA	Mine ventilation fan <30dBA; Dist road traffic 46/54dBA; Insects
Location R1 (1855 hours)	<30	46	dBA	Mine ventilation fan <30dBA; Dist road traffic 46/54dBA; Insects
Location R2/3 (1805 hours)	<30	41	dBA	Dist road traffic 45/54dBA; Birds; Domestic; Dogs
Location R2/3 (1820 hours)	<30	41	dBA	Dist road traffic 48-55dBA; Birds; Domestic; Dogs

Location (Start time)	Measured Predicted Colliery Noise	Limit	Unit	Comments
	L _{Aeq}			
Night Audit (2200 to 2330) - Tuesday 11 August 2015				
Location R1 (2205 hours)	<30	46	dBA	Ventilation fan <30dBA; Road traffic 46/8dBA; Insects
Location R1 (2220 hours)	<35	46	dBA	Ventilation fan <30dBA; Road traffic 46/8dBA; Insects
Location R2/3 (2250 hours)	<30	41	dBA	Ventilation fan <30dBA; Road traffic 46/8dBA; Insects
Location R2/3 (2303 hours)	<30	41	dBA	Ventilation fan <30dBA; Cows; Insects

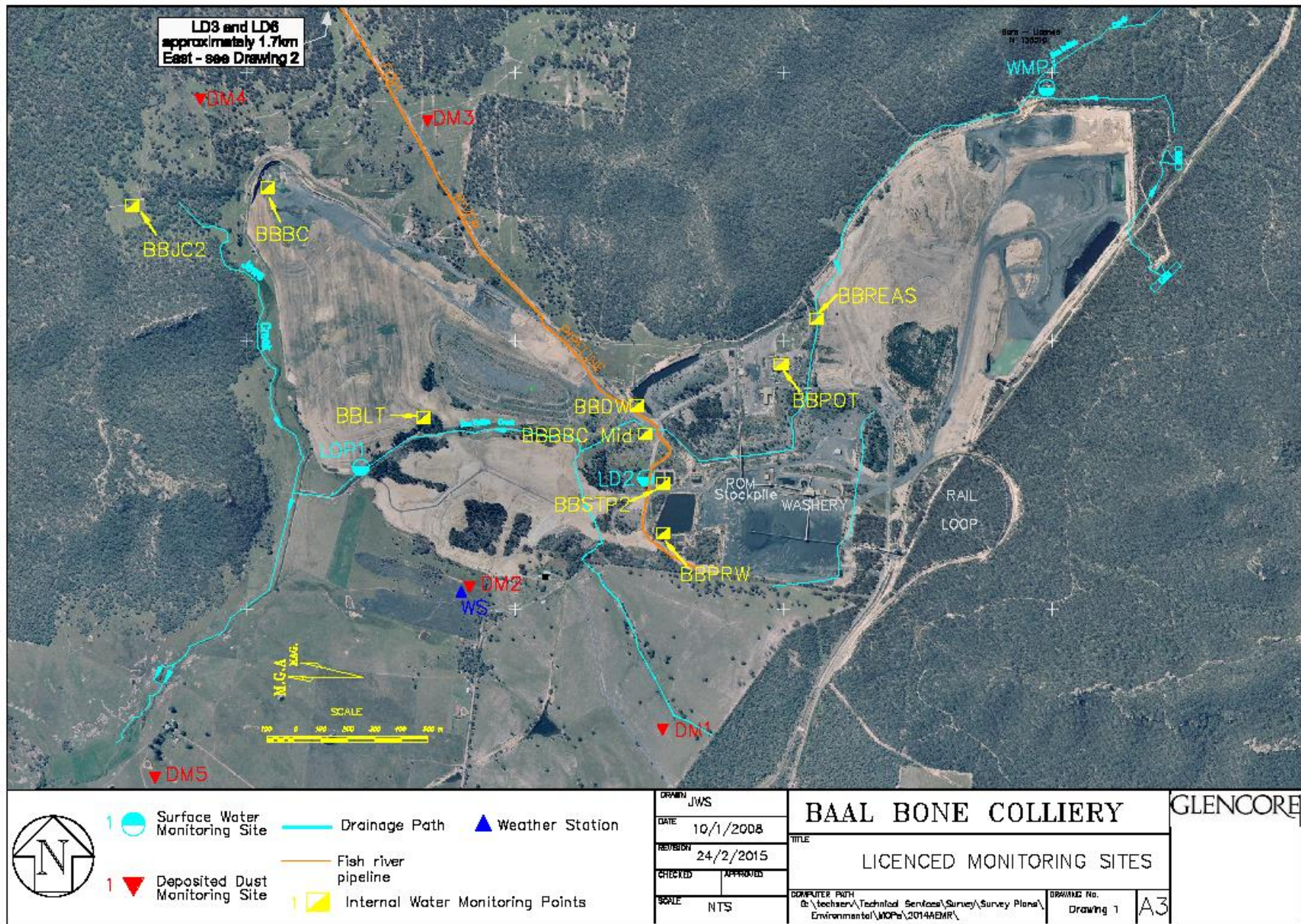
The audit report concluded that:

“During the site-attended audits noise from the ventilation fan would not be described as tonal, impulsive, irregularity or with low frequency content. Accordingly no ‘modifying factor’ corrections are required to satisfy EPL 765 (L4.7). From the audit measurements and assessment, the L_{Aeq}, 15 min noise contributions from BBC during the day, evening and night assessment periods satisfied the long-term licence noise limits.

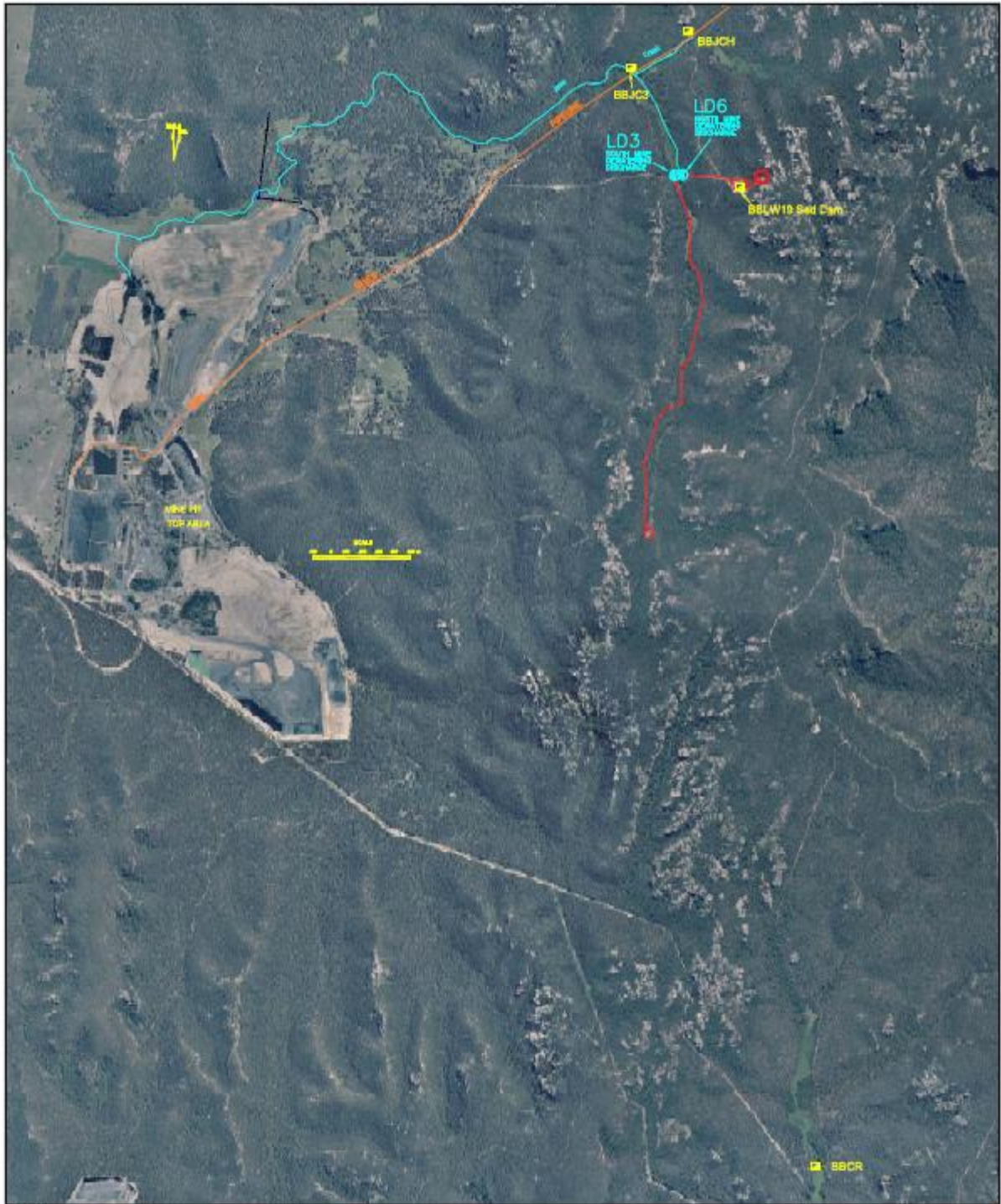
BBC related L_{Amax} noise levels were not observed to cause exceedances of the licence noise limits at measurement locations for the duration of the audit.”

The full August 2015 audit report and previous noise audit reports can be accessed from the Baal Bone publications page at:

<http://www.glencore.com.au/EN/who-we-are/baal-bone/Pages/epl-reporting.aspx>



Drawing 1. Baal Bone Monitoring Points



<table border="1"> <tr><td>DRAWN</td><td>JWS</td></tr> <tr><td>DATE</td><td>24/2/2014</td></tr> <tr><td>CHECKED</td><td></td></tr> <tr><td>APPROVED</td><td></td></tr> <tr> <td>SCALE</td> <td>NTS</td> <td>REVISION</td> <td>24/2/2014</td> </tr> </table>	DRAWN	JWS	DATE	24/2/2014	CHECKED		APPROVED		SCALE	NTS	REVISION	24/2/2014	<h1 style="text-align: center;">BAAL BONE COLLIERY</h1> <p style="text-align: center;">OAKBRIDGE</p> <p style="text-align: center;">2013 LICENCED MONITORING SITES</p> <p style="text-align: center;">COMPUTER PATH G:\techserv\Technical Services\Survey\Survey Plans\ Environmental\MOPs\2013AEMR\</p>	 <p style="text-align: center;">PTY LIMITED</p>
DRAWN	JWS													
DATE	24/2/2014													
CHECKED														
APPROVED														
SCALE	NTS	REVISION	24/2/2014											
DRAWING No. - Drawing 2		A3												

Drawing 2. Baal Bone Monitoring Points