GLENCORE

BAAL BONE COLLIERY

July to September 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 July 2016 to 30 September 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 PM^{10}.

In accordance with the DP&E 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 $\mu g/m^3$	
PM10	24 hour	50 $\mu g/m^3$	
	Annual	30 $\mu g/m^3$	

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	0.2	0.2	0.2	0.2
August	0.3	0.1	0.1	0.1
September	0.3	0.1	0.3	0.1
October				
November				
December				

Note: * Contaminated sample.

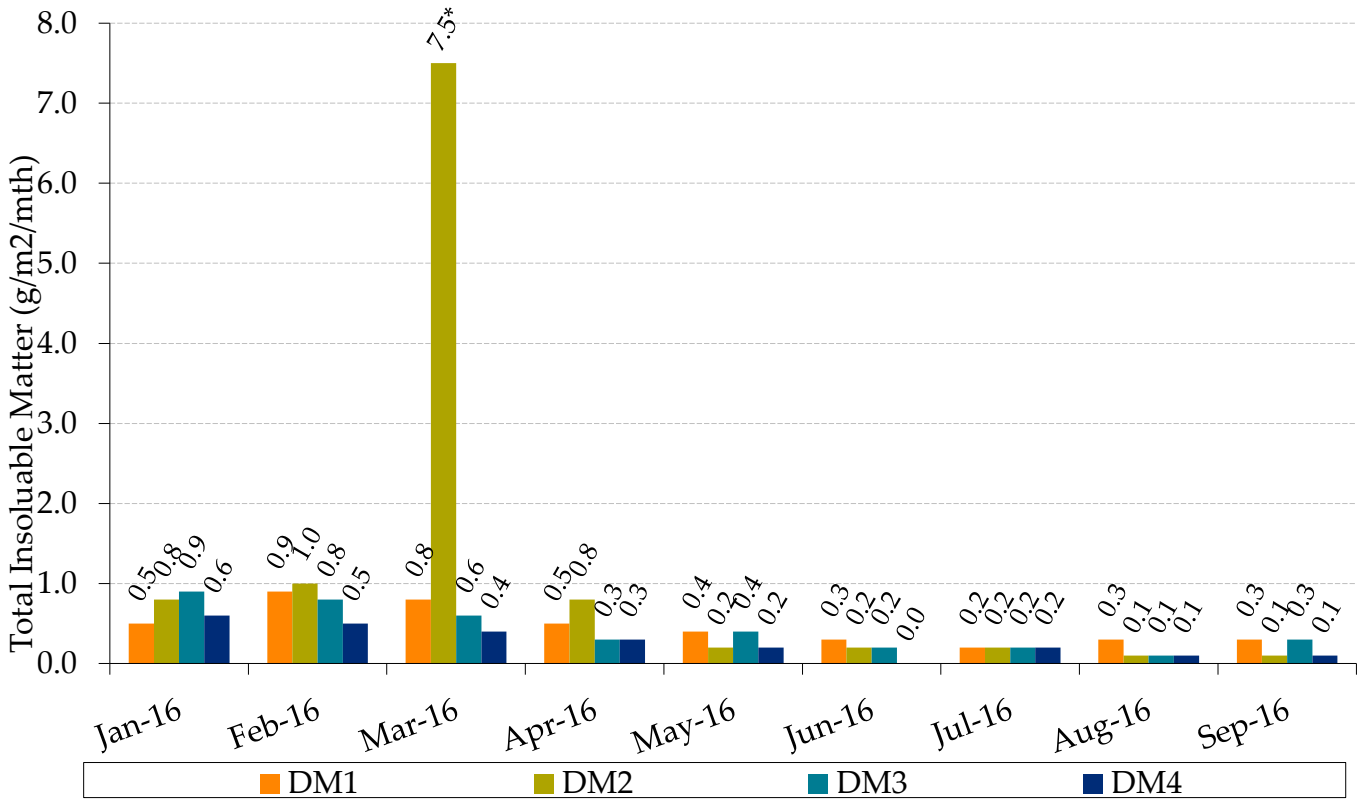


Figure 1: Monthly Total Insoluble Matter.

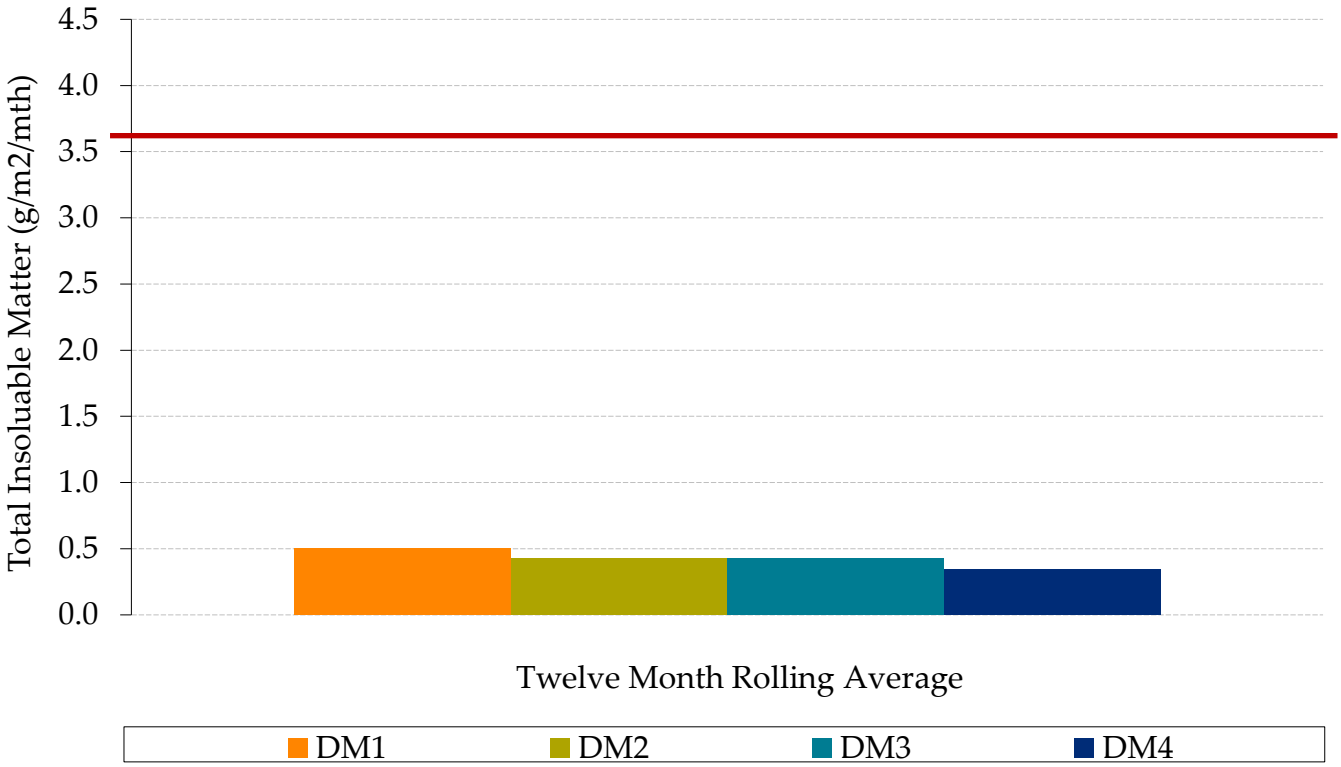


Figure 2: YTD Twelve Month Rolling Average Total Insoluble Matter.

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	-	-	-	-	-	-	-	-	-	-
	Jun	-	-	-	-	-	-	-	-	-	-
	Jul	-	-	-	-	-	-	-	-	-	-
	Aug	-	-	-	-	-	-	-	-	-	-
	Sep	-	-	-	-	-	-	-	-	-	-
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	8.0	-	-	-	-
	Jun	990	<2	251	<0.05	15	8.0	-	-	-	-
	Jul	1020	2	248	<0.05	6	7.8	-	-	-	-
	Aug	1040	5	255	0.07	3	7.8	-	-	-	-
	Sep	840	<2	219	<0.05	15	7.2	-	-	-	-
WMP1[b]	Jan	-	-	-	-	-	-	-	-	-	-
	Feb	-	-	-	-	-	-	-	-	-	-
	Mar	-	-	-	-	-	-	-	-	-	-
	Apr	-	-	-	-	-	-	-	-	-	-
	May	-	-	-	-	-	-	-	-	-	-
	Jun	-	-	-	-	-	-	-	-	-	-
	Jul	-	-	-	-	-	-	-	-	-	-
	Aug	-	-	-	-	-	-	-	-	-	-
	Sep	-	-	-	-	-	-	-	-	-	-

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
SO^{2-}_4 = Sulfate
TSS = Total suspended solids

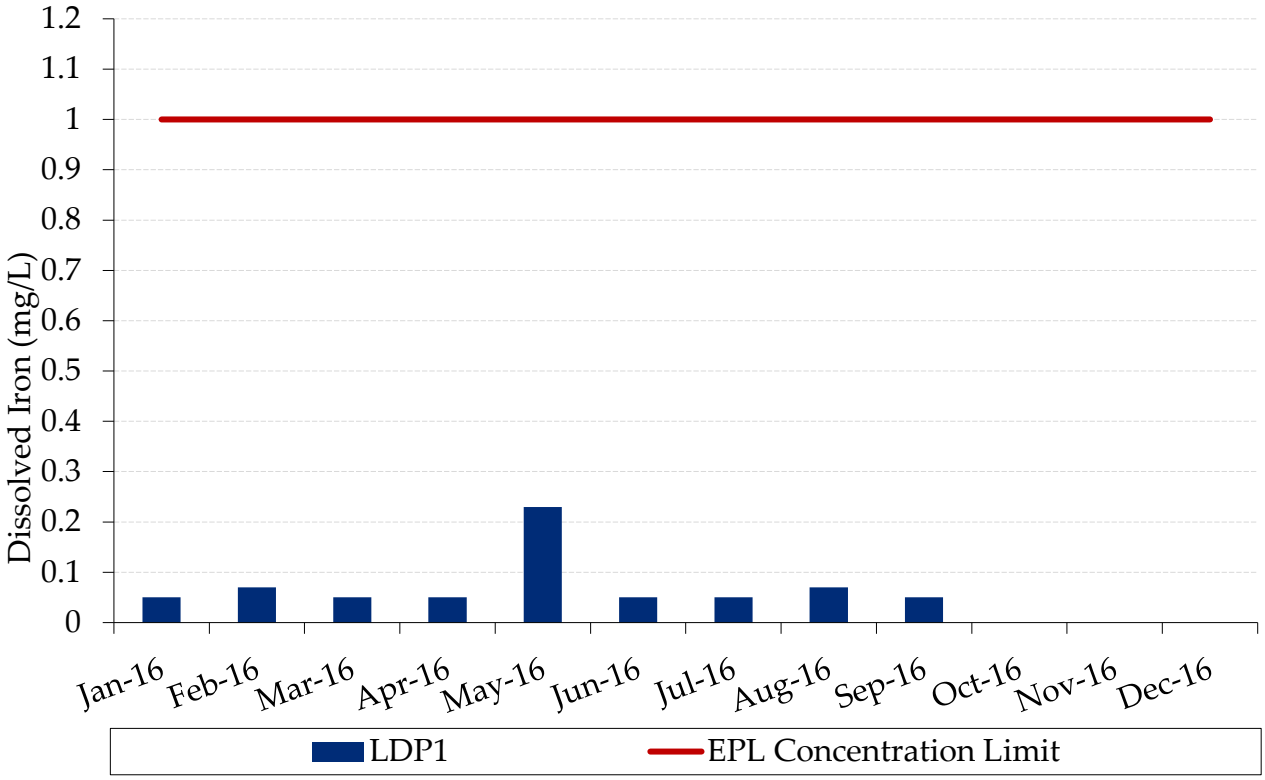


Figure 3: Dissolved iron

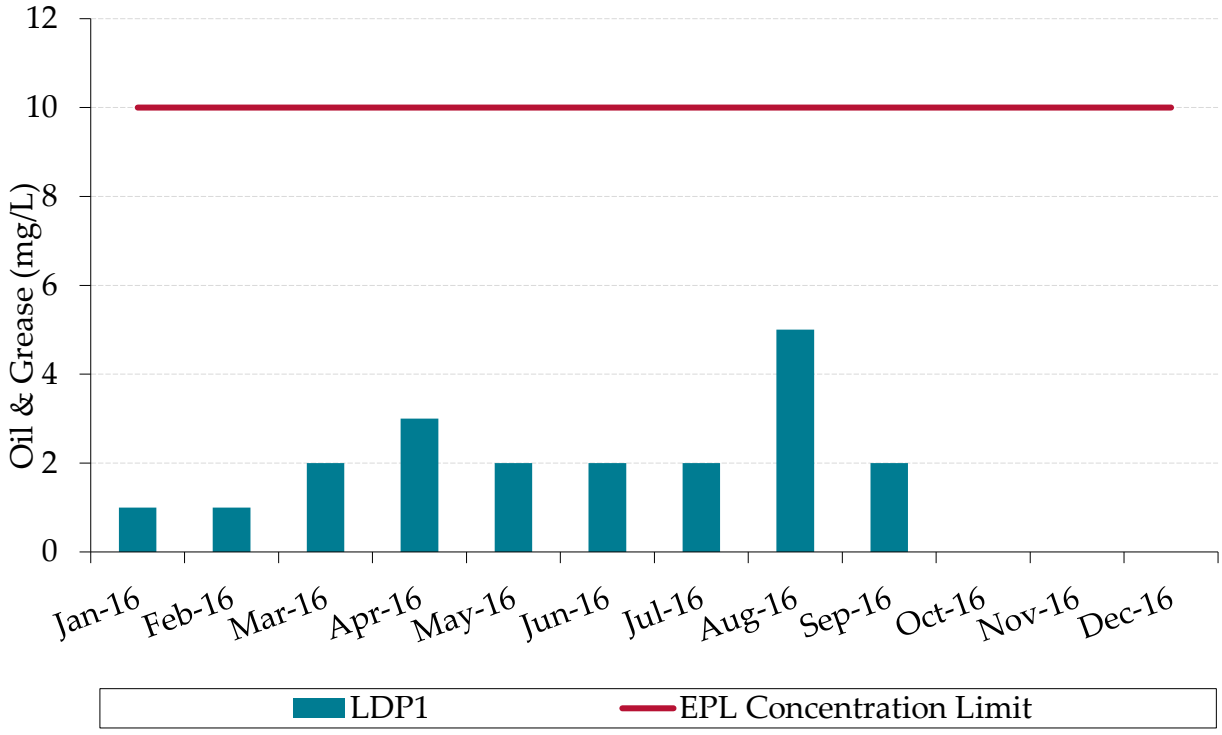


Figure 4: Oil and grease

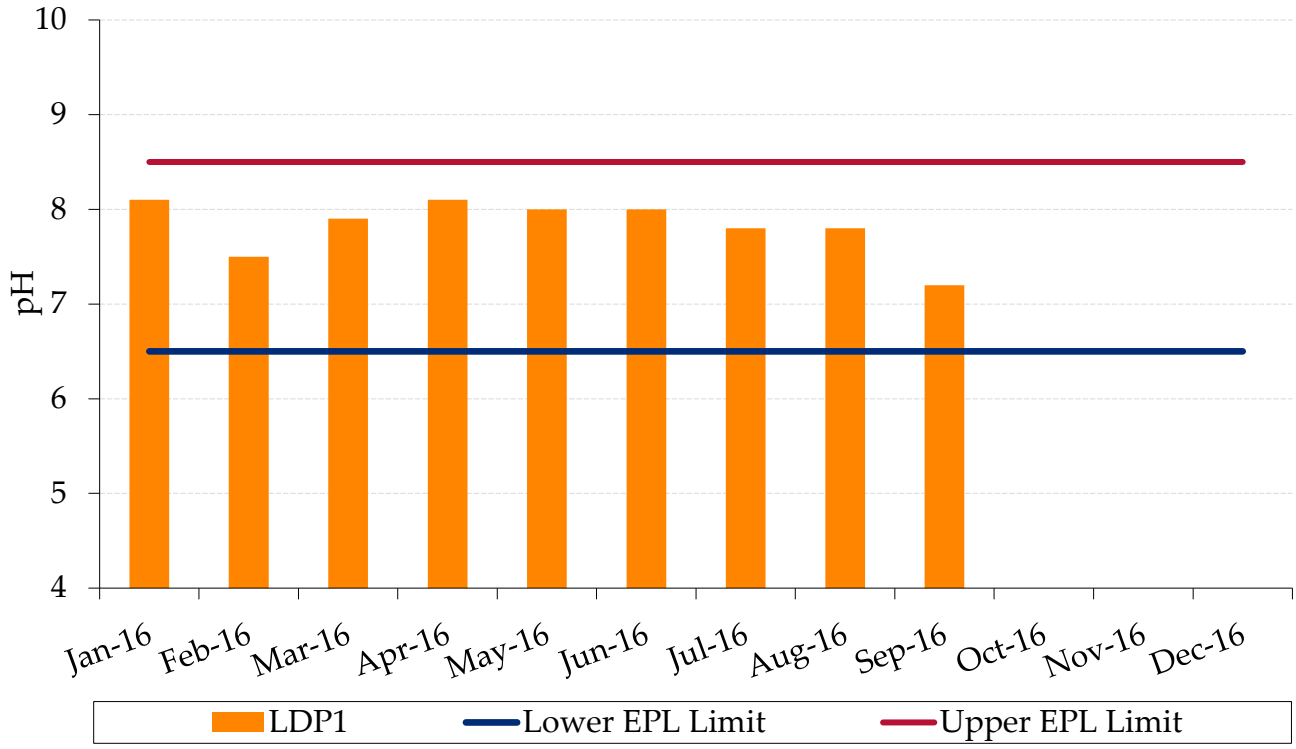


Figure 5: pH

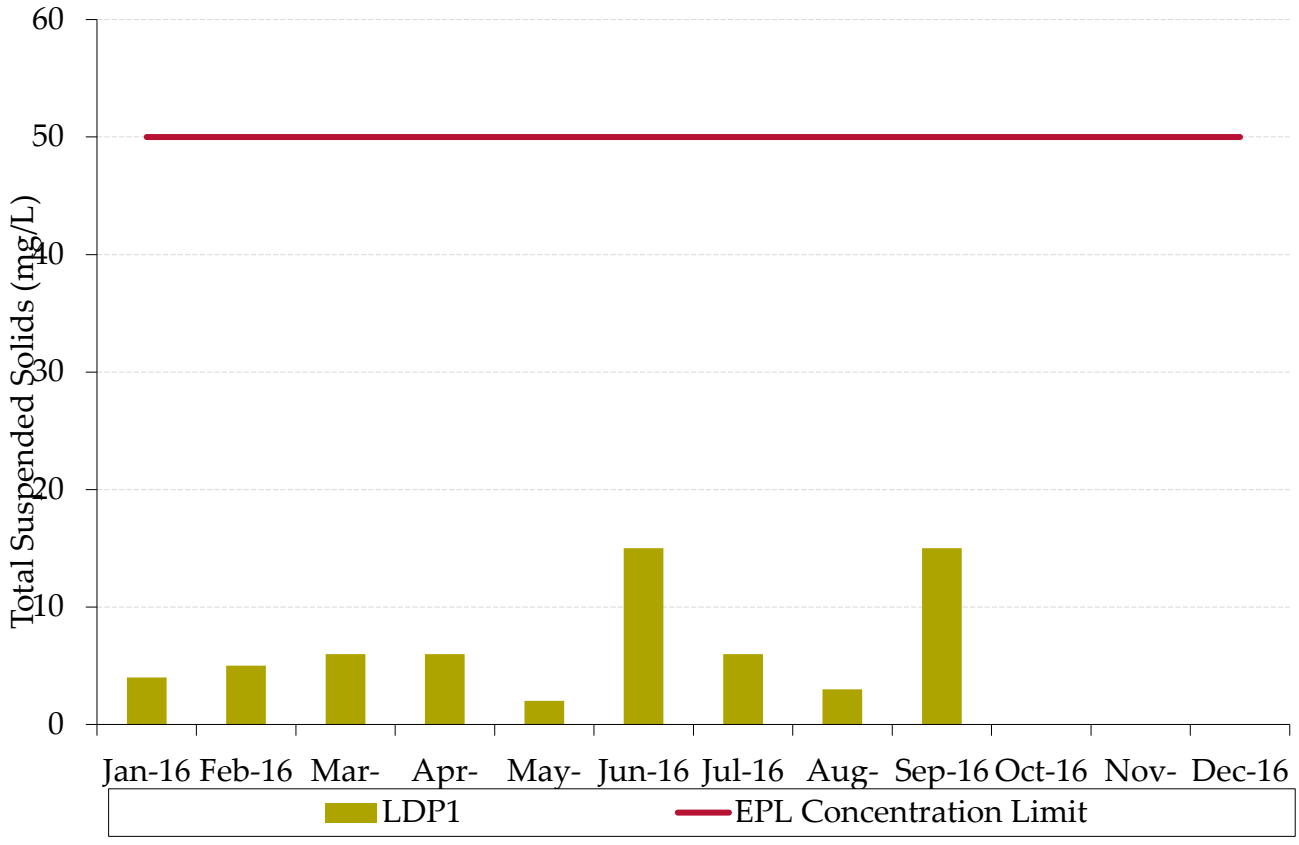


Figure 6: Total suspended solids

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) $L_{Aeq(15\ min)}$	Night dB(a) $L_{A1(1\ min)}$
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 1**).

Noise Audit Results

Atkins Acoustics carried out an environmental compliance noise audit at Baal Bone Colliery on Monday 29 August 2016 between 4:30 pm and 12:00 am. The next noise audit is scheduled for mid-2017.

Table 6: Noise Audit Summary

Location (Start time)	Measured Predicted Colliery Noise L_{Aeq}	Limit	Unit	Comments
Daytime Audit (1350-1505) – Tuesday 11 August 2015				
Location R1 (1725 hours)	<30	46	dBA	Mine ventilation fan <30 dBA Dist road traffic 30/45 dBA Ducks/insects/birds 35/40 dBA Dog 38/42 dBA
Location R1 (1740 hours)	<30	46	dBA	Mine ventilation fan <30 dBA Dist road traffic 32/46 dBA Ducks/insects/birds 34/43 dBA Dog 39/44 dBA
Location R2/3 (1645 hours)	<30	41	dBA	Mine ventilation fan <30 dBA Road traffic 38/45 dBA Insects/birds 35/45 dBA
Location R2/3 (1700 hours)	<30	41	dBA	Mine ventilation fan <30 dBA Road traffic 38/45 dBA Insects/birds 35/45 dBA Dog 48/55 dBA

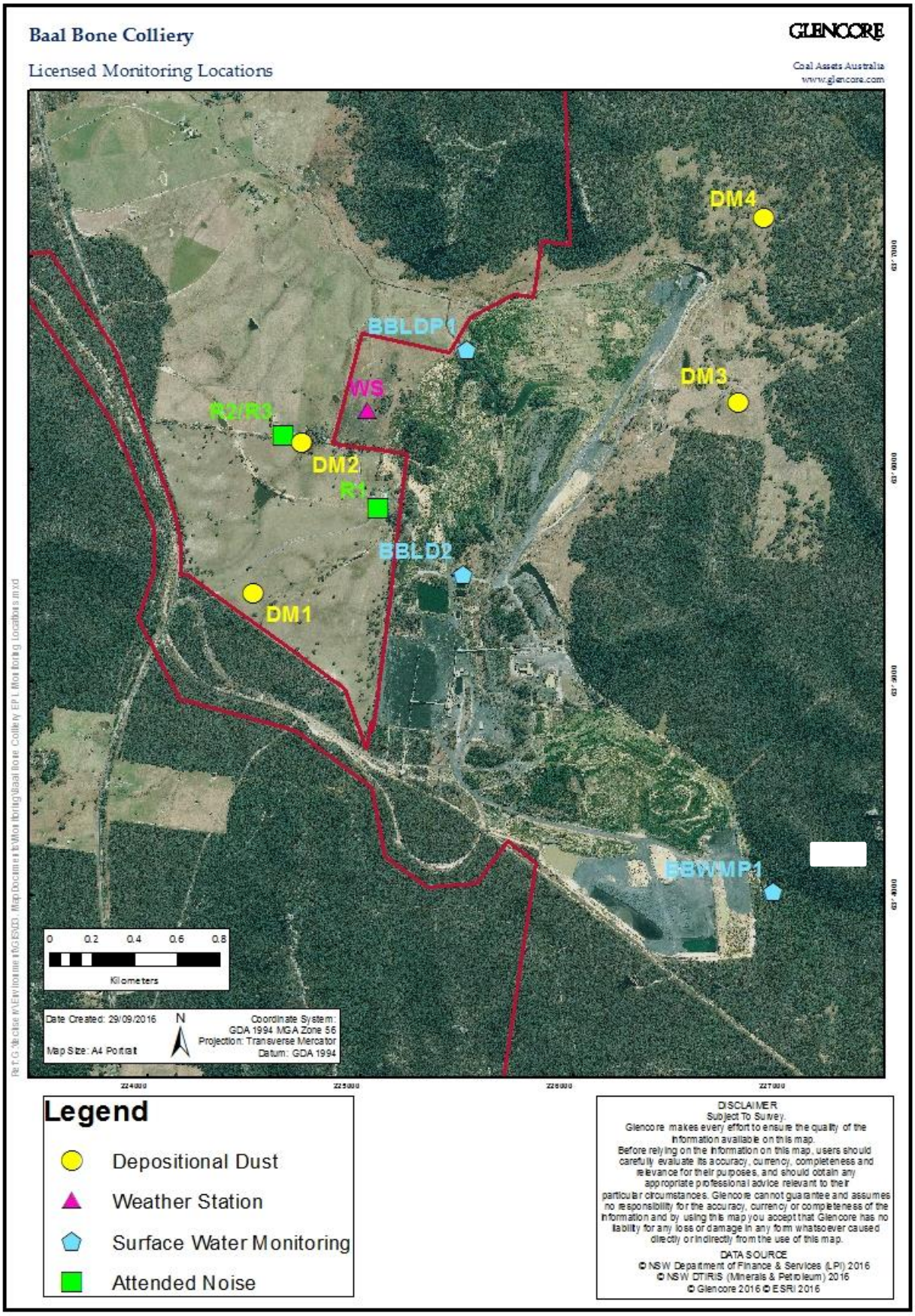
Location (Start time)	Measured Predicted Colliery Noise L_{Aeq}	Limit	Unit	Comments
Evening Audit (2000 to 2130) - Tuesday 11 August 2015				
Location R1 (1820 hours)	<30	46	dBA	Mine ventilation fan <30 dBA Dist road traffic 32/48 dBA Ducks/insects/birds 36/42
Location R1 (1835 hours)	<30	46	dBA	Mine ventilation fan <30 dBA Dist road traffic 32/48 dBA Ducks/insects/birds 36/42 dBA
Location R2/3 (1850 hours)	<30	41	dBA	Mine ventilation fan <30 dBA Dist road traffic 38/48 dBA Insects/birds/dog 36/55 dBA
Location R2/3 (1905 hours)	<30	41	dBA	Mine ventilation fan <30 dBA Dist road traffic 36/45 dBA Insects/birds 36/44 dBA

Location (Start time)	Measured Predicted Colliery Noise L_{Aeq}	Limit	Unit	Comments
Night Audit (2200 to 2330) - Tuesday 11 August 2015				
Location R1 (2235 hours)	<30	46	dBA	Ventilation fan <30 dBA Road traffic 46/8 dBA Insects
Location R1 (2250 hours)	<35	46	dBA	Ventilation fan <30 dBA Road traffic 38/44 dBA Insects
Location R2/3 (2315 hours)	<30	41	dBA	Ventilation fan <30 dBA Road traffic 35/8 dBA Insects
Location R2/3 (2330 hours)	<30	41	dBA	Ventilation fan <30dBA Dog 48/35 dBA 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 LAeq, 15 min noise contributions from BBC during the day, evening and night assessment periods satisfied the long-term licence noise limits.*
>
> *BBC related LAmax 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 2016 audit report and previous noise audit reports can be accessed from the Baal Bone publications web page at:
http://www.glencore.com.au/EN/who-we-are/baal-bone/Pages/epl-reporting.aspx



Drawing 1. Baal Bone Monitoring Points