GLENCORE

BAAL BONE COLLIERY

October to December 2017
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 October 2017 to 31 December 2017.** Baal Bone's licensed discharge and monitoring locations are identified in Figure 7.

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 Figure 7.

Schedule 3, Condition 10 of Project Approval 09_0178 includes air quality impact assessment criteria for the project and are 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 2017 (g/m²/month)

Month	DM1	DM2	DM3	DM4
January	0.4	0.5	0.7	0.6
February	1.1	0.7	0.7	0.5
March	0.1	0.3	0.3	0.4
April	0.3	4.3*	0.2	0.3
May	0.2	0.5	0.2	0.3
June	0.2	0.4	0.2	0.3
July	<0.1	0.1	0.1	<0.1
August	0.2	0.4	0.2	6.2*
September	0.4	0.4	0.4	0.4
October	0.5	0.6	0.7	0.8
November	0.6	0.5	0.9	0.5
December	0.6	0.1	4.0*	0.4

Note: * Contaminated sample, not included in graphs below.

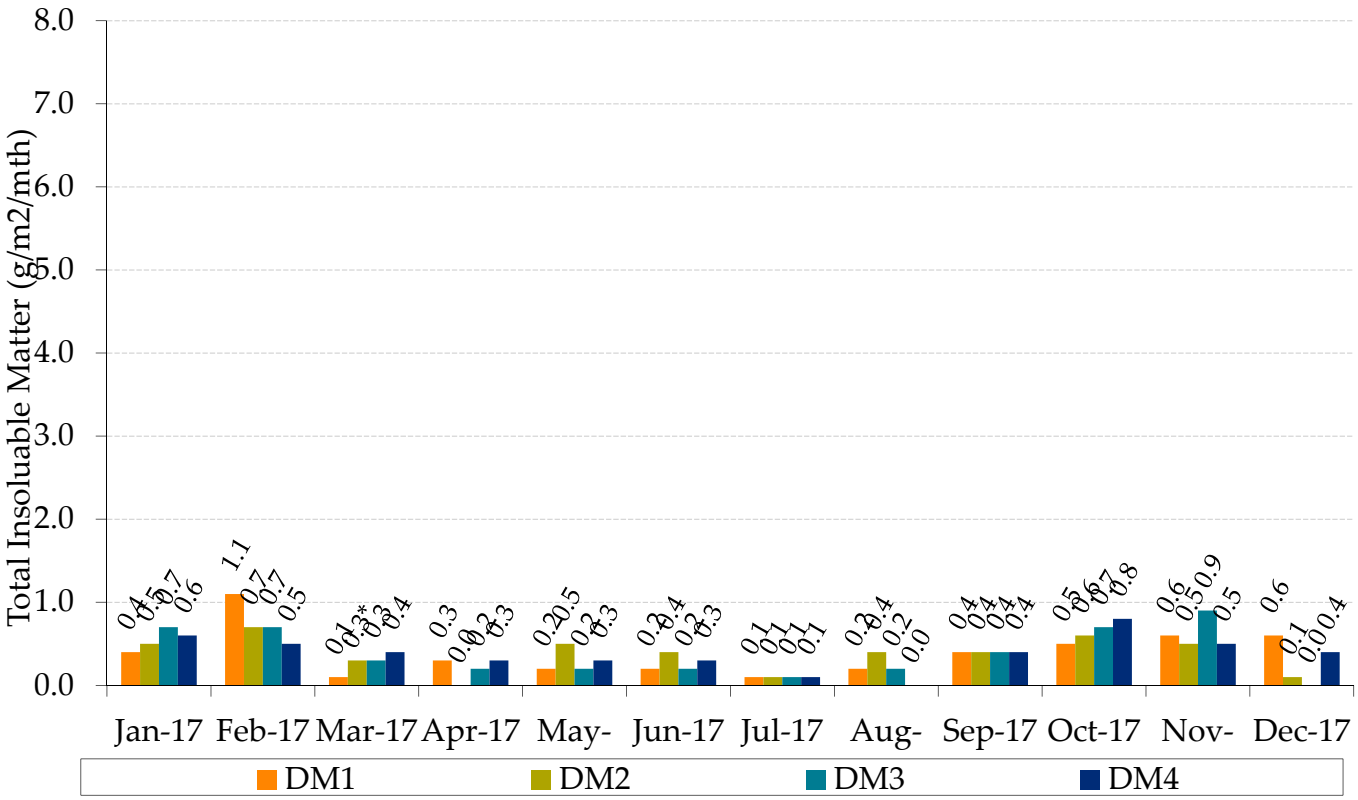

Figure 1: Monthly Total Insoluble Matter

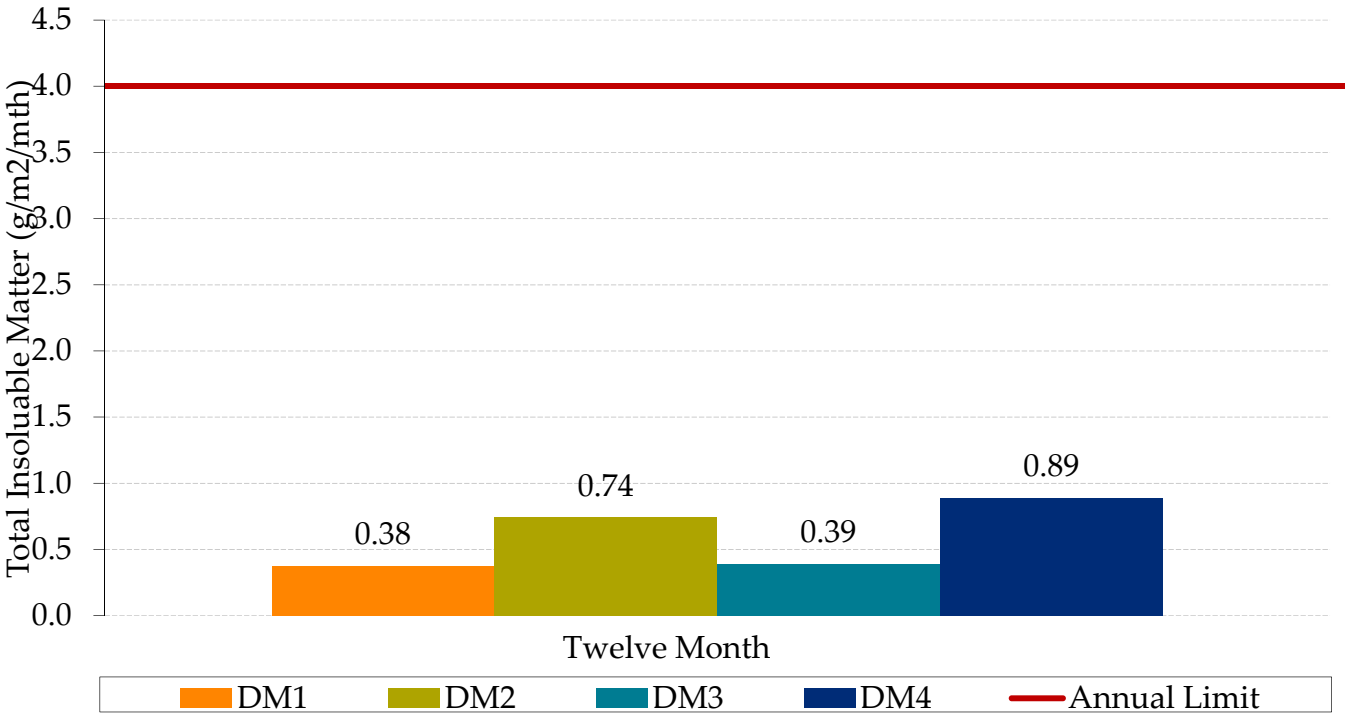

Figure 2: YTD Twelve Month Rolling Average Total Insoluble Matter

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.

Figure 3 to Figure 6 provide monthly results for each pollutant.

Table 4: EPL Water quality results for the 2017 YTD

EPL Point	Month	EC µS/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	-	-	-	-	-	-	-	-	-	-
	Oct	-	-	-	-	-	-	-	-	-	-
	Nov	-	-	-	-	-	-	-	-	-	-
	Dec	-	-	-	-	-	-	-	-	-	-
LDP1	Jan	1050	<2	249	<0.05	2	8.0	-	-	-	-
	Feb	1070	<2	230	0.06	2	8.0	-	-	-	-
	Mar	1080	<2	271	<0.05	2	8.1	-	-	-	-
	Apr	1110	3	305	<0.05	2	8.2	-	-	-	-
	May	1080	<2	242	<0.05	1	8.1	-	-	-	-
	Jun	1080	<2	295	<0.05	1	8.1	-	-	-	-
	Jul	1080	<2	220	<0.05	<1	8.2	-	-	-	-
	Aug	1100	<2	278	<0.05	4	8.2	-	-	-	-
	Sep	1080	2	203	0.05	1	8.2	-	-	-	-
	Oct	1119	<5	322	0.18	<5	8.2	-	-	-	-
	Nov	1079	<5	331	0.08	<5	7.9	-	-	-	-
	Dec	1080	<5	302	0.06	6	8.1	-	-	-	-
WMP1[b]	Jan	-	-	-	-	-	-	-	-	-	-
	Feb	-	-	-	-	-	-	-	-	-	-
	Mar	-	-	-	-	-	-	-	-	-	-
	Apr	-	-	-	-	-	-	-	-	-	-
	May	-	-	-	-	-	-	-	-	-	-
	Jun	-	-	-	-	-	-	-	-	-	-
	Jul	-	-	-	-	-	-	-	-	-	-
	Aug	-	-	-	-	-	-	-	-	-	-
	Sep	-	-	-	-	-	-	-	-	-	-
	Oct	-	-	-	-	-	-	-	-	-	-
	Nov	-	-	-	-	-	-	-	-	-	-
	Dec	-	-	-	-	-	-	-	-	-	-

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– = Sulfate4
TSS = Total suspended solids

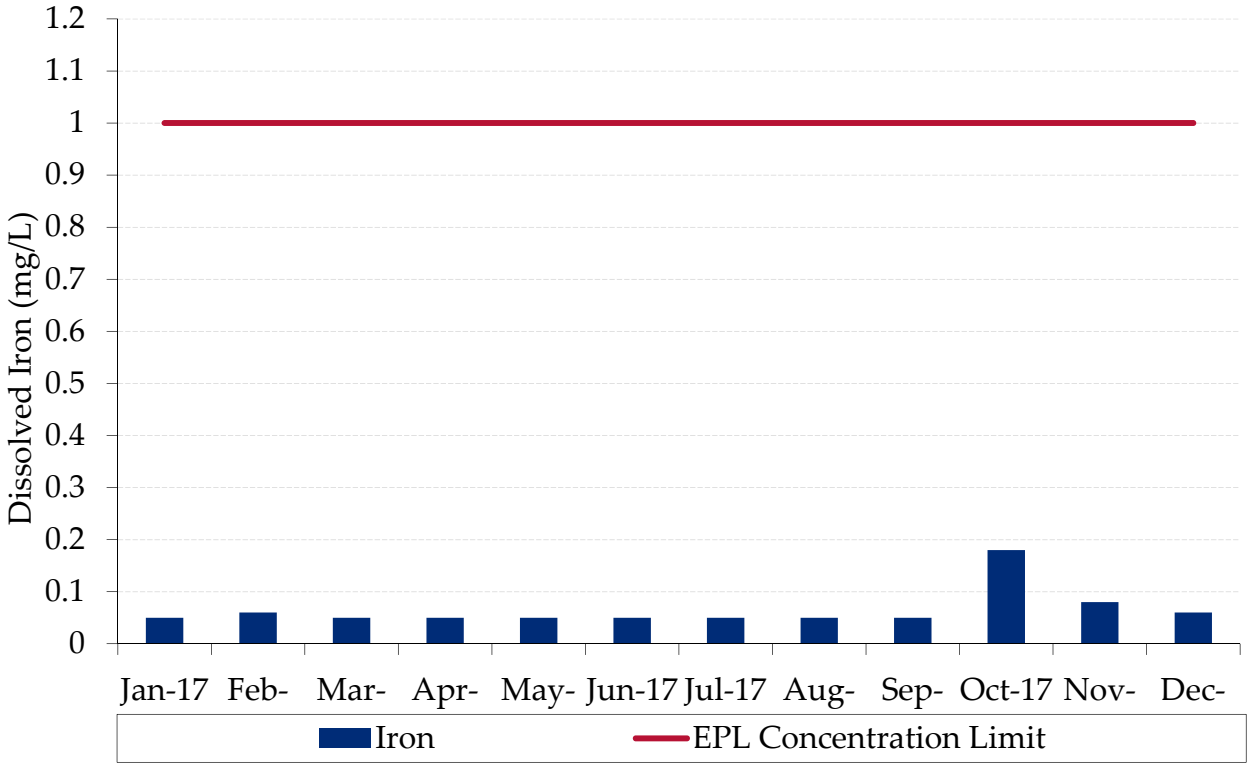

Figure 3: Monthly Dissolved Iron

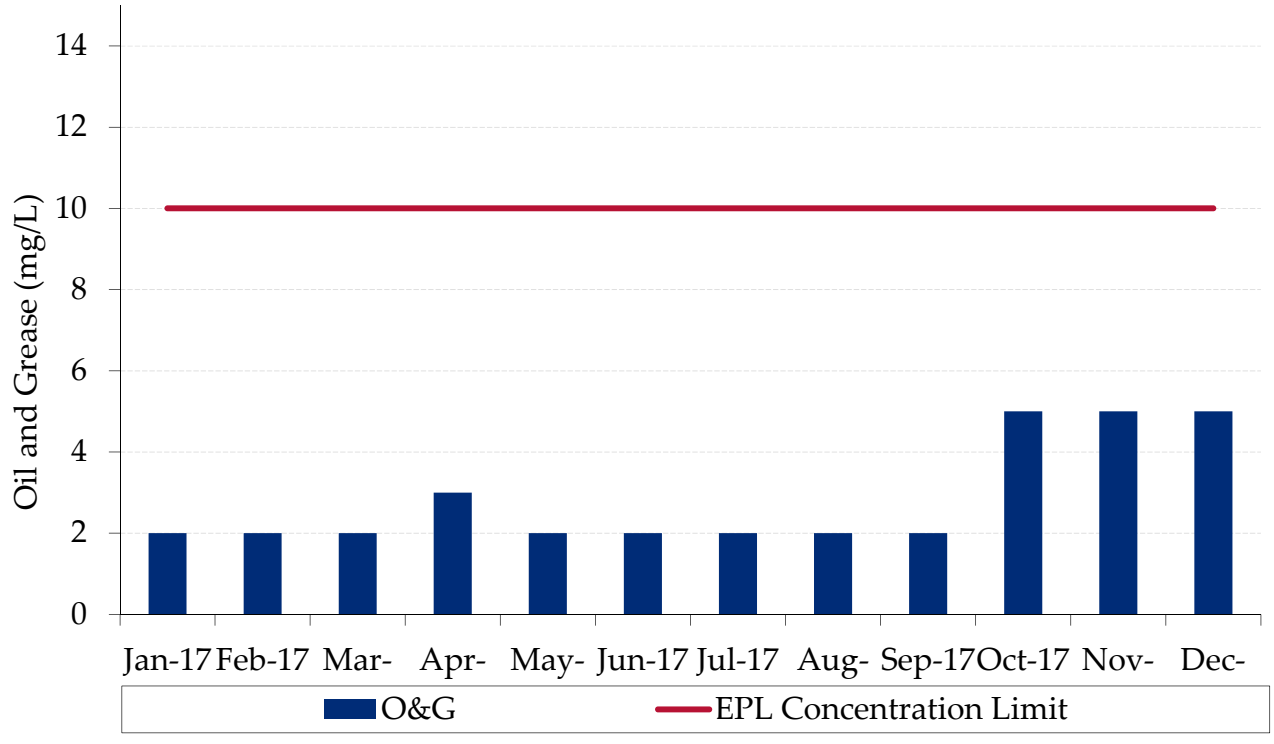

Figure 4: Monthly Oil and Grease

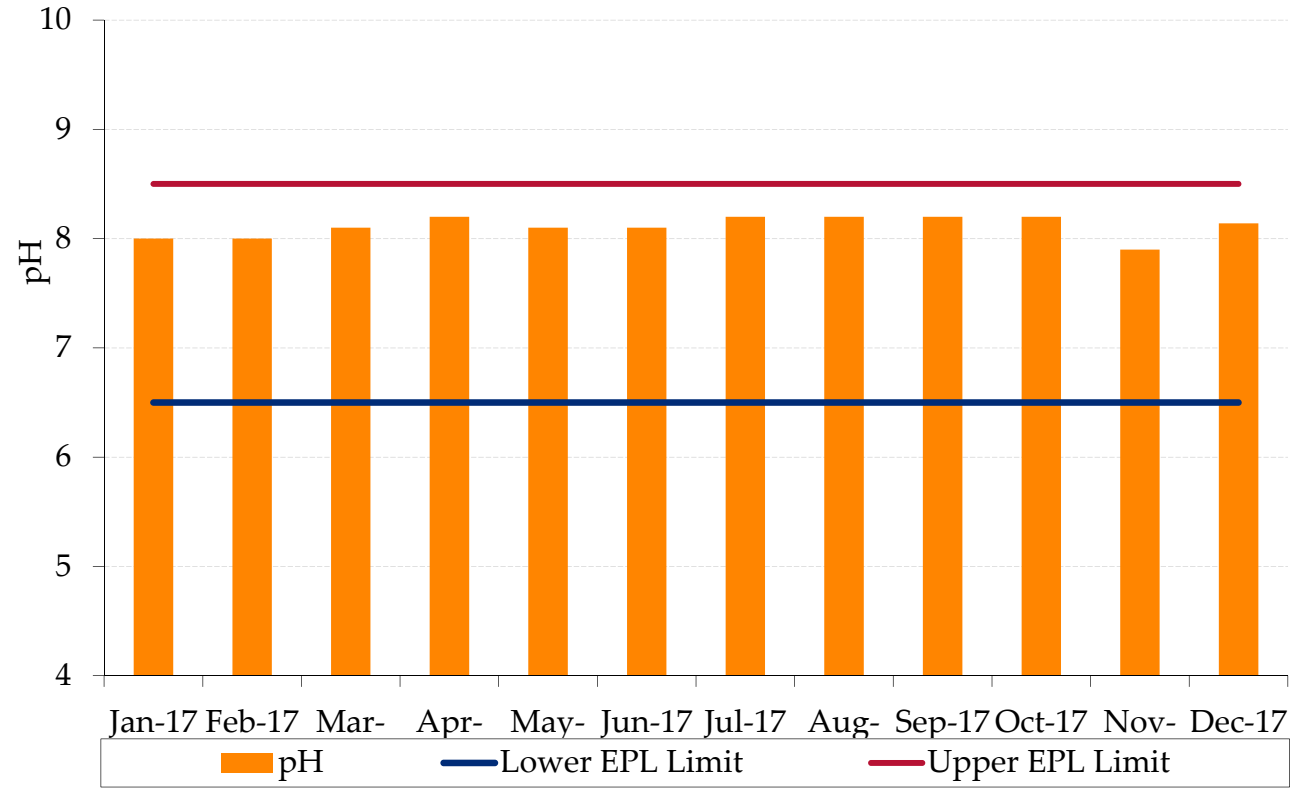

Figure 5: Monthly pH

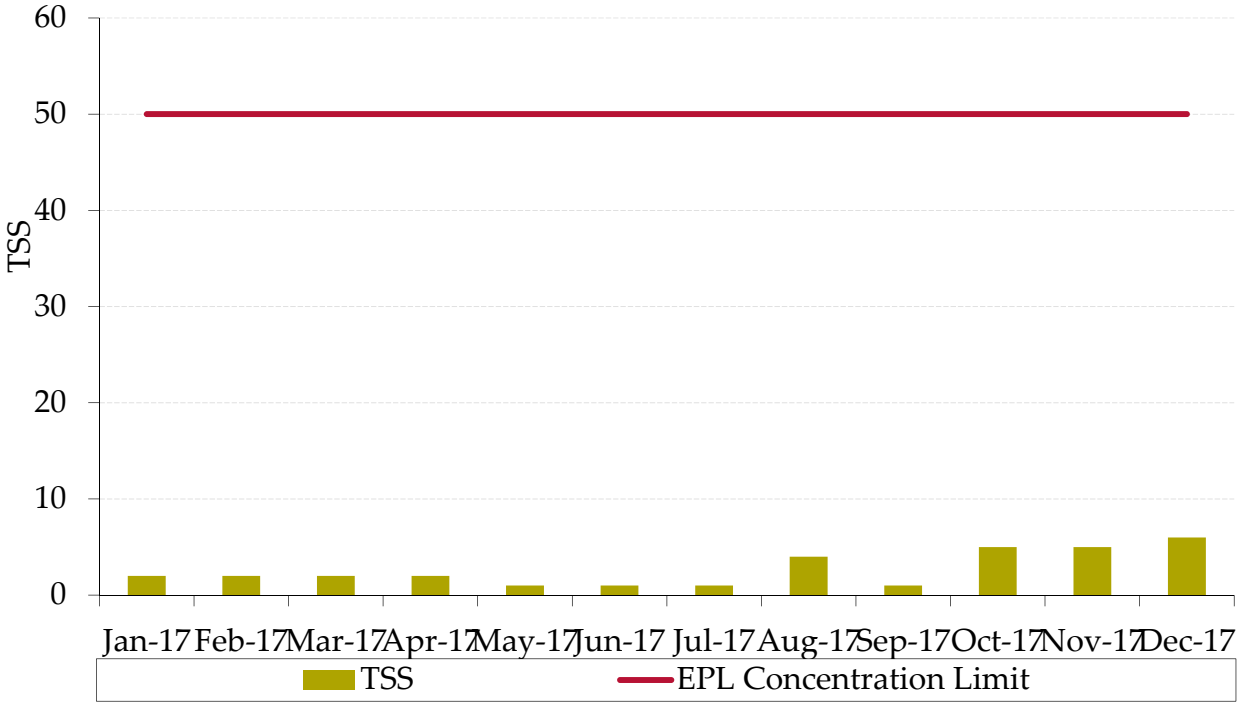

Figure 6: Monthly Total Suspended Solids

Monthly EPL reporting can be accessed at:

http://www.glencore.com.au/en/who-we-are/energy-products/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, shown in Figure 7.

Noise Audit Results

Global Acoustics conducted the annual environmental compliance noise audit at Baal Bone Colliery on Thursday 27 July 2017 during the day, evening and night periods. The next noise audit is scheduled for August 2018. Table 6 to Table 8 provide a summary of the 2017 noise audit results.

Table 6: Noise Audit Summary (Daytime)

Location (Start time)	Measured Predicted Colliery Noise	Limit	Unit	Comments
	L_{Aeq}			
Daytime Audit (1244-1341) – Thursday 27 July 2017				
Location R1 (1326 hours)	IA	46	dBA	In compliance
Location R1 (1341 hours)	<20	46	dBA	In compliance
Location R2/3 (1244 hours)	<30	41	dBA	In compliance
Location R2/3 (1259 hours)	<30	41	dBA	In compliance

Table 7: Noise Audit Summary (Evening)

Location (Start time)	Measured Predicted Colliery Noise L_{Aeq}	Limit	Unit	Comments
Evening Audit (2029-2125) – Thursday 27 July 2017				
Location R1 (2029 hours)	26	46	dBA	In compliance
Location R1 (2044 hours)	26	46	dBA	In compliance
Location R2/3 (2110 hours)	IA	41	dBA	In compliance
Location R2/3 (2125 hours)	IA	41	dBA	In compliance

Table 8: Noise Audit Summary (Night)

Location (Start time)	Measured Predicted Colliery Noise L_{Aeq}	Limit	Unit	Comments
Night Audit (2201-2254) – Thursday 27 July 2017				
Location R1 (2239 hours)	<20	46	dBA	In compliance
Location R1 (2254 hours)	<20	46	dBA	In compliance
Location R2/3 (2201 hours)	<20	41	dBA	In compliance
Location R2/3 (2216 hours)	<20	41	dBA	In compliance

The audit report concluded that:

"Activities from BBC complied with the relevant noise limits during attended monitoring on 27 July 2017 at all monitoring locations. There were no exceedances, complaints or noise related incidents recorded by BBC since the previous monitoring was carried out (August 2016). No measurements occurred during which BBC mine was directly measurable, was within 5 dB of the relevant limits and where meteorological conditions resulted in criteria applying (in accordance with the EPL)."

The full July 2017 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/energy-products/baal-bone/Pages/epl-reporting.aspx

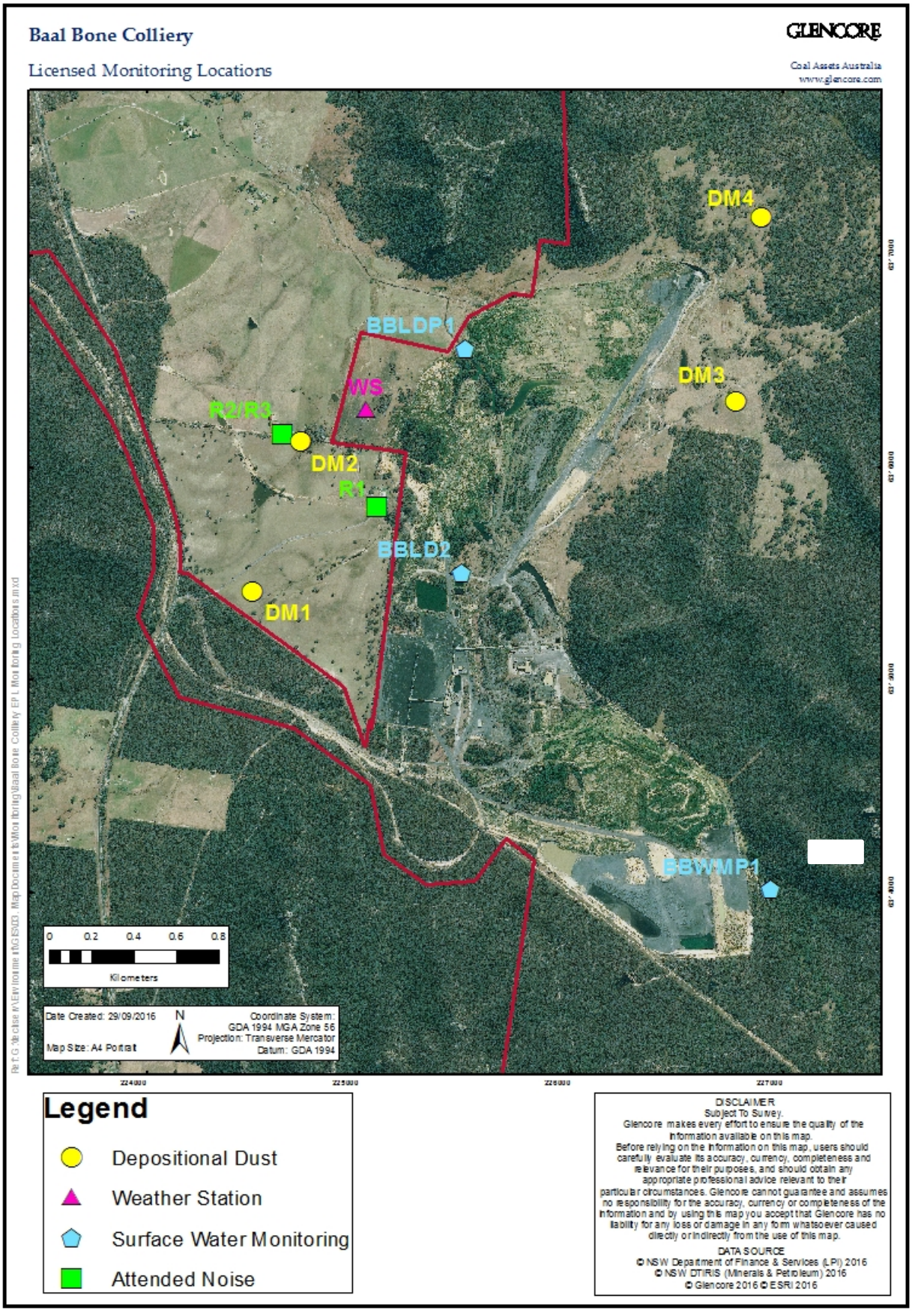

Figure 7. Baal Bone Monitoring Points