GLENCORE

BAAL BONE COLLIERY

July to September 2018
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** to **30 September 2018.** 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 2018 YTD (g/m²/month)

Month	DM1	DM2	DM3	DM4
January	1.7	1.4	0.7	0.4
February	1.3	0.5	0.2	0.5
March	0.7	0.6	0.9	0.6
April	0.9	0.5	0.5	0.5
May	0.6	0.6	0.5	0.6
June	0.8	0.3	0.4	0.2
July	<0.1	<0.1	<0.1	<0.1
August	0.3	0.5	0.3	0.3
September	4.6*	1.0	0.9	1.9

*EPL Monitoring Point 7 (DM1) result for September 2018 is above the monthly maximum total deposited dust level of 4g/m²/month however when the annual average is applied the result is well within Project Approval limits – refer to **Figure 2** for 12 month rolling average.

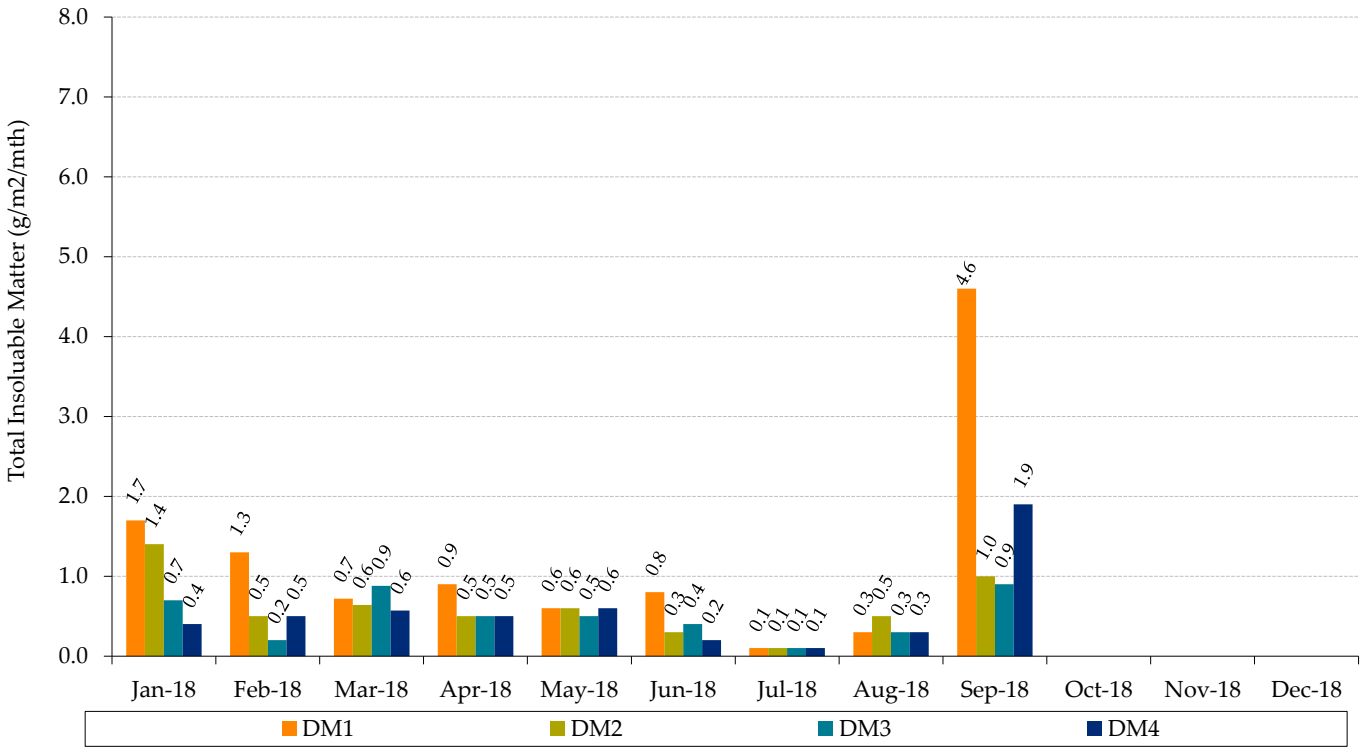

Figure 1: Monthly Total Insoluble Matter

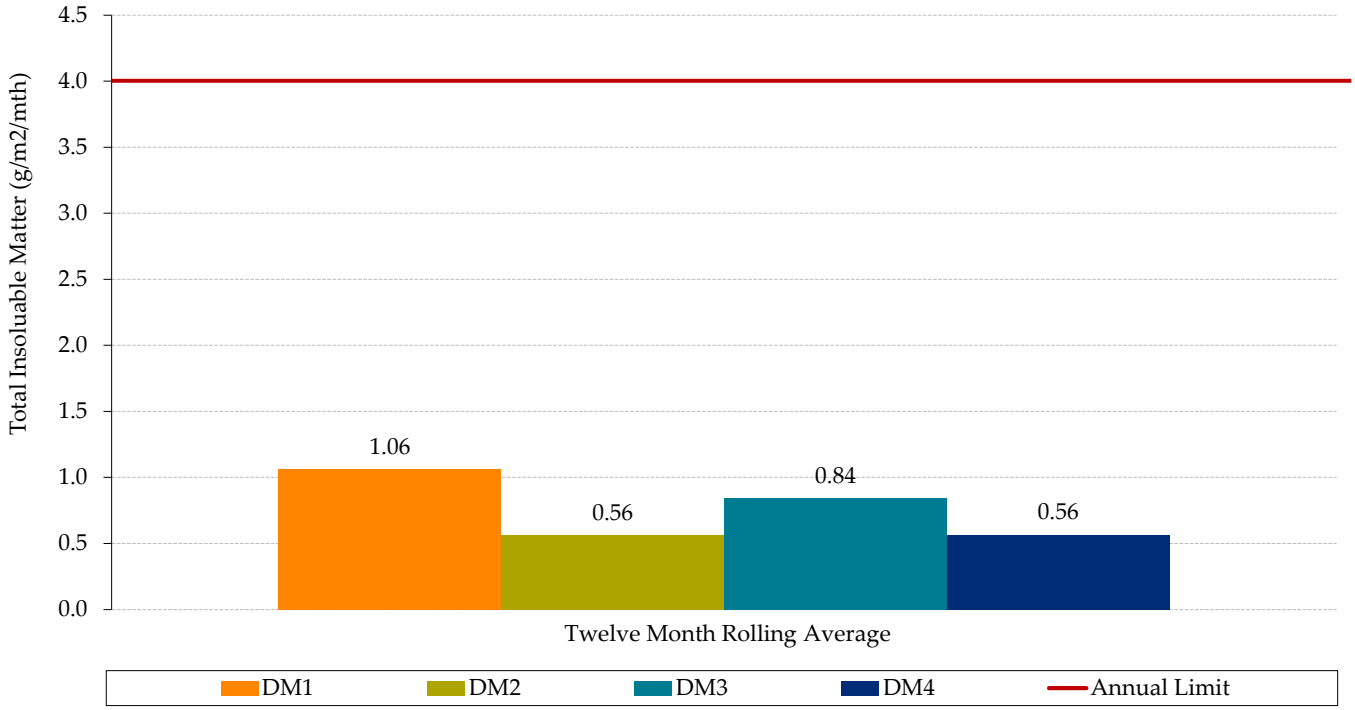

Figure 2: Twelve Month Rolling Average Total Insoluble Matter (12 months until 30 September 2018)

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 2018 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	-	-	-	-	-	-	-	-	-	-
	Sept	-	-	-	-	-	-	-	-	-	-
LDP1	Jan	1036	<5	229	0.08	5	7.7	-	-	-	-
	Feb	920	<5	275	0.18	<5	7.6	-	-	-	-
	Mar	1060	<5	371	0.05	<5	8.07	-	-	-	-
	Apr	1140	<5	313	0.1	<5	7.9	-	-	-	-
	May	1205	<5	311	<0.05	<5	6.8	-	-	-	-
	Jun	1190	<5	320	<0.05	<5	7.9	-	-	-	-
	Jul	1191	<5	284	<0.05	<5	7.5	-	-	-	-
	Aug	1208	<5	314	<0.05	<5	7.2	-	-	-	-
	Sept	968	<5	250	<0.05	<5	7.9	-	-	-	-
WMP1[b]	Jan	-	-	-	-	-	-	-	-	-	-
	Feb	-	-	-	-	-	-	-	-	-	-
	Mar	-	-	-	-	-	-	-	-	-	-
	Apr	-	-	-	-	-	-	-	-	-	-
	May	-	-	-	-	-	-	-	-	-	-
	Jun	-	-	-	-	-	-	-	-	-	-
	Jul	-	-	-	-	-	-	-	-	-	-
	Aug	-	-	-	-	-	-	-	-	-	-
	Sept	-	-	-	-	-	-	-	-	-	-

Notes **(a)** No samples taken at LD2 during 2018 to date as sample location was dry
(b) No samples taken at WMP1 during 2018 to date as sample location was dry

Legend

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

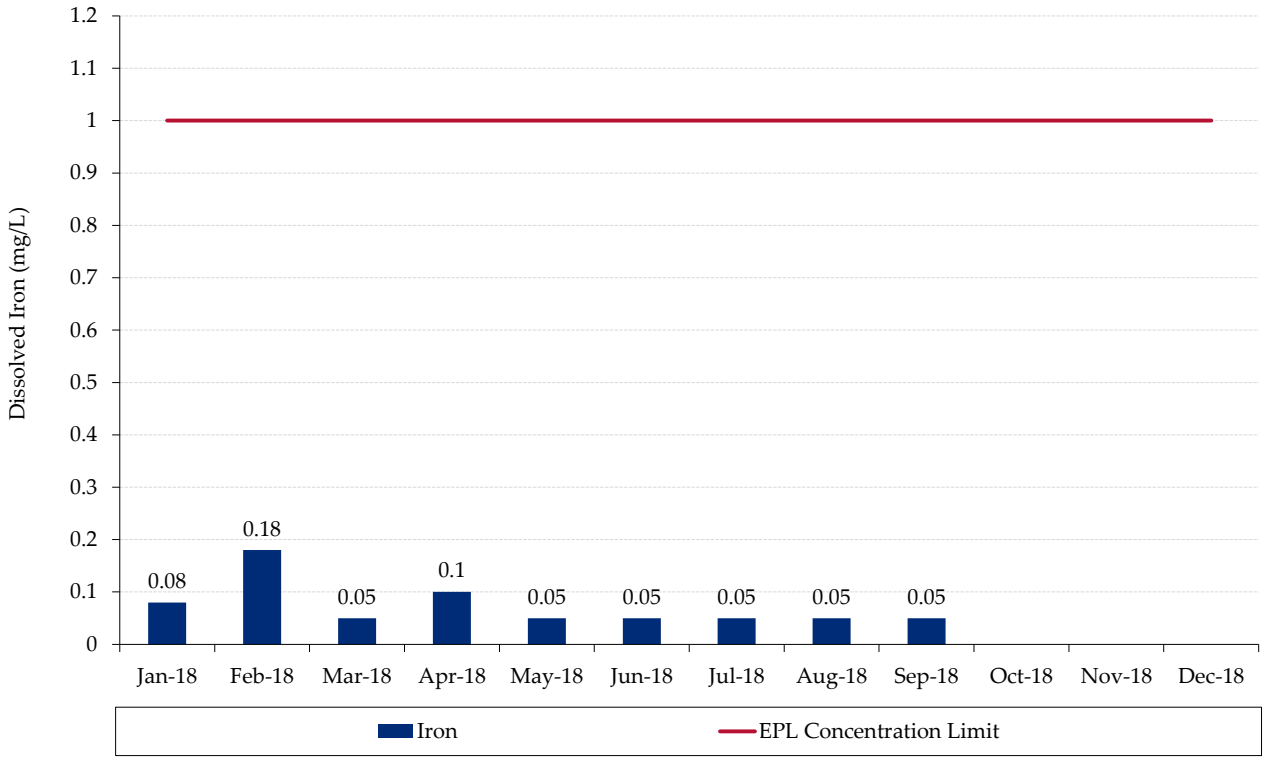

Figure 3: Monthly Dissolved Iron

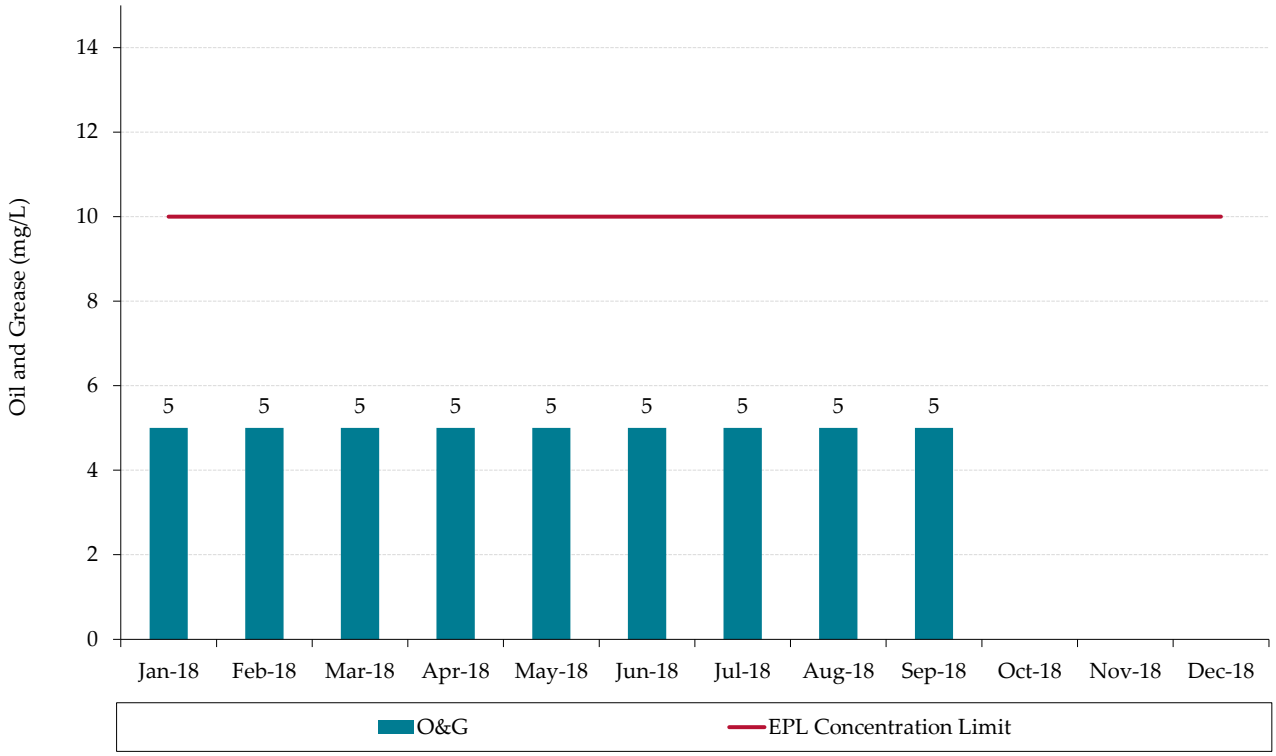

Figure 4: Monthly Oil and Grease

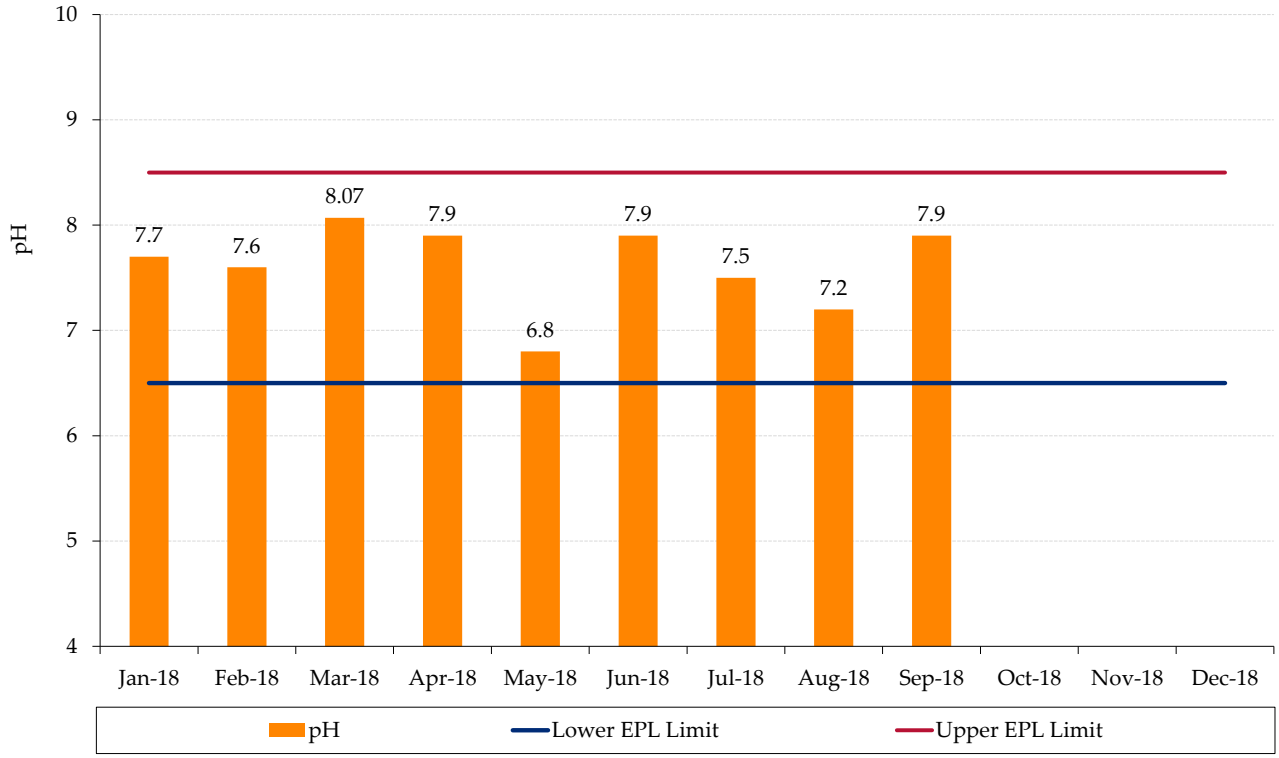

Figure 5: Monthly pH

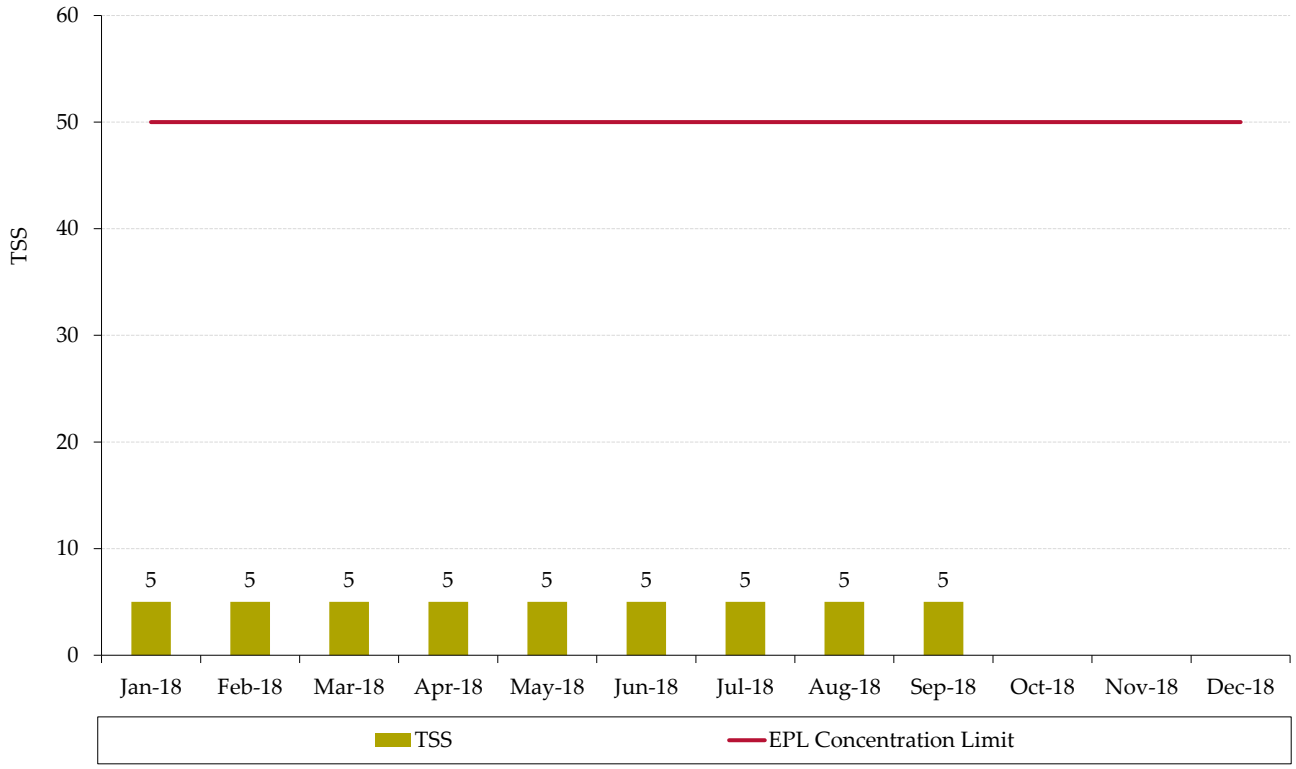

Figure 6: Monthly Total Suspended Solids

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 Wednesday 4 July 2018 during the day, evening and night periods. The next noise audit is scheduled for mid 2019. **Table 6** to **Table 8** provide a summary of the 2018 noise audit results.

Table 6: Noise Audit Summary (Daytime)

Location (Start time)	Measured Predicted Colliery Noise $L_{Aeq15min}$ dB	Limit	Unit	Comments
Daytime Audit - Wednesday 4 July 2018				
Location R1 (1404 hours)	IA	46	dB	In compliance
Location R1 (1421 hours)	IA	46	dB	In compliance
Location R2/3 (1316 hours)	IA	41	dB	In compliance
Location R2/3 (1337 hours)	IA	41	dB	In compliance

IA = Inaudible

Table 7: Noise Audit Summary (Evening)

Location (Start time)	Measured Predicted Colliery Noise	Limit	Unit	Comments
	$L_{Aeq15min}$ dB			
Evening Audit– Wednesday 4 July 2018				
Location R1 (2031 hours)	26	46	dB	In compliance
Location R1 (2046 hours)	28	46	dB	In compliance
Location R2/3 (2111 hours)	26	41	dB	In compliance
Location R2/3 (2127 hours)	<25	41	dB	In compliance

Table 8: Noise Audit Summary (Night)

Location (Start time)	Measured Predicted Colliery Noise	Limit	Unit	Comments
	$L_{Aeq15min}$ dB			
Night Audit– Wednesday 4 July 2018				
Location R1 (2251 hours)	28	46	dB	In compliance
Location R1 (2307 hours)	26	46	dB	In compliance
Location R2/3 (2200 hours)	29	41	dB	In compliance
Location R2/3 (2226 hours)	28	41	dB	In compliance

The audit report concluded that:

"Activities from BBC complied with the relevant noise limits during attended monitoring on 4 July 2018 at all monitoring locations. Criteria may not always be applicable due to meteorological conditions at the time of monitoring.
There were no exceedances, complaints or noise related incidents recorded by BBC since the previous monitoring was carried out (July 2017)."

The full July 2018 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

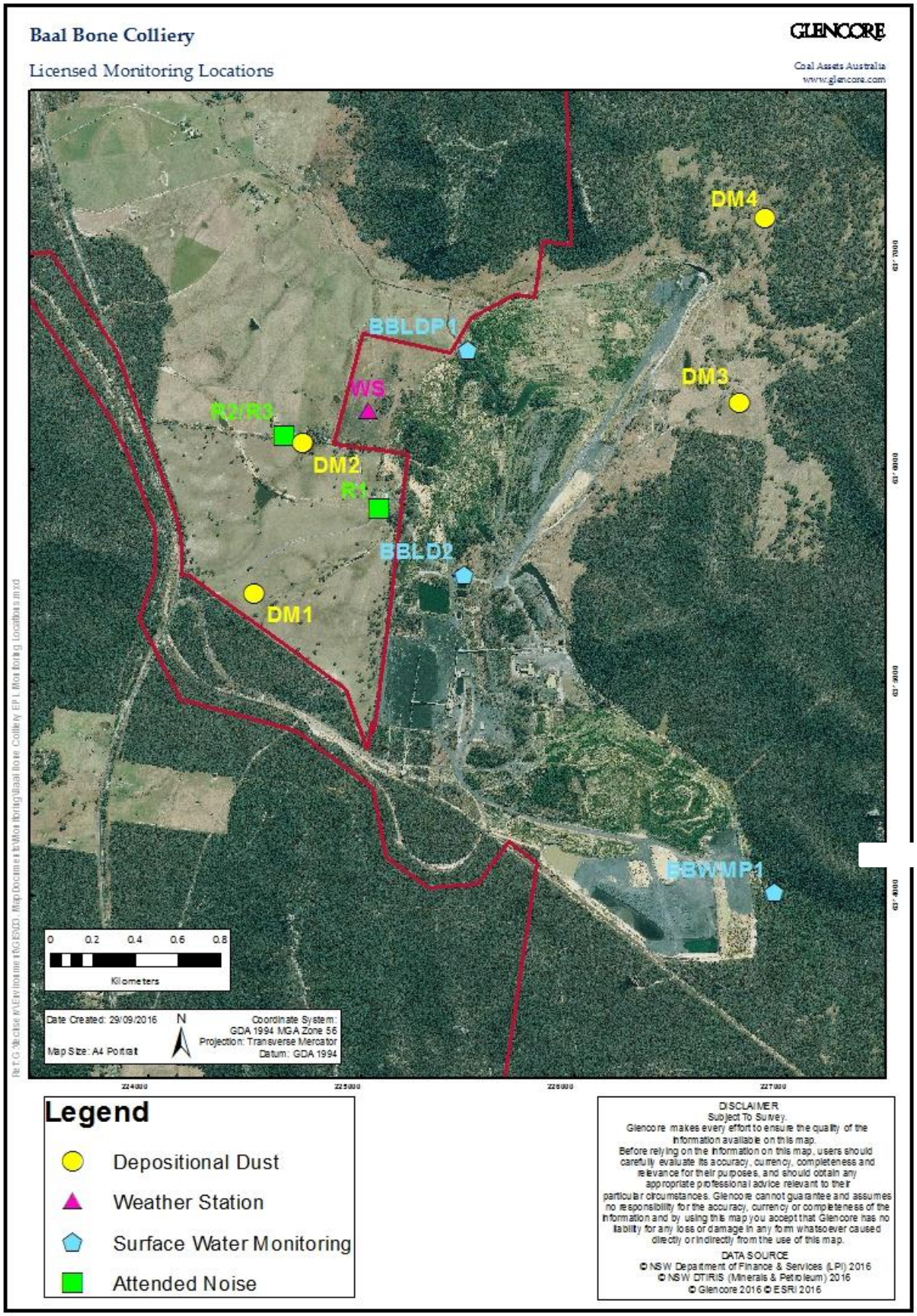

Figure 7. Baal Bone Monitoring Points