



DONALDSON COAL

Part of the Yancoal Australia Group
ABN: 87 073 088 945



Annual Review

Abel Underground Coal Mine

1 January 2016 – 31 December 2016

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DONALDSON COAL

PTY LTD

ABN: 87 073 088 945

Annual Review

for the

Abel Underground Coal Mine

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Ref No. 737/19

March 2017

TITLE BLOCK

Name of Operation	Abel Underground Coal Mine
Name of Operator	Donaldson Coal Pty Ltd
Development consent / project approval #	05_0136
Name of holder of development consent / project approval	Donaldson Coal Pty Ltd
Mining Lease #	ML1618 and ML 1653
Name of holder of mining lease	Donaldson Coal Pty Ltd
Water licence #	20BL171935
Name of holder of water licence	Donaldson Coal Pty Ltd
MOP/RMP start date	02/05/2016
MOP/RMP end date	01/05/2019
Annual Review start date	01/01/2016
Annual Review end date	31/12/2016
<p>I, Phillip Brown, certify that this audit report is a true and accurate record of the compliance status of the Tasman Underground Coal Mine for the period 1 January 2016 to 31 December 2016 and that I am authorised to make this statement of behalf of Newcastle Coal Company Pty Ltd.</p> <p><i>Note.</i></p> <p>a) <i>The Annual Review is an 'environmental audit' for the purposes of section 122B(2) of the Environmental Planning and Assessment Act 1979. Section 122E provides that a person must not include false or misleading information (or provide information for inclusion in) an audit report produced to the Minister in connection with an environmental audit if the person knows that the information is false or misleading in a material respect. The maximum penalty is, in the case of a corporation, \$1 million and for an individual, \$250,000.</i></p> <p>b) <i>The Crimes Act 1900 contains other offences relating to false and misleading information: Section 192G (Intention to defraud by false or misleading statement – maximum penalty 5 years imprisonment); Section 307A, 307B and 307C (false or misleading application/information/documents – maximum penalty 2 years imprisonment or \$22,000, or both).</i></p>	
Name of authorised reporting officer	Phillip Brown
Title of authorised reporting officer	Environment and Community Manager
Signature of authorised reporting officer	
Date	31 March 2017

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1. STATEMENT OF COMPLIANCE

The compliance status of relevant approvals was reviewed for the reporting period and is summarised in **Table 1.1**. It was determined that there were two non-compliances during the reporting period. The non-compliances recorded during the reporting period have been ranked according to the risk matrix included in **Table 1.2**.

Table 1.1
Statement of Compliance

Were all conditions of the relevant approval(s) complied with?	Yes / No
Project Approval 05_0136	No
Mining Lease 1618	Yes
Mining Lease 1653	Yes
Water Licence 20BL171935	No

Table 1.2
Non-compliances

Relevant Approval	Condition #	Condition Description (summary)	Compliance Status	Comment	Where Addressed in Annual Review
PA 05_0136	2/11a	Ensure that all new buildings and structures, and any alterations or additions are constructed in accordance with the relevant requirements of the BCA.	Non-compliant	Construction Certificates have been received but not Occupation Certificates. Certifying body inspected once and requested changes. Changes have been made and the Certifying body requested to reinspect. Certificates yet to be issued.	11
Water Licence 20BL171935	7	Provide the office of water with an annual compliance report, to report on the results of the groundwater monitoring and contingency plan, within (3) three months of the end of the water year being reported on.	Non-compliant	The necessary information has been included in the respective AEMRs and this Annual review. A report prepared by an independent and qualified groundwater expert is also attached (Appendix 8). However, the Annual Review is prepared following each calendar year and therefore has not been submitted within 3 months of the water year (i.e. by 30 September).	11

Compliance Status Key

Risk level	Colour code	Description
High	Non-compliant	Non-compliance with potential for significant environmental consequences, regardless of the likelihood of occurrence.
Medium	Non-compliant	Non-compliance with: <ul style="list-style-type: none"> potential for serious environmental consequences, but is unlikely to occur; or potential for moderate environmental consequences, but is likely to occur.
Low	Non-compliant	Non-compliance with: <ul style="list-style-type: none"> potential for moderate environmental consequences, but is unlikely to occur; or potential for low environmental consequences, but is likely to occur.
Administrative non-compliance	Non-compliant	Only to be applied where the non-compliance does not result in any risk of environmental harm (e.g. submitting a report to government later than required under approval conditions).

2. INTRODUCTION

2.1 OVERVIEW OF OPERATIONS

The Abel Underground Coal Mine (the “mine”) is located approximately 23km northwest of Newcastle, New South Wales (see **Figure 2.1**). Following the grant of Project Approval 05_0136 in June 2007, the Company undertook construction and mining activities until **the mine was placed in care and maintenance from 28 April 2016**. Activities undertaken to date include the following.

- i) Construction of surface infrastructure and facilities, including the administration offices, amenities, service and storage facilities and car parking area, within the surface infrastructure area.
- ii) Initial mine construction involving the formation of three mining portals and underground roadways and construction of the ventilation, conveying and coal stockpiling systems.
- iii) Coal recovery using bord and pillar methods including first and second workings.

Several of the earlier activities, relating to the mine, involving the formation of the box cut within which the surface facilities and ROM stockpiles are located, were undertaken as part of the approved Donaldson Open Cut Coal Mine.

2.2 SCOPE AND FORMAT

This Annual Review for the Abel Underground Coal Mine has been compiled by R.W. Corkery & Co. Pty. Limited on behalf of Donaldson Coal Pty Ltd (the “Company”). Donaldson Coal Pty Ltd. Donaldson Coal Pty Ltd became part of Yancoal Australia Limited in July 2012.

This is the first Annual Review submitted for the mine, following eight Annual Environmental Management Reports, and is applicable for the period 1 January to 31 December 2016 (“the reporting period”). The information presented within this Annual Review has been compiled based on information and advice provided by the Company.

This Annual Review generally follows the format and content requirements identified in the *Annual Review Guideline* dated October 2015.

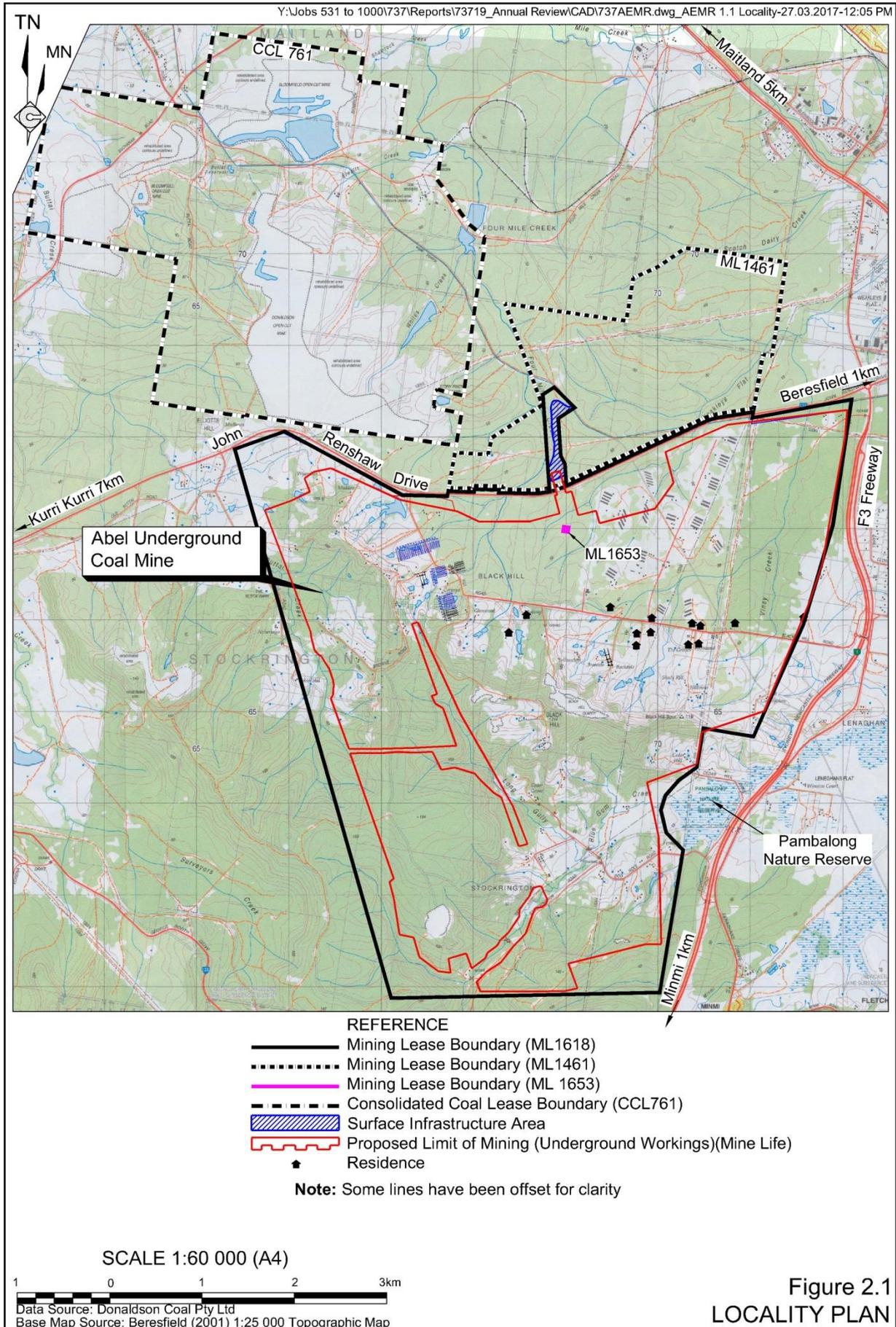


Figure 2.1
LOCALITY PLAN

2.3 KEY PERSONNEL CONTACT DETAILS

The Manager, Mining Engineering, Mr Aaron McGuigan is the primary mine contact (Tel: 02 4015 1100). Mr McGuigan is currently the Manager Mining Engineering for legislative purposes and as such, is responsible for the environmental management of the mine and ensuring compliance with all relevant legislative obligations. Mr Phillip Brown (Tel: 0439 909 952) is the nominated Environment & Community Manager and is also responsible for the environmental management of the mine. The contact details for the mine office are as follows.

Postal Address:	Donaldson Coal Pty Ltd PO Box 2275 GREENHILLS NSW 2323	Tel: 02 4015 1100 Fax: 02 4015 1159
Email:	donaldson@doncoal.com.au	
Physical Address:	Abel Underground Coal Mine 1132 John Renshaw Drive BLACKHILL NSW 2322	

A 24-hour Environmental Hotline (Tel: 1800 111 271) is maintained by the Company. Details of calls taken on this number are forwarded to the Environment & Community Manager for further actioning, if required.

3. APPROVALS

The Company has operated the approved activities at the mine under the approvals listed in **Table 3.1**.

Table 3.1
Abel Underground Coal Mine – Consents, Leases and Licences

Consent/Lease/Licence	Issue Date	Expiry Date	Details / Comments
Project Approval 05_0136	7 June 2007	31 December 2030	Granted by the (then) Minister for Planning and last modified on 04 December 2013.
Mining Lease ML 1618*	15 May 2008	15 May 2029	Granted by the Minister for Primary Industries. Incorporates 2755ha of surface area.
Mining Lease ML 1653*	21 January 2011	21 January 2032	Granted by the Minister for Primary Industries. Incorporates 0.25ha of surface area. Issued construction of ventilation shaft.
Environment Protection Licence No. 12856	9 July 2008 (licence version date 21 December 2011)	Not applicable	Issued by the (then) Department of Environment and Climate Change (EPA).
Water Licence 20BL171935	5 August 2013	4 August 2018	Bore licence to intercept groundwater issued by the (then) NSW Office of Water.
* See Figure 2.1			

It is noted that this Annual Review has been prepared to fulfil the annual reporting requirements of Project Approval 05_0136, ML 1618, ML 1653, and Water Licence 20BL171935. A separate Annual Return has continued to be submitted to the NSW EPA in accordance with the requirements of Environment Protection Licence 12856.

The Company also holds Exploration Licence 5497 (see **Figure 2.1**) which was granted on 22 July 1998, renewed on 09 December 2014 and has an expiry date of 21 July 2017.

4. OPERATIONS SUMMARY

4.1 MINING OPERATIONS

Mining activities concentrated on secondary workings within Panels 28, 30 and 31 and small sections of first workings within South Mains and South Mains 2 to create drifts from the Upper Donaldson seam to the Lower Donaldson seam (see **Figures 4.1** and **4.2**). A total of 265 425t of run-of-mine (ROM) coal was recovered during the reporting period for transportation to and processing at the Bloomfield Coal Handling and Preparation Plant (CHPP). Coal mining activities subsequently ceased 28 April 2016 when the site was placed into care and maintenance. No coal mining is planned during the next reporting period. **Table 4.1** presents a summary of the production statistics.

Table 4.1
Production Summary

Material	Approved limit (specify source)	Previous reporting period (actual)	This reporting period (actual)	Next reporting period (forecast)
Waste Rock / Overburden (m ³)	None specified	1 000	500	0
ROM Coal / Ore (t)	6 100 000 (PA 05_0136 Cond 2/6)	1 807 933	265 425	0
Coarse Reject (t)	None specified	0	0	0
Fine Reject (Tailings) (t)	None specified	0	0	0
Saleable Product (t)	None specified	1 807 933	265 425	0

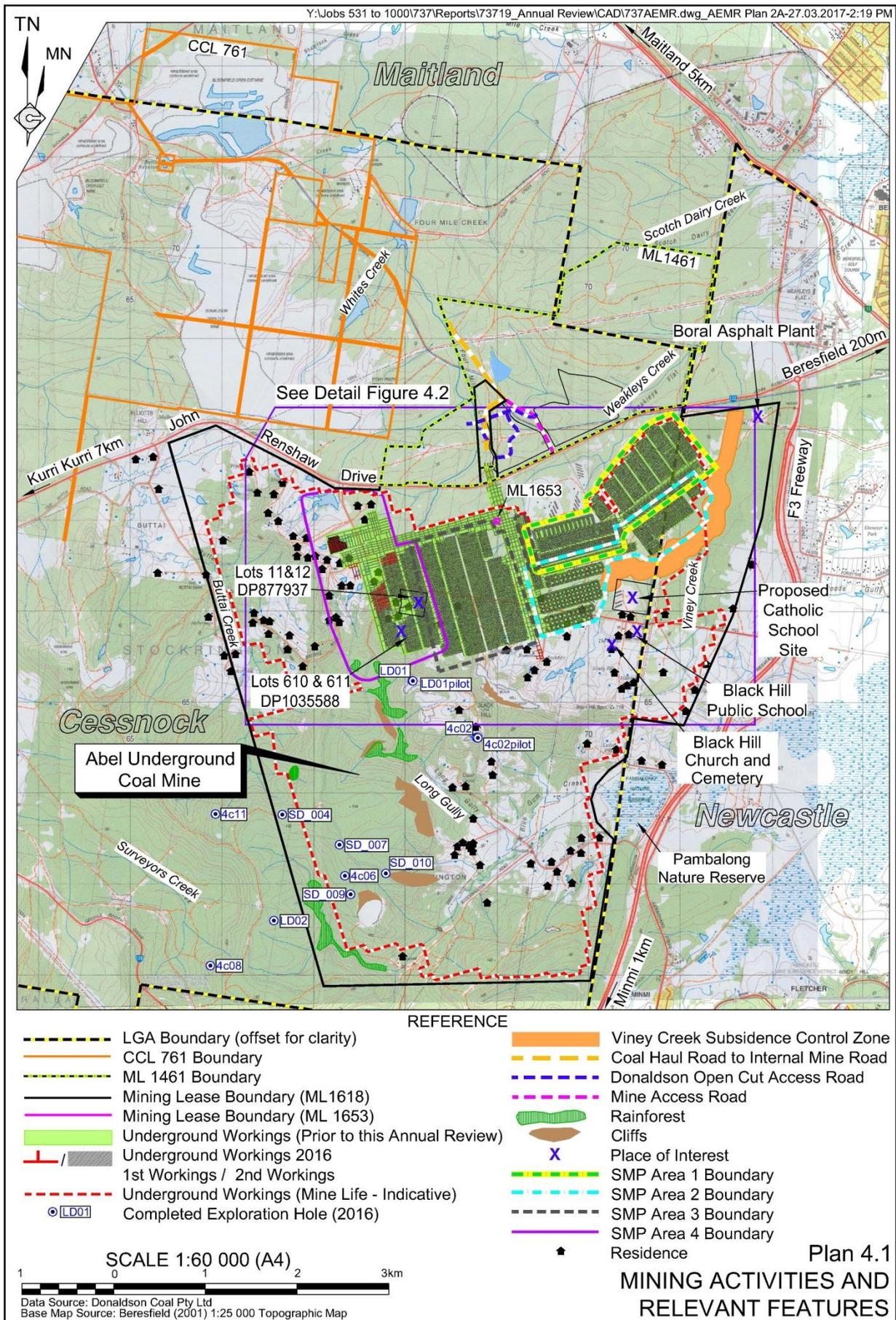
4.2 OTHER OPERATIONS DURING THE REPORTING PERIOD

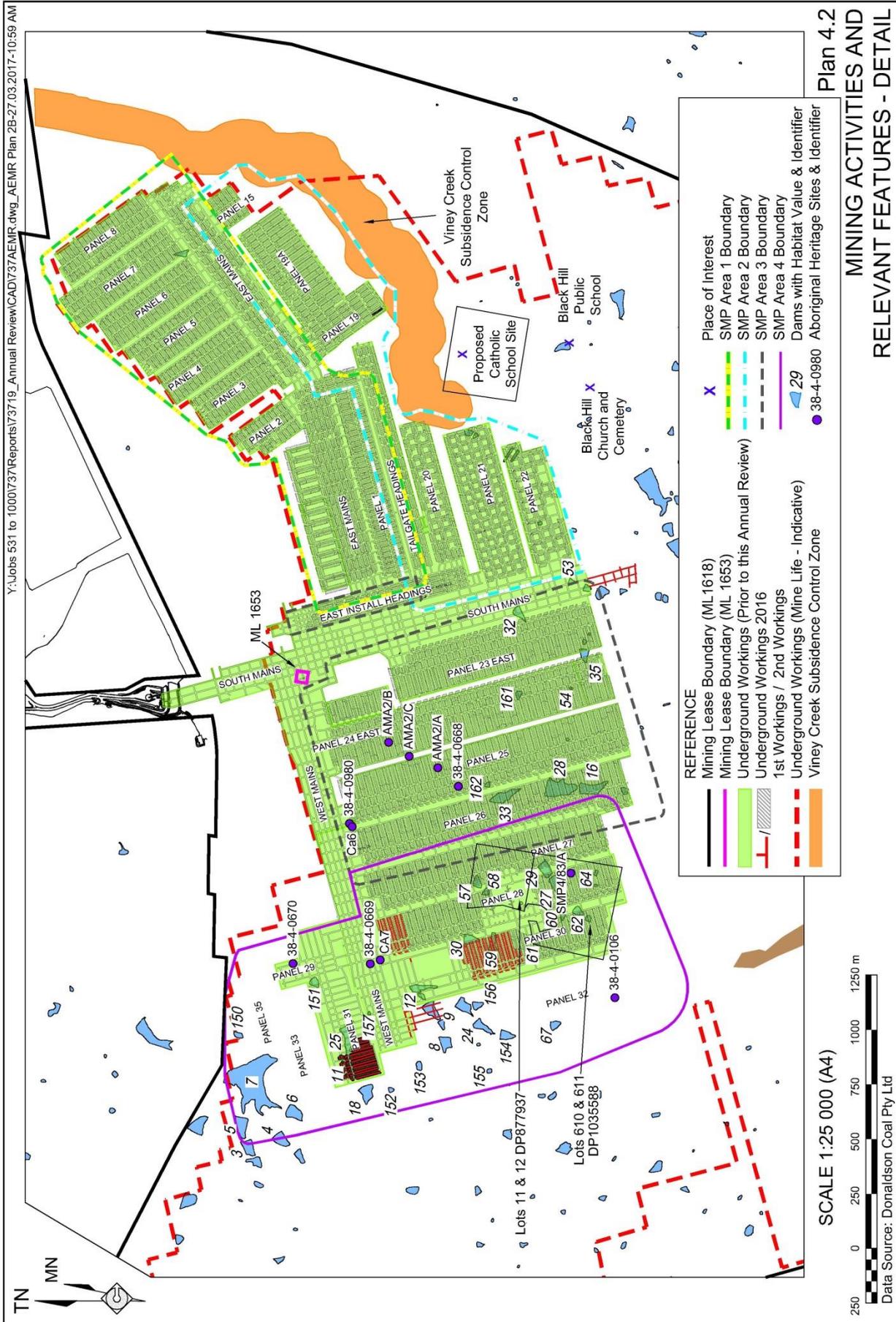
During the reporting period a total of 10 exploration holes were drilled within ML 1618 (see **Figure 4.1**) and a further three within EL 5497 for the purposes of resource validation and mine planning. All exploration holes were grouted and rehabilitated. Exploration reports for ML 1618 and EL 5497 continued to be provided to the Coal Advice and Resource Assessment section of DTIRIS in accordance with *Condition 11* of ML 1618. No exploration activities were undertaken in association with ML 1653.

No land preparation or construction activities were undertaken during the reporting period.

No processing activities were undertaken at the mine other than the use of a feeder breaker to reduce spillage from the conveyor transporting coal to the surface. Processing activities are, however, applicable to Project Approval 05_0136 issued for the Abel Mine which provides for haulage to and processing at Bloomfield CHPP. During the reporting period, 236 506t¹ of coal from the Abel Mine was processed at Bloomfield CHPP producing approximately 159 879t of product coal (based on 67% recovery). A further 33 572t of coal bypassed the Bloomfield CHPP for direct sale as product coal. All product coal was loaded to trains on the Bloomfield rail spur for transportation to the Port of Newcastle.

¹ The apparent difference in coal processed compared to ROM coal mined (per Section 4.1) is a result of differences in timing between mining of ROM coal, transportation to Bloomfield and storage at Bloomfield prior to processing through the CHPP.





Details of the CHPP process and associated waste management, and product transportation are provided within the respective reporting for the Bloomfield CHPP.

Environmental monitoring activities also continued throughout the reporting period including surface water, groundwater, flora and fauna and subsidence monitoring. Results of this monitoring is summarised in Sections 6 and 7.

4.3 NEXT REPORTING PERIOD

The activities proposed for 2017 will principally involve continued monitoring and, if required, maintenance activities in accordance with the approved MOP for Care and Maintenance. The following provides a summary of the planned activities.

Exploration

The Company currently does not intend to undertake any drilling within ML 1618 or ML 1653 during the 2017 reporting period.

Mining

No mining is currently planned to be undertaken during the 2017 reporting period.

Rehabilitation

No specific rehabilitation activities are currently planned for the 2017 reporting period. Any rehabilitation works undertaken will relate to rehabilitation of any subsidence impacts or to ongoing maintenance, principally erosion and sediment control.

Monitoring

The following monitoring will be undertaken during the next reporting period. It is noted that some monitoring programs will be reviewed to ensure that the monitoring during the care and maintenance period remains appropriate.

- Air Quality – ongoing deposited dust, TSP and PM₁₀ monitoring will continue to be undertaken.
- Surface water – ongoing surface water quality and flow monitoring at a range of routine monitoring sites located within Blue Gum Creek, Viney Creek, Buttai Creek, Four Mile Creek and a number of local water storages. This monitoring will be undertaken as part of the integrated monitoring with the Bloomfield, Donaldson and Tasman Mines.
- Groundwater – ongoing groundwater quality and level monitoring will be undertaken as part of the integrated network of monitoring bores for the Bloomfield, Donaldson and Tasman Mines. Measurement of the quality and volume of inflow water to the underground workings will also continue to be undertaken.
- Noise – noise monitoring will continue, if required, or the frequency for monitoring will be reviewed.

- Flora & Fauna – flora and fauna surveys and reporting will continue to be undertaken in accordance with approved Flora and Fauna Management Plan.
- Meteorological – the on-site meteorological station at the Abel Mine will be maintained and data collated.
- Subsidence monitoring will continue to be undertaken in accordance with the approved subsidence monitoring programs.

Community Consultation and Liaison

The community consultative committee will continue to be convened during the next reporting period. It is expected that meetings will continue to be held quarterly unless otherwise agreed with the committee. The 24hr environmental hotline will be maintained and a register retained of any complaints received.

5. ACTIONS REQUIRED FROM PREVIOUS ANNUAL REVIEW

The 2015 AEMR was forwarded to DRE and DPE on 31 March 2016. A site inspection was also undertaken by DRE on 5 May 2016. Feedback was received from DRE dated 14 July 2016. The AEMR was considered satisfactory with no actions specified. Feedback was also received from DPE dated 19 July 2016. The AEMR was considered to generally be in accordance with the conditions of the approval, however, the format of future reports are to follow the Annual Review format. **Table 5.1** summarises the actions arising from the 2015 AEMR.

Table 5.1
Actions from the previous Annual Review

Action required from previous Annual Review	Requested by	Action taken by the Operator	Where discussed in Annual Review
Ensure format of all future reports follow the Annual Review format.	DPE	Preparation and submission of the 2016 Annual Review in accordance with the Annual Review Guideline published October 2015.	Section 5

6. ENVIRONMENTAL PERFORMANCE

6.1 SUMMARY OF ENVIRONMENTAL PERFORMANCE

A summary of environmental performance for the principal environmental aspects is provided in **Table 6.1**. Further detail regarding specific environmental aspects is also provided in the following subsections.

Table 6.1
Environmental performance

Aspect	Approval criteria / EIS prediction	Performance during the reporting period	Trend/key management implications	Implemented/proposed management actions
Noise	No exceedance of applicable noise criteria.	No exceedances and no complaints.	Implies management measures are currently adequate.	No additional management action required.
Blasting	No exceedance of applicable blast criteria.	No complaints. Previous due diligence monitoring indicates compliance.	Implies management measures are currently adequate.	No additional management action required.
Air Quality	No exceedances of applicable air quality criteria.	No exceedances and no complaints.	Implies management measures are currently adequate.	No additional management action required.
Biodiversity	No significant impacts upon flora, fauna species, populations, communities or habitat.	No impacts upon flora, fauna species, populations, communities or habitat were recorded. No effect upon Pambalong Nature Reserve or Sub-tropical rainforest.	Implies current mining design and safeguards are currently adequate.	No additional management action required.
Heritage	Management in accordance with approved Aboriginal Heritage Management Plan.	No heritage items undermined during the reporting period. No subsidence impacts.	Implies no specific management actions were necessary.	No additional management action required.
Subsidence	Subsidence management in accordance with approved Subsidence management Plan / Extraction Plan.	All subsidence remained within predicted levels and no notifiable events occurred.	Implies management measures are currently adequate and predictions sufficiently accurate.	No additional management action required.

6.2 METEOROLOGICAL MONITORING

An automated weather station, installed for the Donaldson Mine, has been approved by the, then, Department of Planning as also meeting the requirements for the Abel Mine. The weather station records wind speed and direction, temperature, rainfall and solar radiation. A summary of the rainfall data since commencement of the Abel Mine in 2007 is presented in **Table 6.2**.

Total rainfall during the 2016 calendar year was 981mm, 221.2mm less than received during 2015 and 15.2mm below the average rainfall.

Table 6.2
Monthly Rainfall Records

Period	Average Monthly Rainfall (mm)												Total
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	
2007	13.4	96.4	101.4	84.6	59.7	315.2	16.5	79.6	28.3	35.0	163.8	49.5	1043.4
2008	153.4	154.3	46.0	237.6	2.2	105.4	17.4	13.4	27.2	8.4	73.3	62.6	901.2
2009	125.7	97.7	102.8	189.0	125.7	75.7	32.1	1.8	29.2	59.8	44.3	62.0	945.8
2010	89.0	52.1	83.9	37.1	89.4	112.8	65.3	38.5	26.0	80.6	171.1	55.9	901.7
2011	25.6	34.5	65.6	138	98.8	152.2	128.8	48.9	103.0	100.0	171.9	75.9	1143.2
2012	96.1	207.0	137.6	114.7	11.8	172.3	53.8	26.6	18.7	5.7	47.9	47.9	940.1
2013	166.7	226.6	97.9	89.4	60.9	96.5	11.2	9.7	21.2	49.5	261.8	2.6	1094.0
2014	15.6	108.3	112.8	99.3	44.3	31.4	24.6	104.0	42.4	55.0	38.4	133.4	809.5
2015	167.0	48.0	73.3	412.0	89.4	44.6	17.9	30.6	56.8	89.0	69.8	103.8	1202.2
2016	430.8	26.0	52.0	31.8	13.4	113.0	44.2	74.2	60.0	43.8	33.2	58.6	981.0
<i>Average</i>	<i>128.3</i>	<i>105.1</i>	<i>87.3</i>	<i>143.4</i>	<i>59.6</i>	<i>121.9</i>	<i>41.2</i>	<i>42.7</i>	<i>41.3</i>	<i>52.7</i>	<i>107.6</i>	<i>65.2</i>	<i>996.2</i>

Note: Results relevant to this reporting period are in bold.

6.3 NOISE

Environmental Management

The principal management noise control prior to the site entering care and maintenance was the continued use of low modulated frequency reversing alarms on mobile equipment used on the surface.

Environmental Performance

Quarterly noise monitoring applicable to the Abel Mine commenced in December 2008 as an extension of the monitoring survey previously undertaken for the Donaldson Open Cut Coal Mine. Quarterly attended and unattended noise monitoring continued to be undertaken throughout the reporting period at four monitoring locations (see **Figure 6.1**) for quarters ending March, June, September and December 2016. Monitoring results are presented in **Table 6.3** and copies of the monitoring reports are presented within **Appendix 1**.

The findings of the monitoring surveys were that the Abel Mine operations were inaudible at the monitoring locations with noise attributable to non-mine related traffic, birds, cricket, insect and frog noise, wind and other extraneous sources. Notably, the June, September and December monitoring events were undertaken whilst the Abel Mine was under care and maintenance. As the Abel operations were inaudible at all locations during all monitoring events, compliance with relevant noise criteria was considered to have been achieved.

Night time sleep disturbance criteria ($LA1_{(1min)}$) were also in compliance during all monitoring events with the Abel mine being inaudible at all locations during all monitoring events.

Reportable Incidents

No reportable incidents were recorded during the reporting period.

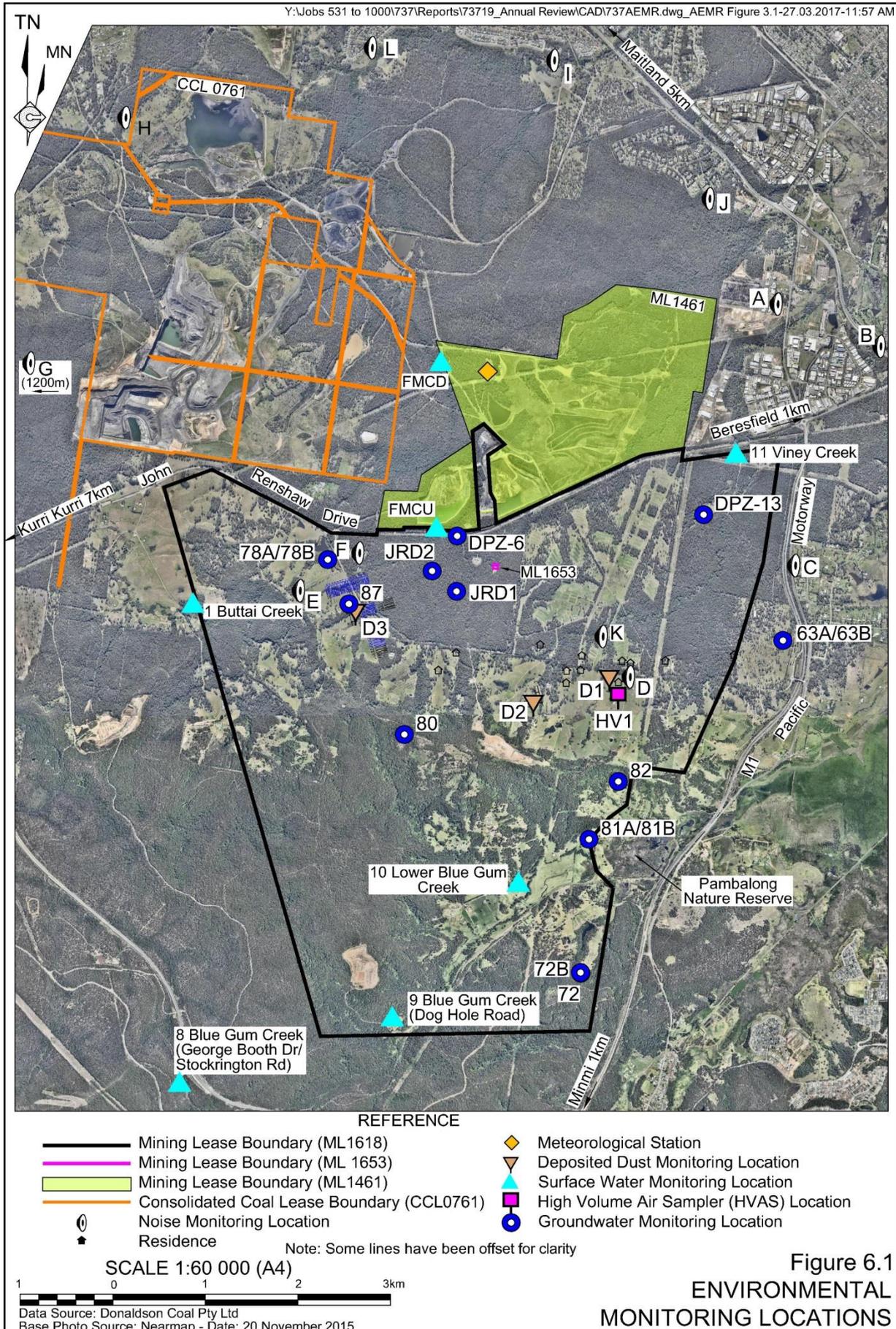


Figure 6.1
ENVIRONMENTAL
MONITORING LOCATIONS

Table 6.3
Summary of Attended Noise Monitoring Results – 2016

Location [#]	Time	Noise Criteria	Attended Monitoring	Noise generated by Abel Mine
D Black Hill School, Black Hill	Day (L _A eq (15 min))	35	NA	Operations inaudible at all times
	Evening (L _A eq (15 min))	35	NA	Operations inaudible at all times
	Night (L _A eq (15 min))	35	NA	Operations inaudible at all times
	Night (L _{A1} (1min))	45	NA	Operations inaudible at all times
F Black Hill Rd, Black	Day (L _A eq (15 min))	35	NA	Operations inaudible at all times
	Evening (L _A eq (15 min))	35	NA	Operations inaudible at all times
	Night (L _A eq (15 min))	35	NA	Operations inaudible at all times
	Night (L _{A1} (1min))	45	NA	Operations inaudible at all times
G Buchanan Rd, Buchanan	Day (L _A eq (15 min))	35	NA	Operations inaudible at all times
	Evening (L _A eq (15 min))	35	NA	Operations inaudible at all times
	Night (L _A eq (15 min))	35	NA	Operations inaudible at all times
	Night (L _{A1} (1min))	45	NA	Operations inaudible at all times
I Lord Howe Drive, Ashtonfield	Day (L _A eq (15 min))	36	NA	Operations inaudible at all times
	Evening (L _A eq (15 min))	36	NA	Operations inaudible at all times
	Night (L _A eq (15 min))	36	NA	Operations inaudible at all times
	Night (L _{A1} (1min))	45	NA	Operations inaudible at all times
J Parish Drive, Thornton	Day (L _A eq (15 min))	35	NA	Operations inaudible at all times
	Evening (L _A eq (15 min))	35	NA	Operations inaudible at all times
	Night (L _A eq (15 min))	35	NA	Operations inaudible at all times
	Night (L _{A1} (1min))	45	NA	Operations inaudible at all times
L 7 Kilshanny Av, Ashtonfield	Day (L _A eq (15 min))	40	31*	Abel not audible Bloomfield CHPP 30-32
	Evening (L _A eq (15 min))	40	NA	Operations inaudible at all times
	Night (L _A eq (15 min))	40	NA	Operations inaudible at all times
	Night (L _{A1} (1min))	47	NA	Operations inaudible at all times

* Associated with operations at the Bloomfield CHPP NA – Not able to be calculated as operations inaudible at all times
See **Figure 6.1**

Further Improvements

Other than ongoing plant maintenance and noise monitoring (both attended and unattended), no other improvements are planned during the next reporting period. Given the results of previous noise monitoring and the placement of the Abel Mine into care and maintenance it is intended to seek a reduction in noise monitoring frequencies until such time as operational activities recommence.

6.4 BLASTING

No blasts were undertaken during the reporting period.

6.5 AIR QUALITY

Environmental Management

Management of air quality during the reporting period included watering of access roads as required and maintenance of mobile equipment and on-site vehicles (including during care and maintenance) to reduce greenhouse and particulate emissions.

Environmental Performance

Monthly deposited dust monitoring was undertaken by the Company at a total of three locations surrounding and relevant to the Abel Mine. Total Suspended Particulates (TSP) and Particulate Matter <math><10\mu\text{m}</math> (PM₁₀) monitoring was also undertaken at the existing High Volume Air Sampling (HVAS) station located approximately 2 300m southeast of the surface infrastructure area at Blackhill (located at Site D1). Locations of deposited dust and suspended particulate (high volume air sampling) monitoring are shown on **Figure 6.1** and results are summarised in **Table 6.4** and **Figures 6.2, 6.3** and **6.4**.

Table 6.4
Deposited Dust Monitoring Results – 2016[^]

Month	Monthly Dust Deposition Rate (g/m ² /month)					
	D1		D2		D3	
	Insoluble	Ash	Insoluble	Ash	Insoluble	Ash
January	0.9	0.7	0.5	0.3	0.6	0.3
February	0.5	0.3	0.5	0.3	0.7	0.5
March	0.3	0.3	0.4	0.4	1.0	1
April	0.4	0.2	0.5	0.4	1.4	0.7
May	0.4	0.3	0.4	0.3	0.6	0.3
June	0.3	0.2	0.5	0.4	0.8	0.5
July	0.3	0.1	0.2	0.1	0.9	0.6
August	0.5	0.2	0.5	0.3	4.2	2.2
September	0.4	0.2	0.4	0.2	1.1	0.7
October	0.5	0.4	0.6	0.3	0.8	0.4
November	0.6	0.5	0.5	0.3	2.9	1.2
December	1.0	0.7	1.3	0.8	3.6	1.7
Monthly Minimum	0.30	0.10	0.20	0.10	0.60	0.30
Monthly Maximum	1.00	0.70	1.30	0.80	4.20	2.20
Average	0.51	0.34	0.53	0.34	1.55	0.84

Source: Donaldson Coal Pty Ltd. [^] Historical data included in **Appendix 2**

Deposited Dust

The highest monthly dust deposition measurement was 4.2g/m²/month (insoluble solids) at D3 and occurred in August 2016. Although this sample was not listed as contaminated the ash content was 2.2g/m²/month indicating that the inorganic component (e.g. bird droppings, insects, leaves etc.) equated to nearly half of the deposited material (See **Table 3.2**). Given that August 2016 dust deposition at D1 and D2 were both 0.5g/m²/month, the slightly elevated result at D3 is likely to be a localised event.

The annual average monthly deposition rates for the reporting period were between 0.51g/m²/month and 1.55g/m²/month which is significantly below the criteria of 4g/m²/month, indicating good air quality with respect to dust deposition.

Since commencement of the Abel operations, the rolling annual average deposited dust levels have remained low although spikes are evident due to local events. When accounting for such events, no specific trends are evident at D1 and D2. The previously identified increase in deposited dust levels at D3 between 2012 and 2015 has reversed with a substantial drop in the rolling annual average. This is principally due to low deposited dust levels having been recorded from January to July 2016 which are more consistent with levels recorded at D1 and D2.

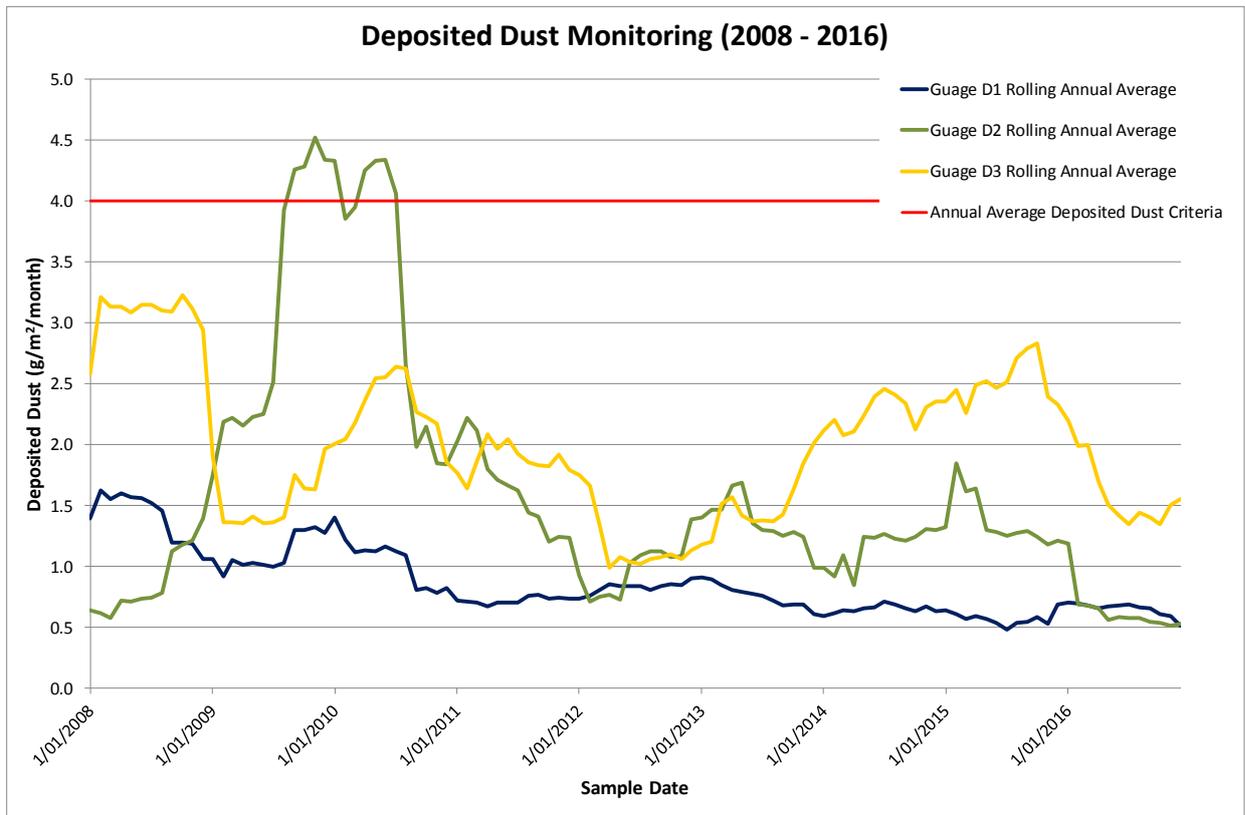
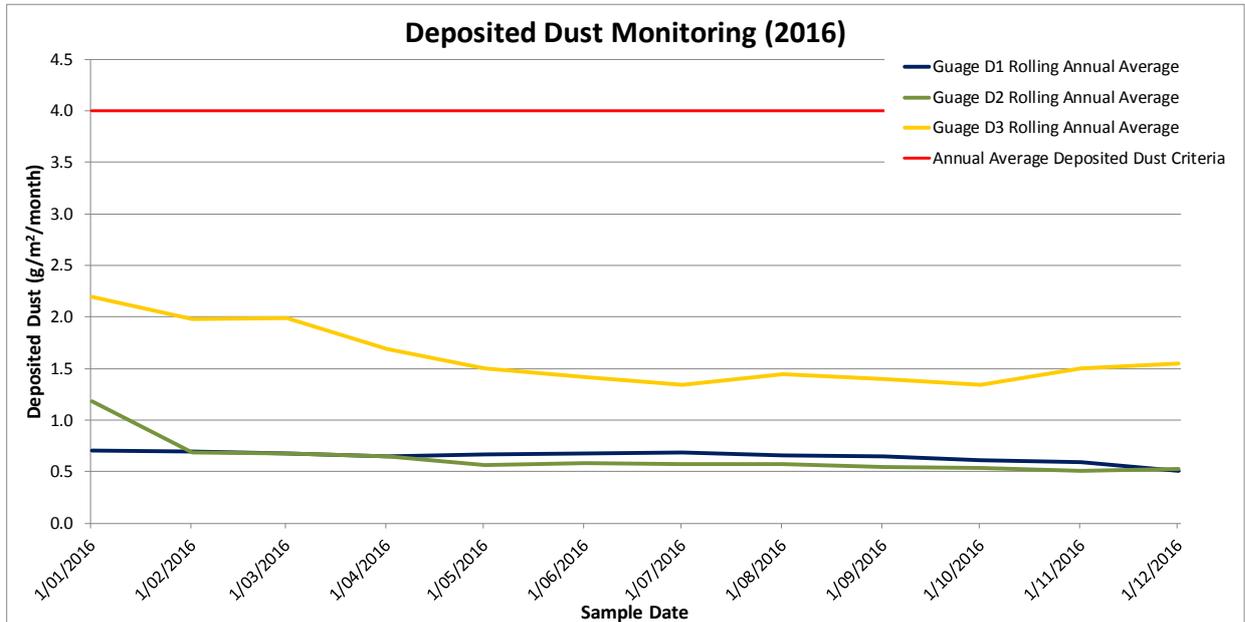


Figure 6.2 Deposited Monitoring Results

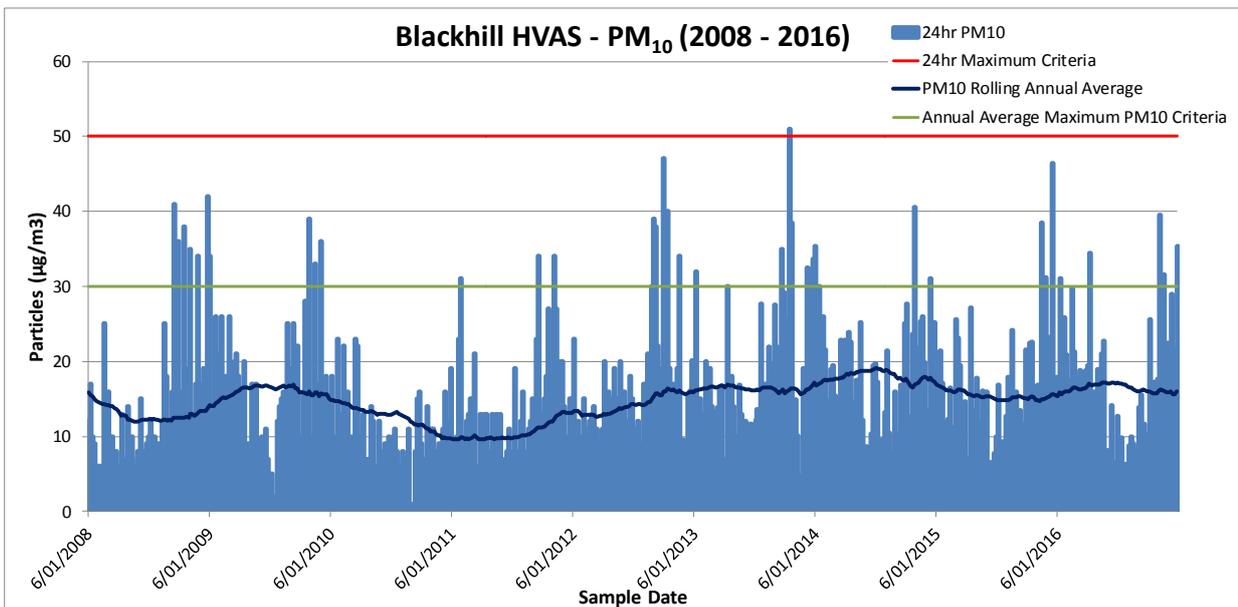
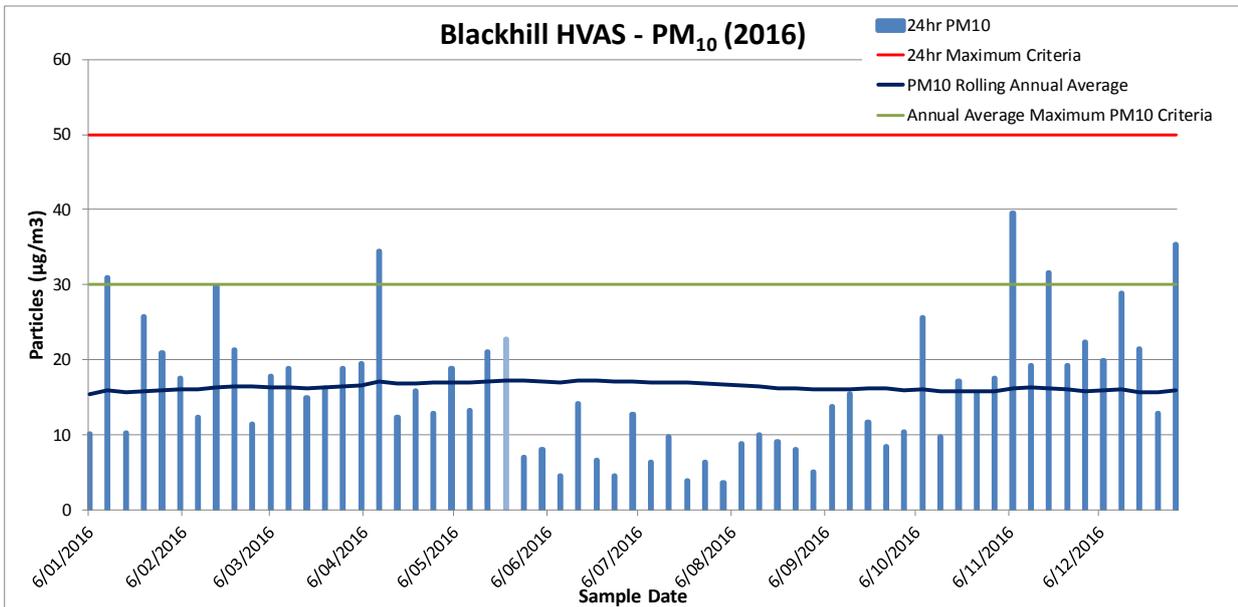


Figure 6.3 PM₁₀ Monitoring Results

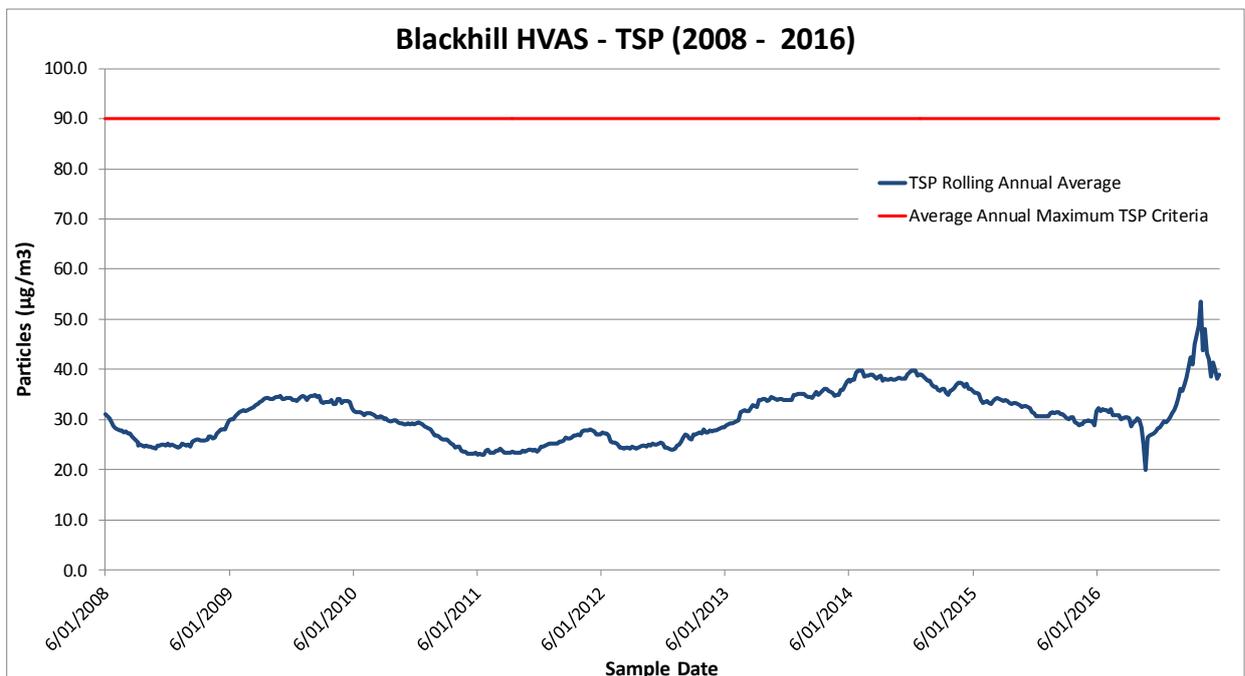
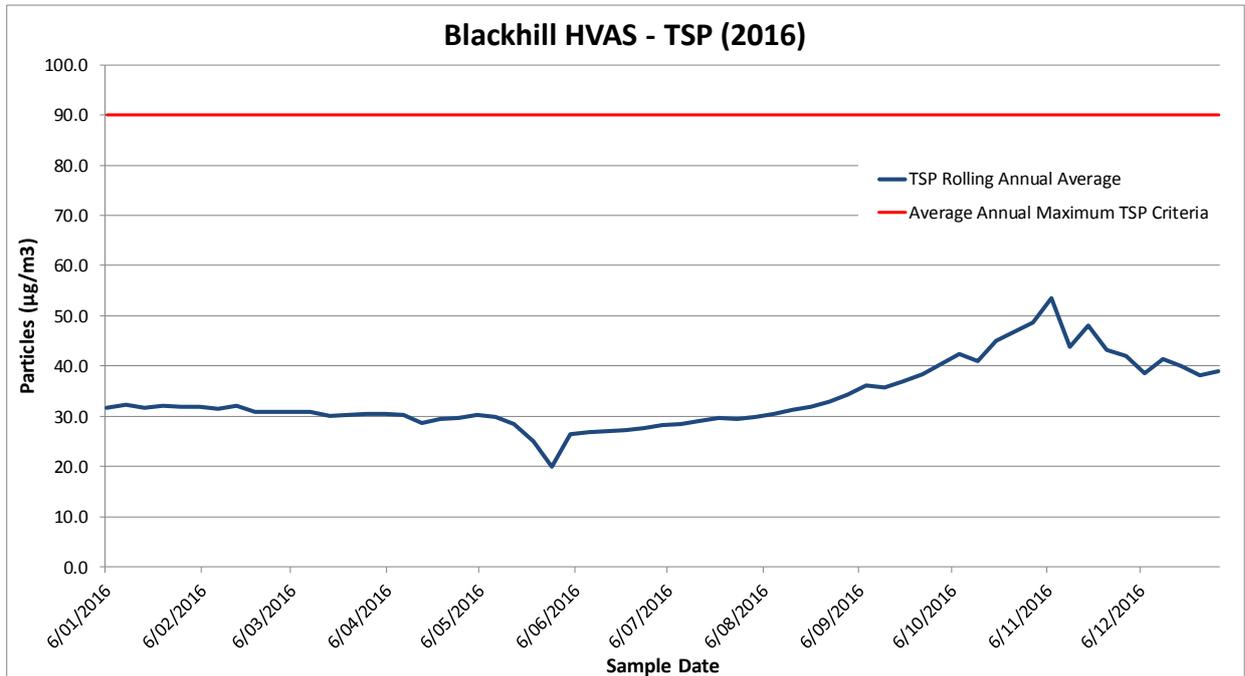


Figure 6.4 TSP Monitoring Results

The previous increase was thought to be as a result of a period of increased activity in the area, principally relating to residential vehicle traffic on unsealed roads and parking areas. There is no evidence that mining activities have influence the deposited dust levels at D3.

Suspended Particulates – PM₁₀ & TSP

The suspended particulate monitoring results show that the highest 24-hour average PM₁₀ concentration was 39.5µg/m³, measured on 7 November 2016 which is below the 50µg/m³ 24-hour *National Environment Protection Measures* (NEPM) goal.

The annual average PM₁₀ concentration for Blackhill was 15.9µg/m³ for the 12 months to 31 December 2016 whilst the annual average TSP concentration was 30.7µg/m³. The annual monitoring results also indicate that suspended particulate concentrations are well below the annual average criteria of 30µg/m³ and 90µg/m³ respectively.

Excepting an annual trend of lower 24-hour average PM₁₀ during the winter months and higher 24-hour averages during the summer months, no long-term trends are currently apparent. Similarly, the rolling annual averages for PM₁₀ and TSP have fluctuated higher or lower by approximately 5µg/m³ and 10µg/m³ respectively (see **Figure 6.3** and **6.4**). However, the annual averages remain very similar to the long-term averages (from 1 January 2008) of 14.8µg/m³ and 30.4µg/m³ respectively.

Reportable Incidents

No reportable incidents relating to air pollution occurred during the reporting period.

Further Improvements

No other improvements relating to air pollution are planned or considered necessary.

6.6 BIODIVERSITY

Environmental Management

Underground workings occurred wholly or partly beneath four dams of habitat value during the reporting period, namely Dams 9 (first workings only), 11, 30, and 59 (secondary workings). No mining was undertaken during the reporting period within areas that would lead to subsidence under or near the Pambalong Nature Reserve or under sub-tropical rainforest. Hence, no specific flora or fauna management measures were required above these areas.

Environmental Performance

Ongoing survey work was completed by Kleinfelder Australia Pty Ltd during the reporting period as part of the Dam Monitoring and Management Plan, Sub-tropical Rainforest Monitoring Plan and Pambalong Nature Reserve Monitoring Plan (see **Appendices 3, 4** and **5**).

Macroinvertebrate sampling also continued to be undertaken within Blue Gum Creek upstream of the Pambalong Nature Reserve by Niche Environment and Heritage during Spring and Autumn 2016 (see **Appendix 6**). A summary of the principal results is provided as follows.

Macroinvertebrate – Blue Gum Creek

Macroinvertebrate surveys have been undertaken within Blue Gum Creek at Stockrington Road and Dog Hole Road since 2009 and 2008 respectively. Monitoring during the reporting period included an assessment of Riparian Channel Environmental (RCE) ranking and aquatic ecology diversity (utilising the SIGNAL index).

At the upstream site the RCE rankings were 39 and 40 during the 2016 Autumn and Spring surveys respectively and at the downstream site 39 and 32. RCE scores above 40 reflect a stream in good condition, between 20 and 40 reflect a stream in moderate condition and below 20 indicates a stream in poor condition. The 2016 RCE rankings are consistent with previous monitoring events which range from 33 to 40.

Table 6.5 provides a summary of the biological characteristics recorded during monitoring undertaken to date. It is noted that the use of the SIGNAL2 index was adopted in 2015 and results in a lower score than the original SIGNAL index utilised in previous monitoring.

Table 6.5
Summary of Biological Characteristics (Macroinvertebrates)

Parameter	Date	Blue Gum Creek at Stockrington Road (upstream)	Blue Gum Creek at Dog Hole Road (downstream)	
Number of Taxa	01/08/08	-	22	
	20/05/09	29	25	
	16/11/09	20	22	
	27/04/10	-	11	
	14/12/10	33	35	
	01/04/11	24	20	
	18/10/11	24	16	
	12/04/12	-	23	
	01/11/12	28	20	
	21/03/13	10	12	
	29/09/13	22	16	
	24/03/14	9	8	
	15/09/14	20	13	
	12/06/15	17	16	
	07/10/15	15	2	
03/03/16	15	20		
08/09/16	22	5		
SIGNAL Index	01/08/08	-	5.1	
	20/05/09	5.7	5.8	
	16/11/09	4.6	4.6	
	27/04/10	-	3.4	
	14/12/10	4.7	4.7	
	01/04/11	4.7	4.4	
	18/10/11	5.0	5.3	
	12/04/12	-	5.6	
	01/11/12	4.4	5.0	
	21/03/13	4.9	5.6	
	29/09/13	4.8	5.3	
	24/03/14	4.8	3.2	
	15/09/14	5.2	4.8	
	SIGNAL2 (weighted) Index	12/06/15	4.45	4.1
		07/10/15	3.29	3.17
03/03/16		3.75	3.76	
08/09/16		3.98	2.73	

Source: Niche Environment & Heritage and Robyn Tuft Associates

The upstream and downstream SIGNAL scores during both Autumn and Spring were <4 which is considered poor and potentially the result of pollution from erosion, siltation, weeds and elevated salinity. Despite the SIGNAL scores, sensitive mayfly taxa (Leptophlebiidae) were recorded both upstream and downstream.

Overall, Blue Gum Creek appears degraded and in poor stream health with the presence of weeds, rubbish and significant erosion at the upstream site and weeds and disturbance from vegetation removal at the downstream site. This poor stream health is unrelated to the Able or Tasman mining operations and is more likely related to disturbance factors such as roadways, agriculture, and past high flow events. Given these other disturbance sources, the ongoing monitoring program will be reviewed to determine whether the current monitoring sites remain appropriate locations.

Dam Monitoring

Over time, the number of participants (land holders) with surveyed dams has declined due to a range of factors including lack of interest and changing ownership. In 2016, only 44 dams were surveyed for amphibians out of a possible 65 dams surveyed in 2008, only two out of the four dams were surveyed for Blue-billed Duck, and only 51 dams out of the original 87 were surveyed for *Maundia triglochinos*.

Species diversity and composition data for frogs, in addition to abundance for water-dependent bird species, were recorded at each of the targeted dams for the 2016 survey.

No frog species listed as threatened under State or Commonwealth legislation were recorded during field surveys. A total of eight species of frog were detected across all dams during the 2016 surveys, consistent with the 2015 surveys. There remains a general pattern of decline in total frog species recorded since 2011 (see **Figure 6.5**) which, following statistical analysis, appears to be correlated to average temperature in the 3 months preceding the survey but is not correlated to rainfall.

A total of 63 bird species, including 23 waterbirds and 40 woodland/forest birds have been recorded between 2008 and 2016 across all of the dams surveyed. The 2016 surveys detected 20 species (9 waterbirds and 11 woodland/forest birds) across the two dams. Notably, the diversity and abundance of waterbirds has been relatively constant over the survey years whilst woodland/forest birds have fluctuated. Whilst woodland/forest bird diversity recorded in 2016 has declined compared to the high levels recorded in 2015, the 2016 results are equal to or slightly above the average recorded since 2008 (**Appendix 3**). The high diversity of woodland/forest birds in 2015 was considered an anomaly and may have been due to increased bird activity following the cessation of a major rain event. This fluctuation as a result of rainfall prior to surveys has also been observed throughout the previous surveys. In summary, Kleinfelder (2017) concludes “*these results suggest that activity at the Abel underground mine has not had a negative impact on bird diversity at either of these dams*”.

No individuals of the threatened plant, *Maundia triglochinos* were identified. However, Water Hyacinth, a Class 3 listed noxious aquatic weed was identified in 10 dams. A range of other weeds were also detected including Pampas Grass (three dams), Blackberry (11 dams), Lantana (nine dams), and Crofton Weed (five dams).

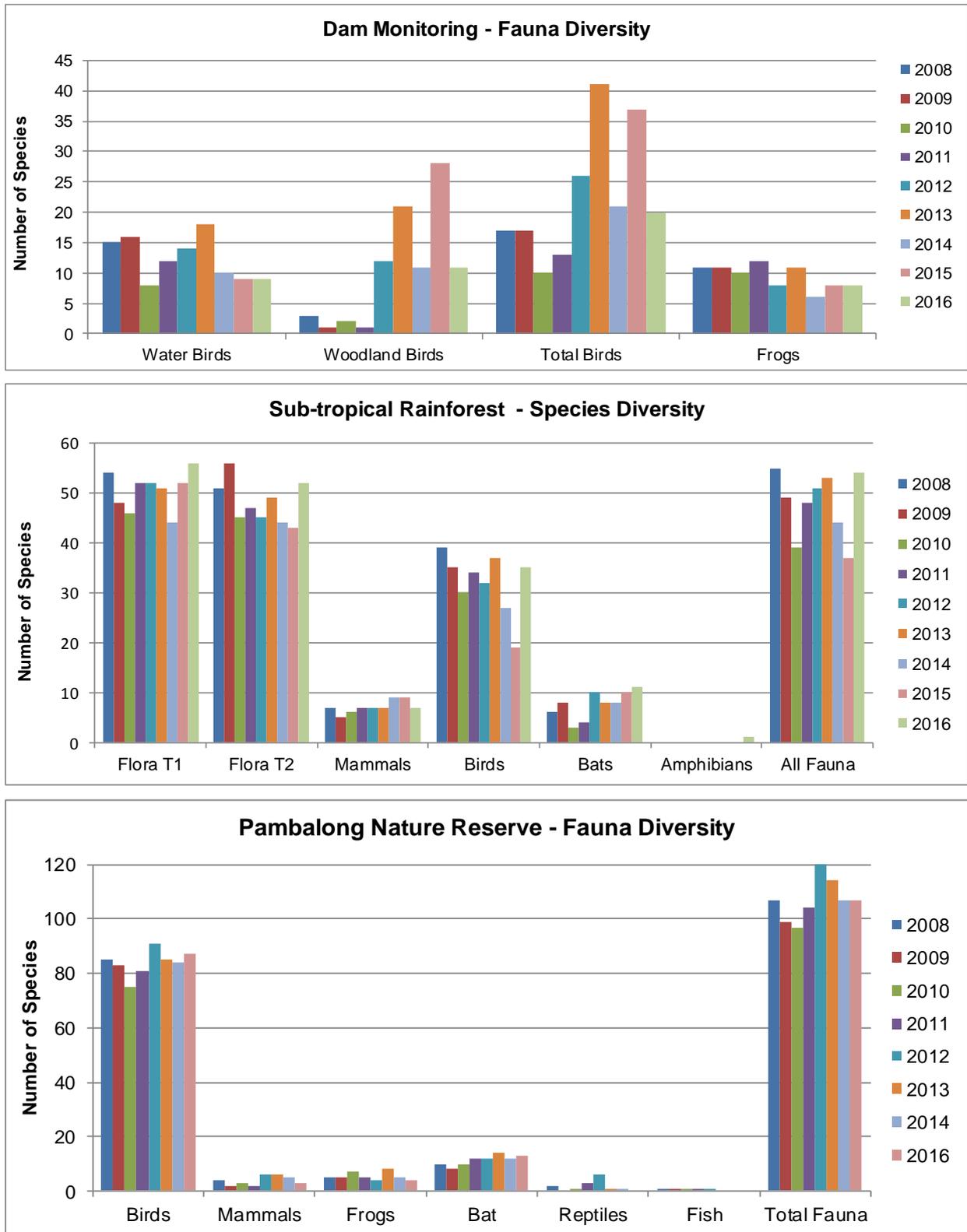


Figure 6.5 Selected Ecological Monitoring Results

Water level and quality monitoring (for pH and Electrical Conductivity) within dams that could potentially be affected by mining induced subsidence is undertaken pre and post mining in accordance with the individual property and dam management plans.

Sub-tropical Rainforest Monitoring

Annual monitoring has been conducted at Long Gully Creek for the past 9 years (2008 to 2016). The Subtropical Rainforest Monitoring Plan (SRMP) is designed to examine the stability of the rainforest/dry forest interface and floristic and faunal diversity. Whilst these areas have not yet been undermined, the information collected will allow best practice measures to be incorporated into the future Subsidence Management Plan(s) to be developed for this area.

The 2016 sub-tropical rainforest monitoring recorded an increase in floral diversity at both transects compared 2015 monitoring and a slight increase compared to the 2008 baseline monitoring (see Figure 6.5). Specifically 56 and 52 flora species were identified along each of the two monitoring transects in 2016 compared to 54 and 51 species in 2008. No threatened flora species were recorded during the survey.

The area of transition between dry and moist forest at Transect 1 has continued to expand since the 2008 baseline survey, with the width of the moist forest increasing. Specifically, along Transect 1, particularly at the end of the transect, there has been an increase in the number of moist species recorded and a decline in the number of dry species within each 5m segment. A similar increase in moist versus dry species compared to the baseline study was also recorded on Transect 2, albeit to a lesser extent than Transect 1. The reduction in the occurrence of Lantana, particularly along Transect 1 has contributed to the reduction in dry species.

Along both Transect 1 and Transect 2 there has been a decline in Foliage Projection Cover (FPC) since the 2008 baseline survey. However, this is not an isolated occurrence in the current survey. When data from the 2016 survey are compared to that of the 2009 survey, the total FPC along both transects is relatively similar. Whilst severe storms occurred around Newcastle in 2015, which has likely reduced canopy cover, reduced levels of ground, shrub and midstorey cover since the baseline survey may reflect natural loss in vegetation between periods of disturbance, such as the lack of fire disturbance over a prolonged period.

In total, 54 fauna species were recorded, the equal highest number of total fauna species recorded since 2008 and above the annual average of 48 species. The recorded species comprised five arboreal mammal species, two terrestrial mammal species, one amphibian species, 11 bat species and 35 bird species. Eight of these species, the Sooty Owl, Powerful Owl, Koala, Greater Glider and four insectivorous bat species are listed as vulnerable under the TSC Act and/or the Environmental Protection and *Biodiversity Conservation Act 1999* (EPBC Act). No reptiles were recorded and only one feral species (*Rattus rattus*) was recorded.

The 2016 survey recorded the highest number of bat species since monitoring began in 2008. The number of bird species have increased to above the average of 32 species since the decline observed in 2015. Similar numbers of arboreal and terrestrial mammal species were recorded compared to previous years.

The Powerful Owl was recorded for the second year in a row since being last recorded in 2012. Comparing the presence/absence of gliders and owls shows a fluctuating pattern that might suggest that the Powerful Owls are regulating the Greater Glider population within the study

area and move throughout their territory as foraging efficiency becomes unprofitable. The return of Powerful Owls to the study area may coincide with an increase in glider numbers over the past few years. Further monitoring will show if this pattern continues over time.

No undermining of sub-tropical rainforest occurred during the reporting period or will occur for a number of years. The data collated continues to contribute to the baseline data set.

Pambalong Nature Reserve Monitoring

Whilst no mining occurred which could potentially impact upon the Pambalong Nature Reserve, monitoring was undertaken as part of the Pambalong Nature Reserve Monitoring Plan. The 2015/2016 survey represents the eight year of baseline monitoring. The monitoring plan is aimed at building a picture of what constitutes normal variation so that any impacts from mining in the future can be identified, should they occur.

During the 2015/2016 survey a total of 107 fauna species consisting of 87 birds, three terrestrial mammals, 13 bats, and four frogs. Of these, six microbat species and two bird species, are listed as threatened under the TSC Act and four species are introduced species.

No significant changes to the vegetation community extent and no additional flora species were recorded. A total of 190 flora species having been recorded since survey commenced in 2008, of which 68 are introduced species.

Reportable Incidents

No reportable incidents were recorded during the reporting period.

Further Improvements

Ongoing monitoring will continue to provide information to assist in assessing any potential impacts from future subsidence and in formulating the subsidence management plans. Prior to the recommencement of mining operations, relevant dams will be reassessed for frog habitat to account for changes such as eutrophication from stock, fertiliser applications or other farming practices as opposed to changes resulting from mining.

As recommended by Niche Environment and Heritage, consideration will also be given to the need for ongoing aquatic monitoring within Blue Gum Creek and/or whether the monitoring program is continued in its current form.

6.7 HERITAGE

All mining during reporting period occurred within SMP Area 4 with secondary workings undertaken within Panels 28, 30, and 31.

Within SMP Area 4 there are six sites (four open artefact sites, a scarred tree and cultural place) located above Panels 27, 29, 32 and the West Mains (see **Figure 4.2**). Previous heritage assessment has predicted no impacts to these sites, however, one of these sites, 38-4-0670, a previously identified scarred tree, is a specified sample monitoring site for sites which no subsidence-related impacts are expected to occur. Attempts were made to re-survey the site during the July 2015 heritage survey, however, it could not be found.

Given that no workings occurred within the relevant panels during the reporting period, no impacts to the identified Aboriginal heritage sites would have occurred.

In accordance with the August 2014 *Abel Underground Mine: Aboriginal Heritage Management Plan* (Donaldson Coal, 2014), annual reporting documenting the results of monitoring undertaken in accordance with the plan will be prepared and provided to either the Mindaribba or Awabakal Local Aboriginal Land Councils (LALCs) (as applicable to the area monitored), DPE and OEH. Given that no mining was undertaken within panels relevant to the identified heritage items during the 2016 reporting period, no specific monitoring was completed. The first of the annual reports is therefore planned following the recommencement of mining operations.

6.8 SUBSIDENCE

Environmental Management

To date four Subsidence Management Plan (SMP) areas have been prepared for the mine (see **Figure 4.1**). All mining during the reporting period occurred within SMP Area 4. As part of each SMP, subsidence monitoring programs have been prepared together with required environmental and public safety management plans. Copies of all relevant SMP assessment reports and management plans are available on the Company's website.

Environmental Performance and Further Improvements

During the reporting period secondary workings were undertaken within Panels 28, 30, and 31. **Table 6.6** provides a summary of the SMP approval, extraction commencement and extraction completion dates for all panels worked to during the reporting period.

Subsidence monitoring has been conducted over all these panels in accordance with the monitoring program included within the approved SMP. Monitoring has included survey assessment, photographic monitoring and visual inspections. **Table 6.6** provides a comparison of the surveyed subsidence levels against predicted levels for panels within which extraction occurred during this reporting period. A comparison for all panels completed to date is provided within the Subsidence Management Reports (see **Appendix 7**).

Table 6.6
Panel Approval and Extraction Summary

Panel	SMP Approval Date	Extraction Commenced	Extraction Completed
Panel 28	19 September 2014	11 May 2015	3 February 2016
Panel 30	19 September 2014	22 June 2015	28 April 2016
Panel 31	19 September 2014	25 February 2016	28 April 2016

Source: Donaldson (2017)

Table 6.7
Predicted versus Measured Subsidence Levels – 2016

Panel	Monitoring Parameter	SMP Prediction	Final Measured
Panel 28	<190m Cover		
	Subsidence	1 400mm	1,286mm
	Tensile Strain	30mm/m	1mm/m
	Compressive Strain	30mm/m	9mm/m
Panel 30	< 200m Cover		
	Subsidence	1 400mm	1,131mm
	Tensile Strain	30mm/m	11mm/m
	Compressive Strain	30mm/m	11mm/m
Panel 31	<200m Cover		
	Subsidence	1 400mm	307mm
	Tensile Strain	30mm/m	6mm/m
	Compressive Strain	30mm/m	7mm/m
Source: Donaldson Coal (2017)			

All final measurements for subsidence, tilt and strain results for panels completed during the reporting period were within the predicted range.

During the reporting period a range of additional subsidence monitoring was undertaken in accordance with the approved monitoring programs including regular visual inspections and photographic monitoring. A summary of the outcomes of this monitoring and any actions taken is outlined as follows.

- Surface cracking occurred above the worked panels within vegetated areas, cleared areas, private access tracks, and local government road. Surface cracking remained within predictions and remedial works were completed in consultation with the relevant landowners and infrastructure owners.
- Impacts to Blackhill Road were within predictions and the infrastructure remained within a safe and serviceable condition.
- All subsidence impacts on the Hunter Water Corporation Waterline, Ausgrid Powerlines and TransGrid Transmission Towers were within predicted levels with no subsidence impacts or management actions required during the reporting period.
- There have been no other observed and/or reported subsidence impacts, incidents, service difficulties, community complaints during the reporting period that would require notification under the SMP approvals or plans.

Monitoring including subsidence surveys and photographic and visual monitoring will be continued in accordance with the approved Subsidence Management Plans.

6.9 WASTE MANAGEMENT

In accordance with *Schedule 3, Condition 25* of Project Approval 05_0136, a summary of waste management during the reporting period is provided as follows.

Wastes generated on site during the reporting period included the following.

- Waste rock / unprocessable weathered coaly material.
- Greases, oils, filters, tyres and batteries from maintenance of vehicles and equipment.
- Bulk scrap metal and plastics from discarded equipment.
- General office wastes, e.g. paper.
- General waste generated by employees, e.g. food scraps, paper, cardboard, aluminium and steel cans.
- Wastewater and sewage from bathhouses.

Fine and coarse rejects were also generated at the Bloomfield CHPP.

As shown in **Table 4.1**, approximately 500m³ of waste rock and unprocessable coaly material was removed within the reporting period during formation of underground roadways. All waste rock and unprocessable coaly material was removed using haul trucks and placed within the West Pit in accordance with the approved final landform.

Waste oil was stored within 205L drums, 1 000L IBCs or the waste oil tank within the oil store before being removed from site, along with used oil filters and oily rags, by J R Richards & Sons. Excess waste oil drums that were stored external to bunded areas were removed and a purpose built bunded storage container is now also utilised to ensure adequate bunded storage is available. Used tyres are removed from site during servicing by Marathon Tyres Pty Ltd for repair or disposal.

Paper, cardboard, steel, aluminium and any other recyclable material was stored separately in 1.5m³ and 3.0m³ skip bins for recycling. Paper, cardboard and general waste material continued to be collected by J R Richards & Sons on a weekly basis whilst scrap metal was also collected by J R Richards & Sons on an as-needs basis. The scrap steel/drum crusher continued to be used.

All general wastes were stored in skip bins and removed by J R Richards & Sons. All wastewater (greywater) and sewage generated within the on-site bathhouses was treated using the sewage treatment system with treated water being transferred to the Big Kahuna Dam. The treatment system was approved by Council on 24 August 2011.

The approximate volume of each waste stream generated during the reporting period is presented in **Table 6.8** together with the proportion of waste recycled. The proportion of waste recycled increased from 27.28% in 2015 to 71.61% in 2016, largely due to the increased volume of steel recycled in 2016 as a result of the fact that the site was placed under care and maintenance.

Table 6.8
Approximate Waste Volumes during 2016

Waste Stream	Total Volume (kg)	Volume (kg) per 1 000t ROM Coal
Effluent (Off Site)	43 500	164
Waste Oil & Oil Filters	6 454	24
Paper & Cardboard	1 960	7
Scrap Steel	116 560	439
Timber	4 560	17
Other wastes	448	2
Mixed Solid Waste	67 595	255
Total Waste (kg)	241 077	908
Recycled Waste	172 633	650
Recycling %	71.61%	71.61%

As part of the Company's Environmental Management Strategy, it is a requirement for contractors and employees to minimise waste generation wherever possible and to dispose of all waste in a satisfactory manner. Waste volumes will continue to be monitored into the future and opportunities to minimise waste or increase recycling implemented, where appropriate.

7. WATER MANAGEMENT

7.1 WATER TAKE

Water Licence 20BL171935 issued for the Abel Mine operation provides for up to 500ML of water take annually. The Abel Mine is not actively dewatered in advance of mining, rather passive inflows occur into the mine workings and are transferred from active mining areas to completed mine workings or to the surface.

The net groundwater inflow volume has been estimated to be 220.5ML for the current water year 01 July 2015 to 30 June 2016 (see **Table 7.1**). Further detail regarding estimated groundwater inflows is provided in Section 7.3 and **Appendix 8**. No take of water from the overlying alluvial aquifers has occurred to date.

Table 7.1
Water Take – 1 July 2015 to 30 June 2016

Water Licence #	Water sharing plan, source, and management zone	Entitlement	Passive take/inflows	Active pumping	Total
20BL171935	Not Applicable to water year – issued and regulated under <i>Water Act 1912</i> *	500ML	220.5ML	0	220.5ML
Source: Appendix 8 – Figure 18					
* The <i>Water Sharing Plan for the North Coast Fractured and Porous Rock Groundwater Sources 2016</i> commenced 1 July 2016 and will be applicable to the 2016/2017 water year. However, the existing water licence has not yet been transferred to a Water Access Licence as regulated by the <i>Water Management Act 2000</i> .					

No compensatory water been required to be supplied throughout the life of the mine.

7.2 SURFACE WATER

Environmental Management

As part of the Water Management Plan, Abel Mine transfers water off site to the Big Kahuna Dam and then to Bloomfield CHPP, as required. Surface water monitoring sites specified for the Abel Mine are aimed at detecting indirect impacts such as from underground mining activities and activities in the surface infrastructure area. Monitoring at Sites FMCU and FMCD commenced prior to the commencement of the Abel Mine and serve to provide baseline data. Monitoring at Sites 1, 8, 10 and 11 commenced in 2006 and provide baseline data and can also be used to assess impacts attributable to the Abel Mine.

Environmental Performance

Surface water monitoring data for the reporting period is summarised in **Table 7.2** and presented graphically in **Figure 7.1** with the full graphical presentation since 2008 presented in **Figure 7.2** and data set provided in **Appendix 2**. It is noted that monitoring at additional sites identified within the Integrated Environmental Monitoring Program incorporating the Abel Mine, Donaldson Mine, Tasman Underground Coal Mine and Bloomfield Colliery were undertaken and will be reported within their respective Annual Reviews.

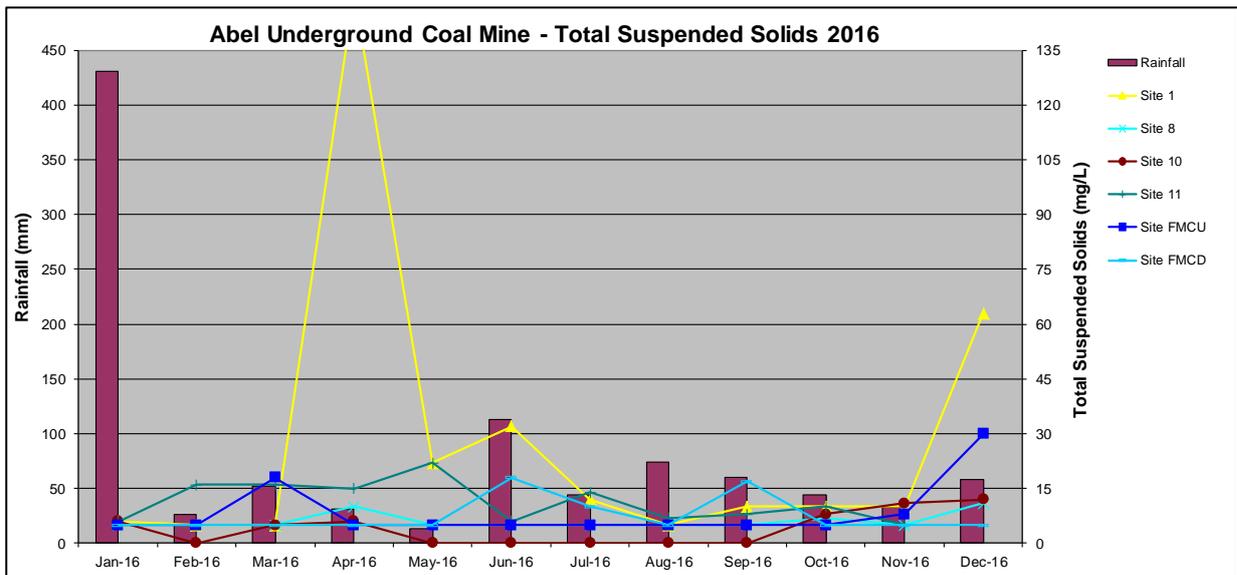
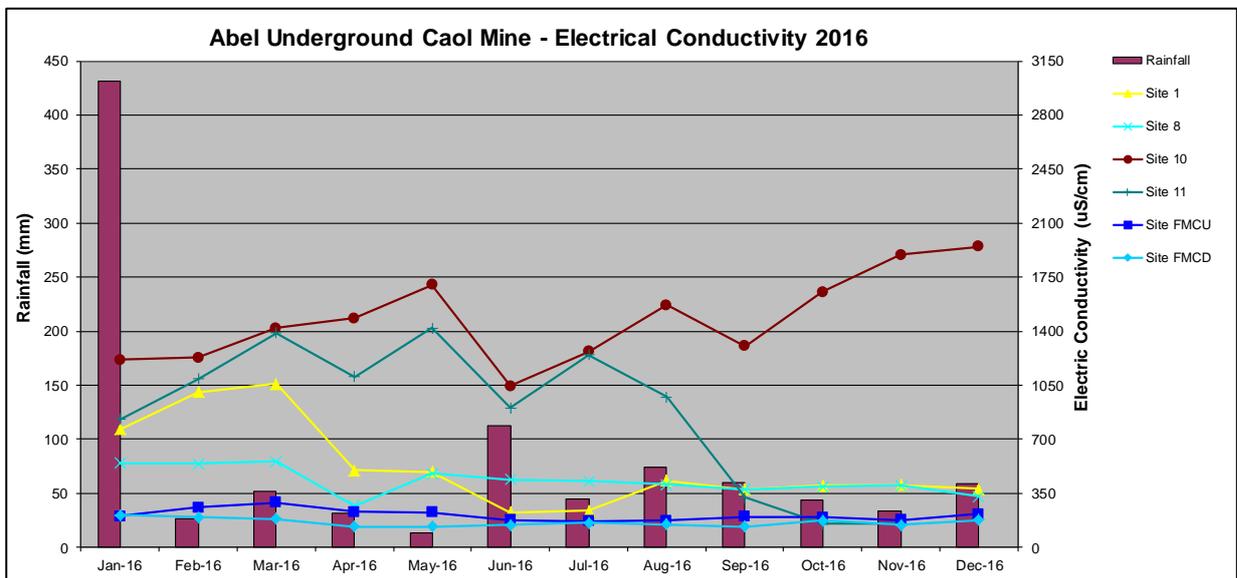
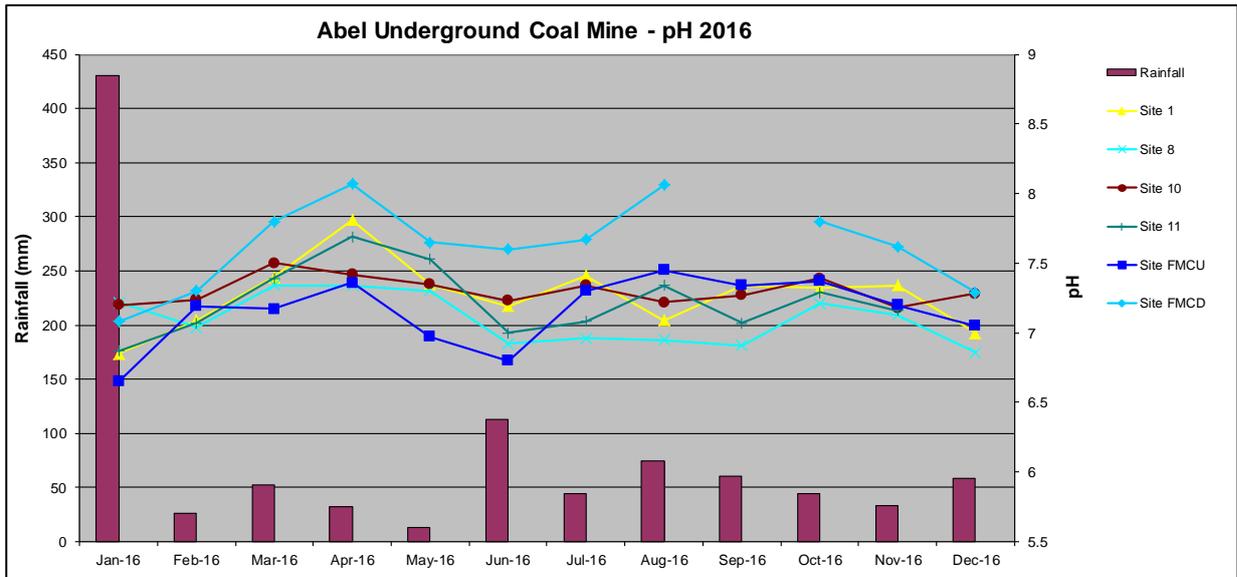


Figure 7.1 Surface Water Quality Monitoring Results – 2016

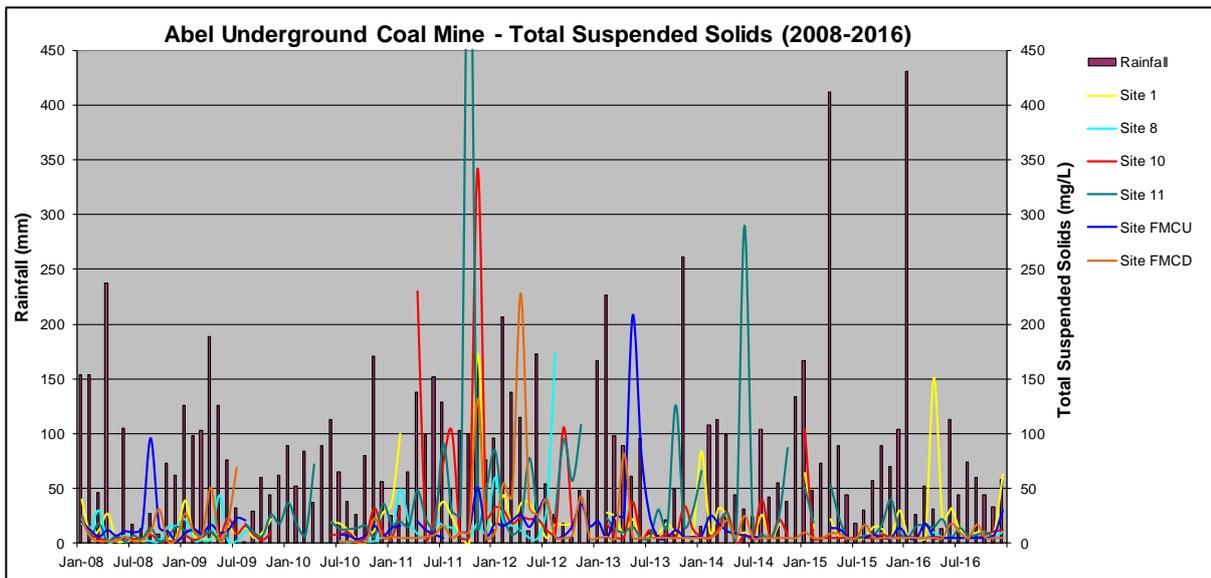
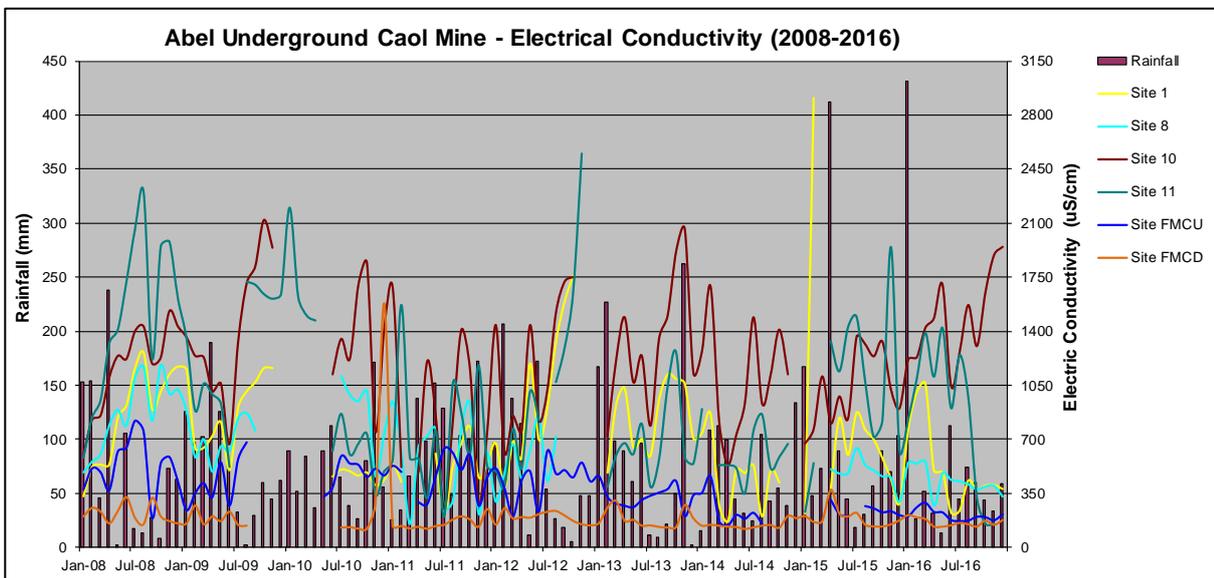
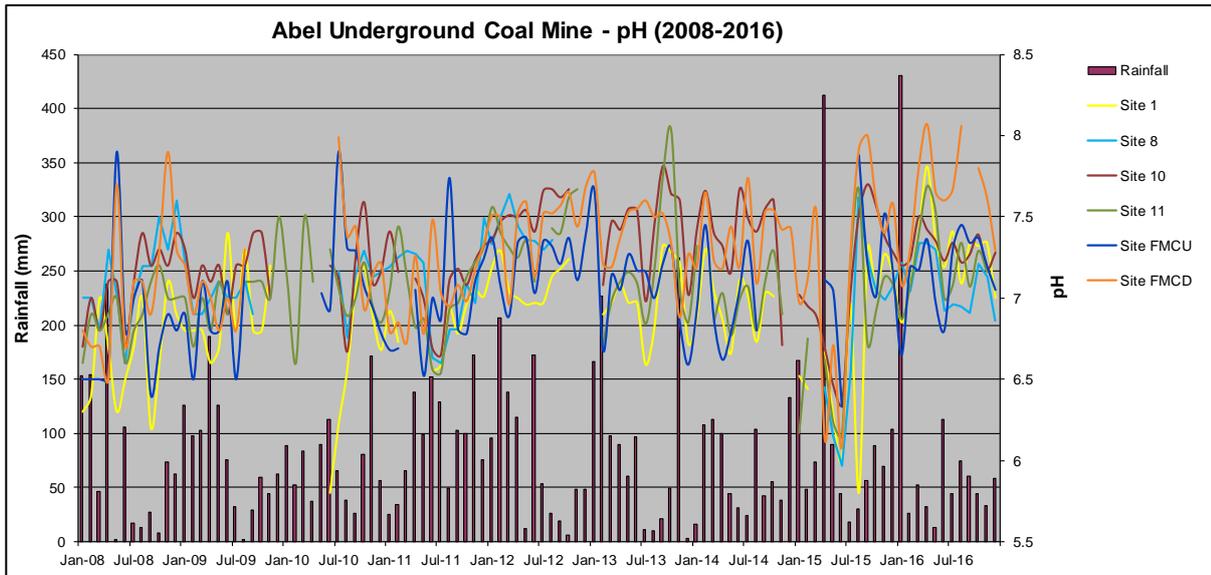


Figure 7.2 Surface Water Quality Monitoring Results – 2008 to 2016

Table 7.2
Summary of Water Quality Monitoring Results – 2016¹

Sampling Site [^]	pH [#]	EC (µS/cm) [#]	Turbidity (NTU)	TSS (mg/L)
Upstream of Underground Workings (to date)				
1	6.85 – 7.81 (7.27)	226 – 1 060 (522)	5.3 – 444 (120)	6 – 151 (28)
8	6.86 – 7.34 (7.10)	270 – 556 (430)	8.0 – 28.4 (16.1)	5 – 11 (6)
10	7.18 – 7.50 (7.30)	1 044 – 1 946 (1 477)	3.6 – 45.6 (11.6)	5 – 12 (8)
Downstream of Underground Workings (to date)				
11	6.87 – 7.69 (7.23)	152 – 1 421 (871)	2.4 – 29.7 (15.1)	5 – 22 (11)
FMCU	6.65 – 7.45 (7.15)	170 – 289 (209)	36.7 – 46.6 (41.8)	5 – 30 (8)
FMCD	7.08 – 8.07 (7.63)	134 – 208 (161)	4.4 – 38.3 (24.9)	5 – 18 (8)
Trigger Level	6.5 – 8.5*	125 to 2 200*	6 – 50 (NTU)*	50[®]
[^] See Figure 6.1 [®] Standard Industry Criterion * ANZECC Chapter 3 – Aquatic Ecosystems – Lowland Rivers in NSW Bold Text – Exceedance of Trigger Level # Field Measurement NS – Not Sampled 1. Results cover period 01/1/2016 to 31/12/2016 () = Average Source: Donaldson Coal Pty Ltd				

Analysis of the results obtained during the reporting period indicates the following.

1. The pH values at all sites were slightly acidic to slightly alkaline. All results were within the upper and lower water quality trigger values for Lowland Rivers in NSW (8.5) outlined in the *Guidelines for Fresh and Marine Water Quality* (ANZECC 2000). Previously there have been short term declines in pH following significant rainfall events such as in November 2013 (261.8mm rainfall) and April 2015 (412mm rainfall) (see **Figure 7.2**). The recorded rainfall in January 2016 (430.8mm) is the highest since the Abel Mine commenced in 2008. A decline in pH did occur, particularly within the Four Mile Creek upstream and downstream sites, however, the fall was not sustained. Overall, during the reporting period there were no significant differences in pH between the upstream and downstream sites.

No long-term trends in pH are apparent with the average pH across all sites since 2008 ranging between 6.9 and 7.3.

2. The electrical conductivity (EC) results range between 134µS/cm and 1 946µS/cm for all sites which are within the water quality trigger values for Lowland Rivers in NSW (125 to 2 200µS/cm) (ANZECC 2000) at all sample sites.

Whilst it is expected that rainfall will influence EC results, EC does not appear to be strongly correlated with the monthly rainfall. The average EC values upstream are higher than the corresponding downstream values. No other long-term trends in EC are apparent.

Turbidity and total suspended solids (TSS) levels at upstream Sites 1 during April 2016 exceeded the water quality trigger values for Lowland Rivers in NSW (6 to 50 NTU) outlined in the *Guidelines for Fresh and Marine Water Quality*

(ANZECC 2000) and industry standard TSS criteria (50mg/L). Whilst TSS levels reduced following April 2016, turbidity levels continued to exceed trigger levels during May, June and July. This exceedance does not correspond to a high rainfall event. Given that Site 1 is upstream of the Abel Mine, it is not considered that the mine activities contributed to these levels but rather localised conditions.

No long-term trends are apparent within the monitoring data with widely varying results with spikes in turbidity and TSS not necessarily correlated with monthly rainfall. Baseline monitoring results for both upstream and downstream sites have previously recorded significantly elevated TSS which are considered to form part of the natural variation.

The Environmental Assessment (Donaldson Coal, 2006) predicted no significant impacts upon surface water as a result of the mine activities. The monitoring results to date support that assessment.

Reportable Incidents

No reportable incidents occurred during the reporting period.

Further Improvements

No other surface water control measures are planned or considered necessary.

7.3 GROUNDWATER

Environmental Management

Monthly monitoring of regional groundwater levels and groundwater quality was undertaken, where possible, throughout the reporting period in accordance with the Water Management Plan and Integrated Environmental Monitoring Plan.

Environmental Performance

A full annual review of groundwater monitoring for 2016 has been completed by Dundon Consulting Pty Limited and is presented in **Appendix 8**. A summary of the principal outcomes and conclusions from this review is provided as follows.

Groundwater Levels

Piezometers located within and to the south of the Abel mine area are behaving predictably, with drawdown in the Donaldson Seams and by a lesser amount in most overburden piezometers responding as expected to mining activities. Piezometers to the west of the Abel mine area appear to likely be influenced by mining activity at Bloomfield.

Monitoring confirms that there is no evidence of any drawdown response in the alluvium or regolith groundwater. In particular Piezometers 81A and 81B are located adjacent the Pambalong Nature Reserve (see **Figure 6.1**). Monitoring results from 81A (single vibrating wire transducer placed within the Lower Donaldson Seam) showed a drawdown response to mining the Donaldson Seam within the Abel Mine. However, Piezometer 81B is screened

within overlying shallow Permian strata with water levels remaining stable. The lack of response in the shallow piezometer indicates there has been no mining impact on the Pambalong Nature Reserve.

Piezometers 63A and B are located to the east of the Abel Mine adjacent to the F3 Freeway and near the Hexham Swamp (see **Figure 6.1**). However, it appears that the shallow Piezometer 63B has failed or the bore has collapsed. Notwithstanding this, review of the responses from other shallow alluvium and regolith bores is still consistent with there being no impact on the Hexham Swamp.

A full summary of all bores and the groundwater response to mining is provided in **Appendix 8**.

Groundwater Inflows

As reported for 2015, between August 2013 and October 2015 inflow volumes could not be accurately estimated as a significant portion of mine water was accumulating in isolated in-mine storages. From 01 October 2015 water began reporting from the overflow of the storage areas. Based on a total in-mine storage volume of 459ML it is calculated that average groundwater inflow ranged from 120ML/year to 240ML/year during that time.

During the 2016 reporting period, groundwater inflows are estimated at 226ML (2016 calendar year). Since the mine was placed on care and maintenance, water has continued to be pumped from the underground workings, however, there have been smaller volumes of inflow and declining outflows. Groundwater model predictions for this stage of mining were for between 800ML and 1,000ML/year. Therefore, the actual inflow rates remain well below the predicted maximum rate. Further detail, including graphing on estimated monthly inflows is provided in the annual groundwater review (**Appendix 8**).

Groundwater Quality

Groundwater quality monitoring results are presented in **Appendix 8**. A summary of three representative bores located within the Abel underground mine area is presented in **Table 7.3** and **Figures 7.3** with the full graphical presentation since 2008 presented in **Figure 7.4**. They show that the pH values ranged between slightly acidic (6.29) and slightly alkaline (7.14) and EC values ranged between 527µS/cm and 5 310µS/cm, consistent with the ranges recorded during 2015.

Table 7.3
Summary of Groundwater Quality Monitoring Results – 2016

Sampling Site[#]	pH	EC (µS/cm)
DPZ – 6	6.57 – 6.90 (6.72)	2 194 – 2 650 (2 473)
DPZ – 13	6.89 – 7.13 (7.02)	3 060 – 5 310 (4 273)
JRD2	6.29 – 7.14 (6.97)	527 – 2 660 (2 146)
Source: Donaldson Coal Pty Ltd () = Average # see Figure 6.1		

However, a downward trend in EC has been observed at bores DPZ13 and DPZ6 (see **Figure 7.4**) starting in 2010 / 2011, which may be due to enhanced recharge following drawdowns in the coal measures as a result of mining. Whilst salinity has been relatively consistent within JRD2, monitoring indicates occasional ‘outliers’ of significantly lower salinity. This is likely due to ingress of rainwater temporarily lowering the salinity.

Whilst some variations have occurred in pH, monitoring has generally recorded consistent pH values over time.

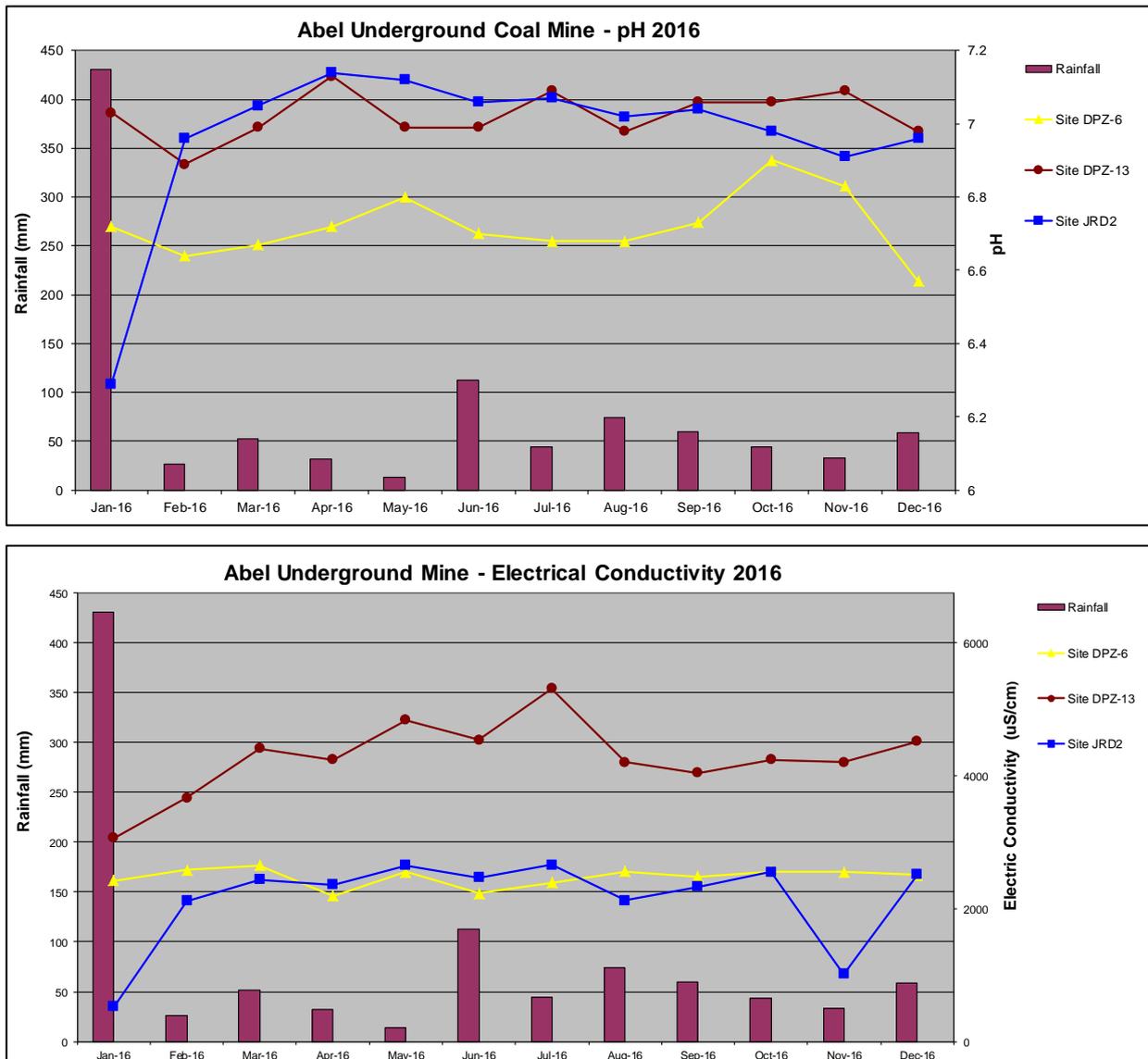


Figure 7.3 Groundwater Quality Monitoring Results – 2016

In comparison to previously recorded groundwater quality, the Environmental Assessment baseline monitoring reported that the quality of groundwater sampled within the underground mining area of the Abel Mine was variable with total dissolved solids (TDS) ranging from less than 518mg/L to 13 000mg/L, which is approximately equivalent to EC readings of between

865 μ S/cm and 21 700 μ S/cm. All results were within previously recorded baseline ranges. Therefore, it is considered that, at this point in time, the activities of Abel Underground Coal Mine are not having an effect on groundwater quality.

Reportable Incidents

No reportable incidents occurred during the reporting period.

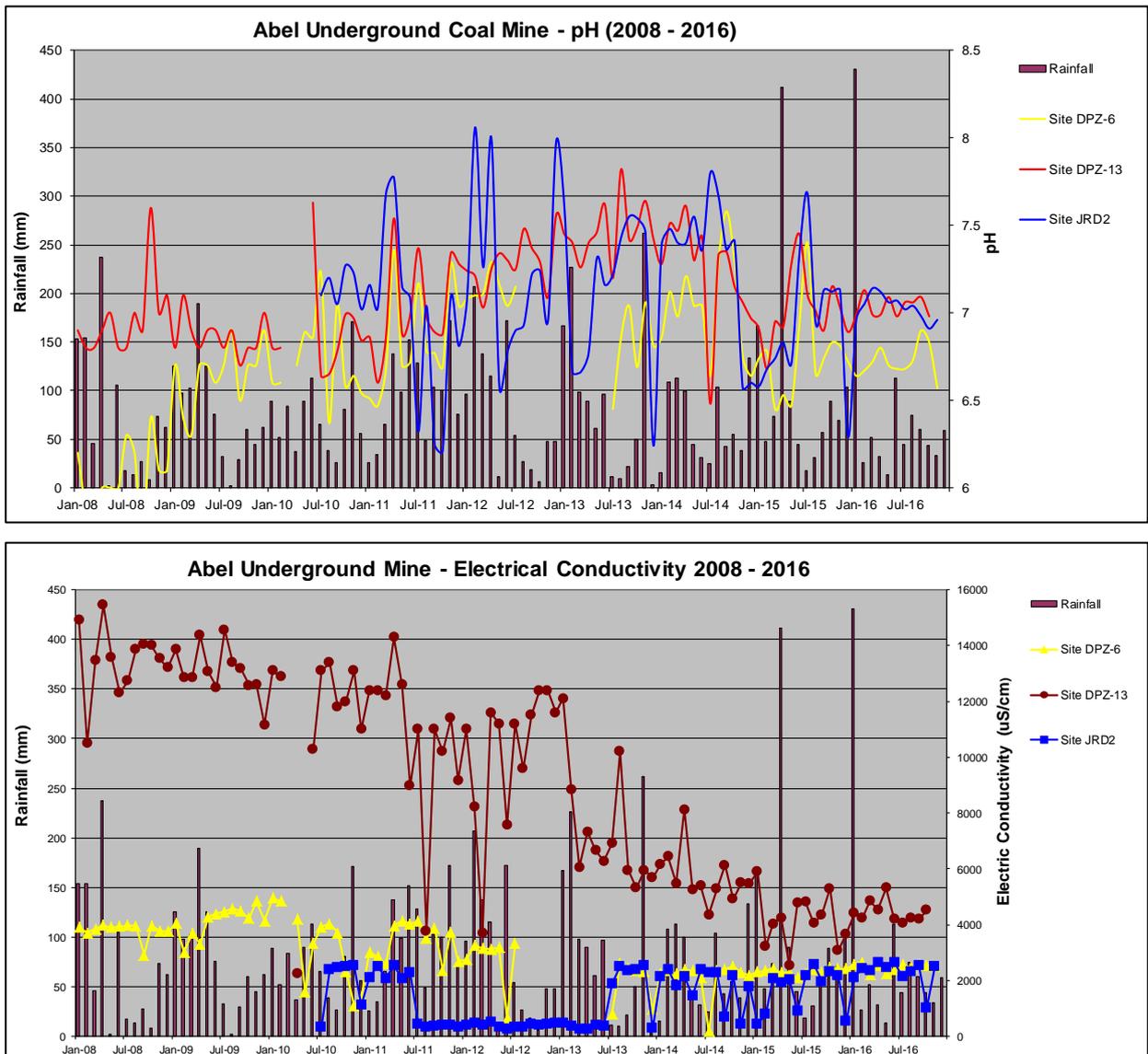


Figure 7.4 Groundwater Quality Monitoring Results – 2008 - 2016

Further Improvements

Monitoring will continue in accordance with the current Water Management Plan with no changes currently considered necessary in the monitoring network. However, groundwater sampling will be extended to include six standpipe bores located within and south of the Abel mine area which are not currently being sampled. Monitoring at Bores C081A and B, which were not monitored in 2016 due to access, will also recommence in 2017.

8. REHABILITATION

8.1 REHABILITATION PERFORMANCE DURING THE REPORTING PERIOD

Figure 8.1 shows the status of rehabilitation and a summary of the areas of rehabilitation is provided in Table 8.1.

Table 8.1
Rehabilitation Summary

Mine Area Type	Previous Reporting Period (Actual)	This Reporting Period (Actual)	Next Reporting Period (Forecast)
	Year 8 (ha)	Year 9 (ha)	Year 10 (ha)
Total mine footprint	13.15 ¹	13.15 ¹	13.15 ¹
Total active disturbance	13.15 ²	13.15 ²	13.15 ²
Land being prepared for rehabilitation	0	0	0
Land under active rehabilitation	0	0	
Completed rehabilitation	0	0	0

Notes:

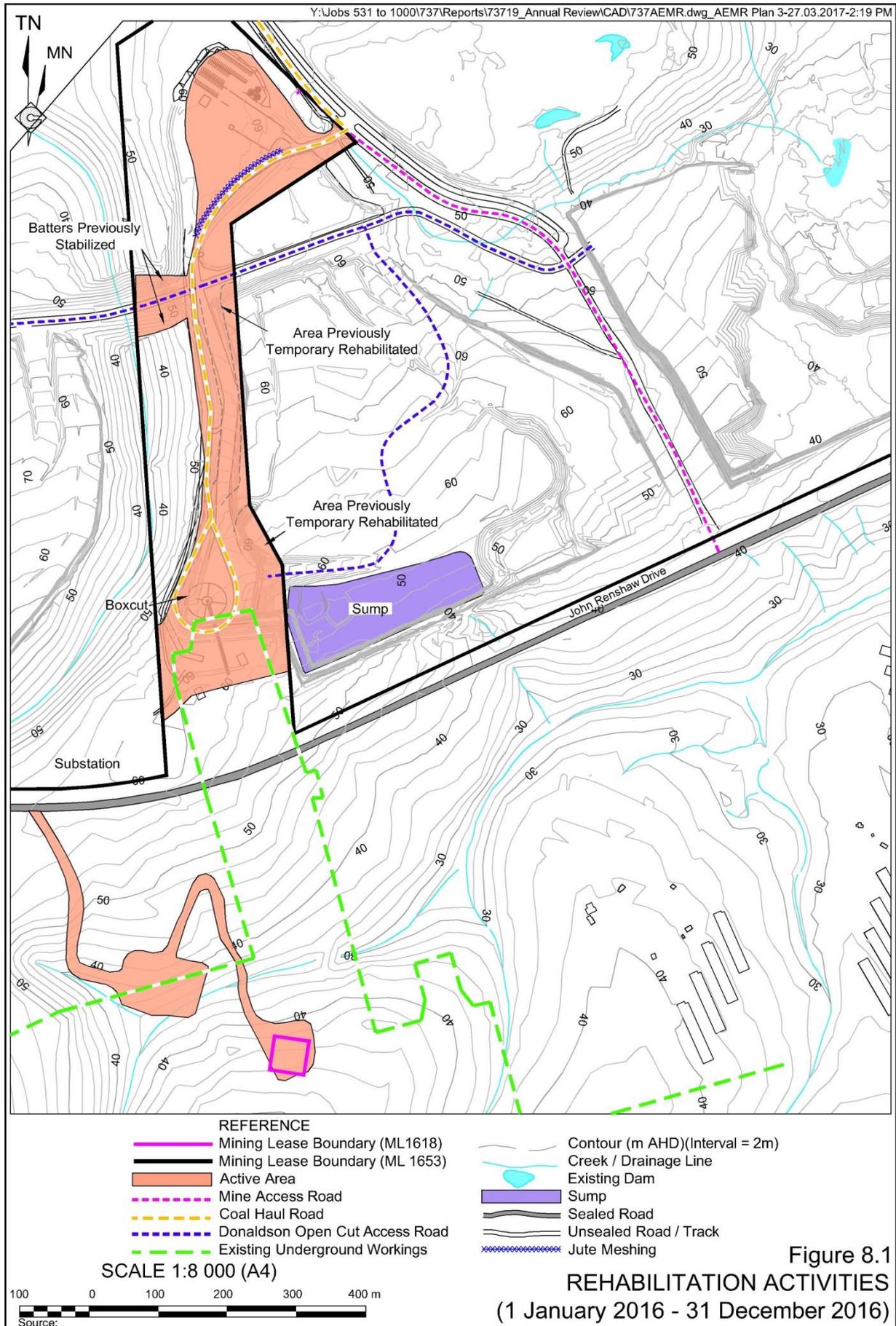
- Includes 0.41ha associated with the extended light vehicle car park, 0.23ha for the downcast ventilation shaft and 0.58ha relating to the upcast ventilation shaft but excludes underground mining areas. Areas that have been temporarily rehabilitated also included.
- Whilst some areas have been temporarily rehabilitated, all areas within ML 1618 surface infrastructure area are considered to be 'active'

No rehabilitation areas became available for DRE sign off and no final land use objectives were met during the reporting period. As the Abel Mine is an underground operation, the only significant rehabilitation will be during mine decommissioning. As outlined within the approved Mining Operations Plan, during decommissioning the creation of the final landform will involve blasting of the western side of the Abel Box Cut (as part of final landform creation within the West Pit) followed by grading using a dozer to create a maximum slope of 18 degrees. The northern side of the Abel Box Cut will also be blasted and graded to a maximum of 10 degrees, with a permanent vehicle access and egress ramp constructed to allow access to the final void for ongoing monitoring and management.

Surface infrastructure areas located within existing forested areas, such as the substation and ventilation shafts, will be returned to native vegetation. The current post mining land use goal for the Abel Box Cut is for use as water storage suitable for use in surrounding mining operations.

Within the surface infrastructure area, no permanent buildings were renovated or removed during the reporting period and, other than regular inspection and maintenance of previously temporarily rehabilitated areas (i.e. batter slopes) and retained vegetation, no specific rehabilitation activities were undertaken. Maintenance activities completed included ongoing spot control of Pampas Grass across the entire surface infrastructure area and maintenance of sediment fencing.

Above the underground mining area, minor rehabilitation works were completed for surface cracks associated with subsidence. These cracks were within the predicted range and were excavated to the limit of the crack, backfilled, compacted, topsoiled and seeded. Road repair works were also completed for Blackhill Road in accordance with the Blackhill Road Management Plan. All road cracking was within predicted levels.



As discussed in Section 4.2, 10 exploration holes were drilled within ML 1618 during the reporting period and three within EL 5497. Following completion, all holes were sealed in accordance with the *Borehole Sealing Requirements on Land: Coal Exploration* guidelines and standard industry practice. Any disturbance resulting from the drilling of the holes and equipment used was rehabilitated in accordance with landholder requirements. No issues relating to the rehabilitation exploration holes / drill sites were raised during the reporting period.

In addition to rehabilitation of subsidence impacts and exploration holes, a Wild dog baiting program was undertaken in September 2016 in consultation with surrounding land holders.

No rehabilitation trials or research was undertaken during the reporting period and there were no variation to the rehabilitation activities as outlined within the approved Mining Operations Plan.

There are currently no specific issues affecting the ability to successfully rehabilitate the site and therefore no specific management measures.

8.2 ACTIONS FOR THE NEXT REPORTING PERIOD

No specific rehabilitation works are planned during the next reporting period and no major rehabilitation work will be able to be undertaken until the decommissioning of the site. Any surface cracks that appear will be backfilled, compacted, topsoiled and seeded and ongoing repairs to any subsidence damage to public roads will be completed in accordance with the approved subsidence monitoring and management plans. Notably, any further rehabilitation works to Blackhill Road will be completed by the Mine Subsidence Board.

Maintenance works, such as erosion and sediment control, and ongoing control of weeds and feral pests will also be undertaken as required.

9. COMMUNITY

9.1 COMMUNITY COMPLAINTS

No complaints were received during the 2016 reporting period. The last complaint was received on 2 October 2015. Since commencement of the Abel Mine, a total of six complaints have been received which are summarised in **Table 9.1** and presented on the Donaldson website. Given that no further complaints have been received and the Abel Mine is currently under care and maintenance, no specific actions are currently deemed necessary.

Table 9.1
Community Complaints Summary

Location	Date of Complaint	Comments
Blackhill	24/04/2009	Light from Donaldson Open Cut/Abel shining towards house and is very bright. Light was turned down.
EPA	22/06/2015	Complaint about noise from trucks on 5th and 18th June 2015. Advised the EPA officer that there had been no change to truck movements on site and that the recent noise monitoring in May 2015 showed compliance with Licence limits.
Browns Road, Black Hill	17/07/2015	A resident in Brown's Road Black Hill lodged a complaint with the EPA regarding truck noise on 16/07/15 at 20:30hrs. Quebe provided data that trucks were parked up at that time. Advised the EPA officer. No further action.
John Renshaw Drive	3/09/2015	Complaint received regarding sulphur smell for the last month. Complainant told the EPA that it was the mine on John Renshaw Drive that was owned by Ashton company. Advised EPA that there was no odour emanating from site.
Meredith Road Black Hill	1/10/2015	Concerned about subsidence to his property and Meredith Road. Repairs undertaken in accordance with the Property Subsidence Management Plan.
210 Meredith Road Black Hill	2/10/2015	Concerned about subsidence damage to Meredith Road/Blackhill Road. Repairs undertaken in accordance with Property Subsidence Management Plan.
Source: Donaldson Coal		

9.2 COMMUNITY LIASION

The principal formal community consultation undertaken is the Community Consultative Committee. In accordance with *Schedule 6 Condition 6* of the modified Project Approval 05_0136, the Company has established a Community Consultative Committee for the Abel Mine. During the reporting period, the committee consisted of:

- three to four representatives from the Company at each meeting (included during the year, Messrs Phillip Brown, Tony Sutherland, Aaron McGuigan, Matthew Wright, Ryan Tubridy, and Ben Tockuss);
- a representative from Bloomfield Colliery (Mr Greg Lamb);
- five representatives of the local community (Messrs Alan Brown, Allan Jennings, Terry Lewin, Andrew Pace and Brad Ure); and
- One representative from Cessnock Council (Mr Ian Turnbull).

No representative from the Maitland City Council was present at the committee meetings during the reporting period.

The committee was chaired by Mrs Margaret MacDonald-Hill, an independent chairperson appointed as the independent Chair by the Secretary, Department of Planning and Environment.

The committee held a total of three meetings during the reporting period (29 February, 30 May, and 29 August 2016) with the fourth meeting in December 2016 deferred to February 2017. The meetings have continued to provide an opportunity for the Company to keep the community up to date with activities undertaken and programmed at the Abel Mine and for community members to table issues relating to the Abel Mine for the Company's consideration. It is noted that the Company provided presentations during each meeting to provide updates on the mine development / care and maintenance, environmental monitoring, subsidence management, planning, and other relevant matters.

In addition to the community consultative committee, the Company notified neighbours in writing in April 2016 of the planned placement of the Abel Mine in care and maintenance and released a community newsletter in August 2016. These communications also provided the opportunity to provide an overview of the status of the mine and planned activities including rehabilitation, exploration, environmental studies, and mine planning.

10. INDEPENDENT AUDIT

The last independent environmental audit of the mine was undertaken in March 2015, in accordance with *Schedule 5 Condition 5* of PA 05_0136. The independent audit confirmed a high degree of compliance and did not identify any non-compliance with the Project Approval or Statement of Commitments for the activities undertaken during the 2012 to 2015 period.

The next independent environmental audit is due by the end of March 2018.

11. INCIDENTS AND NON-COMPLIANCES DURING THE REPORTING PERIOD

During the reporting period there were no:

- reportable incidents or exceedances; or
- official cautions, warning letters, penalty notices or prosecution proceedings.

Two administrative non-compliances were recorded for the reporting period.

Project Approval 05_0136 Schedule 2 Condition 11 which requires that all new buildings and structures, and any alterations or additions are constructed in accordance with the relevant requirements of the BCA. Whilst construction certificates have been received for buildings within the surface infrastructure area the occupation certificates have not yet been received. The certifying body inspected once and requested changes prior to issuing the occupation certificate. The requested changes have been made and the certifying body requested to reinspect. However, the certifying body has not yet issued the final certificate. This will be followed up again during the 2017 reporting period. The Company believes that the buildings meet the BCA and no environmental or social impact has arisen from this administrative non-compliance.

Water Licence 20BL171935 requires an annual compliance report, which reports on the results of the groundwater monitoring and contingency plan, to be supplied to the NSW Office of Water (now DPI Water) within 3 months of the end of the water year being reported on (i.e by end of September). Whilst the necessary information has been included in the respective AEMRs and this Annual review, including a report prepared by an independent and qualified groundwater expert (**Appendix 8**), the Annual Review is prepared following the calendar year and therefore has not been submitted within 3 months of the current water year (i.e. by 30 September 2016). The Company will consult with DPI Water in relation to the acceptance of the Annual Review reporting at this time interval and / or adjustment of the condition wording during the transfer of conditions from the current Water Licence to a Water Access Licence under the new *Water Sharing Plan for the North Coast Fractured and Porous Rock Groundwater Sources 2016* (see Section 7.1).

12. ACTIVITIES TO BE COMPLETED IN THE NEXT REPORTING PERIOD

As outlined in Section 4.3, a range of monitoring, including surface water, groundwater, flora and fauna and subsidence monitoring are planned during the next reporting period. This monitoring represents a continuation of standard monitoring practices.

However, as discussed in Section 6.3, the need for / frequency of noise monitoring during care and maintenance is to be reviewed. As discussed in Section 6.5, consideration will also be given to the need for ongoing aquatic monitoring within Blue Gum Creek and/or whether the monitoring program is continued in its current form. Prior to the recommencement of mining operations, relevant dams will also be reassessed for frog habitat to account for changes such as eutrophication from stock, fertiliser applications or other farming practices as opposed to changes resulting from mining.

No other specific measures are currently deemed necessary to improve environmental or community performance.

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