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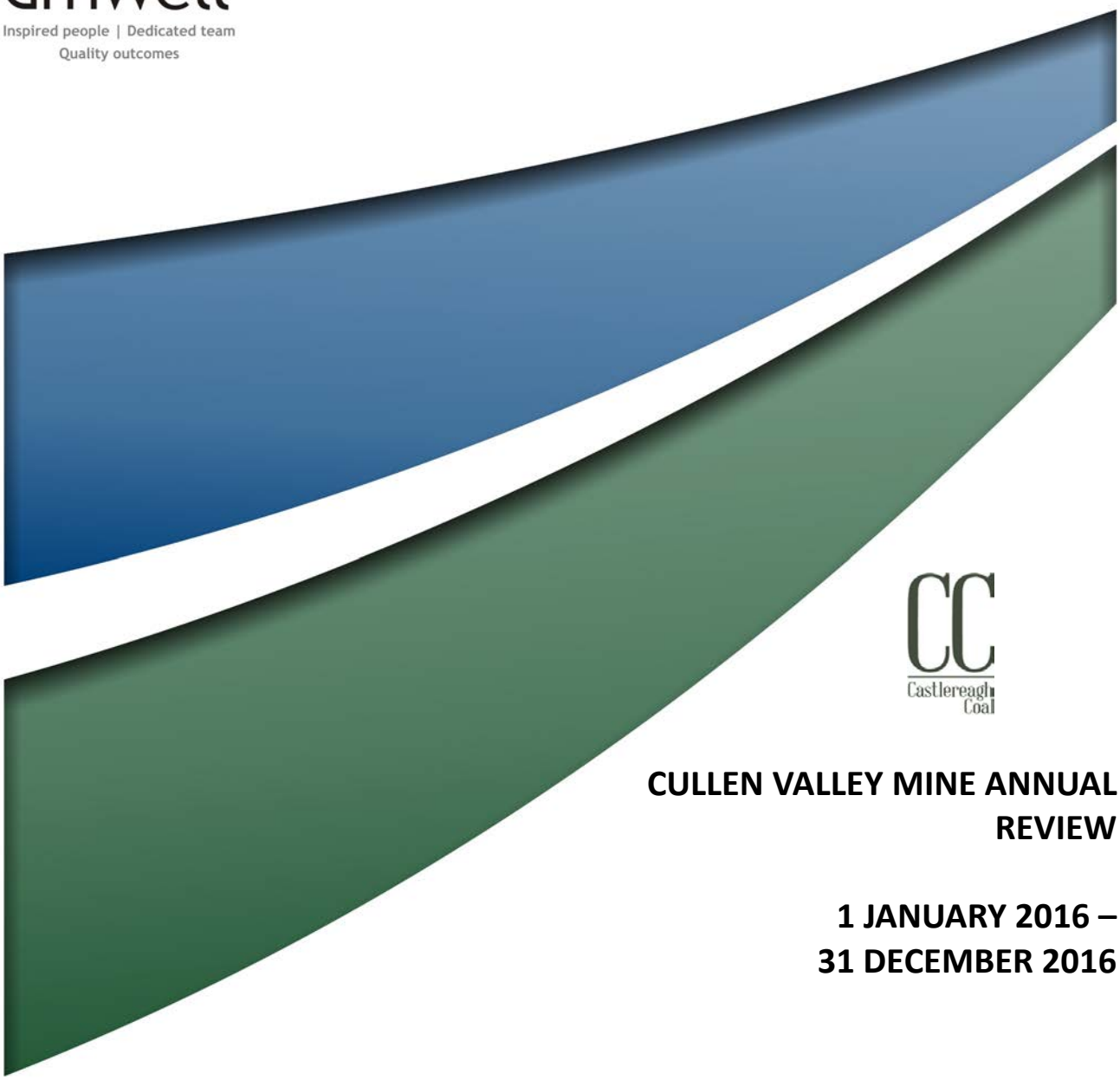

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Castlereagh Coal

CULLEN VALLEY MINE ANNUAL REVIEW

1 JANUARY 2016 – 31 DECEMBER 2016

May 2017

CULLEN VALLEY MINE ANNUAL REVIEW

1 JANUARY 2016 – 31 DECEMBER 2016

Prepared by
Umwelt (Australia) Pty Limited
on behalf of
Shoalhaven Coal Pty Limited

Project Director:	Luke Bettridge
Project Manager:	Brendan Rice
Report No.	3968_R02_Annual Review
Date:	May 2017

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Document Status

Rev No.	Reviewer		Approved for Issue	
	Name	**Date**	**Name**	**Date**
1	Brendan Rice (Umwelt (Australia) Pty Limited)	23/03/2017	Luke Bettridge (Umwelt (Australia) Pty Limited)	23/03/2017
2	Brendan Rice (Umwelt (Australia) Pty Limited)	17/5/2017	Luke Bettridge (Umwelt (Australia) Pty Limited)	17/5/2017

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Annual Review Title Block

Name of operation:	Cullen Valley Mine
Name of operator:	Shoalhaven Coal Company Pty Limited
Development consent:	DA-200-5-2003
Name of holder of development consent:	Shoalhaven Coal Company Pty Limited
Mining leases:	ML 1455, ML 1488, ML 1556, ML 1557
Name of holder of mining leases:	Shoalhaven Coal Company Pty Limited
Water licence:	WAL 27898 (80WA706148)
Name of holder of water licence:	Shoalhaven Coal Company Pty Limited
MOP start date:	31 December 2015
MOP end date:	31 December 2017
Annual Review start date:	1 January 2016
Annual Review end date:	31 December 2016

I, Peter Stretton, certify that this audit report is a true and accurate record of the compliance status of Cullen Valley Mine for the period 1 January 2016 to 31 December 2016, and that I am authorised to make this statement on behalf of Shoalhaven Coal Company Pty Limited.

Note.

a) 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.

b) 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); sections 307A, 307B and 307C (False or misleading applications/information/documents—maximum penalty 2 years imprisonment or $22,000, or both).

Name of authorised report officer:	Peter Stretton
Title of authorised report officer:	Chief Financial Officer – Manildra Group
Signature of authorised report officer:	
Date:	

1.0 Statement of Compliance

The following section provides a statement of compliance in regards to the operations undertaken at Cullen Valley Mine (CVM) for the 2016 report period, being 1 January 2016 to 31 December 2016. It is noted that during the report period an Independent Environmental Audit (IEA) was undertaken for the period 23 November 2010 until 8 September 2016. There were a number of non-compliances with Development Consent 200-5-2003 identified as part of the IEA. Of these there were 5 non-compliances with the Development Consent DA 200-5-2003 identified during the IEA that relate to non-compliances that occurred during the 2016 report period and require further action. There were also 2 non-compliances with the Environment Protection Licence (EPL) 10341 identified as part of the IEA that relate to 2016 activities. The non-compliances are summarised in **Table 1.3** below and discussed in further detail in **Section 10**. A number of the non-compliances were administrative and low risk non-compliances during the IEA with a number of historic non-compliances attributed to the previous mine owner. The IEA did not identify any non-compliance with the Mining Leases for the site. **Table 1.1** below provides a statement of compliance for the report period.

Table 1.1 Statement of Compliance

Relevant approval	All conditions complied with?
Development consent DA-200-5-2003	No – refer to **Table 1.3**
Environment Protection Licence EPL 10341	No – refer to **Table 1.3**
Mining lease ML 1455	Yes
Mining lease ML 1488	Yes
Mining lease ML 1556	Yes
Mining lease ML 1557	Yes

Table 1.2 Compliance Status Key for Table 1.3

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: • Potential for serious environmental consequences, but is unlikely to occur; or • Potential for moderate environmental consequences, but is likely to occur

Risk Level	Colour Code	Description
Low	Non-compliant	Non-compliance with: • 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)

Source: Annual Review Guideline (NSW Government, 2015).

Table 1.3 Non compliances recorded during the 2016 report period as taken from the IEA

Relevant Approval	Condition #	Description (Summary)	Compliance Status	IEA Comment and Proposed Action	Where addressed in Annual Review
Development consent DA-200-5-2003	Condition 27 Schedule 4	Subsurface Heatings Management and Rehabilitation	Non – compliant	Non-compliant due to ongoing subsurface heating issues at the site. A program of works has been developed to rehabilitate subsurface heating issues. Shoalhaven Coal Company Pty Limited (Shoalhaven Coal) will continue to monitor and report on heating issues. Actions have been undertaken during 2016 and will continue to be implemented during 2017 as required. In accordance with DRE requirements, a revised program of works will be submitted prior to the end of 2017.	**Section 6.10**
	Condition 2, Schedule 4	Historical noise exceedances during operational phase of mine	Non-compliant	Non-compliant due to noise exceedances for the operational phase of mining. Given the site is on care and maintenance and there are no plans to recommence mining, the action to revise operational management of the site to avoid noise impacts has not been triggered. The NMP will be revised, if required. No further action is proposed.	**Section 6.6**

Relevant Approval	Condition #	Description (Summary)	Compliance Status	IEA Comment and Proposed Action	Where addressed in Annual Review
	Condition 31 Schedule 4 **and** Condition 47 Schedule 4 EIS commitments relating to flora, soils and rehabilitation	Biodiversity Monitoring	Non – compliant	Non – compliant for the period 2011 - 2015. Biodiversity monitoring was conducted in December 2016. The scope of works for this monitoring was broadened from the monitoring conducted between 2011-2015, with biodiversity monitoring results from 2016 detailed in **Section 6.7**.	**Section 6.7**
	Condition 5 Schedule 6	EIS predictions not discussed in the Annual Review	Non- compliant	Non- compliant with requirement to provide a review of monitoring data against the key EIS predictions for previous Annual Reviews. Details of complaints not included for previous Annual Reviews across the past five years. A review against the predictions of the EIS is included in **Section 6.1** and complaints have been included in **Section 9.2**.	**Section 6.1**

Relevant Approval	Condition #	Description (Summary)	Compliance Status	IEA Comment and Proposed Action	Where addressed in Annual Review
EPL 10341	L4.5	Utilisation of the Bureau of Meteorology (BoM) Weather Station located at Bathurst for Noise Monitoring assessments, rather than utilisation of the onsite Weather Station.	Non-compliant	Non-compliant with conditions of EPL regarding utilisation of a meteorological station. The onsite weather station was shut down and inoperable during Coalpac's ownership of the site. The onsite weather station was reinstated in December 2015 and serviced for use in accordance with Australian Standards in May 2016. No further action proposed.	**Section 6.2**
	L6.1	Odour complaints associated with fumes and emissions from the sub-surface heating areas at CVM.	Non-compliant	Identified as non-compliant with conditions of EPL during the Independent Environmental Audit. Odour complaints have been received relating to subsurface heatings at the site. Works to rehabilitate subsurface heating areas are ongoing.	**Section 6.10**

A number of non-compliances were historic non-compliances that were attributed to the previous mine owner and occurred prior to the current report period, as discussed above. These non-compliances are further addressed in **Section 10** of this Annual Review. There were no environmental incidents recorded at the site during 2016.

2.0 Introduction

Underground mining commenced at Cullen Valley Mine (CVM), formerly Tyldesley Colliery around 1904 and continued up until the 1960's when the workings were abandoned. Open cut operations were conducted on the site between 1948 and 1953. Modern open cut operations began at CVM after 19 August 1999 when the Lithgow Coal Company was granted Mining Lease (ML) 1455 by the then Minister for Mineral Resources (refer to **Figure 2.1**). Mining commenced on site in May 2000 following a four month construction phase.

Following the identification of additional open cut coal reserves, a further Environmental Assessment and Development Application was lodged for an extension of the mine in April 2003. The lease extension area lies along the western side of Tyldesley Hill adjacent to the main railway line. Approval of the Development Application was granted by the then Department of Planning and Infrastructure (DP&I) on 19 August 2004.

CVM has historically supplied coal under contract to Mount Piper Power Station. However, with the failure of the mine to renew a supply contract in 2007, it was proposed to place the operation on a care and maintenance program until such time as sufficient contracts were awarded that would make the operation of the mine viable once again.

Coalpac Pty Ltd purchased the Lithgow Coal Company Pty Ltd, which owned the CVM, in January 2008 and the previous plans to place the mine on care and maintenance were discarded. Recommencement of the open cut mining operations occurred in February 2008. Mining of the available approved area at CVM was completed in early December 2012. Any remaining stockpiled ROM coal was transported to the Invincible Colliery during February 2013 and processed through the Invincible Coal Crushing Plant. The CVM was then placed under care and maintenance.

Shoalhaven Coal purchased the mine from Coalpac administrators in May 2015 and continue to operate the mine under a care and maintenance arrangement.

2.1 Mine Contacts

The Mining Engineering Manager is responsible to the regulatory authorities for all aspects of environmental compliance at the site. The Mining Engineering Manager's contact details are summarised in **Table 2.1.** During the 2016 report period it is noted that Sedgman were the nominated operator at CVM operating the colliery on behalf of Shoalhaven Coal. On 1 March 2017 Palaris Pty Ltd (Palaris), commenced as nominated operator of the Colliery with the relevant contact details for 2017 personnel included in **Table 2.2**.

Table 2.1 Key Personnel Responsible for Environmental Management of CVM during the Report Period[1]

Name	Role	Company	Contact details
Gary Boland	Mining Engineering Manager	Palaris	Invincible Colliery, Castlereagh Highway, Cullen Bullen, NSW 2790 0408 651022

Name	Role	Company	Contact details
Graham Goodwin	Client Representative	Manildra Group	0418830598

2.2 Annual Review Requirements

Condition 5 of Schedule 6 of the CVM Extension Development Consent 200-5-2003 requires an Annual Review (AR) to be prepared and submitted to the Department of Planning and Environment (DP&E) and relevant agencies. This report has been prepared in accordance with the *NSW Government Annual Review Guidelines* (NSW Government, 2015) and details the operational and environmental management activities at CVM during the report period 1 January 2016 to 31 December 2016. Project Approval requirements along with an explanation of where each requirement is addressed within this document are provided in **Table 2.2**.

Table 2.2 Project Approval (07_0127) Conditions for the Annual Review

Conditions		Addressed in Section
Schedule 4 – Specific Environmental Conditions Noise		
4.	The applicant shall: a) Investigate ways to reduce the noise generated by the development; b) Implement best practice noise mitigation measures at the development; and c) Report on these investigations and the implementation of any new noise mitigation measures at the development of the AEMR.	Noise management measures are discussed in **Section 6.6**
6.	**Noise Monitoring** Within 3 months of the date of this consent, unless otherwise approved by the DEC, the applicant shall establish a continuous noise monitoring system adjacent to the meteorological weather station required under this consent. This system must be capable of recording LAmax, LA1, LA90 and LAeq noise levels in 15-minute statistical intervals. Unless otherwise agreed, the results of this monitoring must be reported to the DEC on a monthly basis and included in the AEMR.	Results of noise monitoring are included in **Section 6.6.**
Schedule 4 – Specific Environmental Conditions Waste Minimisation		
58.	**Waste Minimisation** The applicant shall: a) Monitor the amount of waste generated by the development; b) Investigate ways to minimise waste generated by the development; c) Implement reasonable and feasible actions to minimise waste generated by the development; and d) Report on waste monitoring and minimisation in the AEMR, to the satisfaction of the Director-General.	**Section 6.12**
Schedule 4 – Specific Environmental Conditions Greenhouse Gas		
60.	(e) report on greenhouse gas monitoring and minimisation in the AEMR	**Section 6.15**
Schedule 6 – Environmental Management, Monitoring, Auditing and Report Annual Report		
5.	The Proponent shall submit an AEMR to the Director- General and relevant agencies. This report must:	This document

Conditions		Addressed in Section
	(a) identify the standards and performance measures that apply to the project;	Relevant sections throughout **Section 6.0**
	(b) include a detailed summary of the complaints received during the past year, and compare this to the complaints received in the previous 5 years;	**Section 9.2**
	(c) include a detailed summary of the monitoring results for the project during the past year;	Relevant sections throughout **Section 6.0**
	(d) include a detailed analysis of these monitoring results against the relevant: • impact assessment criteria/limits; • monitoring results from previous years; and • predictions in the EA;	Relevant sections throughout **Section 6.0**
	(e) identify any trends in the monitoring results over the life of the development;	Relevant sections throughout **Section 6.0**
	(f) identify any non-compliance during the previous year;	**Section 11.0**
	(g) describe what actions were, or are being, taken to ensure compliance.	**Section 11.0**

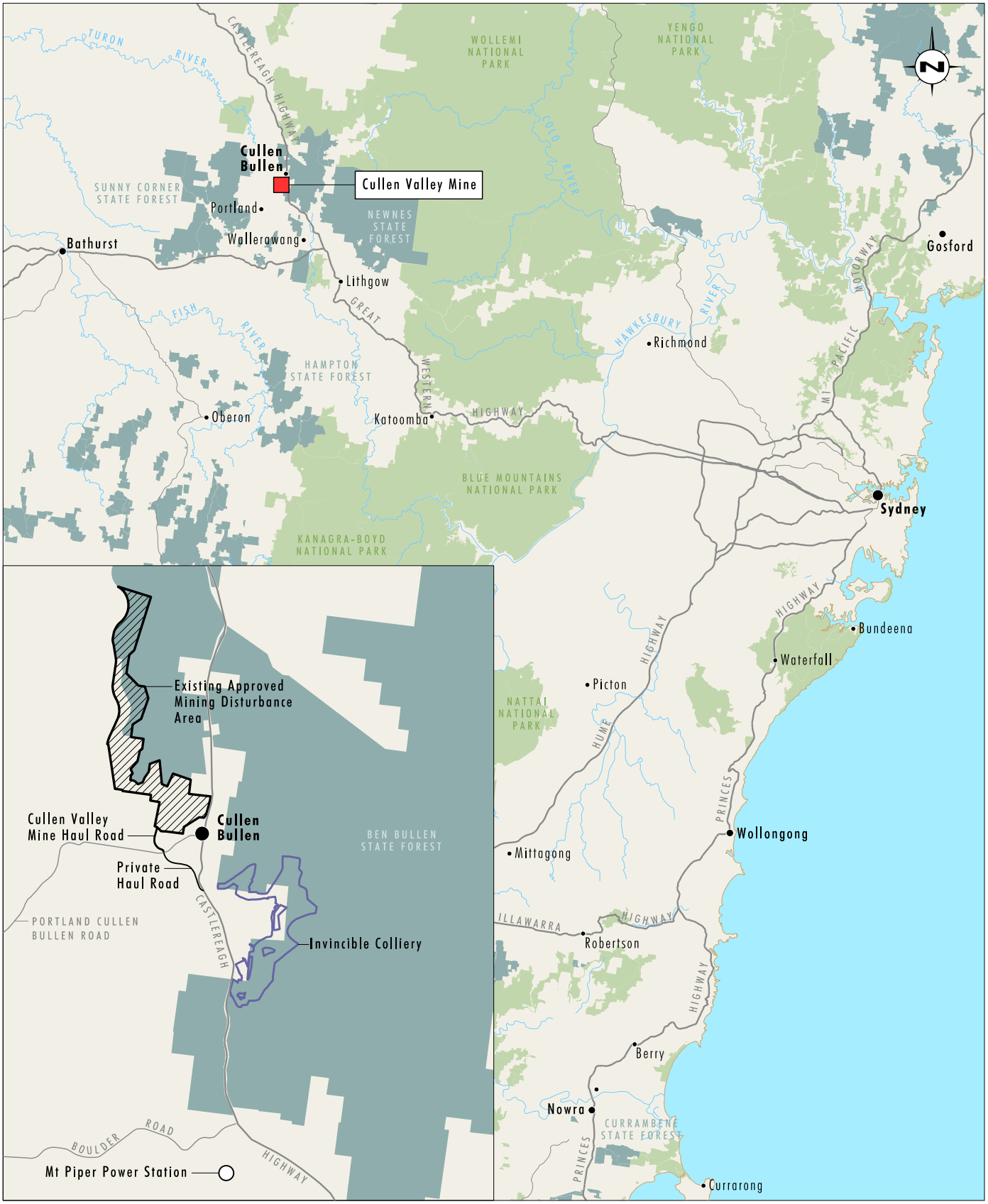


FIGURE 2.1

Locality Plan
Cullen Valley Mine

3.0 Approvals

The operations of CVM during 2016 were regulated by a range of leases, licences and approvals from both State and Local authorities. The current approvals, licences and leases associated with the CVM are listed in **Table 3.1**

Table 3.1 Environmental approvals held by CVM

Approval	Date Granted	Expiry Date	Status
DA-200-5-2003	19 August 2004	19 August 2025	Current
EPL 10341	10 December (anniversary date)	Annually	Current
ML 1455	19 August 1999	18 August 2020	Current
ML 1488	21 June 2001	20 June 2022	Current
ML 1556	20 September 2004	19 September 2025	Current
ML 1557	20 September 2004	19 September 2025	Current
WAL 27898	25 June 2015	N/A - Continuing	Current
Exploration Licence (EL) 5712	10 April 2000	9 April 2014	Renewal application submitted on 8 April 2014
EL 6007	8 October 2002	7 October 2014	Renewal application submitted on 25 September 2014

Care and maintenance activities at CVM are undertaken in accordance with an approved Care and Maintenance (C&M) MOP for the site. The C&M MOP has been approved for activities up to the end of December 2017.

4.0 Operations Summary

4.1 Mining Operations

No production occurred during the report period. A summary of the production figures and mining activity for 2016 and the forecast production for 2017 are summarised in **Table 4.1**. It is noted that the CVM has been on care and maintenance since 2013 and therefore there has been minimal activity at the operations since this time. The production summary is included in **Table 4.1** below.

Table 4.1 Production Summary

Material	Approved limit (specify source)	Previous report period (actual)	This report period (actual)	Next report period (forecast)
Waste rock/overburden	Not specified	0	0	0
Coal works Coal mining	0-2 Mtpa (EPL) 0.5-2 Mtpa 1 Mtpa (DA)	0	0	0
Coarse reject	Not specified	0	0	0
Fine reject (tailings)	Not specified	0	0	0
Saleable coal	Not specified	0	0	0

4.1.1 Waste rock/overburden

As the site has been in care and maintenance since 2013, there were no mining activities undertaken during the 2016 report period. Therefore no waste rock or overburden was produced.

4.1.2 ROM Coal

As the site has been in care and maintenance since 2013, there were no mining activities undertaken during the 2016 report period. Therefore no coal was handled or produced.

4.1.3 Coarse reject

As the site has been in care and maintenance since 2013, there were no mining activities undertaken during the 2016 report period. Therefore no coal reject material was produced.

4.1.4 Fine reject (tailings)

As the site has been in care and maintenance since 2013, there were no mining activities undertaken during the 2016 report period. Therefore no tailings were produced.

4.1.5 Saleable coal

As the site has been in care and maintenance since 2013, there were no mining activities undertaken during the 2016 report period. Therefore no coal was produced for sale.

4.2 Other Operations

No other operations such as construction or demolition activities have been undertaken at the site during 2016.

4.3 Next Report Period

There are no mining operations proposed during the 2017 report period at CVM.

5.0 Actions Required from Previous Annual Review

Actions required by DP&E as an outcome of the previous Annual Review (2015 AEMR) are listed in **Table 5.1.**

Table 5.1 DP&E Actions from the previous Annual Review

Action required	Action taken	Where discussed in Annual Review
A comparison of complaints with the previous five (5) years is required	Comparison of complaints is provided in this Annual Review	**Section 9.0**
Graphical representation of trends and comparisons with previous years are provided. If this is not possible for all parameters (e.g. groundwater results) then key parameters should be selected	Graphical representations of trends have been included in this Annual Review	**Appendix 1**
A comparison of results with the predictions in the Environmental Assessment are required	Comparison to EIS predictions has been included in this Annual Review	**Section 6.1**
Previous years' data and trends for PM_{10}, TSP and surface water are required	Previous years data and trends are provided in this Annual Review	Relevant subsections of **Section 6.0** and **Appendix 1**
Notes are included when report noise monitoring results indicating the source of noise, particularly where exceedances of noise criteria (not attributed to operational activities) occur	Noise sources during monitoring have been identified as part of the noise monitoring undertaken during 2016. These reports are available on the Castlereagh Coal website. There were no exceedances of noise criteria during the report period.	**Section 6.6**
The complainant's details are removed from the complaints summary, unless the inclusion is specifically requested by the complainant	Complainants details are no longer included in the complaints summary	**Section 9.2**

Action required	Action taken	Where discussed in Annual Review
In accordance with Schedule 4 Condition 35, details of the annual review of the Flora and Fauna Management Plan are to be provided	In accordance with a request by DPE, the FFMP will be updated by 30 June 2017.	N/A – commitment made to update FFMP during 2017
In accordance with Schedule 4 Condition 60, a section named 'Greenhouse Gas Emissions' is to be included which addresses the requirements with this condition.	Additional section included in the 2016 Annual Review to cover this requirement	**Section 6.15**

The NSW Department of Industry – Division of Resources and Energy (DRE) completed a review of the 2015 AEMR and completed an inspection of the site during 2016. The outcomes and actions of the 2016 AEMR inspection by DRE are provided in **Table 5.2**.

Table 5.2 Current Status of DRE 2016 Review Actions

Item Number	DRE Observation	Works Required	Timeframe	Works undertaken during 2016	Proposed Action 2017
1	Subsurface heating observed in several areas. Heating effects such as, steam, smoke and odour emissions evident. Capping used to seal surface, cement to fill cracks appeared to be of limited effectiveness. Rehabilitated vegetation shows signs of heating i.e. eucalypts show browning in canopy when affected by heating and or are dead.	Ongoing capping of heat affected areas. Ongoing management to reduce emissions of smoke, steam and odour. Ongoing monitoring of heat affected areas. Development of a comprehensive monitoring plan including subsurface monitoring. Development of a strategy to extinguish heating both in open cut areas and old workings to be implemented.	Monitoring and all works to be reported in the next Annual Review. A new plan of works (POW) strategy to be developed and accepted by the department. Current C&M MOP expires on 31 December 2017.	Subsurface heating works are described in **Section 6.10**.	During Quarter 4 2017, an updated C&M MOP will be developed and submitted to DRE. The C&M MOP will include further information regarding the proposed rehabilitation at CVM. Further information on works to be undertaken during 2017 are included in **Section 12.0**.

Item Number	DRE Observation	Works Required	Timeframe	Works undertaken during 2016	Proposed Action 2017
2	Extensive sediment erosion control failures, including contour banks and rock armouring.	Prepare and submit for approval to DRE a Sediment and Erosion Control Rectification / Remediation plan and implement works once approved.	Submit to Department by 31 August 2016. Complete rectification works by 31 December 2016 or other agreed timeframe.	A design for civil works to upgrade the existing erosion controls was completed in November 2016.	The concept erosion and sediment control design completed in November 2016 included a number of proposed measures which were determined by Shoalhaven Coal to not be feasible. As a result, Shoalhaven Coal will review the potential erosion control works through the revision of the site Water Management Plan (June 2017) to determine whether there are any suitable drainage repair works which can be undertaken to improve erosion control at CVM. Further detail is provided in **Section 6.9**.
3	Several rock armouring controls have failed.	As per Item No. 2 above.	Submit to Department by 31 August 2016. Complete rectification works by 31 December 2016 or other agreed timeframe.	Response as per Item No. 2 above	Response as per Item No. 2 above

Item Number	DRE Observation	Works Required	Timeframe	Works undertaken during 2016	Proposed Action 2017
4	Noise bund inspection and vegetation progress. No planting has occurred.	Establish re-planting.	Complete seeding by end of November 2016.	Reseeding of trees and grass on the noise bund was completed during October 2016	In accordance with the outcomes of the IEA the Noise Management Plan will be updated if mining operations are proposed to re-commence. There are no plans to recommence operations in 2017.
5	Is water quality monitoring occurring at the Hillcroft property and has it been reported in the AEMR. Not observed, but advised that this has been addressed and information will be forthcoming	Advise Department of status of Hillcroft property and provide a copy of the water quality monitoring.	Submit by 31 August 2016.	Shoalhaven Coal have advised that an update was provided to DRE during 2016. All required surface water quality monitoring is reported in the Annual Review. Monitoring undertaken as per **Section 6.4**.	N/A
6	Flora and Fauna Management Plan Status. Not observed, but advised that a copy will be provided to the Department.	Provide copy of plan to Department.	Submit by 31 August 2016.	N/A	In accordance with the outcomes of the IEA, the Flora and Fauna Management Plan will be submitted by 30 June 2017.

Item Number	DRE Observation	Works Required	Timeframe	Works undertaken during 2016	Proposed Action 2017
7	The Groundwater Monitoring Plan provides for 7 sites however BHW1 has not been included. Not observed. Shoalhaven Coal staff advised at the AEMR inspection that information regarding this will be forthcoming to DRE.	Advise Department of status of ground water monitoring plan and provide a copy of the plan.	Submit by 31 August 2016.	Monitoring is undertaken at BHW1 (refer to **Section 6.5** for details)	Monitoring to be undertaken during 2017
8.	Publish Environmental Data on website. Not observed. Shoalhaven Coal staff advised at the AEMR inspection that information regarding this will be forthcoming to DRE.	Advise Department of status.	Submit by 31 August 2016.	Environmental data as required by licence conditions is published on the Castlereagh Coal Website	Environmental monitoring data will continue to be placed on the Castlereagh Coal website.
9	Subsurface Heating – reports and status. Provided in Annual Review.	Refer to Item No. 1	Ongoing – next AEMR.	Refer to response to Item No. 1	Refer to response to Item No. 1

Item Number	DRE Observation	Works Required	Timeframe	Works undertaken during 2016	Proposed Action 2017
10	Pollution Incident Response Management Plan (PIRMP) – status. Advised that this has been addressed and information will be forthcoming.	Provide Plan to Department.	Submit by 31 August 2016.	The PIRMP has been completed and a copy of the plan has been uploaded to the Castlereagh Coal website.	The PIRMP will be tested in accordance with legislative requirements during 2017.
11	Species Management Plan for Clandulla Geebung. Advised that this has been addressed and information will be forthcoming.	Provide Plan to Department.	Submit by 31 August 2016.	The Species Management Plan was completed in 2012 and submitted to DPE.	A Species Management Plan for the Clandulla Geebung has been developed. In the event that mining is proposed to recommence, the Species Management Plan will be reviewed and updated.
12	Total Suspended Solids (TSS) Monitoring and Report. Advised that this has been addressed and information will be forthcoming.	Provide Department copy of results.	Submit by 31 August 2016.	All TSS results are reported online on the Shoalhaven Coal monthly environmental monitoring reports.	N/A

6.0 Environmental Performance

The following sections provide a summary of environmental monitoring and management undertaken during the report period. In accordance with the *Annual Review Guidelines* (2015) this AR contains a summary of environmental monitoring data where it is required to explain trends or environmental performance during the report period.

To ensure the implementation and effectiveness of control strategies for identified environmental risks, a number of management plans have been developed in consultation with regulators and other relevant stakeholders. Management plans utilised at CVM include the:

- Flora and Fauna Management Plan
- Species Management Plan (Clandulla Geebung)
- Environmental Management Plan
- Environmental Monitoring Program
- Blast Management Plan
- Fire Management Plan
- Cullen Valley Sub-surface Heating Program of Works (PoW) MOP Variation; and
- Pollution Incident Response Management Plan.

Please refer to **Figure 6.1** for the location of monitoring points for CVM.

6.1 Summary of Performance Against EIS Predictions

The CVM has been subject of two Environmental Impact Statements (EIS) in the last twenty years of operations. The results of environmental monitoring conducted during the current report period are compared to the predictions of these EIS.

The Feldmast Coal Project for open cut and underground operations to the north-east and north-west of Cullen Bullen was assessed in the EIS dated February 1997 (International Environmental Consultants, 1997). The CVM Lease Extension Project involved expanded operations further to the north-west of the original mining area adjacent to the Wallerawang-Gwabegar Railway line and was assessed in the EIS dated April 2003 (International Environmental Consultants, 2003).

As the mine is in care and maintenance and there have been no mining activities conducted during the report period. Environmental monitoring is currently limited to noise, air quality, water quality and biodiversity. Below is a summary of predictions from the two EIS completed for the site. **Table 6.1** provides a summary of performance against the EIS predictions for the 2016 report period. It is noted that modelling undertaken for the respective EIS's assumed mining operations were being undertaken at CVM. As noted previously there were no mining operations during the report period.

6.1.1 Noise Predictions

The 1997 EIS predicted that with construction of the noise bund, noise from open cut operations was expected to result in an increase in existing background levels measured at the Hillcroft property (Hillcroft) of no more than 5 dB(A). The construction of a private access road between the mine and Mudgee Road to bypass Cullen Bullen was completed during construction phase and was expected to minimise truck noise. The bypass around Cullen Bullen and noise bund were constructed, significantly reducing traffic and noise impacts on the town and nearby properties.

In the 2003 EIS and approved extension to mining operations, noise exceedances of 2-4 dB(A) were predicted to occur at Red Springs during temperature inversion conditions. Noise exceedances of 4-7 dB(A) were also predicted at Hillcroft during temperature inversion conditions. At Forest Lodge, exceedances of 1 dB(A) (calm), 5dB(A) (south wind) and 5dB(A) (temperature inversion) were predicted in Years 9 and 10 of the extension operations. Exceedances of 3 dB(A) (calm), 10dB(A) (south wind) and 5dB(A) (temperature inversion) were also predicted during years 9 and 10 at the 25 acre allotments to the north of the mine. *NB: These are exceedances of the 35 dB(A) criteria.*

6.1.2 Air Quality Predictions

The Feldmast EIS (1997) predicted annual average TSP concentrations from background levels + mine emissions to be 48 µg/m^3 at the closest residences to the mine, which is well below the 90 µg/m^3 annual average goal. Predicted PM_{10} concentrations were 24 µg/m^3 (background + mine emissions) and this is well below the annual average goal of 50 µg/m^3. $PM_{2.5}$ concentrations from mine emissions were predicted to be 0.5 µg/m^3 at the closest residence.

Modelling of dust deposition in the worst case scenario predicted that no long-term adverse air quality impacts were expected on the closest residential area as a result of mine operations. Episodic short term impacts were predicted where there are large exposed areas or large waste stockpiles, however, the potential for impacts was considered to be small.

The 2003 EIS predicted that nearby residences and those in Cullen Bullen were unlikely to experience unacceptable long-term impacts on air quality from the mine extension operations. It was predicted that short-term impacts could occur if emissions from the mine extension operations were combined with elevated levels from other sources.

6.1.3 Water Quality Predictions

Given the water management system which contains and treats water within storage ponds prior to discharge, the 1997 EIS predicted that EPA discharge criteria would be met. All water within the Lithgow Seam was proposed to be drained within the mining area. Groundwater systems below the Lithgow Seam were expected to be unaffected by the project.

The 2003 EIS predicted that the water management system for containment and reuse of all runoff from disturbed areas would ensure that EPA licence criteria for surface water quality would be met. The project was expected to use underground water within the old Tyldesley underground workings which collects subsurface water contained within the coal measures. Groundwater systems below the Lithgow Seam were expected to be unaffected by the project.

6.1.4 Biodiversity Predictions

Only one threatened plant species, Capertee Stringybark, was found to occur in the study area during the 1997 EIS. The EIS predicted that no local population of Capertee Stringybark would be placed at risk

of extinction as a result of the proposed mining operations. The 2003 EIS made similar predictions and concluded that there would not be a significant effect on Capertee Stringybark as a result of the expansion.

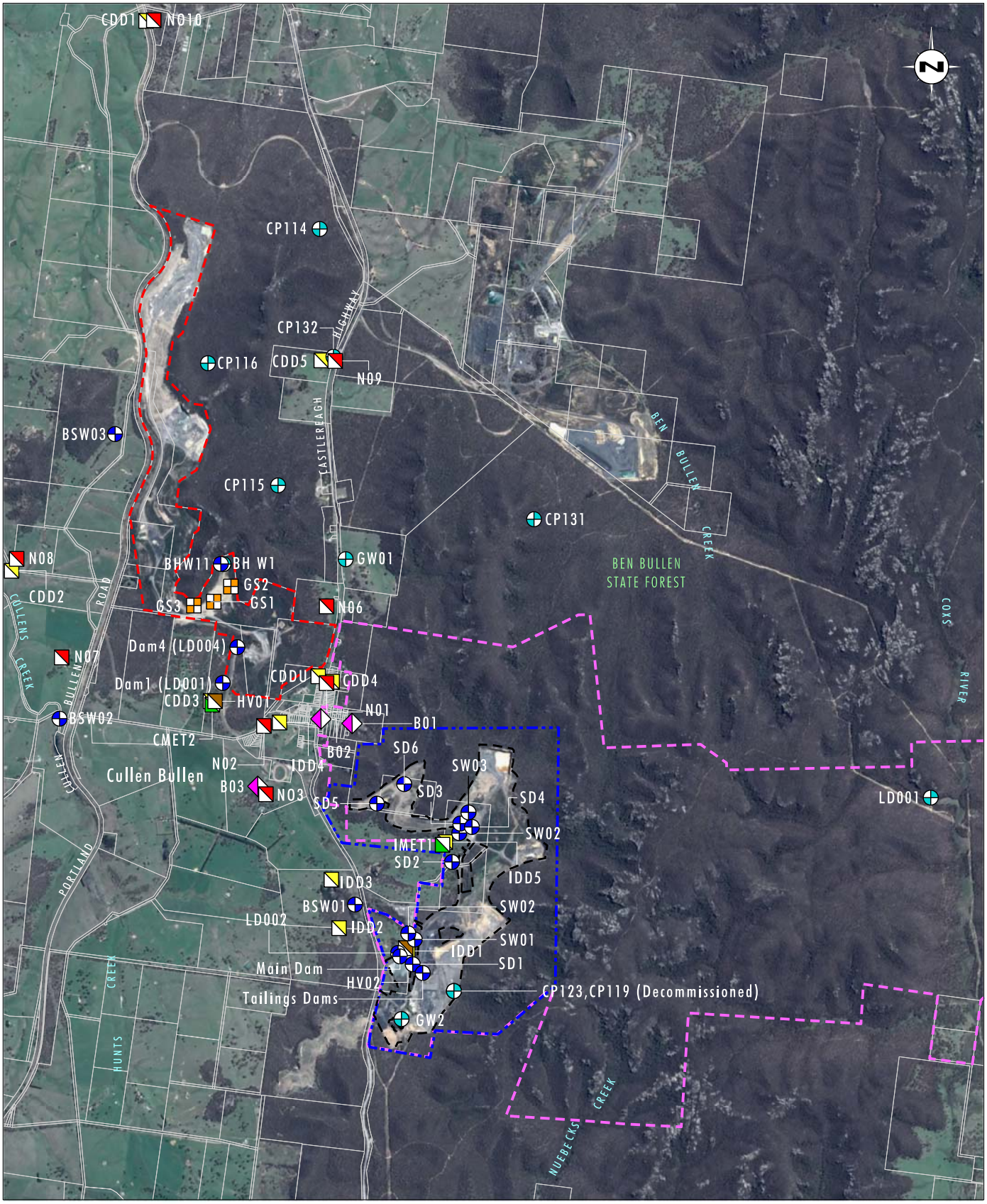
The 1997 EIS predicted that the mining operations were unlikely to cause a significant impact on threatened fauna species found in the study area. Similarly, the 2003 EIS predicted that the expansion was unlikely to have a significant impact on threatened fauna.

A summary of the environmental performance of CVM during the current report period as compared to predictions made in the EISs is provided in **Table 6.1**.

Table 6.1 Summary of Environmental Performance during 2016

Aspect	Development Consent criteria / EA prediction	Performance during the report period	Trend / key management implications	Proposed additional management actions
Noise	Refer to **Section 6.1.1**	Noise performance is compliant with Development Consent criteria and conforms with EIS predictions. Refer to **Section 6.6**	No noise issues during 2016. Historic trends are shown In **Section 6.6**	No further action required. The NMP will be reviewed should mining operations recommence
Air Quality	Refer to **Section 6.1.2**	Air Quality performance is compliant with Development Consent criteria and conforms with EIS predictions. Refer to **Section 4.1.4**	A comparison to historic trends for Air Quality are shown in **Section 6.3** and **Appendix 1**	No further action required.
Water Quality	Refer to **Section 6.1.3**	Water quality performance is compliant with Development Consent criteria and conforms with EIS predictions. Refer to **Section 4.4**	A comparison of Surface Water Quality results to historic trends are shown in **Section 6.4** and **Appendix 1.** Groundwater monitoring is generally in accordance with previous monitoring undertaken and is discussed in **Section 6.5**.	No further action required.

Aspect	Development Consent criteria / EA prediction	Performance during the report period	Trend / key management implications	Proposed additional management actions
Biodiversity	Refer to **Section 6.1.4**	No vegetation clearing occurred during the report period.	The revised Biodiversity Monitoring Program commenced in 2016 and will be continued in 2017.	Further rehabilitation actions to address subsurface heating's will be undertaken during 2017.



Legend

- Existing Approved Mining Disturbance Area - Cullen Valley
- Existing Approved Mining Disturbance Area - Invincible
- Invincible Project Approval Boundary
- EPL Boundary
- Blast Monitoring Point
- Depositional Dust Monitoring Point
- Meteorological Station
- HVAS Monitor
- Noise Monitoring Point
- Surface Water Monitoring Point
- Groundwater Monitoring Point

FIGURE 6.1

Environmental Monitoring Locations
Cullen Valley Mine and Invincible Colliery

6.2 Meteorological Monitoring

Meteorological monitoring is undertaken at CVM in accordance with the requirements of Schedule 4 Condition 28 of the Development Consent. Shoalhaven Coal is required to conduct meteorological monitoring at the site in accordance with Schedule 4, Condition 28 of DA 200-5-2003. The CVM weather station is located at the training centre adjacent the compensatory habitat area. A summary of monthly meteorological monitoring results is provided in **Table 6.2.**

6.2.1 Rainfall

CVM received 856 mm of rainfall over 143 rain days during the report period. The highest rainfall occurred during June (163.2 mm) and April had the lowest rainfall (12.6 mm). A summary of monthly rainfall data is provided in **Table 6.2.**

6.2.2 Temperature

Air temperature is measured at 2 m and 10 m above ground level to account for temperature inversions. The maximum temperature recorded during the report period was in January (-35.9°C @ 2m, 34.8°C @10m) and the lowest temperature occurred in May (-7.9°C @ 2m, -6.6°C @10m). Average monthly temperatures are summarised in **Table 6.2.**

6.2.3 Humidity

The highest humidity recorded during the report period at CVM occurred during November (93.1%) and the lowest was during May (9.7%) as shown in **Table 6.2.**

Table 6.2 CVM weather station summary

Month	Rainfall (mm)	Cumulative Rainfall (mm)	No of rain days	Air temp @ 2m (°C)		Air temp @ 10m (°C)		Humidity (%)	
				Minimum	Maximum	Minimum	Maximum	Minimum	Maximum
January	126.2	126.2	14	6.2	35.9	6.8	34.8	15.8	86.4
February	32.4	158.6	4	6.3	35.3	6.9	34.3	12.8	86.7
March	36.4	195	7	2.6	34.4	3.4	33.2	12.9	87.5
April	12.6	207.6	6	0.5	29.6	1.6	28.8	13.7	87.3
May	48.0	255.6	9	-7.9	24.9	-6.6	24.4	9.7	88.8
June	163.2	418.8	20	-7.2	15.6	-6.2	15.1	33.7	86.9
July	90.4	509.2	19	-6.6	18.3	-6.2	17.7	33.2	89.2
August	50.2	559.4	12	-5.0	19.1	-3.6	18.0	20.3	89.3
September	114.8	674.2	20	-0.5	21.2	0.0	20.2	26.8	91.9
October	47.6	721.8	10	-2.5	26.0	-1.6	25.2	19.4	91.4
November	41.8	763.6	8	-0.9	30.8	0.3	29.0	13.2	93.1
December	92.4	856	13	2.6	35.3	3.7	33.2	14.5	93.0
Total	**856**	-	**142**	-	-	-	-	-	-

6.3 Air Quality

6.3.1 Environmental Management Measures

There were no mining activities undertaken during the 2016 report period. On-site activities are limited to inspections conducted for care and maintenance of the mine site and environmental monitoring as well as works required to manage subsurface heating and erosion and sediment controls. As such, impacts to air quality were minimal. Control measures to minimise air quality impacts include limiting vehicle speeds on site.

Air quality monitoring is undertaken in accordance with the Environmental Management Plan (EMP) to verify the effectiveness of air quality control measures and includes monitoring of deposited dust, particulate matter, and meteorological conditions. The air quality monitoring network consists of five dust deposition gauges and one High Volume Air Sampler (HVAS) measuring particulate matter <10µm (PM_{10}).

Air quality impacts at CVM are managed in a manner that minimises generation of airborne and visual dust. The control strategies outlined in the EMP are considered adequate to manage risks associated with air pollution.

6.3.2 Performance Criteria

Shoalhaven Coal is required to ensure that dust and particulate emissions do not cause exceedances of the criteria specified by the Development Consent (DA 200-5-2003). The air quality impact assessment criteria specified in DA 200-5-2003 are provided in **Table 6.3.**

Table 6.3 Air Quality Impact Assessment Criteria

Pollutant	Averaging Period	Criterion
Total suspended particulate (TSP) matter	Annual average	90 µg/m^3
Particulate matter <10µm (PM_{10})	Annual average	30 µg/m^3
	24 hour average	50 µg/m^3
Deposited dust	Annual average (maximum total)	4 g/m^2/month
	Annual average (maximum increase)	2 g/m^2/month

6.3.3 Environmental Outcomes

Deposited dust is monitored on a monthly basis at five representative locations around the mine site (dust deposition gauges CDD1 to CDD5). The annual average criterion for deposited dust (4g/m^2/month) was not exceeded at any of the dust deposition gauges during 2016. The increase in annual average dust levels was less than the criterion of 2 g/m^2/month at all gauges. The deposited dust monitoring results for 2016 are shown in **Table 6.4**.

Table 6.4 Deposited dust monitoring results

	Total Insoluble Solids (g/m^2/month)				
Date	**CDD1**	**CDD2**	**CDD3**	**CDD4**	**CDD5**
January 2016	0.4	1.7	0.4	0.7	1.1
February 2016	0.4	0.5	0.4	0.9	0.4
March 2016	0.3	0.4	1	1	0.2
April 2016	0.5	0.5	0.2	0.5	0.4
May 2016	0.2	0.2	0.3	0.3	0.4
June 2016	0.1	<0.1	0.2	<0.1	0.3
July 2016	0.2	0.1	0.2	0.2	0.4
August 2016	0.1	0.4	0.2	0.1	0.6
September 2016	0.2	1.0	0.1	0.3	2.5
October 2016	0.3	0.3	0.4	0.5	2.1
November 2016	0.2	1.1	0.7	1.7	1.3
December 2016	<0.1	0.6	0.1	1.0	0.3
Annual Average 2016	**0.3**	**0.6**	**0.4**	**0.7**	**0.8**

Monitoring of particulate matter is conducted on a 24-hour basis (collected every 6 days) using a HVAS located within the CVM site. Total suspended particulates are estimated from the PM_{10} concentrations. The annual average criteria for PM_{10} (30 µg/m^3) and TSP (90 µg/m^3) were not exceeded during the 2016 report period. The 24 hour maximum allowable limit for PM_{10} (50µg/m^3) was not exceeded during the report period. Graphs of raw PM_{10} and TSP monitoring data are included in **Appendix 1**. The particulate matter monitoring results for 2016 are shown in **Table 6.5**.

Table 6.5 Particulate matter (PM_{10}) and Total Suspended Particulates (TSP) results

	PM_{10} (µg/m^3)	TSP (µg/m^3)
Annual Average 2016	8.5	21.2

6.3.4 Trends in Data

Annual averages for dust deposition during 2016 are compared with monitoring data from the previous five years in **Appendix 1**. The annual averages for particulate matter recorded at CVM during 2016 are within the range of average levels recorded in the previous 5 years and are well below criteria limits.

6.3.5 Proposed Improvements

Monitoring of air quality will continue to be conducted during the care and maintenance phase in accordance with the approved EMP to ensure compliance with the conditions of the development approval. Air quality monitoring equipment and weather stations are regularly inspected, calibrated and maintained as required.

6.4 Surface Water Quality

6.4.1 Environmental Management Measures

The surface water management system at CVM is a closed loop system that utilises a series of settlement dams within the site. These dams are managed in accordance with the water management plan for the site. Water is only discharged from the licenced discharge points if water quality concentration limits specified in EPL 10341 and DA 200-5-2003 are achieved. Further discussion regarding water management and erosion and sediment control measures is included in **Section 7.0**.

6.4.2 Performance Criteria

Shoalhaven Coal is required to ensure that water discharged from the site does not exceed the pollutant concentration limits specified by the Environment Protection Licence (EPL 10341) and DA 200-5-2003. The concentration limits specified in EPL 10341 and DA 200-5-2003 are provided in **Table 6.6.**

Table 6.6 Water quality concentration limits for Dam 1 and Dam 4 during Discharge

Pollutant	Concentration limit
Oil & Grease	10 mg/L
pH	6.5 – 8.5
Total suspended solids (TSS)	30 mg/L

6.4.3 Environmental Outcomes

Water quality monitoring is conducted monthly at Dam 1 and Dam 4 regardless of discharge status. There were no discharge events from the licenced discharge points during the 2016 report period. Due diligence monitoring was undertaken at these dams as interpreted from EPL condition P1.3 and is included in **Appendix 1**.

6.4.4 Trends in Data

Annual averages for water quality in on-site dams during 2016 are compared with monitoring data from the previous five years in **Appendix 1.** No water quality monitoring was undertaken during 2013 and 2014 as a result of previous site operator interpretation of monitoring requirements.

The average pH in Dams 1 and 4 for 2016 is within EPL limits and is consistent with historic results. Oil and grease has been below detection limits in both dams for all years sampled. Results of TSS monitoring in both dams during 2016 are generally consistent with levels recorded during the previous 5 years.

6.4.5 Proposed Improvements

Monitoring of water quality will continue to be conducted during the care and maintenance phase to ensure compliance with the EPL conditions. The water management system is regularly inspected and repairs undertaken as required.

6.5 Groundwater Quality

6.5.1 Environmental Management Measures

The mining operation is located on the western escarpment of the Sydney Basin and groundwater intercepted from monitoring bore holes is typically greater than 70m depth. The open cut voids at the CVM are less than this depth and generally do not intercept any natural groundwater aquifers. Therefore no specific environmental management controls are considered necessary for groundwater management.

6.5.2 Performance Criteria

There are no pollutant concentration limits for groundwater specified in the Development Consent or EPL. Groundwater monitoring results are reviewed against historic monitoring results to detect any trends in data.

6.5.3 Environmental Outcomes

Groundwater monitoring was conducted on 8 November 2016. The results of monitoring are presented in **Appendix 1**.

There have been no impacts detected to groundwater quality during the report period.

6.5.4 Trends in Data

Baseline groundwater monitoring has been undertaken since 2011. Following the 2016 monitoring event conducted by RCA, the following conclusions were made regarding historical trends in groundwater monitoring:

- There were no significant changes in Standing Water Level in monitoring bores since the previous monitoring event.
- Salinity remains relatively fresh at the site with concentrations below 1,000 µS/cm. Salinity results are below the ANZECC guideline for 95% protection of species.
- pH has declined since the previous monitoring event, and are in general lower than recorded levels when compared to historical values. Previous studies completed by Coalpac have identified Low pH in groundwater in the area. Low pH is expected to represent naturally occurring background conditions associated with silica saturation and oxidation of accessory marcasites grains (iron sulphide) within the weathered sandstone.
- Hardness values are reported between 48 mg/L (LD001) and 376 mg/L (CP115). The majority of Site waters may be classified as moderate to very hard. Results for hardness have increased during this monitoring round against historical levels.
- Concentrations of sulfate and nitrate were generally in the range of previous monitoring results.

- Concentrations of metals and metalloids in groundwater show variable concentrations across the six bores monitored. Generally, the concentrations of aluminium, arsenic, cadmium, chromium, copper, lead, molybdenum, selenium and mercury were below laboratory detection limits during the November 2016 monitoring round. The remaining metals monitoring (iron, manganese, nickel and zinc) showed variable concentration trends. The ANZECC guideline for Aluminium, Copper and Nickel were exceeded at some bores. The concentration of zinc was exceeded across all six bores during the November 2016 monitoring round.

6.5.5 Proposed Improvements

There have been no impacts detected on groundwater levels and water quality at CVM and therefore no further improvements are proposed.

6.6 Noise

6.6.1 Environmental Management Measures

There were no mining operations during the 2016 report period, however, quarterly attended monitoring was conducted at five locations around the site during the 2016 report period.

Management of noise emissions is undertaken in accordance with the CVM EMP (Section 3: Noise Management Plan). Noise controls and mitigation measures are implemented to ensure compliance with noise impact assessment criteria.

6.6.2 Performance Criteria

Noise impact assessment criteria for monitoring as specified in DA 200-5-2003 are outlined in **Table 6.7**.

Table 6.7 Noise impact assessment criteria DA 200-5-2003

Location	Day – LAeq (15 minute)	Evening – LAeq (15 minute)	Night – LAeq (15 minute)	Night - LA1 (1 minute)
Red Springs (east of rail line)	37 dB(A)	35 dB(A)	35 dB(A)	45 dB(A)
Red Springs (west of rail line)	43	38	35	45
Hillcroft (east of rail line)	35	35	35	45
Hillcroft (west of rail line)	43	38	35	45
Forest Lodge	40	40	38	45
Doble Gate	43	38	35	45
Tilley	43	38	35	45

Noise impact assessment criteria for monitoring as specified in EPL 10341 are outlined in **Table 6.8.**

Table 6.8 Noise impact assessment criteria EPL 10341

Location	Day – LAeq (15 minute)	Evening – LAeq (15 minute)	Night – LAeq (15 minute)	Night - LA1 (1 minute)
Red Springs (east of rail line)	35 dB(A)	35 dB(A)	35 dB(A)	45 dB(A)
Red Springs (west of rail line)	43	38	35	45
Hillcroft (east of rail line)	35	35	35	45
Hillcroft (west of rail line)	43	38	35	45
Forest Lodge	40	40	40	45
Doble Gate	43	38	35	45
Tilley	43	38	35	45

6.6.3 Environmental Outcomes

There were no exceedances of the impact assessment criteria detected during quarterly monitoring conducted during the 2016 report period as shown in **Table 6.9**. On all monitoring occasions, the noise from CVM was inaudible.

Table 6.9 2016 Quarterly Noise Monitoring Results

Location	Criterion (dB)	Quarter 1 ($L_{Aeq\ 15min}$)	Quarter 2 ($L_{Aeq\ 15min}$)	Quarter 3 ($L_{Aeq\ 15min}$)	Quarter 4 ($L_{Aeq\ 15min}$)
Red Springs (N07)	37	32 (IA) #	37 (IA)	36 (IA)	36 (IA) #
Hillcroft (N08)	35	40 (IA) #	37 (IA)	35 (IA)	35 (IA) #
Forest Lodge (N10)	40	32 (IA) #	33 (IA)	30 (IA)	36 (IA)
Doble Gate (N09)	43	46 (IA) #	52 (IA)	49 (IA)	48 (IA) #
Tilley (N06)	43	67 (IA) #	66 (IA)	67 (IA)	66 (IA)

IA – noise from the mine was inaudible, # these measurements were affected by wind speeds > 3m/s² therefore criteria do not apply

6.6.4 Trends in Data

The results of noise performance monitoring for the period 2011 – 2015 are summarised in **Appendix 1**. The results show a general trend of reduced noise emanating from the mine site following the cessation of mining in 2012. Results for quarterly noise monitoring during 2013 and 2014 showed the site contribution to be inaudible at all monitoring locations.

6.6.5 Proposed Improvements

Where non-compliance with approval and licence conditions is detected or noise complaints are received, corrective actions will be implemented as required. As there were no non-compliances or complaints received during the 2016 report period, no further improvements are required.

6.7 Biodiversity

6.7.1 Environmental Management Measures

Existing vegetation communities and fauna habitat have been previously characterised during the Ecological Impact Assessment (Cumberland Ecology 2014) conducted for the Environmental Assessment. Site environmental values are assessed during annual biodiversity monitoring of the rehabilitation and offset areas in accordance with the Flora and Fauna Management Plan and the Environmental Monitoring Program.

6.7.2 Performance Criteria

During 2016, biodiversity monitoring was undertaken for the CVM Compensatory Habitat Area (CHA) and the CVM Rehabilitation Areas, refer to **Figures 6.2** and **6.3** for monitoring locations. The Biodiversity Monitoring Program for CVM was based on the monitoring requirements documented in the following plans:

- CVM Flora and Fauna Management Plan 2012 (Coalpac 2012) and
- CVM Environmental Monitoring Program 2009 (Hansen Bailey 2009).

In addition to the monitoring requirements stated in the above documents, the following was undertaken during 2016 monitoring:

- Rehabilitation monitoring
- Clandulla geebung and Capertee stringybark monitoring
- Fauna surveys
- Vegetation dieback surveys in areas of subsurface heating (further discussed in **Section 6.10**)
- Foot traverse and fixed monitoring plots every 10 ha and
- An assessment against the performance / completion criteria and checklists of the management plans Mining Operations Plan for the site.

6.7.3 Environmental Outcomes / Trends in Data

6.7.3.1 CVM Compensatory Habitat Areas

Based on results of the 2016 surveys, the vegetation condition of the CVM CHA is considered to be relatively good with high native species diversity and minor weed colonisation in comparison to the Rehabilitation areas. This is expected as the CVM CHA comprises intact woodland. Additionally, it is ideally situated adjacent to Ben Bullen State Forest forming a corridor facilitating native species recruitment.

The three vegetation communities monitored (i.e. the Tablelands Dry Woodland type, Tablelands Sheltered Valley Forest type and the Sandstone Ridgetop Woodland type) were floristically and structurally similar in condition to that observed in previous monitoring events. However quantitative analysis of some aspects (flora diversity and sub-plot characteristics) is limited as previous monitoring events used a meandering transect survey technique while fixed monitoring plot were undertaken in 2016.

During the 2016 fauna surveys, 66 species were recorded among the sites of the CHA. Compared with previous monitoring results, the species diversity for 2016 was higher than the December 2015 monitoring survey, but lower for the 2011, 2012 and February 2015 surveys. The number of mammal species recorded was the main driver for these differences and is possibly due to the use of hair funnel trapping, which was conducted in earlier surveys and would increase the detection of smaller, cryptic mammals. The CHA sites are well established woodland and forest communities which provide a diverse range of habitat features in the form of woody debris, hollow bearing trees, fallen timber and rocky outcrops. The proximity of the CHA to Ben Bullen State Forest is also likely to influence the diversity of fauna species.

A total of three threatened species were recorded in the CHA at CVM. These were the greater glider (*Petauroides volans*), eastern bent-wing bat (*Miniopterus schreibersii oceanensis*) and Clandulla geebung (*Persoonia marginata*). All three species are listed as vulnerable under the TSC Act and have been recorded in previous surveys events.

6.7.3.2 Rehabilitation Areas

During 2016, fauna surveys were conducted for the first time at the rehabilitation areas in CVM with 53 species being recorded.

The results of the 2016 fauna survey consider fauna diversity to be high, given the nature of the site as a rehabilitated area. The likely reasons for this high diversity is the range of ages and therefore habitat complexity of rehabilitated areas, as well as the proximity of the rehabilitation sites to the established offset areas. The habitat within the rehabilitation areas is primarily comprised of woody debris, which provides habitat for small ground species such as small reptiles and mammals. As the trees within the rehabilitation areas are still quite young, there are no hollows available for arboreal fauna. However, the established nest boxes provide an artificial substitute for species including sugar gliders (*Petaurus breviceps*), which have been shown to consistently use the boxes based on the current and previous inspection results.

6.7.3.3 Clandulla geebung Monitoring

In the 2016 surveys, 83 Clandulla geebung plants were recorded within the established Clandulla geebung monitoring site. This is an increase from the results of the previous year, which recorded sixty-five plants, however is slightly lower than the 92 plants recorded during baseline surveys. No plants were observed fruiting however the majority (90%) of plants were flowering, indicating that this population is healthy. Overall, there has been no discernible change in this population which suggests that the population is stable and currently not affected by the previous mining activities.

6.7.4 Proposed Improvements

The Biodiversity Monitoring Report (Umwelt, 2017) made a range of recommendations that may assist Shoalhaven Coal in the ongoing successful management of the CVM sites. The key recommendations include:

- Fauna surveys are continued to be conducted for the BOA and rehabilitation areas as a method of comparison among the CVM and Invincible Colliery monitoring sites. Over time this data will highlight the success or need for improvement of these areas. The frequency of the Fauna surveys will be determined by an Ecologist.

- It is recommended that the current weed and feral animal management program be continued in 2017 with specific attention given to key weed and feral species.

- Review the site management plans with a view of simplifying the monitoring studies. There are certain completion criteria for the rehabilitation areas which are not able to be monitored because of the design of the monitoring program.

6.8 Weeds and Feral Animals

6.8.1 Cullen Valley Compensatory Habitat Area

Five introduced species were recorded within the CHA monitoring sites during 2016. These were the Eurasian blackbird (*Turdus merula*), common myna (*Sturnus tristis*), house sparrow (*Passer domesticus*), brown hare (*Lepus capensus*) and red fox (*Vulpes vulpes*).

6.8.2 Rehabilitation Areas

A total of three feral animal species were recorded within the rehabilitation areas in CVM and Invincible Colliery. These included the Eurasian blackbird (*Turdus merula*), rabbit (*Oryctolagus cuniculus*) and red fox (*Vulpes vulpes*) within the CVM rehabilitation areas. While fauna surveys have not been conducted in the rehabilitation areas in previous years, the rabbit and fox have been recorded in the CHA, which are in proximity to the rehabilitation sites in CVM.

This is the first time the Eurasian blackbird has been recorded in the CVM area however this urbanised species is likely to occur along the edges of the habitat given the rural town of Cullen Bullen is in the vicinity of the sites.

6.9 Erosion and Sediment Control

6.9.1 Environmental Management Measures

Permanent ESC measures within the CVM include containment and diversion of “clean” water around disturbed areas and containment of runoff from these disturbed areas within on-site sediment dams. Permanent and temporary measures also include contour banks, drainage lines, drop structures and silt-stop fences in rehabilitated areas of the site.

6.9.2 Performance Criteria

There are no performance criteria for erosion and sediment control specified in either the Development Consent or the EPL.

6.9.3 Environmental Outcomes

In accordance with Section 6 of CVM Environmental Management Plan, erosion control structures are to be inspected on a monthly basis or following heavy rainfall and repairs to channels and ponds are to be undertaken when capacity was reduced by 30%. During the 2015 CVM AEMR inspection DRE noted that that ongoing inspection and maintenance of ES structures was required at CVM.

Following the meeting with the DRE 30 July 2015 and an inspection of erosion areas by Sedgman Pty Limited (Sedgman) and Olsen Consulting Group (OCG) on 29 October 2015, initial repairs were undertaken on the drainage channel in Area B adjacent to the sub-surface heating area (Area R). These drainage works were undertaken in conjunction with clearing of vegetation and track rolling of the sub-surface heating area (Area R).

Site inspections were also conducted by Sedgman in June 2016 with representatives from DRE to review failed erosion and sediment control devices in rehabilitation areas and subsurface heating areas at CVM. This site inspection was conducted to determine remedial actions required to prevent further deterioration of existing ESC controls in place at CVM. Actions to be undertaken during 2017 are provided in **Section 6.9.4.** There were no discharge events from Dam 1 and Dam 4 during the 2016 report period and there were no reportable incidents relating to surface water discharge.

6.9.4 Trends in Data and Proposed Improvements

The site has been assessed as having moderate to severe erosion (rilling) since monitoring commenced in 2011. During 2016 Shoalhaven Coal commissioned a design for civil works related to ESC structures to be completed at CVM. The concept erosion and sediment control design was completed in November 2016. Shoalhaven Coal undertook a review of the proposed design and determined that the concept ESC design was not feasible. Subsequently, Shoalhaven Coal have committed to undertake a further review of potential interim erosion controls which can be implemented on site in addition to determining a longer term approach to ESC management across the site. This review will be undertaken during 2017. Additional works will be undertaken to repair existing failed erosion controls.

6.10 Subsurface Heating

In 2011, DRE issued the previous mine owner/operator (Coalpac) with a Section 240 Notice requiring a concentrated effort to manage and extinguish subsurface heating in a noise bund and in other areas within ML1488. The Notice also required rehabilitation of heating affected areas.

In accordance with the Notice, a plan of work has been developed and included within the Plan of Works MOP Variation (dated 30th January 2013) and the 2011 to 2015 CVM MOP. The MOP was revised and the current Care and Maintenance (C&M) MOP has been approved by DRE for the period December 2015 to December 2017.

During 2016 DRE inspections of the site, DRE have noted that there are still a number of areas where subsurface heating had caused vegetation dieback. The main subsurface heating areas are known as R1, F1 and F2 and are shown on **Figure 6.4**.

6.10.1 Environmental Management Measures

A comprehensive assessment of sub-surface heating at the CVM has been undertaken in consultation with DRE since 2011. Development of management measures implemented for rectification of subsurface heating issues was undertaken in consultation with DRE. Further site assessments were

conducted by OCG throughout 2015 and 2016 to provide updates on subsurface heating at CVM. Ongoing subsurface heating monitoring is undertaken in the key heating areas at CVM.

6.10.2 Environmental Outcomes and Further Improvements

During 2016, further inspection of vegetation dieback areas was undertaken as well as ongoing monitoring of subsurface heating areas, refer to **Figure 6.4**. The status of subsurface heating areas and works completed during 2016 are detailed in **Table 6.10**.

Table 6.10 2016 Subsurface Heating Actions

Heating Area	Works During 2016	Action for 2017
R1	• heating and dieback had expanded during late 2016 and has not yet been capped.	• During 2017, further investigation will be undertaken into capping methods and requirements for the site. • Actions such as capping and sealing subsurface heating cracks, which have been used effectively at the F1 and F2 heating areas should be considered.
F1	• heating area was capped during 2015 / 2016.	• The expansion and dieback of vegetation appeared to be contained. Capping had been undertaken through the utilisation of earthworks. Ongoing monitoring will be undertaken for this area to confirm heating remediation has been adequately completed.
F2	• minor vegetation dieback had occurred. • cracks had appeared due to escaping gases from the underground spontaneous combustion process. • concrete has been used to fill the subsurface heating cracks.	• during 2017, further investigation will be undertaken into the heating in this area and appropriate remediation techniques employed as required.

In addition to the above, ongoing management and monitoring actions arising from the various site assessments conducted since 2011 will continue to be implemented during 2017 and are as follows:

- Further monitoring and observations of heating areas will continue to confirm the appropriate level of heating management

- Capping of heating areas will be continued as a management strategy. Continue monitoring of treated areas to record success or identify the need to modify actions

- Treatment of vegetation die back in heating areas to include water management to ensure overland water flow does not enter the site. Initial investigation could include a trench excavated at the active front of the heated area to assist in planning a suitable response and

- Treatment of heating areas as required by removal of heating material and substitution with inert material as required.

6.11 Blasting

Blasting is managed and monitored in accordance with the Blast Management Plan (BMP) and the conditions of EPL 10341. However, as no mining operations were undertaken, no blasting was conducted during the 2016 report period.

6.12 Waste Management

As no mining activities were undertaken during the 2016 report period, minimal quantities of waste materials were required to be stored on site. All sewage from the workshop areas is directed to septic systems which are pumped out by a licensed waste collection and disposal contractor on an as-needs basis.

Any maintenance works required on machinery and equipment is undertaken within existing bunded areas at the CVM. Waste oils from the bunded areas are pumped or gravity flow to an oil-water separator which is maintained on an as needs basis. Waste oils and grease stored at the maintenance workshop are collected by a licensed waste recycling contractor on an as needs basis. There were no mining activities undertaken during the 2016 report period and as such only minimal oil and greases were stored on site.

All paper and general wastes from workshop areas is disposed of in garbage bins located adjacent to the workshop areas. The bins are regularly collected and the contents placed in large waste skip bins positioned adjacent to the heavy vehicle maintenance building to await removal by a licensed industrial waste collector. Industrial waste collection is undertaken as required. Approximately 198 T of steel waste were removed from the site during 2016.

6.13 Hazardous Material Management

Hazardous material storage tanks containing oils, grease and degreasers have been emptied, isolated and secured. Any additional storage tanks have been removed from the site. Storage tanks remaining onsite are kept emptied during the care and maintenance period.

Any bunds containing storage tanks or drums have been cleaned and are checked during regular statutory inspections. The above ground self bunded diesel tank (Transtank) is not currently operational during the care and maintenance period. Up to 35,000L of diesel may be stored in the facility if diesel is required for environmental works on site.

Two EPA registered radionuclide fixed radiation gauges (No. RR20215 and No. RR21832) have been decommissioned and are stored onsite.

A register of hazardous materials is maintained on site. In addition, any contractor is required to maintain a register of hazardous materials utilised by its operations and service personnel whilst activities are being undertaken at CVM.

6.14 Heritage

6.14.1 Indigenous Heritage

Previous archaeological surveys did not locate any Aboriginal artefacts or sites within the approved open cut mining area. However, two sites of significance were recorded in close proximity to the approved mining area. A campsite-stone artefact scatter (C-OS-1) and a rock shelter site (C-S-1). A further two sites where identified in surveys undertaken during 2011 and include 45-1-2542 and RSC-OS-1. These sites are located outside of the existing mining area and will not be impacted.

6.14.2 Non-indigenous Heritage

The most important site of European heritage significance is the Cullen Bullen General Cemetery, which demonstrates a wide range of approaches to funerary memorials throughout the twentieth century. Monuments contained within the cemetery display a variety of interpretations on the more sophisticated contemporary styles and the site includes a number of unusual features including concrete pyramids which mark denominational sections. The graves marked with sandstone drill core sections provide an indication of the importance of mining to this rural community. Other items of heritage significance in the local area include the Coach House and Back Cullen Cemetery.

No mining activities or exploration works were undertaken in proximity of locations of European heritage significance.

6.15 Greenhouse Gas Emissions

As the site is in care and maintenance and no mining was undertaken during the report period, greenhouse gas emissions from the site were minimal. Emissions are limited to a small fleet of vehicles / equipment in the completion of care and maintenance and rehabilitation activities at the site. CVM is below the trigger thresholds for National Greenhouse and Energy Report System (NGERS) report as a single facility, however a consolidated Greenhouse Gas emissions report is completed by the ownership group taking into account other business interests, in accordance with NGERS requirements.

6.16 Bushfire

A Bushfire Management Plan has been developed in consultation with the Forestry Corporation NSW. A number of measures and safeguards have been implemented to minimise bushfire risk. These include:

- Fitting fire extinguishers to all earthmoving and mining equipment
- Fitting and maintaining efficient exhaust systems and spark arresters to mobile equipment
- Advising NSW Rural Fire Service, regulatory authorities and neighbours of any burning-off operations
- Ensuring that vehicles with low level exhaust systems do not leave defined tracks in locations and conditions likely to lead to ignition of combustible plant material and

- Maintaining, at the request of NSW Forestry Corporation, existing fire trails or access roads at the extremities of the lease area, which serve as access for firefighting services as well as establishing a fire break to the limits of operations at the open cut.

6.17 Mine Subsidence

Mining operations ceased in 2012. There have been no reportable incidents and no subsidence management measures have been required to be implemented.

6.18 Public Safety

Access to working areas of the open cut are controlled by locked gates. Access to the site by members of the public is via contact at the mine office where visitors or contractors can only be escorted by site personnel around the site.

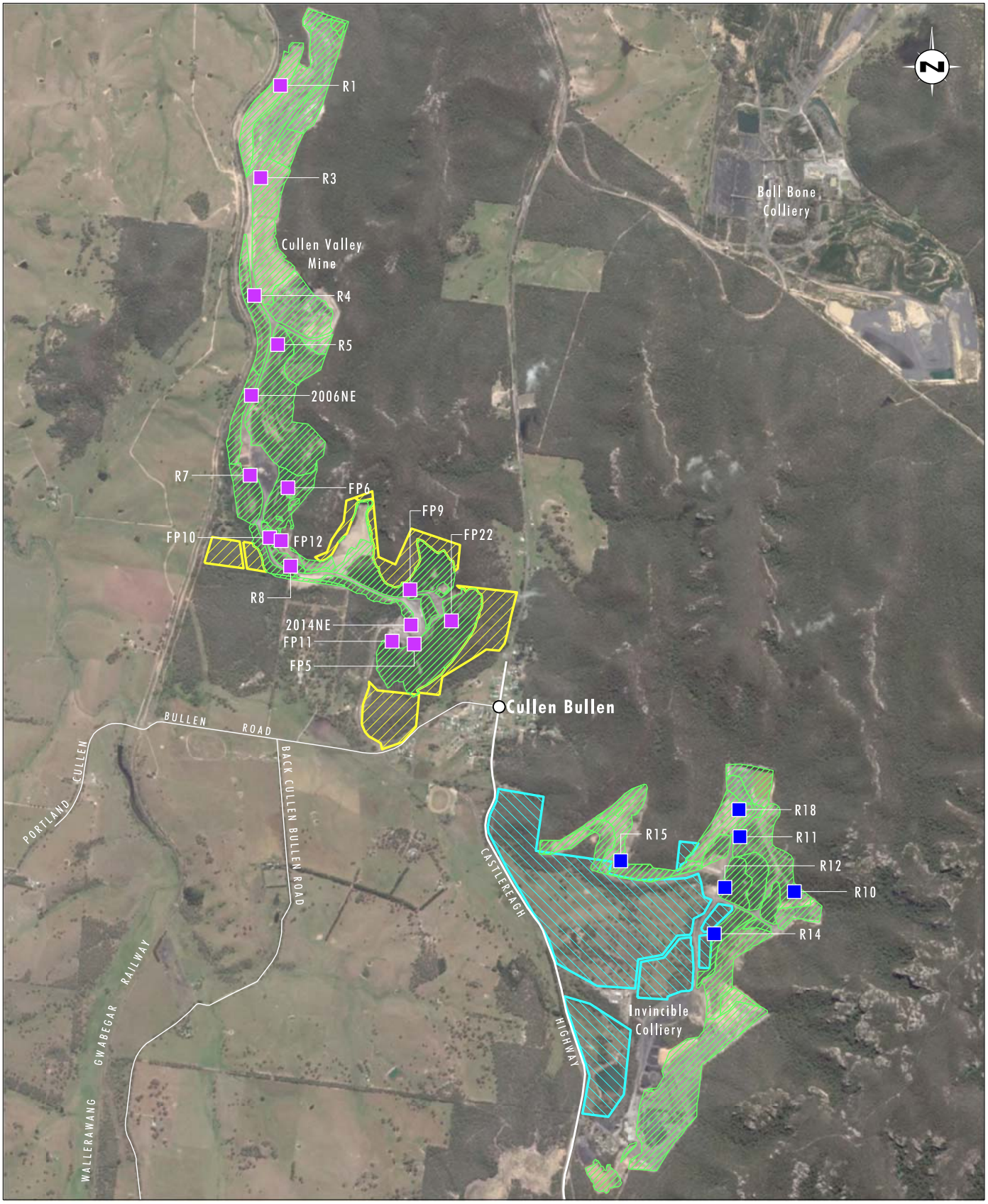


Image Source: Google Earth (MAR 2015)
Data Source: Kleinfelder (2017)

0 0.5 1.0 2.0km
1:35 000

Legend

- Compensatory Habitat Area
- Biodiversity Offset Area
- Rehabilitation Zones
- Rehabilitation Monitoring Sites - Invincible
- Rehabilitation Monitoring Sites - Cullen Valley

FIGURE 6.2

Rehabilitation Monitoring Sites
Cullen Valley Mine and Invincible Colliery

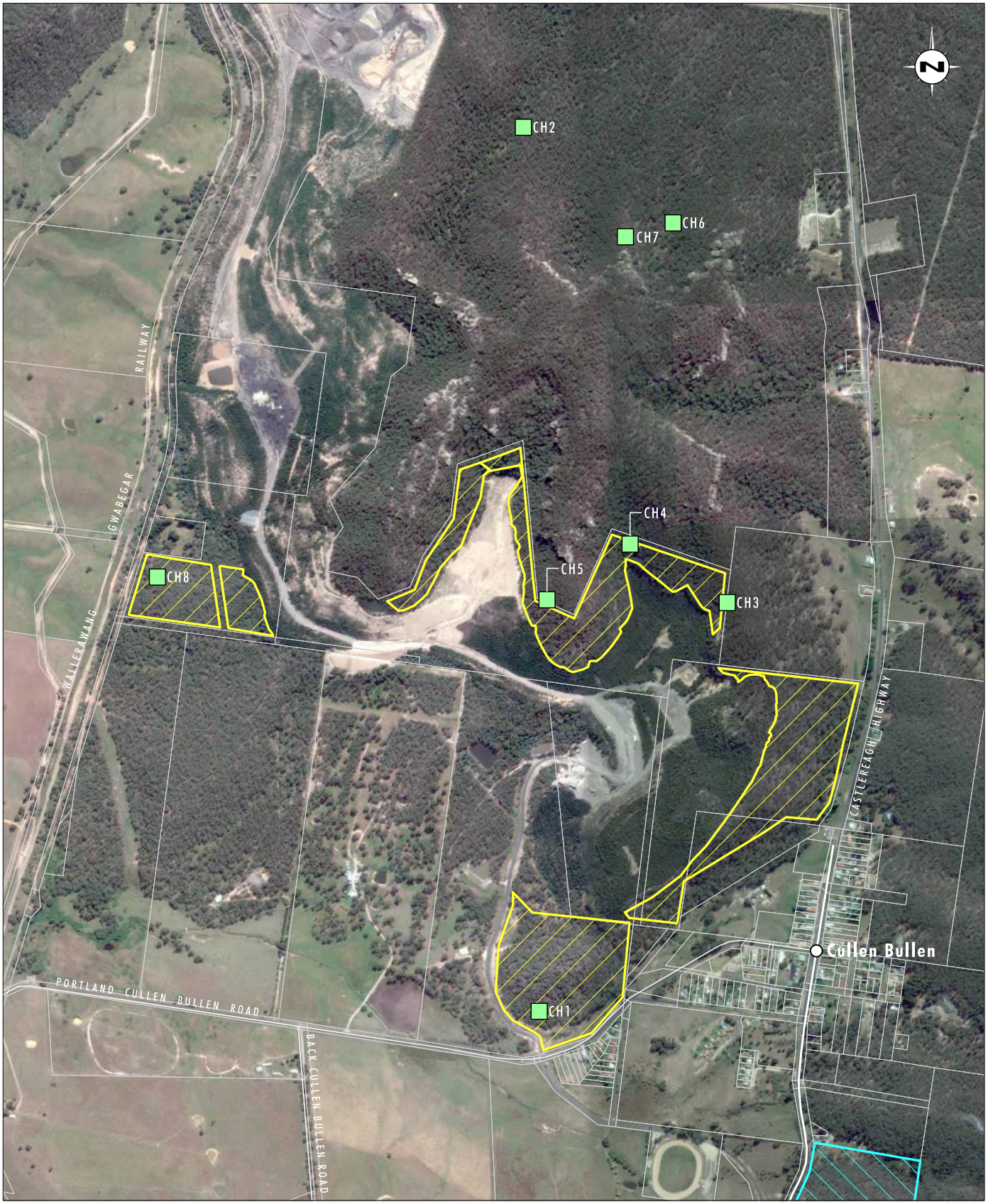


Image Source: Google Earth (MAR 2015)
Data Source: Kleinfelder (2017)

0 250 500 750m
1:15 000

Legend

- Compensatory Habitat Area
- Biodiversity Offset Area
- Compensatory Habitat Monitoring Sites

FIGURE 6.3

Compensatory Habitat Monitoring Sites
Cullen Valley Mine

Image Source: Google Earth (MAR 2015)
Data Source: Kleinfelder (2017)

0 100 200 400m
1:7 500

Legend

Sub-surface Heating Impact Areas

FIGURE 6.4

Sub-surface Heating Impact Areas
Cullen Valley Mine

7.0 Water Management

7.1 Water Management System

The water management system at CVM has been designed, as far as possible, as a closed loop system. All water that enters the site via rainfall or through the water table is diverted to a series of settlement dams within the site.

There are four dams currently on site, two of which are licensed discharge points for the site. These are LD001 (Dam 1) and LD004 (Dam 4). Two other settlement dams (Dam 2 and Dam 3) are used to store water during heavy rainfall events from predominately hardstand areas and from batter slopes of the noise/visual bund. The dams are generally kept at low, approximately 1/3 of capacity, levels unless periods of extended dry conditions occur or are forecast.

The primary source of water for CVM is from the abandoned and flooded Tyldesley Mine underground workings via the Tilley's Bore (GW01). The water is pumped from the workings to two 500,000L tanks when required. Distribution around the site is by gravity fed water mains.

Secondary sources of water come from the mine's pollution control dams. Any excess water captured in the open void (Pit 106) will be pumped to Dam 4. Water from Dam 4 can be transferred to Dam 1 to be used for dust suppression and/or pumped into the underground workings.

All rehabilitation areas are designed with large contour drains which capture runoff during rain events. Due to the location of a large section of the rehabilitation over the old underground workings of the abandoned Tyldesley Colliery, water that percolates through the soil will ultimately flow into the underground workings for storage. The water level of the underground workings is monitored and recorded on a regular basis.

In the event that heavy vehicles are required for planned activities or maintenance works and the haul road is used, a water cart will be made available to ensure air quality impacts are minimised. The water cart will draw water from designated water fill points as per the water management system. The potable water supply will continue to be sourced from an existing connection to the Fish River Water Supply pipeline.

7.2 Water Take

There has been no water drawn from external sources under licences. Licence and water take information is summarised in **Table 7.1**.

Table 7.1 Water take

Water Licence #	Water sharing plan, source and management zone (as applicable)	Entitlement	Passive take / inflows	Active pumping	Total
WAL27898	Sydney Basin MDB Groundwater Source Water Sharing Plan – NSW Murray Darling Basin porous rock groundwater sources	80 units	0	0	0

8.0 Rehabilitation

8.1 Status of Mining and Rehabilitation

Buildings and workshops are maintained and inspected by site personnel on a weekly basis. Infrastructure that has been retained on site is maintained and undergoes regular electrical and mechanical inspections to ensure the safety and integrity of equipment.

Mine pits, voids and unshaped emplacement areas as well as access tracks and water management structures are inspected on a weekly basis by site personnel and maintenance and repairs are undertaken as required. Previously established rehabilitation areas include 132.8 ha of land mined since the commencement of open cut mining operations at the CVM. No rehabilitation is forecast to be undertaken during 2017. It is estimated that approximately 1 hectare of rehabilitation maintenance related to subsurface heating and erosion controls will be undertaken during 2017.

The status of rehabilitation at CVM is detailed in **Table 8.1.**

Table 8.1 CVM Rehabilitation Status

Mine Area Type	Previous Report Period (actual) 2015 (ha)	This Report Period (actual) 2016 (ha)	Next Report Period (forecast) 2017 (ha)
A. Total mine footprint (all areas including active disturbance areas and rehabilitation areas)	193.9	193.9	193.9
B. Total active disturbance (areas within the footprint still requiring rehabilitation)	56.7	56.7	56.7
C. Land being prepared for rehabilitation	4.4	4.4	4.4
D. Land under active rehabilitation	132.8	132.8	132.8
E. Completed rehabilitation (areas that have achieved completion criteria and been signed-off by DRE)	0	0	0

The progress of rehabilitation at CVM has been reviewed against the rehabilitation performance measures and criteria of the approved CVM C&M MOP (December 2015) and is summarised in **Section 8.3**.

8.2 Post Rehabilitation Land Uses

The proposed final land use aims to emulate the pre-mining environment and will enhance local and regional ecological linkages across the site and with adjacent areas. The primary objective of site revegetation and regeneration is to create a stable final landform with acceptable post-mining land use and suitability.

Rehabilitation will be established progressively once mining operations recommence and will be managed in accordance with the Flora and Fauna Management Plan. In the long term, rehabilitation areas will become integrated with adjacent native vegetation communities. Rehabilitation areas will continue to be monitored on an annual basis and will be managed until self-sustaining. Final rehabilitation areas will achieve the rehabilitation completion criteria specified in the approved CVM C&M MOP prior to relinquishment.

8.3 Completion Criteria Assessment

The results of the 2016 biodiversity monitoring program have been compared against the objectives of the CVM FFMP. An objective of the FFMP is to determine whether the management techniques being employed in the rehabilitation areas are successful in providing consistent or improved habitat for native flora and fauna. Monitoring undertaken during 2016 has indicated that the CHAs within CVM are providing consistent native flora and fauna habitat compared to baseline information and previous annual monitoring results.

An assessment of the rehabilitation of CVM against the MOP Completion Criteria is provided in **Table 8.2**. It is noted that not all criteria from the MOP were assessed during the 2016 Biodiversity monitoring surveys as some criteria had not yet been triggered e.g. criteria related to the decommissioning of infrastructure. Criteria relevant to rehabilitation works undertaken to date on site are shown in **Table 8.1**. There were no further actions identified as being required as a result of the biodiversity monitoring undertaken.

Table 8.2 Assessment of Rehabilitation progress from MOP Completion Criteria

Domain Objectives	Performance indicators	Completion criteria	Progression Status from 2016 Biodiversity Monitoring
Revegetation works are undertaken in accordance with the Flora and Fauna Management Plan.	Plant establishment	Planting/seeding is assessed during annual monitoring as becoming successfully established.	Planting/seeding was assessed during 2016 monitoring as becoming successfully established.
Established rehabilitation areas to be monitored on an annual basis and managed until self-sustaining.	Species composition	A range of native shrubs, grasses and other understorey species have established through topsoil, seeding or recolonization.	A range of local species are present within the Rehabilitation Areas.
	Plant health	More than 75% of trees are healthy and growing as indicated by monitoring.	All Rehabilitation Areas, apart from the 2010 areas, were found to have 75% or more healthy trees. Given the current care and maintenance status of the site, it is expected that the 2010 Rehabilitation Areas will passively regenerate over time. All other Rehabilitation Areas inspected were considered to meet this criteria milestone.
	Weed establishment	A spraying program for the control of declared plants and other weeds has been implemented on the site.	A spraying program for the control of declared plants and other weeds has been implemented on the site.
	Soil conditions	Soil salinity is sufficiently low to allow survival and growth of plant species, soil pH levels are within the range to allow plant growth.	Not monitored as part of the 2016 monitoring report.

Domain Objectives	Performance indicators	Completion criteria	Progression Status from 2016 Biodiversity Monitoring
	Fauna habitat structure	Fauna habitat includes a range of vegetation structural habitats, e.g. eucalypts, shrubs, ground cover and a developing litter layer.	Rehabilitated Areas are not old enough to support the range of habitats. The rehabilitated areas are progressing towards the pre-existing or surrounding landforms.
	Presence of fauna species	Vertebrate surveys demonstrate that bird, mammal, reptile and frog communities are becoming established in rehabilitated sites.	Fauna surveys were conducted in Rehabilitation Areas for the first time in 2016. The results suggest that sustainable animal populations are becoming established. Further evidence will be drawn from future monitoring events.
	Biodiversity monitoring	Annual biodiversity monitoring indicates that rehabilitation areas are becoming integrated with adjacent vegetation communities	Rehabilitated Areas are not old enough to support the range of habitats provided by the surrounding un-mined forests and woodlands. The rehabilitated areas are progressing towards the pre-existing or surrounding landforms.
Final rehabilitation areas to achieve rehabilitation completion criteria	Vegetation cover	No bare areas that have obviously failed and are greater than 0.5ha in total area.	Bare areas were noted within the 2014 Rehabilitation Areas. It is expected that these areas will passively regenerate over time and will naturally recruit from surrounding areas. All other Rehabilitation Areas inspected were considered to meet this criteria milestone.
	Tree cover	No treeless areas greater than 0.5ha are present.	No treeless area greater than 0.5 hectares were observed during the 2016 monitoring.
	Shrub/grass cover	Monitoring and visual estimation show grass or shrub cover to be >50%.	Monitoring and visual estimation show grass or shrub cover to be >50% on the Rehabilitation areas in 2016. It is noted that these are mainly exotic cover crop species.

Domain Objectives	Performance indicators	Completion criteria	Progression Status from 2016 Biodiversity Monitoring
Water management system to be maintained and monitored in accordance with the Water Management Plan	Mine affected water	Clean water is diverted around unsealed areas and directed through the water management system.	Water Management System was not upgraded or revised during the 2016 report period.
Disturbed landform is graded and shaped to reflect natural landforms and is free-draining.	Sediment and erosion control	Weekly monitoring by the MEM and annual monitoring of rehabilitation areas does not detect any major erosion/washouts that will compromise vegetation establishment or safety of final surfaces.	Failed erosion and sediment controls have been identified across the site as detailed in **Section 6.9**. Further action to address these issues is detailed in **Section 12.0**.
Water management system to be maintained and monitored in accordance with the Water Management Plan.	Water management system	Clean water to be diverted around operational mining areas and directed through the water management system.	No changes were made to site Water Management System during 2016.
		Mine affected water and sediment laden water from bare ground surfaces is captured and diverted to sediment ponds and dams for treatment prior to discharge from the site.	No changes were made to site Water Management System during 2016.
Water management structures to be retained in place until rehabilitation is complete and post-mining landforms achieve stability and land use suitability.	Discharge water quality	Water quality at the licenced discharge point is assessed as being within licence release limits prior to discharge	Water Quality for samples taken from site were within EPL limits during 2016.

8.4 Rehabilitation Activities

Although the mine is in care and maintenance, management and monitoring of rehabilitation areas is undertaken in accordance with the approved CVM Flora and Fauna Management Plan (Coalpac, September 2012).

There has been no renovation or removals of buildings or other infrastructure and no new rehabilitation areas were established during the 2016 report period as the mine is currently in care and maintenance. Rehabilitation activities undertaken during the report period focused on assessment of failed vegetation in existing rehabilitation areas. These rehabilitation activities included:

- Assessment of failed rehabilitation areas
- Monitoring of vegetation dieback in subsurface heating areas
- Repair and rectification of erosion washouts and erosion control devices
- Revegetation of the noise bund.

In the long term, rehabilitation areas are to become integrated with adjacent native vegetation communities. There were no exploration activities or variation to activities proposed in the C&M MOP conducted at CVM during the report period.

8.5 Actions for the Next Report Period

During 2017, rehabilitation works will involve:

- further subsurface heating capping works as described in **Section 6.10**;
- re-vegetation of vegetation dieback areas following subsurface heating capping works.

9.0 Community

9.1 CCC Meetings

Two meetings were held in 2016 with CCC members on 10 March 2016 and 8 September 2016. During these meetings, information was presented on environmental monitoring, statutory reporting, updated MOPs, the results of Independent Environmental Audits and remediation works carried out in rehabilitation areas. Members were also given presentations on the proposed Invincible Colliery Southern Extension Project.

The outcomes of the CCC meetings are detailed in the meeting minutes available on the Castlereagh Coal website.

9.2 Complaints

Shoalhaven Coal maintains a complaints register to record and respond to complaints received from the community. There were four complaints received from the local community in relation to odour emissions from sub-surface heating areas during the 2016 report period. No other complaints were received.

A comparison of complaints received between 2011 and 2016 is outlined in **Table 9.1** below.

Table 9.1 Comparison of Complaints

Complaint type	2011	2012	2013*	2014	2015	2016
Noise	9	9	1	0	1	0
Air quality	5	5	2	0	1	0
Blasting	3	5	0	0	0	0
Traffic	4	13	0	0	0	0
Water	0	0	0	2	0	0
Subsurface Heating	2	-	-	-	-	4
Other	2	4	2	1	0	0
Total	**25**	**36**	**5**	**3**	**2**	**4**

** CVM was placed in care and maintenance in December 2012*

10.0 Audit Information

10.1 DPE Independent Environmental Audit

An Independent Environmental Audit (IEA) was conducted during the report period in accordance with Schedule 6, Condition 6 of the project approval DA-200-5-2003. The IEA was conducted on-site by SLR Consulting on 7th and 8th September 2016 and the final audit report was received on 25th November 2016.

The audit timeframe covered the period from November 2010 to September 2016. The mine was operated by the previous mine owner Coalpac up until May 2015. The current owner, Shoalhaven Coal, was only responsible for operations from May 2015 onwards and therefore many of the non-compliances detected by the audit were outside the control of Shoalhaven Coal. In addition, a large number of the non-compliances that have occurred during Shoalhaven Coal's ownership are as a direct result of historical practices conducted by Coalpac.

Shoalhaven Coal is currently addressing all issues identified during the audit. An Action Plan was developed as an outcome of the audit findings and follow up actions have been implemented as required in consultation with DPE. The current status of outcomes relating to the 2016 audit is presented in **Appendix 2.**

11.0 Incidents and Non-compliances during the Report Period

There were no environmental incidents causing or threatening material environmental harm at CVM during the 2016 report period.

As identified in **Appendix 2**, there were a number of non-compliances identified during the IEA conducted at CVM. Many of these non-compliances occurred during ownership by Coalpac and were outside the control of Shoalhaven Coal. In addition, a large number of the non-compliances that have occurred during Shoalhaven Coal's ownership occurred as a direct result of historical practices conducted by Coalpac. Shoalhaven Coal are currently addressing all issues identified during the audit and have substantially progressed works in the area of Biodiversity Monitoring and in the rehabilitation of subsurface heatings.

12.0 Activities to be Completed in the Next Report Period

There are no mining activities proposed at CVM in the next report period (1 Jan 2017 – 31 Dec 2017) as the site is currently managed under a care and maintenance arrangement. Care and maintenance activities will be limited to:

- Monitoring and treatment of subsurface heating areas as required (refer to **Section 6.10**). As noted during the IEA and in correspondence received from DRE during 2016, subsurface heating remains an issue requiring ongoing remediation. Specific works to be undertaken at CVM to manage subsurface heating during 2017 are detailed in **Table 12.1** below.

Table 12.1 2017 Subsurface Heating Actions

Heating Area	Action for 2017
F1	• The expansion and dieback of vegetation appeared to be contained during the 2016 Biodiversity Monitoring inspection. Capping of heating areas had been undertaken through the utilisation of earthworks. Ongoing monitoring will be undertaken during 2017 to confirm appropriate remediation of heating areas.
F2	• Further investigation will be undertaken into the heating in this area and appropriate remediation techniques (such as capping) will be employed as required.
R1	• Further investigation will be undertaken into capping methods and requirements for the site. Actions such as capping and sealing sub-surface heating cracks, which have been used effectively at the F1 and F2 heating areas will be considered.

- In accordance with DRE requirements, an updated C&M MOP will be prepared during Quarter 4 2017. In accordance with the requirements of DRE letter (OUT 16/26409) dated 20 July 2016, DRE expect that a revised Plan of Works (PoW) for the management of subsurface heatings will be prepared and submitted with the revised C&M MOP. The revised PoW is required to:
    - Identify all areas that are heat affected throughout the mine site
    - Identify potential areas that may become affected by subsurface heating
    - Detail strategies and actions which will contain and extinguish the subsurface heating
    - Provide a monitoring regime (before, during and after works) and
    - Include timeframe commitments for the works to be undertaken and the targets to be achieved.

- Repair and rectification of erosion washouts and erosion control devices. As described in **Section 6.9,** the site has been assessed as having moderate to severe erosion (rilling) since monitoring commenced in 2011. As a result, Shoalhaven Coal will review the potential erosion control works during 2017 to determine whether there are any suitable drainage repair works which can be undertaken to improve erosion control at CVM. Works to be undertaken during 2017 include the repair the damaged erosion and sediment controls at the site, in particular, repair of the current drop structure at the northern end of the site. This work will involve:
    - Repair of the existing washout from the contour drain
    - Repair of the existing damaged drop structure and
    - Revision of the drainage flow path within the existing contour drain to enhance flow.
- Monthly monitoring of air quality, surface water and weather station data
- Annual groundwater monitoring, biodiversity monitoring and weed spraying
- Assessment of potentially failed rehabilitation areas and
- Monitoring of vegetation dieback in subsurface heating areas.

13.0 References

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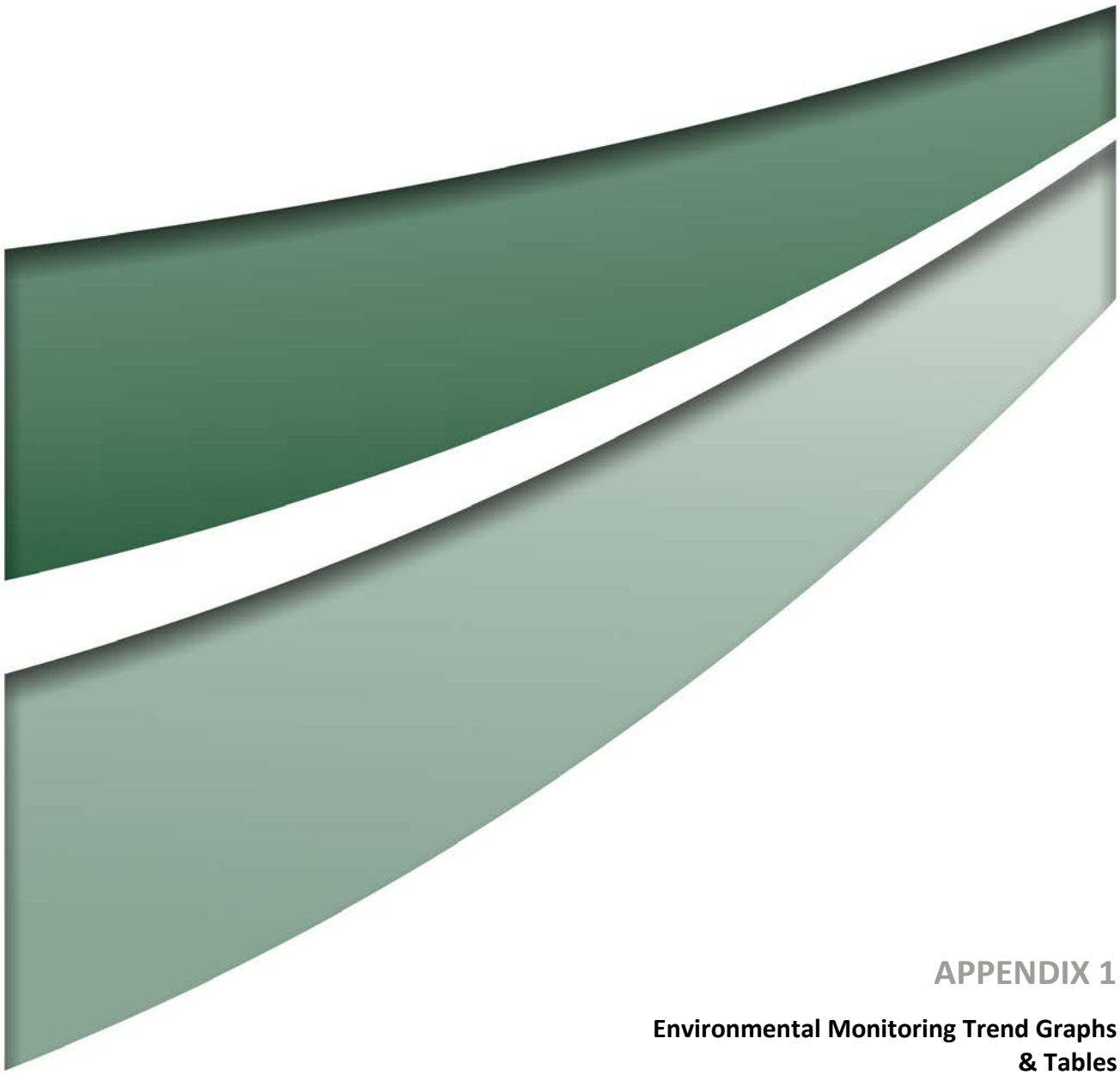
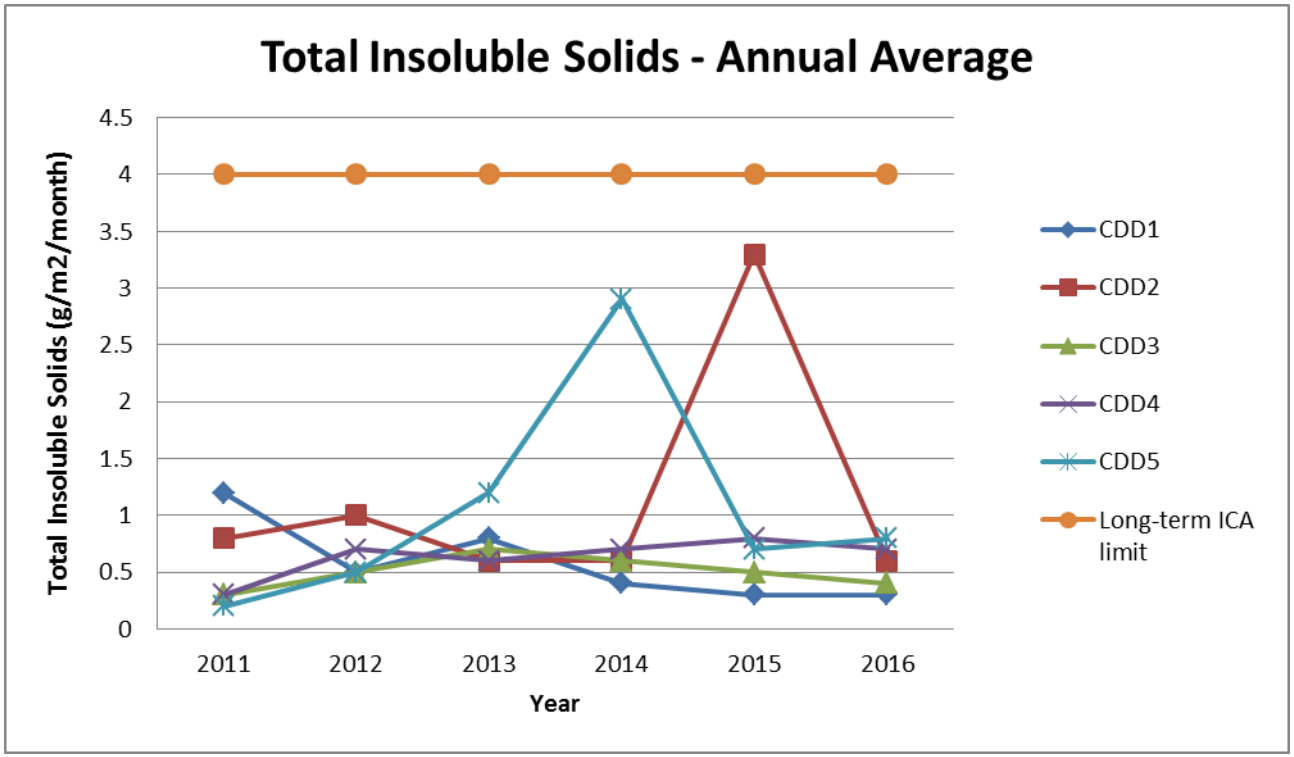
SLR Consulting (2016). Cullen Valley Mine Independent Environmental Audit. Prepared for Shoalhaven Coal Pty Limited

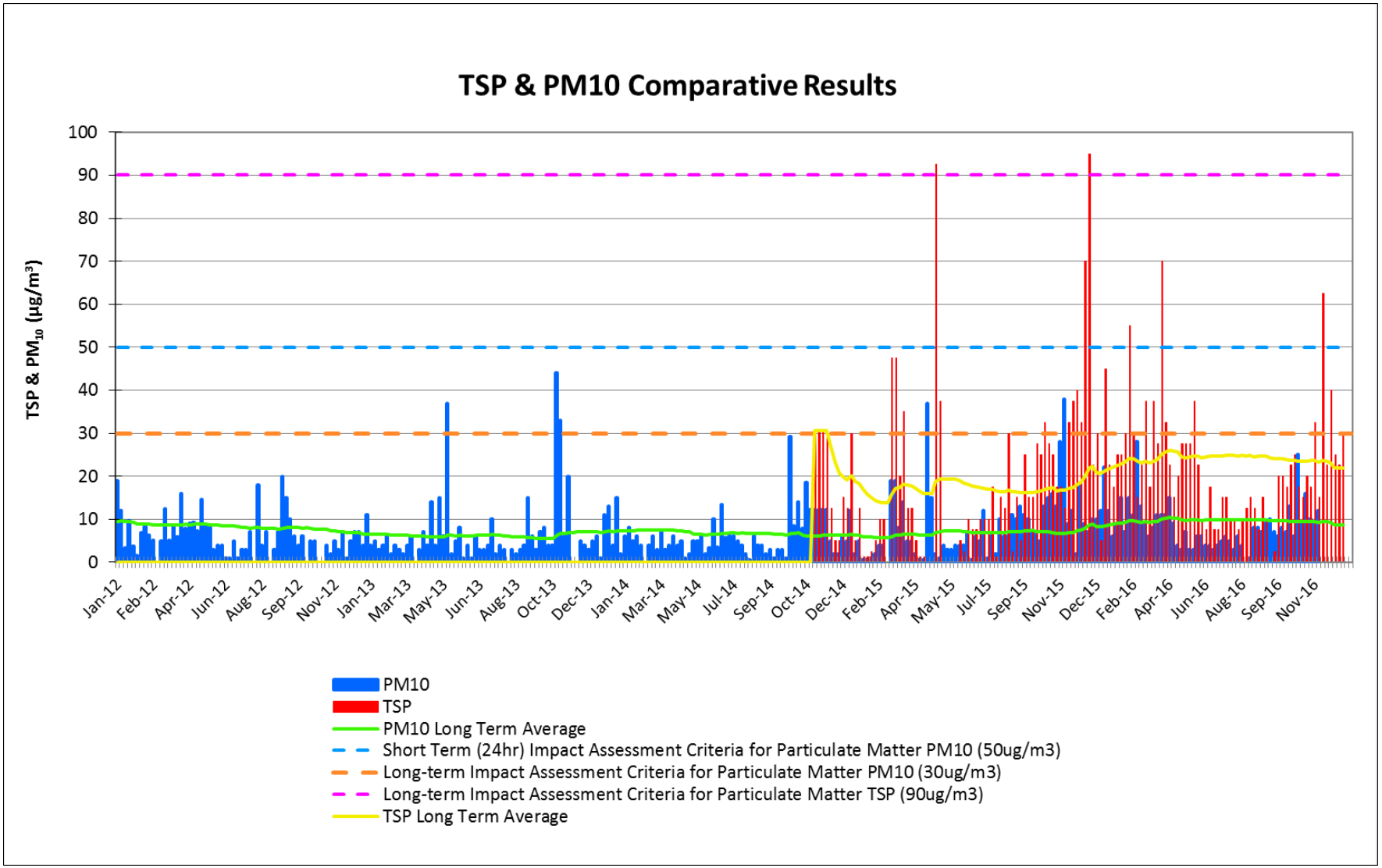
Umwelt (Australia) Pty Limited (2017). 2016 Biodiversity Offset Monitoring of Cullen Valley Mine and Invincible Colliery. Prepared for Shoalhaven Coal Pty Limited.

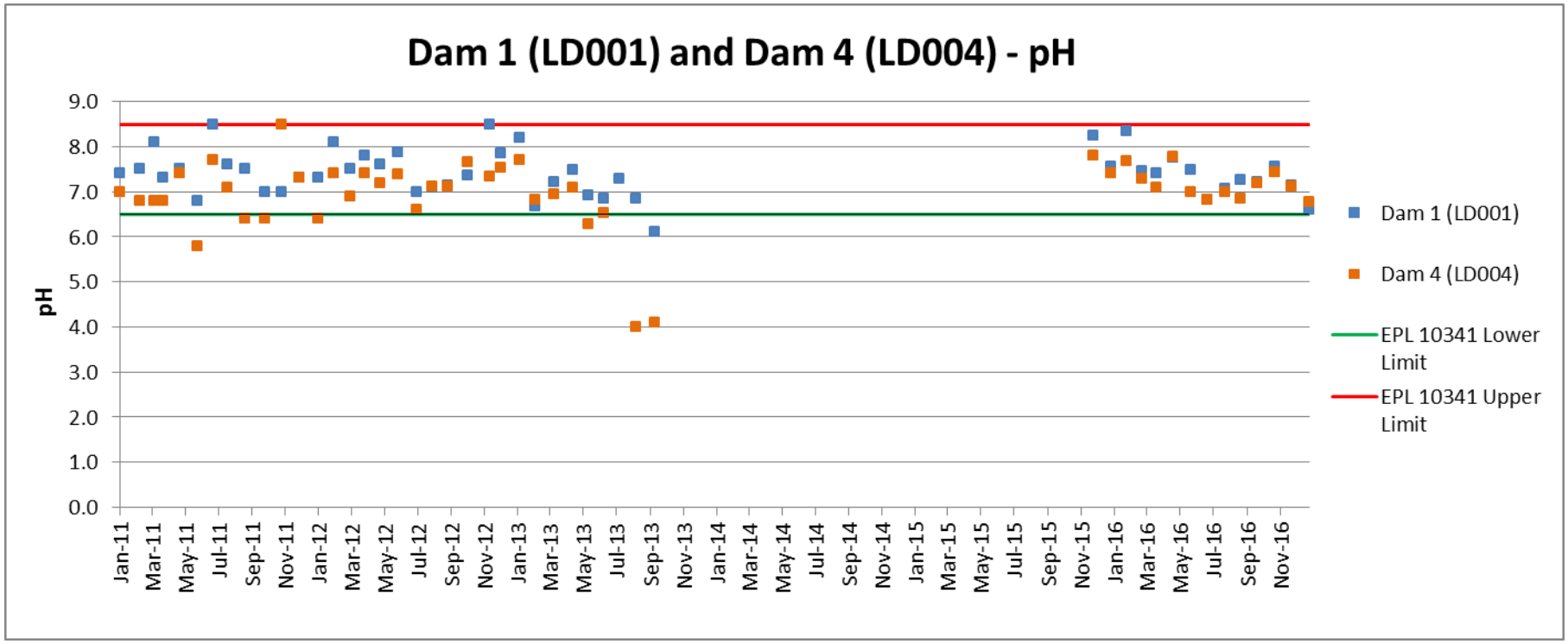


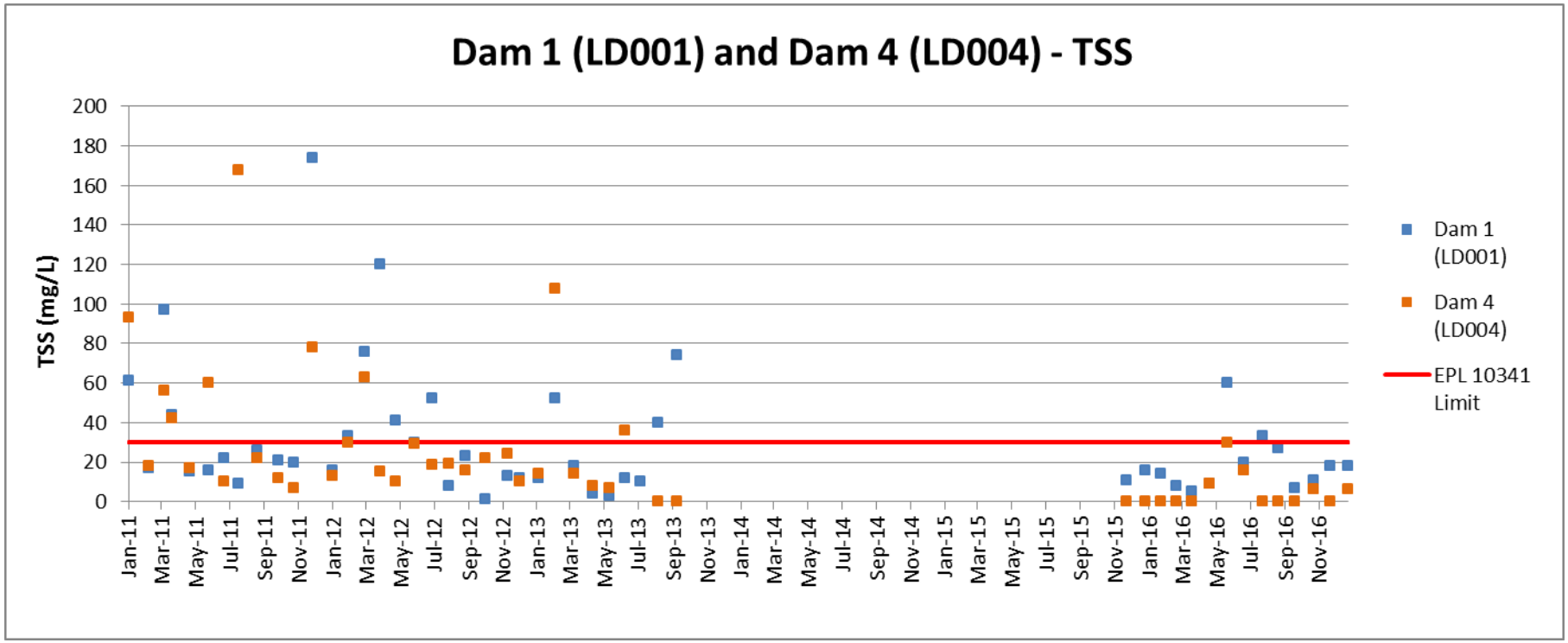
APPENDIX 1

Environmental Monitoring Trend Graphs & Tables

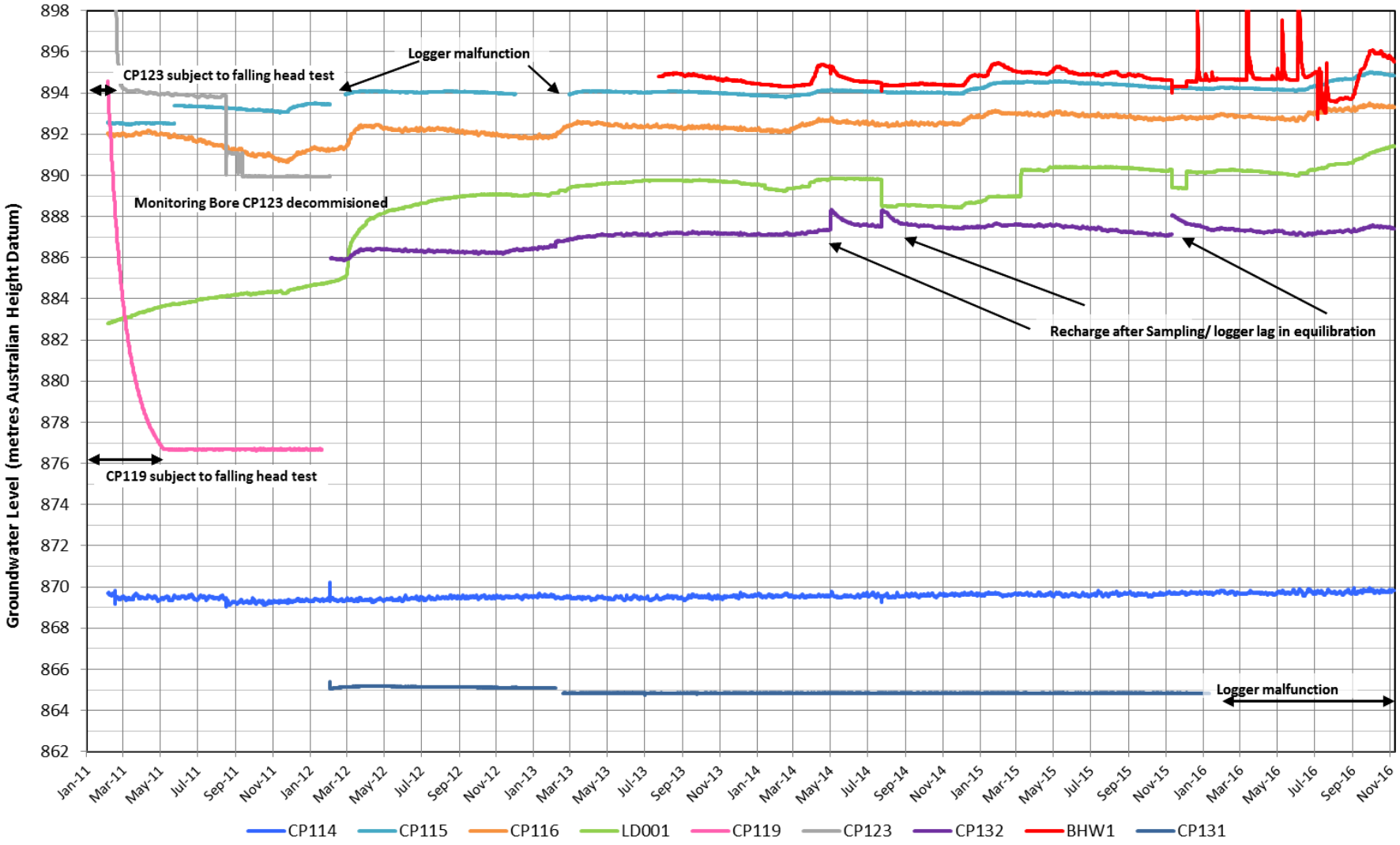

Total Insoluble Solids - Annual Average
Total Insoluble Solids (g/m2/month)
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
2011
2012
2013
2014
2015
2016
Year
CDD1
CDD2
CDD3
CDD4
CDD5
Long-term ICA limit

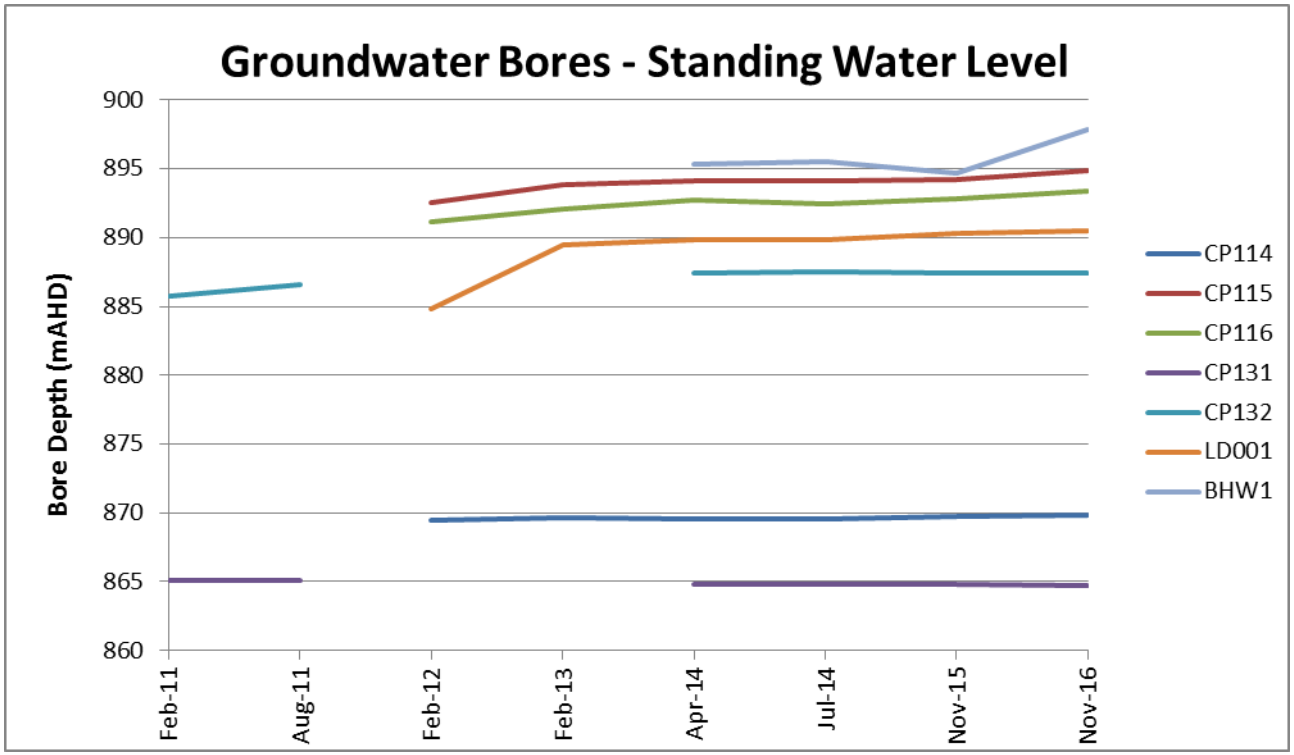

TSP & PM10 Comparative Results
TSP & PM10 (µg/m³)
100
90
80
70
60
50
40
30
20
10
0
Jan-12
Feb-12
Apr-12
Jun-12
Aug-12
Sep-12
Nov-12
Jan-13
Mar-13
May-13
Jun-13
Aug-13
Oct-13
Dec-13
Jan-14
Mar-14
May-14
Jul-14
Sep-14
Oct-14
Dec-14
Feb-15
Apr-15
May-15
Jul-15
Sep-15
Nov-15
Dec-15
Feb-16
Apr-16
Jun-16
Aug-16
Sep-16
Nov-16
PM10
TSP
PM10 Long Term Average
Short Term (24hr) Impact Assessment Criteria for Particulate Matter PM10 (50ug/m3)
Long-term Impact Assessment Criteria for Particulate Matter PM10 (30ug/m3)
Long-term Impact Assessment Criteria for Particulate Matter TSP (90ug/m3)
TSP Long Term Average

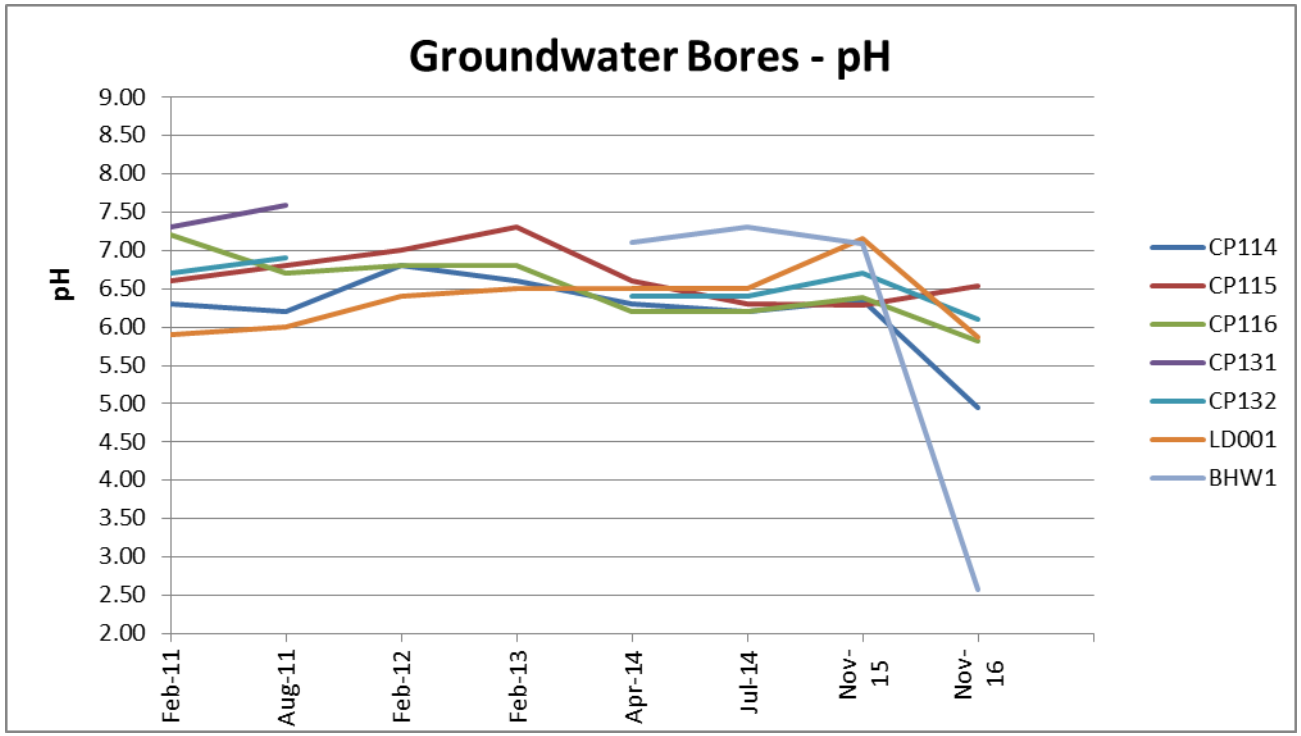

Dam 1 (LD001) and Dam 4 (LD004) - pH
pH
9.0
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
Jan-11
Mar-11
May-11
Jul-11
Sep-11
Nov-11
Jan-12
Mar-12
May-12
Jul-12
Sep-12
Nov-12
Jan-13
Mar-13
May-13
Jul-13
Sep-13
Nov-13
Jan-14
Mar-14
May-14
Jul-14
Sep-14
Nov-14
Jan-15
Mar-15
May-15
Jul-15
Sep-15
Nov-15
Jan-16
Mar-16
May-16
Jul-16
Sep-16
Nov-16
Dam 1 (LD001)
Dam 4 (LD004)
EPL 10341 Lower Limit
EPL 10341 Upper Limit

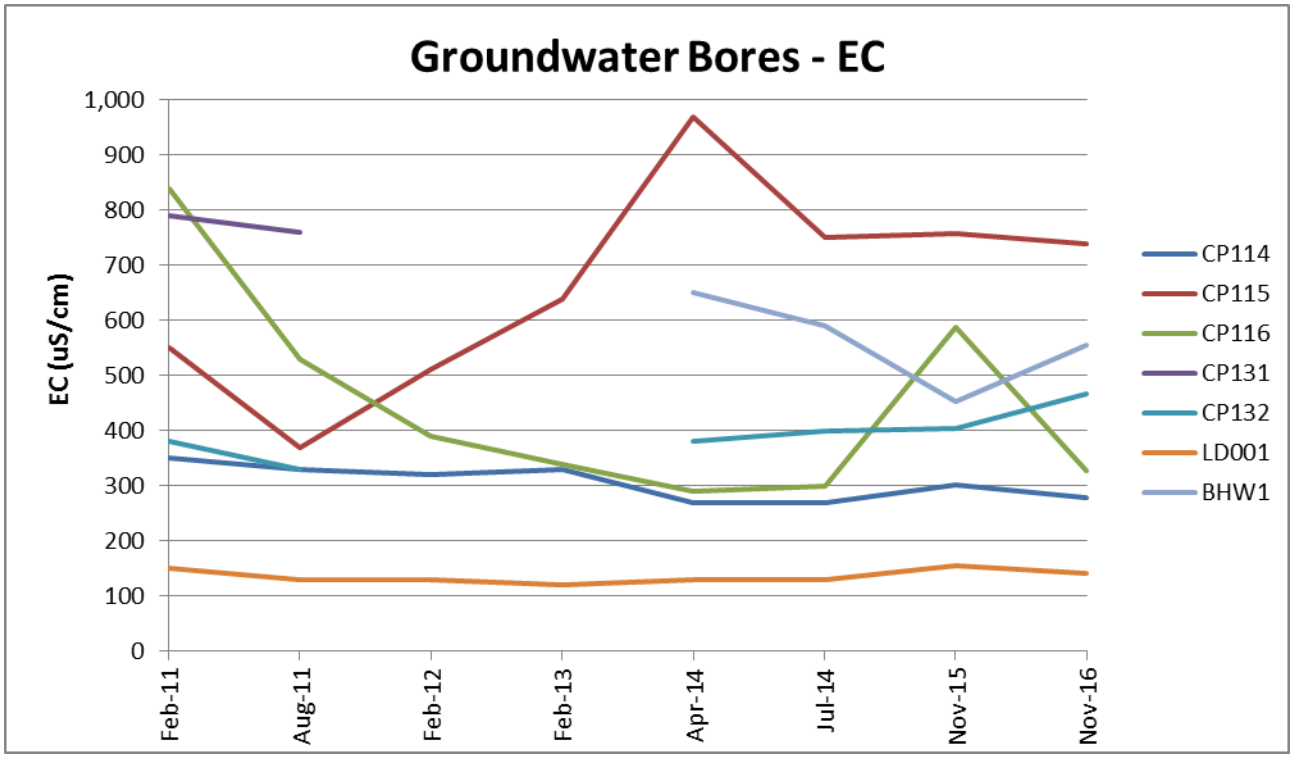

Dam 1 (LD001) and Dam 4 (LD004) - TSS
TSS (mg/L)
200
180
160
140
120
100
80
60
40
20
0
Jan-11
Mar-11
May-11
Jul-11
Sep-11
Nov-11
Jan-12
Mar-12
May-12
Jul-12
Sep-12
Nov-12
Jan-13
Mar-13
May-13
Jul-13
Sep-13
Nov-13
Jan-14
Mar-14
May-14
Jul-14
Sep-14
Nov-14
Jan-15
Mar-15
May-15
Jul-15
Sep-15
Nov-15
Jan-16
Mar-16
May-16
Jul-16
Sep-16
Nov-16
Dam 1 (LD001)
Dam 4 (LD004)
EPL 10341 Limit

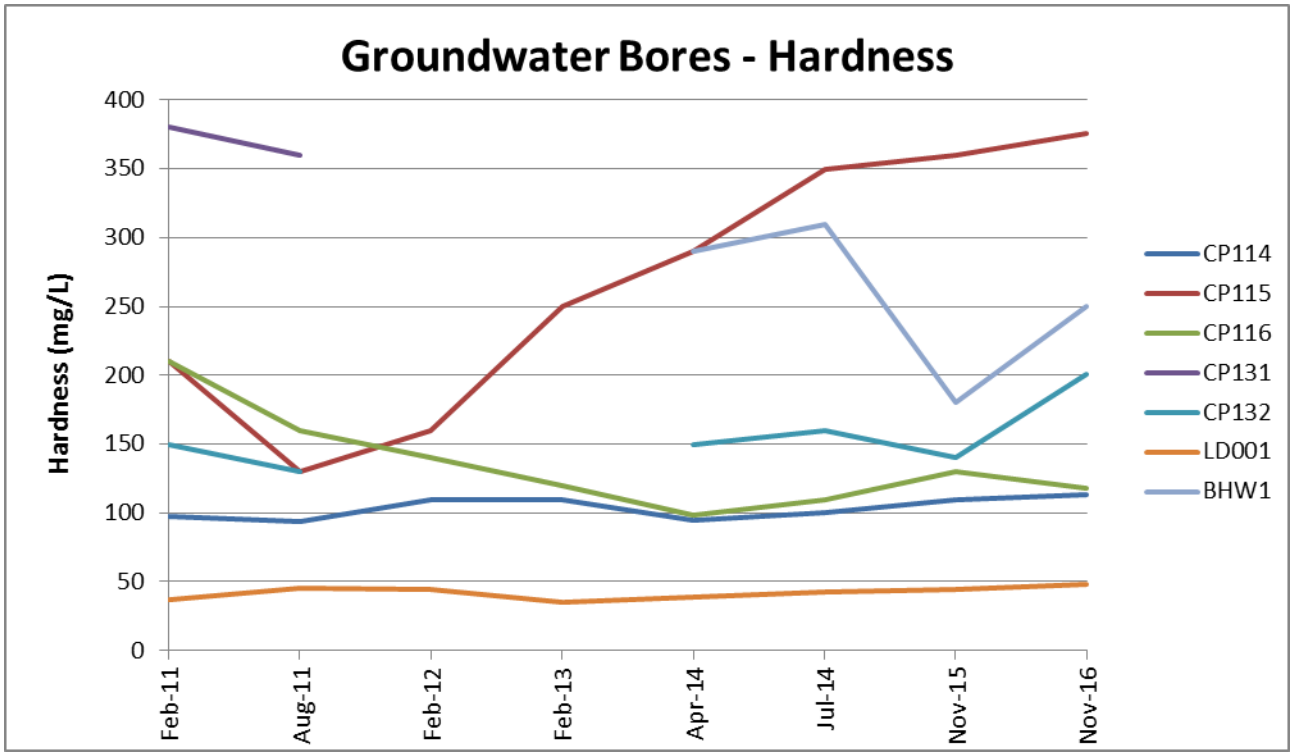
Groundwater Hydrograph

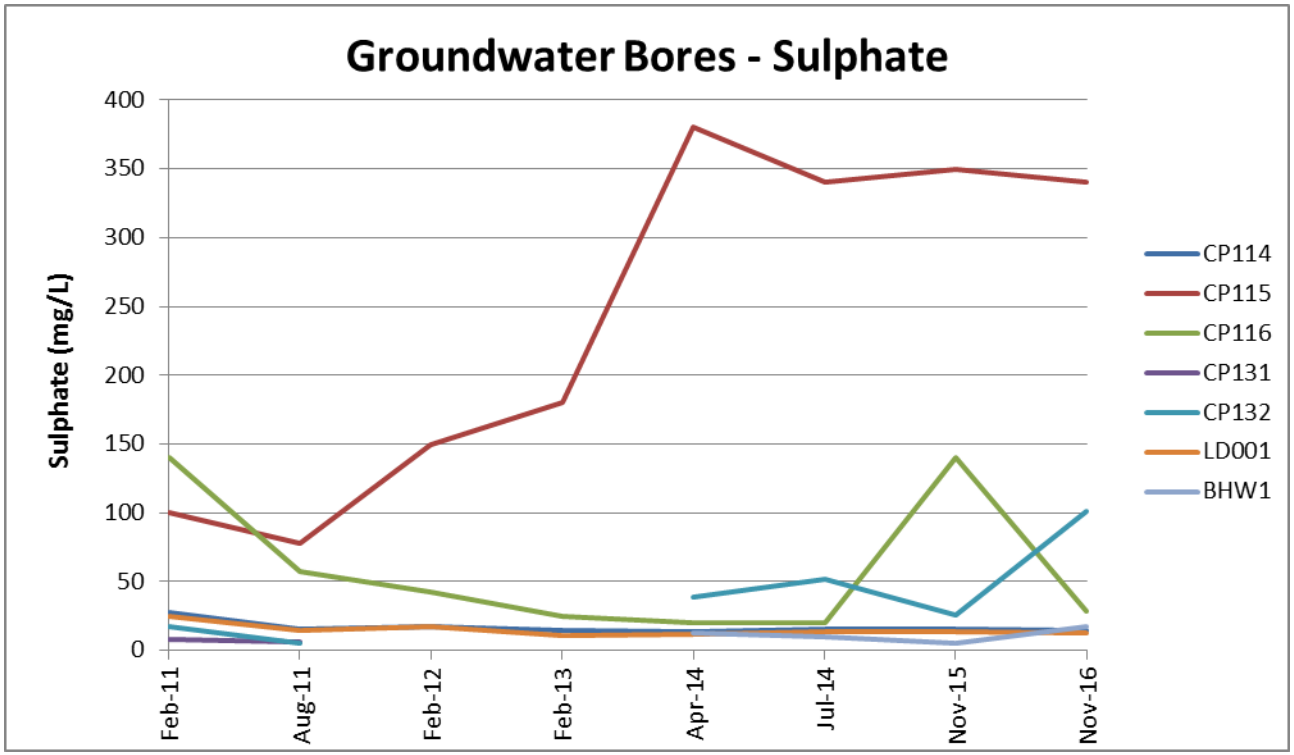


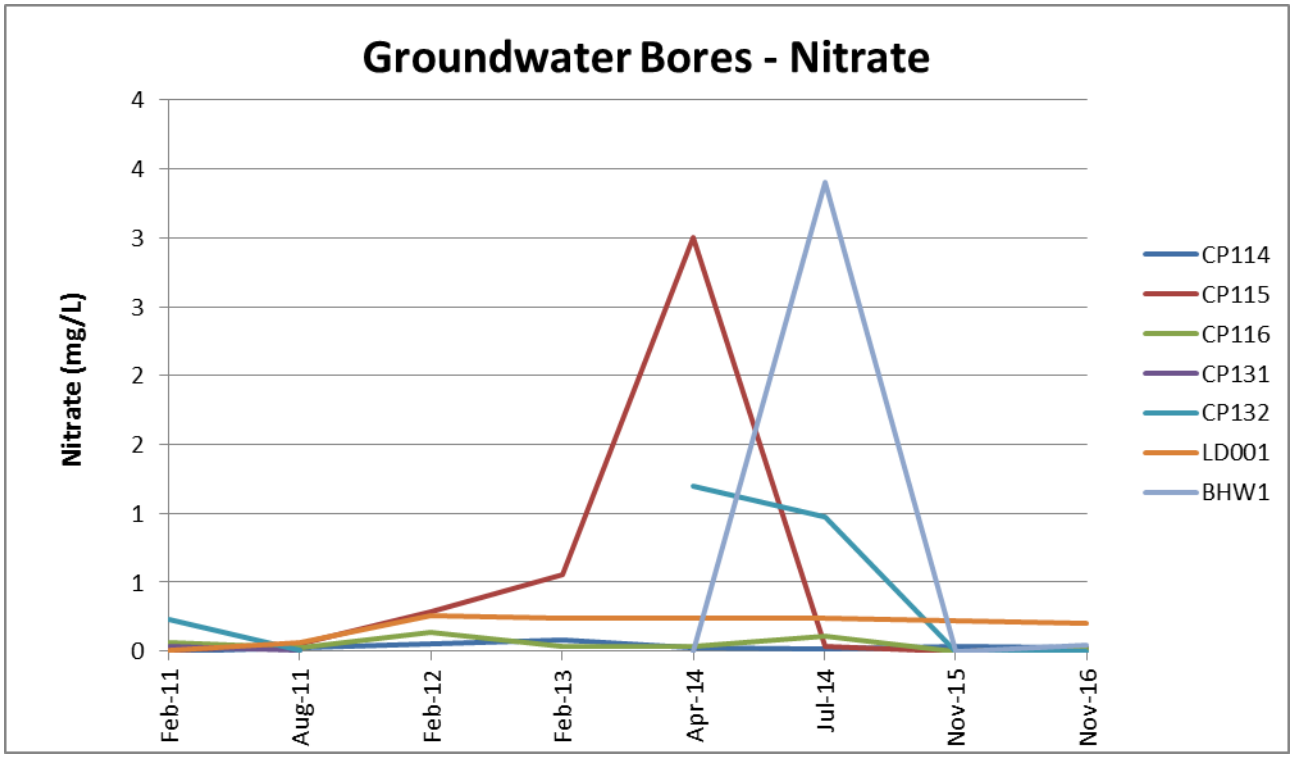

Groundwater Bores - Standing Water Level
Bore Depth (mAHD)
900
895
890
885
880
875
870
865
860
Feb-11
Aug-11
Feb-12
Feb-13
Apr-14
Jul-14
Nov-15
Nov-16
CP114
CP115
CP116
CP131
CP132
LD001
BHW1


Groundwater Bores - pH
pH
9.00
8.50
8.00
7.50
7.00
6.50
6.00
5.50
5.00
4.50
4.00
3.50
3.00
2.50
2.00
Feb-11
Aug-11
Feb-12
Feb-13
Apr-14
Jul-14
Nov-15
Nov-16
CP114
CP115
CP116
CP131
CP132
LD001
BHW1


Groundwater Bores - EC
EC (uS/cm)
1,000
900
800
700
600
500
400
300
200
100
0
Feb-11
Aug-11
Feb-12
Feb-13
Apr-14
Jul-14
Nov-15
Nov-16
CP114
CP115
CP116
CP131
CP132
LD001
BHW1


Groundwater Bores - Hardness
Hardness (mg/L)
400
350
300
250
200
150
100
50
0
Feb-11
Aug-11
Feb-12
Feb-13
Apr-14
Jul-14
Nov-15
Nov-16
CP114
CP115
CP116
CP131
CP132
LD001
BHW1


Groundwater Bores - Sulphate
Sulphate (mg/L)
400
350
300
250
200
150
100
50
0
Feb-11
Aug-11
Feb-12
Feb-13
Apr-14
Jul-14
Nov-15
Nov-16
CP114
CP115
CP116
CP131
CP132
LD001
BHW1


Groundwater Bores - Nitrate
Nitrate (mg/L)
4
4
3
3
2
2
1
1
0
Feb-11
Aug-11
Feb-12
Feb-13
Apr-14
Jul-14
Nov-15
Nov-16
CP114
CP115
CP116
CP131
CP132
LD001
BHW1

Monitoring Results

The water quality monitoring results for CVM are shown in **Table A.**

Table A Water quality monitoring results in site dams and receiving environments

Sampling date	pH	Oil and grease	TSS
Dam 1			
12/1/2016	7.56	<2 mg/L	16 mg/L
10/2/2016	8.34	<2 mg/L	14 mg/L
9/3/2016	7.45	<2 mg/L	8 mg/L
6/4/2016	7.42	<2 mg/L	5 mg/L
6/5/2016	7.76	<2 mg/L	9 mg/L
7/6/2016	7.48	<2 mg/L	60 mg/L
7/7/2016	6.82	<2 mg/L	20 mg/L
10/8/2016	7.06	<2 mg/L	33 mg/L
7/9/2016	7.25	<2 mg/L	27 mg/L
7/10/2016	7.22	<5 mg/L	7 mg/L
9/11/2016	7.55	<5 mg/L	11 mg/L
9/12/2016	7.13	<5 mg/L	18 mg/L
Dam 4			
12/1/2016	7.42	<2 mg/L	<5 mg/L
10/2/2016	7.68	<2 mg/L	<5 mg/L
9/3/2016	7.29	<2 mg/L	<5 mg/L
6/4/2016	7.09	<2 mg/L	<5 mg/L
6/5/2016	7.78	<2 mg/L	9 mg/L
7/6/2016	6.98	<2 mg/L	30 mg/L
7/7/2016	6.81	<2 mg/L	16 mg/L
10/8/2016	6.98	<2 mg/L	<5 mg/L
7/9/2016	6.84	<2 mg/L	<5 mg/L
7/10/2016	7.18	<5 mg/L	<5 mg/L
9/11/2016	7.44	<5 mg/L	6 mg/L

Sampling date	pH	Oil and grease	TSS
9/12/2016	7.12	<5 mg/L	<5 mg/L

The results of groundwater monitoring conducted during the 2016 reporting period are provided in **Table B.**

Table B 2016 Groundwater monitoring results

Sample site	CP114	CP115	CP116	CP131	CP132	LD001	BHW1
Sample date	8/11/16	8/11/16	8/11/16	8/11/16	8/11/16	8/11/16	8/11/16
AHD (RL) (m)	869.83	894.87	893.35	864.75	887.41	890.45	897.86
Depth to aquifer (m)	35.26	55.51	48.47	73.48	17.35	49.68	40.94
pH	4.95	6.54	5.82		6.10	5.87	2.57
Electrical Conductivity (µS/cm	278	738	327		466	142	555
Nitrite (mg/L)	<0.01	<0.01	<0.01		<0.01	<0.01	<0.01
Total Oxidised Nitrogen (mg/L)	0.030	0.02	0.02		<0.01	0.20	0.04
Chloride (mg/L)	17	4.0	17		28	6	24
Nitrate (mg/L)	0.030	0.020	0.020		<0.01	0.200	0.040
Sulphate (mg/L)	15	340	29		101	13	17
Alkalinity (mg/L)	100	57	115		95	46	239
Calcium (mg/L)	27	93	26		46	11	62
Magnesium (mg/L)	11	35	13		21	5	23
Sodium (mg/L)	14	18	12		14	6	12
Potassium (mg/L)	6.0	11	7		10	8	10
Total Hardness (mg $CaCO_3$/L)	113	376	118		201	48	250
Aluminium (µg/L)	<10	<10	<10		220	<10	<10
Arsenic (µg/L)	<1	<1	<1		<1	<1	<1

Sample site	CP114	CP115	CP116	CP131	CP132	LD001	BHW1
Cadmium (µg/L)	<0.1	<0.1	0.2		<0.1	<0.1	0.1
Chromium (µg/L)	<1	<1	<1		<1	<1	<1
Copper (µg/L)	3	<1	<1		<1	14	<1
Iron (µg/L)	<50	4100	10200		8260	<50	80
Lead (ug/L)	<1	<1	<1		1	<1	<1
Manganese (ug/L)	47	399	620		246	2	187
Molybdenum (ug/L)	<1	10	<1		<1	<1	<1
Nickel (ug/L)	2	96	2		<1	9	36
Selenium (ug/L)	<10	<10	<10		<10	<10	<10
Zinc (ug/L)	56	1260	183		94	122	19700
Mercury (mg/L)	<0.0001	<0.0001	<0.0001		<0.0001	<0.0001	<0.0001

** Bore dry.*

Historical Noise monitoring results for years 2015, 2012 and 2011 are shown in Tables C, D and E. Contribution from CVM was inaudible for all monitoring undertaken for 2013, and 2014.

Table C 2015 Quarterly Noise Monitoring Results*

Location	Criterion (dB)	Quarter 1 (L_{Aeq})	Quarter 2 (L_{Aeq})	Quarter 3 (L_{Aeq})	Quarter 4 (L_{Aeq})
Red Springs (N07)	37	42 (IA)	32	43 (IA)	41 (IA)
Hillcroft (N08)	35	34	39 (IA) #	35	38 (IA)
Forest Lodge (N10)	40	40	28	40	42 (IA)
Doble Gate (N09)	43	64 (IA)	49 (IA) #	51 (IA) #	49 (IA)
Tilley (N06)	43	66 (IA)	69 (IA) #	66 (IA) #	69 (IA)

IA – noise from the mine was inaudible therefore criteria do not apply, # these measurements were affected by wind speeds > 3m/s^2 therefore criteria do not apply

Table D 2012 Quarterly Noise Monitoring Results

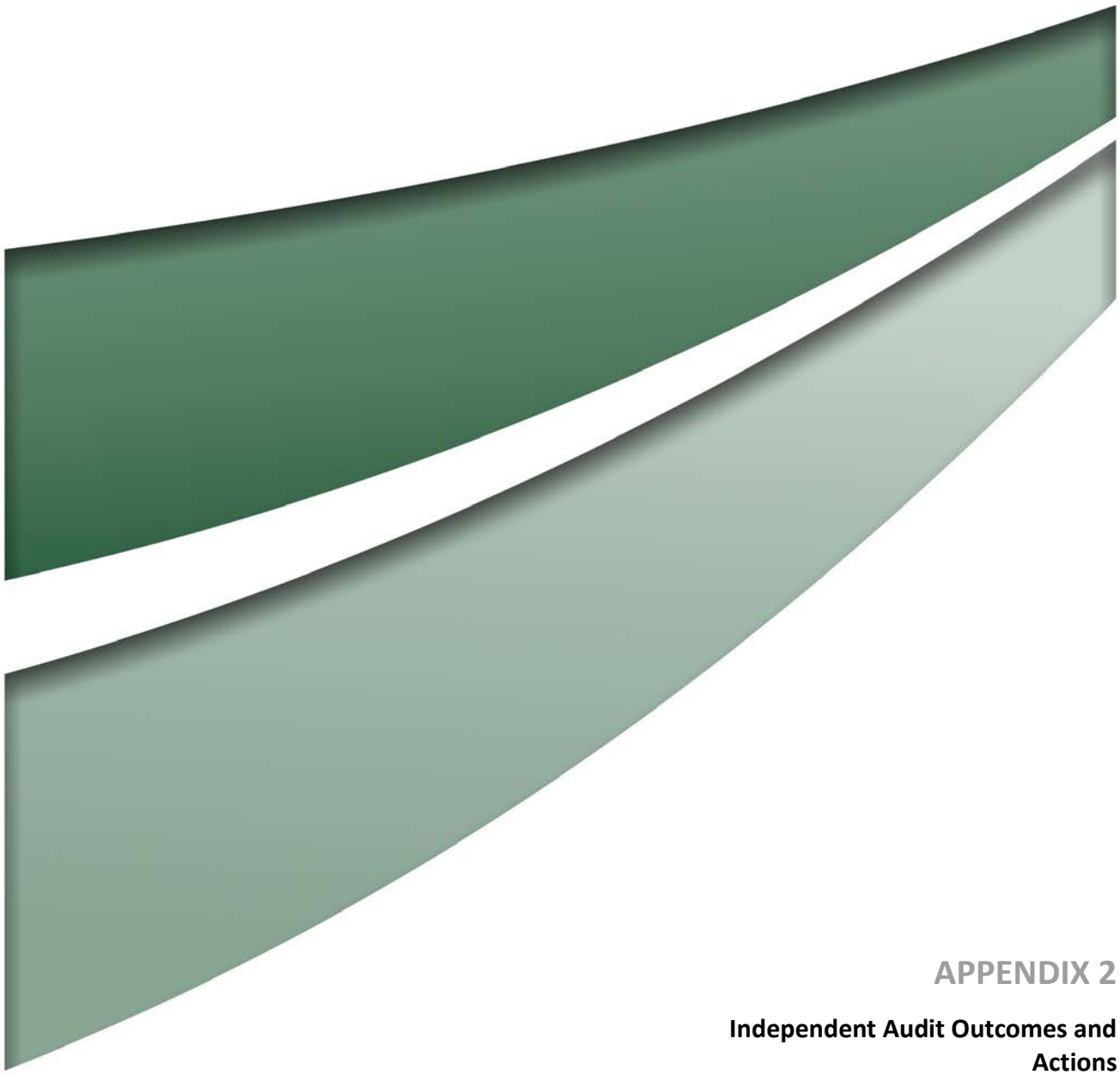
Location	Criterion (dB)	Quarter 1 ($L_{Aeq\ 15min}$)	Quarter 2 ($L_{Aeq\ 15min}$)	Quarter 3 ($L_{Aeq\ 15min}$)	Quarter 4 ($L_{Aeq\ 15min}$)
Red Springs (N07)	37	33	35	30	32
Hillcroft (N08)	35	35	39	32	33
Forest Lodge (N10)	40	<25	30	<25	NM
Doble Gate (N09)	43	IA	IA	IA	IA
Tilley (N06)	43	IA	IA	IA	IA

IA – noise from the mine was inaudible therefore criteria do not apply, NM - noise was not measurable

Table E 2011 Quarterly Noise Monitoring Results

Location	Criterion (dB)	Quarter 1 ($L_{Aeq\ 15min}$)	Quarter 2 ($L_{Aeq\ 15min}$)	Quarter 3 ($L_{Aeq\ 15min}$)	Quarter 4 ($L_{Aeq\ 15min}$)
Red Springs (N07)	37	IA	33	<20	IA
Hillcroft (N08)	35	31	37	30	<20
Forest Lodge (N10)	40	26	<30	<25	<25
Doble Gate (N09)	43	IA	IA	IA	IA
Tilley (N06)	43	IA	IA	IA	IA

IA – noise from the mine was inaudible therefore criteria do not apply



APPENDIX 2

Independent Audit Outcomes and Actions

Appendix 2 Current Status of DPE Audit Actions

Consent Condition	Audit Finding	Compliance	Audit Recommendation	Proposed Action and Timing
DA Sch 4, Condition 2	2010 AEMR - During the report period, CVM complied with the criteria LAeq(15 minute) noise limits at all locations with the exception of Hillcroft in Quarter 1 and 3. The noise levels at Hillcroft exceeded the criteria by 5 and 2 dB(A) respectively. This was outside the audit period. 2011 AEMR - CVM complied with the daytime LAeq (15 minute) noise criteria at all locations during the report period, with the exception of the Hillcroft property (N08) during quarter two. 2012 AEMR - CVM complied with the daytime LAeq (15 minute) noise criteria at all locations during the report period, with the exception of the Hillcroft property (N08) which exceeded the noise criteria on one occasion during quarter two. 2013, 14 and 15 AEMR's - Nil exceedances These noise non - compliances related to when the site was operating and under previous ownership. Noise is a minor issue during care and maintenance, however if mining activities were to recommence there would be a requirement for additional noise controls.	Non-compliant	Noise is a minor issue during care and maintenance, however if mining activities were to recommence there should be a full review of noise mitigation measures to reduce the chance of non - compliances relating to noise. The Noise Management Plan would require to be updated.	Noise exceedances occurred during Coalpac ownership of the mine. The noise management plan would only be updated if and when mining operations recommence at CVM. Noise mitigation measures for mining operations would be reviewed at that time.
DA Sch 4, Condition 27	There have been odour complaints in every year of the audit period with this relating to the area of sub surface heating. These have been outlined in the AEMR/Annual Reviews. There has been some works at site (movement of material) to control the fire/odour issue with investigations still continuing. Based on discussions with site this is an ongoing issue that is being managed by Shoalhaven Coal in consultation with experts and the Departments.	Non-compliant	Continue to investigate issue and develop a strategy to remediate. Continue to monitor and report on the odour issue. Implement actions where possible.	Sub-surface heating is being managed by Shoalhaven Coal in consultation with specialist consultants and the Departments. Shoalhaven are also undertaking reconstruction of contour and flume drains to direct water away from areas to reduce the incidence of venting, smoke and odour. Stage 1 works will be monitored during Q2 and

Consent Condition	Audit Finding	Compliance	Audit Recommendation	Proposed Action and Timing
	Shoalhaven Coal are also resolving drainage issues that are directly linked to 2017 heating issues particularly venting, smoke and odour prior to capping.			Q3 2017. **2016 Annual Review Update** In accordance with Section 12.0 of the Annual Review and DRE requirements, during 2017 Shoalhaven Coal will review and manage subsurface heating across the site, and an updated PoW for management of subsurface heatings will be developed as part of the updated C&M MOP.
DA Sch 4, Condition 31	a) Partially covered under Section 2.2 of the Compensatory Habitat Plan. No differentiation between short term and long term management. There should be goals developed for short term e.g. Year 1, medium term Year 5 and long-term Year 10. b) Covered under Section 2.2.3.1 of the Compensatory Habitat Plan. This section outlines fencing and prohibiting access. Minimal signage was identified at the site illustrating the compensatory habitat area. There has been no evidence of disturbance (from the site inspection) associated with the Cullen Valley project within the compensatory habitat area. A detailed plan within the Flora and Fauna Management Plan outlines the boundaries of these areas. c) Covered under Section 2.2.3.1 including fencing and signage. d) Baseline vegetation communities are shown in Figure 2 of the audit report. Description of existing vegetation within Section 2.2.2. e) Implementation within Section 2.2.3 of the Compensatory Habitat Plan. Details of monitoring	Administrative non-compliance	There is no differentiation between short term and long term management of compensatory habitat area. To be included in future updates. Completion criteria for the compensatory habitat area should be included in this Management Plan. All management plans would be required to be updated prior to recommencement of operations as agreed with DP&E. The ecological monitoring has been prepared to a high standard, however there are no definitive goals for the compensatory habitat area or other rehabilitation areas. These criteria and goals should be developed as well as being included within the management plan and monitoring reports. Where possible this criteria should be linked with MOP criteria. There should be a more detailed analysis of monitoring results relating to the compensatory habitat area within the	Annual Biodiversity Monitoring was undertaken in December 2016 and was broadened from the scope of previous biodiversity monitoring. This monitoring included assessment of the compensatory habitat areas. As requested by DPE, the Flora and Fauna Management Plan will be updated by 30 June 2017.

Consent Condition	Audit Finding	Compliance	Audit Recommendation	Proposed Action and Timing
	are outlined in the Annual Flora, Fauna and Rehabilitation Monitoring Program which is undertaken by Kleinfelder. This monitoring program includes eight survey sites across the compensatory habitat area. A brief methodology relating to the monitoring within the compensatory habitat area is outlined within Section 3.2 of the 2015 Annual Flora, Fauna and Rehabilitation Monitoring Program. f) There is no criteria for the compensatory habitat area within the Compensatory Habitat Plan. SLR recognises that this management plan was completed prior to the site being managed by Shoalhaven Coal.		Annual Review. Currently there is little detail in the Annual Review regarding the performance and management of the compensatory habitat area, with reference to the very detailed ecological monitoring report. Although the Kleinfelder report is very detailed, a summary section or table within the report would be useful in determining key changes within monitoring locations and proposed actions within specific sections of the compensatory habitat area. The recommendations from the Annual Flora, Fauna and Rehabilitation Monitoring Program should be implemented by Shoalhaven Coal. This includes: • Development of a feral animal control strategy. It should be noted the feral animals identified within the compensatory habitat area are consistent with the surrounding landscape. • Dumping has occurred to a minor extent within the compensatory habitat area. During the inspection SLR did not view these areas, but the Ecological Report recommends rubbish is removed.	
DA Sch 4, Condition 47	(a) minimal infrastructure visible from offsite (b) noise bunds act as visual screens c) revegetating underway on noise bunds, was rehabilitated previously but had to be re-turned and shaped due to sub - surface heating (d) lots of areas still required for rehabilitation. Pre	Non-compliant	SLR recommends engaging a specialist to review the reasons for poor rehabilitation (post 2012 rehabilitation) to improve existing rehabilitation as well as future rehabilitation. Some possible options to improve future rehabilitation include:	Biodiversity monitoring is conducted annually in rehabilitation areas by a specialist ecological consultant and was conducted again in December 2016. The scope of works for this monitoring was broadened from the monitoring conducted between 2011-2015.

Consent Condition	Audit Finding	Compliance	Audit Recommendation	Proposed Action and Timing
	2012 rehabilitation appears to be of a good quality with low degree slopes, topsoil used and a mix of grasses, acacias and eucalypts. Poor results in large sections of the post 2012 rehabilitation was observed with erosion in some areas. This is possibly due to steep slopes and lack of topsoil. No rehabilitation has been completed (apart from rehabilitation maintenance) since Shoalhaven Coal commenced managing the site. In 2016 the focus has been to improve existing rehabilitation. Biodiversity monitoring is conducted annually in rehabilitation areas and will be conducted again in December 2016. Based on discussions with Shoalhaven Coal the scope of works for this monitoring has been broadened from the monitoring conducted between 2011-2015		* soil and material testing. * reducing slope angle and landform design; * application of ameliorates such as gypsum, biosolids; and * review of seed mix (including grass within seed mix). It is acknowledged there is little topsoil available for future rehabilitation. Further rehabilitation/biodiversity monitoring should be compared against completion criteria from the MOP. Local seed should be collected for rehabilitation in accordance with the Flora and Fauna Management Plan.	Annual Biodiversity Monitoring was completed during December 2016. **2016 Annual Review Update** Results of 2016 Biodiversity Monitoring are included in the 2016 Annual Review
DA Sch 6, Condition 5	AEMRs/Annual Reviews sighted for 2011 to 2015. A comparison against the EIS predictions was not been completed in the recent C&M AEMRs/Annual Reviews. SLR understands that most EIS commitments are not relevant to the site as it is under care and maintenance; however some predictions for water should be reviewed and reported against. Monitoring results are compared against monitoring limits/criteria. There was a comparison of dust data across five years with this outlining the long-term trend. Details of complaints are included however there is	Administrative non-compliance	Ensure key EIS predictions are reviewed in future Annual Reviews. Provide details of complaints across five years.	This Annual Review provides a comparison of EIS predictions in **Section 6.1**. A review of complaints is provided in **Section 9.0**.

Consent Condition	Audit Finding	Compliance	Audit Recommendation	Proposed Action and Timing
	no comparison over five years which means this is an administrative non-compliance. Details of complainants (names) should not be included in the AEMR/Annual Reviews.			

Licence Condition	Audit Finding	Compliance	Audit Recommendation	Proposed Action and Timing
EPL L4.5	Quarterly noise monitoring reports state the source of the meteorological data utilised for determining meteorological conditions. The data is generally sourced from the Cullen Valley weather station however, it is noted that the noise monitoring reports prepared for 2015 state that meteorological data has been sourced from the Bureau of Meteorology Met station in Bathurst. This is located approximately 45 km from the site and is unlikely to be representative of onsite weather conditions. Temperature inversion conditions are reported in the quarterly noise monitoring reports and are calculated from sigma theta data. Where met data is obtained from Bathurst, standard stability class is assumed. Shoalhaven Coal informed SLR that the weather station at CVM had been shut down and was inoperable prior to Shoalhaven Coal ownership. Shoalhaven Coal has reinstated and serviced the weather station to allow recording and download of meteorological data during care and maintenance. Prior to recommencement of	Administrative non-compliance	Ensure that meteorological data is sourced from the onsite meteorological station. If this is not possible due to equipment failure etc., justification for the use of alternative meteorological data and its relevance should be provided.	The noise monitoring requires weather data from an accredited source. The weather station at CVM had been shut down and was inoperable prior to Shoalhaven Coal ownership. Shoalhaven Coal has now reinstated and serviced the weather station to allow recording and download of meteorological data during care and maintenance. Prior to recommencement of operations, the weather station will be calibrated according to the Australian Standard to allow data to be used for noise monitoring purposes. This action will only be required if and when mining operations recommence at CVM.

Licence Condition	Audit Finding	Compliance	Audit Recommendation	Proposed Action and Timing
	operations, the weather station will be calibrated according to the Australian Standard to allow data to be used for noise monitoring purposes.			
EPL L6.1	There have been odour complaints in every year of the audit period with relating to the area of sub surface heating. These have been outlined in the AEMR/Annual Reviews. There has been some works at site (movement of material) to control the fire/odour issue with investigations still continuing. Based on discussions with site this is an ongoing issue that is being managed by Shoalhaven Coal in consultation with experts and the Departments. Shoalhaven Coal are also resolving drainage issues that are directly linked to sub surface heating issues particularly venting, smoke and odour prior to capping.	Non-compliant	Continue to investigate issue and develop a strategy to remediate. Continue to monitor and report on the odour issue.	Sub-surface heating is being managed by Shoalhaven Coal in consultation with specialist consultants and the Departments. Shoalhaven Coal are also undertaking reconstruction of contour and flume drains to direct water away from areas to reduce the incidence of venting, smoke and odour. Stage 1 works will be monitored during Q2 and Q3 2017. **2016 Annual Review Update** In accordance with Section 12.0 of the Annual Review and DRE requirements, during 2017 Shoalhaven Coal will review and manage subsurface heating across the site, and an updated PoW for management of subsurface heatings will be developed as part of the updated C&M MOP.

EIS Commitments	Audit Finding	Compliance	Audit Recommendation	Proposed Action and Timing
2003 EIS Section: Flora	Rehabilitation works have attempted to replicate a woodland/forest community. Results have been variable with good results prior to 2012, and average since. No Capertee Stringybark seed has been collected for rehabilitation.	Non-compliant	Recommend engaging a specialist to review reasons for poor rehabilitation (post 2012 rehabilitation) to improve existing rehabilitation as well as future rehabilitation. Some possible options to improve future rehabilitation include: * soil and material testing. * reducing slope angle and landform design; * application of ameliorates such as gypsum, biosolids; * review of seed mix (including grass within seed mix); It is acknowledged there is little topsoil available for future rehabilitation. Further rehabilitation/biodiversity monitoring should be compared against completion criteria from the MOP. Local seed should be collected for rehabilitation in accordance with the Flora and Fauna Management Plan.	Biodiversity monitoring is conducted annually in rehabilitation areas by a specialist ecological consultant and was conducted again in December 2016. The scope of works for this monitoring was broadened from the previous monitoring conducted between 2011-2015. The Annual Biodiversity Monitoring was completed during December 2016. **2016 Annual Review Update** Results of 2016 Biodiversity Monitoring are included in the 2016 Annual Review
2003 EIS Section: Rehabilitation	There are still large sections of disturbed areas that have not been rehabilitated.	Non-compliant	Same as 'Flora' recommendation to improve rehabilitation.	Biodiversity monitoring is conducted annually in rehabilitation areas by a specialist ecological consultant and was conducted again in December 2016. The scope of works for this monitoring was broadened from the previous monitoring conducted between 2011-2015 The Annual Biodiversity Monitoring was completed during December 2016.

EIS Commitments	Audit Finding	Compliance	Audit Recommendation	Proposed Action and Timing
2003 EIS Section: Soil Resources	Topsoil was used in most of the rehabilitation prior to 2012, however does not appear to be used in post 2012 rehabilitation.	Non-compliant	Same as 'Flora' recommendation to improve rehabilitation.	Biodiversity monitoring is conducted annually in rehabilitation areas by a specialist ecological consultant and was conducted again in December 2016. The scope of works for this monitoring was broadened from the previous monitoring conducted between 2011-2015. The Annual Biodiversity Monitoring was completed during December 2016.

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