umwelt

Inspired people | Dedicated team
Quality outcomes

CC
Castlereagh Coal

INVINCIBLE COLLIERY
ANNUAL REVIEW

1 JANUARY – 31 DECEMBER 2017

May 2018

INVINCIBLE COLLIERY
ANNUAL REVIEW

1 JANUARY – 31 DECEMBER 2017

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

Project Director:	Luke Bettridge
Project Manager:	Luke Bettridge
Report No.	3968_R34_Annual Review_V2_Final
Date:	May 2018

Newcastle

75 York Street
Teralba NSW 2284

Ph. 02 4950 5322

www.umwelt.com.au

This report was prepared using Umwelt's ISO 9001 certified Quality Management System.

Document Status

Rev No.	Reviewer		Approved for Issue	
	Name	**Date**	**Name**	**Date**
FINAL	Luke Bettridge	28 March 2018	Graham Goodwin (Manildra)	29 March 2018
V2 Final	Luke Bettridge	22 May 2018	Graham Goodwin (Manildra)	23 May 2018

Table of Contents

Figures

Tables

Appendices

Annual Review Title Block

Name of operation:	Invincible Colliery
Name of operator:	Shoalhaven Coal Pty Limited
Development consent:	Invincible Coal Mine Extension Project Approval (07_0127)
Name of holder of development consent:	Shoalhaven Coal Company Pty Limited
Mining leases:	ML1638, ML1635, CCL702, EL7517
Name of holder of mining leases:	Shoalhaven Coal Pty Limited
Water licence:	Water Access Licence (WAL) 36485 (10BL602586) Water Access Licence (WAL) 35978 (10BL602584)
Name of holder of water licence:	Shoalhaven Coal Pty Limited
MOP start date:	29 September 2015
MOP end date:	29 March 2019
Annual Review start date:	1 January 2017
Annual Review end date:	31 December 2017

I, Graham Goodwin, certify that this audit report is a true and accurate record of the compliance status of Invincible Colliery for the period 1 January 2017 to 31 December 2017, and that I am authorised to make this statement on behalf of Shoalhaven Coal.

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 reporting officer:	Graham Goodwin
Title of authorised reporting officer:	Mining Engineering Manager
Signature of authorised reporting officer:	
Date:	23 May 2018

1.0 Statement of compliance

This Annual Review has been prepared to provide a summary of the performance of the Invincible Colliery operations over the period 1 January 2017 to 31 December 2017 (referred to hereafter as the reporting period). The compliance of the operation with relevant approvals was managed during the reporting period by Invincible Colliery and the compliance status is summarised in **Table 1.1**.

The statement of compliance status in **Table 1.1** is based on compliance information provided by Invincible Colliery. Umwelt (Australia) Pty Limited has relied on this information in combination with other information sources such as; environmental monitoring documentation, discussions with the Invincible Colliery, site inspection(s) and our general understanding of the operation. In preparing this report Umwelt has not sought to undertake a full compliance audit, including secondary verification of the collated documentary evidence with relevant government agency staff, construction personnel or operational staff, site records etc.

It is noted that during the report period an Independent Environmental Audit (IEA) was not undertaken. An IEA was undertaken in 2016 which identified non-compliances across EPL, Mining Lease (ML) and the Project Approval. An updated action plan is included on the Castlereagh Coal website.

Table 1.1 below provides a statement of compliance for the report period and has identified non-compliances with statutory approvals. During the reporting period, Invincible Colliery operated in accordance with Project Approval (07_0127 – MOD 3) and therefore all references to project approval conditions within this document refer to the MOD 3 Project Approval.

It was determined that a total of 2 non-compliances relating to the failure of air quality monitoring equipment occurred during the reporting period. The non-compliances recorded during the reporting period have been ranked according to the risk matrix included in **Table 1.2** and a brief description of each is provided in **Table 1.3**.

Table 1.1 Statement of compliance

Relevant Approval	All Conditions Complied With?
Project Approval (PA) 07_0127	No
Environment Protection Licence (EPL) 1095	No
Water Licences WAL 35978 (10BL602584) WAL 36485 (10BL602586)	Yes
Mining Lease (ML) 1635, ML 1638 and Consolidated Coal Lease (CCL) 702 and EL7517	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
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 2017 report period

Relevant Approval	Condition No.	Condition Description (Summary)	Compliance Status/Risk Level	Comment	Where addressed in Annual Review
Project Approval/EPL	PA 07_0127 Condition 10 of Schedule 3 EPL 1095 Condition M2.2	Failure to monitor in accordance with Air Quality Monitoring Program Failure to Monitor the High Volume Air Sampler (HVAS) unit HV02	Low	In October 2017, Castlereagh Coal reported a failure to monitor due to an outage of the HVAS unit at Invincible Colliery (EPL No. 1095) which occurred during September 2017. HV02 was not monitored on 9, 15, 21 and 27 September 2017. It is noted that HV02 malfunctioned on 9 and 15 September 2017 and a replacement HVAS was unable to be obtained and installed onsite until 28 September 2017. The results obtained for the remainder of the report period were consistent with results obtained prior to the outage and all results obtained from the HVAS for 2017 were within criteria for the site. The failure of the High Volume Air Sampler to monitor was reported to the EPA and DPE at the time of failure.	**Section 6.3.3**

2.0 Introduction

Shoalhaven Coal Pty Limited (Shoalhaven Coal) owns the Invincible Colliery, a coal mine located approximately 25 kilometres (km) north-west of Lithgow in New South Wales (NSW) (refer to **Figure 2.1**). The town of Cullen Bullen is located approximately 3 km north-west of the Invincible Mine infrastructure area. Shoalhaven Coal is the trading name for Shoalhaven Coal Pty Ltd which is part of the Manildra Group (Manildra), a family owned Australian group of companies providing integrated and diverse agribusiness operations. Shoalhaven Coal purchased Invincible Colliery, and the nearby Cullen Valley Mine, in 2015 to secure a continued supply of a speciality coal product, known as 'nut' coal, for Manildra's Shoalhaven Starches Plant located at Bomaderry on the NSW South Coast (refer to **Figure 2.1**). Shoalhaven Starches Plant previously sourced speciality nut coal from Invincible Colliery prior to cessation of mining in 2013.

Invincible Colliery is located in an area of historical mining operations associated with western coalfields of NSW, including the former mining operations at Cullen Valley Mine, Baal Bone Colliery, Pine Dale and Ivanhoe Colliery. The Invincible site has had a long history of mining operations commencing in 1901. Open cut mining has been carried out at Invincible Colliery at various times ranging from the 1940s through to the mine being placed onto care and maintenance in 2013 when the available coal within the approved Invincible Colliery mining area was exhausted. The existing operations are shown in **Figure 2.2**. Future mining operations were approved by the Planning and Assessment Commission (PAC) on 5 February 2018 which was in the form of the Invincible Colliery Southern Extension, refer to **Section 3.1**.

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.**

Table 2.1 Key personnel responsible for environmental management

Name	Role	Company	Contact details
Graham Goodwin	Mining Engineering Manager	Manildra Group	Invincible Colliery, Castlereagh Highway, Cullen Bullen, NSW 2790 0418 830 598

2.2 Annual review requirements

During the reporting period, Invincible Colliery operated in accordance with Project Approval (07_0127 – MOD 3) and therefore all references to project approval conditions within this document refer to the MOD 3 Project Approval unless otherwise stated.

Condition 4 of Schedule 5 of the Invincible Coal Mine Extension Project Approval requires an Annual Review (AR) to be prepared and submitted to the Department of Planning and Environment (DPE). This report has been prepared in accordance with NSW *Government Annual Review Guidelines* (NSW Government, 2015) and details the operational and environmental management activities of Invincible Colliery during the report period 1 January 2017 to 31 December 2017. 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 MOD 3) conditions for the annual review

Conditions		Addressed in Section
Schedule 3 – Specific Environmental Conditions Noise		
7.	(b) continue to investigate ways to reduce the noise generated by the project; and (c) report on these investigations and the implementation and effectiveness of these measures in the AEMR, to the satisfaction of the Director-General.	**Section 6.6**
Schedule 3 – Specific Environmental Conditions Monitoring of Coal Transport		
14.	The Proponent shall keep records of the amount of coal transported from the mine site and number of coal truck movements each year and include these records in the AEMR.	**Section 4.2**
Schedule 3 – Specific Environmental Conditions Waste Minimisation		
43.	(e) report on waste management and minimisation in the AEMR to the satisfaction of the Director-General.	**Section 6.10**
Schedule 5 – Environmental Management, Monitoring, Auditing and Reporting Annual Reporting		
4.	By the end of November 2009, and annually thereafter, the Proponent shall submit an AEMR to the Director- General and to all relevant agencies. This report must:	**This document**
	(a) identify the standards and performance measures that apply to the project;	**Section 6.0**
	(b) describe the works carried out in the last 12 months;	**Section 4.0**
	(c) describe the works that would be carried out in the next 12 months;	**Section 4.1 and 12.0**
	(d) include a summary of the complaints received during the past year, and compare this to the complaints received in previous years;	**Section 9.2**
	(e) include a summary of the monitoring results for the project during the past year;	**Section 6.0**
	(f) include an analysis of these monitoring results against the relevant: • impact assessment criteria/limits; • monitoring results from previous years; and • predictions in the EA;	**Section 6.0**
	(g) identify any trends in the monitoring results over the life of the project;	**Section 6.0**
	(h) identify any non-compliance during the previous year; and	**Section 1.0**
	(i) describe what actions were, or are being, taken to ensure compliance.	**Section 1.0 and relevant information in Section 6.0**

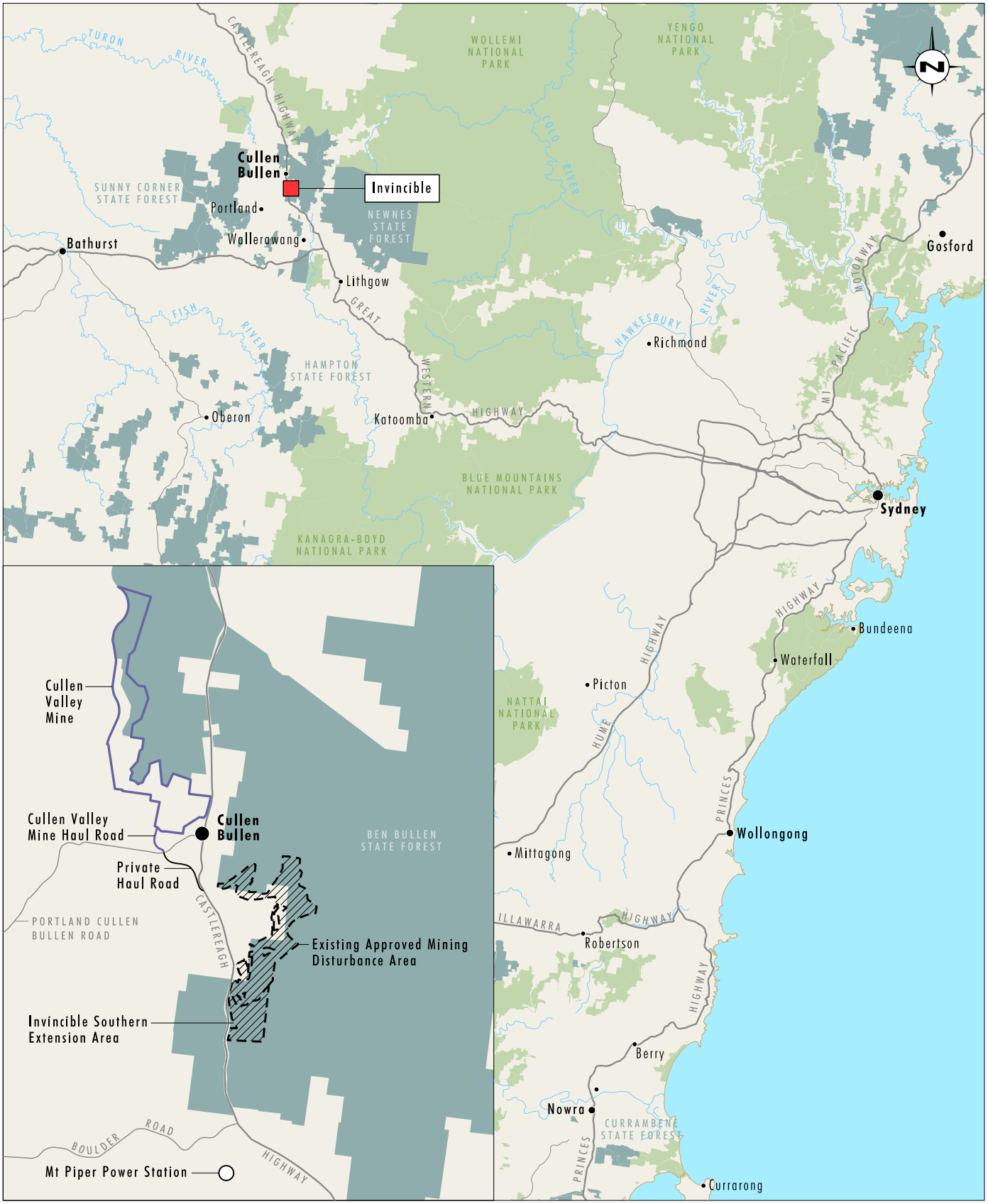


FIGURE 2.1

Locality Plan
Invincible Colliery

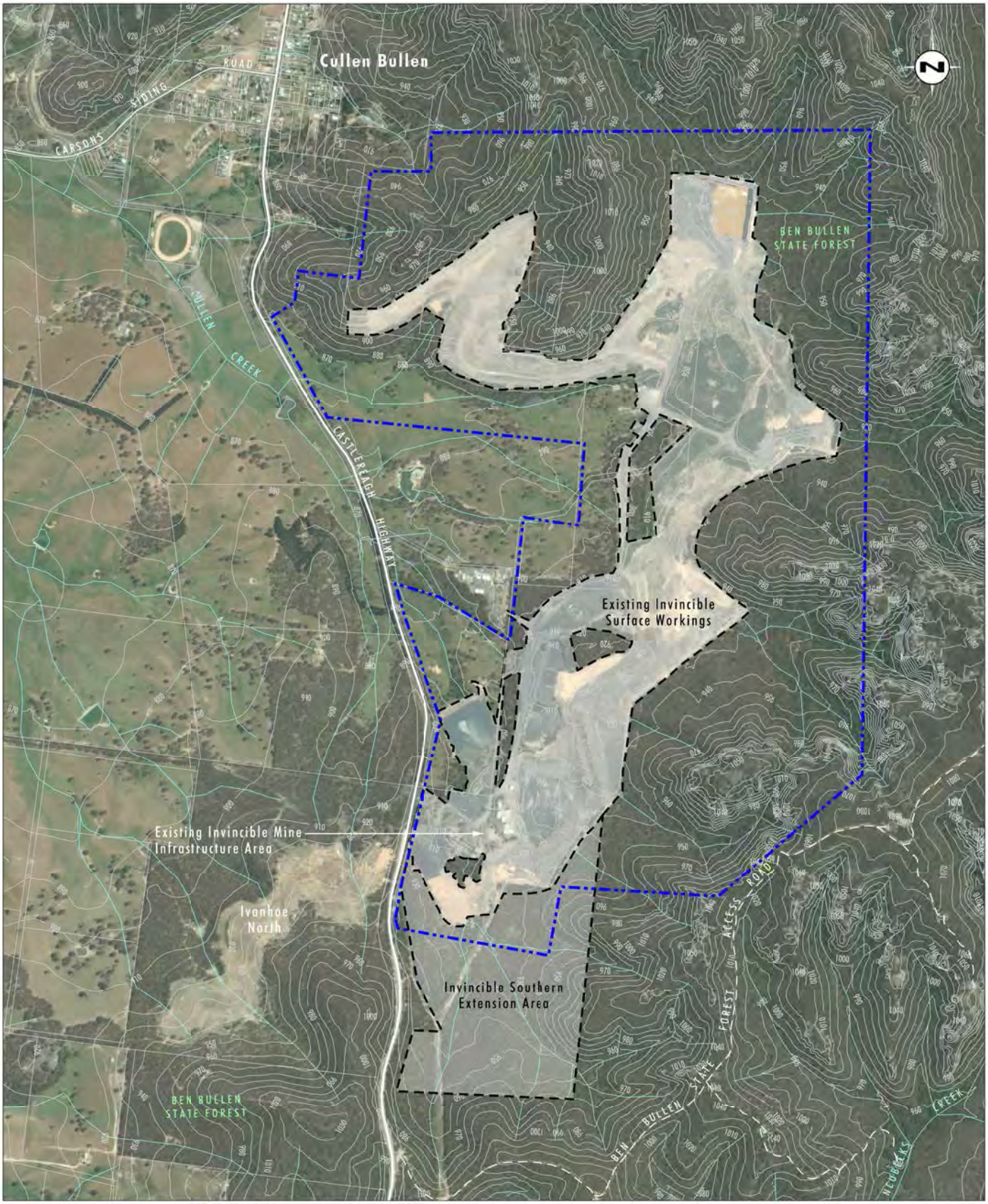


Image Source: Google Earth - CNES/Astrium (Nov 2014)
Data Source: LPI (2016), Forest Corporation of NSW (2015)
Note: Contour Interval 10m

0 0.25 0.5 1.0km

Legend

- Existing Approved Mining Disturbance Area
- Proposed Southern Extension Area
- Invincible Project Approval Boundary (PA07/0127)

FIGURE 2.2

Invincible Southern Extension Project

3.0 Approvals

The operations at Invincible Colliery are subject to a range of standards and performance measures. All approvals currently held by Invincible Colliery are listed in **Table 3.1.**

3.1 Development consent history

The Invincible Project Approval 07_0127 (Project Approval) was granted on 4 December 2008 and permitted mining to eight years from the date of grant of the approval (i.e. to 4 December 2016) with subsequent modifications approved in 2009 and 2010. During the report period, Invincible Colliery operated in accordance with the Project Approval (MOD 3) in a care and maintenance capacity. All references to Project Approval conditions within this document refer to the MOD 3 Project Approval.

During 2016, Shoalhaven Coal submitted an application to DPE to modify the Invincible Project Approval to extend the life of mining operations at Invincible Colliery and obtain approval to extend the open cut mining operations to an area immediately south of the existing operations referred as the Invincible Southern Extension Project (refer to **Figure 2.2**). The Invincible Southern Extension Project area is located within the Ben Bullen State Forest to the east of the Castlereagh Highway. The Invincible Southern Extension Project was approved by the PAC on 2 February 2018. The approval of the Southern Extension Project is noted as MOD 5 on the Project Approval.

The Invincible Southern Extension Project includes:

- extending the period in which mining can continue for a period of 8 years from approval of the modification application;
- extending the open cut mining area to mine down to, and including, the Lithgow Seam to the south of the existing mine in the Southern Extension Area;
- maximum mining and production rates of up to 1.2 Mtpa;
- hours of operation through maintaining open cut mine and coal processing operations in day time with coal loading undertaken to 9.30 pm and maintenance activities up to 10.00 pm;
- product coal transport arrangements (with coal to be transported from the site by road truck to either the Shoalhaven Starches Plant or Mt Piper Power Station);
- use of existing open cut voids and former underground workings for temporary water storage;
- continued use of existing Invincible Colliery infrastructure (including maintenance work, and minor upgrades and operation of the existing Invincible Coal Preparation Plant (Invincible CPP); and
- rehabilitation of the proposed Southern Extension Area and all existing disturbance areas at Invincible Colliery by reshaping mining areas to remove voids and revegetating the reshaped landform with locally endemic woodland and forest communities.

Table 3.1 Current approvals, licences and leases

Approval	Date Granted	Expiry Date	Details
Project Approval (PA) 07_0127 (MOD 3)	8 Dec 2008	31 December 2025	The MOD 3 Project Approval applied through the reporting period. Mining operations permitted to 31 December 2025 in accordance with the MOD 3 Project Approval.
Project Approval (PA) 07_0127 (MOD 5)	8 Dec 2008	31 December 2025	The MOD 5 Project Approval relates to the Southern Extension Project which was determined on 2 February 2018. Mining operations permitted to 31 December 2025 in accordance with the MOD 5 Project Approval.
Environment Protection Licence (EPL) 1095	28 Feb (anniversary date)	Renewed annually	Held by Shoalhaven Coal over the Invincible premises.
Mining Lease (ML) 1635	10 Sep 2009	10 Sep 2030	Held by Shoalhaven Coal. Extends to the surface and covers the existing open cut mining areas at Invincible.
Mining Lease (ML) 1638	6 Nov 2009	5 Nov 2030	Held by Shoalhaven Coal. Extends to the surface and covers the existing open cut mining areas at Invincible. ML 1638 extends into the northern end of the Southern Extension Area.
Consolidated Coal Lease (CCL) 702	26 Nov 1991	24 Nov 2024	Held by Shoalhaven Coal. Variable depth.
Exploration Licence 7517	16 Apr 2010	16 Apr 2021	Renewal application approved during report period.
Water Access Licence (WAL) 36485 (10BL602586) "Long Swamp"	19 Feb 2013	18 Dec 2018	Authorises the extraction of 120 units from the Greater Metropolitan Region Groundwater Sources Water Sharing Plan.
WAL 35978 (10BL602584) "Washery Bore"	24 Dec 2012	23 Dec 2027	Held by Shoalhaven Coal and authorises the extraction of 26 units from the NSW Murray-Darling Porous Rock Groundwater Sources Water Sharing Plan.

4.0 Operations summary

A summary of the operations undertaken at Invincible Colliery during the report period are included in the following sections. It is noted that Invincible Colliery was on care and maintenance during the report period and therefore there were no mining operations undertaken.

4.1 Mining operations

Production figures are detailed in **Table 4.1**. As discussed in **Section 3.1**, on 5 February 2018 the Invincible Colliery Southern Extension Project was approved by the PAC. This approval allows the mining down to, and including, the Lithgow Seam to the south of the existing mine in the Southern Extension Area (refer to **Figure 2.2**). There was no mining undertaken at Invincible Colliery during 2017. The proposed timing for mining during 2018 within the Invincible Southern Extension Project Area is being confirmed by Shoalhaven Coal. Prior to the re-commencement of mining, and in accordance with the Project Approval, a range of environmental management plans are required to be developed and approved by the Secretary of DPE, refer to **Section 12.0**. This will include the preparation of a Mining Operations Plan for submission to DRG. As the timing of mining operations during 2018 is still being confirmed by Shoalhaven Coal, **Table 4.1** notes that this information has not yet been confirmed. Shoalhaven Coal will update the community of the proposed mining schedule via the Community Consultative Committee once the timing has been confirmed.

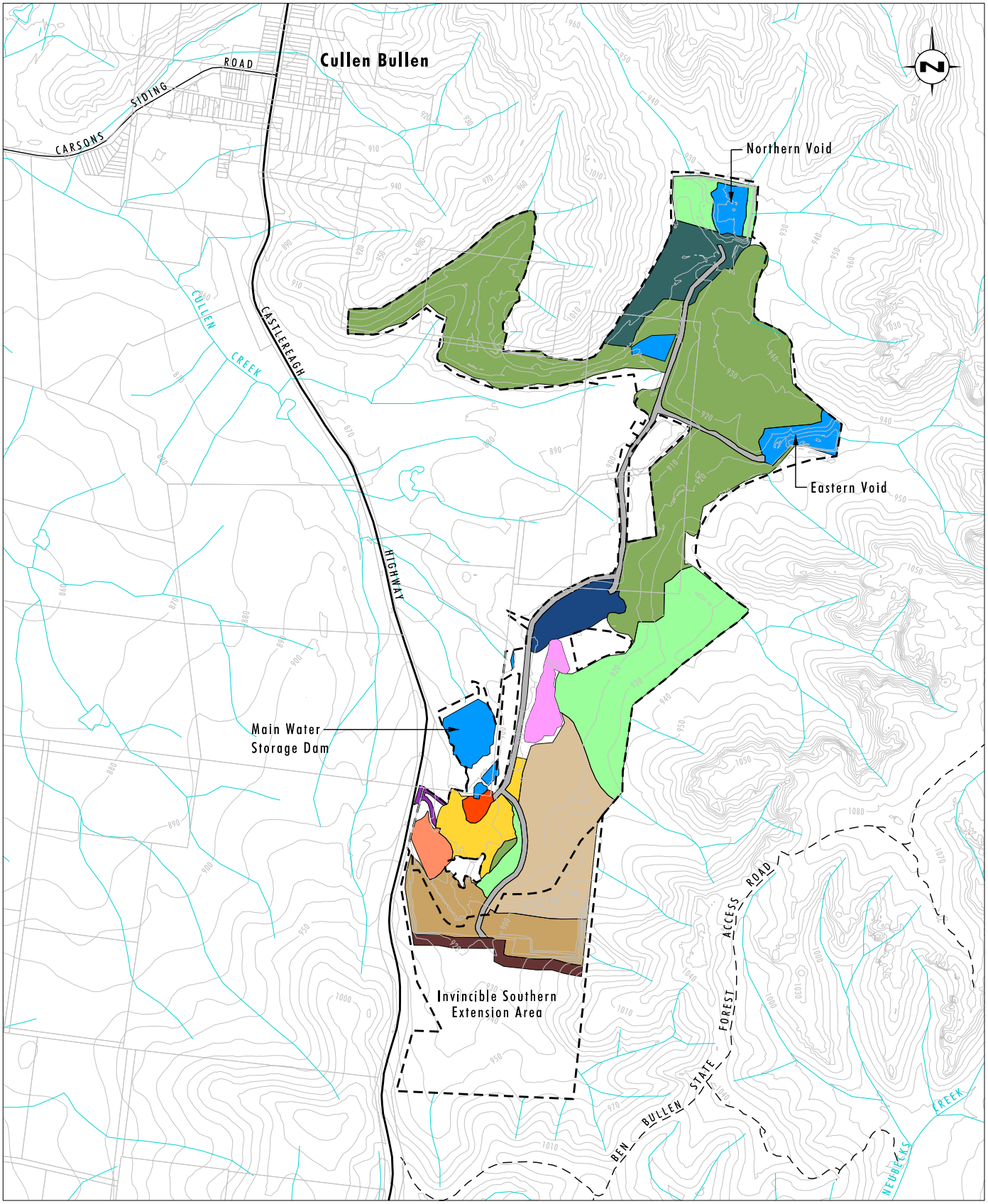
Table 4.1 2017 Production summary

Material	Approved limit	Previous reporting period (actual 2016)	This reporting period (actual 2017)	Next reporting period (forecast 2018)
Waste rock/ overburden	-	0	0	Not yet confirmed*
Coal works Coal mining	0 – 2Mtpa handled (EPL) 0.5 - 2Mtpa produced (EPL) 1.2Mtpa extraction (PA)	0	0	Not yet confirmed
Coarse reject	-	0	0	Not yet confirmed
Fine reject (tailings)	-	0	0	Not yet confirmed

Note: See explanation in **Section 4.1** above

4.2 Vehicle movements

In accordance with Condition 14 of Schedule 3 of the Project Approval, records regarding the amount of coal transported from the mine site and annual number of coal truck movements for 2017 is required to be included within this report. As the site was in care and maintenance during the report period there was no coal transported from Invincible Colliery during 2017.



Data Source: LPI (2016)
Note: Contour Interval 10m

Legend

- Existing Approved Mining Disturbance Area
- Proposed Southern Extension Area
- Proposed Active Mining
- Proposed Overburden Emplacement Area
- Pre Strip
- Rehabilitation - Vegetated (to date)
- Shaped Not Seeded (to date)
- Coal Stockpile - Product
- Coal Stockpile - ROM
- Haul Road/Access Road
- Sealed Access Road
- Infrastructure/Laydown Area
- MIA/Administration
- Water Management Area
- Tailings Drying Area
- Temporary Stabilisation Area

FIGURE 4.1

Mining and Rehabilitation Activities 2017
Invincible Colliery

File Name (A4): R34/3968_039.dgn
20180226 15.45

5.0 Actions required from previous annual review

DPE provided comment on the 2016 Invincible Colliery Annual Review in correspondence provided to Shoalhaven on 21 April 2017. DPE requested the inclusion of additional information in the 2016 Annual Review and updates to information which was located on the Invincible Colliery website. These requirements and where they are addressed in this Annual Review are detailed in **Table 5.1** below.

Table 5.1 DPE requirements following review of Invincible 2016 annual review

DPE Requirements	Works Undertaken	Where addressed in this Document
Complaints register on the Castlereagh Coal website is to be updated on a quarterly basis.	Invincible complaints register updated on a quarterly basis	Noted
'Groundwater Bores – pH' graph to be modified prior publishing the Annual Review on the Castlereagh Coal website to extend the scale on the y axis to show the actual groundwater quality for pH.	The requested graph was updated in the Invincible 2016 Annual Review prior to the Annual Review being published on the Castlereagh Coal website.	Noted

There were no specific actions identified from DRG for inclusion within this Annual Review following the submission of the 2016 Annual Review.

6.0 Environmental performance

The following sections provide a summary of environmental monitoring and management undertaken during the report period. In accordance with the Project Approval, Invincible Colliery has prepared a number of management plans in consultation with relevant stakeholders. In accordance with the revised Project Approval (MOD 5), a number of these management plans will be updated during 2018 (refer to **Section 12.0**).

Environmental management plans

The management plans have been prepared for a number of environmental management aspects and include:

- Environmental Management Strategy (Coalpac, 2009a);
- Environmental Monitoring Program (Coalpac, 2009b);
- Aboriginal Cultural Heritage Management Plan (Coalpac, 2009g);
- Air Quality Monitoring Plan (Coalpac, 2009c);
- Blast Management Plan (Coalpac, 2009d);
- Noise Monitoring Program (Coalpac, 2009f);
- Road Closure Management Plan (Coalpac, 2010);
- Landscape Management Plan (Coalpac, 2009e);
- Mining Operations Plan (Sedgman, 2015);
- Pollution Incident Response Management Plan (Umwelt, 2017).

In accordance with the Project Approval (MOD 5), prior to the commencement of mining as part of the Invincible Southern Extension, a range of Invincible Colliery Management Plans are required to be updated in consultation with regulatory authorities and approved by the Secretary of DPE.

In addition to environmental management plans, Invincible Colliery undertakes a range of environmental monitoring, these locations are shown on **Figure 6.1**.

Environmental monitoring data and a copy of the Invincible Colliery management plans have been published on the Shoalhaven Coal website (http://www.castlereaghcoal.com.au) in accordance with Condition 9 and 10 of Schedule 5 of the Project Approval. A summary of the environmental performance of Invincible Colliery is included in **Table 6.1** below with the following sections providing an overview of performance by environmental aspect.

6.1 Summary of performance against EA predictions

The Invincible Colliery has been subject to three EA and several modifications in the last 11 years of operations. The Invincible Expansion Project involving expanded operations to the north and south of the original mining area was assessed by the EA dated April 2008 (R.W. Corkery & Co. Pty Limited, 2008). In addition to the 2008 EA, an EA for the Invincible Southern Extension Project (Umwelt, 2016).

As there have been no operations undertaken during the report period in accordance with the EA for the Invincible Southern Extension Project (Umwelt, 2016), the results of environmental monitoring obtained during the report period has been compared to the predictions in the EA dated April 2008 (R.W. Corkery & Co. Pty Limited, 2008) and associated modification documents dated February 2009 (R.W. Corkery & Co. Pty Limited, 2009) and June 2010 (Hansen Bailey, 2010) within this Annual Review. During the report period, Invincible Colliery was on care and maintenance and there were no mining activities conducted. Environmental monitoring undertaken during the report period included noise, air quality, water quality and biodiversity.

6.1.1 Air quality predictions against the EA

The EA (R.W. Corkery & Co. Pty Limited, 2008) predicted that adoption of air quality control measures including dust suppression, progressive rehabilitation and minimisation of clearing in advance of operational activities would result in annual average PM_{10} and dust deposition concentrations being below regulatory criteria. The air quality modelling completed for the EA (R.W. Corkery & Co. Pty Limited, 2008) was undertaken assuming that mining operations were being conducted. Invincible Colliery operated on a care and maintenance basis during the report period and as detailed within **Section 6.3.3**, all air quality monitoring results have been in accordance with relevant regulatory criteria.

6.1.2 Water quality predictions against the EA

Clean surface water is diverted away from active disturbance areas and runoff from disturbed areas is collected and stored for operational uses such as dust suppression. The EA (R.W. Corkery & Co. Pty Limited, 2008) predicted that the project was unlikely to have a significant impact on local or regional surface water quantity or quality. The EA (R.W. Corkery & Co. Pty Limited, 2008) did not predict any additional water quality impacts for the modification proposals.

There were no exceedances of surface water quality during the report period.

6.1.3 Groundwater predictions against the EA

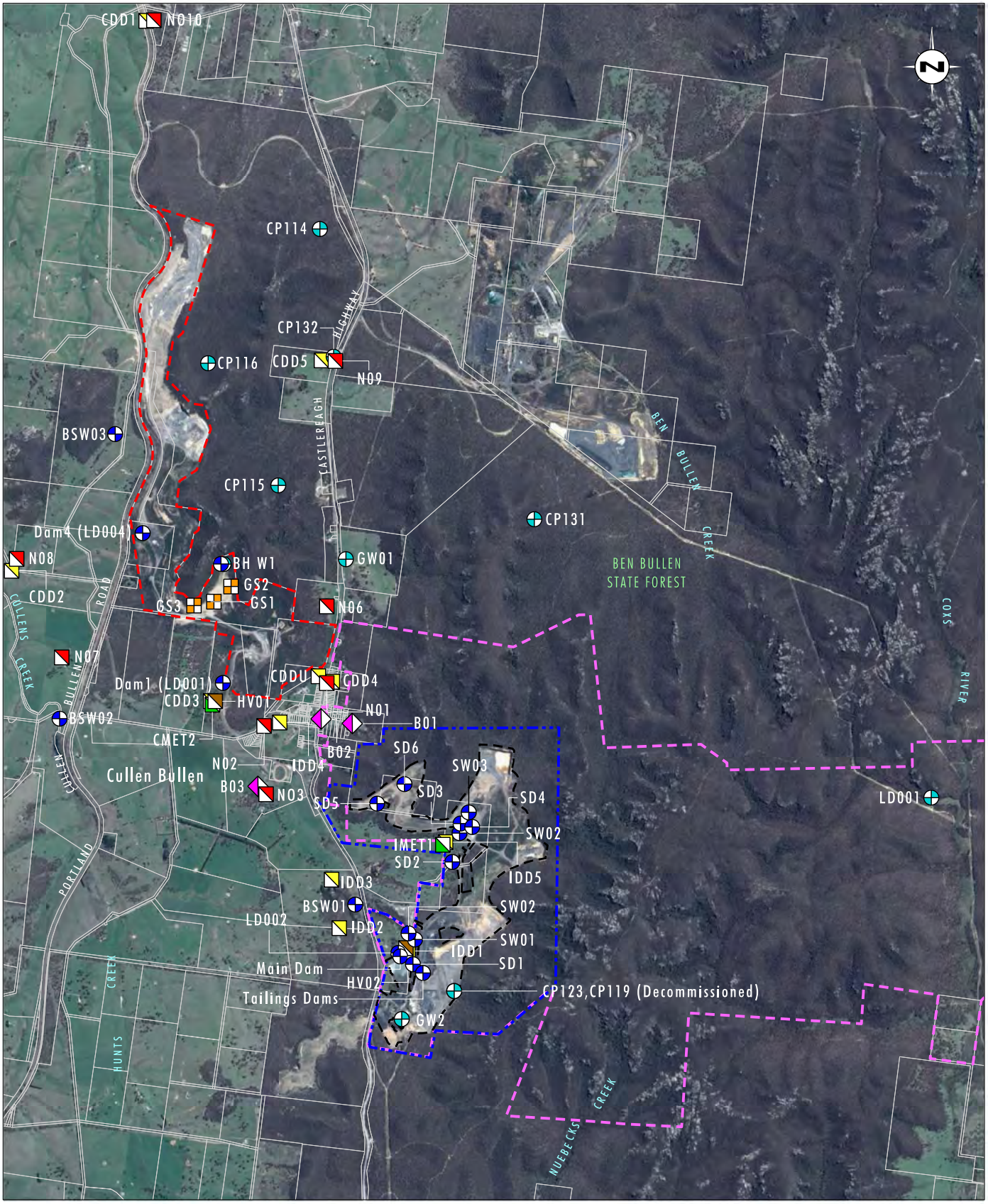
As noted in **Section 6.5.5**, there have been no impacts detected on groundwater levels and water quality at Invincible Colliery.

6.1.4 Noise predictions against the EA

The EA (R.W. Corkery & Co. Pty Limited, 2008) modelling results indicated that noise mitigation measures would result in compliance with project specific noise criteria except for a 1dB(A) exceedance during calm daytime conditions at the Billabong property. Under worst case scenario conditions, the following exceedances were predicted:

- 2dB(A) at Hillview property;
- between 4dB(A) and 7dB(A) at Billabong property;
- 1dB(A) at Cullen Bullen west; and
- between 2dB(A) and 4dB(A) at Cullen Bullen south property.

As detailed in **Section 6.2.2**, noise monitoring has shown that noise emissions have been inaudible at all locations since the mine was placed on care and maintenance.



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

File Name (A4): R34/3968_042.dgn
20180302 12.19

Table 6.1 Summary of environmental performance during the report period

Aspect	Approval Criteria/ EIS Prediction	Performance during the reporting period	Trend / key management implications	Implemented / proposed management actions
Air Quality (Refer to Section 6.3)	Refer **Section 6.1.1**/ Refer **Section 6.3.2**	Non-compliant	Refer to **Section 6.3.4** Recorded air quality levels are consistent with previous years when Invincible has been on care and maintenance. Non-compliant due to HVAS samples not being obtained for all required sampling events.	Monthly depositional dust and PM_{10}/TSP monitoring will continue to be undertaken in accordance with regulatory requirements.
Surface Water Quality (Refer to Section 6.4)	Refer **Section 6.1.2**/ Refer **Section 6.4.2**	Compliant	Refer to **Section 6.4.4** Annual average water quality at downstream locations during 2017 is compared with annual averages from the previous years.	Continuation of monitoring within the Main Dam prior to discharge.
Groundwater (Refer to Section 6.5)	Refer **Section 6.1.3**/ Refer **Section 6.5.2**	Compliant	Groundwater quality monitoring results are further discussed in **Section 6.5.4**.	Groundwater monitoring program to continue in accordance with regulatory requirements.
Noise (Refer to Section 6.6)	Refer to **Section 6.1.4**/ Refer to **Section 6.6.2**	Compliant	Refer to **Section 6.6.4** Noise emissions were inaudible at private residences during the report period, which is consistent with monitoring undertaken during care and maintenance.	The quarterly noise monitoring program will continue to be undertaken in accordance with the Project Approval and EPL.
Biodiversity (Refer to Section 6.7)	Refer to **Section 6.7.2**/ Refer to **Section 8.3**	Compliant	Refer to **Section 6.7.3**	Biodiversity monitoring program will continue in accordance with regulatory requirements.

6.2 Meteorological monitoring

Shoalhaven Coal is required to conduct meteorological monitoring at the site in accordance with Schedule 3, Condition 11 of the Project Approval. The Invincible Colliery weather station (IMET1) is located within the Lot 113 biodiversity offset area. A summary of monthly meteorological monitoring results is provided in **Table 6.2.**

6.2.1 Rainfall

Invincible Colliery received 421.4 mm of rainfall over 132 rain days during the report period. The highest rainfall occurred during March (97.2 mm) and September had the lowest rainfall (2.4 mm). A summary of monthly rainfall data is provided in **Table 6.2**.

6.2.2 Temperature

Air temperature is measured at 2 and 10 m above ground level to account for temperature inversions. The maximum temperature recorded during the report period was in January (39.9°C @ 2m, 39.3°C @10m) and the lowest temperature occurred in July (-6.4°C @ 2m, -5.7°C @10m). Average monthly temperatures are summarised in **Table 6.2**.

6.2.3 Humidity

The highest humidity recorded during the report period at Invincible Colliery occurred during June (97.6%) and the lowest was during July (5.2%) as shown in **Table 6.2**.

6.3 Air quality

6.3.1 Environmental management measures

There were no mining activities undertaken during the report period. On-site activities were limited to inspections conducted for care and maintenance of the mine site and environmental monitoring. As such, impacts to air quality were minimal.

Air quality monitoring is undertaken in accordance with the Air Quality Monitoring Program (AQMP) (Coalpac, 2009c). The air quality monitoring network consists of five dust deposition gauges and one High Volume Air Sampler (HVAS) (HV02) measuring particulate matter <10µm (PM_{10}) (refer to **Figure 6.1**).

Air quality impacts at Invincible Colliery are managed in a manner that minimises generation of airborne and visual dust.

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 Project Approval. The air quality impact assessment criteria specified in the Project Approval are provided in **Table 6.3.**

Table 6.2 Invincible Colliery weather station data

Month	Rainfall (mm)	Cumulative Rainfall (mm)	No of rain days/ month	Air temp @ 2m (°C)		Air temp @ 10m (°C)		Humidity (%)	
				Minimum	Maximum	Minimum	Maximum	Minimum	Maximum
January	26.6	26.6	14	11.8	36.5	12.0	36.2	9.15	94.5
February	21.0	47.6	9	4.4	39.9	5.3	39.3	9.8	93.1
March	97.2	144.8	18	5.8	28.8	6.2	28.7	14.4	95.1
April	16.4	161.2	10	0.5	20.5	1.2	20.8	20.6	96
May	27.4	188.6	10	-3.2	17.9	-2.6	18.3	16.6	96.9
June	14.4	203.0	15	-3.5	15.9	-2.7	16.4	25.3	97.6
July	10.6	213.6	11	-6.4	18.9	-5.7	19.1	5.2	97.2
August	23.0	236.6	13	-5.2	19.2	-4.6	18.9	11.1	97.4
September	2.4	239.0	2	-4.0	28.8	-3.4	28.8	8.7	96
October	65.6	304.6	8	1.4	27.2	2.6	27.5	13.0	95.9
November	50.4	355.0	11	2.4	27.3	3.2	27.6	17.4	95.3
December	66.4	421.4	11	7.7	32.3	8.2	32.2	11.9	94.7
Total	421.4	-	132	-	-	-	-	-	-

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 IDD1 to IDD5). The annual average criterion for deposited dust (4g/m^2/month) was not exceeded at any of the dust deposition gauges during 2017. The deposited dust monitoring results for 2017 and annual averages are shown in **Table 6.4.**

Table 6.4 Deposited Dust Monitoring Results - 2017

	Total Insoluble Solids (g/m^2/month)				
Date	IDD1	IDD2	IDD3	IDD4	IDD5
January 2017	0.8	0.06	0.5	1.3	1.9
February 2017	1.0	0.5	0.7	0.8	1.5
March 2017	0.2	0.1	0.6	0.3	0.8
April 2017	3.4	1.4	0.4	0.4	0.5
May 2017	0.2	0.1	0.4	0.3	0.2
June 2017	0.2	0.05	0.7	0.7	0.05
July 2017	0.8	0.2	0.6	1.3	0.4
August 2017	6.8	6.4	0.8	0.4	0.4
September 2017	0.7	0.7	1.1	0.8	2.2
October 2017	0.1	0.2	0.6	0.3	1.3
November 2017	0.2	0.4	0.2	0.6	0.2
December 2017	1.1	0.2	0.4	0.6	0.6
Annual Averages	**1.3**	**0.9**	**0.6**	**0.7**	**0.8**

Monitoring of particulate matter is conducted over a 24-hour period using a HVAS located within the Invincible Colliery 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 2017 report period. The 24 hour maximum allowable limit for PM_{10} (50 µg/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 and annual averages for 2017 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 2017	7.8	19.5

In October 2017, Castlereagh Coal reported a failure to monitor due to an outage of the HVAS unit at Invincible Colliery (under EPL no. 1095) which occurred during September 2017. HV02 was not monitored on 9, 15, 21 and 27 September 2017. It is noted that HV02 malfunctioned on 9 and 15 September 2017 and a replacement HVAS was unable to be obtained and installed onsite until 28 September 2017.

During September 2017, there were no mining activities undertaken at Invincible Colliery as the site was on care and maintenance. Historically, during care and maintenance, Invincible Colliery HVAS results have been well below the long term impact assessment criteria for the site. Dust deposition gauge results for August/September were < 2.2 g/m^2/month and were broadly consistent with the results obtained to date in 2017. The failure of the HVAS to monitor was reported to the EPA and DPE at the time of failure.

6.3.4 Trends in data

Annual averages for dust deposition during 2017 are compared with monitoring data from the previous 5 years, refer to **Table 6.6** and as graphs within **Appendix 1**.

Table 6.6 Annual averages for dust deposition 2012 -2017

	Total Insoluble Solids (g/m2/month)				
Year	IDD1	IDD2	IDD3	IDD4	IDD5
2017	1.3	0.9	0.6	0.7	0.6
2016	1.1	0.3	0.7	0.5	1.5
2015	0.6	0.6	0.9	0.5	1.0
2014	2.0	0.8	1.0	0.6	19.2*
2013	0.8	0.5	0.5	0.4	0.6
2012	1.0	1.1	0.6	0.5	0.9

**High value during 2014 was thought to be due to measurement error, equipment malfunction or external influence, as results is not consistent with other dust gauge results obtained during that year and the historical dust deposition values for this gauge. Refer to 2014 AEMR for further details.*

The annual averages for deposited dust recorded at each of the monitoring locations during 2017 are consistent with average dust levels recorded in recent years. Annual averages for particulate matter during 2017 are compared with monitoring data from the previous 5years in **Table 6.7.** As noted previously, TSP results are estimated from PM_{10} results.

Table 6.7 Annual averages for particulate matter 2012 – 2017

Monthly average	PM_{10} (µg/m^3)	TSP (µg/m^3)
Annual Average 2017	7.8	19.5
Annual Average 2016	8.0	20.0
Annual Average 2015	6.1	15.2
Annual Average 2014	3.9	9.8
Annual Average 2013	7.0	17.5
Annual Average 2012	9.6	24.0

The annual averages for particulate matter recorded at Invincible Colliery during 2017 are within the range of average levels recorded in the previous 5 years.

6.3.5 Proposed improvements

Monitoring of air quality will continue to be conducted during 2018 in accordance with the Air Quality Management Plan (AQMP). During 2018, in accordance with the Invincible Colliery Southern Extension Project Approval, the existing AQMP will be updated and submitted to DPE for approval. As noted in **Section 6.3.3**, HV02 malfunctioned during September 2017, with a replacement HVAS installed on 28 September 2017.

6.4 Surface water

6.4.1 Environmental management measures

The surface water management system at Invincible Colliery is a closed loop system that utilises a series of settlement ponds and storage dams within the site. These ponds and dams are managed in accordance with the Water Management Plan (WMP) (Coalpac, 2009h) and further described in **Section 7.0**. Water is discharged as required from the main colliery dam via LD002.

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 EPL. The concentration limits specified in the EPL are provided in **Table 6.8** with the surface water monitoring results discussed in **Section 6.4.3**.

Table 6.8 Water quality concentration limits

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

6.4.3 Environmental outcomes

Monitoring of water quality is conducted during discharge of water at the licenced discharge point (LD002) and monthly due diligence monitoring is conducted within the Main Dam, Environmental Dam and Silt Dam. Water quality is also monitored on a monthly basis for due diligence purposes at two discrete locations within Cullen Creek (BSW01) and Dulhunty's Creek (BSW02).

The water quality monitoring results from LD002 is included in **Table 6.9** with background water quality Main Dam, Environmental Dam (SW01), Silt Dam (SW02), Cullen Creek (BSW01) and Dalhunty's Creek (BSW02) included **in Appendix 1**. A comparison of annual water quality across dams on site is included in **Section 6.4.4**.

Table 6.9 LD002 water quality monitoring results

Sampling date	pH	Oil and grease	TSS
LD002 (licensed discharge point)			
10/1/2017	No Discharge	No Discharge	No Discharge
9/2/2017	No Discharge	No Discharge	No Discharge
9/3/2017	No Discharge	No Discharge	No Discharge

Sampling date	pH	Oil and grease	TSS
10/4/2017*	6.98	< 5	< 5
12/5/2017	No Discharge	No Discharge	No Discharge
9/6/2017*	7.98	< 5	5
11/7/2017	No Discharge	No Discharge	No Discharge
11/8/2017	No Discharge	No Discharge	No Discharge
7/9/2017	No Discharge	No Discharge	No Discharge
9/10/2017	No Discharge	No Discharge	No Discharge
8/11/2017	No Discharge	No Discharge	No Discharge
12/12/2017	No Discharge	No Discharge	No Discharge

** Discharge event*

There were two discharge events from the licenced discharge point (LD002) during the report period. There were no exceedances of the water quality concentration limits for LD002 during the report period.

6.4.4 Trends in data

Annual averages for water quality in on-site dams during 2017 are compared with monitoring data from the previous 5 years is shown in **Table 6.10.** LD002 discharge data from 2011-2017 for pH and TSS is displayed graphically in **Appendix 1.** Generally oil and grease has recorded results below the detection limit.

The average pH in the Main Dam for 2017 is the highest average recorded in recent years. Average pH in the Environmental Dam and Silt Dam is consistent with historic values. Water is not discharged from the Environmental Dam or Silt Dam. The licensed discharge point is at LD002 in the Main Dam. Total suspended solids (TSS) in the Main Dam, Environmental Dam and Silt Dam during 2017 is consistent with levels recorded during 2016.

Table 6.10 Comparison of water quality in on-site dams 2012 - 2017

Annual Average	Location	pH	Oil & grease	TSS
2017	Main Dam	7.47	<5 mg/L	10 mg/L
	Environmental Dam	3.49	<5 mg/L	25 mg/L
	Silt Dam	7.02	<5 mg/L	16 mg/L
2016	Main Dam	7.39	<2 mg/L	10 mg/L
	Environmental Dam	3.07	<2 mg/L	26 mg/L
	Silt Dam	6.75	<2 mg/L	27 mg/L
2015	Main Dam	6.74	<2 mg/L	<5 mg/L
	Environmental Dam	2.93	<2 mg/L	7 mg/L
	Silt Dam	7.36	<2 mg/L	32 mg/L
2014	Main Dam	No discharge	No discharge	No discharge
	Environmental Dam	No discharge	No discharge	No discharge
	Silt Dam	No discharge	No discharge	No discharge

Annual Average	Location	pH	Oil & grease	TSS
2013	Main Dam	No discharge	No discharge	No discharge
	Environmental Dam	No discharge	No discharge	No discharge
	Silt Dam	No discharge	No discharge	No discharge
2012	Main Dam	7.2	<5 mg/L	8 mg/L
	Environmental Dam	3.3	<5 mg/L	8 mg/L
	Silt Dam	7.7	<5 mg/L	15 mg/L

The 2017 average pH at all downstream locations are generally consistent with 2016 monitoring results. Average oil and grease concentrations have been below laboratory detection limits during every year sampled, with the exception being BSW02 for 2017. Average TSS concentrations are generally low at downstream locations.

Annual average water quality at downstream locations during 2017 is compared with annual averages from the previous years in **Table 6.11.** It is noted that monitoring was not undertaken during 2011 and 2012.

Monitoring locations detailed in **Table 6.11** include:

- Cullen Creek (BSW01);
- Dulhunty's Creek (BSW02).

Table 6.11 Comparison of water quality at downstream locations 2011 – 2017 (Annual Average)

Year	Location	pH	Oil & grease	TSS
2017	BSW01	6.46	<5 mg/L	23 mg/L
	BSW02	7.78	6 mg/L	7 mg/L
2016	BSW01	6.55	<2 mg/L	27 mg/L
	BSW02	7.47	<2 mg/L	8 mg/L
2015	BSW01	6.99	<2 mg/L	19 mg/L
	BSW02	7.90	<2 mg/L	12 mg/L
2014	BSW01	4.57	<5 mg/L	-
	BSW02	7.61	<5 mg/L	-
2013	BSW01	6.78	<5 mg/L	-
	BSW02	7.63	<5 mg/L	-

6.4.5 Proposed improvements

Monitoring of water quality will continue to be conducted during care and maintenance. The water management system is regularly inspected and repairs undertaken as required, this will continue to occur during 2018. In accordance with the Invincible Colliery Southern Extension Project Approval, the site WMP will be updated during 2018 in consultation with regulatory authorities. The revised WMP will be developed in accordance with the Southern Extension Project Approval, and will consider water quality monitoring requirements during the operational phase for the commencement of the Invincible Southern Extension.

6.5 Groundwater

Shoalhaven Coal operates a groundwater monitoring network which extends across the Cullen Valley Mine and the Invincible Colliery. In accordance with the approved WMP for Invincible, only the groundwater monitoring bore of LD001 relates to the Invincible Colliery. Historically, groundwater monitoring results have been reported within the Invincible Colliery Annual Review for groundwater monitoring undertaken for Invincible Colliery and Cullen Valley Mine. For this Annual Review, the groundwater monitoring data provided in this report is for LD001 only. The Cullen Valley Mine Annual Review includes the results of the groundwater monitoring which is conducted across both mining complexes as this data is relevant to Cullen Valley Mine.

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 70 m depth. The open cut voids at the Invincible Colliery 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. There are also no trigger levels detailed in the Invincible Colliery Water Management Plan (Coalpac, 2009h). During the 2018 report period a revised Invincible Colliery Water Management Plan (including performance criteria and trigger levels) will be developed for the Invincible Colliery in accordance with the Project Approval (MOD 5).

6.5.3 Environmental outcomes

During the reporting period, groundwater monitoring was conducted at LD001 in accordance with the Water Management Plan Cullen Valley Mine (Umwelt ,2017).

6.5.4 Trends in data

The long term trends for LD001 in Standing Water Level, Electrical Conductivity, Hardness, Sulphate and Nitrate and metals are discussed below. Long term graphs for groundwater can be found in **Appendix 1**.

Standing water level

Since 2013 the standing water level in LD001 has steadily increased from 899.49mAHD to 890.88 mAHD in 2017. The 2017 measurement of 890.88 mAHD is 0.43 mAHD above the previous maximum, as shown as shown graphically in **Appendix 1**.

pH

Between 2011 and 2016 the pH level ranges between 5.87 and 7.17. During this period the pH level recorded was between 6.4 and 6.5 on four occasions. The 2017 result of 6.16 is within the range of previous results (see **Appendix 1**).

EC

The conductivity level between 2011 and 2016 ranges between 120 µS/cm and 155 µS/cm, with five of the results between 120 µS/cm and 130 µS/cm. The 2017 result of 125 µS/cm is consistent with previous results (see **Appendix 1**).

Nitrate

Nitrate levels between 2011 and 2016 have ranged between 0.01 mg/L and 0.26 mg/L, with five results being 0.24 mg/L ±0.02 mg/L. The 2017 result of 0.22 mg/L is within the historical range and consistent with the commonly recorded level (see **Appendix 1**).

Hardness

Between 2011 and 2016 hardness has ranged between 35 mg$CaCO_3$/L and 48 mg$CaCO_3$/L. Since 2013 the hardness level has shown a linear increase. The 2017 is slightly above the previous maximum at 53 mg$CaCO_3$/L and is consistent with the linear trend, as shown graphically in **Appendix 1**.

Sulphate

Since 2011 the sulphate level has declined from a maximum of 25 mg/L to 13 mg/L in 2016, with a minimum of 11 mg/L occurring in 2013. Since 2013 the sulphate level has shown little variation, ranging between 11 and 14 mg/L (see **Appendix 1**). The 2017 level of 13 mg/L is within the historical range and consistent with the levels recorded since 2013.

Metals

For 2017 Aluminium, Arsenic, Cadmium, Chromium, Iron, Lead, Molybdenum, Selenium and Mercury all return results which were below the limit of detection. The levels for Copper, Manganese and Nickel were however within the range of previous results. The level of Zinc (138 mg/L) was however above the previous maximum of 122 mg/L and is consistent with the trend since 2013 of an increase in concentration.

6.5.5 Proposed improvements

During the 2018 report period, revised Invincible Colliery Water Management Plan will be prepared in consultation with regulatory authorities and submitted to DPE for approval.

6.6 Noise

6.6.1 Environmental management measures

A Noise Monitoring Program (NMP) (Coalpac, 2009f) has been prepared in accordance with the Project Approval outlining the required frequency of monitoring during mining operations. There were no mining operations during the report period, however, quarterly attended monitoring was conducted by Global Acoustics (2017a-d) at three locations (N01, N02 and N03) around the site during care and maintenance activities (refer to **Figure 6.1**). A copy of the noise monitoring reports are published on Shoalhaven Coal's website (http://www.castlereaghcoal.com.au).

6.6.2 Performance criteria

Noise impact assessment criteria for monitoring are specified in the EPL and Project Approval as outlined in **Table 6.12**.

Table 6.12 Noise Impact Assessment Criteria

Location	Day time limit	Evening limit	Nigh time limit
At any residence on privately owned land (except Billabong and Hillview properties)	40 dB(A) LAeq (15 minute)	35 dB(A) LAeq (15 minute)	35 dB(A) LAeq (15 minute)

Note: The Billabong and Hillview properties were purchased by Coalpac in 2010.

6.6.3 Environmental outcomes

There were no exceedances of the impact assessment criteria (where applicable) detected during quarterly monitoring conducted during the report period as shown in **Table 6.13.** On all monitoring occasions, the noise from Invincible Colliery was inaudible.

Table 6.13 2017 Quarterly attended noise monitoring results

Location	Criterion (dB)	Quarter 1 ($L_{Aeq\ 15min}$)	Quarter 2 ($L_{Aeq\ 15min}$)	Quarter 3 ($L_{Aeq\ 15min}$)	Quarter 4 ($L_{Aeq\ 15min}$)
Cullen Bullen Central (N01)	40	IA	IA	IA	IA
Cullen Bullen West (N02)	40	IA	IA	IA	IA
Cullen Bullen South (N03)	40	IA	IA	IA	IA

IA – noise from the mine was inaudible

6.6.4 Trends in data

The results of noise performance monitoring for the period 2011 – 2016 are summarised in **Appendix 1**. Results for quarterly noise monitoring during 2014 and 2015 showed the site contribution to be inaudible at all monitoring locations.

6.6.5 Proposed improvements

There were no noise complaints or non-compliances with noise criteria during the report period. Current management measures will continue to be undertaken for care and maintenance activities. Noise monitoring will continue to be undertaken quarterly during the care and maintenance phase. In the unlikely event that non-compliance with approval and licence conditions is detected or noise complaints are received, corrective actions will be implemented as required. Prior to the commencement of mining operations for the Southern Extension Project, Invincible Colliery will update the existing Invincible Colliery Noise Management Plan and submit to the secretary of DPE for approval.

6.7 Biodiversity

6.7.1 Environmental management measures

A Landscape Management Plan (LMP) (Coalpac, 2009e) has been prepared in accordance with the Project Approval outlining the required monitoring of rehabilitation and biodiversity offset sites. Biodiversity monitoring has been undertaken across the Invincible monitoring locations since 2011 (Kleinfelder, 2011-2015) and has been undertaken by Umwelt since 2016 (refer to **Figure 6.2**).

6.7.2 Performance criteria

During 2017, biodiversity monitoring was undertaken for the Invincible Colliery Biodiversity Offset Area (BOA) and Rehabilitation Areas (refer to **Figure 6.2** for monitoring locations). The Biodiversity Monitoring Program for Invincible Colliery was based on the monitoring requirements documented in the LMP (Coalpac, 2009e).

Monitoring of BOA and rehabilitation areas in 2017 included the following:

- Floristic monitoring within fixed plots (20m x 10m) every 10ha;
- Fauna surveys to record the fauna species diversity and habitats quality;
- Clandulla geebung and Capertee stringybark monitoring (only in conservation areas); and
- An assessment against the performance/completion criteria and checklists of the management plans and current MOP for the site.

An assessment of compliance of the monitoring results against the relevant biodiversity and rehabilitation performance and completion criteria for Invincible Colliery is summarised within the 2017 Biodiversity Offset Monitoring of Cullen Valley Mine and Invincible Colliery Report (Umwelt, 2018) and detailed in **Section 8.3**.

6.7.3 Environmental outcomes / trends in data

6.7.3.1 Biodiversity offset areas

Native vegetation of the BOA is considered to be in adequate condition across both native grassland and woodland habitats, generally with a low abundance of weeds across all habitat types. Floristic composition and vegetation condition have overall remained consistent with previous monitoring events. Woodland habitats demonstrated the recruitment of canopy species along the edges of open grasslands. While grassland habitats are considered to be dominated by native species, these areas demonstrated a higher abundance of exotic species (predominantly exotic grasses and cosmopolitan weeds) compared to adjacent woodlands. The relationship between native and exotic grassland species is known to fluctuate seasonally, specifically the presence of annual grass species. A higher presence of exotic species within grassland habitats is not surprising considering this site and the surrounding area was historically used for agriculture. Taking into consideration the relatively higher number of native species recorded during surveys no management activities are recommended at the present time.

The BOA exhibits characteristics of good habitat health for a range of habitat types including grasslands, woodlands and farm dams. Well-established woodland communities provide a stable range of habitat features including woody debris, hollow bearing trees, fallen timber, permanent water sources and exposed rock. As such the BOA supports substantial species diversity with 83 fauna species were recorded during monitoring surveys. A large proportion of this is represented by birds with 50 species recorded

across all BOA sites. The diversity of habitats, as well as the abundance of habitat edges and the proximity to rural and remnant forest areas, is the likely reason for a high degree of fauna species diversity. The main habitat feature recorded in the BOA was fallen timber, which provides refuge for fauna species. Tree hollows were scarce, which is likely due to the limited area of woodland habitats and their age.

6.7.3.2 Rehabilitation areas

The Invincible Rehabilitation Areas are defined by the year each area was established and there are currently 12 rehabilitation areas across both mine sites from 11 intervals of rehabilitation (2002, 2003, 2004, 2005, 2006, 2008, 2009, 2010, 2011, 2012 and 2014 rehabilitation areas). The Invincible Rehabilitation Area contains three rehabilitation areas being 2008, 2009 and 2011.

The vegetation condition of the Invincible Colliery rehabilitation areas is considered to be generally in good condition. The benchmark target for proportion of exotic species to native species diversity was met in 2016 and remains consistent for 2017. Monitoring in 2017 identified a higher native species diversity and greater density of plants within eastern rehabilitation areas. In contrast, vegetation quality was found to be slightly lower in north-western patches where ecosystem function and vegetation growth varied slightly compared to the well-established eastern areas.

Overall, the lower condition rehabilitation areas across Invincible Colliery will likely benefit from additional management actions to enhance the functionality of these ecosystems to a level comparable with remnant communities. These management actions include, but are not limited to, supplementary plantings of native ground cover and tubestock where required, as well as further installation of compensatory structures such as hollow logs and nest boxes, and increasing wood debris to improve soil structure and facilitate organic matter deposition.

The results of the 2017 fauna survey consider fauna diversity to be high (44 species), given the nature of the site as a relatively young rehabilitated area. This level of species diversity is likely due to the proximity of the rehabilitation sites to the established remnant habitat of the offset areas. This is particularly the case for highly mobile fauna such as birds that move between habitat patches while foraging. Compensatory habitat features such as nest boxes provide an artificial substitute for species including a variety of gliders, birds and microbats, which have been shown to consistently use the boxes based on the current and previous inspection results.

6.7.3.3 Clandulla geebung Monitoring

Targeted searches for Clandulla geebung was undertaken within the BOA, however no new locations were identified.

6.7.4 Proposed improvements

Annual Biodiversity and Rehabilitation monitoring will be continued in 2018. In accordance with the Project Approval (MOD 5), for the Southern Extension Project, a Biodiversity Management and Rehabilitation Management plan is required prior to the commencement of mining operations.

These plans will integrate the rehabilitation and offset monitoring, target completion criteria and triggers for correction action and/or investigation at the Invincible Colliery. The preparation of these plans may revise the annual biodiversity and rehabilitation monitoring program currently utilised at Invincible Colliery. The above processes will track the progression of rehabilitated and biodiversity offset areas and required actions. Both of which will be reported in future Annual Reviews.

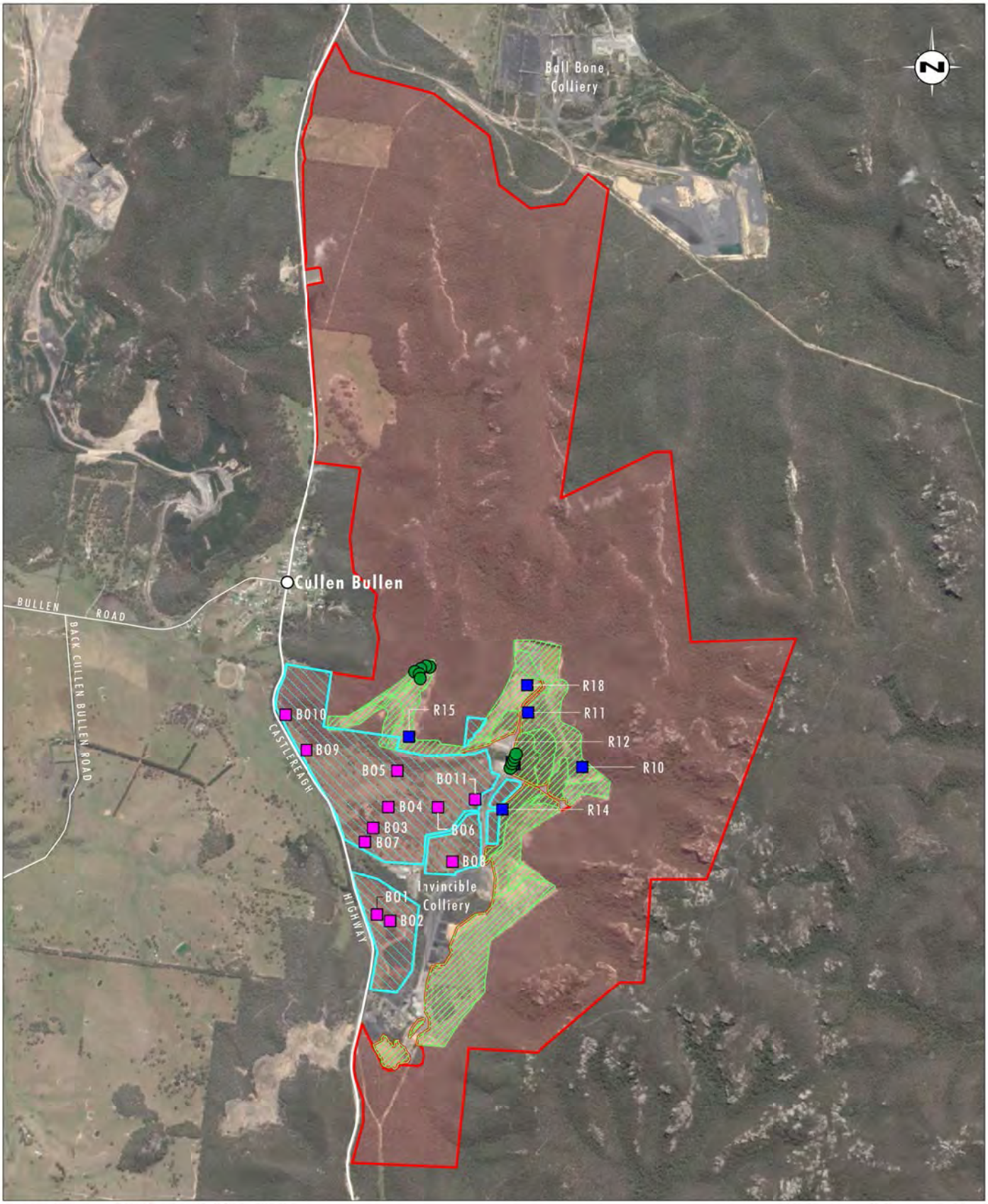


Image Source: Google Earth (MAR 2015)
Data Source: Kleinfelder (2017)

0 0.5 1.0 1.5km
1:35 000

Legend

- Study Area
- Biodiversity Offset Area
- Rehabilitation Zones
- Rehabilitation Monitoring Point
- Biodiversity Offset Area Monitoring Site
- Nest Box Location

FIGURE 6.2

Biodiversity Offset and Rehabilitation Monitoring Locations within the Invincible Colliery Area

File Name (A4): R34/3968_057.dgn
20180309 11.19

6.8 Weeds and feral animals

6.8.1 Weeds

Weeds within these areas were generally found to be cosmopolitan weed species such as catsear (*Hypochaeris radicata*) or St John's wort (*Hypericum perforatum*) and are not likely to cause significant impact to vegetation condition at this stage. While studies have shown that bare ground favours the establishment of some weed species via colonisation from surrounding areas, this does not appear to be the case considering rehabilitation areas have been established for up to 9 years (2008). The likelihood of exotic species further colonising rehabilitation areas is low, given the soil structure and the density of tree and shrub species currently in established in rehabilitation areas.

Weed management is conducted in accordance with the LMP (Coalpac, 2009e) and spraying is targeted towards known weed species occurrences within the site. Weed spraying was undertaken as required during the report period.

6.8.2 Feral animals

6.8.2.1 Biodiversity offset area

Four introduced species were recorded within the Biodiversity Offset Sites monitoring sites during 2017. These were the common myna (*Sturnus tristis*), common starling (*Sturnus vulgaris*), brown hare (Lepus capensis), rabbit (*Oryctolagus cuniculus*) and red fox (*Vulpes vulpes*).

6.8.2.2 Rehabilitation area

No feral animal species were recorded within the rehabilitation area of Invincible Colliery during 2017 monitoring surveys. Evidence of feral pig (*Sus scrofa*) activity within the rehabilitation site was recorded during the 2016 monitoring surveys. While they weren't recorded in 2017, ongoing management actions for feral pigs should be considered as this species can cause habitat degradation and facilitate the spread of weeds.

6.9 Blasting

Blasting is managed and monitored in accordance with the Blast Management Plan (BMP) (Coalpac, 2009d) and the EPL. However, as no mining operations were undertaken, no blasting was conducted during the report period.

6.10 Waste management

As no mining activities were undertaken during the report period, minimal quantities of waste materials were required to be stored on site. All sewage from the workshops/administration areas is directed to septic systems which are pumped out by a licensed waste collection and disposal contractor 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. All paper and general wastes from administration and workshop areas is disposed of in garbage bins located adjacent to the administration buildings. The bins are collected as required 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. During the report period, the 4.5 m^3 general waste skip bin at the site was emptied on two occasions.

6.11 Hazardous material management

The volume of hazardous materials delivered to and stored within the site are low as there were no mining operations conducted during the report period.

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 on site that contain these materials are kept emptied during the care and maintenance period. One of the above ground self bunded diesel tanks (75,000L Transtank) is operational with up to 35,000L of diesel stored in the facility. A second Transtank (95,000L) is kept on site but is currently not in use.

Diesel is delivered to site as required. In addition, waste oil and grease is stored adjacent to the workshop in a bunded area which is removed as required by a licensed contractor.

6.12 Heritage

6.12.1 Indigenous heritage

Several artefact scatters, open camp sites and an isolated find were located during an archaeological field survey conducted in 2010. Only one of these sites (Invincible OS1 artefact scatter) was determined to have high archaeological significance.

An Aboriginal Heritage Management Plan (AHMP) (Coalpac, 2009g) has been prepared and implemented in accordance with the Project Approval and in consultation with the then Department of Environment and Climate Change and the Aboriginal community. The artefact scatter site OS1 is located outside the mine disturbance area and has been fenced and signposted in accordance with the AHMP. No disturbance of OS1 occurred and no vegetation clearing or ground disturbance works were conducted in report period. A revised AHMP will be prepared during the 2018 reporting period in accordance with the requirements of the Project Approval (MOD 5).

6.12.2 Non-indigenous heritage

No items of European heritage are present within the Invincible Colliery site. There are no items of European heritage are likely to be disturbed during care and maintenance activities and no specific management measures are required. No items of European heritage were disturbed during the report period.

6.13 Spontaneous combustion

There are no known occurrences of spontaneous combustion at Invincible Colliery. Experience to date in mining at the Invincible Colliery has demonstrated that the waste material, stockpiled coal and other relevant materials have a low propensity to spontaneously combust. Any future extraction, processing and stockpiling of coal will continued to be managed to ensure any potential for spontaneous combustion is minimised.

6.14 Bushfire

Bushfire hazards are managed in accordance with the LMP (Coalpac, 2009e). A number of measures and safeguards have been implemented to minimise bushfire risk at Invincible Colliery, 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; 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 fire-fighting services as well as establishing a fire break to the limits of operations at the open cut.

There were no bushfire events within the Invincible Colliery site during the report period.

6.15 Mine subsidence

There was no mining undertaken during the report period. As such, no subsidence management measures were required to be implemented.

6.16 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. Warning signs have been placed on extremities of operations to ensure members of the public are aware of the presence of the open cut. There were no public safety incidents during the report period.

7.0 Water management

7.1 Water management system

The strategy behind the surface water management plan is to keep the clean and dirty water systems separate by interception and diversion of stormwater runoff from operational and non-operational areas. The water management system at Invincible Colliery 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 5 active sediment dams (SD2, SD3, SD4, SD5 and SD6), one Environmental Dam (SD1), one storage dam (Main Water Dam – LD002), 2 sediment ponds, one clean water storage dam located within the Aboriginal Heritage site (OS-1) and 7 inactive fine reject dams currently on site (refer to **Figure 6.1**). The Main Water Dam has a total capacity of 117 ML. The remaining dams have the following capacities:

- SD1 – 0.03 ML
- SD2 – 6 ML
- SD3 – 0.3 ML
- SD4 -38 ML
- SD5 – 6.6 ML
- SD6 – 12.8 ML

The Environmental Dam which contains acid water is monitored on a regular basis by site personnel. The Environmental Dam is fitted with an automatic pump out unit to ensure the water level remains low.

Due to the permeable nature of the waste rock that is back-filled into the completed open cut excavation, and the proximity of the open cut to the abandoned underground workings, the majority of surface water runoff collected in pit sumps, fine reject dams, coal stockpile areas, active mining areas and waste dumps seeps down into the abandoned underground workings. Water from the abandoned underground workings is used for dust suppression and accessed from Pit 205. Any excess water, that meets the required water quality criteria, will be released from the Main Dam, LD002 which is a licenced discharge point under the EPL. During the 2018 report period, an updated Water Management Plan including an erosion and sediment plan and surface water management plan will be prepared and submitted to DPE for approval.

7.2 Water take

There has been no water drawn from external sources under licences. Water is currently sourced from the existing connection to the Fish River Water Supply pipeline.

Table 7.1 Water take

Water Licence #	Water sharing plan, source and management zone (as applicable)	Entitlement	Passive take/inflows	Active pumping	Total
WAL 36485 (10BL602586)	Greater Metropolitan Region Groundwater Sources Water Sharing Plan	120 units	0	0	0
WAL 35978 (10BL602584)	NSW Murray-Darling Porous Rock Groundwater Sources Water Sharing Plan	26 units	0	0	0

7.3 Erosion and sedimentation

7.3.1 Environmental management measures

Permanent erosion and sediment control (ESC) measures within the Invincible Colliery include containment and diversion of “clean” water around disturbed areas and containment of runoff from these disturbed areas within on-site sediment dams. Temporary measures include contour banks, drainage lines, and rock lined drop structures. ESC measures are monitored and maintained in accordance with the ESCP to minimise transport of sediment to downstream waters. Where monitoring indicates failure of ESC measures, repairs and rectification works are undertaken as required. During the 2018 report period, an updated Water Management Plan including an erosion and sediment plan and surface water management plan will be prepared and submitted to DPE for approval.

8.0 Rehabilitation

8.1 Status of mining and rehabilitation

Infrastructure at Invincible Colliery is being maintained for future mining operations. 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 with maintenance and repairs undertaken as required. The current status of mining and rehabilitation areas within the mine domains established in the approved Invincible Colliery Care and Maintenance Mining Operations Plan (MOP) (Sedgman, 2015) is provided in **Table 8.1.**

Table 8.1 Rehabilitation status

Mine Area Type	Previous Reporting Period (actual) 2016 (ha)	This Reporting Period (actual) 2017 (ha)	Next Reporting Period (forecast) 2018 (ha)
A. Total mine footprint (all areas including active disturbance areas and rehabilitation areas)	134.17	134.17	134.17*
B. Total active disturbance (areas within the footprint still requiring rehabilitation)	63.23	63.23	63.23*
C. Land being prepared for rehabilitation	9.1	9.1	9.1*
D. Land under active rehabilitation	61.84	61.84	61.84*
E. Completed rehabilitation (areas that have achieved completion criteria and been signed-off by DRE)	0	0	0*

* Projected disturbance and rehabilitation figures for the 2018 reporting period will be included within the Invincible Rehabilitation Management Plan to be submitted to DPE /DRG prior to the commencement of mining and will be reported in the 2018 Annual Review.

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. In the long term, rehabilitation areas will become integrated with adjacent native vegetation communities.

In accordance with Condition 51 of Schedule 3 of the Project Approval, by the end of May 2018, Shoalhaven will complete a Rehabilitation Strategy for Invincible Colliery to the satisfaction of DPE. The Rehabilitation Strategy will investigate the various options for backfilling of the remaining voids onsite, options to avoid the disturbance of vegetation in proximity to the Eastern Void and include a detailed description of the measures to be implemented and a plan for the implementation of these measures.

Prior to the recommencement of mining operations Shoalhaven Coal will prepare a Rehabilitation Management Plan for Invincible Colliery to the satisfaction of DPE. The Rehabilitation Management Plan will detail the various rehabilitation activities to be completed in the next 5-7 years of operations and will be prepared in accordance with the relevant DRG guidelines. The Rehabilitation Management Plan will be completed in consultation with DPI Water, Office of Environment and Heritage (OEH), Lithgow Council and the Community Consultative Committee (CCC).

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 prior to relinquishment.

8.3 Completion criteria assessment

Table 8.2 provides a summary and assessment of compliance of the monitoring results against the relevant biodiversity and rehabilitation performance and completion criteria for Invincible Colliery.

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 Invincible Colliery LMP (Coalpac, 2009e).

Areas of rehabilitation to the north of the site were shaped in 2015. There has been no removal of buildings or other infrastructure and no new rehabilitation areas were established during the report period. 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; and
- repair and rectification of erosion washouts and erosion control devices.

In the long term, rehabilitation areas are to become integrated with adjacent native vegetation communities. During the report period, the existing Care and Maintenance MOP was extended by DRG, to cover the period of care and maintenance until the decision was made regarding the approval of the Invincible Southern Extension Project. A new Rehabilitation Management Plan (RMP) will be prepared during 2018 to detail the mining and rehabilitation operations at the site.

All exploration and rehabilitation activities were undertaken in accordance with the Exploration and Rehabilitation Activities Environmental Management Plan submitted for approval to DRG and Forestry NSW prior to commencement of exploration. An assessment of rehabilitation performance against the completion criteria in the LMP is included in **Table 8.2** below.

Table 8.2 Assessment of monitoring results against Invincible Colliery completion criteria

Rehabilitation Criteria	Standard or Milestone Required	Suggested Corrective Action	Results and Outcomes of 2017 Monitoring
1. Planning Stage			
Consideration of the completion criteria for the Planning Stage of the project are not relevant to this monitoring report and have not been considered further.			
2. Establishment Stage			
Consideration of the completion criteria for the Establishment Phase of the project are not relevant to this monitoring report and have not been considered further.			
3. Development and Sign-off Stages			
3.1 Vegetation establishment and sustainability			
Tree species composition is compatible with that of other vegetation types in the lease, i.e. it includes:			
• local eucalypt species	A range of local eucalypt species are present.	Plant or seed more species if required	A range of local eucalypt species are present within the Rehabilitation Areas
• local tall acacia species	A range of local acacia species are present	Plant or seed more species if required	A range of local acacia species are present within the Rehabilitation Areas
Tree health	More than 75% of trees are healthy and growing as indicated by monitoring	Investigate causes of the problem and correct if required	All Invincible Rehabilitation Areas were found to have 75% or more healthy trees.
Leaf nutrient analysis	Nutrient analyses conducted on trees in representative areas indicate no deficiencies of key macro- or micro-nutrients	Investigate causes of any problems and address as required	No nutrient analyses were undertaken as part of the 2017 monitoring.
Tree density	Monitoring or visual estimation show the density of eucalypt trees >2m tall to be >200 stems/ha, averaged over the rehabilitated area monitored.	Plant or seed more trees if required	Tree densities within the rehabilitation areas appeared to be greater than 200 stems per hectare.

Rehabilitation Criteria	Standard or Milestone Required	Suggested Corrective Action	Results and Outcomes of 2017 Monitoring
Presence of treeless areas	No treeless areas greater than 0.5 ha are present	Correct using planting or seeding if required	No treeless area greater than 0.5 ha were observed during the 2017 monitoring.
Evidence of tree regeneration	Second generation tree seedlings are present or likely to be, based on monitoring or research in comparable older sites	Conduct follow-up assessment later, or add seed if required	Second generation tree seedlings were not observed within the monitoring locations. Second generation seedlings have the potential to occur in the older rehabilitation areas (2003 primarily) however further monitoring would be required to confirm this.
Sufficient grass or shrub cover, rocks, logs, etc. are present on steeper slopes to control erosion in the long-term	Monitoring and visual estimation show grass or shrub cover to be >50% on these areas, or sites have sufficient rock cover to maintain erosion below target standards (see Criteria 3.3)	Where necessary, delay closure until grass and shrub cover increases, or increase cover by seeding	Monitoring and visual estimation show grass or shrub cover to be >50% on these areas in 2017. It is noted that these are mainly shrub species.
Presence of bare areas on outer slopes	No bare areas that have obviously failed and are greater than 0.1ha in total area, or greater than 5m in width extending >10m down the slope, are present	Increase soil quality to assist grass and herb cover on bare areas, this may include increasing organic matter content to promote soil structures.	While bare ground was frequently encountered across the Invincible rehabilitation area resulting from a sparse vegetative ground layer and dense shrub layer. The Rehabilitation Areas inspected were considered to meet this criteria milestone.
Shrubs, grasses and other understorey plants	A range of native shrubs, grasses and other understorey species have established through topsoil, seeding or recolonisation	Investigate the feasibility of establishing more shrub or grass species and do so if practicable	A range of native shrubs, grasses and other understorey species have established through topsoil, seeding or recolonisation.
Noxious weeds	A management program for the control of declared plants and other weeds such as Pampas Grass and Crofton Weed has been implemented on the site	Control declared plants and other problem weeds as per the management program	A management program is in place to control noxious weeds

Rehabilitation Criteria	Standard or Milestone Required	Suggested Corrective Action	Results and Outcomes of 2017 Monitoring
Fire tolerance	Tree, understorey and grass species are capable of either surviving or regenerating following a fire	Rehabilitation may be too young to determine this; investigate using research and/or literature review of relevant research on other mines	Rehabilitation areas are too young to determine the fire resistance. It is unlikely, at this stage that the Rehabilitation Areas would survive, or regenerate after, a moderate or high intensity fire.
Drought tolerance	Tree, understorey and grass species are capable of surviving drought	If large-scale deaths have occurred, consider the need for replanting or reseeding, and whether more drought tolerant species should be included in the seed mix	The long term drought tolerance of the rehabilitation is unclear. The rehabilitation areas appear to be relatively tolerant given the lack of rainfall since 2016 monitoring, however ongoing and consistent monitoring is required to assess this criteria.
Sustainability	Monitoring and research results indicate that the rehabilitation is likely to be sustainable over the long-term, if managed according to the procedures defined in Criteria 4 below	Continue monitoring in accordance with approved Flora and Fauna Management Plan / Biodiversity Management Plan.	Consistency seen in qualitative descriptions suggest that the rehabilitation may be sustainable over time, however ongoing and consistent monitoring is required to assess this criteria.
3.2 Fauna habitat and faunal recolonisation			
Habitat	Fauna habitat in rehabilitated areas matches that in some surrounding un-mined open forest/woodland areas, or will do so in time	Investigate whether further planting or seeding might be required as per Criterion 3.1	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.
Diversity of vegetation	Includes a range of vegetation structural habitats, e.g. eucalypts, shrubs, ground cover and a developing litter layer	Investigate whether further planting or seeding might be required as per Criterion 3.1	All Rehabilitation Areas include a range of structural habitats. The diversity of native flora species at this stage of rehabilitation is still limited by the initial seeding mix used during works.

Rehabilitation Criteria	Standard or Milestone Required	Suggested Corrective Action	Results and Outcomes of 2017 Monitoring
Fauna recolonisation - invertebrates	Studies demonstrate that key invertebrate functional groups such as ants and soil faunal communities are re-establishing	Investigate the causes where key groups have not recolonised	Invertebrate studies have not been undertaken previously and were not conducted in 2017.
Fauna recolonisation - vertebrates	Vertebrate surveys demonstrate that bird, mammal, reptile and frog communities are becoming established in rehabilitated sites	Investigate the causes where key vertebrate groups have not recolonised	Fauna surveys were conducted in Rehabilitation Areas for the first time in 2016. The results since then suggest that rehabilitation habitat are not yet able to permanently support animal populations. Vegetation growth is improving corridors by developing foraging habitat for many fauna species. Further evidence will be drawn from future monitoring events as permanent habitat features become more frequent.
Management of fauna habitat in un-mined areas	Fauna habitat of adjacent un-mined areas has been protected as stipulated in this Plan	Protect areas of adjacent native fauna habitat	Fauna habitat of adjacent un-mined areas has been protected as stipulated in the LMP.
Management of rare species habitat	Habitat of rare or vulnerable fauna species, such as the Common Bent-winged Bat, Little Bent-winged Bat and the Squirrel Glider, has been managed to promote the species conservation	Take necessary steps to conserve habitat considered likely to provide habitat for these species	Habitat of rare or vulnerable fauna species, such as the Common Bent- Winged Bat, Little Bent-winged Bat and the Squirrel Glider, has been managed to promote the species conservation.
3.3 Landform stability			
Absence of significant erosion - gullies	No erosion gullies >1m deep and 1m wide are present on any outer slopes	Gullies which fail to meet the standard should be reshaped and replanted if required	No erosion gullies of this size were identified within the areas visited during the monitoring surveys. While smaller erosion gullies were noted as a precaution to enable future monitoring.

Rehabilitation Criteria	Standard or Milestone Required	Suggested Corrective Action	Results and Outcomes of 2017 Monitoring
Absence of significant erosion - sheet	Total soil loss rates will not exceed a value to be determined through discussion with regulatory authorities	Where erosion rates are measured or likely to exceed this value, procedures will be implemented to reduce erosion rates, such as reseeding, construction of more grade banks, etc. as appropriate	Not assessed as part of biodiversity monitoring report.
Integrity of waterways	If still required, any constructed waterways are still in good working condition	Repair waterways if required	Not assessed as part of biodiversity monitoring report.
Graded banks have been removed	To avoid overtopping, after establishment of adequate vegetation cover, graded banks will be removed	Remove when appropriate	Not assessed as part of biodiversity monitoring report.
Final void	Standards or milestones relating to a final void will be developed if applicable.	Refer to Mine Closure Plan	Not assessed as part of biodiversity monitoring report.
3.4 Soil Suitability			
Not assessed as part of annual biodiversity monitoring.			
3.5 Land Use Suitability			
Suitability for nature conservation	Areas of rehabilitation and adjacent un-mined areas together possess defined conservation values and could be managed for the purposes of conserving a range of local flora and fauna species and vegetation types, including any rare fauna species recorded	Determine whether further revegetation or other management procedures may be required	Areas of rehabilitation and adjacent un-mined areas together possess conservation values and could be managed for the purposes of conserving a range of local flora and fauna species and vegetation types.

Rehabilitation Criteria	Standard or Milestone Required	Suggested Corrective Action	Results and Outcomes of 2017 Monitoring
Protection of water quality	Water quality, landform design, geotechnical stability and vegetation monitoring data all suggest that sites are not likely to pose a threat to downstream water quality.	Implement corrective procedures if required	Vegetation monitoring suggests that dirty water runoff is unlikely to pose a threat to downstream water quality. Water quality to continue to be monitored as part of the approved WMP.
Long-term management	Management requirements have been defined (see Criteria 4 below). Long-term management operations (e.g. maintenance of access tracks, fire) will not be greater than those of areas prior to mining, or where extra management actions may be required, a mechanism has been put in place for addressing these	Develop long-term management plan as in Criteria 4 below	Not assessed as part of biodiversity monitoring report.
3.6 Safety			
Not assessed as part of biodiversity monitoring report.			
4. Monitoring and Maintenance Stage			
Monitoring and maintenance requirements to addresses post-closure and post-relinquishment is not relevant to this monitoring report and are not addressed further.			

9.0 Community

9.1 CCC meetings

Two meetings were held in 2017 with CCC meetings on 27 April 2017 and 13 December 2017. During these meetings, information was presented on environmental monitoring, statutory reporting, works undertaken on site as well as updates regarding the Invincible Southern Extension Project. The outcomes of the CCC meetings are detailed in the meeting minutes available on the Castlereagh Coal website.

9.2 Complaints

In accordance with Condition M5 of the EPL, a community complaints line is operated by Invincible Colliery during the hours of operation. The complaints line is (02) 6359 0600 which is also displayed on the Shoalhaven Coal's website. This contact point provides the community with a mechanism by which to raise any concerns that they have with operations at Invincible Colliery.

Shoalhaven Coal maintains a complaints register to record and respond to complaints received from the community. There were no complaints received from the local community in relation to care and maintenance activities at Invincible Colliery during the report period. A comparison of complaints received between 2011 and 2016 is outlined in **Table 9.1**.

There have been no complaints received relating to operations at Invincible Colliery since the mine was placed in care and maintenance in May 2013. Prior to 2013 and during previous mining operations, the majority of complaints received were in relation to traffic. There were also a number of complaints relating to blasting and noise and only one complaint of dust.

Table 9.1 Comparison of complaints for Invincible Colliery 2011 - 2017

Complaint type	2011	2012	2013*	2014	2015	2016	2017
Noise	2	0	0	0	0	0	0
Air quality (dust)	1	0	0	0	0	0	0
Blasting	2	1	0	0	0	0	0
Traffic	3	5	0	0	0	0	0
Water	0	0	0	0	0	0	0
Other	0	1	3	0	0	0	0
Total	**8**	**7**	**3**	**0**	**0**	**0**	**0**

** Invincible Colliery was placed in care and maintenance in May 2013.*

10.0 Independent audit

An IEA was conducted during 2016 in accordance with Schedule 5, Condition 5 of the Project Approval. The audit period included the care and maintenance period from May 2013 to January 2016. The mine was operated by the previous mine owner Coalpac from May 2013 to May 2015. The current owner, Shoalhaven Coal, was only responsible for operations between May 2015 and January 2016; 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.

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 status of each audit action plan item can be found in **Appendix 2**. As seen, Shoalhaven Coal has complete many of the audit action items. It is expected that the remaining audit action items will be addressed as part of the management approval process or as in the case of the oil separator prior to the recommencement of mining in the Southern Extension Project area. The inclusion of the **Appendix 2** is in response to DP&E request of 27 April 2018 following their review of the 2017 Annual Review which was submitted in March 2018.

In accordance with Condition 11 of Schedule 5 of the Project Approval, An IEA is required within a year of the recommencement of mining operations. The results of the IEA, if completed during 2018, will be reported in the 2018 Annual Review.

11.0 Incidents and non-compliances during the reporting period

There were no environmental incidents causing or threatening material environmental harm at Invincible Colliery during the report period. One failure to monitor occurred during 2017, relating to an outage of the Invincible HVAS. Further information regarding this outage is included in **Section 6.3**. The Invincible Pollution Incident Response Management Plan (Umwelt, 2017) was not activated during the report period.

12.0 Activities to be completed in the next reporting period

Activities to be completed in the next report period will include the range of tasks required to be undertaken to commence mining within the Invincible Southern Extension Area.

During 2018, the following activities will be undertaken:

- undertake works required within the Project Approval, EPL prior to the commencement of mining operations;
- completion of 6 monthly CCC meetings as required;
- completion of rehabilitation strategy to define the proposed rehabilitation of the site, during and post mining of the Invincible Southern Extension;
- completion of Rehabilitation Management Plan for mining operations;
- completion of updated Environmental Management Plans as required by Schedule 3 of the Project Approval;
- continuation of environmental monitoring program and update in accordance with Project Approval Southern Extension (MOD 5).

13.0 References

Coalpac Pty Ltd (2009a). Environmental Management Strategy for the Invincible Open Cut Coal Mine Extension.

Coalpac Pty Ltd (2009b). Environmental Monitoring Program for the Invincible Colliery.

Coalpac Pty Ltd (2009c). Air Quality Monitoring Program for the Invincible Open Cut Coal Mine Extension.

Coalpac Pty Ltd (2009d). Invincible Open Cut Coal Mine Extension Blast Monitoring & Management Plan.

Coalpac Pty Ltd (2009e). Landscape Management Plan for the Invincible Open Cut Coal Mine Extension.

Coalpac Pty Ltd (2009f). Noise Monitoring Program for the Invincible Open Cut Coal Mine Extension.

Coalpac Pty Ltd (2009g). Aboriginal Cultural Heritage Management Plan for the Invincible Open Cut Coal Mine Extension.

Coalpac Pty Ltd (2009h). Water Management Plan for the Invincible Open Cut Coal Mine Extension. Prepared for Shoalhaven Coal.

Coalpac Pty Ltd (2010). Road Closure Management Plan for the Invincible Colliery Operation.

Global Acoustics Pty Ltd (2017a). Invincible Colliery Environmental Noise Monitoring Quarter 1, 2017. Prepared for Shoalhaven Coal.

Global Acoustics Pty Ltd (2017b). Invincible Colliery Environmental Noise Monitoring Quarter 2, 2017. Prepared for Shoalhaven Coal.

Global Acoustics Pty Ltd (2017c). Invincible Colliery Environmental Noise Monitoring Quarter 3, 2017. Prepared for Shoalhaven Coal.

Global Acoustics Pty Ltd (2017d). Invincible Colliery Environmental Noise Monitoring Quarter 4, 2017. Prepared for Shoalhaven Coal.

Hansen Bailey (2010). Invincible Colliery: Modification to Project Approval Environmental Assessment. Prepared for Coalpac Pty Limited.

Hansen Bailey (2012). Coalpac Consolidated Project: Environmental Assessment Statement. Prepared for Coalpac Pty Limited

Hansen Bailey (2014). Invincible Colliery and Cullen Valley Mine Environmental Assessment: Modifications to PA 07_127 and DA 200-5-2003.

NSW Government (2015). Annual Review Guideline.

RCA Australia (2017). Groundwater Monitoring – Invincible Colliery, Cullen Bullen. Prepared for Invincible Colliery.

R.W. Corkery & Co. Pty Limited (2008). Environmental Assessment of the Proposed Extension to the Invincible Colliery Open Cut Mine and Production Increase.

R.W. Corkery & Co. Pty Limited (2009). Proposed Modification to Project Approval 07_0127 for the Invincible Colliery Open Cut Mine. Prepared for Coalpac Pty Limited.

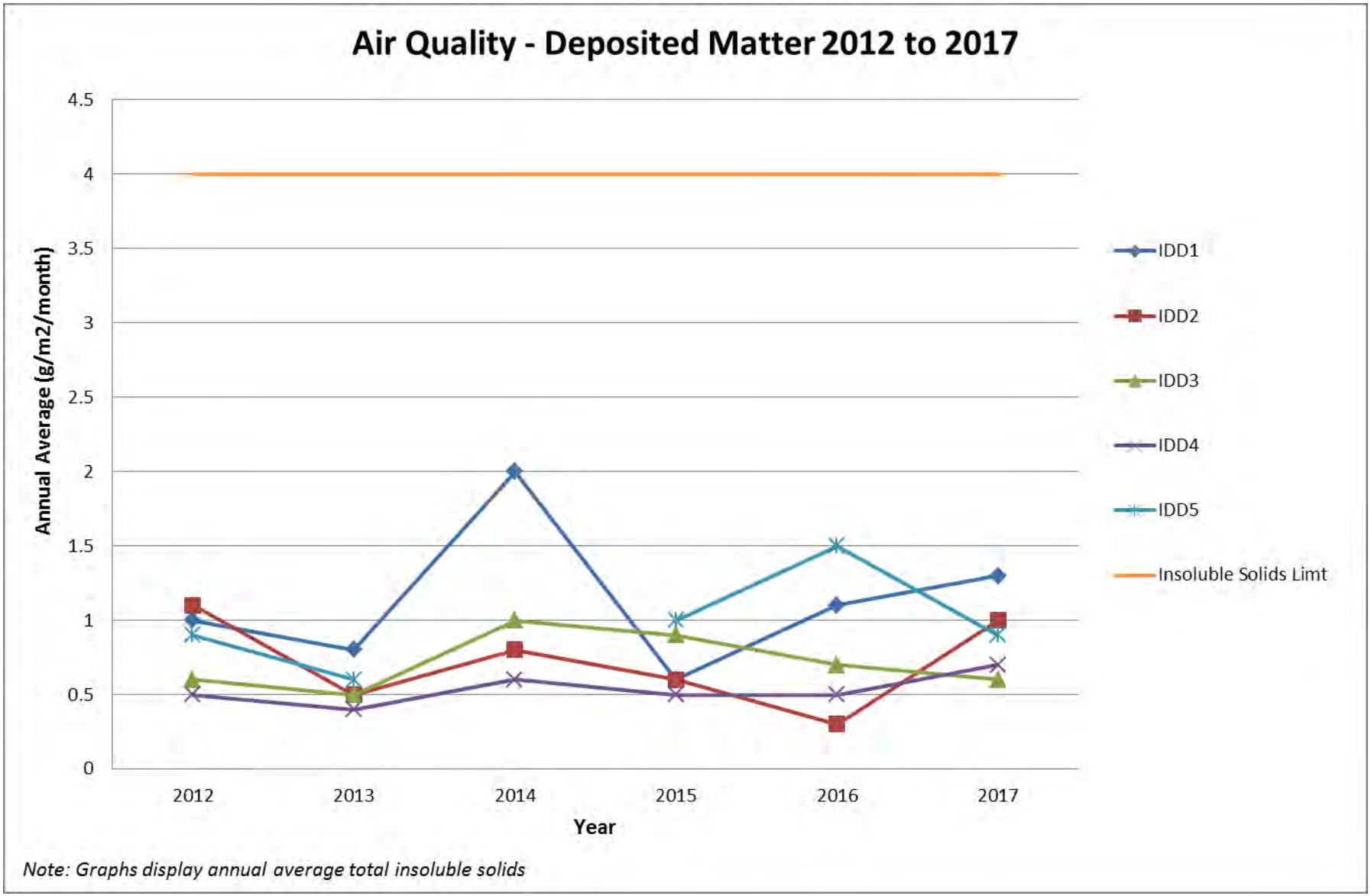
Sedgman Limited (2015). Invincible Colliery Care and Maintenance Mining Operations Plan.

Sedgman Limited (2016). Cullen Valley Mine & Invincible Colliery Pollution Incident Response Management Plan. Prepared for Shoalhaven Coal.

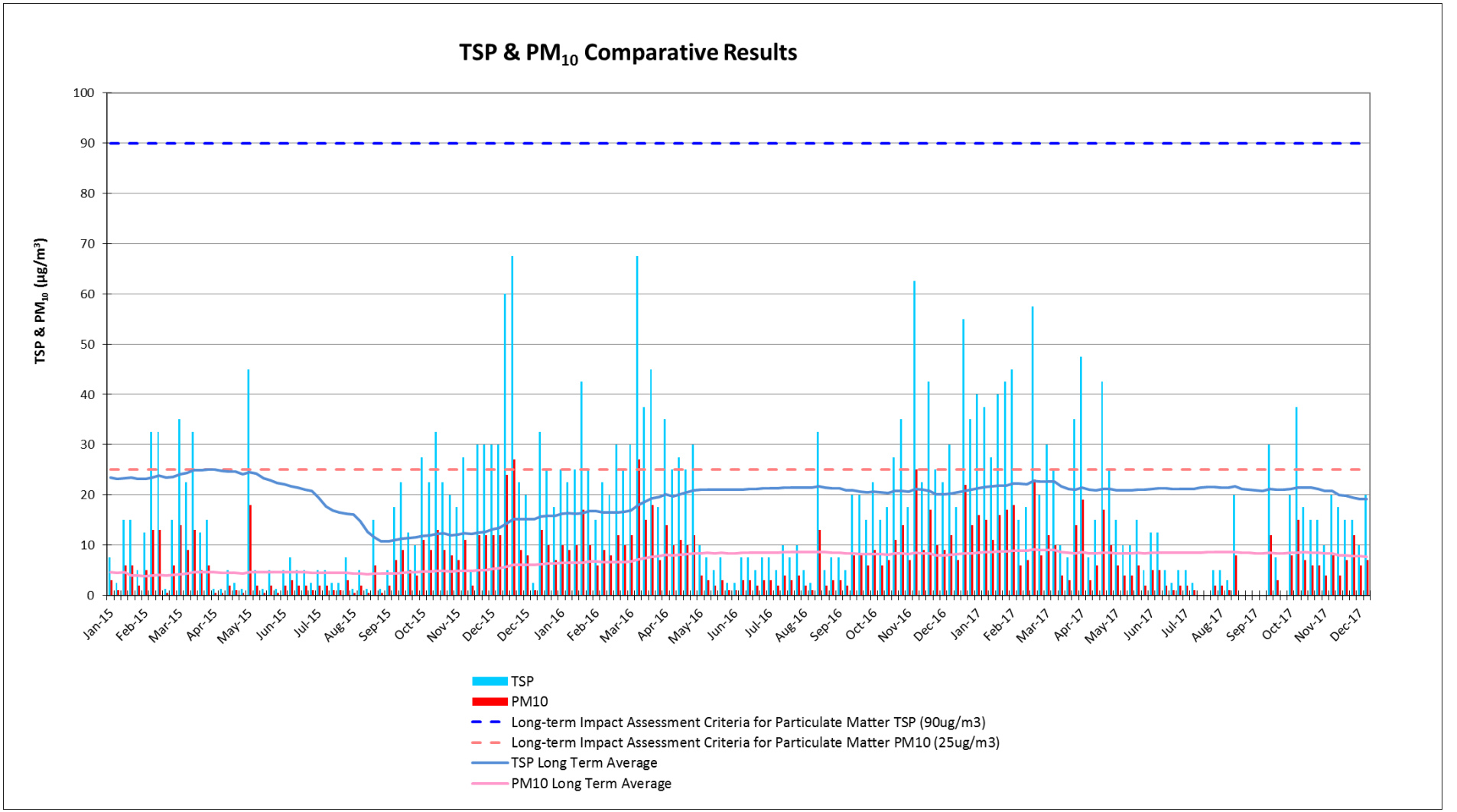
Umwelt (Australia) Pty Limited (2016). Invincible Southern Extension Project – Environmental Assessment. Prepared for Shoalhaven Coal Pty Limited.Umwelt (Australia) Pty Limited (2017). 2016 Biodiversity Offset Monitoring of Cullen Valley Mine and Invincible Colliery. Prepared for Shoalhaven Coal Pty Limited.

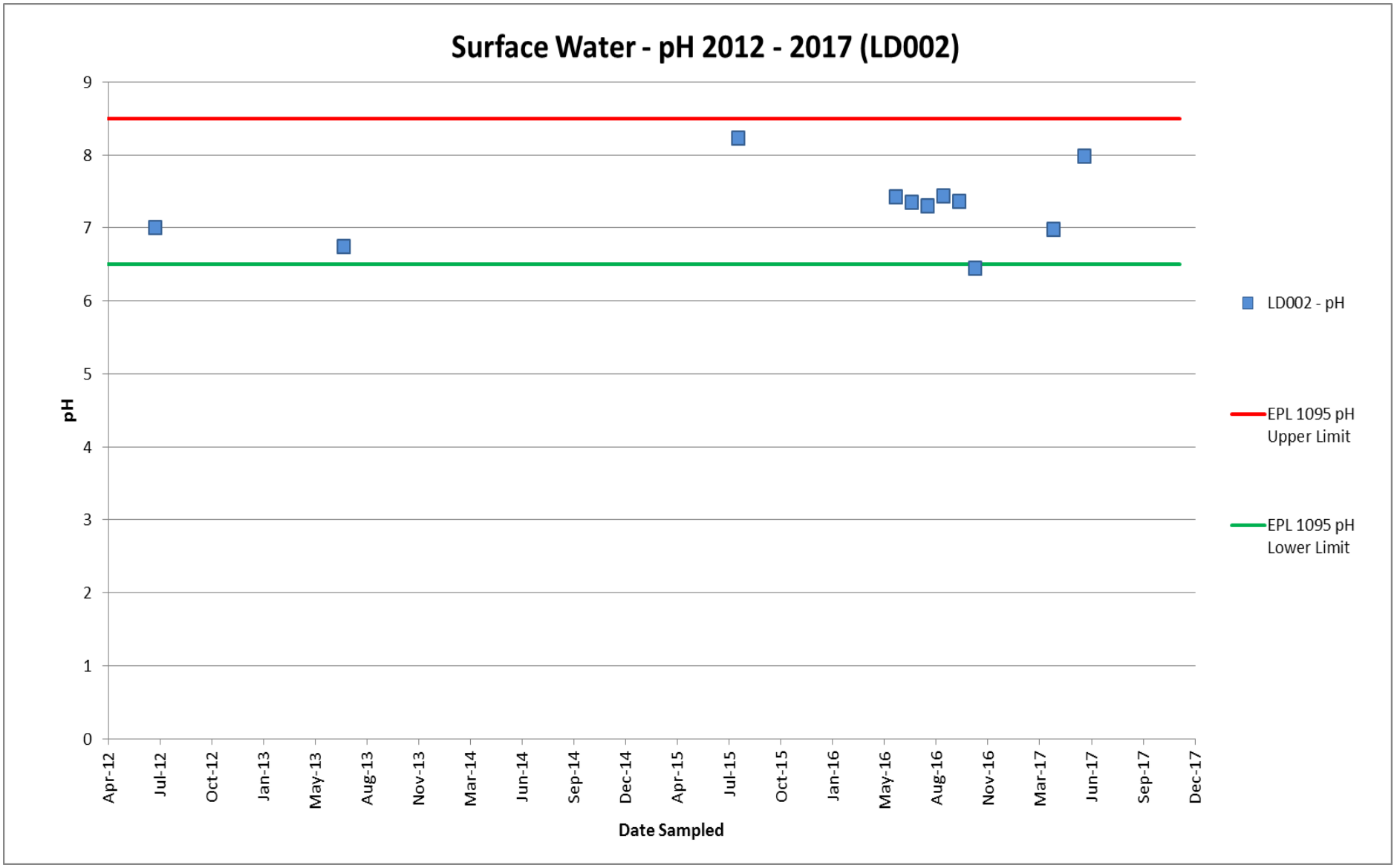
APPENDIX 1

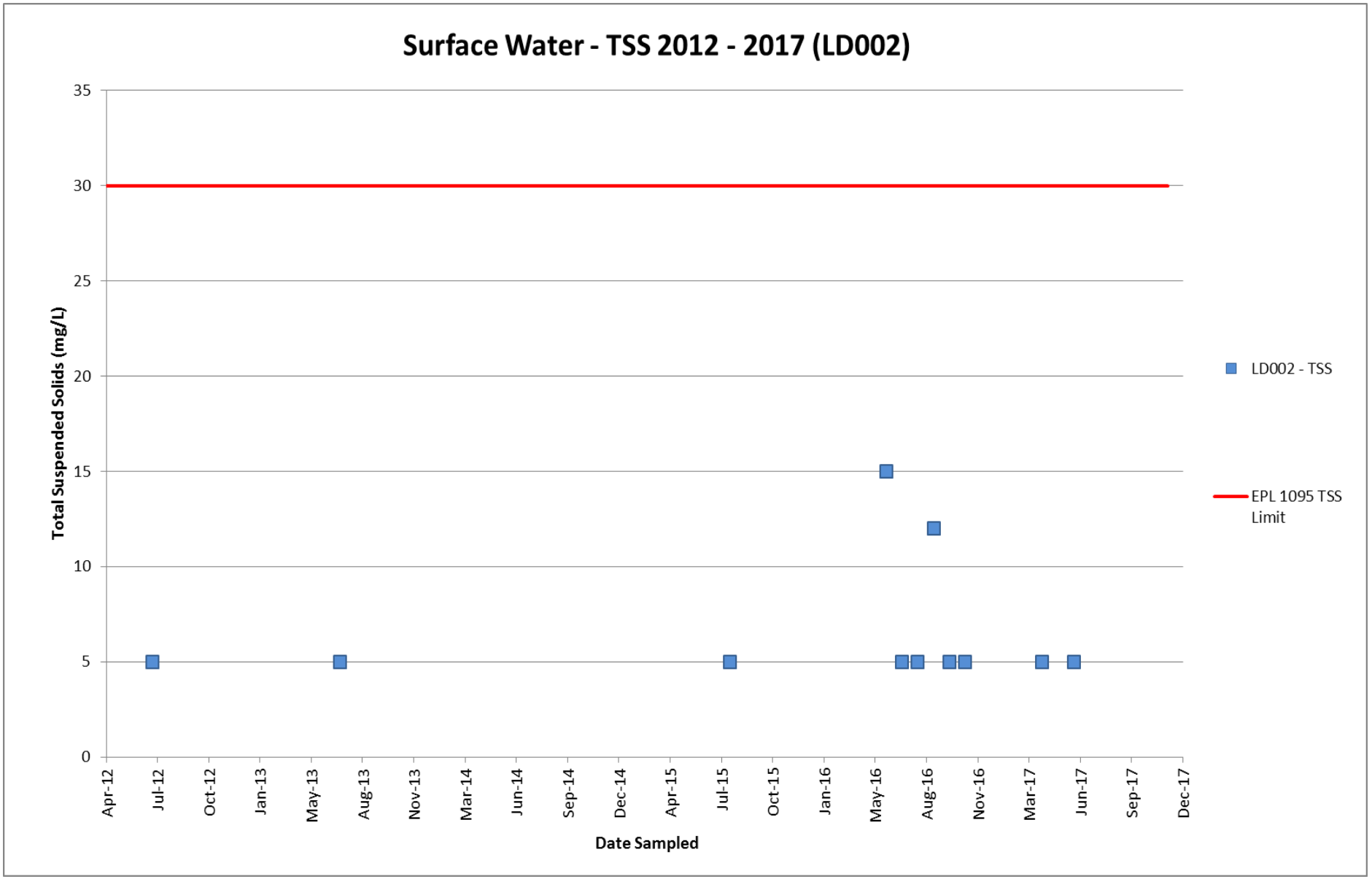
Environmental monitoring summary tables and graphs



Note: Graphs display annual average total insoluble solids


TSP & PM10 Comparative Results
TSP & PM10 (µg/m³)
100
90
80
70
60
50
40
30
20
10
0
Jan-15
Feb-15
Mar-15
Apr-15
May-15
Jun-15
Jul-15
Aug-15
Sep-15
Oct-15
Nov-15
Dec-15
Dec-15
Jan-16
Feb-16
Mar-16
Apr-16
May-16
Jun-16
Jul-16
Aug-16
Sep-16
Oct-16
Nov-16
Dec-16
Jan-17
Feb-17
Mar-17
Apr-17
May-17
Jun-17
Jul-17
Aug-17
Sep-17
Oct-17
Nov-17
Dec-17
TSP
PM10
Long-term Impact Assessment Criteria for Particulate Matter TSP (90ug/m3)
Long-term Impact Assessment Criteria for Particulate Matter PM10 (25ug/m3)
TSP Long Term Average
PM10 Long Term Average


Surface Water - pH 2012 - 2017 (LD002)
pH
Date Sampled
LD002 - pH
EPL 1095 pH Upper Limit
EPL 1095 pH Lower Limit
0
1
2
3
4
5
6
7
8
9
Apr-12
Jul-12
Oct-12
Jan-13
May-13
Aug-13
Nov-13
Mar-14
Jun-14
Sep-14
Dec-14
Apr-15
Jul-15
Oct-15
Jan-16
May-16
Aug-16
Nov-16
Mar-17
Jun-17
Sep-17
Dec-17


Surface Water - TSS 2012 - 2017 (LD002)
Total Suspended Solids (mg/L)
35
30
25
20
15
10
5
0
Apr-12
Jul-12
Oct-12
Jan-13
May-13
Aug-13
Nov-13
Mar-14
Jun-14
Sep-14
Dec-14
Apr-15
Jul-15
Oct-15
Jan-16
May-16
Aug-16
Nov-16
Mar-17
Jun-17
Sep-17
Dec-17
Date Sampled
LD002 - TSS
EPL 1095 TSS Limit

The results of groundwater monitoring conducted during the period 2012 - 2017 are provided in **Table A**

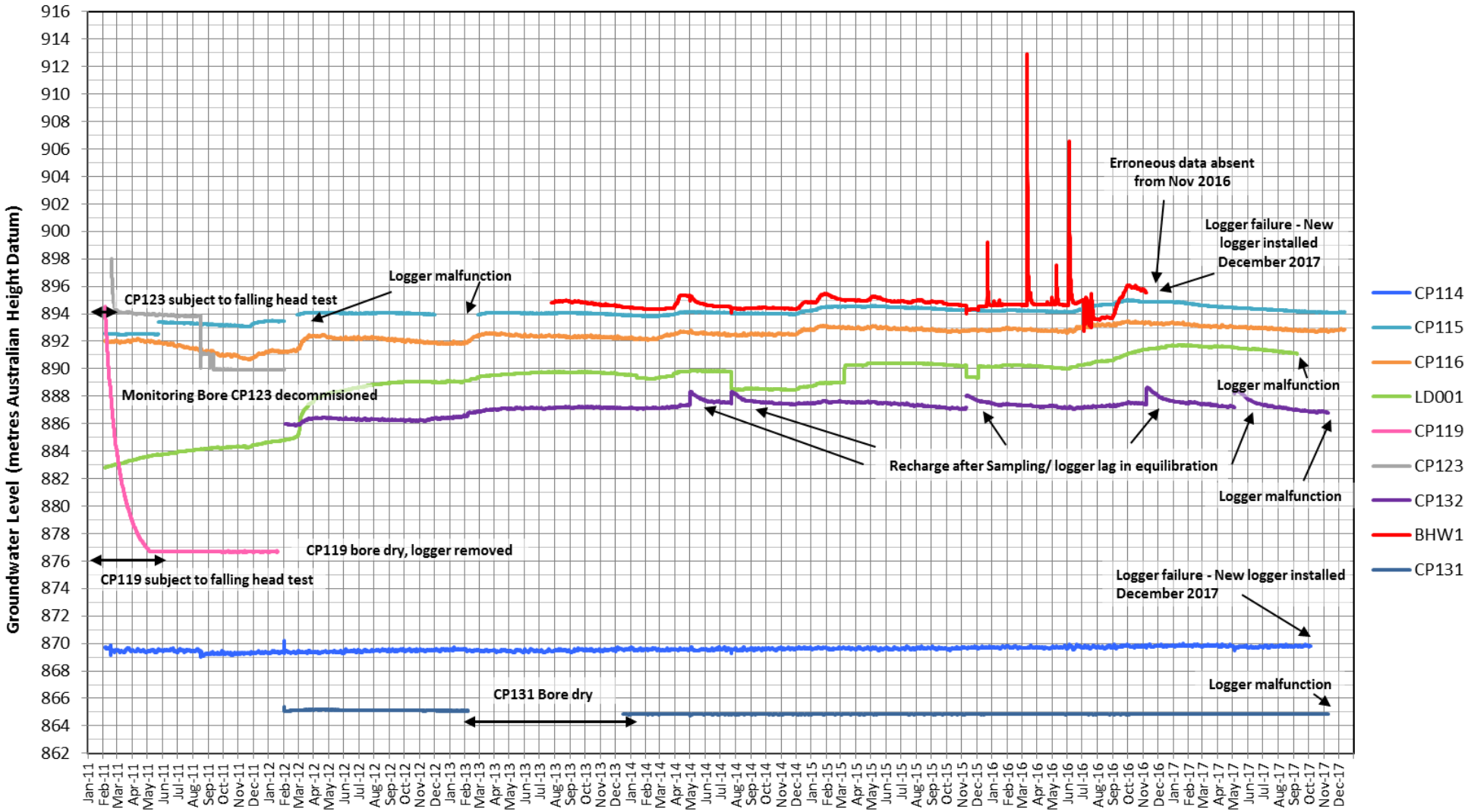
Table A Groundwater monitoring results LD001

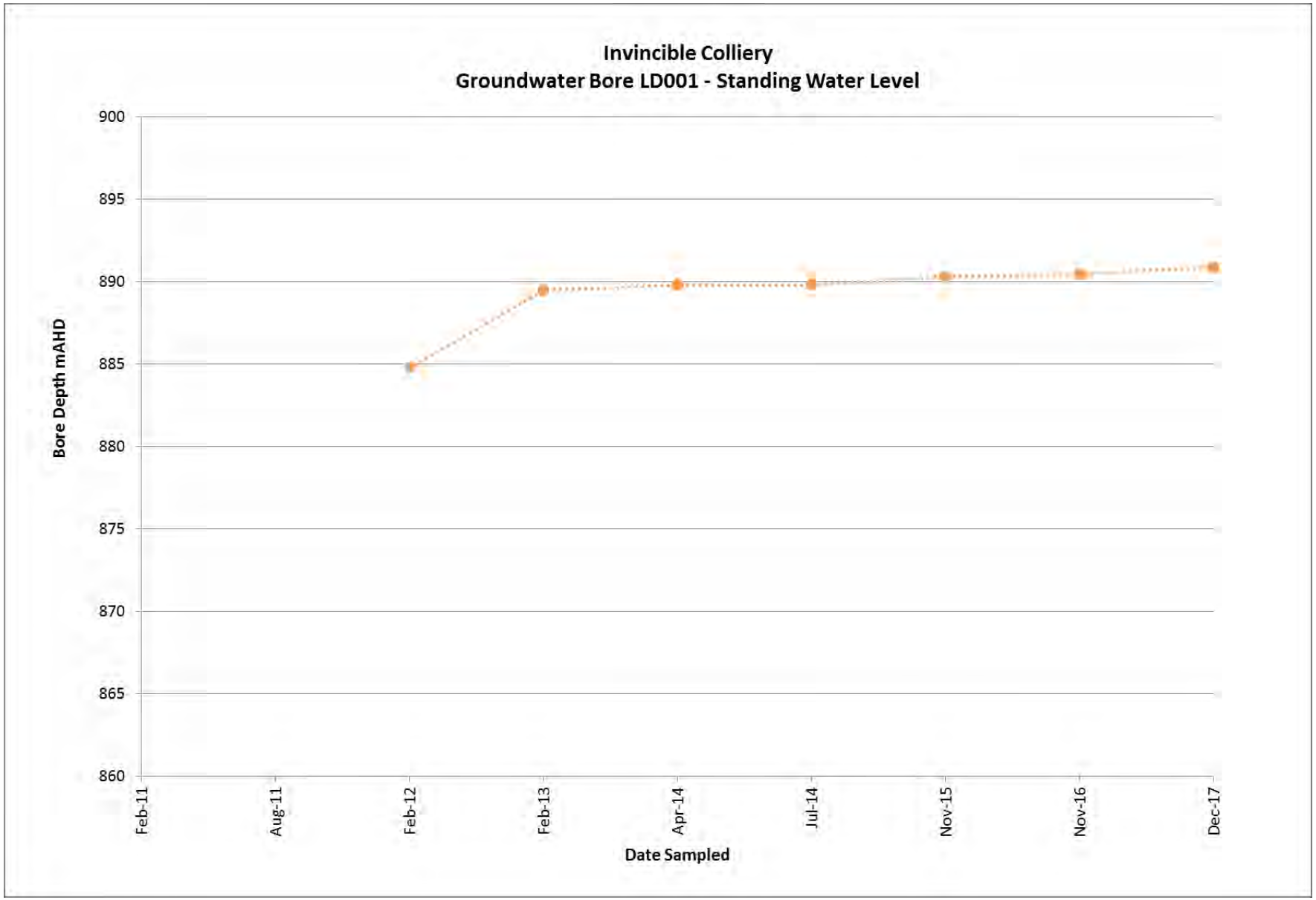
Sample date	16/02/2011	17/08/2011	2/02/2012	27/02/2013	30/04/2014	24/07/2014	10/11/2015	8/11/2016	12/12/2017
AHD (RL) (m)	ND	ND	884.81	889.49	889.80	889.80	890.31	890.45	890.88
Depth to aquifer (m)	ND	ND	55.32	50.64	50.26	50.38	49.82	49.68	49.25
pH	5.90	6.00	6.40	6.50	6.50	6.50	7.15	5.87	6.16
Electrical Conductivity (µS/cm	150	130	130	120	130	130	155	142	125
Nitrite (mg/L)	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.01	<0.05
Total Oxidised Nitrogen (mg/L)	ND	ND	ND	ND	ND	ND	0.22	0.20	0.22
Chloride (mg/L)	6	5	5	5	5	5	5.3	6	6
Nitrate (mg/L)	0.01	0.064	0.26	0.24	0.24	0.24	0.220	0.200	0.22
Sulphate (mg/L)	25	15	17	11	12	14	14	13	13
Alkalinity (mg/L)	33	32	42	40	42	44	44	46	56
Calcium (mg/L)	7.8	8.3	9.9	8.2	9.2	10	11	11	13
Magnesium (mg/L)	4.3	6	4.7	3.6	3.8	4.3	4.0	5	5
Sodium (mg/L)	7.1	6.2	7.3	5.8	5.8	5.8	5.4	6	6
Potassium (mg/L)	6.2	6	6.3	5.7	6.8	7.2	6.7	8	8
Total Hardness (mg $CaCO_3$/L)	37	45	44	35	39	43	44	48	53

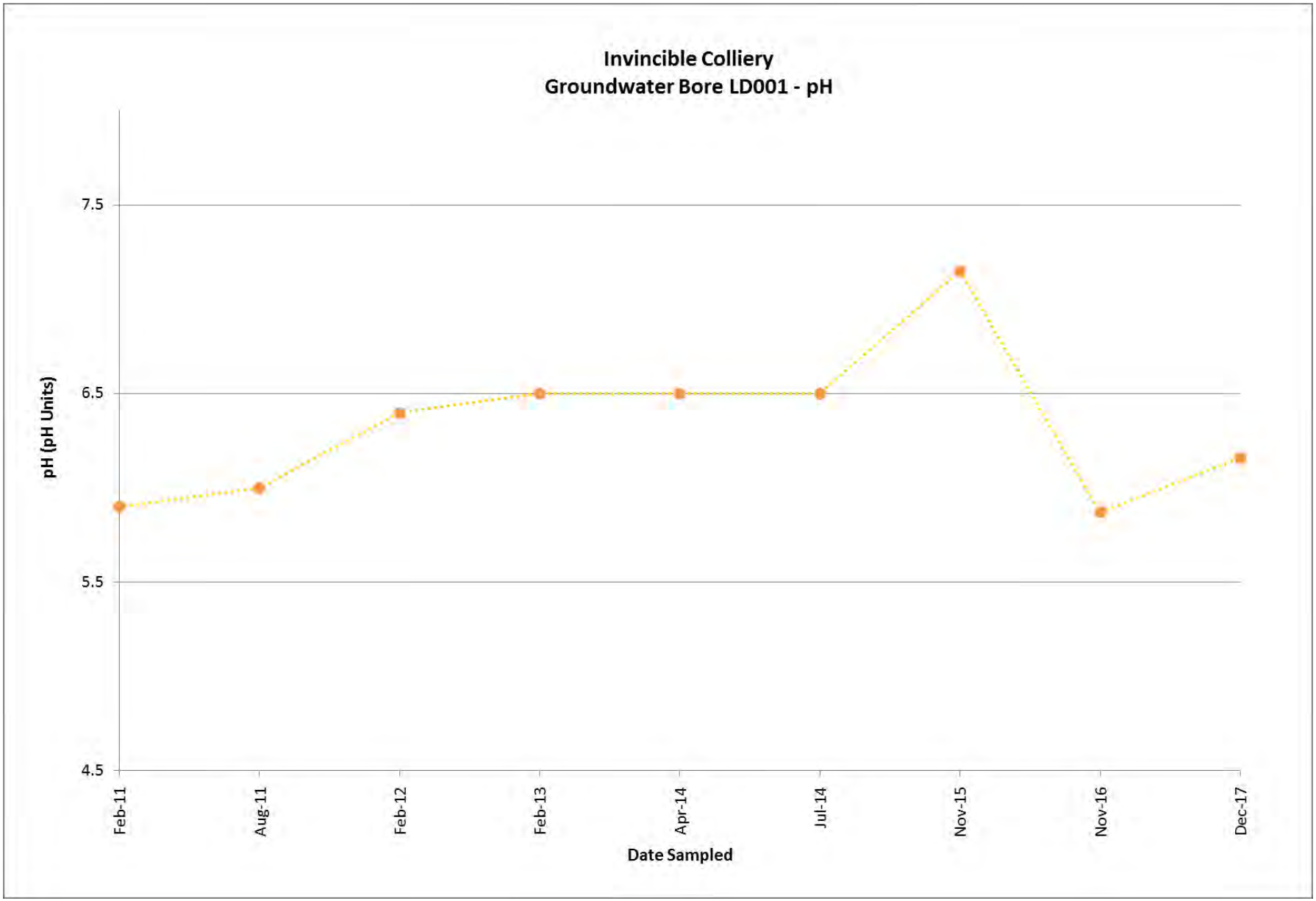
Sample date	16/02/2011	17/08/2011	2/02/2012	27/02/2013	30/04/2014	24/07/2014	10/11/2015	8/11/2016	12/12/2017
Dissolved Aluminium (µg/L)	<10	<10	ND	ND	<10	<10	26	<10	<10
Dissolved Arsenic (µg/L)	<1	<1	<1	<1	<1	<1	<1	<1	<1
Dissolved Cadmium (µg/L)	<0.1	<0.1	<0.1	<0.1	0.2	1	<0.1	<0.1	<0.1
Dissolved Chromium (µg/L)	<1	<1	<1	<1	<1	<1	<1	<1	<1
Dissolved Copper (µg/L)	2	4	6	38	38	21	23	14	10
Dissolved Iron (µg/L)	56	<10	96	<10	<10	<10	21	<50	<50
Dissolved Lead (ug/L)	<1	<1	<1	<1	<1	<1	<1	<1	<1
Dissolved Manganese (ug/L)	500	510	ND	ND	<5	<5	1	2	4
Dissolved Molybdenum (ug/L)	1	ND	ND	ND	<1	<1	<1	<1	<1
Dissolved Nickel (ug/L)	21	27	10	11	11	11	10	9	8
Dissolved Selenium (ug/L)	<1	ND	ND	ND	<1	<1	<1	<10	<10
Dissolved Zinc (ug/L)	66	79	79	52	66	65	100	122	138
Dissolved Mercury (mg/L)	ND	<0.1	ND	ND	ND	ND	<0.0001	<0.0001	<0.0001

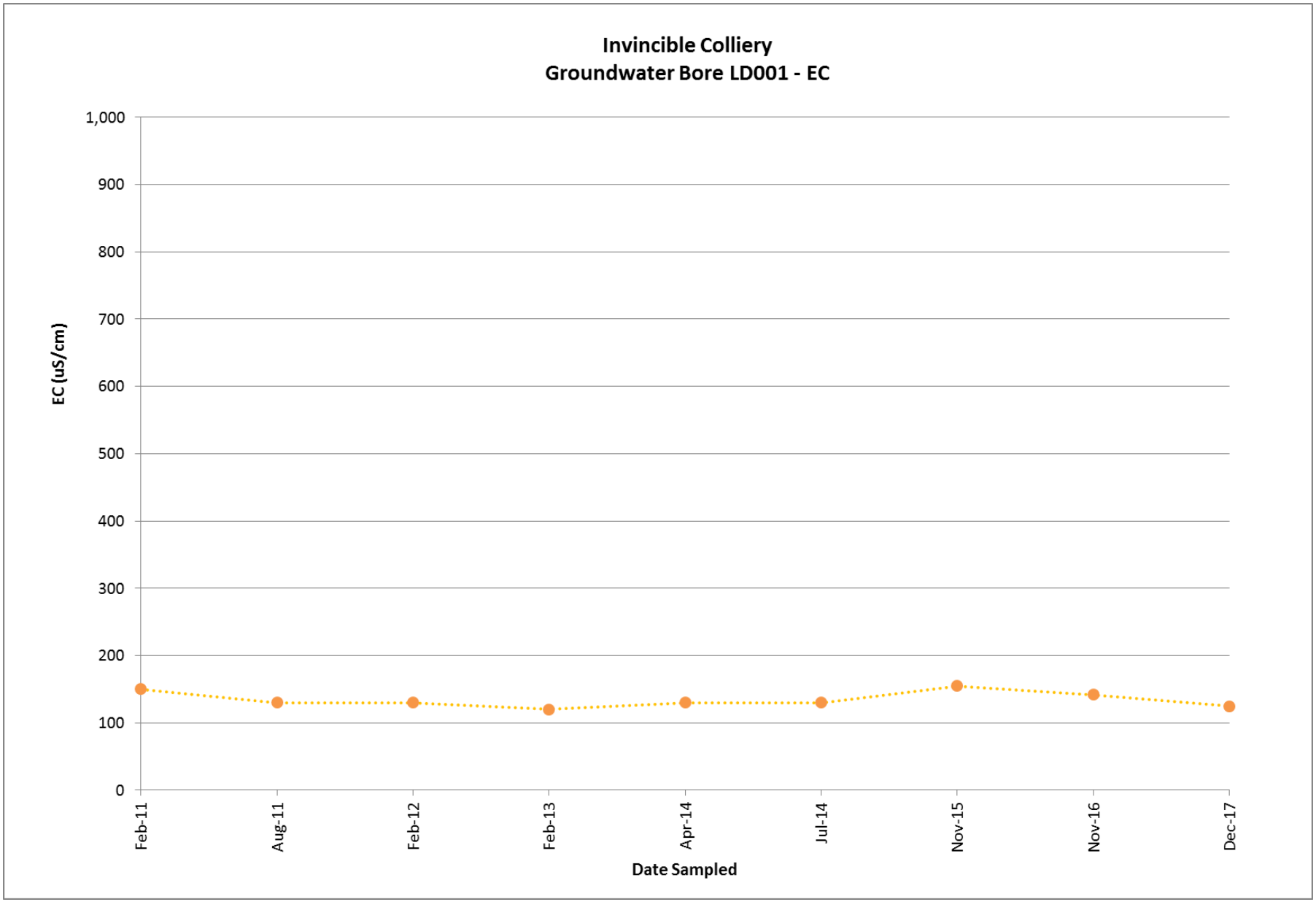
ND = No Data

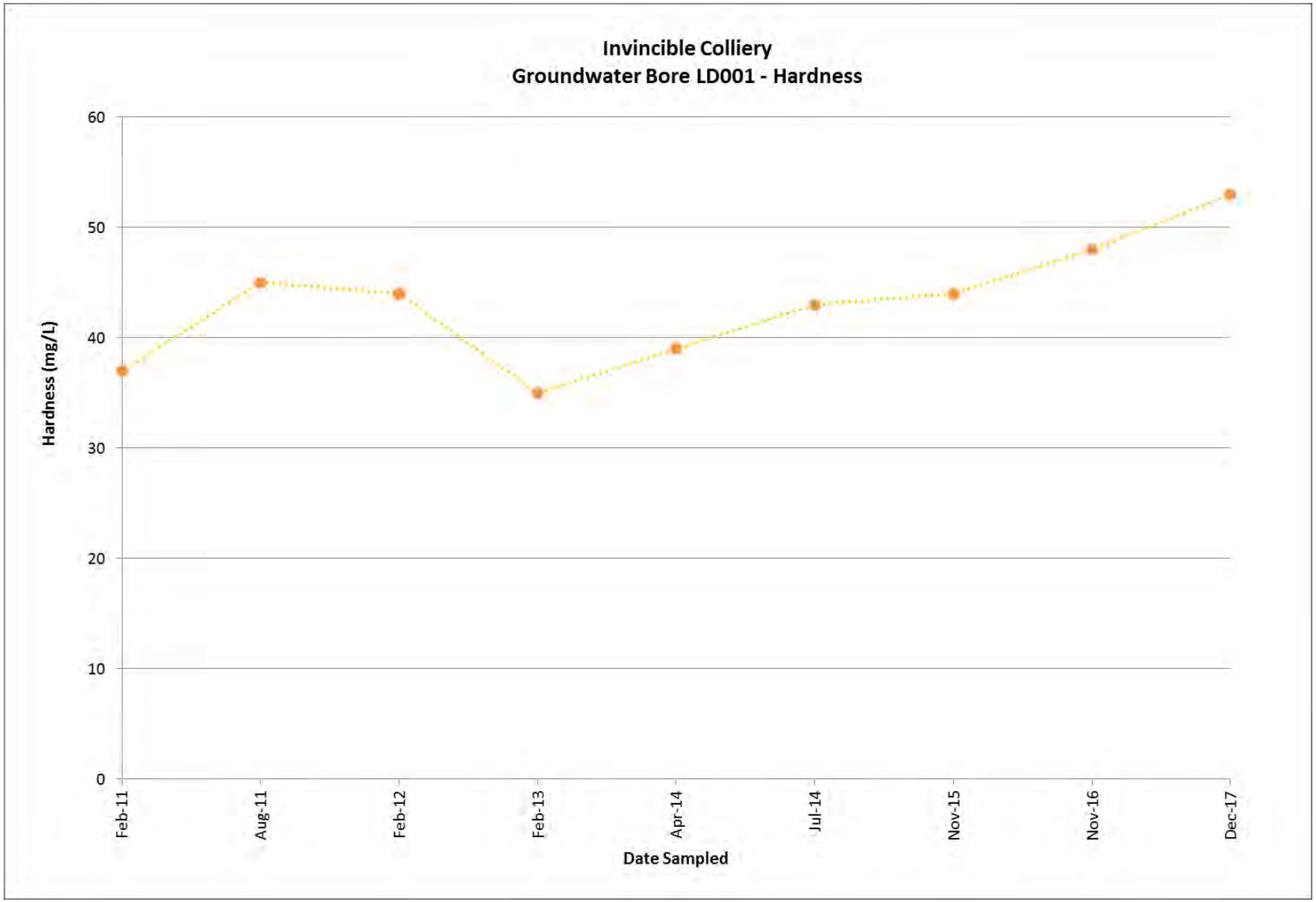
Groundwater Hydrographs - Invincible Mine (2011-2018)

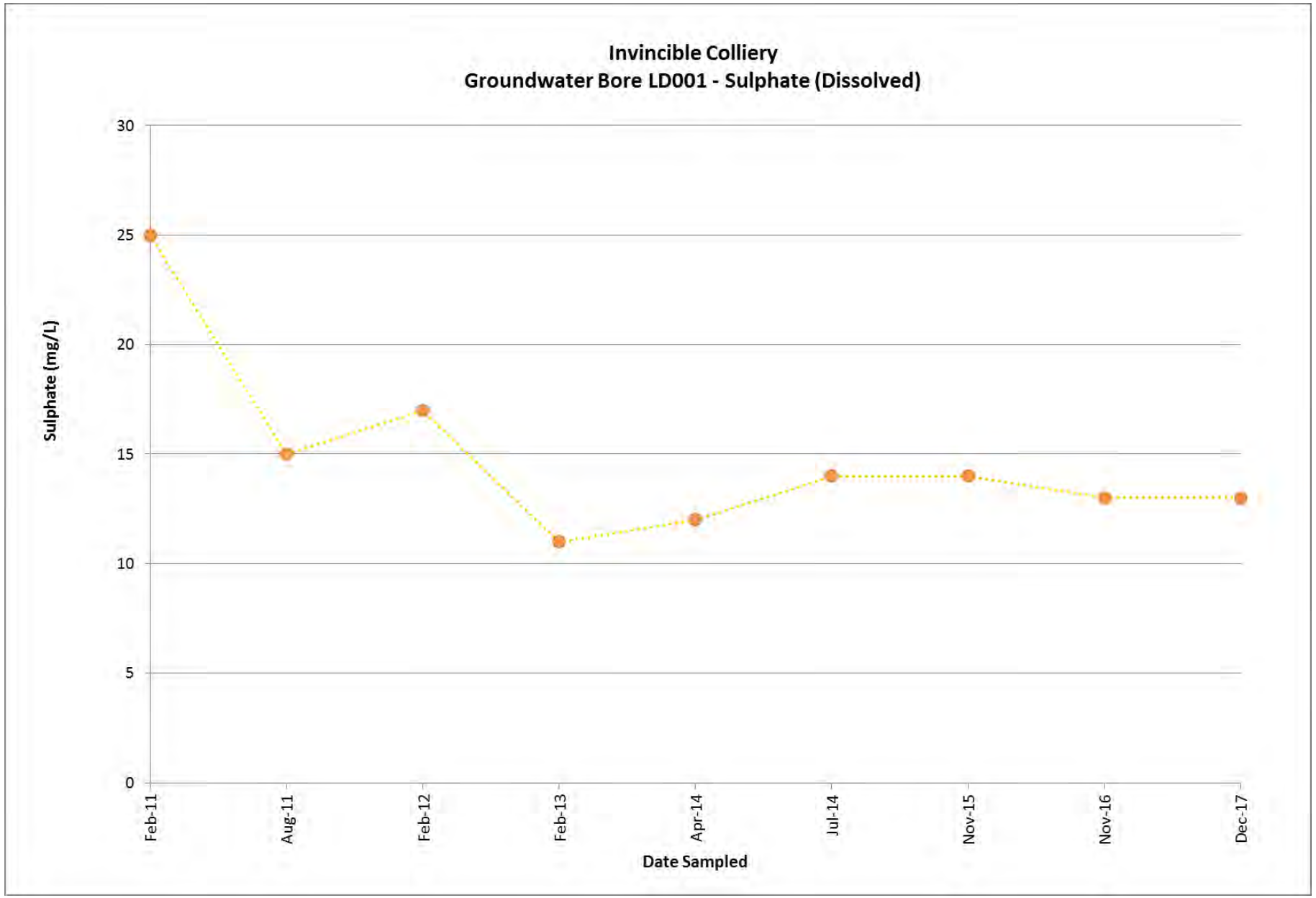


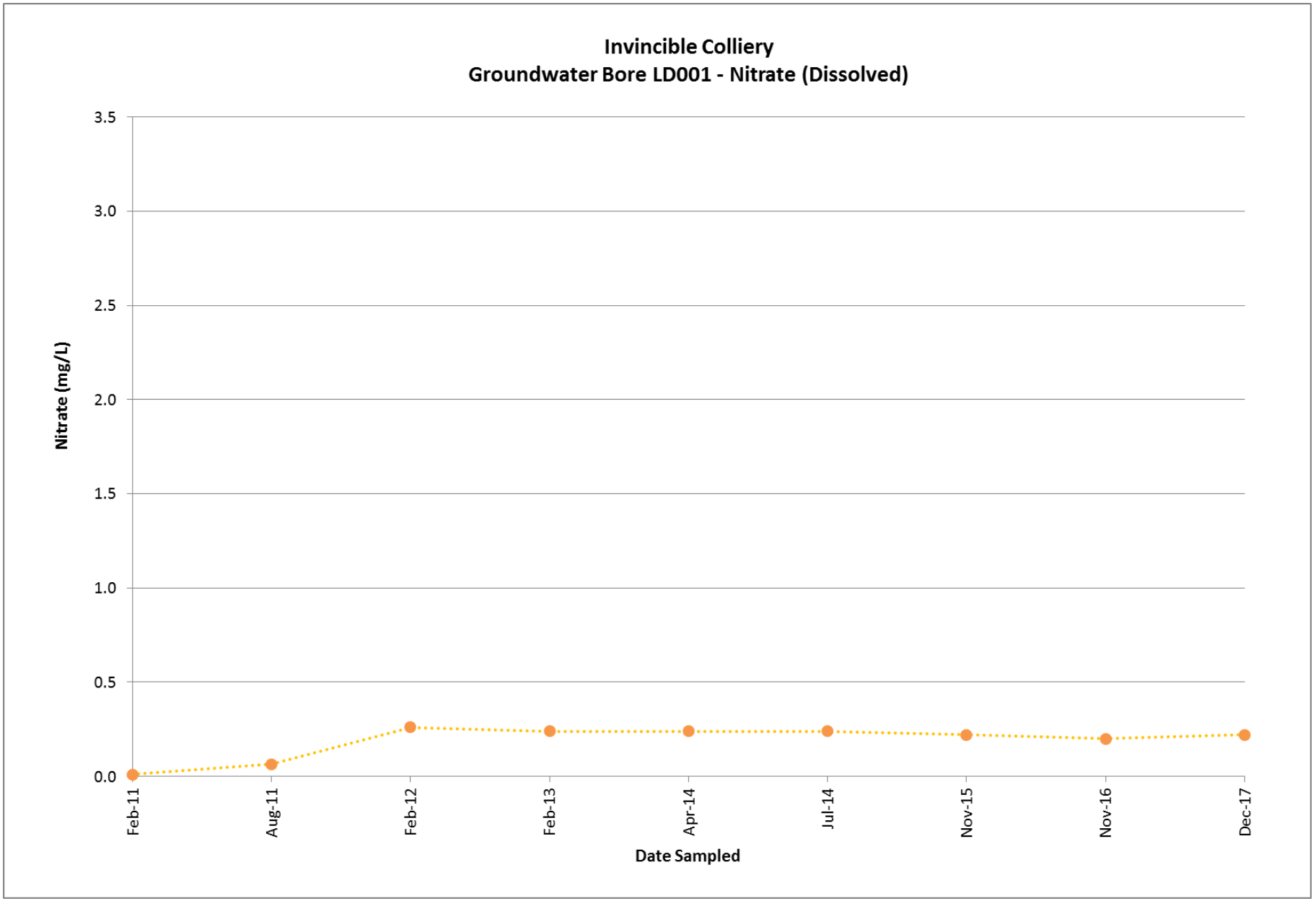

Invincible Colliery
Groundwater Bore LD001 - Standing Water Level
Bore Depth mAHD
900
895
890
885
880
875
870
865
860
Feb-11
Aug-11
Feb-12
Feb-13
Apr-14
Jul-14
Nov-15
Nov-16
Dec-17
Date Sampled


Invincible Colliery
Groundwater Bore LD001 - pH
pH (pH Units)
7.5
6.5
5.5
4.5
Feb-11
Aug-11
Feb-12
Feb-13
Apr-14
Jul-14
Nov-15
Nov-16
Dec-17
Date Sampled


Invincible Colliery
Groundwater Bore LD001 - 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
Dec-17
Date Sampled


Invincible Colliery
Groundwater Bore LD001 - Hardness
Hardness (mg/L)
60
50
40
30
20
10
0
Feb-11
Aug-11
Feb-12
Feb-13
Apr-14
Jul-14
Nov-15
Nov-16
Dec-17
Date Sampled


Invincible Colliery
Groundwater Bore LD001 - Sulphate (Dissolved)
Sulphate (mg/L)
30
25
20
15
10
5
0
Feb-11
Aug-11
Feb-12
Feb-13
Apr-14
Jul-14
Nov-15
Nov-16
Dec-17
Date Sampled


Invincible Colliery
Groundwater Bore LD001 - Nitrate (Dissolved)
Nitrate (mg/L)
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
Feb-11
Aug-11
Feb-12
Feb-13
Apr-14
Jul-14
Nov-15
Nov-16
Dec-17
Date Sampled

Background Surface Water Quality Results

Note: surface water discharge events are represented with an asterisk.

Main Dam (LD002)			
Sampling Date	**pH**	**Oil and Grease (mg / L)**	**TSS (mg / L)**
10/1/2017	7.43	<5	<5
9/2/2017	7.16	<5	6
9/3/2017	7.54	<5	7
10/4/2017*	6.95	<5	<5
12/5/2017	7.66	<5	<5
9/6/2017*	7.89	<5	5
11/7/2017	7.27	<5	<5
11/8/2017	7.4	<5	<5
7/9/2017	7.68	<5	26
9/10/2017	7.94	<5	7
8/11/2017	7.87	<5	<5
12/12/2017	6.85	<5	<5

** Discharge event*

Environmental Dam (SW01)			
Sampling Date	**pH**	**Oil and Grease (mg / L)**	**TSS (mg / L)**
10/1/2017	2.88	<5	<5
9/2/2017	2.52	<5	6
9/3/2017	2.85	<5	7
10/4/2017*	3.01	<5	<5
12/5/2017	2.96	<5	<5
9/6/2017*	3.04	<5	5
11/7/2017	2.99	<5	<5
11/8/2017	3.20	<5	<5
7/9/2017	5.11	<5	26
9/10/2017	6.41	<5	7
8/11/2017	3.56	<5	<5
12/12/2017	3.37	<5	<5

** Discharge event*

Silt Dam (SW02)			
Sampling Date	**pH**	**Oil and Grease (mg / L)**	**TSS (mg / L)**
10/1/2017	6.51	<5	35
9/2/2017	5.94	<5	9
9/3/2017	6.17	<5	16
10/4/2017*	6.60	<5	17
12/5/2017	7.08	<5	13
9/6/2017*	7.87	<5	12
11/7/2017	7.48	<5	10
11/8/2017	7.62	<5	11
7/9/2017	6.83	<5	9
9/10/2017	7.63	<5	24
8/11/2017	7.25	<5	19
12/12/2017	7.32	<5	20

** Discharge event*

Cullen Creek (BSW01)			
Sampling Date	**pH**	**Oil and Grease (mg / L)**	**TSS (mg / L)**
10/1/2017	6.55	<5	20
9/2/2017	7.51	<5	10
9/3/2017	6.87	<5	35
10/4/2017	7.05	<5	35
12/5/2017	6.10	<5	16
9/6/2017	6.53	<5	10
11/7/2017	6.38	<5	18
11/8/2017	5.85	<5	30
7/9/2017	6.16	<5	38
9/10/2017	5.94	<5	33
8/11/2017	6.87	<5	9
12/12/2017	7.17	<5	26

** Discharge event*

Dulhunty's Creek (BSW02)			
Sampling Date	**pH**	**Oil and Grease (mg / L)**	**TSS (mg / L)**
10/1/2017	7.04	<5	<5
9/2/2017	7.91	<5	<5
9/3/2017	8.00	<5	6
10/4/2017	7.92	<5	<5
12/5/2017	7.88	<5	<5
9/6/2017	8.04	<5	<5
11/7/2017	8.16	<5	<5
11/8/2017	7.81	<5	13
7/9/2017	7.80	6	5
9/10/2017	7.89	6	<5
8/11/2017	7.80	<5	<5
12/12/2017	7.1	<5	<5

** Discharge event*

Historical Noise Results

Historical Noise monitoring results for years 2011 and 2012 and are shown in below. Contribution from Invincible was inaudible for all monitoring undertaken for 2013, 2014, 2015 and 2016.

2012 Quarterly Noise Monitoring Results

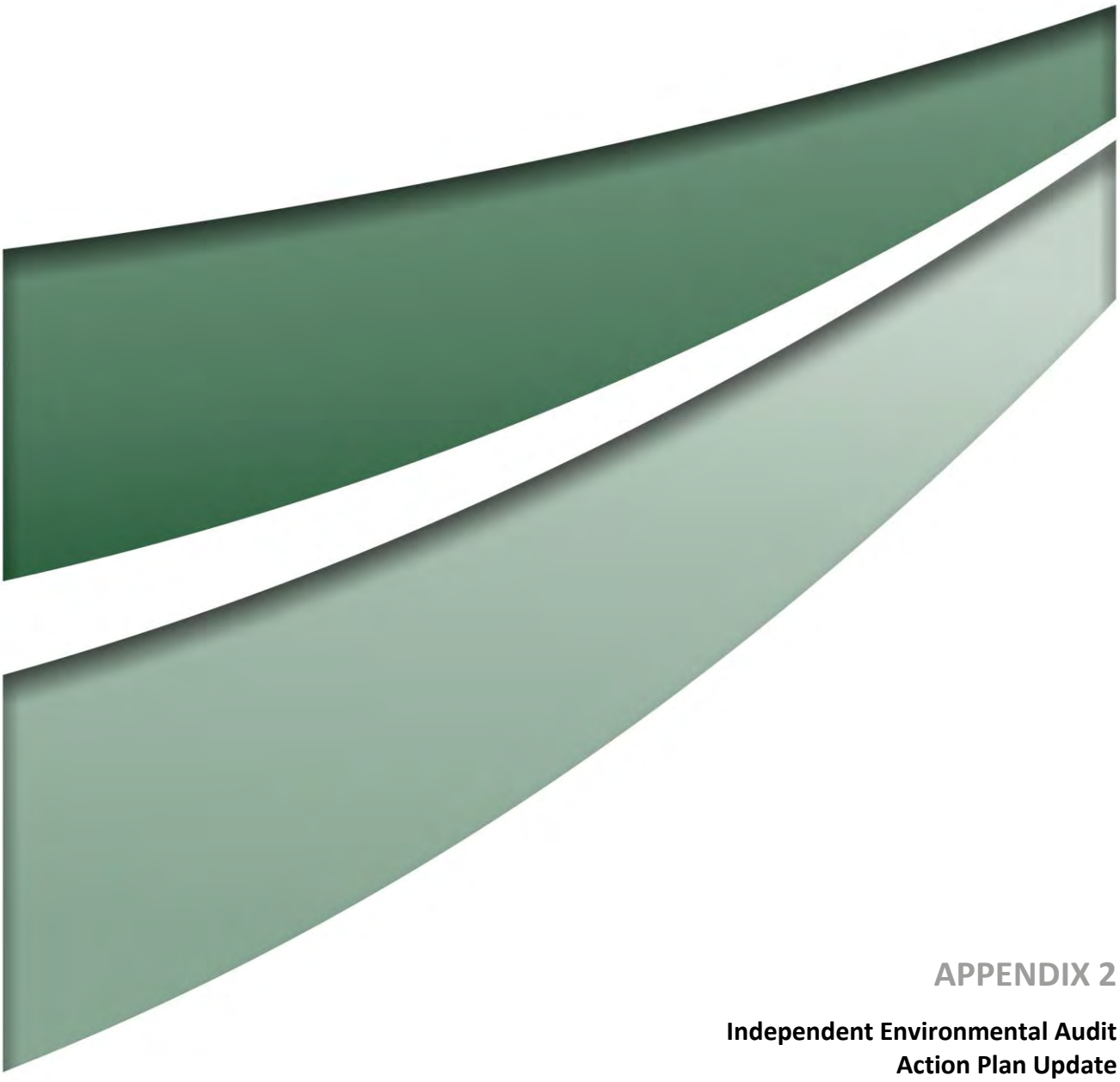
Location	Criterion (dB)	Quarter 1 ($L_{Aeq\ 15min}$)	Quarter 2 ($L_{Aeq\ 15min}$)	Quarter 3 ($L_{Aeq\ 15min}$)	Quarter 4 ($L_{Aeq\ 15min}$)
Cullen Bullen Central (N01)	40	IA	<30	IA	IA
Cullen Bullen West (N02)	40	IA	<30	IA	IA
Cullen Bullen South (N03)	40	IA	34	IA	IA

IA – noise from the mine was inaudible

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 ($L_{Aeq\ 15min}$)
Cullen Bullen Central (N01)	40	IA	IA	IA	IA
Cullen Bullen West (N02)	40	IA	IA	IA	IA
Cullen Bullen South (N03)	40	IA	NM	IA	IA

IA – noise from the mine was inaudible. NM - noise was audible but not measurable.



APPENDIX 2

Independent Environmental Audit
Action Plan Update

Invincible Colliery IEA Action Plan

ID	Criteria	Requirement	Audit Finding	Audit Recommendation	Responsibility (assigned by auditor)	Follow up Actions and Current Status	Status
NC1 Low	PA-07-0127, S2, C1	The Proponent shall implement all practicable measures to prevent and/or minimise any harm to the environment that may result from the construction, operation, or rehabilitation of the project.	The AEMRs stated that there were no reportable incidents of material harm to the environment during the audit period. A site inspection and review of documentation found no significant issues, however non compliances have been identified. In the Auditors' opinion, the intent of this condition to minimise harm to the environment has been established via various environmental management plans and the engagement of Sedgman in 2015 to manage implementation of these plans during the care and maintenance period.	Implement recommendations described below.	Castlereagh Coal	All non-compliances are addressed in this Action Plan and follow up actions have been implemented as required. **2017 – Annual Review Update** Continued implementation of the audit action plan to be undertaken during 2018, as they relate to project Approval (07_0127) as modified on 2 February 2018..	Active
NC2 Low	PA-07-0127, S2, C2	The Proponent shall carry out the project generally in accordance with the: a) EA; b) statement of commitments; c) the modification application 07_0127 MOD 2 and accompanying documents entitled: • 'Proposed Modification to Project Approval 07_0127 for the Invincible • Colliery Open Cut Mine, May 2009'; and • 'Addendum to the Proposed Modification to Project Approval 07_0127 for the Invincible Colliery Open Cut Mine, July 2009' d) modification application 07_0127 – MOD 3 and the accompanying Environmental Assessment prepared by Hansen Bailey and dated June2010; and e) the conditions of this approval.	This scope of the audit incorporated a review of compliance against the Project Approval, Statement of Commitments, EPL and Mine leases only. Non-compliances with the conditions of the Project Approval (S2.2e) and Statement of Commitments (S2.2b) were identified during the audit as outlined in this compliance table.	Implementation of the recommendations in this audit will assist in ensuring the project is carried out in accordance with the Project Approval and Statement of Commitments.	Castlereagh Coal	All non-compliances are addressed in this Action Plan and follow up actions have been implemented as required. **2017 – Annual Review Update** Continued implementation of the audit action plan to be undertaken during 2018, as they relate to project Approval (07_0127) as modified on 2 February 2018.	Active

Invincible Colliery IEA Action Plan

ID	Criteria	Requirement	Audit Finding	Audit Recommendation	Responsibility (assigned by auditor)	Follow up Actions and Current Status	Status
NC3 Low	PA-07-0127, S2, C4A	The Proponent shall prepare revisions of any strategies, plans or programs required under this project approval if directed to do so by the Director-General. Such revisions shall be prepared to the satisfaction of, and within a timeframe approved by, the Director-General.	Sedgman reported that there have been no requests for revisions of any strategies, plans or programs required under the Project Approval since they were appointed Environmental Manager in May 2015. A letter from the Department of Planning and Environment (DPE) dated 6 July 2009 was sighted and refers to Coalpac's (former mine operator) application, submitted on 30 May 2009, for approval of monitoring programs, environmental management plans and an ESAP. The DPE requested theESAP be updated to include assessment and monitoring of greenhouse gas emissions from the sites open cut and auger mining operations in accordance with condition 42 (b) and (c) of Schedule 3. The Coalpac EASP, dated June 2009, available on the Coalpac website, did not include details on the assessment and monitoring of greenhouse gas emissions, despite this information being reported in the AEMRs.	Consult with the DPE to confirm the status of the approval of the ESAP. Upon approval of any application to continue mining activities, review the ESAP to ensure it includes the assessment and monitoring of greenhouse gas emissions, including the duty to report under the National Greenhouse and Energy Reporting Scheme (NGERS).	Coalpac	All previously approved Management Plans and Programs were prepared by Coalpac and the agreed timing of updates pre-dates Castlereagh Coal's (CC's) involvement in the project. As the site is in care and maintenance, it has been agreed between CC and DPE that all management plans and programs will be updated as part of the project approval process for approval of future mining operations. Studies and investigations are currently underway to support the application and the results of these investigations will be used to update management plans/programs prior to the recommencement of operations. It should be noted that as the site has been in care and maintenance since 2013, there have been no mining operations and as a result, greenhouse gas emissions have been below the thresholds for reporting under the NGERS. However, the emissions from the use of electricity and fuel use during care and maintenance is reported as part of the Manildra Group's overall NGERS reporting. Based on the current program for assessment of the EA for the Invincible Expansion Project (IEP), the timing of this item has been updated to June 2017. **2016 – Annual Review Update** No further action required until a decision is made regarding the IEP. **2017 – Annual Review Update** The ESAP was a NSW Government initiative which ran from 28 October 2005 to 31 December 2012. Following the approval of the Invincible Southern Extension Project on 2 February 2018, the consolidated Project Approval (PA 07_0127) (as modified) removed the requirements of this condition. No further action is required.	Complete

Invincible Colliery IEA Action Plan

ID	Criteria	Requirement	Audit Finding	Audit Recommendation	Responsibility (assigned by auditor)	Follow up Actions and Current Status	Status
NC4 Low	PA-07-0127, S2, C11(a)	The Proponent may: (a) with the approval of the Director-General, submit any management plan or monitoring program required by this approval on a progressive basis; and	The DPE approved (via letter dated 6 July 2009) the following monitoring and management plans: - Noise Monitoring Program (condition 6 of schedule 3); - Air Quality Monitoring Program (condition 10 of schedule 3); - Water Management Plan (condition 13 of schedule 3); - Blast Monitoring Program (condition 30 of schedule 3); - Landscape Management Plan incorporating a Rehabilitation and Offset Management Plan (condition 34 and 35 of schedule 3); - Aboriginal Heritage Management Plan (condition 40 of schedule 3). The letter approved a request for an alternative timetable for the submission of a Mine Closure Plan (MCP), required by conditions 34 and 36 of schedule 3. The plan was to be submitted by 30th June 2010. It was reported that a MCP has not yet been prepared and therefore was not submitted to the DPE by the required date and evidence of an extension to that date was not sighted during the audit. It is noted that an Environmental Management Strategy, Environmental Monitoring Program and ESAP has also been submitted progressively.	Consult with the DPE to obtain approval for an alternative timetable for the submission of a MCP, in consideration of the proposal to extend mining operations at the site.	Coalpac	The previous timeframe for submission of a MCP was agreed between Coalpac and the DPE and pre-dates CC's involvement in the project. Negotiations will be held between CC and DPE to agree a new timeframe for submission of a MCP prior to recommencement of operations. Based on the current program for assessment of the EA for the IEP, the timing of this item has been updated to June 2017. **2016 – Annual Review Update** Consultation to be undertaken with DPE prior to June 2017. **2017 – Annual Review Update** This condition (i.e. S2, C11(a)) has been removed from the Project Approval. Management Plans will be updated during 2018 to incorporate the Southern Extension Project Area and Project Approval conditions. CC will liaise with DPE regarding the submission timing for the various management plans, as relevant.	Complete

Invincible Colliery IEA Action Plan

ID	Criteria	Requirement	Audit Finding	Audit Recommendation	Responsibility (assigned by auditor)	Follow up Actions and Current Status	Status
NC5 Med	PA 07_0127, S2, C14(a)	The Proponent shall ensure that all the plant and equipment used on site is: (a) maintained in a proper and efficient condition; and	The 2015 AEMR reports that most mobile plant and equipment has been removed from the site. Remaining equipment (such as excavators and dozers used for erosion control and rehabilitation maintenance and a mobile water pump) is periodically run, where possible, with pre-start inspections conducted at each instance. Sedgman advise that light vehicles are serviced off-site as required and no records are kept on site. Maintenance/pre-start inspection records for mobile equipment were not verified. It is noted that the mobile water pump is new and has not required servicing. Stationary plant and equipment that is currently used on site during the care and maintenance period, as observed during the site inspection, includes (but is not limited to): a 75,000L diesel AST and a wastewater collection system. This system comprises a bulk waste oil tank and liquid waste storage facility that is bunded and contained by a catch drain network that leads to an oil/water separator and a 6,000L waste oil collection tank. During the site inspection, the following observations were made by the Auditor: 1. The catch drain system contained (in sections) oily sediment and debris. 2. A break in the PVC pipes that leads from the catch drains to the oil/water separator and waste oil collection tank. Should any spills within the bunded area occur, this would leak onto the soil and vegetation on the embankment. 3. The 6000L waste oil collection tank is not bunded. The wastewater collection system is designed to capture any spills from the current diesel AST refuelling area, the bunded waste oil tank and the liquid waste storage area. As such it is required to be maintained in proper and efficient working condition during the care and maintenance period.	Undertake maintenance and cleaning of the wastewater catch drain system. Conduct a maintenance inspection and integrity test of the wastewater collection system including bunding, tanks and piping. Repair the breakage in the piping that leads from the wastewater catch drain to the oil/water separator and waste oil collection tank. Investigate whether any soil contamination has resulted from the breakage. Install bunding around the waste oil collection tank (if it is to remain operational). Retain maintenance and servicing records for all plant and equipment used at the site.	Castlereagh Coal	The following items are included in the current inspection/ maintenance program. However, there is currently no formal recording of actions for repair/maintenance: • Inspection and maintenance of the catch drain system. • Inspection and maintenance of the wastewater collection system. • Plant and equipment maintenance and servicing. A new Inspection Checklist has been prepared to allow recording of repairs/maintenance and corrective actions required and this checklist is currently being used during routine inspections conducted by the Mining Engineering Manager. The waste oil collection system is currently not in use. However, repairs to the catch drain pipework will be undertaken as required. The wastewater collection system is now assessed during routine inspections. There is no evidence of leakage/spillage or contamination in this area and the system will continue to be monitored on a regular basis. The waste oil collection system is currently not in use. If this system is proposed to be used in future, bunding will be installed prior to use. The UST tank is empty and is not currently used. However, it may be used again once operations recommence so will not be decommissioned. The tank and associated pipework will be tested prior to recommissioning. **2016 – Annual Review Update** No further action required as waste oil system is not utilised. A risk assessment regarding the utilisation of the system will be undertaken prior to the system being recommissioned. **2017 – Annual Review Update.** The waste oil system was not utilised during the 2017 report period. A risk assessment regarding the utilisation of the system will be undertaken prior to the system being recommissioned. The waste oil collection system will be reinstated prior to recommencing mining.	Active

Invincible Colliery IEA Action Plan

ID	Criteria	Requirement	Audit Finding	Audit Recommendation	Responsibility (assigned by auditor)	Follow up Actions and Current Status	Status
NC6 Med	PA 07_0127, S3, C12	Except as may be expressly provided for by an EPL, or in accordance with section 120 of the *Protection of the Environment Operations Act 1997*, (POEO Act) the Proponent shall not discharge any mine water from the site.	The EPL permits wet weather discharge from the overflow point located at the water storage dam below the washery and labelled as Discharge Point #2 on plan titled 'Invincible Open Cut Environmental Monitoring Sites' dated 29 June 2001. A copy of the plan was not available at the time of the audit and is required to verify the location as per this figure; however the description appears to match the discharge location used. It was reported during site interviews, that dirty water storage dams are utilised during heavy rainfall events, these are the Sump Dam (SDC3-7) and Crib Hut Dam (SD-C3-6, now SD4). All water captured in these two dams is either pumped or drains into the underground workings or is reused on site when required. This is approved in the Care and Maintenance Mining Operations Plan (2013) but is not expressly provided for within the EPL. Consultation with the Department of Primary Industries - Water also indicated that the site needs to consider the Aquifer Interference Policy for all surface water movement activities.	Review the current operations against the Aquifer Interference Policy. Apply to the EPA for a modification of the Environment Protection Licence to permit discharge via the underground workings.	Coalpac	Mine water is not discharged from the site except from the licenced discharge location at the Main Dam (LD002) and only when water quality is in accordance with EPL criteria. EPA has advised that discharge of groundwater from old underground workings (LD001) was previously approved under the EPL at a rate of 2ML/day but was removed in 2012 due to concerns with groundwater quality and volumes and the potential impacts on Cox's River and Long Swamp. At that time, the pump was removed from LD001 and no discharge currently occurs from this location. While water is pumped from Sediment Dam 2 to Sediment Dam 4, which drains to the old underground workings, there is no discharge from the underground workings. **2016 – Annual Review Update** No further action required. **2017 – Annual Review Update** No further action required.	Complete
NC7 Med	PA 07_0127, S3, C13(c)(ii)	Water Management Plan (WMP) This Plan must include an erosion and sediment control plan for all surface works in the mining area that is consistent with the requirements of Managing Urban Stormwater: Soils and Construction Manual (Landcom 2004, or its latest version);	Section 8 of the WMP (2009) provides an Erosion and Sediment Control Plan. Erosion was observed on site during the site inspection and has been noted by others during recent inspections of the rehabilitation areas (Kleinfelder, 2015), indicating that review and maintenance of controls is required.	Update the Erosion and Sediment Control Plan with reference to the latest guidelines for Managing Urban Stormwater: Soils and Construction, Volume 2E Mines and Quarries (Blue Book).	Coalpac	Erosion and sediment control rectification works are currently being conducted by Sedgman Civil Engineers. Proposed timeframe for update of the ESCP: 31 January 2017. The Stage 1 erosion control design has been completed and a new ESCP will be provided by the end of June 2017. **2016 – Annual Review Update** A review of the proposed design, including determination of whether any interim works can be undertaken will be completed by June 2017. **2017 – Annual Review Update** Management Plans will be updated during 2018 to incorporate the Southern Extension Project Area and Project Approval conditions.	Active

Invincible Colliery IEA Action Plan

ID	Criteria	Requirement	Audit Finding	Audit Recommendation	Responsibility (assigned by auditor)	Follow up Actions and Current Status	Status
NC8 Low	PA 07_0127, S3, C13(c)(iv)	This Plan must include a groundwater monitoring program with: - baseline data of groundwater levels and quality in the region, including details of any privately-owned groundwater bores which could be affected by the development; - groundwater impact assessment criteria, including trigger levels for investigating any potentially adverse groundwater impacts of the development; and - a program to monitor: - groundwater inflows to the open cut mining operations; & - impacts of the development on the region's aquifers, groundwater bores and surrounding watercourses	Section 10 of the WMP (2009) references a Groundwater Monitoring Program. The plan includes baseline data, groundwater impact assessment criteria and trigger levels; however it lacks a detailed monitoring program to assess groundwater inflows to the open cut mining operations or impacts of the development on the regions water resources. The 2014 and 2015 AEMRs indicate that groundwater monitoring is undertaken from up and downgradient wells, however this monitoring is not detailed in the WMP.	Update the WMP to include a groundwater monitoring program that satisfies the requirements of the Project Approval.	Coalpac	6 rounds of groundwater monitoring have previously been conducted since 2011 and a 7th round was conducted in November 2015 by RCA Environmental. The groundwater monitoring has been undertaken to provide a baseline dataset to assess the impact of mining operations on groundwater resources. The groundwater water monitoring program and results are described in RCAs *Invincible Colliery Groundwater Monitoring Report November 2015*. The WMP will be updated to include the groundwater monitoring program as part of the project approval process for future mining operations as agreed with DPE. Update of the WMP will be undertaken as part of the proposed expansion project. **2016 – Annual Review Update** No further action proposed. **2017 – Annual Review Update** Management Plans will be updated during 2018 to incorporate the Southern Extension Project Area and Project Approval conditions.	Active
NC9 Low	PA 07_0127, S3, C14	Monitoring of Coal Transport The Proponent shall keep records of the amount of coal transported from the mine site and number of coal truck movements each year and include these records in the AEMR.	During the audit period, coal was transported from the mine site between May to September 2013. Records showing coal transport volumes and truck movements were not available at the time of the audit, as these activities were recorded by the previous mine operator and access to records is limited. The 2013 AEMR does not clearly identify the total amount of product coal transported from the mine. It indicates that 366,361 tonnes of product coal was generated at the site in 2013; and that a total of 30,873 t of coal was dispatched to domestic destinations other than the mount Piper or Wallerawang Power Stations. The amount of coal transported to these power stations was not specified and it has been assumed that the maximum amount of coal transported from the site to be up to 366, 361 tonnes. The 2013 AEMR states that the average laden truck movements per day were five. However it did not report the total number of truck movements during the period.	The 2013 AEMR (Coalpac, 2013b) did not report the total number of truck movements during the audit period. As this condition relates to previous mining operations by Coalpac, there are no current recommendations related to this non-compliance.	Coalpac	This coal transport was conducted by Coalpac during 2013. Coal has not been transported off-site during the care and maintenance period under the operation of CC. No action required **2017 – Annual Review Update** Management Plans will be updated during 2018 to incorporate the Southern Extension Project Area and Project Approval conditions. This will include an update to the Invincible Colliery Transport Management Plan.	Active

Invincible Colliery IEA Action Plan

ID	Criteria	Requirement	Audit Finding	Audit Recommendation	Responsibility (assigned by auditor)	Follow up Actions and Current Status	Status
NC10 Admin	PA 07_0127, S3, C18A	Coal Haulage Limits The Proponent shall install a truck wheel wash with sprays by 31 December 2010 and following this date, must ensure that all coal trucks have their tyres and vehicles cleaned of mud and dust prior to exiting the Colliery, to the satisfaction of the Director-General. The truck wheel wash with sprays must remain in place unless replaced by equivalent mitigation measures to the satisfaction of the Director-General.	The 2011 AEMR reported the installation of the wheel wash at the site in 2011. The wheel wash was not installed by the required date. There are no recommendations required to address this administrative non-compliance. The wheel wash was observed in operating condition during the site inspection.	The truck wheel wash was not installed by Coalpac by the required date. There are no recommendations required to address this administrative noncompliance.	Coalpac	The truck wheel wash was installed by Coalpac in 2011. While this was after the required date, installation of the truck wheel wash pre-dates CC's involvement with the project. The wheel wash is currently operational. No action required. **2017 Annual Review Update** No further action proposed.	Complete
NC11 Low	PA 07_0127, S3, C32	Biodiversity Offsets Within 2 years of the date of this approval, the Proponent shall provide appropriate long term security for the biodiversity offset strategy (BOS), to the satisfaction of the Director-General. Note: The long-term security of the offset can be achieved through one, or a combination, of the following: Deed of Agreement with the Minister, rezoning the land under the Lithgow Local Environment Plan, caveats on the title under the *Conveyancing Act 1919*, etc.	Evidence of the provision of appropriate long-term security for the BOS was not provided by Sedgman or CC.	It is recommended that the leaseholder provide appropriate security for the BOS such as rezoning of Lot 112 DP877190, Lot 113 DP 877190 and Lot 1 DP180294 or the application of a protective covenant (such as a Section 88B Covenant) on title. Consult with the DPE.	Coalpac	Preparation of the BOS and establishment of a security pre-dates CC's involvement in the project and we are unable to confirm whether a security has been provided. Provision of a long-term security for the BOS will be addressed as part of the proposed expansion project. **2016 – Annual Review Update** No further works proposed as provision of a long-term security for the BOS will be addressed as part of the proposed expansion project. **2017 – Annual Review Update** The timing requirements of this condition have been revised in the current project approval (i.e. Z" Within 2 years of the recommencement of mining operations, unless the Secretary agrees otherwise,…"These works will be progressed during 2018 – 2019,	Active
NC12 Low		The Proponent shall progressively rehabilitate the site in a manner that is generally consistent with the final landform set out in the EA (shown conceptually in Figure 5 of Appendix 1) to the satisfaction of the Director-General and I&I NSW.	Progressive rehabilitation of the site has generally been consistent with the final landform set out in the EA. Although the maximum slope has been exceeded in some areas of rehab, particularly the 2012 seeded areas. This has resulted in top soil loss and erosion, in parts, and the failed establishment of native vegetation, seeded as part of rehabilitation measures (aerial seeding in particular) in the north-western portion of the site. Although there has been no new rehabilitation areas established by CC and rehabilitation performance is assessed annually, re-evaluation of the establishment of failed rehabilitation areas, particularly on steep slopes is required.	Whilst no new rehabilitation has been established during CC operations and rehabilitation performance is assessed annually, it is recommended that CC review Rehabilitation progress and performance, including the establishment of failed rehabilitation areas on steep slopes. Any recommendations from the annual review process should be reflected in future rehabilitation plans.	Castlereagh Coal	Annual biodiversity monitoring was conducted within rehabilitation areas in December 2015 and December 2016 and recommendations are being implemented by CC. Areas of failed rehabilitation and erosion in rehabilitation areas are currently being monitored and will be reseeded as required as part of the ongoing care and maintenance activities. **2016 – Annual Review Update** Annual biodiversity monitoring undertaken during 2016. Erosion and sediment control on site to be reviewed in accordance with item NC7. **2017 – Annual Review Update** Annual biodiversity monitoring undertaken during 2017 and reported in the Annual Review. Erosion and sediment control on site to be reviewed in accordance with item NC7. CC notes that a Rehabilitation Management Plan required under Schedule 3 Condition 52 requires a detailed rehabilitation schedule and performance assessment aspects. The Rehabilitation Management Plan will be submitted during 2018.	Active

Invincible Colliery IEA Action Plan

ID	Criteria	Requirement	Audit Finding	Audit Recommendation	Responsibility (assigned by auditor)	Follow up Actions and Current Status	Status
NC13 Med	PA 07_0127, S3, C34(a)	The Proponent shall prepare and implement a detailed Landscape Management Plan for the site to the satisfaction of the Director-General and I&I NSW. This plan must: (a) be prepared in consultation with Lithgow City Council (LCC) and NOW by suitably qualified expert/s whose appointment/s have been approved by the Director-General;	A Landscape Management Plan (LMP), dated June 2009 was reviewed. Section 1.2 of the plan indicates that it was prepared in consultation with LCC and NOW as required by this condition. Records were not available to verify this condition has been met. The plan states that it was developed in consultation variously between relevant mine personnel, Global Soil Systems (GSS) and LCC and DWE. Records showing the approved appointment of GSS by the DPE were not available to verify this condition. Site inspection confirmed that the LMP was not implemented according with all criteria set out in the plan. In particular with regard to planting in the BOS, successful establishment of progressive rehabilitation areas, and the annual monitoring of each new area of rehabilitation.	Ensure the LCC and the DPI-Water is consulted during any future revisions to the WMP, and evidence of consultation is retained. Implement the LMP in terms of achieving performance criteria for rehabilitation, and following recommendations from Annual Flora, Fauna and Rehabilitation Monitoring.	Castlereagh Coal	The LMP was prepared and approved by the Director-General during Coalpac ownership of the mine and pre-dates CC's involvement in the project. Any future revisions of the management plans will be undertaken in consultation with relevant regulatory agencies (as required). Update of management plans will be undertaken as part of the proposed expansion project. The annual biodiversity monitoring conducted by Kleinfelder includes assessment against the performance criteria contained in the development stage section of the LMP Assessment Checklist (Appendix 2) including vegetation establishment and sustainability, fauna habitat and recolonization, landform stability and soil suitability. However, they do not provide a completed Assessment Checklist as contained in the LMP Appendix 2. Further annual biodiversity monitoring was conducted by Umwelt in December 2016 and included assessment against the relevant sections of the LMP Checklist. **2016 – Annual Review Update** Annual biodiversity monitoring conducted during 2016 with results included within the 2016 Annual Review (refer to **Section 8.3**). Any updates made to management plans in the future will be undertaken in accordance with relevant stakeholders as defined by statutory approvals. **2017 – Annual Review Update** This condition (i.e. S3, C34(a)) has been removed from the Project Approval. CC notes that a Rehabilitation Management Plan required under Schedule 3 Condition 52 must be prepared in consultation with DPI Water, OEH, Council and CCC. The Rehabilitation Management Plan will be submitted during 2018.	Complete
NC14 Med	PA 07_0127, S3, C34(c)	Landscape Management Plan (LMP) This plan must: (c) include a: • Rehabilitation and Offset Management Plan; and • Mine Closure Plan (MCP) *Note: The Department accepts that the initial LMP may not include the detailed Mine Closure Plan. However, if this occurs, the Proponent will be required to seek approval from the Director-General for an alternative timetable for the completion and approval of the MCP.*	The LMP includes the Rehabilitation and Offset Management Plan. A MCP has not been prepared. The DPE (via letter dated 6 July 2009) approved a request for an alternative timetable for the submission of a MCP, required by conditions 34 and 36 of schedule 3. The plan was to be submitted by 30 June 2010. It is reported that a MCP has not been completed and therefore was not submitted to the DPE by this date and evidence of an extension to this date was not sighted during the audit.	The MCP was not submitted by Coalpac by the agreed alternative timetable date of 30 June 2010. Consult with the DPE to obtain approval for an alternative timetable for the submission of a MCP, in consideration of the proposal to extend mining operations at the site.	Coalpac	The previous timeframe for submission of a MCP was agreed with the previous mine owner/operator and pre-dates CC's involvement in the project. Negotiations will be held between CC and DPE to agree a new timeframe for submission of a MCP. Based on the current program for assessment of the EA for the Invincible Expansion Project, the timing of this item has been updated to June 2017. Update of management plans will be undertaken as part of the proposed expansion project. **2016 – Annual Review Update** No further action proposed until a determination is made in regards to the IEP.. **2017 – Annual Review Update** Refer to NC4 and NC13	Complete

Invincible Colliery IEA Action Plan

ID	Criteria	Requirement	Audit Finding	Audit Recommendation	Responsibility (assigned by auditor)	Follow up Actions and Current Status	Status
NC15 Low	PA 07_0127, S3, C36	Mine Closure Plan (MCP) The MCP must: (a) define the objectives for the site following the cessation of mining operations under this approval; (b) investigate options for the future use of the site; (c) investigate ways to minimise the adverse socio-economic effects associated with the conclusion of the project, including reduction in local and regional employment levels; (d) describe the measures that would be implemented to minimise or manage the on-going environmental effects of the project; and (e) describe how the performance of these measures would be monitored over time.	The DPE (via letter dated 6 July 2009) approved a request for an alternative timetable for the submission of a MCP, required by conditions 34 and 36 of schedule 3. The plan was to be submitted by 30 June 2010. It is reported that a MCP has not been completed and therefore was not submitted to theDPE by this date and evidence of an extension to this date was not sighted during the audit.	Consult with the DPE to obtain approval for an alternative timetable for the submission of a MCP, in consideration of the proposal to extend mining operations at the site.	Coalpac	The previous timeframe for submission of a MCP was agreed with the previous mine owner/operator and pre-dates CC's involvement in the project. Negotiations will be held between CC and DPE to agree a new timeframe for submission of a MCP. Based on the current program for assessment of the EA for the IEP, the timing of this item has been updated to June 2017. Update of management plans will be undertaken as part of the proposed expansion project. **2016 – Annual Review Update** No further action proposed until a determination is made in regards to the IEP. **2017 – Annual Review Update** This condition (i.e. S3, C36) has been removed from the Project Approval. CC notes that a Rehabilitation Management Plan required under Schedule 3 Condition 52 must include detailed mine closure planning information. The Rehabilitation Management Plan will be submitted during 2018.	Complete

Invincible Colliery IEA Action Plan

ID	Criteria	Requirement	Audit Finding	Audit Recommendation	Responsibility (assigned by auditor)	Follow up Actions and Current Status	Status
NC16 Low	PA 07_0127, S3, C37	Biodiversity Offset Strategy (BOS) Implementation Bond Within 3 months of the approval of the LMP, the Proponent shall lodge a BOS implementation bond with either the I&I NSW or the DPE to ensure that the BOS is implemented in accordance with the performance and completion criteria of the LMP. The sum of the bond shall reflect the full cost of implementing the BOS and be determined by employing a suitably qualified rehabilitation expert or quantity surveyor. Notes: • If the BOS is implemented to the satisfaction of the Director-General and I&I NSW, then the bond holder will release the implementation bond. • If the BOS is not implemented to the satisfaction of the Director-General and I&I NSW, then all or part of the bond may be used to ensure the satisfactory completion of the relevant works. • The bond may be incorporated into rehabilitation bonding arrangements under the *Mining Act 1992*.	Evidence of the BOS Implementation Bond was not provided by Sedgman or CC	Evidence of the BOS Implementation Bond was not available. Consult with DPE and DRE and provide evidence of BOS Implementation Bond, or evidence of DG sign-off on the implementation of the BOS.	Coalpac	This security was required to be paid in 2009 during Coalpac ownership; however we are unable to find records of this payment. We have been advised that neither DPE nor DRE have any records of this implementation bond being paid by Coalpac. It is expected that this issue will be resolved as part of the assessment being undertaken for the Invincible Southern Expansion Project. **2016 – Annual Review Update** No further action proposed until a determination is made in regards to the IEP. **2017 – Annual Review Update** This condition (i.e. S3, C37) has been removed from the Project Approval. CC notes that a Conservation Bond must be lodged with the Department within 6 months of the approval of the Biodiversity Management Plan required under Schedule 3 Condition 35 of the Project Approval (as modified). The Biodiversity Management Plan will be submitted during 2018 – 2019 in accordance with this condition.	Active

ID	Criteria	Requirement	Audit Finding	Audit Recommendation	Responsibility (assigned by auditor)	Follow up Actions and Current Status	Status
NC17 Low	PA07_012 7,S3, C40 (a)	Aboriginal Heritage Management Plan (AHMP) The Proponent shall prepare and implement an AHMP for the project to the satisfaction of the Director-General. The Plan must: (a) be prepared in consultation with DECCW and the Aboriginal community;	Verifiable evidence of consultation with DECCW (now NSW OEH) or the Aboriginal Community was not reviewed as the current mine operators' access to these records is limited. The AHMP states that consultation with the Bathurst Local Aboriginal Land Council was made by phone and that they agreed with the conditions of the Project Approval and those detailed within the plan, in terms of its provisions for site material should any such material be found during the course of the project. The AHMP (June 2009) requires 'Invincible OS1' to be fenced and sign posted (Warning and Notice signs). During the site inspection, the Auditor observed: - a fence around the heritage site "Invincible OS1"; however no signage was visible. - maps showing the location of the heritage site on the noticeboard at the main office. It was reported that signage had been installed, but was not visible to the auditor during the audit.	Ensure the EPA and the Aboriginal Community is consulted during any future revisions to the AHMP, and evidence of consultation is retained. Re-erect the signs at the 'Invincible OS1' Aboriginal heritage site as outlined in the AHMP (i.e. Warning and Notice signs). Update plans in all management documents to include the location of the cultural heritage site "Invincible OS1".	Castlereagh Coal	The AHMP prepared by Coalpac states that consultation was made with the DECC and the BLALC. Contact details for BLALC are provided in Appendix 1 and correspondence from BLALC is provided in Appendix 2. Any future review of the AHMP by CC would be conducted in consultation with relevant regulatory authorities and Aboriginal parties. There are eight signs in total at the OS1 site (many of which the audit team would not have seen as they are not visible from a distance and the audit team did not go right down to the site). However many of the signs had fallen off the fence and were therefore not visible from a distance. These signs have now been reattached and all signs are visible. No further action required.	Complete
NC18 Low	PA 07_0127, S3, C42 (c)(d)(e)	Greenhouse and Energy Efficiency This plan must: (c) include a program to monitor greenhouse gas emissions and energy use generated by the project; (d) include a framework for investigating and implementing measures to reduce greenhouse gas emissions and energy use at the site; (e) describe how the performance of these measures would be monitored over time.	Refer to response to S2.4A. The EASP (2009) as available on the Coalpac website does not reference greenhouse gas emissions and as such does not include a program to assess or monitor greenhouse gas emissions generated by the project. The DPE requested that the plan be updated to incorporate this.	Consult with the DPE to determine whether the ESAP was approved in accordance with PA 07_0127 Schedule 3, Condition 42. If required, seek approval to provide a revised plan upon approval to continue mining operations. The revised plan is to ensure it meets all requirements of the Project Approval.	Coalpac	It should be noted that as the site has been in care and maintenance since 2013, there have been no mining operations and as a result, greenhouse gas emissions have been below the thresholds for reporting under the NGERS. However, the emissions from the use of electricity and fuel use during care and maintenance is reported as part of the Manildra Group's overall NGERS reporting. The ESAP was prepared by Coalpac and pre-dates CC's involvement with the project. There is little information available to CC regarding any agreement that was reached between DPE and Coalpac previously. However CC will ensure that future revisions of all management plans will be undertaken in consultation with relevant regulatory agencies. Update of management plans will be undertaken as part of the proposed expansion project. **2016 – Annual Review Update** No further action proposed until a determination is made in regards to the IEP. **2017 – Annual Review Update** This condition (i.e. S3, C42) has been removed from the Project Approval.	Complete

Invincible Colliery IEA Action Plan

ID	Criteria	Requirement	Audit Finding	Audit Recommendation	Responsibility (assigned by auditor)	Follow up Actions and Current Status	Status
NC19 Low	PA 07_0127, S3, C43(a)	Waste Minimisation The Proponent shall: (a) monitor the amount of waste generated by the project;	The 2015 AEMR states that General industrial waste is collected by a licenced contractor as required. A waste disposal receipt was sighted (Suez Environment, 30/09/2015, general solid waste dry) to demonstrate compliance. The 2013 AEMR stated that less than 5000L of waste oil was removed from site by a licensed contractor for recycling. The 2014 AEMR stated that less than 1000L of waste oil was disposed in 2014. The 2015 AEMR did not quantify the volume of any waste disposed in 2015. Records of industrial liquid waste or recycling volumes relevant to the audit period were not sighted by the Auditor and therefore this is considered to be a non-compliance with this condition, which requires monitoring of the amount of waste generated by the project.	Ensure records of waste disposal are retained on site for a period of 7 years. Monitor the amount of waste generated by the project. Include detailed waste monitoring requirements in the Environmental Monitoring Program.	Castlereagh Coal	It should be noted that waste material generated from the site is minimal given that the mine is in care and maintenance and there are no mining activities currently undertaken. Waste disposal records have been maintained during CC ownership. We have been unable to locate records of waste disposal conducted during Coalpac ownership. All waste receipts/invoices and waste volumes will be recorded and maintained at the site office for future reporting requirements. **2016 – Annual Review Update** Waste records for the 2016 report period have been retained on site. Records will be retained for subsequent years, no further action required.	Complete
NC20 Low	PA 07_0127, S3, C43(e)	Waste Minimisation The Proponent shall: (e) report on waste management and minimisation in the AEMR to the satisfaction of the Director-General.	AEMRs for 2013, 2014 and 2015 report on waste management processes employed at the site. The 2013 and 2014 AEMR provided estimates of waste volume and recycling volumes, however the 2015 provided no data on waste volumes.	Report the total volume of waste to landfill and recycling in the AEMR.	Castlereagh Coal	It should be noted that waste material generated from the site is minimal given that the mine is in care and maintenance and there are no mining activities currently undertaken. While records of waste disposal during Coalpac ownership have not been located, all waste receipts/invoices and waste volumes will be recorded and maintained at the site office for future reporting requirements. **2016 – Annual Review Update** Waste volumes have been reported in the 2016 Annual review and will continue to be reported in future Annual Reviews. No further action required.	Complete

Invincible Colliery IEA Action Plan

ID	Criteria	Requirement	Audit Finding	Audit Recommendation	Responsibility (assigned by auditor)	Follow up Actions and Current Status	Status
NC21 Admin	PA 07_0127, S5, C1(e)	Environmental Management Strategy (EMS) This strategy must (e) include environmental monitoring program for the project that includes all the monitoring requirements of this approval;	Section 12 of the EMS states that Environmental Monitoring Programs have been prepared pursuant to Schedule 3, Condition 6, 10, 13 and 30 of PA 07_0127. This relates to noise, air, water and blast monitoring only and does not include the requirement to monitor waste generation (Schedule 3, Condition 43), rehabilitation (Schedule 3, Condition 35), greenhouse and energy efficiency (Schedule 3, Condition 42), coal transport etc. Section 12 states that the included monitoring plans have been consolidated into a single document as described within Appendix 2 - However, the plans included in Appendix 2 of the EMS could not be verified as Appendix 2 is not attached to the EMS (on the CC website). An Environmental Monitoring Program (Coalpac, 2009) is provided on the CC website. This plan states that it has been developed as required by Schedule 5, Condition 1 (e), however, the date of this report (December 2009) does not indicate that it is the Appendix 2 of the EMS (November 2009).	Inclusion of the current Environmental Monitoring Program within the EMS is required to meet the conditions of the Project Approval. A full copy of the EMS should be uploaded to the website and the EMS should be updated to reference the EMP (ensuring also that the EMP is reviewed for relevancy).	Castlereagh Coal	A link to the Coalpac website is provided on the CC website for access to 'historic documents'. Appendix 2 (Environmental Monitoring Program) was not attached to the pdf of the EMS on the Coalpac website but the Environmental Monitoring Program was included separately on the website. This Environmental Monitoring Program includes programs for waste monitoring (Section 9), rehabilitation (Section 8), greenhouse gases (Section 10), and coal transport (Section 11). Appendix 2 was added to the pdf of the EMS and the complete EMS document has now been uploaded to the CC website **2016 – Annual Review Update** No further action required.	Complete

Invincible Colliery IEA Action Plan

ID	Criteria	Requirement	Audit Finding	Audit Recommendation	Responsibility (assigned by auditor)	Follow up Actions and Current Status	Status
NC22 Low	PA 07_0127, S5, C4	Annual Reporting By the end of November 2009, and annually thereafter, the Proponent shall submit an AEMR to the Director-General and to all relevant agencies. This report must: (a) identify the standards and performance measures that apply to the project; (b) describe the works carried out in the last 12 months; (c) describe the works that would be carried out in the next 12 months; (d) include a summary of the complaints received during the past year, and compare this to the complaints received in previous years; (e) include a summary of the monitoring results for the project during the past year; (f) include an analysis of these monitoring results against the relevant: • impact assessment criteria/limits; • monitoring results from previous years; and • predictions in the EA; (g) identify any trends in the monitoring results over the life of the project; (h) identify any non-compliance during the previous year; and (i) describe what actions were, or are being, taken to ensure compliance.	AEMRs relevant to the audit period are: 2013, 2014 and 2015. These reports cover January to December (reporting by calendar year). The condition requires submission of the AEMR annually by 30 November. It is considered likely that the intent of this condition, is for the AEMR to report using the financial year. It is noted that the AEMR is required by both the DPE (as per the project approval) and the DRE (as per the mining lease). The mining lease conditions however have recently changed and a Rehabilitation Report and Compliance Report now replace the AEMR for that Department. The requirement to submit an AEMR to the DPE remains however, the 2015 AEMR was not submitted to the DPE. Consultation with the DRE indicated that the AEMR should be reported per financial year, as it - is due for submission on the Mining Lease anniversary date of (10th September and 6th November for ML1635 and ML1638 respectively). The AEMRs are compliant with the content requirements specified in S5.4, with the following exceptions: – Analysis of monitoring results against the monitoring results from previous years and predictions in the EA is not consistently undertaken. – - Trends in monitoring results over the life of the project is not included. It was not verified which relevant agencies were provided the AEMR over the audit period.	Consult with the DPE and DRE to confirm details of AEMR reporting including: definition of relevant agencies, reporting period (calendar year or financial year) and submission dates. Include within the AEMRs, an analysis of monitoring results against the results of previous years monitoring and the EA predictions and include an analysis of trends over the life of the project.	Castlereagh Coal	The AEMR for Invincible Colliery was submitted to the DRE on 22 January 2016 and to the DPE on 29 January 2016 within 60 calendar days of the end of the reporting period from 1 January 2015 to 31 December 2015 as required for previous years. As the rehabilitation report and compliance report are new requirements for mining leases and replace the AEMR, clarification was sought from DRE regarding the timing of submission of these reports. As agreed with DRE, the first Compliance Report was submitted for Invincible Colliery (grouped reports for all mining leases) on 10 February 2016. In future, the Compliance Reports will be submitted each year as a grouped report for all mining leases to be submitted prior to the first of the lease grant anniversary dates (21 June), as agreed with DRE. Further, as agreed with DRE and DPE, the AEMR/Annual Review and Rehabilitation Report will be submitted annually 60 calendar days after the end of each reporting period (i.e. the calendar year from 1 January to 31 December) as has been done in previous years. No further action required	Complete

Invincible Colliery IEA Action Plan

ID	Criteria	Requirement	Audit Finding	Audit Recommendation	Responsibility (assigned by auditor)	Follow up Actions and Current Status	Status
NC23 Low	PA07_0127, S5, C5	By the end of November 2010, and every 3 years thereafter, unless the Director-General directs otherwise, the Proponent shall commission and pay the full cost of an Independent Environmental Audit of the project. This audit must: (a) be conducted by suitably qualified, experienced and independent team of experts whose appointment has been endorsed by the Director-General; (b) include consultation with the relevant agencies; (c) assess the environmental performance of the project and assess whether it is complying with the relevant requirements in this approval and any associated EPL or Mining Lease (including any strategy, plan or program required under these approvals); (d) review the adequacy of strategies, plans or programs required under these approvals; and, if appropriate, (e) recommend measures or actions to improve the environmental performance of the project, and/or any strategy, plan or program required under these approvals. Note: This audit team must be led by a suitably qualified Auditor and include experts in the fields of ecology and mine site rehabilitation.	The first Independent Environmental Audit (IEA) was undertaken by GSSE in December 2010 and the audit report was completed in February 2011. The next IEA was due to be completed in November 2013. The Auditor sighted a letter from Coalpac to the DPE dated 31 October 2013. Coalpac requested an extension of 6 months or more due to a business moratorium after they went into voluntary administration on 18th October 2013. Written response from the DPE was not sighted to verify whether this extension was granted. This condition is therefore assessed as not compliant. The Auditor sighted a letter from the DPE to Sedgman dated 9/12/2015, requesting the Independent Environmental Audit be completed (following an application for postponement due to the mine being in care and maintenance since 2013) and acknowledging that an audit had not been completed since the GSSE audit and was due to be provided by the end of March 2016. The Auditor Environmental was approved by the DPE on 16th December 2015. The audit was completed on 28/01/2016 and will be reported in accordance with the requirements of S5.5 by end of March.	An IEA has not been conducted every 3 years as required. No recommendations are required for this non-compliance.	Castlereagh Coal	The IEA was not conducted every 3 years during Coalpac ownership. However, this IEA was conducted within 1 year of CC commencing ownership of the Invincible Colliery and IEAs will be conducted every 3 years in future in accordance with the current project approval or future project approval conditions. No further action required	Complete

Invincible Colliery IEA Action Plan

ID	Criteria	Requirement	Audit Finding	Audit Recommendation	Responsibility (assigned by auditor)	Follow up Actions and Current Status	Status
NC24 Low	PA 07_0127, S5, C9	Within 3 months of the approval of any strategy/plan/ program required under this approval (or any subsequent revision of these strategies/plans/programs), or the completion of the audits or AEMRs required under this approval, the Proponent shall: (a) provide a copy of the relevant document/s to the relevant agencies and CCC; and (b) put a copy of the relevant document/s on its website.	Sedgman advise that all current AEMRs, MOPs, strategies, plans and programs were provided to the CCC members (either on USB or in hard copy) following the August 2015 meeting. Audit results and 2015 AEMRs will be provided to members once these are finalised. The 2011 IEA is not available on the Coalpac website and therefore this is assessed as not compliant. The Condition of Approval requires all audit reports to be uploaded to the mine website. As the audit report covers the period prior to CC ownership, it is recommended that CC seek DP&E approval to waive this requirement for the first audit report.	The Condition of Approval requires all audit reports to be uploaded to the mine website. As the audit report covers the period prior to CC ownership, it is recommended that CC seek DP&E approval to waive this requirement for the first audit report.	Coalpac	The 2016 IEA report has now been uploaded to the CC website **2016 – Annual Review Update** No further action required	Complete
NC25 Low	PA 07_0127, S5, C10	From the end of November 2009, and thereafter during the project, the Proponent shall: (a) provide a copy of this approval as may be modified from time to time on its website; (b) provide a comprehensive, running summary of monitoring results required under this approval on its website; and (c) update these results on a regular basis (at least every three months).	A copy of the approval is available on the website. Monitoring results are available on the website, with the exception of the following: Noise monitoring reports for Q3 and 4 2014 and Q1 2015; and environmental monitoring reports for September 2014 to April 2015, August 2013 and September 2013. These reports are during Coalpac's operations and CC has limited access to Coalpac's records. Groundwater monitoring is not available on the website. A comprehensive running summary of monitoring results required under the PA is not available on the website.	Provide a comprehensive running summary of monitoring results as required under the PA on the website.	Castlereagh Coal	Historic monitoring results that are available to CC have been uploaded to the Coalpac website and a link provided from the CC website under 'historic reports'. The noise reports have now been uploaded to the CC website A running summary of all environmental monitoring results (noise, air quality, weather data, water quality) commissioned by CC are uploaded to the CC website as these results are received. The Q1 Noise report for 2015 had not been received from the consultant at the time of the audit. But was added once received. Blasting and coal transport are not conducted during care and maintenance and no monitoring of these activities is required. **2016 – Annual Review Update** Monitoring will continue to be uploaded to CC website. No further action required.	Complete

Invincible Colliery IEA Action Plan

ID	Criteria	Requirement	Audit Finding	Audit Recommendation	Responsibility (assigned by auditor)	Follow up Actions and Current Status	Status
NC26 Low	SOC, C3.3	Organise the regular collection of industrial wastes (fortnightly).	Solid waste The 2015 AEMR states that General industrial waste that is collected in skip bins (see 3.2), is collected by a licenced contractor as required. A waste disposal receipt was sighted (Suez Environment, 30/09/2015, general solid waste dry) to demonstrate compliance. Liquid waste The 2013 AEMR states that in May 2013, liquid wastes from storage tanks and sumps were removed, the inlet bay where oily water enters the oil and water separator was pumped out and cleaned and less than 5000L of waste oil was removed from site by a licensed contractor for recycling. Liquid waste disposal and infrastructure maintenance records were not sighted as the current mine operator has limited access to previous records. During the site inspection, a number of containers of liquid waste were observed in and near the workshop. The containers held a moderate volume of industrial liquid waste which is assumed to have been generated since the May 2013 clean up. The 2014 AEMR stated that less than 1000L of waste oil was disposed in 2014. The 2015 AEMR did not quantify the volume of waste disposed in 2015. Records of industrial liquid waste collection relevant to the audit period were not sighted and therefore this is considered to be a non-compliance with this condition, which requires fortnightly (or regular) collection of industrial wastes and the 2013 MOP which states these wastes will be collected twice a month or as required.	Organise the collection of all industrial wastes (including oil, grease and other liquid wastes) by a licensed contractor. It is noted that the frequencies are relevant to full scale operations and are reported to be reduced during the care and maintenance phase. Ensure records of waste disposal are retained on site for a period of 7 years.	Castlereagh Coal	The collection of all industrial waste by a licenced contractor is arranged on an 'as needs' basis. Fortnightly collection is not required at present as the site is in care and maintenance and waste generation is minimal. While records of waste disposal during Coalpac ownership have not been located, all waste receipts/invoices and waste volumes will be recorded and maintained at the site office for future reporting requirements. **2016 – Annual Review Update** Waste is collected on a regular basis as required with waste tracking information maintained in accordance with legislative requirements. No further action required.	Complete

Invincible Colliery IEA Action Plan

ID	Criteria	Requirement	Audit Finding	Audit Recommendation	Responsibility (assigned by auditor)	Follow up Actions and Current Status	Status
NC27 Med	SOC, C3.4	Store waste oils and grease at the maintenance workshop for collection by a licensed waste recycling contractor (Bi-monthly)	Waste oils and grease are stored within drums in the maintenance workshop. The 2015 AEMR states that waste oils and grease from workshop areas is collected in the waste oil storage tank. The above ground waste oil tank is located in bunding near the mechanical servicing area. A number of other chemical storage containers are located within this bunded area. A catch drain is adjacent to the waste oil tank to capture any material in the unlikely event that waste oil or other chemicals are spilled. This drain leads to an oil/water separator and a 6,000L waste oil collection tank. The 2015 AEMR reports that minor servicing may be undertaken on site using this infrastructure however maintenance records or liquid waste disposal records were not sighted. During the site inspection, a number of observations were recorded as follows: 1. The catch drain system was (in sections) filled with oily sediment and debris and as the area is still in use for chemical storage, it requires cleaning and maintenance. 2. A break in the PVC pipes that leads from the catch drains to the oil/water separator and waste oil tank was observed. Should any spills within the bunded area occur, this would leak onto the soil and vegetation on the embankment. The piping needs repair and the integrity of the system requires testing. 3. The waste oil collection tank is not bunded. 4. Liquid waste/product containers stored within the workshop are not bunded.	Ensure all liquid waste containers are stored within secondary containment / in bunding. • Undertake maintenance and cleaning of the wastewater catch drain system. • Retain all records of maintenance of equipment for a period of 7 years. • Retain all records of waste disposal for a period of 7 years. • Install bunding around the waste oil collection tank (if it is to remain operational). • Repair the PVC pipe in the waste oil collection system and investigate any residual contamination. • Conduct a maintenance inspection and integrity test of the waste oil collection system tanks and piping.	Castlereagh Coal	The following items are included in the current inspection/ maintenance program. However, there is currently no formal recording of actions for repair/maintenance: • Inspection and maintenance of the catch drain system. • Inspection and maintenance of the wastewater collection system. • Plant and equipment maintenance and servicing. A new Inspection Checklist has been prepared to allow recording of repairs/maintenance and corrective actions required and this checklist is currently being used during routine inspections conducted by the Mining Engineering Manager. The waste oil collection system is currently not in use. However, repairs to the catch drain pipework will be undertaken as required. The wastewater collection system is now assessed during routine inspections. There is no evidence of leakage/spillage or contamination in this area and the system will continue to be monitored on a regular basis. The waste oil collection system is currently not in use. If this system is proposed to be used in future, bunding will be installed prior to use. The UST tank is empty and is not currently used. However, it may be used again once operations recommence so will not be decommissioned. The tank and associated pipework will be tested prior to recommissioning. **2016 – Annual Review Update** No further action required as waste oil system is not utilised. A risk assessment regarding the utilisation of the system will be undertaken prior to the system being recommissioned. **2017 – Annual Review Update** The waste oil system was not utilised during the 2017 report period. A risk assessment regarding the utilisation of the system will be undertaken prior to the system being recommissioned. The waste oil collection system will be reinstated prior to recommencing mining.	Active

Invincible Colliery IEA Action Plan

ID	Criteria	Requirement	Audit Finding	Audit Recommendation	Responsibility (assigned by auditor)	Follow up Actions and Current Status	Status
NC28 Med	SOC, C3.6	Store hydrocarbon contaminated water in the oil/water separator for regular removal from site by a licensed contractor (as required).	See Item 3.3 and 3.4 above. Disposal receipts for the regular removal of liquid wastes is not recorded and the infrastructure to store the liquid waste is in need of repair.	See recommendations for 3.3 and 3.4 above.	Castlereagh Coal	The following items are included in the current inspection/ maintenance program. However, there is currently no formal recording of actions for repair/maintenance: • Inspection and maintenance of the catch drain system. • Inspection and maintenance of the wastewater collection system. • Plant and equipment maintenance and servicing. A new Inspection Checklist has been prepared to allow recording of repairs/maintenance and corrective actions required and this checklist is currently being used during routine inspections conducted by the Mining Engineering Manager. The waste oil collection system is currently not in use. However, repairs to the catch drain pipework will be undertaken as required. The wastewater collection system is now assessed during routine inspections. There is no evidence of leakage/spillage or contamination in this area and the system will continue to be monitored on a regular basis. The waste oil collection system is currently not in use. If this system is proposed to be used in future, bunding will be installed prior to use. The UST tank is empty and is not currently used. However, it may be used again once operations recommence so will not be decommissioned. The tank and associated pipework will be tested prior to recommissioning. **2016 – Annual Review Update** No further action required as waste oil system is not utilised. A risk assessment regarding the utilisation of the system will be undertaken prior to the system being recommissioned. **2017 – Annual Review Update** The waste oil system was not utilised during the 2017 report period. A risk assessment regarding the utilisation of the system will be undertaken prior to the system being recommissioned. The waste oil collection system will be reinstated prior to recommencing mining.	Active
NC29 High	SOC, C4.2	Stabilise earthworks, drainage lines and disturbed areas no longer required for mine related activities (as areas become available).	Areas of rehabilitation in the north of site, seeded during 2012, have not been successfully stabilised, as evident from site inspection. Reports from DPE inspection correspond to this finding. This has been classified by Cumberland Ecology as a high risk as further erosion is likely, and failure of the rehabilitation to establish a native vegetation community.	Areas of rehabilitation in the north of site, seeded during 2012, have not been successfully stabilised. Stabilise rehabilitation areas to the satisfaction of DPE (soil re-profiling, or adapted seeding and tubestock planting methods are required as remedial action). Provide update in 2016 AEMR.	Castlereagh Coal	Annual Biodiversity Monitoring is conducted in rehabilitation areas and recommendations are being implemented by CC. Rectification works undertaken in rehabilitation areas are outlined in this Annual Review. **2016 – Annual Review Update** Update included in 2016 Annual Review. **2017 – Annual Review Update** Update included in 2017 Annual Review. No further action required.	Complete

Invincible Colliery IEA Action Plan

ID	Criteria	Requirement	Audit Finding	Audit Recommendation	Responsibility (assigned by auditor)	Follow up Actions and Current Status	Status
NC30 Low	SOC, C4.4	Utilise native tree, shrub and grass species and / or pasture species comparable with either the existing vegetation communities or those which occurred in the area prior to mining and agriculture-related disturbance (ongoing during rehabilitation activities).	Rehabilitation seed mix includes inappropriate species that are not components of the vegetation types present prior to mining. This is particularly the case with grass species used on slopes adjoining areas of retained native vegetation, and Ben Bullen State Forest.	Modify seed mix for all future rehabilitation, as per the Landscape Management Plan, and recommendations in the 2015 Annual Biodiversity Monitoring report (Kleinfelder, 2015).	Coalpac	The rehabilitation seed mix in the LMP has been modified by removal of *Acacia dealbata* and *Acacia decurrens* as recommended by Kleinfelder and the modified seed mix was included in the revised C&M MOP prepared by Sedgman (September 2015). This modified seed mix will be provided to all contractors involved in future rehabilitation works. **2016 – Annual Review Update** No further action required.	Complete
NC31 Low	SOC, C5.8	Ensure the on-site road network is well maintained to limit body noise from empty trucks travelling on internal roads (ongoing).	Inspection of the on-site road network indicated that roads have not been adequately maintained during the care and maintenance period. Although activities on the site are low during this period and noise monitoring indicates that noise emissions from the site are compliant at off-site monitoring locations, this condition relating to the carrying out of maintenance is assessed as not compliant.	Maintain the on-site road network by repairing existing scouring and erosion. This will help to limit noise levels associated with vehicle movements at the site.	Castlereagh Coal	The road network is included in the current inspection and maintenance regime. While scouring and erosion occurs from time to time following heavy rain events, repairs and maintenance are undertaken periodically as required. The scouring and erosion referred to in this item has been repaired since the audit site inspection. It should be noted that vehicle use of this road is minimal during care and maintenance. **2016 – Annual Review Update** No further action required.	Complete
NC32 Low	SOC, C7.12	Include a vertebrate pest control program as part of the mining operation (within 12 months of commencement of mining).	Feral Pest Control methods are described in the Landscape Management Plan (S9.10). Biodiversity Monitoring Reports and AEMR's for the current audit period have not documented any vertebrate pest control activities. No evidence of inspections, or development of a feral pest control plan have been reviewed.	Undertake assessment of the need for vertebrate pest control, as described in the LMP and Biodiversity Monitoring reports. Undertake control activities, as advised.	Castlereagh Coal	The annual biodiversity monitoring conducted by Kleinfelder in December 2015 indicated that feral animals within the site are typical of surrounding environments and that feral animal control is only recommended where these animals pose a specific threat to threatened species or rehabilitation activities. These threats were not identified in the biodiversity monitoring conducted in December 2015. The requirement for feral animal control will be assessed annually as recommended by Kleinfelder. **2016 – Annual Review Update** Update included in 2016 Annual Review. Feral animal presence was undertaken as part of biodiversity monitoring. **2017 – Annual Review Update** Update included in 2017 Annual Review. Feral animal presence was undertaken as part of biodiversity monitoring.	Complete

Invincible Colliery IEA Action Plan

ID	Criteria	Requirement	Audit Finding	Audit Recommendation	Responsibility (assigned by auditor)	Follow up Actions and Current Status	Status
NC33 Med	SOC, C8.1	Construct a fence around the site “Invincible OS1” and identify this as a culturally sensitive area at the site and on all mine plans (prior to commencement of the project).	The AHMP (June 2009) requires 'Invincible OS1' to be fenced and sign posted (Warning and Notice signs). During the site inspection, the Auditor observed: - a fence around the heritage site "Invincible OS1"; however no signage was visible. - maps showing the location of the heritage site on the noticeboard at the main office. It was reported that signage had been installed, but was not visible to the auditor during the audit. A review of monitoring and management plans indicated that the location of the heritage site is not identified on all mine plans. For example, the 2013 MOP does not include the site on plans 1, 2A, 3, 4A. The AHMP does not include the site's location on the overall mine site layout on Figure 2.	Update plans in all management documents to include the location of the cultural heritage site "Invincible OS1". Re-erect signs on the fencing at the 'Invincible OS1' Aboriginal heritage site as outlined in the Aboriginal Heritage Management Plan (i.e. Warning and Notice signs).	Castlereagh Coal	There are eight signs in total around the fencing of OS1 (most of which the audit team would not have seen as they are not visible from a distance and the audit team did not go right down to the site). However many of these signs had fallen off the fence and were not visible. These signs have now been reattached. No further action required	Complete
NC34 Med	SOC, C8.3	Inform all site personnel to the presence of the site and their obligations under the National Parks and Wildlife Act 1974 (NPW Act, 1974) in relation to site protection (prior to commencement of construction).	A template site induction competency assessment record, dated October 2012, was reviewed. The most recent completed record reviewed was dated 11 April 2012. The induction presentation or more recent (post 2012) site induction records were not available. Whilst this condition states that the induction is required prior to commencement of construction, it is the Auditors opinion, that the intent of this measure is to ensure that site workers are inducted before working on the site (at any stage of the project). Therefore, this condition is assessed as not compliant.	Ensure that the care and maintenance period site induction for staff and contractors, includes an appropriate Aboriginal Heritage induction that includes the location of the site and obligations under the NPW Act 1974. Ensure that training records are kept to demonstrate current staff and contractors have been inducted into procedures relevant to their work at the site, before working on the site.	Castlereagh Coal	The current site induction has been modified to include information on the nature and location of the Aboriginal heritage site OS1 and obligations for protection of this site. All training and induction records are maintained at the site office. No further action required	Complete

Invincible Colliery IEA Action Plan

ID	Criteria	Requirement	Audit Finding	Audit Recommendation	Responsibility (assigned by auditor)	Follow up Actions and Current Status	Status
NC35 Med	SOC, C8.5	Conduct a Cultural Heritage Awareness Induction Course for staff, contractors and any heritage monitors working on the Project Site (ongoing).	The Auditor sighted the following: - Map of the Aboriginal heritage site on notice board near the office - A template site induction competency assessment record, dated October 2012, which has a question on what to do if a new heritage site is found. - A completed site induction record dated 11 April 2012. Records pertaining to a Cultural Heritage Awareness Induction and induction records post-2012 were not sighted. The site is currently in care and maintenance, however, some ground disturbing works may be undertaken during rehabilitation and maintenance of erosion and sediment controls. It is therefore considered that continued cultural heritage induction is required during this period.	Ensure that the care and maintenance period site induction for staff and contractors, includes an appropriate Aboriginal Heritage induction that includes the location of the site and obligations under the NPW Act 1974. Ensure that training records are kept to demonstrate current staff and contractors have been inducted into procedures relevant to their work at the site, before working on the site.	Castlereagh Coal	The current site induction has been modified to include information on the nature and location of the Aboriginal heritage site OS1 and obligations for protection of this site. All training and induction records are maintained at the site office. No further action required	Complete
NC36 Low	SOC, C9.4	Undertake quarterly (groundwater) sampling and general observation of water within the main Colliery Dam and analyse / inspect for signs of ferrous iron oxidation or other contamination (quarterly).	The WMP (June 2009) specifies that water quality monitoring will be undertaken monthly within the Main Colliery Dam. Review of the AEMRs indicates that this monthly monitoring was primarily not undertaken throughout the audit period, with the 2015 AEMR reporting that this monitoring commenced at the site in December 2015. The Auditor notes the proposal by the current mine operator to implement monthly monitoring of the dam (regardless of whether discharge is occurring) from this point forward, and that this is an increased frequency to what is required by this condition. The monthly environmental monitoring reports reviewed, did not include results of visual inspections for ferrous iron oxidation or other contamination, as required by this condition. It is noted that the reports reviewed were summary reports and the analytical and field data (which is reported to contain this information) was not available for review at the time of the audit.	Ensure monthly environmental monitoring reports include the results of visual inspections for ferrous iron oxidation and other contamination.	Castlereagh Coal	Monthly monitoring of the Main Dam is conducted by RCA and includes visual inspection. Anything out of the ordinary is recorded in monthly reports. The absence of these observations in monthly reports indicates that no visual contamination was detected. No further action required.	Complete
NC37 Low	SOC, C9.6	Operate the existing clean water diversion structures in accordance with the Invincible Colliery Soil and Water Management Plan (ongoing).	The WMP (June 2009) stipulates the installation of clean water diversions. A full review of clean water diversion structures was not undertaken however, some erosion was observed during the site inspection and it was noted that roads other areas require maintenance.	Engage a suitably qualified and experienced person to inspect the surface water management system structures and conduct maintenance/repairs/rectifications as required.	Castlereagh Coal	The water management system structures including pumping systems, diversion structures and sediment basins/dams are inspected during routine site inspections and repairs are undertaken as required. The road erosion referred to in this item has been repaired since the audit site inspection. **2016 – Annual Review Update** No further action required.	Complete

Invincible Colliery IEA Action Plan

ID	Criteria	Requirement	Audit Finding	Audit Recommendation	Responsibility (assigned by auditor)	Follow up Actions and Current Status	Status
NC38 Med	SOC, C9.8	Inspect the diversion banks and other clean water management structures on a regular basis, or following rainfall of >25mm/24 hours, and undertake maintenance work as necessary (Quarterly or following rainfall of >25m/24hours).	Inspection records were sighted, including the OCE Designated District Inspection Reports (8/7/15-25/1/16), General Area Inspection Reports (8/7/15-25/1/16) and inspection check sheets (30/12/15-28/01/16). During the site inspection, some areas of erosion were observed requiring maintenance. Additional maintenance works are required to be undertaken at the site.	Dams and drains are inspected regularly. Erosion issues require maintenance. Engage a suitably qualified and experienced person to inspect the surface water management system structures and conduct such maintenance/repairs/rectifications as required.	Castlereagh Coal	The water management system structures including pumping systems, diversion structures and sediment basins/dams are inspected during routine site inspections and repairs are undertaken as required. The erosion referred to in this item has been repaired since the audit site inspection. **2016 – Annual Review Update** No further action required.	Complete
NC39 Med	SOC, C9.9	Construct low flow contour bank(s) discharging to a sediment basin(s) downstream of the proposed open cut mine extension (Prior to commencement of open cut mining).	The WMP (June 2009) stipulates the installation of dirty water retention structures. Contour banks are constructed and discharge to sediment ponds. Some areas of erosion were observed across the site and a review of the dirty water retention structures (including low flow contours) should be undertaken.	Banks and sediment basins are installed. Erosion issues were identified. Engage a suitably qualified and experienced person to inspect and review the surface water management system structures and conduct Maintenance /repairs/rectifications as required. The review should assess the adequacy of the size of the sediment basins.	Castlereagh Coal	The water management system structures including pumping systems, diversion structures and sediment basins/dams are inspected during routine site inspections and repairs are undertaken as required. The sediment basins are of adequate size and are routinely inspected. In the event that these basins fill with sediment, they are cleaned out as required. **2016 – Annual Review Update** No further action required.	Complete
NC40 Med	SOC, C9.11	Inspect the settlement ponds and sediment basins on a regular basis, or following rainfall of >25mm/24 hours, and clean out the sediment basins of consolidated sediment once capacity reduced by 20% (Quarterly or following rainfall of >25mm/24 hours).	Inspection records were sighted, including the OCE Designated District Inspection Reports (8/7/15-25/1/16), General Area Inspection Reports (8/7/15-25/1/16) and inspection check sheets (30/12/15-28/01/16). This includes a check of 'dams and drains'. During the site inspection, it was evident that maintenance of water management structures is required.	Dams and drains are inspected, some basins require maintenance. Engage a suitably qualified and experienced person to inspect the surface water management system structures and conduct maintenance/repairs/rectifications as required	Castlereagh Coal	The water management system structures including pumping systems, diversion structures and sediment basins/dams are inspected during routine site inspections and repairs are undertaken as required. **2016 – Annual Review Update** A review of erosion control structures will be undertaken by June 2017. 2017 – Annual Review Update Water management basins inspected by site personnel with the inspection regime to be included in the Southern Extension Water Management Plan to be developed during 2018.	Active

Invincible Colliery IEA Action Plan

ID	Criteria	Requirement	Audit Finding	Audit Recommendation	Responsibility (assigned by auditor)	Follow up Actions and Current Status	Status
NC41 Low	SOC, C9.14	Ensure any water discharged from nominated discharge point (No. 2) meets the criteria of EPL 1095, as follows. TSS <50mg/L. pH: 5.5 to 8.5. Oil and grease <10mg/L. Within 24 hours of discharge event.	Annual Returns were reviewed for the following reporting years: 2012-2013, 2013-2014, 2014-2015 and Feb 2015 to May 2015. Preparation of the annual return for 2015-2016 is currently in progress. Review of the POEO Public Register for EPL 1095 (7/02/16) showed one non-compliance was recorded by the EPA in the 2014-2015 annual return for a minor exceedance of pH at LDP2. Consultation with the EPA confirmed that LDP2 corresponds with the EPL discharge monitoring location LD002. The EPA stated on the POEO Register that it will monitor future compliance with this condition. The 2014 AEMR did not report any discharge monitoring being undertaken in 2014. A review of the available monitoring reports indicated that wet weather discharge monitoring was undertaken at LD002 in both April and August 2014. The August 2014 report does not present the results, rather it references a report 24004899-A which was not reviewed as part of this audit. In the absence of other records, is considered likely that the exceedance occurred during this month. It is noted that the environmental monitoring reports for September 2014 to April 2015, August 2013 and September 2013 are not available on the Coalpac website (former mine operator). A copy of the September 2014 to April 2015 reports was provided by Sedgman. It was reported that earlier records could not be obtained due to pre-dating the current mine operators' records. As such, the Auditor was unable to verify compliance with this condition for some dates.	A historical monitoring result from 2014 identified a minor exceedance of the pH range. Continue to monitor water quality in accordance with the requirements of the EPL, including identification of trends relating to pH.	Coalpac	Historical water quality results during the ownership of Coalpac pre-dates CC's involvement in the project. There have been no exceedances of the EPL water quality criteria during CC's ownership. A summary of monthly water quality monitoring results is provided on the CC website and a link to all available historic monitoring results conducted by Coalpac is provided on the CC website. All water quality monitoring commissioned by CC is conducted in accordance with the project approval, EPL and the WMP. No action required.	Complete
NC42 Low	SOC, C9.15	Securely store all hydrocarbon products (ongoing)	Hydrocarbon products were generally stored securely, in areas that either contained bunding or flammable chemical cupboards, however some drums of product were observed in the workshop without secondary containment. A repair is required to the mechanical workshop drains that lead to the separator.	Ensure all liquid chemical containers are stored within secondary containment / in bunding that is in good working order.	Castlereagh Coal	Small amounts of chemicals required during care and maintenance are kept with chemical cabinets with the relevant MSDS for each substance. There are some oils containers that are currently stored outside the chemical cabinets in an undercover area. Recent inspection found no evidence of leakage/spillage or contamination around these containers and the MEM will investigate options for removal and disposal. **2016 – Annual Review Update** Containers have been disposed of by licensed waste contractor. No action required.	Complete

Invincible Colliery IEA Action Plan

ID	Criteria	Requirement	Audit Finding	Audit Recommendation	Responsibility (assigned by auditor)	Follow up Actions and Current Status	Status
NC43Med	SOC, C9.17	Direct all water from wash-down areas and workshops to oil/water separators and containment systems (ongoing).	Wash down areas and workshops drain to a catch drain system that leads to an oil/water separator and a 6000L waste oil collection tank. During the site inspection, maintenance and integrity issues were identified as outlined in condition 9.18 below. These issues affect the ability of the system to contain wastewater and are required to be addressed.	Refer to actions in NC 44 below.	Castlereagh Coal	The following items are included in the current inspection/ maintenance program. However, there is currently no formal recording of actions for repair/maintenance: • Inspection and maintenance of the catch drain system. • Inspection and maintenance of the wastewater collection system. • Plant and equipment maintenance and servicing. A new Inspection Checklist has been prepared to allow recording of repairs/maintenance and corrective actions required and this checklist is currently being used during routine inspections conducted by the Mining Engineering Manager. The waste oil collection system is currently not in use. However, repairs to the catch drain pipework will be undertaken as required. The wastewater collection system is now assessed during routine inspections. There is no evidence of leakage/spillage or contamination in this area and the system will continue to be monitored on a regular basis. The waste oil collection system is currently not in use. If this system is proposed to be used in future, bunding will be installed prior to use. The UST tank is empty and is not currently used. However, it may be used again once operations recommence so will not be decommissioned. The tank and associated pipework will be tested prior to recommissioning. **2016 – Annual Review Update** No further action required as waste oil system is not utilised. A risk assessment regarding the utilisation of the system will be undertaken prior to the system being recommissioned. **2017 – Annual Review Update** The waste oil system was not utilised during the 2017 report period. A risk assessment regarding the utilisation of the system will be undertaken prior to the system being recommissioned. The waste oil collection system will be reinstated prior to recommencing mining.	Active

Invincible Colliery IEA Action Plan

ID	Criteria	Requirement	Audit Finding	Audit Recommendation	Responsibility (assigned by auditor)	Follow up Actions and Current Status	Status
NC44 Med	SOC, C9.18	Ensure all storage tanks are either self-bunded tanks or bunded with an impermeable surface and have a capacity to contain a minimum 110% of the largest storage tank capacity (ongoing).	The 2015 AEMR reports two above ground fuel storage tanks on site. One self-bunded 75,000L diesel tank is currently used to store a maximum of 35,000L fuel for pumps and light vehicles. A second tank (95,000L) was drained down and secured and is currently not in use. Waste oil is collected in the workshop area in portable drums for offsite disposal. Waste oil is also transferred to a bulk waste oil tank located in a bunded area near the vehicle servicing area. A catch drain adjacent to the waste oil tank is designed to capture any spills in this area. This drain leads to an oil/water separator and a 6,000L waste oil collection tank. During the site inspection, a number of observations were recorded as follows: 1. The catch drain system was (in sections) filled with oily sediment and debris and as the area is still in use for chemical storage, it requires cleaning and maintenance. 2. A break in the PVC pipes that leads from the catch drains to the oil/water separator and waste oil tank was observed. Should any spills within the bunded area occur, this would leak onto the soil and vegetation on the embankment. The piping needs repair and the integrity of the system requires testing. 3. The 6000L waste oil collection tank is not bunded. 4. Liquid waste containers stored within the workshop are not bunded.	*Ensure all liquid waste containers are stored within secondary containment / in bunding. *Undertake maintenance and cleaning of the wastewater catch drain system. *Retain all records of maintenance of equipment for a period of 7 years. *Retain all records of waste disposal for a period of 7 years. *Install bunding around the waste oil collection tank (if it is to remain operational). *Repair the breakage in the pipe that leads from the wastewater catch drain to the oil/water separator and waste oil collection tank. Investigate whether any soil contamination has resulted from the breakage. * Conduct a maintenance inspection and integrity test of the waste oil collection system tanks and piping.	Castlereagh Coal	The following items are included in the current inspection/ maintenance program. However, there is currently no formal recording of actions for repair/maintenance: • Inspection and maintenance of the catch drain system. • Inspection and maintenance of the wastewater collection system. • Plant and equipment maintenance and servicing. A new Inspection Checklist has been prepared to allow recording of repairs/maintenance and corrective actions required and this checklist is currently being used during routine inspections conducted by the Mining Engineering Manager. The waste oil collection system is currently not in use. However, repairs to the catch drain pipework will be undertaken as required. The wastewater collection system is now assessed during routine inspections. There is no evidence of leakage/spillage or contamination in this area and the system will continue to be monitored on a regular basis. The waste oil collection system is currently not in use. If this system is proposed to be used in future, bunding will be installed prior to use. The UST tank is empty and is not currently used. However, it may be used again once operations recommence so will not be decommissioned. The tank and associated pipework will be tested prior to recommissioning. **2016 – Annual Review Update** No further action required as waste oil system is not utilised. A risk assessment regarding the utilisation of the system will be undertaken prior to the system being recommissioned. **2017 – Annual Review Update** The waste oil system was not utilised during the 2017 report period. A risk assessment regarding the utilisation of the system will be undertaken prior to the system being recommissioned. The waste oil collection system will be reinstated prior to recommencing mining.	Active

Invincible Colliery IEA Action Plan

ID	Criteria	Requirement	Audit Finding	Audit Recommendation	Responsibility (assigned by auditor)	Follow up Actions and Current Status	Status
NC45 Low	SOC, C12.2	Monitor water quality within the Main Colliery Dam (quarterly).	The Water Management Plan (June 2009) specifies that water quality monitoring will be undertaken monthly within the Main Colliery Dam. Review of the AEMRs indicates that this monthly monitoring was primarily not undertaken throughout the audit period, with the 2015 AEMR reporting that this monitoring commenced at the site in December 2015. This condition is therefore assessed as not compliant. However the Auditor notes the proposal by the current mine operator to implement monthly monitoring of the dam (regardless of whether discharge is occurring) from this point forward, is an increased frequency to what is required by this condition. A review of previous monitoring reports indicates that clarity around the sampling location nomenclature is required when reporting the monitoring results. It is unclear whether the sampling location (Main Dam) which is proposed to be undertaken monthly, is the same location as LD002 (Discharge point). This should be made clear in the monthly environmental reports published on the website.	Monitoring commenced in December 2015. It is recommended that the Water Management Plan be revised to clearly identify the sampling locations. Review the nomenclature used for sampling locations (Main Dam and LD002) to clearly distinguish between the two locations. Ensure monthly environmental monitoring reports provide clear identification of the different sampling locations when reporting the results.	Castlereagh Coal	The WMP prepared by Coalpac proposed monthly water quality sampling of dams regardless of discharge. This monitoring frequency was not implemented by Coalpac during the care and maintenance period and monitoring was conducted monthly during discharge only in accordance with the EPL and project approval. Castlereagh Coal implemented the increased frequency of monitoring in accordance with the WMP within 6 months of commencing ownership of the mine (December 2015). The monitoring location LD002 is at the outflow of the Main Colliery Dam which is shown on Figure 2 of the WMP. Monthly sampling is undertaken at this discharge location as well as from within the Main Colliery Dam. The locations of water monitoring points are identified in the monthly environmental monitoring reports provided to CC by RCA. However, this plan is not included in the summary report uploaded to the CC website. We are not aware that monitoring locations are required to be uploaded to the website. No further action required (unless required by EPA or DPE).	Complete

Invincible Colliery IEA Action Plan

ID	Criteria	Requirement	Audit Finding	Audit Recommendation	Responsibility (assigned by auditor)	Follow up Actions and Current Status	Status
NC46 Low	SOC, C12.3	Undertake quarterly attended and unattended monitoring at the "Hillview", "Billabong", Cullen Bullen south and Cullen Bullen west residences for the life of the Invincible Colliery (quarterly).	Quarterly attended noise monitoring has been undertaken at the site for the duration of the audit period at three locations: Cullen Bullen South, Cullen Bullen West and Cullen Bullen Centre. As per the 2011 AEMR, Hillview and Billabong properties were acquired in 2010 and were therefore no longer included in the noise monitoring program. No unattended noise monitoring was carried out. It is noted that the Noise Monitoring Program (2009) states that should the results of unattended monitoring indicate that the Project Noise cannot be delineated between external contributors over two consecutive monitoring periods, unattended noise monitoring will be discontinued. Global Acoustic (Q1, 2015) state that 'Attended monitoring is preferred to the use of noise loggers when determining compliance with prescribed limits; it allows an accurate determination of the contribution, if any, to measured noise levels by the source of interest (in this case Invincible Colliery) '. Evidence of approval from the DPE to remove the requirement for unattended monitoring was not sighted. This condition requires: - quarterly unattended monitoring. Most monitoring reports are provided on the Coalpac and Castlereagh Coal websites. The Q3 and 4 2014 and Q1 2015 reports were provided by Sedgman and it is recommended these, be uploaded to the website.	Consult with DPE to confirm the current noise monitoring requirements of the Project Approval and the application of attended monitoring only.	Coalpac	Castlereagh Coal will consult with DPE to determine the requirement for unattended noise monitoring. We sent a request to DPE for approval of attended noise monitoring instead of unattended noise monitoring on 13th December 2016 but have not received a response to date. A follow up email was sent to DPE on 13th January 2017. **2016 – Annual Review Update** Noise monitoring requirements will be discussed with DPE during April 2017. **2017 – Annual Review Update** This SOC has been removed from the Project Approval. Castlereagh Coal notes that a Noise Management Plan (NMP) is required under Schedule 3 Condition 4 of the Project Approval (as modified). The NMP includes a noise monitoring program. The NMP will be submitted during 2018.	Complete
NC47 Low	SOC, C12.7	Update the Invincible Colliery Blasting Management Plan to account for the proposed implementation of highwall mining and production increase (within 3 months of approval).	The Blast Monitoring and Management Plan (June 2009) does not include any information on Highwall Mining or Production Increases. Therefore this is condition is assessed as not compliant. It is noted that this action relates to former mining operations by the previous mine operator. The Auditor sighted a letter from the DoP (dated 6th July 2009) which approved the Blast Monitoring Program (as per Condition 4 and 30, Schedule 3 of the Project Approval).	Pending approval to extend mining operations, review the Blast Monitoring and Management Plan (June 2009) to include information on high wall mining and production increases as appropriate.	Coalpac	As the site is in care and maintenance, it has been agreed between CC and DPE that all management plans and programs will be updated as part of the project approval process for future mining operations. Studies and investigations are currently underway to support the application and the results of these investigations will be used to update management plans/programs prior to the recommencement of operations. Update of management plans will be undertaken as part of the proposed expansion project. **2016 – Annual Review Update** No further action proposed until a determination is made in regards to the Invincible Expansion Project. **2017 – Annual Review Update** This SOC has been removed from the Project Approval. CC notes that a BMP is required under Schedule 3 Condition 13 of the Project Approval (as modified). The BMP will be submitted during 2018.	Complete

ID	Criteria	Requirement	Audit Finding	Audit Recommendation	Responsibility (assigned by auditor)	Follow up Actions and Current Status	Status
NC48 Low	SOC, C12.9	Monitor deposited dust deposition at locations IDD-1 to IDD-6 surrounding the Invincible Colliery (monthly).	AEMRs from 2007 to 2011 and the Environmental Monitoring Program (December 2009) state that dust deposition sampling occurs at 6 locations IDD1 to IDD6. There are no maps which show IDD6 in any of these documents. However, the NSW EPA provided the Auditor with the plan referenced in P1.1 of the EPL as 'Figure faxed to the EPA on 20/11/06'. This figure shows six dust guages,#1-5 appearing to be in the locations currently sampled on site, with dust gauge #6 located outside of the boundary of the mining lease within the Ben Bullen State Forest to the north west of the site. The AEMRs for 2012-2015, the Air Quality Monitoring Program (June 2009) and the current EPL state dust deposition sampling occurs at 5 locations, IDD1 to IDD5. AEMRs and monthly reports for the audit period record the results of the deposited dust monitoring at locations IDD1 to IDD5. Monitoring at IDD6 was not undertaken. It is considered that the intent of this condition has been met. However there was no available documentation to demonstrate approval by the DPE to reduce the number of monitoring locations from 6 to 5. Therefore compliance with this condition, as written is assessed as not compliant. It is noted that access to records held by the previous mine operator was limited during the audit.	Consult with DPE to confirm current dust deposition sampling requirements of the Project Approval, particularly with respect to removal of IDD6 from the monitoring program.	Coalpac	The EPL specifies dust monitoring at 5 locations in Conditions P1.1 and M2.2. Dust monitoring has been undertaken at 5 locations throughout the care and maintenance period as reported in monthly website reports and AEMRs. The Environmental Monitoring Program states on page 10 that five monitoring locations (IDD1 to IDD5) have been installed in accordance with EPL 1095 and then on page 14 states that monitoring is undertaken at IDD1 to IDD6. We believe this is a typo. The approved AQMP was prepared in accordance with the project approval and states that dust monitoring is to be conducted at 5 locations IDD1 to IDD5 in accordance with the EPL. We are not aware of any requirement to monitor at a 6th location. No further action required.	Complete
NC49 Med	SOC, C12.12	Undertake annual monitoring of rehabilitation success (annual).	Monitoring of Rehabilitation areas seeded prior to 2011 has been undertaken. No areas of 2012 rehabilitation have been formally monitored and there is a lack fixed monitoring plots. The majority of monitoring plots are in and clustered near the older established rehabilitation of 2008.	Fixed monitoring plots should be established in all years of rehabilitation across the site to achieve compliances and enable review of the performance against the completion criteria set out in the LMP.	Castlereagh Coal	Annual Biodiversity Monitoring in rehabilitation areas was conducted by Kleinfelder from December 2010 to February 2015 as commissioned by Coalpac. The monitoring commissioned in December 2015 by CC utilised existing monitoring plots established in previous years. Further Annual Biodiversity Monitoring of rehabilitation areas was conducted by Umwelt in December 2016 to ensure that all years of rehabilitation across the site are assessed in accordance with relevant performance criteria (relating to the rehabilitation stage) stated in the LMP. Completion criteria are used to assess completed rehabilitation areas for relinquishment and sign-off by DRE. There are no areas at Invincible Colliery that are complete and ready for relinquishment. **2016 – Annual Review Update** Annual biodiversity monitoring conducted during 2016 with results included within the 2016 Annual Review (refer to **Section 8.3**). **2017 – Annual Review Update** This SOC has been removed from the Project Approval. Annual monitoring was undertaken in 2017 and was reported in the Annual Review. Castlereagh Coal notes that a Rehabilitation Management Plan required under Schedule 3 Condition 52 requires a detailed rehabilitation schedule and performance assessment aspects. The Rehabilitation Management Plan will be submitted during 2018.	Complete

Invincible Colliery IEA Action Plan

ID	Criteria	Requirement	Audit Finding	Audit Recommendation	Responsibility (assigned by auditor)	Follow up Actions and Current Status	Status
NC50 High	EPL, A2.1	Premises or plant to which the licence applies. The licence applies to the following premises: THE INVINCIBLE COLLIERY, CASTLEREAGH HIGHWAY, CULLEN BULLEN, NSW 2790 LOT 1 DP 180294, LOT 113 DP 877190 PART BEN BULLEN STATE FOREST. INVINCIBLE COLIERY HOLDING	Project Approval 07_0127 is for: Part Ben Bullen State Forest, Lot 1/DP 180294, Lot 113/DP 877190 and Lot 112/DP 877190. The EPL does not cover Lot 112/DP 877190, an area of land partially within Ben Bullen State Forest and partially outside the Forest. Scheduled works have been undertaken across Lot 112/DP 877190 and the area is also established as a Biodiversity Offset Area. As the areas covered by the Project Approval do not align with the areas covered by the EPL, this is assessed as a non-compliance. A map showing the extent of the land covered by the EPL, in particular, the 'Part Ben Bullen State Forest, Invincible Colliery Holding' was not sighted and is not held by the EPA. Therefore it was difficult to determine if this area of the Project approval area called 'Part Ben Bullen State Forest ', on which coal works have been undertaken, aligns with the EPL.	Review premises details specified in condition A2.1 of the EPL to ensure that it is consistent with the area covered by the Project Approval. Vary the EPL if required.	Castlereagh Coal – the Auditor notes this was carried over from the EPL transferred from Coalpac to CC	EPA has advised that omission of Lot 112 DP877190 from the EPL is likely an oversight at the time of granting the licence. Castlereagh Coal will liaise with EPA to include this lot on the premises description on the licence. It is expected that this issue will be resolved on issue of the new approval and licence for the Invincible Southern Expansion Project. **2016 – Annual Review Update** No further action proposed.	Complete
NC51 Low	EPL, L1.1	Pollution of waters Except as may be expressly provided in any other condition of this licence, the licensee must comply with section 120 of the *Protection of the Environment Operations Act 1997*.	The 2013 to 2015 AEMRs state that there have been no reportable incidents relating to water quality. The EPA POEO Public Register Annual Return list shows one non-compliance for the period of 28 February 2014 to 27 February 2015. The non-conformance was for a minor exceedance of pH at 'LDP2', the licenced wet weather discharge point. The value of pH recorded on the Annual Return for 2014-2015 was 6.23. **Observation:** It is noted that the nomenclature for the two sampling locations associated with the Main Dam and the adjacent wet weather discharge point at the Main Dam is not consistent across the monitoring reports, management plans and annual return documents (LDP2/LDOO2/LD002 (point 2), Main Dam) and requires clarification.	A historical monitoring result from 2014 identified a minor exceedance of the pH range. Continue to monitor water quality in accordance with the requirements of the EPL, including identification of trends relating to pH. It is also recommended that CC clarify the different nomenclature of water quality monitoring locations previously reported at the Main Dam (i.e. LDP2/LD002/ LD002 (point 2), Main Dam). Update relevant management plans (as required) and all future monitoring reports.	Coalpac	Historical water quality results during the ownership of Coalpac pre-dates Castlreagh Coal's involvement in the project. There have been no exceedances of the EPL water quality criteria during Castlereagh Coal's ownership. A summary of monthly water quality monitoring results is provided on the CC website and a link to all available historic monitoring results conducted by Coalpac is provided on the CC website. All water quality monitoring commissioned by Castlereagh Coal is conducted in accordance with the project approval, EPL and the WMP. The water monitoring discharge point referred to in EPL1095 as 'EPA Identification Point 2' and described as the 'overflow point located at water storage dam below washery and labelled as Discharge Point #2 on plan titled Invincible open Cut Environmental Monitoring Sites dated 29 June 2001' is referred to in all environmental monitoring reports as Licence Discharge Point 2 (LD002). No further action required.	Complete

Invincible Colliery IEA Action Plan

ID	Criteria	Requirement	Audit Finding	Audit Recommendation	Responsibility (assigned by auditor)	Follow up Actions and Current Status	Status
NC52 Low	EPL, L2.4	Water and/or Land Concentration Limits Oil and grease – 10 mg/L, pH – 6.5-8.5, Total suspended solids – 30 mg/L	The EPA POEO Public Register Annual Return list shows one non-compliance for the period of 28 February 2014 to 27 February 2015. The non-conformance was for a minor exceedance of pH at 'LDP2'. The value of pH recorded on the Annual Return for 2014-2015 was 6.23. Consultation with the EPA confirmed that LDP2 corresponds with the EPL discharge monitoring location LD002. The EPA stated on the POEO Register that it will monitor future compliance with this condition. The 2014 AEMR did not report any discharge monitoring being undertaken in 2014. A review of the available monitoring reports indicated that wet weather discharge monitoring was undertaken at LD002 in both April and August 2014. The August 2014 report does not present the results, rather it references a report 24004899-A which was not reviewed as part of this audit. In the absence of other records, is considered likely that the exceedance occurred during this month. A review of the AEMRs and available monitoring reports indicated that the monitoring results for all other wet weather discharge sampling events during the audit period met the EPL criteria. The environmental monitoring reports for August 2013, September 2013, and September 2014 to April 2015 are not available on the Coalpac website (former mine operator). A copy of the September 2014 to April 2015 reports were provided by Sedgman. Earlier records could not be obtained due to pre-dating the current mine operator's records. As such, the assessment of compliance with this condition for August and September 2013 was based on results provided in the AEMRs.	A historical monitoring result from 2014 identified a minor exceedance of the pH range. Continue to monitor water quality in accordance with the requirements of the EPL, including identification of trends relating to pH.	Coalpac	Historical water quality results during the ownership of Coalpac pre-dates Castlereagh Coal's involvement in the project. There have been no exceedances of the EPL water quality criteria during Castlereagh Coal's ownership. A summary of monthly water quality monitoring results is provided on the CC website and a link to all available historic monitoring results conducted by Coalpac is provided on the CC website. All water quality monitoring commissioned by Castlereagh Coal is conducted in accordance with the project approval, EPL and the WMP. No action required.	Complete

Invincible Colliery IEA Action Plan

ID	Criteria	Requirement	Audit Finding	Audit Recommendation	Responsibility (assigned by auditor)	Follow up Actions and Current Status	Status
NC53 Low	EPL, L4.3	Noise limits The noise emission limits identified in this licence apply under all meteorological conditions except: a) during rain and wind speeds (at 10m height) greater than 3m/s; and b) under "non-significant weather conditions". Note: Field meteorological indicators for non-significant weather conditions are described in the NSW Industrial Noise Policy, Chapter 5 and Appendix E in relation to wind and temperature inversions.	Quarterly noise monitoring reports by Global Acoustic provide assessment of meteorological conditions to determine where noise emission limits apply. However, the body of the report references the meteorological conditions provided in the notes of Project Approval condition 3-2 only. These are different to the conditions specified in the EPL: *Noise emission limits apply the following meteorological conditions:* *• Wind speeds of up to 3 m/s at 10 meters above ground level; or* *• Up to 3ºC/100m temperature inversion strength plus a 2m/s source-to-receiver component drainage flow wind at 10 meters* As the report does not provide assessment of conditions as specified specifically in the EPL, compliance with this condition could not be verified during the audit. It is recommended that the monitoring report also specify the meteorological conditions specified in the EPL and include a statement in the report to demonstrate compliance with relevant conditions of both the project approval and the EPL.	Quarterly noise monitoring reports to provide a statement of compliance with respect to EPL conditions L4.1 to L4.3. The monitoring reports are to ensure an assessment against the meteorological conditions in the EPL is undertaken.	Castlereagh Coal – the Auditor notes this was carried over from the EPL transferred from Coalpac to CC	Noise monitoring reports prepared by Global Acoustics provide an assessment of noise emissions under meteorological conditions including wind speed and temperature inversions as described in the NSW Industrial Noise Policy. Specifically the reports explain that the noise criteria specified by the EPL '*apply under all meteorological conditions except for the following:* *• Wind speeds greater than 3 metres per second at 10 metres above ground level; and* *• Stability category F temperature inversion conditions and wind speeds greater than 2 metres per second at 10 metres above ground level; or* *• Stability category G temperature inversion conditions*.' Section 4.2 (Development Consent Criteria and Weather Conditions) and Section 4.3 (EPL Criteria and Weather Conditions) of the reports then provides an assessment of whether or not the DA and EPL criteria apply according to weather conditions. No action required.	Complete

Invincible Colliery IEA Action Plan

ID	Criteria	Requirement	Audit Finding	Audit Recommendation	Responsibility (assigned by auditor)	Follow up Actions and Current Status	Status
NC54 Low	EPL, O1.1	Activities must be carried out in a competent manner Licensed activities must be carried out in a competent manner. This includes: a) the processing, handling, movement and storage of materials and substances used to carry out the activity; and b) the treatment, storage, processing, reprocessing, transport and disposal of waste generated by the activity.	Operations during the site inspection were generally observed to be carried out in a competent manner. The mine is inspected regularly, and records of this inspection are maintained (record for 28/1/16 sighted). A review of the AEMRs and Annual Return summaries on the POEO Public Register indicated that the site is generally compliant with environmental monitoring requirements and there have been no reportable incidents within the audit period. A number of items requiring attention relating chemical storage, training and record keeping have resulted in this condition being assessed as not compliant. During the site audit, chemical storage areas were inspected within the workshop and servicing area. Spill kits were available for use as required. Items requiring attention include: some containers of chemicals/liquid waste in the workshop were not stored in secondary containment; chemical register was dated December 2012 and requires updating, MSDS require updating are needs to be readily available; wastewater collection system requires maintenance (as detailed in O2.1 below). Waste storage areas were inspected and were observed to be well managed. Waste streams were observed to be separated. Liquid waste disposal receipts were not available for review. A site induction competency assessment record was reviewed, dated 11 April 2012. The induction content was not reviewed. Records of induction undertaken within the audit period were not sighted.	Review chemical storage areas and implement corrective actions to ensure that all chemicals are stored within secondary containment; the chemical register and MSDS are current and readily available; the waste collection system is inspected, maintained and repaired (as required). Maintain records of waste disposal and retain on site. Ensure that the care and maintenance period site induction for staff and contractors, includes a) the processing, handling, movement and storage of materials and substances used to carry out the activity; and b) the treatment, storage, processing, reprocessing, transport and disposal of waste generated by the activity. Ensure that training records are kept to demonstrate current staff and contractors have been inducted into procedures relevant to their work at the site.	Castlereagh Coal	Small amounts of chemicals required during care and maintenance are kept with chemical cabinets with the relevant MSDS for each substance. There are some oils containers that are kept outside these cabinets. These containers are currently stored outside the chemical cabinets in an undercover area. Recent inspection found no evidence of leakage/spillage or contamination around these containers and the MEM will investigate options for removal and disposal. Site induction includes a) the processing, handling, movement and storage of materials and substances used to carry out the activity; and b) the treatment, storage, processing, reprocessing, transport and disposal of waste generated by the activity. Training and induction records are maintained at the site office. **2016 – Annual Review Update** Containers stored outside of bunded areas have been placed inside appropriate bunding. No further action proposed.	Complete

Invincible Colliery IEA Action Plan

ID	Criteria	Requirement	Audit Finding	Audit Recommendation	Responsibility (assigned by auditor)	Follow up Actions and Current Status	Status
NC55 Med	EPL, O2.1(a)	Maintenance of plant and equipment All plant and equipment installed at the premises or used in connection with the licensed activity: a) must be maintained in a proper and efficient condition; and	The 2015 AEMR reports that most mobile plant and equipment has been removed from the site. Remaining equipment (such as excavators and dozers used for erosion control and rehabilitation maintenance and a mobile water pump) is periodically run, where possible, with pre-start inspections conducted at each instance. Sedgman advise that light vehicles are serviced off-site as required and no records are kept on site. Maintenance/pre-start inspection records for mobile equipment were not verified. it is noted that the mobile water pump is new and has not required servicing. Stationary plant and equipment that is currently used on site during the care and maintenance period, as observed during the site inspection, includes (but is not limited to): a 75,000L diesel AST and a wastewater collection system. This system comprises a bulk waste oil tank and liquid waste storage facility that is bunded and contained by a catch drain network that leads to an oil/water separator and a 6,000L waste oil collection tank. An underground fuel storage tank is also reported to be located on the site. The fuel tank has not been used during the audit period and has not been decommissioned. Maintenance/servicing/integrity inspection records for this infrastructure were not sighted. During the site inspection, a number of observations were recorded as follows: 1. The catch drain system contained (in sections) oily sediment and debris. 2. A break in the PVC pipes that leads from catch drains to oil/water separator and waste oil collection tank. Should any spills within bunded area occur, this would leak onto the soil and vegetation on the embankment. 3. The 6000L waste oil collection tank is not bunded. The wastewater collection system is designed to capture any spills from current diesel AST refuelling area, bunded waste oil tank and liquid waste storage area. The 2015 AEMR reports that minor servicing may be undertaken on site using this infrastructure. As such it is required to be maintained in proper and efficient working condition during the care and maintenance period. The UST should be decommissioned in accordance with WorkSafe NSW and NSW EPA requirements.	Undertake maintenance and cleaning of the wastewater catch drain system. Conduct a maintenance inspection and integrity test of the wastewater collection system including bunding, tanks and piping. Repair the breakage in the piping that leads from the wastewater catch drain to the oil/water separator and waste oil collection tank. Investigate whether any soil contamination has resulted from the breakage. Install bunding around the waste oil collection tank (if it is to remain operational). Ensure all plant and equipment required during care and maintenance is maintained in a proper and efficient manner as per a maintenance schedule or manufacturer's instructions. Retain maintenance and servicing records for all plant and equipment used at the site. Investigate the status of UST (which has not been used for 3 years). Undertake integrity testing and report results in the AEMRs. If no longer required, decommission the UST in accordance with WorkSafe NSW and NSW EPA requirements. If the tank is proposed to be used in the future, it is recommended that CC arrange for the tank and associated piping be tested prior to recommissioning.	Castlereagh Coal	The following items are included in the current inspection/ maintenance program. However, there is currently no formal recording of actions for repair/maintenance: • Inspection and maintenance of the catch drain system. • Inspection and maintenance of the wastewater collection system. • Plant and equipment maintenance and servicing. A new Inspection Checklist has been prepared to allow recording of repairs/maintenance and corrective actions required and this checklist is currently being used during routine inspections conducted by the Mining Engineering Manager. The waste oil collection system is currently not in use. However, repairs to the catch drain pipework will be undertaken as required. The wastewater collection system is now assessed during routine inspections. There is no evidence of leakage/spillage or contamination in this area and the system will continue to be monitored on a regular basis. The waste oil collection system is currently not in use. If this system is proposed to be used in future, bunding will be installed prior to use. The UST tank is empty and is not currently used. However, it may be used again once operations recommence so will not be decommissioned. The tank and associated pipework will be tested prior to recommissioning. **2016 – Annual Review Update** No further action required as waste oil system is not utilised. A risk assessment regarding the utilisation of the system will be undertaken prior to the system being recommissioned. **2017 – Annual Review Update** The waste oil system was not utilised during the 2017 report period. A risk assessment regarding the utilisation of the system will be undertaken prior to the system being recommissioned. The waste oil collection system will be reinstated prior to recommencing mining. .	Active

Invincible Colliery IEA Action Plan

ID	Criteria	Requirement	Audit Finding	Audit Recommendation	Responsibility (assigned by auditor)	Follow up Actions and Current Status	Status
NC56 Admin	EPL, M1.1	Monitoring records The results of any monitoring required to be conducted by this licence or a load calculation protocol must be recorded and retained as set out in this condition.	Monitoring required by the EPL includes: dust, wet weather discharge, noise and airblast overpressure levels. AEMRs 2013 to 2015 were reviewed which summarise all monitoring data. Monthly environmental monitoring reports are retained on the Coalpac website (prior to May 2015) and CC website (post May 2015). Environmental monitoring reports for August 2013, September 2013, and September 2014 to April 2015 are not available on the Coalpac website (former mine operator). A copy of the September 2014 to April 2015 reports was provided by Sedgman. It was reported that earlier records (2013) could not be obtained due to pre-dating the current mine operators records. The August 2014 water quality monitoring report does not present the results, rather it references a report 24004899-A.	Ensure environmental monitoring data for the last 4 years is readily available on site in accordance with the EPA Advisory Letter dated 6 January 2016 (including raw data).	Coalpac	Historic monitoring results that are available to CC have been uploaded to the Coalpac website and a link provided from the CC website under 'historic reports'. A running summary of all environmental monitoring results (noise, air quality, weather data, water quality) commissioned by CC are uploaded to the CC website as these results are received. Raw data is now kept at the site office following receipt of the EPA advisory letter. No further action required	Complete
NC57 Admin	EPL, M1.2	Monitoring records All records required to be kept by this licence must be: a) in a legible form, or in a form that can readily be reduced to a legible form; b) kept for at least 4 years after the monitoring or event to which they relate took place; and c) produced in a legible form to any authorised officer of the EPA who asks to see them.	a) All environmental monitoring records reviewed during the audit were in a legible form. b) The 4 year period relevant to this audit is January 2012 to January 2016. Environmental monitoring reports that pre-date records held by the current mine operator and are not available on the Coalpac website include: April and November 2012, August and September 2013. c) An advisory letter has been issued to Shoalhaven Coal Pty Ltd as a result of an audit of EPL administrative requirements conducted on 4 January 2016. The audit recorded EPL condition M1.2 as partially compliant stating that on the day of the visit, monitoring records were not able to be produced to the EPA with the EPA being advised that the monitoring records are kept in Sedgman's (contracted mine manager) corporate office. The EPA acknowledged that monitoring is being undertaken with monitoring records being kept as they are published online, however requested that all monitoring records, including any raw data, must be available to an EPA Officer on request. This must be rectified (i.e. internal server/intranet/etc.) as soon as possible and by no later than 5pm on 29 January 2016. At the time of the site inspection on 28/01/06, Sedgman were in the process of establishing the records on the internal server.	Ensure environmental monitoring data for the last 4 years is readily available on site in accordance with the EPA Advisory Letter dated 6 January 2016 (including raw data).	Castlereagh Coal	Historic monitoring results that are available to CC have been uploaded to the Coalpac website and a link provided from the CC website under 'historic reports'. A running summary of all environmental monitoring results (noise, air quality, weather data, water quality) commissioned by CC are uploaded to the CC website as these results are received. Raw data is now kept at the site office following receipt of the EPA advisory letter. No further action required	Complete

Invincible Colliery IEA Action Plan

ID	Criteria	Requirement	Audit Finding	Audit Recommendation	Responsibility (assigned by auditor)	Follow up Actions and Current Status	Status
NC58 Admin	EPL, M1.3	Monitoring records The following records must be kept in respect of any samples required to be collected for the purposes of this licence: a) the date(s) on which the sample was taken; b) the time(s) at which the sample was collected; c) the point at which the sample was taken; and d) the name of the person who collected the sample.	Monitoring required by the EPL includes: dust, wet weather discharge, noise and airblast overpressure levels. A sample of monitoring records reviewed comprised a combination of laboratory reports (raw data) and monthly summary reports. The review indicated that the required records were not consistently kept over the reporting period including time of sampling, name of sampler and at times, sampling location. Review of a sample report by the current environmental monitoring contractor, RCA dated August 2015 (provided post audit) indicated that this data is kept within the original monitoring reports, kept on file. Analytical or other supporting raw data (besides the 2014 ALS reports) was not reviewed.	Ensure all future environmental monitoring reports captures all details required to be reported by EPL condition M1.3. This includes date, time and location of sampling, and name of person collecting the sample.	Coalpac	These details are included in the monthly monitoring reports provided to CC (website reports are a summary of results). The EPL does not require that these details be published on the website, only that these records are kept, which they are. No action required	Complete
NC59 Low	EPL, M2.2	Requirement to monitor concentration of pollutants discharged – Air Monitoring Requirements	Dust and HVAS monitoring data was reviewed from May 2013 to December 2015. PM10 - PM10 was monitored weekly and is reported as ug/m3. The ALS 2014 monthly dust monitoring reports specified that the HVAS monitoring was carried out in conformance with AS/NZS 3850.9.6:2003. The Castlereagh Coal monthly monitoring reports provide a summary of results only and do not specify sampling methodology (not verified). Deposited Matter - Dust gauges are monitored monthly and reported as g/m2/month. Weekly estimations of particulate matter are made as outlined below. The ALS 2014 monthly dust monitoring reports specified that the dust monitoring was carried out in conformance with AS/NZS 3580.10.1:2003. The CC monthly monitoring reports provide a summary of results only and do not specify sampling methodology (not verified). Particulate Matter (TSP) - The EPL requires monitoring of particulate matter at IDD1 (EPA point 3) weekly in accordance with AS/NZS 3580:2003 Methods for sampling and analysis of ambient air - Determination of suspended particulate matter - TSP matter - High volume sampler gravimetric method. The Project Approval specifies the impact assessment criteria for (TSP) monitoring.	The EPL specifies that particulate matter (TSP) is sampled using a high volume air sampler. In practice, at IDD1 (EPA point 3), TSP is estimated from PM10 data that is collected using a high volume air sampler. This revised sampling methodology is outlined in the Air Quality Management Plan, however is in contravention to the current EPL conditions. Consult with the EPA and DPE regarding the appropriateness of the sampling method used for measurement of TSP at IDD1 (EPA point 3). Retain copies of correspondence. If the change in sampling method for TSP is accepted by the relevant agencies, document the methodology for estimation of TSP from PM10 data and ensure this is recorded within the monthly air quality monitoring reports. Monthly monitoring reports to specify sampling methods to demonstrate compliance with EPL sampling method requirements.	Castlereagh Coal – the Auditor notes that the method of TSP sampling was also undertaken by Coalpac	The methodology for calculating TSP based on historic methodology is provided in the monthly monitoring reports provided by RCA to CC. This method was likely agreed between regulatory agencies and Coalpac prior to Castlereagh Coals involvement with the project. CC has sought clarification from the EPA and DPE whether this methodology is still acceptable. DPE has advised that monitoring is currently in accordance with the project approval, as Castlereagh Coal is monitoring air quality using a high volume air sampler and dust deposition gauges. We sent a request to EPA for approval of the calculation of TSP from PM_{10} data on 1st December 2016 but have not received a reply to date. A follow up email was sent to EPA on 13th January 2017. **2016 – Annual Review Update** Consultation will be undertaken with DP&E and EPA during 2017 to resolve the calculation methodology. **2017 – Annual Review Update** The Project Approval (as modified) requires the preparation of an Air Quality Management Plan (AQMP) in consultation with the EPA (Schedule 3 Condition 19). The AQMP will address this issue. The AQMP will be submitted during 2018.	Active

ID	Criteria	Requirement	Audit Finding	Audit Recommendation	Responsibility (assigned by auditor)	Follow up Actions and Current Status	Status
			Review of the AQMP (2009) indicates that 'a determination was made to estimate TSP from PM10 data' that is collected using the high volume air sampler (HVAS) at this location. Correspondence from the EPA accepting this change in methodology has not been sighted and given that it remains a condition of the EPL, this variation in sampling methodology is considered a non-compliance. Monitoring reports for August 2013 and September 2013 were not available and therefore, the Auditor could not verify compliance for these dates with respect to this condition.				
NC60 Low	EPL, M3.1	Testing methods - concentration limits Monitoring for the concentration of a pollutant emitted to the air required to be conducted by this licence must be done in accordance with: a) any methodology which is required by or under the Act to be used for the testing of the concentration of the pollutant; or b) if no such requirement is imposed by or under the Act, any methodology which a condition of this licence requires to be used for that testing; or c) if no such requirement is imposed by or under the Act or by a condition of this licence, any methodology approved in writing by the EPA for the purposes of that testing prior to the testing taking place. Note: The *Protection of the Environment Operations (Clean Air) Regulation 2010* requires testing for certain purposes to be conducted in accordance with test methods contained in the publication "Approved Methods for the Sampling and Analysis of Air Pollutants in NSW".	Refer to M2.2. A full assessment of the requirements under the *Protection of the Environment Operations (Clean Air) Regulation 2010* has not been undertaken.	Refer to recommendations in NC59.	Castlereagh Coal	The methodology for calculating TSP based on historic methodology is provided in the monthly monitoring reports provided by RCA to CC. This method was likely agreed between regulatory agencies and Coalpac prior to Castlereagh Coals involvement with the project. CC has sought clarification from the EPA and DPE whether this methodology is still acceptable. DPE has advised that monitoring is currently in accordance with the project approval, as CC is monitoring air quality using a high volume air sampler and dust deposition gauges. We sent a request to EPA for approval of the calculation of TSP from PM10 data on 1st December 2016 but have not received a reply to date. A follow up email was sent to EPA on 13th January 2017. **2016 – Annual Review Update** Consultation will be undertaken with DP&E and EPA during 2017 to resolve the calculation methodology. **2017 – Annual Review Update** The Project Approval (as modified) requires the preparation of an AQMP in consultation with the EPA (Schedule 3 Condition 19). The AQMP will address this issue. The AQMP will be submitted during 2018.	Active

Invincible Colliery IEA Action Plan

ID	Criteria	Requirement	Audit Finding	Audit Recommendation	Responsibility (assigned by auditor)	Follow up Actions and Current Status	Status
NC61 Med	ML1635, C2	Rehabilitation Any disturbance resulting from the activities carried out under this mining lease must be rehabilitated to the satisfaction of the Minister.	Rehabilitation strategies are detailed in the Care and Maintenance MOP (2013) which is approved by the DRE. Consultation with the DRE (who regulate the conditions of this Mining Lease) indicate that implementation of the rehabilitation strategy in a manner that is consistent with what is outlined in the MOP is what is required to satisfy the Minister with respect to this condition. Rehabilitation progress has been reported annually to the DRE using the AEMR. The DRE advised the Auditor that weed management is an issue. Sedgman provided the Auditor with records to demonstrate that weed management contractors have been engaged to address these issues. It is also noted that poor performing rehabilitation in ML1635 have been identified by the DPE during a recent site inspection.	Address rehabilitation performance within ML1635 area and report remedial action in 2016 AEMR.	Castlereagh Coal	Rehabilitation areas were assessed during annual biodiversity monitoring conducted by Umwelt during December 2016. The results and recommendations of this assessment are reported in this Annual Review. **2016 – Annual Review Update** Annual biodiversity monitoring conducted during 2016 with results included within the 2016 Annual Review (refer to **Section 8.3**). **2017 – Annual Review Update** This SOC has been removed from the Project Approval. Annual monitoring was undertaken in 2017 and was reported in the Annual Review.	Complete
NC62 Low	ML1635, C4(a)	Compliance Report (a) The lease holder must submit a Compliance Report to the satisfaction of the Minister. The report must be prepared in accordance with any relevant guidelines or requirements published by the Minister for compliance reporting.	Rehabilitation strategies are detailed in the Care and Maintenance MOP (2013) which is approved by the DRE. Consultation with the DRE (who regulate the conditions of this Mining Lease) indicate that implementation of the rehabilitation strategy in a manner that is consistent with what is outlined in the MOP is what is required to satisfy the Minister with respect to this condition. Rehabilitation progress has been reported annually to the DRE using the AEMR. The DRE advised the Auditor that weed management is an issue. Sedgman provided the Auditor with records to demonstrate that weed management contractors have been engaged to address these issues. It is also noted that poor performing rehabilitation in ML1635 have been identified by the DPE during a recent site inspection.	An Annual Compliance Report (ACR) (as per Condition 4 of the Mining Lease) is required to be submitted to the DRE by the lease anniversary date for each lease. A compliance report (the Auditor was not provided with a copy of this report) was submitted to DRE on 10 February 2016 which is not in line with the mine lease anniversary date. Ensure that subsequent ACR are prepared and issued to DRE by the relevant lease anniversary to DRE in accordance with relevant guidelines. Establish a compliance register (that includes Mine Lease conditions) to enable compliance tracking and reporting.	Castlereagh Coal	The first Compliance Report was submitted for Invincible Colliery (grouped reports for all mining leases) on 10 February 2016. Clarification was sought from DRE and it was agreed that the Compliance Report will be submitted each year as a grouped report (for all mining leases) to be submitted prior to the first of the lease grant anniversary dates (21 June), as agreed with the DRE. **2016 – Annual Review Update** Compliance Reports to be submitted by 21 June annually. No further action proposed.	Complete
NC63 Low	ML1635, C4(c)	Compliance Report (c) The Compliance Report must be lodged with the Department annually on the grant anniversary date for the life of this mining lease.	See response to 4(a) above.	See response to NC61.	Castlereagh Coal	The first Compliance Report was submitted for Invincible Colliery (grouped reports for all mining leases) on 10 February 2016. Clarification was sought from DRE and it was agreed that the Compliance Report will be submitted each year as a grouped report (for all mining leases) to be submitted prior to the first of the lease grant anniversary dates (21 June), as agreed with the DRE. **2016 – Annual Review Update** Compliance Reports to be submitted by 21 June annually. No further action proposed.	Complete

Invincible Colliery IEA Action Plan

ID	Criteria	Requirement	Audit Finding	Audit Recommendation	Responsibility (assigned by auditor)	Follow up Actions and Current Status	Status
NC64 Med		Rehabilitation Any disturbance resulting from the activities carried out under this mining lease must be rehabilitated to the satisfaction of the Minister.	Rehabilitation strategies are detailed in the Care and Maintenance MOP (2013) which is approved by the DRE. Consultation with the DRE (who regulate the conditions of this Mining Lease) indicate that implementation of the rehabilitation strategy in a manner that is consistent with what is outlined in the MOP is what is required to satisfy the Minister with respect to this condition. Rehabilitation progress has been reported annually to the DRE using the AEMR. The DRE advised the Auditor that weed management is an issue that is being addressed at the moment. Sedgman provided the Auditor with records to demonstrate that weed management contractors have been engaged to address these issues. It is also noted that poor performing rehabilitation in ML1638 have been identified by the DPE during a recent site inspection. This indicates that not all rehabilitation has been completed in accordance with the MOP.	Address rehabilitation performance within ML 1638 area and report remedial action in 2016 AEMR.	Castlereagh Coal	Rehabilitation areas were assessed during annual biodiversity monitoring conducted by Umwelt during December 2016. The results and recommendations of this assessment are reported in this Annual Review. **2016 – Annual Review Update** Annual biodiversity monitoring conducted during 2016 with results included within the 2016 Annual Review (refer to **Section 8.3**). **2017 – Annual Review Update** Annual monitoring was undertaken in 2017 and was reported in the Annual Review.	Complete
NC65 Low	ML1638, C4(a)	Compliance Report (a) The lease holder must submit a Compliance Report to the satisfaction of the Minister. The report must be prepared in accordance with any relevant guidelines or requirements published by the Minister for compliance reporting.	An ACR (as per Condition 4 of the Mining Lease) is required to be submitted to the DRE by the lease anniversary date. A compliance report (the Auditor was not provided with a copy of this report) was submitted to DRE on 10 February 2016 which is not in line with the mine lease anniversary date.	An ACR (as per Condition 4 of the Mining Lease) is required to be submitted to the DRE by the lease anniversary date for each lease. A compliance report (the Auditor was not provided with a copy of this report) was submitted to DRE on 10 February 2016 which is not in line with the mine lease anniversary date. Ensure that subsequent ACR are prepared and issued to DRE by the relevant lease anniversary to DRE in accordance with relevant guidelines. Establish a compliance register (that includes Mine Lease conditions) to enable compliance tracking and reporting.	Castlereagh Coal	The first Compliance Report was submitted for Invincible Colliery (grouped reports for all mining leases) on 10 February 2016. Clarification was sought from DRE and it was agreed that the Compliance Report will be submitted each year as a grouped report (for all mining leases) to be submitted prior to the first of the lease grant anniversary dates (21 June), as agreed with the DRE. **2016 – Annual Review Update** Compliance Reports to be submitted by 21 June annually. No further action proposed.	Complete
NC66 Low	ML1638, C4(c)	Compliance Report (c) The Compliance Report must be lodged with the Department annually on the grant anniversary date for the life of this mining lease.	See response to 4(a) above.	See response to NC65.	Castlereagh Coal	The first Compliance Report was submitted for Invincible Colliery (grouped reports for all mining leases) on 10 February 2016. Clarification was sought from DRE and it was agreed that the Compliance Report will be submitted each year as a grouped report (for all mining leases) to be submitted prior to the first of the lease grant anniversary dates (21 June), as agreed with the DRE. **2016 – Annual Review Update** Compliance Reports to be submitted by 21 June annually. No further action proposed.	Complete

Invincible Colliery IEA Action Plan: Improvement Opportunities

ID	Criteria	Audit Recommendation	Proposed Action	Status as at 31 December 2018
IO1	PA 07_0127, S2, C14 (b)	Ensure that the site induction includes efficient operation of plant and equipment and that training records are kept to demonstrate current staff and contractors have been inducted into procedures relevant to their work at the site.	There are currently two staff members located on the mine site. Where staff and contractors will be engaged to operate plant and equipment during current care and maintenance and future mining operations, training and inductions will ensure the competencies of staff to provide efficient operations. Training records are maintained at the site office as required.	No further action required.
IO2	PA 07_0127, S3, C2	Noise monitoring reports should include a description of the sampling locations to demonstrate that the locations meet the requirements of PA07_0127 Schedule 3, Condition 2.	Sampling locations are described in Global Acoustics Noise Reports in Section 1.2 and these reports are available on the Castlereagh Coal website.	No further action required.
IO3	PA 07_0127, S3, C5 & SOC 5.18	Upon approval of any future mining operations at the site, obtain and review the Noise Pollution Reduction Program (required by PA 07_0127 Schedule 3, Condition 5 and SOC 5.18) and consult with the DPE and EPA to enable implementation of any outstanding actions resulting from this condition. Ensure all mobile plant to be used on site have appropriate reversing alarms.	Future review of all management plans will be undertaken as described in **NC3** There is currently no mobile plant operated on the site.	No further action required.
IO4	PA 07_0127, S3, C11	Engage a qualified technician to undertake an operation, maintenance and calibration check of the meteorological station and gain written confirmation that it complies with the requirements of the Approved Methods for Sampling of Air Pollutants in New South Wales guideline (in line with PA 07_0127, Schedule 3, Condition 11).	Weather stations are calibrated regularly during download of meteorological data by RCA. Weather stations services are conducted regularly by Ecotech qualified technicians. Full calibration of the stations in accordance with the Australian Standard will be undertaken prior to recommencement of mining operations.	No further action required.
IO5	PA 07_0127, S3, C39	Ensure that the care and maintenance period site induction for staff and contractors includes an appropriate Aboriginal Heritage induction that includes the location of the site and obligations under the NPW Act 1974. Ensure that training records are kept to demonstrate current staff and contractors have been inducted into procedures relevant to their work at the site, before working on the site.	Please refer to the response to **NC34**	The current site induction has been modified to include information on the nature and location of the Aboriginal heritage site OS1 and obligations for protection of this site. All training and induction records are maintained at the site office. No further action required
IO6	PA 07_0127, S3, C42(a)	Review the Energy Savings Action Plan to confirm it meets the requirements of PA 07_0127 Schedule 3, Condition 42.	Please refer to the response to **NC3**	The Energy Savings Action Plan was a NSW Government initiative which ran from 28 October 2005 to 31 December 2012. Following the approval of the Invincible Expansion project on 2 February 2018, the consolidated Project Approval (PA 07_0127) (as modified) removed the requirements of this condition. No further action is required.
IO7	PA 07_0127, S5, C1(a)	Consult with the DPE to verify whether the Environmental Management Strategy (Coalpac, November 2009) has been approved by the DPE as required by PA 07_0127 Schedule 5, Condition 1.	This document was prepared by Coalpac in 2009 and has been implemented on site. We have no evidence of approval by DPE as this pre-date Castlereagh Coal's involvement in the project. However, we will request confirmation of this from DPE.	The Project Approval (as modified) requires the preparation of an EMS (Schedule 5 Condition 1). The EMS will be submitted during 2018.
IO8	SOC, C3.8	Retain records of licensed waste collection and disposal for the onsite septic systems.	All waste collection and disposal records are maintained as described in **NC19**	Waste records for the 2016 report period have been retained on site. Records will be retained for subsequent years, no further action required.
IO9	SOC, C4.5	Statement of Commitment Condition 4.5 requires planting of Eucalyptus cannonii. The 2013 AEMR (Coalpac, 2013b) describes the planting of E. cannonii (Section 3.8.1) although this species does not appear on the Rehabilitation Seed Species List in Table 17. It is recommended that future AEMRs provide consistency between relevant sections of the report, or supplementary information on the planting of Eucalyptus cannonii is documented.	There has been no planting of E. cannonii or any other species during the audit period as the site has been in care and maintenance. Any future planting of these species will be documented in AEMRs.	No further action required.
IO10	SOC, C5.3	Ensure all equipment used on site is regularly serviced and all service records are kept on file. Conduct periodic checks of the sound power levels of equipment used on site during noise generating maintenance works to compare against the levels used in the modelling and confirm compliance with noise criteria (as required by SOC Condition 5.3).	Servicing is conducted as described in **NC55.** There is plant and equipment used as needed on site during care and maintenance, however, this plant and equipment is serviced as required. There have been no complaints of noise disturbance from Invincible Colliery during the audit period and quarterly monitoring of noise from the mine is undertaken by Global Acoustics. Once mining operations recommence, sound power levels of equipment will bechecked.	The waste oil system was not utilised during the 2017 report period. A risk assessment regarding the utilisation of the system will be undertaken prior to the system being recommissioned. The waste oil collection system will be reinstated prior to recommencing mining. .

Invincible Colliery IEA Action Plan

ID	Criteria	Audit Recommendation	Proposed Action	Status as at 31 December 2018
IO11	SOC, C5.4	Inspect all mobile plant onsite to ensure it is fitted with mid-high frequency broadband reverse beepers prior to use.	Mobile plant is currently fitted with standard reversing beepers/quackers. The nearest noise sensitive place is located approximately 1km from the operating area.	No further action required.
IO12	SOC, C7.5	Review target noxious weed species in subsequent control programs to capture the species identified during the site inspection on 28 January 2016, including Scotch Thistle (*Onopordum acanthium*) that were not known to be targeted during recent control spraying.	Targeted and general weed spraying was undertaken in consultation with ecologists undertaking annual biodiversity monitoring. Weed species were prioritised and spraying conducted between November 2015 and May 2016. It is likely that this weed was sprayed following the site inspection. Biodiversity monitoring will be undertaken again in November/December 2016 and will identify any further species required for weed control.	No further action required. This SOC has been removed from the Project Approval. CC notes weed management activities are reported in the Annual Review.
IO13	SOC, C7.11	Requires planting of *Eucalyptus cannonii*. The 2013 AEMR (Coalpac, 2013b) describes the planting of *E. cannonii* (Section 3.8.1) although this species does not appear on the Rehabilitation Seed Species List in Table 17 of the AEMR. It is recommended that future AEMRs provide consistency between relevant sections of the report, or supplementary information on the planting of *Eucalyptus cannonii* is documented.	Please refer to the response to **IO9**	No further action required.
IO14	SOC, C8.2	Conduct inspections of the Aboriginal Heritage site 'Invincible OS1' prior to any planned pumping activity in the vicinity of the site, to ensure that planned water movements do not cause flood impacts to this area in accordance with the requirements of SOC Condition 8.2. Monitor the 'Invincible OS1' site during heavy rainfall periods and implement non-intrusive measures to divert water away from this area as required to minimise flooding impacts.	There is no active pumping into this area. This area only receives runoff from rehabilitation areas located upstream. Site operational staff are not aware of any flooding impacts that have occurred in this area in the last 3 years.	No further action required.
IO15	SOC, C9.3	If no longer applicable, it is recommended that SOC Condition 9.3 (relating to groundwater discharge point at the Main Colliery Dam) be removed in consultation with DPE and a record of consultation retained.	Please refer to the response to **NC6**	No further action required.
IO16	SOC, C9.13 & SOC, C12.1	Ensure water quality discharge monitoring reports identify whether sampling was undertaken within 24 hours of the commencement of discharge.	None identified	No further action required. CC notes discharge water quality is reported in the Annual Review.
IO17	SOC, C9.15	Ensure all liquid chemical containers are stored within secondary containment / in bunding.	Please refer to the response to **NC42**	No further action required.
IO18	SOC, C11.15	Inspect all mobile plant onsite to ensure it is fitted with exhaust controls which satisfy NSW EPA emission requirements prior to use.	Current plant and equipment used on site is serviced as required. There have been no complaints of noise disturbance from Invincible Colliery during the audit period and quarterly monitoring of noise from the mine is undertaken by Global Acoustics.	No further action required.
IO19	SOC, C11.16	Ensure all plant and equipment required during care and maintenance is maintained in a proper and efficient manner as per a maintenance schedule or manufacturer's instructions. Retain service records for all plant and equipment installed at the premises or currently used in connection with Project.	Please refer to the response to **NC55**	No further action required. This SOC has been removed from the Project Approval. CC notes the waste oil system was not utilised during the 2017 report period. A risk assessment regarding the utilisation of the system will be undertaken prior to the system being recommissioned. The waste oil collection system will be reinstated prior to recommencing mining. .
IO20	SOC, C11.19	Environmental monitoring reports should include information about meteorological conditions as they relate to the dispersion of air contaminants (at the time of air quality monitoring).	Meteorological conditions are reported in Section 5 of the Environmental Monitoring Reports.	No further action required.
IO21	EPL, A3.1	Obtain a copy of the EPL application and review current works and activities to determine compliance with EPL condition A3.1. Establish and maintain a compliance register and include the requirements of the EPL application to enable compliance tracking.	CC does not have access to the original licence application as this was submitted by Coalpac. However, we will request this information from the EPA.	No further action proposed.
IO22	EPL, P1.3	Update the maps within relevant Environmental Management plans (including the Water Management Plan to clearly identify the location of the wet weather discharge monitoring point (EPA identification 2).	Please refer to the response to **NC45**	No further action required.

Invincible Colliery IEA Action Plan

ID	Criteria	Audit Recommendation	Proposed Action	Status as at 31 December 2018
IO23	EPL, L4.2	Quarterly noise monitoring reports to provide a statement of compliance with respect to EPL conditions L4.1 to L4.3.	Please refer to the response to **NC53**	No further action required.
IO24	EPL, O2.1(b)	Ensure that the site induction includes efficient operation of plant and equipment and that training records are kept to demonstrate current staff and contractors have been inducted into procedures relevant to their work at the site to satisfy the requirement of EPL Condition O2.1(b).	Please refer to the response to **IO1**	No further action required.
IO25	EPL, M2.3	Monthly environmental monitoring reports to specify sampling methods to demonstrate compliance with the sampling method specified in EPL Condition M2.3.	Condition M2.3 specifies grab sample at Point 2 (LD002) monthly during discharge. Monthly environmental monitoring is undertaken at LD002 and other on-site dams in accordance with EPL1095 and this is specified in monthly reports.	No further action required.
IO26	EPL, M3.2	Monthly environmental monitoring reports to specify testing methods to demonstrate compliance with the testing method specified in EPL Condition M3.2.	Please refer to the response to **IO25**	No further action required.
IO27	ML1635, 3(f)(ii)	Confirm Annual reporting requirements with the DRE with respect to submission due dates for reports and the reporting period (i.e. financial year vs calendar year) for ML1635.	Please refer to the response to **NC22**	The AEMR for Invincible Colliery was submitted to the DRE on 22 January 2016 and to the DPE on 29 January 2016 within 60 calendar days of the end of the reporting period from 1 January 2015 to 31 December 2015 as required for previous years. As the rehabilitation report and compliance report are new requirements for mining leases and replace the AEMR, clarification was sought from DRE regarding the timing of submission of these reports. As agreed with DRE, the first Compliance Report was submitted for Invincible Colliery (grouped reports for all mining leases) on 10 February 2016. In future, the Compliance Reports will be submitted each year as a grouped report for all mining leases to be submitted prior to the first of the lease grant anniversary dates (21 June), as agreed with DRE. Further, as agreed with DRE and DPE, the AEMR/Annual Review and Rehabilitation Report will be submitted annually 60 calendar days after the end of each reporting period (i.e. the calendar year from 1 January to 31 December) as has been done in previous years. No further action required
IO28	ML1635, 4(d) (ii)	Retain evidence of submission of a Compliance Report to the DRE with the ML1635 mining licence transfer application. Establish a compliance register and include the conditions of the Mine Lease to enable compliance tracking.	Please refer to the response to **NC22** Annual Compliance Reports track compliance with the conditions of the Invincible Colliery Mining Leases.	As per action in IO27. No further action required
IO29	ML1635, 8	Retain evidence of submission of the group security required by Mining Lease 1635.	Evidence of payment of securities are retained by Shoalhaven Coal's lawyers.	No further action required
IO30	ML1638, 1(a)	Establish a compliance register and include the conditions of the Mine Lease to enable compliance tracking.	Please refer to the response to **IO28**	As per action in IO27. No further action required
IO31	ML1638, 3(f)(ii)	Confirm Annual reporting requirements with the DRE with respect to submission due dates for reports and the reporting period (i.e. financial year vs calendar year) for ML1638.	Please refer to the response to **NC22** and **IO27**	As per action in IO27. No further action required
IO32	ML1638, 4(d) (ii)	Retain evidence of submission of a Compliance Report to the DRE with the ML1638 mining licence transfer application. Establish a compliance register and include the conditions of the Mine Lease to enable compliance tracking.	Please refer to the response to **NC22** and **IO28**	As per action in IO27. No further action required
IO33	ML1685, 8	Retain evidence of submission of the group security required by Mining Lease 1638.	Please refer to the response to **IO29**	Please refer to the response to **IO29**

Invincible Colliery IEA Action Plan

ID	Criteria	Audit Recommendation	Proposed Action	Status as at 31 December 2018
IO34	LMP S7.1.1	Annual flora and fauna and rehabilitation monitoring has not recorded the following parameters during the audit period: Species Diversity (the presence of at least four overstorey and four understorey species in 20m x 10m plot per 10ha); Stem densities. Minimum total tree/shrub densities for sown areas are: (i) Year 2 - 3,000 stems/ha (ii) Year 5 - 2,000 stems/ha (iii) Year 7 - 600 stems/ha. This is not reported in the AEMRS. There are no fixed monitoring plots within rehabilitation post 2011. It is recommended that a review of rehabilitation performance against the stated criteria in the LMP is undertaken.	Please refer to the response to **NC49**	Annual biodiversity monitoring conducted during 2016 with results included within the 2016 Annual Review (refer to **Section 8.3**). No further action required This SOC has been removed from the Project Approval. CC notes that a Rehabilitation Management Plan required under Schedule 3 Condition 52 requires a detailed rehabilitation schedule and performance assessment aspects. The Rehabilitation Management Plan will be submitted during 2018.
IO35	LMP S7.2(e)	The LMP (Section 7.2) requires areas not vegetated with established/remnant native trees and shrubs to be deep ripped in preparation for planting or seeding. No evidence that deep ripping has occurred within the BOA grassland areas during the site inspection. It is recommended that the need for this requirement be reviewed in the next monitoring session, and reported within the AEMR. Undertake deep ripping, if deemed appropriate.	The need for this requirement will be reviewed in consultation with consultants engaged to undertake future biodiversity monitoring. All works undertaken in rehabilitation and biodiversity offsets areas will be reported in the AEMR.	Annual biodiversity monitoring conducted during 2016 with results included within the 2016 Annual Review (refer to **Section 8.3**). No further action required. This LMP requirement has been removed from the Project Approval. CC Coal notes that the performance of rehabilitated areas is reported in the Annual Review.
IO36	LMP S7.2(f)	The LMP (Section 7.2) requires seeds to be sown in areas not designated for tubestock planting. No seeding was reported in the AEMRs. It is recommended that the need for this requirement be reviewed following the next monitoring session, and reported within the AEMR. Undertake seeding in appropriate areas, as recommended.	Please refer to the response to **IO35**	Annual biodiversity monitoring conducted during 2016 with results included within the 2016 Annual Review (refer to **Section 8.3**). No further action required. This LMP requirement has been removed from the Project Approval. CC notes that the performance of rehabilitated areas is reported in the Annual Review.
IO37	LMP S7.2(g)	The LMP (Section 7.2) requires tubestock planting in areas which contain already established native grasses. No tubestock planting was reported in the AEMR. It is recommended that the need for this requirement be reviewed following the next monitoring session, and reported within the AEMR. Undertake planting in appropriate areas, as recommended.	Please refer to the response to **IO35**	Annual biodiversity monitoring conducted during 2016 with results included within the 2016 Annual Review (refer to **Section 8.3**). No further action required. This LMP requirement has been removed from the Project Approval. CC notes that the performance of rehabilitated areas is reported in the Annual Review.
IO38	LMP S7.2(h)	The LMP (Section 7.2) requires the addition of fertiliser during the sowing and tubestock planting process. No fertiliser application in BOA was reported in the AEMR. It is recommended that the need for this requirement be reviewed following the next monitoring session, and reported within the AEMR. Undertake in appropriate areas, as recommended.	Please refer to the response to **IO35**	Annual biodiversity monitoring conducted during 2016 with results included within the 2016 Annual Review (refer to **Section 8.3**). No further action required. This LMP requirement has been removed from the Project Approval. CC notes that the performance of rehabilitated areas is reported in the Annual Review.
IO39	LMP S8.1(b)	The LMP (Section 8.1) requires regular walk-through site assessment (minimum once a year). Walk-through site assessments have been conducted as part of the annual monitoring; however it is unclear if all areas of rehabilitation have been inspected annually. This should be clarified/updated as part of future monitoring.	Please refer to the response to **NC49**	Annual biodiversity monitoring conducted during 2016 with results included within the 2016 Annual Review (refer to **Section 8.3**). No further action required. This LMP requirement has been removed from the Project Approval. CC notes that the performance of rehabilitated areas is reported in the Annual Review.
IO40	LMP S8.1(c)	The LMP (Section 8.1) requires formal long-term monitoring using fixed monitoring plots. These have been established in older rehabilitation areas (centred within and around the 2008 block). However, monitoring plots are absent from 2012 and part of 2011 rehabilitation areas. It is recommended that fixed monitoring plots are established within all blocks of rehabilitation, including the 2012 rehabilitation areas. Monitoring should occur from the next season.	Please refer to the response to **NC49**	Annual biodiversity monitoring conducted during 2016 with results included within the 2016 Annual Review (refer to **Section 8.3**). No further action required. This LMP requirement has been removed from the Project Approval. CC notes that the performance of rehabilitated areas is reported in the Annual Review.

Invincible Colliery IEA Action Plan

ID	Criteria	Audit Recommendation	Proposed Action	Status as at 31 December 2018
IO41	Ecology	Specific ecological adaptive management recommendations have been made by Kleinfelder (2015), as part of the Annual Flora, Fauna and Rehabilitation Monitoring report, and these are supported by observations and recommendations resulting from the site inspection by Cumberland Ecology. The rehabilitation program should be updated as per the findings of the Cumberland Ecology assessment and the recommendations of annual monitoring.	Please refer to the response to **NC49** The need for this requirement will be reviewed in consultation with ecological consultants engaged to undertake future biodiversity monitoring.	Annual biodiversity monitoring conducted during 2016 with results included within the 2016 Annual Review (refer to **Section 8.3**). No further action required. This SOC has been removed from the Project Approval. CC notes that a Rehabilitation Management Plan required under Schedule 3 Condition 52 requires a detailed rehabilitation schedule and performance assessment aspects. The Rehabilitation Management Plan will be submitted during 2018.
IO42	Ecology	Additional statistical data analysis could be performed to gain a greater understanding of the changes in species composition over time in the BOA, and this would strengthen the monitoring reports.	Please refer to the response to **NC49** The need for this requirement will be reviewed in consultation with ecological consultants engaged to undertake future biodiversity monitoring.	Annual biodiversity monitoring conducted during 2016 with results included within the 2016 Annual Review (refer to **Section 8.3**). No further action required. This SOC has been removed from the Project Approval. CC notes that a Rehabilitation Management Plan required under Schedule 3 Condition 52 requires a detailed rehabilitation schedule and performance assessment aspects. The Rehabilitation Management Plan will be submitted during 2018.
IO43	Ecology	2012 rehabilitation was in very poor condition. Exotic species were found to dominate the understorey with native eucalypt and acacia species germination found to be limited. No tubestock planting was observed in this area. It is therefore recommended that slope stabilisation, seeding, and subsequent tubestock planting (after the slope is stabilised) be undertaken in this area of rehabilitation.	Please refer to the response to **NC49**	Annual biodiversity monitoring conducted during 2016 with results included within the 2016 Annual Review (refer to **Section 8.3**). No further action required. This SOC has been removed from the Project Approval. CC notes that a Rehabilitation Management Plan required under Schedule 3 Condition 52 requires a detailed rehabilitation schedule and performance assessment aspects. The Rehabilitation Management Plan will be submitted during 2018.
IO44	Ecology	The key area for continuing improvement of flora, fauna and rehabilitation management is the remedial action within failed and poor quality rehabilitation areas, particularly the 2012 blocks.	Please refer to the response to **NC49**	Annual biodiversity monitoring conducted during 2016 with results included within the 2016 Annual Review (refer to **Section 8.3**). No further action required. This SOC has been removed from the Project Approval. CC notes that a Rehabilitation Management Plan required under Schedule 3 Condition 52 requires a detailed rehabilitation schedule and performance assessment aspects. The Rehabilitation Management Plan will be submitted during 2018.
IO45	Ecology	Low condition grasslands were not observed to be regenerating and adaptive management should be reviewed.	Please refer to the response to **NC49.** The need for this requirement will be reviewed in consultation with ecological consultants engaged to undertake future biodiversity monitoring.	Annual biodiversity monitoring conducted during 2016 with results included within the 2016 Annual Review (refer to **Section 8.3**). No further action required. This SOC has been removed from the Project Approval. CC notes that a Rehabilitation Management Plan required under Schedule 3 Condition 52 requires a detailed rehabilitation schedule and performance assessment aspects. The Rehabilitation Management Plan will be submitted during 2018.
IO46	Ecology	Actions such as deep-ripping have not been employed at the edges of the moderate quality woodland and native dominated grasslands, which would be likely to improve natural regeneration. Bush regeneration techniques to promote natural regeneration, and then supplementing with tubestock planting and seeding, as part of an adaptive and ongoing approach would be suitable, and should be reviewed in the final MOP and supporting management plans.	Please refer to the response to **IO35**, **IO36** and **IO37**	Annual biodiversity monitoring conducted during 2016 with results included within the 2016 Annual Review (refer to **Section 8.3**). No further action required. This LMP requirement has been removed from the Project Approval. CC notes that the performance of rehabilitated areas is reported in the Annual Review.

Invincible Colliery IEA Action Plan

ID	Criteria	Audit Recommendation	Proposed Action	Status as at 31 December 2018
IO47	Ecology	A low intensity ecological burn within the BOA has been recommended in each monitoring report. This recommendation has not been followed; and is supported by the findings of the Cumberland Ecology site inspection. Controlled ecological burn are very useful for promoting natural regeneration, and are suitable for all the vegetation types present in the BOA and should be considered.	Please refer to the response to **NC49** The need for this requirement will be reviewed in consultation with ecological consultants engaged to undertake future biodiversity monitoring.	Annual biodiversity monitoring conducted during 2016 with results included within the 2016 Annual Review (refer to **Section 8.3**). No further action required. This SOC has been removed from the Project Approval. CC notes that a Rehabilitation Management Plan required under Schedule 3 Condition 52 requires a detailed rehabilitation schedule and performance assessment aspects. The Rehabilitation Management Plan will be submitted during 2018.
IO48	Records	In general it was difficult to locate documentation to demonstrate compliance often due to the unique circumstance of a change in ownership throughout the audit period and access to records of the previous mine operator being limited. For current records, it is recommended that a review of the sites record management system be undertaken so that documents (including raw monitoring data) can be located easily by relevant parties on site. This will also assist in ensuring compliance with relevant conditions requiring presentation of information to regulators upon request (e.g. EPA).	All historic Coalpac documentation that is available to Castlereagh Coal have been provided to auditors and is retained within current project records at the site and/or on the project website. Castlereagh Coal has no control over difficulties with obtaining historic documentation that was prepared and submitted prior to their ownership of the mine. No further action required.	No further action required
IO49	Records	The PIRMP is current and was updated in February 2016. The PIRMP has not yet been tested and it is recommended that this be undertaken when required.	The PIRMP has been approved by EPA and uploaded to the Castlereagh Coal website. The PIRMP will be tested prior to February 2017.	No further action required.
IO50		The UST and its management or maintenance is not recorded in any documents relevant to the audit period. It is recommended that the UST be included within the Care and Maintenance MOP and regular maintenance by carried out and reported in the AEMRs. It the tank is no longer required, it should be decommissioned in accordance with WorkCover and NSW EPA requirements.	Please refer to the response to **NC55** If any works are undertaken on the UST, these will be documented in the MOP and reported in the AEMR.	The waste oil system was not utilised during the 2017 report period. A risk assessment regarding the utilisation of the system will be undertaken prior to the system being recommissioned. The waste oil collection system will be reinstated prior to recommencing mining.

Newcastle

75 York Street
Teralba NSW 2284

Ph. 02 4950 5322

Perth

PO Box 783
West Perth WA 6872
7 Havelock Street
West Perth WA 6005

Ph. 1300 793 267

Canberra

PO Box 6135
56 Bluebell Street
O'Connor ACT 2602

Ph. 02 6262 9484

Sydney

50 York Street
Sydney NSW 2000

Ph. 1300 793 267

Brisbane

Level 11
500 Queen Street
Brisbane QLD 4000

Ph. 1300 793 267

www.umwelt.com.au