WHITEHAVEN COAL

Tarrawonga Coal Pty Ltd

ABN: 73 100 742 185

Annual Environmental Management Report (ML 1579, ML 1685 & ML 1693) and Annual Review (PA 11_0047)

for the

Tarrawonga Coal Mine

1 May 2014 – 30 April 2015

Tarrawonga Coal Pty Ltd

Annual Environmental Management Report (ML 1579, ML 1685 & ML 1963) and Annual Review (PA 11_0047) for the Tarrawonga Coal Mine

MOP Commencement Date **1-11-2013** – Nominal MOP Completion Date **31-10-2015**
AEMR Commencement Date **1-05-2014** – AEMR Completion Date **30-04-2015**

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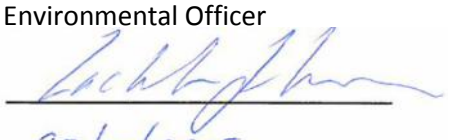
Signature: 

Date: 30/7/2015

Distribution:

- Environment Protection Authority
- Department of Planning and Environment
- Department of Trade and Investment, Regional Infrastructure and Services – Division of Resources and Energy
- Department of Trade and Investment, Regional Infrastructure and Services – Primary Industries, Food and Water
- NSW Office of Water
- Gunnedah Shire Council
- Narrabri Shire Council
- Tarrawonga Coal Mine Community Consultative Committee

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ACRONYMS USED THROUGHOUT THIS DOCUMENT

AEMR	-	Annual Environmental Management Report
AQGHGA	-	Air Quality and Greenhouse Gas Assessment
BCD	-	Bollol Creek Downstream
BCU	-	Bollol Creek Upstream
BOS	-	Biodiversity Offset Strategy
CCC	-	Community Consultative Committee
CHPP	-	Coal Handling and Preparation Plant
DA	-	Development Application
DECCW	-	Department of Environment, Climate Change and Water (now EPA)
DoP	-	Department of Planning (now DP&E)
DoPI	-	Department of Planning and Infrastructure (now DP&E)
DP&E	-	Department of Planning and Environment
DRE	-	Division of Resources and Energy
EA	-	Environmental Assessment
EC	-	Electrical Conductivity
EEO	-	Energy Efficiency Opportunity
EIS	-	Environmental Impact Statement
EL	-	Exploration Licence
EPA	-	Environment Protection Authority
EPL	-	Environment Protection Licence
LOM	-	Life-of-Mine
ML	-	Mining Lease or Mega Litres
MOP	-	Mining Operations Plan
MSDS	-	Material Safety Data Sheet
NCD	-	Nagero Creek Downstream
NCU	-	Nagero Creek Upstream
OEH	-	Office of Environment and Heritage
PM_{10}	-	Particulate Matter 10 microns in diameter or smaller
PRP	-	Pollution Reduction Program
ROM	-	Run-of-Mine
SB	-	Sediment Basin
SD	-	Storage Dam
SWL	-	Standing Water Level
TCM	-	Tarrawonga Coal Mine
TCPL	-	Tarrawonga Coal Pty Ltd
TSP	-	Total Suspended Particles
TSS	-	Total Suspended Solids
WCL	-	Whitehaven Coal Limited
WCMPL	-	Whitehaven Coal Mining Pty Ltd

1 INTRODUCTION AND OBJECTIVES

1.1 Scope

1.1.1 Introduction and Period of Reporting

This is the ninth Annual Environmental Management Report (AEMR) produced for the Tarrawonga Coal Mine, and it has been prepared in accordance with Condition 3 of Mining Lease ML 1579 and ML 1685 and Condition 4 of ML 1693 (Mining Act 1992), and Condition 4 (Schedule 5) of PA 11_0047. The current Mining Operations Plan for Tarrawonga was prepared under the guidelines *"ESG3: Mining Operations Plan (MOP) Guidelines".* There are currently no guidelines associated with the preparation of AEMRs in the new format and therefore this AEMR generally follows the format identified in the Department of Primary Industries Mineral Resources (DPI-MR) document, entitled "*Guidelines to the Mining, Rehabilitation and Environmental Management Process*", Version 3 dated January 2006. It also addresses Condition 4 (Schedule 5) of PA 11_0047, which requires provision of an Annual Review and is herein referred to as an AEMR/Annual Review.

Though primarily covering the period from 1st May 2014 to 30th April 2015 (the reporting period), where relevant the AEMR/Annual Review provides information on historical aspects of the operations, longer term trends in environmental monitoring results and provides relevant information on activities to be undertaken during the ensuing period, i.e. from 1st May 2015 to 30th April 2016, or beyond.

1.1.2 The Company

The Tarrawonga Coal Mine (TCM) is located approximately 15km northeast of Boggabri, 10km north of the former Canyon Coal Mine (in closure) and south of, and adjacent to, the Boggabri Coal Mine (Figure 1). The mine site is contained within Mining Lease (ML) 1579, ML 1685 and ML 1693, as shown in Figure 1. The mine is being developed by Tarrawonga Coal Pty Ltd (TCPL), a joint venture between Whitehaven Coal Mining Pty Ltd (WCMPL) (70%) and Idemitsu Boggabri Coal Pty Ltd (IBC) (30%), and operates under Environment Protection Licence (EPL) 12365 and Project Approval (PA) 11_0047. WCMPL is a subsidiary company of Whitehaven Coal Limited (WCL), a publicly listed company which has several coal mining interests in the Gunnedah region of NSW. The mine is operated by WCMPL.

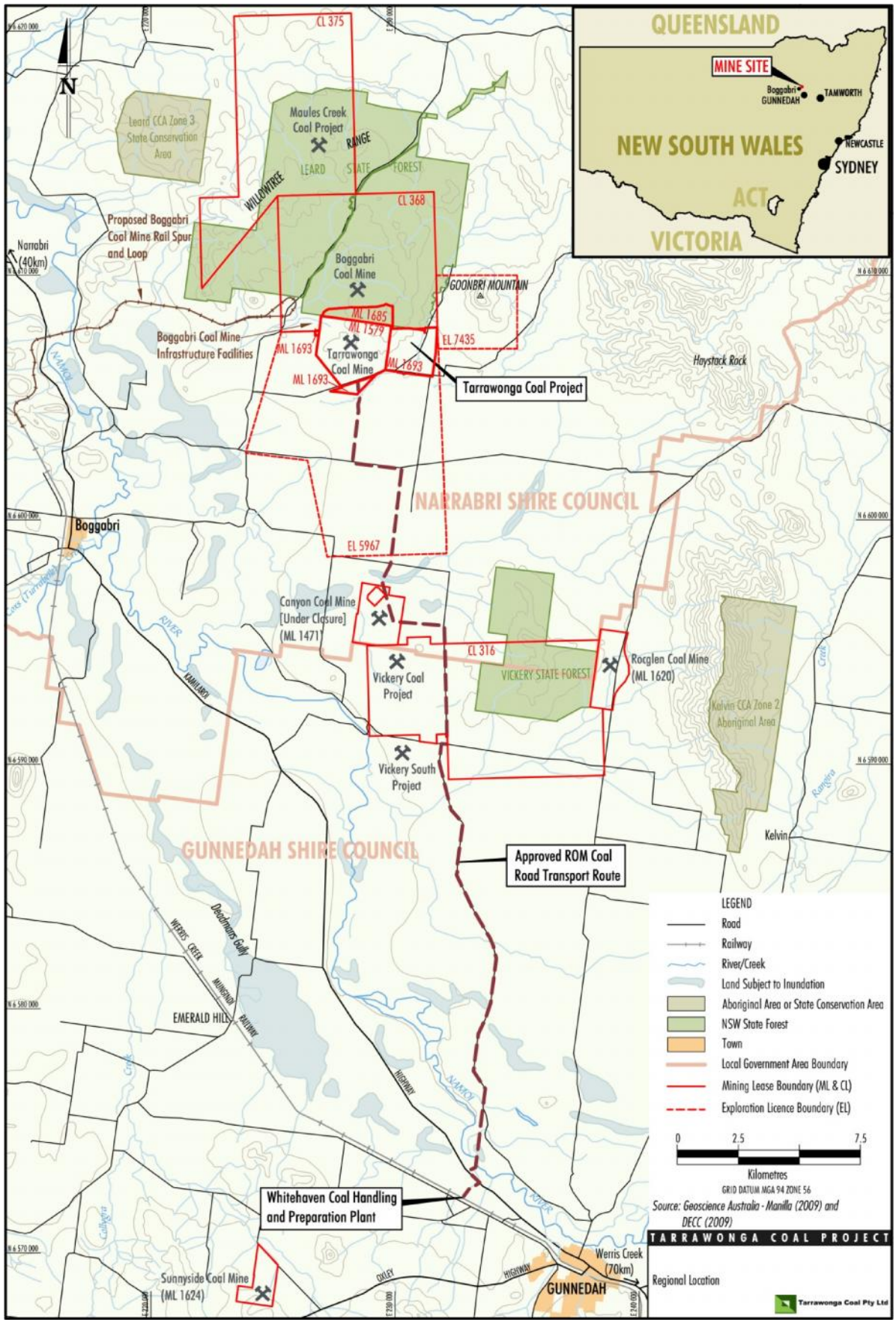


Figure 1 - Regional Location

WCL's coal mining assets are as follows:

- Canyon Coal Mine (formerly Whitehaven Coal Mine), 10km south of Tarrawonga, 100% owned by WCL, which ceased production in July 2009 and is currently under final rehabilitation;
- Whitehaven Rail Siding and Coal Handling and Preparation Plant (CHPP), 6km north-west of Gunnedah, 100% owned by WCL;
- Werris Creek Coal Mine, 4km south of Werris Creek, 100% owned by WCL;
- Narrabri Underground Coal Mine, 30km south-southeast of Narrabri, 70% owned by subsidiary company Narrabri Coal Pty Ltd. Production commenced mid 2010;
- Rocglen Coal Mine (formerly Belmont Coal Mine), 28km north of Gunnedah, 100% owned by WCL, which commenced operations in 2008;
- Sunnyside Coal Mine, 15km south west of Gunnedah, 100% owned by subsidiary company Namoi Mining Pty Ltd, which commenced production in 2008 and remained in care and maintenance during the reporting period;
- WCL also has 100% ownership of the Bonshaw project near Ashford;
- 100% ownership of the former Gunnedah Colliery through Namoi Mining Pty Ltd;
- 100% ownership of the former Vickery site and adjacent deposits. The Vickery Project was approved during the reporting period;
- 75% ownership of the Maules Creek Project, via the Aston Resources/Whitehaven merger, with joint venture partners ITOCHU (15%) and J-Power (10%). The Maules Creek Project commenced construction and completed key project milestones ahead of schedule with its extraction and export of first coal through the completed rail loop commencing during this AEMR/Annual Return period;
- 100% ownership of Dingo, Sienna and Monto projects (QLD) and Ferndale and Oaklands projects (NSW) via the Whitehaven/Coalworks merger; and
- WCL is also actively pursuing other prospective tenements with a view of maintaining a long-term presence in the Gunnedah Basin.

1.1.3 Background and History of the Tarrawonga Coal Mine

The Tarrawonga Coal Mine was developed after substantial investigations were undertaken under Exploration Licence 5967, granted in July 2002. Following

completion of relevant assessments and studies, the Department of Planning provided approval to the development via Development Consent (DA-88-4-2005) on the 9th November 2005. Environment Protection Licence (EPL) 12365 was also granted on 9th January 2006.

The Development Consent provided for the extraction of approximately 12.4 million tonnes of ROM coal, at a maximum rate of 2 million tonnes per year. The consent allowed for the crushing and screening of ROM coal at the mine site prior to transport to the Whitehaven CHPP near Gunnedah. It also allowed for the disposal of rejects from the Whitehaven CHPP at the mine.

Prior to commencement of operations in 2006, a Mining Operations Plan (MOP) was developed for a period of up to 6 years, until February 2012. In late 2009, following additional exploration works, an extension of the open cut pit limit and modifications to the northern and southern waste emplacements were identified to enable access to a further 4 million tonnes of coal. Consequently, a modification to the original consent DA-88-4-2005 was applied for under Section 75W of the *Environmental Planning and Assessment Act*. This modification was approved on 15th October 2010. As a consequence of this approval, an amendment to the existing MOP was developed, and subsequently approved, by the former I&I NSW in December 2010 (effective from the period 1st July 2010 – 30th June 2013).

In 2011, TCPL sought approval under the now repealed Part 3A, Section 75J of the EP&A Act for a continuation and extension of operations. The potential environmental impacts associated with the extension were assessed in the *Tarrawonga Coal Project Environmental Assessment* (Whitehaven Coal Pty Ltd, 2012). The extension project would allow continued development of the mining operations to facilitate a run-of-mine (ROM) coal production rate of up to 3 million tonnes per annum, and life of mine to 2030. PA 11_0047 was granted on 22nd January 2013 by the Planning Assessment Commission as the delegated approval authority, and received conditional federal approval (EPBC 2011/5923) on the 11th March 2013.

Notice of Modification for PA 11_0047 was approved 6th November 2014 which enabled to the continuation and increased haulage from the mine to the Whitehaven CHPP in Gunnedah; up to 3 million tonnes may transported from the mine with a combined total between Tarrawonga and Rocglen of 3.5million tonnes approved.

Subsequent to PA 11_0047 and conditional Federal approval, a new MOP was prepared in accordance with *"ESG3 Mining Operations Plan (MOP) Guidelines, September 2013"* and approved by DRE on 23rd October 2013. MOP Amendment B, which incorporated additional top soil stockpile areas and extension to mine area, was approved on 13th November 2014. The current MOP was developed for a 2 year period expiring 31st October 2015.

1.1.4 Products and Markets

Coal within the Tarrawonga coal deposit can be described as a high volatility coal which will produce a very low sulphur, semi-soft coking/thermal coal, with typically <10% ash. It is expected that up to 65% of coal produced would be suitable for marketing as a thermal or semi soft coking coal without the requirement for further washing. The coal also contains a low percentage phosphorous and exhibits a high energy.

The majority of coal produced is exported to Asia.

1.1.5 Operational and Environmental Management

1.1.5.1 Contacts

The management personnel responsible for operational and environmental performance at the Tarrawonga Coal Mine and their relevant contacts are as follows:

- Mr Anthony Margetts, Manager Mining Engineering - retains statutory responsibility for mining activities at the site. Contact: (02) 6743 4000.
- Mr Nigel Wood, General Manager, Open Cut Operations - oversees open cut operations for the Whitehaven Group. Contact: (02) 6741 9303.
- Mrs Jill Johnson, Group Environment Manager - oversees environmental and rehabilitation performance for all Whitehaven sites. Contact: (02) 6741 9321.
- Mr Lachlan Johnson, Environmental Officer – oversees day to day environmental compliance and performance at the Tarrawonga Mine. Contact: (02) 6743 4000.

1.1.5.2 Support Personnel

In addition to the personnel identified in Section 1.1.5.1, Tarrawonga Coal utilises specialist assistance as and when required. Specialist environmentally-based or related companies or consultants involved in activities at the mine during the reporting period included:

- ALS Acirl Pty Ltd;
- PAE Holmes;
- Eco Logical Australia Pty Ltd;
- Spectrum Acoustics;
- G&B Ward Earthmoving;
- Geoterra Pty Ltd;

- RPS;
- Parsons Brinkerhoff;
- Tobiah Tree Mulching Services;
- Enright Land Management;
- Urban Tree Management Services;
- Fields Environmental Solutions;
- GSS Environmental;
- SLR; and
- Resource Strategies

All mining and environmental management activities are undertaken generally in accordance with the MOP, management plans and procedures prepared in satisfaction of Tarrawonga Coal's Mining Leases, EPL 12365, Project Approval, and relevant legislation.

1.1.6 Corporate Environmental Policy

WCL has a documented Health, Safety and Environmental Policy which states:

Whitehaven intends to conduct business in a way that maintains a safe and healthy workplace for its employees, contractors, visitors and the surrounding community and will protect the environment in all stages of exploration, mining, processing and train loading.

Whitehaven aims to:

- *Achieve zero injuries and occupational illnesses.*
- *Achieve zero equipment damage.*
- *Achieve zero environmental incidents.*

Whitehaven will strive to achieve these goals by:

- *Ensuring health, safety and environment is considered in all planning and work activities.*
- *Involve employees through regular communication, consultation and training.*
- *Identifying and controlling all potential hazards in the workplace through hazard identification and risk analysis.*
- *Ensuring all incidents are reported, controlled and learning's applied and shared.*
- *Providing effective injury management and rehabilitation for all employees.*
- *Seeking continuous improvement in performance by taking into account employee & community concerns and advances in health, safety and environment.*
- *Complying with legislative and other requirements and providing necessary training and resources.*

Whitehaven will ensure the availability of human, financial and physical resources to maintain and implement the Health and Safety Management System.

Responsibilities of people employed at Whitehaven Coal:

All persons employed by Whitehaven have a personal responsibility to comply with this policy and associated Health, Safety & Environment systems. No work is to be undertaken without a clear understanding of a safe method that minimizes the risk of injury, equipment damage and environmental harm.

Whitehaven employees shall:

- *Work in a healthy, safe and environmentally responsible manner.*
- *Encourage others to work in a healthy, safe and environmentally responsible manner.*
- *Promptly report incidents, unsafe practices or conditions and environmental concerns as they become apparent.*
- *Co-operate with Management in the support of promotion of health and safety responsible environmental management in the work place.*

This policy applies to all mines operated by Whitehaven Coal Limited and its subsidiaries.

1.2 Approval Status

1.2.1 Leases, Licences and Approvals

Table 1 identifies the leases, licences and approvals in place for the Tarrawonga Coal Mine at the end of the reporting period, the issuing/responsible Authority, dates of issue, duration (where limited) and relevant comments. The list is presented chronologically according to the date of issue.

Reviews of compliance/performance with the conditions identified in PA 11_0047 (Appendix 1), EPL 12365 (Appendix 2), and ML 1579, ML 1685 and ML 1693 are presented in Appendix 3, Tables A3-1, A3-2 and A3-3, respectively.

1.2.2 Amendments to Leases, Licences and Approvals

Amendments to leases, licences and approvals for the Tarrawonga Coal Mine during the reporting period (or planned for the next reporting period) are as follows:

- EPL 12365 – one licence variation was issued by the EPA (6th 13th November 2014) as detailed below:

  - Former Pollution Reduction Program conditions U1 & U2 were removed from the licence

  - Former Pollution Reduction Program Condition U3 has become condition U1

  - Addition of a new Pollution Reduction Program at Condition U2

- Increase permitted scale of scheduled activities “Mining for Coal” and “Coal Works” at condition A1.1

- Amended description of EPA Point 27 at condition P1.3,

- As discussed in Section 1.1.3, the MOP for the LOM project was approved in October 2013. MOP Amendment B, which includes Mine Extension Areas and Additional Topsoil Stockpile Areas, was approved 13 November 2014.
- A new MOP is under development and will be submitted to DRE during the next reporting period, prior to the expiration of the current MOP, and in accordance with the relevant requirements.
- Management plans that are required to be developed and adopted under PA 11_0047 were prepared and submitted to the DP&E in accordance with the Conditions of Approval (CoA). The Air Quality and Greenhouse Gas Management Plan, Noise Management Plan, Biodiversity Management Plan (Stage One) were submitted and approved during the reporting period. The remaining management plans are being reviewed by relevant agencies and Whitehaven Coal (WHC) and will be resubmitting revised plans in the upcoming reporting period for approval. Management plans will continue to undergo review in accordance with the Project Approval.

Table 1 - Tenements, Licences and Approvals

Issuing / Responsible Authority	Type of Lease, Licence, Approval	Date of Issue	Expiry	Comments
Department of Primary Industries (DPI)[*1]	Exploration Licence (EL 5967)	24/07/2002	23/07/2015	Renewed 5th August 2013
DA originally issued by Minister for Infrastructure and Planning[*2]	Development Application (DA) 88-4-2005	09/11/2005	09/11/2017	Original consent. It is anticipated that this consent will be surrendered during the next reporting period.
Department of Primary Industries - Mineral Resources[*1]	Mining Lease (ML) 1579	03/04/2006	02/04/2027	Expires 21 years from commencement
Department of Primary Industries - Mineral Resources[*1]	Mining Operations Plan (MOP)	09/05/2006	28/02/2012	Replaced by MOP Amendment approved in 2010
Department of Environment, Climate Change and Water (DECCW)[*3]	Environment Protection Licence (EPL) No. 12365 (Appendix 2)	09/01/2006	Anniversary date: 9 January	Variations to EPL made in Dec 07, Sep 08, May 09 Dec 11, Mar 13, No 14.
Department of Water and Energy (DWE)[*4]	90BL253276 90BL253278 90BL253279 90BL253280 90BL254253 90BL254254 90BL254255 90BL254221 90BL254214 90BL255766 90BL255084	18/05/2006 18/05/2006 18/05/2006 18/05/2006 18/05/2006 18/05/2006 24/04/2007 05/04/2007 04/04/2007 19/08/2012 26/06/2012	Perpetuity Perpetuity Perpetuity Perpetuity Perpetuity Perpetuity Perpetuity Perpetuity Perpetuity Perpetuity 25/06/2017	Monitoring bores 250ML Mining
Director, Mining and Industry Projects for Department of Planning[*2]	Notice of Modification (DA) 88-4-2005 MOD 1 (Appendix 1)	15/10/2010	09/11/2017	Modification to original consent
Industry & Investment NSW[*1]	Mining Operations Plan (MOP) Amendment	01/07/2010	30/06/2013. Extension granted to 30/10/2013.	Superseded by 2013 MOP
Department of Planning and Infrastructure (DoPI)[*2]	Project Approval PA 11_0047	22/01/2013	31/12/2030	Project Approval for LOM Extension Project. Expires December 2030
Department of Sustainability, Environment, Water, Population	EPBC 2011/5923	11/03/2013	31/12/2053	Conditional Federal Project Approval for LOM Project

Issuing / Responsible Authority	Type of Lease, Licence, Approval	Date of Issue	Expiry	Comments
and Communities (SEWPaC) [*5]				
Department of Trade & Investment – Regional Infrastructure and Services	Mining Lease (ML) 1685	18/07/2013	14/11/2032	
Department of Trade & Investment – Regional Infrastructure and Services	Mining Lease (ML) 1693	14/10/2013	14/10/2034	Expires 21 years from commencement
Division of Resources and Energy (DRE)	Mining Operations Plan (MOP)	23/10/2013	31/10/2015	MOP prepared under the new ESG3 Guidelines for LOM Project
Division of Resources and Energy (DRE)	Mining Operations Plan Amendment A (MOP)	6/12/2013	31/10/2015	Amendment A to MOP
Department of Planning & Environment	Notice of Modification of Project Approval PA11_0047	6/11/2014	31/12/2030	Modification to allow coal haulage to continue to the Gunnedah CHPP.
Division of Resources and Energy (DRE)	Mining Operations Plan Amendment B (MOP)	13/11/2013	31/10/2015	Amendment B to MOP

*[1] Now, Department of Trade and Investment, Regional Infrastructure and Services, Division of Resources and Energy (DTIRIS – DRE)
*[2] Now, Department of Planning and Environment (DP&E)
*[3] Now, Environment Protection Authority (EPA)
*[4] Now, NSW Office of Water (NOW)
*[5] Now, Department of the Environment

1.3 Actions Requested at Previous AEMR Review

The annual environmental meeting for the 2013/2014 AEMR for the Tarrawonga Coal Mine was undertaken by DRE, EPA & DP&E on the 9th October 2014.

Formal advice was received from the DRE, DP&E and the EPA on the 14th October, 24th October and 13th October 2014 respectively.

Four actions were identified by the DRE, as follows:

- Provide DRE with a revised Plan 4 indicating proposed rehabilitation. This plan was provided as requested.
- Provide sufficient inert cover and adequate compaction of cover material to mitigate risk of spontaneous combustion in course rejects emplacement (addressed in s2.6.7).

- Continue consultation with Boggabri Coal to develop MOP plans addressing mining and rehabilitation of common boundary waste rock emplacement which are consistent and provide for high standard rehabilitation outcomes (addressed in s6).
- Install appropriate signage at the bioremediation area (addressed in s2.6.3).

Advice received from DP&E is as follows:

- Water Management - concerns were raised over surface water than has come into contact with contaminated areas (including coal contact), specifically the size of the ROM surface water collection dam. A review and revision of the Surface Water Management Plan was requested which incorporates the advice of the EPA and DP&E by 28th November 2014. Subsequent to this correspondence, DP&E agreed to the provision of a revised WMP including SWMP by 31st August 2015.
- Dust Management – The DP&E noted unacceptable dust emissions across three particular areas of operations;

  1. Road haulage trucks travelling from the ROM
  2. Mobile coal crusher
  3. Haul trucks operating in pit

  It was advised that there would be an increase in the frequency of unannounced site inspections. No further action required outside of ensuring effective dust control and use of best practice to control airborne dust emissions.
- Rejects Emplacement – It was noted that the reject emplacement may pose a long term issue for spontaneous combustion and long term impacts on rehabilitation. A review of reject emplacement management practices was requested to be implemented in accordance with Condition 39, Schedule 3 of PA1 1_0047. This is issue addressed in s2.6.7.

Advice received from the EPA is as follows

- Dust control measures require improvement; in particular, portion of in pit haul road, mobile crusher and road haul trucks entering the ROM. No further action required outside of ensuring effective dust control and use of best practice to control airborne dust emissions.
- Southern emplacement remains an ongoing concern with regard to potential dust issues (addressed in s3.1.2).

- ROM pad storm water runoff management needs to be improved to remove this water from the current sedimentation system. WHC and the EPA continue to discuss this matter and outcomes will be reported in a subsequent AEMR/AR.
- The EPL fee based activity scale of 2 million tonnes was exceeded during the reporting year by 136,045 tonnes (addressed in s1.2.2). The EPA issued Tarrawonga a Penalty Infringement Notice and subsequently varied the EPL during the reporting period to increase the licenced production and coal handling limits.

Matters discussed during the onsite meeting have been addressed throughout the document as required and where applicable.

2 SUMMARY OF OPERATIONS

2.1 Exploration, Resources / Reserves and Mine Life

2.1.1 Exploration

Exploration drilling was undertaken during the reporting period in ML 1579, ML 1685, ML 1693 with a total of 47 holes drilled (41 open holes, 6 core holes). Exploration drilling carried out during the reporting period guided future mine planning and was carried out generally in accordance with the EA.

2.1.2 Resources and Reserves

Eight coal seams are present within the Tarrawonga Open Cut and are listed below in increasing depth from the surface:

- Braymont (BR);
- Bollol Creek (BC);
- Jeralong (JE);
- Jeralong Lower (JEL);
- Merriown (ME);
- Merriown Lower (MEL);
- Velyama (VE); and
- Nagero (NA).

The coal seams range in thickness up to 4.0m, with an average thickness of 1.5m. Significant conglomerate interburden below the Nagero seam presents a practical divide between those seams mineable by open cut methods and those for which the potential may exist for future underground mining (the Northam, Therribri, Flixton and Tarrawonga seams).

2.1.3 Estimated Mine Life

The total thickness of the coal to be mined is approximately 20m, with the depth below the natural surface varying between 20m and 120m. With the approval of the Tarrawonga Mine Extension, it is estimated that the open cut coal resource remaining within the Tarrawonga Deposit will be exhausted by 2030.

2.2 Land Preparation

Land preparation activities undertaken at the mine during the reporting period were conducted in accordance with commitments identified in the MOP and included:

- Vegetation removal in advance of the active pit over an area of approximately 56.2ha comprising the White Cypress Pine – Narrow-leaved Ironbark Shrub/Grass Open Forest of the Western Nandewar Bioregion vegetation type.
- A further 26.9ha was cleared but not reported during the last reporting period as the clearing campaign had not been completed, and as such there had been no provision of the finalised clearing report by the suitably qualified ecologist. The area cleared is addressed in this report as part of the 2014 clearing campaign in ML1685. Pre clearance surveys and clearing supervision reports are located in Appendix 11.
- During the reporting period, 66,457m³ topsoil, subsoil and friable overburden was stripped into final stockpile locations. Soil stripping areas shown on Plan 3 indicate areas where material has been removed to soil stockpiles. Existing stockpile locations are shown on Plan 3.

Table 2 shows that at the end of the reporting period, no subsoil or topsoil had been replaced on reshaped areas of the final landform. Approximately 931,924m3 of topsoil and subsoil remains stockpiled within the mining lease.

During the reporting period, the mine, which has been developed as a series of approximately 60 m wide strips, advanced south east as activity was focused on the southern end of the existing pit area. In addition, pit development and coal production commenced in the northern extension (ML1685) pit during the period.

At the end of the reporting period there was sufficient topsoil to cover all exposed areas to a depth of 200mm as specified in the EA and MOP.

The disturbed area is 406.7ha and comprises the following areas::

- infrastructure area (29.7ha);
- active mining area (146.7ha);
- waste emplacements (221.9ha);
- tailings emplacement (5.4ha); and
- shaped waste emplacement (3ha).

To cover this area to the depth specified in the EA and MOP a total of 813,600m³ would be required, which is slightly less than what is currently stockpiled.

Tarrawonga maximises resource recovery and generally strips soil to greater depth than required. Maximising the recovery of top soil resources ensures that there is not a shortfall in top soil to achieve progressive and final rehabilitation targets as outlined in the EA and MOP.

Table 2 - Production and Waste Summary

	Cumulative Production			
	Start of Reporting Period (up to 30/4/14)	**During Reporting Period (1/5/14 to 30/4/15)**	**Cumulative Total at End of Reporting Period**	**End of next Reporting Period (estimated)**
Soil Stripped (m^3)	1,242,037	66,457	1,308,494	1,350,000
Soil Used/spread (m^3)	461,149	0	461,149	482,000
Waste Rock (m^3)	115,058,717	19,273,391	134,332,108	155,000,000
ROM Coal (t)	12,132,950	2,383,715	14,516,665	16,500,000
Product (t)	11,040,366	1,987,050	13,027,416	15,178,000
Domestic Product (t)	216,783	50,960	267,773	322,743

ROM Coal is total production at the mine site. The difference between ROM Coal and final Product is related to changes in stockpile volumes both at the mine and the CHPP during the reporting period.

2.3 Construction

No significant construction activities were undertaken over the last 12 months; with construction being limited to redevelopment activities including:

- Redevelopment of the heavy equipment go-line;
- Redevelopment of workshop lay down area;
- Redevelopment of employee and visitor parking area;

2.4 Mining

2.4.1 Mining Method

All mining during the reporting period was undertaken by open cut methods using the techniques identified in the MOP, namely:

- Clear and mulch vegetation;
- Separate topsoil and subsoil removal by open bowl scraper and/or dozer push into windrows and load into articulated trucks with loader;
- Friable overburden removal by scraper;

- Drilling and blasting the underlying competent overburden;
- Overburden (and interburden) removal by bulldozers and/or excavator and dump trucks, with the overburden placed in and over the mined-out areas of the open cut; and
- Coal extraction by excavator loading into haul trucks for transport to the ROM stockpile.

All coal was assessed in pit and, depending on the seam, known quality, and the extent of dilution, was classified into:

- "clean"- (by-pass) top seam; and
- "dirty" - (to be washed).

The in-pit classification determines the form of subsequent processing undertaken on-site or off-site.

During the reporting period, a total of 19,273,391BCM friable and competent overburden was removed to produce 2,383,715t ROM coal at an average overburden: coal stripping ratio of 8.1:1 (See Table 2).

The lower strip ratio is a result of mining within the existing pit and south of the hill section avoiding for the present the greater overburden removal that would be required to access the coal under the hill. Plan 4 presents the status of mine and infrastructure development as of 30th April 2015. Plan 4 also identifies the limit of mining at the commencement of the reporting period.

2.4.2 Mining Constraints

Day-to-day mining activities are primarily constrained by economic considerations which, in turn, are determined to a large extent by factors beyond Tarrawonga Coal's control (i.e. coal price and demand). Economic factors determine the viability of the determined overburden: coal stripping ratio, and hence the lateral extent of mining undertaken.

Other constraints to mining operations at the mine have included or continue to include:

- The depth of weathering of the coal seams which influences the volume of overburden requiring removal to access the coal;
- The potential presence of faulting within the seam structure which may influence the sequence and possibly the method of mining;
- The potential for an uneven coal seam floor which could potentially complicate vehicular access to the coal;

- Agricultural and ecological considerations;
- Inclement weather; and
- The existence of Aboriginal heritage sites within the ML areas.

2.4.3 Mining Equipment

Table 3 presents a list of mining equipment in use at the mine at the end of the reporting period, together with its principal function(s) and frequency of use.

Table 3 - Mining Equipment

ITEM	NUMBER IN OPERATION	FUNCTION
O & K RH170 Excavator	3	Overburden excavation and loading
Hitachi EX1900 Excavator	1	Overburden / interburden / coal loading
CAT 785 Dump Trucks	16	
CAT 789 Dump Trucks	3	
Terex SKF Drill	1	Blast hole drilling
CAT SKSW Drill	1	Blast hole drilling
Cubex 1320 Drill	1	Blast hole drilling
CAT D11R Dozer	6	Interburden / coal ripping / pushing, dump maintenance
CAT D10T Dozer	4	Interburden / coal ripping / pushing, dump maintenance
Water Cart	3	Dust Suppression
CAT 16M Grader	2	Road maintenance
Service Truck	2	Machinery servicing
Cummins Genset	2	Power for site offices, workshop and coal loader
Mobile Crusher	1	Crushing
IT38G Loader	2	Loading
Lighting Plant	16	Lighting
CAT 988H Loader	3	Coal Pad

2.4.4 Hours of Operations

PA 11_0047 permits 24 hour operation of mining activities, and allows for changes to coal transportation following the commissioning of the Boggabri Rail Spur Line, and Boggabri CHPP. The 2014 Notice of Modification to PA 11_0047 enables continuation of coal haulage to the WHC Gunnedah CHPP with the potential use of the Boggabri Rail Spur Line remaining open subject to further negotiation and agreement between TCPL and BCM. TCPL has made some minor changes to operating times to accommodate changes in the working roster for improved production and economic stability.

Open cut mining activities, including processing of coal, generally occurred between the hours of 6:30am and midnight Monday to Friday, between midnight and 3.00am Tuesday to Saturday, and 6:30am to 5.00pm Saturdays. During the reporting period Saturday operations ceased and the mine now operates Monday 6.30am to Saturday 3.00am. On occasion Saturday and Sunday day shifts have been run to meet production deadlines.

Coal transportation from the mine site continued between the hours of 7:00am to 9:15pm Monday to Friday, and 7:00am to 5:15pm on Saturdays. Following the approval of 2014 Notice of Modification, coal was approved to be transported from site from 6:00am to 9:15pm Monday to Friday, and 7:00am to 5:15pm on Saturdays. General maintenance activities are permitted to be undertaken 24/7.

2.5 Processing

2.5.1 Outline of Processing Activities

With the exception of coal crushing to <200 mm, no coal processing was undertaken within the Project Area.

Figure 2 presents a schematic of coal movements and washery inputs, outputs and yields for the reporting period. The flowchart shows that during the reporting period a total of 2,193,084 tonnes of coal was transported from the Tarrawonga site to the CHPP. 1,143,534 tonnes was direct bypass coal (i.e. crushed product coal not requiring washing) whilst 1,043,303 tonnes was directed through the washery, producing 862,805 tonnes of washed product (average yield of 83%). Coal from the CHPP was despatched via rail to domestic and export markets (Figure 2).

The slight variations in totals (i.e. washery input + bypass does not total coal from site and washery output + bypass coal does not total coal sales) are simply a result of variations in stockpiles.

Domestic Coal sales totalled 50,960 tonnes for the reporting period.

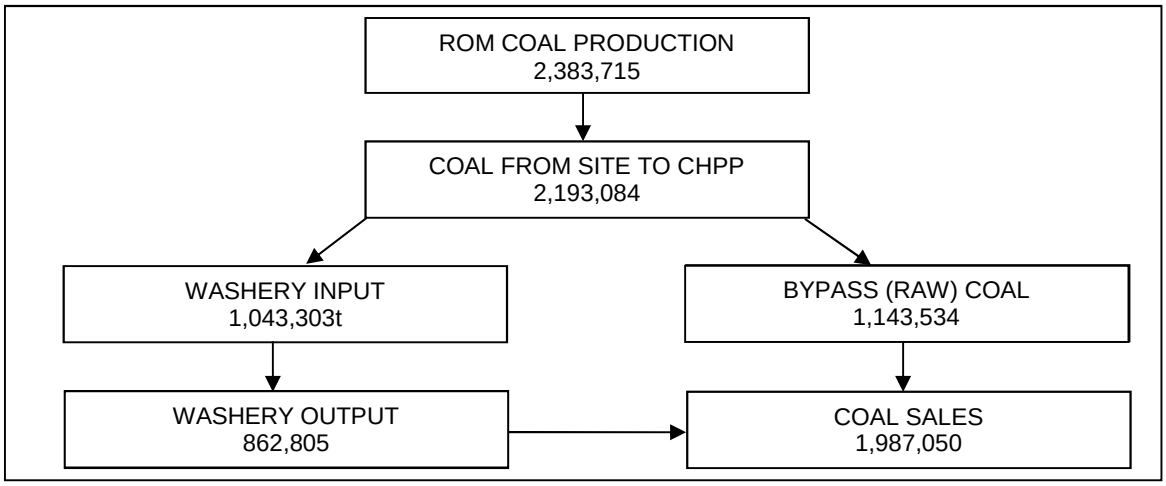


Figure 2 - Coal Movement and Production Summary
(2014/2015 Reporting Period)

2.5.2 Changes or Additions to the Process or Facilities

No significant changes or additions to processes carried out at the mine have occurred. Tarrawonga ceased receiving course rejects during the reporting period; see s2.6.7.2.

2.6 Waste Management

2.6.1 Introduction

Wastes produced from the Tarrawonga Coal Mine (or at the Whitehaven CHPP) remain unchanged from those identified in the previous AEMR and Environmental Assessment and are comprised of:

- General domestic-type wastes from on-site buildings and routine maintenance consumables;
- Oils and grease;
- Sewage;
- Overburden and interburden;
- Mine equipment tyres; and
- Coarse and fine coal rejects from any coal preparation undertaken.

The following sub-sections identify the management procedures adopted for each of these wastes throughout the reporting period. Management procedures remain unchanged from those previously identified and will be continued for the ensuing reporting period.

2.6.2 Domestic Type Wastes

All general wastes were collected on-site and placed into large storage receptacles on a daily basis. An industrial waste collector collected this waste on a weekly basis. TCPL has established a recycling program for domestic type wastes which are collected in separate receptacles and delivered to the Gunnedah Waste Management Centre for recycling.

2.6.3 Oil Containment and Disposal

Waste oils from the maintenance building were pumped from machinery to bulk storage tanks bunded in accordance with EPA requirements (also see Section 2.8.2). When breakdown maintenance was undertaken away from this location, oil was pumped from the equipment to a tank on the service truck from which it was subsequently transferred to the bulk storage tank.

Waste oil stored at the maintenance building was collected and disposed of by a licensed contractor approximately once every three months.

Oil filters at Tarrawonga are crushed prior to collection.

Runoff from the concrete vehicle and equipment wash pad was directed to an oil separator and containment system for subsequent pump out and disposal.

A bioremediation area is located on site for the management of hydrocarbons spills with appropriate signage installed during the reporting period.

2.6.4 Sewage Treatment and Disposal

Effluent from the sewage and ablutions facilities at the mine was managed through the Council-approved septic system which is serviced by a licenced contractor. Pump outs are undertaken by a licensed waste disposal contractor on an as-needs-basis.

2.6.5 Mine Equipment Tyres

Mine equipment tyres are retained (stored) on site prior to disposal within the open cut void. Tyres were disposed of in-pit during the reporting period with the disposal location recorded by site personnel.

2.6.6 Overburden and Interburden

Overburden and interburden materials at the mine comprise conglomerates, sandstones, shales and mudstones which are prone to various degrees of breakdown

on exposure to the atmosphere. The overburden is cast into the mined-out areas by blasting or removed from above the coal seam by a combination of dozer pushing and excavator loading and hauling using dump trucks. Interburden removal to enable lower coal ply excavation is undertaken by excavator and dump truck.

During the reporting period, all overburden and interburden was blasted/pushed/ dumped within areas nominated in the MOP for overburden emplacement.

2.6.7 Processing Plant Residues

2.6.7.1 Physical and Chemical Characteristics

The coarse and fine rejects produced from washing Tarrawonga coal comprise a mixture of coal and non-coal materials, e.g. sedimentary rocks such as shale, mudstone or claystone, and sand, silts and clays which either occur naturally within the coal seam or represent overburden or interburden materials which dilute the coal during its extraction.

2.6.7.2 Reject Handling and Disposal Procedures

Coarse Reject – As rehabilitation progresses at the mine, coarse reject produced from the Whitehaven CHPP will be back loaded to the mine for placement in the open cut prior to reshaping and rehabilitation. Approximately 349,717 tonnes of coarse reject has been disposed at the site during the reporting period.

Tarrawonga ceased receiving course rejects during the reporting year. DRE initiated a review of the activity during the reporting period into the handling and placement of course rejects at site. It is expected that the review will be finalised in the next reporting period.

Fine Reject – Pumped to a series of ten fine reject ponds within the Whitehaven CHPP balloon loop and adjacent to the Whitehaven CHPP for consolidation. The ponds are encircled by bunding and drains to contain fine reject in the event of a pond failure. Following consolidation, the fine rejects are excavated and transported to the former Gunnedah Colliery for use in final landform development and emplacement in the Melville Open Cut workings.

2.6.7.3 Monitoring and Management of Containment Facilities

Routine management and monitoring of reject material at the Whitehaven Siding is undertaken by Whitehaven Coal personnel under the direction of the CHPP Plant

Manager. Inspections of the reject ponds at the Whitehaven CHPP are undertaken by officers of DRE, the statutorily responsible Authority.

2.7 Stockpile Capacity

All ROM coal produced is delivered to clean and dirty ROM stockpiles. ROM stockpile capacity at the Tarrawonga Coal Mine is approximately 150,000t. Average stockpile volume during the reporting period was 139,528 tonnes.

2.8 Water Management

2.8.1 Objectives

The mine lies within the catchment of the Namoi River. Locally, and within proximity of the project site, Goonbri Creek, Bollol Creek and Nagero Creek all provide flows to the Namoi River during runoff events. The design of sediment detention basins within the disturbed area of the mine aims to limit the opportunity of discharge of runoff from mine-disturbed area, i.e. after appropriate detention time to satisfy licensed discharge criteria.

There are seven wet weather discharge points nominated in the current EPL 12365. These are SD9, SD16, SD17, SB14, SB22, SB23 and SB24 (Plan 4).

Management of water at the mine is undertaken with the following objectives:

(i) The quantity of water exhibiting elevated suspended solids loadings is minimised;

(ii) Erosion is minimised;

(iii) Sediment-laden water is contained for a sufficient period and/or flocculent is applied such that if a controlled discharge is undertaken it satisfies the discharge criteria identified in EPL 12365;

(iv) Surface water is harvested off-site to the extent permissible, thereby minimising water extraction from bores or other sources;

(v) Groundwater is not contaminated;

(vi) Downstream water users are not adversely affected by the Mine's operations, either in terms of quantity or quality; and

(vii) The water management system is consistent with planned rehabilitation objectives and long-term land use.

2.8.2 Surface Water Management

Water within the project approval area is nominally classified either as "clean", "sediment-laden" or "dirty", or "contaminated", depending on the source of the flow and its potential for physical or chemical contamination.

"**Clean water**" comprises water which emanates from areas undisturbed by mining activities, flows from sediment basins following its clarification in those structures or is contained within, or discharges from, storage dams. Within the DA Area, clean surface water flows either pass to natural drainage lines, and hence off-site, or are collected by diversion banks and directed to the storage dams for use on-site. All water flowing from sediment basins ultimately flows to storage dams.

"**Dirty water**" comprises water which does or could potentially contain elevated levels of suspended solids originating from areas of mining-related disturbance.

Dirty water originating from surface runoff is collected by catch banks located down slope of the potential sources of pollution and directed to the sediment basins. Water collecting within the sediment basins is used for dust suppression in addition to waters in the storage dams to avoid potential for off-site water discharge.

The sediment basins are monitored to ensure effective capacity to maintain required storage to manage onsite water effectively; were it is deemed necessary ancillary structures may be constructed or existing basins de-silted. In the event of structure replacement, the contents of the former structure will be allowed to dry prior to being capped and rehabilitated.

The principal components of the water management systems in place at the end of the reporting period are shown on Plan 4.

"**Contaminated Water Management**". Two self bunded diesel fuel tanks with capacities of 68,000L and 105,000L (62,000L and 94,500L safe fill respectively) are maintained adjacent to the Tarrawonga workshop area. This ensures that in the event of a leak from the tanks, there is sufficient capacity to adequately store the full complement of diesel from those tanks. Tarrawonga Coal has also installed an additional concrete bund adjacent to the fuel tanks to house other oils and lubricants in a safe and efficient manner. Any associated spills within the bund then report to an oil separating unit, the separated oil from which is disposed of by an appropriately licensed contractor. Waters potentially contaminated with hydrocarbons from the workshop area are also diverted to the oil separator, with clean water used for dust suppression purposes. Spill kits are also maintained on the mine site.

The likelihood of localised spills of fuel or oil external to bunded areas is kept to a minimum by the adoption of the above practice. In the event that localised spills do

occur, immediate action would be undertaken to ensure appropriate clean-up and minimisation of harm.

Water originating from the open cut pit is pumped to Void Water Dams or retained in pit within managed sumps. Pit water is also used for dust suppression.

2.8.3 Discharges

Wet weather discharges that occurred during the reporting period are discussed in Section 3.3.2.

2.8.4 Water Sources, Demand and Use

Within the Project Approval area and immediate vicinity of the mine, surface water resources are limited to a number of ephemeral drainage lines which flow for a short period after substantial rainfall, farm dams, water storage dams and a series of interlinked sediment basins within the Project Approval area as shown on Plans 3 and 4.

Water is required on the mine site primarily for dust suppression purposes, with minor quantities required for irrigation, toilet and ablutions purposes. Where practicable, water collected on-site is retained or reused, with water for dust suppression sourced from a combination of on-site water harvesting, inflows from the exposed coal seam, overburden and interburden, and groundwater extraction. Water for potable, toilet and ablutions purposes is trucked to the site from Gunnedah or Boggabri.

During the reporting period, a total of approximately 414ML was used for mine site and processing facility dust suppression purposes, with all water sourced within the Project Approval area.

Water sources comprise the following:

- Groundwater/surface water inflows to the open cut (majority being surface water inflows); and
- Surface flows to sediment basins and storage dams within the Project Approval area.

A water pipeline from the adjacent Boggabri Coal Mine was not utilised during the reporting period and was decommissioned.

During the exploration drilling program a suitable water supply was identified within the mine lease and potential water licence transfers found which have been lodged

with the NSW Office of Water. This supply will be available to supplement existing water supplies for dust suppression during prolonged dry periods.

There was a slight reduction in water usage over the reporting period with approximately 414ML used. This reduction can be attributed to reduction in operating days and above average rainfall during summer and early autumn periods that require the most water for dust suppression.

The updated Water Management Plan required by PA 11_0047, which was submitted to DP&E during the previous reporting period, has been under review for finalisation. The revised WMP will be distributed for stakeholder comment with further revision undertaken where required and will be submitted for approval by the Secretary in August 2015.

2.8.5 Stored Water

Table 4 presents an estimate of the volume of stored water at the beginning and end of the reporting period.

Table 4 - Stored Water

	Volumes Held (m3)		Storage Capacity at the end of the Reporting Period (m3)
	Start of Reporting Period	At end of Reporting Period	
Clean Water (in Storage Dams)	41,143	56,816	110,053
Dirty Water (in Sediment Basins)	136,623	171,069	178,527
Controlled Discharge Water (salinity trading schemes)	N/A*	N/A*	N/A*
Pit Water	132,072	69,747	174,033
* N/A = Not applicable for the Tarrawonga Coal Mine			

2.8.6 Groundwater Management

Inflows into the open cut are irregular and result from a combination of:

- Direct rainfall runoff and infiltration through the emplaced overburden which flows down-dip to the open cut sumps;
- Where the open cut workings expose water stored within fractures in the rock mass or coal seams; and/or
- From areas where weakly cemented gravel overburden has been encountered.

Inflows not reporting to the sump(s) within the open cut either evaporate or are incorporated within the coal or replaced overburden.

Contamination of groundwater is controlled by the management of chemical, oil and grease spills and storage, with:

- Vehicle maintenance carried out in designated areas;
- Any spills being cleaned up and are transported to the bioremediation site for treatment; and
- Fuels, oils and greases being stored within a bunded area, constructed in accordance with AS 1940-2004 (also see Section 2.8.2) and/or EPA requirements.

Groundwater from surrounding bores is monitored on a regular basis to detect and assess any changes in groundwater quality or level that may be attributable to the mine (see Section 3.4.2).

2.9 Hazardous and Explosive Material Management

During the reporting period LDE Corporation undertook the blasting services for Tarrawonga.

An offsite remote mixing station (RMS) and magazine is located to the west of Tarrawonga outside ML 1579 and LDE Corporation operates out of this facility.

LDE Corporation utilise a low density hybrid explosive product that has a very low potential to produce fume (NOx gases). This product is mixed at the RMS prior to being transported onsite and loaded into the shot. A generic product is also utilised where necessary.

Safety Data Sheets (SDS's) are retained on-site for all hazardous materials, independent of the quantity. Additionally, all contractors are required to supply SDS sheets for any hazardous goods they may bring onto the site.

2.10 Infrastructure Management

Management of infrastructure (e.g. buildings, roads, generators and pumps) and other facilities not specified elsewhere within this AEMR/Annual Review, is undertaken on an as-needs basis or in accordance with Statutory requirements in order to maintain them in an operationally efficient, safe, neat and tidy condition, and one which does not result in the direct or indirect generation of unacceptable environmental impacts.

2.11 Product Transport

All sized (<200 mm) ROM coal delivered to the Whitehaven CHPP that is destined for the export market is transported via rail to the Port Waratah or Kooragang Island ship loaders at the Port of Newcastle. Approximately 2,193,084 tonnes of coal was transported from the mine to the CHPP whilst 50,960 tonnes was transported offsite to domestic customers over the reporting period in 50,846 truckloads. This equates to an average of 259 truckloads of coal being transported per haulage day from the mine to the Whitehaven CHPP.

3 ENVIRONMENTAL MANAGEMENT AND PERFORMANCE

The following sub-sections document the implementation and effectiveness of the various environmental control strategies adopted at the Tarrawonga Coal Mine, together with monitoring data for the reporting period. Existing monitoring sites are shown in Figure 3, Figure 4 and Figure 5. Where relevant, life of mine monitoring data is also included as a basis for discussion on longer-term trends. A risk identification matrix and the relevant Environmental Management procedures are identified in the Tarrawonga Coal Mine MOP.

3.1 Air Pollution

3.1.1 Criteria

The air quality criteria applicable to the Tarrawonga Coal Mine are specified in PA 11_0047 Schedule 3 Condition 24, Tables 6, 7 & 8 (Appendix 1) which is summarised below:

- Acceptable mean annual increase in deposited dust – 2g/m^2/month.
- Mean annual dust deposition (all sources) – 4g/m^2/month.
- Mean annual TSP (all sources) concentration – 90 µg/m^3.
- Mean annual PM_{10} particulate level – 30 µg/m^3.
- 24 hour average PM_{10} particulate level – 50 µg/m^3.

Routine air quality monitoring at the Tarrawonga Coal Mine is required for deposited dust and PM_{10} particulates. Monitoring of deposited dust is undertaken on a monthly basis whilst PM_{10} levels are monitored for 24hours every 6 days.

Monitoring continues at all sites but exceedances on project-related properties are not reportable to the EPA and monitoring results are not reportable via the Annual Return.

Throughout the reporting period, real time PM_{10} TEOM (air quality) monitoring was conducted with a permanent monitoring station located at the nearby "Flixton" property (Figure 3). Data is generated every 15 minutes and correlated against current weather conditions, with alarms notifying site personnel of elevated PM_{10} results when wind conditions and direction is indicative of mining influence on the monitor. Real-time monitoring is used as a management tool to facilitate in the day to day mine plan and operations and is not as a compliance monitor.

Schedule 3, Condition 29 of PA 11_0047 requires the updating of the existing Air Quality and Greenhouse Gas Management Plan. This Plan was approved by the

Secretary in January 2015. A requirement of the approval, which is addressed in the Management Plan, is the development of a proactive and reactive air quality management system. A real time $PM_{2.5}$ TEOM is located at the "Will-gai" property south of Tarrawonga.

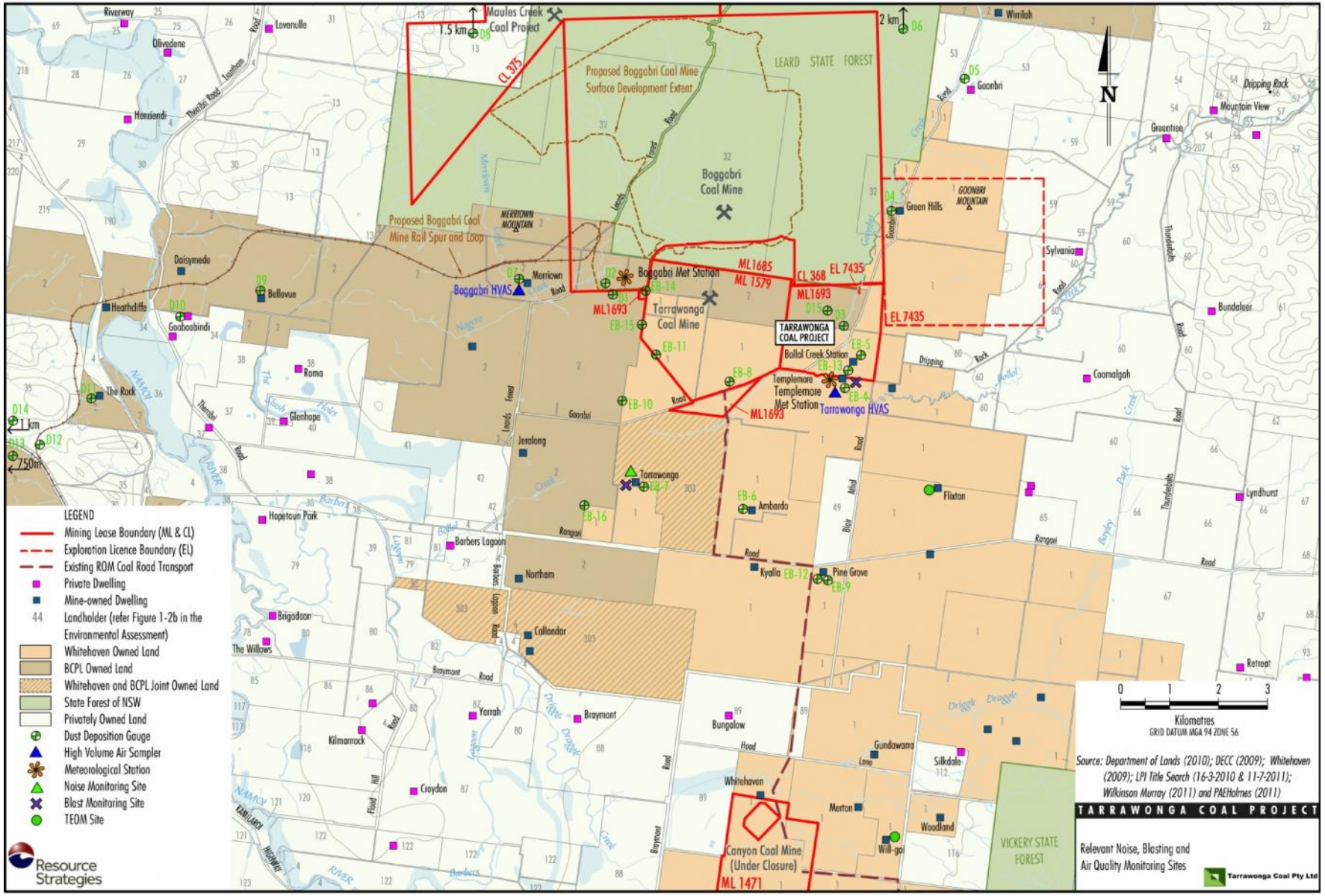


Figure 3 - Environmental Monitoring Locations

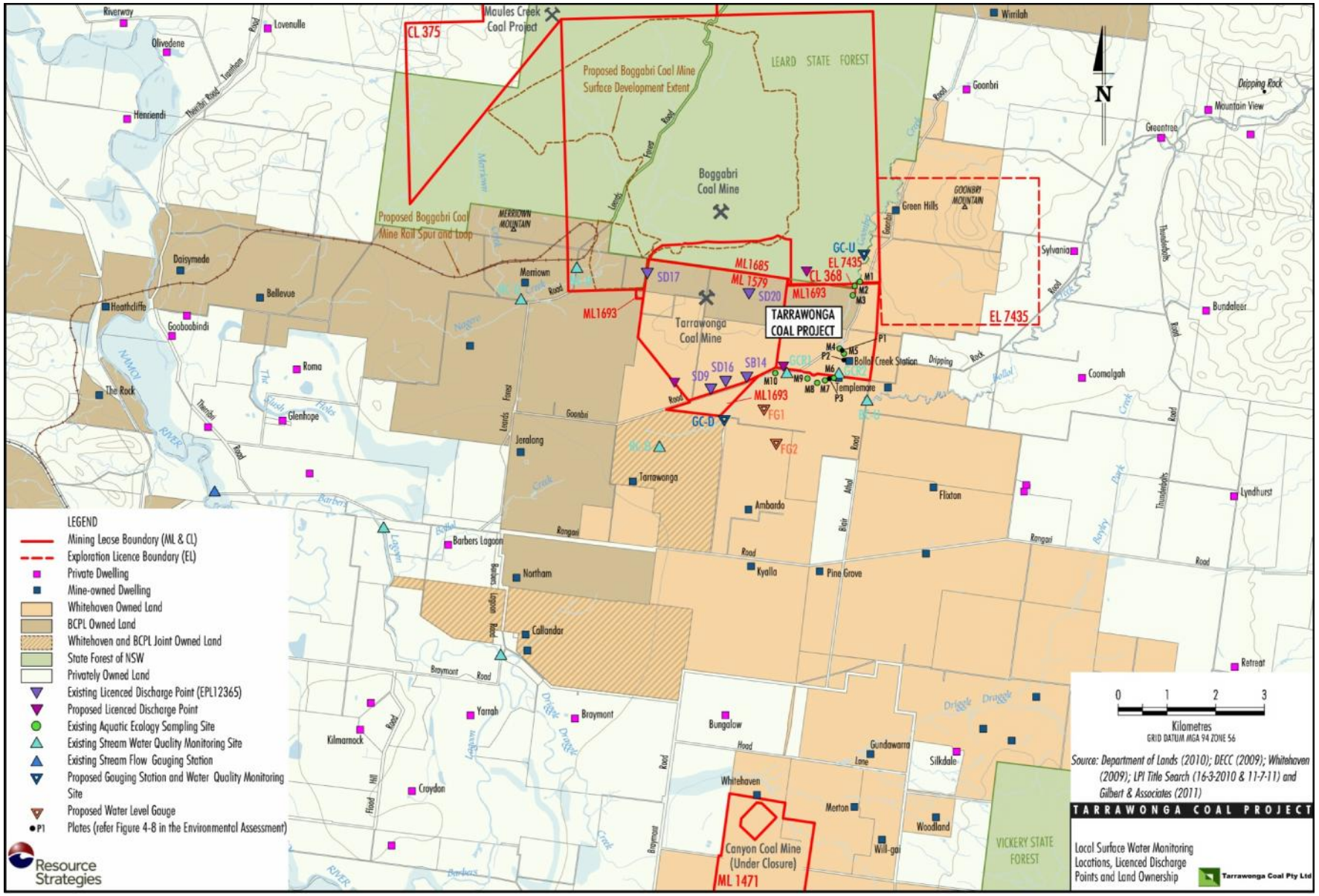


Figure 4 – Surface Water Monitoring Locations

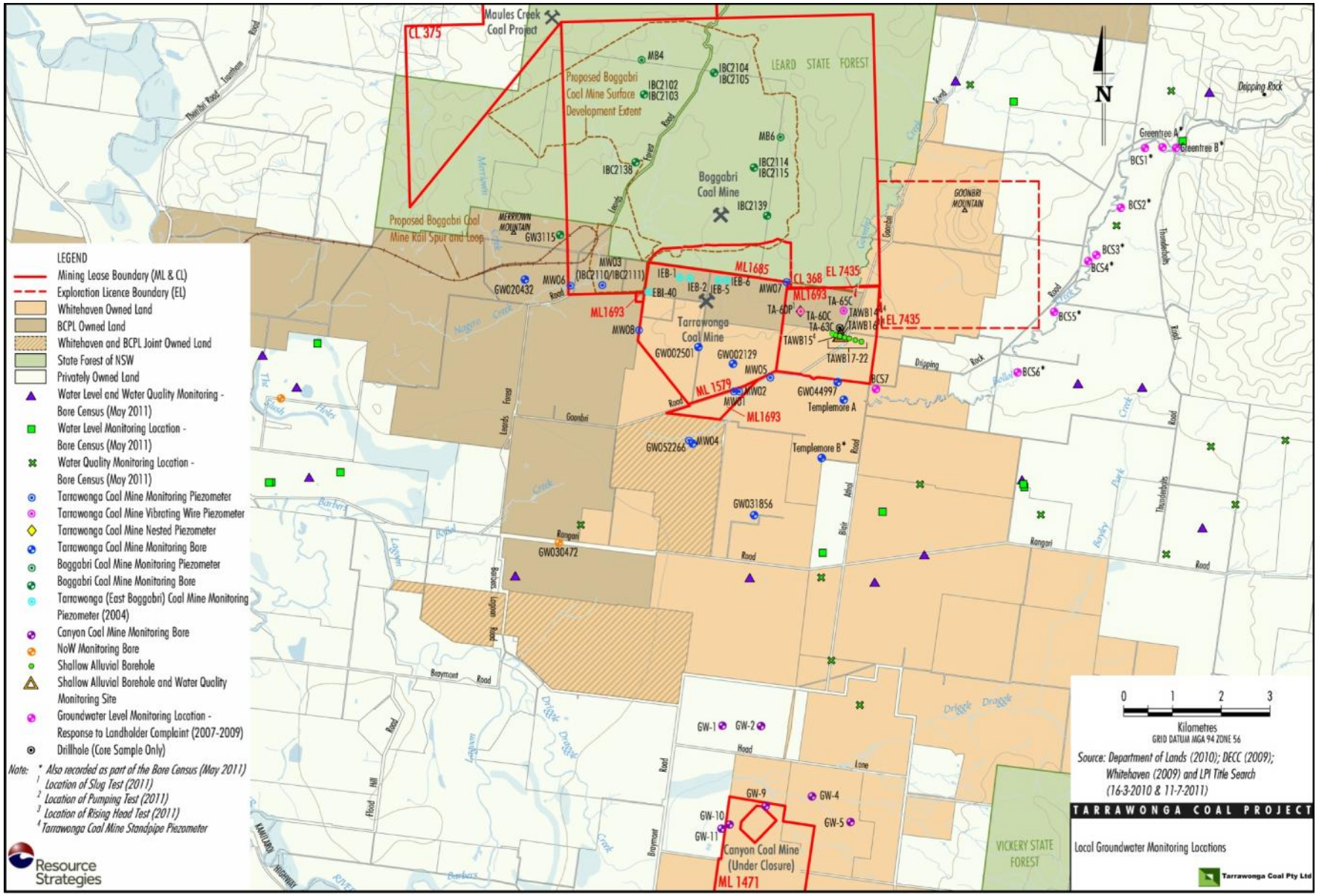


Figure 5 - Groundwater Monitoring Locations

3.1.2 Control Procedures

In order to satisfy the criteria identified above, Tarrawonga Coal employs a range of air pollution control measures including:

- Use of trunks, branches and litter from clearing for mine site rehabilitation. No materials are burnt;
- Limiting groundcover removal in advance of mining consistent with operational requirements. Under normal operational circumstances, a maximum of 100 m is prepared in advance of mining;
- Groundcover removal as part of the topsoil removal activities, rather than prior to topsoil removal;
- Where practicable, limiting soil stripping activities to periods when there is sufficient soil moisture to prevent significant dust lift-off and avoiding periods of high winds;
- Soil stripping using open bowl scrapers or bulldozers, thereby eliminating the dust generated from elevated scrapers;
- Application of water to exposed surfaces, with emphasis on those areas subject to frequent vehicle / equipment movements which may cause dust generation and dispersal;
- Use of water injection on drilling rigs;
- Use of imported aggregates for blast hole stemming;
- Water application at the crusher and on the conveyor discharge point to the coal bin;
- Cessation of coal processing activities during periods of concurrent high winds and temperatures which cause coal dust dispersal, independent of water applications.
- ROM coal pad watering;
- Progressive shaping and rehabilitation of areas once they are no longer required for mining purposes;
- Speed limit restrictions on all vehicles and equipment on the mine site;
- Equipment exhaust positioning to avoid exhausts impinging on the ground and causing dust lift-off; and
- Use of covers on all product coal trucks. All coal haulage vehicles, including those operated by sub-contractors, are fitted with roll-over tarpaulins.

The site has continued to implement the requirements of the Pollution Studies and Reduction Programs listed in the EPL at the end of the reporting period. The requirements relate to:

- Particulate Matter Control Best Practice Implementation – Trial of Best Practice Measures for Disturbing and Handling Overburden;

Coal Mine Wind Erosion Land Assessment The previously proposed temporary stabilisation of the southern emplacement did not get completed during the AEMR reporting period due to considerations of alternative stabilisation options and mine planning. At the time of preparing this report an aerial seeding trial had been completed. Details of the trial will be provided in the next AEMR report.

3.1.3 Dust Monitoring

Table 5 presents a summary of the deposited dust monitoring data for the reporting period, while Appendix 4 presents the results of all dust monitoring over the life of the mine to date. A graphical representation of the total insoluble solids and ash content data for each of the sites monitored during the reporting period is also included in Appendix 4.

As part of ongoing review and continuous improvement of environmental management across Whitehaven Coal's mine sites an internal assessment of particulate deposition monitoring, in accordance with Approved Method 19, was undertaken during the reporting period.

The assessment identified opportunities for improvement in monitoring practices including:-

- Installation of funnel stoppers,
- Increased stability of some monitoring stands,
- Minor repositioning of some stands,
- Adjustment of sample height of some stands, and
- Introduction of a more comprehensive inspection and maintenance regime.

Implementation of the opportunities for improvement commenced during the reporting period.

Figure 3 identifies the locations of the various deposited dust gauges maintained during the reporting period.

Table 5 - Deposited Dust Monitoring Data

Site (see Figure 3)	Property Name	Mean Annual Total Insoluble Solids*[1] (g/m^2/month)	Cumulative Total Insoluble Solids*[3] (g/m2/month)	Mean Ash*[1] (g/m^2/month)	Long Term Mean Total Insoluble Solids (g/m^2/month)
EB-4	TEMPLEMORE	2.6	2.8	1.1	2.5
EB-5	BOLLOL CREEK STATION	2.6	3.8	1.8	2.8
EB-6	AMBARDO	2.1	3.2	0.8	1.2
EB-7	TARRAWONGA	0.8	2.0	0.4	1.0
EB-8	THUIN	2.1	3.3	1.4	2.4
EB-9	PINE GROVE	1.1	2.2	0.6	1.0
EB-10	TARRAWONGA MINE	3.0	4.2	1.7	4.0
EB-11	TARRAWONGA MINE	3.6	4.8	2.9	2.9
EB-14	WESTERN BOUNDARY OF ML	3.4	4.6	1.8	2.9
EB-15	WESTERN BOUNDARY OF ML	7.8	9.0	6.0	5.2
D-4*2	GREEN HILLS	1.9	3.1	1.2	3.5

*[1] At end of reporting period
*[2] Site is monitored and maintained by Boggabri Coal
*[3] Includes 1.2g/m^2/month background levels

A review of

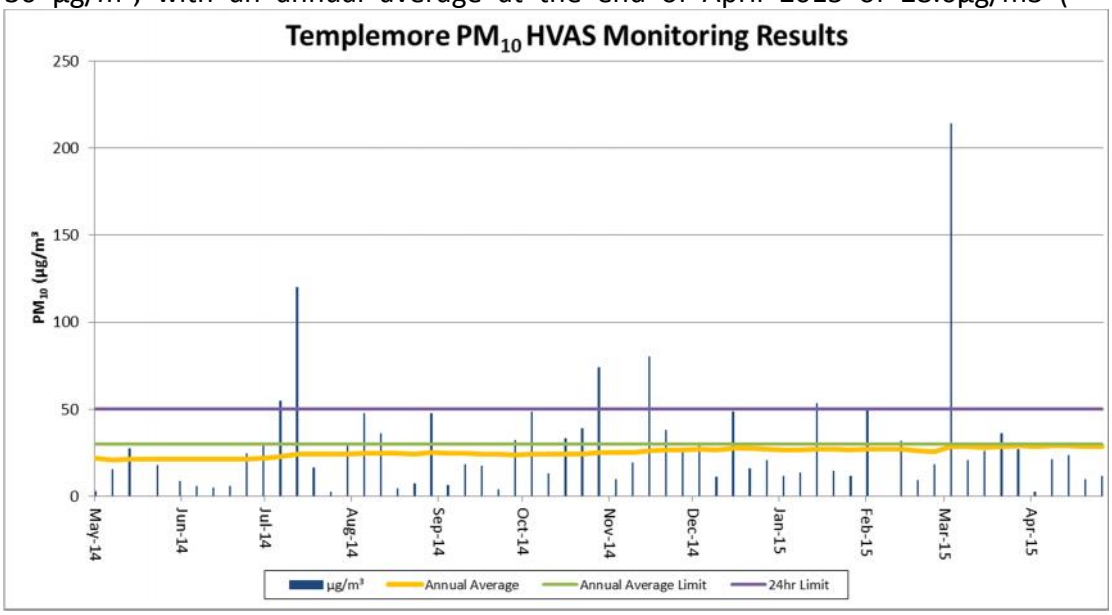
Table 5 and Appendix 4 shows that:

- The mean annual total insoluble solids (deposited dust) criterion was satisfied at all monitoring locations, except for EB-15 “Western Boundary”. The site where the mean annual deposited dust criteria exceeded the 4g/m^2/month criteria is on project related property. It should be noted that the Total Insoluble Matter value can be significantly impacted by other sources.
- EB-15 is located on the western boundary of the mining lease, in close proximity to Boggabri Coal infrastructure and facilities most likely leading to anomalous results when Boggabri Coal construction works are being undertaken.

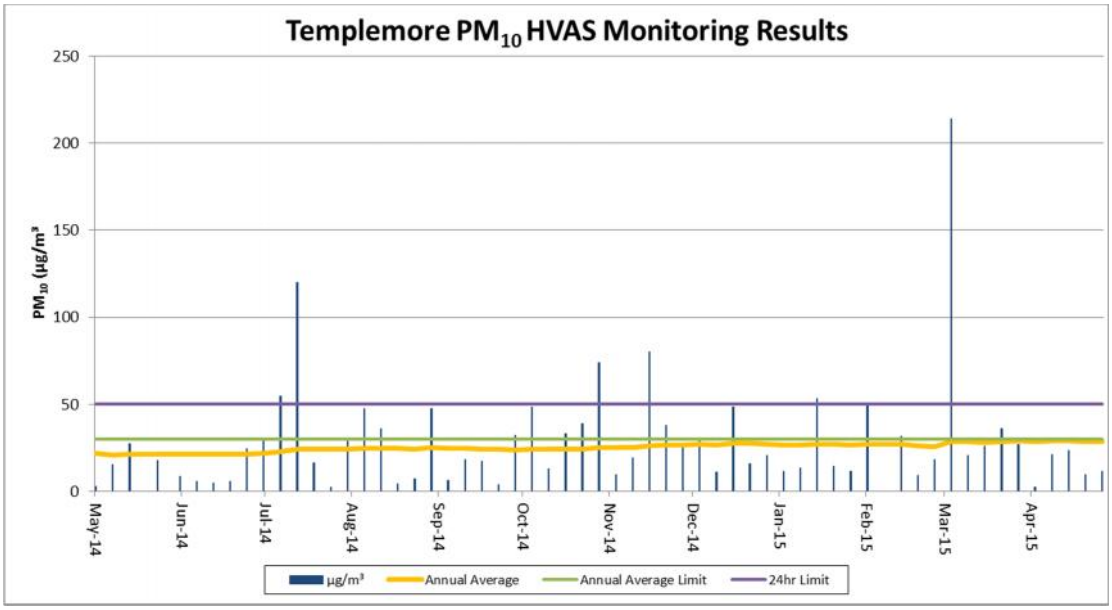
TCPL has a High Volume Air Sampler (PM_{10}) located at the property "Templemore", to the south-east of the mine site. There is another PM_{10} monitor located on the "Merriown" property, to the west of the mine site, which is operated by Boggabri Coal and is used as a cumulative impact monitor for the Boggabri and Tarrawonga mines. Each sampler runs for 24 hours every 6 days, with filter papers sent to an accredited laboratory for analysis.

During the reporting period, the PM_{10} results at the "Templemore" monitor have exceeded compliance with the 24 hour criteria on six occasions:

- July 2014 (2)
- October 2014 (1)
- November 2014 (1)
- January 2014 (1) – Site not operating on day of exceedance.
- March 2014 (1) – Observation of smoke haze, likely to be associated with bushfire in the Pilliga Forest and to have influenced the elevated result.
- These exceedances were likely primarily due to a significant increase in traffic use of the nearby unsealed Goonbri Road which was utilised as the main access to the Maules Creek Coal during the reporting period. The exceedances in July, October and November also coincided with dry weather conditions and increased dust generation from other unsealed roads. As the "Templemore" monitor is located on project owned property, and is unoccupied, the 24 hour PM_{10} criteria do not apply at this property. Despite the exceedances in the 24 hour criteria, the "Templemore" monitor remains within the annual average compliance criteria of 30 µg/m^3, with an annual average at the end of April 2015 of 28.6µg/m3 (



- Figure 6).



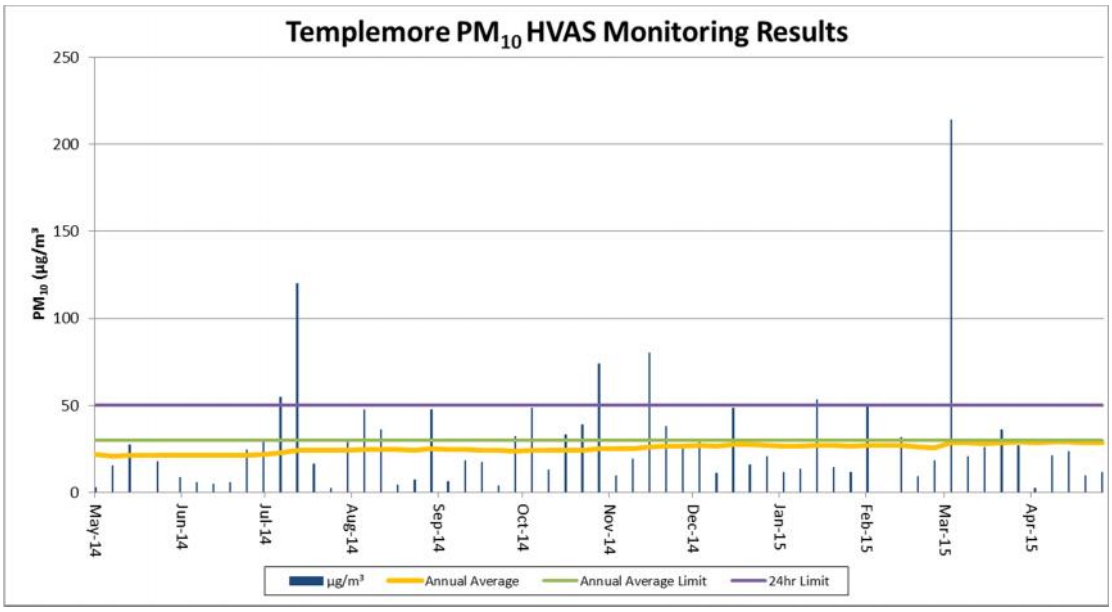


Figure 6 - Templemore HVAS PM_{10} Data
May 2014 – April 2015

During the reporting period, the PM_{10} results at the "Merriown" monitor have not exceeded the compliance criteria. The "Merriown" monitor remains within the annual average compliance criteria of 30µg/m^3, with the running annual average of 15.31 µg/m^3 at the end of the reporting period (Figure 7).

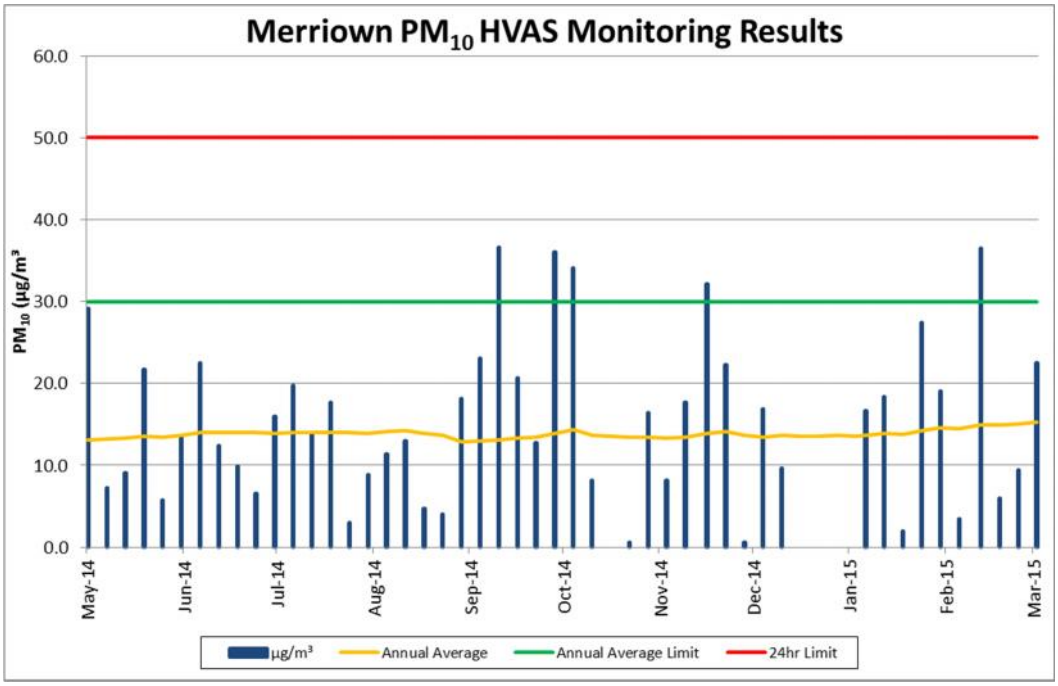


Figure 7 - Merriown HVAS PM_{10} Data
May 2014 – April 2015

The full data set for the PM_{10} monitoring over the life of the mine, including graphs of long term data records, is contained within Appendix 4.

Tarrawonga has continued to receive complaints about dust despite continuing to improve dust management practices over the reporting period through increased water application on haul roads and continuation of best operational practices to improve dust mitigation. Dust impacts are further complicated by cumulative impacts from Tarrawonga, Boggabri Coal and Maules Creek Coal, with complainants not necessarily able to distinguish dust sources from Tarrawonga, Boggabri, Maules Creek or the local unsealed roads. This is despite photographic evidence from the site camera located on the northern emplacement which has generally supported Tarrawonga claims that dust generation is minimised with no specific dust source associated with operating equipment being able to be identified.

A major contributing factor to visible dust in the wider valley is dust generation from unsealed roads such as Rangari Road, Goonbri Road, Wean Road, Dripping Rock Road, Blair Athol Lane and Leard Forest Road. During the reporting period Goonbri Road was the main access to the Maules Creek Coal Mine which saw a significant increase in daily light and heavy vehicle movements along Goonbri Road and adjacent roads including Blair Athol Lane and Rangari Road.

During the winter period, with temperature inversions prevalent, a layer of dust can be visible during the early morning until the inversion layer dissipates. The impact of road dust on overall dust levels has been identified by the real time PM_{10} unit located at the “Flixton” property, with spikes in PM_{10} concentrations correlating with

additional road use associated with shift change events at the mine sites. Tarrawonga employees and contractors are encouraged to utilise sealed roads where possible to minimise this impact.

3.1.4 Comparison with EA Predictions

The Air Quality and Greenhouse Gas Assessment (AQGHGA) was undertaken by PAE Holmes Pty Ltd as part of the Tarrawonga Coal Project mine extension (*Tarrawonga Coal Project Environmental Assessment, Appendix D, 2012*). The predicted levels and comparisons with actual monitoring data are included below for both dust deposition and PM_{10}.

Dust Deposition

The AQGHGA predicted that the annual average dust deposition levels at all receptors surrounding the Project Area would be below the relevant criteria of 4g/m^2/month for cumulative dust deposition when using a background dust deposition level of 1.2g/m^2/month.

There was an exceedance of the criteria (4g/m^2/month) recorded at site EB-15 (7.8g/m^2/month) which is located on project related land, during the reporting period. The exceedance at EB-15 is not unexpected as this monitor is located between Boggabri Coal's ROM pad and Tarrawonga operations.

PM_{10}

The AQGHGA predicted that cumulative impacts from the extension of the Tarrawonga mine and background levels would not exceed the annual average PM_{10} limit of 30µg/m^3 at any receiver or the 24 hour PM_{10} concentration limit of 50µg/m^3 at any privately-owned receiver. The highest 24 hour concentration recorded during the reporting period was 214µg/m^3 at "Templemore" and 36.6µg/m^3 at "Merriown". The highest annual rolling average during the reporting period was 28.67/m^3 at "Templemore" and 15.31µg/m^3 at "Merriown". Although the annual averages of both monitors are below the annual average criteria, exceedances of the 24 hour concentration limit occurred at "Templemore" in July 2014 (2), October 2014 (1), November 2014 (1), January 2014 (1) (site not operating on day of exceedance), and March 2014 (1). As previously mentioned, this site is project related and therefore the criterion does not apply.

During the reporting period an Independent Environmental Audit was undertaken by SMEC. Findings of this audit are in Appendix 13.

3.2 Erosion and Sedimentation

3.2.1 Management

Methods for the management of erosion and sediment control at the mine are presented in the MOP, and the draft Water Management Plan.

Control of erosion and sediment generation is achieved primarily through the implementation of water management controls identified in Section 2.8.2 and shown on Plan 4. Water usage for dust suppression ensures adequate storage capacity is available within the various water containment structures to receive inflows. Additional measures which assist in the control of erosion and sedimentation include:

- Minimising the extent of disturbance consistent with operational requirements;
- Revegetation of long-term subsoil and topsoil stockpiles, areas shaped to their final landform and areas no longer required for mining-related purposes;
- Undertaking soil management activities generally in accordance with the soil stripping and stockpiling recommendations from Geoff Cunningham Natural Resource Consultants and McKenzie Soil Management; and
- Installation of contour banks and rock-lined waterways on the final landform following soil application.

Existing soil stockpiles are located on gently sloping or near flat areas surrounded by grassland which effectively reduces the runoff velocity, and hence erosive potential, from any run-on waters. Soil stripped during the reporting period was stockpiled on top of the northern and southern emplacements. TCPL is aware of the potential for stockpile erosion and will adopt stockpile protective procedures to minimise impacts as required over the remaining life of the mine. All soil stockpiles on the site are sown to cover crops on completion to aid in stabilisation.

3.2.2 Performance

The effectiveness of the procedures for erosion and sedimentation management are assessed visually as part of routine mine operations and supervision undertaken by Tarrawonga Coal, with any ameliorative works initiated as and when required.

Continued compliance with licence discharge conditions throughout the reporting period has shown that each LDP catchment has the necessary capacity to manage 5 day rainfall events which up to 38.4mm. Ongoing performance will be monitored and should de-silting of sediment basins or storage dams be required works be undertaken to ensure ongoing compliance with licence and approval conditions.

3.2.3 Comparison with EA Measures

The Tarrawonga Coal Project EA stated that new and existing erosion and sediment control structures would be inspected by mine personnel on a regular basis and following rainfall events greater than 25mm in a 24 hour period to assess integrity, identify instances of potential erosion and determine retained capacity. The Environmental Officer is responsible for undertaking monthly environmental inspections as well as inspections after heavy rainfall. Site mining supervisors also undertake daily inspections of the site which include visual assessment of water management structures.

During the reporting period an Independent Environmental Audit was undertaken by SMEC; findings of this audit are in Appendix 13.

3.3 Surface Water Pollution

3.3.1 Management

The prevention of surface water pollution is achieved through the management of surface water as presented in Section 2.8.2.

3.3.2 Performance

3.3.2.1 Wet Weather Discharges

TCPL has, at all times, made every effort practically possible to avoid discharge and to minimise impacts when discharge is inevitable (i.e. maintenance of sediment control fencing). No instances of wet weather discharge occurred during the reporting period.

3.3.2.2 Conclusion

Significant improvements have been made in regards to managing wet weather discharge issues, with the successful trial and implementation of liquid flocculent into storage dams when required (not required during this reporting period), as well as constructing additional dams for increased storage capacity and improved water management (no new dams required this reporting period). Signage indicating dam names and purpose has been installed to allow for easy identification of necessary storage capacities. The draft Water Management Plan prepared by URS to comply with PA 11_0047 was under review during the reporting period taking into consideration the comments from respective agencies. It is expected that this document will be submitted to the Secretary of DP&E for approval during the next reporting period.

3.3.2.3 Surface Water Storages

In addition to monitoring of wet weather discharge events, TCPL undertakes quarterly sampling of surface waters, with samples during the reporting period submitted to ALS Acirl Pty Ltd for analysis. The results of analysis are presented in Appendix 5.

Whilst there are no criteria or concentration limits specified for the quarterly surface water samples, the results do provide an indication as to the quality of waters on-site.

EC levels in various storages have shown to be variable, and have been the subject of previous discussions during AEMR reviews. Results presented over the last 12 months continue to identify fluctuating EC levels.

The assessment of sediment load during these quarterly water monitoring events also provides an indication of the capacity for those storages to meet water quality criteria should a wet weather discharge occur, and if additional treatment methods would be warranted to minimise potential for a non-compliant discharge.

3.3.3 Comparison with EA predictions

The 2012 Tarrawonga Coal Project EA identified no consistent difference between water quality at sites upstream and downstream of the mine. It did however note potential impacts on creek water quality from elevated suspended solids contained in runoff and/or leakage or spillage of hydrocarbons from infrastructure areas. No hydrocarbon related issues or impacts on creek water quality from elevated suspended solids in runoff have occurred during the reporting period.

As per the Tarrawonga Coal Project EA, off-site creek monitoring locations have not changed. Assessment of Arsenic, Molybdenum and Selenium have continued in accordance with water management plan requirements, with no suggested trend of enrichment of these minerals in surface waters adjacent to the overburden emplacements.

During the reporting period an Independent Environmental Audit was undertaken by SMEC. Findings of this audit are in Appendix 13.

3.4 Groundwater Pollution

3.4.1 Management

With the exception of fuels and oils, no materials occur, or are retained on the mine site which is likely to be a source of groundwater pollution.

The methods for management of potential pollutants are summarised in Section 2.8. Ongoing monitoring to assess trends in groundwater chemistry will enable assessment of potential contaminants to groundwater, with particular emphasis on heavy metals and major cations and anions. Groundwater monitoring requirements are identified in the Water Management Plan.

3.4.2 Performance

Throughout the life of the mine to date, Tarrawonga Coal's performance with respect to groundwater management, the prevention of pollution and the assessment of impacts on groundwater availability to other surrounding users, has been assessed through groundwater level and chemistry monitoring. This monitoring has been undertaken at a series of operating and abandoned bores within ML 1579, 1685 and 1693 and extends to distances of up to 3km from the mining activities. Frequency and parameter analysis required are described in the draft Water Management Plan.

Appendix 6 presents the results of the groundwater monitoring undertaken since the commencement of mining at the Tarrawonga Coal Mine. Monitoring sites are shown on Figure 5.

Groundwater sampling and analysis was conducted by ALS Acirl Pty Ltd during the reporting period. A review of the groundwater monitoring results presented in Appendix 6 shows the following trends:

Groundwater levels

Groundwater levels within most bores remained relatively consistent throughout the reporting period.

Two vibrating wire piezometers were installed into exploration boreholes drilled in 2011 (TA60c and TA65c). The logger data from TA60 shows continual drawdown of water levels in the Velyama Seam and Velyama-Nagero interburden whilst logger data from TA65 shows continual draw down from Velyama-Nagero interburden; Nagero Seam and Nagero UN Interburden. Logger data from both TA60 and TA65 for the remaining depths shows relatively consistent water levels.

Groundwater quality

- The water in most bores is generally neutral in pH to mildly alkaline.
- The water in all bores can be described as fresh to brackish.

- During the reporting period the ANZECC guideline trigger values for livestock drinking water were exceeded on two occasions;

  - MW2 9th September 2014: Exceeded trigger value for aluminium recording 14.8mg/L (trigger level - 5mg/L), results in subsequent monitoring on 26th February 2015 fell below trigger value.

  - MW5 9th September 2014: Exceeded trigger value for aluminium recording 12.7mg/L (trigger level - 5mg/L), results in subsequent monitoring on 26th February 2015 fell below trigger value.

3.4.3 Comparison with EA predictions

The Tarrawonga Coal Project EA identified that there would be negligible drawdown effect on alluvial and porous rock systems and that the drawdown would only be in an area where no privately-owned bores are located. It also indicated that variations in standing water levels across the monitoring network are generally considered to be typical of natural effects and a response to rainfall trends and farming activity. This has been the case throughout the reporting period with all monitoring locations maintaining consistent levels (with fluctuations). Vibrating Wire Piezometers installed in TA60 and TA65 continue to demonstrate depressurisation as predicted in the Tarrawonga Coal Project EA as the mine moves toward the east.

3.5 Contaminated or Polluted Land

Prior to mining, the project area was a greenfield site. Discussion with landowners during the preparation of the EIS revealed that no environmentally harmful products had been used on their landholding nor had there been any disposal of potential environmental contaminants.

Areas identified of potential land contamination during the Tarrawonga Extension Environmental Assessment have not been disturbed during this reporting period and are several years from disturbance based on current mine planning.

3.6 Threatened Flora

Investigations undertaken by Geoff Cunningham Natural Resource Consultants Pty Ltd as part of the original Mine EIS identified no significant impact on threatened flora species, endangered ecological communities, endangered flora populations or critical habitat as a consequence of the development.

Establishment of monitoring plots commenced in April 2007 and has continued as required. Over the life of the mine, a total of 28 quadrats are to be established across rehabilitation sites and control sites.

During the reporting period, vegetation monitoring was conducted during mid to late 2014 by Eco Logical Australia Pty Ltd (Appendix 7). This monitoring comprised of:

- Multi-spectral imagery capture across the entire target area (including control areas) on 4 September 2014 using 4-Band WorldView-2;
- Native vegetation monitoring undertaken on 19 and 20 November 2014; and
- Soil profile analysis undertaken on 7 October 2014. Remote sensing (multi-spectral imaging) on the 25th August 2013;

Changes in the 2013 and 2014 Normalised Differential Vegetation Index (NDVI) of multi-spectral imagery were assessed. Areas of significant increases or decreases in photo synthetically active biomass (PAB) across the site were associated with mine rehabilitation or clearing for the mine extension and associated activities. There were no areas of significant change in groundcover within the rehabilitation and control zones.

Woodland survey monitoring in the control and rehabilitation areas in November 2014 is consistent with the previous monitoring period (January 2014), and the results are indicative of the drier than average conditions experienced prior to and throughout 2014, i.e. continued natural declines in native species cover.

The soil pit assessment undertaken in the rehabilitation area showed that root establishment for grasses was occurring down to 0.10m. Only one horizon was identified, consisting of brown sandy clay with chunks of medium – heavy clay surrounded by rocks varying from 10 – 30mm up to a depth of 0.46 m. The soil pit assessment undertaken in the control area had 3 horizons with only horizon A being distinct, which had 0.24 m of brown soil containing minimal organic matter. Tree roots extended to 0.60 m.

The Whitehaven Regional Biobank site was formally established on the 28th June 2012 under Biobank Agreement 43. This Biobank site now accounts for Tarrawonga offset requirements associated with the original Tarrawonga development and the 2010 modification. The biobank credits required to be retired for these approvals occurred on the 17th April 2013, and the area is now subject to active management in accordance with the Management Plan for the Regional Biobank site.

A stage 1 Biodiversity Management Plan (BMP) addressing on site biodiversity management was approved during the reporting period. A stage 2 BMP incorporating approved threatened species and endangered ecological community implementation plans, and off site biodiversity management, will be provided for

stakeholder comment prior to submission to Secretary DP&E for approval, in the next reporting period.

3.6.1 Comparisons with EA Measures

The Biodiversity Assessment undertaken as part of the Tarrawonga Coal Project EA outlines the approved areas of disturbance. Approximately 56.2ha was cleared in advance of the pit during the reporting period; a further 26.9ha was cleared during the end of the last reporting period and was part of the 2014 clearing campaign which ran from February through till May. Details of land clearing are outlined in (Appendix 11). Flora and fauna monitoring has occurred as identified in the Tarrawonga Coal Project EA (see Appendix 7 for reports), with pre-start clearance surveys completed by recognised ecologists prior to clearing activity.

During the reporting period an Independent Environmental Audit was undertaken by SMEC. Findings of this audit are in Appendix 13.

DP&E undertook an Archaeology and Ecology audit during the audit period specifically focussing 2014 and 2015 clearing activities and adherence to the project approval, Biodiversity Management Plan and Heritage Management Plan.

3.7 Threatened Fauna

The annual terrestrial fauna and habitat monitoring was undertaken on the 27th and 28th August 2014 and the 5th and 6th November 2014.

The report is provided in Appendix 7 and includes details on the suite of monitoring undertaken. As with flora monitoring, the results from the Eco Logical assessment will form a quantitative set of baseline data for ongoing monitoring via these methods.

A total of 100 bird species were recorded across all monitoring sites by ELA, with most species being recorded in the woodland control plots. There was a significant decrease of species identified on rehabilitation survey plots from September 2013 (Appendix 7). The cause is related to the disconnect of the rehabilitation area to the Leard State Forest as a result of the mine extension cleared between Tarrawonga and Boggabri rehabilitation areas and unfavourable weather conditions (wind and rain) at time of monitoring. Five species listed as vulnerable under the TSC Act were recorded during the survey, most of which occurred in control plots. One occurred in Fauna Rehab 1.

- *Chthonicola sagittata* (Speckled Warbler)
- *Climacteris picumnus* (Brown Treecreeper)

- *Glossopsitta pusilla* (Little Lorikeet)
- *Hieraaetus morphnoides* (Little Eagle)
- *Pomatostomus temporalis temporalis* (Grey-crowned Babbler)

Of the non-bird fauna *Macropus giganteus* (Eastern Grey Kangaroo) was recorded at all rehabilitation and control zones, and *Macropus robustus* (Common Wallaroo) was also recorded at all zones with the exception of Fauna Control 5. *Macropus rufogriseus* (Red-necked Wallaby) was recorded at Fauna Control 5. These species have been recorded in previous years. The introduced species *Vulpes vulpes* (Fox) was recorded on Fauna Control 4 and *Lepus capensis* (Hare) was recorded at Fauna Rehab 1. Neither of these species has been recorded by ELA previously.

3.7.1 Comparison with EA Measures

The Tarrawonga Coal Project EA identified pre-clearance fauna surveys, rehabilitation and revegetation of disturbed areas and fauna monitoring as measures to avoid or mitigate impacts on fauna. Appendix 7 provides the Rehabilitation Monitoring Report undertaken by Eco Logical Australia. Rehabilitation is discussed in Section 5.

During the reporting period an Independent Environmental Audit was undertaken by SMEC. Findings of this audit are in Appendix 13.

DP&E undertook an Archaeology and Ecology audit during the reporting period specifically focussing 2014 and 2015 clearing activities, and adherence to the project approval, Biodiversity Management Plan and Heritage Management Plan.

3.8 Weeds

3.8.1 Management

Weed management within the Project area involves general observations as well as six-monthly targeted inspections to determine levels of weed infestation. Weed control is undertaken by contractors or Whitehaven's Environmental Field Officer. All persons involved with weed control hold required chemical handling certificates.

3.8.2 Performance

Ongoing weed management during the reporting period comprised:

- Spot spraying of African Boxthorn within the ML (particularly in the waste emplacement rehabilitation and around SB5A);
- Spraying of Silver leaf Nightshade along roadsides and within the ML;

- Spot spraying of general weeds and grasses around the administration office and workshops;
- Spot spraying of Prickly Pear, Bathurst Burr and Noogoora Burr within the ML;
- Targeted spot spraying of Green Cestrum and St Johns Wart on and adjacent to the Willeroi biodiversity offset area;
- Facilitation of Cochineal to manage Prickly Pear plants; and
- Spraying of grasses along rip lines and mounded areas to reduce competition with planted tubestock in rehabilitation areas.

Key recommendations from the ELA report relating to weed control include targeted control of African Boxthorn across the site and weed management protocols are applied to prevent further proliferation of Rhodes Grass; management of which will be undertaken during the upcoming reporting periods.

3.9 Blasting

3.9.1 Blast Criteria and Control Procedures

3.9.1.1 Blast Criteria

Blasting criteria for the Tarrawonga Coal Mine are nominated in PA 11_0047 and specify that:

- Blasting must only be carried out between 9.00 am and 5.00 pm, Monday to Saturday inclusive. Blasting is not allowed on Sundays, public holidays or at any other time without the written approval of the Director-General.
- A maximum of one (1) blast per day; unless an additional blast is required following a blast misfire and a maximum of 4 blasts per week averaged over a calendar year for the project:
- The overpressure level from blasting operations must not:
    - exceed 115dB (Lin Peak) for more than 5% of the total number of blasts over a period of 12 months; and
    - exceed 120dB (Lin Peak) at any time.
- Ground vibration peak particle velocity from the blasting operations must not:
    - exceed 5mm/s for more than 5% of the total number of blasts during each reporting period; and
    - exceed 10mm/s at any time, at any residence on privately-owned land.

3.9.1.2 Control Procedures

Fly rock, air vibration, ground vibration and dust from blasting are controlled using a combination of design and operational methods which are detailed in the MOP and/or documented blasting procedures.

3.9.2 Performance

During the reporting period, a total of 90 blasts were initiated (all of which were monitored).

There were four instances of monitoring results exceeding 115 dB during the reporting period, occurring at the project-related "Matong". This exceedance falls within the allowable 5% of blasts in a 12 month period over 115 dB but not greater than 120 db. There were three instances of blast results exceeding 120 dB during this reporting period.

- 30th June 2014 – 122.7dB at the project related "Matong"
- 16th September 2014 – 120.3dB at the project related "Matong"
- 16th January 2015 – 127.3dB and 122.8dB at the project related "Tarrawonga" and "Matong" respectively.

As the properties are project related they are not considered to be non-complaint.

The maximum recorded ground vibration during the reporting period was 1.22mm/s recorded at Tarrawonga on 20th April 2015. This is well inside the consent criteria of 5mm/s.

Upon approval of the Blast Management Plan the blast monitors will be relocated to the nearest private receivers in the south and east; this will provide suitable monitoring to determine ongoing compliance.

All blast monitoring results for the reporting period, including the time of initiation has been included in Appendix 8.

3.9.3 Comparison with EA predictions

Blasting impact predictions are presented in Appendix C of the Tarrawonga Coal Project EA and indicate that vibration and air blast emissions would comply with the relevant human comfort and structural damage criteria at nearby privately-owned receivers.

There were three instances of exceeding the 120dB limit during the reporting period; as these occurred on project related property they are not considered non-

compliant. The one instance of exceeding 115dB does not exceed the 5% limit as specified by the project approval. In addition the exceedance occurred on project related property and as such the blasting criterion does not apply.

The Blast Management Plan was resubmitted for approval, following review comments received from DP&E, during the reporting period, with approval expected in the next reporting period. The development of a Road Closure Management Plan as part of the preparation of the Blast Management Plan was required prior to undertaking road closures for the purposes of blasting. This plan was developed in consultation with relevant stakeholders, including Narrabri Shire Council. During the reporting period the plan was enacted on one occasion.

During the reporting period an Independent Environmental Audit was undertaken by SMEC. Findings of this audit are in Appendix 13.

3.10 Operational Noise

3.10.1 Criteria

Noise compliance criteria are those of PA 11_0047 which are specified as follows:

Noise Criteria dB(A)

Location	***Day, Evening & Night $L_{Aeq\ (15\ min)}$***	***Night $L_{A!\ (1\ min)}$***
All other privately-owned residences	*35*	*45*

Road Traffic Noise Criteria dB(A) $L_{Aeq\ (1\ hour)}$

Location	***Day***	***Evening***	***Night***
Any residence on privately-owned land	*60*	*60*	*55*

A number of other specific conditions (i.e. acquisition, monitoring protocols and cumulative impacts) are listed in PA 11_0047 (Appendix 1) and EPL 12365 (Appendix 2).

3.10.2 Control Procedures

Control of noise generation and propagation on the mine site is by a combination of general source and propagation path methods including:

- Installation and maintenance of appropriate mufflers on plant and equipment;
- Where operationally feasible, scheduling activities to minimise operation of equipment in exposed locations when winds are blowing towards residences;

- Equipment removal or replacement;
- Changing operational procedures;
- Restricting hours of operations;
- Enclosure of fixed items of plant, e.g. generators;
- Bunding close to noise sources to create obstructions to the propagation path;
- On-going site road maintenance using the mine-based grader; and
- Regular equipment maintenance.

Tarrawonga Coal also regularly liaises with surrounding neighbours to seek feedback not only on noise, but on all mining activities. Any issues raised are investigated and appropriate measures are implemented to alleviate further impacts.

3.10.3 Operational Noise Monitoring

3.10.3.1 Introduction

Routine attended noise monitoring programs were undertaken quarterly during the reporting period by Spectrum Acoustics. The noise monitoring sites are identified on Figure 3. A copy of all the attended noise monitoring reports is presented in Appendix 9.

In addition to the operational noise requirements, Tarrawonga Coal monitors road transport noise along public sections of the coal haulage route, in accordance with the Tarrawonga and Rocglen Road Noise Management Plans. This monitoring occurs at the privately owned residences on the “Weroona” property and “Brooklyn” property located off Blue Vale Road. The results of this noise monitoring are presented within Appendix 9.

In accordance with the requirements of PA 11_0047 and EPL 12365, TCPL undertook real time noise monitoring during the reporting period. Monitoring was undertaken at the “Matong” property.

During this reporting period, Tarrawonga Coal continued to implement the noise management procedures in relating to real time monitoring e.g. operational reviews. The procedure has shown to provide crucial data in relation to the management of noise emissions from the operation.

The following sub-sections present a summary of the outcomes of attended noise monitoring over the reporting period.

3.10.3.2 June 2014 Noise Monitoring - Attended

Noise monitoring was undertaken from the 10th to the 12th June 2014. TCM were in exceedance of the operational noise criterion at the "Tarrawonga" monitoring location on nights of 11th and 12th of June, and day and evening of 12th June.

As the "Tarrawonga" property is project owned land the noise criterion does not apply.

3.10.3.3 June 2014 Noise Monitoring – Road Noise

Road noise monitoring was conducted at the "Brooklyn" (2 residences) and "Weroona" properties on the 13th June 2014, with the following observations and results:

- 57 truck movements were recorded during the measurement period for Residence 1 and 2 at "Brooklyn" (9.46am to 10.47am). The calculated contribution at Residence 1 from mine-related vehicles was 55 dB(A),$L_{eq\ (1\ hour)}$. The calculated contribution from mine-related vehicles at Residence 2 was 50dB(A), Leq (1 hour). Both results are below the daytime criterion of 60 dB(A) $L_{eq\ (1\ hour)}$.
- Over the course of the measurement period at "Weroona" (8.34am to 9.35am) there were 57 coal truck movements related to Tarrawonga and Rocglen. The total measured contribution from mine-related vehicles at "Weroona" was 50dB(A),$L_{eq\ (1\ hour)}$. This is below the daytime criterion of 60 dB(A) $L_{eq\ (1\ hour)}$.

3.10.3.4 September 2014 Noise Monitoring – Attended

Noise monitoring was undertaken from the 9th to the 12th September 2014. TCM was in exceedance of the operational noise criterion at the "Tarrawonga" monitoring location during the days of 9th and 12th September and during the nights of 9th and 12th September. TCM did not exceed the sleep disturbance criterion.

As the "Tarrawonga" property is project owned land the noise criterion do not apply.

3.10.3.5 December 2014 Noise Monitoring – Attended

Noise monitoring was undertaken from the 9th to the 12th December 2014. Noise emissions from TCM were higher than the operational noise criterion at the "Tarrawonga" monitoring location during the night of the 10th.

TCM did not exceed the sleep disturbance criterion.

As the "Tarrawonga" property is project owned land the noise criterion does not apply.

3.10.3.6 December 2014 Noise Monitoring – Road Noise

Road noise monitoring was conducted at the "Brooklyn" (2 residences) and "Weroona" properties on the 17th and 18th December 2014, with the following observations and results:

- 51 truck movements were recorded during the measurement period for Residence 1 and 2 at "Brooklyn" (8.58am to 9.59am and 10.05am to 11.06am respectively). The calculated contribution at Residence 1 from mine-related vehicles was 52 dB(A), Leq $_{(1\ hour)}$. The calculated contribution from mine-related vehicles at Residence 2 was 41dB(A), Leq (1 hour). Both results are below the daytime criterion of 60 dB(A) $L_{eq\ (1\ hour)}$.
- Over the course of the measurement period at "Weroona" (9.13am to 10.14am 18th December) there were 49 coal truck movements related to Tarrawonga and Rocglen. The total measured contribution from mine-related vehicles at "Weroona" was 50dB(A),$L_{eq\ (1\ hour)}$. This is below the daytime criterion of 60 dB(A) $L_{eq\ (1\ hour)}$.

3.10.3.7 March 2015 Noise Monitoring – Attended

Noise monitoring was undertaken from the 23rd to 26th March 2015 at the "Barbers Lagoon", "Bungalow and "Matong" properties. Noise emissions were within specified criteria.

3.10.4 Comparison with EA predictions

During the reporting period it was identified that noise levels measured at the "Tarrawonga" property were generally in accordance with predictions made in the 2011 Extension EA, with noise levels up to 5dB above the standard 35dB criteria. The "Tarrawonga" property is project related land.

Following the approval of the Noise Management Plan attended noise monitoring is undertaken at two private receivers, and at on the boundary of a third private receiver. Initial results indicate that levels are generally in accordance with EA predictions.

Sound power level testing was undertaken on onsite equipment during the reporting period. The results generally indicate that the equipment onsite has exceeded the EA sound power level prediction, in particular the CAT 785C truck fleet and the CAT D10

and D11 dozer fleet (March 2014 & July 2014). Subsequent sound power level testing in March 2015 indicates that the CAT 785C fleet is generally compliant. The remaining equipment onsite is generally in accordance with the EA predictions. The results of this monitoring are presented in Appendix 9.

During the reporting period an Independent Environmental Audit was undertaken by SMEC. Findings of this audit are in Appendix 13.

3.11 Visual, Light

3.11.1 Management

Management/minimisation of local and more distant visual impacts is achieved by:

- Undertaking activities in accordance with the various management plans applicable to the mine, all of which incorporate safeguards which indirectly reduce visual impact;
- Minimising the extent of land disturbance / clearing in advance of mining;
- Progressive rehabilitation of disturbed areas; and
- Sympathetic positioning and direction of lights to avoid them impacting on local residences.

3.11.2 Performance

Tarrawonga Coal continues to minimise the visual impact of its activities to the extent practicable.

Temporary stabilisation works on the southern waste emplacement, identified in last year's AEMR/AR, were not undertaken during the reporting period. However, at the time of preparing this report the stabilisation works had been undertaken and will be reported in the 2015/2016 AEMR/AR. Works were postponed due to the consideration of a number of different options to achieve stabilisation of the exposed overburden/interburden material.

Visual impacts from dust generation are discussed in Sections 3.1.3 and 4.1.

3.11.3 Comparison with EA Predictions

The Tarrawonga Coal Project EA provided simulations from neighbouring properties as well as predictions for general visual impacts created by the mine.

Mine management continually reiterates the importance of sympathetic positioning of lighting plant however it is difficult at times to locate lighting to avoid any offsite impact whilst maintaining safety requirements. In the event that complaints are received in relation to lighting, immediate action is taken on site to reduce the lighting impact wherever possible.

The Tarrawonga Coal Project EA also notes progressive rehabilitation as a visual impact mitigation measure. Section 5 discusses rehabilitation during the reporting period.

During the reporting period an Independent Environmental Audit was undertaken by SMEC. Findings of this audit are in Appendix 13.

3.12 Aboriginal Heritage Management

3.12.1 Management and Consultation

A Cultural Heritage Assessment was completed in September 2011 as part of the Tarrawonga Coal Project EA by Kayandel Archaeological Services. A total of 57 sites (21 open artefacts, 11 scarred trees and 21 isolated artefacts) were located during the surveys of the Project Area. An updated Heritage Management Plan (HMP) was approved, as required in PA 11_0047, during the last reporting period and was in the process of review during this AEMR period following the Independent Environmental Audit. An additional requirement of PA 11_0047 includes the development of an Aboriginal Cultural Heritage Strategy (ACHS) in conjunction with the Boggabri Coal Mine and Maules Creek Coal Mine. This Strategy remains under development following the completion of the Stage One Scoping Study which was submitted to DP&E during the audit period.

During the reporting period the salvage of a culturally modified tree (AHIMS – 20-4-0347, Site Identifier – TCEP-ST-010) was undertaken in ML1685 in accordance with the HMP. The salvage report is presented in Appendix 12. Artefacts recovered in the previous reporting period, and the culturally modified tree salvaged during this reporting period, are currently stored onsite in a shipping container. This temporary keeping place was agreed to by the RAP's present during the salvage event of this reporting period. A long term keeping place is being investigated as part of the development of the ACHS.

During the reporting period soil stripping monitoring activities were undertaken for both the Northern and Central pits in advance of mining activities. No artefacts were located during these activities.

To date, the measures in place to protect Aboriginal cultural heritage are considered satisfactory, with all measures identified in the EA, Project Approval and HMP in

place. New procedures have been implemented to manage a significantly larger number of registered Aboriginal parties identified through the Tarrawonga Coal Project EA (refer to HMP).

3.12.2 Comparison with EA Measures

Management measures for Aboriginal heritage items are detailed in the Tarrawonga Coal Project EA and the HMP. All measures, where applicable, have been implemented during the reporting period including, salvage works, monitoring of soil stripping and ground disturbance activities by Registered Aboriginal Parties.

During the reporting period an Independent Environmental Audit was undertaken by SMEC. Findings of this audit are in Appendix 13.

DP&E undertook an Archaeology and Ecology audit during the audit period specifically focussing 2014 and 2015 clearing activities and adherence to the project approval, BMP and HMP.

3.13 Natural Heritage

There are no features of natural heritage within the Project Area and hence, no specific management procedures are required.

3.14 Spontaneous Combustion

3.14.1 Management

Tarrawonga Coal has a low percentage of inorganic sulphur and hence a low potential for exothermic oxidation reactions. The short residence time of ROM coal stockpiles at the mine also minimises the potential for spontaneous combustion incidents.

In the event of spontaneous combustion Tarrawonga Coal personnel are present within the area of the ROM coal stockpiles during work hours, and are trained to watch for indications of spontaneous combustion. Any incident would be followed by excavation to identify the source and extinguishment through water saturation.

3.14.2 Performance

There were no incidents of spontaneous combustion during the reporting period.

3.15 Bushfire Management

3.15.1 Management

The existing Bushfire Management Plan was updated in April 2013, as required by Condition 59 of Schedule 3 of PA 11_0047. The plan identifies policies, procedures, responsibilities, equipment and equipment maintenance schedules, emergency response procedures and contact details in place for the Tarrawonga Coal Mine. The Plan was issued to both the Rural Fire Service and Narrabri Shire Council for reference, and is available on the Whitehaven website.

Tarrawonga Coal maintains firebreaks around both its landholding and the mine area and maintains firefighting equipment as well as earthmoving equipment, a water truck etc. Any use of equipment for offsite bushfire control would be under the direction of the Rural Fire Service.

3.15.2 Performance

There were no bushfire incidents on or adjacent to the Project Area during the 2014/2015 reporting period.

3.16 Hydrocarbon Contamination

3.16.1 Management

It is Tarrawonga Coal's objective that:

- All bulk hydrocarbons, i.e. fuel, oils, grease etc. (both new and waste) retained at the Tarrawonga Coal Mine be contained within bunded areas located within the contained water management system as described in Section 2.8.2;
- All fixed or portable equipment incorporate self-contained bunding;
- Hydrocarbon-contaminated materials be disposed of appropriately; and
- Minor spillages, if occurring, are cleaned up and the contaminated soil either bio-remediated or transferred off-site to an appropriately licensed waste disposal area.

3.16.2 Performance

Tarrawonga Coal's procedures for hydrocarbon management have been effective throughout the reporting period with:

- No surface or groundwater contamination evident or reported by landowners; and
- No requirement for off-site disposal of contaminated materials.

A concrete apron has been constructed at the refuelling area to contain any spillages and prevent soil contamination.

3.16.3 Greenhouse Gas Emissions

Diesel Consumption

During the reporting period, a total of 18,722,258 litres of diesel fuel was used on site for mining related activity, which is an increase of approximately 2.79 million litres since the last reporting period. This increase is due to increased ROM coal production and increased overburden movement. Assuming an energy content of Automotive Diesel Oil of 38.6 GJ/kL and using Table 3 of the *National Greenhouse Accounts (NGA) Factors – July 2011*, the estimated direct – Scope 1 Greenhouse Gas emissions including all CO_2 and non CO_2 gases are shown in Table 6.

Table 6 - GHG Emissions - Diesel Fuel

	Diesel Fuel Usage kL	Emission Factor T $CO_{2\text{-}e}$/kL	Equivalent Tonnes
GHG 2012/13	18,755	2.7	50,639

The Tarrawonga site does not utilise electricity from the power grid, but via a number of diesel powered gensets. The emissions associated with diesel consumption by the gensets are included in the table above.

Explosives

During the reporting period, a total of 14,264 tonnes of explosives was used at Tarrawonga Coal Mine, which is an increase of approximately 4,001 tonnes from last year. Assuming a conversion factor of 0.1778, it is estimated that blasting at the mine yielded 2,536 equivalent tonnes of CO_2.

Fugitive Emissions

Fugitive emissions from ROM coal production are reported via Whitehaven's National Greenhouse and Energy Report, as required by the *National Greenhouse and Energy Reporting Act 2007*. Emissions for Tarrawonga are determined from borehole samples taken at the mine and gas sampling analysed by external consultants. The actual gas content from each gas bearing strata is then applied to the mass of the gas bearing strata which is under the extraction area of the mine during the relevant financial year. The 2013/2014 National Greenhouse and Energy

Report for the Whitehaven Group identified emissions from Tarrawonga of 2,084 total tonnes CO2-e carbon dioxide equivalent.

Summary

A summary of calculated total CO_2 equivalent tonnes/year for the reporting period is provided in Table 7.

Table 7 - GHG Emissions Summary

Source	Calculated Total CO_2 Equivalent tonnes/year
Diesel	50,639
Explosives	2,536
Fugitive Emissions	2,084
TOTAL	**55,259**

The potential for reducing greenhouse gas emissions at Tarrawonga is related predominantly to consumption of diesel use by plant and equipment. Methods are in place at site to maximise efficiency from the mining fleet through regular maintenance scheduling and, where possible, minimising the gradient and length of loaded haul runs for the operating dump trucks.

Tarrawonga Coal remains committed to a reduction in emission levels as a result of operations at the mine site.

The fuel burn rate has increased slightly over the last 12 months with an average rate of 7.9 litres/tonne of ROM coal. This compares to 7.8 litres/tonne of ROM coal in the 2013/14 reporting period; 9.8 litres/tonne ROM coal in 2012/2013 reporting period and 9.7 litres/tonne of ROM coal in the 2011/2012 AEMR period. The similar rate since the last reporting period can be attributed to continued mine planning efficiencies, similar overburden/coal strip ratio and similar haul distances.

As part of Whitehaven's participation in the Commonwealth government's Energy Efficiency Opportunities (EEO) Program, the Tarrawonga site is subject to review and assessment of energy use performance and potential energy savings mechanisms. This program ceased June 2014.

The site has been undertaking energy efficiency works in accordance with the requirements of the program and in the last reporting year noted a decrease in fuel use by ancillary equipment (dozers, water carts and graders), whilst maintaining or increasing production, as a result of streamlined mine planning and scheduling.

3.16.4 Comparison with EA Predictions

Greenhouse gas emissions associated with the mine were assessed in Appendix D of the Tarrawonga Coal Project EA. The total direct (Scope 1) emissions were estimated

to be approximately 0.2 million tonnes of carbon-dioxide equivalent (Mt CO_2-e) per annum. Scope 1 emissions are the release of greenhouse gases into the atmosphere as a direct result of an activity, or series of activities, that constitute the facility and include fugitive emissions from coal mines and diesel combustion.

Actual consumption (combining the major Scope 1 contributors of fugitive emissions, diesel consumption and explosives) totalled 50,639 tonnes (or 0.051 Mt), which is significantly lower than the predicted emissions. This is expected as PAE Holmes identified in Appendix D of the Tarrawonga Coal Project EA that their estimation was expected to be a significant overestimate as it was based on the standard National Greenhouse Accounts factor which at the time was identified to be approximately 45 times greater than the factor measured for the same coal seams for a nearby mining project. This assumption was confirmed during 2012 drilling at Tarrawonga and subsequent NGERS reporting.

During the reporting period an Independent Environmental Audit was undertaken by SMEC; findings of this audit are in Appendix 13.

3.17 Public Safety

3.17.1 Management

The mine is located wholly on WCL and Boggabri Coal owned land in a relatively remote area, in excess of 1 km from any public road and accessible only by a single access road which is locked when no mine-related personnel are at the mine. The site is fenced and appropriate signs installed.

Visitors to the mine are required to report to the mine office and unauthorised personnel are not permitted to move around the mine area unaccompanied. Procedures are in place with respect to blasting to ensure the area around each blast site is clear of personnel and that all surrounding residents are advised in advance of proposed blasts.

3.17.2 Performance

The procedures in place have been generally effective throughout the reporting period. However, anti-coal activists have on numerous occasions blocked haul roads and disrupted operations.

3.18 Feral Animal Control

Tarrawonga Coal continues to monitor feral animal occurrences both onsite and on other mine owned land and implements necessary control programmes if and when necessary.

A feral animal control program will be undertaken in the upcoming reporting period.

3.19 Land Capability

All land currently disturbed by mining is classified as Land Capability Class III, IV, VI and VII. All disturbances during the reporting period were undertaken on Class III, IV, VI and VII land.

On completion of all mining activities, the successful rehabilitation of areas of disturbance and the relinquishment of the mining leases, the land affected by mining within the Project Area will, in the main, be returned to a classification similar to that prior to mining.

3.20 Meteorological Monitoring

3.20.1 Introduction

A weather station is located at the project owned "Templemore" property.

3.20.2 Rainfall

Rainfall data for the reporting period recorded from the "Templemore" meteorological station is presented in

Table 8 and Figure 8. Full station data is presented in Appendix 10.

Table 8 - Rainfall Data
(1 May 2014 – 30 April 2015)

Month	*Monthly Rainfall (mm)*	*Long Term Average* (mm)*	*Cumulative Rainfall (mm)*	*Number of Rain Days (≥1mm)*
May 2014	17.0	42.5	17.0	3
June 2014	54.6	43.6	71.6	5
July 2014	12.0	42.7	83.6	2
August 2014	90.8	41.3	174.4	7
September 2014	11.0	40.3	185.4	1
October 2014	24.6	55.1	210.0	3
November 2014	16.4	62.2	226.4	3
December 2014	94.5	70	320.9	8
January 2015	98.2	71.7	419.1	7

February 2015	9.0	67.3	428.1	3
March 2015	37.8	47.8	465.9	5
April 2015	125.0	37.2	590.9	6
Total	**590.9**	**621.7**	**590.9**	**53**

Month	***Monthly Rainfall (mm)***	***Long Term Average* (mm)***	***Cumulative Rainfall (mm)***	***Number of Rain Days (≥1mm)***
May 2013	21.6	42.5	21.6	5
June 2013	136.6	43.6	158.2	7
July 2013	21.4	42.7	179.6	4
August 2013	5.0	41.3	184.6	1
September 2013	21.8	40.3	206.4	2
October 2013	13.0	55.1	219.4	1
November 2013	120.0	62.2	339.4	7
December 2013	20.4	70	359.8	4
January 2014	8.4	71.7	368.2	2
February 2014	37.8	67.3	406.8	3
March 2014	168.0	47.8	574.0	9
April 2014	8.2	37.2	582.2	2
Total	**582.2**	**621.7**	**582.2**	**47**

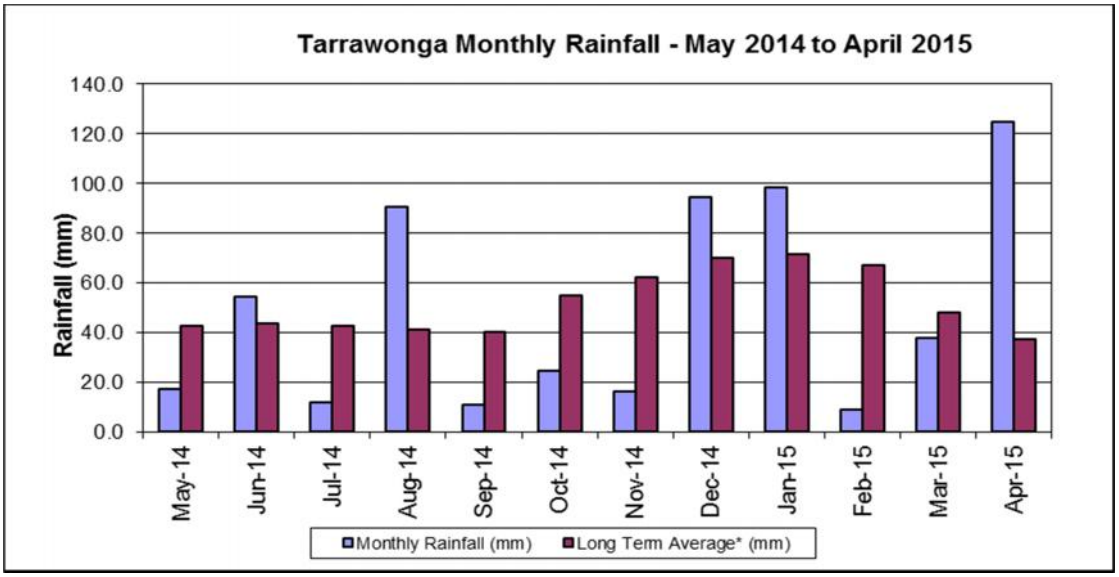


Figure 8 - Monthly Rainfall Data

A review of

Table 8 and Figure 8 shows that the total rainfall at the mine during the reporting period was 590.9mm. The total rainfall at the site was 30.8mm less than the annual average rainfall for Gunnedah and 9.7mm more than the mine's total rainfall for the 2013/2014 AEMR/Annual Review reporting period. Below average rainfall was experienced for the majority of the reporting period; in particular during spring. Seven of the twelve months received well below average rainfall. August and December 2014 and January and April 2015 received well above average rainfall which ultimately bolstered the annual figures.

3.20.3 Temperature

Average maximum and minimum temperatures for the reporting period are presented in

Table 9 together with long-term monthly averages for Gunnedah Pool (Bureau of Meteorology Station 055023).

Table 9 - Average Monthly Temperatures
(May 2014 – April 2015)

Month	Average Daily Temperature			
	Reporting Period (°C)		Station 055023 (Gunnedah Pool)* (°C)	
	Min	Max	Min	Max
May 2014	6.1	21.7	7.1	21.3
June 2014	3.5	18.0	4.3	17.6
July 2014	0.7	17.4	3.0	16.9
August 2014	2.4	18.6	4.2	18.9
September 2014	4.7	22.9	7.0	22.8
October 2014	9.3	29.6	10.8	26.7
November 2014	15.5	34.5	14.2	30.3
December 2014	17.4	33.1	16.8	32.9
January 2015	17.1	32.7	18.4	34.0
February 2015	16.9	33.2	18.1	32.9
March 2015	14.2	32.5	15.8	30.7
April 2015	11.7	26.2	11.4	26.4
Annual Average	**10.0**	**26.7**	**10.9**	**26.0**

* Averages from 1876-2011

3.20.4 Wind Speed and Direction

Fifteen minute average wind speed and direction data is collected from the Tarrawonga meteorological station, as it, together with operational records and environmental monitoring results, can be used to assess the environmental effects or consequences of specific activities undertaken at the mine or in surrounding areas. Monthly wind roses show that the dominant wind directions during the reporting period were from the south east (Appendix 10).

3.20.5 Inversions

The meteorological station at “Templemore” is fitted with temperature sensors at 2m and 10m intervals to assist in the determination of inversion conditions. As the noise results obtained over the reporting period were generally in compliance or within modelled limits, no specific investigation into temperature inversion impacts on noise propagation was undertaken. Noise exceedances at the “Tarrawonga” property were modelled in the Tarrawonga Project Approval EA. TCM has access to

data from a 60m tower with temperature sensors located at Boggabri Coal, as part of the cumulative management of air quality and noise. This data provides detailed information on inversion layers throughout the winter.

4 COMMUNITY RELATIONS

4.1 Environmental Complaints

Tarrawonga Coal maintains a designated complaints line, with messages checked on a daily basis (Monday to Friday) by the Environmental Officer. In the event of a complaint, details pertaining to the complainant, complaint and action taken are recorded on a "Complaints Form".

Eighteen (18) complaints were received during the reporting period. The nature of the complaints, details and responses to each complaint are presented in Table 10. The number of complaints has risen since previous reporting period (11 recorded in the 2013/2014 AEMR period and 55 recorded in the 2012/2013 AEMR period). There is also some duplication of complaints whereby a complaint was made directly to the mine and then additionally via the EPA.

Table 10 provides a comparison of complaints received over the past AEMR reporting periods.

The most common complaints were related to dust (including dust generation on the unsealed sections of nearby roads and blasting). Anonymous complaints received via the EPA totalled 50% of the complaints whilst complaints from the most prominent complainant totalled 33%. The remaining 17% of complaints were from individuals who registered a single complaint during the reporting period.

Any complaints that are made are reported to the Community Consultative Committee and documented in the AEMR/Annual Review.

Table 10 - Complaints Summary (2014/2015 Reporting Period)

#	Method	Date/Time of Complaint	Nature of Complaint	Investigation	Action Taken / Follow-up
1	Email to Environmental Super-intendant	21/05/2014 8:19am	Complaint regarding the heavy dust within the valley and around the complainant's homes through Tuesday 20/5 and morning of Wednesday 21/5. The complainant stated it is unacceptable to live with such conditions.	The Site Environmental Officer has undertaken preliminary investigation into the source, weather conditions, monitoring data and external factors which resulted in elevated atmospheric dust conditions on the day.	Meeting held with the complainant to discuss the handling of complaints, and dust, noise and blast monitoring.
2	After hours call to EPA	26/5/2014 3.35pm	Complaint to EPA on the 20/5/2014 at 6:00am with the caller reporting extreme levels of dust in the valley that morning coming from the two main coal mines. The caller also said above both the mines there is a black haze, a mixture of diesel and coal dust the caller believes. The weather was not windy on the day, with only a slight breeze. The complainant also noted that there was a lot of machine noise as well that morning.	Environmental Officer replied by email to the EPA 28/5/2014 advising that the site was aware of the poor weather conditions on the day of the complaint, made every effort to minimise dust generation and initiated an investigation following an email from the complainant to the Environmental Superintendent. The EPA was advised that the Tarrawonga Environmental Officer has been attempting to make a time to meet with the complainant since their last complaints with no advice to date from the complainant as to when they would like to meet.	Meeting held with the complainant to discuss the handling of complaints, and dust, noise and blast monitoring.
3	After hours call to EPA	26/5/2014 3.35pm	Complaint to EPA on 21/5/2014 regarding large amount of thick dust being generated by general mine activity plus a black inversion layer across the Tarrawonga and Boggabri Coal Mines and Leards Forest Rd at 6:30am. The complainant noted that the dust was still very heavy at the time of the call at 8:26am.	Environmental Officer replied by email to the EPA 28/5/2014 advising that the site was aware of the poor weather conditions on the day of the complaint, made every effort to minimise dust generation and initiated an investigation following an email from the complainant to the Environmental Superintendent. The EPA was advised that the Tarrawonga Environmental Officer has been attempting to make a time to meet with the complainant since their last complaints with no advice to date from the complainant as to when they would like to meet.	Meeting held with the complainant to discuss the handling of complaints, and dust, noise and blast monitoring.
4	Phone call to Environmental Officer	27/6/2014 1.20pm	Complaint made to the Environmental Officer regarding Blast No. 492 in the Tarrawonga Open Cut Pit. The complainant believed that the blast caused the house to shake in an unacceptable manner and that this was the second occasion within the last 3 weeks (Boggabri Blast) that had adversely impacted the property.	The Environmental Officer spoke to the complainant and advised that the blast was within compliance limits as specified in the project approval and the EPL. The concerns of the complainant were noted.	The Environmental Officer advised the complainant that the provision of relocating a blast monitor to the residence would provide accurate information regarding the impacts of blasting. The complainant agreed to the relocation of a blast monitor to the residence. Relocation is pending the approval of the Blast Management Plan.

#	Method	Date/Time of Complaint	Nature of Complaint	Investigation	Action Taken / Follow-up
5	Phone call to the Environmental Officer	9/7/2014	Complaint made relating to blast no. 494 and also blasting in general over the last few months. The house shook considerably during the blast. Complainant happy to work with Tarrawonga to reach an outcome.	The Environmental Officer discussed the matter at length with the complainant including blast timing, product etc. It was advised that the blast was within compliance limits specified in both the EPL and PA.	Advised complainant that a blast monitor would be relocated to a nearby residence and that it would be used to assess compliance against the blasting criterion. Relocation is pending the approval of the Blast Management Plan.
6	Phone call to the Tarrawonga Complaint Hotline	31/7/14	Complaint made relating to dust levels emanating from Tarrawonga on day of the complaint and also the previous afternoon.	An investigation was subsequently carried out by the Environmental Officer which identified increased dust levels blowing off an exposed drill pattern.	A water cart was utilised to water down drill pattern and cuttings to reduce dust emissions.
7	Phone call to the EPA	23/7/14 (Received 1/8/14)	Complaint made regarding dust coming from Tarrawonga.	Weather data and dust inspection records were reviewed indicating that a strong inversion was present on the morning of the complaint. Dust inspection carried out later in the day identified that dust was being minimised.	Response sent to the EPA via email.
8	Phone call to the EPA	30/7/14 (Received 1/8/14)	Complaint made regarding dust plume coming from Tarrawonga.	Weather conditions and dust inspection records were reviewed. Elevated dust conditions had been noted; in particular moderate winds resulted in dust blowing off an exposed drill pad (noted during dust inspection).	A water cart was utilised to suppress dust emanating from an exposed drill pad and drill cuttings. This drill pad had been part of the circuit but had dried since the last pass.
9	Phone call to the Tarrawonga Complaint Hotline	11/9/14 11.09 (follow-up call 1700)	Complaint made regarding the dust over the mine/s at 0700 and again 0900 on the morning of the complaint.	A review of weather conditions and real time dust monitor was undertaken following the discussion with the complainant. Only light winds were occurring on the morning of the complaint and would have impacted upon dust dispersal. The real time monitor showed no sign of increased PM10 levels.	Continue to monitor dust levels and ensure dust is being minimised
10	Phone call to the EPA	11/9/14 (received 12/9/14)	Complaint made reporting thick and heavy dust in the Valley from mining operations.	A review of meteorological conditions was undertaken post receiving the complaint; conditions were stable with a moderate inversion and low winds speeds. These conditions would have impacted upon dust dispersal. A review of real time dust monitor results showed no sign of increase in PM10 levels. Operations only commenced at 6.45am following the morning pre start meeting with two water carts in operation from the commencement of the shift. Given the time of the complaint there may have been other factors contributing to dust (such as local unsealed roads).	Response provided to the EPA via email.
11	Phone call to the EPA	16/9/14 (received 17/9/14)	Complaint made regarding ongoing dust pollution from mining operations.	A review of meteorological conditions, real time dust levels, operational notes and daily dust inspection records have been undertaken to outline the conditions on the day of complaint and actions implemented at site to minimise dust levels. At the commencement shift meteorological were stable with low	Response provided to the EPA via email.

#	Method	Date/Time of Complaint	Nature of Complaint	Investigation	Action Taken / Follow-up
				winds and a moderate inversion in effect; three water carts were in operation from the beginning of shift. Conditions deteriorated as expected (predictive weather forecast) during the morning at which point operations planned and implemented a number of dust minimisation strategies and measures to reduce dust levels; including, restricting dump truck speeds, restricting Bis haul truck speeds on the ROM circuit, and increased water use on exposed areas such as drill patterns and unused haul roads. Consideration was also given to shutting down a digger and coal crushing plants in high risk conditions. An adverse weather condition alarm was issued at 1000 enacting investigation level as per the PRP – Identification of Adverse Weather Conditions for Overburden Handling. At approximately 1030, the RH170 excavator and associated haul trucks were shutdown to enable water carts to continue to minimise dust. All three water carts were hot seated during the crib break (1130 – 1230) further allowing water trucks to target hotspots and reduce dust levels. Following the crib break the RH170 and trucks returned to operation. There were no subsequent adverse weather condition triggers; however wind speeds remained relatively moderate until mid-afternoon when wind speeds declined. The real time dust monitor did show some signs of elevated PM10 levels in particular during the morning; however, post crib break PM10 levels began to reside with only small spikes in an otherwise downward trend. 24hr PM10 levels for the day of the complaint were 23.8 which was also the peak. The OCE, Environmental Officer and Operations Manager monitored operations throughout to most efficiently managed and minimise dust levels; operators were also proactively managing dust through proper of equipment and requesting water cart when required.	
12	Phone call to DP&E	16/9/2014	Complaint related to blasting in high wind conditions.	At the time of the blast the wind speed was 6.7m/s at 312°. Wind speeds were monitored throughout the morning and it is noted that moderate wind conditions were observed. Due to these conditions, the decision to fire the shot was postponed until wind conditions were assessed and considered to be within limits (per Draft Blast MP, which has had two rounds of comments from DPE and will be re-submitted for approval in the next week or two). Wind speeds observed for the 45 minute period leading up to the shot	Response sent via email to DP&E.

#	Method	Date/Time of Complaint	Nature of Complaint	Investigation	Action Taken / Follow-up
				remained below the 7m/s threshold, 20 minutes prior the shot these conditions were confirmed with the Operations Manager and at the two minute countdown confirmation was provided to the shot firer & Operations Manager that wind speeds remained within limits.	
13	Phone call to the EPA	24/9/14 (received 3/10/14)	Complaint related to dust generated by blast at Tarrawonga Mine and dust conditions on the following day.	A review of blast records and meteorological data was undertaken following receipt of the complaint. Meteorological conditions were suitable for blasting at the time with clear skies, a wind speed of 1.9m/s and direction of 185°; these weather conditions were consistent throughout the morning of the blast with the wind emanating from the south and south – east. Dust inspection records for the 24th September identify no dust issues and meteorological conditions did not identify any adverse weather conditions; with a maximum speed of 2.7m/s and with prevailing winds from the north. Two water trucks were in operation throughout the day.	Response sent via email to the EPA on 9/10/14
14	Phone call to the EPA	7/10/14 (received 10/10/14)	Complaint related to high levels of dust being generated by Tarrawonga Coal; speeds high with significant gusts.	A review of meteorological conditions and operations was undertaken on receipt of the complaint. It was observed on arrival at Tarrawonga (0645) that there was increased dust surrounding the mining operations and adjacent unsealed roads and properties; it should be noted at the time of observation Tarrawonga had not commenced operations and had not been operational since the end of day shift on Saturday (4/10/14). It was also observed that there was significant dust being generated by increased traffic volumes on Goonbri Road (non-project related), dust was also being generated along other unsealed local roads. A review of meteorological conditions was undertaken upon arrival at site it was recorded that Category F Stability Class; this remained until approximately 0745. Operations were modified throughout the day to minimise dust generation; at the commencement of shift two water trucks were in operation and shortly after commencement a third water truck was utilised.	Response sent via email to the EPA on 16/10/14
15	Phone call to the EPA	10/10/14 (received 10/10/14)	Complaint related to dust covering the valley surrounding Tarrawonga Coal and Boggabri Coal.	A review of meteorological conditions and operations was undertaken upon receipt of the complaint. The Environmental Officer observed dust being generated by surrounding local unsealed roads in particular Goonbri Rd with non-project related traffic the major contributor. At that time a review of meteorological was also undertaken and Category F Stability Class was observed at 0705. Conditions and operations were monitored and conditions improved throughout the morning. Dust being generated from Goonbri Rd was consistent throughout the morning.	Response sent via email to the EPA on 16/10/14
16	Email to Group Environment	31/10/14	Complaint related to visible dust within the Wean Valley which is impacting upon breathing.	A review of operations and dust sources was undertaken by the Environmental Officer at the time of the complaint. The review found that there was an	Email sent to complainant at 10:08am 31/10/14. Email sent to the EPA on 24/11/14

#	Method	Date/Time of Complaint	Nature of Complaint	Investigation	Action Taken / Follow-up
	Manager		A subsequent complaint was made to the EPA, received by TCM on 13/11/14	increase in both mine and non-mine related traffic utilising local unsealed roads; in particular, Manilla and Goonbri Road. On the morning of the complaint all light vehicles travelling to Tarrawonga and Maules Creek mines were diverted via Blue Vale Road (dirt section) and Braymont Road due to protestor activity on the dedicated private haul road. In relation to the subsequent complaint received from the EPA; a review of the original investigation was undertaken, no additional information was obtained.	addressing the complaint and outlining the response provided to the initial complainant.
17	Phone call to the Environmental Officer, Environmental Superintendent and EPA	16/1/2015 12.01pm & 12.10pm	Complaint made regarding dust associated with blast no. 540; complaint advised that the plume resembled a bushfire and inundated the property impacting workers who stated that there was a strong sulphur smell and caused throat and eye irritation.	A preliminary investigation was carried out of the meteorological conditions, blast video and eye witnesses. No evidence of blast fume was identified; the dust plume could be attributed to a face burst in the blast causing an increase in dust generation. Further investigation details will be provided subsequent to the outcome of the investigation. Following further investigation of the dust generation caused by blast no. 540; the increased dust level has been attributed to *'face burst'* caused by broken ground with the blast pattern. No evidence of fume has been identified.	Tarrawonga Site Environmental Officer provided details of the blast which caused increased dust to the complainant on 16/2/2015. The Tarrawonga Environmental Officer and WHC Environmental Superintendent met with the complainant 10/3/2015.
18	Email to the Group Environment Manager	18/2/2015 12.21pm	Complaint received regarding dust associated with blast no. 547. Complainant advised it is the second blast related dust issue in recent weeks and does not believe that it is acceptable to live with this ongoing issue.	A preliminary investigation was carried by the Environmental Officer. Photos were taken onsite of the blast which so the dust generated from the blast mostly dissipate on site with evidence of some dust travelling eastward prior to dispersal in the atmosphere. A review of meteorological data indicated that conditions were satisfactory for blasting.	The Environmental Officer responded to the complainant providing details of the blast. The Tarrawonga Environmental Officer and WHC Environmental Superintendent met with the complainant 10/3/2015.

Table 11 - Yearly Complaints Comparison

AEMR/Annual Review Period	Issue											Total
	Dust	Noise	Driver behaviour – coal trucks	Blasting	Multiple impacts (dust, noise, blasting	Other traffic issues	Load coverage – coal trucks	Compliance with haulage hours	Lights	Surface Water or Ground-water	Other	
2006-2007				1		1				1		3
2007-2008	4		2	2	2			2		2		14
2008-2009			5					4	1		1	10
2009-2010		1	2	1	1	1	2	1				9
2010-2011			1	3	2	2	1	1				10
2011-2012	12	1	1	6	1	1	2					24
2012-2013	23	6	3	12	1	4	1		1	1	3	55
2013-2014	2	1		3	2	3						11
2014-2015	11	0	0	5	2	0	0	0	0	0	0	18

4.2 Community Liaison

In accordance with Condition 7 of Schedule 5 of PA 11_0047, a Community Consultative Committee (CCC) continues to meet on regular basis, meeting 4 times per year and once per year in a combined CCC with Boggabri Coal and Maules Creek Coal. The committee comprises representatives of Narrabri and Gunnedah Shire Councils, Tarrawonga Coal and the community and is chaired by John Turner (Independent Chairman).

During the reporting period meetings were held on the 21st May 2014, 7th August 2014, 19th November 2014, 19th November 2014 (Combined CCC) and 4th March 2015.

Tarrawonga Coal representatives continue to maintain regular personal contact with the neighbours in the vicinity of the mine and CHPP. These contacts not only provide a means of information dissemination, but also enable Tarrawonga Coal to ascertain and address any potential issues which may arise from time to time.

Community organisations and other local business and institutions regularly identify an interest with activities occurring at the mine site. In this regard, and to maintain links with those business and community members, information is provided as required, and on occasion, guided tours of the facility have been undertaken.

5 REHABILITATION

5.1 Buildings

There was no removal of buildings or rehabilitation of building sites during the reporting period.

5.2 Rehabilitation of Disturbed Land

5.2.1 Objectives

Tarrawonga Coal's rehabilitation / land use objectives for the Project approval area, (i.e. the area within the boundary of ML 1579, ML 1685 and ML 1693) are identified in the Mining Operations Plan Amendment A and in Table 12:

Table 12 - MOP Rehabilitation Commitments

Post Mining Land Use	Key Rehabilitation Goals
Final Landforms	• Create a physically and chemically stable and non-polluting post - mining landform. • Construct the Northern Emplacement to a maximum height of 370m AHD to integrate with the adjoining southern extent of the Boggabri Coal Mine waste rock emplacement and blend with the surrounding undisturbed environment including Leard State Forest (adjacent ridgeline has local high points between 370 and 382 m) and the Willow Tree Range. • Re-profile the Southern Emplacement to a final height of 340M AHD and partially infill the adjoining services corridor so that it integrates with the Northern Emplacement. • The Northern and Southern Emplacements will be shaped to be free draining with outer batters predominantly 10 degrees or shallower. • Construct the final top surface of the Northern Emplacement so that it drains in a stable manner to Goonbri Creek via a series of terraces with drop structures on the intervening batters.
Final Void	• Progressively backfill the open cut with overburden and inter-burden and reshape completed areas to their final landform shape so that they can be progressively rehabilitated. • Partially backfill the final void to the extent required to minimise long-term drawdown and water quality effects on local groundwater aquifers, so that their beneficial use is not compromised. • The total catchment for the final void will be defined by perimeter bunds and limited to achieve a target final void water equilibrium level of approximately 240 to 260 m AHD
Rehabilitation and	• Rehabilitation of land disturbed by the project will contribute to approximately 752 ha of native woodland vegetation communities

Revegetation Areas	within the project area, focused on Box Gum Woodland EEC. • Native vegetation areas in the Northern Emplacement will be vegetated with species to integrate with Boggabri's waste rock emplacement and the adjoining Leard State Forest. • The Southern Emplacement will be rehabilitated with native tree, shrub and grass species to achieve a native woodland / forest post mining land use. • The establishment of a minimum of 210 ha of Class 3 agricultural suitability land, including 160 ha with cropping capability. The final landform for agricultural areas will be developed to blend with the adjoining agricultural areas consistent with that area immediately adjacent to Goonbri Creek. • Minimise active disturbance areas by progressively rehabilitating, and by restricting clearing to the minimum required for operations. • Recover vegetation and habitat resources during clearing activities where practically possible and re-use in rehabilitated areas to provide habitat resources for fauna (e.g. trees, hollows). • Use soil resources stripped from disturbance areas directly for rehabilitation, but if this is not possible, minimise the time soil is stored in temporary stockpiles before being reused. • Install erosion and sediment control measures prior to the commencement of soil stripping and rehabilitation activities. • Plant cover crops on newly rehabilitated mine landform areas (and topsoil stockpiles) as soon as possible after completing earthworks, to minimise the potential for soil erosion. • Stabilise new infrastructure disturbance areas (e.g. road and dam embankments) as soon as possible by topsoiling and seeding. • Plant vegetation screens in key areas ahead of mine disturbance activities, to allow growth and screening to occur prior to the commencement of disturbance activities. • Revegetate the mine landforms to a combination of native woodland/forest and agricultural land uses that meet community and regulatory expectations in consideration of existing land uses and conservation values • Construct the low permeability barrier and permanent Goonbri Creek alignment such that they achieve their design objectives and the low flow channel is revegetated with riparian and floodplain vegetation, by using species characteristic of the Bracteate Honey myrtle (*Melaleuca bracteata*) community. (Note: Not to be undertaken within this MOP period). • Enhance the habitat values and biodiversity of the 3 km section of Goonbri Creek downstream of ML 1693, through revegetation, stock exclusion, and remedial earthworks if required. (Note: Not undertaken within this MOP period).

Domain	Rehabilitation Objectives
Primary Domains	
Active Mining	• Rehabilitation resources including vegetation, topsoil and habitat resources will be identified for salvage ahead of mining. • Vegetation and topsoil will be progressively stripped ahead of mining to minimise the total area of disturbance and the potential period of soil storage. • Mined areas will be progressively backfilled and rehabilitated where possible.
Water Management Area	• Clean water will be diverted around operational areas prior to disturbance, where practical. • Mine water and sediment laden (dirty) water runoff from disturbance areas will be captured and diverted to mine water and dirty water dams. • Mine water and dirty water will be preferentially used for operational requirements such as dust suppression and earthworks. • Dirty water will be treated before discharge from site in accordance with regulatory requirements. • No mine water will be discharged from site. • Water management structures will be designed and constructed prior to disturbance, in accordance with Best Practice and "the Blue Book". • Sediment dams and associated water management structures will remain in place until the catchment is rehabilitated and discharge water quality is similar to comparable undisturbed landforms.
Infrastructure Area	• Mining infrastructure will be removed progressively, and the area rehabilitated, when no longer required, • All land contamination will be identified and appropriately remediated.
Topsoil Stockpile Areas	• Topsoil stockpiles will be stabilised with sterile cover crops to minimise weed infestation and retain soil biological health. • Topsoil stockpiles will be constructed and managed to optimise physical, chemical and biological characteristics. • Topsoil stockpile areas will be rehabilitated progressively when no longer required.
Overburden Emplacements	• Final landform will be safe, stable and adequately drained. • Final landforms will be designed to integrate with the surrounding landscape. • The Northern Emplacement will be progressively constructed to a maximum height of 370 m AHD to integrate with the southern extent of the Boggabri waste rock emplacement. • The Southern Emplacement will be progressively constructed to a maximum height of 340 m AHD. • Outer batter slopes for the Northern and Southern Emplacements will be predominantly constructed at 10 degrees or shallower. • Any potentially acid forming (PAF) material will be covered with at

	least 15 m of non-acid forming material (NAF). • Final outer surfaces of overburden emplacements will be constructed with non-sodic or low sodicity and/or will be treated with gypsum. • Dump sequencing will be optimised to facilitate progressive shaping and rehabilitation.

Domain	**Rehabilitation Objective**
Secondary Domains	
Final Void	• Final void will be safe, stable and non-polluting. • Final void northern and eastern highwalls will be profiled to be geotechnically stable with slopes approximately 60 degrees. • Material from the Southern Emplacement will be used to partially infill the southern and western low walls of the open cut to construct final grades generally between 10 and 15 degrees. • Surface water inflows to the final void will be managed through appropriate landform design (including final void perimeter bunding and the permanent flood bund) to minimise long term drawdown and potential water quality impacts on local aquifers. • Native vegetation will be established above the permanent water level (260 m AHD).
Water Management Area	• The final landform drainage will integrate with the surrounding catchments and will achieve long term geomorphic stability and minimise erosion. • Sediment dams identified for retention in the final landform will be decontaminated and preserved as clean water farm dams or water sources for native fauna.
Agricultural Rehabilitation Area	• At least 210 ha of Class 3 agricultural land (including 160 ha constructed on emplaced overburden) will be reinstated on areas disturbed by mining. • Soil profiles (soil characteristics and soil depths) will be reinstated to produce an Effective Rooting Depth at least 1.5 m, and capable of sustaining cereal and pasture production comparable to pre-mining agricultural areas near Goonbri Creek.
Woodland Rehabilitation Area	• Approximately 752 ha of open woodland/forest, with riparian corridors (including Goonbri Creek realignment) will be established on areas disturbed by mining. • Woodland Rehabilitation Areas will be comparable with adjacent undisturbed remnant native vegetation including areas commensurate with Box-Gum Woodland EEC.

5.2.2 Variations Against the MOP

There were no variations against the MOP with rehabilitation undertaken on the northern emplacement (as detailed in Section 5.2.18). Bulk earth works and topsoil

replacement is underway in the northern extension and is scheduled for completion in the next reporting period in line with the commitments of the MOP.

5.2.3 Post Rehabilitation Land Use

Woodland areas will be established on slopes and upper terraces of the northern and southern emplacement areas. Tree species selection and planting densities adjacent to Boggabri and Leard State Forest are being determined with consideration of required integration with the Boggabri waste emplacement area and Leard State Forest.

Rehabilitation on the southern emplacement is immature and still requires ongoing maintenance. Rehabilitation on the northern emplacement is further advanced and requires significantly less maintenance and is nearly to the point where it could be considered that open woodland land use has been achieved.

No rehabilitation has been undertaken to date adjacent to the Boggabri Coal Mine and in the Leard State Forest (ML1685).

5.2.4 Post Mining Rural Land Capability Classification

The Project final landform and revegetation program will provide for a combination of approximately 752 ha of native woodland/forest and some 210 ha of Class 3 agricultural suitability land.

5.2.5 Landform Details

The rehabilitation areas on the northern emplacement and southern emplacement have been shaped with an average slope of 10° and utilise contours banks to divert runoff to rock lined waterways which minimise potential for erosion.

5.2.6 Physical Relevant Chemical Characteristics

To date there has been no visible evidence of acid or contamination formation, or spontaneous combustion, of emplaced material.

5.2.7 Cover Material

Topsoil stripped as part of the mine operations and expansion was used on the northern and southern rehabilitation areas and replaced utilising scrapers to spread the soil to an average depth of 150-250mm. Topsoil which has been replaced in the

northern extension was placed utilising articulated trucks and spreading with dozers. Soil testing as required by the Biodiversity Management Plan will be undertaken in the next reporting period.

5.2.8 Vegetation

Rehabilitation has been undertaken in accordance with the EA, MOP and management plans. Vegetation on the southern emplacement is young and in mixed condition. Monitoring of vegetation progression is undertaken and where deemed necessary maintenance works are undertaken. Vegetation on the northern emplacement is in good condition and progressing well towards maturity.

Typical vegetation species include:

Trees

White Box	*Eucalyptus albens*
Blakely's Red Gum	*Eucalypus blakelyi*
Yellow Box	*Eucalyptus melliodora*
Narrow-leaved Ironbark	*Eucalyptus creba*
Bimble Box	*Eucalyptus populnea*
Tumbledown Gum	*Eucalyptus dealbata*
Pilliga Grey Box	*Eucalyptus pilligaensis*
Wilga	*Geijera parviflora*
Belah	*Casuarina cristata*
Western Rosewood	*Alecttyon oleifolius*

Shrubs

Western Golden Wattle	*Acacia decora*
Amulla	*Eremophila debilis*
Sandlewood	*Santalum lanceolatum*
Eastern Cottonbush	*Marireana microphylla*
Native Jasmine	*Jasminium lineare*
Gangaloo	*Parsonsia eucalyptophylla*
Yellow Berry Bush	*Maytenus cunninghamii*
Wild Lemon	*Canthium oleifolum*
Wild Orange	*Capparis mitchelli*
Hopbush	*Dodomaea spp.*
Emubush	*Eremophila longofolia*
Native Olive	*Notelaea macrocarpa*
Butterbush	*Pittosporum angustifolium*
Cough Bush	*Cassinia laevis*

5.2.9 Progression to Maturity

The rehabilitation on the northern emplacement is progressing well towards maturity. As it nears maturity, the number of risks to achieving sustainability has become fewer and those that remain are predominately beyond the control of the Tarrawonga. Ongoing weed and pest control will continue as part of the maintenance of these areas, any necessary infill plating will be undertaken and water management structures will be repaired as necessary. For the area of the northern rehabilitation that was direct seeded immediately following this reporting period, the risks are far more significant, however they can be readily managed and monitored to ensure that a high survival rate is achieved and this vegetation reaches maturity. Risks associated with weather are considered most likely to impact on the survival of trees. Many of these risks can be managed through timely planting, follow up watering and weed and pest control.

The rehabilitation on the southern emplacement is significantly younger and is susceptible to risks including adverse weather, pests, soil condition, and planting techniques. It is therefore important to manage this area more intensely than areas that are considered mature or nearing maturity. A planting schedule and follow-up maintenance plan is a key component to the survival of tube stock. This includes timely planting, watering and pest control.

5.2.10 Present & Future Habitat

Winter and spring monitoring programmes are undertaken on site by Eco Logical Australia. Part of this monitoring provides an annual snapshot to ascertain the resident habitat in these areas. This compared to baseline data collected from adjacent unaffected land surrounding the mine is used to determine its success and progression in regards to habitat value for native and threatened species.

5.2.11 Weeds & Other Unwanted Vegetation

Monthly inspections of rehabilitation areas, as well as random visits, are undertaken to monitor weeds within the rehabilitation areas. A regular spraying regime is utilised to target identified weeds throughout both the northern and southern rehabilitation areas. Weeds listed as noxious under the Noxious Weeds Act 1993 are targeted and controlled in accordance with requirements of that legislation.

5.2.12 Erosion Control

Between both the northern and southern rehabilitation areas there are only minor signs of erosion including some minor channelling, in particular on the southern rehabilitation area where the establishment of trees and understorey has not yet commenced or is in the early stages. During the reporting period works were undertaken on the southern emplacement to remediate areas of erosion/channelling occurring on the upper tier were tubestock had not yet been planted.

5.2.13 Erosion, Pollution and Contamination Risks with Passive Strategies

Each of the rehabilitation areas on the northern and southern was emplacements has been shaped and constructed with a series of contour banks which feed into a rock lined waterway. Within each level, the topsoil is mounded for tree planting which also facilitates in reducing runoff and facilitates infiltration. The rock lined waterways, which run straight down the batter, are designed to convey water away from the contour banks and slow the water to minimise erosion within the rehabilitation areas.

5.2.14 Pollution Risk Monitoring

Sediment basins and storage dams are sampled quarterly and in the event of a discharge from licensed discharge point/s. These results are utilised to monitor pollution levels and ensure discharge waters are within compliance criteria as set out in the EPL.

5.2.15 Safety Risks

Landform design is the key passive system in addressing safety risks associated with rehabilitation.

5.2.16 Fencing

Fencing is restricted to the property/mine leases boundaries bounded by Goonbri Road in the south and east and some internal fences outside of the disturbance limit.

5.2.17 Additional Work Required to Meet Completion Criteria

Recommendations are provided in the annual flora monitoring report undertaken by Eco Logical Australia. The report more specifically addresses the northern emplacement rehabilitation objectives. Given the relative age of the southern emplacement rehabilitation area no recommendations have yet been made. The area will continue to be monitored and additional works undertaken where required.

5.2.18 Rehabilitation Targets and Outcomes

Due to the northern extension being delayed during the last reporting period areas for rehabilitation remain restricted. Rehabilitation to date does however reflect the commitments of the MOP. Active rehabilitation has progressed on those areas no longer required for production purposes. A total of 2 ha on the northern emplacement were rehabilitated with a pasture mix sown early in the reporting period, and direct seeding of native trees and shrubs undertaken at the end of the period and immediately following this reporting period.

An area of 5.5ha was direct seeded with native trees and shrubs as part of maintenance on both the northern and southern emplacements at the end of the period, and immediately following this reporting period. As both rehabilitation and maintenance planting occurred immediately following the reporting period the details will be provided in the next AEMR/AR report.

Existing rehabilitation on the northern and western faces of the northern emplacement continues to progress well.

Ongoing drought conditions during the first half of the last reporting period impacted upon autumn rehabilitation activities. During August above average rainfall was utilised to plant tubestock on the southern emplacement (Table 13). Seasonal conditions following this planting were extremely poor. The latter part of the reporting period showed improved seasonal conditions with average to above average rainfall received onsite. This provided the opportunity to commence rehabilitation and maintenance works whilst setting up the next reporting period's rehabilitation objectives.

The planting of tubestock on the southern emplacement was postponed until the next reporting period due to resource availability. Due to the constrained timeframe in which clearing activities must be undertaken contractor and onsite resources utilised for rehabilitation maintenance activities, in particular bulldozers, are not always available. As this is will be an ongoing issue rehabilitation activities will not be scheduled for late summer or early autumn to ensure that these resource issues are not an ongoing problem to meet rehabilitation commitments.

Rehabilitation commitments in the MOP, as identified by plan Map 3B – Mining and Rehabilitation Year 1, have been met and commitments shown in Map 3C – Mining and Rehabilitation are progressing towards completion. Overall rehabilitated and disturbed areas are outlined in Table 14 – Rehabilitation Summary including progress during the reporting period, project progress to date and expected areas at the end of the next reporting period.

Maintenance activities undertaken during the reporting period are outlined in Table 15.

Table 13 – Tree and Understorey Species

Date	Location	Species	Total
21st August 2014	Western face of the Southern emplacement.	*Capparis mitchelli*	40
		Eucalyptus pilligaensis	120
		Acacia Decora	120
		Dodonaea viscosa	80
		Swainsona galegifolia	120
		Brachychiton popupneus	200
		Pine	80
		Total	**760**

Table 14 - Rehabilitation Summary

		Area Affected (hectares)		
		This Report Period (as of 30.04.15)	**Last Report Period (as of 30.04.14)**	**Next Report Period (estimated)**
A1	**Mine Lease(s) Area**	1224.3		
B:	**DISTURBED AREAS**			
B1	**Infrastructure area** (other disturbed areas to be rehabilitated at closure including facilities, roads)	29.7	29.7	29.7
B2:	**Active Mining Area** (excluding items B3 - B5 below)	146.7	108.1	100.0
B3	**Waste emplacements**, (active/unshaped/in or out-of-pit)	221.9	206.2	230.0
B4	**Tailings emplacements,** (active/unshaped/uncapped)	5.4	5.0	5.4
B5	**Shaped waste emplacement** (awaits final vegetation)	3.0	7.6	3.0
ALL DISTURBED AREAS		406.7	356.6	356.6
C	**REHABILITATION PROGRESS**			
C1	**Total Rehabilitated area*** (except for maintenance)	51.65[1]	51.0	56.5
D:	**REHABILITATION ON SLOPES**			
D1	**10 to 18 degrees**	0	0	0
D2	**Greater than 18 degrees**	0	0	0
E:	**SURFACE OF REHABILITATED LAND**			
E1	**Pasture and grasses**	24.6	23.5	29.5
E2	**Native forest/ecosystems***	27.05	27.05	27.05
E3	**Plantations and crops**	0	0	0
E4	**Other** (include non-vegetative outcomes)	0	0	0

*** Areas with established tube stock are considered to be "native forest/ecosystem" and contribute to the Total Rehabilitated Area. "Pasture and Grasses" includes areas with recently planted tube stock that are not yet established.**

[1] Same from year-to-year until more recently completed rehab works can be considered as established. C1 should equal E2.

Table 15 - Maintenance Activities on Rehabilitated Land

NATURE OF TREATMENT	Area Treated (ha)		
	Report period	Next period	Comment/control strategies/ treatment detail
Additional erosion control works (drains re-contouring, rock protection**)**	1	1	Repair of washouts and replacement of sediment control measures (hay bales) on western side of ML
Re-covering (detail - further topsoil, subsoil sealing etc.)	Nil	Nil	
Soil treatment (detail - fertilizer, lime, gypsum etc.)	4.9	As required	Northern emplacement – chook manure and phosphorous to address sodic soils. Top soil will be tested prior to replacement to determine necessary ameliorants.
Treatment/Management (detail - grazing, cropping, slashing etc.)	Nil	Nil	
Re-seeding/Replanting (detail - species density, season etc.)	3.5	As required	Northern Emplacement and Southern Emplacement – Direct seeding Trial
Adversely Affected by Weeds (detail - type and treatment)	5	5	General weed control (spot spraying within a 5ha area).
Feral animal control (detail - additional fencing, trapping, baiting etc.)	*	Nil	* See Section 3.20

5.3 Other Infrastructure

Rehabilitation of exploration sites was progressively undertaken for sites which are outside of the area to be impacted by mining operations over the upcoming 12 months.

No other rehabilitation was undertaken in areas of infrastructure.

5.4 Rehabilitation Trials and Research

During the reporting period a direct seeding trial was undertaken on the northern and southern rehabilitation. The trial will be monitored and reported in upcoming reports. The direct seeding was applied at a rate of 6.5kg/ha with a mixture of native trees and shrubs planted into an existing cover crop.

5.5 Further Development of the Final Rehabilitation Plan

No further development beyond the preparation of a 5 year MOP and work undertaken in the EA has been undertaken with respect to the Final Rehabilitation Plan.

6 ACTIVITIES PROPOSED IN THE NEXT AEMR PERIOD

During the next reporting period a new MOP will be submitted for a period of five years up till the end of 2020. This MOP will incorporate a Common Boundary Rehabilitation Plan prepared in consultation with Boggabri Coal. All other operations pertaining to operation of the mine will be undertaken in accordance with the current MOP.

7 CONTINUOUS IMPROVEMENT AND TARGET INITIATIVES

7.1 Objectives

TCPL has an ongoing commitment to environmental management and aims to minimise any adverse impacts on the physical, biological, cultural and socio-economic environment in the area of the mine and in surrounding areas.

Improvements in environmental management will be achieved through the effective implementation of the operational and monitoring aspects of the MOP, which in turn, will incorporate relevant aspects of various management plans and monitoring programs prepared in accordance with the mine's Project Approval.

7.2 Achievements to Date

Achievements at the mine over its ninth year of operation have included:

- Approval of the Noise Management Plan, Air Quality and Greenhouse Gas Management Plan, and Biodiversity Management Plan;
- Ongoing development of the remaining management plans required by PA 11_0047 including Stage Two of Biodiversity Management Plan, Water Management Plan and Blast Management Plan;
- Continued effective management of site water, resulting in no discharges during the reporting period;
- Continuation of cumulative impacts strategies preparation and submission to DP&E with Boggabri Coal and Maules Creek Coal; and
- Ongoing relationship with local community, neighbours and community groups. Tarrawonga Coal recognises its role in the local community and that its activities have the potential to create benefits which extend beyond the life of the mine.

7.3 Targets and Goals

Targets and goals for the 2015 / 2016 reporting period include:

- Completion and implementation of additional Management Plans required for State and Federal approvals;

- Continual improvements in site rehabilitation practices and progression;
- Continued community liaison, support and involvement / education in the mines activities;
- Compliance with all relevant conditions of the lease, licences and consents;
- Stabilisation of the southern face of the southern emplacement to minimise dust generation whilst it remains un-rehabilitated;
- Implementation of management actions within the Regional Biobank site, pertinent to Tarrawonga offset requirements;
- Implementation of management actions at the Willeroi Offset Area once the management plans are approved.

Appendix 1

PA 11_0047, PA11_0047 MOD and EPBC Approval

Appendix 2

ENVIRONMENT PROTECTION LICENCE 12365

Appendix 3

COMPLIANCE REVIEWS

- PA 11_0047 (Table A3-1)
- EPL 12365 (Table A3-2)
- ML 1579, 1685 & 1693 (Table A3-3)

Appendix 4

DUST MONITORING RESULTS

Appendix 5

SURFACE WATER AND WET WEATHER DISCHARGE MONITORING DATA

Appendix 6

GROUNDWATER MONITORING DATA

Appendix 7

REHABILITATION MONITORING REPORT

Appendix 8

BLAST MONITORING RESULTS

Appendix 9

NOISE MONITORING RESULTS

Appendix 10

METEOROLOGICAL DATA

Appendix 11

VEGETATION CLEARING REPORTS

Appendix 12

CULTURAL HERITAGE SALVAGE

Appendix 13

AUDIT REPORTS

N6609000
N6608500
N6608000
N6607500
N6607000
N6606500
N6606000
N6605500
N6605000

E226500 E227000 E227500 E228000 E228500 E229000 E229500 E230000 E230500 E231000 E231500 E232000

N

10cm
25cm
10cm
45cm*
10cm
25cm
300cm
10cm

ML1685
ML1579
ML1693
ML1579
ML1693
ML1693
ML 1693

TS10 SS10 TS45 SS45

P1 P2 P3 P4 P5 P6 P7 P8 P9 P10 P11 P12 P14 P15 P16 P17 P18 P19 P20 P21 P22 P23 P26 P27 P28 P29 P30 P31 P32 P33 P34 P35 P36 P37 P38 P40 P41 P42 P43 P44 P45 P46

① ② ③ ④ ⑧ ⑨ ⑩

TARRAWONGA COAL PTY LTD

00 200 400 600
REDUCTION RATIO 1:6000 @ A0

LEGEND

- Proposed Soil Stripping Area (2015/2016 AEMR)
- Soil Stripping Area (to 30/4/14)
- Soil Stripping Area (2014/2015 AEMR)
- Topsoil Stockpile Areas
- Infrastructure Areas
- P8 Soil Test Pit Site
- 15cm Soil Stripping Depth
- Mining Lease Boundary
- Colliery Holding Boundary
- Recommended Stripping Depths
- TS^{10} Topsoil (depth stripped to)
- SS^{10} Subsoil (depth stripped to)
- ③ Vegetation Monitoring Quadrat

Notes:

* TS^{15} stockpiles refer to topsoil stripped between 0 - 15cm.
SS^{45} refers to stripping between 15 - 45cm.

PLAN 3
LAND PREPARATION
TARRAWONGA MINE

File Ref:	TA150430
Surveyor:	T Collins
Date:	30/4/2015

TARRAWONGA COAL PTY LTD

N

0 200 400 600

REDUCTION RATIO
1:6000 @ A0

LEGEND

- Infrastructure Areas
- Sediment Basin (Dirty)
- Storage Dam (Clean)
- Flow (Dirty)
- Flow (Clean)
- Mining Lease Boundary
- Colliery Holding Boundary
- Diversion/Catch Bank
- Extent of Mining to 30/4/14
- Extent of Mining (2014/2015 AEMR)
- Waste Emplacement (2014/2015 AEMR)
- Coal Stockpile
- Contour banks
- Rock Waterway

N6609000
N6608500
N6608000
N6607500
N6607000
N6606500
N6606000
N6605500
N6605000

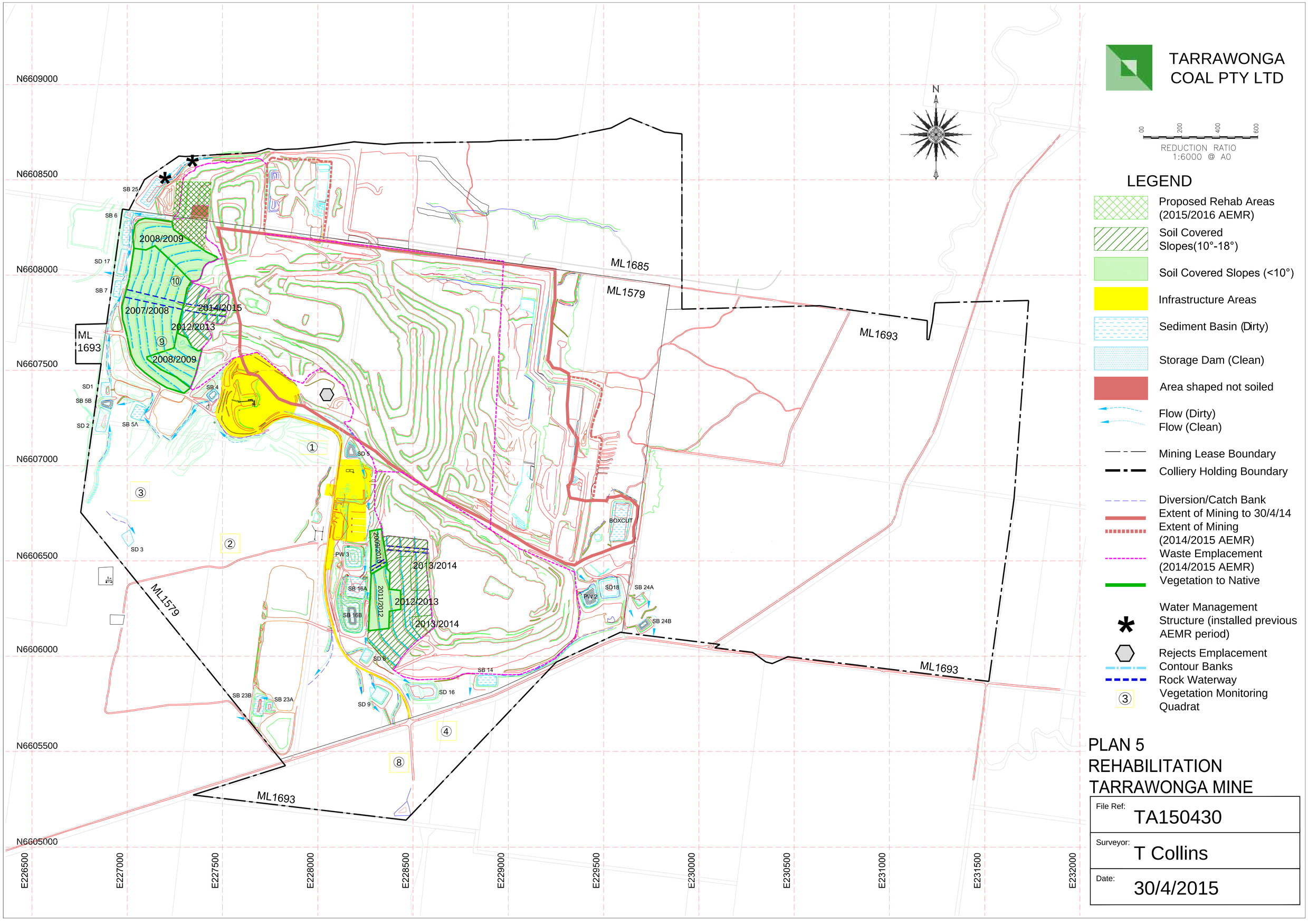
E226500 E227000 E227500 E228000 E228500 E229000 E229500 E230000 E230500 E231000 E231500 E232000

ML1685
ML1579
ML1693
ML 1693

SB 25 SB 6 SD 17 SB 7 SD1 SB 5B SD 2 SB 5A SB 4 SD 5 SD 3 PW 3 SB 16A SB 16B SD 8 SB 14 SD 16 SD 9 SB 23B SB 23A BOXCUT SD18 PW 2 SB 24A SB 24B

PLAN 4
MINING ACTIVITIES
TARRAWONGA MINE

File Ref:	TA150430
Surveyor:	T Collins
Date:	30/4/2015



TARRAWONGA COAL PTY LTD

0 200 400 600

REDUCTION RATIO 1:6000 @ A0

LEGEND

- Proposed Rehab Areas (2015/2016 AEMR)
- Soil Covered Slopes(10°-18°)
- Soil Covered Slopes (<10°)
- Infrastructure Areas
- Sediment Basin (Dirty)
- Storage Dam (Clean)
- Area shaped not soiled
- Flow (Dirty)
- Flow (Clean)
- Mining Lease Boundary
- Colliery Holding Boundary
- Diversion/Catch Bank
- Extent of Mining to 30/4/14
- Extent of Mining (2014/2015 AEMR)
- Waste Emplacement (2014/2015 AEMR)
- Vegetation to Native
- Water Management Structure (installed previous AEMR period)
- Rejects Emplacement
- Contour Banks
- Rock Waterway
- ③ Vegetation Monitoring Quadrat

PLAN 5
REHABILITATION
TARRAWONGA MINE

File Ref:	TA150430
Surveyor:	T Collins
Date:	30/4/2015

Appendix 1

PA 11_0047 and EPBC Approval

Notice of Modification

Section 75W of the *Environmental Planning and Assessment Act 1979*

As delegate of the Minister for Planning, I approve the modification of the project approval referred to in Schedule 1, as set out in Schedule 2.

Carolyn McNally
Secretary

Sydney 6 · 11 · 2014

SCHEDULE 1

The project approval (MP 11_0047) granted by the Minister for Planning and Infrastructure for the Tarrawonga Extension Project on 22 January 2013.

SCHEDULE 2

1. Delete the word "Infrastructure" in the footnotes and replace with "Environment".

2. Delete all references to "Director-General" and replace with "Secretary".

3. In the Table of Contents:
   a) delete the headings "Schedule 1", "Schedule 2", "Schedule 3", "Schedule 4" and "Schedule 5";
   b) delete the heading "Staged Submission of Strategies, Plans and Programs" and replace with "Updating & Staging Strategies, Plans or Programs";
   c) delete the heading "Property Investigations";
   d) update the page numbers for each heading in the Table of Contents.

4. In the Definitions list, delete the definitions for "Dedicated haulage route", "Director-General" and "Executive Director Mineral Resources", and update/insert the following definitions:

Approved haulage route	The route used to transport coal from the Project and the Rocglen and Vickery coal mines to the Whitehaven CHPP, including the use of sections of the public road network, as shown in Figure 4 of Appendix 2
Boggabri coal mine	The Boggabri coal mine (MP 09_0182)
Cumulative haulage	The total amount of ROM coal transported from the Project and the Rocglen and Vickery coal mines
Department	Department of Planning and Environment
EA	Environmental Assessment titled: • Tarrawonga Coal Project Environmental Assessment dated January 2012; associated response to submissions titled Tarrawonga Coal Project Environmental Assessment - Response to Submissions (A and B) dated May 2012; and the Preferred Project Report dated September 2012; and • Whitehaven ROM Coal Haulage modification, dated February 2014, and associated response to submissions titled Whitehaven ROM Coal Haulage Modification – Response to Submissions, dated April 2014.
Kamilaroi Highway overpass	A section of private haul road to be developed over the Kamilaroi Highway, providing access from Blue Vale Road directly to the Whitehaven CHPP access road, and to be constructed as part of the Vickery Coal Project (SSD 5000)
Minister	Minister for Planning, or delegate

OEH	NSW Office of Environment and Heritage
Rocglen coal mine	The Rocglen Extension Project (MP 10_0015)
Secretary	Secretary of the Department, or nominee
Vickery coal mine	The Vickery Coal Project (SSD 5000)

5. In schedule 2, delete all references to "the Executive Director Mineral Resources" and replace with "DRE".

6. Delete the heading "Coal Transport – Before Commissioning of the Boggabri Rail Spur & Boggabri CHPP" and conditions 6-10 of schedule 2, and replace with the following:

"**Coal Transport**

7. For the period up until the commissioning of the Kamilaroi Highway overpass, the Proponent:
   (a) shall not transport more than 3 million tonnes of ROM coal from the site in any calendar year;
   (b) may transport up to 150,000 tonnes of this ROM coal from the site in any calendar year for direct distribution to domestic markets via the approved haulage route to the Kamilaroi Highway;
   (c) shall transport all remaining coal from the site to the Whitehaven CHPP via the approved haulage route; and
   (d) shall, together with the owners of the Rocglen and Vickery coal mines, ensure that the cumulative haulage of coal along the approved haulage route does not exceed 3.5 million tonnes.

   Note: For the avoidance of doubt, the total amount of coal permitted to be transported from the site by road in any calendar year is 3 million tonnes.

8. For the period following the commissioning of the Kamilaroi Highway overpass, the Proponent:
   (a) shall not transport more than 3 million tonnes of ROM coal from the site in any calendar year;
   (b) may transport up to 150,000 tonnes of this ROM coal from the site in any calendar year for direct distribution to domestic markets via the approved haulage route to the Kamilaroi Highway;
   (c) shall transport all remaining coal from the site to the Whitehaven CHPP via the approved haulage route and the Kamilaroi Highway overpass; and
   (d) shall, together with the owners of the Rocglen and Vickery coal mines, ensure that the cumulative haulage of coal along the approved haulage route does not exceed 4.5 million tonnes.

   Notes:
   - *For the avoidance of doubt, the total amount of coal permitted to be transported from the site by road in any calendar year is 3 million tonnes.*
   - *For the avoidance of doubt, while any ROM coal transported from the site to the Whitehaven CHPP must use the Kamilaroi Highway overpass (once commissioned), this requirement does not apply to the transport of ROM coal directly to domestic markets or the transport of gravel off site.*

9. The Proponent shall only transport coal from the site or receive coal reject from the Whitehaven CHPP by truck between the hours of:
   (a) 6 am to 9.15 pm Monday to Friday;
   (b) 7 am to 5.15 pm Saturday; and
   (c) at no time on Sundays or public holidays.

10. Within 6 months of the Boggabri rail spur line and Boggabri CHPP being commissioned, and every 2 years thereafter, the Proponent shall use all reasonable efforts to reach an agreement with the owners of the Boggabri coal mine to use this infrastructure to process and transport coal from the site, to the satisfaction of the Secretary.

    If an agreement is reached to transport coal via the Boggabri rail spur line, the Proponent:
    (a) shall not transport more than 3 million tonnes of ROM coal from the site in any calendar year;
    (b) may transport up to 150,000 tonnes of this ROM coal from the site in any calendar year for direct distribution to domestic markets by road via the approved haulage route to the Kamilaroi Highway; and
    (c) shall transport all remaining coal from the site via the Boggabri rail spur line."

7. In condition 12 of schedule 2, delete the word "dedicated" and replace with "approved".

8. Insert the following note to condition 17 of schedule 2:

   Note: This condition does not apply to any damage to roads caused as a result of general road usage.

9. Delete the heading "Staged Submission of Strategies, Plans and Programs" and conditions 19 and 20 of schedule 2, and replace with the following:

"UPDATING & STAGING STRATEGIES, PLANS OR PROGRAMS

19. With the approval of the Secretary, the Proponent may submit any strategies, plans or programs required by this approval on a progressive basis.

To ensure the strategies, plans or programs under the conditions of this approval are updated on a regular basis, the Proponent may at any time submit revised strategies, plans or programs to the Secretary for approval.

With the agreement of the Secretary, the Proponent may prepare any revised strategy, plan or program without undertaking consultation with all parties under the applicable condition of this approval.

Notes:
- *While any strategy, plan or program may be submitted on a progressive basis, the Proponent must ensure that the existing operations on site are covered by suitable strategies, plans or programs at all times.*
- *If the submission of any strategy, plan or program is to be staged, then the relevant strategy, plan or program must clearly describe the specific stage to which the strategy, plan or program applies, the relationship of this stage to any future stages, and the trigger for updating the strategy, plan or program.*

20. The Proponent shall continue to implement the existing strategies, plans or programs that apply to any development on site under project approval DA-88-4-2005, until they are replaced by an equivalent strategy, plan or program approved under this approval."

10. In the notes to Table 2 in condition 3 of schedule 3, insert the words "(excluding the Kamilaroi Highway overpass)" after the words "private roads"

11. In the notes to condition 6 of schedule 3, insert the words "(excluding the Kamilaroi Highway overpass)" after the words "private roads"

12. Delete condition 8 of schedule 3 and replace with the following:

"8. The Proponent, together with the owners of the Rocglen and Vickery coal mines, shall ensure that the noise generated on public roads by the Project and the other mines, does not exceed the criteria in Table 4 at any existing residence on privately-owned land.

Table 4: Road traffic noise criteria dB(A)

Land	Day and Evening LAeq (15 hour)	Night LAeq (9 hour)
All privately-owned residences	60	55

However, these criteria do not apply if the Proponent has a written agreement with the relevant landowner to exceed the criteria, and the Proponent has advised the Department in writing of the terms of this agreement.

Note: Traffic noise generated by the Project is to be measured in accordance with the relevant procedures in the NSW Road Noise Policy."

13. In condition 12 of schedule 3, insert the following after dot point (e) "(f) describe the measures that would be implemented to ensure the noise impacts from the operation of the Kamilaroi Highway overpass are minimised as far as practicable;", and renumber the remaining dot points.

14. In condition 12 of schedule 3, insert the words "against all noise criteria in this approval" after the words "performance of the project".

15. In condition 28(a) of schedule 3, delete the words "management to minimise the off-site" and replace with "air quality management practices on site, including all reasonable and feasible measures to minimise".

16. In condition 28(b) of schedule 3, delete the words "on site".

17. In condition 28(c) of schedule 3, delete the words "off-site" and insert the words "generated by the project" after the word "pollution".

18. In condition 54 of schedule 3, delete the words "on Hoad Lane" and replace with "near school bus stops along the approved haulage route".

19. Insert the following after condition 54 of schedule 3:

"Traffic Management Plan

54A. The Proponent shall prepare and implement a traffic management plan for the Project, to the satisfaction of the Secretary. This plan must:

(a) be prepared in consultation with RMS, Gunnedah Shire Council, Narrabri Shire Council and the owners of the Rocglen and Vickery coal mines;

(b) be submitted to the Secretary for approval by 30 June 2015;

(c) include:

- a protocol for operating haul trucks during school bus hours;
- consideration of measures to minimise dust from unsealed roads that may be used for access to the mine site;
- arrangements to comply with cumulative coal haulage limits from the Project and the Rocglen and Vickery coal mines; and
- a monitoring program to audit vehicle movements, including the origin and destination of employees, against predictions in the EA."

20. In condition 55 of schedule 3, insert the following "These agreements may be modified from time to time by agreement of the Proponent and respective Council." after the words "respective Council.".

21. In condition 56 of schedule 3, insert the following "(if coal from the project is transported by rail)" after the word "project".

22. In condition 9 of schedule 4, delete the words "condition 5" and replace with "condition 8".

APPENDICES

23. In Appendix 2, insert the following headings to Figures 1-3
"Figure 1: Regional Context"
"Figure 2: Project Layout "
"Figure 3: Project Layout (Year 16)"

24. In Appendix 2, insert the following after Figure 3:

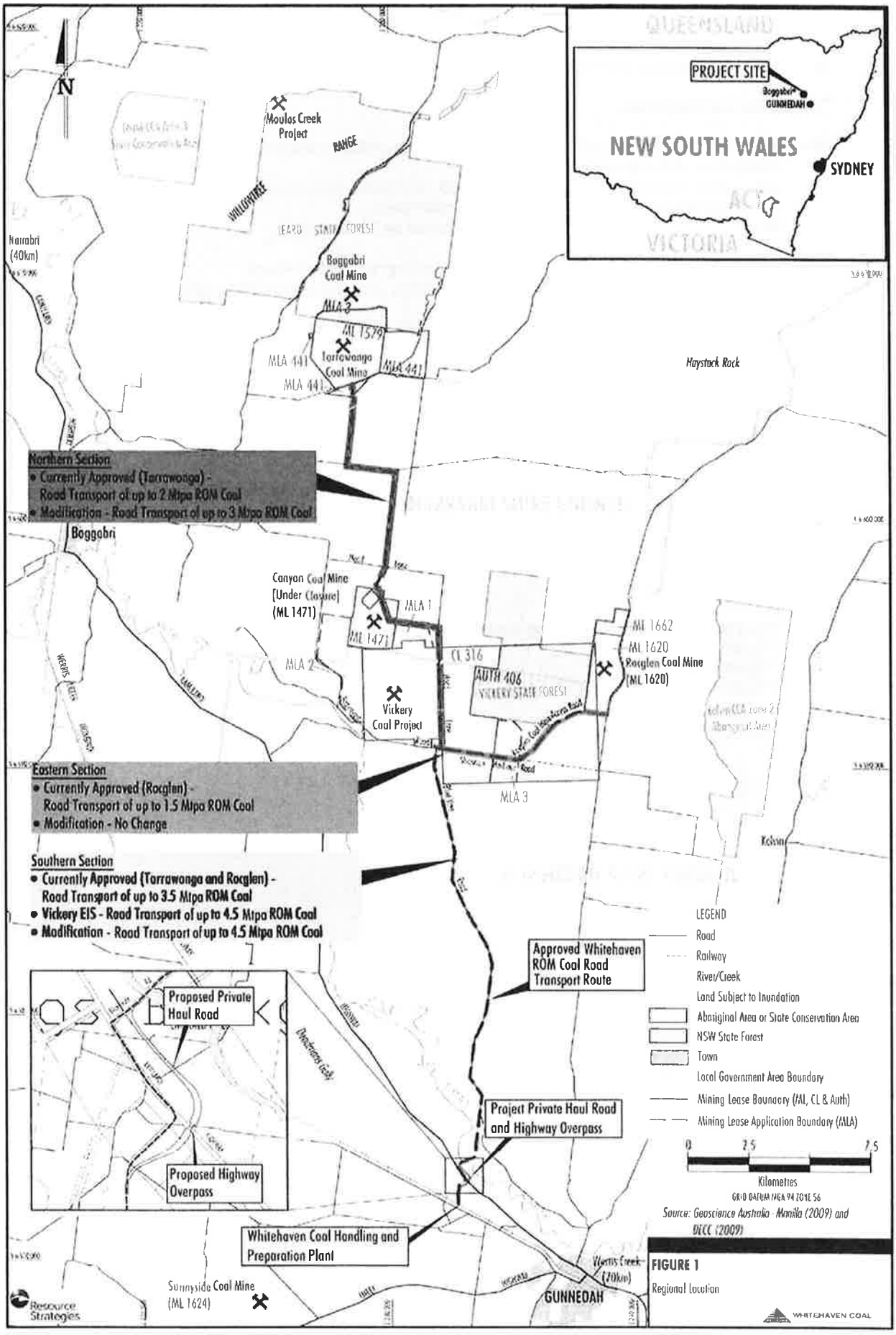


Figure 4: *Approved Road Haulage Route*

Approval

Tarrawonga Coal Mine Extension (EPBC 2011/5923)

This decision is made under sections 130(1) and 133 of the *Environment Protection and Biodiversity Conservation Act 1999*.

Proposed action

person to whom the approval is granted	Tarrawonga Coal Pty Ltd
proponent's ABN	73 100 742 185
proposed action	To extend and operate an open cut coal mine 15 km north-east of the township of Boggabri in New South Wales, including associated infrastructure [See EPBC Act referral **2011/5923**].

Approval decision

Controlling Provision	**Decision**
Listed threatened species and communities (sections 18 & 18A)	Approved
Listed migratory species (sections 20 & 20A)	Approved

conditions of approval

This approval is subject to the conditions specified below.

expiry date of approval

This approval has effect until 31 December 2053

Decision-maker

name and position	James Tregurtha Assistant Secretary Environment Assessment Branch
signature	
date of decision	11 **March 2013**

Conditions attached to the approval

Disturbance areas

1. The person taking the action must not clear more than 13 hectares (ha) of the EPBC listed White Box—Yellow Box—Blakely's Red Gum Grassy Woodland and Derived Native Grassland critically endangered ecological community within the Tarrawonga Coal Extension **project area**, as identified in Attachment A of these conditions.
2. The person taking the action must not clear more than:
    a. 279 ha of **habitat** for the regent honeyeater (*Anthochaera phrygia: formerly Xanthomyza phrygia*);
    b. 54 ha of **habitat** for the swift parrot (*Lathamus discolor*); and
    c. 334 ha of **habitat** for the greater long-eared bat (*Nyctophilus corbeni*),

    within the Tarrawonga Coal Extension **project area**.
3. The person taking the action must submit to the **Minister** for approval within three months of **commencement of construction,** an approach that:
    a. limits the maximum disturbance (in hectares) specified for each of the years 5, 10, 15 and 17 from the date of this approval of the White Box—Yellow Box—Blakely's Red Gum Grassy Woodland and Derived Native Grassland ecological community and the habitat or potential habitat for the regent honeyeater, swift parrot and greater long-eared bat;
    b. incorporates an analysis, undertaken by independent ecological experts approved by the **Department**, that demonstrates the maximum disturbance limits which will minimise any impacts on relevant matters of national environmental significance;
    c. demonstrates collaboration with the person taking the action to develop and operate the Boggabri Coal Project (EPBC 2009/5256) and the person taking the action to develop and operate the Maules Creek Coal Project (EPBC 2010/5566), in order to minimise progressive **project area** disturbance limits across all three sites. The progressive disturbance limits are to be reflected in the development of the Leard Forest Mining Precinct Biodiversity Strategy.
4. The person taking the action must not clear more than the maximum **project area** disturbance limits specified for each of the years 5, 10, 15 and 17 as described in condition 3, unless otherwise approved by the **Minister.**
5. The person taking the action must publish the analysis under condition 3 on their website.

Direct Offsets

6. The person taking the action must register a legally binding conservation covenant over **offset areas** of no less than:
    a. 1055 ha of an equivalent or better quality of habitat for the regent honeyeater;
    b. 397 ha of an equivalent or better quality of habitat for the swift parrot;

c. 1355 ha of an equivalent or better quality of habitat for the greater long-eared bat; and

d. 232 ha of an equivalent or better quality of the White Box—Yellow Box—Blakely's Red Gum Grassy Woodland and Derived Native Grassland ecological community.

Note: Offset areas described in condition 6 do not necessarily need to be separate if the same areas can meet the listing criteria for the EPBC listed threatened species or communities as defined in the EPBC listing advice for that threatened species or community and meet the requirements of condition 6.

7. The person taking the action must verify through **independent review** the quantity and **condition class** of White Box—Yellow Box—Blakely's Red Gum Grassy Woodland and Derived Native Grassland ecological community and the quantity and quality of habitat for the regent honeyeater, swift parrot and greater long-eared bat within all proposed **offset areas** including those proposed in the **Environmental Assessment** and any additional offsets as required at condition 8. Details of all independently verified **offset areas** must be submitted to the **Minister** for approval by 31 January 2014. The findings of the independent review must be published on the proponent's website.

8. If the **independent review** finds that the **offset areas** do not meet the requirements of conditions 6, 7 and 9 then additional areas must be included in the offset areas until all relevant criteria under these conditions are met.

9. The **offset areas** must be of an overall equivalent or better quality than the areas being cleared. This means:

    a. for White Box—Yellow Box—Blakely's Red Gum Grassy Woodland and Derived Native Grassland ecological community, **offset areas** must meet the definition of the ecological community described in the listing advice, and must be of an overall equivalent or better **condition class** than the areas being cleared, based on the proportion of each **condition class** represented and other relevant ecological attributes;

    b. for the threatened species, the quality of the habitat for the species, taking account of its ecological requirements, must be equivalent to or better than the areas being cleared.

10. The mechanism/s for registering a legally binding covenant must provide protection for the offset areas in perpetuity and be registered within 5 years of the date of this approval.

11. If the person taking the action proposes to undertake any action within areas secured under condition 6, other than those management activities related to managing the offset areas or as set out in the conditions of approval, then approval to undertake that action must be obtained in writing from the **Minister**. In seeking the **Minister's** approval, the person undertaking the action must provide a detailed assessment of the area where the action is proposed to take place and an assessment of all associated adverse impacts on **matters of national environmental significance**. If the **Minister** agrees to the action within the offset areas, the area identified for the action must be excised from the **offset area** and alternative offsets secured by the person taking the action at a ratio of at least 20:1 in relation to the impact on **matters of national environmental significance**.

Offset management plan

12. The person taking the action must submit to the **Minister** for approval an *Offset management plan* for all of the **offset areas**, specified in condition 6, within 12 months of the date of this approval. The approved *Offset management plan* must be implemented.

Note: for consistency, the proponent may develop a Biodiversity Management plan that includes the requirements set for managing offsets and set out in these conditions, to align with the requirements of the NSW state government Project Approval dated 22 January 2013 (application number 11_0047) and this approval.

13. The *Offset management plan* must include, but not be limited to, the following:

a) a text description and map which clearly defines the location and boundaries of the **offset areas**. This must be accompanied by the **offset attributes** and **shapefiles**;

b) a description of the methodology and results of surveys measuring the baseline ecological conditions in the **offset areas**. This must be consistent with the **State and Transition Model** and include but not be limited to:

i. the extent and condition of all vegetation communities, including a description of the structure, floristics and tree age class representation of each community;

ii. the extent and **condition class** of all areas of the White Box—Yellow Box—Blakely's Red Gum Grassy Woodland and Derived Native Grassland ecological community;

iii. surveys targeting the regent honeyeater, swift parrot and greater long-eared bat;

iv. the extent and quality of all areas of habitat for the regent honeyeater, swift parrot and greater long-eared bat;

v. the location of all survey sites (including co-ordinates);

vi. photo reference points at survey sites.

c) clearly defined ecological management objectives for the **offset areas**;

d) detailed description of all ecological management activities proposed to be undertaken, including maps and/or diagrams showing areas to be managed and the timing of the proposed activities;

e) details of ongoing ecological monitoring programs, performance criteria, targets and provisions for adaptive management, including but not limited to:

i. a set of measurable ecological indicators for detecting changes to the White Box—Yellow Box—Blakely's Red Gum Grassy Woodland and Derived Native Grassland ecological community, including those that may be ascribed to ongoing water stress;

ii. a monitoring plan to assess the success of the management activities measured against the baseline condition. The monitoring must be statistically robust and able to quantify change in the condition of the White Box—Yellow Box—Blakely's Red Gum Grassy Woodland and Derived Native Grassland ecological community and habitat for the regent honeyeater, swift parrot and greater long-eared bat.

This should include the use of control sites and periodic ecological surveys to be undertaken by a qualified ecologist;

iii. a list of performance criteria based on the ecological management objectives for the White Box—Yellow Box—Blakely's Red Gum Grassy Woodland and Derived Native Grassland ecological community and habitat for the regent honeyeater, swift parrot and greater long-eared bat;

iv. measures to exclude weeds from all **offset areas** for the period covered by this approval;

v. a description of the potential risks to successful management against the performance criteria, and a description of the contingency measures that would be implemented to mitigate against these risks;

vi. a process by which to report to the department the progress of management activities undertaken in the offset areas and the outcome of those activities, including identifying any need for improved management and activities to undertake such improvement.

f) details of all parties responsible for management, monitoring and implementing the management activities, including their position or status as a separate contractor.

g) details of the funding requirements for the ongoing management activities, including an estimate of the costs of the activities and details of the parties responsible for funding the activities.

14. Unless otherwise agreed to in writing by the **department,** the baseline surveys for threatened species must be conducted in accordance with the department's *Survey Guidelines for Australia's Threatened Birds* and the *Survey Guidelines for Australia's Threatened Bats*. Subsequent monitoring must be carried out annually at the same time of year as the baseline surveys, unless otherwise agreed to in writing by the **department**.

Surface and groundwater management plans

15. The person taking the action must provide by the 31 May 2013, to the **Minister** for approval, the *surface and groundwater management plans* as identified in condition 39 of the NSW state government Project Approval dated 22 January 2013 (application number 11_0047).

16. The *surface and groundwater management plans* must be consistent with the **National Water Quality Management Strategy**.

17. The person taking the action must, within six months of this approval, in collaboration with the proponent to develop and operate the Boggabri Extension (EPBC 2009/5256) and the proponent to develop and operate the Maules Creek Mine (EPBC 2010/5566), provide written advice to the Minister demonstrating how the NSW government approved *surface and groundwater management plans*, address the cumulative impact of groundwater drawdown as a result of mining and how this may impact on the consequent health of the remnant native vegetation in the Leard State Forest, the Leard State Conservation Area and surrounding areas. In particular the advice must address the following matters:

a. maximum amount of allowable drawdown in the alluvial aquifer

b. drawdown in hard rock

c. trigger levels pertaining to drawdown in the alluvial aquifer when corrective actions will be required to be undertaken

d. identify the depth of root zone of the native vegetation

e. monitoring to assess the ongoing quality and quantity of both surface and groundwater to identify impacts on the native vegetation.

18. The person taking the action must within 6 months of the date of this approval, or such other timeframe specified by the **Minister**, provide to the **Minister** a report on:

    a. any updated modelling of surface and groundwater impacts that has been undertaken in preparing the *surface and groundwater management plans*

    b. how the *surface and groundwater management plans* addressed groundwater and surface water impacts on matters of national environmental significance.

Goonbri Creek Diversion and Low Permeability Barrier

19. The person taking the action must provide to the **Minister** for approval, before **commencement of the construction of the permanent Goonbri Creek alignment, permanent flood bund and low permeability barrier**, a *Goonbri Creek Diversion and Flood Bund Concept Design Plan*. This approved *Goonbri Creek Diversion and Flood Bund Concept Design Plan* must be implemented.

20. The *Goonbri Creek Diversion and Flood Bund Concept Design Plan* must include:

    a. an assessment of the surface water and groundwater quality, ecology, hydrological and geomorphic baseline conditions within the creek;

    b. a description of how restoration of the re-aligned riparian zone will be undertaken to best replicate the habitat of the existing creek, including plant species and fauna habitat features;

    c. water quality, ecology, hydrological and geomorphic performance and completion criteria for the creek diversion and low permeability barrier based on the assessment of the baseline conditions identified in condition 20 (a); and

    d. a risk assessment of the environmental consequences of the proposed low permeability barrier and the proposed Goonbri Creek realignment including the potential for impacts on groundwater and surface discharge. The risk assessment must be peer-reviewed.

    e. details for ongoing monitoring and management of downstream impacts on the adjacent floodplains and Namoi River floodplain.

21. The person taking the action must ensure that dispersed waters downstream of the Goonbri Creek re-alignment do not adversely affect the downstream environment and avoid any impacts on matters of national environmental significance.

Leard Forest Mining Precinct Regional Biodiversity Strategy

22. The person taking the action must implement the regional biodiversity strategy as required under condition 41 of the NSW state government project approval dated 22 January 2013 (application number 11_0047). The required scoping report for the development of the strategy must be submitted to the **Minister** for approval on or before 31 July 2013. The approved strategy must be implemented.

Mine site rehabilitation

23. To mitigate the impacts to the White Box-Yellow Box –Blakely's Red Gum Grassy Woodland and Derived Native Grassland and the habitat of the regent honeyeater, swift parrot and greater long-eared bat, the person taking the action must, within 12 months of the commencement of construction, submit to the **Minister** for approval a *mine site rehabilitation plan* for the progressive rehabilitation and revegetation of no less than 752 ha of native forest and woodland in the **project area** including 13 ha using species consistent with a White Box—Yellow Box—Blakely's Red Gum Grassy Woodland and Derived Native Grassland Ecological Community. This approved *mine site rehabilitation plan* must be implemented.

24. The person taking the action must rehabilitate the site to be consistent with the proposed rehabilitation strategy as provided in the **Environmental Assessment** and, as required under the NSW State Government approval dated 22 January 2013 (Application 11_0047).

25. The *mine site rehabilitation plan* must include, at a minimum, the following information:
    a. targets and performance indicators to achieve effective restoration of potential habitat for the regent honeyeater, swift parrot and greater long-eared bat and White Box—Yellow Box—Blakely's Red Gum Grassy Woodland and Derived Native Grassland ecological community, including weed management;
    b. details of the vegetation communities to be rehabilitated and the timing of progressive rehabilitation (commencing as soon as practicable following disturbance);
    c. detailed soil depth surveys and analysis to inform the effective placement and restoration of soils underlying the proposed rehabilitation sites; including mapping of soils across the disturbance sites and soil sampling at no less than one sample point per 20 ha of each soil type identified. Sampling must identify; type, depth, water holding capacity, structure and physio-chemical properties of each of the soil and subsoil layers;
    d. processes and methodologies for the removal, storage and re-layering of the top soil and sub soil layers underlying the disturbed sites being prepared for rehabilitation. These processes and methodologies must ensure the replacement of top soil and sub soil layers as provided in the Environment Assessment.

e. a process to report annually to the department the rehabilitation management actions undertaken and the outcome of those actions, and the mechanisms to be used to identify the need for improved management;

f. a description of the potential risks to successful management and rehabilitation on the project site, including weed invasion, and a description of the contingency measures that would be implemented to mitigate these risks;

g. details of long-term management and protection of the mine site, including details of the commitment of funds to achieve this.

26. The *mine site rehabilitation plan* must be subject to an **independent review** by a qualified ecologist prior to being submitted to the **Minister** for approval. The findings of the **independent review** must be published on the proponent's website.

Conservation Bond

27. The person taking the action is required to submit a Conservation and Biodiversity Bond under condition 49 of the New South Wales state government project approval dated 22 January 2013 (application 11_0047). It is noted that this bond may be combined with the rehabilitation security deposit as required under the New South Wales *Mining Act 1992*. The person taking the action must submit details of this bond and the rehabilitation security deposit, to the **Minister**, within six months of this approval. If the **Minister** is not satisfied that the bond and rehabilitation security deposit lodged by the person taking the action is adequate to provide for the requirements referred to under conditions 19, 20, 22, 23 and 24, the **Minister** may require the person taking the action establish an additional bond or equivalent financial instrument in trust, under conditions approved in writing by the **Minister**.

Final Landform

Note: for consistency, the person taking the action may develop a single mine rehabilitation plan to align with the requirements, including timing of reporting, of the NSW State Government approval dated 22 January 2013 (Application 11_0047) and this approval. The Offset Management Plan and the Rehabilitation management Plan need to be substantially integrated for achieving biodiversity objectives for the rehabilitated mine-site.

28. The person taking the action must undertake rehabilitation to ensure the final landform provides the optimum opportunity for the successful restoration of native forest and woodland including the critically endangered White Box—Yellow Box—Blakely's Red Gum Grassy Woodland and Derived Native Grassland ecological community.

Note: for consistency, the proponent may develop a single mine rehabilitation plan to align with the requirements of the NSW Government and this approval. The Offset Management Plan and the Rehabilitation management Plan need to be substantially integrated for achieving biodiversity objectives for the rehabilitated mine-site.

29. The person taking the action must undertake rehabilitation to ensure the final void and landform minimises the extent of any resulting pit lake, avoids salt scalding and ensures that drained waters do not adversely affect the downstream environment and avoids any impacts on **matters of national environmental significance**.

Note: the State approval conditions for project 11_0047 require the preparation and implementation of a Final Void and Mine Closure Plan that considers interactions with the adjoining mines, including interaction between final voids, opportunities for integrated mine planning with adjoining mines to minimise environmental impacts, all reasonable

and feasible landform options for the final void (including filling) and predicted hydrochemistry and hydrogeology (including long-term groundwater recovery and void groundwater quality).

Survey data

30. All survey data collected for the project must be recorded so as to conform to data standards notified from time to time by the **department**. When requested by the **department**, the proponent must provide to the **department** all species and ecological survey data and related survey information from ecological surveys undertaken for matters of national environmental significance. This survey data must be provided within 30 business days of request, or in a timeframe agreed to by the **department** in writing. The **department** may use the survey data for other purposes.

In the event that any additional **matters of national environmental significance** are recorded within the **project area** and a significant impact on the matter/s is likely, the **department** must be notified in writing within 14 days of the matter/s being recorded. In accordance with condition 36, the Minister may request that the person taking the action revise any relevant plans to ensure better protection of the relevant matter/s.

Reporting and auditing

31. Within 14 days after the **commencement of construction**, the person taking the action must advise the **department** in writing of the actual date of **commencement of construction.**

32. By the end of March of each year after the commencement of the action, the person taking the action must publish a report on their website addressing compliance with the conditions of this approval over the previous 12 months, including implementation of any management plans as specified in the conditions. Non-compliance with any of the conditions of this approval must be reported to the **department** at the same time as the compliance report is published.

33. Upon the direction of the **Minister**, the person taking the action must ensure that an independent audit of compliance with the conditions of approval is conducted and a report submitted to the **Minister**. The independent auditor must be approved by the **Minister** prior to the commencement of the audit. Audit criteria must be agreed to by the **Minister** and the audit report must address the criteria to the satisfaction of the **Minister**.

34. If the person taking the action wishes to carry out any activity otherwise than in accordance with the plans, as specified in the conditions, the person taking the action must submit to the **department** for the **Minister's** written approval a revised version of that plan. The varied activity shall not commence until the Minister has approved the revised plan in writing. The **Minister** will not approve a revised plan, unless the revised plan would result in an equivalent or improved environmental outcome. If the **Minister** approves the revised plan that plan must be implemented in place of the plan originally approved.

35. If the **Minister** believes that it is necessary or convenient for the better protection of listed threatened species and communities or listed migratory species to do so, the **Minister** may request that the person taking the action make specified revisions to the management plan

specified in the conditions and submit the revised plan for the **Minister's** written approval. The person taking the action must comply with any such request. The revised approved plan must be implemented. Unless the **Minister** has approved the revised plan then the person taking the action must continue to implement the originally approved plan, as specified in the conditions.

36. If, at any time after 5 years from the date of this approval, the person taking the action has not **substantially commenced the action**, then the person taking the action must not substantially commence the action without the written agreement of the **Minister**.

Publication of plans

37. The person taking the action must maintain accurate records substantiating all activities and outcomes associated with or relevant to the above conditions of approval, including measures taken to implement the management plans required by this approval, and make them available upon request to the **department**. Such records may be subject to audit by the **department** or an independent auditor in accordance with section 458 of the *Environment Protection and Biodiversity Conservation Act 1999*, or used to verify compliance with the conditions of approval. Summaries of audits will be posted on the **department's** website. The results of audits may also be publicised through the general media.

38. Unless otherwise agreed to in writing by the **Minister**, the person taking the action must publish all management plans referred to in these conditions of approval on their website. Each management plan must be published on the website within 1 month of being approved.

Definitions

Commencement of construction – the commencement of any activities within the project area which are included in this approval.

Commencement of the construction of the permanent Goonbri Creek alignment, permanent flood bund and low permeability barrier – the commencement of any activities in relation to the permanent Goonbri Creek alignment, permanent flood bund and/or low permeability barrier.

Condition class – One of three states in which the White Box—Yellow Box—Blakely's Red Gum Grassy Woodland and Derived Native Grassland ecological community may exist, as defined within the Commonwealth listing advice for the listing of this ecological community as critically endangered under the EPBC Act.

Department - the Australian Government Department responsible for the *Environment Protection and Biodiversity Conservation Act 1999.*

Environmental Assessment – The Maules Creek Coal Project Environmental Assessment July 2011, prepared by Hansen Bailey for Aston Coal 2 Pty Ltd, and submitted as part of the approval documents for the Maules Creek Coal Project.

Habitat – areas in which a species or community is known to occur or is thought to have the potential to occur based on the biophysical conditions prevailing in the area and the ecological

requirements of the species or community.

Independent review – an investigation conducted by an independent expert ecologist who has been approved by the department.

Minister - the Minister administering the *Environment Protection and Biodiversity Conservation Act 1999* and includes a delegate of the Minister.

Matters of national environmental significance – all matters listed under Part 3 of the EPBC Act

Offset areas – areas that are proposed to meet the criteria set out in conditions 6, 7 and 8 of the approval, to offset the impacts of the action on matters of national environmental significance.

Offset attributes -means an '.xls' file capturing relevant attributes of the Offset Area, including the EPBC reference ID number, the physical address of the offset site, coordinates of the boundary points in decimal degrees, the EPBC protected matters that the offset compensates for, any additional EPBC protected matters that are benefiting from the offset, and the size of the offset in hectares.

Project area – the area defined by the Tarrawonga Coal Mine Extension Project EPBC Act referral (EPBC Act reference 2011/5923) as lying within the Project Application Boundary.

Shapefiles -means an ESRI Shapefile containing '.shp', '.shx' and '.dbf' files and other files capturing attributes of the Offset Area, including the shape, EPBC reference ID number and EPBC protected matters present at the relevant site. Attributes should also be captured in '.xls' format. A geographically referenced raster 'img' file/s must be provided to provide context for the shapefiles.

State and Transition Model – Section 3.2 of *A Guide to Managing Box Gum Grassy Woodlands* (Caring for our Country Environmental Stewardship, 2010), depicts the different condition states (as reflected by disturbance, inputs and altered land use) in which a given vegetation can exist. This publication can be found at:
http://www.nrm.gov.au/resources/publications/stewardship/bggw-handbook.html

Substantially commence the action – means the extraction of coal from the Tarrawonga Coal Mine Project for the purpose of commercial production. Substantial commencement does not include test extraction or extraction of coal samples for quality assurance.

Appendix 2

ENVIRONMENT PROTECTION LICENCE 12365

Environment Protection Licence

Licence - 12365

Licence Details	
Number:	12365
Anniversary Date:	09-January

Licensee
TARRAWONGA COAL PTY LTD
PO BOX 600
GUNNEDAH NSW 2380

Premises
TARRAWONGA COAL MINE
469 GOONBRI ROAD
BOGGABRI NSW 2382

Scheduled Activity
Coal Works
Mining for Coal

Fee Based Activity	Scale
Coal works	> 2000000-5000000 T handled
Mining for coal	> 2000000-3500000 T produced

Region
North - Armidale
Ground Floor, NSW Govt Offices, 85 Faulkner Street ARMIDALE NSW 2350
Phone: (02) 6773 7000
Fax: (02) 6772 2336
PO Box 494 ARMIDALE
NSW 2350

Environment Protection Licence

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Information about this licence

Dictionary

A definition of terms used in the licence can be found in the dictionary at the end of this licence.

Responsibilities of licensee

Separate to the requirements of this licence, general obligations of licensees are set out in the Protection of the Environment Operations Act 1997 ("the Act") and the Regulations made under the Act. These include obligations to:

- ensure persons associated with you comply with this licence, as set out in section 64 of the Act;
- control the pollution of waters and the pollution of air (see for example sections 120 - 132 of the Act);
- report incidents causing or threatening material environmental harm to the environment, as set out in Part 5.7 of the Act.

Variation of licence conditions

The licence holder can apply to vary the conditions of this licence. An application form for this purpose is available from the EPA.

The EPA may also vary the conditions of the licence at any time by written notice without an application being made.

Where a licence has been granted in relation to development which was assessed under the Environmental Planning and Assessment Act 1979 in accordance with the procedures applying to integrated development, the EPA may not impose conditions which are inconsistent with the development consent conditions until the licence is first reviewed under Part 3.6 of the Act.

Duration of licence

This licence will remain in force until the licence is surrendered by the licence holder or until it is suspended or revoked by the EPA or the Minister. A licence may only be surrendered with the written approval of the EPA.

Licence review

The Act requires that the EPA review your licence at least every 5 years after the issue of the licence, as set out in Part 3.6 and Schedule 5 of the Act. You will receive advance notice of the licence review.

Fees and annual return to be sent to the EPA

For each licence fee period you must pay:

- an administrative fee; and
- a load-based fee (if applicable).

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The EPA publication “A Guide to Licensing” contains information about how to calculate your licence fees. The licence requires that an Annual Return, comprising a Statement of Compliance and a summary of any monitoring required by the licence (including the recording of complaints), be submitted to the EPA. The Annual Return must be submitted within 60 days after the end of each reporting period. See condition R1 regarding the Annual Return reporting requirements.

Usually the licence fee period is the same as the reporting period.

Transfer of licence

The licence holder can apply to transfer the licence to another person. An application form for this purpose is available from the EPA.

Public register and access to monitoring data

Part 9.5 of the Act requires the EPA to keep a public register of details and decisions of the EPA in relation to, for example:

- licence applications;
- licence conditions and variations;
- statements of compliance;
- load based licensing information; and
- load reduction agreements.

Under s320 of the Act application can be made to the EPA for access to monitoring data which has been submitted to the EPA by licensees.

This licence is issued to:

TARRAWONGA COAL PTY LTD
PO BOX 600
GUNNEDAH NSW 2380

subject to the conditions which follow.

Environment Protection Licence

Licence - 12365

1 Administrative Conditions

A1 What the licence authorises and regulates

A1.1 This licence authorises the carrying out of the scheduled activities listed below at the premises specified in A2. The activities are listed according to their scheduled activity classification, fee-based activity classification and the scale of the operation.

Unless otherwise further restricted by a condition of this licence, the scale at which the activity is carried out must not exceed the maximum scale specified in this condition.

Scheduled Activity	Fee Based Activity	Scale
Coal Works	Coal works	> 2000000 - 5000000 T handled
Mining for Coal	Mining for coal	> 2000000 - 3500000 T produced

A2 Premises or plant to which this licence applies

A2.1 The licence applies to the following premises:

Premises Details
TARRAWONGA COAL MINE
469 GOONBRI ROAD
BOGGABRI
NSW 2382
THE LAND APPROVED UNDER PROJECT APPROVAL 11_0047- INDICATED IN APPENDIX 1- SCHEDULE OF LAND OF PROJECT APPROVAL 11_0047, DATED 22 JANAURY 2013 (DOC13/87399).

A3 Information supplied to the EPA

A3.1 Works and activities must be carried out in accordance with the proposal contained in the licence application, except as expressly provided by a condition of this licence.

In this condition the reference to "the licence application" includes a reference to:
a) the applications for any licences (including former pollution control approvals) which this licence replaces under the Protection of the Environment Operations (Savings and Transitional) Regulation 1998; and
b) the licence information form provided by the licensee to the EPA to assist the EPA in connection with the issuing of this licence.

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2 Discharges to Air and Water and Applications to Land

P1 Location of monitoring/discharge points and areas

P1.1 The following points referred to in the table below are identified in this licence for the purposes of monitoring and/or the setting of limits for the emission of pollutants to the air from the point.

Air

EPA identification no.	Type of Monitoring Point	Type of Discharge Point	Location Description
28	Ambient air monitoring		Real time air quality monitor located on 'Flixton' as referred to in map titled "Real Time Air Monitor Location- Tarrawonga Coal Mine" received by the EPA on 16 November 2011 (DOC11/56063).

P1.2 The following utilisation areas referred to in the table below are identified in this licence for the purposes of the monitoring and/or the setting of limits for any application of solids or liquids to the utilisation area.

P1.3 The following points referred to in the table are identified in this licence for the purposes of the monitoring and/or the setting of limits for discharges of pollutants to water from the point.

Water and land

EPA Identification no.	Type of Monitoring Point	Type of Discharge Point	Location Description
1	Wet weather discharge Discharge water quality monitoring	Wet weather discharge Discharge water quality monitoring	Discharge point located on the western boundary and labelled "SD17" on Figure 4: Proposed Water Discharge Points and Weather Station submitted with licence variation application form 13 October 2008.
2	Wet weather discharge Discharge water quality monitoring	Wet weather discharge Discharge water quality monitoring	Spillway on Storage Dam 9 located on southern boundary of premises labelled "SD9" on Figure 4: Proposed Water Discharge Points and Weather Station submitted with licence variation application form 13 October 2008.
3	Wet weather discharge Discharge water quality monitoring	Wet weather discharge Discharge water quality monitoring	Spillway on Sediment Basin 14 located east of Thuin house on southern boundary labelled "SB14" on Figure 4: Proposed Water Discharge Points and Weather Station submitted with licence variation application form 13 October 2008.

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5	Ambient water quality monitoring	Bollol Creek upstream of discharge from premises labelled "BC-U" on Figure 4: Proposed Water Discharge Points and Weather Station submitted with licence variation application form 13 October 2008.
6	Ambient water quality monitoring	Bollol Creek downstream of discharge from premises labelled "BC-D" on Figure 4: Proposed Water Discharge Points and Weather Station submitted with licence variation application form 13 October 2008.
7	Ambient water quality monitoring	Nagero Creek upstream of discharge from premises labelled "NC-U "on Figure 4: Proposed Water Discharge Points and Weather Station submitted with licence variation application form 13 October 2008.
8	Ambient water quality monitoring	Nagero Creek downstream of discharge from premises labelled "NC-D "on Figure 4: Proposed Water Discharge Points and Weather Station submitted with licence variation application form 13 October 2008.
9	Groundwater monitoring	Groundwater monitoring bore located on property "Thuin" labelled MW-1 on Figure 5 Water Monitoring Locations in the Site Water Management Plan submitted with licence application 17 November 2005
10	Groundwater monitoring	Groundwater monitoring bore located on property "Bollol Ck Station" labelled MW-2 on Figure 5 Water Monitoring Locations in the Site Water Management Plan submitted with licence application 17 November 2005
11	Groundwater monitoring	Groundwater monitoring bore located on property "Nagero" labelled MW-3 on Figure 5 Water Monitoring Locations in the Site Water Management Plan submitted with licence application 17 November 2005

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12	Groundwater monitoring		Groundwater monitoring bore located on property "Tarrawonga" labelled MW-4 on Figure 5 Water Monitoring Locations in the Site Water Management Plan submitted with licence application 17 November 2005
13	Surface water quality monitoring		Mining void (variable location) labelled MV1 on Figure 5 Water Monitoring Locations in the Site Water Management Plan submitted with licence application 17 November 2005
24	Wet weather discharge Discharge water quality monitoring	Wet weather discharge Discharge water quality monitoring	Spillway on Storage Dam 16 located on the southern side of the premises labelled "SD16" on "Figure 1: Existing and Proposed Water Discharge Monitoring Points" submitted with licence variation application form dated 14-5-09
25	Wet weather discharge Dischagre water quality monitoring	Wet weather discharge Dischagre water quality monitoring	Spillway on Sediment Basin 22 located on northern side of premises labelled "SB22" in Figure titled "Tarrawonga Mine Site. Licensed Discharge Points" submitted with licence variation application form dated 19 August 2011.
26	Wet weather discharge Discharge water quality monitoring	Wet weather discharge Discharge water quality monitoring	Spillway on Sediment Basin 23 located on northern side of premises labelled "SB23" in Figure titled "Tarrawonga Mine Site. Licensed Discharge Points" submitted with licence variation application form dated 19 August 2011.
27	Wet weather discharge Discharge water quality monitoring	Wet weather discharge Discharge water quality monitoring	Spillway on Sediment Basin 18 located on south eastern side of premises labelled "SB24" in Figure titled "Tarrawonga Mine Site. Licensed Discharge Points" submitted with licence variation application form dated 19 August 2011.

P1.4 The following point(s) in the table are identified in this licence for the purpose of the monitoring of weather parameters at the point.

EPA Identification number	Type of Monitoring Point	Description of Location

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W1	Weather analysis	Weather station located on "Templemore" labelled "Templemore- Project Related" on Figure submitted with licence variation application form received by EPA on 12 June 2012 (DOC12/23618).

3 Limit Conditions

L1 Pollution of waters

L1.1 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.

L2 Concentration limits

L2.1 For each monitoring/discharge point or utilisation area specified in the table\s below (by a point number), the concentration of a pollutant discharged at that point, or applied to that area, must not exceed the concentration limits specified for that pollutant in the table.

L2.2 Where a pH quality limit is specified in the table, the specified percentage of samples must be within the specified ranges.

L2.3 To avoid any doubt, this condition does not authorise the pollution of waters by any pollutant other than those specified in the table\s.

L2.4 Water and/or Land Concentration Limits

POINT 1,2,3,24,25,26,27

Pollutant	Units of Measure	50 percentile concentration limit	90 percentile concentration limit	3DGM concentration limit	100 percentile concentration limit
Oil and Grease	milligrams per litre				10
pH	pH				6.5 - 8.5
Total suspended solids	milligrams per litre				50

L2.5 The Total Suspended Solids concentration limits specified for Points 1, 2, 3, 24, 25, 26 and 27 may be exceeded for water discharged provided that:

(a) the discharge occurs solely as a result of rainfall measured at the premises that exceeds 38.4 millimetres over any consecutive 5 day period immediately prior to the discharge occurring; and
(b) all practical measures have been implemented to dewater all sediment dams within 5 days of rainfall such that they have sufficient capacity to store run off from a 38.4 millimetre, 5 day rainfall event.

Note: 38.4 mm equates to the 5 day 90%ile rainfall depth for Gunnedah sourced from Table 6.3a Managing Urban Stormwater: Soils and Construction Volume 1: 4th edition, March 2004.

L3 Waste

L3.1 The licensee must not cause, permit or allow any waste generated outside the premises to be received at the premises for storage, treatment, processing, reprocessing or disposal or any waste generated at the premises to be disposed of at the premises, except as expressly permitted by the licence.

L3.2 This condition only applies to the storage, treatment, processing, reprocessing or disposal of waste at the premises if those activities require an environment protection licence.

L3.3 Reject material from the Whitehaven CHPP can be disposed of at the premises in accordance with the disposal method outlined in the Environmental Impact Statement titled “East Boggabri Joint Venture, Environmental Impact Statement for the Proposed East Boggabri Coal Mine, May 2005” prepared by R.W. Corkery & Co. Pty. Limited dated May 2005, or as otherwise approved by the EPA.

L4 Noise limits

L4.1 Noise generated at the premises must not exceed the noise limits in the table below.

Locality and Location	Day- LAeq (15 minute)	Evening- LAeq (15 minute)	Night- LAeq (15 minute)	Night- LA1 (1 minute)
All other surrounding residences	35	35	35	45

L4.2 The noise limits identified in the above table do not apply at privately owned residences that are:
a) identified as residences subject to acquisition or noise mitigation on request within the Project Approval; or
b) subject to a private agreement, relating to the noise levels, between the licensee and the land owner.

L4.3 For the purpose of the table above:

a) Day is defined as the period from 7am to 6pm Monday to Saturday and 8am to 6pm Sundays and Public Holidays;
b) Evening is defined as the period from 6pm to 10pm;
c) Night is defined as the period from 10pm to 7am Monday to Saturday and 10pm to 8am Sundays and Public Holidays.

L4.4 **Determining Compliance**

To determine compliance:
a) with the Leq(15 minute) noise limits in the Noise Limits table, the noise measurement equipment must be located:
i) approximately on the property boundary, where any dwelling is situated 30 metres or less from the property boundary closest to the premises; or
ii) within 30 metres of a dwelling façade, but not closer than 3m, where any dwelling on the property is situated more than 30 metres from the property boundary closest to the premises; or, where applicable
iii) within approximately 50 metres of the boundary of a National Park or a Nature Reserve.
b) with the LA1(1 minute) noise limits in the Noise Limits table, the noise measurement equipment must be located within 1 metre of a dwelling façade.
c) with the noise limits in the Noise Limits table, the noise measurement equipment must be located:
i) at the most affected point at a location where there is no dwelling at the location; or
ii) at the most affected point within an area at a location prescribed by part (a) or part (b) of this condition.

L4.5 The noise limits set out in the Noise Limits table apply under all meteorological conditions except for the following:
a) Wind speeds greater than 3 metres/second at 10 metres above ground level; or
b) Stability category F temperature inversion conditions and wind speeds greater than 2 metres/second at 10 metres above ground level; or
c) Stability category G temperature inversion conditions.

For the purposes of this condition:
a) Data recorded by the meteorological station identified as EPA Identification Point(s) W1 must be used to determine meteorological conditions; and
b) Temperature inversion conditions (stability category) are to be determined by the sigma-theta method referred to in Part E4 of Appendix E to the NSW Industrial Noise Policy.

L4.6 For the purposes of determining the noise generated at the premises the modification factors in Section 4 of the NSW Industrial Noise Policy must be applied, as appropriate, to the noise levels measured by the noise monitoring equipment.

L5 Blasting

L5.1 The overpressure level from blasting operations at the premises must not exceed 120dB (Lin Peak) at any time and at any point within 30 metres of any non project related residential building or other noise sensitive location. Error margins associated with any monitoring equipment used to measure this are not to be taken into account in determining whether or not the limit has been exceeded.

L5.2 The overpressure level from blasting operations at the premises must not exceed 115dB (Lin Peak) for more than five per cent of the total number of blasts over each reporting period at any time and at any point within 30 metres of any non-project related residential building or other noise sensitive location. Error margins associated with any monitoring equipment used to measure this are not to be taken into account in determining whether or not the limit has been exceeded.

L5.3 Ground vibration peak particle velocity from the blasting operations at the premises must not exceed 10mm/sec at any time and at any point within 3.5 metres of any non project related residential building or other noise sensitive location. Error margins associated with any monitoring equipment used to measure this are not to be taken into account in determining whether or not the limit has been exceeded.

L5.4 Ground vibration peak particle velocity from the blasting operations at the premises must not exceed 5mm/sec for more than five per cent of the total number of blasts over each reporting period at any point within 3.5 metres of any non project related residential building or other noise sensitive location. Error margins associated with any monitoring equipment used to measure this are not to be taken into account in determining whether or not the limit has been exceeded.

L5.5 Blasting operations on the premises must only be carried out between the hours 9am to 5pm, Monday to Saturday, inclusive.

L5.6 The hours of operation for blasting operations specified in condition L7.3 may be varied if the EPA, having regard to the effect that the proposed variation would have on the amenity of the residents in the locality, gives written consent to the variation.

L5.7 Blasting at the premises is limited to 1 blast on each day on which blasting is permitted.

Note: Additional blasts are permitted where it is demonstrated to be necessary for safety reasons and the EPA and neighbours have been notified of the intended blast prior to the additional blast being fired.

4 Operating Conditions

O1 Activities must be carried out in a competent manner

O1.1 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.

O2 Maintenance of plant and equipment

O2.1 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
b) must be operated in a proper and efficient manner.

O3 Dust

O3.1 All operations and activities occurring at the premises must be carried out in a manner that will minimise the emission of dust from the premises.

O3.2 Trucks transporting coal from the premises must be covered immediately after loading to prevent wind blown emissions and spillage. The covering must be maintained until immediately before unloading the trucks.

O4 Other operating conditions

Blast Fume

O4.1 Offensive blast fume must not be emitted from the premises.

Definition: *Offensive blast fume* means post-blast gases (whether visible or invisible, odorous or odourless) from the detonation of explosives at the premises that by reason of their nature, duration, character or quality, or the time at which they are emitted, or any other circumstances:
(i) are harmful to (or is likely to be harmful to) a person that is outside the premises from which it is emitted, or
(ii) interferes unreasonably with (or is likely to interfere unreasonably with) the comfort or repose of a person who is outside the premises from which it is emitted.

Pollution Incident Response Management Plan

O4.2 The licensee must maintain, and implement as necessary, a current Pollution Incident Response Management Plan (PIRMP) for the premises. The PIRMP must document systems and procedures to deal with all types of incidents (e.g. spills, explosions, fire) that may occur at the premises or that may be associated with activities that occur at the premises and which are likely to cause harm to the environment.

O4.3 The licensee must keep the PIRMP on the premises at all times.

5 Monitoring and Recording Conditions

M1 Monitoring records

M1.1 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.

M1.2 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.

M1.3 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.

M2 Requirement to monitor concentration of pollutants discharged

M2.1 For each monitoring/discharge point or utilisation area specified below (by a point number), the licensee must monitor (by sampling and obtaining results by analysis) the concentration of each pollutant specified

in Column 1. The licensee must use the sampling method, units of measure, and sample at the frequency, specified opposite in the other columns:

M2.2 Air Monitoring Requirements

POINT 28

Pollutant	Units of measure	Frequency	Sampling Method
PM10	micrograms per cubic metre	Continuous	AM-22

M2.3 Water and/ or Land Monitoring Requirements

POINT 1,2,3,24,25,26,27

Pollutant	Units of measure	Frequency	Sampling Method
Conductivity	microsiemens per centimetre	Special Frequency 1	Grab sample
Oil and Grease	milligrams per litre	Special Frequency 1	Grab sample
pH	pH	Special Frequency 1	Grab sample
Total suspended solids	milligrams per litre	Special Frequency 1	Grab sample

POINT 5,6,7,8

Pollutant	Units of measure	Frequency	Sampling Method
Conductivity	microsiemens per centimetre	Special Frequency 1	Grab sample
Oil and Grease	milligrams per litre	Special Frequency 1	Grab sample
pH	pH	Special Frequency 1	Grab sample
Total suspended solids	milligrams per litre	Special Frequency 1	Grab sample

POINT 9,10,11,12

Pollutant	Units of measure	Frequency	Sampling Method
Conductivity	microsiemens per centimetre	Every 6 months	Grab sample
Lead	milligrams per litre	Every 6 months	Grab sample
pH	pH	Every 6 months	Grab sample
Standing Water Level	metres	Every 6 months	In situ

POINT 13

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Pollutant	Units of measure	Frequency	Sampling Method
Conductivity	microsiemens per centimetre	Quarterly	Grab sample
Oil and Grease	milligrams per litre	Quarterly	Grab sample
pH	pH	Quarterly	Grab sample
Total suspended solids	milligrams per litre	Quarterly	Grab sample

M2.4 For the pruposes of the table(s) above Special Frequency 1 means the collection of samples as soon as practicable after a discharge from points 1, 2, 3, 24, 25, 26, and 27 commences and in any case not more than 12 hours after a discharge commences.

M2.5 For the purposes of condition M2.1, this licence acknowledges that points 15, 16, 20 and 21 are established, maintained and monitored by the licensee who holds Environment Protection Licence number 12407. The holder of environment protection licence 12365 obtains monitoring data from Licensee 12407 for these points to meet their obligations under this licence. The licensee is deemed to have not breached condition M2.1 of this licence where the licensee is unable to obtain the monitoring data to meet this condition.

M3 Testing methods - concentration limits

M3.1 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.

M3.2 Subject to any express provision to the contrary in this licence, monitoring for the concentration of a pollutant discharged to waters or applied to a utilisation area must be done in accordance with the Approved Methods Publication unless another method has been approved by the EPA in writing before any tests are conducted.

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".

M4 Weather monitoring

M4.1 For each monitoring point specified in the table below the licensee must monitor (by sampling and obtaining results by analysis) the parameters specified in Column 1. The licensee must use the sampling method, units of measure, averaging period and sample at the frequency, specified opposite in the other columns.

Point W1

Parameter	Units of Measure	Frequency	Averaging Period	Sampling Method
Temperature @ 2 metres	°C	Continuous	15 minute	AM-4
Wind direction @ 10 metres	°	Continuous	15 minute	AM-2 & AM-4
Wind speed @ 10 metres	m/s	Continuous	15 minute	AM-2 & AM-4
Sigma theta @ 10 metres	°	Continuous	15 minute	AM-2 & AM-4
Rainfall	mm/h	Continuous	1 hour	AM-4
Solar Radiation	W/m2	Continuous	15 minute	AM-4
Temperature @ 10 metres	°C	Continuous	15 minute	AM-4
Additional requirements - Siting - Measurement				AM-1 & AM-4 AM-2 & AM-4

M4.2 The meteorological weather station must be maintained so as to be capable of continuously monitoring the parameters specified in this section.

M5 Recording of pollution complaints

M5.1 The licensee must keep a legible record of all complaints made to the licensee or any employee or agent of the licensee in relation to pollution arising from any activity to which this licence applies.

M5.2 The record must include details of the following:
a) the date and time of the complaint;
b) the method by which the complaint was made;
c) any personal details of the complainant which were provided by the complainant or, if no such details were provided, a note to that effect;
d) the nature of the complaint;
e) the action taken by the licensee in relation to the complaint, including any follow-up contact with the complainant; and
f) if no action was taken by the licensee, the reasons why no action was taken.

M5.3 The record of a complaint must be kept for at least 4 years after the complaint was made.

M5.4 The record must be produced to any authorised officer of the EPA who asks to see them.

M6 Telephone complaints line

M6.1 The licensee must operate during its operating hours a telephone complaints line for the purpose of

receiving any complaints from members of the public in relation to activities conducted at the premises or by the vehicle or mobile plant, unless otherwise specified in the licence.

M6.2 The licensee must notify the public of the complaints line telephone number and the fact that it is a complaints line so that the impacted community knows how to make a complaint.

M6.3 The preceding two conditions do not apply until 3 months after: the date of the issue of this licence.

M7 Other monitoring and recording conditions

M7.1 For each monitoring point specified below, the Licensee must monitor the noise or vibration parameter specified in Column 1. The Licensee must use the sampling method, units of measure, and sample at the frequency, specified opposite in the other columns.

Points: N1

Parameter	Units of Measure	Frequency	Sampling Method
Ambient Noise	LAeq (15 minute) LAmax LA1 LA10 LA90 LAmin	Frequency of monitoring as detailed in the most recently approved “Noise Management Plan" and “Road Noise Management Plan" for the premises.	As detailed in the most recently approved “Noise Management Plan" and “Road Noise Management Plan" for the premises.

M7.2 Point: N3

Parameter	Units of Measure	Frequency	Sampling Method
Ambient Noise	LAeq (15 minute) LAmax LA1 LA10 LA90 LAmin	Continuous real time noise monitoring as detailed in the most recently approved “Noise Management Plan" and “Road Noise Management Plan" for the premises.	As detailed in the most recently approved “Noise Management Plan" and “Road Noise Management Plan" for the premises.

M7.3 Points: N1

Parameter	Units of measure	Frequency	Sample Method
Blast Noise	DB(Lin Peak)	Every Blast	Type 1 Noise Blast Logger
Blast Vibration	mm/s	Every Blast	Geophone Logger or Similar

M7.4 For the purpose of conditions M7.1 and M7.2, the noise monitoring locations are described as:

EPA Identification No.	Description of Location
N1	Within 30m of the residence on property '"Tarrawonga"
N3	Portable monitor

M7.5 Note: N3 is a portable monitor enabling the monitor to be relocated to areas of potential greatest impact. The licensee is responsible to ensure that it is located at the most suitable location.

M7.6 Note: The location, frequency of monitoring and the parameters to be monitored may be varied by the EPA once the variability of the noise impact is established.

M7.7 To assess compliance with the noise limits presented in the Noise Limits table, attended noise monitoring must be undertaken in accordance with the condition titled Determining Compliance, outlined above, and:
a) at each one of the locations listed in the Noise Limits table;
b) occur Quarterly in a reporting period;
c) occur during each day, evening and night period as defined in the NSW Industrial Noise Policy for a minimum of:
i) 1.5 hours during the day;
ii) 30 minutes during the evening; and
iii) 1 hour during the night.
d) occur for three consecutive operating days.

6 Reporting Conditions

R1 Annual return documents

R1.1 The licensee must complete and supply to the EPA an Annual Return in the approved form comprising:
a) a Statement of Compliance; and
b) a Monitoring and Complaints Summary.
At the end of each reporting period, the EPA will provide to the licensee a copy of the form that must be completed and returned to the EPA.

R1.2 An Annual Return must be prepared in respect of each reporting period, except as provided below.

R1.3 Where this licence is transferred from the licensee to a new licensee:
a) the transferring licensee must prepare an Annual Return for the period commencing on the first day of the reporting period and ending on the date the application for the transfer of the licence to the new licensee is granted; and
b) the new licensee must prepare an Annual Return for the period commencing on the date the application for the transfer of the licence is granted and ending on the last day of the reporting period.

R1.4 Where this licence is surrendered by the licensee or revoked by the EPA or Minister, the licensee must prepare an Annual Return in respect of the period commencing on the first day of the reporting period and ending on:
a) in relation to the surrender of a licence - the date when notice in writing of approval of the surrender is given; or
b) in relation to the revocation of the licence - the date from which notice revoking the licence operates.

R1.5 The Annual Return for the reporting period must be supplied to the EPA by registered post not later than

60 days after the end of each reporting period or in the case of a transferring licence not later than 60 days after the date the transfer was granted (the 'due date').

R1.6 The licensee must retain a copy of the Annual Return supplied to the EPA for a period of at least 4 years after the Annual Return was due to be supplied to the EPA.

R1.7 Within the Annual Return, the Statement of Compliance must be certified and the Monitoring and Complaints Summary must be signed by:
a) the licence holder; or
b) by a person approved in writing by the EPA to sign on behalf of the licence holder.

Note: The term "reporting period" is defined in the dictionary at the end of this licence. Do not complete the Annual Return until after the end of the reporting period.

Note: An application to transfer a licence must be made in the approved form for this purpose.

R2 Notification of environmental harm

R2.1 Notifications must be made by telephoning the Environment Line service on 131 555.

R2.2 The licensee must provide written details of the notification to the EPA within 7 days of the date on which the incident occurred.

Note: The licensee or its employees must notify all relevant authorities of incidents causing or threatening material harm to the environment immediately after the person becomes aware of the incident in accordance with the requirements of Part 5.7 of the Act.

R3 Written report

R3.1 Where an authorised officer of the EPA suspects on reasonable grounds that:
a) where this licence applies to premises, an event has occurred at the premises; or
b) where this licence applies to vehicles or mobile plant, an event has occurred in connection with the carrying out of the activities authorised by this licence,
and the event has caused, is causing or is likely to cause material harm to the environment (whether the harm occurs on or off premises to which the licence applies), the authorised officer may request a written report of the event.

R3.2 The licensee must make all reasonable inquiries in relation to the event and supply the report to the EPA within such time as may be specified in the request.

R3.3 The request may require a report which includes any or all of the following information:
a) the cause, time and duration of the event;
b) the type, volume and concentration of every pollutant discharged as a result of the event;
c) the name, address and business hours telephone number of employees or agents of the licensee, or a specified class of them, who witnessed the event;
d) the name, address and business hours telephone number of every other person (of whom the licensee is aware) who witnessed the event, unless the licensee has been unable to obtain that information after

making reasonable effort;
e) action taken by the licensee in relation to the event, including any follow-up contact with any complainants;
f) details of any measure taken or proposed to be taken to prevent or mitigate against a recurrence of such an event; and
g) any other relevant matters.

R3.4 The EPA may make a written request for further details in relation to any of the above matters if it is not satisfied with the report provided by the licensee. The licensee must provide such further details to the EPA within the time specified in the request.

R4 Other reporting conditions

R4.1 A noise compliance assessment report must be submitted to the EPA within thirty (30) days of the completion of the quarterly noise monitoring. The assessment must be prepared by a suitably qualified and experienced acoustical consultant and include:
a) an assessment of compliance with noise limits detailed in the limit conditions of this licence; and
b) an outline of any management actions taken within the monitoring period to address any exceedences of the limits detailed in the limit conditions of this licence.

R4.2 The licensee must report any exceedence of the licence blasting limits to the regional office of the EPA as soon as practicable after the exceedence becomes known to the licensee or to one of the licensee's employees or agents.

7 General Conditions

G1 Copy of licence kept at the premises or plant

G1.1 A copy of this licence must be kept at the premises to which the licence applies.

G1.2 The licence must be produced to any authorised officer of the EPA who asks to see it.

G1.3 The licence must be available for inspection by any employee or agent of the licensee working at the premises.

8 Pollution Studies and Reduction Programs

U1 Coal Mine Wind Erosion of Exposed Land Assessment

U1.1 The licensee must undertake the following steps:
1. Calculate the wind erosion exposed surface area (in hectares) within the premises as of 31 July 2015.
2. Determine the wind erosion exposed surface area (in hectares) predicted as at 31 July 2015 within the licensee's Environmental Assessment for the premises.
3. Compare the areas calculated in steps 1 and 2.
4. Submit a written report to the EPA at armidale@epa.nsw.gov.au containing the analysis required in

steps 1 to 3, by 30 September 2015.

The report submitted to the EPA must be accompanied by spatial data to confirm the wind erosion exposed surface area calculations. The following data is required:
· Shapefiles showing the premises boundary.
· Shapefiles showing the wind erosion exposed area within the premises as of 31 July 2015
· Shapefiles showing areas classified as stabilised surface as of 31 July 2015
· Details of any studies undertaken to verify that the areas of stabilised surface meet the definition.

Note: Definitions:
Environmental Assessment means any environmental assessment document prepared in order to gain approval or consent under the Environmental Planning and Assessment Act (1979) under which the licensee currently operates at the premises. If the predictions made in this document do not correspond to the current year of mine operation, the licensee should extrapolate between predictions.

Stabilised Surface means any previously disturbed surface area which shows visual or other evidence of surface crusting and is resistant to wind-driven fugitive dust and is demonstrated to be stabilised. Stabilisation can be determined in accordance with one or more of the applicable test methods contained in the Rule 403 Implementation Handbook located at:
www.capcoa.org/Docs/SCAQMD%20r403%20handbook.doc.

Wind Erosion Exposed Surface Area means the portion of the premises surface which has been physically moved, uncovered, destabilised or otherwise modified from its natural state, thereby increasing the potential for fugitive particulate matter emissions, but excluding areas which have been:
· paved or covered by a permanent building or structure;
· maintained with a vegetative ground cover of at least 50% of ground cover for particular areas. Vegetative ground cover can be determined in accordance with the standardised procedure for revegetation assessment contained in Atyeo C. & Thackway R. (2009) located at:
http://data.daff.gov.au/data/warehouse/pe_brs90000004196/revegetationManual200906_20100410_ap14.pdf or
· classified as a stabilised surface.

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Dictionary

General Dictionary

3DGM [in relation to a concentration limit]	Means the three day geometric mean, which is calculated by multiplying the results of the analysis of three samples collected on consecutive days and then taking the cubed root of that amount. Where one or more of the samples is zero or below the detection limit for the analysis, then 1 or the detection limit respectively should be used in place of those samples
Act	Means the Protection of the Environment Operations Act 1997
activity	Means a scheduled or non-scheduled activity within the meaning of the Protection of the Environment Operations Act 1997
actual load	Has the same meaning as in the Protection of the Environment Operations (General) Regulation 2009
AM	Together with a number, means an ambient air monitoring method of that number prescribed by the *Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales*.
AMG	Australian Map Grid
anniversary date	The anniversary date is the anniversary each year of the date of issue of the licence. In the case of a licence continued in force by the Protection of the Environment Operations Act 1997, the date of issue of the licence is the first anniversary of the date of issue or last renewal of the licence following the commencement of the Act.
annual return	Is defined in R1.1
Approved Methods Publication	Has the same meaning as in the Protection of the Environment Operations (General) Regulation 2009
assessable pollutants	Has the same meaning as in the Protection of the Environment Operations (General) Regulation 2009
BOD	Means biochemical oxygen demand
CEM	Together with a number, means a continuous emission monitoring method of that number prescribed by the *Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales*.
COD	Means chemical oxygen demand
composite sample	Unless otherwise specifically approved in writing by the EPA, a sample consisting of 24 individual samples collected at hourly intervals and each having an equivalent volume.
cond.	Means conductivity
environment	Has the same meaning as in the Protection of the Environment Operations Act 1997
environment protection legislation	Has the same meaning as in the Protection of the Environment Administration Act 1991
EPA	Means Environment Protection Authority of New South Wales.
fee-based activity classification	Means the numbered short descriptions in Schedule 1 of the Protection of the Environment Operations (General) Regulation 2009.
general solid waste (non-putrescible)	Has the same meaning as in Part 3 of Schedule 1 of the Protection of the Environment Operations Act 1997

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flow weighted composite sample	Means a sample whose composites are sized in proportion to the flow at each composites time of collection.
general solid waste (putrescible)	Has the same meaning as in Part 3 of Schedule 1 of the Protection of the Environmen t Operations Act 1997
grab sample	Means a single sample taken at a point at a single time
hazardous waste	Has the same meaning as in Part 3 of Schedule 1 of the Protection of the Environment Operations Act 1997
licensee	Means the licence holder describe d at the front of this licence
load calculation protocol	Has the same meaning as in the Protection of the Environment Operations (General) Regulation 2009
local authority	Has the same meaning as in the Protection of the Environment Operations Act 1997
material harm	Has the same meaning as in section 147 Protection of the Environment Operations Act 1997
MBAS	Means methylene blue active substances
Minister	Means the Minister administering the Protection of the Environment Operations Act 1997
mobile plant	Has the same meaning as in Part 3 of Schedule 1 of the Protection of the Environment Operations Act 1997
motor vehicle	Has the same meaning as in the Protection of the Environment Operations Act 1997
O&G	Means oil and grease
percentile [in relation to a concentration limit of a sample]	Means that percentage [eg.50%] of the number of samples taken that must meet the concentration limit specified in the licence for that pollutant over a specified period of time. In this licence, the specified period of time is the Reporting Period unless otherwise stated in this licence.
plant	Includes all plant within the meaning of the Protection of the Environment Operations Act 1997 as well as motor vehicles.
pollution of waters [or water pollution]	Has the same meaning as in the Protection of the Environment Operations Act 1997
premises	Means the premises described in condition A2.1
public authority	Has the same meaning as in the Protection of the Environment Operations Act 1997
regional office	Means the relevant EPA office referred to in the Contacting the EPA document accompanying this licence
reporting period	For the purposes of this licence, the reporting period means the period of 12 months after the issue of the licence, and each subsequent period of 12 mo nths. In the case of a licence continued in force by the Protection of the Environment Operations Act 1997, the date of issue of the licence is the first anniversary of the date of issue or last renewal of the licence following the commencement of the Act.
restricted solid waste	Has the same meaning as in Part 3 of Schedule 1 of the Protection of the Environment Operations Act 1997
scheduled activity	Means an activity listed in Schedule 1 of the Protection of the Environment Operations Act 1997
special waste	Has the same meaning as in Part 3 of Schedule 1 of the Protection of the Environment Operations Act 1997
TM	Together with a number, means a test method of that number prescribed by the *Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales*.

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TSP	Means total suspended particles
TSS	Means total suspended solids
Type 1 substance	Means the elements antimony, arsenic, cadmium, lead or mercury or any compound containing one or more of those elements
Type 2 substance	Means the elements beryllium, chromium, cobalt, manganese, nickel, selenium, tin or vanadium or any compound containing one or more of those elements
utilisation area	Means any area shown as a utilisation area on a map submitted with the application for this licence
waste	Has the same meaning as in the Protection of the Environment Operations Act 1997
waste type	Means liquid, restricted solid waste, general solid waste (putrescible), general solid waste (non - putrescible), special waste or hazardous waste

Mr Robert O'Hern

Environment Protection Authority

(By Delegation)

Date of this edition: 09-January-2006

Environment Protection Licence

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End Notes

1	Licence varied by notice 1082112, issued on 25-Feb-2008, which came into effect on 25-Feb-2008.
2	Licence varied by notice 1093269, issued on 10-Nov-2008, which came into effect on 10-Nov-2008.
3	Licence varied by notice 1103021, issued on 18-Aug-2009, which came into effect on 18-Aug-2009.
4	Licence varied by notice 1126949, issued on 13-Jul-2011, which came into effect on 13-Jul-2011.
5	Licence varied by notice 1501194 issued on 20-Dec-2011
6	Licence varied by notice 1506685 issued on 27-Nov-2012
7	Licence varied by notice 1510429 issued on 21-Mar-2013
8	Licence varied by notice 1516121 issued on 06-Sep-2013
9	Licence varied by notice 1518350 issued on 05-Feb-2014
10	Licence varied by notice 1522246 issued on 14-Nov-2014
11	Licence varied by notice 1529401 issued on 14-Jul-2015

Appendix 3

COMPLIANCE REVIEWS

- PA 11_0047 (Table A3-1)
- EPL 12365 (Table A3-2)
- ML 1579, 1685 & 1693 (Table A3-3)

TABLE A3.1

Compliance Review – PA 11_0047 Mod 1

Cond.	Conditional Requirement	Compliance	Comments
Schedule 2 – Administration Conditions			
1.	In addition to meeting the specific performance criteria established under this approval, the Proponent shall implement all reasonable and feasible measures to prevent and/or minimise any material harm to the environment that may result from the construction, operation, or rehabilitation of the project.	Yes	As per condition.
2.	The Proponent shall carry out the project generally in accordance with the: (a) EA; (b) statement of commitments; and (c) conditions of this approval.	Yes	The activities on site were being undertaken generally in accordance with the nominated documents.
3.	If there is any inconsistency between the above documents, the most recent document shall prevail to the extent of the inconsistency. However, the conditions of this approval shall prevail to the extent of any inconsistency.	Not applicable	
4.	The Proponent shall comply with any reasonable requirement/s of the Secretary arising from the Department's assessment of: (a) any reports, strategies, plans, programs, reviews, audits or correspondence that are submitted in accordance with this approval; and (b) the implementation of any actions or measures contained in these documents.	Yes	As per condition.
5.	The Proponent may carry out mining operations on the site until the end of December 2030.	Not yet applicable	
6.	The Proponent shall not extract more than 3 million tonnes of ROM coal from the site in any calendar year.	Yes	As per condition
7.	For the period up until the commissioning of the Kamilaroi Highway overpass, the Proponent: (a) shall not transport more than 3 million tonnes of ROM coal from the site in any calendar year; (b) may transport up to 150,000 tonnes of this ROM coal from the site in any calendar year for direct distribution to domestic markets via the approved haulage route to the Kamilaroi Highway; (c) shall transport all remaining coal from the site to the Whitehaven CHPP via the approved haulage route; and (d) Shall, together with the owners of the Rocglen and Vickery coal mines, ensure that the cumulative haulage of coal along the approved haulage route does not exceed 3.5 million tonnes. (a) *Note: For the avoidance of doubt, the total amount of coal permitted to be transported from the site by road in any calendar year is 3 million tonnes*	Yes	PA11_0047 Modification of Approval enables continuation of transport of ROM coal to the Whitehaven CHPP and an increase up to 3 million tonnes of ROM Coal.
8.	For the period following the commissioning of the Kamilaroi Highway overpass, the Proponent: (a) shall not transport more than 3 million tonnes of ROM coal from the site in any calendar year; (b) may transport up to 50,000 tonnes of this ROM coal from the site in any calendar year for direct distribution to domestic markets via the approved haulage route to the Kamilaroi Highway; (c) shall transport all remaining coal from the site to the Whitehaven CHPP via the approved haulage route and the Kamilaroi Highway overpass; and	Not applicable	

Cond.	Conditional Requirement	Compliance	Comments
	(d) (d) shall together with the owners of the Rocglen and Vickery coal mines, ensure that the cumulative haulage of coal along the approved haulage route does not exceed 4.5 million tonnes. *Notes:* • *For the avoidance of doubt, the total amount of coal permitted to be transported from the site by road in any calendar year is 3 million tonnes.* (a) *For the avoidance of doubt, while any ROM coal transported from the site to the Whitehaven CHPP must use the Kamilaroi Highway overpass (once commissioned), this requirement does not apply to the transport of ROM coal directly to domestic markets or the transport of gravel off site.*		
9.	The Proponent shall only transport coal from the site or receive coal reject from the Whitehaven CHPP by truck between the hours of: (a) 6 am to 9.15 pm Monday to Friday; (b) 7 am to 5.15 pm Saturday; and (a) (c) at no time on Sundays or public holidays.	Yes	
10.	Within 6 months of the Boggabri rail spur line and Boggabri CHPP being commissioned, and every 2 years thereafter, the Proponent shall use all reasonable efforts to reach an agreement with the owners of the Boggabri coal mine to use this infrastructure to process and transport coal from the site, to the satisfaction of the Secretary. lf an agreement is reached to transport coal via the Boggabri rail spur line, the Proponent: (a) shall not transport more than 3 million tonnes of ROM coal from the site in any calendar year; (b) may transport up to 150,000 tonnes of this ROM coal from the site in any calendar year for direct distribution to domestic markets by road via the approved haulage route to the Kamilaroi Highway; and (c) shall transport all remaining coal from the site via the Boggabri rail spur line.".	Not yet applicable	
11.	The Proponent shall not extract more than 90,000m3 of gravel from the site for distribution off-site in any calendar year.	Yes	No gravel transported from site during reporting period.
12.	The Proponent may transport up to 90,000m3 of gravel from the site by truck in any calendar year. This gravel is to be transported from the site to the Kamilaroi Highway via the approved haulage route.	Yes	No gravel transported from site during reporting period.
13.	The Proponent shall only transport gravel from the site by truck between 7 am and 6 pm Monday to Saturday.	Yes	No gravel transported from site during reporting period.
14.	By the end of December 2013, or as otherwise agreed by the Secretary, the Proponent shall surrender the existing development consent (DA-88-4-2005) for the Tarrawonga Coal Mine in accordance with Section 104A of the EP&A Act. Prior to the surrender of this development consent, the conditions of this approval shall prevail to the extent of any inconsistency with the conditions of the development consent.	No	DA-88-4-2005 not yet surrendered in accordance with condition.
15.	The Proponent shall ensure that all new buildings and structures, and any alterations or additions to existing buildings and structures, are constructed in accordance with the relevant requirements of the BCA.	Yes	All buildings meet relevant requirements.
16.	The Proponent shall ensure that all demolition work on site is carried out in accordance with Australian Standard AS 2601-2001: The Demolition of Structures, or its latest version.	Not applicable	No demolition of buildings during reporting period.

Cond.	Conditional Requirement	Compliance	Comments
17.	Unless the Proponent and the applicable authority agree otherwise, the Proponent shall: (a) repair, or pay the full costs associated with repairing, any public infrastructure that is damaged by the project; and (b) relocate, or pay the full costs associated with relocating, any public infrastructure that needs to be relocated as a result of the project. *Note: This condition does not apply to any damage to roads caused as a result of general road use.*	Not applicable	No relocation or damage of public infrastructure during reporting period.
18.	The Proponent shall ensure that all the plant and equipment used on site, or to transport coal from the site, is: (a) maintained in a proper and efficient condition; and (b) operated in a proper and efficient manner.	Yes	All plant and equipment maintained and operated in proper and efficient manner.
19.	With the approval of the Secretary, the Proponent may submit any strategies, plans or programs required by this approval on a progressive basis. To ensure the strategies, plans or programs under the conditions of this approval are updated on a regular basis; the Proponent may at any time submit revised strategies, plans or programs to the Secretary for approval. With the agreement of the Secretary, the Proponent may prepare any revised strategy, plan or program without undertaking consultation with all parties under the applicable condition of this approval. *Notes:* • *White any strategy, plan or program may be submitted on a progressive basis, the Proponent must ensure that the existing operations on site are covered by suitable strategies, plans or programs at all times* *If the submission of any strategy, plan or program is to be staged, then the relevant strategy, plan or program must clearly describe the specific stage of which the strategy, plan or program applies, the relationship of this stage to any future stages, and the trigger for updating the strategy, plan or program*	Yes	
20.	The Proponent shall continue to implement the existing strategies, plans or programs that apply to any development on site under project approval DA-88-4-2005, until they are replaced by an equivalent strategy, plan or program approved under this approval	Yes	As per condition.
21.	By the end of March 2013, unless otherwise agreed by the Secretary, the Proponent shall enter into a planning agreement with Council in accordance with: (a) Division 6 of Part 4 of the EP&A Act; and (b) the terms of the Proponent's offer provided in Appendix 3.	No	Planning agreement yet to be executed.
Schedule 3 – Environmental Performance Conditions			
1.	Upon receiving a written request for acquisition from an owner of the privately-owned land listed in Table 1, the Proponent shall acquire the land in accordance with the procedures in conditions 0 and 0 of schedule 4.	Not yet applicable	
2.	Upon receiving a written request from the owner of any residence on the land listed in Table 1, the Proponent shall implement additional noise and/or air quality mitigation measures (such as double glazing, insulation, air filters, a first flush roof water drainage system and/or air conditioning) at the residence in consultation with the owner. These measures must be reasonable and feasible and directed towards reducing the noise and/or air quality impacts of the project on the residence. If within 3 months of receiving this request from the owner, the Proponent and the owner cannot agree on the measures to be implemented, or there is a dispute about the implementation of these measures, then either party may refer the matter to the	Not yet applicable	No written requests received to date.

<table>
<tr><th>Cond.</th><th>Conditional Requirement</th><th>Compliance</th><th>Comments</th></tr>
<tr><td></td><td>Secretary for resolution.</td><td></td><td></td></tr>
<tr><td>3.</td><td>Except for the noise-affected land in Table 1, the Proponent shall ensure that operational noise generated by the project does not exceed the criteria in Table 2 (35dB(A) $L_{Aeq(15min)}$ at all properties during day, evening and night and 45$L_{Aeq\ (1\ min}$) at night) at any residence on privately-owned land.
However, these noise criteria do not apply if the Proponent has an agreement with the owner/s of the relevant residence or land to generate higher noise levels, and the Proponent has advised the Department in writing of the terms of this agreement.</td><td>Yes</td><td>Exceedances at “Tarrawonga” which is a project related untenanted property.</td></tr>
<tr><td>4.</td><td>If the owner(s) of a privately-owned residence, that is not listed in Table 1, have reason to believe that operational noise from the project is causing the criteria in Table 2 to be exceeded at the residence, the owner(s) can request an independent noise impact assessment for the residence. The request shall be made in writing to the Secretary. If the Secretary considers that a noise impact assessment is warranted, then the Proponent shall commission the assessment.
(further details in condition)</td><td>Not yet applicable</td><td>No written requests received to date.</td></tr>
<tr><td>5.</td><td>If the owner(s) of land containing a privately owned residence, which is not listed in Table 1, have reason to believe that operational noise from the project is causing noise levels to exceed 40 dB(A) LAeq(15 min) over more than 25% of that land, the owner(s) can request an independent noise impact assessment for the land. The request shall be made in writing to the Secretary. If the Secretary considers that a noise impact assessment is warranted, then the Proponent shall commission the assessment.
(further details in condition)</td><td>Not yet applicable</td><td>No written requests received to date.</td></tr>
<tr><td>6.</td><td>Except for the land listed in Table 1, the Proponent shall ensure that the operational noise generated by the project combined with the noise generated by other mines does not exceed the criteria in Table 3 (40dB(A) $L_{Aeq(period)}$ at all properties during day, evening and night) at any residence on privately-owned land.</td><td>Yes</td><td>No exceedances recorded at privately owned residences that are not listed in Table 1.</td></tr>
<tr><td>7.</td><td>If the owner(s) of a privately-owned residence, which is not listed in Table 1, reasonably believes that the noise limits in Table 3 are being exceeded at the residence and that the exceedance is caused by operational noise from the project and one or more other mines (including use of private roads or rail spurs), the owner(s) can request an independent noise impact assessment for the residence. The request shall be made in writing to the Secretary. If the Secretary considers that a noise impact assessment is warranted, then the Proponent shall commission the assessment.
(further details in condition)</td><td>Not yet applicable</td><td>No written requests received to date.</td></tr>
<tr><td>8.</td><td>The Proponent, together with the owners of the Rocglen and Vickery coal mines, shall ensure that the noise generated on public roads by the Project and the other mines, does not exceed the criteria in Table 4 at any existing residence on privately-owned land.
Table 4: Road criteria
<table>
<tr><td>Land</td><td>Day and Evening LAeq (15 hour)</td><td>Night LAeq (9 hour)</td></tr>
<tr><td>All privately-owned residences</td><td>60</td><td>55</td></tr>
</table>
However, these criteria do not apply if the Proponent has a written agreement with the relevant landowner to exceed the criteria, and the Proponent has advised the Department in writing of the terms of this agreement.

Note: Traffic noise generated by the Project is to be measured in accordance</td><td>Yes</td><td>No recorded exceedances in road noise criteria.</td></tr>
</table>

Cond.	Conditional Requirement	Compliance	Comments
	with the relevant procedures in the NSW Road Noise Policy."		
9.	The Proponent shall: (a) ensure that: • all trucks, dozers, drills and excavators purchased for use on the site after the date of this approval are commissioned as noise suppressed (or attenuated) units; • all equipment and noise control measures deliver sound power levels that are equal to, or less than, the sound power levels identified in the EA, and correspond to best practice, or the application of best available economically achievable technology; • improvements are made to existing noise suppression equipment as improved technology becomes available where reasonable and feasible; and (b) monitor and report on the implementation of these requirements annually on its website.	No	No additional equipment purchases made. Site continues to operate equipment in use pre-approval. Equipment onsite has exceeded the predicted noise levels in the EA; see appendix 9. Subsequent sound power level testing indicates that the majority of mobile equipment is now compliant.
10.	The Proponent shall: (a) conduct an annual testing program of the plant on site; (b) restore the effectiveness of any attenuation if it is found to be defective; and (c) report on the results of any testing and/or attenuation work within the Annual Review.	Yes	As per condition
11.	The Proponent shall: (a) implement best management practice to minimise all operational, low frequency, road and rail traffic noise levels associated with the project; (b) operate a comprehensive on-site noise management system that uses a combination of predictive meteorological forecasting and real-time noise monitoring data to guide the day to day planning of mining operations and the implementation of both proactive and reactive noise mitigation measures to ensure compliance with the relevant conditions of this approval; (c) maintain the effectiveness of noise suppression equipment on plant at all times and ensure defective plant is not operationally used until fully repaired; (d) ensure that noise attenuated plant is deployed preferentially in locations near to sensitive receivers; (e) minimise the noise impacts of the project during meteorological conditions under which the noise limits in this approval do not apply (see condition 0); (f) ensure that project related trains on the Boggabri spur line only use locomotives that are approved to operate on the NSW rail network in accordance with the noise limits in ARTC's EPL (No. 3142); (g) use its best endeavours to ensure that project-related rolling stock supplied by service providers on the Boggabri rail spur line is designed, constructed and maintained to minimise noise; and (h) co-ordinate the noise management on site with the noise management at other mines within the Leard Forest Mining Precinct, to minimise the cumulative noise impacts of these mines, to the satisfaction of the Secretary.	No (a)	No additional equipment purchases made. Site continues to operate equipment in use pre-approval. Equipment onsite has exceeded the predicted noise levels in the EA; see appendix 9. Subsequent sound power level testing indicates that the majority of mobile equipment is now compliant.
12.	The Proponent shall prepare and implement a Noise Management Plan for the project to the satisfaction of the Secretary. This plan must: (a) be prepared in consultation with the EPA, and be submitted to	Yes	Noise Management Plan prepared in accordance with all requirements of this condition and submitted for approval prior to the end of May 2013. Noise

Cond.	Conditional Requirement	Compliance	Comments
	the Secretary for approval by the end of May 2013; *(further details in condition)*		Management Plan approved during reporting period.
13.	Where conditions in this approval refer to measurement of noise within the context of the NSW Industrial Noise Policy the inversion class to be applied to the project is Class G. However, the Proponent may undertake an investigation to determine whether a proposal for change in this classification could be considered for approval by the Secretary. Any such investigation must be conducted in consultation with the EPA and be conducted by a suitably qualified person whose appointment has been endorsed by the EPA and approved by the Secretary. The report and recommendation must be submitted to the EPA for endorsement prior to submission to the Secretary. If the Secretary is satisfied that the recommendation is reasonable, then the Secretary may amend the inversion class applying to the project under this approval.	Yes	Class G applied.
14.	The Proponent shall ensure that blasting does not cause any exceedance of the criteria in Table 5. **Residence on privately owned land** • 115dBL, Allowable exceedances: 5% of the total number of blasts in a 12 month period. • 120dBL at any time. • 5mm/s, Allowable exceedances: 5% of the total number of blasts in a 12 month period. • 10mm/s at any time. **All public infrastructure** • 50 mm/s at any time	Yes	See Section 3.9.2 and Appendix 8 for details.
15.	The Proponent shall only carry out blasting on the site between 9 am and 5 pm Monday to Saturday inclusive. No blasting is allowed on Sundays, public holidays, or at any other time without the written approval of the Secretary.	Yes	As per condition.
16.	The Proponent may carry out a maximum of: (a) 1 blast a day; unless an additional blast is required following a blast misfire; and (b) 4 blasts a week, averaged over a calendar year, for the project. This condition does not apply to blasts that generate ground vibration of 0.5 mm/s or less at any residence on privately-owned land, or to blasts required to ensure the safety of the mine or its workers.	Yes	See Section 3.9.2 and Appendix 8 for details.
17.	If the Proponent receives a written request from the owner of any privately-owned land within 2 kilometres of the approved open-cut pit on site, for a property inspection to establish the baseline condition of any buildings and/or structures on his/her land, or to have a previous property inspection report updated, then within 2 months of receiving this request the Proponent shall: (a) commission a suitably qualified, experienced and independent person, whose appointment is acceptable to both parties, to: (b) establish the baseline condition of any buildings and/or structures on the land, or update the previous property inspection report; and (c) identify any measures that should be implemented to minimise the potential blasting impacts of the project on these buildings and/or structures; and (d) give the landowner a copy of the new or updated property inspection report. If there is a dispute over the selection of the suitably qualified, experienced and independent person, or the Proponent or	Not yet applicable	No written requests received to date.

Cond.	Conditional Requirement	Compliance	Comments
	landowner disagrees with the findings of the independent property investigation, either party may refer the matter to the Secretary for resolution.		
18.	If any owner of privately-owned land within 2 kilometres of blasting operations, or any other landowner nominated by the Secretary, claims that the buildings and/or structures on his/her land have been damaged as a result of blasting on site, then within 2 months of receiving this claim in writing from the landowner, the Proponent shall: (a) commission a suitably qualified, experienced and independent person, whose appointment is acceptable to both parties, to investigate the claim; and (b) give the landowner a copy of the property investigation report. If this independent property investigation confirms the landowner's claim, and both parties agree with these findings, then the Proponent shall repair the damages to the satisfaction of the Secretary. If there is a dispute over the selection of the suitably qualified, experienced and independent person, or the Proponent or landowner disagrees with the findings of the independent property investigation, either party may refer the matter to the Secretary for resolution.	Not yet applicable	No claims made during reporting period.
19.	During mining operations on site, the Proponent shall: (a) implement best practice blasting management to: • protect the safety of people and livestock in the surrounding area; • protect public or private infrastructure/property in the surrounding area from any damage; • minimise the dust and fume emissions of any blasting; and • minimise blasting impacts on heritage items in the vicinity of the site; (b) co-ordinate the timing of blasting on site with the timing of blasting at other mines within the Leard Forest Mining Precinct to minimise the cumulative blasting impacts of the mines; and (c) operate a suitable system to enable the public to get up-to-date information on the proposed blasting schedule on site, to the satisfaction of the Secretary.	Yes	As per condition.
20.	The Proponent shall not undertake blasting on-site within 500 metres of: (a) any public road without the approval of Council; or (b) any land outside of the site not owned by the Proponent, unless: • the Proponent has a written agreement with the relevant landowner to allow blasting to be carried out closer to the land, and the Proponent has advised the Department in writing of the terms of this agreement; or • the Proponent has: o demonstrated that the blasting can be carried out closer to the land without compromising the safety of the people or livestock on the land, or damaging the buildings and/or structures on the land; and o updated the Blast Management Plan to include the specific measures that would be implemented while blasting is being carried out	Yes	As per condition.

<table>
<tr><th>Cond.</th><th>Conditional Requirement</th><th>Compliance</th><th>Comments</th></tr>
<tr><td></td><td>within 500 metres of the land,
to the satisfaction of the Secretary.</td><td></td><td></td></tr>
<tr><td>21.</td><td>The Proponent shall prepare and implement a Blast Management Plan for the project to the satisfaction of the Secretary. This plan must:
(a) be submitted to the Secretary for approval by the end of May 2013;
(further details in condition)</td><td>Yes</td><td>Blast Management Plan prepared in accordance with all requirements of this condition and submitted for approval prior to the end of May 2013. Approval expected during next reporting period.</td></tr>
<tr><td>22.</td><td>Unless otherwise authorised by an EPL, the Proponent shall ensure that no offensive odours are emitted from the site, as defined under the POEO Act.</td><td>Yes</td><td>As per condition.</td></tr>
<tr><td>23.</td><td>The Proponent shall implement all reasonable and feasible measures to minimise the release of greenhouse gas emissions from the site to the satisfaction of the Secretary.</td><td>Yes</td><td>As per condition.</td></tr>
<tr><td>24.</td><td>The Proponent shall ensure that all reasonable and feasible avoidance and mitigation measures are implemented so that particulate matter emissions generated by the project do not cause exceedances of the criteria in Table 6, Table 7 and Table 8 at any residence on privately-owned land or on more than 25 percent of any privately-owned land.
The assessment acknowledges that it may not be reasonable and feasible to prevent exceedance of the PM10 criteria in Table at property 45 and exceedance of the criteria in Table 7 in year 16 at property 49. (To interpret the property locations referred to see the applicable figure(s) in Appendix 5.)
Table 6: Long-term criteria for particulate matter
<table>
<tr><th>Pollutant</th><th>Averaging Period</th><th>[d] Criterion</th></tr>
<tr><td>Total suspended particulate (TSP) matter</td><td>Annual</td><td>[a] 90 µg/m^3</td></tr>
<tr><td>Particulate matter < 10 µm (PM_{10})</td><td>Annual</td><td>[a] 30 µg/m^3</td></tr>
</table>
Table 7: Short-term criteria for particulate matter
<table>
<tr><th>Pollutant</th><th>Averaging Period</th><th>[d] Criterion</th></tr>
<tr><td>Particulate matter < 10 µm (PM_{10})</td><td>24 hour</td><td>[a] 50 µg/m^3</td></tr>
</table>
Table 8: Long-term criteria for deposited dust
<table>
<tr><th>Pollutant</th><th>Averaging Period</th><th>Maximum increase in deposited dust level</th><th>Maximum total deposited dust level</th></tr>
<tr><td>[c] Deposited dust</td><td>Annual</td><td>[b] 2 g/m^2/month</td><td>[a] 4 g/m^2/month</td></tr>
</table></td><td>Yes</td><td>No exceedances recorded on privately owned land. See s3.1.3 and Appendix 4 for further detail.</td></tr>
<tr><td>25.</td><td>The Proponent shall ensure that particulate matter emissions generated by the project do not exceed the criteria listed in Table 9 (24 hr PM_{10}: 50µg/m^3) at any residence on privately-owned land or on more than 25 percent of any privately-owned land, except on property 49 in year 16.</td><td>Yes</td><td>As per condition.</td></tr>
<tr><td>26.</td><td>If particulate matter emissions generated by the project exceed the criteria, or contribute to an exceedance of the relevant cumulative criteria, in Table 10, Table 11 or Table 12, at any residence on privately-owned land or on more than 25 percent of any privately-owned land, then upon receiving a written request for acquisition from the landowner the Proponent shall acquire the land in accordance with the procedures in conditions 8 and 9 of schedule 4.
Table 10: Long term land acquisition criteria for particulate matter</td><td>Not yet applicable</td><td>No written requests received to date.</td></tr>
</table>

<table>
<tr><th>Cond.</th><th>Conditional Requirement</th><th>Compliance</th><th>Comments</th></tr>
<tr><td></td><td>
<table>
<tr><th>Pollutant</th><th>Averaging period</th><th>[d] Criterion</th></tr>
<tr><td>Total suspended particulate (TSP) matter</td><td>Annual</td><td>[a] 90 µg/m^3</td></tr>
<tr><td>Particulate matter < 10 µm (PM$_{10}$)</td><td>Annual</td><td>[a] 30 µg/m^3</td></tr>
</table>
Table 11: Short term land acquisition criteria for particulate matter
<table>
<tr><th>Pollutant</th><th>Averaging period</th><th>[d] Criterion</th></tr>
<tr><td>Particulate matter < 10 µm (PM$_{10}$)</td><td>24 hour</td><td>[a] 150 µg/m^3</td></tr>
<tr><td>Particulate matter < 10 µm (PM$_{10}$)</td><td>24 hour</td><td>[b] 50 µg/m^3</td></tr>
</table>
Table 12: Long term land acquisition criteria for deposited dust
<table>
<tr><th>Pollutant</th><th>Averaging period</th><th>Maximum increase in deposited dust level</th><th>Maximum total deposited dust level</th></tr>
<tr><td>[c] Deposited dust</td><td>Annual</td><td>[b] 2 g/m^2/month</td><td>[a] 4 g/m^2/month</td></tr>
</table>
</td><td></td><td></td></tr>
<tr><td>27.</td><td>The Proponent shall ensure that all reasonable and feasible avoidance and mitigation measures are implemented so that particulate matter emissions generated by the project do not exceed the criteria in Table 6, Table 7 and Table 8 at any occupied residence on any mine-owned land (including land owned by adjacent mines), unless:
(a) the tenant and/or landowner has been notified of any health risks in accordance with the notification requirements under schedule 4 of this approval;
(b) the tenant on project-related land can terminate the tenancy agreement without penalty, subject to giving reasonable notice, and the Proponent uses its best endeavours to provide assistance with relocation and sourcing of alternative accommodation;
(c) air mitigation measures such as air filters, a first flush roof water drainage system and/or air conditioning) are installed at the residence, if requested by the tenant and landowner (where owned by another mine other than the Proponent);
(d) particulate matter air quality monitoring is undertaken to inform the tenant and landowner of potential health risks; and
(e) monitoring data is presented to the tenant in an appropriate format, for a medical practitioner to assist the tenant in making an informed decision on the health risks associated with occupying the property,
to the satisfaction of the Secretary.</td><td>Yes</td><td>Notifications made as required.</td></tr>
<tr><td>28.</td><td>The Proponent shall:
(a) implement best practice air quality management practices on site, including all reasonable and feasible measures to minimise odour, fume and dust emissions of the project;
(b) operate a comprehensive air quality management system that uses a combination of predictive meteorological forecasting, predictive and real time air dispersion modelling and real-time air quality monitoring data to guide the day-to-day planning of mining operations and implementation of both proactive and reactive air quality mitigation measures to ensure compliance with the relevant conditions of this approval;
(c) manage PM2.5 levels in accordance with any requirements of an EPL;
(d) minimise the air quality impacts of the project during adverse meteorological conditions and extraordinary events (see note d under Table 8);
(e) minimise any visible off-site air pollution;</td><td>Yes</td><td>As per condition.</td></tr>
</table>

Cond.	Conditional Requirement	Compliance	Comments
	(f) minimise the surface disturbance of the site generated by the project; and (g) co-ordinate the air quality management on site with the air quality management at other mines within the Leard Forest Mining Precinct to minimise the cumulative air quality impacts of the mines, to the satisfaction of the Secretary.		
29.	The Proponent shall prepare and implement an Air Quality and Greenhouse Gas Management Plan for the project to the satisfaction of the Secretary. This plan must: (a) be prepared in consultation with the EPA and be submitted to the Secretary for approval by the end of May 2013; *(further details in condition)*	Yes	AQGGMP prepared in accordance with all requirements of this condition and submitted for approval prior to the end of May 2013. Approved during reporting period
30.	For the life of the project, the Proponent shall ensure that there is a meteorological station in the vicinity of the site that: (a) complies with the requirements in the Approved Methods for Sampling of Air Pollutants in New South Wales guideline; and (b) is capable of continuous real-time measurement of temperature lapse rate in accordance with the NSW Industrial Noise Policy, unless a suitable alternative is approved by the Secretary following consultation with the EPA.	Yes	As per condition.
31.	The Proponent shall ensure that it has sufficient water for all stages of the project, and if necessary, adjust the scale of mining operations on site to match its available water supply, to the satisfaction of the Secretary.	Yes	As per condition.
32.	The Proponent shall provide a compensatory water supply to any owner of privately-owned land whose water supply is adversely and directly impacted (other than a negligible impact) as a result of the project, in consultation with NOW, and to the satisfaction of the Secretary. The compensatory water supply measures must provide an alternative long-term supply of water that is equivalent to the loss attributed to the project. Equivalent water supply should be provided (at least on an interim basis) within 24 hours of the loss being identified. If the Proponent and the landowner cannot agree on the measures to be implemented, or there is a dispute about the implementation of these measures, then either party may refer the matter to the Secretary for resolution. If the Proponent is unable to provide an alternative long-term supply of water, then the Proponent shall provide alternative compensation to the satisfaction of the Secretary.	Not yet applicable	No compensatory water supply required to date.
33.	The Proponent shall ensure that all surface water discharges from the site comply with the discharge limits (both volume and quality) set for the project in any EPL.	Not applicable	See Section 3.3.2 for details.
34 - 38	Conditions relating to Goonbri Creek Diversion and Low Permeability Barrier.	Not yet applicable	Not proposed until later in the mine life.
39.	The Proponent shall prepare and implement a Water Management Plan for the project to the satisfaction of the Secretary. This plan must: (a) be prepared in consultation with OEH, NOW and Namoi CMA, by suitably qualified and experienced person/s whose appointment has been approved by the Secretary, (b) be submitted to the Secretary for approval by the end of May 2013; *(further details in condition)*	Yes	WMP prepared in accordance with all requirements of this condition and submitted for approval in May 2013. Approval expected during next reporting period.
40.	The Proponent shall implement the biodiversity offset strategy described in the EA, summarised in Table 14 and shown conceptually in Appendix 7, to the satisfaction of the Secretary.	Not Yet Applicable	Currently awaiting approval to the Management Plan to enable

<table>
<tr><th>Cond.</th><th>Conditional Requirement</th><th>Compliance</th><th>Comments</th></tr>
<tr><td></td><td>Table 1: Summary of the biodiversity offset strategy
<table>
<tr><th>Area</th><th>Offset Type</th><th>Minimum Size (hectares)</th></tr>
<tr><td>Willeroi Offset Area</td><td>Existing native vegetation to be enhanced, and additional native vegetation to be established with the restoration of at least 193 ha of Box Gum Woodland EEC, as listed under the TSC Act</td><td>1,660</td></tr>
<tr><td>Rehabilitation Area</td><td>Native woodland vegetation communities to be re-established, focused on Box Gum Woodland EEC</td><td>752</td></tr>
</table></td><td></td><td>active implementation of the strategy as defined in the EA.</td></tr>
<tr><td>41.</td><td>The Proponent shall contribute to the funding and preparation of the Leard Forest Mining Precinct Regional Biodiversity Strategy, as required under the approvals for the Boggabri coal mine and Maules Creek coal mine, to the satisfaction of the Secretary.
(further details in condition)</td><td>Yes</td><td>Preparation has commenced on development of the strategy, and Tarrawonga contributes as required.</td></tr>
<tr><td>42.</td><td>Within 6 months of the approval of Stage 2 of the Leard Forest Mining Precinct Regional Biodiversity Strategy the Proponent shall review, and if necessary revise, the biodiversity offset strategy for the project to the satisfaction of the Secretary. The review/revision must:
(a) be prepared in consultation with OEH, Namoi CMA, Forests NSW, the CCC, DPI Catchments and Lands and SEWPaC;
(b) not reduce the size or quality of the offset area; and
(c) be consistent (as far as is possible) with the recommendations and objectives of the Leard Forest Mining Precinct Regional Biodiversity Strategy.</td><td>Not yet applicable</td><td></td></tr>
<tr><td>43.</td><td>For the White Box – Yellow Box – Blakely's Red Gum Grassy Woodland Endangered Ecological Community the Proponent shall:
(a) ensure that the Biodiversity Offset Strategy and site Rehabilitation Strategy is focused on protection rehabilitation, re-establishment and long-term maintenance of viable stands of this community;
(b) investigate in consultation with OEH and the Namoi CMA, all factors likely to enhance or impede the effective long term restoration of degraded remnants of this EEC in offset areas or regeneration of this EEC on disturbed areas (both offset areas and the site);
(c) within 24 months of the date of this approval (and if possible in conjunction with Stage 2 of the Leard Forest Mining Precinct Regional Biodiversity Strategy), submit a report of this investigation and provide an implementation plan to maximise the prospects for rehabilitation and regeneration of this EEC on the offset areas and the site, for approval by the Secretary; and
(d) incorporate the approved implementation plan into the revised Biodiversity Management Plan, required under condition 48.</td><td>Yes</td><td>As per condition.</td></tr>
<tr><td>44.</td><td>For all threatened species on site, the Proponent shall ensure that the Biodiversity Offset Strategy and Rehabilitation Strategy are focused on protection, rehabilitation and long-term maintenance of viable stands of suitable habitat for these species.</td><td>Not Yet Applicable</td><td>Awaiting approval of Strategies to enable implementation to commence.</td></tr>
<tr><td>45.</td><td>The Proponent shall:
(a) investigate, in consultation with OEH and the Namoi CMA, all factors likely to enhance or impede the effective long term provision of suitable habitat(s) for the following species: Speckled Warbler, Brown Treecreeper, Grey-crowned Babbler, Hooded Robin, Varied Sittella, Turquoise Parrot, Masked Owl,</td><td>Yes – 45 (a) and (b)
45 (c) Not yet applicable</td><td>As per condition.</td></tr>
</table>

Cond.	Conditional Requirement	Compliance	Comments
	Yellow-bellied Sheath Tail Bat and Squirrel Glider; (b) within 12 months of the date of this approval (and if possible, in conjunction with Stage 2 of the Leard Forest Mining Precinct Regional Biodiversity Strategy), submit a report of this investigation and provide an implementation plan to ensure delivery of suitable areas of viable habitat for the species included in (a) above, for approval by the Secretary; and (c) incorporate the approved implementation plan into the revised Biodiversity Management Plan, required under condition 48.		
46.	The Proponent shall make suitable arrangements to provide appropriate long-term security for the offset areas: (a) for the Willeroi Offset Area the long-term security shall be provided by way of: • the Proponent entering into a conservation agreement or agreements pursuant to section 69B of the National Parks and Wildlife Act 1974, recording the obligations assumed by the Proponent under the conditions of this approval in relation to these offset areas, and registering the agreement(s) pursuant to section 69F of the National Parks and Wildlife Act 1974 ; or • a tenure of higher conservation status such as a National Park, or Nature Reserve, under the National Parks and Wildlife Act 1974, • The conservation agreement(s) must be registered by the end of December 2013 unless agreed otherwise by the Secretary after consultation with OEH. The conservation agreements must remain in force in perpetuity; and (b) by the end of December 2030 unless otherwise agreed by the Secretary, for the woodland to be established in the Rehabilitation Area, as identified in Table 14, to the satisfaction of the Secretary.	Not Yet Applicable	Required by 31st December 2016
47.	The Proponent shall prepare and implement a Biodiversity Management Plan for the project to the satisfaction of the Secretary. This plan must: (a) be prepared in consultation with OEH, SEWPaC, Forests NSW, the CCC, DPI Catchments and Lands and the Namoi CMA, and be submitted to the Secretary for approval by the end of May 2013; *(further details in condition)*	Yes	Biodiversity Management Plan Stage One (onsite) approved during reporting period. Stage Two to be completed and submitted for approval during the next reporting period as per direction from DP&E.
48.	The Proponent shall review and if necessary revise the Biodiversity Management Plan within 6 months of the completion of Stage 2 of the Leard Forest Mining Precinct Regional Biodiversity Strategy, to the satisfaction of the Secretary. The review/revision must: (a) be prepared in consultation with OEH, SEWPaC, Forests NSW, the CCC, DPI Catchments and Lands and the Namoi CMA; (b) be consistent with the findings of Leard Forest Mining Precinct Regional Biodiversity Strategy; and (c) include any implementation plans arising from the studies required under conditions 43 and 45 of this approval.	Not Yet Applicable	
49.	By the end of May 2013, the Proponent shall lodge a Conservation and Biodiversity Bond with the Department to ensure that the biodiversity offset strategy is implemented in accordance with the performance and completion criteria of the Biodiversity Management Plan. The sum of the bond shall be determined by: (a) calculating the full cost of implementing the biodiversity offset strategy (other than land acquisition costs); and (b) employing a suitably qualified quantity surveyor to verify the	Not yet applicable	Bond to be lodged within 3 months of DP&E approval of Stage 2 BMP.

Cond.	Conditional Requirement	Compliance	Comments
	calculated costs, to the satisfaction of the Secretary. If the offset strategy is completed generally in accordance with the completion criteria in the Biodiversity Management Plan to the satisfaction of the Secretary, the Secretary will release the bond. If the offset strategy is not completed generally in accordance with the completion criteria in the Biodiversity Management Plan, the Secretary will call in all, or part of, the conservation bond, and arrange for the satisfactory completion of the relevant works. With the agreement of the Secretary, this bond may be combined with rehabilitation security deposit administered by DRE.		
50.	By the end of June 2014 and every 3 years thereafter, unless both the Secretary and OEH agree to a different timeframe, the Proponent shall commission suitably qualified, experienced and independent person/s, whose appointment has been approved by the Secretary, to undertake an audit of the revegetation of the rehabilitation area and management and restoration within the Biodiversity Offset Strategy areas to the satisfaction of the Secretary. *(condition details what audit must involve)*	No	Undertaken during the reporting period; however, not completed and submitted to DP&E by the end of June.
51.	The Proponent shall prepare and implement an Aboriginal Heritage Conservation Strategy for the project and the Biodiversity Offset Strategy areas to the satisfaction of the Secretary. This Strategy must enhance and conserve the Aboriginal cultural heritage values (both cultural and archaeological) and provide for their long-term protection and management. *(condition details what strategy must involve)*	Yes	Stage one of the Strategy submitted to the Secretary for Approval.
52.	The Proponent shall prepare and implement a Heritage Management Plan for the project to the satisfaction of the Secretary. *(further details in condition)*	Yes	Heritage Management Plan prepared in accordance with all requirements of this condition.
53.	The Proponent shall: (a) construct the Goonbri Road realignments and associated mine access road intersection, Goonbri Road/private coal haulage road intersection and the Goonbri Road/Dripping Rock Road/Blair Athol Lane intersection as shown conceptually in the EA; and (b) install appropriate advance warning signs and lighting on Goonbri Road, the private coal haulage road at the intersection of the Northern Site Access Road, to the satisfaction of Council.	Not yet applicable	Road realignments not yet required.
54.	Whilst coal transport by road is permitted under this approval, the Proponent shall ensure that: (a) trucks travelling to and from the site do not exceed 40 kilometres per hour in the vicinity of the school bus when it is operating near school bus stops along approved haulage routeunless an alternative protocol is agreed by the Secretary; and (b) spillage from coal haulage vehicles is minimised and promptly managed.	Yes	As per condition.
54A	The Proponent shall prepare and implement a traffic management plan for the Project, to the satisfaction of the Secretary. This plan must: (a) be prepared in consultation with RMS, Gunnedah Shire Council, Narrabri Shire Council and the owners of the Rocglen and Vickery coal mines; (b) be submitted to the Secretary for approval by 30 June 2015; (c) include: • a protocol for operating haul trucks during school bus hours;	Yes	As per condition

Cond.	Conditional Requirement	Compliance	Comments
	• consideration of measures to minimise dust from unsealed roads that may be used for access to the mine site; • arrangements to comply with cumulative coal haulage limits from the Project and the Rocglen and Vickery coal mines; and a monitoring program to audit vehicle movements, including the origin and destination of employees, against predictions in the EA."		
55.	During mining operations, the Proponent shall continue to implement road maintenance agreements with Narrabri Shire Council and Gunnedah Shire Council for the maintenance of the public roads affected by the project to the satisfaction of the respective Council. These agreements may be modified from time to time by agreement of the Proponent and respective Council. If there is any dispute in relation to these agreements, then any of the parties may refer the matter to the Secretary for resolution.	Yes	Road maintenance agreements in place.
56.	The Proponent shall: (a) keep records of the: • amount of coal and gravel transported from the site (on a monthly basis); and • date and time of each train movement on the Boggabri rail spur line generated by the project (if coal from the Project is transported by rail); and (b) make these records available on its website at the end of each calendar year.	Yes	Records kept and made available on the website at the end of each calendar year.
57.	The Proponent shall: (a) implement all reasonable and feasible measures to minimise the visual and off-site lighting impacts of the project; (b) ensure no outdoor lights shine above the horizontal; (c) wherever possible, ensure that mobile equipment is appropriately designed and/or retrofitted to prevent light being directed above the horizontal; (d) ensure that all external lighting associated with the project complies with Australian Standard AS4282 (INT) 1997 – Control of Obtrusive Effects of Outdoor Lighting or its latest version; (e) provide for the establishment of trees and shrubs and/or the construction of mounding or bunding: • along the realigned Goonbri Road and access road to the mine site; • along the services corridor to the Boggabri Coal Mine; • around the water storage dams; and • at other areas identified as necessary for the maintenance of satisfactory visual amenity; and (f) ensure that the visual appearance of all buildings, structures, facilities or works (including paint colours and specifications) is aimed at blending as far as possible with the surrounding landscape, to the satisfaction of the Secretary.	Yes	As per condition.
58.	Upon receiving a written request from the owner of any residence on privately-owned land which has, or would have, significant direct views of the mining operations and infrastructure on-site during the project, the Proponent shall implement additional visual impact mitigation measures (such as landscaping treatments or vegetation screens) to reduce the visibility of the mining operations and infrastructure from the residences on the privately-owned land. These mitigation measures must be reasonable and feasible, and must be implemented within a reasonable timeframe.	Not yet applicable	No written requests received to date.

Cond.	Conditional Requirement	Compliance	Comments
	If the Proponent and the owner cannot agree on the measures to be implemented, or there is a dispute about the implementation of these measures, then either party may refer the matter to the Secretary for resolution.		
59.	The Proponent shall: (a) implement all reasonable and feasible measures to manage bushfire risks, including the suspension of activities that may have the potential to ignite a fire, during adverse conditions; (b) ensure that the project is suitably equipped to respond to any fires on site; and (c) assist the Rural Fire Service, Forests NSW, emergency services and National Parks and Wildlife Services as much as possible if there is a fire in the surrounding area.	Yes	As per condition.
60.	The Proponent shall: (a) implement all reasonable and feasible measures to minimise the waste (including coal reject) generated by the project; (b) ensure that the waste generated by the project is appropriately stored, handled and disposed of; and (c) monitor and report on the effectiveness of waste minimisation and management measures in the Annual Review.	Yes	Methodology of reject disposal at Tarrawonga is currently the subject of discussion with DRE.
61.	The Proponent shall rehabilitate the site to the satisfaction of DRE. This rehabilitation must be generally consistent with the proposed Rehabilitation Strategy described in the EA (and depicted conceptually in Appendix 8) and comply with the objectives in Table 15. (*see condition for Table 15*)	Not yet applicable	
62.	The Proponent shall, in consultation with the Namoi CMA: (a) develop a detailed soil management protocol that identifies procedures for: • comprehensive soil surveys prior to soil stripping; • assessment of top-soil and sub-soil suitability for mine rehabilitation; and • annual soil balances to manage soil handling including direct respreading and stockpiling; (b) maximise the salvage of suitable top-soils and sub-soils and biodiversity habitat components such as bush rocks, tree hollows and fallen timber for rehabilitation of disturbed areas within the site and for enhancement of biodiversity offset areas; and (c) ensure that coal reject, or any potentially acid forming interburden materials, are not emplaced at elevations in the pit shell where they may promote acid or sulphate species generation and migration beyond the pit shell.	Yes	Tarrawonga liaised with the Namoi CMA in relation to soil management requirements in development of the site Rehabilitation Management Plan. The site Rehabilitation Management Plan will be revised in the next reporting period.
63.	The Proponent shall rehabilitate the site progressively, that is, as soon as reasonably practicable following disturbance. All reasonable and feasible measures must be taken to minimise the total area exposed for dust generation at any time. Interim rehabilitation strategies shall be employed when areas prone to dust generation cannot yet be permanently rehabilitated.	Yes	As per condition.
64.	The Proponent shall prepare and implement a Rehabilitation Management Plan to the satisfaction of the Executive Director, Mineral Resources. *(condition details what plan must include)*	Yes	Rehabilitation Management Plan prepared in accordance with all requirements of this condition and submitted by end of May 2013. Approval received in previous reporting period.
65.	The Proponent shall prepare and implement an updated Final Void and Mine Closure Plan (as a component of the overall Rehabilitation Management Plan required under condition 0 of schedule 3) to the satisfaction of DRE, following consultation with	Not yet applicable	

Cond.	Conditional Requirement	Compliance	Comments
	the Secretary. A draft plan must be prepared and submitted to DRE by the end of December 2019, and a final plan must be prepared and submitted to DRE by the end of December 2024. *(condition details what plan must include)*		
66.	The Proponent shall use its best endeavours to ensure that the agricultural productivity and production of non-operational project-related land is maintained or enhanced.	Not Yet Applicable	To be addressed in establishment of Farm Management Plan.
Schedule 4 – Additional procedures			
1.	Within 3 months of the date of this approval, the Proponent shall: (a) notify in writing the owners of: • the land listed in Table 1 of schedule 3 that they have the right to require the Proponent to acquire their land in accordance with the procedures in conditions 8 and 9 below at any stage during the project; • any residence on the land listed in Table 1 of schedule 3 that they have the right to request the Proponent to ask for additional noise and/or air quality mitigation measures to be installed at their residence at any stage during the project; and • any privately-owned land within 2 kilometres of the approved open-cut mining pit/s that they are entitled to ask for a property inspection, to establish the baseline condition of any buildings or structures on their land, or to have a previous property inspection report updated; (b) notify the tenants of any mine-owned land of their rights under this approval; and (c) send a copy of the NSW Health fact sheet entitled "Mine Dust and You" (as may be updated from time to time) to the owners and/or existing tenants of any land (including mine-owned land) where the predictions in the EA identify that dust emissions generated by the project are likely to be greater than the relevant air quality criteria in schedule 3 at any time during the life of the project.	Yes	Notifications made as required.
2.	Prior to entering into any tenancy agreement for any land owned by the Proponent that is predicted to experience exceedances of the recommended dust and/or noise criteria, or for any of the land listed in Table 1 that is subsequently purchased by the Proponent, the Proponent shall: (a) advise the prospective tenants of the potential health and amenity impacts associated with living on the land, and give them a copy of the NSW Health fact sheet entitled "Mine Dust and You" (as may be updated from time to time); (b) advise the prospective tenants of the rights they would have under this approval; and (c) request the prospective tenants consult their medical practitioner to discuss the air quality monitoring data and predictions and health impacts arising from this information, to the satisfaction of the Secretary.	Yes	Notifications made as required.
3.	As soon as practicable after obtaining monitoring results showing: (a) an exceedence of the relevant criteria in schedule 3, the Proponent shall notify the affected landowner in writing of the exceedence, and provide regular monitoring results to the landowner until the project is complying with the relevant criteria again; and (b) (b)an exceedance of the relevant air quality criteria schedule 3, the Proponent shall send to the affected landowners and/or existing tenants of the land (including the tenants of any mine-owned land) a copy of:	Not Yet Applicable	No exceedances identified during period.

Cond.	Conditional Requirement	Compliance	Comments
	• the NSW Health fact sheet entitled "Mine Dust and You" (as may be updated from time to time); and • the monitoring data, in an appropriate format so that a medical practitioner can assist the resident in making an informed decision on the health risks associated with occupation of the property.		
4.	If an owner of privately-owned land considers the project to be exceeding the criteria in schedule 3 at his/her land, then he/she may ask the Secretary in writing for an independent review of the impacts of the project on his/her land. *(further details in condition)*	Not yet applicable	No requests received to date.
5.	If the independent review determines that the project is complying with the relevant criteria in schedule 3, then the Proponent may discontinue the independent review with the approval of the Secretary. *(further details in condition)*	Not yet applicable	No independent reviews to date.
6.	If the independent review determines that the relevant criteria are being exceeded, but that more than one mine is responsible for this exceedance, then together with the relevant mine/s the Proponent shall: (a) implement all reasonable and feasible mitigation measures, in consultation with the landowner and appointed independent expert, and conduct further monitoring until there is compliance with the relevant criteria; or (b) secure a written agreement with the landowner and other relevant mine/s to allow exceedances of the relevant impact assessment criteria, to the satisfaction of the Secretary. *(further details in condition)*	Not yet applicable	No independent reviews to date.
7.	If a person has good reason to believe the Proponent is not implementing the biodiversity and/or heritage conditions in schedule 3 satisfactorily, then he/she may ask the Secretary in writing for an independent review of the matter. If the Secretary is satisfied that an independent review is warranted, then within 2 months of the Secretary's decision, the Proponent shall: (a) commission a suitably qualified, experienced and independent person, whose appointment has been approved by the Secretary, to: • consult with the person and/or any relevant agencies; • investigate the person's complaints/claims; • review the environmental performance of the Proponent; • determine whether the Proponent s performance is satisfactory or not; and if necessary • recommend measures to improve the Proponent s performance; and (b) give the Secretary and complainant a copy of the independent review.	Not yet applicable	No requests received to date.
8.	Within 3 months of receiving a written request from a landowner with acquisition rights, the Proponent shall make a binding written offer to the landowner based on: (a) the current market value of the landowner's interest in the land at the date of the written request, as if the land was unaffected by the project, having regard to the: • existing and permissible use of the land, in accordance with the applicable planning instruments at the date of the written request; and • presence of improvements on the land and/or any	Not yet applicable	No requests received to date.

Cond.	Conditional Requirement	Compliance	Comments
	approved building or structure which has been physically commenced at the date of the landowner's written request, and is due to be completed subsequent to that date, but excluding any improvements that have resulted from the implementation of the additional mitigation measures required under condition 2 of schedule 3; (b) the reasonable costs associated with: • relocating within the Tamworth, Narrabri, Gunnedah or Moree local government areas, or to any other local government area as agreed by the Secretary; and • obtaining legal advice and expert advice for determining the acquisition price of the land, and the terms upon which it is to be acquired; and (c) reasonable compensation for any disturbance caused by the land acquisition process. *(further details in condition)*		
9.	The Proponent shall pay all reasonable costs associated with the land acquisition process described in condition 8 above, including the costs associated with obtaining Council approval for any plan of subdivision (where permissible), and registration of this plan at the Office of the Registrar-General.	Not yet applicable	No requests received to date.
Schedule 5 – Environmental Management, Reporting and Auditing			
1.	The Proponent shall prepare and implement an Environmental Management Strategy for the project to the satisfaction of the Secretary. *(condition details what strategy must include)*	Yes	
2.	The Proponent must assess and manage project-related risks to ensure that there are no exceedences of the criteria and/or performance measures in schedule 3. Any exceedence of these criteria and/or performance measures constitutes a breach of this approval and may be subject to penalty or offence provisions under the EP&A Act or EP&A Regulation. Where any exceedence of these criteria and/or performance measures has occurred, the Proponent must at the earliest opportunity: (a) take all reasonable and feasible steps to ensure that the exceedence ceases and does not reoccur; (b) consider all reasonable and feasible options for remediation (where relevant) and submit a report to the Department describing those options and any preferred remediation measures or other courses of action; and (c) implement remediation measures as directed by the Secretary, to the satisfaction of the Secretary.	Yes	As per condition.
3.	The Proponent shall ensure that the management plans required under this approval are prepared in accordance with any relevant guidelines, and include: (a) detailed baseline data; (b) a description of: • the relevant statutory requirements (including any relevant approval, licence or lease conditions); • any relevant limits or performance measures/criteria; • the specific performance indicators that are proposed to be used to judge the performance of, or guide the implementation of, the development or any management measures; (c) a description of the measures that would be implemented to comply with the relevant statutory requirements, limits, or	Yes	As per condition.

Cond.	Conditional Requirement	Compliance	Comments
	performance measures/criteria; (d) a program to monitor and report on the: • impacts and environmental performance of the project; • effectiveness of any management measures (see c above); (e) a contingency plan to manage any unpredicted impacts and their consequences; (f) a program to investigate and implement ways to improve the environmental performance of the project over time; (g) a protocol for managing and reporting any: • incidents; • complaints; • non-compliances with statutory requirements; and • exceedences of the impact assessment criteria and/or performance criteria; and (h) a protocol for periodic review of the plan.		
4.	By the end of June each year (or as otherwise agreed by the Secretary), the Proponent shall review the environmental performance of the project for the previous calendar year to the satisfaction of the Secretary. This review must: (a) describe the development (including any rehabilitation) that was carried out in the past calendar year, and the development that is proposed to be carried out over the current calendar year; (b) include a comprehensive review of the monitoring results and complaints records of the project over the past year, which includes a comparison of these results against the: • relevant statutory requirements, limits or performance measures/criteria; • monitoring results of previous years; and • relevant predictions in the EA; (c) identify any non-compliance over the last year, and describe what actions were (or are being) taken to ensure compliance; (d) identify any trends in the monitoring data over the life of the project; (e) identify any discrepancies between the predicted and actual impacts of the project, and analyse the potential cause of any significant discrepancies; and (f) describe what measures will be implemented over the next year to improve the environmental performance of the project.	No	Request for submission timing to align with DRE (30th July 2015) made during reporting period with no response.
5.	Within 3 months of the submission of an: (a) annual review under condition 4 above; (b) incident report under condition 8 below; (c) audit under condition 10 below; or (d) any modification to the conditions of this approval, the Proponent shall review, and if necessary revise, the strategies, plans, and programs required under this approval to the satisfaction of the Secretary.	Yes	Review of applicable Management Plan underway.
6.	In conjunction with the owners of the nearby mines in the Leard Forest Mining Precinct, the Proponent shall use its best endeavours to minimise the cumulative impacts of the project on the surrounding area, to the satisfaction of the Secretary.	Yes	Cumulative monitoring programs being developed to minimise impacts on surrounding area.
7.	The Proponent shall establish and operate a Community Consultative Committee (CCC) for the project to the satisfaction of the Secretary. This CCC must be operated in general accordance	Yes	CCC has been operating since 2006. Independent chair

Cond.	Conditional Requirement	Compliance	Comments
	with the Guidelines for Establishing and Operating Community Consultative Committees for Mining Projects (Department of Planning, 2007, or its latest version), and be operating by the end of May 2013. The CCC must seek to include joint membership with CCCs for other operating coal mines within the Leard Forest Mining Precinct, unless otherwise agreed by the Secretary.		appointed for all three complex mines and some members are on more than one CCC.
8.	The Proponent shall notify, at the earliest opportunity, the Secretary and any other relevant agencies of any incident that has caused, or threatens to cause, material harm to the environment. For any other incident associated with the project, the Proponent shall notify the Secretary and any other relevant agencies as soon as practicable after the Proponent becomes aware of the incident. Within 7 days of the date of the incident, the Proponent shall provide the Secretary and any relevant agencies with a detailed report on the incident, and such further reports as may be requested.	Not applicable	No notifiable incidents during the reporting period.
9.	The Proponent shall provide regular reporting on the environmental performance of the project on its website, in accordance with the reporting arrangements in any plans or programs approved under the conditions of this approval.	Yes	Website updated at least monthly.
10.	By the end of June 2014 and every 3 years thereafter, unless the Secretary directs otherwise, the Proponent shall commission and pay the full cost of an Independent Environmental Audit of the project. *(condition details what audit must involve)*	No	Submitted during the reporting period; however was not commissioned by end of June 2014.
11.	Within 3 months of commissioning this audit, or as otherwise agreed by the Secretary, the Proponent shall submit a copy of the audit report to the Secretary, together with its response to any recommendations contained in the audit report.	Not yet applicable	
12.	The Proponent shall: (a) within 3 months of the date of this approval, make the following information publicly available on its website: • the EA; • all current statutory approvals for the project; • approved strategies, plans and programs required under the conditions of this approval; • a comprehensive summary of the monitoring results of the project, which have been reported in accordance with the various plans and programs approved under the conditions of this approval; • a complaints register, which is to be updated on a monthly basis; • minutes of CCC meetings; • the last five annual reviews; • any independent environmental audit, and the Proponent's response to the recommendations in any audit; • any other matter required by the Secretary; and (b) keep this information up to date, to the satisfaction of the Secretary.	Yes	As per condition.
13.	The Proponent shall, within 3 months of the date of this approval: (c) make the following information for the project publicly available on its website, on a daily basis and in a clearly understandable form: • daily weather forecasts for the coming week; • proposed operational responses to these weather forecasts;	Yes	As per condition.

Cond.	Conditional Requirement	Compliance	Comments
	• real-time noise and air quality monitoring data (subject to any necessary caveats); and • any operational responses that were taken in response to the noise and air quality monitoring data, and (d) make provision on its website for the provision of on-line and/or email comments by members of the community regarding this information, to the satisfaction of the Secretary.		

TABLE A3-2

Compliance Review – EPBC Approval 2011/5923

Cond.	Condition Requirement	Compliance	Comment
1	The person taking the action must not clear more than 13 hectares (ha) of the EPBC listed White Box – Yellow Box – Blakely's Red Gum Grass Woodland and Derived Native Grassland critically endangered ecological community within the Tarrawonga Coal Extension **project area**, (as identified on Attachment A of the conditions)	Yes	As per condition
2	The person taking the action must not clear more than: a. 279 ha of **Habitat** for the regent honeyeater b. 54ha of **habitat** for the swift parrot c. 334ha of **habitat** for the greater long-eared bat	Yes	As per condition
3	The person taking the action must submit to the **minister** for approval within three months of **commencement of construction,** an approach that: a. Limits the maximum disturbance specified for each of the years 5, 10, 15 and 17 from the date of this approval of the White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland ecological community and the habitat or potential habitat for the regent honeyeater, swift parrot and greater long-eared bat b. Incorporates an analysis, undertaken by independent ecological experts approved by the **Department,** that demonstrates the maximum disturbance limits which will minimise an impacts on relevant matters of national environmental significance c. Demonstrates collaboration with the person taking the action to develop and operate the Boggabri Coal Project (EPBC 2009/5256) and the Maules Creek Project (EPBC2010/5566), in order to minimise progressive **project area** disturbance limits across all the three sites. The progressive limits are to be reflected in the development of the Leard Forest Mining Precinct Biodiversity Strategy	Yes	Approach submitted to the minister 11th June 2014. Analysis required by condition 3(b) undertaken by Eco Logical Australia Pty Ltd.
4	The person taking the action must not clear more than the maximum project area disturbance limits specified for each of the years 5, 10, 15 and 17 as described in condition 3, unless otherwise approved by the Minister	Not yet applicable	
5	The person taking the action must publish the analysis under condition 3 on their website.	Not yet applicable	The analysis required under condition 3(b) will be published on the Company website once the approach is approved by the Minister of Department of the Environment (DotE). .

Cond.	Condition Requirement	Compliance	Comment
6	The person taking the action must register a legally binding conservation covenant over offset areas of no less than: a. 1055ha of an equivalent or better quality of habitat for the regent honeyeater b. 397ha of an equivalent or better quality of habitat for the swift parrot c. 1355ha of an equivalent or better quality of habitat for the greater long-eared bat; and d. 232ha of an equivalent or better quality of the White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland ecological community	Not yet applicable	Required by 11/03/2018
7	The person taking the action must verify through independent review the quantity and condition class of White Box—Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland ecological community and the quantity and quality of habitat for the regent honeyeater, swift parrot and greater long-eared bat within all proposed offset areas including those proposed in the Environmental Assessment and any additional offsets as required at condition 8. Details of all independently verified offset areas must be submitted to the Minister for approval by 31 January 2014. The findings of the independent review must be published on the proponent's website.	Partial	Review submitted 05/12/2013. The findings of the review will be published on the Company website once approved by the Minister of DotE.
8	If the independent review finds that the offset areas do not meet the requirements of conditions 6, 7 and 9 then additional areas must be included in the offset areas until all relevant criteria under these conditions are met.	Not applicable	Independent review determined that offset areas meet requirements of conditions 6, 7 and 9.
9	The offset areas must be of an overall equivalent or better quality than the areas being cleared. This means: a. for White Box—Yellow Box—Blakely's Red Gum Grassy Woodland and Derived Native Grassland ecological community, offset areas must meet the definition of the ecological community described in the listing advice, and must be of an overall equivalent or better condition class than the areas being cleared, based on the proportion of each condition class represented and other relevant ecological attributes; b. for the threatened species, the quality of the habitat for the species, taking account of its ecological requirements, must be equivalent to or better than the areas being cleared.	Yes	Independent review determined that offset areas met condition 9.
10	The mechanism/s for registering a legally binding covenant must provide protection for the offset areas in perpetuity and be registered within 5 years of the date of this approval.	Not yet applicable	Required by 11/03/2018

Cond.	Condition Requirement	Compliance	Comment
11	If the person taking the action proposes to undertake any action within areas secured under condition 6, other than those management activities related to managing the offset areas or as set out in the conditions of approval, then approval to undertake that action must be obtained in writing from the Minister. In seeking the Minister's approval, the person undertaking the action must provide a detailed assessment of the area where the action is proposed to take place and an assessment of all associated adverse impacts on matters of national environmental significance. If the Minister agrees to the action within the offset areas, the area identified for the action must be excised from the offset area and alternative offsets secured by the person taking the action at a ratio of at least 20:1 in relation to the impact on matters of national environmental significance.	Not yet applicable	No actions other than those management activities related to managing the offset areas, or as set out in the conditions of approval, have been undertaken.
12	The person taking the action must submit to the Minister for approval an Offset management plan for all of the offset areas, specified in condition 6, within 12 months of the date of this approval. The approved Offset management plan must be implemented.	Yes	Submitted for approval 7/03/2014.

Cond.	Condition Requirement	Compliance	Comment
13	13. The Offset management plan must include, but not be limited to, the following: a) a text description and map which clearly defines the location and boundaries of the offset areas. This must be accompanied by the offset attributes and shapefiles; b) a description of the methodology and results of surveys measuring the baseline ecological conditions in the offset areas. This must be consistent with the State and Transition Model and include but not be limited to: i. the extent and condition of all vegetation communities, including a description of the structure, floristics and tree age class representation of each community; ii. the extent and condition class of all areas of the White Box—Yellow Box—Blakely's Red Gum Grassy Woodland and Derived Native Grassland ecological community; iii. surveys targeting the regent honeyeater, swift parrot and greater long-eared bat; iv. the extent and quality of all areas of habitat for the regent honeyeater, swift parrot and greater long-eared bat; v. the location of all survey sites (including co-ordinates); vi. photo reference points at survey sites. c) clearly defined ecological management objectives for the offset areas; d) detailed description of all ecological management activities proposed to be undertaken, including maps and/or diagrams showing areas to be managed and the timing of the proposed activities; e) details of ongoing ecological monitoring programs, performance criteria, targets and provisions for adaptive management, including but not limited to: i. a set of measurable ecological indicators for detecting changes to the White Box—Yellow Box—Blakely's Red Gum Grassy Woodland and Derived Native Grassland ecological community, including those that may be ascribed to ongoing water stress; ii. A monitoring plan to assess the success of the management activities measured against the baseline condition. The monitoring must be statistically robust and able to quantify change in the condition of the White Box—Yellow Box— Blakely's Red Gum Grassy Woodland and	Yes	Submitted Offset Management Plan generally meets this condition.

Cond.	Condition Requirement	Compliance	Comment
	Derived Native Grassland ecological community and habitat for the regent honeyeater, swift parrot and greater long-eared bat. This should include the use of control sites and periodic ecological surveys to be undertaken by a qualified ecologist; iii. a list of performance criteria based on the ecological management objectives for the White Box—Yellow Box—Blakely's Red Gum Grassy Woodland and Derived Native Grassland ecological community and habitat for the regent honeyeater, swift parrot and greater long-eared bat; iv. measures to exclude weeds from all offset areas for the period covered by this approval; v. a description of the potential risks to successful management against the performance criteria, and a description of the contingency measures that would be implemented to mitigate against these risks; vi. a process by which to report to the department the progress of management activities undertaken in the offset areas and the outcome of those activities, including identifying any need for improved management and activities to undertake such improvement. f) details of all parties responsible for management, monitoring and implementing the management activities, including their position or status as a separate contractor. g) details of the funding requirements for the ongoing management activities, including an estimate of the costs of the activities and details of the parties responsible for funding the activities.		
14	Unless otherwise agreed to in writing by the department, the baseline surveys for threatened species must be conducted in accordance with the department's Survey Guidelines for Australia's Threatened Birds and the Survey Guidelines for Australia's Threatened Bats. Subsequent monitoring must be carried out annually at the same time of year as the baseline surveys, unless otherwise agreed to in writing by the department.	Not yet applicable	Commencement of threatened species monitoring is dependent upon Department of Environment (DoE) approval of the Offset Management Plan.

Cond.	Condition Requirement	Compliance	Comment
15	The person taking the action must provide by the 31 May 2013, to the Minister for approval, the surface and groundwater management plans as identified in condition 39 of the NSW state government Project Approval dated 22 January 2013 (application number 11_0047).	Partial	Not yet submitted to the Minister for approval. The Water Management Plan (WMP) required under condition 39 of the NSW PA 11_0047 was issued to the NSW Department of Planning and Environment (DP&E) on 31st May 2013 in accordance with condition, following consultation with required stakeholders. The WMP has been subject to a number of subsequent reviews following DP&E comment and is yet to be approved by DP&E. Once approved by NSW DP&E, the WMP will be provided to the Minister for approval.
16	The surface and groundwater management plans must be consistent with the National Water Quality Management Strategy.	Not yet applicable	The WMP required under condition 39 of the NSW PA 11_0047 will be consistent with the National Water Quality Management Strategy.
17	The person taking the action must, within six months of this approval, in collaboration with the proponent to develop and operate the Boggabri Extension (EPBC 2009/5256) and the proponent to develop and operate the Maules Creek Mine (EPBC 2010/5566), provide written advice to the Minister demonstrating how the NSW government approved surface and groundwater management plans, address the cumulative impact of groundwater drawdown as a result of mining and how this may impact on the consequent health of the remnant native vegetation in the Leard State Forest, the Leard State Conservation Area and surrounding areas. In particular the advice must address the following matters: a. maximum amount of allowable drawdown in the alluvial aquifer b. drawdown in hard rock c. trigger levels pertaining to drawdown in the alluvial aquifer when corrective actions will be required to be undertaken d. identify the depth of root zone of the native vegetation e. monitoring to assess the ongoing quality and quantity of both surface and groundwater to identify impacts on the native vegetation.	Partial	The Boggabri/Tarrawonga/Maules (BTM) water management strategy, that addresses the cumulative surface and groundwater impacts of the BTM complex, was submitted before the end of May 2013 in accordance with State condition, and is currently with the NSW DP&E for review and approval. Condition 17 can only be met once the BTM water management strategy has been approved.

Cond.	Condition Requirement	Compliance	Comment
18	The person taking the action must within 6 months of the date of this approval, or such other timeframe specified by the Minister, provide to the Minister a report on: a. any updated modelling of surface and groundwater impacts that has been undertaken in preparing the surface and groundwater management plans b. how the surface and groundwater management plans addressed groundwater and surface water impacts on matters of national environmental significance.	Not Applicable	No updated modelling of surface and groundwater impacts undertaken in preparing the surface and groundwater management plans.
19	The person taking the action must provide to the Minister for approval, before commencement of the construction of the permanent Goonbri Creek alignment, permanent flood bund and low permeability barrier, a Goonbri Creek Diversion and Flood Bund Concept Design Plan. This approved Goonbri Creek Diversion and Flood Bund Concept Design Plan must be implemented.	Not yet applicable	
20	The Goonbri Creek Diversion and Flood Bund Concept Design Plan must include: a. an assessment of the surface water and groundwater quality, ecology, hydrological and geomorphic baseline conditions within the creek; b. a description of how restoration of the re-aligned riparian zone will be undertaken to best replicate the habitat of the existing creek, including plant species and fauna habitat features; c. water quality, ecology, hydrological and geomorphic performance and completion criteria for the creek diversion and low permeability barrier based on the assessment of the baseline conditions identified in condition 20 (a); and d. a risk assessment of the environmental consequences of the proposed low permeability barrier and the proposed Goonbri Creek realignment including the potential for impacts on groundwater and surface discharge. The risk assessment must be peer-reviewed. e. details for ongoing monitoring and management of downstream impacts on the adjacent floodplains and Namoi River floodplain.	Not yet applicable	
21	The person taking the action must ensure that dispersed waters downstream of the Goonbri Creek re-alignment do not adversely affect the downstream environment and avoid any impacts on matters of national environmental significance.	Not yet applicable	
22	The person taking the action must implement the regional biodiversity strategy as required under condition 41 of the NSW state government project approval dated 22 January 2013 (application number 11_0047). The required scoping report for the development of the strategy must be submitted to the Minister for approval on or before 31 July 2013. The approved strategy must be implemented.	Yes	Scoping report submitted to DP&E in 2013. DP&E redeveloped Stage 1 scoping in 2015. Strategy yet to be developed.

Cond.	Condition Requirement	Compliance	Comment
23	To mitigate the impacts to the White Box-Yellow Box –Blakely's Red Gum Grassy Woodland and Derived Native Grassland and the habitat of the regent honeyeater, swift parrot and greater long-eared bat, the person taking the action must, within 12 months of the commencement of construction, submit to the Minister for approval a mine site rehabilitation plan for the progressive rehabilitation and revegetation of no less than 752 ha of native forest and woodland in the project area including 13 ha using species consistent with a White Box—Yellow Box—Blakely's Red Gum Grassy Woodland and Derived Native Grassland Ecological Community. This approved mine site rehabilitation plan must be implemented.	Partial	The mine site rehabilitation plan was submitted to NSW DP&E for approval in May 2013. The RMP has been subject to a number of subsequent reviews following DP&E comment and is yet to be approved by DP&E. The mine site rehabilitation plan has not yet been submitted to DotE.
24	The person taking the action must rehabilitate the site to be consistent with the proposed rehabilitation strategy as provided in the Environmental Assessment and, as required under the NSW State Government approval dated 22 January 2013 (Application 11_0047).	Yes	Rehabilitation of site undertaken in accordance with Mining Operation Plan.

Cond.	Condition Requirement	Compliance	Comment
25	The mine site rehabilitation plan must include, at a minimum, the following information: a. targets and performance indicators to achieve effective restoration of potential habitat for the regent honeyeater, swift parrot and greater long-eared bat and White Box—Yellow Box—Blakely's Red Gum Grassy Woodland and Derived Native Grassland ecological community, including weed management; b. details of the vegetation communities to be rehabilitated and the timing of progressive rehabilitation (commencing as soon as practicable following disturbance); c. detailed soil depth surveys and analysis to inform the effective placement and restoration of soils underlying the proposed rehabilitation sites; including mapping of soils across the disturbance sites and soil sampling at no less than one sample point per 20 ha of each soil type identified. Sampling must identify; type, depth, water holding capacity, structure and physio-chemical properties of each of the soil and subsoil layers; d. processes and methodologies for the removal, storage and re-layering of the top soil and sub soil layers underlying the disturbed sites being prepared for rehabilitation. These processes and methodologies must ensure the replacement of top soil and sub soil layers as provided in the Environment Assessment. e. a process to report annually to the department the rehabilitation management actions undertaken and the outcome of those actions, and the mechanisms to be used to identify the need for improved management; f. a description of the potential risks to successful management and rehabilitation on the project site, including weed invasion, and a description of the contingency measures that would be implemented to mitigate these risks; g. details of long-term management and protection of the mine site, including details of the commitment of funds to achieve this.	Yes	As per condition Submitted to NSW DP&E for approval May 2013.
26	The mine site rehabilitation plan must be subject to an independent review by a qualified ecologist prior to being submitted to the Minister for approval. The findings of the independent review must be published on the proponent's website.	Not yet applicable	The mine site rehabilitation plan has been developed but is yet to be submitted to the Minister.

Cond.	Condition Requirement	Compliance	Comment
27	The person taking the action is required to submit a Conservation and Biodiversity Bond under condition 49 of the New South Wales state government project approval dated 22 January 2013 (application 11_0047). It is noted that this bond may be combined with the rehabilitation security deposit as required under the New South Wales Mining Act 1992. The person taking the action must submit details of this bond and the rehabilitation security deposit, to the Minister, within six months of this approval. If the Minister is not satisfied that the bond and rehabilitation security deposit lodged by the person taking the action is adequate to provide for the requirements referred to under conditions 19, 20, 22, 23 and 24, the Minister may require the person taking the action establish an additional bond or equivalent financial instrument in trust, under conditions approved in writing by the Minister.	No	Conservation and Biodiversity Bond under condition 49 of the New South Wales state government project approval dated 22 January 2013 (application 11_0047) is dependent upon approval of the Biodiversity Management Plan (BMP). The BMP was submitted to DP&E for approval before the end of May 2013 in accordance with condition 47 of PA 11_0047. The BMP is yet to be approved.
28	The person taking the action must undertake rehabilitation to ensure the final landform provides the optimum opportunity for the successful restoration of native forest and woodland including the critically endangered White Box—Yellow Box—Blakely's Red Gum Grassy Woodland and Derived Native Grassland ecological community.	Not yet applicable	The requirements of this condition are addressed in the Mine Site Rehabilitation Management Plan
29	The person taking the action must undertake rehabilitation to ensure the final void and landform minimises the extent of any resulting pit lake, avoids salt scalding and ensures that drained waters do not adversely affect the downstream environment and avoids any impacts on matters of national environmental significance.	Not yet applicable	Rehabilitation Management Plan and MOP Amendment B address these issues.
30	All survey data collected for the project must be recorded so as to conform to data standards notified from time to time by the department. When requested by the department, the proponent must provide to the department all species and ecological survey data and related survey information from ecological surveys undertaken for matters of national environmental significance. This survey data must be provided within 30 business days of request, or in a timeframe agreed to by the department in writing. The department may use the survey data for other purposes. In the event that any additional matters of national environmental significance are recorded within the project area and a significant impact on the matter/s is likely, the department must be notified in writing within 14 days of the matter/s being recorded. In accordance with condition 36, the Minister may request that the person taking the action revise any relevant plans to ensure better protection of the relevant matter/s.	Yes	No request made to date.
31	Within 14 days after the commencement of construction, the person taking the action must advise the department in writing of the actual date of commencement of construction.	Yes	Notification sent 26th March 2014 advising that construction commenced 12th March 2014

Cond.	Condition Requirement	Compliance	Comment
32	By the end of March of each year after the commencement of the action, the person taking the action must publish a report on their website addressing compliance with the conditions of this approval over the previous 12 months, including implementation of any management plans as specified in the conditions. Non-compliance with any of the conditions of this approval must be reported to the department at the same time as the compliance report is published.	Yes	This report.
33	Upon the direction of the Minister, the person taking the action must ensure that an independent audit of compliance with the conditions of approval is conducted and a report submitted to the Minister. The independent auditor must be approved by the Minister prior to the commencement of the audit. Audit criteria must be agreed to by the Minister and the audit report must address the criteria to the satisfaction of the Minister.	Not yet applicable	No direction received to date
34	If the person taking the action wishes to carry out any activity otherwise than in accordance with the plans, as specified in the conditions, the person taking the action must submit to the department for the Minister's written approval a revised version of that plan. The varied activity shall not commence until the Minister has approved the revised plan in writing. The Minister will not approve a revised plan, unless the revised plan would result in an equivalent or improved environmental outcome. If the Minister approves the revised plan that plan must be implemented in place of the plan originally approved.	Not applicable	Activity to date undertaken in accordance with plans and approval.
35	If the Minister believes that it is necessary or convenient for the better protection of listed threatened species and communities or listed migratory species to do so, the Minister may request that the person taking the action make specified revisions to the management plan specified in the conditions and submit the revised plan for the Minister's written approval. The person taking the action must comply with any such request. The revised approved plans must be implemented. Unless the Minister has approved the revised plan then the person taking the action must continue to implement the originally approved plan, as specified in the conditions.	Not applicable	No request received to date.
36	If, at any time after 5 years from the date of this approval, the person taking the action has not substantially commenced the action, then the person taking the action must not substantially commence the action without the written agreement of the Minister.	Not applicable	Construction commenced 12th March 2014.

Cond.	Condition Requirement	Compliance	Comment
37	The person taking the action must maintain accurate records substantiating all activities and outcomes associated with or relevant to the above conditions of approval, including measures taken to implement the management plans required by this approval, and make them available upon request to the department. Such records may be subject to audit by the department or an independent auditor in accordance with section 458 of the Environment Protection and Biodiversity Conservation Act 1999, or used to verify compliance with the conditions of approval. Summaries of audits will be posted on the department's website. The results of audits may also be publicised through the general media.	Yes	No request received. Information available.
38	Unless otherwise agreed to in writing by the Minister, the person taking the action must publish all management plans referred to in these conditions of approval on their website. Each management plan must be published on the website within 1 month of being approved.	Not yet applicable	

TABLE A3-3

Compliance Review – Environment Protection Licence 12365

Condition		Compliance	Comment
A1 What the licence authorises and regulates	A1.1	Yes	Mining for Coal (>2,000,000-3,500,000 T produced) – 2,190,761 T Coal Works (>2,000,000 – 5,000,000 T Handled) – 2,284,900 T
A2 Premises or plant to which this licence applies	A2.1	Yes	Premises details correct
A3 Information supplied to the EPA	A3.1	No	Non-compliances outlined below
P1 Location of monitoring/discharge points and areas	P1.1	Yes	Monitoring occurred at this location during the reporting period, real time air quality monitor at Flixton. (see attached monitoring network plan).
	P1.2	N/A	
	P1.3	Yes	Monitoring was undertaken at these points (where applicable)
	P1.4	Yes	Monitoring occurred at this location.
L1 Pollution of waters	L1.1	Yes	No pollutions of waters. Discharge resulting from rain fall event in accordance with L2.5 occurred. TSS limit not exceeded, see Annual Return.
L2 Concentration limits	L2.1	Yes	As per condition
	L2.2	Yes	As per condition; results remain within specified range; refer to Annual Return.
	L2.3	Yes	As per condition
	L2.4	Yes	Monitoring undertaken for specified concentration limits
	L2.5	Yes	TSS limits not exceeded despite discharge during 90%ile rain event.
L3 Waste	L3.1	Yes	
	L3.2	N/A	
	L3.3	No	Not disposed of in accordance with requirements of condition
L4 Noise limits	L4.1	No	Quarterly Attended Monitoring at Tarrawonga exceeded limits specified in condition; however, property is project related land as identified by noise modelling in Environmental Assessment. Attended noise monitoring reports provided to EPA as per Condition R4.1, no correspondence received to date from EPA.
	L4.2	N/A	

Condition		Compliance	Comment
	L4.3	Yes	Noise assessment reports provided by the consultant note 'to avoid undue disturbance to the residents the L1 (min) noise level from the operational measurements are used to show general compliance with the sleep disturbance criteria. That is, the distance between the noise monitoring location and sleep disturbance location is insignificant when assessed against overall distance from the noise source.
	L4.4	N/A	
	L4.5	Yes	NSW Industrial Noise Policy applied and adhered to.
L5 Blasting	L5.1	Yes	0% of blasts exceeded 100 percentile limit during reporting period
	L5.2	Yes	1.75% of blasts exceeded threshold during reporting period
	L5.3	Yes	0% of blasts exceeded 100 percentile limit during reporting period
	L5.4	Yes	0% of blasts exceeded 100 percentile limit during reporting period
	L5.5	Yes	Blasting occurred within designated hours only
	L5.6	N/A	No application made to amend L5.5 (note that EPL incorrectly references L7.3)
	L5.7	No	Two blasts occurred on a single day (17/4/2014) without necessary notifications. Second blast was fired for safety reason as per L5.7 Note. EPA advised of non-compliance on 17/4/2014.
O1 Activities must be carried out in a competent manner	O1.1	Yes	Please note some level of ambiguity exists as to status of compliance with this condition in relation to L3.3.
O2 Maintenance of plant and equipment	O2.2	Yes	Maintenance records, trained and component operators.
O3 Dust	O3.1	Yes	As per condition, note correspondence from EPA and DP&E regarding instance of excessive dust.
	O3.2	Yes	Activities undertaken in accordance with Traffic Management Plan.
M1 Monitoring records	M1.1	Yes	As per condition
	M1.2	Yes	As per condition
	M1.3	Yes	As per condition
M2 Requirement to monitor	M2.1	Yes	Generally in accordance. Periodic connection failure (Point 28) resulting in minor data gaps; these gaps are

Condition		Compliance	Comment
concentration of pollutants discharged			not considered material to meeting the condition.
	M2.2	Yes	Generally in accordance. Periodic connection failure resulting in minor data gaps; these gaps are not considered material to meeting the condition.
	M2.3	Yes	Points 1,2,3,5,6,7,8,24,25,26,27 sampled when applicable as per L1.1. Points 9,10,11,12 Conducted six monthly. Point 13 sampled at period greater than 3 months in December 2014 due to no available pit water in November 2014;
	M2.4	Yes	Cannot definitively determine compliance as discharge commencement is not logged.
	M2.5	N/A	Point 15, 16, 20 and 21 no longer on EPL.
M3 Testing methods - concentration limits	M3.1	Yes	As per condition
	M3.2	N/A	No pollutions discharged to waters contrary to this license.
M4 Weather monitoring	M4.1	Yes	Generally in accordance. Periodic connection failures resulting in minor data gaps; these gaps are not considered material to meeting the condition.
	M4.2	Yes	Generally in accordance. Periodic connection failures resulting in minor data gaps; these gaps are not considered material to meeting the condition.
M5 Recording of pollution complaints	M5.1	Yes	Complaints register maintained
	M5.2	Yes	In accordance with condition
	M5.3	Yes	In accordance with condition
	M5.4	N/A	No authorised officer of the EPA has requested to view the records
M6 Telephone complaints line	M6.1	Yes	Complaints line maintained
	M6.2	Yes	Advertised on the Whitehaven Coal Website
	M6.3	N/A	Complaints lined maintained
M7 Other monitoring and recording conditions	M7.1	Yes	Monitored per Management Plans.
	M7.2	Yes	Real time noise monitor
	M7.3	Yes	As per condition

Condition		Compliance	Comment
	M7.4	Yes	As per condition
	M7.5	N/A	
	M7.6	N/A	No variation undertaken by EPA
	M7.7	Yes	Monitoring undertaken in accordance with condition
R1 Annual return documents	R1.1	Yes	As per attached Annual Return
	R1.2	Yes	As per condition
	R1.3	N/A	
	R1.4	N/A	
	R1.5	Yes	3/3/2014. It is noted that a revised Annual Return was submitted 21/11/14.
	R1.6	Yes	Records maintained
	R1.7	Yes	Timothy Burt (Company Secretary) and Jamie Frankcombe (Executive General Manager Operations)
R2 Notification of environmental harm	R2.1	Yes	No instances of environmental harm within reporting period
	R2.2	N/A	Reports were provided on events that did not constitute environmental harm during the reporting period.
R3 Written report	R3.1	Yes	Written request relating to exceedance A1.1 during 14/15 reporting period.
	R3.2	Yes	As per condition.
	R3.3	Yes	Information supplied to the satisfaction of the EPA
	R3.4	N/A	
R4 Other reporting conditions	R4.1	No	July 2014 noise monitoring report not supplied within specified timeframe.
G1 Copy of licence kept at the premises or plant	G1.1	Yes	In accordance with condition
	G1.2	N/A	No request to view EPL made
	G1.3	Yes	In accordance with condition
U1 Particulate Matter Control Best Practice Implementation – Trial of Best Practice Measures for Disturbing and Handling Overburden	U1.1	Yes	Report submitted to EPA 30/7/2014. Subsequent consultation has been undertaken with NSW Minerals Council, NSW Coal Mines and Whitehaven Coal

Condition		Compliance	Comment
U2 Coal Mine Wind Erosion of Exposed Land Assessment	U2.1	N/A	Not due until 31/7/2015

TABLE A3-4

Compliance Review – ML 1579

Cond.	Conditional Requirement	Compliance	Comments
1	Service of notice on landholders of granting of mining lease.	Yes	All affected landholders were advised within the 3 months of the grant date.
2	Prepare and submit a MOP in accordance with DG's guidelines.	Yes	Initial MOP lodged with DMR and accepted on the 9th May 2006. MOP amendment for Section 75W extension approved in October 2010. Revised MOP for Tarrawonga Extension area lodged May 2013; with MOP Amendment B approved in November 2014.
3	Submit AEMR to DG and prepare AEMR in accordance with DG's guidelines.	Yes	This document has been prepared in satisfaction with this condition. Content of AEMR follows guidelines.
5	Maintain at least 27 employees or expend not less that $472,500 per year in mining operations	Yes	As per condition.
6	Comply with direction of Environmental Officer of Department.	Not Yet Applicable	No directions issued.
7	Provision of Exploration Report at each anniversary of grant of lease.	Yes	Exploration report supplied as required.
11(a)	Ground vibration from blasting must not exceed 10mm/s at any time, and must not exceed 5mm/s in more than 5% of the total number of blasts over a 12 month period.	Yes	No exceedances recorded. See Appendix 8.
11(b)	Peak Overpressure from blasting must not exceed 120dB at any time, and must not exceed 115dB in more than 5% of the total number of blasts over a 12 month period.	No	See s3.9.2 and Appendix 8.
12	Operations must be carried out in such a way as to ensure the safety of persons or stock in the vicinity of operations	Yes	As per condition.
13(a)	Land disturbed is to be rehabilitated to a stable and permanent form in accordance with the MOP.	Yes	Current rehabilitation activities are in accordance with commitments identified in the MOP
13(b)	Topsoil is to be stored and maintained in a manner acceptable to the Director General.	Yes	Topsoil is stockpiled and seeded in accordance with commitments identified in the MOP.
14	Comply with directions issued by the Director-General regarding stabilisation and revegetation of mine residues, tailings or overburden dumps	Not Yet Applicable	No directions issued.
15(1)	Advise DNR Regional hydrogeologist of intention to drill exploration holes 28 days prior to commencement	Yes	As per condition.

Cond.	Conditional Requirement	Compliance	Comments
15(2)	All exploration drill holes must be completed to the satisfaction of the Director General in relation to:- -adequate marking/survey -sealed to prevent collapse -sealed with cement plugs to prevent discharge of groundwaters -if meets gas, it is plugged to prevent escape -if meets artesian or sub-artesian flow is sealed to prevent contamination of aquifer -once no longer used, is sealed according to Department guidelines -once no longer used, the land is left in a clean, tidy and stable condition.	Yes	As per condition.
16	Operations must be carried out so as not to cause or aggravate air pollution, water pollution or soil contamination or erosion.	Yes	See Section 3 for details.
17	Operations must not interfere with transmission lines, pipelines or any other utility	Yes	As per condition.
18	Activities must not interfere with or damage fences, and gates must be closed or left open in accordance with landholder requirements.	Yes	As per condition.
19(a)	Operations must not affect any road unless in accordance with the MOP or written approval of Director General.	Yes	As per condition.
19(b)	Leaseholder must pay to the authority responsible for the road the cost incurred in fixing any damage to the roads caused by the operations.	Yes	Agreement in place with GSC and NSC.
20	Access tracks kept to a minimum and positioned so as not to cause unnecessary damage. Temporary tracks to be ripped, re-topsoiled and revegetated when no longer required.	Yes	As per condition.
21(a)	Trees must not be felled without the consent of the landholder who is entitled to the use of the timber.	Yes	As per condition.
21(b)	Trees must not be felled on the lease area except where it directly obstructs or prevents the carrying out of operations.	Yes	As per condition.
21(c)	Timber from Crown land within the lease area must not be used until all relevant approvals have been obtained.	Yes	As per condition.
23	Comply with direction of Director General if notice is issued with regard to resource recovery.	Not Yet Applicable	No notice issued.
25	Provision of Security of $100,000 to the Minister to ensure fulfilment of lease conditions.	Yes	As per condition.

TABLE A3-5

Compliance Review – ML 1685

Cond.	Conditional Requirement	Compliance	Comments
1	Service of notice on landholders of granting of mining lease.	Yes	All affected landholders were advised within the 3 months of the grant date.
2	Any disturbance relating to the activities under this lease must be rehabilitated to the satisfaction of the Minister	Yes	Current rehabilitation activities are in accordance with commitments identified in the MOP
3	Must comply with the approved MOP	Yes	As per condition
3(f)	Prepare to the satisfaction of the Minister and submit annually a Rehabilitation Report	Yes	As per condition
4	Must submit annually a Compliance Report to the satisfaction of the Minister. Must be submitted on the anniversary of the grant date of this lease each year.	Yes	As per condition
5(a)	Must notify the Department immediately of any and all breaches of this mining lease or breaches of the Act causing or threatening harm to the environment, and any breaches of environmental protection legislation.	Yes	Department notified of exceedance of 120dB limit for overpressure associated with blasting activities.
5(b)	Must submit an Environmental Incident Report to the Department within 7 days of any breach mentioned in 5(a)	Not applicable	No environmental incidents during reporting period
5(c)	Must immediately advise the Department of any notification made under section 148 of the *Protection of the Environment Operations Act 1997*	Yes	As per condition
8	Provide and maintain a security deposit to the value of $4,364,000	Yes	As per condition
9	Must make every reasonable attempt to enter into a cooperation agreement with the holders of any overlapping titles. Addressing, but not limited to: • Access arrangements • Operational interaction procedures • Dispute resolution • Information exchange • Well location • Timing of drilling • Potential resource extraction conflicts • Rehabilitation issues	Yes	As per condition
10	Must submit a security review (in accordance with ESU guidelines and policy) within one month of the granting of the new mining lease.	Yes	As per condition

TABLE A3-6

Compliance Review – ML 1693

Cond.	Conditional Requirement	Compliance	Comments
1	Service of notice on landholders of granting of mining lease.	Yes	All landholders were notified within 3 months
3	Prepare and submit a MOP in accordance with DG's guidelines.	Yes	As per condition. MOP Amendment B approved in November 2014.
4	Submit AEMR annually or as directed to DG and prepare AEMR in accordance with DG's guidelines.	Yes	As per condition
5	An environmental incident report of any environmental incidents must be submitted within 24 hours.	Not Applicable	No environmental incidents during reporting period.
7	Any disturbance as a result of activities under this lease must be rehabilitated to the satisfaction of the DG.	Not Yet Applicable	
9(a)	Maintain at least 27 employees, or expend not less than $297,500 per year in mining operations.	Yes	As per condition
10(a)	Ground vibration from blasting must not exceed 10mm/s at any time, and must not exceed 5mm/s in more than 5% of the total number of blasts over a 12 month period.	Yes	As per condition The maximum recorded ground vibration during the reporting period was 2.43mm/s.
10(b)	Peak Overpressure from blasting must not exceed 120dB at any time, and must not exceed 115dB in more than 5% of the total number of blasts over a 12 month period.	No	See s3.9.2 and Appendix 8.
11	Operations must be carried out in such a way as to ensure the safety of persons or stock in the vicinity of operations.	Yes	As per condition.
12	Prospecting operations must not cause or aggravate air or water pollution, soil contamination, or erosion, and must be carried out in accordance with the MOP.	Yes	See section 3 for details.
13	Operations must not interfere with transmission lines, pipelines or any other utility.	Yes	As per condition
14(a)	Leaseholder must pay to the authority responsible for the road the cost incurred in fixing any damage to the roads caused by the operations.	Yes	Agreement in place with GSC and NSC.
14(b)	Use of any road or track must be restricted in wet weather to minimise/prevent damage.	Yes	As per condition
14(c, d)	Access tracks kept to a minimum and positioned so as not to cause unnecessary damage. Temporary tracks to be ripped, re-topsoiled and revegetated when no longer required.	Yes	As per condition
15(a)	Trees must not be felled without the consent of the landholder who is entitled to the use of the timber.	Yes	As per condition.
15(b)	Timber from Crown land within the lease area must not be taken until all relevant approvals have been obtained.	Yes	As per condition
17	Comply with direction of Director General if notice is issued with regard to resource recovery.	Yes	As per condition
18	The lease holder must indemnify and keep indemnified the Crown from and against all actions, suits, claims and demands of whatsoever nature.	Yes	As per condition

Cond.	Conditional Requirement	Compliance	Comments
23	The lease holder may not suspend mining operations other than in accordance with consent from the Minister.	Yes	As per condition
24	Must make every reasonable attempt to enter into a cooperation agreement with the holders of any overlapping titles. Addressing, but not limited to: • Access arrangements • Operational interaction procedures • Dispute resolution • Information exchange • Well location • Timing of drilling • Potential resource extraction conflicts • Rehabilitation issues	Yes	As per condition

Appendix 4

DUST MONITORING RESULTS

TEMPLEMORE PM_{10} HIGH VOLUME AIR SAMPLER

Site	Site Id	Datum	Zone	Easting	Northing
Templemore	EB4	MGA	56	230706	6605640

Date	mg/paper	µg/m³	Annual Average	Annual Average Limit	24hr Limit	Comments
5/05/2007	78.1	49	49.00	30	50	
11/05/2007	23	14	31.50	30	50	
17/05/2007	16.9	11	24.67	30	50	
23/05/2007	14.3	9	20.75	30	50	
29/05/2007	26.5	17	20.00	30	50	
4/06/2007	7	4	17.33	30	50	
10/06/2007	3.4	2	15.14	30	50	
16/06/2007	1.9	1	13.38	30	50	
22/06/2007	0.1	0	11.89	30	50	
28/06/2007	0.3	0	10.70	30	50	
4/07/2007	5.6	4	10.09	30	50	
10/07/2007	4.9	3	9.50	30	50	
16/07/2007	11.7	7	9.31	30	50	
22/07/2007	9	5	9.00	30	50	
28/07/2007	10.4	6	8.80	30	50	
3/08/2007	8.5	5	8.56	30	50	
9/08/2007	13.7	14	8.88	30	50	
15/08/2007	30	18	9.39	30	50	
21/08/2007	2.6	2	9.00	30	50	
27/08/2007	5.2	3	8.70	30	50	
2/09/2007	18.8	12	8.86	30	50	
8/09/2007	4.1	3	8.59	30	50	
14/09/2007	41.2	27	9.39	30	50	
20/09/2007	48.9	32	10.33	30	50	
26/09/2007	46.2	30	11.12	30	50	
2/10/2007	51.8	33	11.96	30	50	
8/10/2007	39.4	25	12.44	30	50	
14/10/2007	32.4	20	12.71	30	50	
20/10/2007	46	29	13.28	30	50	
26/10/2007	44.9	29	13.80	30	50	
1/11/2007	13	13	13.77	30	50	
7/11/2007	3	3	13.44	30	50	
13/11/2007	11	11	13.36	30	50	
19/11/2007	12	12	13.32	30	50	
25/11/2007	8	8	13.17	30	50	
1/12/2007	5.5	4	12.92	30	50	
7/12/2007	14.9	10	12.84	30	50	
13/12/2007	14.1	9	12.74	30	50	
19/12/2007	14.7	10	12.67	30	50	
25/12/2007	19.2	12	12.65	30	50	
31/12/2007	22.3	15	12.71	30	50	
6/01/2008	25.7	17	12.81	30	50	
12/01/2008	37.2	25	13.09	30	50	
18/01/2008	25.3	17	13.18	30	50	
24/01/2008	32.4	21	13.36	30	50	
30/01/2008	47.9	32	13.76	30	50	
5/02/2008	13.3	9	13.66	30	50	
11/02/2008	18.7	12	13.63	30	50	
17/02/2008	9.6	6	13.47	30	50	
23/02/2008	62.5	42	14.04	30	50	
29/02/2008	7.1	5	13.86	30	50	
6/03/2008	41.1	27	14.12	30	50	
12/03/2008	48.4	32	14.45	30	50	
18/03/2008	33.9	22	14.59	30	50	
24/03/2008	35.6	24	14.76	30	50	
30/03/2008	27.8	18	14.82	30	50	
5/04/2008	27.9	18	14.88	30	50	
11/04/2008	17.2	11	14.81	30	50	
17/04/2008	17.2	11	14.75	30	50	
23/04/2008	1.9	1	14.52	30	50	
29/04/2008	4.9	3	14.33	30	50	
5/05/2008	41.3	26	13.95	30	50	
11/05/2008	12.8	8	13.85	30	50	

Date	mg/paper	µg/m³	Annual Average	Annual Average Limit	24hr Limit	Comments
17/05/2008	22.5	15	13.92	30	50	
23/05/2008	5.9	4	13.84	30	50	
29/05/2008	20.6	13	13.77	30	50	
4/06/2008	2.5	2	13.74	30	50	
10/06/2008	6.8	4	13.77	30	50	
16/06/2008	1.6	1	13.77	30	50	
22/06/2008	1	1	13.79	30	50	
28/06/2008	15.4	9	13.93	30	50	
4/07/2008	6.5	4	13.93	30	50	
10/07/2008	1.2	1	13.90	30	50	
16/07/2008	4.7	3	13.84	30	50	
22/07/2008	14	9	13.90	30	50	
28/07/2008	1.8	1	13.82	30	50	
3/08/2008	3.3	1	13.75	30	50	
9/08/2008	4.2	3	13.57	30	50	
15/08/2008	7.5	5	13.36	30	50	
21/08/2008	15.5	10	13.49	30	50	
27/08/2008	28.1	18	13.74	30	50	
2/09/2008	7	4	13.61	30	50	
8/09/2008	6.6	4	13.62	30	50	
14/09/2008	16.7	11	13.36	30	50	
20/09/2008	48.1	32	13.36	30	50	
26/09/2008	9.5	6	12.97	30	50	
2/10/2008	47.2	31	12.93	30	50	
8/10/2008	14.3	9	12.67	30	50	
14/10/2008	14.1	9	12.49	30	50	
20/10/2008	38.5	25	12.43	30	50	
26/10/2008	21.7	14	12.18	30	50	
1/11/2008	39.9	25	12.38	30	50	
7/11/2008	27.6	18	12.62	30	50	
13/11/2008	34.5	22	12.80	30	50	
19/11/2008	3.6	2	12.64	30	50	
25/11/2008	14.5	9	12.66	30	50	
1/12/2008		11	12.77	30	50	
7/12/2008		16	12.87	30	50	
13/12/2008		14	12.95	30	50	
19/12/2008		9	12.93	30	50	
25/12/2008		16	13.00	30	50	
31/12/2008		32	13.28	30	50	
6/01/2009	21.7	15	13.25	30	50	
12/01/2009	19.6	13	13.05	30	50	
18/01/2009	22.1	14	13.00	30	50	
24/01/2009	19.7	14	12.89	30	50	
30/01/2009	20.8	14	12.59	30	50	
5/02/2009	25.9	18	12.74	30	50	
11/02/2009	34.1	22	12.90	30	50	
17/02/2009	3.2	2	12.84	30	50	
23/02/2009	29.5	20	12.48	30	50	
1/03/2009	35.3	24	12.79	30	50	
7/03/2009	40.1	26	12.77	30	50	
13/03/2009	33	22	12.61	30	50	
19/03/2009	59.8	40	12.90	30	50	
25/03/2009	68.5	45	13.25	30	50	
31/03/2009	8.7	6	13.05	30	50	
6/04/2009	9.8	6	12.85	30	50	
12/04/2009	5.3	3	12.72	30	50	
18/04/2009	35.3	23	12.92	30	50	
24/04/2009	20.6	13	13.11	30	50	
30/04/2009	26.8	17	13.34	30	50	
6/05/2009	57.6	37	13.52	30	50	
12/05/2009	56.1	36	13.98	30	50	
18/05/2009	36.8	24	14.13	30	50	
24/05/2009	18.3	12	14.26	30	50	
30/05/2009	10.1	6	14.15	30	50	
5/06/2009	3.2	2	14.15	30	50	
11/06/2009	14.6	9	14.23	30	50	
17/06/2009	2	1	14.23	30	50	
23/06/2009	2.6	1	14.23	30	50	
29/06/2009	3.2	4	14.15	30	50	

Date	mg/paper	µg/m³	Annual Average	Annual Average Limit	24hr Limit	Comments
5/07/2009	2.9	2	14.11	30	50	
11/07/2009	17.1	11	14.28	30	50	
17/07/2009	4.4	3	14.28	30	50	
23/07/2009	21.8	14	14.36	30	50	
29/07/2009	4.1	1	14.36	30	50	
4/08/2009	9.2	6	14.44	30	50	
10/08/2009	35.4	23	14.77	30	50	
16/08/2009	46	30	15.18	30	50	
22/08/2009	41.3	27	15.46	30	50	
28/08/2009	36.7	24	15.56	30	50	
3/09/2009	39.5	25	15.90	30	50	
9/09/2009	6.8	4	15.90	30	50	
15/09/2009	49.2	32	16.25	30	50	
21/09/2009	30	20	16.05	30	50	
27/09/2009	83.2	54	16.84	30	50	
3/10/2009	55.1	36	16.92	30	50	
9/10/2009	22.7	14	17.00	30	50	
15/10/2009	59.3	39	17.49	30	50	
21/10/2009	60.8	40	17.74	30	50	
27/10/2009	6.3	4	17.57	30	50	
2/11/2009	31.4	21	17.51	30	50	
8/11/2009	11	8	17.34	30	50	
14/11/2009	30.5	20	17.31	30	50	
20/11/2009	78.5	54	18.16	30	50	
26/11/2009	49.3	33	18.56	30	50	
2/12/2009	21.4	14	18.61	30	50	
8/12/2009	140.2	97	19.93	30	50	
14/12/2009	101.9	68	20.82	30	50	
20/12/2009	30.4	20	21.00	30	50	
26/12/2009	25.4	17	21.02	30	50	
1/01/2010	13.7	9	20.64	30	50	
7/01/2010	33.8	23	20.77	30	50	
13/01/2010	51.7	35	21.13	30	50	
19/01/2010	48.7	32	21.43	30	50	
25/01/2010	55.3	37	21.80	30	50	
31/01/2010	16.8	11	21.75	30	50	
6/02/2010	18	12	21.66	30	50	
12/02/2010	11.1	7	21.41	30	50	
18/02/2010	27.2	18	21.67	30	50	
24/02/2010			21.70	30	50	No power
2/03/2010			21.66	30	50	No power
8/03/2010	23.1	18	21.53	30	50	
14/03/2010	12.8	8	21.29	30	50	
20/03/2010	40.6	27	21.07	30	50	
26/03/2010	136.5	91	21.85	30	50	
1/04/2010	7.5	5	21.83	30	50	
7/04/2010	7.7	5	21.81	30	50	
13/04/2010	20.4	13	21.98	30	50	
19/04/2010	16.6	11	21.78	30	50	
25/04/2010	9.2	6	21.66	30	50	
1/05/2010	52	34	21.95	30	50	
7/05/2010	28.6	18	21.63	30	50	
13/05/2010	42.5	27	21.47	30	50	
19/05/2010	22.4	14	21.31	30	50	
25/05/2010	26.5	17	21.39	30	50	
31/05/2010	6.6	4	21.36	30	50	
6/06/2010	2.7	2	21.36	30	50	
12/06/2010	5.3	3	21.25	30	50	
18/06/2010	4.2	3	21.29	30	50	
24/06/2010	7.7	5	21.36	30	50	
30/06/2010	7.6	5	21.37	30	50	
6/07/2010	12.6	8	21.47	30	50	
12/07/2010	9	6	21.39	30	50	
18/07/2010	12.3	8	21.47	30	50	
24/07/2010	10.2	6	21.34	30	50	
30/07/2010	0.9	1	21.34	30	50	
5/08/2010	15.1	10	21.41	30	50	
11/08/2010	8	5	21.10	30	50	
17/08/2010	3.6	2	20.63	30	50	

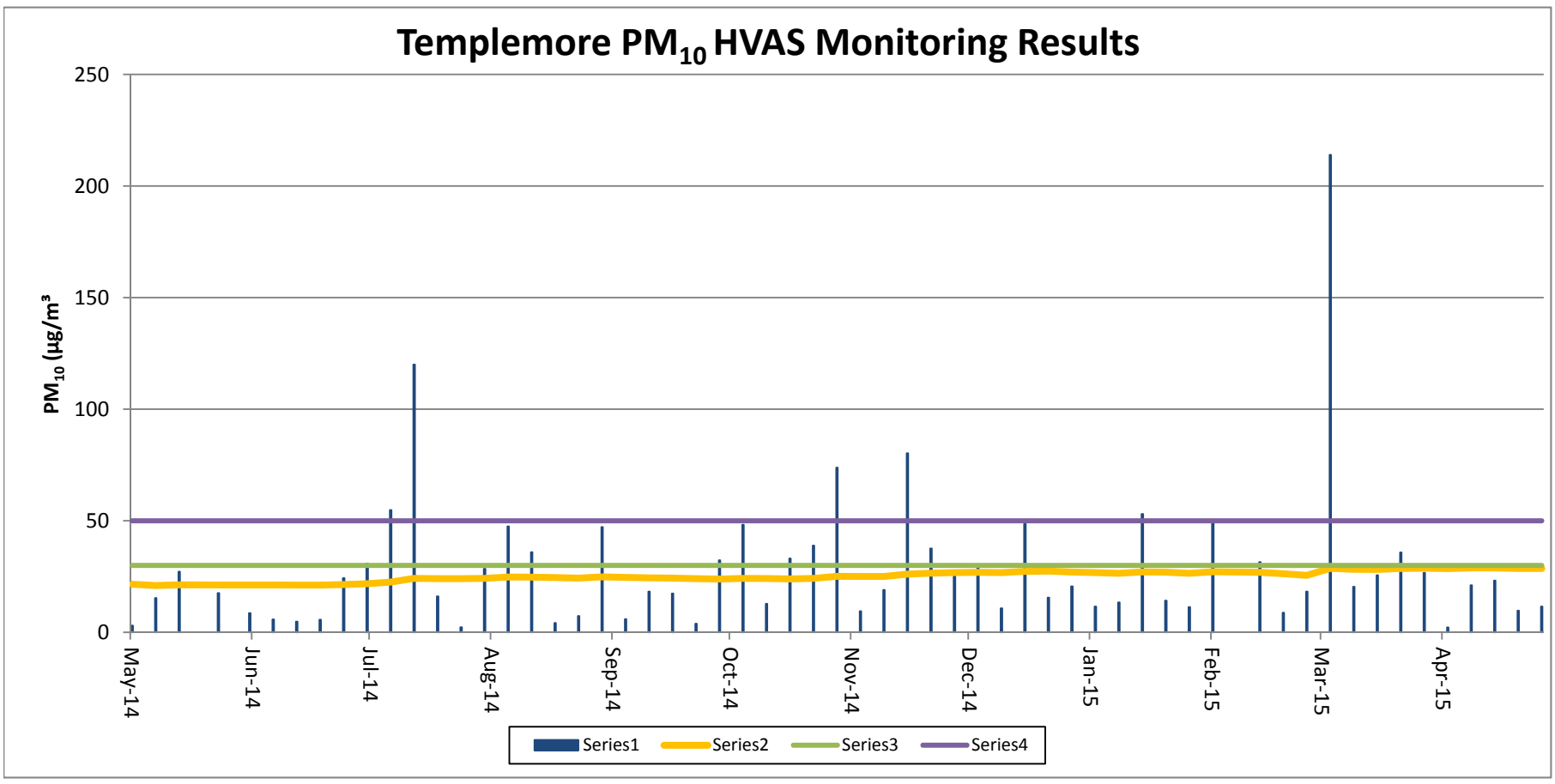
Date	mg/paper	µg/m³	Annual Average	Annual Average Limit	24hr Limit	Comments
23/08/2010	7.5	5	20.25	30	50	
29/08/2010	7.1	4	19.92	30	50	
4/09/2010	6.4	4	19.56	30	50	
10/09/2010	10.4	7	19.61	30	50	
16/09/2010	5.3	3	19.12	30	50	
22/09/2010	23.4	15	19.03	30	50	
28/09/2010	22.2	15	18.37	30	50	
4/10/2010	9	6	17.86	30	50	
10/10/2010	11.4	7	17.75	30	50	
16/10/2010	11.2	7	17.20	30	50	
22/10/2010	28.7	19	16.85	30	50	
28/10/2010	24.4	16	17.05	30	50	
3/11/2010	12.3	7.5	16.82	30	50	
9/11/2010	12.8	7.8	16.82	30	50	
15/11/2010	15.1	9.2	16.64	30	50	
21/11/2010	14	8.6	15.87	30	50	
27/11/2010	16	9.8	15.47	30	50	
3/12/2010	12.5	7.7	15.37	30	50	
9/12/2010	20.9	12.8	13.94	30	50	
15/12/2010	27	16.6	13.07	30	50	
21/12/2010	16	9.8	12.89	30	50	
27/12/2010	7.2	4.4	12.68	30	50	
2/01/2011	14.1	8.6	12.67	30	50	
8/01/2011	13.5	8.3	12.43	30	50	
14/01/2011	15.2	9.3	11.99	30	50	
20/01/2011	16.5	10.1	11.62	30	50	
26/01/2011	28.9	47.2	11.79	30	50	
1/02/2011	42.3	25.9	12.04	30	50	
7/02/2011	5.7	3.5	11.90	30	50	
13/02/2011	20.7	12.7	12.00	30	50	
19/02/2011	22.6	13.8	11.93	30	50	
25/02/2011	46.4	28.4	12.20	30	50	
3/03/2011	17.1	10.7	12.18	30	50	
9/03/2011	14.2	8.7	12.02	30	50	
15/03/2011	14.3	8.8	12.04	30	50	
21/03/2011	6.7	4.1	11.66	30	50	
27/03/2011	15	9.2	10.32	30	50	
2/04/2011	10.7	6.6	10.35	30	50	
8/04/2011	14.3	8.8	10.41	30	50	
14/04/2011	51	31.3	10.71	30	50	
20/04/2011	35	21.4	10.88	30	50	
26/04/2011	10.1	6.2	10.88	30	50	
2/05/2011	53.8	33	10.87	30	50	
8/05/2011	44.1	27	11.01	30	50	
14/05/2011	23.1	14.2	10.80	30	50	
20/05/2011			10.75	30	50	Power Outage
26/05/2011			10.64	30	50	Power Outage
1/06/2011	9.4	5.8	10.67	30	50	
7/06/2011	25	15.3	10.90	30	50	
13/06/2011	3.7	2.3	10.89	30	50	
19/06/2011	11.6	7.1	10.96	30	50	
25/06/2011	12.3	7.5	11.00	30	50	
1/07/2011	17.9	11	11.10	30	50	
7/07/2011	34.9	21.4	11.33	30	50	
13/07/2011	42.9	26.3	11.67	30	50	
19/07/2011	18.7	11.5	11.73	30	50	
25/07/2011	45.5	27.9	12.10	30	50	
31/07/2011	36.7	22.5	12.47	30	50	
6/08/2011	35.2	21.6	12.66	30	50	
12/08/2011	4.2	2.6	12.62	30	50	
18/08/2011	16.9	10.4	12.77	30	50	
24/08/2011	15.8	9.7	12.85	30	50	
30/08/2011	28.4	17.4	13.07	30	50	
5/09/2011	39.6	24.3	13.42	30	50	
11/09/2011	6.1	3.7	13.36	30	50	
17/09/2011	44.3	27.2	13.77	30	50	
23/09/2011	69.8	42.8	14.24	30	50	
29/09/2011	22.5	13.8	14.22	30	50	
5/10/2011	21.9	13.4	14.35	30	50	

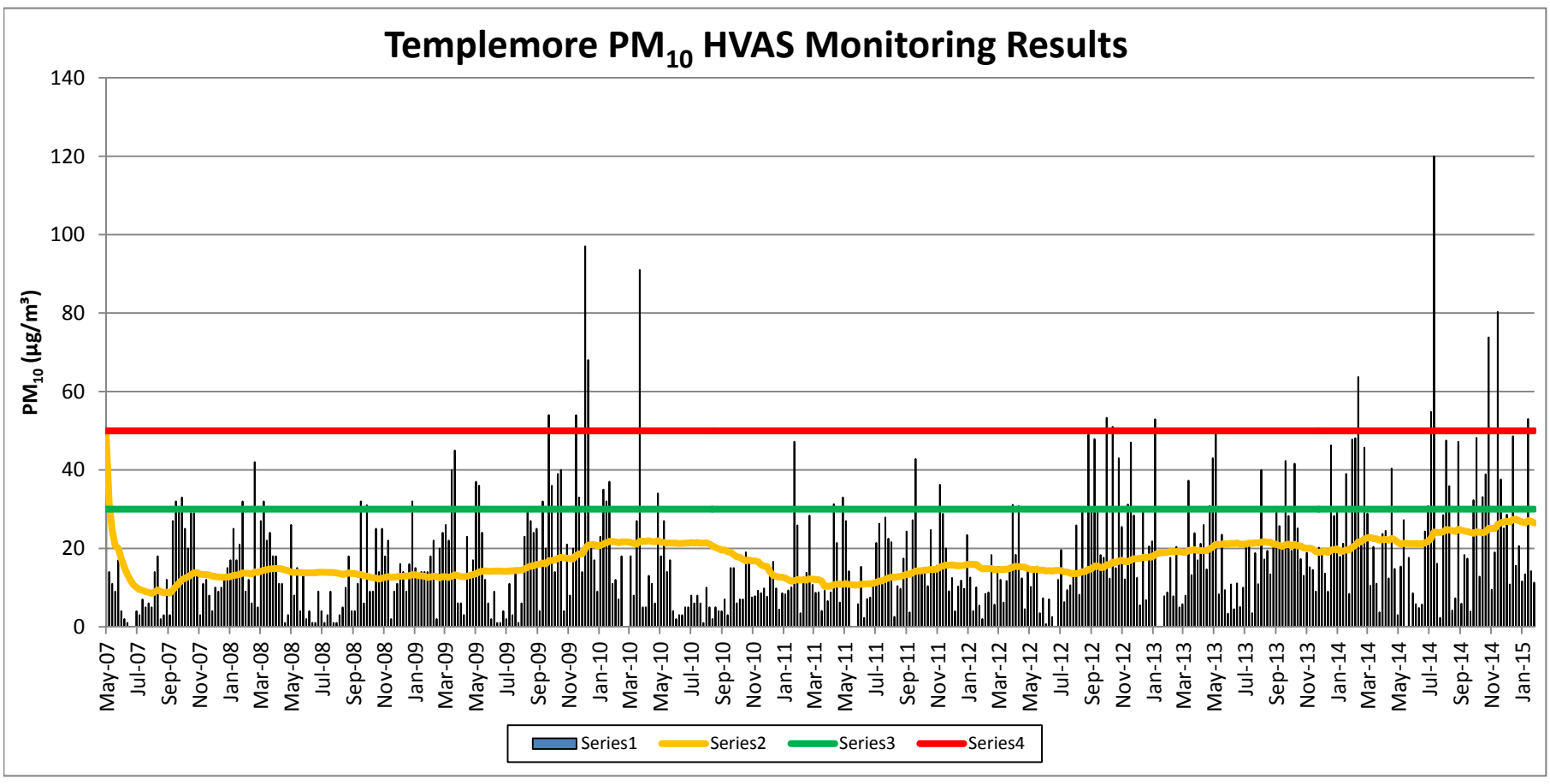
Date	mg/paper	µg/m³	Annual Average	Annual Average Limit	24hr Limit	Comments
11/10/2011	23.2	14.2	14.47	30	50	
17/10/2011	17	10.4	14.53	30	50	
23/10/2011	40.3	24.7	14.62	30	50	
29/10/2011	22.9	14	14.59	30	50	
4/11/2011	25.4	15.6	14.73	30	50	
10/11/2011	59.1	36.2	15.21	30	50	
16/11/2011	46.9	28.8	15.54	30	50	
22/11/2011	32.7	20	15.73	30	50	
28/11/2011	14.8	9.1	15.72	30	50	
4/12/2011	20.4	12.5	15.80	30	50	
10/12/2011	6.6	4	15.65	30	50	
16/12/2011	16.8	10.3	15.55	30	50	
22/12/2011	19.2	11.8	15.58	30	50	
28/12/2011	15.9	9.7	15.67	30	50	
3/01/2012	38.2	23.4	15.92	30	50	
9/01/2012	20.6	12.6	15.99	30	50	
15/01/2012	6.5	4	15.91	30	50	
21/01/2012	16.5	10.1	15.91	30	50	
27/01/2012	8.9	5.4	15.20	30	50	
2/02/2012	3.2	2	14.79	30	50	
8/02/2012	13.7	8.4	14.87	30	50	
14/02/2012	14.4	8.8	14.81	30	50	
20/02/2012	29.9	18.3	14.88	30	50	
26/02/2012	9.3	5.7	14.50	30	50	
3/03/2012	25	15.3	14.58	30	50	
9/03/2012	19.5	12	14.63	30	50	
15/03/2012	10.2	6.2	14.59	30	50	
21/03/2012	19.1	11.7	14.72	30	50	
27/03/2012	25.4	15.6	14.83	30	50	
2/04/2012	50.8	31.1	15.24	30	50	
8/04/2012	30	18.4	15.41	30	50	
14/04/2012	50.2	30.8	15.40	30	50	
20/04/2012	20.2	12.4	15.24	30	50	
26/04/2012	7.4	4.5	15.22	30	50	
2/05/2012	23.6	14.5	14.90	30	50	
8/05/2012	16.7	10.2	14.62	30	50	
14/05/2012	24.7	15.1	14.63	30	50	
20/05/2012	25.1	15.4	14.65	30	50	
26/05/2012	5.7	3.5	14.46	30	50	
1/06/2012	11.9	7.3	14.49	30	50	
7/06/2012	1.1	0.7	14.25	30	50	
13/06/2012	11.5	7	14.32	30	50	
19/06/2012	4.1	2.5	14.25	30	50	
25/06/2012			14.36	30	50	Runtime error
1/07/2012	19.7	12	14.38	30	50	
7/07/2012	32	19.6	14.35	30	50	
13/07/2012	10.3	6.3	14.02	30	50	
19/07/2012	15.4	9.4	13.98	30	50	
25/07/2012	17.3	10.6	13.69	30	50	
31/07/2012	23	14.1	13.55	30	50	
6/08/2012	42.3	25.9	13.62	30	50	
12/08/2012	13.4	8.2	13.72	30	50	
18/08/2012	49.2	30.2	14.05	30	50	
24/08/2012	23.4	14.3	14.12	30	50	
30/08/2012	30	49	14.65	30	50	
5/09/2012	36.6	29.7	14.74	30	50	
11/09/2012	77.9	47.9	15.48	30	50	
17/09/2012	49	30.1	15.53	30	50	
23/09/2012	29.7	18.3	15.12	30	50	
29/09/2012	28.6	17.6	15.18	30	50	
5/10/2012	86.9	53.3	15.85	30	50	
11/10/2012	15.2	12.3	15.81	30	50	
17/10/2012	83.3	51	16.49	30	50	
23/10/2012	24.5	15	16.33	30	50	
29/10/2012	70.2	43	16.81	30	50	
4/11/2012	41.6	25.5	16.98	30	50	
10/11/2012	19.8	12.1	16.58	30	50	
16/11/2012	50.8	31.2	16.62	30	50	
22/11/2012	76.6	47	17.07	30	50	

Date	mg/paper	µg/m³	Annual Average	Annual Average Limit	24hr Limit	Comments
28/11/2012	46.3	28.4	17.39	30	50	
4/12/2012	21	12.5	17.39	30	50	
10/12/2012	9.3	5.5	17.41	30	50	
16/12/2012	48.4	29.3	17.73	30	50	
22/12/2012	11.1	6.8	17.65	30	50	
28/12/2012	33.4	20.5	17.83	30	50	
3/01/2013	35.5	21.8	17.80	30	50	
9/01/2013	86.3	52.9	18.47	30	50	
15/01/2013			18.72	30	50	No power
21/01/2013			18.86	30	50	No power
27/01/2013	12.8	7.8	18.91	30	50	
2/02/2013	14.4	8.8	19.02	30	50	
8/02/2013	28.7	17.6	19.18	30	50	
14/02/2013	12.7	7.8	19.16	30	50	
20/02/2013	28.8	20.4	19.20	30	50	
26/02/2013	8.1	5	19.19	30	50	
4/03/2013	9.4	5.8	19.02	30	50	
10/03/2013	13	8	18.96	30	50	
16/03/2013	60.8	37.3	19.49	30	50	
22/03/2013	21.6	13.2	19.52	30	50	
28/03/2013	39	23.9	19.66	30	50	
3/04/2013	27.8	17	19.42	30	50	
9/04/2013	34.5	21.2	19.47	30	50	
15/04/2013	42.5	26	19.38	30	50	
21/04/2013	24	14.7	19.42	30	50	
27/04/2013	50.3	30.8	19.88	30	50	
3/05/2013	70.2	43	20.37	30	50	
9/05/2013	80.7	49.5	21.04	30	50	
15/05/2013	13.5	8.3	20.93	30	50	
21/05/2013	38.3	23.5	21.07	30	50	
27/05/2013	15.4	9.4	21.17	30	50	
2/06/2013	5.6	3.4	21.10	30	50	
8/06/2013	17.6	10.8	21.28	30	50	
14/06/2013	7.4	4.5	21.23	30	50	
20/06/2013	18.1	11.1	21.38	30	50	
26/06/2013	8.3	5.1	21.11	30	50	
2/07/2013	16.4	10	21.07	30	50	
8/07/2013	34.9	21.4	21.10	30	50	
14/07/2013	35.7	21.9	21.37	30	50	
20/07/2013	5.7	3.5	21.27	30	50	
26/07/2013	30.6	18.8	21.41	30	50	
1/08/2013	17.8	10.9	21.35	30	50	
7/08/2013	65.2	40	21.59	30	50	
13/08/2013	28	17.2	21.74	30	50	
19/08/2013	31.6	19.4	21.56	30	50	
25/08/2013	21.8	13.4	21.54	30	50	
31/08/2013	33.4	20.5	21.06	30	50	
6/09/2013	50	30.6	21.08	30	50	
12/09/2013	41.9	25.7	20.70	30	50	
18/09/2013	32.6	20	20.53	30	50	
24/09/2013	69	42.3	20.94	30	50	
30/09/2013	46.1	28.3	21.12	30	50	
6/10/2013	31.6	19.4	20.54	30	50	
12/10/2013	67.9	41.6	21.04	30	50	
18/10/2013	40.9	25.1	20.60	30	50	
24/10/2013	28.2	17.3	20.64	30	50	
30/10/2013	21.2	13	20.13	30	50	
5/11/2013	30.8	18.9	20.02	30	50	
11/11/2013	24.4	15.2	20.07	30	50	
17/11/2013	23.6	14.5	19.79	30	50	
23/11/2013	14.7	9	19.14	30	50	
29/11/2013	33	20.2	19.01	30	50	
5/12/2013	30	18.4	19.11	30	50	
11/12/2013	22.2	13.6	19.24	30	50	
17/12/2013	14.7	9	18.90	30	50	
23/12/2013	75.5	46.3	19.57	30	50	
29/12/2013	46.2	28.3	19.70	30	50	
4/01/2014	49.6	30.4	19.85	30	50	
10/01/2014	29.2	17.9	19.25	30	50	

Date	mg/paper	µg/m³	Annual Average	Annual Average Limit	24hr Limit	Comments
16/01/2014	34.6	21.2	19.29	30	50	
22/01/2014	63.5	39	19.61	30	50	
28/01/2014	13.7	8.4	19.62	30	50	
3/02/2014	78.1	47.8	20.26	30	50	
9/02/2014	78.5	48.1	20.76	30	50	
15/02/2014	104	63.7	21.67	30	50	
21/02/2014	34	20.8	21.68	30	50	
27/02/2014	74.6	45.7	22.35	30	50	
5/03/2014	47.2	28.9	22.73	30	50	
11/03/2014	17.1	10.5	22.77	30	50	
17/03/2014	33.3	20.4	22.49	30	50	
23/03/2014	17.9	11	22.45	30	50	
29/03/2014	6	3.7	22.12	30	50	
4/04/2014	38.7	23.7	22.23	30	50	
10/04/2014	39.9	24.5	22.29	30	50	
16/04/2014	20.3	12.4	22.06	30	50	
22/04/2014	65.8	40.4	22.49	30	50	
28/04/2014	24.2	14.8	22.22	30	50	
4/05/2014	4.9	3	21.57	30	50	
10/05/2014	25.2	15.4	21.01	30	50	
16/05/2014	44.4	27.2	21.32	30	50	
26/05/2014	28.7	17.6	21.22	30	50	
3/06/2014	14.1	8.6	21.21	30	50	
9/06/2014	9.5	5.8	21.25	30	50	
15/06/2014	7.9	4.8	21.15	30	50	
21/06/2014	9.2	5.7	21.17	30	50	
27/06/2014	39.7	24.3	21.39	30	50	
3/07/2014	50.3	30.8	21.81	30	50	
9/07/2014	89.3	54.8	22.54	30	50	
15/07/2014	196	120	24.16	30	50	
21/07/2014	26.2	16.1	24.06	30	50	
27/07/2014	3.8	2.3	24.04	30	50	
2/08/2014	46.5	28.5	24.20	30	50	
8/08/2014	77.4	47.5	24.80	30	50	
14/08/2014	58.5	35.9	24.73	30	50	
20/08/2014	6.9	4.2	24.52	30	50	
26/08/2014	11.9	7.3	24.32	30	50	
1/09/2014	77	47.2	24.88	30	50	
7/09/2014	9.6	5.9	24.64	30	50	
13/09/2014	29.8	18.3	24.44	30	50	
19/09/2014	28.4	17.4	24.30	30	50	
25/09/2014	6.4	3.9	24.04	30	50	
1/10/2014	52.7	32.3	23.87	30	50	
7/10/2014	78.7	48.2	24.20	30	50	
13/10/2014	20.8	12.8	24.09	30	50	
19/10/2014	45.2	33.1	23.95	30	50	
25/10/2014	63.4	38.9	24.18	30	50	
31/10/2014	120	73.8	25.10	30	50	
6/11/2014	15.5	9.5	25.05	30	50	
12/11/2014	31	19	25.05	30	50	
18/11/2014	131	80.3	26.11	30	50	
24/11/2014	61.3	37.6	26.49	30	50	
30/11/2014	41	25.1	26.76	30	50	
6/12/2014	46.6	28.6	26.90	30	50	
12/12/2014	17.6	10.8	26.77	30	50	
18/12/2014	79.2	48.6	27.34	30	50	
24/12/2014	25.5	15.6	27.45	30	50	
30/12/2014	33.6	20.6	27.03	30	50	
5/01/2015	18.9	11.6	26.76	30	50	
11/01/2015	21.8	13.4	26.48	30	50	
17/01/2015	86.4	53	27.05	30	50	
23/01/2015	23.2	14.2	26.94	30	50	
29/01/2015	18.4	11.3	26.49	30	50	
4/02/2015	80.9	49.6	27.16	30	50	
16/02/2015	103	31.5	26.89	30	50	
22/02/2015	14.3	8.8	26.25	30	50	
28/02/2015	29.9	18.3	25.50	30	50	
6/03/2015	349	214	28.67	30	50	
12/03/2015	33.3	20.4	28.26	30	50	

Date	mg/paper	µg/m³	Annual Average	Annual Average Limit	24hr Limit	Comments
18/03/2015	41.7	25.6	28.20	30	50	
24/03/2015	45.4	35.8	28.62	30	50	
30/03/2015	43.6	26.7	28.72	30	50	
5/04/2015	3.6	2.2	28.58	30	50	
11/04/2015	34.5	21.1	28.86	30	50	
17/04/2015	37.9	23.2	28.85	30	50	
23/04/2015	16	9.7	28.61	30	50	
29/04/2015	19	11.6	28.60	30	50	





Appendix 5

SURFACE WATER AND WET WEATHER DISCHARGE MONITORING DATA

Wet Weather Discharge Results

Sample No.	Sample Location	Date	Time	pH	Electrical Conductivity (µS/cm)	Total Suspended Solids (mg/L)	Grease & Oil (mg/L)	Total Organic Carbon (mg/L)	Comments
26194.01	BCU	1 March 2007	1600	6.8	165	193	<2		
26194.02	NCU	1 March 2007	1530	7.0	105	78	4		
26194.03	NCD	1 March 2007	1545	6.5	65	304	<2		
26194.04	BCD	2 March 2007	900	6.4	105	45	4		
26194.05	SD1	2 March 2007	1345	7.5	540	524	3		
26194.06	SD2	2 March 2007	1350	7.8	610	290	2		
27779.01	BCD	23 August 2007	1015	6.2	110	23	<2		
27779.02	SD8	23 August 2007	1035	6.8	475	5	<2		
27779.03	BCU	23 August 2007	1100	6.8	180	46	2		
29122.01	SB14	17 January 2008	1420	7.3	570	100	<2		
29122.02	SD17	17 January 2008	1500	7.6	425	837	<2		
29122.03	SD8	17 January 2008	1715	7.4	725	173	<2		
29297.01	BCU	6 February 2008	1505	7.1	120	20	<2		
29297.02	SD9	6 February 2008	1525	7.4	220	42	<2		
29297.03	SD8	6 February 2008	1535	8.2	1170	26	<2		
29297.04	SD17	6 February 2008	1615	7.9	420	476	<2		
29297.05	BCD	6 February 2008	1700	7.3	135	9	<2		
32813.01	BCU	17 February 2009	1418	6.8	275	35	<2		
32813.02	SD9	17 February 2009	1510	7.1	90	22	<2		
32813.03	BCD	17 February 2009	1530	6.5	130	32	<2		
ES1000141-001	SD16	4 January 2010	1600	7.3	729	51	<5	20	
ES1000141-002	NC-D	4 January 2010	1630	7.56	189	29	<5	28	
ES1000141-003	NC-U	4 January 2010	1725	7.42	181	68	<5	20	
ES1000141-004	BC-D	4 January 2010	1750	7.43	125	5	<5	35	
ES1002193	SD16	8 February 2010	1055	7.63	633	242	7	3	
ES1002886-001	SD17	15 February 2010	1315	7.56	252	1020	<5	4	
ES1002886-002	SD9	15 February 2010	1350	7.18	55	75	<5	11	
ES1002886-003	SD16	15 February 2010	1400	7.54	741	263	<5	7	
ES1002886-004	BCU	15 February 2010	1445	7.22	63	94	<5	13	
ES1002886-005	NCD	15 February 2010	1505	7.09	101	40	<5	19	
ES1002886-006	NCD	15 February 2010	1525	6.89	71	40	<5	26	
ES1002886-007	NCU	15 February 2010	1545	6.6	78	24	<5	30	
ES1006095-001	SD16	31 March 2010	0850	7.95	816	23	<5	3	
ES1013940-001	SB14	14 July 2010	1255	8.04	246	30	<5	7	
ES1015037-003	SB14	28 July 2010	1354	7.71	74	41	<5	15	
ES1015037-001	NCU	28 July 2010	1312	8.05	26	1940	<5	10	
ES1015037-002	NCD	28 July 2010	1325	7.53	379	44	<5	16	
ES1015611-001	BCD	3 August 2010	1115	8.03	101	32	<5	28	
ES1016049-005	SB14	10 August 2010	1300	6.76	233	2630	<5	<10	
ES1016049-001	NCU	10 August 2010	1200	7.51	34	766	<5	7	
ES1016049-002	NCD	10 August 2010	1215	7.14	72	616	<5	8	
ES1016049-004	BCU	10 August 2010	1250	6.66	65	94	<5	13	
ES1016049-003	BCD	10 August 2010	1230	6.7	78	39	<5	19	
ES1016144-001	SD16	11 August 2010	1150	8.42	727	64	<5	4	
ES1016144-002	SD9	11 August 2010	1200	7.27	116	28	<5	12	
ES1016962-001	SD16	20 August 2010	1230	8.76	748	22	9	4	
ES1016962-002	SB14	20 August 2010	1250	8.36	264	666	33	5	
ES1016962-003	BCD	20 August 2010	1310	8.29	115	26	22	32	
ES1017959-001	SD16	2 September 2010	1620				<5		Resample for oil and grease only
ES1017959-002	SB14	2 September 2010	1630				5		
ES1017959-003	BCD	2 September 2010	1600				<5		
ES1018430-002	SB14	10 September 2010	1220	7.71	298	548	<5	5	
ES1018430-001	BCD	10 September 2010	1120	6.64	99	66	<5	22	
ES1018625-001	SB14	15 September 2010	0820	7.63	272	231	5	5	
ES1018625-002	SD16	15 September 2010	0840	8.52	795	21	<5	5	
ES1018625-003	SD9	15 September 2010	0850	7.28	110	78	<5	19	
ES1023143-001	SB14	12 October 2010	0930	6.75	98	58	6	17	
ES1023279-001	BCD	16 October 2010	1055	6.58	143	85	8	17	
ES1023279-002	NCD	16 October 2010	1115	6.86	140	118	<5	22	
ES1024688-001	SD16	1 December 2010	1130	8.03	857	6	<5	6	
ES1025100-001	SB14	3 December 2010	0800	7.64	321	122	<5	5	
ES1025103-001	BCD	6 December 2010	1420	6.72	152	46	<5	23	
ES1025678-001	SD17	10 December 2010	1000	7.31	232	152	<5	14	

Sample No.	Sample Location	Date	Time	pH	Electrical Conductivity (µS/cm)	Total Suspended Solids (mg/L)	Grease & Oil (mg/L)	Total Organic Carbon (mg/L)	Comments
ES1025678-002	NCD	10 December 2010	1030	6.97	132	79	<5	15	
ES1025678-003	NCU	10 December 2010	1055	6.57	29	181	<5	10	
ES1025678-004	SD16	10 December 2010	1140	8.14	800	45	<5	5	
ES1025678-005	SD9	10 December 2010	1200	7.25	118	66	<5	10	
ES1025678-006	SB14	10 December 2010	1210	6.9	77	156	<5	18	
ES1025678-007	BCD	10 December 2010	1230	6.83	77	65	<5	15	
ES1119817-001	NCD	9 September 2011	1030	7.14	76	76	<5	14	38.2mm in the previous 24 hours. Reported to EPA.
ES1119817-002	SB14	9 September 2011	1100	7.53	276	131	<5	9	
ES1119817-003	SD9	9 September 2011	1110	7.1	43	50	<5	12	
ES1121350-001	SB14	29 September 2011	1050	7.69	293	414	<5	5	38.6mm of rainfall on the day of discharge and 2.6mm on the previous day. Reported to EPA.
ES1121350-002	SD9	29 September 2011	1100	7.13	91	228	<5	7	
ES1121350-003	NCD	29 September 2011	1115	6.98	48	144	<5	10	
ES1124940-001	SD9	14 November 2011	1030	7.98	227	144	<5	10	34.0mm of rainfall on the previous day. Reported to EPA.
ES1124940-002	BCD	14 November 2011	1110	7.34	131	29	<5	35	
ES1125587-001	SD16	18 November 2011	0910	7.52	596	64	<5	8	62.5mm of rainfall in preceding 5 days. Reported to EPA.
ES1125587-003	BCD	18 November 2011	1000	6.72	222	32	<5	87	
ES1125587-004	NCD	18 November 2011	1019	7	115	147	<5	26	
ES1125587-005	NCU	18 November 2011	1030	6.57	26	146	<5	7	
ES1125999-001	BCD	23 November 2011	1540	6.64	79	24	<5	27	41.4mm of rainfall on the day.
ES1125999-002	NCD	23 November 2011	1555	7.04	103	133	<5	20	
ES1125999-003	NCU	23 November 2011	1610	6.64	28	98	<5	10	
ES1125999-004	BCU	23 November 2011	1640	7.27	177	64	<5	28	
ES1126008-001	SD17	24 November 2011	1025	7.7	304	620	<5	14	41.4mm of rainfall on previous day. Reported to EPA.
ES1202202-001	SB23	31 January 2012	1145	7.74	188	1340	<5	6	37.6mm of rainfall in previous 5 days. Reported to EPA.
ES1202202-002	SD9	31 January 2012	1130	7.39	48	116	<5	5	
ES1202202-003	SD16	31 January 2012	1150	7.79	301	124	<5	4	
ES1202202-004	SB14	31 January 2012	1200	7.92	356	1170	<5	3	
ES1202202-005	SB24	31 January 2012	1220	7.28	76	37	<5	11	
ES1202202-006	BCU	31 January 2012	1355	6.76	306	584	<5	14	
ES1202202-007	NCU	31 January 2012	1430	7.23	174	78	<5	14	
ES1202202-008	NCD	31 January 2012	1450	7.13	167	132	<5	9	
ES1202506-001	GCDW	31 January 2012	0710	7.6	710	2720	<5	10	Non Licenced Discharge. Reported to EPA and Penalty Infringement Notices issued.
ES1202506-002	BCD	31 January 2012	1230	7.15	102	30	<5	13	
ES1204080-001	BCU	21 Feburary 2012	1020	7.91	633	6	<5	7	64.8mm of rainfall in preceding 5 days. This exceeds the 90%ile 5 day event criteria and therefore TSS exceedances were not reported to EPA.
ES1204080-002	GCD	21 Feburary 2012	1047	8.01	696	35	<5	11	
ES1204080-003	GCU	21 Feburary 2012	1100	7.59	401	12	<5	38	
ES1204080-004	SB14	21 Feburary 2012	1115	8.07	661	193	<5	7	
ES1204080-005	SD16	21 Feburary 2012	1125	7.64	339	59	<5	5	
ES1204080-006	SB23	21 Feburary 2012	1140	7.6	137	396	<5	15	
ES1204197-001	BCD	21 Feburary 2012	1400	7.7	471	5	<5	24	
ES1204197-002	NCD	21 Feburary 2012	1425	8.17	903	29	<5	11	
ES1204197-003	NCU	21 Feburary 2012	1500	7.79	379	<5	<5	23	
ES1214029-001	NCD	4 June 2012	1100	7.67	345	30	<5	14	No Discharge
ES1217574-001	GCD	12 July 2012	0520	7.56	166	79	<5	23	Not reportable - rainfall exceeded 38.4mm (45.4mm)
ES1217574-002	GCU	12 July 2012	0540	7.04	103	388	<5	24	
ES1217574-003	BCD	12 July 2012	0610	7.2	147	122	<5	25	
ES1217577-001	SD9	12 July 2012	1545	7.6	127	37	<5	10	
ES1217577-002	SB23	12 July 2012	1600	7.86	234	910	<5	7	
ES1217577-003	SB14	12 July 2012	1625	8.07	448	932	<5	5	
ES1302188-001	NCD	29 January 2013	1155	6.73	187	88	<5	38	No Discharge
ES1302188-002	NCU	29 January 2013	1211	6.9	158	7	<5	40	
ES1302188-003	BCD	29 January 2013	1225	6.68	167	45	<5	78	
ES1302188-004	GCD	29 January 2013	1240	7.01	143	116	<5	21	
ES1302188-005	GCU	29 January 2013	1252	6.9	112	32	<5	19	
ES1302188-006	BCU	29 January 2013	1312	6.99	188	72	<5	26	
ES1305146-001	SB23	4 March 2013	1130	7.92	174	752	<5	4	Not reportable - rainfall exceeded 38.4mm (60.4mm)
ES1406432-001	TAR-NCU	21 March 2014	0100	6.93	34	160	<5	10	No Discharge
ES1406432-002	TAR-NCD	21 March 2014	0116	7.31	94	1370	<5	10	
ES1406545-001	TAR-NCD	25 March 2014	1330	7.04	166	631	<5	12	No Discharge
ES1406545-002	TAR-NCU	25 March 2014	1350	7.05	93	72	<5	17	
ES1407115-001	BCU	28 March 2014	0800	7.19	131	88	<5	13	Rainfall event exceeded 38.4mm, not reportable
ES1407115-002	GCD	28 March 2014	0818	7.24	97	219	<5	9	
ES1407115-003	GCU	28 March 2014	0842	7.18	97	89	<5	10	
ES1407115-004	SD9	28 March 2014	0858	7.21	271	12	<5	16	
ES1407115-005	BCD	28 March 2014	0918	6.92	87	89	<5	14	
ES1407115-006	SD17	28 March 2014	1058	8	358	137	<5	6	

Sample No.	Sample Location	Date	Time	pH	Electrical Conductivity (µS/cm)	Total Suspended Solids (mg/L)	Grease & Oil (mg/L)	Total Organic Carbon (mg/L)	Comments
ES1407115-007	NCD	28 March 2014	1128	7.12	188	103	<5	26	
ES1407115-008	NCU	28 March 2014	1142	6.99	121	26	<5	28	
ES1419360-001	NCD	27 August 2014	1255	7.39	193	839	<5	8	No Discharge
ES1502387-001	NCD	28 January 2015	1228	7.01	189	348	<5	15	No Discharge
ES1520296-001	NCD	21 April 2015	1528	7.18	185	326	<5	8	No Discharge
ES1520296-001	NCD	4 April 2015	1300	7.21	213	221	<5	9	No Discharge

Appendix 6

GROUNDWATER MONITORING DATA

Sample Location	Date	Time	Depth to Ground - mbgl	Depth to Stand - mbtoc	Field Parameters			Total Metals																Mercury (Hg) - mg/L	pH - Lab	EC - Lab - µs/cm	Major Cations				Total Cations - meq/L	Major Anions						Total Anions - meq/L	Ionic Balance	Ammonia as Nitrogen (N)	Nitrite as N -mg/L	Nitrate as N - mg/L	Nitrite + Nitrate as N - mg/L	Total Dissolved Solids	Dissolved oxygen	TPH C6-C9	TPH C10-C36
					pH - Field	EC - Field - µs/cm	Temp - Field - °C	Aluminium (Al) - mg/L	Arsenic (As) - mg/L	Barium (Ba) - mg/L	Beryllium (Be) - mg/L	Boron (B) - mg/L	Cadmium (Cd) - mg/L	Chromium (Cr) - mg/L	Cobalt (Co) - mg/L	Copper (Cu) - mg/L	Iron (Fe) - mg/L	Lead (Pb) - mg/L	Manganese (Mn) - mg/L	Nickel (Ni) - mg/L	Selenium (Se) - mg/L	Vanadium (V) - mg/L	Zinc (Zn) - mg/L				Calcium (Ca) - mg/L	Magnesium (Mg) - mg/L	Sodium (Na) - mg/L	Potassium (K) - mg/L		Chloride (Cl) - mg/L	Sulfate (SO4) - mg/L	Hydroxide Alkalinity as CaCO3 - mg/L	Carbonate Alkalinity as CaCO3 - mg/L	Bicarbonate Alkalinity as CaCO3 - mg/L	Alkalinity - mg/L										
ANZECC Guideline - stock drinking water								**5**	**0.5**				**0.1**	**1**	**1**	**1**		**0.1**		**1**			**20**	**0.002**			**1000**						**1000**								**1500**	**400**		**4000**			
THUIN																																														
MW1	2-Jun-06		7.77	8.50	7.48				0.006																6330	92	138	1710	43		2680	424				772										
MW1	11-Jan-07		8.49	9.22	7.12				0.001				<0.0001	<0.005		<0.006		<0.001		0.026			0.11	<0.0001	2410	26	33	554	18		346	145				684										
MW1	18-Apr-07		6.77	7.50																																										
MW1	9-Jul-07		7.23	7.96	7.30	2440	17.4		<0.001				<0.0001	<0.005		0.0005		<0.001		0.008			0.09	<0.0001	2500	21	29	504	25		385	143				614							3.1	<20	380
MW1	10-Jul-07		7.18	7.91																																									
MW1	18-Jul-07		7.18	7.91																																									
MW1	7-Aug-07	1250	7.01	7.74																																									
MW1	22-Aug-07	1355	6.93	7.66																																									
MW1	5-Sep-07	1005	6.97	7.70																																									
MW1	24-Sep-07	1320	6.93	7.66																																									
MW1	11-Oct-07	1110	6.91	7.64																																									
MW1	26-Nov-07	1400	6.89	7.62																																									
MW1	29-Jan-08	1430	6.82	7.55																																									
MW1	4-Mar-08	1210	6.87	7.60																																									
MW1	23-Apr-08	1240	6.94	7.67	7.30	3100	21.3		<0.001				<0.00005	<0.01		0.002		0.0036		0.01			0.007	0.0002	3120	46	50	614	29		567	247				665								<0.025	0.027
MW1	21-Aug-08	1251	7.00	7.73																																									
MW1	29-Oct-08	1615	7.07	7.82	7.80	3430	21.6		0.001				0.00023	0.015		0.13		0.37		0.03			0.22	<0.0001	3500	44	51	670	32		680	210				690								<0.025	<0.100
MW1	29-Jan-09	1030	7.08	7.73																																									
MW1	17-Jun-09			7.87	7.20	5470	19.8		0.001	0.091	<0.001		<0.0001	0.013	0.001	0.047	0.71	0.008	0.103	0.009		<0.01	0.019	<0.0001	3870	46	61	762	28	41.2	777	167	<1	<1	725	725	39.9	1.58	<0.01				2320			
MW1	11-Sep-09	1344	7.23	7.90																																									
MW1	14-Dec-09	1000	7.23	7.90	7.5	4670	17.5	<0.01	0.001					<0.005		0.014	<0.05	0.001	0.131	0.038			0.048	<0.0001	7.83	4510	70	95	875	28	50.1	882	234	<1	<1	780	780	45.3	4.99		<0.01	0.2	0.2				
MW1	25-Feb-10	1025	7.17	7.84																																									
MW1	11-May-10	1045	7.46	8.13	7.56	4330	22.6		0.001	0.075	<0.001		0.0001	0.002	0.002	0.011	0.88	0.005	0.204	0.009		<0.01	0.012	<0.0001		4090	43	60	779	26	41.7	795	229	<1	<1	694	694	41	0.75	0.16				1850			
MW1	30-Aug-10	1010	7.47	8.14	7.47	3890	21.5																																							
MW1	9-Nov-10	1050	7.45	8.12	7.06	3170	24.6																																							
MW1	10-Mar-11	1310	7.38	8.05	7.1	3280	23.7	0.04	0.002					0.003		0.063	0.3	0.006	0.035	0.006			0.016	<0.0001	7.26	3650	44	62	771	29	41.6	839	210	<1	<1	658	658	41.2	0.49		<0.01	0.09	0.09				
MW1	6-Jun-11	1110	7.20	7.87	7.2	3110	19.9																																							
MW1	6-Sep-11	1050	7.19	7.86	7.09	3200	22.5	0.1	0.003	0.057	<0.001		0.0001	0.002	0.002	0.019	0.99	0.01	0.193	0.005		<0.01	0.014	<0.0001	7.72	3990	41	56	739	26	39.5	774	246	<1	<1	620	620	39.3	0.12	<0.01	<0.01	0.04	0.04	2080			
MW1	7-Dec-11	1020	7.09	7.76	7.16	3150	20.1																																							
MW1	13-Mar-12	1100	6.90	7.57	7.44	3140	21.9	0.12	<0.001	0.067	<0.001		<0.0001	0.003	<0.001	0.081	0.23	0.001	0.028	0.009		<0.01	0.027	<0.0001	7.78	3590	44	58	758	30	40.7	748	232	<1	<1	629	629	38.5	2.76	<0.01	<0.01	0.12	0.12	2040			
MW1	13-Jun-12	1100	6.53	7.20	7.37	3730	20.3																																							
MW1	4-Sep-12	1220	6.41	7.08	7.44	3340	20.8	0.03	<0.001	0.069	<0.001		<0.0001	0.005	<0.001	0.09	0.2	0.003	0.067	0.007		<0.01	0.067	<0.0001	7.8	3570	39	55	662	26	35.9	676	212	<1	<1	681	681	37.1	1.62	<0.01	<0.01	0.06	0.06	2090			
MW1	27-Nov-12	1020	6.25	6.92	7.54	3140	20.8																																							
MW1	20-Mar-13	1055	6.15	6.82	7.52	3180	21.9	0.05	0.002	0.055	<0.001		<0.0001	0.007	<0.001	0.1	0.25	0.008	0.031	0.016		<0.01	0.125	<0.0001	7.65	3400	35	48	700	25	36.8	575	182	<1	<1	690	690	33.8	4.2	0.08	<0.01	0.1	0.1	1830			
MW1	11-Jul-13	1040	6.18	6.85	7.49	3110	20.1																																							
MW1	5-Sep-13	1120	6.14	6.81	7.48	3040	21.4	0.15	<0.001	0.058	<0.001	0.06	<0.0001	0.003	<0.001	0.113	0.24	0.005	0.088	0.012	<0.01	<0.01	0.079	<0.0001	7.99	3330	31	44	677	27	35.3	586	205	<1	<1	672	672	34.2	1.52	0.02				1900			
MW1	22-Nov-13	1100	5.95	6.62	7.6	3140	20.8																																							
MW1	20-Feb-14	1100	6.08	6.75	7.5	3150	20.2	1.23	0.001	0.062	<0.001	<0.05	0.0004	0.023	0.001	0.487	2.49	0.031	0.073	0.016	<0.01	<0.01	0.624	<0.0001	7.65	3440	29	45	710	30	36.8	516	195	<1	<1	624	624	31.1	8.39	0.07				1800			
MW1	27-May-14	0950	6.25	6.92	7.6	3140	20.7																																							
MW1	9-Sep-14	1040	6.26	6.83	7.7	3220	20.2	0.13	0.002					0.01		0.058	0.53	0.006	0.077	0.009			0.098		7.97	3320	29	40	594	24	31.2	520	206	<1	<1	714	714	33.2	3.19		<0.01	0.17	0.17				
MW1	20-Nov-14	0945	6.36	7.03	7.7	3190	21.6																																							
MW1	26-Feb-15	1110	6.39	7.06	7.6	3170	27.7	0.08	0.001	0.056	<0.001		<0.0001	0.004	<0.001	0.045	0.3	0.003	0.078	0.009	<0.01	<0.01	0.118	<.0001	8	3420	34	45	634	22	33.5	551	210	<1	<1	739	739	34.7	1.71	0.05	<0.01	0.15	0.15	1700			
THUIN																																														
MW2	2-Jun-06		3.63	4.40	7				<0.001																5440	132	106	1400	14		2230	475				432										
MW2	11-Jan-07		3.85	4.62	6.8				0.002				0.0001										0.09	<0.0001		511	1	<1	101	1		25.1	9				176										
MW2	18-Apr-07		2.83	3.60																																										
MW2	9-Jul-07		3.39	4.16	7.15	446	18.8		0.002				0.0002	<0.005		0.003		<0.001		0.002			0.233	<0.0001		496	<1	<1	99	1		27.2	11				175							7.89	<20	250
MW2	10-Jul-07		3.45	4.22																																										
MW2	18-Jul-07		3.52	4.29																																										
MW2	7-Aug-07	1245	3.58	4.35																																									
MW2	22-Aug-07	1350	3.55	4.32																																									
MW2	5-Sep-07	1040	3.57	4.34																																									
MW2	24-Sep-07	1315	3.57	4.34																																									
MW2	11-Oct-07	1105	3.60	4.37																																									
MW2	26-Nov-07	1355	3.91	4.68																																									
MW2	29-Jan-08	1435	3.48	4.25																																									
MW2	4-Mar-08	1200	3.46	4.23																																									
MW2	23-Apr-08	1115	3.73	4.50	7.3	400	19.9		0.005				0.00018	0.11		0.13		0.14		0.15			0.37	0.0004		440	8.9	5.8	99	17		39	10				165								<0.025	<0.1
MW2	21-Aug-08	1244	3.74	4.51																																									
MW2	29-Oct-08	1655	3.59	4.37	6.9	600	19.2		0.008				0.00007	0.026		0.027		0.061		0.031			0.17	0.0002		620	6.8	7.1	120	6.8		93	27				180								<0.025	<0.100
MW2	29-Jan-09	1040	3.73	4.51																																									
MW2	17-Jun-09		3.69	4.53	7.7	660	19.1		0.006	0.311	0.004		0.0002	0.025	0.052	0.047	32.6	0.052	1.54	0.041		0.08	0.172	0.0005		602	1	1	128	2	5.76	59	<10	<1	<1	195	195	5.57	1.62	0.1				1540			
MW2	11-Sep-09	1348	4.01	4.8																																									
MW2	14-Dec-09	1100	3.72	4.51	7.7	691	18.3	<0.01	<0.001					<0.001		<0.001	<0.05	<0.001	0.018	<0.001			<0.005	<0.0001	7.5	640	2	1	134	2	6.07	55.3	12.8	<1	<1	202	202	5.86	1.73		<0.01	0.45	0.45				
MW2	25-Feb-10	1029	1.72	2.51																																									
MW2	11-May-10	1115	2.15	2.94	7.61	717	22.3		0.014	0.441	0.006		0.0002	0.071	0.058	0.073	88.3	0.071	1.06	0.094		0.13	0.3	0.0002		618	2	1	129	2	5.84	76.7	24.3	<1	<1	149	149	5.66	1.6	0.01				780			
MW2	30-Aug-10	1020	2.10	2.89	7.4	590	20.5																																							
MW2	9-Nov-10	1040	2.22	3.01	7.32	513	24.1																																							
MW2	10-Mar-11	1330	2.96	3.75	7.31	566	24.2	0.28	0.001					0.001		0.018	0.3	0.002	0.018	0.006			0.045	0.0001	7.23	457	2	2	124	2	5.69	69	24	<1	<1	156	156	5.57	1.02		<0.01	0.07	0.07				
MW2	6-Jun-11	1130	2.86	3.65	7.3	553	20.3																																							
MW2	6-Sep-11	1120	2.95	3.74	6.9	585	19.8	1.93	<0.001	0.016	<0.001		<0.0001	0.002	<0.001	0.005	1.76	0.001	0.028	0.003		<0.01	0.021	<0.0001	7.33	692	3	3	144	2	6.71	92	32	<1	<1	169	169	6.64	0.5	<0.01	<0.01	0.02	0.02	340			
MW2	7-Dec-11	1040	2.71	3.5	7.08	600	19.2																																							
MW2	13-Mar-12	1130	2.38	3.17	7.06	912	22	0.3	<0.001	0.012	<0.001		<0.0001	0.002	<0.001	0.002	0.28	<0.001	0.058	0.004		<0.01	0.01	<0.0001	7.41	1060	12	10	224	4	11.3	164	50	<1	<1	232	232	10.3	4.44	0.03	<0.01	0.05	0.05	640			
MW2	13-Jun-12	1120	3.13	3.92	7.02	1320	20																																							
MW2	4-Sep-12	1250	3.11	3.9	7.07	1260	19.7	3.48	0.001	0.034	<0.001		<0.0001	0.002	0.002	0.009	2.86	0.003	0.145	0.004		<0.01	0.075	0.0002	7.47	1310	20	17	252	5	13.5	221	68	<1	<1	319	319	14	1.99	<0.01	<0.01	0.06	0.06	802			

Sample Location	Date	Time	Depth to Ground - mbgl	Depth to Stand - mbtoc	Field Parameters			Total Metals																Mercury (Hg) - mg/L	pH - Lab	EC - Lab - µs/cm	Major Cations				Total Cations - meq/L	Major Anions						Total Anions - meq/L	Ionic Balance	Ammonia as Nitrogen (N)	Nitrite as N -mg/L	Nitrate as N - mg/L	Nitrite + Nitrate as N - mg/L	Total Dissolved Solids	Dissolved oxygen	TPH C6-C9	TPH C10-C36
					pH - Field	EC - Field - µs/cm	Temp - Field - °C	Aluminium (Al) - mg/L	Arsenic (As) - mg/L	Barium (Ba) - mg/L	Beryllium (Be) - mg/L	Boron (B) - mg/L	Cadmium (Cd) - mg/L	Chromium (Cr) - mg/L	Cobalt (Co) - mg/L	Copper (Cu) - mg/L	Iron (Fe) - mg/L	Lead (Pb) - mg/L	Manganese (Mn) - mg/L	Nickel (Ni) - mg/L	Selenium (Se) - mg/L	Vanadium (V) - mg/L	Zinc (Zn) - mg/L				Calcium (Ca) - mg/L	Magnesium (Mg) - mg/L	Sodium (Na) - mg/L	Potassium (K) - mg/L		Chloride (Cl) - mg/L	Sulfate (SO4) - mg/L	Hydroxide Alkalinity as CaCO3 - mg/L	Carbonate Alkalinity as CaCO3 - mg/L	Bicarbonate Alkalinity as CaCO3 - mg/L	Alkalinity - mg/L											
ANZECC Guideline - stock drinking water								**5**	**0.5**				**0.1**	**1**	**1**	**1**		**0.1**		**1**			**20**	**0.002**			**1000**						**1000**								**1500**	**400**		**4000**			
MW2	27-Nov-12	1035	3.42	4.21	7.29	905	19.1																																							
MW2	20-Mar-13	1115	2.82	3.61	7.39	670	22.7	1.3	0.002	0.022	<0.001		<0.0001	<0.001	0.004	0.036	0.88	0.006	0.293	0.005		<0.01	0.078	0.0002	6.9	686	3	3	150	3	7	95	26	<1	<1	179	179	6.8	1.41	0.04	<0.01	0.05	0.05	376			
MW2	11-Jul-13	1050	3.64	4.43	7.03	739	19.8																																							
MW2	5-Sep-13	1130	3.45	4.24	6.78	680	19.8	6.39	0.001	0.1	0.039	<0.001	<0.0001	0.005	0.002	0.037	5.54	0.006	0.134	0.006	<0.01	0.02	0.095	0.0002	7.46	674	2	2	142	3	6.52	83	28	<1	<1	173	173	6.38	1.01	0.04				389			
MW2	22-Nov-13	1120	3.68	4.47	6.9	694	19.4																																							
MW2	20-Feb-14	1120	3.72	4.51	7.4	675	21.2	1.32	0.001	0.06	0.012	<0.001	<0.0001	0.004	<0.001	0.055	1.32	0.006	0.058	0.004	<0.01	<0.01	0.08	<0.0001	7.01	694	2	2	155	3	7.08	85	27	<1	<1	171	171	6.38	5.2	<0.01				395			
MW2	27-May-14	10.20	3.35	4.14	7.4	618	20.9																																							
MW2	9-Sep-14	1040	3.48	4.29	7.6	845	21.4	14.8	0.004					0.01			11.8	0.01	0.22	0.012			0.086	<0.0001	7.27	615	<1	<1	131	2	5.75	57	19	<1	<1	219	219	6.38	5.25		<0.01	0.08	0.08				
MW2	20-Nov-14	1005	3.63	4.42	7.4	615	20.4																																							
MW2	26-Feb-15	1110	3.32	4.11	7.3	495	21.6	0.01	0.002	0.007	<0.001	0.05	<0.0001	<0.001	0.001	0.006	0.75	0.001	0.066	0.002	<0.01	<0.01	0.027	<0.0001	7.59	567	<1	<1	113	2	4.97	27	16	<1	<1	214	214	5.37	3.97	0.02	<0.01	0.02	0.02	306			
NAGERO																																													
MW3	2-Jun-06		15.08		7.65		20		<0.001																	1525	25	10	356	4		139	16				642									
MW3	15-Oct-06		15.71		7.85		23.1																			1534																				
MW3	11-Jan-07		15.89		7.66		24.9		<0.001					<0.001		0.006		<0.001		0.004						1600	19	7	381	4		127	4				696									
MW3	9-Jun-07		15.9		7.69		19.7		<0.001				<0.0001	<0.005		<0.001		<0.001		0.01			0.1			1028	15	5	389	3			3				673									
MW3	5-Oct-07		15.6		6.8		19.8																			1710																				
MW3	8-Jan-08		15.01		7.9		23.8																			1620																				
MW3	23-Apr-08		14.05		7.8		23.5																			1740																				
MW3	10-Jul-08		14.08		7.8		19																			1630																				
MW3	29-Oct-08		13.85		7.8		22.8																			1770																				
MW3	20-Jan-09		13.3		7.8		21.7																			1770																				
MW3	22-Apr-09		13.78		7.9		21.8																			1780																				
MW3	22-Jul-09		14.13		7.9		21.2																			1780																			890		
MW3	12-Nov-10		14.65		8		23.1																			1800																			890		
MW3	15-Feb-10		14.24		7.9	1440	21.5																			1440																			720		
MW3	16-Apr-10		13.21		8	1440	23.3																			1440																			720		
MW3	19-Jul-10		12.7		7.8	1700	20.3		0.002				<0.0001	<0.001		0.003	0.27	<0.001		0.003			0.013		7.93	1730	12	4	479	3	21.8	104	<1	<1	<1	871	871	20.3	3.56	0.17	<0.01	<0.01	<0.01		1020		
MW3	26-Oct-10		12.2		7.83	1730	21.7																																							
MW3	28-Jan-11		11.7		7.35	1750	26.1		0.001				<0.0001	<0.005		<0.001	0.16	<0.001		0.003			0.005		7.6	1740	10	4	436	3	19.8	108	<1	<1	<1	815	815	19.3	1.27	0.33	<0.01	<0.01	<0.01				
MW3	2-May-11		11.92		8.05	1760	22.2																																							
MW3	18-Jul-11		11.95		7.9	1760	20.8		<0.001				0.0001	0.003		<0.001	<0.005	<0.001		0.004			0.017		7.96	1840	11	4	3	454	20.7	104	<1	<1	<1	798	798	18.9	4.55	0.33	<0.01	0.02	0.02	1060			
MW3	24-Oct-11		12.1		8.08	1810	23.5																																							
MW3	18-Jan-12		11.25		6.86	1670	23.6		0.002				<0.0001	0.004		0.001	0.49	<0.001		0.007			0.02		7.63	1690	29	9	5	410	20.2	112	40	<1	<1	715	715	18.3	4.82	0.14	<0.01	<0.01	<0.01				
MW3	1-May-12		10.4		7.18	1840	22.5																																							
MW3	23-Jul-12		9.9		7.56	1700	20.6		<0.001			<0.0001	0.001		<0.001	<0.05	<0.001		0.004		0.01				8.05	1730	19	5	398	4	18.8	104	35	<1	<1	765	765	19	0.52	0.31	<0.01	0.02	0.02	1010			
MW3	23-Oct-12		9.84		7.66	1900	21.7																																						1020			
MW3	7-Mar-13		10.02		7.25	1650	21.9		0.001			<0.0001	0.008		0.001	0.17	<0.001		0.013		0.022				7.68	1830	18	5	470	4	21.9	103	31	<1	<1	815	815	19.8	4.79	0.17	<0.01	<0.01	<0.01	1190			
MW3	16-May-13		10.12		7.78	1730	20.7																																							
MW3	21-Aug-13		10.23		7.57		20.1		0.003			<0.0001	<0.001		<0.001	<0.05	<0.001		0.002		0.008				7.93	2020	12	4	504	4	23	284	52	<1	<1	592	592	20.9	4.58	0.23	<0.01	<0.01	<0.01				
MW3	14-Nov-13		10.39		8.13	1820	23.6																																							
MW3	3-Feb-14		10.3		8.41	1.87	23.3		0.001			<0.0001	<0.001		0.002	<0.05	<0.001		0.002		0.013				7.76	2140	17	5	464	4	21.5	319	60	<1	<1	477	477	19.8	4.23	0.12	<0.01	0.12	0.12				
MW3	17-Jul-14		10.00		7.98				0.001				<0.0001	0.001		<0.001	<0.05	<0.001		0.002			0.013		7.98	2150	14	5	485	3	22.3	353	67	<1	<1	436	436	20.1	5.2	0.2	<0.01	0.04	0.04	1060			
MW3	29-Jan-15		10.47		7.92				0.001				<0.0001	<0.001		0.001	<0.05	<0.001		0.002			0.026		7.92	2050	17	5	436	3	20.3	369	74	<1	<1	398	398	19.9	0.96	0.2	<0.01	0.02	0.02				
TARRAWONGA																																													
MW4	2-Jun-06		8.8	9.5	7				0.006																	3290	157	118	614	19		905	155				1010									
MW4	9-Sep-06		8.6	9.3																																										
MW4	11-Jan-07		8.67	9.37	7.06				0.004				0.0003	<0.005		0.011		0.029		0.014			0.1	<0.0001		3430	152	103	594	17		787	143				1050									
MW4	9-Jul-07		9.13	9.83	6.82	5410	18.9		0.001				0.0004	<0.005		0.008		0.011		0.011			0.13	<0.0001		5400	211	166	829	16		1480	235				989						0.6	<20	330	
MW4	18-Jul-07		9.18	9.88																																									
MW4	7-Aug-07	1305	9.17	9.87																																									
MW4	22-Aug-07	1340	9.17	9.87																																									
MW4	5-Sep-07	1000	9.21	9.91																																									
MW4	24-Sep-07	1310	9.03	9.73																																									
MW4	11-Oct-07	1055	8.97	9.67																																									
MW4	26-Nov-07	1350	9.06	9.76																																									
MW4	29-Jan-08	1425	9.1	9.8																																									
MW4	4-Mar-08	1150	9.17	9.87																																									
MW4	4-Apr-08	1220	9.15	9.85																																									
MW4	23-Apr-08	1015	9.18	9.88	7.1	5160	18		0.004				0.0015	0.042		0.29		0.44		0.16			0.62	0.001		4960	210	158	802	21		1240	317				995							<0.025	<0.1	
MW4	21-Aug-08	1230	9.31	10.01																																									
MW4	29-Oct-08	1740	9.28	9.98	7	5740	22.2		0.001				0.00009	0.008		0.008		0.18		0.016			0.2	<0.0001		5800	220	170	840	23		1400	280				980							<0.025	<0.100	
MW4	29-Jan-09	0900	9.29	9.96																																									
MW4	17-Jun-09			10.05	6.8	5400	21.5		0.007	1.16	0.003		0.0004	0.023	0.015	0.207	24.9	0.106	1.82	0.055		0.04	0.278	0.0004		4920	189	147	755	16	54.8	1160	156	<1	<1	977	977	55.6	0.8	<0.01				2980			
MW4	28-Aug-09	1215	9.48	10.1																																									
MW4	14-Dec-09	0900	9.52	10.14	6.94	5060	25.6	<0.01	0.001					<0.005		0.001	<0.05	<0.001	0.671	0.016			0.114	<0.0001	7.35	5040	187	149	746	16	54.5	64.1	31.6	<1	<1	783	783	45.3	3.41		0.02	0.45	0.48				
MW4	25-Feb-10	1330	9.68	10.3																																									
MW4	11-May-10	1000	9.66	10.28	7.58	5660	21.8		0.012	1.84	0.006		0.0006	0.033	0.03	0.17	25.3	0.138	1.26	0.096		0.08	0.238	0.0002		5210	149	115	821	14	53	1180	200	<1	<1	942	942	56.2	3.01	0.02				3120			
MW4	30-Aug-10	0940	9.69	10.31	7.33	4740	20																																							
MW4	9-Nov-10	0940	9.61	10.23	6.9	3810	24.4																																							
MW4	10-Mar-11	1130	9.31	9.93	7.18	3060	24.9	0.77	<0.001					0.005		0.084	1.08	0.15	0.188	0.014			0.801	<0.0001	7.37	3460	78	63	741	11	41.6	730	87	<1	<1	893	893	40.2	1.61		0.04	0.38	0.41				
MW4	6-Jun-11	1000	9.42	10.04	7.25	3080	18.7																																							
MW4	6-Sep-11	0950	9.46	10.08	7.12	3196	21	0.65	<0.001	0.146	<0.001		<0.0001	0.001	0.002	0.008	0.7	0.006	0.175	0.006		<0.01	0.418	<0.0001	7.77	3910	74	58	702	10	39.3	700	104	<1	<1	861	861	39.1	0.15	0.2	<0.01	0.43	0.43				
MW4	7-Dec-11	0940	9.35	9.97	7.1	3180	20.5																																							

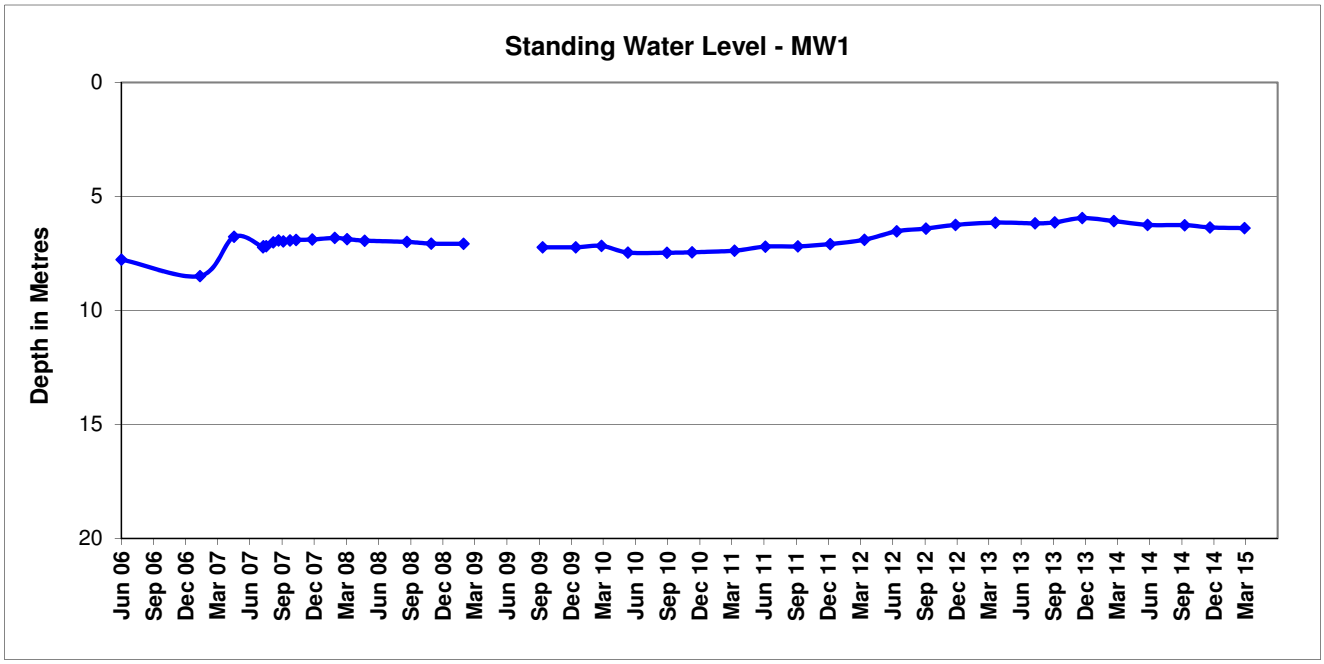
Sample Location	Date	Time	Depth to Ground - mbgl	Depth to Stand - mbtoc	Field Parameters			Total Metals																Mercury (Hg) - mg/L	pH - Lab	EC - Lab - µs/cm	Major Cations				Total Cations - meq/L	Major Anions						Total Anions - meq/L	Ionic Balance	Ammonia as Nitrogen (N)	Nitrite as N -mg/L	Nitrate as N - mg/L	Nitrite + Nitrate as N - mg/L	Total Dissolved Solids	Dissolved oxygen	TPH C6-C9	TPH C10-C36
					pH - Field	EC - Field - µs/cm	Temp - Field - °C	Aluminium (Al) - mg/L	Arsenic (As) - mg/L	Barium (Ba) - mg/L	Beryllium (Be) - mg/L	Boron (B) - mg/L	Cadmium (Cd) - mg/L	Chromium (Cr) - mg/L	Cobalt (Co) - mg/L	Copper (Cu) - mg/L	Iron (Fe) - mg/L	Lead (Pb) - mg/L	Manganese (Mn) - mg/L	Nickel (Ni) - mg/L	Selenium (Se) - mg/L	Vanadium (V) - mg/L	Zinc (Zn) - mg/L				Calcium (Ca) - mg/L	Magnesium (Mg) - mg/L	Sodium (Na) - mg/L	Potassium (K) - mg/L		Chloride (Cl) - mg/L	Sulfate (SO4) - mg/L	Hydroxide Alkalinity as CaCO3 - mg/L	Carbonate Alkalinity as CaCO3 - mg/L	Bicarbonate Alkalinity as CaCO3 - mg/L	Alkalinity - mg/L											
ANZECC Guideline - stock drinking water								**5**	**0.5**				**0.1**	**1**	**1**	**1**		**0.1**		**1**			**20**	**0.002**			**1000**						**1000**								**1500**	**400**		**4000**			
MW4	13-Mar-12	0940	9.36	9.98	7.6	2580	22.1	0.16	<0.001	0.159	<0.001		<0.0001	<0.001	<0.001	0.01	0.3	<0.001	0.017	0.004		<0.01	0.27	<0.001	8.01	3690	90	64	759	13	43.1	700	103	<1	<1	898	898	39.8	3.92	<0.01	<0.01	0.85	0.85	2130			
MW4	13-Jun-12	0935	9.22	9.84	7.52	3850	20.6																																							
MW4	4-Sep-12	1120	9.11	9.73	7.72	3410	21.8	0.07	<0.001	0.167	<0.001		<0.0001	<0.001	<0.001	0.058	0.44	0.005	0.116	0.007		<0.01	0.513	<0.0001	7.98	3770	82	65	664	12	38.6	674	108	<1	<1	962	962	40.5	2.37	0.02	0.02	1.04	1.06	2170			
MW4	27-Nov-12	0920	8.94	9.56	7.74	3440	21.7																																							
MW4	20-Mar-13	0945	8.92	9.54	7.53	3420	21.6	0.27	0.001	0.156	<0.001		<0.0001	0.011	<0.001	0.05	0.4	0.006	0.158	0.01		<0.01	0.338	<0.0001	7.65	3730	104	73	672	12	40.7	652	49	<1	<1	880	880	37	4.78	0.02	<0.01	1.68	1.68	2020			
MW4	11-Jul-13	940	8.87	9.49	7.76	3410	20.9																																							
MW4	5-Sep-13	950	8.83	9.45	7.63	3560	21.8	0.21	<0.001	<0.05	0.182	<0.001	0.0002	0.001	0.005	0.144	0.68	0.018	0.282	0.008	<0.01	<0.01	0.453	<0.0001	7.99	3950	110	81	704	15	43.2	745	110	<1	<1	908	908	41.4	2	0.09				2260			
MW4	22-Nov-13	940	8.61	9.23	7.6	3720	21.7																																							
MW4	24-Feb-14	940	8.74	9.36	7.6	3920	21.4	0.14	<0.001	<0.05	0.166	<0.001	0.0003	0.005	<0.001	0.128	1.22	0.006	0.116	0.007	<0.01	<0.01	0.444	<0.0001	7.98	3890	93	78	644	15	39.5	676	113	<1	<1	875	875	38.9	0.68	0.06				2010			
MW4	27-May-14	930	8.78	9.4	7.6	3840	21.3																																							
MW4	9-Sep-14	0940	8.76	9.38	7.2	4090	20.5	0.13	<0.001					0.003		0.057	0.86	0.007	0.235	0.008			0.334	<0.0001	7.83	4170	108	79	597	11	38.1	679	118	<1	<1	1020	1020	42	4.83		0.2	0.54	0.74				
MW4	20-Nov-14	0930	8.72	9.34	7.3	3970	21.8																																							
MW4	26-Feb-15	930	8.71	9.33	7.3	4030	21.6	0.13	<0.001	0.159	<0.001	<0.05	<0.0001	0.002	0.002	0.033	3.4	0.02	0.373	0.007	<0.01	<0.01	0.244	<0.0001	7.7	4430	131	107	687	14	45.6	786	132	<1	<1	1090	1090	46.7	1.23	0.18	0.01	0.97	0.98	2200			
TEMPLEMORE																																														
MW5	2-Jun-06		2.78	3.4	6.9				0.006																	1530	17	13	373	6		169	138				472										
MW5	9-Sep-06		2.98	3.6																																										
MW5	11-Jan-07		3.56	4.18	7.25				0.003				<0.0001	<0.001		<0.001		<0.001		0.013			0.09			4870	44	49	1070	13		1060	435				836										
MW5	18-Apr-07		2.98	3.6																																									
MW5	10-Jul-07		3.85	4.47	7.59	1360	19.7		0.002				<0.0001	<0.005		0.001		<0.001		0.009			0.111	<0.0001		1930	14	15	13	5		291	161				380								1.32	<20	3490
MW5	18-Jul-07		3.87	4.49																																									
MW5	7-Aug-07	1230	3.92	4.54																																									
MW5	22-Aug-07	1500	3.88	4.5																																									
MW5	5-Sep-07	1200	3.84	4.46																																									
MW5	24-Sep-07	1410	3.86	4.48																																									
MW5	11-Oct-07	1200	3.91	4.53																																									
MW5	26-Nov-07	1515	3.94	4.56																																									
MW5	29-Jan-08	1520	3.06	3.68																																									
MW5	4-Mar-08	1405	3.01	3.63																																									
MW5	4-Apr-08	1200	3.07	3.69																																									
MW5	23-Apr-08	1500	3.15	3.77	7.9	3550	19.9		0.012				0.00017	0.006		0.027		0.054		0.042			0.11	<0.0001		3260	29	33	696	13		553	332				630										
MW5	21-Aug-08	1305	3.10	3.72																																									
MW5	29-Oct-08	1840	2.97	3.59	7.3	3300	19.1		0.008				<0.00005	0.005		0.004		0.018		0.007			0.028	<0.0001		3400	21	24	640	11		560	290				680									<0.025	0.57
MW5	29-Jan-09	1050	3.12	3.73																																									
MW5	17-Jun-09		3.33	4.18	7.7	2390	19.6		0.012	0.054	<0.001		<0.0001	0.002	0.003	0.02	1.66	0.019	0.586	0.006		<0.01	0.105	<0.0001		2120	13	15	485	8	23.2	315	120	<1	<1	486	486	21.1	4.6	0.07				1370			
MW5	14-Sep-09	1314	3.52	4.32																																									
MW5	14-Dec-09	1200	3.76	4.56	7.21	6900	28.4	0.04	0.016					<0.001		0.002	0.19	<0.001	1.4	0.022			0.078	<0.0001	7.44	7460	9	106	1870	28	91	1720	678	<1	<1	1110	1110	84.9	3.44		<0.01	<0.01	<0.01				
MW5	25-Feb-10	1035	2.91	3.71																																									
MW5	11-May-10	1145	3	3.8	7.73	6590	22		0.032	0.426	0.001		0.009	0.024	0.032	0.07	23	0.068	1.59	0.071		0.05	0.277	<0.0001		5920	38	70	1210	17	60.5	1260	491	<1	<1	838	838	62.4	1.53	0.1				3630			
MW5	30-Aug-10	1210	2.6	3.4	7.85	1740	22.8																																							
MW5	9-Nov-10	1115	2.48	3.28	7.35	2620	24.1																																							
MW5	10-Mar-11	1400	2.51	3.31	7.39	1917	25.2	0.81	0.01					0.001		0.03	0.79	0.007	0.64	0.003			0.139	<0.0001	7.69	1980	11	13	474	8	22.4	396	150	<1	<1	416	416	22.6	0.49		<0.01	0.11	0.11				
MW5	6-Jun-11	1200	2.47	3.27	7.45	1032	20.8																																							
MW5	6-Sep-11	1240	2.7	3.5	7.39	1910	22.6	6.24	0.012	0.051	<0.001		<0.0001	0.004	0.001	0.006	4.1	0.004	0.081	0.005		<0.01	0.032	<0.0001	7.89	2310	10	11	501	7	23.4	385	177	<1	<1	427	427	23.1	0.6	0.11	<0.01	0.04	0.04	1360			
MW5	7-Dec-11	1100	1.96	2.76	7.36	2275	20.5																																							
MW5	13-Mar-12	1320	1.28	2.08	7.52	1110	25.1	1.91	0.006	0.027	<0.001		<0.0001	0.002	<0.001	0.005	1.2	<0.001	0.122	0.003		0.01	0.02	<0.0001	7.78	1250	8	7	292	5	13.8	262	45	<1	<1	269	269	13.7	0.33	<0.01	<0.01	0.43	0.43	736			
MW5	13-Jun-12	1150	1.58	2.38	7.81	977	20.3																																							
MW5	4-Sep-12	1320	1.46	2.26	7.63	1980	20.1	7.89	0.016	0.056	<0.001		<0.0001	0.004	<0.001	0.014	5.13	0.007	0.073	0.004		<0.01	0.086	<0.0001	7.92	2120	9	11	473	8	22.1	380	146	<1	<1	439	439	22.5	0.93	<0.01	<0.01	<0.01	<0.01	1400			
MW5	27-Nov-12	1105	1.84	2.64	7.65	2650	22.5																																							
MW5	20-Mar-13	1300	1.94	2.74	7.54	1430	24.7	0.53	0.011	0.029	<0.001		<0.0001	0.002	<0.001	0.054	0.56	0.008	0.33	0.004		<0.01	0.158	<0.0001	7.61	1520	7	8	321	6	15.1	236	46	<1	<1	323	323	14.1	3.57	0.08	<0.01	0.06	0.06	956			
MW5	11-Jul-13	1120	2.26	3.06	7.62	846	21.5																																							
MW5	5-Sep-13	1200	2.45	3.25	7.55	1640	21.8	4.62	0.011	0.12	0.038	<0.001	<0.0001	0.003	<0.001	0.062	3.25	0.009	0.07	0.004	<0.01	<0.01	0.118	<0.0001	8.07	1810	5	7	406	8	18.7	287	115	<1	<1	396	396	18.4	0.73	0.02				1040			
MW5	22-Nov-13	1155	2.76	3.56	7.7	2430	21.1																																							
MW5	20-Feb-14	1145	3.01	3.81	7.9	1790	22.7	2.6	0.014	<0.05	0.039	<0.001	0.0004	0.01	0.002	0.166	2.68	0.024	0.232	0.007	<0.01	<0.01	0.46	<0.0001	7.77	1850	7	8	394	6	18.3	282	111	<1	<1	377	377	17.8	1.34	<0.01				964			
MW5	27-May-14	11.50	2.77	3.57	7.7	925	22.5																																							
MW5	9-Sep-14	1500	2.80	3.6	7.7	2130	20.5	12.7	0.014					0.009		0.059	8.81	0.016	0.379	0.019			0.141	<0.0001	7.99	2200	7	8	462	8	21.3	319	159	<1	<1	476	476	21.8	1.23		0.02	0.65	0.67				
MW5	20-Nov-14	1240	3.00	3.8	7.8	3020	22.3																																							
MW5	26-Feb-15	1155	3.18	3.97	7.8	1890	23.7	1.18	0.01	0.026	<0.001	<0.05	<0.0001	<0.001	<0.001	0.005	0.74	<0.001	0.044	0.002	<0.01	<0.01	0.04	<0.0001	8.15	2060	5	6	399	6	18.2	299	130	<1	<1	433	433	19.8	4.09	0.01	<0.01	0.14	0.14	1060			
NAGERO																																														
MW6	2-Jun-06		8.34	9	7.3				<0.001																	2030	59	29	440	8		308	55				720										
MW6	9-Sep-06		8.84	9.5																																										
MW6	11-Jan-07		9.15	9.81	6.89				<0.001				<0.0001	<0.005		<0.001		<0.001		0.011			0.08	<0.0001		2030	62	30	426	7		252	51				724										
MW6	10-Jul-07		9.37	10.03	7.5	2060	18.1		0.0005				0.00005	0.0025		0.001		0.0005		0.004			0.01	0.00005		2000	58	27	411	8		283	47				666								5.99		
MW6	18-Jul-07		9.35	10.01																																									
MW6	7-Aug-07	1105	9.32	9.98																																									
MW6	22-Aug-07	1320	9.29	9.95																																									
MW6	5-Sep-07	1110	9.31	9.97																																									
MW6	24-Sep-07	1250	9.07	9.73																																									
MW6	11-Oct-07	1035	9.16	9.82																																									
MW6	26-Nov-07	1325	9.17	9.83																																									
MW6	29-Jan-08	1400	9.06	9.72																																									
MW6	4-Mar-08	1125	8.815	9.475																																									
MW6	22-Apr-08	1700	8.62	9.28	7.1	2000	21.1		0.001				<0.00005	0.001		0.002		0.0031		0.006			0.005	<0.0001		2120	64	29	391	9.8		273	51				670									<0.025	<0.1
MW6	21-Aug-08	1051	8.545	9.205																																									
MW6	29-Oct-08	1530	8.48	9.15	7.1	2050	23.9		0.001				0.00005	0.003		0.003		0.077		0.004			0.034	<0.0001		2100	60	27	380	8.5		280	50				680									<0.025	0.18

Sample Location	Date	Time	Depth to Ground - mbgl	Depth to Stand - mbtoc	Field Parameters			Total Metals																Mercury (Hg) - mg/L	pH - Lab	EC - Lab - µs/cm	Major Cations					Major Anions							Total Anions - meq/L	Ionic Balance	Ammonia as Nitrogen (N)	Nitrite as N -mg/L	Nitrate as N - mg/L	Nitrite + Nitrate as N - mg/L	Total Dissolved Solids	Dissolved oxygen	TPH C6-C9	TPH C10-C36
					pH - Field	EC - Field - µs/cm	Temp - Field - °C	Aluminium (Al) - mg/L	Arsenic (As) - mg/L	Barium (Ba) - mg/L	Beryllium (Be) - mg/L	Boron (B) - mg/L	Cadmium (Cd) - mg/L	Chromium (Cr) - mg/L	Cobalt (Co) - mg/L	Copper (Cu) - mg/L	Iron (Fe) - mg/L	Lead (Pb) - mg/L	Manganese (Mn) - mg/L	Nickel (Ni) - mg/L	Selenium (Se) - mg/L	Vanadium (V) - mg/L	Zinc (Zn) - mg/L				Calcium (Ca) - mg/L	Magnesium (Mg) - mg/L	Sodium (Na) - mg/L	Potassium (K) - mg/L	Total Cations - meq/L	Chloride (Cl) - mg/L	Sulfate (SO4) - mg/L	Hydroxide Alkalinity as CaCO3 - mg/L	Carbonate Alkalinity as CaCO3 - mg/L	Bicarbonate Alkalinity as CaCO3 - mg/L	Alkalinity - mg/L											
ANZECC Guideline - stock drinking water								**5**	**0.5**				**0.1**	**1**	**1**	**1**		**0.1**		**1**			**20**	**0.002**			**1000**						**1000**									**1500**	**400**		**4000**			
MW6	29-Jan-09	1010	8.33	9.1																																										
MW6	14-Sep-09	1246	8.65	9.43																																										
MW6	14-Dec-09	1130	8.86	9.64	7.13	2112	23.4	<0.01	<0.001					<0.005		<0.001	<0.05	0.002	0.336	0.008			0.01	<0.0001	7.3	2100	56	26	385	8	21.9	252	39.4	<1	<1	652	652	21	2.24		0.02	0.53	0.55				
MW6	25-Feb-10	1010	8.84	9.62																																										
MW6	11-May-10	1515	8.3	9.08	7.56	2360	21.5		<0.001	0.193	<0.001		<0.0001	0.002	0.002	0.002	2.13	0.006	0.278	0.003		<0.01	0.008	<0.0001		2030	56	26	380	7	21.6	261	42.2	<1	<1	645	645	21.1	1.14	<0.01				1160			
MW6	30-Aug-10	1230	8	8.78	7.2	1927	23.8																																							
MW6	9-Nov-10	1015	7.72	8.5	7.03	1835	24.3																																							
MW6	10-Mar-11	1220	7.41	8.19	7.08	1783	24	0.15	<0.001					0.002		0.034	0.32	0.015	0.047	0.003			0.216	<0.0001	7.53	1790	55	27	406	9	22.9	293	42	<1	<1	627	627	21.7	2.61		0.03	0.97	1				
MW6	6-Jun-11	1040	7.44	8.22	7.15	1670	19.6																																							
MW6	6-Sep-11	1020	Piezo damaged																																											
MW6	7-Dec-11	1000	Piezo damaged																																											
MW6	13-Mar-12	1030	5.74	6.52	7.49	1840	23.4	0.15	<0.001	0.125	<0.001		<0.0001	0.002	<0.001	0.009	0.12	0.001	0.013	0.004		<0.01	0.071	<0.0001	7.68	1980	55	24	390	9	21.9	262	46	<1	<1	624	624	20.8	2.54	<0.01	<0.01	1.44	1.44	1150			
MW6	13-Jun-12	1025	5.87	6.65	7.45	2040	21.3																																							
MW6	4-Sep-12	1150	5.58	6.36	7.82	1840	22	0.09	<0.001	0.143	<0.001		<0.0001	<0.001	<0.001	0.012	0.18	0.003	0.013	0.003		<0.01	0.072	<0.0001	8.08	1990	53	25	381	8	21.5	276	39	<1	<1	681	681	22.2	1.69	<0.01	<0.01	1.13	1.13	1210			
MW6	27-Nov-12	0950	5.55	6.33	7.6	1817	21.1																																							
MW6	20-Mar-13	1025	5.75	6.53	7.46	343	22.8	0.49	0.001	0.037	<0.001		<0.0001	0.003	<0.001	0.081	0.56	0.009	0.095	0.006		0.02	0.402	<0.0001	7.43	351	12	3	49	8	3.18	16	28	<1	<1	106	106	3.15	0.44	0.23	0.1	0.6	0.7	252			
MW6	11-Jul-13	1020	5.88	6.66	7.62	452	20.8																																							
MW6	5-Sep-13	1105	5.96	6.74	7.21	465	21.3	0.86	<0.001	0.08	0.038	<0.001	<0.0001	0.002	<0.001	0.075	0.93	0.006	0.058	0.005	<0.01	0.02	0.151	<0.0001	7.8	496	18	3	75	10	4.66	25	60	<1	<1	132	132	4.59	0.74	0.09				327			
MW6	22-Nov-13	1255	5.85	6.63	7.2	486	20.8																																							
MW6	24-Feb-14	1050	5.84	6.62	7.8	215	22.1	0.48	<0.001	<0.05	0.02	<0.001	<0.0001	0.008	0.001	0.045	0.5	0.004	0.094	0.005	<0.01	0.02	0.185	<0.0001	7.51	212	8	1	29	8	1.95	5	26	<1	<1	66	66	2		0.35				182			
MW6	27-May-14	12.40	5.64	6.42	7.5	360	22.1																																							
MW6	9-Sep-14	1010	5.54	6.32	7.6	845	21.4	1.63	0.002					0.005		0.006	1.55	0.016	0.154	0.012			0.13	<0.0001	7.61	854	24	7	140	8	8.07	83	46	<1	<1	274	274	8.77	4.22		<0.01	<0.01	<0.01				
MW6	20-Nov-14	1140	5.55	6.33	7.5	712	21.6																																							
MW6	26-Feb-15	1040	5.64	6.43	7.6	543	22.2	0.13	<0.01	0.036	<0.01	<0.05	<0.0001	0.001	<0.001	0.012	0.32	0.002	0.059	0.007	<0.01	<0.01	0.238	<0.0001	7.67	617	25	5	89	10	5.79	43	42	<1	<1	173	173	5.54	2.11	0.06	<0.01	0.62	0.62	353			
TARRAWONGA MINE																																															
MW7	2-Jun-06		73.47	74.3	7.2				0.002																	2250	45	43	536	12		202	34				1100										
MW7	9-Sep-06		79.67	80.5																																										
MW7	11-Jan-07		76.17	77	7.32				<0.001				<0.0001	<0.005		<0.001		<0.001		0.005			0.05	<0.0001		1960	23	36	459	8		189	22				935										
MW7	18-Apr-07		76.07	76.9																																									
MW7	10-Jul-07		77.06	77.89	7.24	2250	18.7		<0.001				<0.0001	<0.005		0.001		<0.001		0.018			0.106	<0.0001		2270	35	36	458	10		170	23				998							4.38	<20	410
MW7	18-Jul-07		77.1	77.93																																									
MW7	7-Aug-07	1340	78.29	79.12																																									
MW7	22-Aug-07	1430	78.45	79.28																																									
MW7	5-Sep-07	1140	78.6	79.43																																									
MW7	24-Sep-07	1350	78.56	79.39																																									
MW7	11-Oct-07	1140	78.72	79.55																																									
MW7	26-Nov-07	1440	79.34	80.17																																									
MW7	29-Jan-08	1500	79.8	80.63																																									
MW7	4-Mar-08	1335	80.27	81.10																																									
MW7	22-Apr-08	1200	80.85	81.68	7.6	2440	21.9		<0.001				0.00014	0.004		0.033		0.25		0.017			0.12	<0.0001		2370	52	45	483	11		188	5				1050										
MW7	21-Aug-08	1526	83.74	84.57																																									
MW7	29-Oct-08	0915	85.99	86.81	7.4	2310	24.8		0.001				0.00006	0.005		0.014		0.088		0.009			0.099	<0.0001		2300	48	44	470	13		180	24				990								<0.025	0.3
MW7	28-Jan-09	1615	86.99	87.8																																									
MW7	17-Jun-09	0915	86.45	87.5	7.4	2440	20.7		<0.001	0.2	<0.001		<0.0001	0.001	<0.001	0.057	0.43	0.054	0.047	0.007		<0.01	0.13	<0.0001		2280	46	44	481	11	27.1	169	16	<1	<1	1050	1050	26.1	1.96	0.17				1430			
MW7	27-Aug-09	1225	89.99	91.04																																									
MW7	23-Dec-09	1355	89.53	90.58	7.55	2230	27.4	0.03	<0.001					<0.001		0.002	0.26	0.004	0.075	0.007			0.015	<0.0001	7.49	2240	5	46	556	9	28.5	182	17.1	<1	<1	1050	1050	26.5	3.58		<0.01	<0.01	<0.01				
MW7	25-Feb-10	1355	89.64	90.69																																									
MW7	11-May-10	1400	89.85	90.9	8.32	2950	23.9		<0.001	0.227	<0.001		<0.0001	<0.001	<0.001	0.009	1.5	0.046	0.11	0.017		<0.01	0.054	<0.0001		2330	42	41	478	9	26.5	182	15.9	<1	<1	1010	1010	25.6	1.72	0.45				1380			
MW7	30-Aug-10	1400	90.48	91.53	7.52	2385	24.7																																							
MW7	10-Nov-10	0900	90.38	91.43	7.47	2010	26																																							
MW7	14-Mar-11	1210	90.95	92	7.24	2075	26.2	0.2	<0.001					<0.001	0.094		0.74	0.036	0.155	0.01			0.274	<0.0001	7.57	2220	41	41	493	11	27.1	225	23	<1	<1	951	951	25.8	2.43		<0.01	0.07	0.07				
MW7	21-Jun-11	1400	91.31	92.36	7.55	2180	22.3																																							
MW7	8-Sep-11	0950	92.49	93.54	7.35	2160	22.5	0.09	0.001	0.18	<0.001		<0.0001	<0.001	<0.001	0.006	0.41	0.028	0.059	0.007		<0.01	0.047	<0.0001	7.84	2550	10	36	545	10	27.4	255	29	<1	<1	936	936	26.5	1.66	0.55	<0.01	0.02	0.02	1510			
MW7	9-Dec-11	1000	93.89	94.94	7.7	2200	26.8																																							
MW7	19-Mar-12	1345	95.05	96.10	7.25	2460	24.9	0.31	<0.001	0.186	<0.001		<0.0001	0.002	<0.001	0.032	0.61	0.065	0.059	0.009		<0.01	0.085	<0.0001	7.82	2650	35	34	622	11	31.9	321	45	<1	<1	991	991	29.8	3.34	0.52	<0.01	0.03	0.03	1590			
MW7	14-Jun-12	1040	97.70	98.75	7.6	2900	23.6																																							
MW7	6-Sep-12	1150	98.95	100.00	7.33	2730	25.2	0.52	0.002	0.205	<0.001		<0.0001	0.002	<0.001	0.088	2.84	0.114	0.057	0.005		<0.01	0.19	<0.0001	7.93	2840	18	21	678	8	32.3	342	50	<1	<1	1140	1140	33.5	1.79	0.61	<0.01	0.05	0.05	1760			
MW7	28-Nov-12	0945	101.99	103.04																																									
MW7	20-Mar-13	1200	102.49	103.54																																									
MW7	11-Jul-13	1315	103.65	104.7																																									
MW7	5-Sep-13	1325	103.65	104.7																																									
MW7	22-Nov-13	1025	103.43	104.48																																									
MW7	20-Feb-14	1000	103.55	104.6																																									
MW7	27-May-14	1310	103.96	105.01																																									
MW7	9-Sep-14	1300	103.84	104.89																																									
MW7	20-Nov-14	1040	104.01	105.06																																									
MW7	26-Feb-15	1300	104.09	105.14																																									
TARRAWONGA MINE																																															
MW8	2-Jun-06		13.06	13.8	6.7				<0.001																	2240	161	48	298	9		426	46				588										
MW8	9-Sep-06		13.16	13.9																																										
MW8	11-Jan-07		13.41	14.15	6.7				<0.001				<0.0001	<0.005		0.002		0.001		0.007			0.16	<0.0001		2260	180	53	319	7		411	80				587										
MW8	18-Apr-07		12.86	13.6																																									
MW8	9-Jul-07		13.62	14.36	6.8	2530	18.9		<0.001				<0.0001	<0.005		0.005		0.004		0.006			0.102	<0.0001		2610	196	55	308	8		483	80				616							7.77	<20	250
MW8	18-Jul-07		13.67	14.41																																									

Sample Location	Date	Time	Depth to Ground - mbgl	Depth to Stand - mbtoc	Field Parameters			Total Metals																Mercury (Hg) - mg/L	pH - Lab	EC - Lab - µs/cm	Major Cations				Total Cations - meq/L	Major Anions						Total Anions - meq/L	Ionic Balance	Ammonia as Nitrogen (N)	Nitrite as N -mg/L	Nitrate as N - mg/L	Nitrite + Nitrate as N - mg/L	Total Dissolved Solids	Dissolved oxygen	TPH C6-C9	TPH C10-C36
					pH - Field	EC - Field - µs/cm	Temp - Field - °C	Aluminium (Al) - mg/L	Arsenic (As) - mg/L	Barium (Ba) - mg/L	Beryllium (Be) - mg/L	Boron (B) - mg/L	Cadmium (Cd) - mg/L	Chromium (Cr) - mg/L	Cobalt (Co) - mg/L	Copper (Cu) - mg/L	Iron (Fe) - mg/L	Lead (Pb) - mg/L	Manganese (Mn) - mg/L	Nickel (Ni) - mg/L	Selenium (Se) - mg/L	Vanadium (V) - mg/L	Zinc (Zn) - mg/L				Calcium (Ca) - mg/L	Magnesium (Mg) - mg/L	Sodium (Na) - mg/L	Potassium (K) - mg/L		Chloride (Cl) - mg/L	Sulfate (SO4) - mg/L	Hydroxide Alkalinity as CaCO3 - mg/L	Carbonate Alkalinity as CaCO3 - mg/L	Bicarbonate Alkalinity as CaCO3 - mg/L	Alkalinity - mg/L											
ANZECC Guideline - stock drinking water								**5**	**0.5**				**0.1**	**1**	**1**	**1**		**0.1**		**1**			**20**	**0.002**			**1000**						**1000**						**1500**	**400**		**4000**			
MW8	7-Aug-07	1325	13.66	14.4																																								
MW8	22-Aug-07	1415	13.66	14.4																																								
MW8	5-Sep-07	1130	13.72	14.46																																								
MW8	24-Sep-07	1340	13.64	14.38																																								
MW8	11-Oct-07	1120	13.63	14.37																																								
MW8	26-Nov-07	1410	13.69	14.43																																								
MW8	29-Jan-08	1445	13.54	14.28																																								
MW8	4-Mar-08	1220	13.56	14.3																																								
MW8	22-Apr-08				Bore blocked no sample																																								
MW8	21-Aug-08	1510	13.78	14.52																																								
MW8	29-Oct-08	1030	13.85	14.59	Bore blocked no sample																																								
MW8	28-Jan-09	1600	13.85	14.6																																								
MW8	17-Jun-09		14.02	14.77	Unable to sample - casing blocked																																								
MW8	27-Aug-09	1145	14.02	14.77																																								
MW8	23-Dec-09	1415	14.1	14.85	Unable to sample - casing blocked																																								
MW8	25-Feb-10	1520	13.8	14.55																																								
MW8	11-May-10	1440	13.72	14.47	Unable to sample - casing blocked																																								
MW8	30-Aug-10	1420	13.71	14.46	Unable to sample - casing blocked																																								
MW8	9-Nov-10	1255	13.74	14.49	Unable to sample - casing blocked																																								
MW8	14-Mar-11	1120	14.12	14.87	Unable to sample - casing blocked																																								
MW8	21-Jun-11	1420	13.62	14.37	Unable to sample - casing blocked																																								
MW8	8-Sep-11	1030	13.80	14.55	Unable to sample - casing blocked																																								
MW8	9-Dec-11	1040	13.24	13.99	Unable to sample - casing blocked																																								
MW8	14-Mar-12	1235	12.57	13.32	Unable to sample - casing blocked																																								
MW8	14-Jun-12	1115	12.76	13.51	Blocked 3.2 down pipe																																								
MW8	6-Sep-12	1220	12.63	13.38	Blocked 3.2 down pipe																																								
MW8	28-Nov-12	1005	12.79	13.54	Blocked about 3m down pipe																																								
MW8	20-Mar-13	1230	12.68	13.43	Blocked 3.2 down pipe																																								
MW8	11-Jul-13	1230	12.95	13.7																																								
MW8	5-Sep-13	1300	13.00	13.75																																								
MW8	22-Nov-13	1045	13.01	13.76																																								
MW8	20-Feb-14	1040	13.07	13.82																																								
MW8	27-May-14	1330	13.00	13.75																																								
MW8	9-Sep-14	1240	13.13	13.88																																								
MW8	20-Nov-15	1110	13.22	13.97																																								
MW8	26-Feb-15	1315	13.27	14.02																																								
TEMPLEMORE																																													
GW044997	2-Jun-06		6.19	6.4	6.9				0.001																	3000	112	102	544	4		758	170				768									
GW044997	11-Jan-07		6.62	6.83	6.95				0.009				<0.0001	<0.005		0.001		<0.001		0.002			0.04	<0.0001		1570	45	36	298	1		200	55				495									
GW044997	10-Jul-07		6.7	6.91	7.06	785	17.1		0.009				0.0002	<0.005		0.001		<0.001		0.001			0.088	<0.0001		1590	46	41	270	1		211	84				441						9	<20	740
GW044997	18-Jul-07		6.73	6.94																																								
GW044997	7-Aug-07	1130	6.79	7																																								
GW044997	22-Aug-07	1505	6.76	6.97																																								
GW044997	5-Sep-07	1205	6.83	7.04																																								
GW044997	24-Sep-07	1415	6.62	6.83																																								
GW044997	11-Oct-07	1210	6.73	6.94																																								
GW044997	26-Nov-07	1525	7.05	7.26																																								
GW044997	29-Jan-08	1525	6.44	6.65																																								
GW044997	4-Mar-08	1410	6.23	6.44																																								
GW044997	4-Apr-08	1140	6.295	6.505																																								
GW044997	22-Apr-08	1615	6.31	6.52	7	3370	21.8		0.007				<0.00005	<0.001		0.005		0.0003		0.012			0.008	<0.0001		3150	135	125	461	1.7		656	276				585								<0.025	<0.1
GW044997	21-Aug-08	1410	6.81	7.02																																								
GW044997	29-Oct-08	1815	6.86	7.06	Bore blocked, no sample																																								
GW044997	29-Jan-09	1130	7	7.2																																								
GW044997	17-Jun-09		7.52	7.77	7.1	3580	18.9		0.066	0.523	<0.001		0.0003	0.001	0.002	0.134	46.9	0.016	0.204	0.006		0.09	0.327	0.0001		3350	112	111	486	8	36	626	132	<1	<1	693	693	34.2	2.53	2.93			2020			
GW044997	28-Aug-09	1240	7.85	8.05																																								
GW044997	23-Dec-09	1130	7.97	8.17	6.95	3050	24.2	0.02	0.008					<0.001		0.005	0.07	<0.0010	0.021	0.004			0.065	<0.0001	6.87	3050	40	118	546	3	35.5	636	203	<1	<1	517	517	32.5	4.4		0.22	21	21.2				
GW044997	25-Feb-10	1040	7.81	8.01																																								
GW044997	11-May-10	1200	7.98	8.18	7.49	3720	22.7		0.018	0.258	<0.001		<0.0001	<0.001	<0.001	0.014	7.2	0.002	0.04	0.006		0.04	0.048	<0.0001		3480	114	119	434	2	34.4	640	192	<1	<1	593	593	33.9	0.66	2.03			1770			
GW044997	30-Aug-10	1120	7.91	8.11	6.82	3720	22.2																																						
GW044997	9-Nov-10	1140	7.8	8	6.8	3010	24.2																																						
GW044997	14-Mar-11	1040	7.25	7.45	6.83	1670	25.9	0.04	0.002					<0.001		0.013	<0.05	<0.001	0.004	<0.001			0.032	<0.0001	7.15	1620	131	67	160	2	19.1	333	87	<1	<1	410	410	19.4	0.84		<0.01	1.8	1.8				
GW044997	6-Jun-11	1320	8.02	8.22	7.3	1514	16.8																																						
GW044997	6-Sep-11	1220	8.73	8.93	6.98	1525	16.7	0.05	0.002	0.174	<0.001		<0.0001	<0.001	<0.001	0.01	<0.05	<0.001	0.007	<0.001		0.02	0.047	<0.0001	7.64	1830	122	58	174	2	18.5	308	110	<1	<1	400	400	19	1.31	0.51	<0.01	1.43	1.43	1000			
GW044997	7-Dec-11	1130	8.32	8.52	7.27	1545	20.6																																						
GW044997	13-Mar-12	1230	5.1	5.3	No sample - pump not operational																																								
GW044997	14-Jun-12	940	5.18	5.38																																								
GW044997	6-Sep-12	1100	4.8	5	7.95	1750	17.5	0.02	0.002	0.128	<0.001		<0.0001	<0.001	<0.001	0.011	0.07	<0.001	0.005	<0.001		0.01	0.027	<0.0001	7.69	1840	120	56	211	2	19.8	323	147	<1	<1	409	409	20.3	1.29	0.05	<0.01	5	5	1130			
GW044997	27-Nov-12	1145	5.04	5.24	7.61	1665	24.6																																						
GW044997	21-Mar-13	1230	5.78	5.98																																								
GW044997	11-Jul-13	1205	6.37	6.57																																								
GW044997	5-Sep-13	1145	6.65	6.85																																								
GW044997	22-Nov-13	1140	6.87	7.07																																								
GW044997	20-Feb-14	1205	6.93	7.13																																								
GW044997	27-May-14	1210	8.05	8.25																																								
GW044997	9-Sep-14	1120	7.99	8.19																																								
GW044997	20-Nov-14	1215	8.56	8.76																																								

Sample Location	Date	Time	Depth to Ground - mbgl	Depth to Stand - mbtoc	Field Parameters			Total Metals																		Mercury (Hg) - mg/L	pH - Lab	EC - Lab - µs/cm	Major Cations					Major Anions							Total Anions - meq/L	Ionic Balance	Ammonia as Nitrogen (N)	Nitrite as N -mg/L	Nitrate as N - mg/L	Nitrite + Nitrate as N - mg/L	Total Dissolved Solids	Dissolved oxygen	TPH C6-C9	TPH C10-C36
					pH - Field	EC - Field - µs/cm	Temp - Field - °C	Aluminium (Al) - mg/L	Arsenic (As) - mg/L	Barium (Ba) - mg/L	Beryllium (Be) - mg/L	Boron (B) - mg/L	Cadmium (Cd) - mg/L	Chromium (Cr) - mg/L	Cobalt (Co) - mg/L	Copper (Cu) - mg/L	Iron (Fe) - mg/L	Lead (Pb) - mg/L	Manganese (Mn) - mg/L	Nickel (Ni) - mg/L	Selenium (Se) - mg/L	Vanadium (V) - mg/L	Zinc (Zn) - mg/L				Calcium (Ca) - mg/L	Magnesium (Mg) - mg/L	Sodium (Na) - mg/L	Potassium (K) - mg/L	Total Cations - meq/L	Chloride (Cl) - mg/L	Sulfate (SO4) - mg/L	Hydroxide Alkalinity as CaCO3 - mg/L	Carbonate Alkalinity as CaCO3 - mg/L	Bicarbonate Alkalinity as CaCO3 - mg/L	Alkalinity - mg/L												
ANZECC Guideline - stock drinking water								**5**	**0.5**				**0.1**	**1**	**1**	**1**		**0.1**		**1**			**20**	**0.002**			**1000**					**1000**									**1500**	**400**		**4000**			
GW044997	26-Feb-15	1355	8.61	8.81																																										
AMBARDO																																																
GW031856	2-Jun-06		15.76	16.4	7.3				<0.001				<0.0001	<0.001		0.036		0.001		0.001			0.126	<0.0001		1150	50	33	156	3		105	22				459								<20	<50
GW031856	11-Jan-07		19.1	19.74	7.27	910	23.1		<0.001				<0.0001	<0.005		0.005		<0.001		<0.001			<0.005	<0.0001		1080	47	30	164	3		75	18				457							3.37	<20	<50
GW031856	10-Jul-07		15.51	16.15	7.9	1080	13.5		<0.001				<0.0001	<0.005		0.008		0.0005		0.0005			2.29	0.00005		1180	48	34	162	3		94.8	20				440							3.11	10	25
GW031856	22-Apr-08	1650			7.4	1090	19.8		0.001				<0.00005	<0.001		0.008		0.0004		0.003			0.048	<0.0001		1060	50	33	145	3.6		106	18				480								<0.025	<0.1
GW031856	29-Oct-08	1225																																												
GW031856	10-Feb-09	0915	17.85	18.49	7.3	1090	26.9		0.002				<0.00005	0.003		0.009		0.0006		0.002			0.26	<0.0001		1100	51	30	150	2.8		81	19				440								<0.025	<0.025
GW031856	17-Jun-09	1005			7.4	1170	20.1		0.001	0.156	<0.001		<0.0001	<0.001	<0.001	0.004	0.06	<0.001	0.001	<0.001		<0.01	0.037	<0.0001		1110	51	33	149	3	11.8	92	15	<1	<1	453	453	12	0.52	<0.01				704			
GW031856	11-Sep-09	1330	15.51	16.28																																										
GW031856	23-Dec-09	1450	18.4		7.73	1029	29.3	0.01	0.001					<0.001		0.001	<0.05	0.001	0.012	0.001			0.205	<0.0001	7.45	1060	40	34	169	3	12.2	92.2	17.4	<1	<1	422	422	11.4	3.24		<0.01	0.14	0.14			
GW031856	25-Feb-10	1245	16.31	16.91	7.61	1240	25.3	<0.01	0.001					<0.005		0.002	<0.05	<0.001	0.001	<0.001			0.014	<0.0001	7.54	1110	47	34	160	3	12.2	90.8	17.6	<1	<1	436	436	11.6	2.42		<0.01	0.19	0.19			
GW031856	11-May-10	1310	16.58	17.18	8.2	1292	14.9		<0.001	0.15	<0.001		0.0002	<0.001	<0.001	0.116	<0.05	0.006	<0.001	<0.001		<0.01	0.51	<0.0001		1140	49	32	154	3	11.9	91.8	16.8	<1	<1	431	431	11.5	1.45	0.02				576			
GW031856	30-Aug-10	1310	15.35	15.95	7.35	1106	18.2	<0.01	<0.001					<0.001		0.008	<0.05	<0.001	0.009	<0.001			1.88	<0.0001	7.33	1140	49	33	159	3	12.2	98	20	<1	<1	426	426	11.7	1.99		<0.01	0.24	0.24			
GW031856	10-Nov-10	1310	15.52	16.12	7.08	990	27.8	<0.01	0.001					<0.005		0.014	<0.05	<0.001	0.004	<0.001			1.26	<0.0001	7.42	1160	22	33	163	3	11	103	18	<1	<1	440	440	12.1	4.84		<0.01	0.2	0.2			
GW031856	14-Mar-11	1250	19.71	20.31	7.19	945	26.5	<0.01	<0.001					0.001		0.004	<0.05	<0.001	<0.001	<0.001			0.015	<0.0001	7.46	887	45	30	151	3	11.4	92	20	<1	<1	414	414	11.3	0.4		<0.01	0.2	0.2			
GW031856	7-Jun-11	1430	16.08	16.68	7.35	929	19.2																																								
GW031856	9-Sep-11	1150	15.49	16.09	7.33	970	17	<0.01	<0.001	0.146	<0.001		<0.0001	<0.001	<0.001	0.005	<0.05	<0.001	<0.001	0.001		<0.01	1.25	<0.0001	7.71	1120	52	35	161	3	12.6	109	22	<1	<1	412	412	11.8	3.22	<0.01	<0.01	0.16	0.16	620			
GW031856	7-Dec-11	1230	15.65	16.25	7.64	940	20.9																																							
GW031856	19-Mar-12	1150	15.1	15.7	7.27	1070	24.3	0.02	0.002	0.161	<0.001		<0.0001	0.002	<0.001	0.012	0.06	<0.001	0.002	<0.001		0.02	0.034	<0.0001	7.82	1110	53	34	155	3	12.3	106	23	<1	<1	421	421	11.9	1.55	<0.01	<0.01	0.27	0.27	666			
GW031856	14-Jun-12	1210	16.04	16.64	7.57	1170	25.1																																							
GW031856	19-Sep-12	1040	16.6	17.2	7.39	1060	21.2	0.01	0.001	0.176	<0.001		<0.0001	<0.001	<0.001	0.012	0.29	0.002	0.004	<0.001		0.01	0.027	<0.0001	7.84	1160	48	33	158	4	12.1	115	21	<1	<1	410	410	11.9	0.86	<0.01	<0.01	0.17	0.17	670			
GW031856	27-Nov-12	1230	16	16.6	7.43	1048	25.4																																							
GW031856	21-Mar-13	1300	15.7	16.3	7.42	1020	24.2	<0.01	0.001	0.166	<0.001		<0.0001	0.003	<0.001	0.027	<0.05	0.006	0.005	<0.001		0.01	0.193	<0.0001	7.78	1100	49	32	157	3	12	90	21	<1	<1	435	435	11.7	1.31	<0.01	<0.01	0.22	0.22	640			
GW031856	11-Jul-13	850	17.47	18.07	7.54	1064	19.6																																							
GW031856	5-Sep-13	915	17.2	17.8	7.56	1070	19.2	<0.01	<0.001	<0.05	0.141	<0.001	<0.0001	<0.001	<0.001	0.005	0.06	<0.001	0.002	<0.001	<0.01	<0.01	0.017	<0.0001	7.92	1130	49	33	158	4	12.1	100	20	<1	<1	432	432	11.9	1.08	<0.01				660			
GW031856	22-Nov-13	900	15.88	16.48	7.6	1120	24.9																																							
GW031856	24-Feb-14	1020	15.1	15.7	7.7	1120	24.5	<0.01	0.001	<0.05	0.156	<0.001	<0.0001	<0.001	<0.001	0.007	<0.05	<0.001	<0.001	<0.001	<0.01	0.01	0.138	<0.0001	7.84	1150	48	32	155	3	11.8	99	22	<1	<1	430	430	11.8	<0.01	0.02				684			
GW031856	27-May-14	1050	15.20	15.8	7.5	1097	20.1																																							
GW031856	9-Sep-14	900	14.70	15.3	7.3	1120	18	<0.01	0.002					0.002		0.006	0.12		<0.001	<0.001			0.056	<0.0001	7.82	1140	46	30	142	3	11	101	23	<1	<1	388	388	11.1	0.31		<0.01	0.2	0.2			
GW031856	20-Nov-14	0845	15.87	16.47	7.2	1120	24.5																																							
GW031856	26-Feb-15	1000	15.6	16.2	7.5	1090	25.6	<0.01	0.001	0.143	<0.001	<0.05	<0.0001	<0.001	<0.001	<0.001	<0.05		<0.001	0.001	<0.01	0.01	0.197	<0.0001	7.94	1220	48	33	150	3	11.7	99	22	<1	<1	478	478	12.8	4.47	0.02	<0.01	0.21	0.21	570			
TARRAWONGA																																															
GW052266	2-Jun-06		7.67	8.1	7.9				<0.001							<0.001		<0.001		<0.001						1360	17	13	301	5		134	65				488									
GW052266	11-Jan-07		8.94	9.37	7.58				<0.001				<0.0001	<0.005		<0.001		<0.001		<0.001			0.02	<0.0001		1950	45	29	389	8		362	126				457									
GW052266	10-Jul-07		7.92	8.35	8.01	1330	13.3		<0.001				<0.0001	<0.005		<0.001		<0.001		<0.001			0.01	<0.0001		1480	23	14	315	6		170	79				435							10.61	<20	250
GW052266	18-Jul-07		7.97	8.4																																										
GW052266	7-Aug-07	1300	7.94	8.37																																									
GW052266	22-Aug-07	1335	7.95	8.38																																									
GW052266	5-Sep-07	0955	8.02	8.45																																									
GW052266	24-Sep-07	1305	7.92	8.35																																									
GW052266	11-Oct-07	1050	7.9	8.33																																									
GW052266	26-Nov-07	1345	8	8.43																																									
GW052266	29-Jan-08	1420	8.01	8.44																																									
GW052266	4-Mar-08	1145	8.04	8.47																																									
GW052266	4-Apr-08	1210	8	8.43																																									
GW052266	22-Apr-08	0915	8.04	8.47	7.2	1230	20.6		<0.001				<0.00005	<0.001		<0.001		0.0002		0.006			<0.005	<0.0001		1250	94	48	110	4.5		131	19				465								<0.025	<0.1
GW052266	21-Aug-08	1225	5.86	6.29																																										
GW052266	29-Oct-08	1725			8.7	1600	28.4		<0.001				<0.00005	0.002		0.001		0.0003		<0.001			0.013	0.0006		1600	19	17	270	6.5		220	93				450								<0.025	<0.100
GW052266	28-Aug-09	1205	9.7	10.13																																										
GW052266	14-Dec-09	0840	11.3	11.35	7.4	922	23.3	<0.01	0.003					<0.001		0.003	<0.05	<0.001	0.006	0.003			0.018	<0.0001	7.51	838	55	16	84	<1	7.72	64.1	31.6	<1	<1	252	252	7.51	1.36		<0.01	6.09	6.09			
GW052266	25-Feb-10	1320	10.44	10.49																																										
GW052266	11-May-10	0940	10.43	10.48	8.23	954	18.6		0.002	0.078	<0.001		<0.0001	<0.001	<0.001	0.002	0.54	0.002	0.017	0.004		0.01	0.024	<0.0001		813	54	16	80	<1	7.52	68.3	34	<1	<1	241	241	7.46	0.42	0.05				446			
GW052266	16-Aug-10	1450	9.71	10.21	7.4	860	18.7																																							
GW052266	9-Nov-10	0900	10.53	10.58	6.98	817	24.1																																							
GW052266	10-Mar-11	1045	10.51	11.01	7.04	786	23.5	0.15	0.004					<0.001		0.024	1.28	0.002	0.034	0.001			0.103	<0.0001	7	640	53	17	94	1	8.2	72	34	<1	<1	262	262	7.98	1.34		0.34	4.32	4.66			
GW052266	6-Jun-11	0930	10.19	10.24	7.05	663	20.2																																							
GW052266	6-Sep-11	0920	10.51	10.56	6.94	714	20.2	0.96	0.003	0.106	<0.001		<0.0001	0.002	<0.001	0.009	2.63	0.002	0.085	0.008		0.02	0.061	<0.0001	7.48	823	57	16	90	<1	8.08	71	38	<1	<1	260	260	7.99	0.53	0.14	<0.01	6.35	6.35	464			
GW052266	7-Dec-11	0910	10.55	10.60	6.95	705	20.6																																							
GW052266	13-Mar-12	0900	9.18	9.23	7.04	784	21.6	0.03	0.002	0.086	<0.001		<0.0001	<0.001	<0.001	0.113	0.1	0.003	0.005	0.012		0.02	0.15	<0.0001	7.54	821	57	17	99	<1	8.55	68	37	<1	<1	267	267	8.44	0.65	<0.01	<0.01	5.92	5.92	498			
GW052266	13-Jun-12	900	8.38	8.43	7.05	837	20.4																																							
GW052266	4-Sep-12	1040	7.91	7.96	7.41	780	22.4	0.04	0.003	0.078	<0.001		<0.0001	<0.001	<0.001	0.018	0.92	0.002	0.03	<0.001		0.01	0.068	<0.0001	7.56	802	50	17	93	<1	7.94	76	32	<1	<1	260	260	8	0.42	0.07	0.01	5.53	5.54	562			
GW052266	27-Nov-12	0850	8.00	8.05	7.28	750	22																																							
GW052266	20-Mar-13	0915	9.24	9.29	7.18	740	21.4	0.02	0.004	0.072	<0.001		<0.0001	<0.001	<0.001	0.034	0.16	0.002	0.007	0.001		0.01	0.176	<0.0001	7.13	798	54	17	89	<1	7.97	80	28	<1	<1	244	244	7.71	1.58	0.02	<0.01	5.9	5.9	326			
GW052266	11-Jul-13	0920	7.79	7.84	7.25	822	18.1																																							
GW052266	5-Sep-13	935	8.29	8.34	7.09	590	22.4	1.02	0.002	<0.05	0.091	<0.001	<0.0001	0.004	0.002	0.324	1.72	0.006	0.036	0.009	<0.01	0.02	0.19	<0.0001	7.62	782	48	16	95	<1	7.84	73	35	<1	<1	238	238	7.54	1.94	<0.01				493			
GW052266	22-Nov-13	0920	7.84	7.89	7.2	670	21.8																																							
GW052266	24-Feb-14	910	7.74	7.79	7	727	21.2	0.2	0.002	<0.05	0.072	<0.001	<0.0001	0.001	<0.001	0.112	0.86	0.007	0.03	0.003	<0.01	0.01	0.152	<0.0001	7.48	737	42	14	83	<1	6.86	66	33	<1	<1	203	203	6.6	1.87	0.05				514			
GW052266	27-May-14	900	7.68	7.73	7.2	692	20.6																																							
GW052266	9-Sep-14	920	7.73	7.78	7.4	684	20.6	0.22	0.0001					<0.001		0.007	3.63	<0.001	0.318	0.003			0.048	<0.0001	7.83	693	34	12	82	<1	6.25	66	34	<1	<1	222	222	7.01	4.83		<0.01	1.75	1.75			
GW052266	20-Nov-14	0910	7.77	7.82	7.2	748	21.5																																							
GW052266	26-Feb-15	900	7.51	7.56	7.2	752	21.6	0.44	0.006	0.086	<0.001	<0.05	<0.0001	0.001	0.001	0.012	22.9	0.002	0.141	0.008	<0.01	0.03	0.214	<0.0001	7.13	800	47	15	89	1	7.48	62	81	<1	<1	168	168	9.56	14.2	0.54	0.74	5.12	5.86	430			

Sample Location	Date	Time	Depth to Ground - mbgl	Depth to Stand - mbtoc	Field Parameters			Total Metals																Mercury (Hg) - mg/L	pH - Lab	EC - Lab - µs/cm	Major Cations				Total Cations - meq/L	Major Anions						Total Anions - meq/L	Ionic Balance	Ammonia as Nitrogen (N)	Nitrite as N -mg/L	Nitrate as N - mg/L	Nitrite + Nitrate as N - mg/L	Total Dissolved Solids	Dissolved oxygen	TPH C6-C9	TPH C10-C36
					pH - Field	EC - Field - µs/cm	Temp - Field - °C	Aluminium (Al) - mg/L	Arsenic (As) - mg/L	Barium (Ba) - mg/L	Beryllium (Be) - mg/L	Boron (B) - mg/L	Cadmium (Cd) - mg/L	Chromium (Cr) - mg/L	Cobalt (Co) - mg/L	Copper (Cu) - mg/L	Iron (Fe) - mg/L	Lead (Pb) - mg/L	Manganese (Mn) - mg/L	Nickel (Ni) - mg/L	Selenium (Se) - mg/L	Vanadium (V) - mg/L	Zinc (Zn) - mg/L				Calcium (Ca) - mg/L	Magnesium (Mg) - mg/L	Sodium (Na) - mg/L	Potassium (K) - mg/L		Chloride (Cl) - mg/L	Sulfate (SO4) - mg/L	Hydroxide Alkalinity as CaCO3 - mg/L	Carbonate Alkalinity as CaCO3 - mg/L	Bicarbonate Alkalinity as CaCO3 - mg/L	Alkalinity - mg/L											
ANZECC Guideline - stock drinking water								**5**	**0.5**				**0.1**	**1**	**1**	**1**		**0.1**		**1**			**20**	**0.002**			**1000**						**1000**								**1500**	**400**		**4000**			
TEMPLEMORE A																																																
Templemore A	18-Jul-07		8.61	9.07																																											
Templemore A	7-Aug-07	1135	11.33	11.79																																											
Templemore A	22-Aug-07	1515	12.08	12.54																																											
Templemore A	5-Sep-07	1208	12.09	12.55																																											
Templemore A	24-Sep-07	1420	12.22	12.68																																											
Templemore A	11-Oct-07	1215	12.08	12.54																																											
Templemore A	26-Nov-07	1530	12.09	12.55																																											
Templemore A	29-Jan-08	1540	12.05	12.51																																											
Templemore A	4-Mar-08	1420	12.07	12.53																																											
Templemore A	4-Apr-08	1145	9.16	9.62																																											
Templemore A	21-Aug-08	1325	8.68	9.14																																											
Templemore A	29-Jan-09	1118	7.84	8.3																																											
Templemore A	17-Jun-09		8.65	9.39	7.7	1640	19.7		0.003	0.132	<0.001		<0.0001	<0.001	<0.001	0.021		0.002	0.247	0.002		<0.01	0.02	<0.0001	0.16	1500	165	42	106	1	16.3	228	56	<1	<1	426	426	16.1	0.7	0.01				1000			
Templemore A	28-Aug-09	1242	8.92	9.4																																											
Templemore A	23-Dec-09	1110	10.1	10.58	7.2	1473	24	<0.01	0.002					<0.001		0.007	<0.05	<0.001	0.013	0.001			0.025	<0.0001	7.54	1400	72	41	125	1	12.4	246	79	<1	<1	241	241	13.6	4.61		0.07	3.25	3.32				
Templemore A	25-Feb-10	1055	9.16	9.64																																											
Templemore A	11-May-10	1230	9.12	9.6	7.92	1083	21.2		0.004	0.21	<0.001		0.0001	<0.001	<0.001	0.011	0.11	<0.001	1.9	0.006		0.01	0.019	<0.0001		1600	152	38	105	3	15.4	241	68.3	<1	<1	376	376	15.7	1.13	3.1				906			
Templemore A	30-Aug-10	1100	9.19	9.67	7.77	1590	22.1																																								
Templemore A	9-Nov-10	1130	9.24	9.72	7.67	1485	23.7																																								
Templemore A	14-Mar-11	1020	9.44	9.92	7.35	1486	24.8	0.02	0.003					<0.001		0.011	0.76	<0.001	3.31	0.005			0.079	<0.0001	7.56	1420	175	41	120	4	17.4	297	49	<1	<1	402	402	17.4	0.03		<0.01	0.09	0.09				
Templemore A	6-Jun-11	1255	9.36	9.84	7.45	1392	20.2																																								
Templemore A	6-Sep-11	1150	9.5	9.98	7.61	1395	21.8	0.08	0.004	0.266	<0.001		<0.0001	<0.001	<0.001	0.004	0.1	<0.001	1.81	0.004		<0.01	0.033	<0.0001	8.04	1670	169	41	120	3	17.1	285	62	<1	<1	405	405	17.4	0.9	1.37	0.12	0.46	0.58	790			
Templemore A	9-Dec-11	1120		No access to well - paddock flooded																																											
Templemore A	13-Mar-12	1200	2.7	3.18	7.62	960	22.9	0.1	0.003	0.093	<0.001		<0.0001	<0.001	<0.001	<0.001	0.11	<0.001	0.006	<0.001		<0.01	0.023	<0.0001	7.79	988	92	25	74	8	10.1	103	59	<1	<1	222	222	9.98	0.6	0.04	0.01	19.7	19.7	578			
Templemore A	13-Jun-12	1250	3.28	3.76	7.31	826	20.2																																								
Templemore A	6-Sep-12	1000	3.59	4.07	7.32	816	20.1	0.05	0.002	0.071	<0.001		<0.0001	<0.001	<0.001	0.017	0.09	<0.001	0.008	<0.001		<0.01	0.026	<0.0001	7.67	820	80	22	54	4	8.25	103	66	<1	<1	203	203	8.34	0.48	<0.01	<0.01	2.79	2.79	500			
Templemore A	27-Nov-12	1130	3.85	4.33	7.42	812	21.1																																								
Templemore A	21-Mar-13	1210	4.31	4.79	7.67	943	21.8	1.68	0.003	0.114	<0.001		0.0001	0.001	0.001	0.142	2.56	0.01	0.501	0.005		<0.01	0.279	<0.0001	7.75	1020	97	24	60	9	9.66	116	74	<1	<1	242	242	9.65	0.06	2.75	3.32	0.18	3.5	614			
Templemore A	11-Jul-13	1120	5.34	5.82	7.68	1162	19.2																																								
Templemore A	5-Sep-13	1220	4.29	4.77	7.57	1150	20.4	0.07	0.003	<0.05	0.119	<0.001	<0.0001	<0.001	<0.001	0.068	0.12	0.003	0.688	0.003	<0.01	<0.01	0.103	<0.0001	7.96	1240	119	30	93	5	12.6	175	96	<1	<1	284	284	12.6	0.1	0.07				765			
Templemore A	22-Nov-13	1215	7.5	7.98	7.7	1189	19.8																																							
Templemore A	20-Feb-14	1220	4.41	4.89	7.7	1110	20.7	0.23	0.004	<0.05	0.1	<0.001	<0.0001	0.001	<0.001	0.105	0.75	0.012	0.432	0.005	<0.01	<0.01	0.204	<0.0001	7.71	1150	104	27	80	6	11	150	84	<1	<1	272	272	11.4	1.63	4.83				669			
Templemore A	27-May-14	1130	4.57	5.05	7.6	1281	20																																							
Templemore A	9-Sep-14	1210	4.31	4.79	7.8	1150	19.3	0.02	0.004					<0.001		0.012	0.86	<0.001	0.011	<0.001			0.031	<0.0001	7.98	1190	105	26	78	2	10.8	164	98	<1	<1	272	272	12	5.3		<0.01	2.6	2.6				
Templemore A	20-Nov-14	1300	4.78	5.26	7.9	1117	21.2																																							
Templemore A	26-Feb-15	1340	5.27	5.75	7.9	1100	23.7	0.2	0.003	0.079	<0.001	<0.05	<0.0001	<0.001	<0.001	0.015	0.22	<0.001	0.1	0.002	<0.01	<0.01	0.064	<0.0001	7.69	1210	109	27	84	4	11.4	157	105	<1	<1	242	242	12.9	13.7	0.73	0.14	0.3	0.44	674			
TEMPLEMORE B																																																
Templemore B	18-Jul-07		9.89	9.89																																											
Templemore B	7-Aug-07	1145	8.14	8.14																																											
Templemore B	22-Aug-07	1525	8.31	8.31																																											
Templemore B	5-Sep-07	1211	8.17	8.17																																											
Templemore B	24-Sep-07	1425	8.05	8.05																																											
Templemore B	11-Oct-07	1220	8.09	8.09																																											
Templemore B	26-Nov-07	1535	7.9	7.9																																											
Templemore B	29-Jan-08	1545	8.13	8.13																																											
Templemore B	4-Mar-08	1425	8.44	8.44																																											
Templemore B	4-Apr-08	1150	8.42	8.42																																											
Templemore B	21-Aug-08	1329	10.55	10.55																																											
Templemore B	29-Jan-09	1145	15.5	15.5																																											
Templemore B	17-Jun-09		9.49	9.63	7.3	1810	19.5		0.002	0.145	<0.001		<0.0001	<0.001	<0.001	0.055	<0.05	<0.001	0.008	<0.001		0.01	0.052	<0.0001		1700	118	52	175	2	17.9	240	106	<1	<1	419	419	17.4	1.46	<0.01				1080			
Templemore B	28-Aug-09	1250	12.69	12.83																																											
Templemore B	23-Dec-09	1040	15.84	15.98	6.75	1491	24.4	<0.01	0.003					<0.001		0.022	<0.05	<0.001	0.003	0.002			0.068	<0.0001	7.44	1420	31	31	221	2	13.8	196	134	<1	<1	291	291	14.1	1.29		<0.01	0.74	0.74				
Templemore B	25-Feb-10	1112	9.36	9.5																																										
Templemore B	11-May-10	1250	10.52	10.66	8.01	1722	22.2		0.002	0.059	<0.001		<0.0001	<0.001	<0.001	0.007	0.11	<0.001	0.024	<0.001		0.01	0.02	<0.0001		1540	85	30	194	2	15.1	204	129	<1	<1	328	328	15	0.48	0.02				854			
Templemore B	30-Aug-10	1145	17.65	17.79	7.23	1532	23.8																																								
Templemore B	9-Nov-10	1215	9.94	10.08	7.19	1405	24.8																																								
Templemore B	14-Mar-11	0940	17.11	17.25	7.21	1460	24.7	0.28	0.002					<0.001		0.055	0.43	0.003	0.034	0.002			0.185	<0.0001	7.28	1400	97	37	200	2	16.6	264	136	<1	<1	339	339	17	1.3		<0.01	2.85	2.85				
Templemore B	6-Jun-11	1230	10.42	10.56	7.3	1370	21.5																																								
Templemore B	8-Sep-11	1100	13.56	13.7	7.12	1387	20.8	0.03	0.003	0.076	<0.001		<0.0001	<0.001	<0.001	0.015	<0.05	<0.001	0.005	<0.001		0.01	0.019	<0.0001	7.54	1630	62	38	202	2	15.1	254	137	<1	<1	325	325	16.5	4.62	0.03	<0.01	0.73	0.73	982			
Templemore B	7-Dec-11	1150	10.53	10.67	7.21	1360	21																																								
Templemore B	13-Mar-12	1250	9.58	9.72	7.28	1680	23	0.07	0.002	0.09	<0.001		<0.0001	<0.001	<0.001	0.013	0.1	<0.001	0.004	<0.001		0.02	0.036	<0.0001	7.7	1790	116	42	228	2	19.2	307	142	<1	<1	338	338	18.4	2.24	0.11	<0.01	3.37	3.37	1040			
Templemore B	13-Jun-12	1220	10.51	10.65	7.34	1704	20.8																																								
Templemore B	4-Sep-12	1350	8.28	8.42	7.3	1770	21.4	0.05	0.002	0.099	<0.001		<0.0001	<0.001	<0.001	0.01	0.1	<0.001	0.005	<0.001		0.01	0.072	<0.0001	7.63	1920	110	46	248	2	20.1	326	181	<1	<1	364	364	20.2	0.31	<0.01	<0.01	7.25	7.25	1200			
Templemore B	27-Nov-12	1200	7.65	7.79	7.37	1611	21.8																																								
Templemore B	20-Mar-13	1330	12.36	12.5	7.29	1570	22.4	0.04	0.004	0.069	<0.001		<0.0001	<0.001	<0.001	0.019	0.09	0.001	0.012	<0.001		0.01	0.064	<0.0001	7.51	1700	94	36	235	2	17.9	255	137	<1	<1	335	335	16.7	3.41	0.03	<0.01	4.44	4.44	886			
Templemore B	11-Jul-13	1145	6.08	6.22	7.22	1523	21.7																																								
Templemore B	5-Sep-13	1240	6.1	6.24	7.24	1470	22.3	0.28	0.003	0.06	0.076	<0.001	<0.0001	<0.001	<0.001	0.046	0.3	0.002	0.035	<0.001	<0.01	0.02	0.148	<0.0001	7.79	1620	78	32	230	2	16.6	242	158	<1	<1	304	304	16.2	1.18	0.03				988			
Templemore B	22-Nov-13	1235	7.89	8.03	7.4	1483	20.7																																							
Templemore B	20-Feb-14	1240	8.31	8.45	7.5	1400	21.6	0.1	0.004	0.06	0.061	<0.001	<0.0001	<0.001	<0.001	0.045	0.38	0.005	0.022	0.002	<0.01	0.02	0.129	<0.0001	7.47	1470	69	29	204	1	14.7	199	142	<1	<1	293	293	14.4	1.03	0.02				829			
Templemore B	27-May-14	1110	10.51	10.65	7.4	1566	19.7																																							


Standing Water Level - MW1
Depth in Metres
0
5
10
15
20
Jun 06
Sep 06
Dec 06
Mar 07
Jun 07
Sep 07
Dec 07
Mar 08
Jun 08
Sep 08
Dec 08
Mar 09
Jun 09
Sep 09
Dec 09
Mar 10
Jun 10
Sep 10
Dec 10
Mar 11
Jun 11
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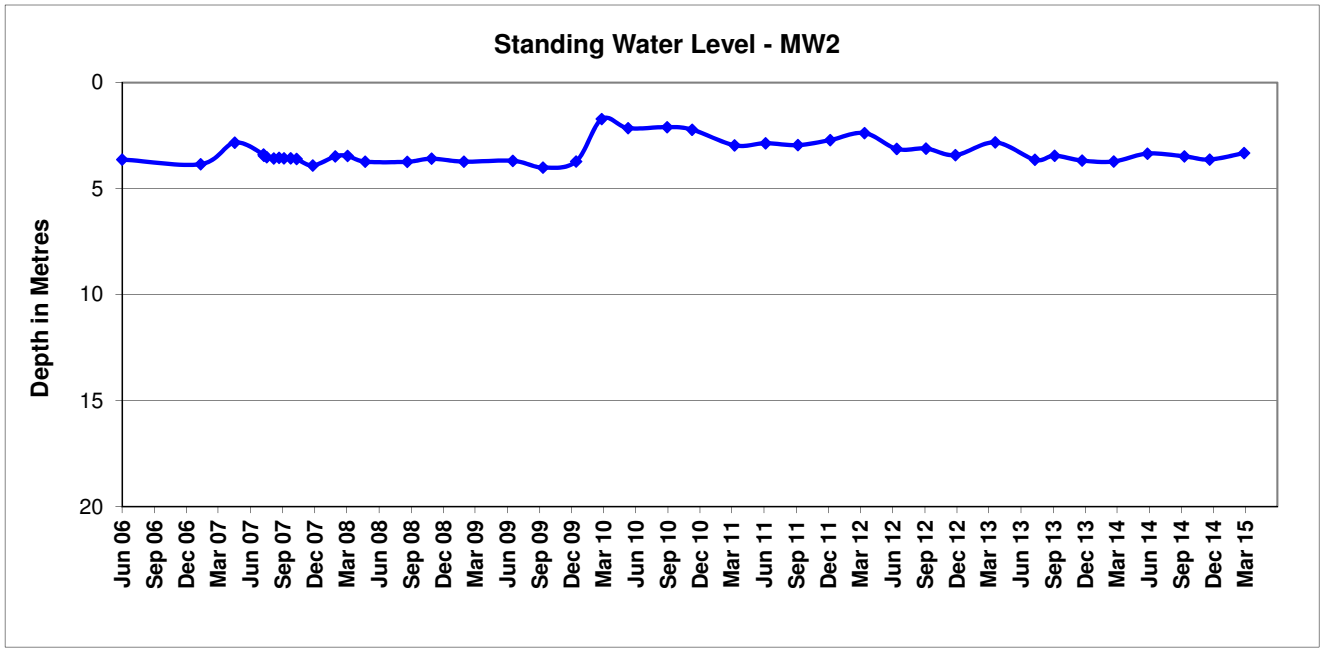
Sep 12
Dec 12
Mar 13
Jun 13
Sep 13
Dec 13
Mar 14
Jun 14
Sep 14
Dec 14
Mar 15


Standing Water Level - MW2
Depth in Metres
0
5
10
15
20
Jun 06
Sep 06
Dec 06
Mar 07
Jun 07
Sep 07
Dec 07
Mar 08
Jun 08
Sep 08
Dec 08
Mar 09
Jun 09
Sep 09
Dec 09
Mar 10
Jun 10
Sep 10
Dec 10
Mar 11
Jun 11
Sep 11
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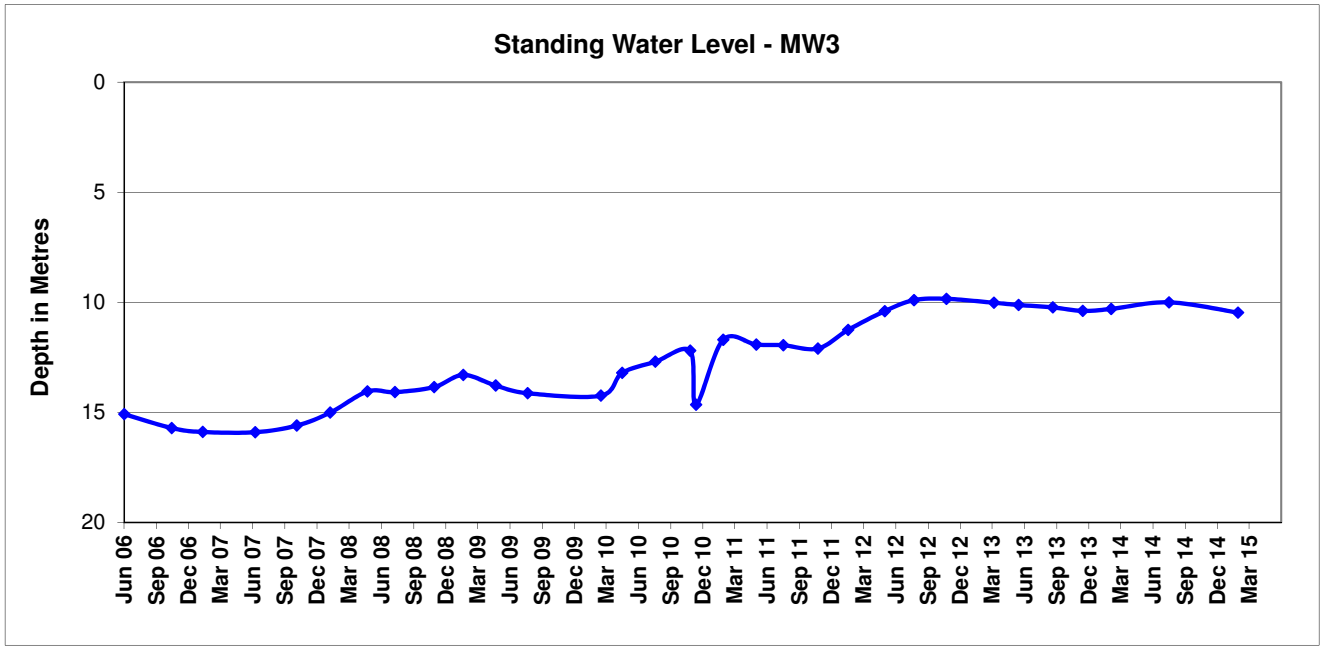
Jun 12
Sep 12
Dec 12
Mar 13
Jun 13
Sep 13
Dec 13
Mar 14
Jun 14
Sep 14
Dec 14
Mar 15


Standing Water Level - MW3
Depth in Metres
0
5
10
15
20
Jun 06
Sep 06
Dec 06
Mar 07
Jun 07
Sep 07
Dec 07
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Jun 08
Sep 08
Dec 08
Mar 09
Jun 09
Sep 09
Dec 09
Mar 10
Jun 10
Sep 10
Dec 10
Mar 11
Jun 11
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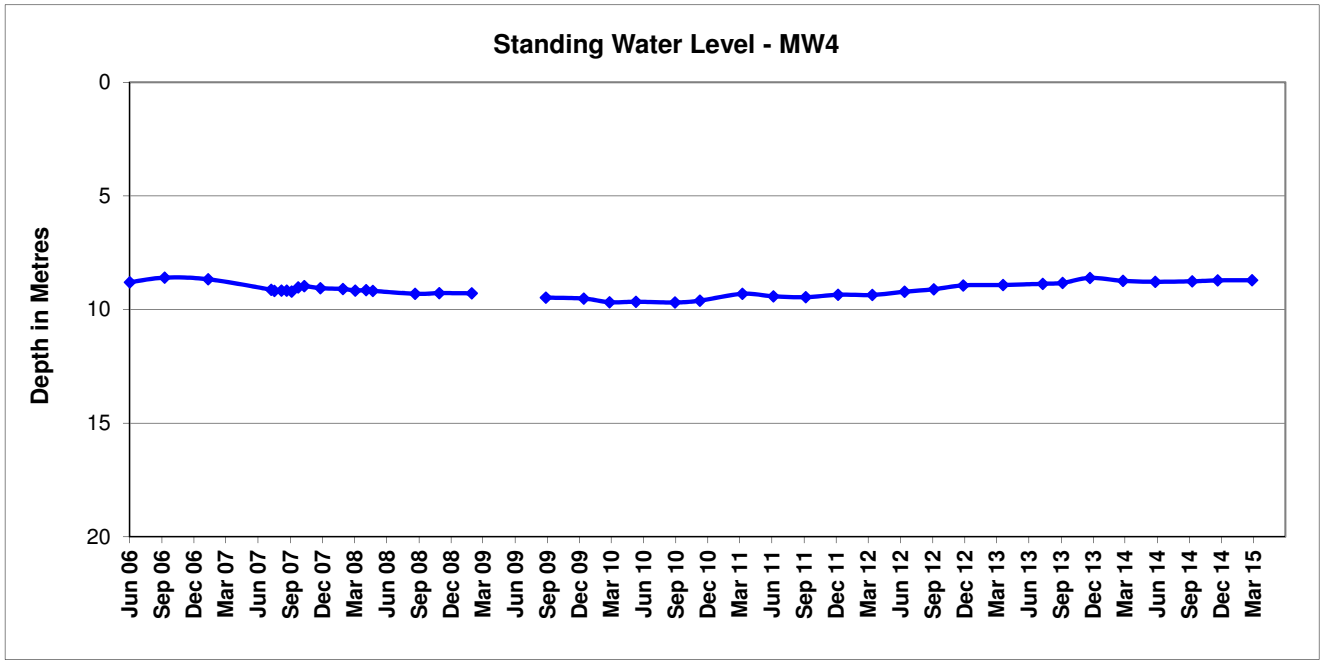
Dec 13
Mar 14
Jun 14
Sep 14
Dec 14
Mar 15


Standing Water Level - MW4
Depth in Metres
0
5
10
15
20
Jun 06
Sep 06
Dec 06
Mar 07
Jun 07
Sep 07
Dec 07
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Jun 08
Sep 08
Dec 08
Mar 09
Jun 09
Sep 09
Dec 09
Mar 10
Jun 10
Sep 10
Dec 10
Mar 11
Jun 11
Sep 11
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Mar 13
Jun 13
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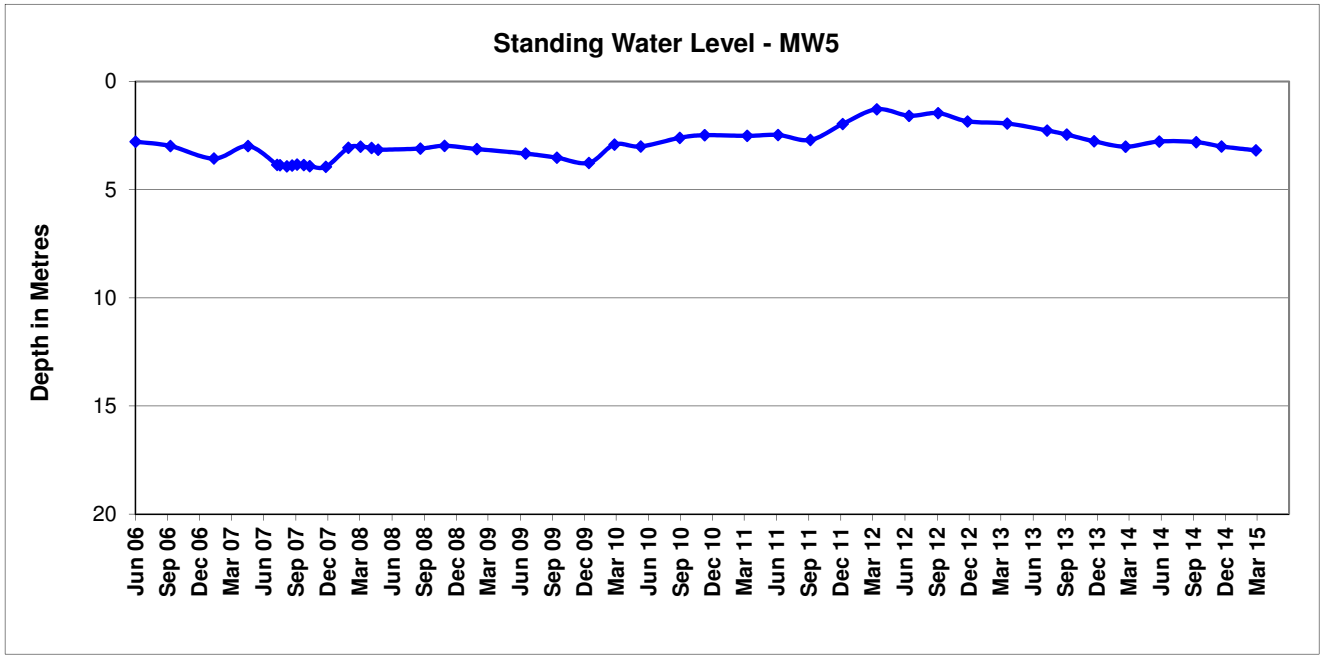
Dec 13
Mar 14
Jun 14
Sep 14
Dec 14
Mar 15


Standing Water Level - MW5
Depth in Metres
0
5
10
15
20
Jun 06
Sep 06
Dec 06
Mar 07
Jun 07
Sep 07
Dec 07
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Sep 08
Dec 08
Mar 09
Jun 09
Sep 09
Dec 09
Mar 10
Jun 10
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Mar 11
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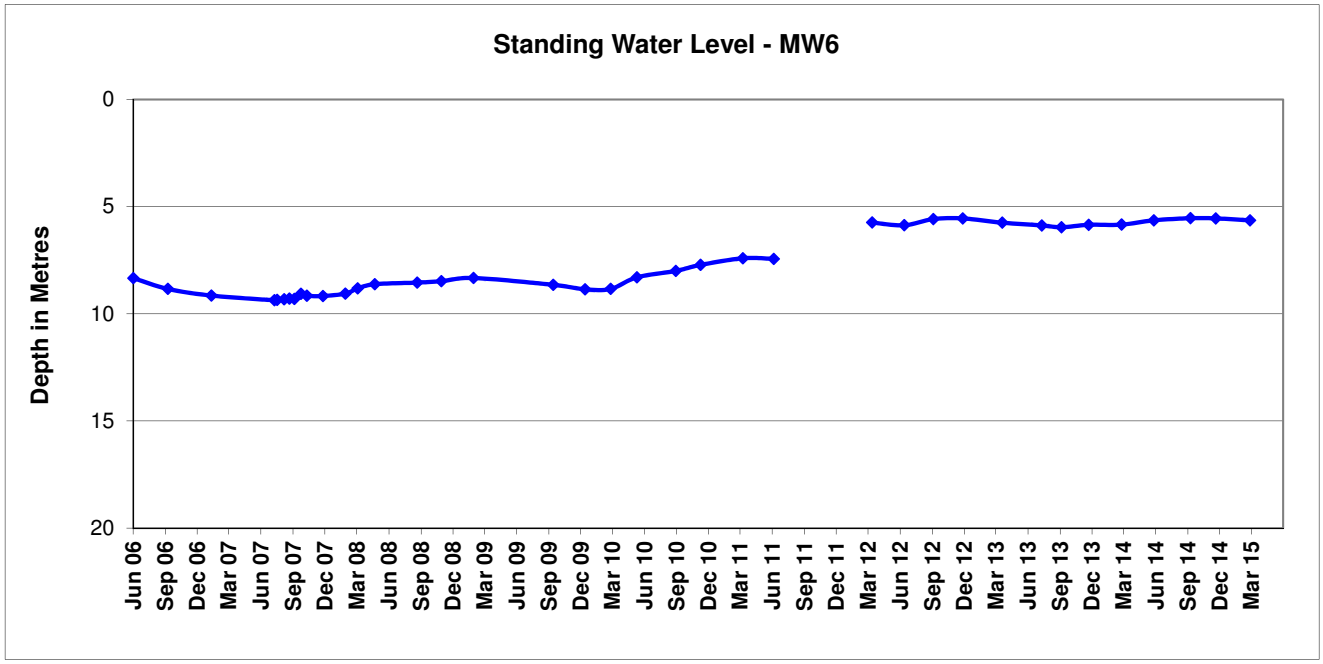
Jun 14
Sep 14
Dec 14
Mar 15


Standing Water Level - MW6
Depth in Metres
0
5
10
15
20
Jun 06
Sep 06
Dec 06
Mar 07
Jun 07
Sep 07
Dec 07
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Sep 08
Dec 08
Mar 09
Jun 09
Sep 09
Dec 09
Mar 10
Jun 10
Sep 10
Dec 10
Mar 11
Jun 11
Sep 11
Dec 11
Mar 12
Jun 12
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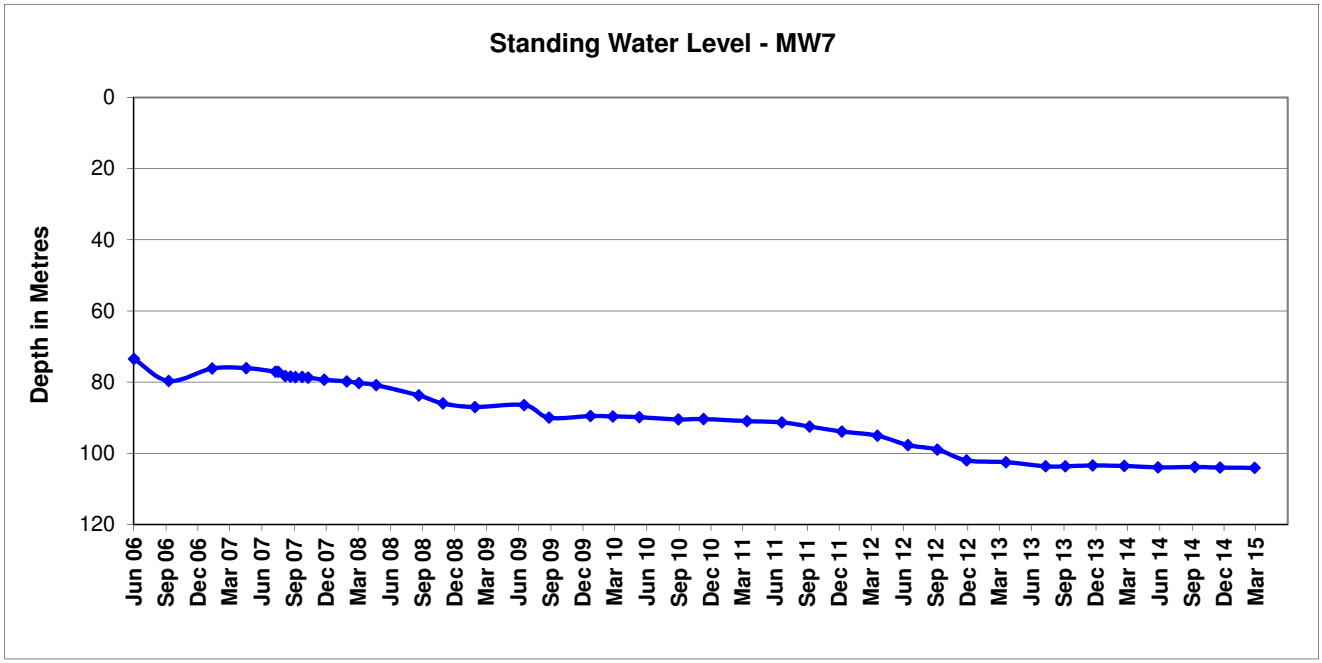
Dec 12
Mar 13
Jun 13
Sep 13
Dec 13
Mar 14
Jun 14
Sep 14
Dec 14
Mar 15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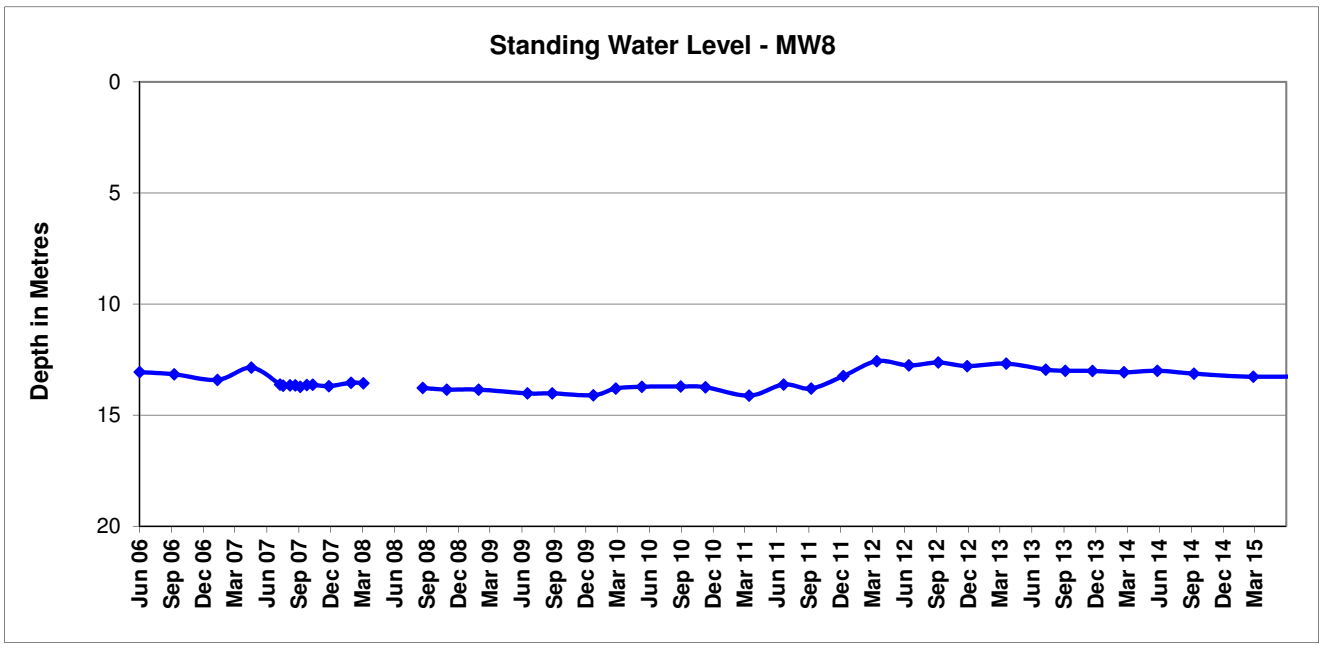
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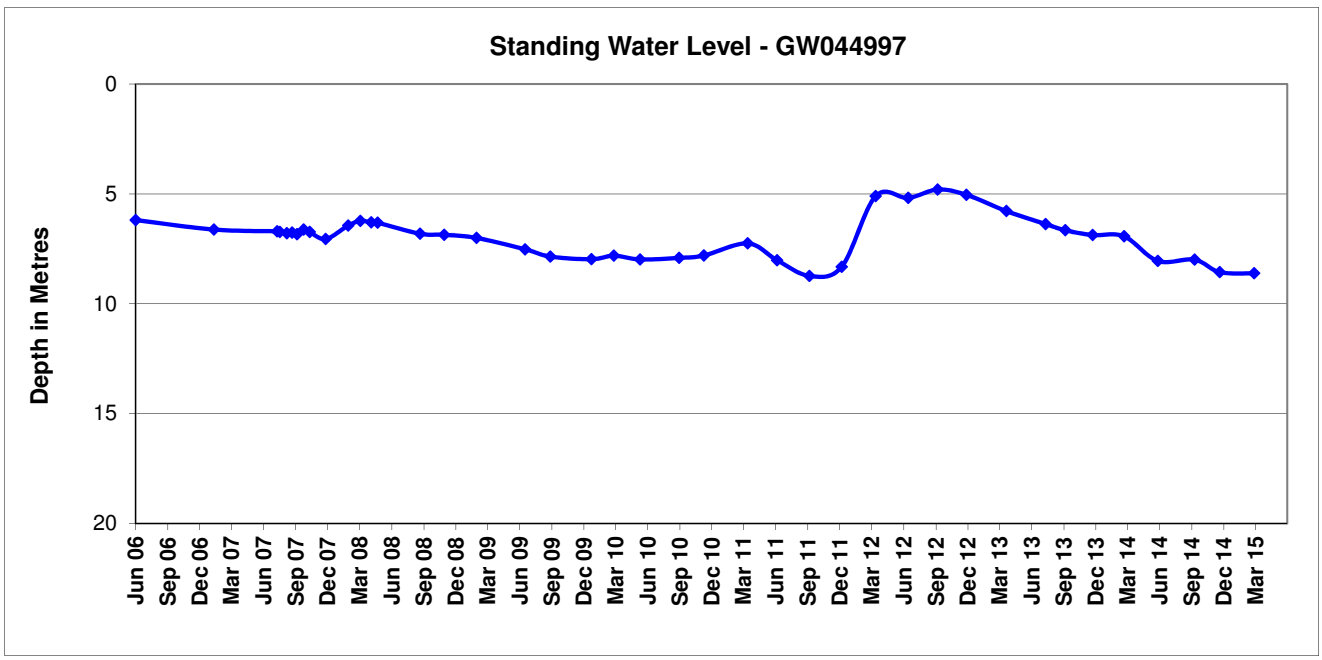
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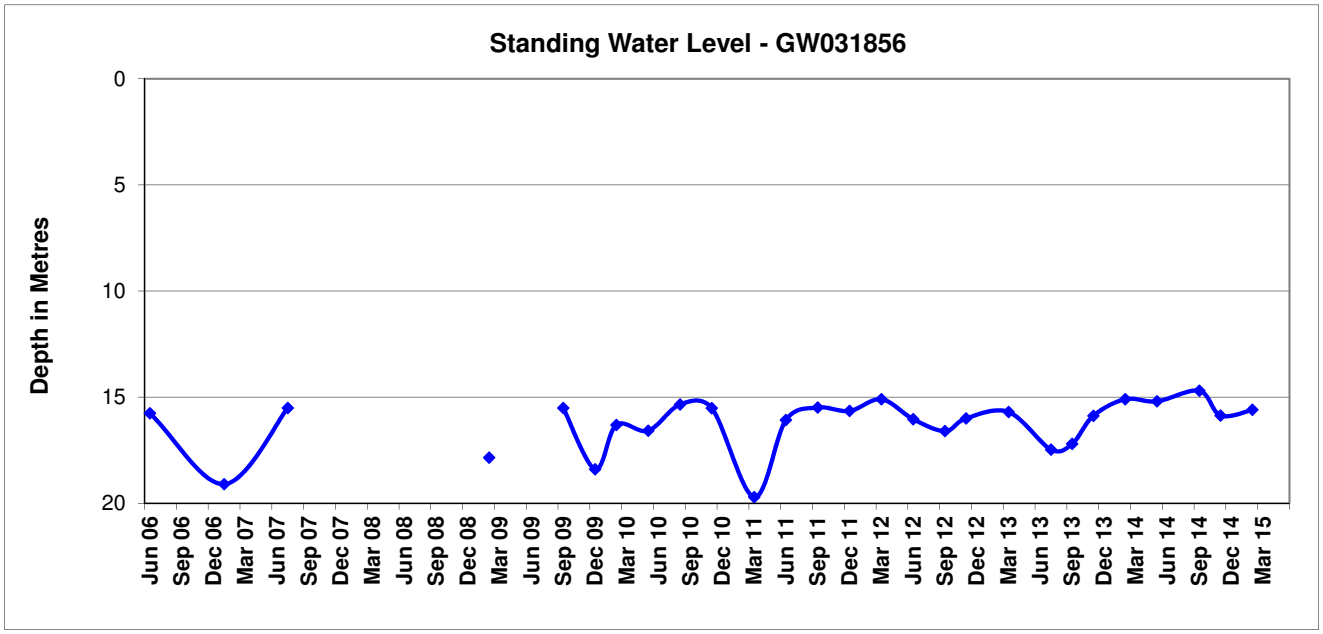
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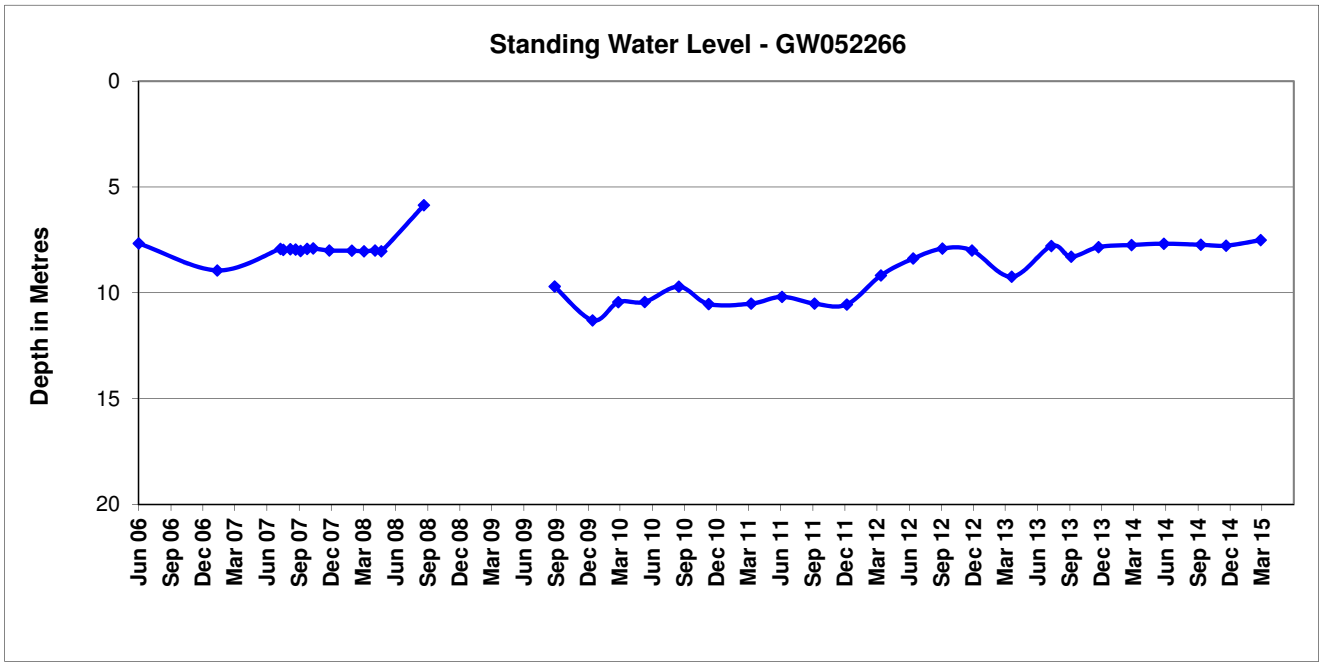
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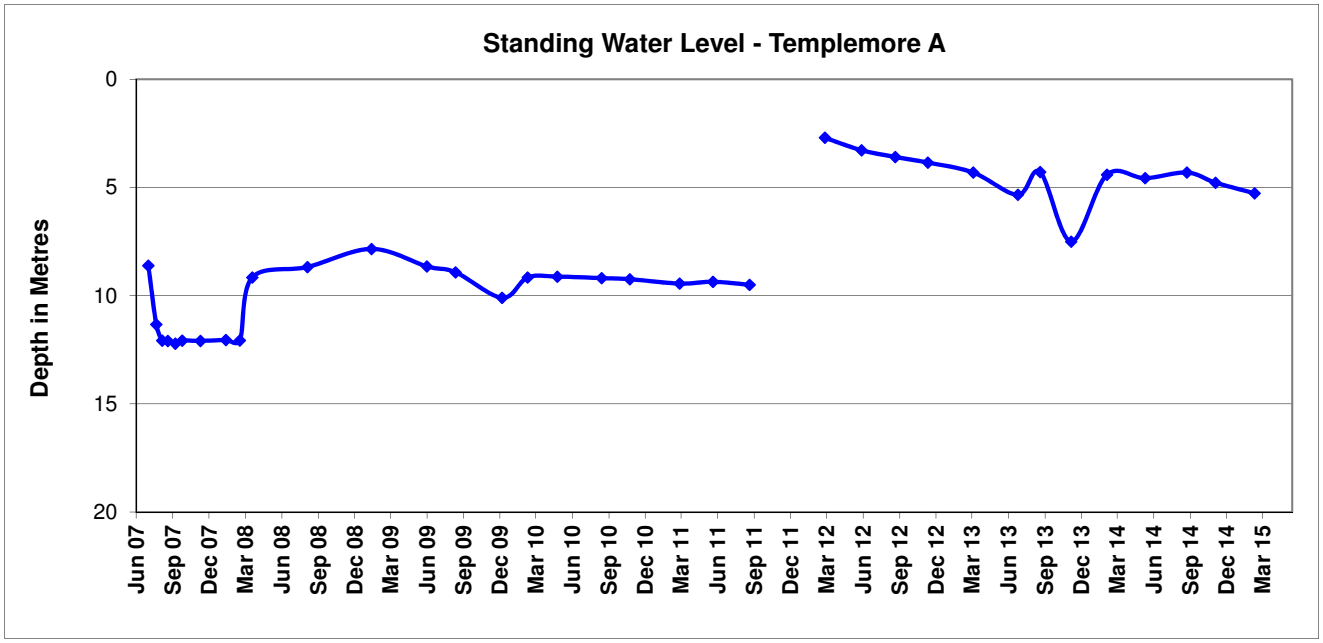
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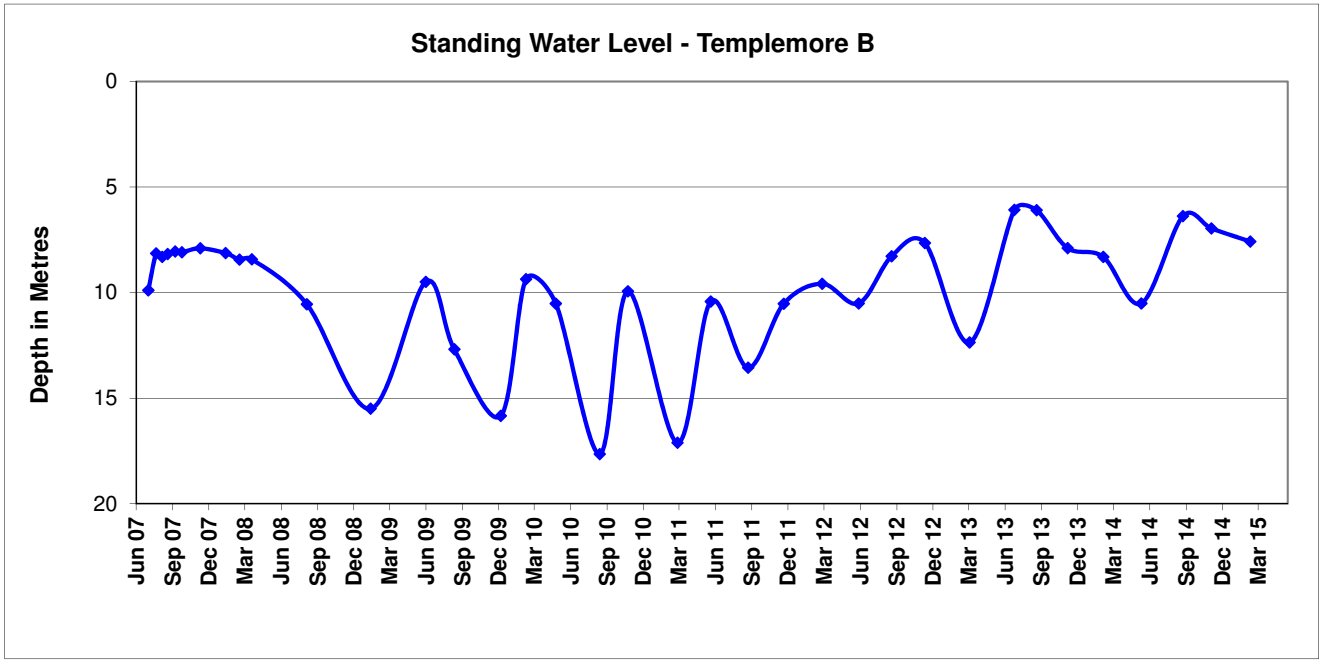
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Appendix 7

REHABILITATION MONITORING REPORT

Tarrawonga Coal Mine – Rehabilitation Monitoring Report Volume 1

Spring 2014

Prepared for
Whitehaven Coal Mining Limited

12 February 2015





DOCUMENT TRACKING

ITEM	DETAIL
Project Name	Tarrawonga Rehabilitation Monitoring Report – Spring 2014 (Volume 2)
Project Number	14ARMECO-0023
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Reviewed by	Dr Paul Frazier
Approved by	Dr Paul Frazier
Status	Draft
Version Number	1
Last saved on	12 February 2015
Cover photo	Plot 10 woodland rehabilitation in 2011 (top) and November 2014 (below)

This report should be cited as 'Eco Logical Australia 2014. *Tarrawonga Coal Mine - Rehabilitation Monitoring Report Spring 2014*. Volume 1. Prepared for Whitehaven Coal Mining Ltd.'

ACKNOWLEDGEMENTS

This document has been prepared by Eco Logical Australia Pty Ltd with support from Whitehaven Coal Mining Ltd.

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Abbreviations

ABBREVIATION	DESCRIPTION
AEMR	Annual Environmental Management Report
CL	Coal Lease
DPI	NSW Department of Primary Industries
EL	Exploration Lease
ELA	Eco Logical Australia
EMS	Environmental Management System
MCP	Mine Closure Plan
ML	Mining Lease
MOP	Mining Operations Plan
NDVI	Normalised differential Vegetation i]Index
PAB	Photosynthetically Active Biomass
RMP	Rehabilitation Monitoring Program
TCPL	Tarrawonga Coal Pty Ltd
TPFC	True Projected Foliage Cover
TSC Act	*Threatened Species Conservation Act 1995* (NSW)
WCM	Whitehaven Coal Mining

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Key outcomes

- Remote sensing analysis found no areas of substantial change.
- Monitoring results of woodland areas are consistent with the previous monitoring period (January 2014) and the drier than average conditions experienced prior throughout 2014.
- Rehab Zone 2 recorded significantly greater exotic species plant cover than the control zone and also recorded the highest number of exotic species since monitoring commenced in 2011.

Recommendations

- Additional shrub species should be considered for planting in the rehabilitation zones to improve habitat complexity.
- It is recommended that regular weed management protocols are applied in Rehab Zone 2 to prevent further spread of Rhodes Grass and other exotic species and to promote native species growth.
- African Boxthorn is present on site and should be eradicated to prevent spread.
- Rehab Zone 3 & 4 plots currently lack large woody debris (LWD). As such, LWD removed during the mine extension can be deployed across Rehab Zone 3 & 4 plots.
- In order to better understand the use of rehabilitated woodland areas by fauna we recommend that bird abundance data be collected and used in the analysis.

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1 Introduction

This Rehabilitation Monitoring Report has been prepared by Eco Logical Australia (ELA) for Whitehaven Coal Mining Limited (WCM) in accordance with the Rehabilitation Monitoring Program (RMP) for Tarrawonga Coal Mine (ELA 2011).

1.1 Background

Tarrawonga Coal Mine (Tarrawonga) commenced operations in 2006 when it was known as the "East Boggabri Coal Mine". An extension within the original Mining Lease (ML) 1579 was granted in 2010. A further expansion was proposed in 2011 which goes beyond the boundary of ML 1579 to the east into Exploration Licence (EL) 5967 and to the north into Coal Lease (CL) 368. The latest expansion will increase the total life of mine coal production to around 55 Mt with a total mine life of approximately 23 years (TCPL 2011). Conditional approval to this expansion was granted in January 2013.

WCM is committed to the progressive rehabilitation of the mine area to restore landscape functionality (WCM 2010). There is also emphasis on the re-establishment of native vegetation across the site to provide amenable links to vegetation on the site and to the north in Leard State Forest.

1.2 Project scope

This rehabilitation monitoring report documents the spring 2014 survey results and subsequent data analysis. Rehabilitation monitoring surveys were undertaken in accordance with the RMP for Tarrawonga Coal Mine (ELA 2011) and included:

- Remote-sensing based landscape assessment (multi-spectral imagery)
- Native vegetation and fauna surveys
- Soil profile assessments
- Analysis of results including statistical analysis.

1.3 Aims & objectives

The aim of this monitoring report is to document the spring 2014 survey results and provide a quantitative assessment of rehabilitation performance against nearby unmined (i.e. control) landscapes. Specific monitoring objectives include:

- Quantitative tracking of rehabilitation performance
- Assess key aspects of flora (upper, mid and lower strata), fauna in woodland areas and soil profile assessments
- Compare data with previous monitoring
- Evaluate monitoring results against monitoring triggers and rehabilitation objectives as outlined in the RMP
- Provide recommendations to assist with the improvement of rehabilitation or monitoring methods.

1.4 Report structure

This report is presented in two volumes. Volume 1 contains a summary of the rehabilitation objectives and provides a summary of the spring 2014 monitoring program, including results, conclusion and

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recommendations. Volume 2 contains the collated field survey data from 2011, 2012, 2013 and 2014 monitoring periods and 2014 weather data.

1.5 Rehabilitation monitoring - management triggers

A multi-scale, multi-data source monitoring approach has been adopted at Tarrawonga. Remote sensing has been used to monitor the entire target area including control areas while targeted field work was implemented for native vegetation environments, with surveys directed into control and impact areas.

A two-tiered system of triggers for management was developed in the RMP as a response to any changes identified via remote sensing. The first tier of response is triggered by changes detected in the remote sensing time change detection which instigates further investigation including targeted rapid on-ground assessments. The second tier of response is triggered if changes are confirmed or discovered on-ground. These triggers instigate the development of site specific management responses and remedial actions.

Management triggers are detailed further in Rehabilitation Monitoring Program for Tarrawonga Coal Mine (ELA 2011).

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2 Rehabilitation objectives

A summary of the objectives for rehabilitation at Tarrawonga as stated in the relevant management plans, is provided in Table 2-1 (ELA 2011).

Table 2-1: Summary of rehabilitation objectives for Tarrawonga Coal Mine

Stated objective (EMS, MOP, MCP)
Establish areas of native vegetation that link with remnant native vegetation and contribute to local and regional habitat corridors
Maintain and/or restore biodiversity and ecological integrity of areas affected by mining or agriculture within the mining lease
Maintain and/or re-establish agricultural land (pasture establishment) of comparable land capability to that of the pre-disturbance environment
Provide a revegetated post-mining landform which is consistent with surrounding landforms and, with the exception of the final void, provides no obvious evidence of a prior mining land use
Create low maintenance, geotechnically stable final landform
Minimise visual exposure by ensuring rehabilitation blends with the adjoining landscape
Minimise erosion and sedimentation
Establish rehabilitated areas that will provide habitat for fauna and corridors for fauna movement between rehabilitated areas, regrowth areas and remnant vegetation
Control vermin, feral animals and noxious weeds
Ensure successful implementation of the approved biodiversity offset strategy
Monitor rehabilitation success in terms of physical and biological parameters
Native vegetation re-establishment / extension using locally collected seed
Develop and implement a Flora and Fauna monitoring program which provides statistically valid conclusions on rehabilitation success and recommendations for improved outcomes (if required)
Monitor rehabilitation success in terms of physical and biological parameters
Exclude bushfire and control noxious weeds and feral animals
Successfully develop native vegetation communities within the stock exclusion zone (i.e. rehabilitated areas and remnants) which emulate the structure and floristics of undisturbed areas (as demonstrated by monitoring)
Successfully establish more extensive native vegetation communities that currently exist in the area of the mine
Rehabilitated areas used by native fauna (as demonstrated by monitoring)
Rehabilitation / offset strategy refinement on the basis of monitoring outcomes, site experience and improved technologies
Maximise the area of land re-established to Class III land capability land while recognizing the emphasis is on native vegetation conservation

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Stated objective (EMS, MOP, MCP)
Re-instate areas of agricultural land on the “Thuin” property
Elsewhere, landform establishment, soil application and vegetation establishment consistent with pre-disturbance land capabilities.

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3 Methods

The Tarrawonga RMP (ELA 2011) recommends that it be reviewed every 3 years. The review is to examine the monitoring program effectiveness and recommend any improvements. After 3 years of implementation, ELA reviewed the implementation and outcomes of the RMP in relation to indicator appropriateness, field survey, analysis and technology changes in August 2014. Key amendments of the RMP are described in the Table 3-1.

Monitoring completed in spring 2014 was undertaken in accordance with the methods prescribed in the revised RMP (ELA 2011) (Table 3-1). Rehabilitation in the agricultural zones has yet to occur, so there was no monitoring for these zones in 2014. Flora monitoring plots 1 to 6 in Control Zone 1 ceased to be monitored in 2014 as this area will form a part of the approved Tarrawonga Coal Mine northern extension. These plots have been replaced by 5 plots that were established in 2013 in the Leard State Forest (Control (LSF) Zone) (Volume 2, Section 3). Fauna Control 3 was monitored in 2014 however this will cease to be monitored in 2015 due to the mine extension and will be replaced by Fauna Control 5 which was also established in 2013 (Volume 2, Section 4).

Table 3-1: Multi-scale monitoring program

Data source	Type	Scale	Purpose	Recommended amendments to the RMP in 2014
Remote sensing	LiDAR (every 3 years)	Entire site	Topographic form and change Woodland parameters	Ongoing capture and analysis of LiDAR should be considered.
	Multi-spectral imaging (annually)	Entire site	Agricultural pasture cover/biomass Woodland cover/biomass Erosion monitoring Direct field survey	-
	EM38/31 (every 3 – 5 years)	Pasture zones	Soil moisture and nutrient zones	Removed from the RMP. Replaced by regular inspections and remote sensing.
Woodland survey	Vegetation survey (annually)	Woodland zones	Woodland health and function	-
	Fauna survey (Birds – winter and spring)	Woodland zones	Woodland health and function	-
	Soil survey (every 4 years)	Woodland zones	Soil condition	-
Agricultural survey	Pasture survey (annually)	Pasture zones	Pasture biomass and composition	Removed from the RMP. Replaced by remote sensing and on ground inspections. ELA recommend baseline pasture species surveys when pasture zones undergo rehabilitation.
	Soil Survey (every 3 years)	Pasture zones	Soil nutrient status	-

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As per recommendations in the 2014 Rehabilitation Monitoring Report (ELA 2014), fauna monitoring was undertaken within the suggested monitoring periods of July-August for winter birds and September-October for spring birds.

Soil surveys are recommended every 4 years (ELA 2011) and were undertaken in 2014 in the control and rehabilitated areas (Volume 2; Section 6).

It was also recommended that image capture for subsequent monitoring periods should be undertaken between late August and early September to minimise seasonal variations and to allow for field validation. Image capture in 2014 was undertaken in early September.

3.1 Management activities undertaken at Tarrawonga Coal Mine in 2013/2014

Management activities undertaken at Tarrawonga Coal Mine from 1 May 2013 to 30 April 2014 included (TCPL 2014):

- Spot spraying of Lycium ferocissimum (African Boxthorn), Opuntia stricta (Prickly Pear), Xanthium spinosum (Bathurst Burr) and Xanthium strumarium (Noogoora Burr) within the ML
- Removal of Solanum elaeagnifolium (Silverleaf Nightshade) and Bryophyllum delagoense (Mother of Millions) along roadsides and within the ML
- Introduction of Cactoblastis cactorum (Cactoblastis Moth) and Dactylopius spp. (Cochineal) to reduce Prickly Pear
- Spraying of grasses along rip lines and mounded areas in rehabilitation areas.

The eradication of African Boxthorn across the site was recommended in the previous monitoring report to prevent proliferation (ELA 2014). Targeted control is to be undertaken in the 2014-2015 monitoring period, as stated in the Annual Environment Monitoring Review (AEMR) (TCPL 2014).

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3.1.1 Survey dates

Multi-spectral imagery was captured across the entire target area (including control areas) on 4 September 2014 using 4-Band WorldView-2.

Botanist Dr Lachlan Copeland and Environmental Scientist Emily Southwell conducted native vegetation monitoring on 19 and 20 November 2014 by.

Ecologist Dr Stephen Debus undertook terrestrial fauna and habitat monitoring of native vegetation areas between 27 and 28 August 2014; and between 5 and 6 November 2014.

Ecologist Ben Martin undertook soil profile analysis on 7 October 2014.

3.1.2 Weather

Conditions remained dry throughout 2014. Temperatures in the three months preceding the spring monitoring period were cool to warm, with average minimum temperatures lower than the historical mean and average maximum temperatures higher than the historical mean (Figure 3-1; Volume 2, Section 1). Rainfall in the six months preceding the spring surveys was below average, with the exception of June and August 2014. Rainfall was twice the monthly average in August 2014 (Figure 3-2; Volume 2, Section 1).

Conditions were wet during the first day of the winter bird survey, with 16.8 mm of rain. The minimum temperatures during the winter bird survey were above average by 4.1 and 4.3°C and the maximum temperatures were close to the historical mean for August (Volume 2, Section 1). Minimum temperatures during the spring bird survey were approximately 3.7°C below the historical mean for November, whilst maximum temperatures ranged from 0.8 to 3.9°C above the historical mean (Volume 2, Section 1).

Conditions were relatively dry during the flora survey, with 0.6 mm of rain on the second day of survey. Minimum and maximum temperatures were 3.9°C below the historical mean for November on the first day of survey, while the minimum and maximum temperatures were 6.7 and 1.4°C above the historical mean on the second day of survey (Volume 2, Section 1).

Conditions were dry during the soil survey (Volume 2, Section 1).

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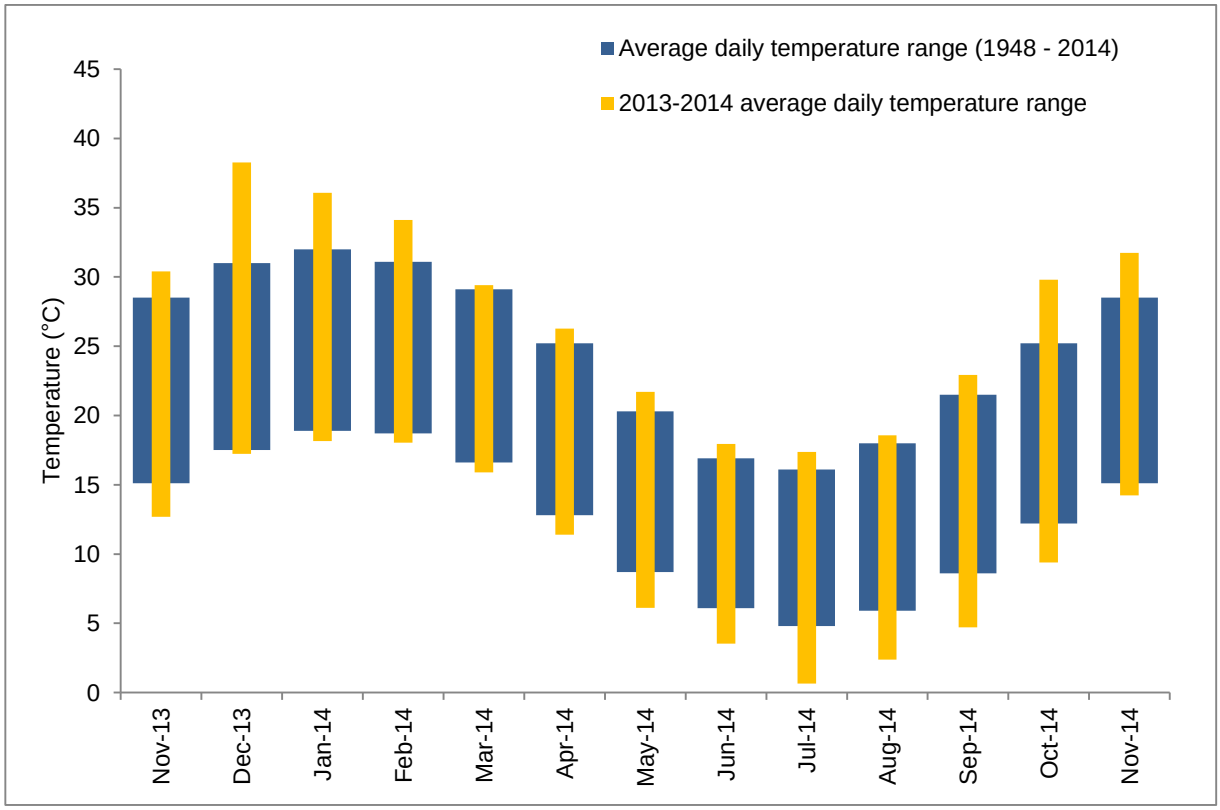

Figure 3-1: Historical average and recorded average daily temperature range (Gunnedah Resource Centre 55024; BoM 2014)

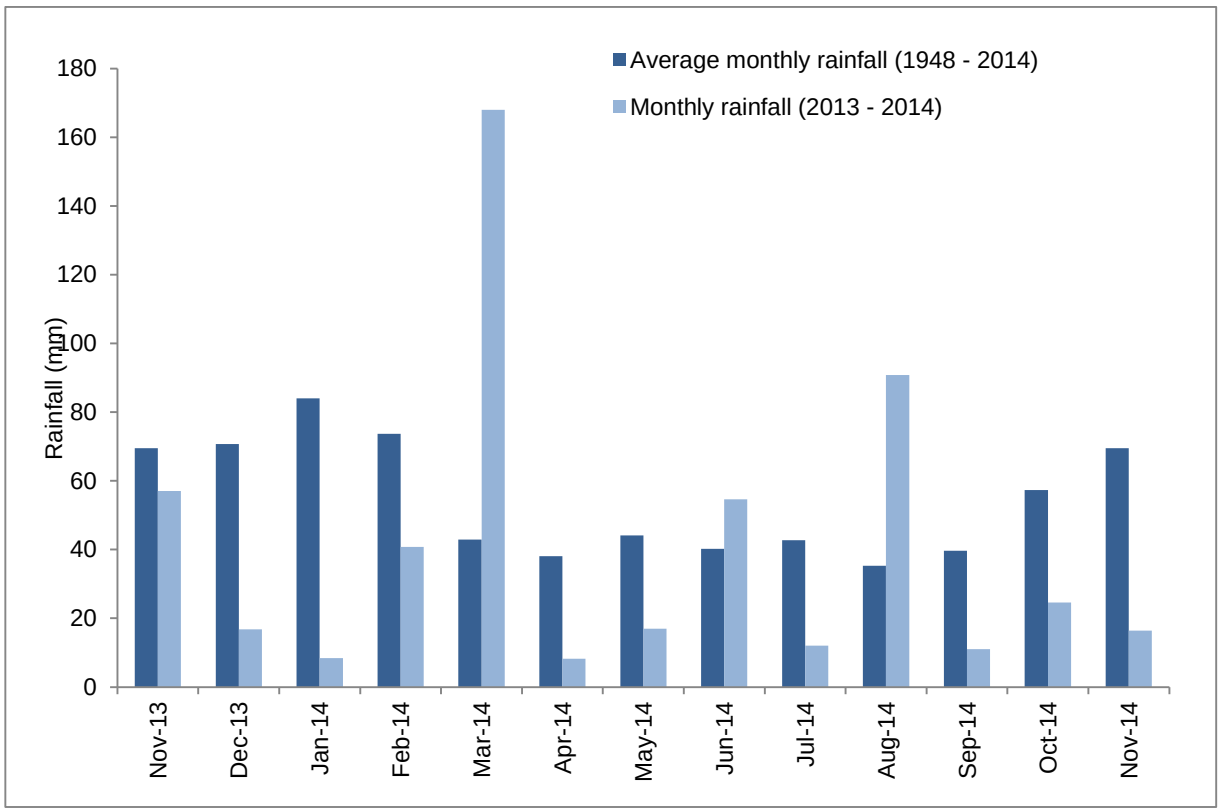

Figure 3-2: Historical average and recorded monthly rainfall (Gunnedah Resource Centre 55024; BoM 2014)

4 Results & discussion

4.1 Remote sensing

Changes in the 2013 and 2014 Normalised Differential Vegetation Index (NDVI) of multi-spectral imagery were assessed. Areas of significant increases or decreases in photosynthetically active biomass (PAB) across the site were associated with mine rehabilitation or clearing for the mine extension and associated activities. There were no areas of significant change in groundcover within the rehabilitation and control zones (Figure 4-1; Volume 2, Section 2).

Rehabilitation Zone 2 displayed an increase in PAB along depressions between contour banks, although this did not meet the criteria for significant change (areas >0.1 ha with >+ 2 standard deviations from average) (Figure 4-1; Volume 2, Section 2). This increase is likely to be due to moisture retention during the heavy rainfall in August 2014 and a consequential increase in groundcover.

Scattered areas of increase and decrease in PAB across the image can be attributed to shadow position and slight image shift; this is particularly pronounced around dam perimeters (Figure 4-1).

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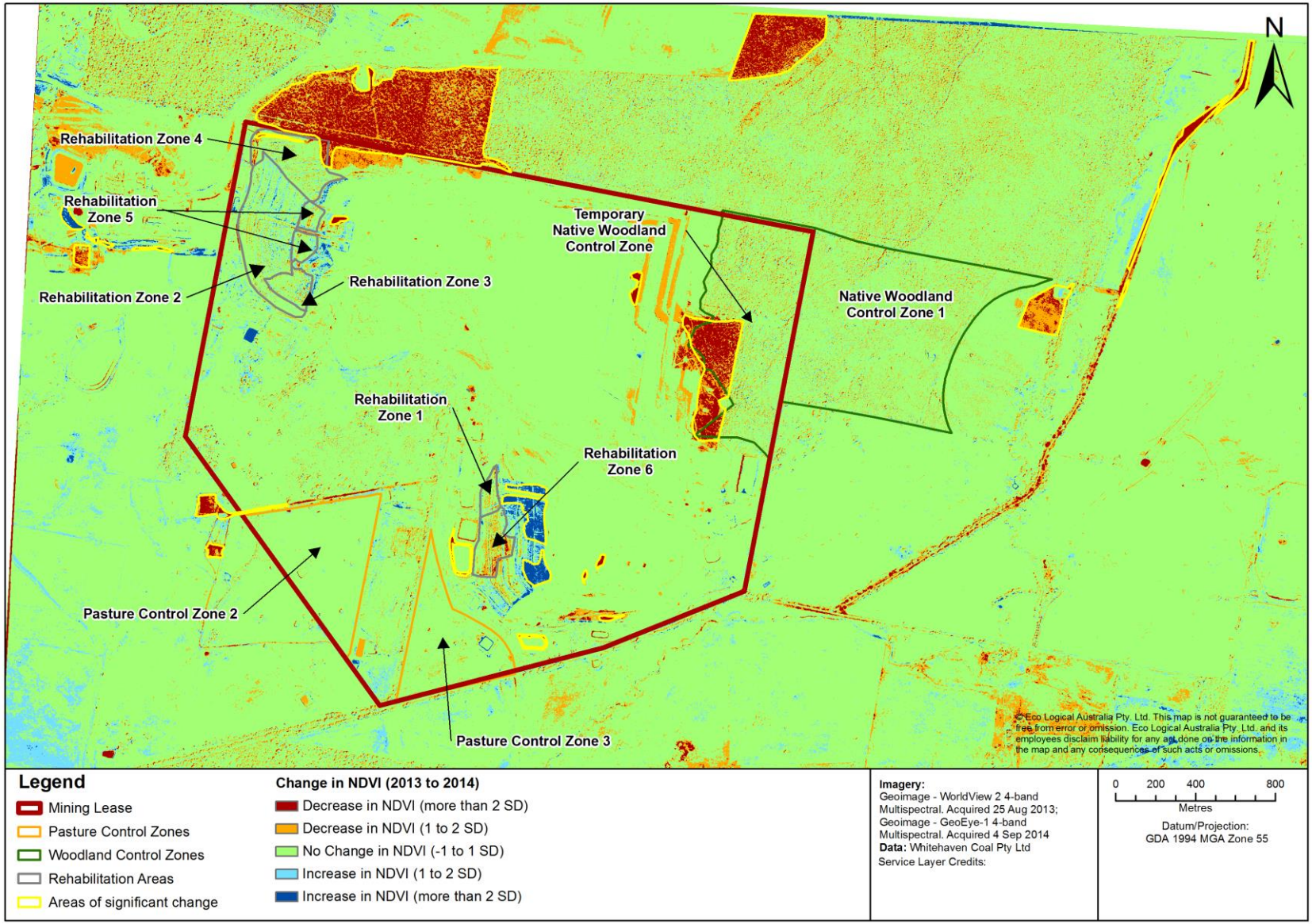

Figure 4-1: NDVI change detection analysis; including area of significant change (>0.1 ha) requiring field investigation

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4.2 Woodland surveys

4.2.1 Vegetation

Canopy and midstorey cover levels remained steady from January to November 2014 at the Control (LSF) plots (Volume 2, Section 3.2). The canopy layer is not yet formed at any of the rehabilitation plots, although a midstorey layer largely comprised of the planted canopy species was recorded in Rehab Zone 2 plots 9 and 10 and Rehab Zone 3 & 4 plots 12, 13 and 15 (Volume 2, Section 3.2 & 3.3). Midstorey cover at these plots is comparable to the Control (LSF) plots 16, 17 and 19, which recorded a midstorey True Projected Foliage Cover (TPFC) between 1 and 3% in both January and November 2014 (Volume 2, Section 3.2). Rehab Zone 2 plots 7 & 8 and Rehab Zone 3 & 4 plots 11 and 14 recorded between 3 and 5% TPFC in January 2014 and recorded no midstorey cover in November 2014, although all 4 plots recorded species in the midstorey (Volume 2, Section 3.2 & 3.3). Such a minor reduction is most likely a result of slight variations in the placement of the tape measure between years and/or an expected +/- 5% difference in operator assessment between years.

The midstorey layer in the rehabilitation plots continues to largely be comprised of juvenile *Eucalyptus* spp. and other canopy species, while the control plots largely consist of shrub species (Volume 2, Section 3.3 and 3.4). This difference between the rehabilitation and control vegetation communities is confirmed in Cluster and nMDS analyses, where the control and rehabilitation zones show strong similarity between plots and only slight similarity between zones (Volume 2, Figures 3-2 to 3-4). As indicated in the previous monitoring report (ELA 2013), this result suggests that the midstorey layer may lack diversity and structure once the juvenile trees mature into the canopy layer.

The majority of the rehabilitated and control plots show a large amount of spatial and temporal variation in the native groundcover communities, although the control plots display greater stability between the two survey periods (see Cluster and nMDS analysis in Volume 2, Section 3.5). Groundcover composition and cover continue to reflect the very dry conditions experienced during and since the previous monitoring period in January 2014, with a higher than average maximum temperature and lower than average rainfall occurring since the months preceding the January 2014 survey period (Figure 3-1; Figure 3-2). There continues to be a greater similarity between plots in Rehab Zones 3 and 4 and plots in the Control (LSF) Zone than there is with plots in Rehab Zone 2, although the nMDS plot suggests that species composition and abundance in the control plots continue to be distinctly different to the rehabilitation plots (see Cluster and nMDS analysis in Volume 2, Section 3.5). *Chloris gayana* (Rhodes Grass) continues to be a threat to the establishment of native groundcover in Rehab Zone 2 (Volume 2, Section 3.5) (ELA 2013).

Native species cover decreased significantly in Rehab Zone 3 & 4 and the Control (LSF) Zone from January 2014 to November 2014, although native cover did not differ significantly between the rehabilitation and control zones in November 2014 suggesting that this reduction is a result of the drier than average conditions experienced since January 2014 (see groundcover statistical analysis in Volume 2, Section 3.7). Exotic species cover decreased significantly at the Rehab Zone 2 from January 2014 to November 2014, although organic matter present at all plots in this zone was comprised of approximately >75% to > 95% exotic annuals and 4 plots also recorded a high presence of Rhodes Grass in the organic matter. Exotic cover was significantly greater at Rehab Zone 2 compared to Rehab Zone 3 & 4 and the Control (LSF) Zone (see groundcover statistical analysis in Volume 2, Section 3.7).

The number of exotic species increased across all rehabilitation plots, with the exception of Rehab Zone 3 & 4 Plot 12 which decreased by 1 (Volume 2, Section 3.5). Since the commencement of monitoring in 2011, the highest numbers of exotic species were recorded in the current monitoring period for all of the

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Rehab Zone 2 plots and at all of these plots exotic species number is greater than the number of native species. The number of native species decreased at 3 of 5 Rehab Zone 2 plots and 4 of 5 Rehab Zone 3 & 4 plots. The numbers of exotic species increased at Control (LSF) plots 17 and 20 and were recorded for the first time in Plot 19 (Volume 2, Section 3.5).

Lycium ferocissimum (African Boxthorn) was recorded again in November 2014 at Rehab Zone 2 Plot 8 and Rehab Zone 2 & 3 Plot 12 (Volume 2, Section 3.3 & 3.4), however it was not recorded again at plots 7 and 13 in November 2014. The control of noxious weeds on private land is the responsibility of the land owner or occupier and is one of the management objectives for Tarrawonga Coal Mine. The removal of African Boxthorn was recommended in the previous monitoring report and target control is to be undertaken in the 2014-2015 on site environmental management period (TCPL 2014).

Leaf litter decreased significantly at both rehabilitation zones and at the Control (LSF) Zone between January 2014 and November 2014 (see groundcover statistical analysis in Volume 2, Section 3.7). It is predicted that this reduction is a result of reduced plant growth and a subsequent increase in leaf litter decomposition during the dry conditions experienced throughout 2014.

Large Woody Debris (LWD) remained steady or increased at all Control (LSF) monitoring. LWD increased in all Rehab Zone 2 plots; Plot 7 recorded almost double the amount of LWD in November 2014 compared to January 2014. It is likely that increases in LWD are a result of management activities. No sections of LWD were recorded in Rehab Zone 2 Plot 8 nor at any Rehab Zone 3 & 4 plots (Volume 2, Section 3.2).

4.2.2 Terrestrial fauna & habitat

Similar to previous monitoring periods, species richness and guild diversity is greater at the control sites compared to the rehabilitation sites (see Cluster and nMDS analysis in Figure 4-2 and 4-3, Volume 2, Section 4). The nMDS plot continues to display a defined difference in bird species composition between the control plots and the rehabilitated plots. Control areas continue to display stability, with data from all plots and monitoring periods clustered more closely together than the rehabilitated areas.

Species diversity was reduced at Fauna Rehab 1 compared to the September and October surveys in 2013 (Section 4, Volume 2). During the winter survey period (August 2014), this site was noise-affected on the first replicate and weather-affected (rain) on the second which would have impacted on species diversity for this monitoring period. Furthermore, there is now no adjoining source of forest from which birds can visit this site, because it has been cleared for the northern extension (Figure 4-1, Volume 2). Fauna Rehab 2 decreased by half in species number from September 2013 to August 2014, which may be partly a result of the second replicate being weather-affected (rain) during the August 2014 survey. Species diversity increased again in November 2014 at Fauna Rehab 2, despite being affected by noise (Section 4, Volume 2).

Species abundance has varied since the first monitoring period in September 2011 at the control sites and it is unclear if impacts associated with the northern mine extension, including increased disturbance, vehicle movement and noise, detected in the winter and spring 2014 surveys, have impacted on Fauna Cont 3 and 4. Fauna Cont 3 will be replaced by Fauna Cont 5 LSF in the 2015 monitoring period, however Fauna Cont 4 will be continue to be monitored to observe any impacts.

The Rehabilitation Monitoring Program for Tarrawonga Coal Mine (ELA 2011) recommends targeted monitoring for several threatened bird species; four of these species as well as six additional threatened bird species have been recorded on site since rehabilitation monitoring began in 2011. During the 2014 monitoring period five threatened bird species were recorded in the control zones (Table 4-1). Although *Pomatostomus temporalis temporalis* (Grey-crowned Babbler) have been sighted during surveys in

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paddock trees on the adjoining property to the east, they were recorded on site at Fauna Cont 4 for the first time since the pre-mining environment on the ML (Table 4-1). No threatened species were recorded in the rehabilitated plots. Threatened species recorded in the 2014 winter and spring surveys include:

- Chthonicola sagittata (Speckled Warbler)
- Climacteris picumnus (Brown Treecreeper)
- Glossopsitta pusilla (Little Lorikeet)
- Hieraaetus morphnoides (Little Eagle)
- Pomatostomus temporalis temporalis (Grey-crowned Babbler)

Of the non-bird fauna *Macropus giganteus* (Eastern Grey Kangaroo) was recorded at all rehabilitation and control zones, and *Macropus robustus* (Common Wallaroo) was also recorded at all zones with the exception of Fauna Cont 5 (Table 4-2, Volume 2). *Macropus rufogriseus* (Red-necked Wallaby) was recorded at Fauna Cont 5. These species have been recorded in previous years. The introduced species *Vulpes vulpes* (Fox) was recorded on Fauna Cont 4 and *Lepus capensis* (Hare) was recorded at Fauna Rehab 1. Neither of these species has been recorded by ELA previously (Table 4-2, Volume 2).

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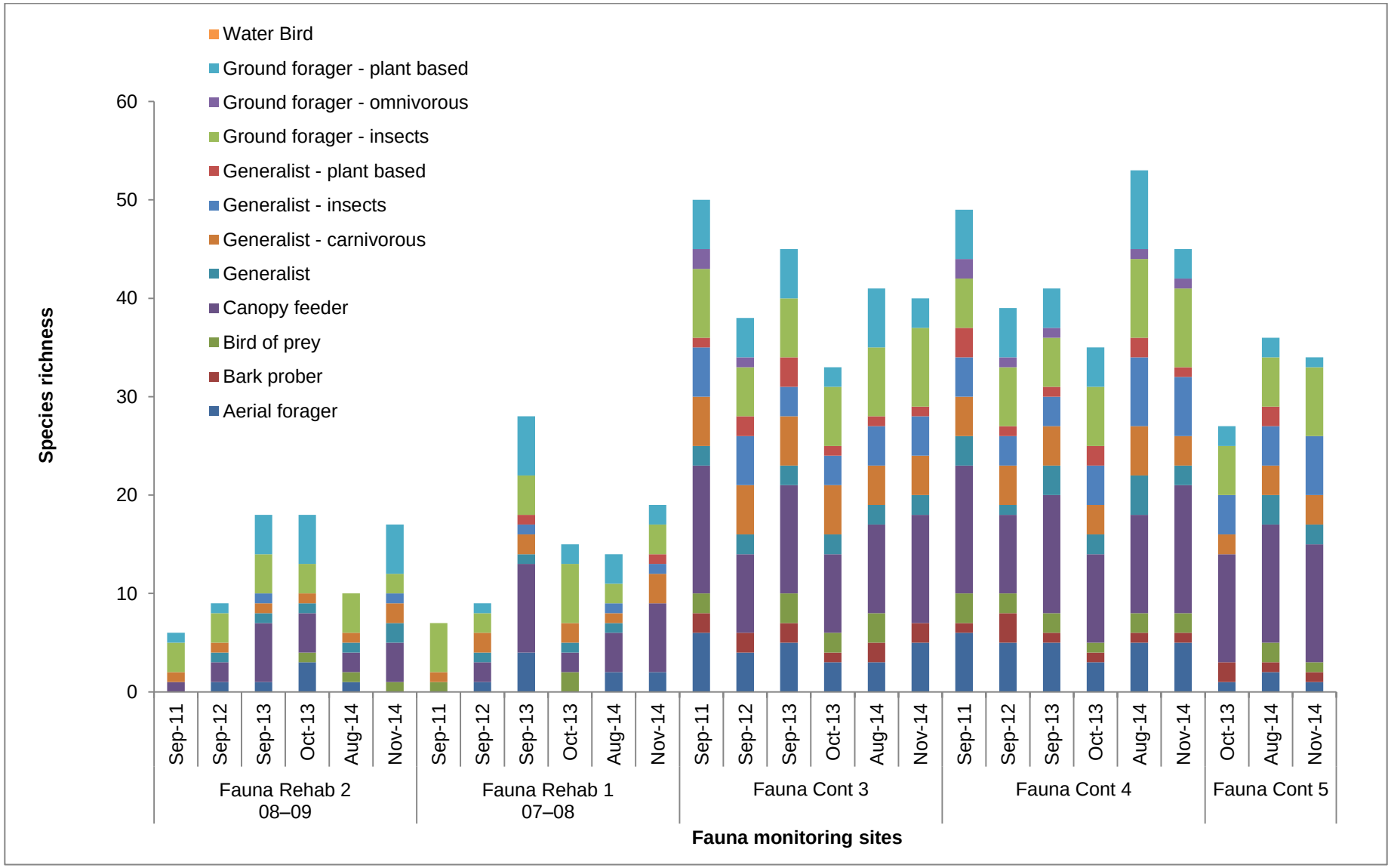

Figure 4-2: Bird species richness and associated feeding guilds recorded at all spring monitoring sites (2011 - 2014)

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Table 4-1: Threatened bird species recorded, including those requiring target searches (cells shaded green) as per the RMP, at Tarrawonga Mine (2011 - 2014)

Species	Conservation status	Fauna Rehab 01				Fauna Rehab 02				Fauna Control 03				Fauna Control 04				Fauna Control 05	
		2011	2012	2013	2014	2011	2012	2013	2014	2011	2012	2013	2014	2011	2012	2013	2014	2013	2014
Calyptorhynchus lathami Glossy Black Cockatoo	TSC Act - Vulnerable	not yet recorded on site																	
Chthonicola sagittata Speckled Warbler	TSC Act - Vulnerable			X						X	X	X	X	X	X	X	X	X	X
Circus assimilis Spotted Harrier	TSC Act - Vulnerable	X												X			X		
Climacteris picumnus Brown Treecreeper	TSC Act - Vulnerable											X	X		X				
Daphoenositta chrysoptera Varied Sittella	TSC Act - Vulnerable									X	X	X	X				X		X
Glossopsitta pusilla Little Lorikeet	TSC Act - Vulnerable									X									X
Hieraaetus morphnoides Little Eagle	TSC Act - Vulnerable											X	X		X	X	X		X
Hirundapus caudacutus White-throated Needletail	EPBC Act - Migratory													X					
Lophoictinia isura Square-tailed Kite	TSC Act - Vulnerable									X									
Melanodryas cucullata Hooded Robin	TSC Act - Vulnerable	not yet recorded on site																	
Neophema pulchella Turquoise Parrot	TSC Act - Vulnerable									X		X							
Pomatostomus temporalis temporalis Grey-crowned Babbler	TSC Act - Vulnerable																X		

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4.2.3 Soil survey

The soil pit in the rehabilitation area showed that root establishment for grasses was occurring down to 0.10m. Only one horizon was identified, consisting of brown sandy clay with chunks of medium – heavy clay surrounded by rocks varying from 10 – 30mm up to a depth of 0.46 m. The soil pit in the control area had 3 horizons with only horizon A being distinct, which had 0.24 m of brown soil containing minimal organic matter. Tree roots extended to 0.60 m.

Full descriptions of soil profiles are provided in Volume 2, Section 5.

4.2.4 Monitoring triggers

Exotic fauna and weed infestation is the only monitoring trigger requiring action at present (Table 4-2).

Table 4-2: Management recommendations for woodland zones

Trigger	2014 monitoring outcomes	Management
Statistically significant decline detected in either: • Native overstorey (cover, health, richness, recruitment) • Mid storey (cover, richness) • Ground cover (cover, richness • Weeds (cover, richness) • % ground cover	Significant decline in native species cover at Rehabilitation Zone 3 & 4 and the Control (LSF) Zone.	No management actions required at this stage as the decline in native species cover is predicted to be a result of the drought conditions experienced since the previous survey period (January 2014).
Exotic fauna	A Fox was recorded on Fauna Cont 4 and a Hare was recorded on Fauna Rehab 1.	Refer to MCP and/or DPI for management procedures.
Weed infestation	African Boxthorn persists on site.	Refer to MCP and/or DPI for management procedures.
Soil erosion	None identified	No management actions required at this stage.

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5 Conclusion & recommendations

5.1 Remote sensing

Image capture for 2014 was undertaken in early September 2014 to minimise seasonal variations and allow for field validation, as suggested in the previous monitoring report (ELA 2014). The majority of significant change in PAB across the site was attributed to the Tarrawonga Mine extension and associated activities or to rehabilitation works.

Land surface stability assessment using LiDAR is also recommended in the RMP. Acquisition of these data will enable quantitative temporal comparison of key land surface condition parameters in both the agricultural and native vegetation environments.

5.2 Woodland surveys

Monitoring in the control and rehabilitation areas in November 2014 is consistent with the previous monitoring period (January 2014) and the results are indicative of the drier than average conditions experienced prior to and throughout 2014, i.e. a continued natural decline in native species cover.

Rehab Zone 2 has a significantly greater amount of exotic weed cover compared to the Control (LSF) Zone. The number of exotic species recorded at Rehab Zone 2 in November 2014 is the highest since monitoring commenced in 2011. Additionally, Rhodes Grass persists across Rehab Zone 2 and the organic leaf litter is comprised of >75% up to >95% Rhodes Grass and/or exotic annuals at all plots, indicating that exotic weed cover was greater prior to the November 2014 survey.

Shrub diversity in the midstorey is poor at the rehabilitation zones compared to the control zone. The midstorey at the rehabilitation zones is currently comprised of juvenile *Eucalyptus* spp. and other canopy species which means that there is a likelihood that once these species reach maturity, the midstorey will be lacking in both diversity and structure. Unless there is a significant non-*Eucalyptus* midstorey layer, there is also a risk that the *Manorina melanocephala* (Noisy Miner) will invade the rehabilitation zones once the canopy species mature. The Noisy Miner is known to be aggressive towards other bird species, including a range of threatened species, and its preferred habitat includes forest and woodland with a reduced understorey, as found at the rehabilitation zones. Additionally, aggressive exclusion of birds from woodland and forest habitat by abundant Noisy Miners is now listed as a Key Threatening Process under Schedule 3 of the TSC Act (OEH 2013).

The 2014 winter and spring bird surveys detected an increase of vehicle movement, disturbance and noise surrounding Fauna Cont 4. It is unclear whether this change has had an impact on species diversity and monitoring will continue to observe any changes. Fauna Rehab 1 is now disconnected from remnant forest as a result of the mine extension.

The introduced Fox was recorded on Fauna Cont 4 and a Hare was recorded at Fauna Rehab 1. Neither of these species has been recorded by ELA previously.

The following suggestions are made to improve monitoring and rehabilitation outcomes:

- As per the previous monitoring report (ELA 2013), additional shrub species should be planted in the rehabilitation zones to improve habitat complexity. It is important that species selected for planting are native to the local area. This will also encourage small woodland

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birds to move into the rehabilitation zones, particularly at Fauna Rehab 1 as it is now disconnected from the remnant forest

- African Boxthorn is present on site in low abundance; this should be eradicated to prevent proliferation
- It is recommended that regular weed management protocols are applied in Rehab Zone 2 to prevent further proliferation of Rhodes Grass and other exotic species and to promote native species growth
- Rehab Zone 3 & 4 plots currently lack LWD. As such, LWD removed during the mine extension can be deployed across Rehab Zone 3 & 4 plots. This will increase the habitat diversity for reptiles, amphibians, invertebrates and birds.

In order to better understand the use of rehabilitated woodland areas by fauna we recommend that bird abundance data be collected and used in the analysis. This will give WHC a better indication as to whether birds are transient or inhabiting the sites. It will also provide a more detailed understanding of bird species assemblages and species interaction in each area; for example, if a high abundance of Noisy Miners is recorded within an area it is likely that this will be a contributing factor to a reduced bird species diversity.

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Tarrawonga Coal Mine – Rehabilitation Monitoring Report

Volume 2

Spring 2014

Prepared for
Whitehaven Coal Mining Limited

12 February 2015





DOCUMENT TRACKING

ITEM	DETAIL
Project Name	Tarrawonga Rehabilitation Monitoring Report – Spring 2014 (Volume 2)
Project Number	14ARMECO-0023
Project Manager	Nathalie Van Der Veer Phone: 02 8081 2684 92 Taylor St, Armidale, NSW 2350
Prepared by	Rebecca McCue
Reviewed by	Dr Paul Frazier
Approved by	Dr Paul Frazier
Status	Draft
Version Number	1
Last saved on	12 February 2015
Cover photo	Plot 10 woodland rehabilitation in 2011 (top) and November 2014 (below)

This report should be cited as 'Eco Logical Australia 2014. *Tarrawonga Coal Mine - Rehabilitation Monitoring Report Spring 2014*. Prepared for Whitehaven Coal Mining Ltd.'

ACKNOWLEDGEMENTS

This document has been prepared by Eco Logical Australia Pty Ltd with support from Whitehaven Coal Mining Ltd.

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1 Weather data

Table 1-1: Daily weather data from Tarrawonga Mine at time of field surveys

		Date	Min temp (°C)	Average temp (°C)	Max temp (°C)	Rainfall (mm)	Min Wind Speed (m/s)	Average Wind Speed (m/s)	Max Wind Speed (m/s)
Birds	Winter	27/08/2014	10	11.9	15.7	16.8	0	2.1	6.1
		28/08/2014	10.2	15.2	19.6	0	0	3.4	6.7
	Spring	04/11/2014	15.9	22.2	29.3	0	0	2.2	1
		05/11/2014	14.5	22.3	32.4	6.4	0	14.1	1.7
		06/11/2014	11.4	20.5	30.2	0	0	0	1
Soil		07/10/2014	16.6	25.2	33.6	0	0	8.8	2.9
Flora		19/11/2014	11.2	24.6	35.5	0	0	0.9	6.3
		20/11/2014	21.8	29.9	37.3	0	0.6	2.2	6.5

Table 1-2: Tarrawonga Mine and Gunnedah historical monthly weather data

Month	Tarrawonga Mine Monthly Mean[#]						Historical Averages[*]			
	Min Temp (°C)	Max Temp (°C)	Rainfall (mm)	Cumulative rainfall (mm)	No. of rain days	Maximum daily rainfall (mm)	Min Temp (°C)	Max Temp (°C)	Rainfall (mm)	No. of rain days
Nov-13	12.7	30.4	57.0	57.0	9	6.0	15.1	28.5	68.7	7.4
Dec-13	17.2	38.3	16.8	73.8	4	18.4	17.4	31	70.7	7.7
Jan-14	18.2	36.1	8.4	82.2	5	67.8	18.9	32	84	7.1
Feb-14	18.0	34.1	40.8	123	5	20.0	18.7	31.1	73.7	6.5
Mar-14	15.9	29.4	168	291	12	54.4	16.6	29.1	42.9	4.9
Apr-14	11.4	26.3	8.2	299.2	4	1.0	12.8	25.2	38.1	4.5
May-14	6.1	21.7	17	316.2	6	11.8	8.7	20.3	44.1	5.4
Jun-14	3.5	18.0	54.6	370.8	12	24.0	6.1	16.9	40.2	6.5
Jul-14	0.7	17.4	12	382.8	6	24.2	4.7	16.1	42.7	6.2
Aug-14	2.4	18.6	90.8	473.6	8	4.2	5.9	18	35.3	6.2
Sep-14	4.7	22.9	11	484.6	3	15.8	8.6	21.5	39.7	5.9
Oct-14	9.4	29.8	24.6	509.2	5	10.2	12.2	25.2	57.3	7.4
Nov-14	14.2	31.7	16.4	525.6	5	21.2	15.1	28.5	68.7	7.4

Tarrawonga Mine data; * Gunnedah Resource Centre Station 55024 (BoM 2015)

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2 Remote sensing analysis

Zone	Year Rehabilitated	Comment*
Rehabilitation Zone 1	2009/2010	No significant change.
Rehabilitation Zone 2	2007/2008	No substantial areas of significant change. Increase in PAB along depressions between contour banks, likely due to moisture retention during the higher than average rainfall in August 2014 and a consequential increase in groundcover.
Rehabilitation Zone 3	2008/2009	No significant change.
Rehabilitation Zone 4	2008/2009	No significant change. Cleared areas to the north and west of the zone due to mining activities.
Rehabilitation Zone 5	2012/2013	No significant change. A decrease in PAB to the east of the rehabilitation zone within the mine operations area.
Rehabilitation Zone 6	2012/2013	No substantial areas of significant change. Small linear zone in the east with decreased PAB, possibly due to a decrease in groundcover or a widening of the contour access track. Significant increase in groundcover outside of the zone to the east and north-east due to rehabilitation works.
Native Woodland 1 (LSF)	N/A	No significant change. Cleared area to the north- east of the zone.
Outside of Mining Lease	N/A	A decrease in vegetation along the road running north-south to the east of the mining lease that is associated with road widening activities. No areas of significant change within Leard State Forest with the exception of mine extension.

* Significant change determined by (areas >0.1 ha with >$\pm$ 2 standard deviations from average)

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3 Native vegetation monitoring

Table 3-1: Location of native vegetation monitoring plots

Treatment		Plot	Start Easting	Start Northing	Transect Bearing (°)
Control 1	Established 2011	1	No longer being monitored		
		2	No longer being monitored		
		3	No longer being monitored		
		4	No longer being monitored		
		5	No longer being monitored		
Rehab Zone 2		6	227083	6608091	10
		7	227053	6607908	20
		8	227063	6607720	160
		9	227203	6607927	360
		10	227208	6607711	210
Rehab Zone 3 & 4	Established 2013	11	227247	6607537	320
		12	227328	6608043	80
		13	227224	6608137	270
		14	227330	6608154	80
		15	227153	6608231	250
Control (LSF)		16	230451	6608213	220
		17	230631	6608205	110
		18	230398	6608070	330
		19	230237	6607982	10
		20	230496	6607909	180

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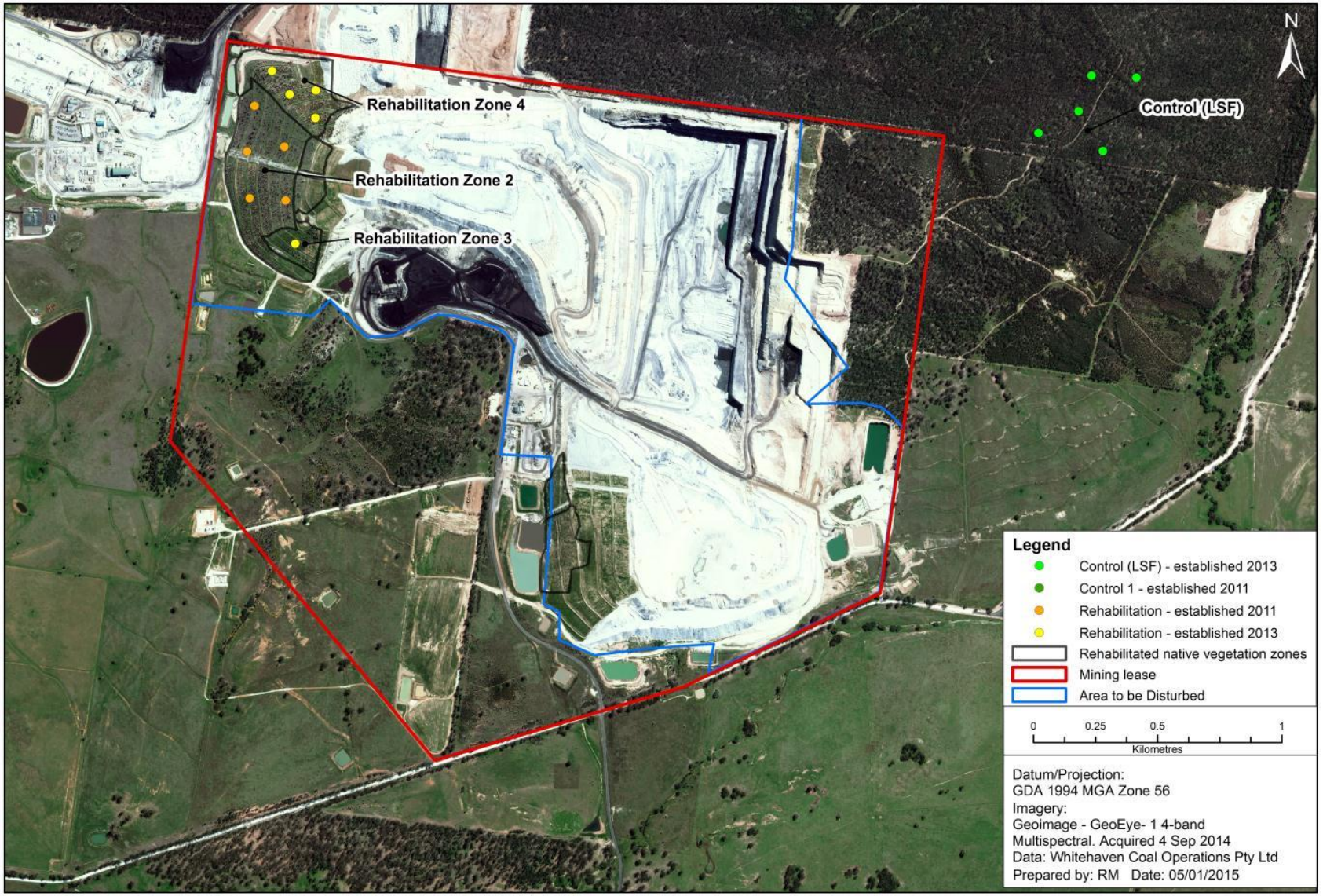

Figure 3-1: Native vegetation monitoring plots (2014)

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3.1 Plot photographs

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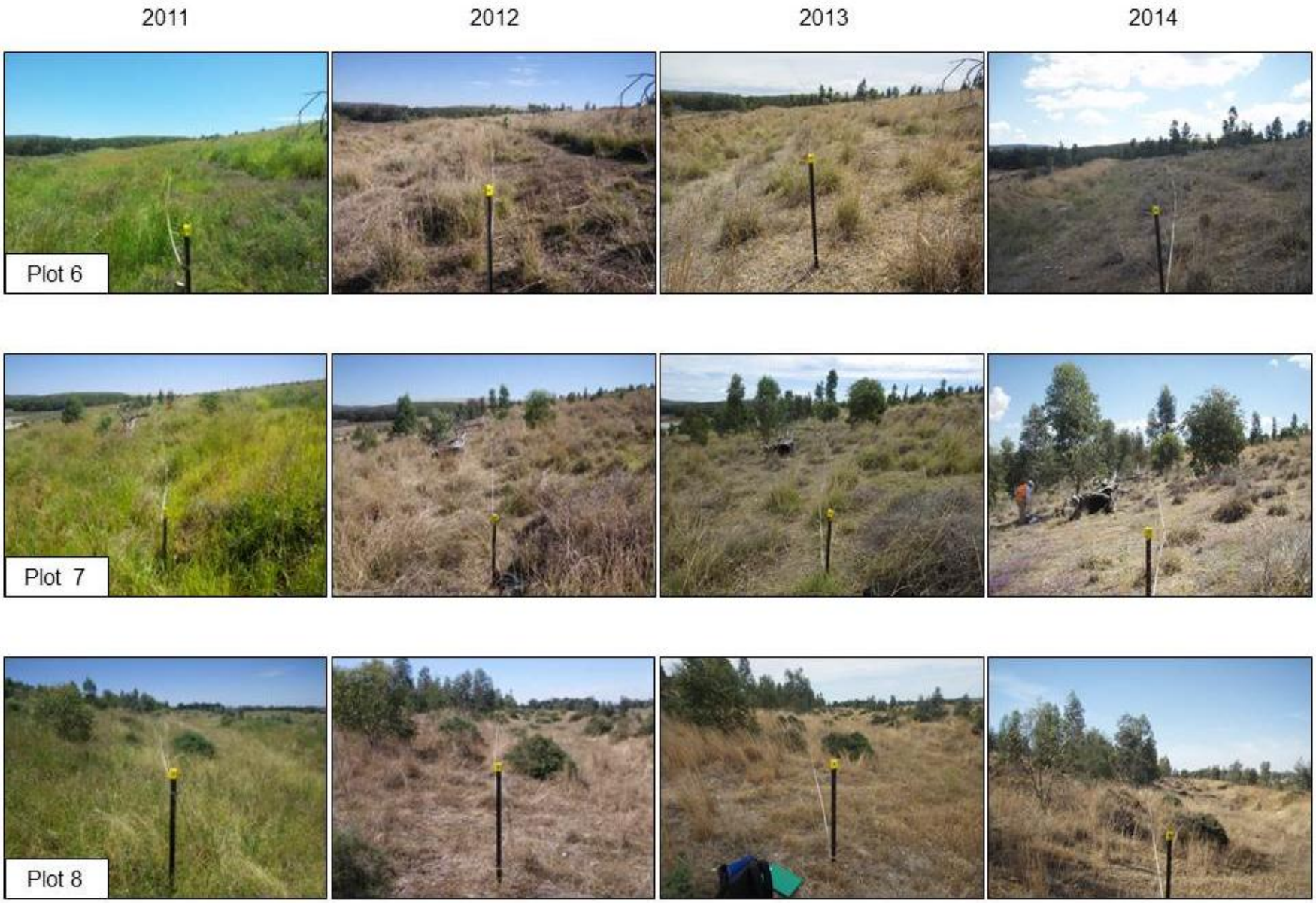

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Established January 2014

January 2014	November 2014	January 2014	November 2014
Plot 11		Plot 12	
Plot 13		Plot 14	
Plot 15		Plot 16	

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Established January 2014

January 2014	November 2014	January 2014	November 2014
 Plot 17		 Plot 18	
 Plot 19		 Plot 20	

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3.2 Canopy & midstorey information

Table 3-2: Habitat characteristics of rehabilitated plots 6 to 7 (2011- 2014)

Treatment		Rehab Zone 2 (rehabilitated 2007/2008)																			
Plot number		6				7				8				9				10			
Monitoring year		2011	2012	Jan-14	Nov-14	2011	2012	Jan-14	Nov-14	2011	2012	Jan-14	Nov-14	2011	2012	Jan-14	Nov-14	2011	2012	Jan-14	Nov-14
Vegetation type		Rehab area - derived grassland																			
Canopy DBH Thresholds	More than 1 stratum?	N	N	N	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	Large Tree ≥	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Mature Tree ≥	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Advanced Regrowth (xcm to xcm)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Sapling ≤ xcm to xcm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Seedlings < xcm dbh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Canopy ≥ xm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Midstorey xm to xm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Ground layer ≤ xm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Canopy Species and Age Classes	No. of native canopy species	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	No. of large trees	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Juveniles present (Y/N)	N	N	N	N	N	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	Mature trees present (Y/N)	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
	Seedlings present (Y/N)	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
	Advanced regrowth present (Y/N)	N	N	N	N	N	N	N	Y	N	N	N	N	N	N	N	N	N	N	N	N
Coarse Woody Debris	Total length of CWD (m)	68	82	89	92	31	101	70	136	0	0	0	0	26	47	49	59	28	29	67	95
	No. of sections of CWD	11	27	20	29	7	46	16	49	0	0	0	0	6	17	12	22	8	14	12	29
Midstorey, Understorey Species	No. of native midstorey species	0	0	0	0	3	4	4	3	4	5	4	4	3	5	4	5	4	2	5	5
	No. of native species in ground layer	14	10	7	11	9	6	4	6	22	6	14	10	12	6	8	6	6	4	4	6
Transect	% Projected Crown Cover- Canopy Species	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	% Projected Crown Cover - Midstorey Species	0	0	0	0	0	0	0	0	0	0	0	0	0	8	14	16	4	4	8	6
	% True Projected Crown Cover- Canopy Species	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	% True Projected Crown Cover - Midstorey Species	0	0	0	0	0	0	3	0	0	0	3	0	0	2	2	2	0	1	4	2

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Table 3-3: Habitat characteristics of rehabilitated plots 11 to 15 and control plots 16 to 20 (January 2013, November 2014)

Treatment		Rehab Zone 3 & 4 (rehabilitated 2008/2009)										Control (LSF)									
Plot number		11		12		13		14		15		16		17		18		19		20	
Monitoring year		Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14
Vegetation type		Mine Rehab										E. crebra; C. glaucophylla woodland				E. crebra woodland					
Canopy DBH Thresholds	More than 1 stratum?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	Large Tree ≥	-	-	-	-	-	-	-	-	-	-	60	-	60	-	60	-	60	-	60	-
	Mature Tree ≥	-	-	-	-	-	-	-	-	-	-	30	-	30	-	30	-	30	-	30	-
	Advanced Regrowth (xcm to xcm)	-	-	-	-	-	-	-	-	-	-	10 to 30	-	10 to 30	-	10 to 30	-	10 to 30	-	10 to 30	-
	Sapling ≤ xcm to xcm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Seedlings < xcm dbh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Canopy ≥ xm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Midstorey xm to xm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Ground layer ≤ xm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Canopy Species and Age Classes	No. of native canopy species	0	0	0	0	0	0	0	0	0	0	2	2	3	2	2	1	2	2	2	2
	No. of large trees	0	0	0	0	0	0	0	0	0	0	2	2	1	1	1	1	0	0	0	0
	Juveniles present (Y/N)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	Mature trees present (Y/N)	N	N	N	N	N	N	N	N	N	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	Seedlings present (Y/N)	N	N	Y	Y	Y	N	Y	N		N	Y	N	Y	Y	Y	Y	Y	Y	Y	N
	Advanced regrowth present (Y/N)	Y	N	N	Y	N	Y	N	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N
Coarse Woody Debris	Total length of CWD (m)	0	0	0	0	0	0	0	0	0	0	128	217	87	133	197	240	200	274	53	-
	No. of sections of CWD	0	0	0	0	0	0	0	0	0	0	45	82	41	59	75	76	60	86	22	-
Midstorey, Understorey Species	No. of native midstorey species	7	5	8	9	8	11	10	8	6	7	6	8	6	6	5	6	6	6	4	3
	No. of native species in ground layer	15	10	13	9	13	16	14	11	10	8	22	19	14	23	14	14	14	15	15	20
Transect	% Projected Crown Cover- Canopy Species	0	0	0	0	0	0	0	0	0	0	74	74	26	48	42	22	34	20	86	80
	% Projected Crown Cover - Midstorey Species	12	4	16	28	12	20	16	4	2	8	18	10	12	22	34	48	12	14	2	2
	% True Projected Crown Cover- Canopy Species	0	0	0	0	0	0	0	0	0	0	3	10	3	6	7	4	7	4	11	10
	% True Projected Crown Cover - Midstorey Species	5	0	3	3	2	4	3	0	0	2	2	1	2	3	6	6	1	1	0	0

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3.3 Overstorey & midstorey cover scores (20 x 50 m woodland plots)

Table 3-4: Overstorey & midstorey cover scores in 20 x 50 m plots for rehabilitated plots 6 to 10 (2011-2014)

O/M	Species	Rehab Zone 2 (rehabilitated 2007/2008)																			
		Plot 6				Plot 7				Plot 8				Plot 9				Plot 10			
		2011	2012	Jan-14	Nov-14	2011	2012	Jan-14	Nov-14	2011	2012	Jan-14	Nov-14	2011	2012	Jan-14	Nov-14	2011	2012	Jan-14	Nov-14
M	*Acacia cheelii* Motherumbah																				
M	*Acacia deanei* Green Wattle																				
M	*Acacia decora* Western Silver Wattle																				
M	*Acacia leiocalyx*																				
M	*Allocasuarina luehmannii* Bulloak										1				1						
M	*Alstonia constricta* Bitter Bark																				
M	*Amyema miquelii*																				
M	*Amyema* sp.																				
M	*Beyeria viscosa* Pinkwood																				
M	*Brachychiton populneus* Flame Tree																				
M	*Callitris glaucophylla* White Cypress Pine																				
M	*Cassinia arcuata* Sifton Bush																				

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O/M	Species	Rehab Zone 2 (rehabilitated 2007/2008)																			
		Plot 6				Plot 7				Plot 8				Plot 9				Plot 10			
		2011	2012	Jan-14	Nov-14	2011	2012	Jan-14	Nov-14	2011	2012	Jan-14	Nov-14	2011	2012	Jan-14	Nov-14	2011	2012	Jan-14	Nov-14
M	*Cassinia laevis* Cough Bush																				
M	*Casuarina cristata* Belah							1	1	1				1		1	1	1		1	1
M	*Dodonaea viscosa* subsp. *angustifolia* Sticky Hop Bush												2								
M	*Eremophila* sp.																				
M	*Eucalyptus albens* White Box					1			3	1	1	1	2	1			3	2	1	1	3
M	*Eucalyptus blakelyi* Blakely's Red Gum					1	2	1		1	1	1	2		1	2	2	1	2	2	2
M	*Eucalyptus crebra* Narrow-leaved Ironbark														1						
M	E*ucalyptus melanophloi*a Silver-leaved Ironbark																				
M	*Eucalyptus melliodora* Yellow Box									1				1		2	2	1	1	1	1
M	*Eucalyptus microcarpa* Grey Box							1	1			2	2								
M	*Eucalyptus populnea* subsp. *bimbil* Bimble Box					1	1	1						1	1	1	2	1	1	2	2

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O/M	Species	Rehab Zone 2 (rehabilitated 2007/2008)																			
		Plot 6				Plot 7				Plot 8				Plot 9				Plot 10			
		2011	2012	Jan-14	Nov-14	2011	2012	Jan-14	Nov-14	2011	2012	Jan-14	Nov-14	2011	2012	Jan-14	Nov-14	2011	2012	Jan-14	Nov-14
M	*Eucalyptus* sp. Ironbark																				
M	*Eucalyptus* sp. Red Gum						1				1				1						
M	*Eucalyptus* sp. Spotted Gum																				
M	*Eucalyptus viridis* Green Mallee					1															
M	*Geijera parviflora* Wilga																				
M	**Lycium ferocissimum* African Boxthorn							1		1	1	1		1							
M	*Lysiana subfalcata*																				
M	*Marsdenia viridiflora* Native Pear																				
M	*Notelaea microcarpa var. microcarpa* Velvet Mock Olive																				
M	*Olearia s*sp. aff. Elliptica																				
M	*Parsonsia eucalyptophylla* Gargaloo																				
M	*Pimelea neo-anglica* Poison Pimelea																				

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O/M	Species	Rehab Zone 2 (rehabilitated 2007/2008)																			
		Plot 6				Plot 7				Plot 8				Plot 9				Plot 10			
		2011	2012	Jan-14	Nov-14	2011	2012	Jan-14	Nov-14	2011	2012	Jan-14	Nov-14	2011	2012	Jan-14	Nov-14	2011	2012	Jan-14	Nov-14
M	*Pittosporum angustifolium* Weeping Pittosporum																				
M	*Psydrax odorata* Shiny-leaved Canthium																				
M	*Senna artemisioides*																				
O	*Callitris glaucophylla* White Cypress Pine																				
O	*Eucalyptus crebra* Narrow-leaved Ironbark																				
O	*Eucalyptus melanophloia* Silver-leaved Ironbark																				
O	*Eucalyptus albens* White Box																				
Total species		**0**	**0**	**0**	**0**	**4**	**3**	**5**	**3**	**5**	**5**	**4**	**4**	**5**	**5**	**4**	**5**	**5**	**4**	**5**	**5**

*Denotes exotic species, O = Overstorey species, M = Midstorey species

Braun-Blanquett cover scores: 1=projected foliage cover <5% of the plot, plants uncommon; 2=projected foliage cover <5% of the plot, plants common; 3=projected foliage cover 6-25%of the plot; 4=projected foliage cover of 26-50% of the plot; 5=projected foliage cover of 51-75% of the plot; 6=projected foliage cover of 76-100% of the plot.

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Table 3-5: Overstorey & midstorey cover scores in 20 x 50 m plots for rehabilitated plots 11 to 15 and control plots 16 to 20 (January 2014, November 2014)

O/M	Species	Rehab Zone 3 & 4 (rehabilitated 2008/2009)										Control (LSF)									
		Plot 11		Plot 12		Plot 13		Plot 14		Plot 15		Plot 16		Plot 17		Plot 18		Plot 19		Plot 20	
		Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14
M	*Acacia cheelii* Motherumbah											2	3				2		2		
M	*Acacia deanei* Green Wattle				1											1		1	1		
M	*Acacia decora* Western Silver Wattle			3	3	1	2	3	3			1	1	2	2			2	2	1	2
M	*Acacia leiocalyx*															3		2			
M	*Allocasuarina luehmannii* Bulloak																				
M	*Alstonia constricta* Bitter Bark											1									
M	*Amyema miquelii*																				
M	*Amyema* sp.						2														
M	*Beyeria viscosa* Pinkwood													2	3	2	2				
M	*Brachychiton populneus* Flame Tree					2	2			1	1	1									
M	*Callitris glaucophylla* White Cypress Pine											2									
M	*Cassinia arcuata* Sifton Bush	1																			
M	*Cassinia laevis* Cough Bush	1	1													1	1	3	3		

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O/M	Species	Rehab Zone 3 & 4 (rehabilitated 2008/2009)										Control (LSF)									
		Plot 11		Plot 12		Plot 13		Plot 14		Plot 15		Plot 16		Plot 17		Plot 18		Plot 19		Plot 20	
		Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14
M	*Casuarina cristata* Belah			1	1	1	2	1	1	1	1										
M	*Dodonaea viscosa* subsp. *angustifolia* Sticky Hop Bush			2	2			2	1												
M	*Eremophila* sp.			1	2		2	1	1												
M	*Eucalyptus albens* White Box		1	2	2					2	1										
M	*Eucalyptus blakelyi* Blakely's Red Gum	2			2	1	2	1													
M	*Eucalyptus crebra* Narrow-leaved Ironbark	2	1	2	2			1													
M	E*ucalyptus melanophloi*a Silver-leaved Ironbark																				
M	*Eucalyptus melliodora* Yellow Box					2	2	2	2	2	1										
M	*Eucalyptus microcarpa* Grey Box	1	2	2	2					2	1										
M	*Eucalyptus populnea* subsp. *bimbil* Bimble Box	2	2				2		1	2	2										
M	*Eucalyptus* sp. (unknown)						1				1										
M	*Eucalyptus* sp. Ironbark					1		1													

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O/M	Species	Rehab Zone 3 & 4 (rehabilitated 2008/2009)										Control (LSF)									
		Plot 11		Plot 12		Plot 13		Plot 14		Plot 15		Plot 16		Plot 17		Plot 18		Plot 19		Plot 20	
		Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14
M	*Eucalyptus* sp. Red Gum							1													
M	*Eucalyptus* sp. Spotted Gum																				
M	*Eucalyptus viridis* Green Mallee	1																			
M	*Geijera parviflora* Wilga												1	1	1						
M	*Indigofera adesmiifolia* Tick Indigo												1								
M	**Lycium ferocissimum** African Boxthorn			1	1	1															
M	*Lysiana subfalcata*													1	1						
M	*Marsdenia viridiflora* Native Pear																				
M	*Notelaea microcarpa var. microcarpa* Velvet Mock Olive												1		1	1	1			1	2
M	*Olearia* ssp. aff. e*lliptica*											1	1						1		
M	*Parsonsia eucalyptophylla* Gargaloo												1							1	
M	*Pimelea neo-anglica* Poison Pimelea												1	1			1			1	1
M	*Pittosporum angustifolium*													1	1			1	1		

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O/M	Species	Rehab Zone 3 & 4 (rehabilitated 2008/2009)										Control (LSF)									
		Plot 11		Plot 12		Plot 13		Plot 14		Plot 15		Plot 16		Plot 17		Plot 18		Plot 19		Plot 20	
		Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14
	Weeping Pittosporum																				
M	*Psydrax odorata* Shiny-leaved Canthium																	1			
M	*Senna artemisioides*			1		1	2	2	2												
O	*Callitris glaucophylla* White Cypress Pine											3	3	3	3	3	3	3	3	3	3
O	*Eucalyptus crebra* Narrow-leaved Ironbark											3	3	3	3	3	3	3	3	3	3
O	*Eucalyptus melanophloia* Silver-leaved Ironbark																				
O	*Eucalyptus albens* White Box													1							
Total species		**7**	**5**	**9**	**10**	**8**	**10**	**10**	**7**	**6**	**7**	**8**	**10**	**9**	**8**	**7**	**7**	**8**	**8**	**6**	**5**

*Denotes exotic species, O = Overstorey species, M = Midstorey species

Braun-Blanquett cover scores: 1=projected foliage cover <5% of the plot, plants uncommon; 2=projected foliage cover <5% of the plot, plants common; 3=projected foliage cover 6-25%of the plot; 4=projected foliage cover of 26-50% of the plot; 5=projected foliage cover of 51-75% of the plot; 6=projected foliage cover of 76-100% of the plot.

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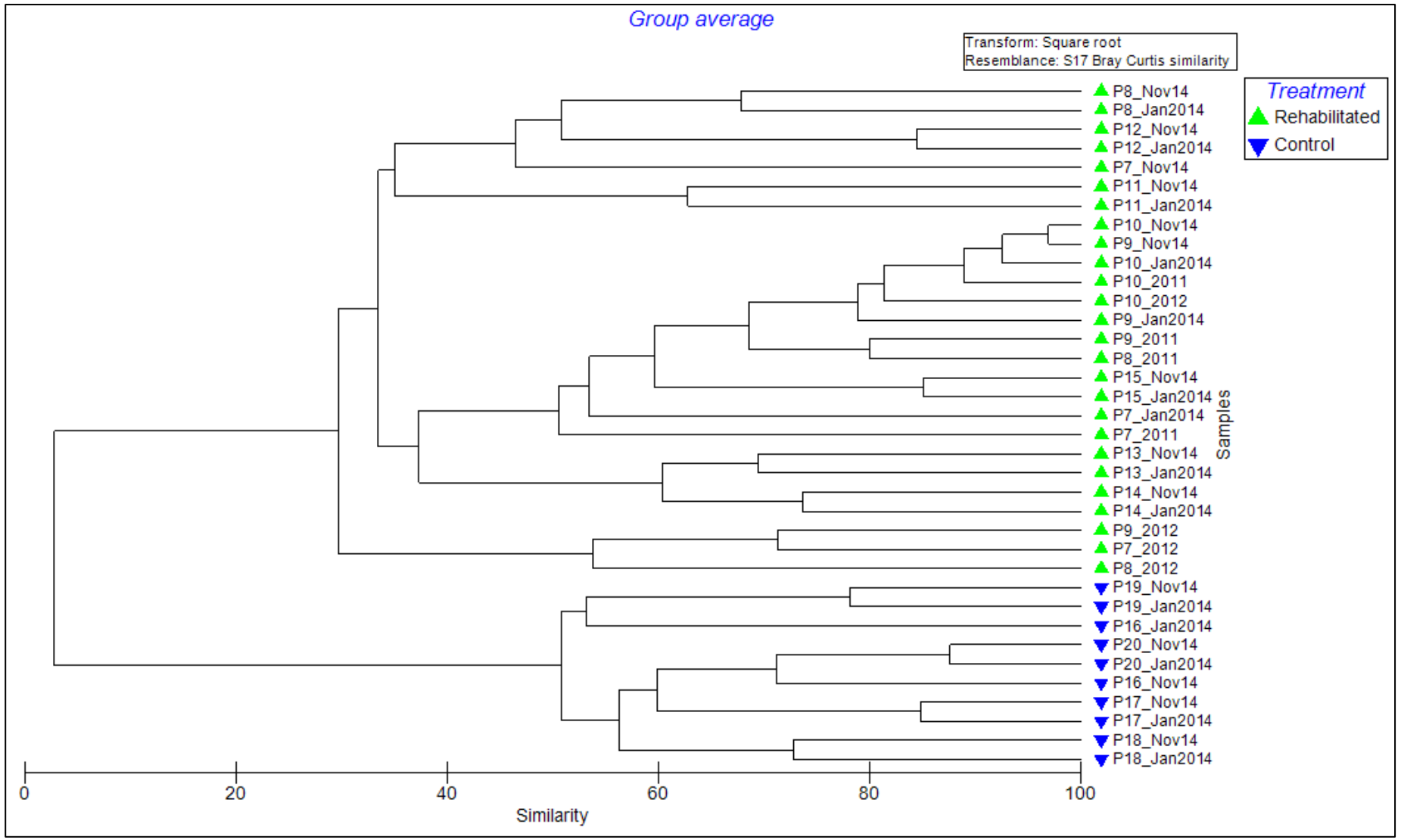

Figure 3-2: Cluster analysis of midstorey and canopy species composition in monitoring plots

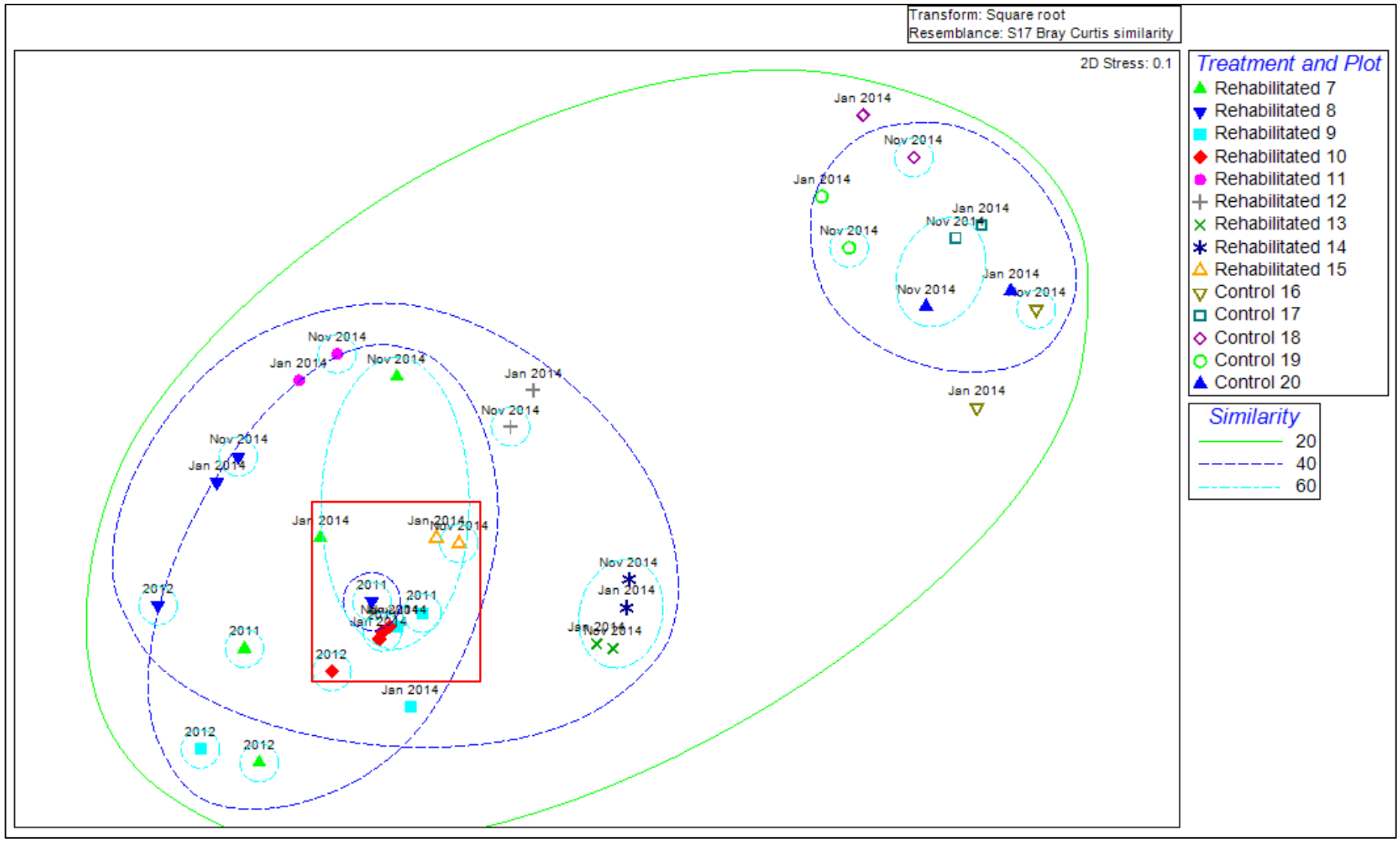

Figure 3-3: nMDS of midstorey and canopy species composition in monitoring plots for 2011- 2014 (red square indicates data captured in nMDS subset in Figure 3-4)

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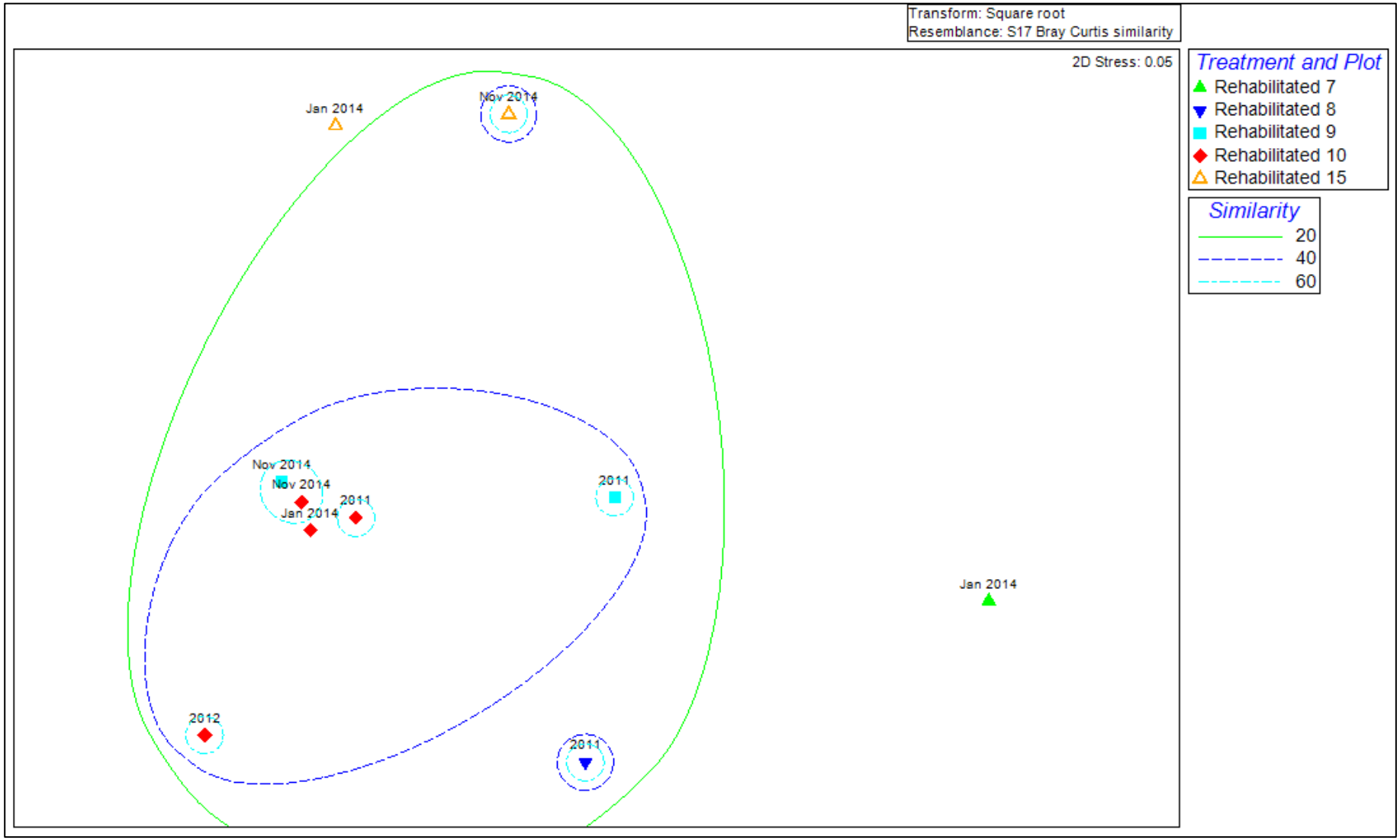

Figure 3-4: nMDS subset of midstorey and canopy species composition in monitoring plots

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3.4 Tree & shrub species >1 m tall in 20 x 20 m plot

Table 3-6: Overstorey & midstorey cover scores in 20 x 20 m plots for rehabilitated plots 6 to 10 (2011-2014)

Species	Rehab Zone 2 (rehabilitated 2007/2008)																			
	Plot 6				Plot 7				Plot 8				Plot 9				Plot 10			
	2011	2012	Jan-14	Nov-14	2011	2012	Jan-14	Nov-14	2011	2012	Jan-14	Nov-14	2011	2012	Jan-14	Nov-14	2011	2012	Jan-14	Nov-14
Acacia cheelii Motherumbah																		2		
Acacia deanei Green Wattle																				
Acacia decora Western Silver Wattle																				
Acacia leiocalyx																				
Allocasuarina luehmannii Bulloak										1				1						
Alstonia constricta																		2		
Amyema miquelii																				
Beyeria viscosa Pinkwood																				
Brachychiton populnea																				
Callitris glaucophylla White Cypress Pine																				
Cassinia laevis Cough Bush																				
Casuarina cristata							1	1	1		1	2	1		1	1	1		1	1

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Species	Rehab Zone 2 (rehabilitated 2007/2008)																			
	Plot 6				Plot 7				Plot 8				Plot 9				Plot 10			
	2011	2012	Jan-14	Nov-14	2011	2012	Jan-14	Nov-14	2011	2012	Jan-14	Nov-14	2011	2012	Jan-14	Nov-14	2011	2012	Jan-14	Nov-14
Dodonaea viscosa subsp. *angustifolia* Sticky Hop-bush																				
Dodonaea viscosa subsp. *cuneata* Sticky Hop-bush																				
Eremophila sp.																				
Eucalyptus albens White Box					1			2	1	1		2	1			3	1		1	3
Eucalyptus blakelyi Blakely's Red Gum						1	1		1	1	2			1	2				1	
Eucalyptus crebra Narrow-leaved Ironbark														1						
Eucalyptus melanophloia Silver-leaved Ironbark																		1		
Eucalyptus melliodora													1		2	2	1			
Eucalyptus microcarpa Inland Grey Box							1	1			1	2								
Eucalyptus populnea					1	1	1										1		2	2
Eucalyptus sp. (Spotted Gum)						1				1				1						

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Species	Rehab Zone 2 (rehabilitated 2007/2008)																			
	Plot 6				Plot 7				Plot 8				Plot 9				Plot 10			
	2011	2012	Jan-14	Nov-14	2011	2012	Jan-14	Nov-14	2011	2012	Jan-14	Nov-14	2011	2012	Jan-14	Nov-14	2011	2012	Jan-14	Nov-14
Eucalyptus sp. (Ironbark)																				
Eucalyptus sp. (Red Gum)																				
Eucalyptus viridis					1				1											
Geijera parviflora Wilga																				
Indigofera adesmiifolia																				
**Lycium ferocissimum* African Boxthorn					1		1		1	1	1	1	1				1	1		
Lysiana subfalcata																				
Notelaea microcarpa																				
Olearia sp. aff. *elliptica*																				
Parsonsia eucalyptophylla Gargaloo																				
Pimelea neo-anglica																				
Pittosporum angustifolium																				
Psydrax odorata Shiny-leaved Canthium																				

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Species	Rehab Zone 2 (rehabilitated 2007/2008)																			
	Plot 6				Plot 7				Plot 8				Plot 9				Plot 10			
	2011	2012	Jan-14	Nov-14	2011	2012	Jan-14	Nov-14	2011	2012	Jan-14	Nov-14	2011	2012	Jan-14	Nov-14	2011	2012	Jan-14	Nov-14
Psydrax sp.																				
Senna artemisioides																				
Total	**0**	**0**	**0**	**0**	**4**	**3**	**5**	**3**	**5**	**5**	**4**	**4**	**4**	**4**	**3**	**3**	**5**	**4**	**4**	**3**

*Denotes exotic species

Braun-Blanquett cover scores: 1=projected foliage cover <5% of the plot, plants uncommon; 2=projected foliage cover <5% of the plot, plants common; 3=projected foliage cover 6-25%of the plot; 4=projected foliage cover of 26-50% of the plot; 5=projected foliage cover of 51-75% of the plot; 6=projected foliage cover of 76-100% of the plot.

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Table 3-7: Overstorey and midstorey cover scores in 20 x 20 m plots for rehabilitated plots 11 to 15 and control plots 16 to 20 (January 2014, November 2014)

Species	Rehab Zone 3 & 4 (rehabilitated 2008/2009)										Control (LSF)									
	Plot 11		Plot 12		Plot 13		Plot 14		Plot 15		Plot 16		Plot 17		Plot 18		Plot 19		Plot 20	
	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14
Acacia cheelii Motherumbah											2	3				2		2		
Acacia deanei Green Wattle				1											1					
Acacia decora Western Silver Wattle			3	3	2	1	3	3			1	1	1	2			1	2		2
Acacia leiocalyx															3		2			
Allocasuarina luehmannii Bulloak																				
Alstonia constricta											1									
Amyema miquelii																				
Beyeria viscosa Pinkwood															2	2				
Brachychiton populnea											1									
Callitris glaucophylla White Cypress Pine											3	3	3	3		3	3	3	3	3
Cassinia laevis Cough Bush															1	1	3	3		
Casuarina cristata			1	1	1	2	1	1	1											
Dodonaea viscosa subsp. *angustifolia* Sticky Hop-bush								1												

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Species	Rehab Zone 3 & 4 (rehabilitated 2008/2009)										Control (LSF)									
	Plot 11		Plot 12		Plot 13		Plot 14		Plot 15		Plot 16		Plot 17		Plot 18		Plot 19		Plot 20	
	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14
Dodonaea viscosa subsp. *cuneata* Sticky Hop-bush			1	2			2													
Eremophila sp.			1	2		1	1	2												
Eucalyptus albens White Box			1	2					1				1							
Eucalyptus blakelyi Blakely's Red Gum	1			2	1	2	1													
Eucalyptus crebra Narrow-leaved Ironbark	1	1	2								3	3	3	3		3	3	3	3	3
Eucalyptus melanophloia Silver-leaved Ironbark																				
Eucalyptus melliodora					2	1	2	2	1	1										
Eucalyptus microcarpa Inland Grey Box	1	2	2	2					1	1										
Eucalyptus populnea		3			2	2		1	2	2										
Eucalyptus sp. (unknown)						1														
Eucalyptus sp. (Spotted Gum)																				
Eucalyptus sp. (Ironbark)							1													

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Species	Rehab Zone 3 & 4 (rehabilitated 2008/2009)										Control (LSF)									
	Plot 11		Plot 12		Plot 13		Plot 14		Plot 15		Plot 16		Plot 17		Plot 18		Plot 19		Plot 20	
	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14
Eucalyptus sp. (Red Gum)																				
Eucalyptus viridis	1																			
Geijera parviflora Wilga																				
Indigofera adesmiifolia												1								
**Lycium ferocissimum* African Boxthorn					1															
Lysiana subfalcata																				
Notelaea microcarpa												1			1				1	2
Olearia sp. aff. *elliptica*												1								
Parsonsia eucalyptophylla Gargaloo																				
Pimelea neo-anglica												1	1						1	1
Pittosporum angustifolium																	1	1		
Psydrax odoratum Shiny-leaved Canthium																				
Psydrax sp.																				
Senna			2		1	1	2	1												

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Species	Rehab Zone 3 & 4 (rehabilitated 2008/2009)										Control (LSF)									
	Plot 11		Plot 12		Plot 13		Plot 14		Plot 15		Plot 16		Plot 17		Plot 18		Plot 19		Plot 20	
	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14
artemisioides																				
Total	**4**	**3**	**8**	**8**	**7**	**8**	**8**	**7**	**5**	**3**	**6**	**8**	**5**	**3**	**5**	**5**	**6**	**6**	**4**	**5**

*Denotes exotic species

Braun-Blanquett cover scores: 1=projected foliage cover <5% of the plot, plants uncommon; 2=projected foliage cover <5% of the plot, plants common; 3=projected foliage cover 6-25%of the plot; 4=projected foliage cover of 26-50% of the plot; 5=projected foliage cover of 51-75% of the plot; 6=projected foliage cover of 76-100% of the plot.

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3.5 Groundcover species – Braun-Blanquet cover scores

Table 3-8: Groundcover species cover scores in 20 x 50 m rehabilitated plots 6 to 10 (2011- 2014)

Species	Rehab Zone 2 (rehabilitated 2007/2008)																			
	Plot 6				Plot 7				Plot 8				Plot 9				Plot 10			
	2011	2012	Jan-14	Nov-14	2011	2012	Jan-14	Nov-14	2011	2012	Jan-14	Nov-14	2011	2012	Jan-14	Nov-14	2011	2012	Jan-14	Nov-14
**Abutilon* sp.																				
Ajuga australis Austral Bugle																				
**Anagallis arvensis* Scarlet Pimpernel		2	2	2			2	2		2		2		2		2		1	1	2
Arthropodium sp. *B*																				
**Aristida leptopoda* White Speargrass											1									
Aristida personata Purple Wire-grass								1		3	2				1				1	
**Aster subulatus* Wild Aster	1			1		2				1								1		
Austrostipa ramosissima Stout Bamboo Grass																				
Austrostipa scabra Speargrass										2	2			1						
Austrostipa sp.																				
Austrostipa verticillata																				
**Bidens subalternans*																				1

Species	Rehab Zone 2 (rehabilitated 2007/2008)																			
	Plot 6				Plot 7				Plot 8				Plot 9				Plot 10			
	2011	2012	Jan-14	Nov-14	2011	2012	Jan-14	Nov-14	2011	2012	Jan-14	Nov-14	2011	2012	Jan-14	Nov-14	2011	2012	Jan-14	Nov-14
Boerhavia sp. Tar-vine																				
Bothriochloa decipiens Red Grass									3	4	3									
Bothriochloa sp.				2				1				3				1				
Brachychiton populneus Kurrajong																				
**Bromus molliformis* Soft Brome												1								
Brunoniella australis Blue Trumpet																				
Bulbine sp.																				
Calotis cuneifolia Purple Burr-daisy																				
Calotis lappulacea Yellow Burr-daisy	1	2	1	1					1		2					2				1
Carex inversa Knob Sedge	1			1							2									
**Carthamus lanatus* Saffron Thistle	2	1	1	3	1	2	2	3				1	2		2	2				1
**Centaurea melitensis* Maltese Cockspur				2						2	2	3								2
**Centaurium erythraea* Common Centaury																		1		

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Species	Rehab Zone 2 (rehabilitated 2007/2008)																			
	Plot 6				Plot 7				Plot 8				Plot 9				Plot 10			
	2011	2012	Jan-14	Nov-14	2011	2012	Jan-14	Nov-14	2011	2012	Jan-14	Nov-14	2011	2012	Jan-14	Nov-14	2011	2012	Jan-14	Nov-14
**Centaurium* sp.	2																1			
Chamaesyce sp.											1									
Cheilanthes distans Bristly cloak fern																				
Cheilanthes sieberi Poison Mulga Fern																				
**Chloris gayana* Rhodes Grass	4	5	4	3	4	5	5	3		2	2		4	5	4	4	5	6	4	4
Chloris truncata Windmill Grass									2											
Chloris ventricosa Plump Windmill Grass																				
**Chondrilla juncea* Skeleton Weed					1		1													
Chrysocephalum apiculatum Yellow Buttons																				
Chrysocephalum semipapposum Clustered Everlasting																				
**Cirsium vulgare* Spear Thistle																				
Clematis microphylla Small-leaved Clematis																				
Convolvulus graminetinus			1	1					1				1				1			

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Species	Rehab Zone 2 (rehabilitated 2007/2008)																			
	Plot 6				Plot 7				Plot 8				Plot 9				Plot 10			
	2011	2012	Jan-14	Nov-14	2011	2012	Jan-14	Nov-14	2011	2012	Jan-14	Nov-14	2011	2012	Jan-14	Nov-14	2011	2012	Jan-14	Nov-14
**Conyza bonariensis* Flaxleaf Fleabane		1	2	2	2		1		2				2		1	1	2		1	2
**Cyclospermum leptophyllum* Slender Celery	1		2	1		1												1		
Cymbopogon refractus Barbed Wire Grass									2				1							
Cynodon dactylon Couch	2			1																
Cyperus fulvus Sticky Sedge																				
Cyperus gracilis Slender Flat-sedge																				
Daucus glochidiatus Native Carrot																				
Desmodium brachypodum Large Tick-trefoil																				
Desmodium varians Slender Tick-trefoil																				
Dichanthium sericeum Queensland Bluegrass									2											
Dichondra repens Kidney Weed	1						1													
Dichondra sp. A		1																		
Digitaria breviglumis																				

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Species	Rehab Zone 2 (rehabilitated 2007/2008)																			
	Plot 6				Plot 7				Plot 8				Plot 9				Plot 10			
	2011	2012	Jan-14	Nov-14	2011	2012	Jan-14	Nov-14	2011	2012	Jan-14	Nov-14	2011	2012	Jan-14	Nov-14	2011	2012	Jan-14	Nov-14
Digitaria brownii Cotton Panic Grass												2								
Digitaria divaricatissima Umbrella Grass									3											
Echinopogon caespitosus Bushy Hedge-hog Grass																				
**Echium plantagineum* Paterson's Curse		2		2				2				1		1		2				2
Einadia hastata Berry Saltbush																				
Einadia polygonoides		1							1			1	1							
Elymus scaber																				
Enneapogon nigricans Nineawns																				
Enneapogon sp. Nineawns											2									
Enteropogon acicularis																				
Eragrostis lacunaria Bristly Love-grass																				
Eragrostis leptostachya Paddock Love-grass																				
Eragrostis setifolia Bristly Love-grass																				
Eremophila debilis Winter Apple																				

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Species	Rehab Zone 2 (rehabilitated 2007/2008)																			
	Plot 6				Plot 7				Plot 8				Plot 9				Plot 10			
	2011	2012	Jan-14	Nov-14	2011	2012	Jan-14	Nov-14	2011	2012	Jan-14	Nov-14	2011	2012	Jan-14	Nov-14	2011	2012	Jan-14	Nov-14
Eriochloa sp.																				
Eriochloa pseudoacrotricha Early Spring Grass	2								3				2							
Euchiton sphaericus Cudweed	1												1							
Evolvulus alsinoides var. *decumbens*																				
Fimbristylis dichotoma Common Fringe-sedge																				
Galium gaudichaudii Rough Bedstraw																				
Geijera parviflora Wilga																				
**Glandularia aristigera* Mayne's Pest	3	3	3	3	3	3	2	3	2	3	3	3	2	3	2	3	2	3	2	2
Glossocardia bidens Native Cobblers Pegs																				
Glycine clandestina Variable glycine									2			1					1			
Glycine tabacina																				
**Gomphrena celosioides* Gomphrena Weed										1		1								
Gonocarpus elatus																				
Gonocarpus sp.																				

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Species	Rehab Zone 2 (rehabilitated 2007/2008)																			
	Plot 6				Plot 7				Plot 8				Plot 9				Plot 10			
	2011	2012	Jan-14	Nov-14	2011	2012	Jan-14	Nov-14	2011	2012	Jan-14	Nov-14	2011	2012	Jan-14	Nov-14	2011	2012	Jan-14	Nov-14
Goodenia glabra																				
Goodenia hederacea Forest goodenia																				
Gypsophila tubulosa Annual Chalkwort																				
Haloragis heterophylla Rough Raspwort																				
Hibbertia obtusifolia Hoary Guniea Flower																				
Hypericum gramineum Small St John's Wort																				
Indigofera adesmiifolia Tick indigo																				
Juncus sp.															1					
Lachnagrostis filiformis																				
**Lactuca serriola* Prickly lettuce	2	2	1	1	1		1	1	2	1	1						2			
Laxmannia gracilis Slender Wire Lily																				
Leiocarpa panaetioides Wooly Buttons		2	1		1					2			1	2	2		1	2	1	
**Lepidium africanum*	2	1								1	1	2								
**Lepidium bonariense*	1								2											

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Species	Rehab Zone 2 (rehabilitated 2007/2008)																			
	Plot 6				Plot 7				Plot 8				Plot 9				Plot 10			
	2011	2012	Jan-14	Nov-14	2011	2012	Jan-14	Nov-14	2011	2012	Jan-14	Nov-14	2011	2012	Jan-14	Nov-14	2011	2012	Jan-14	Nov-14
Leptochloa sp.																				
Leptorhynchos panaetioides								1				2				2				2
**Linaria arvensis*																				
Linum marginale Native Flax																				
**Lolium rigidum* Wimmera Ryegrass		2												2						
Lomandra filiformis Savannah Blue																				
Lomandra multiflora subsp. *multiflora*																				
Maireana microphylla Small-leaf Bluebush									3	3	3	3	1	1	1	2				1
**Malvastrum americanum* Spiked Malvastrum									1											
Marsdenia viridiflora Native Pear																				
Medicago polymorpha Burr Medic				2				2					1			2				
**Medicago sativa* Lucerne									2	2										
**Medicago* sp.		2		2						2						2	1			2
**Melilotus indicus* Hexam Scent				2												2				

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Species	Rehab Zone 2 (rehabilitated 2007/2008)																			
	Plot 6				Plot 7				Plot 8				Plot 9				Plot 10			
	2011	2012	Jan-14	Nov-14	2011	2012	Jan-14	Nov-14	2011	2012	Jan-14	Nov-14	2011	2012	Jan-14	Nov-14	2011	2012	Jan-14	Nov-14
**Misopates orontium* Lesser Snapdragon				1							1	2								1
Olearia spp. aff. *elliptica*																				
Oncinocalyx betchei																				
Opercularia diphylla																				
**Opuntia stricta* Common Prickly Pear																				
Oxalis sp. Soursob									1											
Panicum effusum Hairy Panic									1											
**Panicum maximum*	3			3	2		1	3					3		2		3		2	
Paspalidium sp.									1		1	2								
**Petrorhagia nanteuilii* Proliferous Pink												2								
Phyllanthus virgatus																				
Pimelea sp.																				
Poa sieberiana																				
**Polygonum aviculare* Wireweed	2																			
**Rapistrum rugosum* Turnip Weed		1	2	2		1		2	1	1	2	3	2	2	2	2			2	1
Rostellularia adscendens Pink Tongues																				

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Species	Rehab Zone 2 (rehabilitated 2007/2008)																			
	Plot 6				Plot 7				Plot 8				Plot 9				Plot 10			
	2011	2012	Jan-14	Nov-14	2011	2012	Jan-14	Nov-14	2011	2012	Jan-14	Nov-14	2011	2012	Jan-14	Nov-14	2011	2012	Jan-14	Nov-14
Rumex brownii Swamp dock														1	1		1			
**Rumex crispus* Curled Dock	1	1																		
Rumex crystallinus Shiny Dock		1																		
Rytidosperma longifolia																				
Rytidosperma racemosum var. *obtusatum*																				
Rytidosperma sp. Wallaby Grass					1				2		1						1		1	
Salsola kali				1	1															
**Schkuhria pinnata* Dwarf Marigold													2				2			
Sclerolaena birchii Galvanised Burr	2	1	1	1	1	1			1	1	1		1							
Sclerolaena muricata Black Rolypoly																				
Scutellaria humilis Dwarf Skullcap																				
Senecio quadridentatus Cotton Fireweed	1	2	1	2	1	2	1	1					1	2		1				2
**Setaria incrassata* Purple Pigeon Grass	2				3								3				3		2	

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Species	Rehab Zone 2 (rehabilitated 2007/2008)																			
	Plot 6				Plot 7				Plot 8				Plot 9				Plot 10			
	2011	2012	Jan-14	Nov-14	2011	2012	Jan-14	Nov-14	2011	2012	Jan-14	Nov-14	2011	2012	Jan-14	Nov-14	2011	2012	Jan-14	Nov-14
Setaria sp.								1												
Sida corrugata Corrugated Sida		1																		
Sida cunninghamii Ridged Sida		1									1	1								
Sida sp.																				
**Sida spinosa*	2		2	2	2				1		2	2			2	2			2	
Sida subspicata			1									1	1		1					
**Silene* sp.												1								
**Sisymbrium orientale* Indian Hedge Mustard				1						1		2								
Solanum cinereum Narrawa Burr																				
Solanum esuriale Quena																				
**Solanum nigrum* Black-berry Nightshade	1			1			1						1							
Solanum parvifolium																				
**Sonchus oleraceus* Common Sowthistle				1				1				1					2			
Sporobolus creber Slender Rat's Tail Grass									1											

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Species	Rehab Zone 2 (rehabilitated 2007/2008)																			
	Plot 6				Plot 7				Plot 8				Plot 9				Plot 10			
	2011	2012	Jan-14	Nov-14	2011	2012	Jan-14	Nov-14	2011	2012	Jan-14	Nov-14	2011	2012	Jan-14	Nov-14	2011	2012	Jan-14	Nov-14
Stackhousia viminea Slender Stackhousia																				
Swainsona galegifolia Smooth Darling-pea																				
Tephrosia brachyodon																				
Themeda australis Kangaroo Grass																				
**Trifolium arvense* Haresfoot Clover				2	1		2	2				2				2				2
**Trifolium campestre* Hop Clover		2		2				2		2		1				1				
**Trifolium glomeratum* Clustered Clover								2												
**Urochloa panicoides* Urochloa Grass													1							
Verbena bonariensis Purpletop			2																	
**Verbena caracasana*		2				1														
Verbena gaudichaudii							1	1	1				1	1	1	1				1
**Verbena litoralis*	1			1				1												
**Vicia* sp.					1	1	1	1		1		1								
Vittadinia cuneata Fuzzweed				1		1	1	1		1	2	1								1

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Species	Rehab Zone 2 (rehabilitated 2007/2008)																			
	Plot 6				Plot 7				Plot 8				Plot 9				Plot 10			
	2011	2012	Jan-14	Nov-14	2011	2012	Jan-14	Nov-14	2011	2012	Jan-14	Nov-14	2011	2012	Jan-14	Nov-14	2011	2012	Jan-14	Nov-14
Vittadinia dissecta Dissected New Holland daisy																				
Vittadinia muelleri			2															1	1	
Vittadinia sp. Fuzzweed	2				2				1				1		2		2			
**Vulpia* sp.																				
Wahlenbergia communis Tufted Bluebell	1			1					1								1			
Wahlenbergia sp. Bluebell																				
Xerochrysum bracteatum Golden Everlasting	1			1	1				1											
Xerochrysum viscosum Sticky Everlasting																				
Zornia dyctiocarpa Zornia																				
Total species	**27**	**23**	**17**	**34**	**18**	**11**	**15**	**22**	**29**	**21**	**22**	**28**	**23**	**12**	**15**	**19**	**17**	**8**	**12**	**18**

*Denotes exotic species

Braun-Blanquett cover scores: 1=projected foliage cover <5% of the plot, plants uncommon; 2=projected foliage cover <5% of the plot, plants common; 3=projected foliage cover 6-25%of the plot; 4=projected foliage cover of 26-50% of the plot; 5=projected foliage cover of 51-75% of the plot; 6=projected foliage cover of 76-100% of the plot.

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Table 3-9: Groundcover species cover scores in 20 x 50 m rehabilitation plots 11-15 and control plots 16-20 (January 2014, November 2014)

Species	Rehab Zone 3 & 4 (rehabilitated 2008/2009)										Control (LSF)									
	Plot 11		Plot 12		Plot 13		Plot 14		Plot 15		Plot 16		Plot 17		Plot 18		Plot 19		Plot 20	
	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14
**Abutilon* sp.			3	2	2	1	2	2	1											
Ajuga australis Austral Bugle														1						
**Anagallis arvensis* Scarlet Pimpernel						2				2										2
Arthropodium sp. *B*																				1
**Aristida leptopoda* White Speargrass			1																	
Aristida personata Purple Wire-grass	3	3		1		2	2	2	1	2	2	3	2	2	3	3	3	3	3	3
**Aster subulatus* Wild Aster	1																			
Austrostipa ramosissima Stout Bamboo Grass	2						1													
Austrostipa scabra Speargrass	2	2	1		2	2		2			2	2			2	2	2	2	2	3
Austrostipa sp.																				
Austrostipa verticillata		2									2									
**Bidens subalternans*	2													1						
Boerhavia sp. Tar-vine					1		1													
Bothriochloa decipiens Red Grass					2		2		2											
Bothriochloa sp.	2	2	2	2		3		2						2			2	2		2

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Species	Rehab Zone 3 & 4 (rehabilitated 2008/2009)										Control (LSF)									
	Plot 11		Plot 12		Plot 13		Plot 14		Plot 15		Plot 16		Plot 17		Plot 18		Plot 19		Plot 20	
	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14
Brachychiton populneus Kurrajong														1						
Bromus molliformis Soft Brome																				
Brunoniella australis Blue Trumpet													1					1		
Bulbine sp.																			1	
Calotis cuneifolia Purple Burr-daisy											1	2		1	1					2
Calotis lappulacea Yellow Burr-daisy	1						1			2				1					1	
Carex inversa Knob Sedge	1	1					2													
**Carthamus lanatus* Saffron Thistle	2	2				2			1	2										
**Centaurea melitensis* Maltese Cockspur		2								1										
**Centaurium erythraea* Common Centaury																				
**Centaurium* sp.						3														
Chamaesyce sp.					1															
Cheilanthes distans Bristly cloak fern														2						
Cheilanthes sieberi Poison Mulga Fern				1							1	2	1	2	2	2		2	2	

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Species	Rehab Zone 3 & 4 (rehabilitated 2008/2009)										Control (LSF)									
	Plot 11		Plot 12		Plot 13		Plot 14		Plot 15		Plot 16		Plot 17		Plot 18		Plot 19		Plot 20	
	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14
**Chloris gayana* Rhodes Grass		2			1				2											
Chloris truncata Windmill Grass																				
Chloris ventricosa Plump Windmill Grass			1		2	2														
**Chondrilla juncea* Skeleton Weed	1																			
Chrysocephalum apiculatum Yellow Buttons									1						2			1	1	
Chrysocephalum semipapposum Clustered Everlasting											1	2	2	2		2		2		2
**Cirsium vulgare* Spear Thistle										1										
Clematis microphylla Small-leaved Clematis																				
Convolvulus graminetinus																				
**Conyza bonariensis* Flaxleaf Fleabane																				
**Cyclospermum leptophyllum* Slender Celery																				
Cymbopogon refractus Barbed Wire Grass			2			1			2	3	2	2	2	2	2	1	2	1	2	1

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Species	Rehab Zone 3 & 4 (rehabilitated 2008/2009)										Control (LSF)									
	Plot 11		Plot 12		Plot 13		Plot 14		Plot 15		Plot 16		Plot 17		Plot 18		Plot 19		Plot 20	
	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14
Cynodon dactylon Couch										1										
Cyperus fulvus Sticky Sedge															1					
Cyperus gracilis Slender Flat-sedge													1							
Daucus glochidiatus Native Carrot												1		1		1		1		2
Desmodium brachypodum Large Tick-trefoil			1			1			2		2	2	3	3	2	2	2	2	3	3
Desmodium varians Slender Tick-trefoil											1									
Dichanthium sericeum Queensland Bluegrass																				
Dichondra repens Kidney Weed																				
Dichondra sp. A											1			2					2	1
Digitaria breviglumis														1						
Digitaria brownii Cotton Panic Grass																				
Digitaria divaricatissima Umbrella Grass																				
Echinopogon caespitosus Bushy Hedge-hog Grass																				
**Echium plantagineum* Paterson's Curse	2	3				2		2		2										

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Species	Rehab Zone 3 & 4 (rehabilitated 2008/2009)										Control (LSF)									
	Plot 11		Plot 12		Plot 13		Plot 14		Plot 15		Plot 16		Plot 17		Plot 18		Plot 19		Plot 20	
	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14
Einadia hastata Berry Saltbush											1	1								
Einadia polygonoides	2		1	1		1	1													
Elymus scaber																				
Enneapogon nigricans Nineawns																				
Enneapogon sp. Nineawns									1		2		1				1	1	2	1
Enteropogon acicularis																				
Eragrostis lacunaria Bristly Love-grass																				
Eragrostis leptostachya Paddock Love-grass												1				1				1
Eragrostis setifolia Bristly Love-grass																				
Eremophila debilis Winter Apple		1																		
Eriochloa sp.	2																			
Eriochloa pseudoacrotricha Early Spring Grass																				
Euchiton sphaericus Cudweed												1								
Evolvulus alsinoides var. *decumbens*																	1			
Fimbristylis dichotoma Common Fringe-sedge																				

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Species	Rehab Zone 3 & 4 (rehabilitated 2008/2009)										Control (LSF)									
	Plot 11		Plot 12		Plot 13		Plot 14		Plot 15		Plot 16		Plot 17		Plot 18		Plot 19		Plot 20	
	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14
Galium gaudichaudii Rough Bedstraw												1								
Geijera parviflora Wilga																				
**Glandularia aristigera* Mayne's Pest	2	3	2	2	2	1	2	3	3	3										
Glossocardia bidens Native Cobblers Pegs																	1			1
Glycine clandestina Variable glycine					1			1										1		
Glycine tabacina			1				1													
**Gomphrena celosioides* Gomphrena Weed																				
Gonocarpus elatus																1				
Gonocarpus sp.																				
Goodenia glabra																				
Goodenia hederacea Forest goodenia															1	1				
Gypsophila tubulosa Annual Chalkwort																				1
Haloragis heterophylla Rough Raspwort																				
Hibbertia obtusifolia Hoary Guniea Flower											1	1								
Hypericum gramineum Small St John's Wort																				

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Species	Rehab Zone 3 & 4 (rehabilitated 2008/2009)										Control (LSF)									
	Plot 11		Plot 12		Plot 13		Plot 14		Plot 15		Plot 16		Plot 17		Plot 18		Plot 19		Plot 20	
	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14
Indigofera adesmiifolia Tick indigo											1									
Juncus sp.	1																			
Lachnagrostis filiformis																				1
**Lactuca serriola* Prickly lettuce																				
Laxmannia gracilis Slender Wire Lily															1	1				
Leiocarpa panaetioides Wooly Buttons	1																			
**Lepidium africanum*	1					2														
**Lepidium bonariense*																				
Leptochloa sp.												3	2							
Leptorhynchos panaetioides		1																		
**Linaria arvensis*														2						2
Linum marginale Native Flax														1						
**Lolium rigidum* Wimmera Ryegrass																				
Lomandra filiformis Savannah Blue											1				1	1				
Lomandra multiflora subsp. *multiflora*											1	1	1		1	1	1			1

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Species	Rehab Zone 3 & 4 (rehabilitated 2008/2009)										Control (LSF)									
	Plot 11		Plot 12		Plot 13		Plot 14		Plot 15		Plot 16		Plot 17		Plot 18		Plot 19		Plot 20	
	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14
Maireana microphylla Small-leaf Bluebush					2	2														
**Malvastrum americanum* Spiked Malvastrum																				
Marsdenia viridiflora Native Pear												1								
Medicago polymorpha Burr Medic								2												
**Medicago sativa* Lucerne																				
**Medicago* sp.		3																		
**Melilotus indicus* Hexam Scent																				
**Misopates orontium* Lesser Snapdragon						1		2						2				1		
Olearia spp. aff. *elliptica*																	1			
Oncinocalyx betchei												1	1	1					1	1
Opercularia diphylla																	1			
**Opuntia stricta* Common Prickly Pear											1		1	1				1	2	1
Oxalis sp. Soursob																				
Panicum effusum Hairy Panic											1									
**Panicum maximum*																				
Paspalidium sp.			2	2	2	2	2	2			2	2	2	3			2	2	2	2

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Species	Rehab Zone 3 & 4 (rehabilitated 2008/2009)										Control (LSF)									
	Plot 11		Plot 12		Plot 13		Plot 14		Plot 15		Plot 16		Plot 17		Plot 18		Plot 19		Plot 20	
	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14
**Petrorhagia nanteuilii* Proliferous Pink																				
Phyllanthus virgatus																				
Pimelea sp.																				
Poa sieberiana													1						1	
**Polygonum aviculare* Wireweed																				
**Rapistrum rugosum* Turnip Weed	3	3	2	2		3	2	2	2	3										
Rostellularia adscendens Pink Tongues											1						1		2	
Rumex brownii Swamp dock																				
**Rumex crispus* Curled Dock																				
Rumex crystallinus Shiny Dock																				
Rytidosperma longifolia											3				1					
Rytidosperma racemosum var. *obtusatum*																				
Rytidosperma sp. Wallaby Grass	2	1																		
Salsola kali	1			1		1	1	2		1										
**Schkuhria pinnata* Dwarf Marigold																				
Sclerolaena birchii Galvanised Burr				1	1	1		1												

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Species	Rehab Zone 3 & 4 (rehabilitated 2008/2009)										Control (LSF)									
	Plot 11		Plot 12		Plot 13		Plot 14		Plot 15		Plot 16		Plot 17		Plot 18		Plot 19		Plot 20	
	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14
Sclerolaena muricata Black Rolypoly			1			1		1		1										
Scutellaria humilis Dwarf Skullcap																				
Senecio quadridentatus Cotton Fireweed	2													1						2
**Setaria incrassata* Purple Pigeon Grass																				
**Setaria* sp.																				
Sida corrugata Corrugated Sida						1														
Sida cunninghamii Ridged Sida																				
Sida sp.		1				1														
**Sida spinosa*	3	3			2	2	2	2	3	2										
Sida subspicata	1		1		2		2	1	2	2										
**Silene* sp.																				
**Sisymbrium orientale* Indian Hedge Mustard	2	2				2		2												
Solanum cinereum Narrawa Burr																				
Solanum esuriale Quena					2	1	2	1												
**Solanum nigrum* Black-berry Nightshade																				

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Species	Rehab Zone 3 & 4 (rehabilitated 2008/2009)										Control (LSF)									
	Plot 11		Plot 12		Plot 13		Plot 14		Plot 15		Plot 16		Plot 17		Plot 18		Plot 19		Plot 20	
	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14
Solanum parvifolium											1		2	2	1	1			1	2
**Sonchus oleraceus* Common Sowthistle																				
Sporobolus creber Slender Rat's Tail Grass									1					1						
Stackhousia viminea Slender Stackhousia																				
Swainsona galegifolia Smooth Darling-pea				1																
Tephrosia brachyodon																				
Themeda australis Kangaroo Grass																				
**Trifolium arvense* Haresfoot Clover		2																		1
**Trifolium campestre* Hop Clover																				
**Trifolium glomeratum* *Clustered Clover*																				
**Urochloa panicoides* Urochloa Grass																				
Verbena bonariensis Purpletop									1											
**Verbena caracasana*																				
Verbena gaudichaudii																				
**Verbena litoralis*										1										
**Vicia* sp.																				

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Species	Rehab Zone 3 & 4 (rehabilitated 2008/2009)										Control (LSF)									
	Plot 11		Plot 12		Plot 13		Plot 14		Plot 15		Plot 16		Plot 17		Plot 18		Plot 19		Plot 20	
	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14	Jan-14	Nov-14
Vittadinia cuneata Fuzzweed	2	1	1		1	1	2		2	2	1	2								
Vittadinia dissecta Dissected New Holland daisy																				
Vittadinia muelleri																				
Vittadinia sp. Fuzzweed																				
**Vulpia* sp.																				1
Wahlenbergia communis Tufted Bluebell														1						1
Wahlenbergia sp. Bluebell																				
Xerochrysum bracteatum Golden Everlasting																				
Xerochrysum viscosum Sticky Everlasting																				
Zornia dyctiocarpa Zornia																				
Total species	**25**	**20**	**15**	**11**	**16**	**27**	**17**	**18**	**16**	**17**	**23**	**19**	**15**	**25**	**14**	**14**	**13**	**15**	**16**	**26**

*Denotes exotic species

Braun-Blanquett cover scores: 1=projected foliage cover <5% of the plot, plants uncommon; 2=projected foliage cover <5% of the plot, plants common; 3=projected foliage cover 6-25%of the plot; 4=projected foliage cover of 26-50% of the plot; 5=projected foliage cover of 51-75% of the plot; 6=projected foliage cover of 76-100% of the plot.

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3.6 Native groundcover species composition data analysis

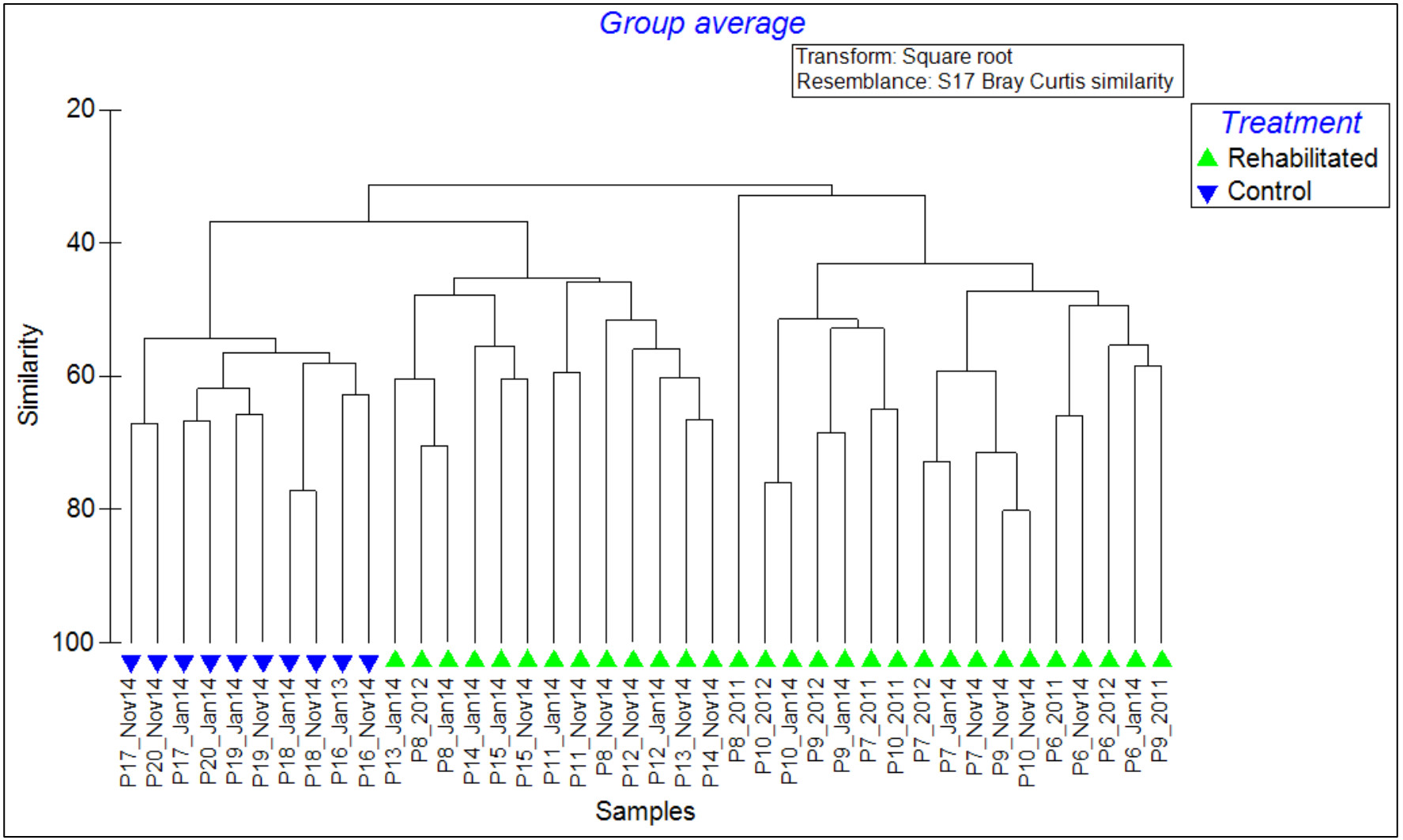

Figure 3-5: Cluster analysis of native groundcover species abundance in monitoring plots for 2011 - 2014

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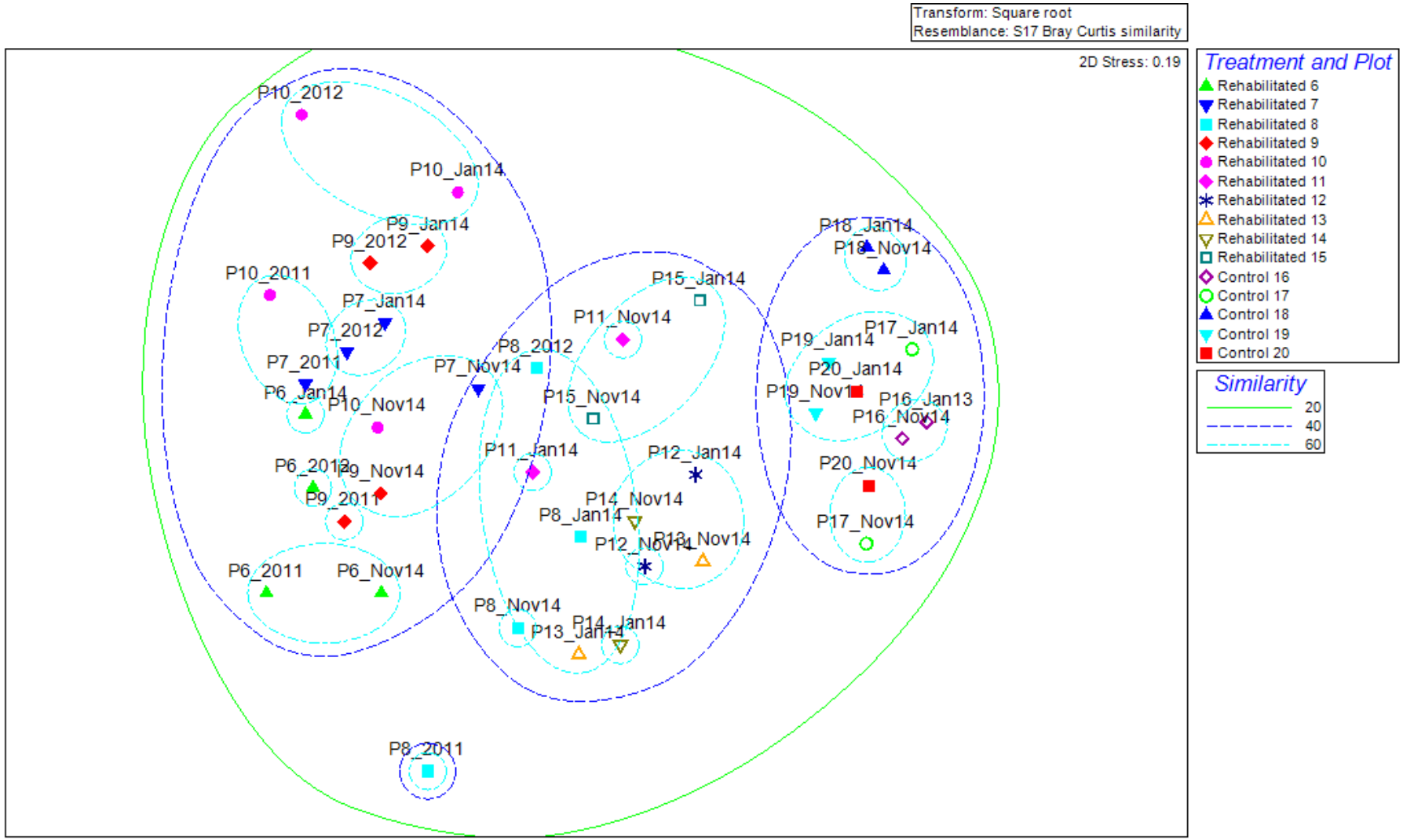

Figure 3-6: Non-metric multi-dimensional scaling plot for native groundcover species abundance in monitoring plots for 2011 - 2014

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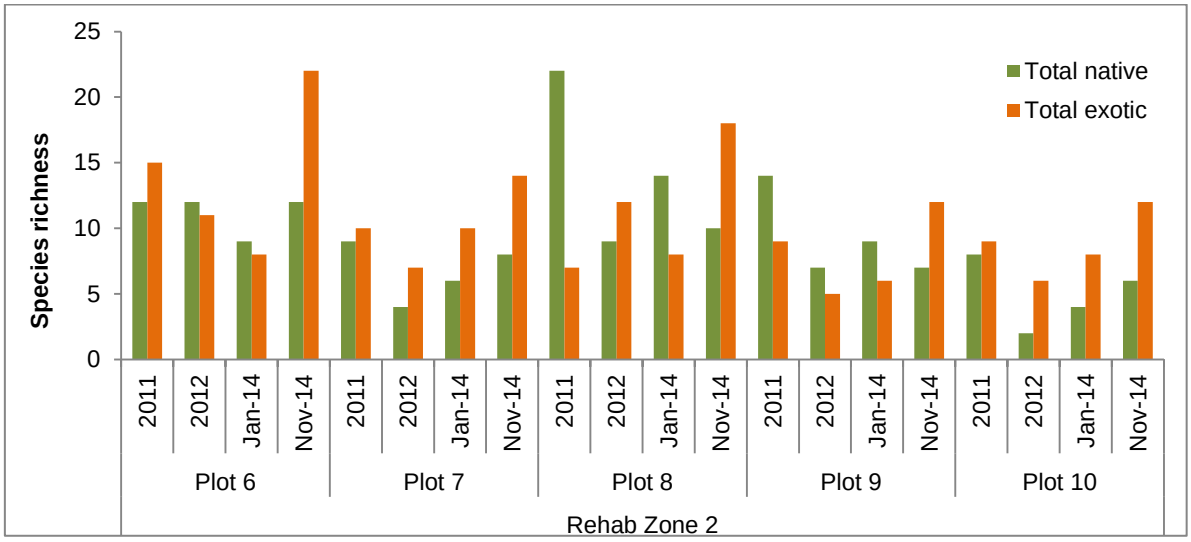

Figure 3-7: Groundcover species richness at Rehab Zone 2 (rehabilitated 2007/2008) (2011 - 2014)

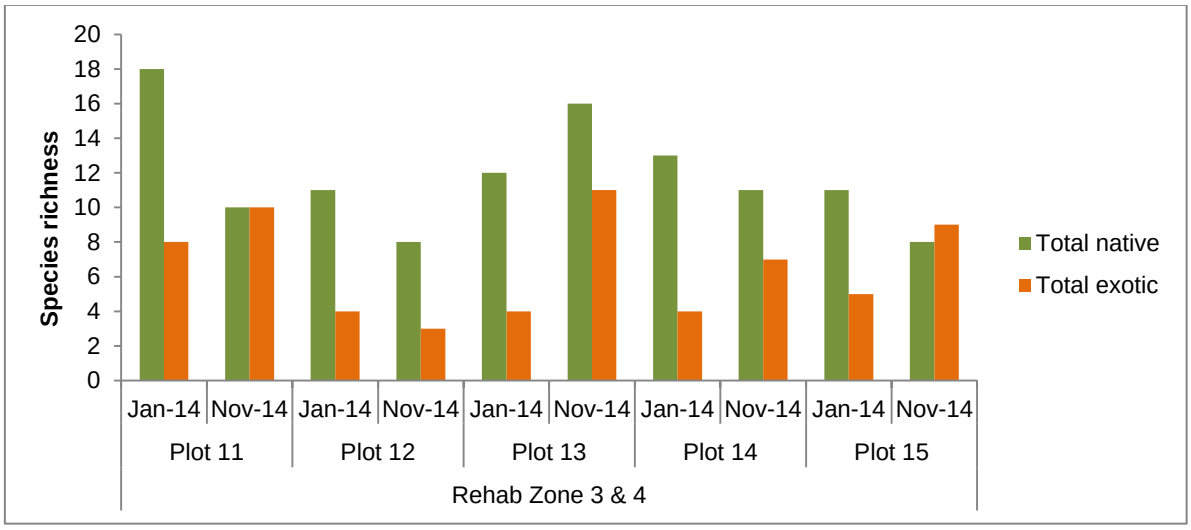

Figure 3-8: Groundcover species richness at Rehab Zone 3 & 4 (rehabilitated 2008/2009) (January 2014, November 2014)

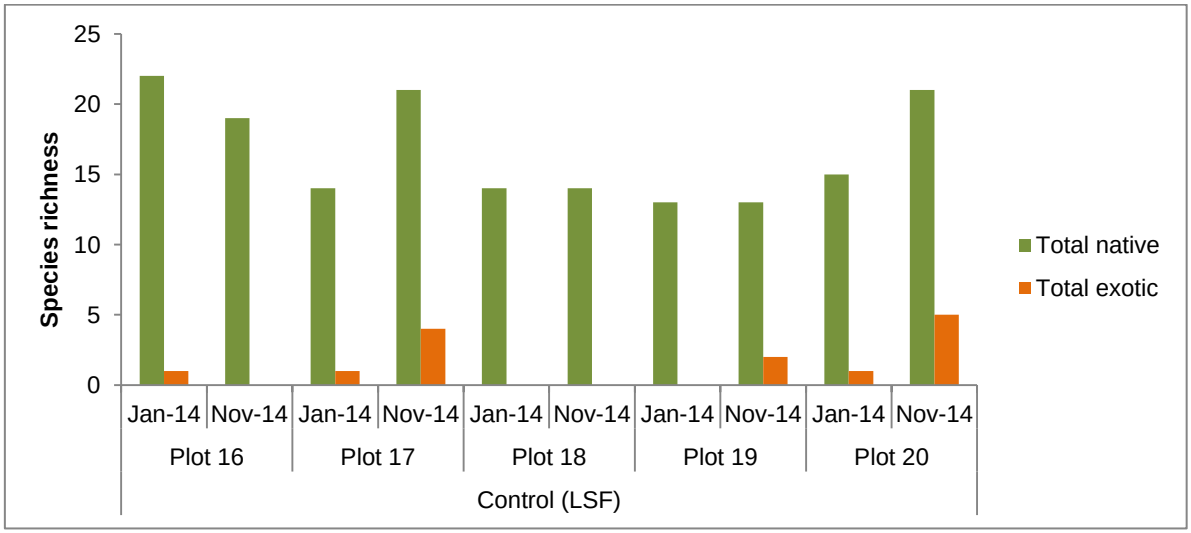

Figure 3-9: Groundcover species richness at Control (LSF) (January 2014, November 2014)

3.7 Groundcover composition

Table 3-10: Groundcover composition (2011-2014)

Zone	Plot	Native species cover (%)				Exotic species cover (%)				Leaf litter cover (%)				Cryptogam cover (%)				Bare ground (%)				Rocks (%)			
		2011	2012	Jan-2014	Nov-2014	2011	2012	Jan-2014	Nov-2014	2011	2012	Jan-2014	Nov-2014	2011	2012	Jan-2014	Nov-2014	2011	2012	Jan-2014	Nov-2014	2011	2012	Jan-2014	Nov-2014
Rehab zone 2	6	16	0	4	1	48	80	54	22	10	20	40	27	0	0	0	0	26	0	2	0	0	0	0	0
	7	2	0	0	0	72	84	52	10	8	14	46	34	0	0	0	0	18	2	2	6	0	0	0	0
	8	38	80	14	12	30	2	22	11	10	18	44	24	0	0	0	0	22	0	18	3	0	0	2	0
	9	8	4	0	1	54	72	28	8	14	20	38	37	0	0	0	0	24	4	34	4	0	0	0	0
	10	0	0	0	0	74	68	38	10	4	32	62	39	0	0	0	0	22	0	0	1	0	0	0	0
Rehab zone 3 & 4	11	Plot established for 2013 monitoring		26	1	Plot established for 2013 monitoring		26	22	Plot established for 2013 monitoring		56	24	Plot established for 2013 monitoring		0	0	Plot established for 2013 monitoring		4	3	Plot established for 2013 monitoring		0	0
	12			6	5			18	4			50	22			0	0			22	19			4	0
	13			14	4			6	5			26	28			0	0			42	13			0	0
	14			26	9			14	7			36	19			0	0			36	6			0	0
	15			14	2			12	5			50	27			0	0			22	16			2	0
Control (LSF)	16			14	5			0	0			68	44			0	0			6	1			0	0
	17			40	17			0	3			54	29			0	1			4	0			2	0
	18			12	4			0	0			54	36			2	2			30	8			2	0
	19			20	5			0	0			62	41			0	0			18	4			0	0
	20			36	6			2	2			52	40			6	2			4	1			0	0
Min (all sites)		**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**4**	**14**	**26**	**19**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**
Max (all sites)		**50**	**80**	**46**	**17**	**74**	**84**	**54**	**22**	**38**	**38**	**68**	**44**	**18**	**10**	**8**	**2**	**34**	**4**	**42**	**19**	**18**	**2**	**4**	**0**
Average		**26**	**39**	**20**	**5**	**28**	**31**	**14**	**7**	**21**	**26**	**50**	**31**	**2**	**2**	**1**	**0**	**20**	**1**	**15**	**6**	**2**	**0**	**1**	**0**

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Table 3-11: Groundcover ANOVA results (note cells shaded green indicate no significant temporal change (p>0.05) within zones; cells shaded red indicate significant (p<0.05) temporal change within zones

Monitoring zone		Rehab zone 2				Rehab zone 3 & 4		Control (LSF)	
Monitoring year		2011	2012	2013	2014	2013	2014	2013	2014
Native cover (%)	Mean	12.8	16.8	3.6	2.8	17.2^{A}	4.2^{B}	24.4^{A}	7.4^{B}
	Standard deviation	15.4	35.37	6.07	5.17	8.67	3.11	12.84	5.41
	P-value	0.62				0.01		0.03	
Exotic cover (%)	Mean	55.6^{AB}	61.2^{AB}	38.8^{A}	12.2^{B}	15.2	8.6	0.4	1
	Standard deviation	18.19	33.69	14.18	5.59	7.43	7.57	0.89	1.41
	P-value	0.00				0.2		0.45	
Leaf litter (%)	Mean	9.2^{C}	20.8^{BC}	46^{A}	32.2^{B}	43.6^{A}	24^{B}	58^{A}	38^{B}
	Standard deviation	3.63	6.72	9.49	6.46	12.28	3.67	6.78	5.78
	P-value	0.00				0.00		0.00	
Bare ground (%)	Mean	22.4^{A}	1.2^{B}	11.2^{AB}	2.8^{B}	25.2	11.4	12.4	2.8
	Standard deviation	2.97	1.79	14.67	2.39	14.74	6.73	11.44	3.27
	P-value	0.00				0.09		0.1	

Common superscript indicates no significant difference in means (p>0.05)

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Table 3-12: Summary statistics for groundcover composition recorded in 2014. (note cells shaded green indicate no significant difference (p>0.05) between zones; cells shaded red indicate significant (p<0.05) difference between zones

	Rehab zone 2	Rehab Zone 3&4	Control LSF
	Native ground cover (%)		
Mean	2.8	4.2	7.4
Standard deviation	5.1672	3.1145	5.4129
p-value	0.32		
	Exotic ground cover (%)		
Mean	12.2^{A}	8.6^{AB}	1^{B}
Standard deviation	5.5857	7.5697	1.4142
p-value	0.02		
	Litter cover (%)		
Mean	32.20^{AB}	24.00^{A}	38.00^{B}
Standard deviation	6.4576	3.6742	5.7879
p-value	0		
	Bare ground (%)		
Mean	11.2	25.2	12.4
Standard deviation	14.67	14.738	11.437
p-value	0.24		

Common superscript indicates no significant difference in means (p>0.05)

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4 Fauna data

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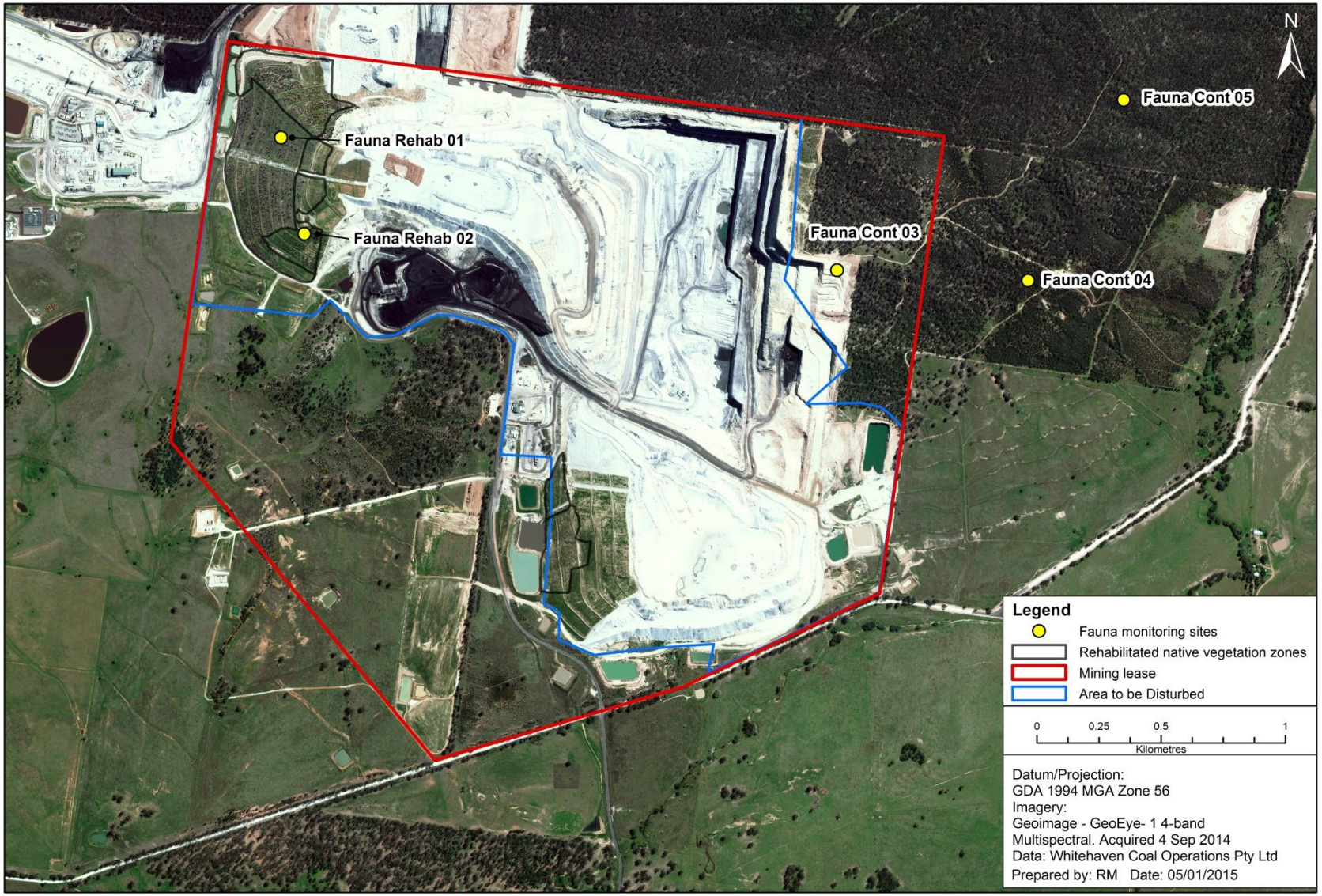

Figure 4-1: Fauna monitoring sites (2014)

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Table 4-4-1: Bird species recorded in the spring bird surveys (2011-2014)

Species	Guild	Fauna Rehab 1						Fauna Rehab 2						Fauna Cont 3					Fauna Cont 4						Fauna Cont 5 LSF			Opportunistic		
		Sep-11	Sep-12	Sep-13	Oct-13	Aug-14	Nov-14	Sep-11	Sep-12	Sep-13	Oct-13	Aug-14	Nov-14	Sep-11	Sep-12	Sep-13	Aug-14	Nov-14	Sep-11	Sep-12	Sep-13	Oct-13	Aug-14	Nov-14	Oct-13	Aug-14	Nov-14	Oct-13	Nov-14	Aug-14
Acanthagenys rufogularis Spiny-cheeked Honeyeater	Canopy feeder			X		X	X		X		X		X	X	X	X	X	X	X	X	X	X	X	X		X	X			
Acanthiza apicalis Inland Thornbill	Generalist - insects													X	X	X	X	X	X		X	X	X	X	X	X	X			
Acanthiza chrysorrhoa Yellow-rumped Thornbill	Ground forager - insects			X	X		X			X		X		X	X	X	X	X		X	X		X				X			
Acanthiza lineata Striated Thornbill	Canopy feeder																								X					
Acanthiza nana Yellow Thornbill	Canopy feeder													X	X	X	X	X	X	X	X	X	X	X	X	X	X			
Acanthiza reguloides Buff-rumped Thornbill	Ground forager - insects																					X		X	X	X	X			
Acanthiza uropygialis Chestnut-rumped Thornbill	Generalist - insects														X		X	X		X			X	X		X	X			

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Species	Guild	Fauna Rehab 1						Fauna Rehab 2						Fauna Cont 3					Fauna Cont 4						Fauna Cont 5 LSF			Opportunistic		
		Sep-11	Sep-12	Sep-13	Oct-13	Aug-14	Nov-14	Sep-11	Sep-12	Sep-13	Oct-13	Aug-14	Nov-14	Sep-11	Sep-12	Sep-13	Aug-14	Nov-14	Sep-11	Sep-12	Sep-13	Oct-13	Aug-14	Nov-14	Oct-13	Aug-14	Nov-14	Oct-13	Nov-14	Aug-14
Accipiter cirrocephalus Collared Sparrowhawk	Bird of prey															X			X	X				X						
Accipiter fasciatus Brown Goshawk	Bird of prey																X				X							X		
Alisterus scapularis Australian King-Parrot	Canopy feeder																		X					X						
Anhinga novaehollandiae Australian Darter	Water Bird																													X
Anthochaera carunculata Red Wattlebird	Canopy feeder																								X					
Anthus novaeseelandiae Australasian Pipit	Ground forager - insects	X			X			X	X			X																		
Aprosmictus erythropterus Red-winged Parrot	Canopy feeder																		X							X				
Aquila audax Wedge-tailed Eagle	Bird of prey													X		X					X					X	X			X

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Species	Guild	Fauna Rehab 1						Fauna Rehab 2						Fauna Cont 3					Fauna Cont 4						Fauna Cont 5 LSF			Opportunistic		
		Sep-11	Sep-12	Sep-13	Oct-13	Aug-14	Nov-14	Sep-11	Sep-12	Sep-13	Oct-13	Aug-14	Nov-14	Sep-11	Sep-12	Sep-13	Aug-14	Nov-14	Sep-11	Sep-12	Sep-13	Oct-13	Aug-14	Nov-14	Oct-13	Aug-14	Nov-14	Oct-13	Nov-14	Aug-14
Artamus cyanopterus Dusky Woodswallow	Aerial forager										X			X	X	X	X	X	X	X	X	X	X	X			X			
Artamus superciliosus White-browed Woodswallow	Generalist - insects																	X		X		X	X	X	X		X			
Barnardius zonarius Australian Ringneck	Generalist - plant based														X	X			X			X								
Cacatua galerita Sulphur-crested Cockatoo	Generalist - plant based						X									X			X				X			X				
Cacomantis flabelliformis Fan-tailed Cuckoo	Generalist - insects															X														
Cacomantis variolosus Brush Cuckoo	Canopy feeder													X																
Chalcites basalis Horsfield's Bronze-Cuckoo	Generalist - insects												X		X				X		X				X					

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Species	Guild	Fauna Rehab 1						Fauna Rehab 2						Fauna Cont 3					Fauna Cont 4						Fauna Cont 5 LSF			Opportunistic		
		Sep-11	Sep-12	Sep-13	Oct-13	Aug-14	Nov-14	Sep-11	Sep-12	Sep-13	Oct-13	Aug-14	Nov-14	Sep-11	Sep-12	Sep-13	Aug-14	Nov-14	Sep-11	Sep-12	Sep-13	Oct-13	Aug-14	Nov-14	Oct-13	Aug-14	Nov-14	Oct-13	Nov-14	Aug-14
Chalcites lucidus Shining Bronze-Cuckoo	Generalist - insects													X										X			X				
Chalcites osculans Black-eared Cuckoo	Generalist - insects													X																	
**Chthonicola sagittata* Speckled Warbler	Ground forager - insects				X						X			X	X	X	X	X	X	X	X	X	X	X	X	X	X				
Cincloramphus mathewsi Rufous Songlark	Ground forager - insects	X		X						X				X		X		X	X												
**Circus assimilis* Spotted Harrier	Bird of prey	X																	X				X								
**Climacteris picumnus* Brown Treecreeper	Bark prober															X	X	X		X											
Colluricincla harmonica Grey Shrike-thrush	Generalist - carnivorous													X	X	X	X	X	X		X	X	X	X		X	X				
Coracina maxima Ground Cuckcoo-shrike	Generalist - insects																X														

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Species	Guild	Fauna Rehab 1						Fauna Rehab 2						Fauna Cont 3					Fauna Cont 4						Fauna Cont 5 LSF			Opportunistic		
		Sep-11	Sep-12	Sep-13	Oct-13	Aug-14	Nov-14	Sep-11	Sep-12	Sep-13	Oct-13	Aug-14	Nov-14	Sep-11	Sep-12	Sep-13	Aug-14	Nov-14	Sep-11	Sep-12	Sep-13	Oct-13	Aug-14	Nov-14	Oct-13	Aug-14	Nov-14	Oct-13	Nov-14	Aug-14
Coracina novaehollandiae Black-faced Cuckoo-shrike	Generalist - insects						X			X				X	X				X			X								X
Coracina papuensis White-bellied Cuckoo-shrike	Generalist - insects																						X							
Corcorax melanoramphos White-winged Chough	Ground forager - insects																			X							X			
Cormobates leucophaea White-throated Treecreeper	Bark prober													X	X	X		X	X	X	X	X		X	X		X			
Corvus coronoides Australian Raven	Generalist - carnivorous	X			X		X				X			X	X	X		X	X	X	X	X	X	X		X	X			
Corvus orru Torresian Crow	Ground forager - omnivorous																													X
Coturnix ypsilophora Brown Quail	Ground forager - plant based	X			X					X									X											

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Species	Guild	Fauna Rehab 1						Fauna Rehab 2						Fauna Cont 3					Fauna Cont 4						Fauna Cont 5 LSF			Opportunistic		
		Sep-11	Sep-12	Sep-13	Oct-13	Aug-14	Nov-14	Sep-11	Sep-12	Sep-13	Oct-13	Aug-14	Nov-14	Sep-11	Sep-12	Sep-13	Aug-14	Nov-14	Sep-11	Sep-12	Sep-13	Oct-13	Aug-14	Nov-14	Oct-13	Aug-14	Nov-14	Oct-13	Nov-14	Aug-14
Cracticus nigrogularis Pied Butcherbird	Generalist - carnivorous		X	X	X	X	X		X		X		X	X	X	X	X	X		X	X		X							
Cracticus tibicen Australian Magpie	Generalist - carnivorous				X		X			X		X	X	X	X	X	X	X					X							
Cracticus torquatus Grey Butcherbird	Generalist - carnivorous															X			X	X	X		X							
Dacelo novaeguineae Laughing Kookaburra	Generalist - carnivorous																			X										
**Daphoenositta chrysoptera* Varied Sittella	Bark prober													X	X		X						X		X	X				
Dicaeum hirundinaceum Mistletoebird	Canopy feeder		X	X	X		X			X	X		X	X		X	X	X	X	X	X	X	X	X	X	X	X			
Elanus axillaris Black-shouldered Kite	Bird of prey				X						X																		X	X
Elseyornis melanops Black-fronted Dotterel	Water Bird																												X	

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Species	Guild	Fauna Rehab 1						Fauna Rehab 2						Fauna Cont 3					Fauna Cont 4						Fauna Cont 5 LSF			Opportunistic		
		Sep-11	Sep-12	Sep-13	Oct-13	Aug-14	Nov-14	Sep-11	Sep-12	Sep-13	Oct-13	Aug-14	Nov-14	Sep-11	Sep-12	Sep-13	Aug-14	Nov-14	Sep-11	Sep-12	Sep-13	Oct-13	Aug-14	Nov-14	Oct-13	Aug-14	Nov-14	Oct-13	Nov-14	Aug-14
Entomyzon cyanotis Blue-faced Honeyeater	Generalist																													X
Eolophus roseicapillus Galah	Ground forager - plant based			X		X				X										X			X						X	
Eopsaltria australis Eastern Yellow Robin	Ground forager - insects													X	X	X	X	X	X	X	X		X	X		X	X				
Eurystomus orientalis Dollarbird	Aerial forager													X																	
Falco berigora Brown Falcon	Bird of prey				X							X																		X	
Falco cenchroides Nankeen Kestrel	Bird of prey				X				X				X											X							
Falco longipennis Australian Hobby	Bird of prey																X														
Falcunculus frontatus Crested Shrike-tit	Bark prober																			X											
Geopelia humeralis Bar-shouldered	Ground forager -													X	X				X	X	X	X	X	X							

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Species	Guild	Fauna Rehab 1						Fauna Rehab 2						Fauna Cont 3					Fauna Cont 4						Fauna Cont 5 LSF			Opportunistic		
		Sep-11	Sep-12	Sep-13	Oct-13	Aug-14	Nov-14	Sep-11	Sep-12	Sep-13	Oct-13	Aug-14	Nov-14	Sep-11	Sep-12	Sep-13	Aug-14	Nov-14	Sep-11	Sep-12	Sep-13	Oct-13	Aug-14	Nov-14	Oct-13	Aug-14	Nov-14	Oct-13	Nov-14	Aug-14
Dove	plant based																													
Geopelia striata Peaceful Dove	Aerial forager			X		X								X	X			X		X	X			X	X	X	X			
Gerygone albogularis White-throated Gerygone	Canopy feeder			X													X						X			X				
Gerygone fusca Western Gerygone	Canopy feeder			X			X			X	X			X		X	X	X			X		X	X	X	X	X			
**Glossopsitta pusilla* Little Lorikeet	Canopy feeder													X													X				
Grallina cyanoleuca Magpie Lark	Ground forager - insects				X																	X	X						X	
Haliastur sphenurus Whistling Kite	Bird of prey																		X											X
**Hieraaetus morphnoides* Little Eagle	Bird of prey															X	X			X		X	X			X				
^Hirundapus caudacutus	Aerial forager																		X											

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Species	Guild	Fauna Rehab 1						Fauna Rehab 2						Fauna Cont 3					Fauna Cont 4						Fauna Cont 5 LSF			Opportunistic		
		Sep-11	Sep-12	Sep-13	Oct-13	Aug-14	Nov-14	Sep-11	Sep-12	Sep-13	Oct-13	Aug-14	Nov-14	Sep-11	Sep-12	Sep-13	Aug-14	Nov-14	Sep-11	Sep-12	Sep-13	Oct-13	Aug-14	Nov-14	Oct-13	Aug-14	Nov-14	Oct-13	Nov-14	Aug-14
White-throated Needletail																														
Hirundo neoxena Welcome Swallow	Aerial forager														X				X	X	X									X
Lalage sueurii White-winged Triller	Aerial forager			X			X				X			X		X			X		X			X						
Lichenostomus chrysops Yellow-faced Honeyeater	Canopy feeder						X											X		X	X			X	X	X	X			
Lichenostomus fuscus Fuscous Honeyeater	Canopy feeder					X									X								X							
Lichenostomus leucotis White-eared Honeyeater	Generalist																									X				
Lichenostomus penicillatus White-plumed Honeyeater	Canopy feeder			X			X						X	X	X	X		X	X	X	X	X		X	X					
Lichenostomus virescens	Generalist		X	X	X	X			X	X	X	X	X	X	X	X	X	X	X		X	X	X	X		X				

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Species	Guild	Fauna Rehab 1						Fauna Rehab 2						Fauna Cont 3					Fauna Cont 4						Fauna Cont 5 LSF			Opportunistic		
		Sep-11	Sep-12	Sep-13	Oct-13	Aug-14	Nov-14	Sep-11	Sep-12	Sep-13	Oct-13	Aug-14	Nov-14	Sep-11	Sep-12	Sep-13	Aug-14	Nov-14	Sep-11	Sep-12	Sep-13	Oct-13	Aug-14	Nov-14	Oct-13	Aug-14	Nov-14	Oct-13	Nov-14	Aug-14
Singing Honeyeater																														
Lichmera indistincta Brown Honeyeater	Canopy feeder																		X					X		X				
**Lophoictinia isura* Square-tailed Kite	Bird of prey													X																
Malurus cyaneus Superb Fairy-wren	Ground forager - insects	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X				
Malurus lamberti Variegated Fairywren	Ground forager - insects				X		X										X	X					X	X						
Malurus leucopterus White-winged Fairy-wren	Ground forager - insects	X	X	X	X	X	X	X	X	X	X	X	X																	
Manorina melanocephala Noisy Miner	Generalist																		X		X		X						X	
Megalurus timoriensis Tawny Grassbird	Ground forager - insects	X																												
Melithreptus brevirostris	Canopy feeder																						X							

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Species	Guild	Fauna Rehab 1						Fauna Rehab 2						Fauna Cont 3					Fauna Cont 4						Fauna Cont 5 LSF			Opportunistic		
		Sep-11	Sep-12	Sep-13	Oct-13	Aug-14	Nov-14	Sep-11	Sep-12	Sep-13	Oct-13	Aug-14	Nov-14	Sep-11	Sep-12	Sep-13	Aug-14	Nov-14	Sep-11	Sep-12	Sep-13	Oct-13	Aug-14	Nov-14	Oct-13	Aug-14	Nov-14	Oct-13	Nov-14	Aug-14
Brown-headed Honeyeater																														
Melithreptus brevirostris Brown-headed Honeyeater	Canopy feeder													X				X	X		X			X	X		X			
Melithreptus lunatus White-naped Honeyeater	Generalist																						X							
Melopsittacus undulatus Budgerigar	Ground forager - plant based															X														
Merops ornatus Rainbow Bee-eater	Aerial forager															X		X				X								
Microeca fascinans Jacky Winter	Aerial forager			X																			X							
Milvus migrans Black Kite	Bird of prey																													X
Myiagra inquieta Restless Flycatcher	Generalist - insects																						X							
Myiagra rubecula Leaden Flycatcher	Generalist - insects																							X			X			

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Species	Guild	Fauna Rehab 1						Fauna Rehab 2						Fauna Cont 3					Fauna Cont 4						Fauna Cont 5 LSF			Opportunistic		
		Sep-11	Sep-12	Sep-13	Oct-13	Aug-14	Nov-14	Sep-11	Sep-12	Sep-13	Oct-13	Aug-14	Nov-14	Sep-11	Sep-12	Sep-13	Aug-14	Nov-14	Sep-11	Sep-12	Sep-13	Oct-13	Aug-14	Nov-14	Oct-13	Aug-14	Nov-14	Oct-13	Nov-14	Aug-14
Neochmia modesta *Plum-headed Finch*	Ground forager - plant based									X																				
Neophema pulchella Turquoise Parrot	Ground forager - plant based													X		X	X						X							
Northiella haematogaster Blue Bonnet	Generalist												X																	
Nymphicus hollandicus Cockatiel	Ground forager - plant based																													X
Ocyphaps lophotes Crested Pigeon	Ground forager - plant based			X	X								X	X	X	X	X	X			X	X	X							
Pachycephala pectoralis Golden Whistler	Generalist - insects																						X			X				
Pachycephala rufiventris Rufous Whistler	Canopy feeder			X			X							X	X	X	X	X	X	X	X	X	X	X	X	X	X			
Pardalotus punctatus Spotted Pardalote	Canopy feeder			X						X				X		X	X		X		X					X	X			

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Species	Guild	Fauna Rehab 1						Fauna Rehab 2						Fauna Cont 3					Fauna Cont 4						Fauna Cont 5 LSF			Opportunistic		
		Sep-11	Sep-12	Sep-13	Oct-13	Aug-14	Nov-14	Sep-11	Sep-12	Sep-13	Oct-13	Aug-14	Nov-14	Sep-11	Sep-12	Sep-13	Aug-14	Nov-14	Sep-11	Sep-12	Sep-13	Oct-13	Aug-14	Nov-14	Oct-13	Aug-14	Nov-14	Oct-13	Nov-14	Aug-14
Pardalotus striatus Striated Pardalote	Canopy feeder			X		X				X		X			X	X	X		X	X	X	X	X	X		X	X			
Petrochelidon ariel Fairy Martin	Aerial forager																						X	X		X				
Petrochelidon nigricans Tree Martin	Aerial forager													X		X	X	X	X	X			X							
Petroica goodenovii Red-capped Robin	Ground forager - insects													X	X	X	X	X	X	X		X		X	X	X	X			
Phaps chalcoptera Common Bronzewing	Ground forager - plant based			X	X	X				X	X						X			X			X		X	X				
Philemon citreogularis Little Friarbird	Canopy feeder														X	X		X	X		X	X								
Philemon corniculatus Noisy Friarbird	Canopy feeder									X				X		X		X			X	X		X	X		X			
Platycercus eximius Eastern Rosella	Ground forager - plant based					X	X						X	X	X	X	X	X	X	X	X	X	X							
Plectorhyncha lanceolata	Generalist -			X										X	X	X	X	X	X	X	X	X	X	X		X				

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Species	Guild	Fauna Rehab 1						Fauna Rehab 2						Fauna Cont 3					Fauna Cont 4						Fauna Cont 5 LSF			Opportunistic		
		Sep-11	Sep-12	Sep-13	Oct-13	Aug-14	Nov-14	Sep-11	Sep-12	Sep-13	Oct-13	Aug-14	Nov-14	Sep-11	Sep-12	Sep-13	Aug-14	Nov-14	Sep-11	Sep-12	Sep-13	Oct-13	Aug-14	Nov-14	Oct-13	Aug-14	Nov-14	Oct-13	Nov-14	Aug-14
Striped Honeyeater	plant based																													
Pomatostomus superciliosus White-browed Babbler	Ground forager - insects													X			X	X			X		X	X			X			
**Pomatostomus temporalis* Grey-crowned Babbler	Ground forager - insects																						X	X						
Psephotus haematonotus Red-rumped Parrot	Ground forager - plant based										X		X				X	X	X				X	X						X
Ptilonorhynchus maculatus Spotted Bowerbird	Canopy feeder													X								X								
Rhipidura albiscapa Grey Fantail	Generalist - insects			X		X								X	X	X	X	X	X	X	X	X	X	X	X	X	X			
Rhipidura leucophrys Willie Wagtail	Aerial forager		X	X	X	X	X		X	X	X	X		X	X	X	X	X	X	X	X	X	X	X						
Robin Eopsaltria Easter Yellow Robin	Ground forager - insects																					X			X					

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Species	Guild	Fauna Rehab 1						Fauna Rehab 2						Fauna Cont 3					Fauna Cont 4						Fauna Cont 5 LSF			Opportunistic		
		Sep-11	Sep-12	Sep-13	Oct-13	Aug-14	Nov-14	Sep-11	Sep-12	Sep-13	Oct-13	Aug-14	Nov-14	Sep-11	Sep-12	Sep-13	Aug-14	Nov-14	Sep-11	Sep-12	Sep-13	Oct-13	Aug-14	Nov-14	Oct-13	Aug-14	Nov-14	Oct-13	Nov-14	Aug-14
Scythrops novaehollandiae Channel-billed Cuckoo	Generalist																										X			
Smicrornis brevirostris Weebill	Canopy feeder		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X			X	X	X	X	X			
Strepera graculina Pied Currawong	Generalist - carnivorous			X										X	X		X		X			X		X	X	X	X			
Struthidea cinerea Apostlebird	Ground forager - omnivorous													X					X	X			X	X						X
#Sturnus vulgaris Common Starling	Ground forager - omnivorous																													X
Taeniopygia bichenovii Double-barred Finch	Ground forager - plant based			X	X		X			X			X	X	X	X	X		X	X	X	X	X	X	X	X	X			
Taeniopygia guttata Zebra Finch	Ground forager - plant based		X		X				X	X			X																	X
Threskiornis molucca	Water Bird																											X		

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Species	Guild	Fauna Rehab 1						Fauna Rehab 2						Fauna Cont 3					Fauna Cont 4						Fauna Cont 5 LSF			Opportunistic		
		Sep-11	Sep-12	Sep-13	Oct-13	Aug-14	Nov-14	Sep-11	Sep-12	Sep-13	Oct-13	Aug-14	Nov-14	Sep-11	Sep-12	Sep-13	Aug-14	Nov-14	Sep-11	Sep-12	Sep-13	Oct-13	Aug-14	Nov-14	Oct-13	Aug-14	Nov-14	Oct-13	Nov-14	Aug-14
Australian White Ibis																														
Turnix varia Painted Button-quail	Ground forager - omnivorous													X	X				X		X									
Zosterops lateralis Silvereye	Generalist													X	X	X	X	X	X	X	X	X	X		X	X				
Total		**8**	**8**	**26**	**22**	**14**	**19**	**4**	**10**	**20**	**16**	**10**	**17**	**50**	**38**	**45**	**41**	**40**	**49**	**39**	**41**	**35**	**53**	**45**	**26**	**36**	**34**	**2**	**6**	**14**

* Denotes threatened under the TSC Act; ^ Denotes migratory or marine under the EPBC Act; # Denotes introduced species

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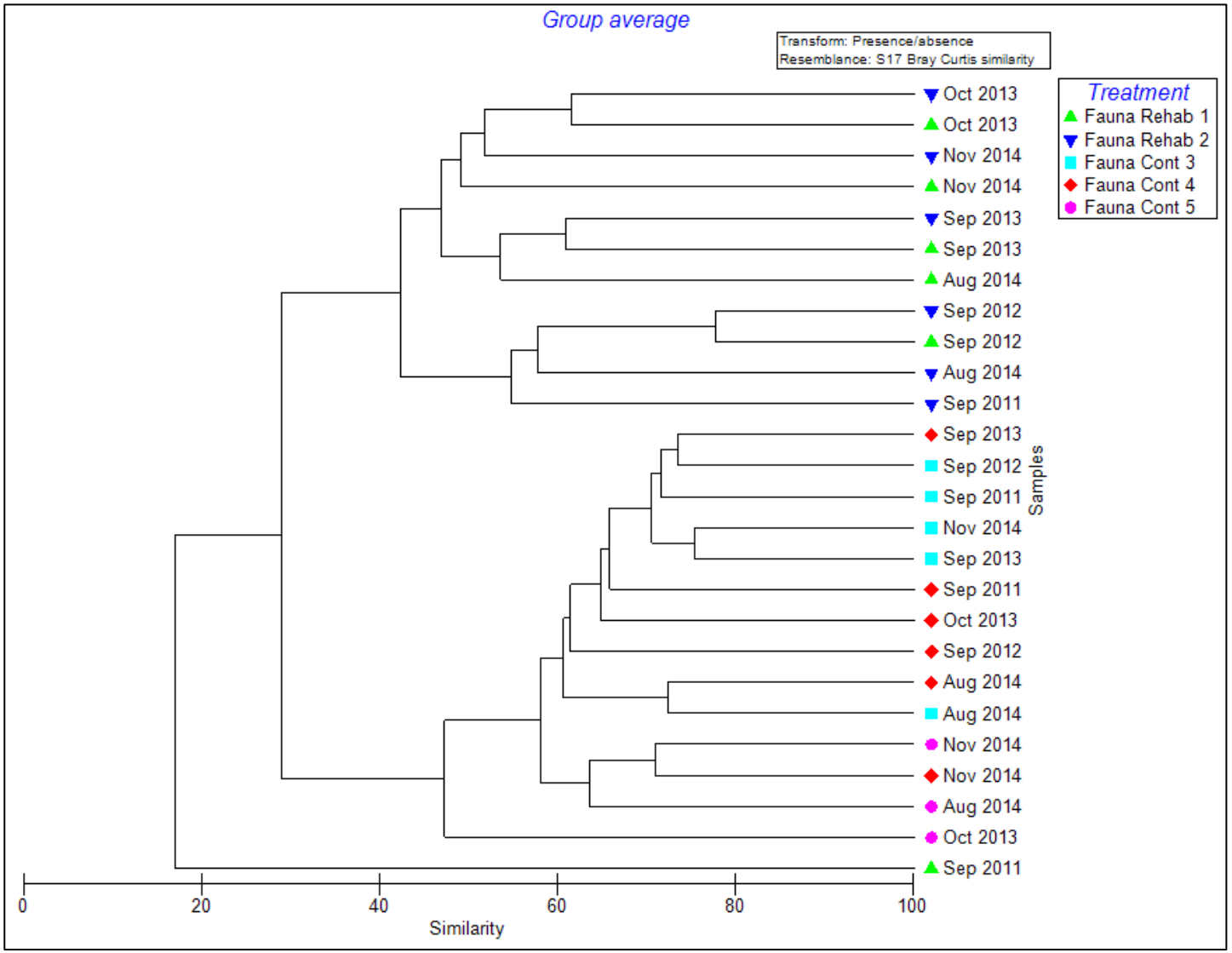

Figure 4-2: Cluster analysis of bird species recorded at all monitoring sites for 2011-2014

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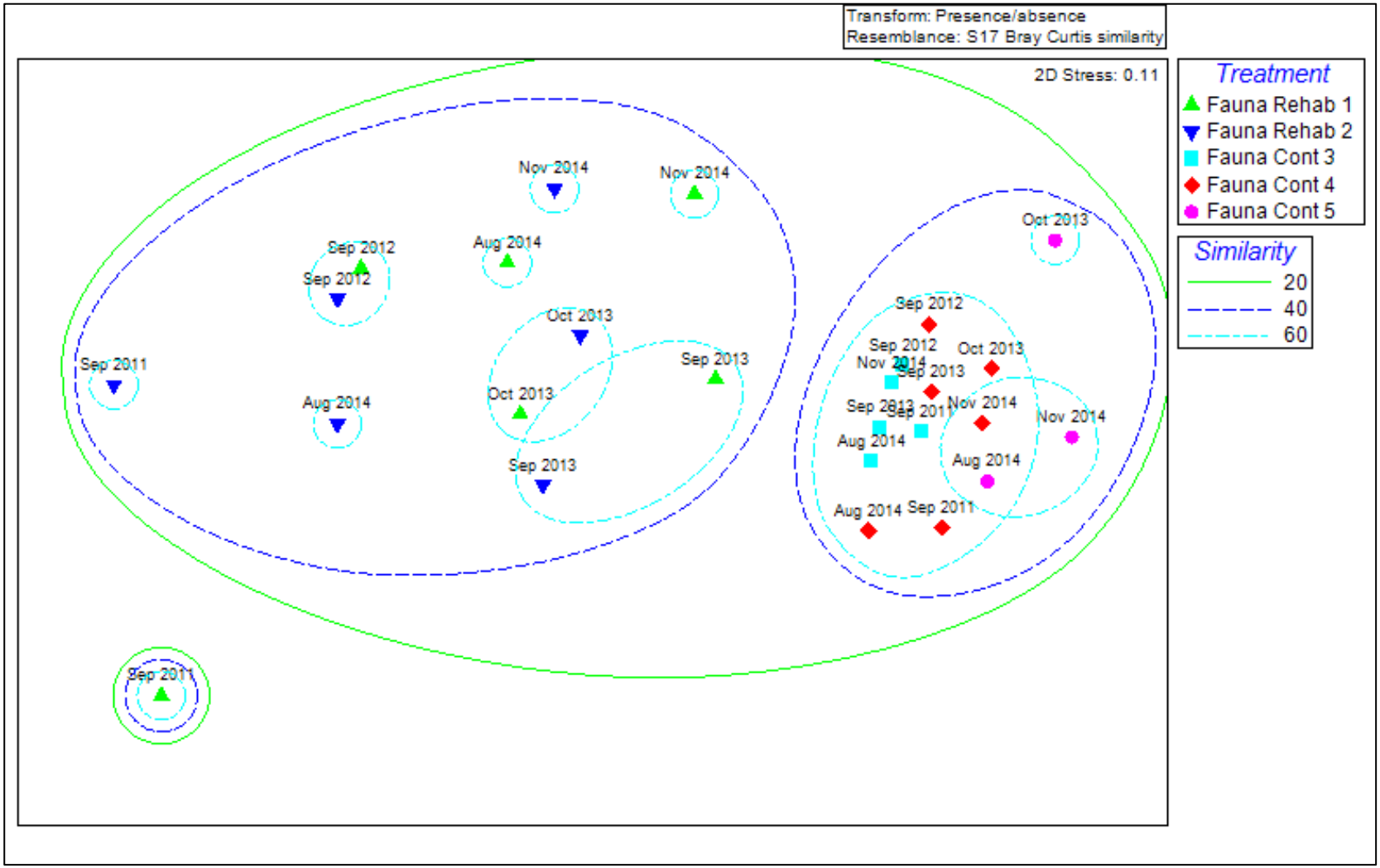

Figure 4-3: Non-metric multi-dimensional scaling plot for bird species recorded at all monitoring sites for 2011-2014

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Table 4-2: Fauna species recorded across all monitoring zones (2011-2014)

Scientific Name	Common Name	Fauna Rehab 1						Fauna Rehab 2						Fauna Cont 3						Fauna Cont 4						Fauna Cont 5	
		2011	2012	Sep-13	Oct-13	Aug-14	Nov-14	2011	2012	Sep-13	Oct-13	Aug-14	Nov-14	2011	2012	Sep-13	Oct-13	Aug-14	Nov-14	2011	2012	Sep-13	Oct-13	Aug-14	Nov-14	Aug-14	Nov-14
Mammals																											
#Lepus capensis	Hare					X																				X	
Macropus giganteus	Eastern Grey Kangaroo	X	X		X	X	X		X		X	X	X	X	X		X				X		X	X		X	
Macropus robustus	Common Wallaroo		X		X		X		X		X	X	X	X	X			X			X			X	X		
Macropus rufogriseus	Red-necked Wallaby																				X						X
#Oryctolagus cuniculus	Rabbit													X				X	X								
Wallabia bicolor	Swamp Wallaby														X		X				X		X				
#Vulpes vulpes	Fox																								X		
Total		**1**	**2**	**0**	**2**	**2**	**2**	**0**	**2**	**0**	**2**	**2**	**2**	**3**	**3**	**0**	**2**	**2**	**1**	**0**	**4**	**0**	**2**	**2**	**2**	**2**	**1**
Amphibians																											
Crinia signifera	Eastern Froglet																			X							
Limnodynastes fletcheri	Barking Marsh-Frog																			X							
Litoria peronii	Peron's Tree-Frog																			X							
Total		**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**3**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

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Scientific Name	Common Name	Fauna Rehab 1						Fauna Rehab 2						Fauna Cont 3						Fauna Cont 4						Fauna Cont 5	
		2011	2012	Sep-13	Oct-13	Aug-14	Nov-14	2011	2012	Sep-13	Oct-13	Aug-14	Nov-14	2011	2012	Sep-13	Oct-13	Aug-14	Nov-14	2011	2012	Sep-13	Oct-13	Aug-14	Nov-14	Aug-14	Nov-14
Reptiles																											
Cryptoblepharus virgatus	Wall Skink				X																						
Morethia boulengeri	Boulenger's Skink				X									X						X	X						
Pogona barbata	Eastern Bearded Dragon														X												
Varanus varius	Lace Monitor																X				X						
Total		**0**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**1**	**0**	**1**	**0**	**1**	**1**	**2**	**0**	**0**	**0**	**0**	**0**	**0**

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5 Soil data

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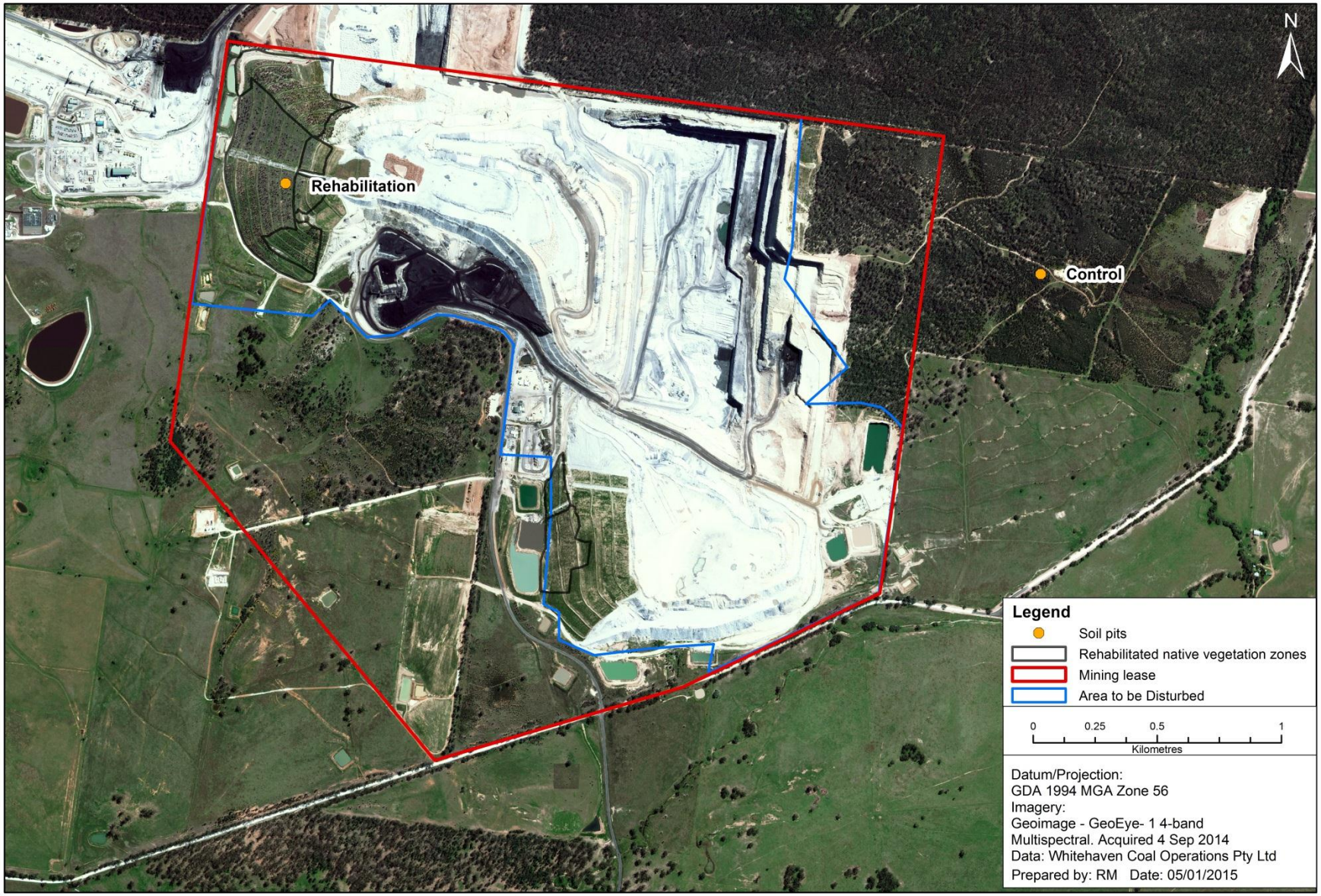

Figure 5-1: Location of soil pits

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Figure 5-2:Soil Pit 1 Woodland Control

Table 5-1: Soil Pit 1 Woodland Control (E 227209, N 6607780)

Horizon and depth	Soil description
1. 0 – 0.24m	Brown sandy loam with high gravel content. Grass, shrub and tree roots in horizon.
2. 0.24 – 0.47m	Light brown – grey sandy clay with gravel up to 20mm. Shrub and tree roots in horizon
3. 0.47 – 1.2m	Light brown – grey sandy clay with gravel and rock up to 60mm. Tree roots down to 0.60m.
Notes	Very poor soil – only distinct horizon is A, with only 0.24m of brown soil containing some organic matter.

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Figure 5-3: Soil Pit 2 Woodland Rehabilitation

Table 5-2: Soil Pit 2 Woodland Rehabilitation (230248, 6607415)

Horizon and depth	Soil description
1. 0 – 0.46m	Brown sandy clay with rocks varying from 10 – 30mm. Chunks of medium – heavy clay surround rocks. Grass roots down to 0.10m.
Notes	Rock starts at 0.46m. Soil has a single horizon which appears to contain a mixture of different soil characteristics. Clay surrounding rocks would have originally been found in deeper soil profiles (up to 2m deep).

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Appendix 8

BLAST MONITORING RESULTS

Environmental Blast Monitoring

SHOT NO	DATE	MONITOR LOCATION	PEAK GROUND PRESSURE (mm/s)	PEAK OVERPRESSURE (dBL)	TIME
478	2/05/2014	Tarrawonga Station	0.1500	97.00	12:09:54
478	2/05/2014	Matong	0.0600	106.70	12:09:54
479	6/05/2014	Tarrawonga Station	0.1400	84.50	11:56:02
479	6/05/2014	Matong	0.0000	77.90	11:56:02
480	7/05/2014	Tarrawonga Station	0.4200	97.00	11:56:44
480	7/05/2014	Matong	0.0000	98.10	11:56:44
481	9/05/2014	Tarrawonga Station	0.2000	104.60	11:57:33
481	9/05/2014	Matong	0.2300	101.70	11:57:33
482	13/05/2014	Tarrawonga Station	0.0100	93.80	13:58:33
482	13/05/2014	Matong	0.0000	85.40	13:58:33
483	15/05/2014	Tarrawonga Station	0.5200	87.10	12:02:13
483	15/05/2014	Matong	0.2300	94.60	12:02:13
484	15/05/2014	Tarrawonga Station	0.0100	100.10	14:06:20
484	15/05/2014	Matong	0.0000	98.30	14:06:20
485	20/05/2014	Tarrawonga Station	0.2300	95.80	12:21:34
485	20/05/2014	Matong	0.2100	99.20	12:21:34
486	24/05/2014	Tarrawonga Station	0.2000	101.50	12:19:43
486	24/05/2014	Matong	0.1900	97.30	12:19:43
487	30/05/2014	Tarrawonga Station	0.5200	98.20	12:02:32
487	30/05/2014	Matong	0.4800	92.90	12:02:32
488	5/06/2014	Tarrawonga Station	0.2800	98.30	11:57:42
488	5/06/2014	Matong	0.3300	104.60	11:57:42
489	12/06/2014	Tarrawonga Station	0.2500	94.30	14:15:02
489	12/06/2014	Matong	0.0600	93.00	14:15:02
490	17/06/2014	Tarrawonga Station	0.5000	90.30	12:35:01
490	17/06/2014	Matong	0.3900	97.40	12:35:01
491	20/06/2014	Tarrawonga Station	0.0500	105.20	11:59:44
491	20/06/2014	Matong	0.0400	96.20	11:59:44
492	27/06/2014	Tarrawonga Station	0.2700	106.10	12.12.22
492	27/06/2014	Matong	0.3200	101.80	12.12.22
493	30/06/2014	Tarrawonga Station	0.4300	99.20	12:01:21
493	30/06/2014	Matong	0.5100	122.70	12:01:21

Environmental Blast Monitoring

SHOT NO	DATE	MONITOR LOCATION	PEAK GROUND PRESSURE (mm/s)	PEAK OVERPRESSURE (dBL)	TIME
494	4/07/2014	Tarrawonga Station	0.0800	98.70	11:54:40
494	4/07/2014	Matong	0.1100	101.60	11:54:40
495	8/07/2014	Tarrawonga Station	0.6600	114.30	12:07:41
495	8/07/2014	Matong	0.5700	107.10	12:07:41
496	15/07/2014	Tarrawonga Station	0.2600	106.60	13:28:02
496	15/07/2014	Matong	0.3500	99.80	13:28:02
497	18/07/2014	Tarrawonga Station	0.1100	92.30	14:02:20
497	18/07/2014	Matong	0.0500	107.30	14:02:20
498	22/07/2014	Tarrawonga Station	0.5300	93.50	12:04:04
498	22/07/2014	Matong	0.3600	95.90	12:04:04
499	28/07/2014	Tarrawonga Station	0.1500	100.70	12:55:42
499	28/07/2014	Matong	0.2500	112.20	12:55:42
500	29/07/2014	Tarrawonga Station	0.1500	106.20	11:57:30
500	29/07/2014	Matong	0.1200	99.20	11:57:30
501	1/08/2014	Tarrawonga Station	0.1600	100.30	14:03:21
501	1/08/2014	Matong	0.0600	105.70	14:03:21
502	6/08/2014	Tarrawonga Station	0.5100	97.40	12:03:14
502	6/08/2014	Matong	0.2600	97.40	12:03:14
503	8/08/2014	Tarrawonga Station	0.2000	97.30	11:59:50
503	8/08/2014	Matong	0.1700	101.30	11:59:50
504	12/08/2014	Tarrawonga Station	0.1500	91.10	11:59:40
504	12/08/2014	Matong	0.1500	95.60	11:59:40
505	15/08/2014	Tarrawonga Station	0.2700	103.50	13:05:15
505	15/08/2014	Matong	0.2100	104.80	13:05:15
506	20/08/2014	Tarrawonga Station	0.2400	105.20	12:02:33
506	20/08/2014	Matong	0.2300	106.70	12:02:33
507	22/08/2014	Tarrawonga Station	0.3400	95.60	15:38:26
507	22/08/2014	Matong	0.3000	97.10	15:38:26
508	25/08/2014	Tarrawonga Station	0.7900	88.90	12:02:44
508	25/08/2014	Matong	0.4400	90.40	12:02:44
509	29/08/2014	Tarrawonga Station	0.1800	91.30	12:35:30
509	29/08/2014	Matong	0.1400	104.00	12:35:30

Environmental Blast Monitoring

SHOT NO	DATE	MONITOR LOCATION	PEAK GROUND PRESSURE (mm/s)	PEAK OVERPRESSURE (dBL)	TIME
510	1/09/2014	Tarrawonga Station	0.2500	100.50	13:00:37
510	1/09/2014	Matong	0.3300	104.60	13:00:37
511	3/09/2014	Tarrawonga Station	0.4800	90.00	11:56:43
511	3/09/2014	Matong	0.4000	107.30	11:56:43
512	9/09/2014	Tarrawonga Station	0.1600	99.20	14:07:01
512	9/09/2014	Matong	0.0400	95.50	14:07:01
513	11/09/2014	Tarrawonga Station	0.0900	97.50	11:00:20
513	11/09/2014	Matong	0.0300	105.10	11:00:20
514	15/09/2014	Tarrawonga Station	0.1200	92.70	11:57:19
514	15/09/2014	Matong	0.0600	94.90	11:57:19
515	16/09/2014	Tarrawonga Station	0.3800	108.30	12:05:43
515	16/09/2014	Matong	0.5600	120.30	12:05:43
516	23/09/2014	Tarrawonga Station	0.8500	119.10	12:01:45
516	23/09/2014	Matong	0.4000	104.10	12:01:45
517	26/09/2014	Tarrawonga Station	0.3000	105.30	11:56:37
517	26/09/2014	Matong	0.3300	100.10	11:56:37
518	29/09/2014	Tarrawonga Station	0.1700	102.20	12:05:58
518	29/09/2014	Matong	0.1500	104.70	12:05:58
519	8/10/2014	Tarrawonga Station	0.3000	100.70	10:58:27
519	8/10/2014	Matong	0.1400	98.60	10:58:27
520	9/10/2014	Tarrawonga Station	0.4100	92.80	12:01:35
520	9/10/2014	Matong	0.2900	99.20	12:01:35
521	10/10/2014	Tarrawonga Station	0.1500	91.40	13:00:44
521	10/10/2014	Matong	0.0800	93.00	13:00:44
522	15/10/2014	Tarrawonga Station	0.2000	98.60	10:47:00
522	15/10/2014	Matong	0.0600	102.90	10:47:00
523	17/10/2014	Tarrawonga Station	0.3100	104.70	11:58:05
523	17/10/2014	Matong	0.2800	106.40	11:58:05
524	21/10/2014	Tarrawonga Station	0.0500	86.00	11:51:44
524	21/10/2014	Matong	0.1200	95.50	11:51:44
525	23/10/2014	Tarrawonga Station	0.2400	103.20	12:03:59
525	23/10/2014	Matong	0.1400	102.10	12:03:59

Environmental Blast Monitoring

SHOT NO	DATE	MONITOR LOCATION	PEAK GROUND PRESSURE (mm/s)	PEAK OVERPRESSURE (dBL)	TIME
526	24/10/2014	Tarrawonga Station	0.2600	108.50	11:52:30
526	24/10/2014	Matong	0.4300	103.20	11:52:30
527	28/10/2014	Tarrawonga Station	0.3400	93.30	11:58:11
527	28/10/2014	Matong	0.1600	104.60	11:58:11
528	3/11/2014	Tarrawonga Station	0.1700	100.10	11:59:34
528	3/11/2014	Matong	0.1600	104.60	11:59:34
529	6/11/2014	Tarrawonga Station	0.2300	97.70	11:57:50
529	6/11/2014	Matong	0.2900	103.10	11:57:50
530	13/11/2014	Tarrawonga Station	0.2800	94.50	11:58:27
530	13/11/2014	Matong	0.3100	100.10	11:58:27
531	18/11/2014	Tarrawonga Station	0.0600	88.10	14:10:02
531	18/11/2014	Matong	0.0500	101.40	14:10:02
532	28/11/2014	Tarrawonga Station	0.1300	87.30	13:00:20
532	28/11/2014	Matong	0.1000	97.70	13:00:20
533	5/12/2014	Tarrawonga Station	0.4400	110.30	10:34:18
533	5/12/2014	Matong	0.1300	105.50	10:34:18
534	11/12/2014	Tarrawonga Station	0.4000	111.70	10:29:16
534	11/12/2014	Matong	0.0900	111.70	10:29:16
535	12/12/2014	Tarrawonga Station	0.0900	106.90	11:58:12
535	12/12/2014	Matong	0.0700	107.20	11:58:12
536	18/12/2014	Tarrawonga Station	0.3900	103.70	11:58:35
536	18/12/2014	Matong	0.3000	107.70	11:58:35
537	24/12/2014	Tarrawonga Station	0.5800	103.40	11:43:18
537	24/12/2014	Matong	0.6500	99.10	11:43:18
538	9/01/2015	Tarrawonga Station	0.7300	100.60	12:00:58
538	9/01/2015	Matong	0.7000	111.50	12:00:58
539	12/01/2015	Tarrawonga Station	0.0900	101.80	12:17:00
539	12/01/2015	Matong	0.0300	91.60	12:17:00
540	16/01/2015	Tarrawonga Station	0.7800	127.30	11.55.35
540	16/01/2015	Matong	0.9100	122.80	11.55.35
541	20/01/2015	Tarrawonga Station	0.1300	95.90	14:17:19
541	20/01/2015	Matong	0.0800	102.40	14:17:19

Environmental Blast Monitoring

SHOT NO	DATE	MONITOR LOCATION	PEAK GROUND PRESSURE (mm/s)	PEAK OVERPRESSURE (dBL)	TIME
541	20/01/2015	Tarrawonga Station	0.1400	93.30	14:37:37
541	20/01/2015	Matong	0.0700	91.70	14:37:37
542	23/01/2015	Tarrawonga Station	0.3000	109.20	12:00:13
542	23/01/2015	Matong	0.5800	105.00	12:00:13
543	30/01/2015	Tarrawonga Station	0.2000	92.20	14:19:04
543	30/01/2015	Matong	0.0500	110.70	14:19:04
544	2/02/2015	Tarrawonga Station	0.2200	101.50	12:05:02
544	2/02/2015	Matong	0.3900	97.30	12:05:02
545	12/02/2015	Tarrawonga Station	0.3700	107.00	14:13:52
545	12/02/2015	Matong	0.1600	97.10	14:13:52
546	17/02/2015	Tarrawonga Station	0.1100	85.10	14:18:55
546	17/02/2015	Matong	0.0300	93.00	14:18:55
547	18/02/2015	Tarrawonga Station	0.4200	102.40	12:06:17
547	18/02/2015	Matong	0.4100	106.30	12:06:17
548	19/02/2015	Tarrawonga Station	0.1100	94.30	11:59:52
548	19/02/2015	Matong	0.1700	97.10	11:59:52
549	24/02/2015	Tarrawonga Station	0.4100	88.40	11:53:50
549	24/02/2015	Matong	0.4000	92.50	11:53:50
550	26/02/2015	Tarrawonga Station	0.1500	88.30	11:53:31
550	26/02/2015	Matong	0.0600	98.30	11:53:31
551	27/02/2015	Tarrawonga Station	0.3700	110.00	10:25:12
551	27/02/2015	Matong	0.1200	100.90	10:25:12
552	3/03/2015	Tarrawonga Station	0.5900	91.70	11:59:32
552	3/03/2015	Matong	0.3600	99.00	11:59:32
553	5/03/2015	Tarrawonga Station	0.1300	94.00	14:25:35
553	5/03/2015	Matong	0.0900	100.10	14:25:35
554	10/03/2015	Tarrawonga Station	0.5000	107.00	12:43:32
554	10/03/2015	Matong	0.9900	108.10	12:43:32
555	11/03/2015	Tarrawonga Station	0.1100	91.40	11:59:32
555	11/03/2015	Matong	0.0800	98.70	11:59:32
556	17/03/2015	Tarrawonga Station	0.1600	93.60	14:33:02
556	17/03/2015	Matong	0.0400	96.50	14:33:02

Environmental Blast Monitoring

SHOT NO	DATE	MONITOR LOCATION	PEAK GROUND PRESSURE (mm/s)	PEAK OVERPRESSURE (dBL)	TIME
557	18/03/2015	Tarrawonga Station	0.1500	108.20	12:34:09
557	18/03/2015	Matong	0.2200	106.20	12:34:09
558	20/03/2015	Tarrawonga Station	0.1400	99.00	11:58:00
558	20/03/2015	Matong	0.3200	105.20	11:58:00
559	25/03/2015	Tarrawonga Station	0.1400	96.70	11:51:19
559	25/03/2015	Matong	0.2100	98.50	11:51:19
560	26/03/2015	Tarrawonga Station	0.8500	97.30	12:05:16
560	26/03/2015	Matong	0.7200	100.70	12:05:16
561	27/03/2015	Tarrawonga Station	0.1300	93.70	11:53:13
561	27/03/2015	Matong	0.0900	97.90	11:53:13
562	2/04/2015	Tarrawonga Station	0.3300	100.20	12:19:54
562	2/04/2015	Matong	0.4000	100.30	12:19:54
563	15/04/2015	Tarrawonga Station	0.4600	100.60	10:49:13
563	15/04/2015	Matong	0.1600	97.00	10:49:13
564	20/04/2015	Tarrawonga Station	0.7900	110.30	12:56:50
564	20/04/2015	Matong	1.2200	111.20	12:56:50
565	28/04/2015	Tarrawonga Station	0.1200	97.80	11:58:14
565	28/04/2015	Matong	0.0800	100.80	11:58:14
566	30/04/2015	Tarrawonga Station	0.1700	97.50	10:32:32
566	30/04/2015	Matong	0.1000	97.20	10:32:32

Appendix 9

NOISE MONITORING RESULTS

4 July 2014

Ref: 06259/5268

Whitehaven Coal Pty Ltd
PO Box 600
GUNNEDAH NSW 2380

RE: WHITEHAVEN COAL – ROAD TRAFFIC NOISE MONITORING, JUNE 2014

This letter report presents the results of a road noise measurements conducted for the Tarrawonga Coal Mine (TCM) and Rocglen Coal Mine (RCM). The measurements were conducted at "Brooklyn" and "Werona" on Blue Vale Road with the intention of determining the $L_{Aeq(1\ hour)}$ noise contribution from mine-related vehicles, particularly coal haul trucks. There are two separate residences on "Brooklyn" and noise measurements were made at, or near, the front of both residences. Residence 1 is closest to Blue Vale Road (approximately 90m) whilst Residence 2 is approximately 480m from the road.

The approvals granted for TCM and RCM state that the cumulative noise level from traffic generated by the two mines must not exceed 60 dB(A),$L_{eq(1hour)}$ during the day and 55 dB(A),$L_{eq(1hour)}$ during the night at these locations. For the purposes of traffic noise assessment the *Environmental Criteria for Road Traffic Noise* (ECRTN) defines day as 7am – 10pm and night as 10pm – 7am. On Sundays and public holidays the daytime transition changes to 8am.

The noise measurements were made adjacent to the front (eastern) facade of Residences 1 and 2 at "Brooklyn" between 9:46 am and 10:47 am and prior to this at "Werona" between 8:34 am and 9:35 am on Friday, June 13, 2014 with third-octave band Bruel & Kjaer Type 2260 sound level meters (IEC Type 1). The sound level meters were placed on tripods and recorded continuously at 1-second statistical intervals while notes on passing vehicles were written down.

Over the course of the measurement period at “Brooklyn” there were 57 coal truck movements related to TCM and RCM. Other noise sources observed throughout the monitoring period included a contribution from birds, dogs and other traffic on Blue Vale Road. All of this extraneous noise was removed during the analysis process.

The calculated contribution from mine-related vehicles to the overall noise level at Residence 1 at “Brooklyn” was **55 dB(A),$L_{eq\ (1\ hour)}$**. This is below the daytime criterion of **60 dB(A) $L_{eq\ (1\ hour)}$**.

The calculated contribution from mine-related vehicles at Residence 2 was **50 dB(A),$L_{eq\ (1\ hour)}$**. This is below the daytime criterion of **60 dB(A) $L_{eq\ (1\ hour)}$**.

Over the course of the measurement period at “Werona” there were 57 coal truck movements related to TCM and RCM.

The total measured contribution from mine-related vehicles at “Werona” was **50 dB(A),$L_{eq\ (1\ hour)}$**. This is below the daytime criterion of **60 dB(A) $L_{eq\ (1\ hour)}$**.

We trust this report fulfils your requirements at this time, however, should you require additional information or assistance please contact the undersigned on 4954 2276.

Yours faithfully,
SPECTRUM ACOUSTICS PTY LIMITED

Author:



Neil Pennington
Acoustical Consultant

Review:



Ross Hodge
Acoustical Consultant

Project No: 04095

ATTENDED NOISE MONITORING – JUNE 2014
Tarrawonga Coal Mine
Boggabri, NSW

Prepared for:

Whitehaven Coal Pty Limited
PO Box 600
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July 2014

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1.0 INTRODUCTION

This letter report presents the results of attended operational noise compliance monitoring conducted for the Tarrawonga Coal Mine (TCM) over a three day period between 10 and 12 June, 2014.

The monitoring was carried out generally in accordance with the requirements of Environment Protection Licence (EPL 12365) and other relevant Australian Standards and guidelines.

1.1 Noise Monitoring Locations

Noise monitoring locations defined in Section M7.4 of EPL 12365 are listed in the table below and shown on **Figure 1**.

EPA Identification No.	*Description of Location*
N1	*Within 30m of the residence on property "Tarrawonga"*

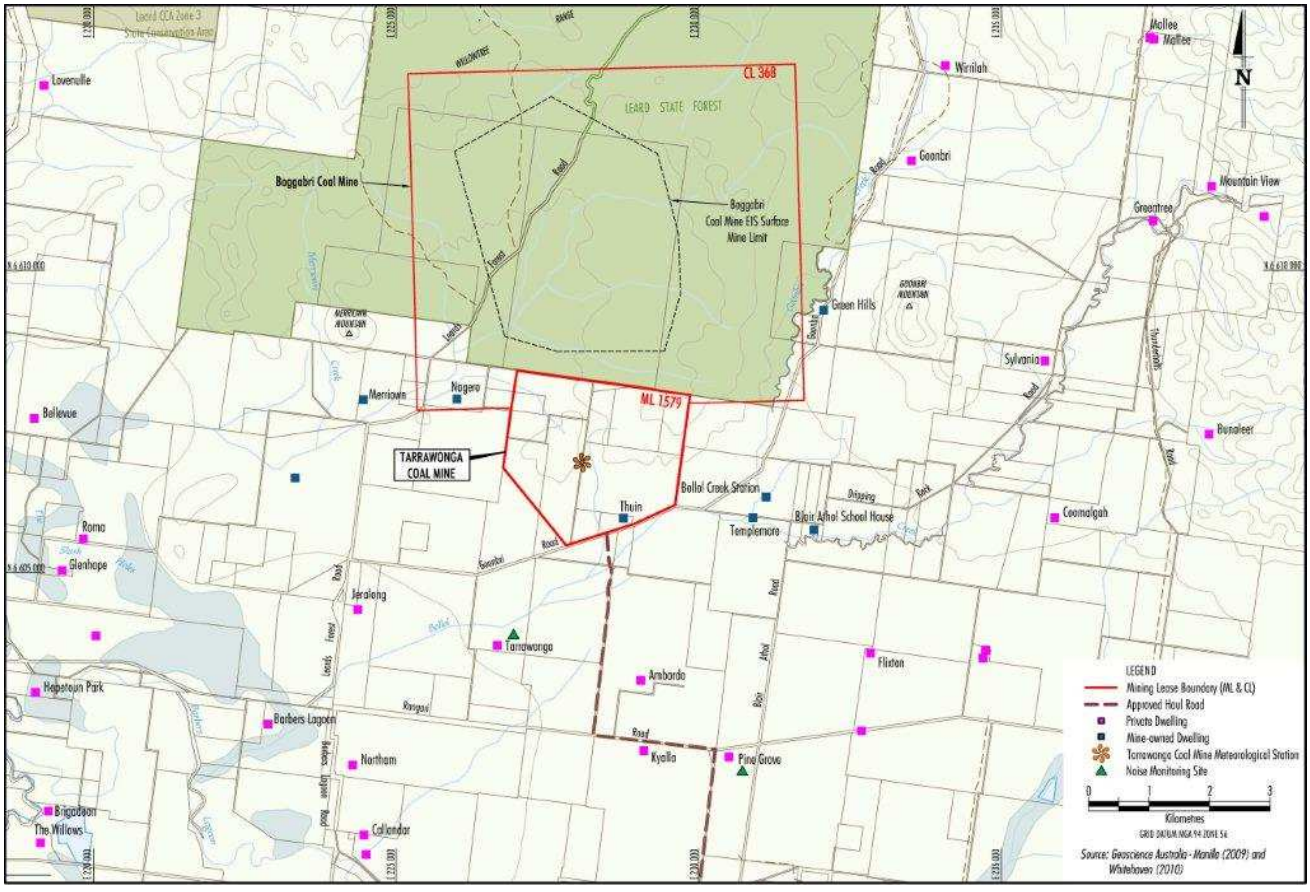

Figure 1 – Noise Monitoring Location

1.2 Monitoring Frequency and Duration

Section M7.7 of EPL 12365 states that the attended noise monitoring must be conducted;

a) at each of the locations detailed above.

b) quarterly in a reporting period.

c) during each day, evening and night period for a minimum of:

- 1.5 hours during the day;
- 30 minutes during the evening; and
- 1 hour during the night.

d) occur for three consecutive operating days.

2.0 NOISE CRITERIA AND CONDITIONS

2.1 Noise Assessment Criteria

Noise generated at the premises must not exceed the noise limits in the table below.

Locality and Location	***Day Leq (15 min)***	***Evening Leq (15 min)***	***Night Leq (15 min)***	***Night L1 (1 min)***
Kyalla	*37*	*37*	*37*	*45*
All other surrounding residences	*35*	*35*	*35*	*45*

2.2 Monitoring Location Definition

EPL 12365 states that to determine compliance with the Leq (15 min) operational noise criteria the noise measurement equipment must be located:

- Approximately on the property boundary, where any dwelling is situated 30m or less from the property boundary closest to the premises; or
- Within 30m of a dwelling façade, but not closer than 3m, where any dwelling on the property is situated more than 30m from the property boundary closest to the premises; or, where applicable
- Within 50m of the boundary of a National Park or Nature Reserve.

In relation to L1 (1 min) noise limits the noise measurement equipment must be located within 1m of a dwelling façade.

2.3 Applicable Meteorological Conditions

The noise limits apply under all meteorological conditions except for the following;

1. Wind speeds greater than 3m/s at 10m above ground level; or
2. Stability category F temperature inversion conditions and wind speeds greater than 2m/s at 10m above ground level; or
3. Stability category G temperature inversion conditions.

2.4 Other Conditions

To determine compliance with the Leq (15 min) operational noise criteria the modification factors detailed in Section 4 of the NSW industrial Noise policy must be applied, as appropriate, to the measured noise levels.

3.0 NOISE MONITORING PROCEDURE

3.1 Monitoring Equipment

Attended noise monitoring was conducted with Brüel & Kjær Type 2250 and 2260 Precision Sound Analysers. These instruments have Type 1 characteristics as defined in AS1259-1982 "Sound Level Meters" and have current NATA calibration. Field calibration is carried out at the start and end of each monitoring period.

A-weighted noise levels were measured over the appropriate monitoring periods (90 minutes/day, 30 minutes/evening and 60 minutes/night) with data acquired at 1 or 2 second statistical intervals and the meter set to "fast" response. Each 1 or 2 second measurement is accompanied by a third-octave band spectrum from 20 - 20k Hz which is required for analysing INP 'modifying factors'. Time based field notes allow for determination of the relative contributions to the overall noise level of all significant noise sources.

3.2 Measurement Analysis

The operational noise criteria for compliance with Section L 4.1 of EPL 12365 are based on a 15 minute Leq noise level. The procedures detailed in Section M 7.7 of EPL 12365 require noise monitoring for significantly longer periods than that of the compliance criteria. To determine compliance with the EPL conditions the worst case 15 minute period, in relation to mine noise, was extracted from each measurement and compared to the criteria in Section L 4.1.

This worst case 15 minute Leq noise level for each monitoring period is shown in the tables below. Where the noise from TCM was audible Bruel & Kjaer "*Evaluator*" analysis software was used to quantify the contributions of the mine and other significant noise sources to the overall.

Due to the close proximity, relative to the receiver, of TCM and the nearby Boggabri Coal Mine (BCM), it is sometimes not always possible to determine the partial contributions of emissions from each mine to the overall measured noise level. Where this is the case the total measured mine noise is shown in the tables as "mine". Where the total measured mine noise is equal to, or greater than, the noise criterion for TCM an estimate of the relative contributions of each mine has been made based on the field observations and data analysis.

When no mine noise was audible at a monitoring location, a representative 15 minute noise measurement was made with observations carried out for the remainder of the applicable time period. In these instances, the measured noise level for the representative 15 minute period is that shown in the tables below.

The compliance measurement locations are different for each of the operational and sleep disturbance noise. That is, the sleep disturbance criterion is typically applicable at 1m from the façade of a bedroom window.

To avoid undue disturbance to residents the L1 (1 min) noise level from the operational measurements are used to show general compliance with the sleep disturbance criterion. That is, as the distance between the noise source and the operational noise monitoring location is significantly greater than the distance between the operational noise monitoring location and the sleep disturbance monitoring location (i.e. 1m from the facade of the house) there will be little variation in L1 (1 min) levels between the two monitoring locations.

It must be noted, however, that the sleep disturbance criterion is to be measured near a bedroom window. As the internal layout of each residence is not known, to consider a worst case, this is assumed to be facing the operational noise monitoring location.

Meteorological data used in this report were taken from a mine operated meteorological station at the located approximately 4km to the east of the TCM open cut. Temperature inversion information is taken from the Boggabri Coal Mine met tower with temperature sensors at 2m and 52m above ground level.

3.3 Special Conditions

Before the noise surveys, Spectrum Acoustics personnel were briefed on the current location(s) of activities.

4.0 RESULTS AND DISCUSSION

4.1 Measured Operational Noise Levels

Measured noise levels are summarised in **Tables 1** to **9**. The total measured Leq (15 min) is shown. Bruel & Kjaer "*Evaluator*" analysis software was used to quantify the contributions of the various noise sources. The identified noise sources are listed, along with the contribution of each source, in descending order (shown in brackets). Mine noise from TCM is shown in the tables in bold type.

Table 1
TCM Operational Noise Monitoring Results – 10 June 2014 (day)

Location	Time	Total dB(A), Leq (15 min)	Wind speed/ direction	Identified Noise Sources
Tarrawonga	1:48 pm	38	5.7/125	Wind (37), **TCM (32)**

Table 2
TCM Operational Noise Monitoring Results – 10 June 2014 (evening)

Location	Time	Total dB(A), Leq (15 min)	Wind speed/ direction	Temperature Inversion °C/100m	Identified Noise Sources
Tarrawonga	9:29 pm	39	5.2/113	+1.2	Wind (39), **TCM inaudible**

Table 3
TCM Operational Noise Monitoring Results – 10 June 2014 (night)

Location	Time	Total dB(A), Leq (15 min)	Wind speed/ direction	Temperature Inversion °C/100m	Identified Noise Sources
Tarrawonga	1:36 am	30	1.1/143	+4.0	**TCM (28)**, traffic (26)

Table 4 TCM Operational Noise Monitoring Results – 11 June 2014 (day)				
Location	**Time**	**Total dB(A), Leq (15 min)**	**Wind speed/ direction**	**Identified Noise Sources**
Tarrawonga	2:27 pm	32	2.1/163	Birds (30), **TCM (28)**

Table 5 TCM Operational Noise Monitoring Results – 11 June 2014 (evening)					
Location	**Time**	**Total dB(A), Leq (15 min)**	**Wind speed/ direction**	**Temperature Inversion °C/100m**	**Identified Noise Sources**
Tarrawonga	9:20 pm	28	0.8/342	+11.2	Generator (26), cattle (23), **TCM inaudible**

Table 6 TCM Operational Noise Monitoring Results – 11 June 2014 (night)					
Location	**Time**	**Total dB(A), Leq (15 min)**	**Wind speed/ direction**	**Temperature Inversion °C/100m**	**Identified Noise Sources**
Tarrawonga	1:29 am	44	Calm	+12.4	**TCM (44)**

Table 7 TCM Operational Noise Monitoring Results – 12 June 2014 (day)				
Location	**Time**	**Total dB(A), Leq (15 min)**	**Wind speed/ direction**	**Identified Noise Sources**
Tarrawonga	9:17 am	44	1.3/158	**TCM (43)**, birds (36)

Table 8 TCM Operational Noise Monitoring Results – 12 June 2014 (evening)					
Location	**Time**	**Total dB(A), Leq (15 min)**	**Wind speed/ direction**	**Temperature Inversion °C/100m**	**Identified Noise Sources**
Tarrawonga	9:27 pm	37	1.4/353	+8.0	**TCM (37)**

Table 9 TCM Operational Noise Monitoring Results – 12 June 2014 (night)					
Location	**Time**	**Total dB(A), Leq (15 min)**	**Wind speed/ direction**	**Temperature Inversion °C/100m**	**Identified Noise Sources**
Tarrawonga	1:37 am	43	0.6/307	+11.2	**TCM (43)**

4.2 Discussion of Results

The results in Tables 1 to 9 show that noise emissions from TCM exceeded the operational noise criterion at the Tarrawonga monitoring location during the evening of June 11 and the day, evening and night of June 12.

The Tarrawonga property retains acquisition rights in the Project Approval for the Tarrawonga Mine as a consequence of modelled noise predictions exceeding 35dB(A). Agreement has recently been reached in

terms of acquisition of the Tarrawonga property, and as a consequence, it is now considered Project Related. As a consequence, the noise limit of 35dB(A) no longer applies at the Tarrawonga receiver.

4.2.1 Modifying Factor Corrections

Data from those times where TCM operations were audible were analysed using the *"Evaluator"* software. This analysis showed the noise did not contain any tonal, impulsive or low frequency components as per definitions of "modifying factor corrections" in the NSW Industrial Noise Policy.

4.3 Sleep Disturbance

The results of the sleep disturbance monitoring are shown below in **Table 10**.

Table 10
TCM Sleep Disturbance Monitoring Results

Location	Time	dB(A),L1 (1 min)	Wind speed/ direction	Temperature Inversion °C/100m
Tarrawonga (10/6/14)	1:36 am	35	1.1/143	+4.0
Tarrawonga (11/6/14)	1:29 am	51	Calm	+12.4
Tarrawonga (12/6/14)	1:37 am	51	0.6/307	+11.2

The results in Table 10 show that the measured L1 (1 min) noise level exceeded the sleep disturbance criterion during the night time monitoring on 11 and 12 June. As described above, the Tarrawonga property retains acquisition rights in the Project Approval for the Tarrawonga Mine.

APPENDIX A

DESCRIPTION OF ACOUSTICAL TERMS

Table A1

Definition of acoustical terms

Term	Description
dB(A)	The quantitative measure of sound heard by the human ear, measured by the A-Scale Weighting Network of a sound level meter expressed in decibels (dB).
SPL	Sound Pressure Level. The incremental variation of sound pressure above and below atmospheric pressure and expressed in decibels. The human ear responds to pressure fluctuations, resulting in sound being heard.
STL	Sound Transmission Loss. The ability of a partition to attenuate sound, in dB.
Lw	Sound Power Level radiated by a noise source per unit time re 1pW.
Leq	Equivalent Continuous Noise Level - taking into account the fluctuations of noise over time. The time-varying level is computed to give an equivalent dB(A) level that is equal to the energy content and time period.
L1	Average Peak Noise Level - the level exceeded for 1% of the monitoring period.
L90	"Background" Noise Level - the level exceeded for 90% of the monitoring period.

7 August 2014

Ref: 04095/5324

Mr Lachlan Johnson
Environmental Officer (Tarrawonga)
Whitehaven Coal Pty Limited
PO Box 600
Gunnedah NSW 2380

RE: TARRAWONGA PLANT NOISE TEST RESULTS – JULY 2014

This letter report presents the results of haul truck noise testing conducted at the Tarrawonga Coal Mine on 29 July 2014.

MONITORING PROCEDURES

Dynamic testing of the trucks in motion was conducted using a modified version of ISO 6395:2008. The layout of the machinery path of motion and measurement points is shown in **Figure 1**. When applied to dump trucks in motion, the forward measurement path is uphill from point A to point B and the reverse path from B to A has the machine travelling downhill. The trucks measured on 29 July 2014 were travelling both uphill (loaded) and downhill (empty).

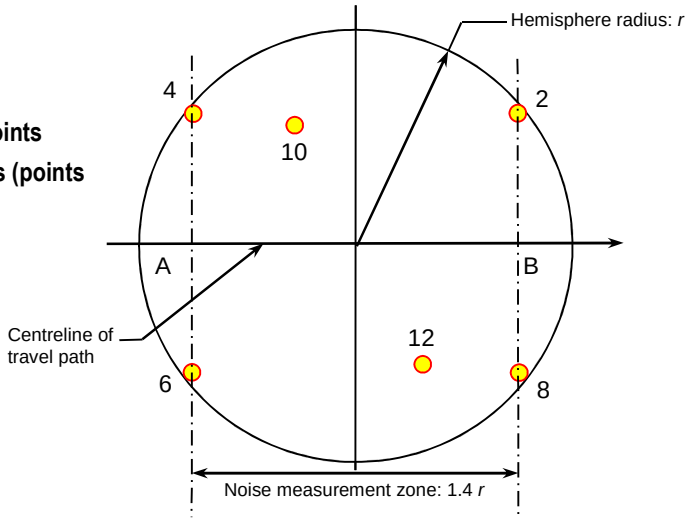

Figure 1. Measurement points for ISO 6395 dynamic tests (points 10 and 12 omitted).

Measurement points 2 and 4 were combined into a single point and the measurement zone extended to approximately 2.8 *r* to allow for an approach distance of 1.4 *r* to represent the measurement at point 2 and a departure distance of 1.4 *r* to represent the measurement at point 4.

RESULTS

Sound power levels (Lw, dB(A)) calculated in accordance with the methodologies of ISO 6395 and ISO 6393, averaged over the uphill and downhill motion, are summarised in Table 1. Previous measurements from March 2014 are also included.

TABLE 1. Measured sound power levels

Plant type	Plant #	Lw, dB(A)	
		March 2014	July 2014
Rear dump truck (785C)	600	--	122
Rear dump truck (785C)	601	--	123
Rear dump truck (785C)	602	--	123
Rear dump truck (785C)	603		122
Rear dump truck (785C)	605	123	122
Rear dump truck (785C)	606	122	123
Rear dump truck (785C)	607	--	123
Rear dump truck (785C)	608	121	
Rear dump truck (785C)	610	122	123
Rear dump truck (785C)	618	--	121
Rear dump truck (785C)	619	122	
Rear dump truck (785C)	621	123	122
Rear dump truck (785C)	623	122	122
Rear dump truck (789C)	872	--	121
Rear dump truck (789C)	873	121	120
Rear dump truck (789C)	874	122	
Water cart	868	--	119
Grader	63	--	109
Dozer D11T	843	--	119 1st gear
		--	124 2nd gear
Dozer	820	--	118 1st gear
		--	123 2nd gear
Drill (Cubex)	522	--	122
Exc. Hitachi	540	--	117
Exc. Terex	531	115	
Dozer D11	825	115 1st Gear	
		122 2nd Gear	
Drill (CAT)	525	114	
Rear dump truck (785C)	620	119	

I trust this report fulfils your requirements at this time, however, should you require additional information or assistance please contact the undersigned on 4954 2276.

Yours faithfully,

SPECTRUM ACOUSTICS PTY LIMITED



Neil Pennington
Acoustical Consultant

Project No: 04095

ATTENDED NOISE MONITORING – SEPTEMBER 2014
Tarrawonga Coal Mine
Boggabri, NSW

Prepared for:

Whitehaven Coal Pty Limited
PO Box 600
Gunnedah NSW 2380

Author:

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B.Sc., B. Math.(Hons), MAAS, MASA
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September 2014

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APPENDIX A Description of Acoustical Terms

1.0 INTRODUCTION

This letter report presents the results of attended operational noise compliance monitoring conducted for the Tarrawonga Coal Mine (TCM) over a four day period between 9 and 12 September, 2014.

The monitoring was carried out generally in accordance with the requirements of Environment Protection Licence (EPL 12365), Project Approval PA 11_0047 and other relevant Australian Standards and guidelines.

1.1 Noise Monitoring Locations

Noise monitoring locations defined in Section M7.4 of EPL 12365 are listed in the table below and shown on **Figure 1**.

EPA Identification No.	*Description of Location*
N1	*Within 30m of the residence on property "Tarrawonga"*

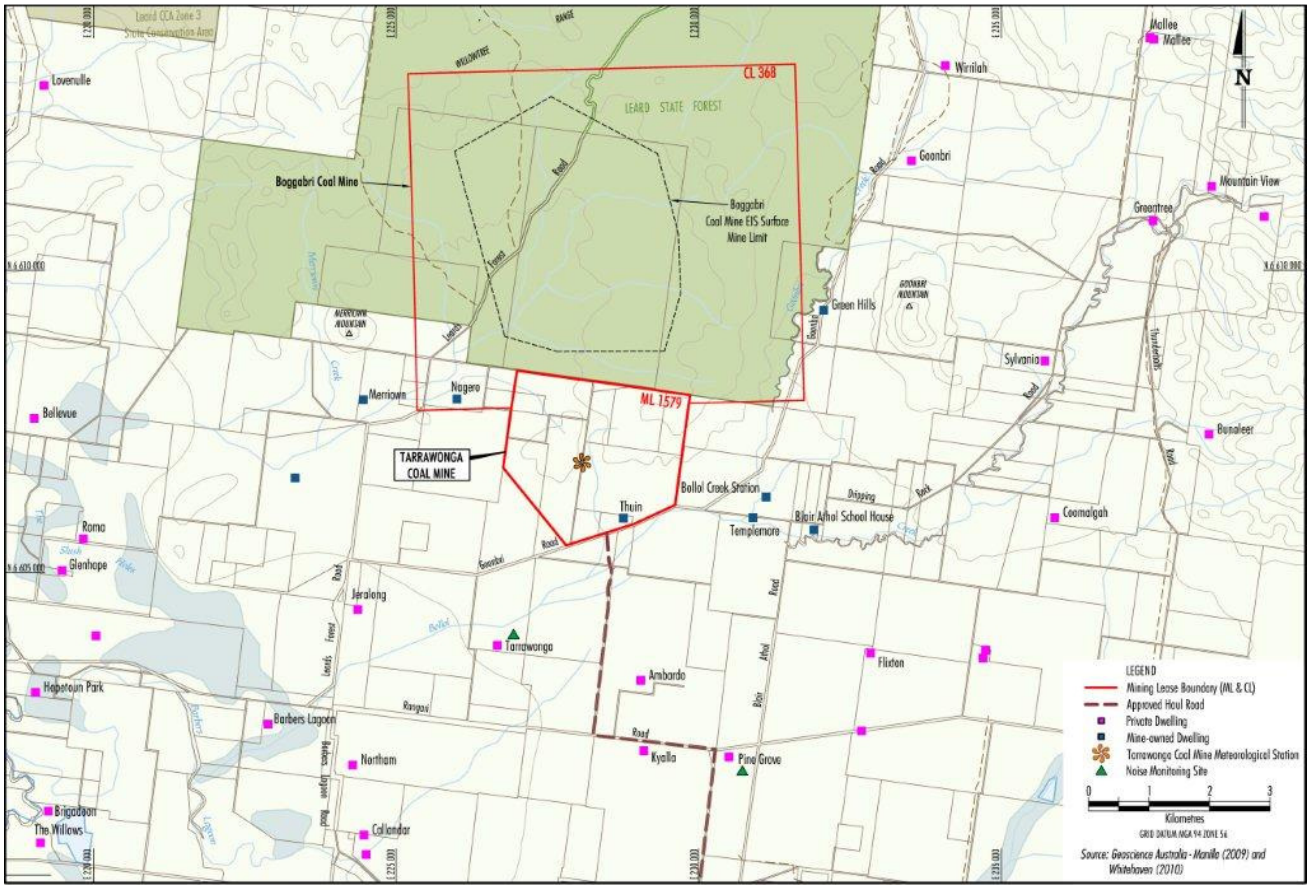

Figure 1 – Noise Monitoring Location

1.2 Monitoring Frequency and Duration

PA 11_0047 details that attended surveys will be conducted during the approved hours of operation with at least three measurements taken during each day over four consecutive days, so that noise levels during the full range of operating times (day, evening and night) are monitored. Monitoring timeframes are to be consistent with requirements of EPL 12365 which requires 1.5 hours during the day, 30 minutes during the evening and 1 hour during the night period.

2.0 NOISE CRITERIA AND CONDITIONS

2.1 Noise Assessment Criteria

Noise generated at the premises must not exceed the noise limits in the table below.

Locality and Location	***Day Leq (15 min)***	***Evening Leq (15 min)***	***Night Leq (15 min)***	***Night L1 (1 min)***
All privately owned land	*35*	*35*	*35*	*45*

2.2 Monitoring Location Definition

EPL 12365 states that to determine compliance with the Leq (15 min) operational noise criteria the noise measurement equipment must be located:

- Approximately on the property boundary, where any dwelling is situated 30m or less from the property boundary closest to the premises; or
- Within 30m of a dwelling façade, but not closer than 3m, where any dwelling on the property is situated more than 30m from the property boundary closest to the premises; or, where applicable
- Within 50m of the boundary of a National Park or Nature Reserve.

In relation to L1 (1 min) noise limits the noise measurement equipment must be located within 1m of a dwelling façade.

2.3 Applicable Meteorological Conditions

The noise limits apply under all meteorological conditions except for the following;

1. Wind speeds greater than 3m/s at 10m above ground level; or
2. Stability category F temperature inversion conditions and wind speeds greater than 2m/s at 10m above ground level; or
3. Stability category G temperature inversion conditions.

2.4 Other Conditions

To determine compliance with the Leq (15 min) operational noise criteria the modification factors detailed in Section 4 of the NSW industrial Noise policy must be applied, as appropriate, to the measured noise levels.

3.0 NOISE MONITORING PROCEDURE

3.1 Monitoring Equipment

Attended noise monitoring was conducted with Brüel & Kjær Type 2250 Precision Sound Analysers. These instruments have Type 1 characteristics as defined in AS1259-1982 "Sound Level Meters" and have current NATA calibration. Field calibration is carried out at the start and end of each monitoring period.

A-weighted noise levels were measured over the appropriate monitoring periods (90 minutes/day, 30 minutes/evening and 60 minutes/night) with data acquired at 1 or 2 second statistical intervals and the meter set to "fast" response. Each 1 or 2 second measurement is accompanied by a third-octave band spectrum from 20 - 20k Hz which is required for analysing INP 'modifying factors'. Time based field notes allow for determination of the relative contributions to the overall noise level of all significant noise sources.

3.2 Measurement Analysis

The operational noise criteria for compliance with Section L 4.1 of EPL 12365 are based on a 15 minute Leq noise level. The procedures detailed in Section M 7.7 of EPL 12365 require noise monitoring for significantly longer periods than that of the compliance criteria. To determine compliance with the EPL conditions the worst case 15 minute period, in relation to mine noise, was extracted from each measurement and compared to the criteria in Section L 4.1.

This worst case 15 minute Leq noise level for each monitoring period is shown in the tables below. Where the noise from TCM was audible Bruel & Kjaer "*Evaluator*" analysis software was used to quantify the contributions of the mine and other significant noise sources to the overall.

Due to the close proximity, relative to the receiver, of TCM and the nearby Boggabri Coal Mine (BCM), it is sometimes not always possible to determine the partial contributions of emissions from each mine to the overall measured noise level. Where this is the case the total measured mine noise is shown in the tables as "mine". Where the total measured mine noise is equal to, or greater than, the noise criterion for TCM an estimate of the relative contributions of each mine has been made based on the field observations and data analysis.

When no mine noise was audible at a monitoring location, a representative 15 minute noise measurement was made with observations carried out for the remainder of the applicable time period. In these instances, the measured noise level for the representative 15 minute period is that shown in the tables below.

The compliance measurement locations are different for each of the operational and sleep disturbance noise. That is, the sleep disturbance criterion is typically applicable at 1m from the façade of a bedroom window.

To avoid undue disturbance to residents the L1 (1 min) noise level from the operational measurements are used to show general compliance with the sleep disturbance criterion. That is, as the distance between the noise source and the operational noise monitoring location is significantly greater than the distance between the operational noise monitoring location and the sleep disturbance monitoring location (i.e. 1m from the facade of the house) there will be little variation in L1 (1 min) levels between the two monitoring locations.

It must be noted, however, that the sleep disturbance criterion is to be measured near a bedroom window. As the internal layout of each residence is not known, to consider a worst case, this is assumed to be facing the operational noise monitoring location.

Meteorological data used in this report were taken from a mine operated meteorological station located approximately 4km to the east of the TCM open cut. Temperature inversion information is taken from the Boggabri Coal Mine met tower with temperature sensors at 2m and 52m above ground level.

3.3 Special Conditions

Before the noise surveys, Spectrum Acoustics personnel were briefed on the current location(s) of activities.

4.0 RESULTS AND DISCUSSION

4.1 Measured Operational Noise Levels

Measured noise levels are summarised in **Tables 1** to **9**. The total measured Leq (15 min) is shown. Bruel & Kjaer "*Evaluator*" analysis software was used to quantify the contributions of the various noise sources. The identified noise sources are listed, along with the contribution of each source, in descending order (shown in brackets). Mine noise from TCM is shown in the tables in bold type.

Table 1
TCM Operational Noise Monitoring Results – 9 September 2014 (day)

Location	Time	Total dB(A), Leq (15 min)	Wind speed/ direction	Identified Noise Sources
Tarrawonga	3:42 pm	37	3.8/329	**TCM (36)**, cattle (30), birds & insects (25)

Table 2
TCM Operational Noise Monitoring Results – 9 September 2014 (evening)

Location	Time	Total dB(A), Leq (15 min)	Wind speed/ direction	Temperature Inversion °C/100m	Identified Noise Sources
Tarrawonga	9:09 pm	35	1.5/5	+7.0	**TCM (32)**, frogs & insects (32)

Table 3
TCM Operational Noise Monitoring Results – 9 September 2014 (night)

Location	Time	Total dB(A), Leq (15 min)	Wind speed/ direction	Temperature Inversion °C/100m	Identified Noise Sources
Tarrawonga	10:05 pm	38	1.5/6	+10.2	**TCM (37)**, frogs (32)

Table 4
TCM Operational Noise Monitoring Results – 10 September 2014 (day)

Location	Time	Total dB(A), Leq (15 min)	Wind speed/ direction	Identified Noise Sources
Tarrawonga	8:49 am	41	3.9/267	Wind (41), TCM (30)

Table 5 TCM Operational Noise Monitoring Results – 10 September 2014 (evening)					
Location	**Time**	**Total dB(A), Leq (15 min)**	**Wind speed/ direction**	**Temperature Inversion °C/100m**	**Identified Noise Sources**
Tarrawonga	7:01 pm	26	1.0/211	+2.6	**TCM (26)**

Table 6 TCM Operational Noise Monitoring Results – 10 September 2014 (night)					
Location	**Time**	**Total dB(A), Leq (15 min)**	**Wind speed/ direction**	**Temperature Inversion °C/100m**	**Identified Noise Sources**
Tarrawonga	10:04 pm	24	Calm	+8.6	Domestic noise (24), **TCM inaudible**

Table 7 TCM Operational Noise Monitoring Results – 11 September 2014 (day)				
Location	**Time**	**Total dB(A), Leq (15 min)**	**Wind speed/ direction**	**Identified Noise Sources**
Tarrawonga	8:05 am	40	1.1/169	Birds (40), **TCM (25)**

Table 8 TCM Operational Noise Monitoring Results – 11 September 2014 (evening)					
Location	**Time**	**Total dB(A), Leq (15 min)**	**Wind speed/ direction**	**Temperature Inversion °C/100m**	**Identified Noise Sources**
Tarrawonga	7:05 pm	29	0.7/343	+11.4	**TCM (28)**, birds (22)

Table 9 TCM Operational Noise Monitoring Results – 11 September 2014 (night)					
Location	**Time**	**Total dB(A), Leq (15 min)**	**Wind speed/ direction**	**Temperature Inversion °C/100m**	**Identified Noise Sources**
Tarrawonga	10:00 pm	25	0.8/331	+11.8	**TCM (22)**, cattle (22)

Table 10 TCM Operational Noise Monitoring Results – 12 September 2014 (day)				
Location	**Time**	**Total dB(A), Leq (15 min)**	**Wind speed/ direction**	**Identified Noise Sources**
Tarrawonga	8:47 am	42	2.1/145	Birds (40), **TCM (37)**

Table 11 TCM Operational Noise Monitoring Results – 12 September 2014 (evening)					
Location	**Time**	**Total dB(A), Leq (15 min)**	**Wind speed/ direction**	**Temperature Inversion °C/100m**	**Identified Noise Sources**
Tarrawonga	7:14 pm	30	0.8/338	+13.0	**TCM (30)**, frogs & insects (30)

Table 12 TCM Operational Noise Monitoring Results – 12 September 2014 (night)					
Location	**Time**	**Total dB(A), Leq (15 min)**	**Wind speed/ direction**	**Temperature Inversion °C/100m**	**Identified Noise Sources**
Tarrawonga	10:06 pm	37	0.4/249	+8.0	**TCM (37)**, frogs (24)

4.2 Discussion of Results

The results in Tables 1 to 9 show that noise emissions from TCM exceeded the operational noise criterion at the Tarrawonga monitoring location during the day and night September 9 and September 12.

The Tarrawonga property is now Project Related and, as a consequence, the noise limit of 35dB(A) no longer applies at the Tarrawonga receiver.

4.2.1 Modifying Factor Corrections

Data from those times where TCM operations were audible were analysed using the *"Evaluator"* software. This analysis showed the noise did not contain any tonal, impulsive or low frequency components as per definitions of "modifying factor corrections" in the NSW Industrial Noise Policy.

4.3 Sleep Disturbance

The results of the sleep disturbance monitoring are shown below in **Table 10**.

Table 10 TCM Sleep Disturbance Monitoring Results				
Location	**Time**	**dB(A),L1 (1 min)**	**Wind speed/ direction**	**Temperature Inversion °C/100m**
Tarrawonga (9/9/14)	10:05 pm	43	1.5/6	+10.2
Tarrawonga (10/9/14)	10:04 pm	n/a	Calm	+8.6
Tarrawonga (11/9/14)	10:00 pm	25	0.8/331	+11.8
Tarrawonga (12/9/14)	10:06 pm	44	0.4/249	+8.0

The results in Table 10 show that the measured L1 (1 min) noise level did not exceed the sleep disturbance criterion during any of the night time monitoring periods.

APPENDIX A

DESCRIPTION OF ACOUSTICAL TERMS

Table A1

Definition of acoustical terms

Term	Description
dB(A)	The quantitative measure of sound heard by the human ear, measured by the A-Scale Weighting Network of a sound level meter expressed in decibels (dB).
SPL	Sound Pressure Level. The incremental variation of sound pressure above and below atmospheric pressure and expressed in decibels. The human ear responds to pressure fluctuations, resulting in sound being heard.
STL	Sound Transmission Loss. The ability of a partition to attenuate sound, in dB.
Lw	Sound Power Level radiated by a noise source per unit time re 1pW.
Leq	Equivalent Continuous Noise Level - taking into account the fluctuations of noise over time. The time-varying level is computed to give an equivalent dB(A) level that is equal to the energy content and time period.
L1	Average Peak Noise Level - the level exceeded for 1% of the monitoring period.
L90	"Background" Noise Level - the level exceeded for 90% of the monitoring period.

Project No: 04095

ATTENDED NOISE MONITORING – DECEMBER 2014
Tarrawonga Coal Mine
Boggabri, NSW

Prepared for:

Whitehaven Coal Pty Limited
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January 2015

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APPENDIX A Description of Acoustical Terms

1.0 INTRODUCTION

This letter report presents the results of attended operational noise compliance monitoring conducted for the Tarrawonga Coal Mine (TCM) over a four day period between 9 and 12 December, 2014.

The monitoring was carried out generally in accordance with the requirements of Environment Protection Licence (EPL 12365), Project Approval PA 11_0047 and other relevant Australian Standards and guidelines.

1.1 Noise Monitoring Locations

Noise monitoring locations defined in Section M7.4 of EPL 12365 are listed in the table below and shown on **Figure 1**.

EPA Identification No.	*Description of Location*
N1	*Within 30m of the residence on property "Tarrawonga"*

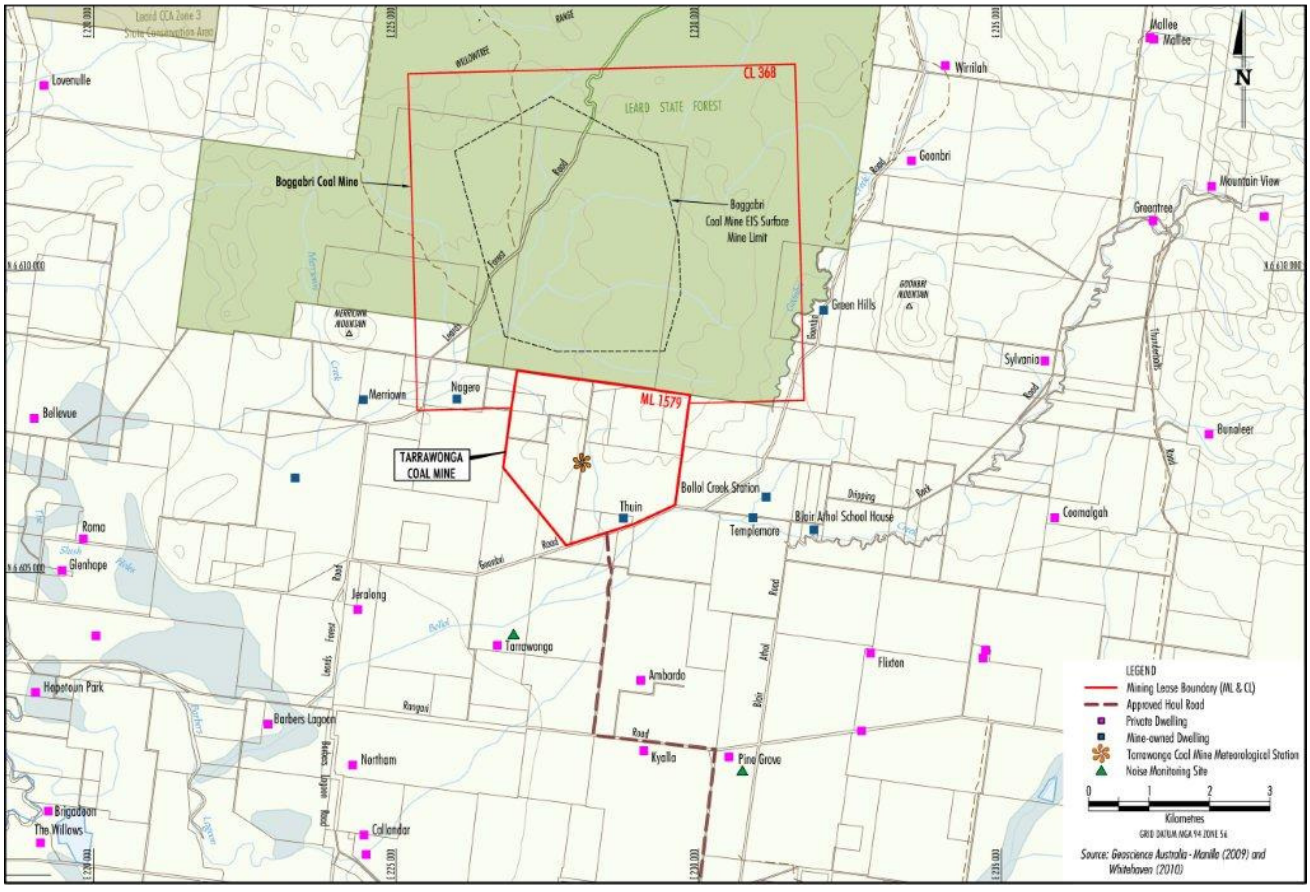

Figure 1 – Noise Monitoring Location

1.2 Monitoring Frequency and Duration

PA 11_0047 details that attended surveys will be conducted during the approved hours of operation with at least three measurements taken during each day over four consecutive days, so that noise levels during the full range of operating times (day, evening and night) are monitored. Monitoring timeframes are to be consistent with requirements of EPL 12365 which requires 1.5 hours during the day, 30 minutes during the evening and 1 hour during the night period.

2.0 NOISE CRITERIA AND CONDITIONS

2.1 Noise Assessment Criteria

Noise generated at the premises must not exceed the noise limits in the table below.

Locality and Location	***Day Leq (15 min)***	***Evening Leq (15 min)***	***Night Leq (15 min)***	***Night L1 (1 min)***
All privately owned land	*35*	*35*	*35*	*45*

2.2 Monitoring Location Definition

EPL 12365 states that to determine compliance with the Leq (15 min) operational noise criteria the noise measurement equipment must be located:

- Approximately on the property boundary, where any dwelling is situated 30m or less from the property boundary closest to the premises; or
- Within 30m of a dwelling façade, but not closer than 3m, where any dwelling on the property is situated more than 30m from the property boundary closest to the premises; or, where applicable
- Within 50m of the boundary of a National Park or Nature Reserve.

In relation to L1 (1 min) noise limits the noise measurement equipment must be located within 1m of a dwelling façade.

2.3 Applicable Meteorological Conditions

The noise limits apply under all meteorological conditions except for the following;

1. Wind speeds greater than 3m/s at 10m above ground level; or
2. Stability category F temperature inversion conditions and wind speeds greater than 2m/s at 10m above ground level; or
3. Stability category G temperature inversion conditions.

2.4 Other Conditions

To determine compliance with the Leq (15 min) operational noise criteria the modification factors detailed in Section 4 of the NSW industrial Noise policy must be applied, as appropriate, to the measured noise levels.

3.0 NOISE MONITORING PROCEDURE

3.1 Monitoring Equipment

Attended noise monitoring was conducted with Brüel & Kjær Type 2250 Precision Sound Analysers. These instruments have Type 1 characteristics as defined in AS1259-1982 "Sound Level Meters" and have current NATA calibration. Field calibration is carried out at the start and end of each monitoring period.

A-weighted noise levels were measured over the appropriate monitoring periods (90 minutes/day, 30 minutes/evening and 60 minutes/night) with data acquired at 1 or 2 second statistical intervals and the meter set to "fast" response. Each 1 or 2 second measurement is accompanied by a third-octave band spectrum from 20 - 20k Hz which is required for analysing INP 'modifying factors'. Time based field notes allow for determination of the relative contributions to the overall noise level of all significant noise sources.

3.2 Measurement Analysis

The operational noise criteria for compliance with Section L 4.1 of EPL 12365 are based on a 15 minute Leq noise level. The procedures detailed in Section M 7.7 of EPL 12365 require noise monitoring for significantly longer periods than that of the compliance criteria. To determine compliance with the EPL conditions the worst case 15 minute period, in relation to mine noise, was extracted from each measurement and compared to the criteria in Section L 4.1.

This worst case 15 minute Leq noise level for each monitoring period is shown in the tables below. Where the noise from TCM was audible Bruel & Kjaer "*Evaluator*" analysis software was used to quantify the contributions of the mine and other significant noise sources to the overall.

Due to the close proximity, relative to the receiver, of TCM and the nearby Boggabri Coal Mine (BCM), it is sometimes not always possible to determine the partial contributions of emissions from each mine to the overall measured noise level. Where this is the case the total measured mine noise is shown in the tables as "mine". Where the total measured mine noise is equal to, or greater than, the noise criterion for TCM an estimate of the relative contributions of each mine has been made based on the field observations and data analysis.

When no mine noise was audible at a monitoring location, a representative 15 minute noise measurement was made with observations carried out for the remainder of the applicable time period. In these instances, the measured noise level for the representative 15 minute period is that shown in the tables below.

The compliance measurement locations are different for each of the operational and sleep disturbance noise. That is, the sleep disturbance criterion is typically applicable at 1m from the façade of a bedroom window.

To avoid undue disturbance to residents the L1 (1 min) noise level from the operational measurements are used to show general compliance with the sleep disturbance criterion. That is, as the distance between the noise source and the operational noise monitoring location is significantly greater than the distance between the operational noise monitoring location and the sleep disturbance monitoring location (i.e. 1m from the facade of the house) there will be little variation in L1 (1 min) levels between the two monitoring locations.

It must be noted, however, that the sleep disturbance criterion is to be measured near a bedroom window. As the internal layout of each residence is not known, to consider a worst case, this is assumed to be facing the operational noise monitoring location.

Meteorological data used in this report were taken from a mine operated meteorological station located approximately 4km to the east of the TCM open cut. Temperature inversion information is taken from the Boggabri Coal Mine met tower with temperature sensors at 2m and 52m above ground level.

3.3 Special Conditions

Before the noise surveys, Spectrum Acoustics personnel were briefed on the current location(s) of activities.

Several electrical storms passed through the area during the night period of December 10. These storms may have resulted in some restrictions to typical mining activities at times throughout the monitoring survey.

4.0 RESULTS AND DISCUSSION

4.1 Measured Operational Noise Levels

Measured noise levels are summarised in **Tables 1** to **12**. The total measured Leq (15 min) is shown. Bruel & Kjaer "*Evaluator*" analysis software was used to quantify the contributions of the various noise sources. The identified noise sources are listed, along with the contribution of each source, in descending order (shown in brackets). Mine noise from TCM is shown in the tables in bold type.

Table 1
TCM Operational Noise Monitoring Results – 9 December 2014 (day)

Location	Time	Total dB(A), Leq (15 min)	Wind speed/ direction	Identified Noise Sources
Tarrawonga	2:55 pm	34	7.1/131	Cattle (32), **TCM (26)**, birds (26)

Table 2
TCM Operational Noise Monitoring Results – 9 December 2014 (evening)

Location	Time	Total dB(A), Leq (15 min)	Wind speed/ direction	Temperature Inversion °C/100m	Identified Noise Sources
Tarrawonga	9:10 pm	35	2.3/126	+3.0	**TCM (35)**, insects (25)

Table 3
TCM Operational Noise Monitoring Results – 9/10 December 2014 (night)

Location	Time	Total dB(A), Leq (15 min)	Wind speed/ direction	Temperature Inversion °C/100m	Identified Noise Sources
Tarrawonga	1:29 am	40	3.4/58	+0.6	**TCM (40)**, insects (24)

Table 4 TCM Operational Noise Monitoring Results – 10 December 2014 (day)				
Location	**Time**	**Total dB(A), Leq (15 min)**	**Wind speed/ direction**	**Identified Noise Sources**
Tarrawonga	12:14 pm	29	1.8/221	**TCM (27)**, birds (24)

Table 5 TCM Operational Noise Monitoring Results – 10 December 2014 (evening)					
Location	**Time**	**Total dB(A), Leq (15 min)**	**Wind speed/ direction**	**Temperature Inversion °C/100m**	**Identified Noise Sources**
Tarrawonga	9:16 pm	35	3.8/142	+1.2	**TCM ((33) incl. (28)[1])**, insects (25)

1. Trucks on TCM haul road

Table 6 TCM Operational Noise Monitoring Results – 10 December 2014 (night)					
Location	**Time**	**Total dB(A), Leq (15 min)**	**Wind speed/ direction**	**Temperature Inversion °C/100m**	**Identified Noise Sources**
Tarrawonga	5:45 am	42	6.4/23	Lapse	Wind (42), birds & insects (32), **TCM inaudible**

Table 7 TCM Operational Noise Monitoring Results – 11 December 2014 (day)				
Location	**Time**	**Total dB(A), Leq (15 min)**	**Wind speed/ direction**	**Identified Noise Sources**
Tarrawonga	12:27 pm	41	2.0/233	Birds (39), wind (36), **TCM (30)**

Table 8 TCM Operational Noise Monitoring Results – 11 December 2014 (evening)					
Location	**Time**	**Total dB(A), Leq (15 min)**	**Wind speed/ direction**	**Temperature Inversion °C/100m**	**Identified Noise Sources**
Tarrawonga	9:13 pm	45	7.8/151	Lapse	Wind (43), insects (40), **TCM inaudible**

Table 9 TCM Operational Noise Monitoring Results – 12 December 2014 (night)					
Location	**Time**	**Total dB(A), Leq (15 min)**	**Wind speed/ direction**	**Temperature Inversion °C/100m**	**Identified Noise Sources**
Tarrawonga	1:28 am	44	5.9/160	Lapse	Wind (44), **TCM inaudible**

Table 10 TCM Operational Noise Monitoring Results – 12 December 2014 (day)				
Location	**Time**	**Total dB(A), Leq (15 min)**	**Wind speed/ direction**	**Identified Noise Sources**
Tarrawonga	8:40 am	51	7.8/159	Wind (51), cattle (34), birds (27), **TCM inaudible**

Table 11 TCM Operational Noise Monitoring Results – 12 December 2014 (evening)					
Location	**Time**	**Total dB(A), Leq (15 min)**	**Wind speed/ direction**	**Temperature Inversion °C/100m**	**Identified Noise Sources**
Tarrawonga	9:26 pm	47	6.0/125	0.0	Wind (46), insects (40), **TCM inaudible**

Table 12 TCM Operational Noise Monitoring Results – 12 December 2014 (night)					
Location	**Time**	**Total dB(A), Leq (15 min)**	**Wind speed/ direction**	**Temperature Inversion °C/100m**	**Identified Noise Sources**
Tarrawonga	10:04 pm	42	7.2/129	Lapse	Insects (40), wind (38), **TCM inaudible**

4.2 Discussion of Results

The results in Tables 1 to 12 show that noise emissions from TCM were measured above the operational noise criterion on one occasion at the Tarrawonga monitoring location during the night of December 9. The Tarrawonga property is now Project Related and, as a consequence, the noise limit of 35dB(A) no longer applies at this receiver.

Noise emissions from TCM were therefore compliant throughout the whole monitoring period.

4.2.1 Modifying Factor Corrections

Data from those times where TCM operations were audible were analysed using the *"Evaluator"* software. This analysis showed the noise did not contain any tonal, impulsive or low frequency components as per definitions of "modifying factor corrections" in the NSW Industrial Noise Policy.

4.3 Sleep Disturbance

The results of the sleep disturbance monitoring are shown below in **Table 13**.

Table 13 TCM Sleep Disturbance Monitoring Results				
Location	**Time**	**dB(A),L1 (1 min)**	**Wind speed/ direction**	**Temperature Inversion °C/100m**
Tarrawonga (10/9/14)	1:29 am	43	3.4/58	+0.6
Tarrawonga (11/9/14)	5:45 am	n/a	6.4/23	Lapse
Tarrawonga (12/9/14)	1:28 am	n/a	5.9/160	Lapse
Tarrawonga (12/9/14)	10:04 pm	n/a	7.2/129	Lapse

The results in Table 13 show that the measured L1 (1 min) noise level did not exceed the sleep disturbance criterion during any of the night time monitoring periods.

APPENDIX A

DESCRIPTION OF ACOUSTICAL TERMS

Table A1
Definition of acoustical terms

Term	Description
dB(A)	The quantitative measure of sound heard by the human ear, measured by the A-Scale Weighting Network of a sound level meter expressed in decibels (dB).
SPL	Sound Pressure Level. The incremental variation of sound pressure above and below atmospheric pressure and expressed in decibels. The human ear responds to pressure fluctuations, resulting in sound being heard.
STL	Sound Transmission Loss. The ability of a partition to attenuate sound, in dB.
Lw	Sound Power Level radiated by a noise source per unit time re 1pW.
Leq	Equivalent Continuous Noise Level - taking into account the fluctuations of noise over time. The time-varying level is computed to give an equivalent dB(A) level that is equal to the energy content and time period.
L1	Average Peak Noise Level - the level exceeded for 1% of the monitoring period.
L90	"Background" Noise Level - the level exceeded for 90% of the monitoring period.

14 January 2015

Ref: 06259/5573

Whitehaven Coal Pty Ltd
PO Box 600
GUNNEDAH NSW 2380

RE: WHITEHAVEN COAL – ROAD TRAFFIC NOISE MONITORING, DECEMBER 2014

This letter report presents the results of road traffic noise measurements conducted for the Tarrawonga Coal Mine (TCM) and Rocglen Coal Mine (RCM). The measurements were conducted at "Brooklyn" and "Werona" on Blue Vale Road with the intention of determining the noise contribution from mine-related vehicles, particularly coal haul trucks. There are two separate residences on "Brooklyn" and noise measurements were made at, or near, the front of both residences. Residence 1 is closest to Blue Vale Road (approximately 90m) whilst Residence 2 is approximately 480m from the road.

The approvals granted for TCM and RCM (and Vickery Mine1[1]) state that the cumulative noise level from traffic generated by the two mines must not exceed 60 dB(A),$L_{eq(15hour)}$ during the day/evening and 55 dB(A),$L_{eq(9hour)}$ during the night at these locations. Traffic noise generated by the project(s) is to be measured in accordance with the relevant procedures in the *NSW Road Noise Policy*.

For practical reasons it is not possible to undertake attended noise monitoring over a 15 hour period (that is, the entire day/evening period). The approach taken here is to monitor the noise over a representative one hour period and utilise the results of this to theoretically predict the noise over the compliance period (based on the number of vehicle movements per day). At the time of the monitoring there was no coal haulage at night.

The noise measurement was made adjacent to the front (eastern) facade of Residence 2 at "Brooklyn" between 8:58 am and 9:59 am and then at Residence 1 of "Brooklyn" between 10:05 am and 11:06 am on Wednesday, December 17, 2014. The noise measurement for "Werona" was conducted the following day (Thursday, December 18, 2014) between 9:13 am and 10:14 am. All measurements were made with third-octave band Bruel & Kjaer Type 2260 sound level meters (IEC Type 1). The sound level meters were placed on tripods and recorded continuously at 1-second statistical intervals while notes on passing vehicles were written down.

[1] At the time of monitoring Vickery Mine was not operating.

Over the course of the measurement period of Residence 2 at "Brooklyn" there were 51 coal truck movements related to TCM and RCM. Other noise sources observed throughout the monitoring period included a contribution from birds, cows, planes and other traffic on Blue Vale Road. All of this extraneous noise was removed during the analysis process.

The calculated contribution from mine-related vehicles to the overall noise level at Residence 2 at "Brooklyn" was **41 dB(A),$L_{eq\ (1\ hour)}$**.

Over the course of the measurement period of Residence 1 at "Brooklyn" there were 47 coal truck movements related to TCM and RCM.

The calculated contribution from mine-related vehicles at Residence 1 was **52 dB(A),$L_{eq\ (1\ hour)}$**.

Over the course of the measurement period at "Werona" there were 49 coal truck movements related to TCM and RCM.

The total measured contribution from mine-related vehicles at "Werona" was **50 dB(A),$L_{eq\ (1\ hour)}$**.

The results of the noise monitoring show that the measured mine related traffic noise levels, over the representative one hour periods, are significantly lower than the daytime criterion of **60 dB(A) $L_{eq\ (15\ hour)}$**, (if considered to be consistent over the entire 15 hour period).

That is, mine related traffic movements at rates similar to those monitored (47 to 51 vehicles per hour), if consistent over an entire 15 hour period, would result in received noise well below the day time noise criterion.

We trust this report fulfils your requirements at this time, however, should you require additional information or assistance please contact the undersigned on 4954 2276.

Yours faithfully,
SPECTRUM ACOUSTICS PTY LIMITED

Author:



Neil Pennington
Acoustical Consultant

Review:



Ross Hodge
Acoustical Consultant

Project No: 04095

ATTENDED NOISE MONITORING – MARCH 2015
Tarrawonga Coal Mine
Boggabri, NSW

Prepared for:

Whitehaven Coal Pty Limited
PO Box 600
Gunnedah NSW 2380

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April 2015

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APPENDIX A Description of Acoustical Terms

1.0 INTRODUCTION

This letter report presents the results of attended operational noise compliance monitoring conducted for the Tarrawonga Coal Mine (TCM) over a four day period between 23 and 26 March, 2015.

The monitoring was carried out generally in accordance with the requirements of Environment Protection Licence (EPL 12365), Project Approval PA 11_0047, the Tarrawonga Coal Mine Noise Management Plan (NMP) and other relevant Australian Standards and guidelines.

1.1 Noise Monitoring Locations

Noise monitoring locations defined in the NMP are listed in the table below and shown as green triangles on **Figure 1**. Residence numbers in the table are as shown on figure.

Property Name	*Description of Location*
Matong/Coomalgah boundary - (R1)	*Eastern zone*
Barbers Lagoon - (R2)	*Western Zone*
Bungalow - (R3)	*Southern zone*

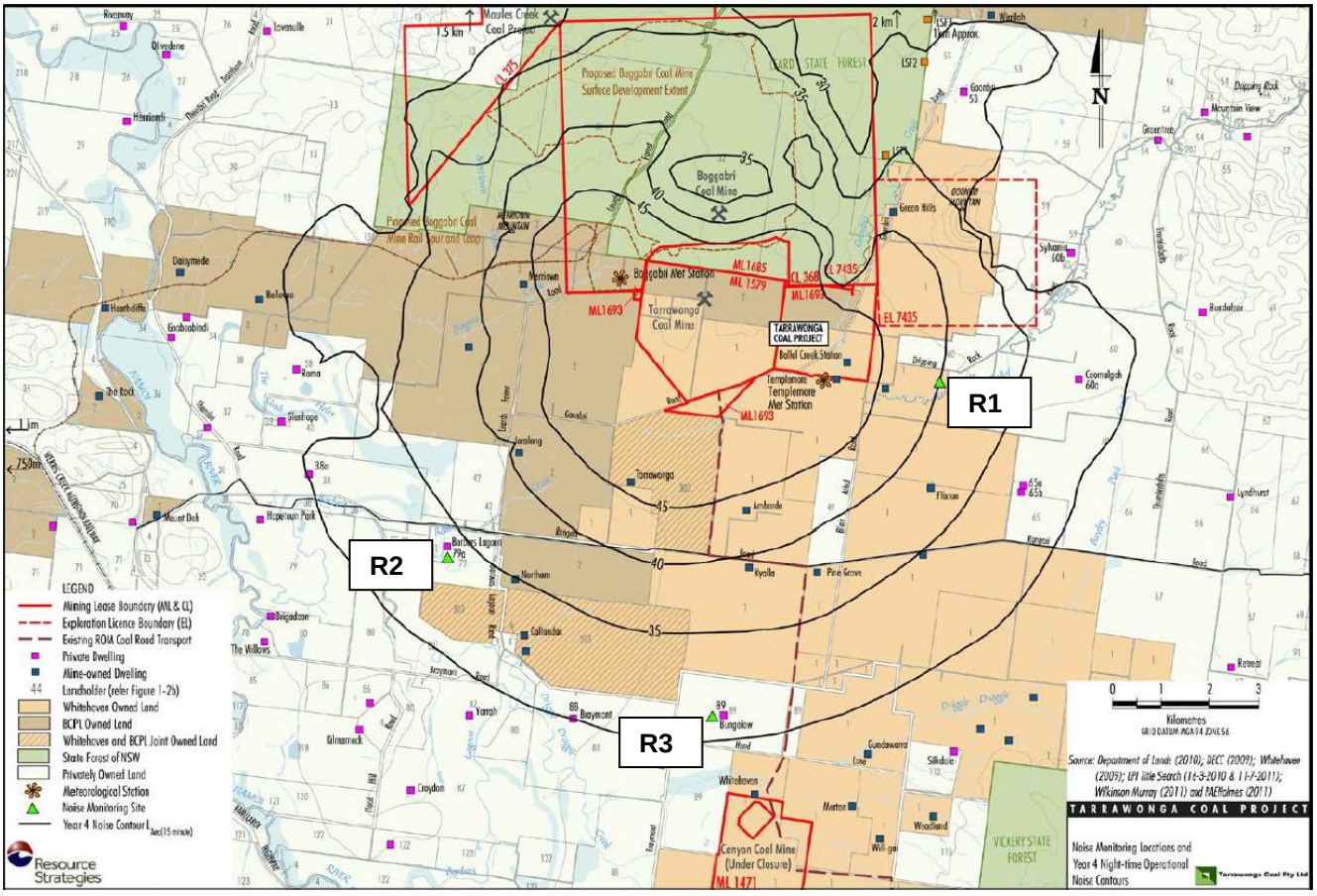


Figure 1 – Noise Monitoring Locations

1.2 Monitoring Frequency and Duration

PA 11_0047 details that attended surveys will be conducted during the approved hours of operation with at least three measurements taken during each day over four consecutive days, so that noise levels during the full range of operating times (day, evening and night) are monitored. Monitoring timeframes are to be

consistent with requirements of EPL 12365 which requires 1.5 hours during the day, 30 minutes during the evening and 1 hour during the night period.

2.0 NOISE CRITERIA AND CONDITIONS

2.1 Noise Assessment Criteria

Noise generated at the premises must not exceed the noise limits in the table below.

Locality and Location	***Day Leq (15 min)***	***Evening Leq (15 min)***	***Night Leq (15 min)***	***Night L1 (1 min)***
All privately owned land	*35*	*35*	*35*	*45*

2.2 Monitoring Location Definition

EPL 12365 states that to determine compliance with the Leq (15 min) operational noise criteria the noise measurement equipment must be located:

- Approximately on the property boundary, where any dwelling is situated 30m or less from the property boundary closest to the premises; or
- Within 30m of a dwelling façade, but not closer than 3m, where any dwelling on the property is situated more than 30m from the property boundary closest to the premises; or, where applicable
- Within 50m of the boundary of a National Park or Nature Reserve.

In relation to L1 (1 min) noise limits the noise measurement equipment must be located within 1m of a dwelling façade.

2.3 Applicable Meteorological Conditions

The noise limits apply under all meteorological conditions except for the following;

1. Wind speeds greater than 3m/s at 10m above ground level; or
2. Stability category F temperature inversion conditions and wind speeds greater than 2m/s at 10m above ground level; or
3. Stability category G temperature inversion conditions.

2.4 Other Conditions

To determine compliance with the Leq (15 min) operational noise criteria the modification factors detailed in Section 4 of the NSW industrial Noise policy must be applied, as appropriate, to the measured noise levels.

3.0 NOISE MONITORING PROCEDURE

3.1 Monitoring Equipment

Attended noise monitoring was conducted with Brüel & Kjær Type 2250 Precision Sound Analysers. These instruments have Type 1 characteristics as defined in AS1259-1982 "Sound Level Meters" and have current NATA calibration. Field calibration is carried out at the start and end of each monitoring period.

A-weighted noise levels were measured over the appropriate monitoring periods (90 minutes/day, 30 minutes/evening and 60 minutes/night) with data acquired at 1 or 2 second statistical intervals and the meter set to "fast" response. Each 1 or 2 second measurement is accompanied by a third-octave band spectrum from 20 - 20k Hz which is required for analysing INP 'modifying factors'. Time based field notes allow for determination of the relative contributions to the overall noise level of all significant noise sources.

3.2 Measurement Analysis

The operational noise criteria for compliance with Section L 4.1 of EPL 12365 are based on a 15 minute Leq noise level. The procedures detailed in Section M 7.7 of EPL 12365 require noise monitoring for significantly longer periods than that of the compliance criteria. To determine compliance with the EPL conditions the worst case 15 minute period, in relation to mine noise, was extracted from each measurement and compared to the criteria in Section L 4.1.

This worst case 15 minute Leq noise level for each monitoring period is shown in the tables below. Where the noise from TCM was audible Bruel & Kjaer "*Evaluator*" analysis software was used to quantify the contributions of the mine and other significant noise sources to the overall.

Due to the close proximity, relative to the receiver, of TCM and the nearby Boggabri Coal Mine (BCM), it is sometimes not always possible to determine the partial contributions of emissions from each mine to the overall measured noise level. Where this is the case the total measured mine noise is shown in the tables as "mine". Where the total measured mine noise is equal to, or greater than, the noise criterion for TCM an estimate of the relative contributions of each mine has been made based on the field observations and data analysis.

When no mine noise was audible at a monitoring location, a representative 15 minute noise measurement was made with observations carried out for the remainder of the applicable time period. In these instances, the measured noise level for the representative 15 minute period is that shown in the tables below.

The compliance measurement locations are different for each of the operational and sleep disturbance noise. That is, the sleep disturbance criterion is typically applicable at 1m from the façade of a bedroom window.

To avoid undue disturbance to residents the L1 (1 min) noise level from the operational measurements are used to show general compliance with the sleep disturbance criterion. That is, as the distance between the noise source and the operational noise monitoring location is significantly greater than the distance between the operational noise monitoring location and the sleep disturbance monitoring location (i.e. 1m from the facade of the house) there will be little variation in L1 (1 min) levels between the two monitoring locations.

It must be noted, however, that the sleep disturbance criterion is to be measured near a bedroom window. As the internal layout of each residence is not known, to consider a worst case, this is assumed to be facing the operational noise monitoring location.

Meteorological data used in this report were taken from a mine operated meteorological station located approximately 4km to the east of the TCM open cut. Temperature inversion information is taken from the Boggabri Coal Mine met tower with temperature sensors at 2m and 52m above ground level.

3.3 Special Conditions

Before the noise surveys, Spectrum Acoustics personnel were briefed on the current location(s) of activities.

4.0 RESULTS AND DISCUSSION

4.1 Measured Operational Noise Levels

Measured noise levels are summarised in **Tables 1** to **12**. The total measured Leq (15 min) is shown. Bruel & Kjaer "*Evaluator*" analysis software was used to quantify the contributions of the various noise sources. The identified noise sources are listed, along with the contribution of each source, in descending order (shown in brackets). Mine noise from TCM is shown in the tables in bold type.

Table 1
TCM Operational Noise Monitoring Results – 23 March 2015 (day)

Location	Time	Total dB(A), Leq (15 min)	Wind speed/ direction	Identified Noise Sources
Matong	9:46 am	32	1.3/213	Birds (30), wind (26), mine noise (22) **TCM est. inaudible**
Barbers Lagoon	11:26 am	44	1.3/219	Birds (44), traffic (26), **TCM inaudible**
Bungalow	1:36 pm	35	2.3/272	Birds & insects (34), wind (28), **TCM inaudible**

Table 2
TCM Operational Noise Monitoring Results – 23 March 2015 (evening)

Location	Time	Total dB(A), Leq (15 min)	Wind speed/ direction	Temperature Inversion °C/100m	Identified Noise Sources
Matong	7:48 pm	32	0.9/1	+7.8	Insects(30), mine noise (28) **TCM est. inaudible**
Barbers Lagoon	8:32 pm	30	1.0/24	+8.6	Insects (30), **TCM inaudible**
Bungalow	9:16 pm	33	1.2/29	+6.8	Frogs & insects (33), **TCM inaudible**

Table 3 TCM Operational Noise Monitoring Results – 23/24 March 2015 (night)					
Location	**Time**	**Total dB(A), Leq (15 min)**	**Wind speed/ direction**	**Temperature Inversion °C/100m**	**Identified Noise Sources**
Matong	10:02 pm	34	1.7/1	+4.0	Mine noise (33) **TCM est. faintly audible**, insects (26)
Barbers Lagoon	11:12 pm	31	1.6/351	+5.2	Frogs & insects (31), **TCM faintly audible**
Bungalow	12:33 am	30	2.9/11	+4.4	Frogs & insects (30), **TCM faintly audible**

Table 4 TCM Operational Noise Monitoring Results – 24 March 2015 (day)				
Location	**Time**	**Total dB(A), Leq (15 min)**	**Wind speed/ direction**	**Identified Noise Sources**
Matong	7:28 am	44	0.8/343	Birds (41), wind (41), mine noise (27) **TCM est. (24)**
Barbers Lagoon	9:19 am	42	2.1/276	Birds (41), traffic (34), mine noise (24) **TCM est. (21)**
Bungalow	11:06 am	42	6.1/327	Wind (41), birds (35), **TCM inaudible**

Table 5 TCM Operational Noise Monitoring Results – 24 March 2015 (evening)					
Location	**Time**	**Total dB(A), Leq (15 min)**	**Wind speed/ direction**	**Temperature Inversion °C/100m**	**Identified Noise Sources**
Tarrawonga	7:45 pm	38	2.1/55	+0.6	Mine noise (36) **TCM est. (28)**, insects (33)
Barbers Lagoon	8:28 pm	36	0.8/113	+1.0	Frogs & insects (35), domestic (29), **TCM inaudible**
Bungalow	9:15 pm	33	1.3/215	Lapse	Frogs & insects (31), wind (25), mine noise (25) **TCM est. (22)**

Table 6 TCM Operational Noise Monitoring Results – 24/25 March 2015 (night)					
Location	**Time**	**Total dB(A), Leq (15 min)**	**Wind speed/ direction**	**Temperature Inversion °C/100m**	**Identified Noise Sources**
Matong	10:01 pm	35	0.8/191	Lapse	Mine noise (34) **TCM est. (25)**, frogs & insects (29)
Barbers Lagoon	11:16 pm	32	1.1/231	Lapse	Frogs & insects (32), mine noise (22) **TCM est. (19)**
Bungalow	12:34 am	36	1.4/209	+2.4	Wind (33), frogs & insects (30), mine noise (30) **TCM est. (27)**

Table 7 TCM Operational Noise Monitoring Results – 25 March 2015 (day)				
Location	**Time**	**Total dB(A), Leq (15 min)**	**Wind speed/ direction**	**Identified Noise Sources**
Matong	7:50 am	41	1.0/174	Birds (38), mine noise (38) **TCM est. (30)**
Barbers Lagoon	9:31 am	43	1.2/173	Birds (40), sheep (37), traffic (36), **TCM faintly audible**
Bungalow	11:16 am	38	1.6/207	Birds & insects (38), **TCM inaudible**

Table 8 TCM Operational Noise Monitoring Results – 25 March 2015 (evening)					
Location	**Time**	**Total dB(A), Leq (15 min)**	**Wind speed/ direction**	**Temperature Inversion °C/100m**	**Identified Noise Sources**
Matong	9:08 pm	32	1.1/350	+9.2	Mine noise (30) **TCM est. (27)**, insects (28)
Barbers Lagoon	8:22 pm	32	0.8/4	+8.4	Insects (32), **TCM inaudible**
Bungalow	7:38 pm	31	1.0/308	+6.2	Birds & insects (31), **TCM inaudible**

Table 9 TCM Operational Noise Monitoring Results – 25/26 March 2015 (night)					
Location	**Time**	**Total dB(A), Leq (15 min)**	**Wind speed/ direction**	**Temperature Inversion °C/100m**	**Identified Noise Sources**
Matong	12:29 am	26	0.8/347	+9.6	Mine noise (25) **TCM est. (22)**, insects (22)
Barbers Lagoon	11:14 pm	25	1.0/346	+9.2	Insects (25), **TCM inaudible**
Bungalow	10:00 pm	32	0.6/341	+8.4	Insects (32), **TCM faintly audible**

Table 10 TCM Operational Noise Monitoring Results – 26 March 2015 (day)				
Location	**Time**	**Total dB(A), Leq (15 min)**	**Wind speed/ direction**	**Identified Noise Sources**
Matong	8:17 am	50	1.0/187	Birds (50), mine noise (26), **TCM est. (23)**
Barbers Lagoon	10:00 am	43	0.8/190	Birds (43), traffic (31), **TCM inaudible**
Bungalow	11:44 am	30	2.8/286	Birds (30), **TCM inaudible**

Table 11 TCM Operational Noise Monitoring Results – 26 March 2015 (evening)					
Location	**Time**	**Total dB(A), Leq (15 min)**	**Wind speed/ direction**	**Temperature Inversion °C/100m**	**Identified Noise Sources**
Matong	7:41 pm	34	2.4/226	+1.0	Insects (33), mine noise (27) **TCM est. (24)**
Barbers Lagoon	8:23 pm	35	1.7/226	+2.2	Insects (34), wind (27), **TCM inaudible**
Bungalow	9:09 pm	27	0.5/128	+4.4	Insects (27), **TCM inaudible**

Table 12 TCM Operational Noise Monitoring Results – 26/27 March 2015 (night)					
Location	**Time**	**Total dB(A), Leq (15 min)**	**Wind speed/ direction**	**Temperature Inversion °C/100m**	**Identified Noise Sources**
Matong	10:15 pm	32	0.6/251	+7.0	Mine noise (30) **TCM est. (27)**, insects (27)
Barbers Lagoon	11:28 pm	26	0.8/217	+5.4	Insects (26), **TCM inaudible**
Bungalow	12:43 am	24	0.7/199	+5.6	Insects (24), **TCM inaudible**

4.2 Discussion of Results

The results in Tables 1 to 12 indicate that, under the operational and atmospheric conditions at the time, the measured noise levels from TCM did not exceed the relevant noise criteria at any location during any monitoring period.

As noted previously in this report TCM and BCM are relatively close together in relation to the various receiver locations. Where observations on site indicated that both mines were approximately equal contributors to the overall mine noise then half of the total measured mine noise was attributed to TCM.

4.2.1 Modifying Factor Corrections

Data from those times where TCM operations were audible were analysed using the *"Evaluator"* software. This analysis showed the noise did not contain any tonal, impulsive or low frequency components as per definitions of "modifying factor corrections" in the NSW Industrial Noise Policy.

4.3 Sleep Disturbance

The results of the sleep disturbance monitoring are shown below in **Table's 13 - 16**.

Table 13 TCM Sleep Disturbance Monitoring Results – 23/24 March 2015 (night)				
Location	**Time**	**dB(A),L1 (1 min)**	**Wind speed/ direction**	**Temperature Inversion °C/100m**
Matong	10:02 pm	20	1.7/1	+4.0
Barbers Lagoon	11:12 pm	19	1.6/351	+5.2
Bungalow	12:33 am	19	2.9/11	+4.4

Table 14 TCM Sleep Disturbance Monitoring Results – 24/25 March 2015 (night)				
Location	**Time**	**dB(A),L1 (1 min)**	**Wind speed/ direction**	**Temperature Inversion °C/100m**
Matong	10:01 pm	29	0.8/191	Lapse
Barbers Lagoon	11:16 pm	22	1.1/231	Lapse
Bungalow	12:34 am	30	1.4/209	+2.4

Table 15 TCM Sleep Disturbance Monitoring Results – 25/26 March 2015 (night)				
Location	**Time**	**dB(A),L1 (1 min)**	**Wind speed/ direction**	**Temperature Inversion °C/100m**
Matong	12:29 am	25	0.8/347	+9.6
Barbers Lagoon	11:14 pm	n/a	1.0/346	+9.2
Bungalow	10:00 pm	n/a	0.6/341	+8.4

Table 16 TCM Sleep Disturbance Monitoring Results – 26/27 March 2015 (night)				
Location	**Time**	**dB(A),L1 (1 min)**	**Wind speed/ direction**	**Temperature Inversion °C/100m**
Matong	10:15 pm	31	0.6/251	+7.0
Barbers Lagoon	11:28 pm	n/a	0.8/217	+5.4
Bungalow	12:43 am	n/a	0.7/199	+5.6

The results in Table's 13 to 16 show that the measured L1 (1 min) noise level did not exceed the sleep disturbance criterion during any of the night time monitoring periods.

APPENDIX A

DESCRIPTION OF ACOUSTICAL TERMS

Table A1

Definition of acoustical terms

Term	Description
dB(A)	The quantitative measure of sound heard by the human ear, measured by the A-Scale Weighting Network of a sound level meter expressed in decibels (dB).
SPL	Sound Pressure Level. The incremental variation of sound pressure above and below atmospheric pressure and expressed in decibels. The human ear responds to pressure fluctuations, resulting in sound being heard.
STL	Sound Transmission Loss. The ability of a partition to attenuate sound, in dB.
Lw	Sound Power Level radiated by a noise source per unit time re 1pW.
Leq	Equivalent Continuous Noise Level - taking into account the fluctuations of noise over time. The time-varying level is computed to give an equivalent dB(A) level that is equal to the energy content and time period.
L1	Average Peak Noise Level - the level exceeded for 1% of the monitoring period.
L90	"Background" Noise Level - the level exceeded for 90% of the monitoring period.

13 April 2015

Ref: 04095/5734

Mr Lachlan Johnson
Environmental Officer (Tarrawonga)
Whitehaven Coal Pty Limited
PO Box 600
Gunnedah NSW 2380

RE: TARRAWONGA PLANT NOISE TEST RESULTS – MARCH 2015

This letter report presents the results of haul truck noise testing conducted at the Tarrawonga Coal Mine on 31st March 2015.

MONITORING PROCEDURES

Dynamic testing of the trucks in motion was conducted using a modified version of ISO 6395:2008. The layout of the machinery path of motion and measurement points is shown in **Figure 1**. When applied to dump trucks in motion, the forward measurement path is uphill from point A to point B and the reverse path from B to A has the machine travelling downhill. The trucks measured on 31st March 2015 were travelling both uphill and downhill with their load status as noted in the table of results.

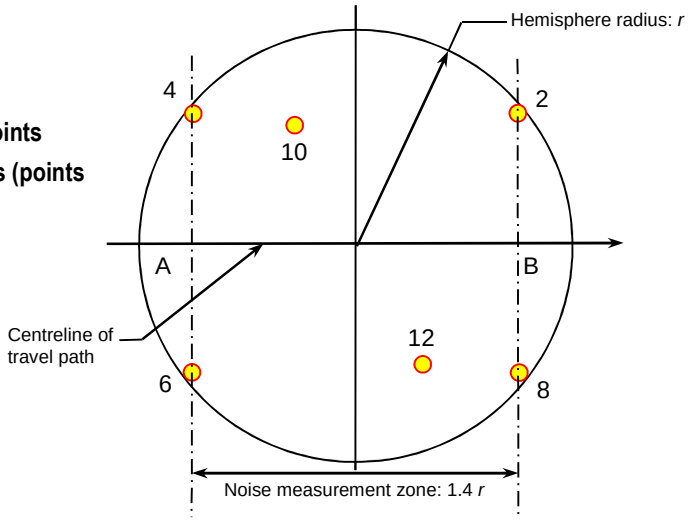


Figure 1. Measurement points for ISO 6395 dynamic tests (points 10 and 12 omitted).

Measurement points 2 and 4 were combined into a single point and the measurement zone extended to approximately 2.8 *r* to allow for an approach distance of 1.4 *r* to represent the measurement at point 2 and a departure distance of 1.4 *r* to represent the measurement at point 4.

Measurements of dozers were made on generally flat ground by the above method, with the dozer performing forward/reverse traverses in first and second gears. The velocity specified in Clause 7.4 of ISO 6395:2008 for tracked dozers is a maximum of 4 km/h in forward and reverse motion. In these practical tests, velocity is greater than 4 km/h, hence noise levels are greater, and the first gear results are the closest approximation to an ISO 6395:2008 test.

Measurements of excavators and drills were conducted generally in accordance with ISO 6393:1998(E) "Acoustics – measurement of exterior noise emitted by earth-moving machinery – Stationary test conditions".

RESULTS

Sound power levels (Lw, dB(A)) calculated in accordance with the methodologies of ISO 6395 and ISO 6393, for the uphill and downhill motion, are summarised in Table 1. Previous measurements from July 2014 are also included for reference.

TABLE 1. Measured sound power levels

Plant type	Plant #	Lw, dB(A)	
		July 2014	March 2015
Rear dump truck (785C)	600	122	114/122[1]
Rear dump truck (785C)	601	123	116/121[1]
Rear dump truck (785C)	602	123	117/122[1]
Rear dump truck (785C)	603	122	-/122[1]
Rear dump truck (785C)	604		116/121[1]
Rear dump truck (785C)	605	122	116/121[1]
Rear dump truck (785C)	606	123	116/122[1]
Rear dump truck (785C)	607	123	116/121[1]
Rear dump truck (785C)	608		-
Rear dump truck (785C)	610	123	-
Rear dump truck (785C)	618	121	121/114[2]
Rear dump truck (785C)	619		121/115[2]
Rear dump truck (785C)	621	122	120/116[2]
Rear dump truck (785C)	623	122	121/116[2]
Rear dump truck (789C)	872	121	116/121[1]
Rear dump truck (789C)	873	120	116/120[1]
Rear dump truck (789C)	874		
Water cart	868	119	-
Grader	63	109	109
Dozer D11T	843	119 1st gear	-
		124 2nd gear	-
Dozer	820	118 1st gear	-
		123 2nd gear	-

Dozer	501		116st gear 119nd gear
Drill (Cubex)	522	122	122
Drill	520		115
Excavator Hitachi	540	117	-
Excavator	532		114

1. Scenario with trucks uphill laden on L.H.S. and downhill empty
2. Scenario with trucks downhill laden on L.H.S. and uphill empty

I trust this report fulfils your requirements at this time, however, should you require additional information or assistance please contact the undersigned on 4954 2276.

Yours faithfully,

SPECTRUM ACOUSTICS PTY LIMITED



Ross Hodge
Acoustical Consultant

Appendix 10

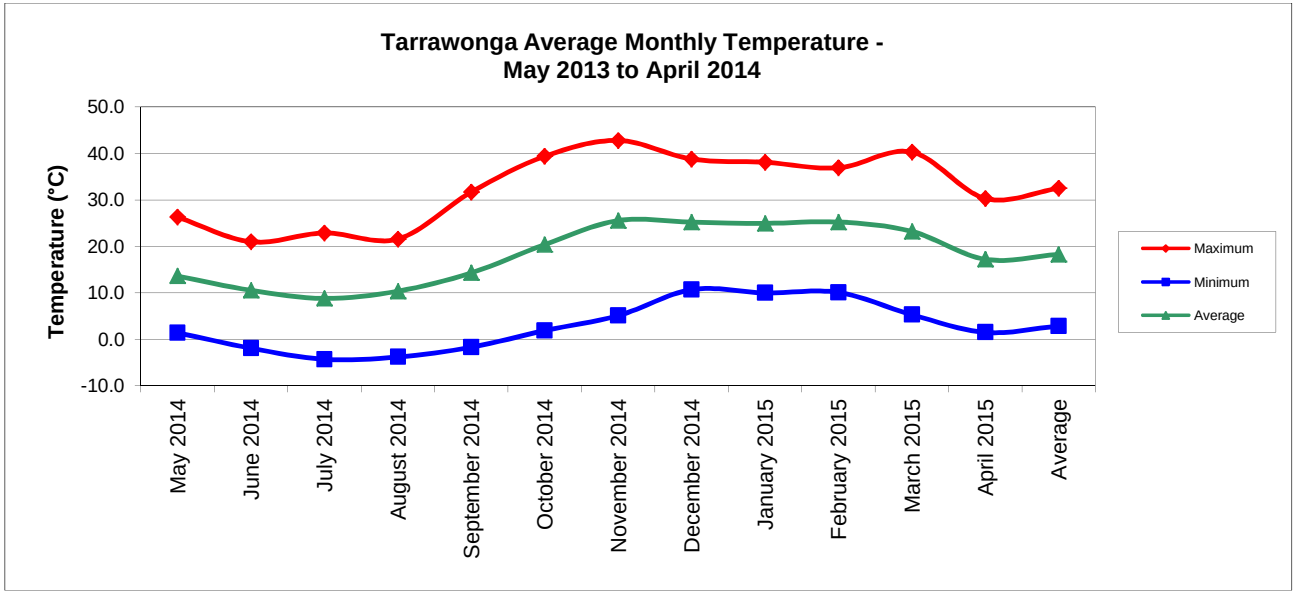
METEOROLOGICAL DATA

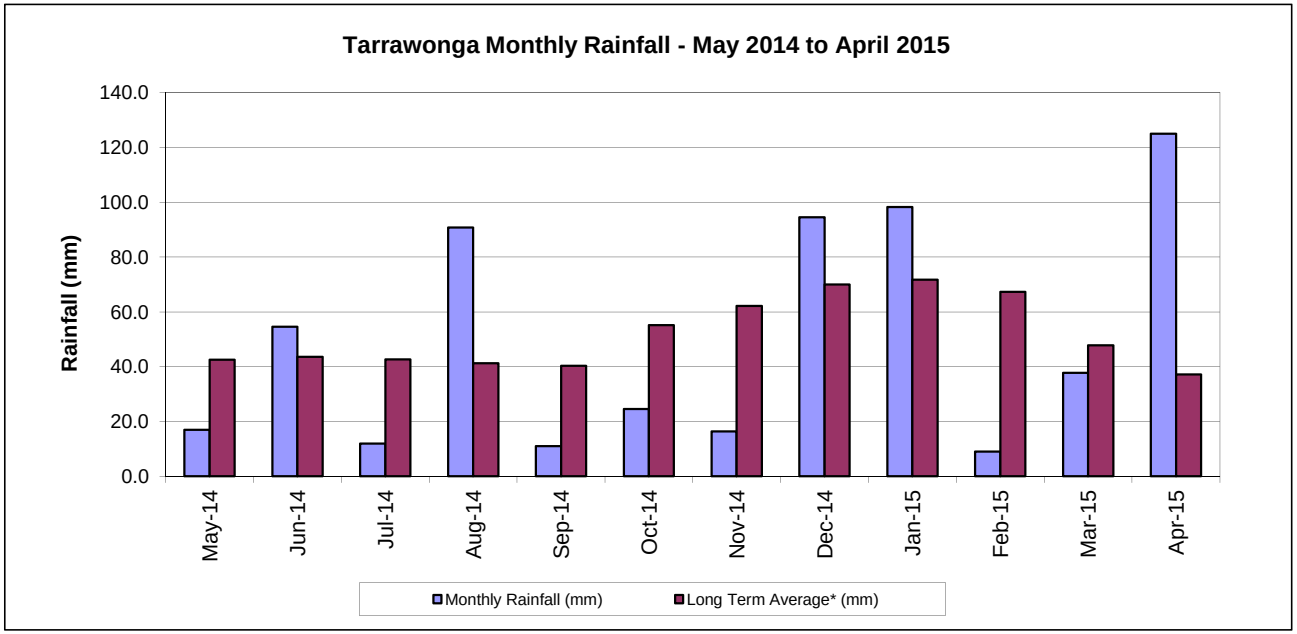
Tarrawonga Coal Mine Average Monthly Results

Month	Minimum Air Temp (°C)	Average Air Temp (°C)	Maximum Air Temp (°C)	Minimum Relative Humidity (%)	Average Relative Humidity(%)	Maximum Relative Humidity (%)	Minimum Wind Speed (m/s)	Average Wind Speed (m/s)	Maximum Wind Speed (m/s)
May 2014	1.4	13.6	26.3	26.5	72.5	**99.8**	0.0	1.2	8.3
June 2014	-1.9	10.5	**21.0**	**35.3**	**76.9**	99.1	0.0	1.2	10.1
July 2014	**-4.3**	**8.8**	22.9	17.4	70.7	98.4	0.0	**1.1**	**7.5**
August 2014	-3.8	10.4	21.6	20.9	**21.6**	98.5	0.0	1.6	**7.5**
September 2014	-1.7	14.3	31.7	14.0	58.2	97.3	0.0	1.5	9.5
October 2014	1.9	20.4	39.4	9.2	44.8	97.6	0.0	1.3	11.8
November 2014	5.1	**25.6**	**42.8**	**8.7**	42.1	97.2	0.0	1.7	**14.1**
December 2014	**10.7**	25.2	38.8	10.6	52.5	98.4	0.0	1.7	11.7
January 2015	10.0	25.0	38.1	9.9	56.6	98.2	0.0	1.6	13.7
February 2015	10.1	25.2	36.9	15.3	25.2	**95.5**	0.0	**2.1**	9.9
March 2015	5.3	23.2	40.3	9.5	50.9	97.3	0.0	1.7	9.7
April 2015	1.5	17.2	30.3	24.7	69.0	98.3	0.0	1.4	8.2
Average	**2.9**	**18.3**	**32.5**	**16.8**	**53.4**	**98.0**	**0.0**	**1.5**	**10.2**
Minimum	**-4.3**	**8.8**	**21.0**	**8.7**	**21.6**	**95.5**	**0.0**	**1.1**	**7.5**
Maximum	**10.7**	**25.6**	**42.8**	**35.3**	**76.9**	**99.8**	**0.0**	**2.1**	**14.1**
Total									

Month	Monthly Rainfall (mm)	Long Term Average* (mm)	Cumulative Rainfall (mm)	Number of Rain Days (≥1mm)
May 2014	17.0	42.5	17.0	3
June 2014	54.6	43.6	71.6	5
July 2014	12.0	42.7	83.6	2
August 2014	90.8	41.3	174.4	7
September 2014	11.0	40.3	185.4	1
October 2014	24.6	55.1	210.0	3
November 2014	16.4	62.2	226.4	3
December 2014	94.5	70	320.9	8
January 2015	98.2	71.7	419.1	7
February 2015	9.0	67.3	428.1	3
March 2015	37.8	47.8	465.9	5
April 2015	125.0	37.2	590.9	6
Total	**590.9**	**621.7**	**590.9**	**53**

* Long term average is from Gunnedah Pool (Station 055023) 1877 - 2012


Tarrawonga Average Monthly Temperature -
May 2013 to April 2014
Temperature (°C)
50.0
40.0
30.0
20.0
10.0
0.0
-10.0
May 2014
June 2014
July 2014
August 2014
September 2014
October 2014
November 2014
December 2014
January 2015
February 2015
March 2015
April 2015
Average
Maximum
Minimum
Average


Tarrawonga Monthly Rainfall - May 2014 to April 2015
Rainfall (mm)
140.0
120.0
100.0
80.0
60.0
40.0
20.0
0.0
May-14
Jun-14
Jul-14
Aug-14
Sep-14
Oct-14
Nov-14
Dec-14
Jan-15
Feb-15
Mar-15
Apr-15
Monthly Rainfall (mm)
Long Term Average* (mm)

Meteorological Daily Statistics Summary

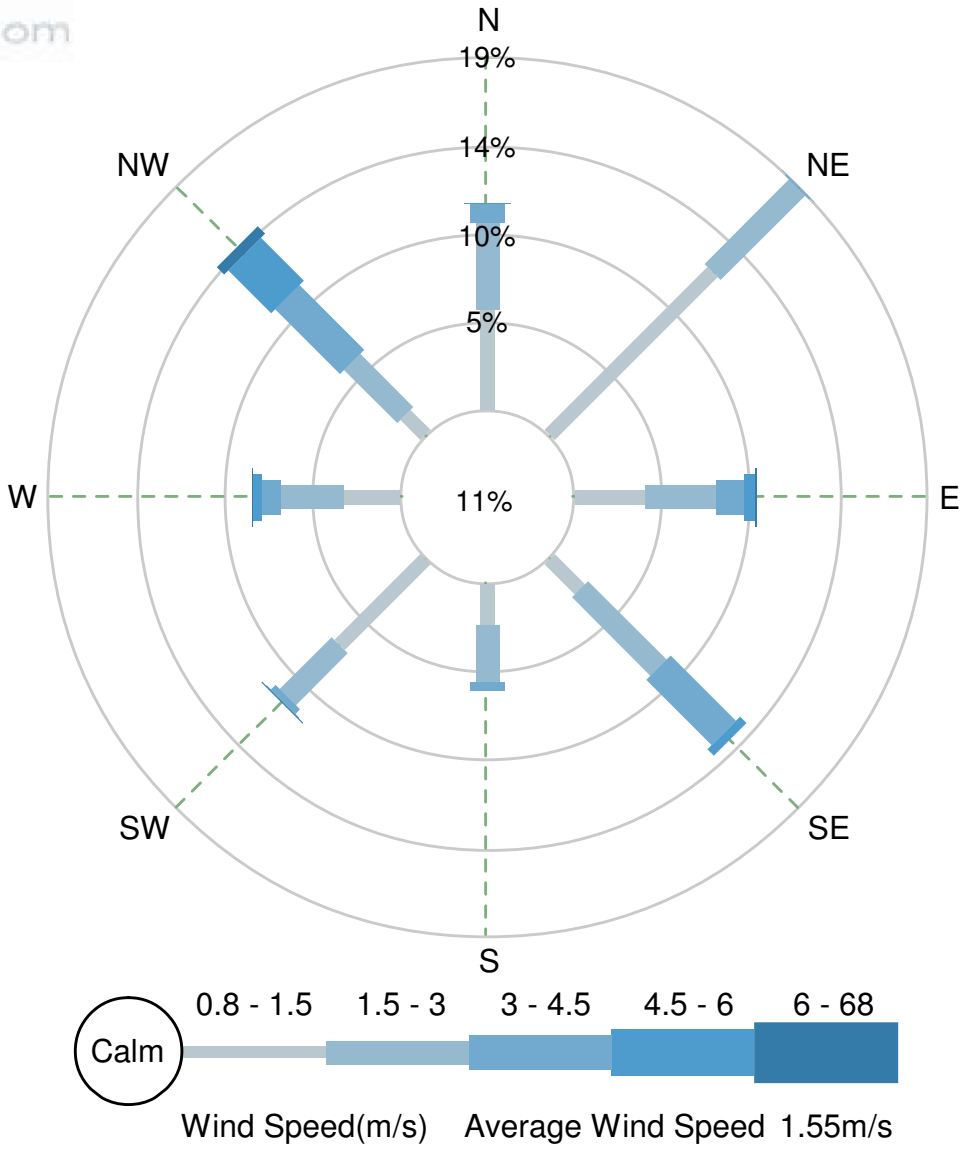
Unit Id	:	Whitehaven Master (Sentinex99)
Module Id	:	M2 (Templemore 10m)
Requested Report Date	:	2014/06/01
Requested Report Hour	:	00
Chart Available	:	no

Main Data Summary

Record Time	Temperature									Humidity			Prevailing Wind						
	2m			10m			60m						Speed			Gust	Dir	Rain	Solar Rad
	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max				Avg Max
					($°C$)						(%)			(m/s)		(m/s)	($°$)	(mm)	(W/m^2)
2014/05/01 00:00:00	13.7	6.5	21.5	14.7	8.5	20.9	-99.0	-99.0	-99.0	80.0	57.4	98.0	1.0	0.0	2.1	6.0	291	0.0	131.4 693.8
2014/05/02 00:00:00	13.5	7.3	20.7	14.2	9.3	19.7	-99.0	-99.0	-99.0	63.8	39.4	93.2	2.0	0.0	6.2	8.9	324	0.0	122.4 667.3
2014/05/03 00:00:00	9.2	7.0	11.2	9.5	7.7	12.2	-99.0	-99.0	-99.0	80.4	56.8	96.9	4.2	0.7	8.3	12.6	310	8.4	72.0 612.4
2014/05/04 00:00:00	11.2	7.6	13.9	11.3	7.7	13.0	-99.0	-99.0	-99.0	76.2	66.6	88.6	3.0	0.0	0.0	9.2	301	0.0	74.7 603.9
2014/05/05 00:00:00	10.5	4.6	15.7	11.2	6.2	15.2	-99.0	-99.0	-99.0	68.1	43.1	96.5	0.9	0.0	1.5	6.6	241	0.0	161.5 610.8
2014/05/06 00:00:00	8.9	1.4	16.8	10.3	4.5	17.1	-99.0	-99.0	-99.0	76.8	44.4	97.4	0.4	0.0	1.4	5.5	48	0.0	139.4 647.3
2014/05/07 00:00:00	15.3	8.9	20.1	16.4	12.2	19.7	-99.0	-99.0	-99.0	66.2	51.9	89.0	2.4	0.0	4.2	7.9	125	0.0	157.7 686.9
2014/05/08 00:00:00	13.5	6.8	21.3	14.6	8.5	21.4	-99.0	-99.0	-99.0	67.0	37.4	88.8	2.2	0.0	4.7	7.3	115	0.0	134.7 576.1
2014/05/09 00:00:00	12.5	2.8	21.8	14.2	5.9	22.5	-99.0	-99.0	-99.0	69.7	32.5	97.8	0.7	0.0	0.0	737.0	120	0.0	88.5 565.5
2014/05/10 00:00:00	13.5	6.5	20.0	14.6	8.6	20.1	-99.0	-99.0	-99.0	76.2	48.3	93.5	0.3	0.0	0.8	3.6	217	0.0	68.1 398.2
2014/05/11 00:00:00	15.2	8.5	21.5	16.1	10.9	21.2	-99.0	-99.0	-99.0	81.3	55.9	97.5	1.0	0.0	0.0	8.9	311	2.0	81.4 540.1
2014/05/12 00:00:00	14.1	5.2	22.7	15.6	7.5	22.9	-99.0	-99.0	-99.0	71.7	28.7	99.8	2.4	0.0	4.2	8.9	118	0.2	126.5 551.5
2014/05/13 00:00:00	14.0	6.3	22.6	15.9	10.2	22.6	-99.0	-99.0	-99.0	70.3	32.6	96.3	1.6	0.0	1.1	6.0	124	0.0	133.9 535.1
2014/05/14 00:00:00	11.7	3.1	22.4	14.0	6.2	22.4	-99.0	-99.0	-99.0	73.8	32.4	98.5	1.5	0.0	0.0	229.3	126	0.0	163.1 10064.6
2014/05/15 00:00:00	12.3	4.0	22.9	14.7	7.0	22.6	-99.0	-99.0	-99.0	71.0	35.3	96.8	1.1	0.0	0.6	6.6	105	0.0	133.0 537.3
2014/05/16 00:00:00	12.8	3.7	22.9	14.8	6.5	23.2	-99.0	-99.0	-99.0	66.0	26.5	96.4	1.5	0.0	0.0	7.5	117	0.0	124.7 533.5
2014/05/17 00:00:00	14.5	6.6	23.8	16.7	10.9	23.5	-99.0	-99.0	-99.0	66.2	35.8	91.5	0.4	0.0	2.1	4.4	75	0.0	123.9 553.2
2014/05/18 00:00:00	14.2	5.8	23.7	15.8	8.8	23.0	-99.0	-99.0	-99.0	73.2	41.3	93.9	0.2	0.0	0.0	4.5	326	0.0	98.7 631.8
2014/05/19 00:00:00	15.4	9.3	24.0	16.6	11.4	24.1	-99.0	-99.0	-99.0	70.8	34.5	94.4	0.2	0.0	1.2	3.7	353	0.0	112.9 521.1
2014/05/20 00:00:00	14.9	9.3	21.4	16.0	11.1	21.1	-99.0	-99.0	-99.0	72.7	47.9	89.5	0.6	0.0	1.1	4.4	309	0.0	82.0 371.3
2014/05/21 00:00:00	13.7	5.6	23.4	15.6	8.7	23.4	-99.0	-99.0	-99.0	74.7	38.5	97.1	0.6	0.0	0.0	6.0	130	0.0	130.1 508.7
2014/05/22 00:00:00	13.5	4.5	24.6	15.4	7.4	25.2	-99.0	-99.0	-99.0	73.2	37.3	96.8	0.2	0.0	0.0	3.6	336	0.0	129.3 510.6
2014/05/23 00:00:00	14.8	8.3	23.4	15.9	10.8	23.2	-99.0	-99.0	-99.0	84.4	53.8	96.5	0.5	0.0	0.7	5.5	341	4.8	82.2 546.6
2014/05/24 00:00:00	13.9	6.9	23.0	15.6	8.8	25.0	-99.0	-99.0	-99.0	84.1	52.1	98.3	0.3	0.0	0.5	3.7	30	0.2	116.0 484.8

Continued on next page

Record Time	Temperature									Humidity			Prevailing Wind						
	2m			10m			60m						Speed			Gust	Dir	Rain	Solar Rad
	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max				Avg Max
					($^\circ C$)						(%)			(m/s)		(m/s)	($^\circ$)	(mm)	(W/m^2)
2014/05/25 00:00:00	14.9	6.4	25.5	16.7	7.9	25.3	-99.0	-99.0	-99.0	74.9	39.0	98.1	0.9	0.0	0.8	7.0	331	0.0	123.2 493.2
2014/05/26 00:00:00	15.3	6.6	26.3	17.2	9.0	27.2	-99.0	-99.0	-99.0	73.8	35.0	97.4	0.2	0.0	2.4	3.7	22	0.0	119.0 497.5
2014/05/27 00:00:00	20.1	10.7	24.6	20.7	13.0	24.6	-99.0	-99.0	-99.0	51.2	32.0	85.7	2.5	0.7	6.8	9.7	3	0.0	111.4 574.5
2014/05/28 00:00:00	17.0	7.7	23.4	18.3	11.2	23.1	-99.0	-99.0	-99.0	68.7	40.4	96.0	1.8	0.0	1.4	9.8	312	1.4	116.6 545.5
2014/05/29 00:00:00	11.2	2.6	22.1	13.2	5.4	21.9	-99.0	-99.0	-99.0	74.3	36.6	97.9	0.5	0.0	0.0	5.2	133	0.0	128.8 527.4
2014/05/30 00:00:00	11.5	2.1	21.7	13.2	4.6	21.8	-99.0	-99.0	-99.0	76.3	44.8	97.3	0.7	0.0	0.6	4.2	163	0.0	91.1 448.8
2014/05/31 00:00:00	15.8	7.3	24.0	16.9	10.0	23.9	-99.0	-99.0	-99.0	71.2	42.5	96.0	0.6	0.0	4.5	6.1	67	0.0	95.1 534.0



Sentinex99 - M2, Whitehaven Master - Wind Rose

Date/Time range = 20140501-00:00 till 20140531-23:59

Meteorological Daily Statistics Summary

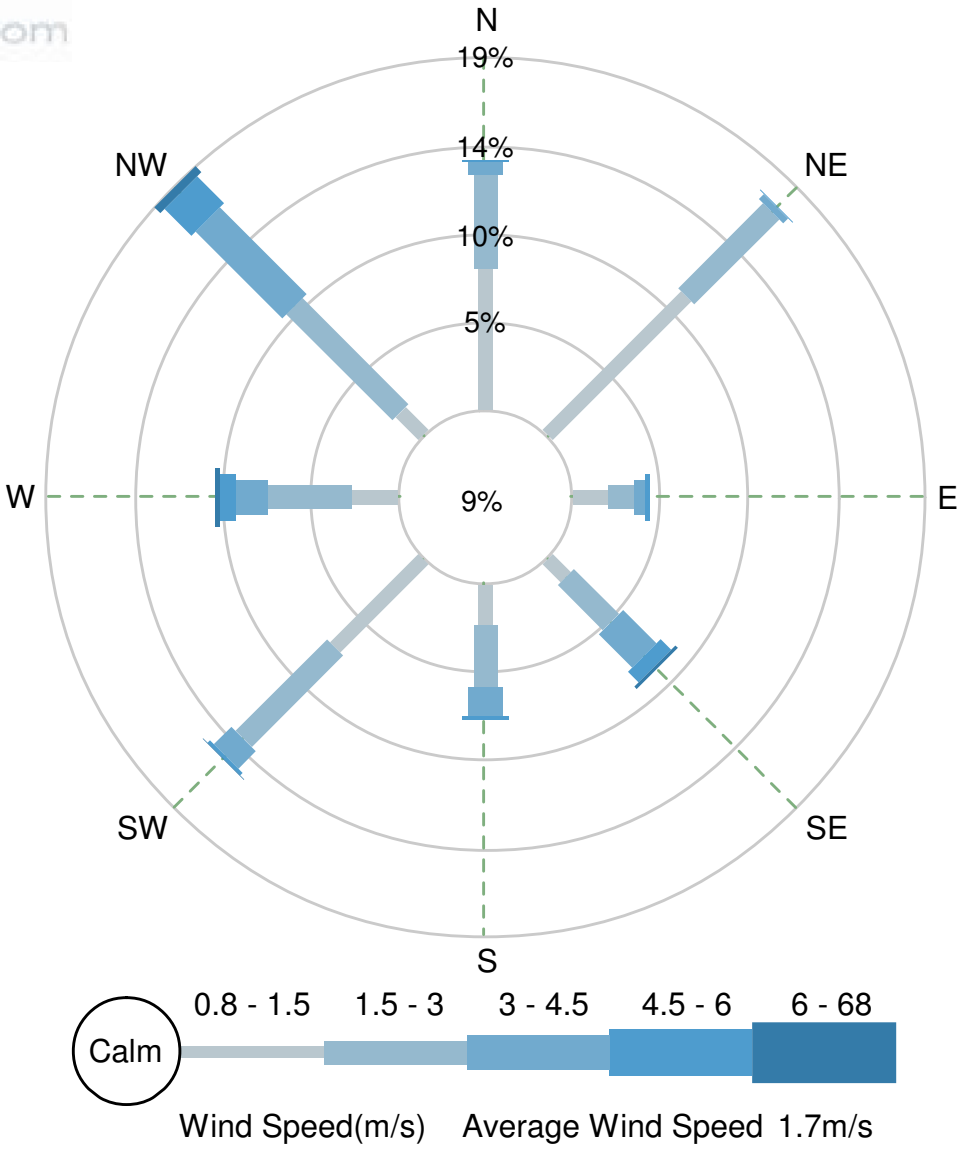
Unit Id	:	Whitehaven Master (Sentinex99)
Module Id	:	M2 (Templemore 10m)
Requested Report Date	:	2014/07/01
Requested Report Hour	:	00
Chart Available	:	no

Main Data Summary

Record Time	Temperature									Humidity			Prevailing Wind						
	2m			10m			60m						Speed			Gust	Dir	Rain	Solar Rad
	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max				Avg Max
					($°C$)						($\%$)			(m/s)		(m/s)	($°$)	(mm)	(W/m^2)
2014/06/01 00:00:00	15.5	13.3	20.9	16.0	14.4	20.4	-99.0	-99.0	-99.0	83.2	52.9	96.8	1.1	0.0	2.3	8.9	51	13.2	38.3 410.2
2014/06/02 00:00:00	13.9	8.2	18.6	14.5	10.7	18.5	-99.0	-99.0	-99.0	86.3	59.6	97.0	0.7	0.0	2.3	6.0	309	8.0	78.8 522.9
2014/06/03 00:00:00	13.4	5.3	18.5	14.4	8.7	18.3	-99.0	-99.0	-99.0	70.8	47.2	97.2	0.0	0.0	1.5	0.0	-99	0.6	150.8 503.4
2014/06/04 00:00:00	9.0	2.0	17.7	10.4	4.3	17.2	-99.0	-99.0	-99.0	83.9	49.5	98.1	0.1	0.0	0.0	4.1	22	0.0	122.2 537.8
2014/06/05 00:00:00	8.9	1.2	19.3	10.4	3.1	19.9	-99.0	-99.0	-99.0	84.1	46.8	98.9	0.4	0.0	0.0	3.7	271	0.0	119.7 478.8
2014/06/06 00:00:00	10.8	1.6	19.7	11.7	3.9	19.8	-99.0	-99.0	-99.0	80.7	50.6	98.9	1.8	0.0	5.2	7.3	150	0.0	111.4 503.9
2014/06/07 00:00:00	10.5	2.8	18.8	12.3	6.0	18.6	-99.0	-99.0	-99.0	80.8	51.6	98.6	1.2	0.0	0.0	7.3	146	0.2	111.9 548.8
2014/06/08 00:00:00	10.3	2.2	18.2	11.6	5.0	18.1	-99.0	-99.0	-99.0	77.1	50.3	99.1	1.6	0.0	0.0	6.0	163	0.0	118.0 484.3
2014/06/09 00:00:00	10.4	2.6	18.3	11.7	5.6	18.4	-99.0	-99.0	-99.0	70.4	38.4	96.3	1.9	0.0	0.6	7.5	147	0.0	117.7 491.5
2014/06/10 00:00:00	11.3	1.4	20.0	12.7	4.4	20.1	-99.0	-99.0	-99.0	68.2	35.3	97.8	2.9	0.0	6.5	10.1	120	0.0	113.8 483.9
2014/06/11 00:00:00	9.1	0.5	19.0	10.9	3.5	19.0	-99.0	-99.0	-99.0	71.7	36.4	97.4	0.7	0.0	0.0	5.3	132	0.0	120.8 480.0
2014/06/12 00:00:00	9.5	1.5	21.0	11.7	4.4	20.6	-99.0	-99.0	-99.0	75.9	38.1	97.1	0.1	0.0	2.2	4.7	217	0.0	116.8 487.3
2014/06/13 00:00:00	12.1	4.0	20.9	12.8	6.9	20.6	-99.0	-99.0	-99.0	79.6	47.1	96.5	0.8	0.0	1.1	5.2	249	5.6	68.2 617.4
2014/06/14 00:00:00	12.9	8.9	16.1	13.3	10.4	16.1	-99.0	-99.0	-99.0	85.4	69.2	97.7	2.0	0.0	0.0	7.3	317	19.2	58.6 419.5
2014/06/15 00:00:00	9.5	5.2	13.0	9.8	7.2	12.8	-99.0	-99.0	-99.0	83.8	69.6	95.9	2.0	0.0	6.1	8.7	304	0.0	81.9 610.6
2014/06/16 00:00:00	9.8	3.0	15.6	10.8	6.4	16.0	-99.0	-99.0	-99.0	79.5	50.2	97.5	0.5	0.0	2.0	4.9	281	0.0	105.6 577.3
2014/06/17 00:00:00	7.6	0.7	15.7	9.3	3.8	15.6	-99.0	-99.0	-99.0	82.0	53.0	97.8	0.2	0.0	1.0	6.5	179	0.2	108.0 533.2
2014/06/18 00:00:00	7.9	-0.4	17.6	9.5	2.0	17.7	-99.0	-99.0	-99.0	84.6	55.8	98.4	0.7	0.0	0.6	6.0	183	0.0	115.1 462.3
2014/06/19 00:00:00	10.2	1.8	20.0	11.6	4.3	20.6	-99.0	-99.0	-99.0	84.1	49.6	98.9	0.3	0.0	1.7	4.7	315	0.0	110.2 458.7
2014/06/20 00:00:00	14.1	10.1	20.2	14.7	11.1	20.0	-99.0	-99.0	-99.0	80.2	47.5	96.9	1.0	0.0	0.9	9.7	322	3.0	65.6 553.4
2014/06/21 00:00:00	12.1	6.9	19.7	13.3	9.5	19.4	-99.0	-99.0	-99.0	87.9	53.5	97.7	0.2	0.0	1.9	3.7	257	0.4	89.0 433.4
2014/06/22 00:00:00	9.4	3.2	19.1	10.8	4.9	18.8	-99.0	-99.0	-99.0	84.5	42.5	98.8	0.2	0.0	2.2	4.2	332	0.2	103.5 472.3
2014/06/23 00:00:00	10.5	2.4	18.7	11.6	4.6	18.5	-99.0	-99.0	-99.0	73.5	40.9	97.1	0.9	0.0	2.5	7.1	348	0.0	61.0 391.3
2014/06/24 00:00:00	11.6	8.3	16.1	12.0	9.1	16.8	-99.0	-99.0	-99.0	53.7	39.2	68.6	3.7	0.8	8.6	12.5	300	0.0	117.3 574.1

Continued on next page

Record Time	Temperature									Humidity			Prevailing Wind						
	2m			10m			60m						Speed			Gust	Dir	Rain	Solar Rad
	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max				Avg Max
					($^\circ C$)						(%)			(m/s)		(m/s)	($^\circ$)	(mm)	(W/m^2)
2014/06/25 00:00:00	10.0	3.0	16.4	11.3	6.6	15.9	-99.0	-99.0	-99.0	65.5	43.9	93.5	1.9	0.0	0.0	8.0	302	0.0	109.9 580.5
2014/06/26 00:00:00	8.6	1.5	16.8	10.4	5.5	16.7	-99.0	-99.0	-99.0	74.0	46.2	95.5	1.3	0.0	0.0	6.9	335	0.0	116.4 470.3
2014/06/27 00:00:00	5.9	-1.9	16.9	8.2	0.4	17.3	-99.0	-99.0	-99.0	81.6	46.2	99.0	0.0	0.0	2.1	3.6	88	0.2	118.8 481.6
2014/06/28 00:00:00	11.2	-0.3	19.6	12.6	2.6	19.5	-99.0	-99.0	-99.0	68.9	47.2	97.5	2.5	0.0	10.1	16.2	328	3.8	51.6 382.1
2014/06/29 00:00:00	9.6	6.6	13.3	9.9	7.0	12.6	-99.0	-99.0	-99.0	57.9	47.0	65.4	3.3	1.3	7.1	11.2	306	0.0	105.2 635.4
2014/06/30 00:00:00	8.1	0.3	12.9	8.9	5.1	12.4	-99.0	-99.0	-99.0	66.1	47.9	95.6	1.5	0.0	1.9	6.9	271	0.0	76.5 635.0



Sentinex99 - M2, Whitehaven Master - Wind Rose

Date/Time range = 20140601-00:00 till 20140630-23:59

Meteorological Daily Statistics Summary

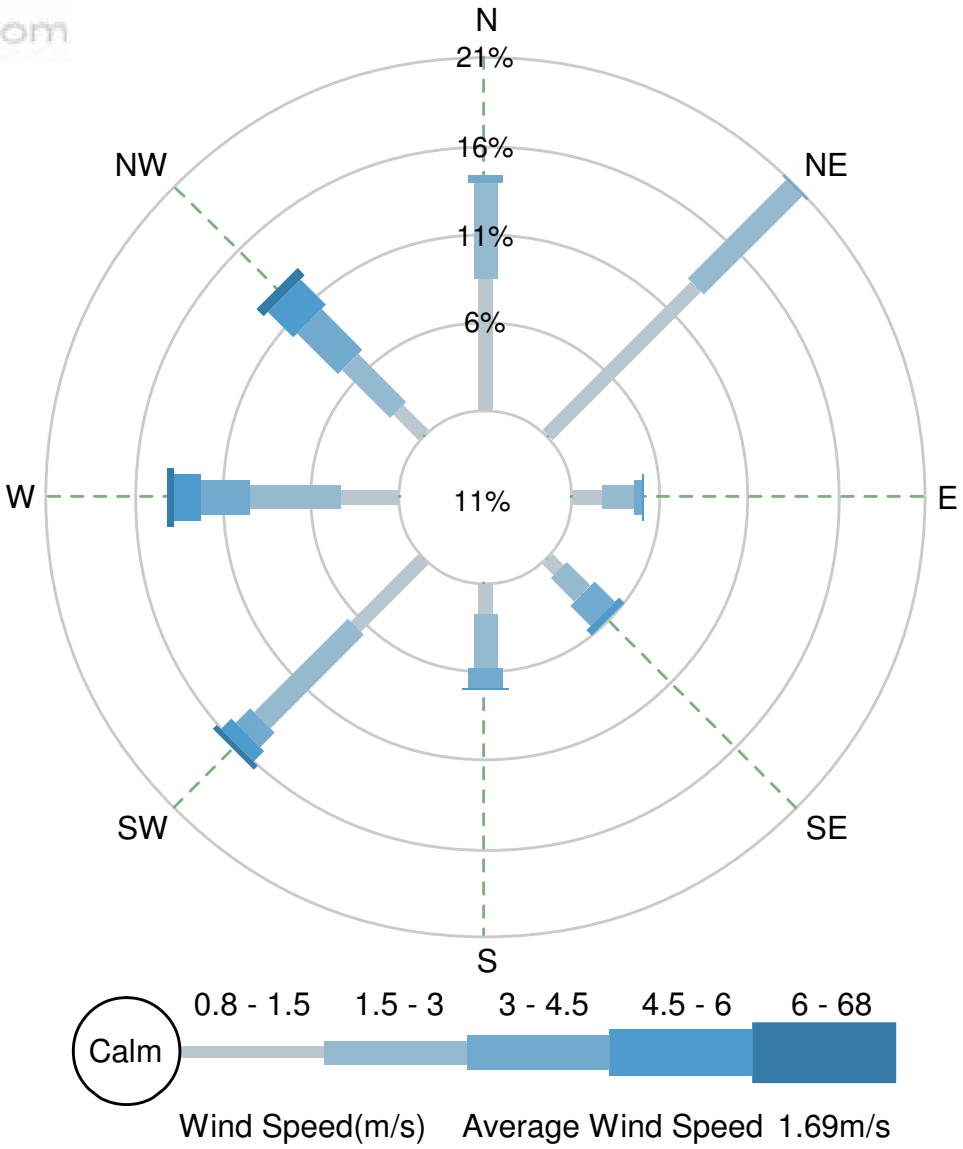
Unit Id	:	Whitehaven Master (Sentinex99)
Module Id	:	M2 (Templemore 10m)
Requested Report Date	:	2014/08/01
Requested Report Hour	:	00
Chart Available	:	no

Main Data Summary

Record Time	Temperature									Humidity			Prevailing Wind						
	2m			10m			60m						Speed			Gust	Dir	Rain	Solar Rad
	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max				Avg Max
					(°C)						(%)			(m/s)		(m/s)	(°)	(mm)	(W/m^2)
2014/07/01 00:00:00	5.9	-0.9	14.2	7.7	2.6	14.7	-99.0	-99.0	-99.0	80.1	51.7	97.1	0.6	0.0	1.0	4.5	338	0.0	98.7 643.6
2014/07/02 00:00:00	4.9	-2.6	14.0	6.8	-0.8	14.1	-99.0	-99.0	-99.0	82.8	51.5	98.4	0.1	0.0	0.0	6.1	130	0.0	120.5 475.6
2014/07/03 00:00:00	5.9	-3.3	18.0	8.0	-0.4	18.3	-99.0	-99.0	-99.0	79.9	38.6	97.3	0.2	0.0	2.3	3.4	71	0.0	120.1 478.7
2014/07/04 00:00:00	7.1	-2.5	19.3	9.3	0.4	19.1	-99.0	-99.0	-99.0	73.8	32.3	97.5	0.9	0.0	1.7	7.7	309	0.2	119.6 475.1
2014/07/05 00:00:00	8.8	1.0	18.4	10.5	4.1	17.9	-99.0	-99.0	-99.0	65.8	28.4	93.4	1.3	0.0	1.3	8.5	276	0.0	115.7 476.3
2014/07/06 00:00:00	8.2	2.7	13.7	9.2	5.5	13.1	-99.0	-99.0	-99.0	67.3	42.2	91.3	1.4	0.0	0.0	7.7	265	0.0	83.5 621.8
2014/07/07 00:00:00	8.1	0.3	14.8	9.3	3.7	14.9	-99.0	-99.0	-99.0	71.1	47.3	95.3	0.6	0.0	0.0	5.2	262	0.0	117.8 536.2
2014/07/08 00:00:00	4.9	-3.0	15.4	7.1	-0.3	15.7	-99.0	-99.0	-99.0	79.5	39.9	96.9	0.4	0.0	0.0	3.7	23	0.0	123.8 491.1
2014/07/09 00:00:00	8.8	-4.3	20.1	10.0	-1.6	19.6	-99.0	-99.0	-99.0	55.0	17.4	96.3	2.8	0.0	7.5	12.4	309	0.0	123.9 495.8
2014/07/10 00:00:00	7.8	1.2	13.1	9.0	6.3	12.6	-99.0	-99.0	-99.0	54.6	34.1	89.5	2.6	0.0	0.0	10.4	293	0.0	83.4 526.9
2014/07/11 00:00:00	6.1	-1.2	15.1	8.7	2.1	15.8	-99.0	-99.0	-99.0	71.4	41.1	94.0	0.5	0.0	1.2	4.5	343	0.0	124.4 494.2
2014/07/12 00:00:00	6.3	-2.8	16.3	8.0	-0.4	15.8	-99.0	-99.0	-99.0	70.6	35.1	97.6	0.9	0.0	1.3	6.6	286	0.0	124.7 591.3
2014/07/13 00:00:00	7.5	-2.4	14.2	8.8	1.6	14.2	-99.0	-99.0	-99.0	63.6	35.4	95.9	1.7	0.0	4.9	7.2	144	0.0	124.8 503.3
2014/07/14 00:00:00	7.2	-3.0	17.1	8.8	-1.3	17.0	-99.0	-99.0	-99.0	73.6	42.7	96.0	1.1	0.0	0.7	7.1	120	0.0	110.1 505.6
2014/07/15 00:00:00	12.7	6.3	18.7	13.7	8.5	18.4	-99.0	-99.0	-99.0	66.8	44.6	88.1	0.6	0.0	2.2	6.8	55	0.0	73.5 523.7
2014/07/16 00:00:00	13.4	9.5	17.1	13.8	10.6	16.7	-99.0	-99.0	-99.0	71.9	53.2	96.7	2.7	0.0	5.9	9.1	321	4.8	81.8 594.2
2014/07/17 00:00:00	11.4	6.8	16.9	11.7	7.7	16.2	-99.0	-99.0	-99.0	67.1	38.6	89.7	2.1	0.0	2.2	9.5	309	1.2	118.0 633.3
2014/07/18 00:00:00	7.1	1.5	11.3	7.9	5.5	10.8	-99.0	-99.0	-99.0	69.6	45.7	90.8	2.7	0.0	1.4	10.0	246	0.0	85.5 535.8
2014/07/19 00:00:00	4.7	-3.0	13.8	6.8	0.1	14.0	-99.0	-99.0	-99.0	75.8	39.3	96.4	0.4	0.0	1.1	6.6	168	0.0	131.3 510.8
2014/07/20 00:00:00	7.5	-3.0	16.5	8.5	-0.8	16.2	-99.0	-99.0	-99.0	74.4	50.4	97.3	1.6	0.0	2.8	7.3	146	0.0	117.9 594.0
2014/07/21 00:00:00	11.5	4.7	19.6	12.7	7.3	19.0	-99.0	-99.0	-99.0	73.6	43.8	95.6	1.1	0.0	0.0	7.4	127	0.0	92.7 596.0
2014/07/22 00:00:00	9.5	1.9	19.6	11.0	4.7	19.9	-99.0	-99.0	-99.0	78.5	39.9	97.9	0.4	0.0	0.0	6.6	174	0.0	127.1 498.5
2014/07/23 00:00:00	8.5	-0.8	19.0	10.4	2.7	18.5	-99.0	-99.0	-99.0	75.4	37.2	97.8	0.2	0.0	0.0	4.1	208	0.0	128.0 529.8
2014/07/24 00:00:00	12.6	5.6	20.6	14.1	7.8	20.6	-99.0	-99.0	-99.0	66.8	40.9	88.3	0.5	0.0	2.8	4.9	358	0.0	80.9 523.1

Continued on next page

Record Time	Temperature									Humidity			Prevailing Wind						
	2m			10m			60m						Speed			Gust	Dir	Rain	Solar Rad
	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max				Avg Max
					($^\circ C$)						(%)			(m/s)		(m/s)	($^\circ$)	(mm)	(W/m^2)
2014/07/25 00:00:00	15.7	6.1	22.7	16.7	8.7	21.9	-99.0	-99.0	-99.0	64.1	40.5	89.4	0.8	0.0	2.9	7.7	326	0.0	82.4 529.9
2014/07/26 00:00:00	13.0	5.2	19.0	14.3	9.1	18.8	-99.0	-99.0	-99.0	81.7	52.5	96.3	0.7	0.0	4.0	11.3	282	5.4	63.6 558.5
2014/07/27 00:00:00	8.6	1.2	18.1	10.4	4.3	18.1	-99.0	-99.0	-99.0	79.1	44.0	98.2	0.2	0.0	2.1	5.5	316	0.2	137.6 530.9
2014/07/28 00:00:00	8.1	0.2	17.8	10.0	3.2	17.6	-99.0	-99.0	-99.0	76.5	38.1	98.1	0.4	0.0	2.1	4.7	2	0.0	140.2 545.2
2014/07/29 00:00:00	8.7	-1.0	19.8	10.7	1.2	19.2	-99.0	-99.0	-99.0	69.0	27.8	97.3	1.0	0.0	2.6	6.9	335	0.2	139.8 540.7
2014/07/30 00:00:00	10.5	0.3	21.5	12.9	3.7	21.1	-99.0	-99.0	-99.0	60.6	26.2	93.3	1.2	0.0	1.7	7.4	325	0.0	138.3 534.2
2014/07/31 00:00:00	12.2	-0.2	22.9	13.9	2.9	22.2	-99.0	-99.0	-99.0	52.6	17.6	93.6	1.8	0.0	6.7	9.7	327	0.0	144.8 550.3



Sentinex99 - M2, Whitehaven Master - Wind Rose

Date/Time range = 20140701-00:00 till 20140731-23:59

Meteorological Daily Statistics Summary

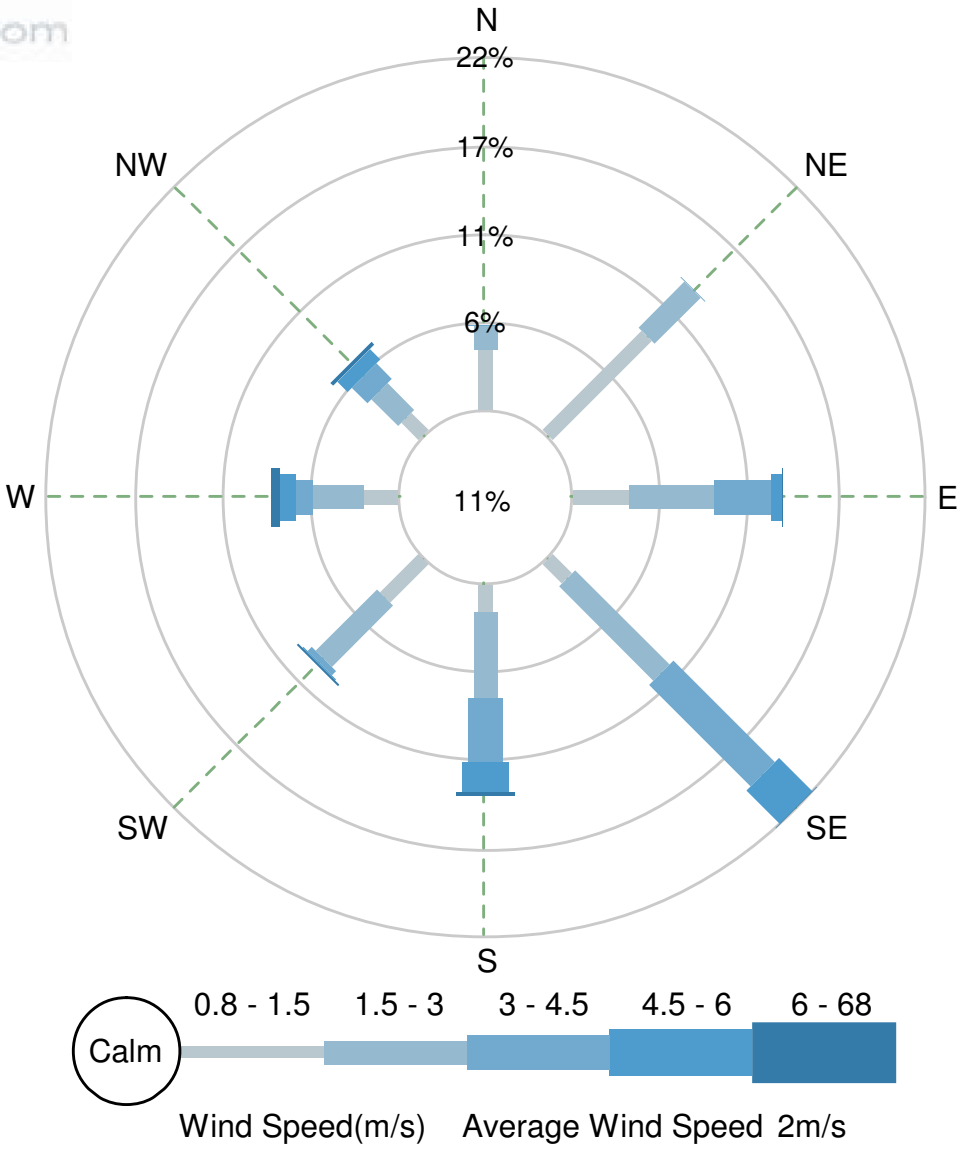
Unit Id	:	Whitehaven Master (Sentinex99)
Module Id	:	M2 (Templemore 10m)
Requested Report Date	:	2014/09/01
Requested Report Hour	:	00
Chart Available	:	no

Main Data Summary

Record Time	Temperature									Humidity			Prevailing Wind						
	2m			10m			60m						Speed			Gust	Dir	Rain	Solar Rad
	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max				Avg Max
					($°C$)						($\%$)			(m/s)		(m/s)	($°$)	(mm)	(W/m^2)
2014/08/01 00:00:00	13.3	3.3	19.6	14.5	6.2	18.7	-99.0	-99.0	-99.0	40.9	26.0	66.5	2.9	0.0	0.0	10.6	287	0.0	135.5 537.4
2014/08/02 00:00:00	4.3	-2.8	13.2	6.6	1.2	13.0	-99.0	-99.0	-99.0	67.1	34.9	90.5	0.4	0.0	0.0	5.3	175	0.0	150.0 565.0
2014/08/03 00:00:00	8.2	-3.5	17.4	9.6	0.7	17.4	-99.0	-99.0	-99.0	62.6	28.1	94.2	2.5	0.0	6.2	8.1	125	0.0	134.6 557.6
2014/08/04 00:00:00	11.0	4.1	19.2	12.4	6.6	19.0	-99.0	-99.0	-99.0	67.2	39.1	89.8	1.4	0.0	0.0	5.3	111	0.0	100.8 627.1
2014/08/05 00:00:00	10.5	2.8	19.9	12.0	5.6	19.6	-99.0	-99.0	-99.0	72.0	39.1	94.8	0.2	0.0	0.7	5.2	171	0.0	126.9 610.1
2014/08/06 00:00:00	9.1	-0.6	20.7	11.0	2.4	20.6	-99.0	-99.0	-99.0	65.9	28.0	97.0	0.8	0.0	0.9	6.8	329	0.0	149.4 563.1
2014/08/07 00:00:00	7.0	-2.9	20.0	9.8	1.1	19.5	-99.0	-99.0	-99.0	65.1	27.1	90.6	0.2	0.0	2.0	4.7	321	0.0	154.4 583.7
2014/08/08 00:00:00	7.3	-3.8	21.1	9.6	-0.9	20.7	-99.0	-99.0	-99.0	65.4	24.6	96.0	0.4	0.0	0.0	4.2	296	0.0	156.2 581.7
2014/08/09 00:00:00	8.5	-2.5	21.6	10.9	0.4	20.6	-99.0	-99.0	-99.0	64.7	28.7	94.2	0.9	0.0	1.0	8.5	294	0.0	152.5 571.9
2014/08/10 00:00:00	8.8	-1.6	21.3	11.1	1.5	20.3	-99.0	-99.0	-99.0	61.2	20.9	94.3	1.0	0.0	1.4	8.4	302	0.0	140.2 617.8
2014/08/11 00:00:00	7.0	-1.2	17.3	9.3	2.1	17.1	-99.0	-99.0	-99.0	61.5	25.9	89.9	0.4	0.0	1.7	4.8	172	0.0	156.8 586.0
2014/08/12 00:00:00	8.6	-3.5	18.8	10.1	0.3	18.2	-99.0	-99.0	-99.0	60.4	30.0	89.2	0.9	0.0	5.0	6.9	145	0.0	124.6 637.0
2014/08/13 00:00:00	11.9	5.2	18.8	12.4	7.0	18.6	-99.0	-99.0	-99.0	56.1	32.9	78.7	2.8	0.0	5.0	7.6	125	0.0	141.1 587.7
2014/08/14 00:00:00	10.9	2.7	19.7	12.3	5.4	19.3	-99.0	-99.0	-99.0	57.6	25.4	91.0	2.4	0.0	2.2	7.1	129	0.0	130.8 616.7
2014/08/15 00:00:00	13.7	3.4	21.0	14.8	7.3	21.2	-99.0	-99.0	-99.0	53.5	29.2	87.3	1.8	0.0	4.1	8.1	88	26.4	116.4 725.8
2014/08/16 00:00:00	12.6	10.1	15.7	13.1	11.0	16.1	-99.0	-99.0	-99.0	80.2	49.6	97.5	2.2	0.0	3.7	7.6	105	19.4	44.1 332.5
2014/08/17 00:00:00	11.6	5.8	16.6	11.7	8.3	15.3	-99.0	-99.0	-99.0	76.1	37.8	97.4	2.5	0.0	5.9	10.8	326	3.6	134.9 661.9
2014/08/18 00:00:00	10.8	8.4	13.0	10.9	8.5	13.1	-99.0	-99.0	-99.0	84.6	72.7	95.2	4.2	1.6	7.5	10.3	299	2.2	38.4 225.9
2014/08/19 00:00:00	10.6	4.5	12.8	11.1	7.5	13.0	-99.0	-99.0	-99.0	87.5	77.4	98.1	1.1	0.0	1.0	6.1	283	1.4	54.3 300.2
2014/08/20 00:00:00	9.6	1.2	17.8	10.9	4.1	17.1	-99.0	-99.0	-99.0	74.7	45.1	98.5	1.8	0.0	3.3	6.9	141	0.2	149.0 779.8
2014/08/21 00:00:00	12.3	6.2	19.5	12.9	7.7	19.2	-99.0	-99.0	-99.0	65.3	40.4	90.5	2.7	0.0	0.5	7.9	128	0.0	141.9 781.6
2014/08/22 00:00:00	12.6	4.5	20.1	13.5	7.2	19.8	-99.0	-99.0	-99.0	69.3	39.7	97.3	1.8	0.0	5.3	7.4	127	0.0	143.9 626.7
2014/08/23 00:00:00	12.6	6.2	19.9	13.8	9.0	19.8	-99.0	-99.0	-99.0	70.6	46.3	93.1	1.8	0.0	2.8	6.8	118	0.0	138.3 746.4
2014/08/24 00:00:00	11.7	3.2	20.3	13.5	6.4	20.0	-99.0	-99.0	-99.0	74.2	41.5	97.9	1.2	0.0	0.0	6.9	161	0.0	173.1 634.0

Continued on next page

Record Time	Temperature									Humidity			Prevailing Wind						
	2m			10m			60m						Speed			Gust	Dir	Rain	Solar Rad
	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max				Avg Max
					($°C$)						(%)			(m/s)		(m/s)	($°$)	(mm)	(W/m^2)
2014/08/25 00:00:00	11.0	2.2	20.5	12.8	5.4	20.4	-99.0	-99.0	-99.0	74.0	33.8	98.3	0.6	0.0	1.9	5.3	183	0.0	177.7 642.1
2014/08/26 00:00:00	11.1	2.2	19.4	12.1	5.2	18.7	-99.0	-99.0	-99.0	81.8	51.1	97.5	1.3	0.0	1.1	9.0	134	20.8	93.9 753.8
2014/08/27 00:00:00	11.9	10.0	15.7	12.2	10.2	15.8	-99.0	-99.0	-99.0	85.9	66.6	97.6	2.1	0.0	6.1	9.5	162	16.8	54.7 363.0
2014/08/28 00:00:00	12.2	4.5	18.6	12.9	7.3	18.3	-99.0	-99.0	-99.0	73.9	48.7	98.0	3.4	0.0	6.7	10.6	159	0.0	127.4 712.5
2014/08/29 00:00:00	9.5	1.4	17.4	10.9	3.9	17.1	-99.0	-99.0	-99.0	73.7	43.0	97.8	1.9	0.0	0.7	9.2	144	0.0	175.5 741.1
2014/08/30 00:00:00	10.1	1.6	18.4	11.6	4.1	18.1	-99.0	-99.0	-99.0	78.1	54.5	98.2	1.9	0.0	0.0	9.1	156	0.0	174.7 687.0
2014/08/31 00:00:00	11.2	2.8	20.5	12.7	5.2	19.7	-99.0	-99.0	-99.0	79.6	47.3	98.2	0.5	0.0	2.5	5.0	196	0.0	186.4 666.1



Sentinex99 - M2, Whitehaven Master - Wind Rose

Date/Time range = 20140801-00:00 till 20140831-23:59

Meteorological Daily Statistics Summary

Unit Id	:	Whitehaven Master (Sentinex99)
Module Id	:	M2 (Templemore 10m)
Requested Report Date	:	2014/10/01
Requested Report Hour	:	00
Chart Available	:	no

Main Data Summary

Record Time	Temperature									Humidity			Prevailing Wind						
	2m			10m			60m						Speed			Gust	Dir	Rain	Solar Rad
	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max				Avg Max
					(°C)						(%)			(m/s)		(m/s)	(°)	(mm)	(W/m^2)
2014/09/01 00:00:00	14.1	3.5	22.5	15.2	6.3	21.7	-99.0	-99.0	-99.0	62.1	31.7	97.3	1.4	0.0	6.4	9.0	321	0.0	188.5 686.1
2014/09/02 00:00:00	11.4	4.8	16.6	12.9	8.7	16.5	-99.0	-99.0	-99.0	63.7	42.5	84.0	2.1	0.0	8.8	12.2	254	0.2	105.7 780.7
2014/09/03 00:00:00	9.4	1.6	16.8	10.5	4.6	16.1	-99.0	-99.0	-99.0	56.0	21.2	92.5	2.6	0.0	1.8	10.9	230	0.0	201.0 708.5
2014/09/04 00:00:00	8.5	-0.6	16.8	10.0	1.9	17.4	-99.0	-99.0	-99.0	67.0	36.5	94.1	0.1	0.0	0.0	5.3	150	0.0	183.7 785.7
2014/09/05 00:00:00	9.2	1.0	17.6	10.9	4.1	17.0	-99.0	-99.0	-99.0	72.2	44.9	96.1	1.8	0.0	0.7	9.7	150	0.0	165.5 815.9
2014/09/06 00:00:00	11.3	0.5	20.3	12.4	3.7	20.0	-99.0	-99.0	-99.0	66.3	35.9	97.3	2.9	0.0	6.0	8.9	118	0.0	188.1 738.6
2014/09/07 00:00:00	14.4	8.1	21.4	14.9	9.4	21.2	-99.0	-99.0	-99.0	55.7	32.2	76.9	3.6	0.9	5.8	8.0	118	0.0	183.7 706.4
2014/09/08 00:00:00	14.6	3.3	22.5	15.8	6.9	22.1	-99.0	-99.0	-99.0	62.0	36.6	94.5	1.0	0.0	3.5	6.8	98	0.0	185.8 701.2
2014/09/09 00:00:00	17.7	8.0	25.5	18.4	9.8	24.4	-99.0	-99.0	-99.0	55.0	32.9	84.8	1.4	0.0	3.0	7.3	358	0.0	201.0 714.0
2014/09/10 00:00:00	17.7	6.0	22.9	18.6	9.8	22.0	-99.0	-99.0	-99.0	52.7	29.2	88.7	2.8	0.5	9.5	14.1	302	0.2	196.0 775.6
2014/09/11 00:00:00	12.4	3.5	23.0	14.5	7.4	22.6	-99.0	-99.0	-99.0	65.6	29.4	94.4	0.2	0.0	1.8	6.5	235	0.0	212.2 731.4
2014/09/12 00:00:00	12.6	2.1	23.6	14.6	5.2	23.2	-99.0	-99.0	-99.0	64.1	25.5	95.5	0.6	0.0	1.2	8.3	169	0.0	211.6 760.5
2014/09/13 00:00:00	14.1	3.3	24.8	15.6	6.8	23.8	-99.0	-99.0	-99.0	65.8	29.9	96.9	1.1	0.0	0.0	8.2	286	0.0	199.4 853.9
2014/09/14 00:00:00	14.8	4.4	25.5	16.6	7.6	24.7	-99.0	-99.0	-99.0	61.8	27.1	94.4	1.4	0.0	3.5	9.2	306	0.0	213.5 738.4
2014/09/15 00:00:00	15.7	3.7	26.8	17.2	7.1	26.0	-99.0	-99.0	-99.0	51.3	16.9	90.2	0.7	0.0	1.4	9.9	304	0.0	215.0 756.1
2014/09/16 00:00:00	17.3	6.7	24.7	18.4	12.6	23.7	-99.0	-99.0	-99.0	44.3	22.9	83.9	2.9	0.0	1.4	12.7	306	0.0	216.2 749.6
2014/09/17 00:00:00	13.2	3.6	22.2	14.7	7.6	21.1	-99.0	-99.0	-99.0	54.1	24.9	92.8	1.7	0.0	1.9	8.7	253	0.0	199.0 851.0
2014/09/18 00:00:00	10.8	0.5	21.4	13.0	4.8	20.7	-99.0	-99.0	-99.0	52.6	18.5	91.1	1.1	0.0	1.4	10.3	231	0.0	226.6 767.2
2014/09/19 00:00:00	9.6	-1.7	20.5	11.5	2.2	19.0	-99.0	-99.0	-99.0	51.1	14.0	90.2	0.4	0.0	0.0	7.3	213	0.0	189.9 952.8
2014/09/20 00:00:00	11.6	-0.6	22.2	13.4	2.4	21.6	-99.0	-99.0	-99.0	47.3	14.7	87.4	1.1	0.0	4.4	7.6	143	0.0	229.6 773.4
2014/09/21 00:00:00	14.7	5.4	21.9	15.6	8.7	21.1	-99.0	-99.0	-99.0	49.9	24.1	84.0	2.1	0.0	5.4	8.4	140	0.0	185.2 896.0
2014/09/22 00:00:00	16.1	8.1	24.1	17.0	10.0	23.4	-99.0	-99.0	-99.0	51.3	24.4	76.7	2.1	0.0	2.8	11.1	118	0.0	206.2 875.2
2014/09/23 00:00:00	16.9	7.7	26.1	18.2	10.9	26.0	-99.0	-99.0	-99.0	48.8	18.1	85.4	1.4	0.0	4.9	6.8	95	0.0	217.1 802.7
2014/09/24 00:00:00	18.9	10.0	26.4	19.7	14.7	25.4	-99.0	-99.0	-99.0	47.3	26.1	72.8	0.9	0.0	2.7	10.1	9	0.0	207.4 878.0

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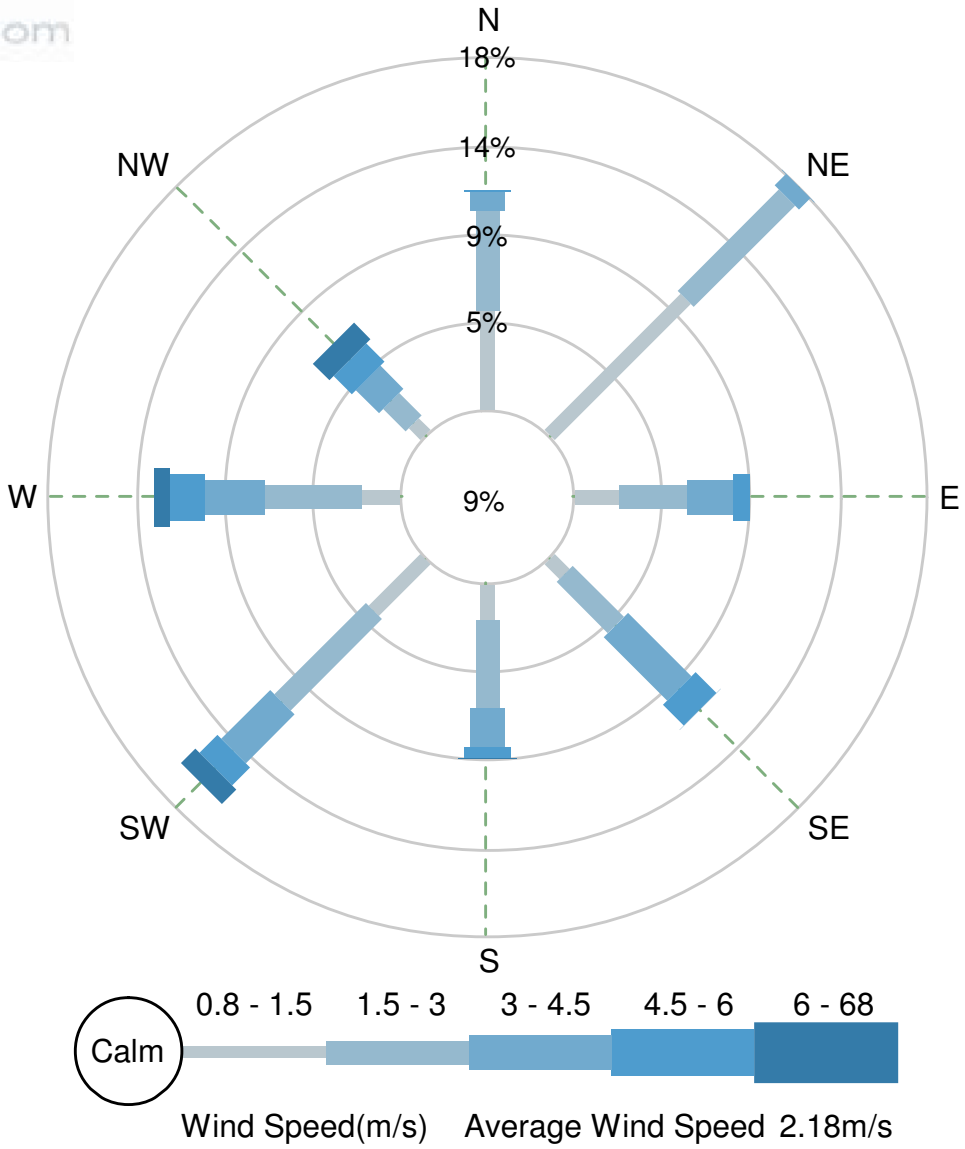
Record Time	Temperature									Humidity			Prevailing Wind						
	2m			10m			60m						Speed			Gust	Dir	Rain	Solar Rad
	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max				Avg Max
					($°C$)						(%)			(m/s)		(m/s)	($°$)	(mm)	(W/m^2)
2014/09/25 00:00:00	16.6	14.1	20.9	16.9	14.6	20.8	-99.0	-99.0	-99.0	80.7	54.1	96.7	2.3	0.0	8.8	12.0	274	10.6	99.3 755.1
2014/09/26 00:00:00	16.5	9.3	22.9	17.2	12.5	22.3	-99.0	-99.0	-99.0	65.6	34.3	91.0	1.4	0.0	0.9	7.3	198	0.0	228.1 894.4
2014/09/27 00:00:00	13.8	5.2	22.4	15.4	8.5	21.9	-99.0	-99.0	-99.0	67.6	36.1	96.3	0.5	0.0	0.6	7.1	196	0.0	234.2 788.2
2014/09/28 00:00:00	15.5	4.3	25.6	17.0	7.0	24.9	-99.0	-99.0	-99.0	61.8	27.6	96.1	0.3	0.0	1.3	7.1	305	0.0	238.9 819.0
2014/09/29 00:00:00	17.9	5.7	28.4	19.4	8.7	27.9	-99.0	-99.0	-99.0	56.8	24.8	92.3	0.6	0.0	5.0	9.2	302	0.0	235.7 796.4
2014/09/30 00:00:00	22.0	9.7	31.7	22.9	12.0	30.9	-99.0	-99.0	-99.0	46.8	20.9	88.9	1.8	0.0	6.9	9.8	327	0.0	190.9 867.2



Sentinex99 - M2, Whitehaven Master - Wind Rose

Date/Time range = 20140901-00:00 till 20140930-23:59

Meteorological Daily Statistics Summary

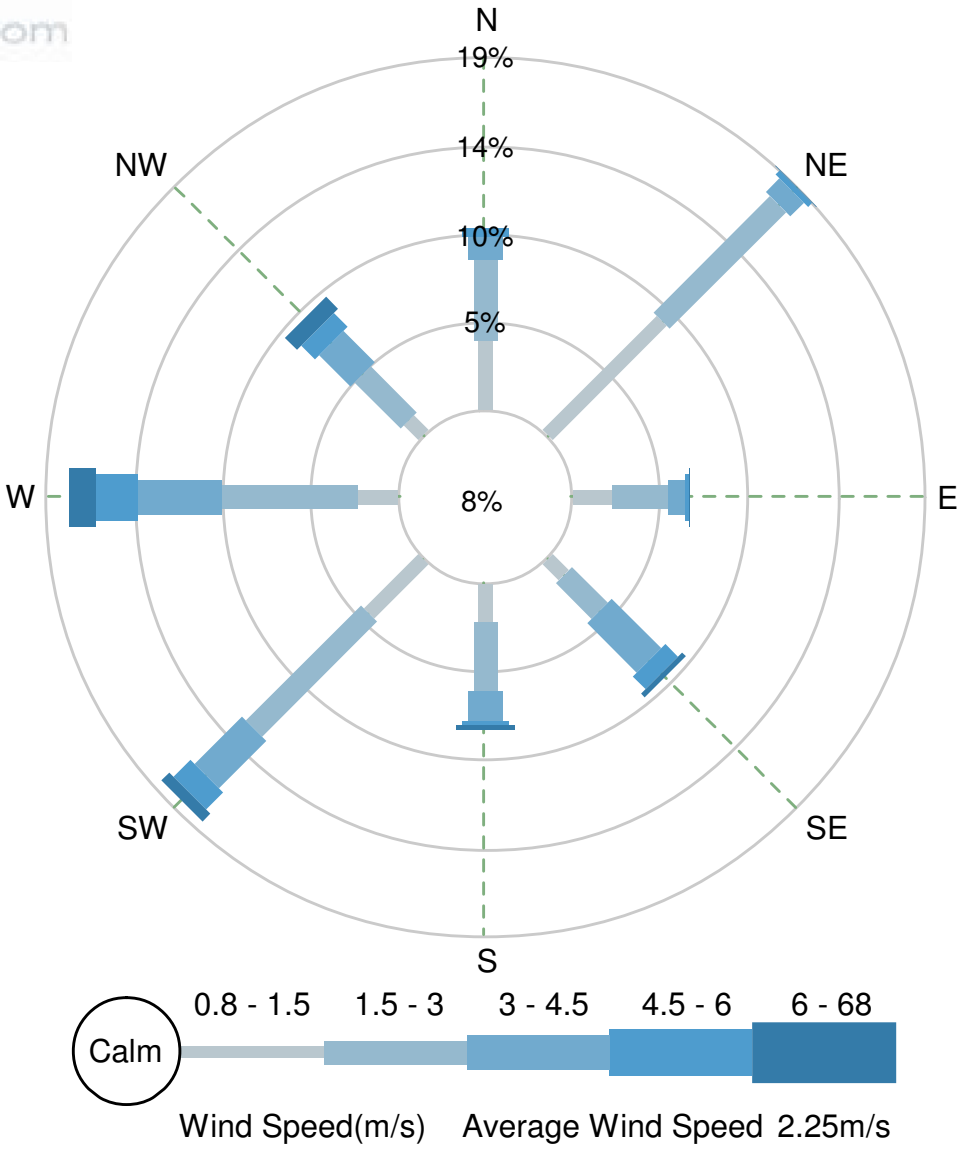
Unit Id	:	Whitehaven Master (Sentinex99)
Module Id	:	M2 (Templemore 10m)
Requested Report Date	:	2014/11/01
Requested Report Hour	:	00
Chart Available	:	no

Main Data Summary

Record Time	Temperature									Humidity			Prevailing Wind						
	2m			10m			60m						Speed			Gust	Dir	Rain	Solar Rad
	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max				Avg	Max
					(°C)						(%)			(m/s)		(m/s)	(°)	(mm)	(W/m^2)	
2014/10/01 00:00:00	17.9	3.7	25.6	19.1	8.8	26.4	-99.0	-99.0	-99.0	35.5	17.5	70.8	2.1	0.0	1.7	9.8	238	0.0	248.2	833.3
2014/10/02 00:00:00	13.6	1.9	25.2	15.4	5.4	24.5	-99.0	-99.0	-99.0	52.0	21.5	83.8	0.5	0.0	1.9	6.9	247	0.0	247.8	824.6
2014/10/03 00:00:00	16.5	3.7	28.0	18.2	7.0	27.9	-99.0	-99.0	-99.0	46.0	15.1	87.2	0.2	0.0	1.7	6.1	295	0.0	253.6	837.5
2014/10/04 00:00:00	18.2	4.6	29.6	19.6	8.3	29.0	-99.0	-99.0	-99.0	51.0	22.0	81.6	1.0	0.0	2.7	8.7	286	0.0	228.4	865.9
2014/10/05 00:00:00	21.7	10.7	30.7	22.9	13.8	29.9	-99.0	-99.0	-99.0	47.2	21.5	84.7	1.2	0.0	1.9	8.1	311	0.0	258.6	825.9
2014/10/06 00:00:00	21.7	9.0	32.5	23.0	11.6	31.8	-99.0	-99.0	-99.0	43.1	14.9	80.7	1.0	0.0	2.4	9.2	19	0.0	249.7	837.9
2014/10/07 00:00:00	25.2	16.6	33.6	25.6	19.3	32.7	-99.0	-99.0	-99.0	33.2	19.0	51.1	2.9	0.0	8.8	13.2	310	0.0	207.3	1004.2
2014/10/08 00:00:00	17.8	6.1	26.9	19.2	10.0	26.3	-99.0	-99.0	-99.0	47.5	23.8	85.5	1.5	0.0	5.2	7.7	215	0.0	237.2	833.3
2014/10/09 00:00:00	17.9	7.0	27.6	19.0	9.6	26.7	-99.0	-99.0	-99.0	53.7	22.5	96.4	0.8	0.0	5.5	7.1	163	0.0	258.3	849.0
2014/10/10 00:00:00	19.3	8.7	29.5	20.4	11.5	28.7	-99.0	-99.0	-99.0	50.2	24.8	84.2	0.2	0.0	2.5	6.3	286	0.0	255.3	856.7
2014/10/11 00:00:00	20.7	11.0	30.7	22.0	13.6	29.7	-99.0	-99.0	-99.0	48.0	20.8	75.2	0.4	0.0	2.8	7.2	271	0.0	245.3	855.4
2014/10/12 00:00:00	22.6	13.3	30.2	23.0	15.5	28.9	-99.0	-99.0	-99.0	46.5	30.1	68.2	0.7	0.0	8.0	10.2	26	1.4	176.5	1013.5
2014/10/13 00:00:00	20.9	15.6	26.3	21.1	16.1	25.6	-99.0	-99.0	-99.0	62.7	39.1	97.6	2.1	0.0	2.8	13.8	15	19.2	122.7	907.9
2014/10/14 00:00:00	13.5	8.1	17.5	13.4	8.7	16.4	-99.0	-99.0	-99.0	50.4	24.1	97.6	3.9	0.8	9.5	12.1	264	0.2	198.0	1029.9
2014/10/15 00:00:00	15.9	7.6	20.9	17.1	11.8	20.3	-99.0	-99.0	-99.0	50.8	28.3	86.1	0.0	0.0	1.7	0.0	-99	0.0	207.5	850.8
2014/10/16 00:00:00	14.9	3.9	24.5	16.1	6.2	23.5	-99.0	-99.0	-99.0	49.8	16.1	92.4	1.1	0.0	2.4	7.9	286	0.0	273.4	883.4
2014/10/17 00:00:00	15.4	3.6	24.4	16.4	6.8	23.7	-99.0	-99.0	-99.0	50.0	20.4	88.9	1.4	0.0	4.8	7.2	155	0.0	275.7	885.7
2014/10/18 00:00:00	16.9	6.7	25.9	17.9	8.5	25.4	-99.0	-99.0	-99.0	51.0	18.7	91.1	1.8	0.0	0.0	10.3	135	0.0	272.4	891.4
2014/10/19 00:00:00	18.6	7.2	30.1	19.7	9.6	29.0	-99.0	-99.0	-99.0	51.4	20.9	90.1	0.2	0.0	2.2	5.5	104	0.0	268.7	867.6
2014/10/20 00:00:00	21.1	9.1	32.4	21.6	11.3	31.5	-99.0	-99.0	-99.0	48.0	19.0	82.9	1.9	0.0	7.7	11.3	150	0.0	264.1	902.3
2014/10/21 00:00:00	20.3	9.8	28.0	20.4	12.2	27.4	-99.0	-99.0	-99.0	52.1	29.9	90.1	3.1	0.0	6.0	8.6	137	0.0	263.1	852.5
2014/10/22 00:00:00	20.6	10.7	29.9	21.0	12.3	28.9	-99.0	-99.0	-99.0	50.2	28.3	77.6	0.6	0.0	4.0	7.7	125	0.0	266.7	855.0
2014/10/23 00:00:00	23.7	16.0	32.0	24.1	16.8	30.5	-99.0	-99.0	-99.0	44.2	24.9	67.2	0.3	0.0	7.5	10.9	267	3.6	245.7	866.9
2014/10/24 00:00:00	25.5	14.1	34.8	25.9	16.5	33.9	-99.0	-99.0	-99.0	41.9	19.3	87.6	1.0	0.0	5.1	9.0	337	0.2	234.0	886.4

Continued on next page

Record Time	Temperature									Humidity			Prevailing Wind						
	2m			10m			60m						Speed			Gust	Dir	Rain	Solar Rad
	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max				Avg Max
					($°C$)						(%)			(m/s)		(m/s)	($°$)	(mm)	(W/m^2)
2014/10/25 00:00:00	27.8	15.1	35.8	28.9	18.9	35.1	-99.0	-99.0	-99.0	30.9	13.5	73.0	0.3	0.0	5.6	8.5	48	0.0	253.9 890.9
2014/10/26 00:00:00	29.2	17.4	39.4	30.4	22.7	38.1	-99.0	-99.0	-99.0	25.6	9.2	47.6	1.8	0.0	1.8	12.5	285	0.0	252.9 871.5
2014/10/27 00:00:00	25.8	12.8	38.3	27.1	15.7	36.7	-99.0	-99.0	-99.0	32.5	12.8	66.0	2.4	0.0	1.3	13.0	258	0.0	189.2 996.8
2014/10/28 00:00:00	21.8	9.1	31.7	22.7	12.6	30.3	-99.0	-99.0	-99.0	30.0	10.5	68.6	2.1	0.0	1.7	8.4	240	0.0	295.7 930.2
2014/10/29 00:00:00	20.0	7.3	31.6	21.6	11.0	30.7	-99.0	-99.0	-99.0	36.2	16.1	64.5	0.3	0.0	0.8	8.4	152	0.0	288.5 906.0
2014/10/30 00:00:00	22.1	9.9	33.8	23.6	12.8	32.7	-99.0	-99.0	-99.0	38.1	16.7	66.3	0.7	0.0	1.9	8.1	309	0.0	269.3 969.2
2014/10/31 00:00:00	25.1	10.9	36.6	25.7	13.1	35.5	-99.0	-99.0	-99.0	38.1	15.6	69.8	1.5	0.0	11.8	18.1	311	0.0	256.2 952.4



Sentinex99 - M2, Whitehaven Master - Wind Rose

Date/Time range = 20141001-00:00 till 20141031-23:59

Meteorological Daily Statistics Summary

Unit Id	:	Whitehaven Master (Sentinex99)
Module Id	:	M2 (Templemore 10m)
Requested Report Date	:	2014/12/01
Requested Report Hour	:	00
Chart Available	:	no

Main Data Summary

Record Time	Temperature									Humidity			Prevailing Wind						
	2m			10m			60m						Speed			Gust	Dir	Rain	Solar Rad
	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max				Avg	Max
					($°C$)						(%)			(m/s)		(m/s)	($°$)	(mm)	(W/m^2)	
2014/11/01 00:00:00	25.9	19.5	33.4	26.0	20.2	32.7	-99.0	-99.0	-99.0	49.5	27.3	85.2	2.7	0.6	10.1	18.5	343	2.6	219.2	901.5
2014/11/02 00:00:00	17.8	8.4	25.9	18.8	12.5	25.0	-99.0	-99.0	-99.0	35.1	10.7	68.5	2.0	0.0	0.0	7.4	210	0.0	284.1	968.3
2014/11/03 00:00:00	18.6	5.1	29.4	20.0	9.1	28.3	-99.0	-99.0	-99.0	43.4	13.0	82.7	1.2	0.0	5.7	7.7	126	0.0	292.6	916.2
2014/11/04 00:00:00	22.2	15.9	29.3	22.7	17.9	28.2	-99.0	-99.0	-99.0	45.8	24.5	64.5	1.0	0.0	2.2	8.9	12	0.0	211.6	1024.6
2014/11/05 00:00:00	22.3	14.5	32.4	22.6	15.1	30.9	-99.0	-99.0	-99.0	51.4	24.8	97.2	1.7	0.0	14.1	20.6	358	6.4	245.2	965.3
2014/11/06 00:00:00	20.5	11.4	30.2	21.0	13.0	28.9	-99.0	-99.0	-99.0	60.9	30.6	96.7	1.0	0.0	0.0	9.2	245	0.0	273.5	988.8
2014/11/07 00:00:00	21.4	9.8	31.2	22.3	12.3	30.3	-99.0	-99.0	-99.0	48.3	16.1	94.7	1.8	0.0	4.2	9.3	153	0.0	276.2	933.5
2014/11/08 00:00:00	24.3	13.0	33.8	25.1	15.4	32.7	-99.0	-99.0	-99.0	45.8	18.6	90.0	0.6	0.0	4.3	7.3	158	0.0	297.1	929.3
2014/11/09 00:00:00	25.7	13.3	36.0	26.5	15.8	35.0	-99.0	-99.0	-99.0	38.1	17.9	70.1	0.5	0.0	5.5	8.9	290	0.0	290.0	929.4
2014/11/10 00:00:00	29.5	18.5	37.3	29.6	21.3	35.9	-99.0	-99.0	-99.0	31.9	15.5	64.0	1.9	0.0	1.5	11.2	305	0.0	281.2	903.8
2014/11/11 00:00:00	25.0	14.4	35.5	24.8	15.8	34.6	-99.0	-99.0	-99.0	52.5	17.8	90.8	2.5	0.0	8.8	12.4	165	0.0	292.6	914.6
2014/11/12 00:00:00	25.2	13.5	34.3	25.2	14.8	33.0	-99.0	-99.0	-99.0	45.7	18.9	82.4	1.7	0.3	6.2	8.7	143	0.0	297.3	914.9
2014/11/13 00:00:00	27.1	16.4	36.5	27.4	18.2	35.2	-99.0	-99.0	-99.0	40.8	14.4	76.6	0.4	0.0	1.3	6.8	214	0.0	296.7	910.9
2014/11/14 00:00:00	30.7	21.2	38.6	30.7	23.9	37.5	-99.0	-99.0	-99.0	34.9	16.0	58.8	2.0	0.7	6.7	10.0	343	0.0	287.9	892.6
2014/11/15 00:00:00	34.7	23.1	42.3	35.0	27.8	41.0	-99.0	-99.0	-99.0	21.5	11.7	43.0	2.6	0.0	8.3	12.2	297	0.0	248.1	924.7
2014/11/16 00:00:00	24.9	18.7	31.9	24.9	19.4	30.8	-99.0	-99.0	-99.0	42.8	21.0	68.9	3.2	0.0	7.9	12.5	250	0.0	216.1	952.8
2014/11/17 00:00:00	22.4	11.5	32.7	22.8	14.5	31.3	-99.0	-99.0	-99.0	38.5	14.4	75.2	1.3	0.0	2.5	7.2	233	0.0	312.6	951.7
2014/11/18 00:00:00	22.5	10.9	32.4	23.9	14.8	30.9	-99.0	-99.0	-99.0	28.2	8.7	58.6	1.2	0.0	2.2	10.1	249	0.0	308.1	961.7
2014/11/19 00:00:00	24.6	11.2	35.5	25.6	13.6	34.5	-99.0	-99.0	-99.0	32.6	12.7	56.5	0.9	0.0	6.3	9.5	157	0.0	292.1	1048.3
2014/11/20 00:00:00	29.9	21.8	37.3	29.6	21.7	35.7	-99.0	-99.0	-99.0	37.0	17.6	64.8	2.2	0.6	6.5	10.3	343	0.0	275.7	1088.5
2014/11/21 00:00:00	31.7	21.0	39.7	32.0	26.0	38.7	-99.0	-99.0	-99.0	33.1	8.9	55.7	3.0	0.0	0.6	12.2	330	0.0	268.3	991.5
2014/11/22 00:00:00	30.2	15.7	41.3	31.4	18.4	39.9	-99.0	-99.0	-99.0	26.8	11.4	56.3	1.5	0.0	2.8	10.2	289	0.0	310.1	942.6
2014/11/23 00:00:00	31.9	19.7	42.8	32.4	22.2	41.1	-99.0	-99.0	-99.0	29.8	12.0	58.1	1.1	0.0	11.4	15.4	14	0.8	281.6	986.2
2014/11/24 00:00:00	30.4	21.5	40.1	30.3	22.3	39.1	-99.0	-99.0	-99.0	46.9	20.7	94.6	3.0	0.0	1.2	13.6	332	6.0	241.9	1136.7

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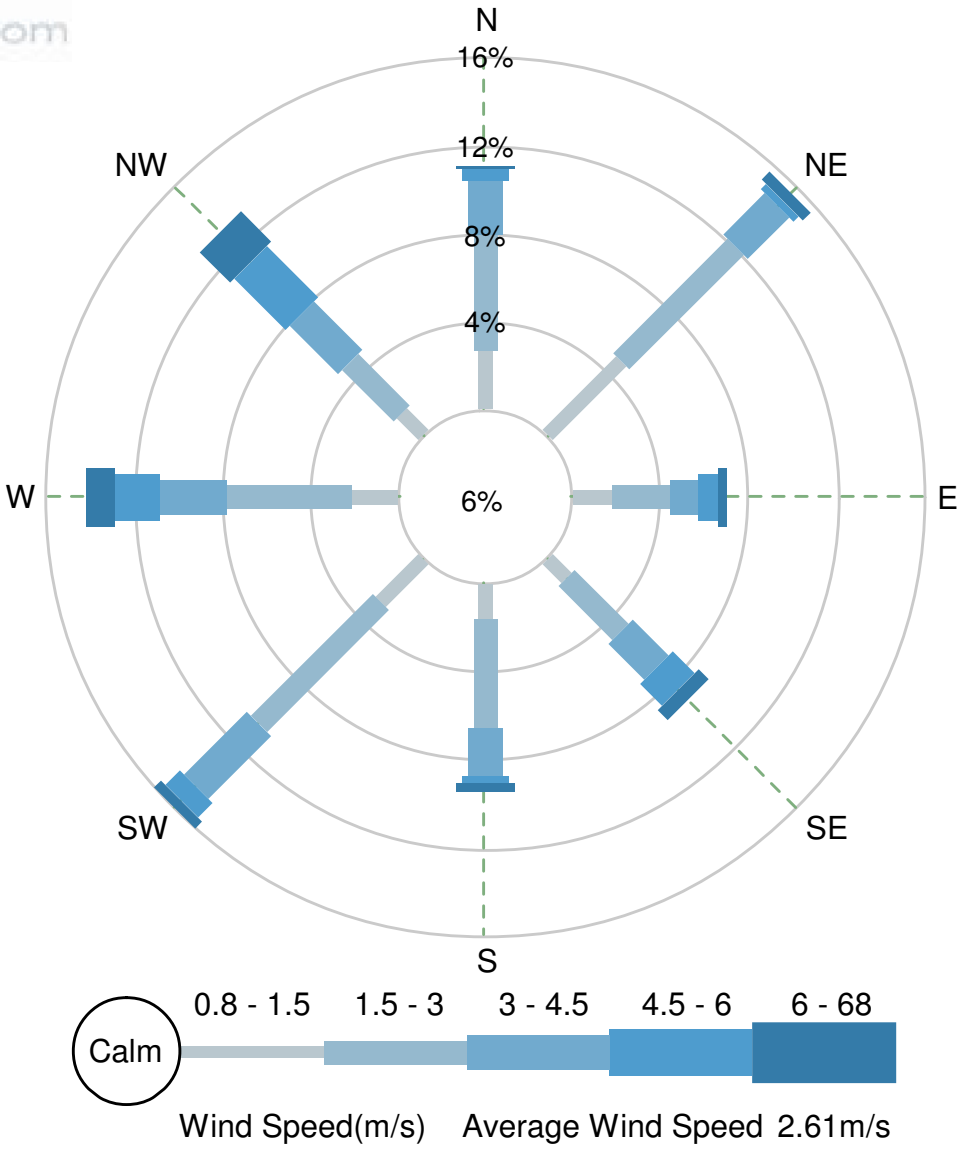
Record Time	Temperature									Humidity			Prevailing Wind						
	2m			10m			60m						Speed			Gust	Dir	Rain	Solar Rad
	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max				Avg Max
					($°C$)						(%)			(m/s)		(m/s)	($°$)	(mm)	(W/m^2)
2014/11/25 00:00:00	24.1	18.2	28.7	24.3	20.9	27.8	-99.0	-99.0	-99.0	68.2	45.7	92.1	1.2	0.0	1.1	6.4	220	0.6	162.4 872.8
2014/11/26 00:00:00	24.1	15.8	32.2	24.5	16.9	31.2	-99.0	-99.0	-99.0	54.3	31.2	84.7	1.6	0.0	0.7	7.9	299	0.0	177.3 912.0
2014/11/27 00:00:00	23.9	11.5	34.2	24.3	13.9	32.8	-99.0	-99.0	-99.0	46.7	16.2	80.9	1.7	0.0	9.5	12.9	138	0.0	310.7 960.4
2014/11/28 00:00:00	25.2	14.3	33.3	25.0	15.6	32.1	-99.0	-99.0	-99.0	40.7	16.1	80.1	2.4	0.1	8.8	11.6	137	0.0	309.8 949.6
2014/11/29 00:00:00	24.8	20.3	33.4	24.6	20.7	31.6	-99.0	-99.0	-99.0	47.2	24.4	61.2	0.5	0.0	10.1	13.8	51	0.0	243.1 1020.2
2014/11/30 00:00:00	25.7	15.2	33.6	25.7	17.7	31.7	-99.0	-99.0	-99.0	44.4	23.3	81.2	1.2	0.0	5.4	10.0	349	0.0	262.8 1013.3



Sentinex99 - M2, Whitehaven Master - Wind Rose

Date/Time range = 20141101-00:00 till 20141130-23:59

Meteorological Daily Statistics Summary

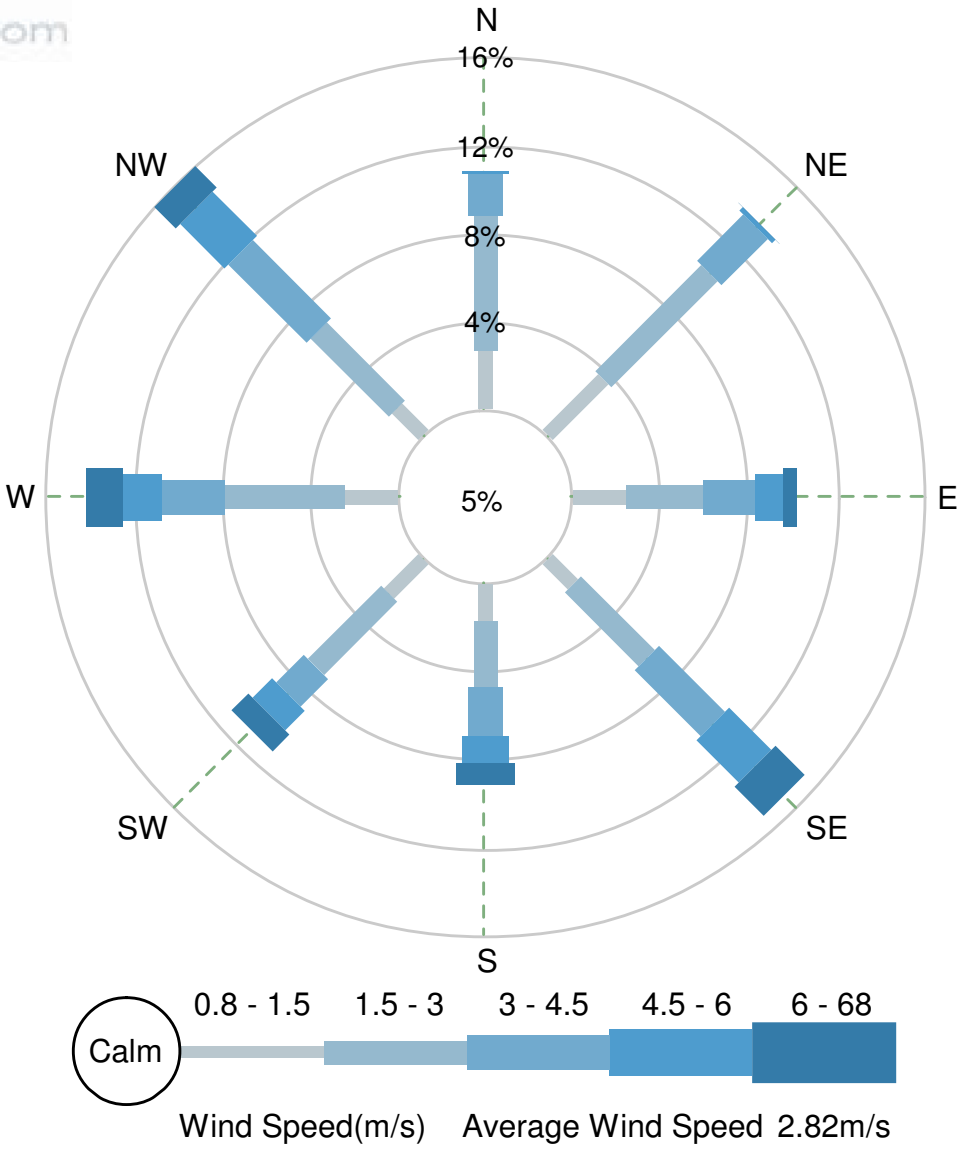
Unit Id	:	Whitehaven Master (Sentinex99)
Module Id	:	M2 (Templemore 10m)
Requested Report Date	:	2015/01/01
Requested Report Hour	:	00
Chart Available	:	no

Main Data Summary

Record Time	Temperature									Humidity			Prevailing Wind			Gust	Dir	Rain	Solar Rad	
	2m			10m			60m						Speed							
	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max				Avg	Max
					(°C)						(%)			(m/s)		(m/s)	(°)	(mm)	(W/m^2)	
2014/12/01 00:00:00	26.3	17.3	31.3	26.1	19.3	30.4	-99.0	-99.0	-99.0	44.3	29.3	79.0	1.9	0.0	7.4	10.0	323	0.0	203.9	982.7
2014/12/02 00:00:00	28.2	18.2	36.1	28.0	19.5	34.5	-99.0	-99.0	-99.0	39.4	22.2	70.6	1.8	0.0	6.1	10.3	320	0.0	294.9	941.6
2014/12/03 00:00:00	30.7	23.2	37.3	30.2	24.3	35.5	-99.0	-99.0	-99.0	35.2	19.9	57.4	2.0	0.0	8.5	11.5	317	0.0	285.8	1075.1
2014/12/04 00:00:00	25.5	17.8	33.9	25.4	19.1	32.6	-99.0	-99.0	-99.0	60.4	28.8	97.5	0.7	0.0	10.5	15.6	279	17.0	138.5	904.3
2014/12/05 00:00:00	25.1	18.3	34.2	24.7	18.7	33.0	-99.0	-99.0	-99.0	64.8	27.7	96.0	0.7	0.0	11.7	15.7	290	6.6	244.0	1002.6
2014/12/06 00:00:00	23.3	18.6	30.5	23.1	19.0	29.2	-99.0	-99.0	-99.0	66.2	38.2	95.1	1.4	0.0	8.3	11.8	22	13.4	215.4	1207.5
2014/12/07 00:00:00	23.2	15.8	34.5	23.0	16.8	33.2	-99.0	-99.0	-99.0	73.6	26.4	96.9	1.0	0.0	2.0	23.7	284	0.2	243.1	1059.1
2014/12/08 00:00:00	26.4	19.7	34.0	26.4	19.9	32.5	-99.0	-99.0	-99.0	56.1	24.0	92.1	2.2	0.0	1.5	11.2	307	0.2	209.1	1008.2
2014/12/09 00:00:00	26.6	19.8	35.2	26.9	21.6	34.1	-99.0	-99.0	-99.0	53.4	23.0	76.8	0.6	0.0	3.2	14.6	61	0.0	239.1	1121.3
2014/12/10 00:00:00	28.4	18.3	38.0	28.3	19.6	36.9	-99.0	-99.0	-99.0	49.5	19.5	85.8	0.4	0.0	11.5	16.8	252	0.0	297.6	957.3
2014/12/11 00:00:00	25.0	18.2	32.1	25.0	18.4	31.5	-99.0	-99.0	-99.0	63.8	29.8	98.4	2.1	0.4	9.1	18.5	173	17.6	162.8	896.4
2014/12/12 00:00:00	20.3	15.6	25.9	20.2	16.0	25.1	-99.0	-99.0	-99.0	55.0	37.9	75.4	5.9	3.3	9.6	14.9	149	0.0	223.3	1070.2
2014/12/13 00:00:00	21.1	12.5	27.9	21.0	14.3	27.0	-99.0	-99.0	-99.0	48.1	28.8	79.1	3.9	0.0	7.5	11.9	122	0.0	285.6	1040.9
2014/12/14 00:00:00	22.3	14.1	30.5	22.6	14.7	30.1	-99.0	-99.0	-99.0	45.1	21.4	72.3	1.6	0.0	2.9	8.4	131	0.0	320.5	1001.5
2014/12/15 00:00:00	24.1	11.6	33.7	25.0	14.4	32.8	-99.0	-99.0	-99.0	41.2	17.1	80.9	1.0	0.0	1.8	13.1	154	0.0	305.2	961.3
2014/12/16 00:00:00	26.6	15.3	36.1	27.2	16.9	35.4	-99.0	-99.0	-99.0	39.2	15.6	66.6	1.8	0.0	8.7	16.0	329	0.0	193.1	1028.8
2014/12/17 00:00:00	29.9	17.0	38.8	30.7	20.9	37.8	-99.0	-99.0	-99.0	34.6	12.1	75.0	2.3	0.0	6.3	12.7	294	0.0	277.2	1009.8
2014/12/18 00:00:00	26.6	18.1	34.8	27.2	19.9	33.3	-99.0	-99.0	-99.0	39.6	14.2	74.4	2.5	0.0	0.9	16.9	289	0.6	180.2	935.4
2014/12/19 00:00:00	24.7	13.9	33.5	25.5	19.6	31.8	-99.0	-99.0	-99.0	31.8	10.6	63.4	2.2	0.0	1.3	12.3	262	0.0	324.6	959.5
2014/12/20 00:00:00	23.5	10.7	33.7	24.3	13.7	32.6	-99.0	-99.0	-99.0	42.7	15.6	89.2	0.9	0.0	6.1	7.7	194	0.0	323.9	964.2
2014/12/21 00:00:00	27.4	19.1	35.3	27.3	20.3	33.8	-99.0	-99.0	-99.0	45.4	19.2	74.7	1.1	0.0	3.7	9.1	85	0.0	298.1	1070.3
2014/12/22 00:00:00	29.1	21.8	36.2	28.8	22.9	34.5	-99.0	-99.0	-99.0	42.4	24.8	65.3	1.5	0.1	8.2	11.6	16	0.0	306.9	1033.7
2014/12/23 00:00:00	24.4	19.2	29.7	24.3	19.6	27.9	-99.0	-99.0	-99.0	62.8	45.6	95.2	1.1	0.0	4.0	10.6	353	5.2	160.4	992.6
2014/12/24 00:00:00	26.9	18.3	35.4	26.8	19.3	34.3	-99.0	-99.0	-99.0	57.2	29.3	93.5	0.5	0.0	9.6	13.0	134	0.0	260.9	1014.1

Continued on next page

Record Time	Temperature									Humidity			Prevailing Wind						
	2m			10m			60m						Speed			Gust	Dir	Rain	Solar Rad
	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max				Avg	Max
					($°C$)						(%)			(m/s)		(m/s)	($°$)	(mm)	(W/m^2)	
2014/12/25 00:00:00	25.5	19.2	33.6	25.6	20.4	32.4	-99.0	-99.0	-99.0	67.5	35.7	98.1	1.2	0.0	3.9	14.0	318	11.2	164.0	979.7
2014/12/26 00:00:00	25.0	20.3	32.7	25.2	20.6	31.7	-99.0	-99.0	-99.0	64.3	24.0	96.4	1.3	0.0	4.3	9.6	266	6.8	194.3	1010.0
2014/12/27 00:00:00	21.5	18.2	26.0	21.6	18.4	25.4	-99.0	-99.0	-99.0	69.0	53.4	86.0	2.8	0.0	6.4	8.4	142	0.0	92.8	452.5
2014/12/28 00:00:00	19.0	16.6	20.8	19.1	16.7	21.0	-99.0	-99.0	-99.0	82.7	64.9	94.7	2.9	1.2	5.3	7.2	129	15.2	68.6	347.8
2014/12/29 00:00:00	23.9	17.4	32.5	23.9	18.2	31.2	-99.0	-99.0	-99.0	66.8	34.3	95.5	0.5	0.0	0.0	6.3	303	0.4	257.7	1044.6
2014/12/30 00:00:00	27.1	16.4	35.7	27.8	20.7	34.8	-99.0	-99.0	-99.0	42.9	15.1	81.5	2.9	0.0	2.2	12.5	283	0.0	306.3	1079.1
2014/12/31 00:00:00	24.0	11.1	35.0	25.5	14.8	34.2	-99.0	-99.0	-99.0	43.5	13.5	82.4	0.9	0.0	2.3	7.6	142	0.0	330.0	985.3



Sentinex99 - M2, Whitehaven Master - Wind Rose

Date/Time range = 20141201-00:00 till 20141231-23:59

Meteorological Daily Statistics Summary

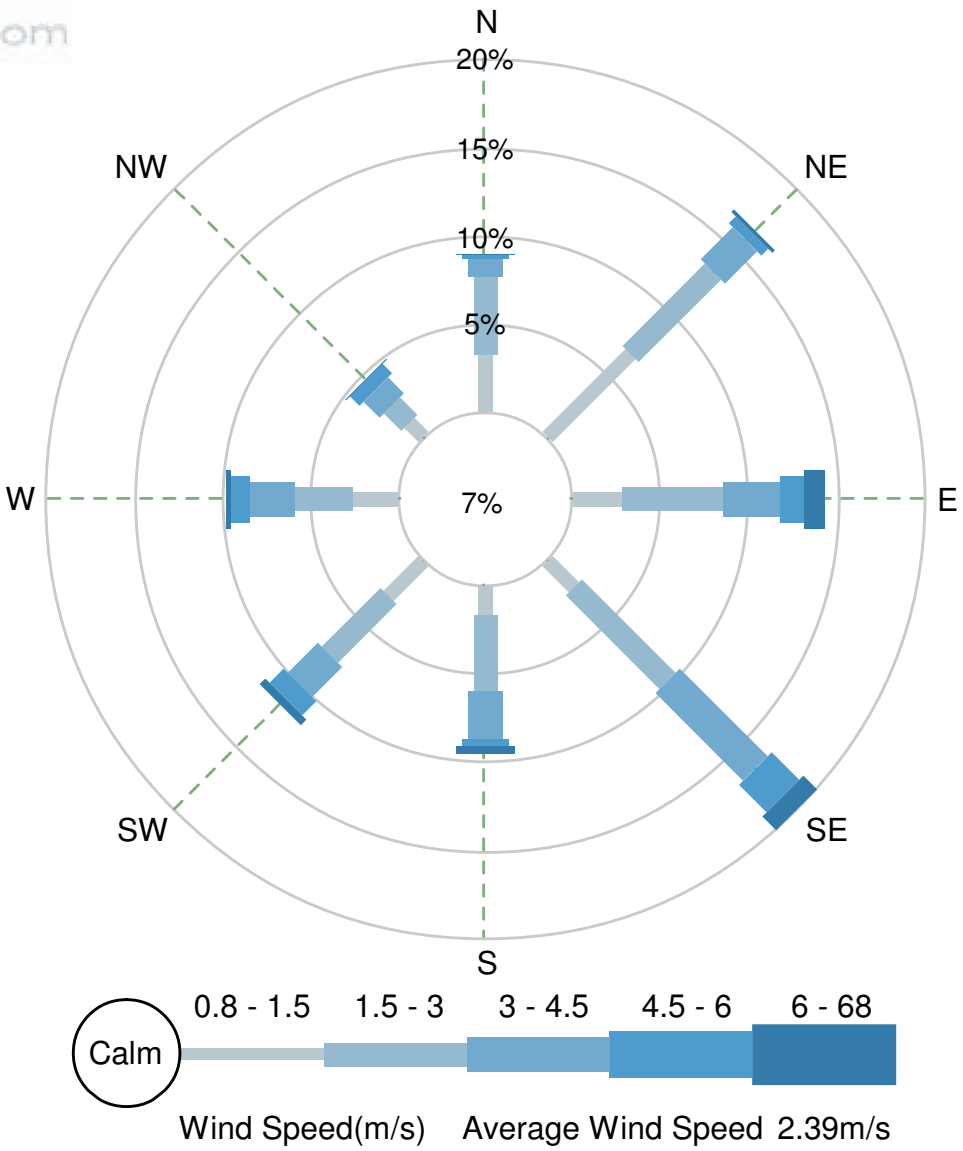
Unit Id	:	Whitehaven Master (Sentinex99)
Module Id	:	M2 (Templemore 10m)
Requested Report Date	:	2015/02/01
Requested Report Hour	:	00
Chart Available	:	no

Main Data Summary

Record Time	Temperature									Humidity			Prevailing Wind			Gust	Dir	Rain	Solar Rad	
	2m			10m			60m						Speed							
	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max				Avg	Max
					(°C)						(%)			(m/s)		(m/s)	(°)	(mm)	(W/m^2)	
2015/01/01 00:00:00	28.6	19.0	36.9	29.0	21.9	36.1	-99.0	-99.0	-99.0	46.5	21.0	80.6	0.5	0.0	7.4	9.7	353	0.0	284.9	1047.6
2015/01/02 00:00:00	22.2	17.4	28.2	22.7	18.1	28.6	-99.0	-99.0	-99.0	71.8	38.3	98.2	2.7	0.6	10.2	14.4	97	31.0	107.7	880.1
2015/01/03 00:00:00	26.8	19.2	34.2	27.1	20.9	33.7	-99.0	-99.0	-99.0	56.4	27.8	88.1	0.8	0.0	4.8	6.1	54	0.0	291.8	1017.7
2015/01/04 00:00:00	26.0	19.5	32.4	26.3	21.6	32.0	-99.0	-99.0	-99.0	61.1	38.6	87.9	0.5	0.0	1.2	10.3	44	0.0	254.0	1102.0
2015/01/05 00:00:00	24.2	19.5	29.4	24.7	21.2	29.3	-99.0	-99.0	-99.0	71.4	49.9	95.5	0.7	0.0	1.4	6.8	121	5.2	150.9	637.5
2015/01/06 00:00:00	25.7	17.8	32.1	26.2	19.8	31.8	-99.0	-99.0	-99.0	59.4	32.3	91.5	2.2	0.0	2.9	8.7	109	0.0	293.4	994.9
2015/01/07 00:00:00	25.8	17.3	31.9	26.3	19.2	31.6	-99.0	-99.0	-99.0	51.8	29.8	89.2	2.0	0.0	5.7	8.4	110	0.0	312.1	1010.3
2015/01/08 00:00:00	26.5	17.5	34.3	26.9	19.3	33.2	-99.0	-99.0	-99.0	49.0	23.8	80.4	0.6	0.0	0.0	6.3	97	0.0	312.9	955.2
2015/01/09 00:00:00	27.7	19.4	34.6	28.1	21.8	33.8	-99.0	-99.0	-99.0	47.5	26.5	76.1	1.0	0.0	2.8	6.8	13	0.0	258.0	1054.4
2015/01/10 00:00:00	27.5	23.9	33.3	27.7	24.8	32.4	-99.0	-99.0	-99.0	52.5	35.8	77.1	1.1	0.0	5.4	9.6	39	1.2	186.9	1076.9
2015/01/11 00:00:00	24.8	22.2	28.4	24.9	22.7	28.2	-99.0	-99.0	-99.0	70.2	52.7	89.8	1.4	0.0	4.4	8.0	124	0.2	105.8	629.7
2015/01/12 00:00:00	23.8	21.1	28.0	23.7	20.9	27.5	-99.0	-99.0	-99.0	73.5	56.8	90.6	2.6	0.0	5.2	7.5	131	0.2	140.3	1034.6
2015/01/13 00:00:00	26.8	22.0	31.2	26.6	22.3	30.1	-99.0	-99.0	-99.0	60.0	46.9	72.0	0.9	0.6	4.3	6.6	68	0.0	125.4	877.6
2015/01/14 00:00:00	28.2	20.6	35.1	28.2	22.2	34.0	-99.0	-99.0	-99.0	58.4	30.4	89.2	2.8	0.8	8.0	12.2	291	0.6	204.3	1008.4
2015/01/15 00:00:00	23.9	14.6	33.1	24.5	17.3	31.9	-99.0	-99.0	-99.0	56.2	24.7	93.2	1.6	0.0	0.0	9.6	232	0.0	309.3	978.2
2015/01/16 00:00:00	24.4	13.0	34.4	25.5	17.2	32.7	-99.0	-99.0	-99.0	41.4	13.1	84.3	1.6	0.0	2.3	10.1	259	0.0	318.8	951.6
2015/01/17 00:00:00	24.9	11.3	36.3	26.1	14.2	34.7	-99.0	-99.0	-99.0	35.8	14.1	69.6	1.0	0.0	0.0	9.0	202	0.0	319.4	957.3
2015/01/18 00:00:00	25.4	12.7	36.1	26.7	16.4	35.0	-99.0	-99.0	-99.0	33.2	9.9	70.9	1.3	0.0	0.0	8.4	202	0.0	322.2	976.2
2015/01/19 00:00:00	24.8	13.0	35.1	25.5	16.2	34.0	-99.0	-99.0	-99.0	44.6	22.7	70.6	2.7	0.0	9.6	12.6	135	0.0	269.1	1041.4
2015/01/20 00:00:00	24.3	18.8	33.6	24.4	19.4	33.0	-99.0	-99.0	-99.0	57.3	26.8	91.0	3.0	0.4	13.7	24.6	82	11.4	205.4	1108.5
2015/01/21 00:00:00	24.6	18.4	31.0	24.6	19.4	30.4	-99.0	-99.0	-99.0	60.0	35.5	89.1	1.4	0.0	0.7	9.1	34	1.8	237.2	1210.2
2015/01/22 00:00:00	25.7	17.9	33.1	25.9	19.4	32.3	-99.0	-99.0	-99.0	59.5	32.0	94.4	2.3	0.0	7.1	9.6	113	0.0	264.2	1115.9
2015/01/23 00:00:00	25.3	20.3	29.3	25.6	21.9	28.8	-99.0	-99.0	-99.0	61.0	42.9	88.8	1.4	0.0	1.0	6.6	73	0.0	123.9	556.2
2015/01/24 00:00:00	26.9	15.9	36.2	27.2	17.6	35.0	-99.0	-99.0	-99.0	53.6	19.7	95.3	0.2	0.0	3.8	8.2	129	0.0	299.5	911.9

Continued on next page

Record Time	Temperature									Humidity			Prevailing Wind						
	2m			10m			60m						Speed			Gust	Dir	Rain	Solar Rad
	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max				Avg Max
					($°C$)						($\%$)			(m/s)		(m/s)	($°$)	(mm)	(W/m^2)
2015/01/25 00:00:00	29.7	21.0	37.8	29.5	21.6	36.5	-99.0	-99.0	-99.0	46.6	21.1	81.4	2.2	0.0	3.6	10.1	247	0.0	262.6 1040.1
2015/01/26 00:00:00	26.6	17.5	38.1	26.9	20.2	36.5	-99.0	-99.0	-99.0	55.8	14.5	91.3	1.9	0.0	9.8	14.1	153	7.8	226.3 1017.6
2015/01/27 00:00:00	21.7	18.2	31.3	21.8	18.3	30.2	-99.0	-99.0	-99.0	77.3	42.9	97.5	2.0	0.0	11.6	15.7	117	38.8	104.9 932.4
2015/01/28 00:00:00	19.7	14.7	24.4	19.8	16.1	23.5	-99.0	-99.0	-99.0	72.0	55.2	95.8	3.2	0.0	8.6	11.5	148	0.0	173.3 1030.6
2015/01/29 00:00:00	19.8	12.9	26.9	20.2	14.1	26.2	-99.0	-99.0	-99.0	61.8	30.4	92.7	1.7	0.0	1.5	11.4	162	0.0	271.6 1009.8
2015/01/30 00:00:00	20.3	10.6	29.9	21.4	12.7	28.9	-99.0	-99.0	-99.0	59.5	23.3	95.2	1.8	0.0	0.9	10.3	273	0.0	269.0 1067.6
2015/01/31 00:00:00	21.1	10.0	31.0	22.5	13.3	29.7	-99.0	-99.0	-99.0	48.4	15.7	89.7	1.4	0.0	2.1	9.4	262	0.0	308.1 943.8



Sentinex99 - M2, Whitehaven Master - Wind Rose

Date/Time range = 20150101-00:00 till 20150131-23:59

Meteorological Daily Statistics Summary

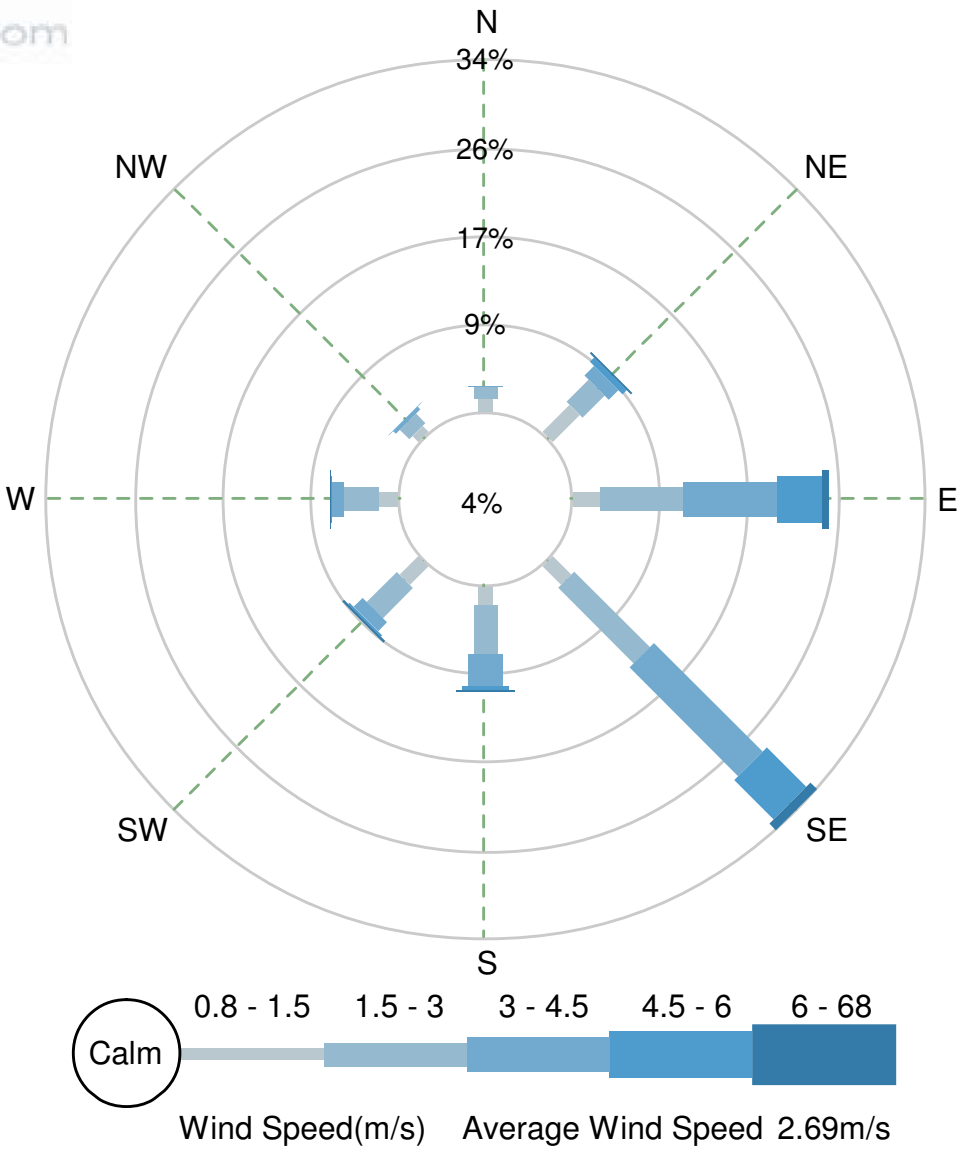
Unit Id	:	Whitehaven Master (Sentinex99)
Module Id	:	M2 (Templemore 10m)
Requested Report Date	:	2015/03/01
Requested Report Hour	:	00
Chart Available	:	no

Main Data Summary

Record Time	Temperature									Humidity			Prevailing Wind						
	2m			10m			60m						Speed			Gust	Dir	Rain	Solar Rad
	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max				Avg	Max
					($°C$)						(%)			(m/s)		(m/s)	($°$)	(mm)	(W/m^2)	
2015/02/01 00:00:00	22.1	10.1	32.7	23.4	12.8	31.6	-99.0	-99.0	-99.0	46.7	18.7	84.7	0.1	0.0	4.7	8.3	109	0.0	298.6	937.9
2015/02/02 00:00:00	23.4	18.7	30.5	23.5	19.6	29.7	-99.0	-99.0	-99.0	55.6	28.8	77.4	3.6	0.8	8.6	11.6	113	0.0	229.0	1118.8
2015/02/03 00:00:00	21.7	16.2	27.4	21.6	16.8	26.1	-99.0	-99.0	-99.0	55.5	37.2	79.5	3.4	0.6	6.9	9.8	129	0.0	230.0	1068.2
2015/02/04 00:00:00	21.8	11.4	29.6	22.1	13.8	28.9	-99.0	-99.0	-99.0	50.6	26.8	89.6	3.0	0.0	6.4	9.3	122	0.0	296.2	931.3
2015/02/05 00:00:00	23.3	13.8	30.8	23.3	16.1	29.6	-99.0	-99.0	-99.0	48.7	29.3	78.3	4.0	0.0	6.8	11.4	122	0.0	286.3	929.4
2015/02/06 00:00:00	23.4	15.9	30.4	23.3	16.5	29.7	-99.0	-99.0	-99.0	48.2	22.0	76.5	3.5	0.7	6.0	10.8	120	0.0	295.6	924.2
2015/02/07 00:00:00	24.0	15.3	33.0	24.3	16.2	31.7	-99.0	-99.0	-99.0	46.0	24.3	73.7	1.2	0.0	3.1	7.4	124	0.0	294.1	909.9
2015/02/08 00:00:00	25.5	13.9	36.9	26.4	16.5	35.4	-99.0	-99.0	-99.0	44.0	18.9	79.4	0.1	0.0	1.2	8.5	258	0.0	288.1	983.7
2015/02/09 00:00:00	27.7	16.2	36.8	28.4	19.5	35.7	-99.0	-99.0	-99.0	39.2	18.4	71.7	2.6	0.0	6.9	9.6	116	0.0	269.6	894.0
2015/02/10 00:00:00	27.1	18.7	34.1	27.2	20.5	32.9	-99.0	-99.0	-99.0	44.5	25.9	73.0	3.3	0.0	6.7	10.1	114	0.0	247.2	1015.2
2015/02/11 00:00:00	26.2	17.5	35.4	26.2	19.2	34.2	-99.0	-99.0	-99.0	46.4	23.1	75.9	3.0	0.0	5.8	9.0	117	1.0	265.0	1024.1
2015/02/12 00:00:00	26.4	18.0	34.3	26.4	19.0	33.3	-99.0	-99.0	-99.0	45.6	21.5	74.1	1.0	0.0	8.5	10.9	142	0.0	256.8	987.3
2015/02/13 00:00:00	26.8	21.4	33.2	26.6	21.7	32.2	-99.0	-99.0	-99.0	40.4	15.3	60.5	2.8	0.6	8.5	11.9	117	0.0	235.9	998.9
2015/02/14 00:00:00	26.2	18.1	33.0	26.4	19.5	32.4	-99.0	-99.0	-99.0	40.9	22.7	67.9	1.4	0.0	4.2	7.6	122	0.0	242.6	1055.9
2015/02/15 00:00:00	25.1	16.8	33.9	25.2	18.8	32.1	-99.0	-99.0	-99.0	49.5	26.6	83.5	0.6	0.0	9.9	14.9	27	2.4	235.5	949.8
2015/02/16 00:00:00	24.2	14.3	33.5	24.7	16.4	32.6	-99.0	-99.0	-99.0	57.3	25.8	95.5	0.8	0.0	4.3	6.8	191	0.0	258.0	962.3
2015/02/17 00:00:00	26.4	18.9	33.9	26.6	20.1	32.8	-99.0	-99.0	-99.0	46.0	22.8	75.9	1.7	0.0	6.3	8.5	90	0.0	231.1	1015.5
2015/02/18 00:00:00	26.4	14.6	34.6	26.5	17.4	33.8	-99.0	-99.0	-99.0	37.7	18.1	68.9	1.9	0.0	7.1	9.6	92	0.0	270.6	889.6
2015/02/19 00:00:00	26.9	19.5	35.1	26.7	20.5	34.3	-99.0	-99.0	-99.0	44.4	25.3	62.0	3.0	0.5	7.5	9.8	105	0.0	234.6	988.3
2015/02/20 00:00:00	23.4	18.5	28.7	23.5	19.9	27.8	-99.0	-99.0	-99.0	66.4	46.2	91.3	2.9	0.0	2.4	7.7	127	2.2	94.7	539.5
2015/02/21 00:00:00	24.7	19.8	30.3	24.6	20.5	29.3	-99.0	-99.0	-99.0	67.6	44.0	94.0	3.4	0.0	7.1	10.9	127	0.0	146.7	636.8
2015/02/22 00:00:00	26.8	19.8	34.5	26.6	20.7	33.2	-99.0	-99.0	-99.0	57.1	33.0	83.6	2.9	0.0	6.6	10.8	137	0.0	236.9	1050.4
2015/02/23 00:00:00	27.6	18.0	35.9	27.5	19.6	34.8	-99.0	-99.0	-99.0	52.0	25.0	87.4	2.5	0.0	5.9	9.3	149	0.0	253.9	969.6
2015/02/24 00:00:00	26.5	17.8	35.4	26.8	20.3	34.3	-99.0	-99.0	-99.0	53.6	25.8	83.2	2.2	0.0	7.5	11.1	138	2.0	225.1	855.6

Continued on next page

Record Time	Temperature									Humidity			Prevailing Wind						
	2m			10m			60m						Speed			Gust	Dir	Rain	Solar Rad
	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max				Avg Max
					($°C$)						(%)			(m/s)		(m/s)	($°$)	(mm)	(W/m^2)
2015/02/25 00:00:00	25.9	16.7	35.6	25.8	18.4	34.6	-99.0	-99.0	-99.0	55.6	22.0	91.2	1.3	0.0	6.9	10.3	161	0.4	247.9 845.5
2015/02/26 00:00:00	25.4	19.5	33.4	25.1	19.7	32.2	-99.0	-99.0	-99.0	63.3	34.2	90.0	0.2	0.0	8.4	14.3	96	0.6	187.6 877.1
2015/02/27 00:00:00	24.6	17.0	32.6	24.6	18.0	31.7	-99.0	-99.0	-99.0	63.5	32.5	95.5	1.2	0.0	4.2	7.7	159	0.4	202.6 1104.4
2015/02/28 00:00:00	27.2	18.9	34.1	27.3	20.6	33.0	-99.0	-99.0	-99.0	52.1	31.7	79.6	0.4	0.0	0.9	7.3	137	0.0	183.3 949.9



Sentinex99 - M2, Whitehaven Master - Wind Rose

Date/Time range = 20150201-00:00 till 20150228-23:59

Meteorological Daily Statistics Summary

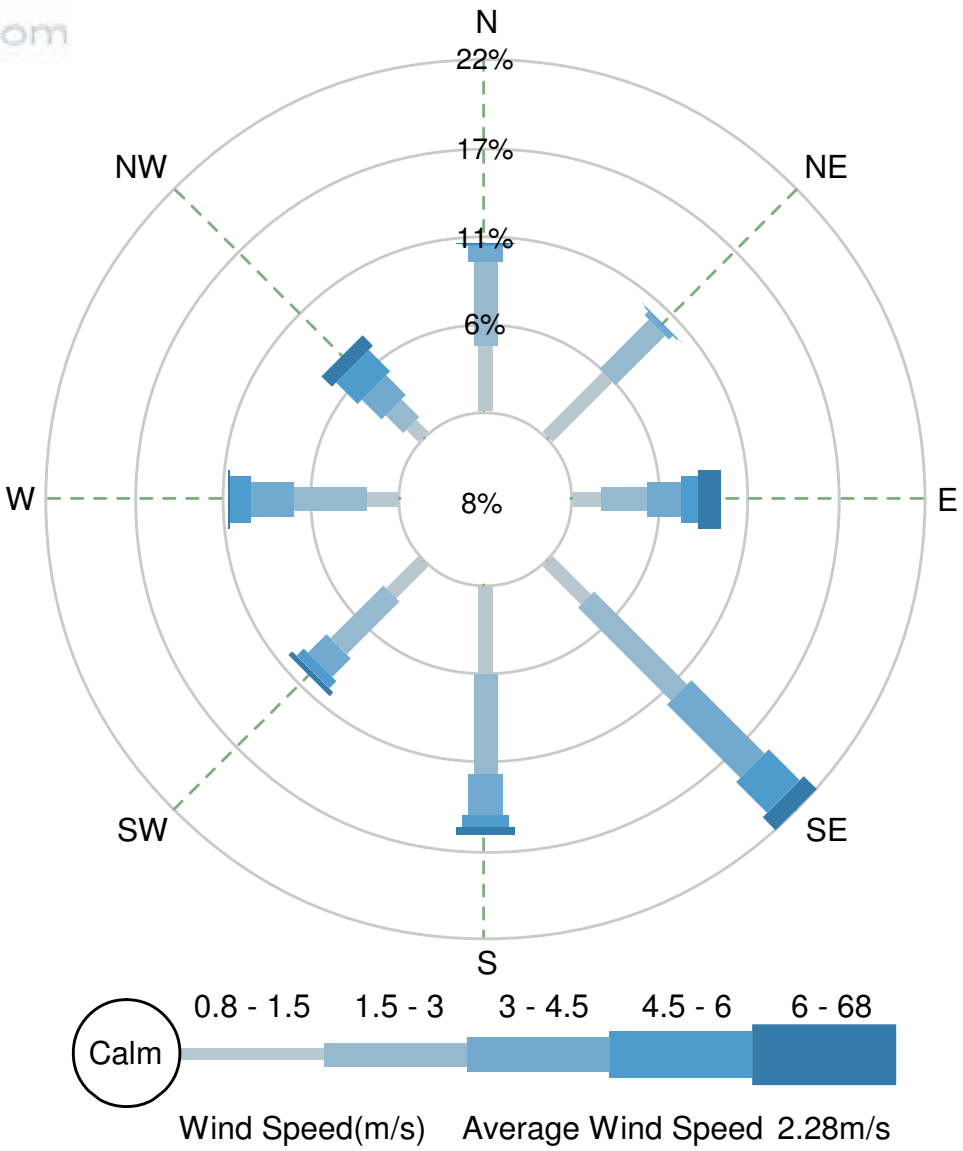
Unit Id	:	Whitehaven Master (Sentinex99)
Module Id	:	M2 (Templemore 10m)
Requested Report Date	:	2015/04/01
Requested Report Hour	:	00
Chart Available	:	no

Main Data Summary

Record Time	Temperature									Humidity			Prevailing Wind						
	2m			10m			60m						Speed			Gust	Dir	Rain	Solar Rad
	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max				Avg Max
					(°C)						(%)			(m/s)		(m/s)	(°)	(mm)	(W/m^2)
2015/03/01 00:00:00	27.9	20.7	34.2	27.6	22.3	32.3	-99.0	-99.0	-99.0	56.5	37.2	90.0	1.3	0.2	9.7	13.5	318	0.8	214.6 961.8
2015/03/02 00:00:00	25.7	16.8	34.6	25.4	17.8	33.3	-99.0	-99.0	-99.0	60.0	28.7	92.7	2.9	0.0	6.5	8.7	134	0.2	248.4 834.4
2015/03/03 00:00:00	26.8	16.4	36.4	26.8	18.0	34.6	-99.0	-99.0	-99.0	51.5	27.7	85.8	0.9	0.0	2.7	8.7	307	0.0	250.3 820.7
2015/03/04 00:00:00	31.1	22.9	38.6	31.3	25.4	37.5	-99.0	-99.0	-99.0	37.6	20.3	65.8	2.9	0.0	8.4	13.0	319	0.0	229.4 801.7
2015/03/05 00:00:00	25.3	15.8	32.5	26.0	18.7	31.4	-99.0	-99.0	-99.0	29.8	11.4	53.3	1.8	0.0	1.1	12.4	164	0.0	255.8 877.6
2015/03/06 00:00:00	20.1	9.6	29.9	21.1	12.1	28.6	-99.0	-99.0	-99.0	32.7	10.2	57.7	2.2	0.0	0.7	8.5	145	0.0	258.5 848.7
2015/03/07 00:00:00	21.7	8.5	34.0	23.2	11.5	32.5	-99.0	-99.0	-99.0	28.0	9.5	55.2	1.9	0.0	2.3	8.0	154	0.0	259.5 851.4
2015/03/08 00:00:00	23.0	13.6	32.1	24.0	16.2	30.6	-99.0	-99.0	-99.0	38.2	20.9	52.7	1.9	0.0	2.0	7.6	155	0.0	139.3 852.5
2015/03/09 00:00:00	24.6	13.5	35.5	25.7	16.2	34.7	-99.0	-99.0	-99.0	38.0	13.1	72.1	1.8	0.0	3.8	10.5	155	0.0	243.2 826.6
2015/03/10 00:00:00	25.2	18.7	34.8	25.3	19.6	33.0	-99.0	-99.0	-99.0	56.8	31.8	92.6	2.5	0.0	1.1	17.4	161	4.2	169.3 971.7
2015/03/11 00:00:00	25.0	19.0	32.4	24.9	19.7	31.1	-99.0	-99.0	-99.0	62.9	34.2	92.3	2.0	0.0	2.8	8.3	156	0.0	206.3 816.3
2015/03/12 00:00:00	23.5	17.3	32.5	23.9	18.7	30.8	-99.0	-99.0	-99.0	67.1	34.0	91.9	1.2	0.0	5.0	9.7	149	3.8	168.3 969.2
2015/03/13 00:00:00	23.2	15.9	31.3	23.2	17.2	30.0	-99.0	-99.0	-99.0	57.3	30.4	88.2	3.4	0.0	9.2	13.2	134	0.2	204.8 887.1
2015/03/14 00:00:00	21.1	11.5	29.0	21.5	13.8	28.3	-99.0	-99.0	-99.0	53.6	24.1	94.4	1.4	0.0	2.0	9.8	154	0.0	236.0 823.5
2015/03/15 00:00:00	22.2	10.1	32.7	22.6	12.6	31.5	-99.0	-99.0	-99.0	48.1	17.1	85.6	1.3	0.0	8.1	11.3	169	0.0	222.4 883.5
2015/03/16 00:00:00	22.1	14.0	30.2	22.1	15.1	29.0	-99.0	-99.0	-99.0	45.8	21.1	78.1	2.2	0.7	5.0	9.2	130	0.0	231.8 802.4
2015/03/17 00:00:00	23.4	13.2	31.5	23.6	14.6	30.9	-99.0	-99.0	-99.0	49.7	30.8	80.3	0.3	0.0	3.8	7.1	286	0.0	172.5 861.6
2015/03/18 00:00:00	26.3	19.4	33.5	26.4	20.2	32.2	-99.0	-99.0	-99.0	58.3	34.7	89.6	2.4	0.0	0.8	10.9	351	1.0	184.3 800.1
2015/03/19 00:00:00	26.3	16.1	36.3	27.5	19.4	35.0	-99.0	-99.0	-99.0	47.1	18.2	87.8	0.7	0.0	1.9	7.0	308	0.0	232.9 797.1
2015/03/20 00:00:00	28.2	14.8	40.3	28.8	16.8	38.7	-99.0	-99.0	-99.0	36.3	13.2	70.7	1.2	0.0	6.4	10.3	282	0.0	220.5 802.9
2015/03/21 00:00:00	25.3	18.2	33.2	25.2	19.8	31.7	-99.0	-99.0	-99.0	55.8	35.8	79.3	4.7	0.0	8.8	12.5	121	0.0	173.1 898.4
2015/03/22 00:00:00	21.4	14.4	30.9	22.1	16.3	29.8	-99.0	-99.0	-99.0	67.7	36.9	90.0	1.3	0.0	4.9	8.9	108	3.0	100.2 880.3
2015/03/23 00:00:00	24.0	15.9	31.6	24.2	17.4	30.2	-99.0	-99.0	-99.0	55.4	30.6	81.2	0.5	0.0	2.3	6.8	347	0.2	217.1 772.7
2015/03/24 00:00:00	25.3	17.0	35.0	25.5	18.6	33.5	-99.0	-99.0	-99.0	62.6	25.6	95.5	1.7	0.0	2.4	15.3	337	9.6	194.3 758.3

Continued on next page

Record Time	Temperature									Humidity			Prevailing Wind						
	2m			10m			60m						Speed			Gust	Dir	Rain	Solar Rad
	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max				Avg Max
					($°C$)						(%)			(m/s)		(m/s)	($°$)	(mm)	(W/m^2)
2015/03/25 00:00:00	21.9	13.0	31.3	22.4	15.2	29.8	-99.0	-99.0	-99.0	59.9	17.1	95.2	1.4	0.0	2.4	8.7	276	0.0	224.4 768.9
2015/03/26 00:00:00	19.3	8.4	30.7	20.6	11.1	29.1	-99.0	-99.0	-99.0	44.3	11.2	84.9	1.4	0.0	0.0	8.6	290	0.0	218.8 786.2
2015/03/27 00:00:00	16.5	6.7	26.9	18.0	10.0	25.7	-99.0	-99.0	-99.0	43.6	15.8	81.4	1.2	0.0	1.2	7.6	221	0.0	222.0 794.7
2015/03/28 00:00:00	17.3	5.3	28.8	18.9	8.9	27.8	-99.0	-99.0	-99.0	39.8	12.1	75.7	0.3	0.0	1.2	8.4	251	0.0	221.5 777.1
2015/03/29 00:00:00	18.8	6.1	30.3	20.0	8.6	29.4	-99.0	-99.0	-99.0	47.3	22.1	77.0	1.1	0.0	1.3	8.6	290	0.0	193.8 756.0
2015/03/30 00:00:00	18.2	14.3	24.2	19.0	14.9	23.6	-99.0	-99.0	-99.0	72.0	54.0	95.0	1.0	0.0	0.9	5.3	17	11.8	73.9 580.6
2015/03/31 00:00:00	19.2	12.7	27.2	19.6	14.1	26.2	-99.0	-99.0	-99.0	75.1	40.6	97.3	0.9	0.0	1.0	7.7	113	3.0	130.9 878.8



Sentinex99 - M2, Whitehaven Master - Wind Rose

Date/Time range = 20150301-00:00 till 20150331-23:59

Meteorological Daily Statistics Summary

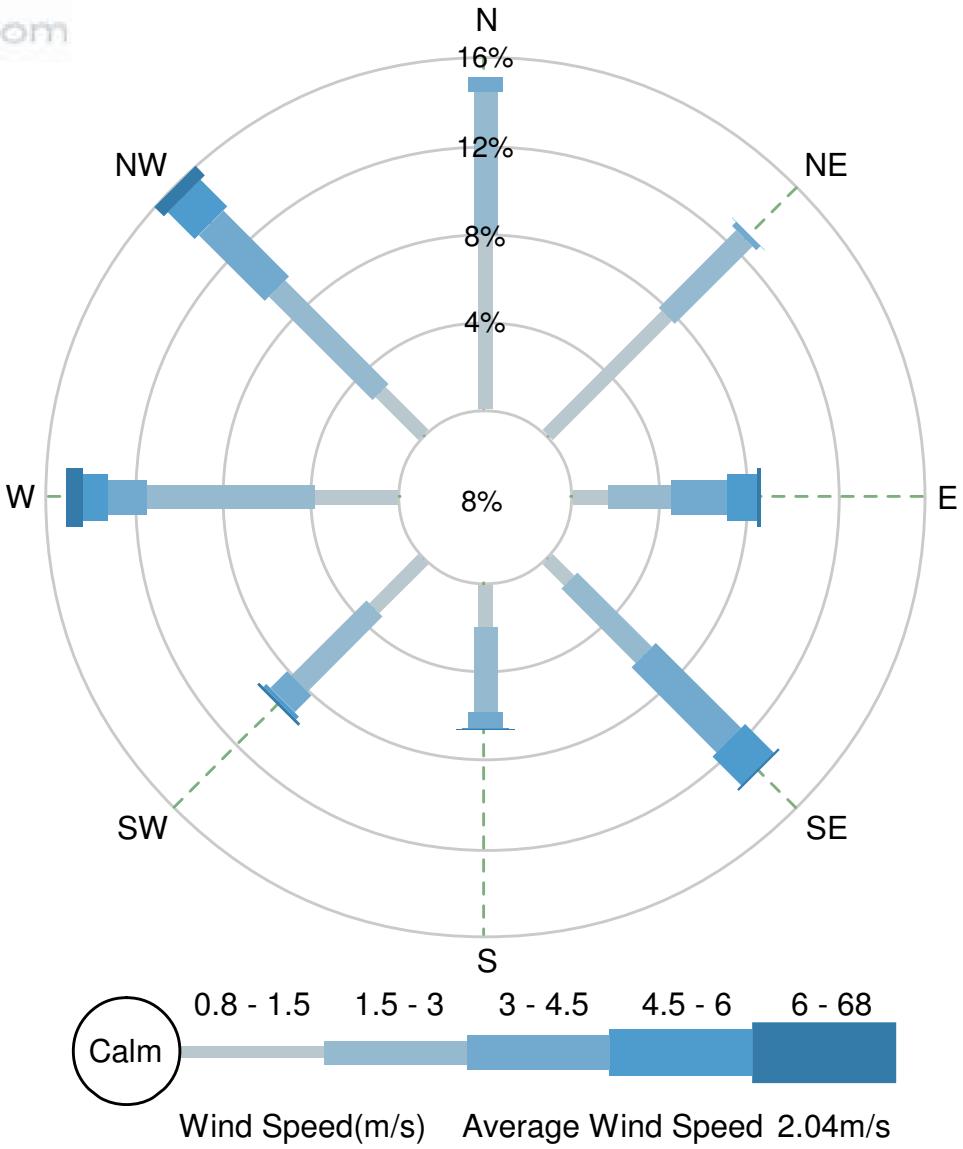
Unit Id	:	Whitehaven Master (Sentinex99)
Module Id	:	M2 (Templemore 10m)
Requested Report Date	:	2015/05/01
Requested Report Hour	:	00
Chart Available	:	no

Main Data Summary

Record Time	Temperature									Humidity			Prevailing Wind			Gust	Dir	Rain	Solar Rad	
	2m			10m			60m						Speed							
	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max				Avg	Max
					(°C)						(%)			(m/s)		(m/s)	(°)	(mm)	(W/m^2)	
2015/04/01 00:00:00	22.2	13.1	29.8	22.3	14.9	28.8	-99.0	-99.0	-99.0	60.6	32.6	95.2	1.2	0.0	5.0	7.9	61	0.0	173.9	817.1
2015/04/02 00:00:00	22.5	14.7	30.3	23.0	16.7	29.6	-99.0	-99.0	-99.0	50.1	24.7	84.1	0.1	0.0	2.0	126.3	134	0.0	199.9	1958.6
2015/04/03 00:00:00	20.2	16.0	27.6	20.6	16.2	26.5	-99.0	-99.0	-99.0	68.7	39.5	94.9	0.9	0.0	5.7	7.7	100	20.2	78.0	530.5
2015/04/04 00:00:00	18.6	16.0	24.5	18.6	16.2	24.0	-99.0	-99.0	-99.0	87.0	55.6	95.8	2.1	0.0	0.0	7.1	139	29.6	72.6	504.2
2015/04/05 00:00:00	18.4	14.2	25.7	18.5	15.0	24.1	-99.0	-99.0	-99.0	80.9	50.5	94.4	0.3	0.0	5.8	9.0	273	8.8	117.5	709.2
2015/04/06 00:00:00	19.1	14.1	28.5	19.2	15.3	27.6	-99.0	-99.0	-99.0	75.9	33.0	96.0	0.3	0.0	1.2	16.5	26	28.4	167.4	826.8
2015/04/07 00:00:00	16.3	9.0	22.1	16.7	12.5	21.1	-99.0	-99.0	-99.0	67.7	36.8	96.8	3.4	0.0	2.9	12.1	302	0.0	172.1	739.1
2015/04/08 00:00:00	13.4	8.8	18.6	13.8	9.6	18.3	-99.0	-99.0	-99.0	68.0	52.5	93.9	2.2	0.0	2.0	7.7	308	0.0	118.8	685.7
2015/04/09 00:00:00	14.8	7.2	23.0	15.5	8.3	22.4	-99.0	-99.0	-99.0	71.6	42.6	95.0	0.3	0.0	2.4	6.8	115	0.0	190.0	674.6
2015/04/10 00:00:00	17.7	10.3	24.3	18.0	12.3	23.6	-99.0	-99.0	-99.0	56.7	27.1	89.5	2.4	0.0	1.0	7.1	131	0.0	167.2	714.7
2015/04/11 00:00:00	18.2	12.0	26.3	18.9	13.8	25.5	-99.0	-99.0	-99.0	60.6	28.0	84.3	0.9	0.0	2.8	6.3	129	0.0	170.8	705.6
2015/04/12 00:00:00	16.9	8.8	25.4	17.9	10.4	24.4	-99.0	-99.0	-99.0	69.9	36.7	94.1	1.0	0.0	0.7	7.0	285	0.0	142.9	750.0
2015/04/13 00:00:00	18.1	9.6	26.3	19.1	12.2	25.3	-99.0	-99.0	-99.0	60.5	30.5	93.4	1.9	0.0	5.3	7.7	137	0.0	172.2	684.3
2015/04/14 00:00:00	18.5	10.5	26.6	19.1	12.5	25.6	-99.0	-99.0	-99.0	65.7	40.7	91.4	0.1	0.0	2.7	6.6	117	0.0	163.7	654.1
2015/04/15 00:00:00	19.0	10.5	28.0	20.1	13.1	26.9	-99.0	-99.0	-99.0	69.9	42.1	95.4	0.6	0.0	0.0	5.3	286	0.0	166.8	653.9
2015/04/16 00:00:00	20.5	12.2	29.5	21.4	13.8	28.4	-99.0	-99.0	-99.0	66.3	35.8	94.9	0.6	0.0	3.3	5.1	308	0.0	171.8	644.8
2015/04/17 00:00:00	21.1	12.7	29.4	21.9	15.0	28.4	-99.0	-99.0	-99.0	67.3	42.1	93.7	0.5	0.0	2.9	4.9	316	0.0	149.2	640.7
2015/04/18 00:00:00	22.3	17.3	26.3	22.6	19.0	25.8	-99.0	-99.0	-99.0	58.5	45.4	88.5	2.0	0.5	5.4	8.2	1	0.6	103.5	577.3
2015/04/19 00:00:00	17.5	13.2	22.9	17.5	13.7	21.4	-99.0	-99.0	-99.0	86.0	58.2	96.6	1.2	0.0	5.6	8.7	268	14.0	78.0	701.4
2015/04/20 00:00:00	13.9	11.9	16.4	13.8	11.8	16.0	-99.0	-99.0	-99.0	81.1	73.7	91.4	0.9	0.0	4.4	6.6	274	0.0	42.2	264.0
2015/04/21 00:00:00	11.1	9.4	13.2	11.2	9.4	13.0	-99.0	-99.0	-99.0	90.3	82.0	96.0	1.5	0.0	2.0	7.2	316	23.4	34.0	261.0
2015/04/22 00:00:00	14.9	11.4	19.5	14.7	11.7	18.5	-99.0	-99.0	-99.0	76.7	58.6	91.0	1.4	0.0	1.8	5.9	308	0.0	123.6	685.6
2015/04/23 00:00:00	16.8	10.2	23.6	17.0	11.8	23.5	-99.0	-99.0	-99.0	76.0	47.2	96.0	0.6	0.0	1.7	4.4	338	0.0	162.9	603.0
2015/04/24 00:00:00	18.0	11.9	24.5	18.8	14.4	23.7	-99.0	-99.0	-99.0	67.3	37.4	94.9	1.8	0.0	1.9	9.2	320	0.0	136.6	690.3

Continued on next page

Record Time	Temperature									Humidity			Prevailing Wind						
	2m			10m			60m						Speed			Gust	Dir	Rain	Solar Rad
	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max				Avg Max
					($°C$)						(%)			(m/s)		(m/s)	($°$)	(mm)	(W/m^2)
2015/04/25 00:00:00	17.5	9.8	24.2	18.1	11.5	23.6	-99.0	-99.0	-99.0	56.1	31.5	90.9	2.4	0.0	8.2	11.4	310	0.0	155.0 682.6
2015/04/26 00:00:00	13.0	9.2	17.8	13.0	9.6	16.5	-99.0	-99.0	-99.0	68.7	50.6	85.6	3.3	0.0	3.1	10.0	282	0.0	128.3 774.9
2015/04/27 00:00:00	11.0	4.7	19.0	12.3	7.7	18.4	-99.0	-99.0	-99.0	72.0	32.5	98.2	0.6	0.0	1.0	6.1	282	0.0	168.4 616.2
2015/04/28 00:00:00	11.4	1.5	21.9	12.8	3.5	21.0	-99.0	-99.0	-99.0	69.4	31.8	98.3	0.9	0.0	4.2	6.8	126	0.0	152.1 603.2
2015/04/29 00:00:00	15.6	9.3	22.7	16.3	10.3	22.3	-99.0	-99.0	-99.0	59.1	29.9	80.7	3.4	0.0	5.6	8.4	119	0.0	137.3 651.4
2015/04/30 00:00:00	16.6	9.2	22.9	17.0	10.6	22.3	-99.0	-99.0	-99.0	61.8	42.4	84.9	3.0	0.0	7.0	10.6	109	0.0	124.5 695.2



Sentinex99 - M2, Whitehaven Master - Wind Rose

Date/Time range = 20150401-00:00 till 20150430-23:59

Appendix 11

VEGETATION CLEARING REPORTS

Tarrawonga Coal Mine

Pre-clearing survey and clearing supervision - 2014

Prepared for
Tarrawonga Coal Pty Ltd

Version 2: 11 June 2014



DOCUMENT TRACKING

Item	Detail
Project Name	Tarrawonga Coal Mine - Pre-clearing Survey and Clearing Supervision
Project Number	13ARMECO-0029
Project Manager	Emma Garraway Phone: 8081 2686 Office address: 92 Taylor St, Armidale NSW 2350
Prepared by	Nathalie van der Veer; Emma Garraway
Reviewed by	Daniel Magdi
Approved by	Dr Paul Frazier
Status	FINAL
Version Number	2
Last saved on	11 June 2014
Cover photo	Hollow-bearing *Eucalyptus albens* (White Box) Ben Martin (3 March 2014)

This report should be cited as 'Eco Logical Australia 2014. *Tarrawonga Coal Mine - pre-clearing survey and clearing supervision*. Prepared for Tarrawonga Coal Pty Ltd.'

ACKNOWLEDGEMENTS

This document has been prepared by Eco Logical Australia Pty Ltd with support from Tarrawonga Coal Pty Ltd.

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1 Introduction

Eco Logical Australia Pty Ltd (ELA) was engaged by Tarrawonga Coal Pty Ltd to undertake pre-clearing surveys and clearing supervision associated with the expansion of the Tarrawonga Coal Mine. Approximately 46 ha were scheduled to be cleared during the first 6 months of 2014, including the northern boxcut area and associated areas for sediment and erosion control.

1.1 Study area

A pre-clearing assessment and clearing supervision were undertaken at the Tarrawonga Coal Mine in the northern expansion area within Mining Lease (ML) 1685 (located in Leard State Forest) and within the eastern expansion area (ML1579) (**Figure 1**).

1.2 Objectives

The objective of the pre-clearing survey was to identify hollow bearing/potential habitat trees prior to clearing for the advancement of mining operations at the mine. In accordance with management plans, ecologists were present during the felling of identified hollow bearing trees. This report summarises the results of the pre-clearing survey and the species, number and condition of fauna identified during clearing.

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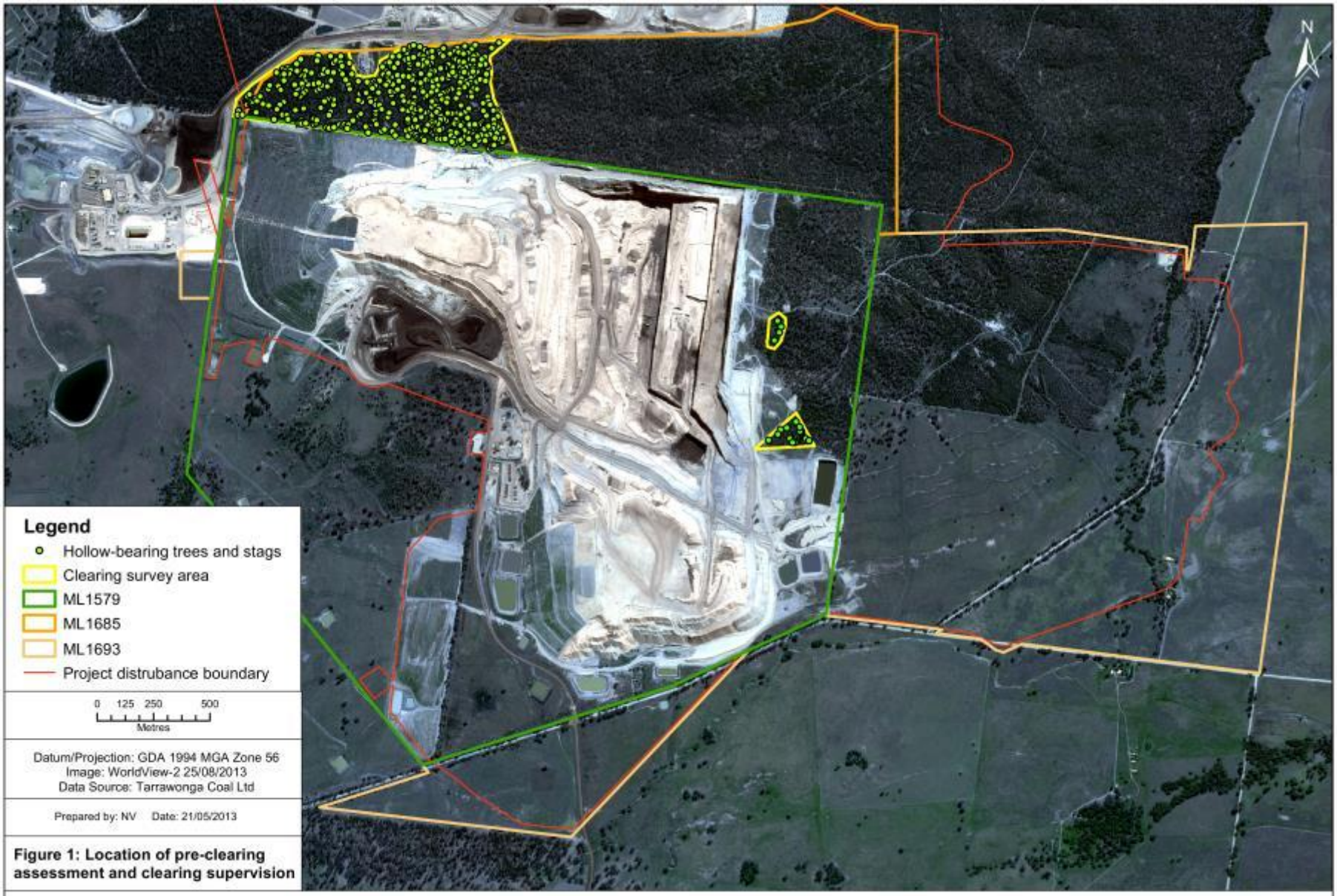

Figure 1: Location of pre-clearing assessment and clearing supervision

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2 Methods

Pre-clearing survey and clearing supervision dates are provided in **Table 1**, along with the ELA ecologist in attendance and weather data for those days.

Table 1: Date of works undertaken and associated weather conditions

Date of works	Works undertaken	Ecologist present	Weather*		
			Min	Max	Rainfall (mm)
3 Feb 2014	Pre-clearing survey (northern)	Dr Steven Debus Ben Martin	18.3	35.1	0.0
4 Feb 2014			17.6	36.0	0.0
11 Feb 2014	Clearing supervision	Dr Steven Debus Ben Martin	21.1	38.5	0.0
12 Feb 2014			20.2	39.9	0.0
27 March 2014	Pre-clearing survey (eastern)	Ben Martin	16.8	20.1	29.4
4 April 2014	Clearing supervision	Dr Steven Debus	19.1	29.3	0.0
14 April 2014		Ben Martin	13.1	25.3	0.0
15 April 2014		Ben Martin	12.3	24.2	0.0
6 May 2014		Dr Steven Debus	0.0	17.6	0.0
7 May 2014		Dr Steven Debus	2.4	21.1	0.0
12 May 2014		Antony von Chrismar	6.9	22.8	3.2
13 May 2014		Antony von Chrismar	8.3	23.1	0.0
14 May 2014		Antony von Chrismar	6.6	22.7	0.0

*Weather data sourced from Bureau of Meteorology Gunnedah Airport AWS 055202

2.1 Pre-clearing survey

All hollow bearing trees were located and recorded by GPS and field data sheets. Data recorded for hollow bearing trees included the following:

- An allocated tree number
- The species of tree
- Any observations of fauna.

2.2 Clearing supervision

Ecologists with experience in fauna capture and rescue supervised the clearing of vegetation. The following procedure was adhered to:

- A visual inspection for fauna was conducted immediately prior to tree removal
- Trees with hollows were removed in autumn to avoid impacts on nesting birds and breeding and over-wintering bats
- The phone number of the nearest veterinary clinic and wildlife carer was on hand to give advice and provide care if injured or care dependant fauna were discovered

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- "Slow drop" techniques were used to fell the trees. This involved nudging and shaking the tree, followed by controlled felling with the aim of preserving tree hollows and preventing the injury or death of fauna
- Once on the ground the hollow was inspected for fauna
- An attempt was made to capture any fauna observed to be present within the tree. Any fauna found deep in hollows and not requiring care were left to vacate the hollow naturally.

The tree-clearing protocol, as nominated in the Biodiversity Management Plan (BMP), is provided in **Appendix B**.

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3 Results

3.1 Pre-clearing survey

The pre-clearing survey identified 547 hollow-bearing trees and stags (**Table 2**). A full list of hollow bearing trees identified and their associated coordinates is provided in **Appendix A**.

One tree (Tree No. 179 227937E; 6608562N UTM56) was identified as potentially being a scarred tree and therefore of cultural and heritage significance. Tree 264 (227982E; 6608224N UTM56) is also a scarred tree, known to Tarrawonga Coal Pty Ltd and fenced off.

Table 2: Hollow-bearing trees and stags identified during pre-clearing survey

Species	Common name	Count
Callitris glaucophylla	White Cypress Pine	1
Eucalyptus albens	White Box	322
Eucalyptus crebra	Narrow-leaved Ironbark	127
Eucalyptus microcarpa	Grey Box	1
Eucalyptus pilligaensis	Pilliga Box	34
Eucalyptus sp.		5
Stags		47
Tree stump		10

During the pre-clearing survey, the following fauna was recorded from opportunistic observations:

- *Varanus varius* (Lace Monitor) were observed at Tree 36 and Tree 39 (towards the centre of the northern perimeter of the survey area).
- *Climacteris picumnus* (Brown Treecreeper) was observed in Tree 167 (*Eucalyptus albens* on the eastern end of the northern perimeter). The Brown Treecreeper is listed as Vulnerable under the NSW *Threatened Species Conservation Act 1995* (TSC Act).

3.2 Clearing supervision

Clearing of the northern and eastern extension areas disturbed several fauna species, including:

- Four species of bat plus three unidentified species of bats
- Eight species of lizard
- One species of snake
- One species of possum
- One species of owl (Table 3).

Most of these fauna were either flushed from the tree when the tree was shaken, or captured and relocated after their habitat tree had been felled (**Table 3**). However, the following incidents were observed:

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- Clearing operations on 4 April
    - A *Gehyra variegata* (Common Dtella) was fatally injured when a tree was felled and the hollow collapsed on it.
    - A *Pseudechis guttatus* (Spotted Black Snake) was also found dead, having been accidentally killed by a mulching machine.
    - *Saccolaimus flaviventris* (Yellow-bellied Sheathtail-Bat), listed as Vulnerable under the TSC Act, was flushed from a tree as it was falling and flew into adjacent forest
- Clearing operations on 6 & 7 May
    - A waiting *Falco longipennis* (Australian Hobby) hunted small woodland birds (unsuccessfully) that flushed from the clearing zone, accompanied by hunting *Cracticus nigrogularis* (Pied Butcherbirds) that flushed the birds out again when they reached the cover of felled tree canopies, or shrubs in the adjacent rehab (next to 07–08 rehab). No captures were seen.
    - A Brown Treecreeper retreated to the last habitat tree in the stand to be felled as its cover diminished, then flushed out and flew to a mulch dump. Isolated in open terrain adjacent to the box cut, its fate was undetermined but it had no cover from foraging predators (Hobby, which had been waiting nearby, and butcherbirds).
    - One felled hollow tree contained the hive of feral *Apis mellifera* (Honeybees), and was therefore too dangerous to approach closely (but was also therefore unlikely to contain other wildlife).
    - Four Common Dtellas were displaced from felled trees and were caught and eaten by Pied Butcherbirds before they could be rescued and relocated.
- Clearing operations on 12 – 14 May
    - An *Egernia striolata* (Tree Skink) was fatally crushed
    - A Lace Monitor was crushed across the shoulders. The Lace Monitor was taken to a vet and subsequently euthanised due to the severity of its injuries. An incident report was completed by Tarrawonga Coal Ltd staff to document the fatality.
    - Two Yellow-bellied Sheathtail-Bats were found in the hollow of a felled tree and relocated to adjacent forest.

Unless recorded in **Table 3**, all cavities and hollows inspected were vacant and no mammals were found.

Opportunistic fauna observations from the site are provided in **Appendix C** and includes the following species listed as Vulnerable under the TSC Act:

- *Neophema pulchella* (Turquoise Parrot)
- *Chthonicola sagittata* (Speckled Warbler)
- Brown Treecreeper.

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Table 3: Fauna species disturbed or impacted during clearing supervision

Date	Location	Species	Outcome
11 March	Northern expansion area (Dam area)	*Chalinolobus gouldii* Gould's Wattled Bat	One Gould's Wattled Bat and two or 3 smaller unidentified bats were flushed from hollow bearing trees before they were felled and flew away. Two of the small bats were attacked unsuccessfully in flight by Pied Butcherbirds and escaped.
		Pseudechis guttatus Spotted Black Snake	One emerged unharmed from cleared area and escaped to adjacent woodland.
12 March	Northern expansion area (Bund area)	*Chalinolobus gouldii* Gould's Wattled Bat	One Gould's Wattled Bat emerged from a cavity in a freshly felled tree and flew away unharmed. One or two others were flushed from trees before the trees were felled and flew away.
		Nyctophilus sp. Long-eared Bat	One was flushed from tree and flew away.
		Egernia striolata Tree Skink	One was rescued unharmed from felled hollow bearing tree and relocated in a forest away from clearing zone.
4 April	Northern expansion area	*Chalinolobus gouldii* Gould's Wattled Bat	One or two and one smaller unidentified bat flushed from trees as or before they were felled, and flew away. One of the former was attacked unsuccessfully in flight by Pied Butcherbirds, and escaped.
		* *Saccolaimus flaviventris* Yellow-bellied Sheathtail-Bat	One emerged from a hollow bearing tree as it was falling, landed on an adjacent live tree and was attacked unsuccessfully by a Kookaburra, escaped and flew away into adjacent forest. Possibly a second one flushed and flew around briefly later in the day before it left the site.
		Egernia striolata Tree Skink	Two rescued unharmed from felled hollow bearing trees, and were relocated in forest away from the clearing zone. Three others survived in felled trees, but escaped before they could be captured and relocated.
		Cryptoblepharus virgatus Wall Skink	Two were rescued unharmed from felled trees, and were relocated in forest away from the clearing zone. Three others survived on felled trees, but escaped before they could be captured and relocated.
		Gehyra variegata Common Dtella	Two were rescued unharmed from felled hollow bearing trees, and were relocated in forest away from the clearing zone. Four others survived in felled trees, but escaped before they could be captured and relocated. One was fatally injured when a tree was felled and the hollow collapsed on it.
		Pseudechis guttatus Spotted Black Snake	One found accidentally killed by a mulching machine.

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Date	Location	Species	Outcome
14 April	Northern expansion area	*Cryptoblepharus carnabyi* Carnaby's Wall Skink	One rescued unharmed from felled hollow bearing tree and relocated in a forest away from clearing zone.
		Oedura robusta Robust Velvet Gecko	One rescued unharmed from felled hollow bearing tree and relocated in a forest away from clearing zone.
15 April	Northern expansion area	*Varanus varius* Lace Monitor	Two were rescued unharmed from felled hollow bearing trees and relocated in a forest away from clearing zone.
		Trichosurus vulpecula Brush-tailed possum	One rescued unharmed from felled hollow bearing tree and relocated in a forest away from clearing zone.
		Chalinolobus gouldii Gould's Wattled Bat	Four were rescued unharmed from felled hollow bearing trees and relocated in a forest away from clearing zone.
		Vespadelus vulturnus Little Forest Bat	Two were rescued unharmed from felled hollow bearing trees and relocated in a forest away from clearing zone.
		Cryptoblepharus carnabyi Carnaby's Wall Skink	One rescued unharmed from felled hollow bearing tree and relocated in a forest away from clearing zone.
		Microbat	Unsure of species. One rescued unharmed from felled hollow bearing tree and relocated in a forest away from clearing zone.
		Oedura robusta Robust Velvet Gecko	10 were captured in various locations after felling and relocated in a forest away from clearing zone.
6 & 7 May	Northern expansion area (West of box cut and east of box cut)	*Chalinolobus gouldii* Gould's Wattled Bat	One flushed from tree and flew away.
		Chalinolobus gouldii Gould's Wattled Bat	One released relocated to sun-warmed Ironbark trunk crevice.
		Egernia striolata Tree Skink	One survived in a felled tree and fled.
		Cryptoblepharus virgatus Wall Skink	Two survived in felled tree and fled.

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Date	Location	Species	Outcome
		Gehyra variegata Common Dtella	Three rescued from felled hollow bearing trees and were relocated in forest away from clearing zone.
		Gehyra variegata Common Dtella	Three survived in felled trees and fled.
		Gehyra variegata Common Dtella	Four displaced from felled trees and were caught and eaten by Pied Butcherbirds before they could be rescued.
		Oedura robusta Robust Velvet Gecko	One rescued from felled hollow bearing trees and was relocated to forest away from clearing zone.
		Oedura robusta Robust Velvet Gecko	One survived but retreated further into hollow and could not be accessed for relocation.
		Varanus varius Lace Monitor	One rescued from felled hollow bearing trees and relocated in forest away from clearing zone.
		Ninox novaeseelandiae Southern Boobook	One flushed from hollow just before felling, flew under attack from Pied Butcherbirds into adjacent older rehab were it presumably found daytime shelter.
		Pogona barbata Bearded Dragon	One emerged from an excavated stump, and was rescued unharmed and relocated in forest away from the clearing zone
12,13 & 14 May	Eastern section of northern expansion area	*Egernia striolata* Tree Skink	One fatally crushed.
		Varanus varius Lace Monitor	One crushed across shoulders and subsequently euthanised by vet - incident report completed by Tarrawonga Coal staff.
		Cryptoblepharus pulcher Elegant snake-eyed Skink	Eight were rescued from felled hollow bearing trees and relocated in forest away from the clearing zone.
		Gehyra variegata Common Dtella	Twelve were rescued from felled hollow bearing trees and relocated in forest away from the clearing zone.
		Diplodactylus vittatus Wood Gecko	Two were rescued from felled hollow bearing trees and relocated in forest away from the clearing zone.

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Date	Location	Species	Outcome
		Chalinolobus gouldii Gould's Wattled Bat	One was flushed from tree prior to felling and another was rescued from felled-hollowed trees and relocated in forest away from the clearing zone.
		* *Saccolaimus flaviventris* Yellow-bellied Sheathtail-Bat	Two were rescued from felled hollow bearing trees and relocated in forest away from the clearing zone.

* Listed as vulnerable under the TSC Act

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4 Recommendations and Conclusion

This report documents pre-clearing survey results, clearing supervision and post-clearing fauna investigations for areas associated within the advancement of mining operations at Tarrawonga Coal Mine.

The pre-clearing survey identified 547 hollow-bearing trees and stags, which were subsequently felled and mulched. All hollow bearing trees were removed under the supervision of an ecologist with 61 individuals of thirteen fauna species relocated to nearby forested areas. Thirty-one individuals of nine species (plus two unidentified species of bat) were either flushed prior to felling or escaped before they could be captured and relocated. There were eight instances of fauna fatality during clearing operations, including one Common Dtella, one Tree Skink and one Lace Monitor that were crushed during felling; four Common Dtellas were eaten by Pied Butcherbirds when escaping a felled tree and one Spotted Black Snake was found to have been killed by the mulching machine.

During the pre-clearing survey a Brown Treecreeper was observed in a White Box on the north-eastern end of northern expansion area. During the clearing supervision one Yellow-bellied Sheathtail-Bat was flushed from a tree as it was falling and flew into adjacent forest. Another two individuals were found in the hollow of a felled tree and relocated to adjacent forest. Both the Brown Treecreeper and Yellow-bellied Sheathtail-Bat are listed as Vulnerable under the TSC Act.

It was noted that during the clearing process many small bats, woodland birds, and lizards were swooped upon by predatory birds; however, with the exception of four Common Dtellas most appeared to find refuge.

In addition to the existing tree clearing protocol, the following recommendations are made to minimise the impact on fauna associated with clearing:

- Felled hollow bearing trees should remain *in situ* for a minimum of 24 hours prior to mulching operations to provide fauna not accessible for relocation the opportunity to move to alternative habitat
- Debris such as hollow bearing trees from the disturbance area can be used for habitat augmentation within rehabilitation and offset areas. Reinstating felled trees and woody debris is a way to provide habitat for fauna while also providing a microclimate for seed germination
- As much as possible, vegetation clearing should progress in a direction that maximises the potential for displaced fauna to move ahead of the clearing towards remaining vegetation.

The Clearing Protocol (Appendix B) has been amended to include these recommendations.

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References

Resource Strategies. 2011. *Tarrawonga Coal Project – Environmental Assessment*. Prepared for Tarrawonga Coal Pty Ltd. Available: http://www.whitehavencoal.com.au

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Appendix A Hollow-bearing trees identified during pre-clearing survey

Waypoint	Easting	Northing	Scientific name	Common name	Pre-clearing notes
2	227025	6608393	*Eucalyptus crebra*	Narrow-leaved Ironbark	
3	227042	6608392	*Eucalyptus crebra*	Narrow-leaved Ironbark	
4	227047	6608398	*Eucalyptus crebra*	Narrow-leaved Ironbark	
5	227049	6608407	*Callitris glaucophylla*	White Cypress Pine	Dead
6	227034	6608417	*Eucalyptus crebra*	Narrow-leaved Ironbark	
7	227024	6608424	*Eucalyptus crebra*	Narrow-leaved Ironbark	
8	227028	6608430	*Eucalyptus crebra*	Narrow-leaved Ironbark	
9	227037	6608438	*Eucalyptus crebra*	Narrow-leaved Ironbark	
10	227064	6608422		Stag	
11	227068	6608410	*Eucalyptus crebra*	Narrow-leaved Ironbark	
12	227096	6608395	*Eucalyptus crebra*	Narrow-leaved Ironbark	
13	227084	6608430	*Eucalyptus crebra*	Narrow-leaved Ironbark	
14	227120	6608462	*Eucalyptus crebra*	Narrow-leaved Ironbark	
15	227127	6608479	*Eucalyptus crebra*	Narrow-leaved Ironbark	
16	227164	6608476	*Eucalyptus pilligaensis*	Pilliga Box	species uncertain
17	227169	6608531	*Eucalyptus pilligaensis*	Pilliga Box	species uncertain
18	227157	6608536	*Eucalyptus pilligaensis*	Pilliga Box	species uncertain
19	227186	6608553	*Eucalyptus pilligaensis*	Pilliga Box	species uncertain
20	227207	6608557	*Eucalyptus pilligaensis*	Pilliga Box	species uncertain
21	227264	6608595	*Eucalyptus pilligaensis*	Pilliga Box	species uncertain
22	227342	6608612	*Eucalyptus pilligaensis*	Pilliga Box	species uncertain
23	227396	6608608		Stag	
24	227402	6608579	*Eucalyptus albens*	White Box	species uncertain
25	227410	6608578	*Eucalyptus albens*	White Box	
26	227421	6608589		Stag	
27	227438	6608576	*Eucalyptus pilligaensis*	Pilliga Box	species uncertain
28	227442	6608610	*Eucalyptus pilligaensis*	Pilliga Box	species uncertain
29	227452	6608582	*Eucalyptus crebra*	Narrow-leaved Ironbark	
30	227441	6608580	*Eucalyptus crebra*	Narrow-leaved Ironbark	
31	227479	6608578	*Eucalyptus albens*	White Box	species uncertain
32	227491	6608529	*Eucalyptus crebra*	Narrow-leaved Ironbark	
33	227586	6608499	*Eucalyptus albens*	White Box	
34	227644	6608578	*Eucalyptus albens*	White Box	
35	227659	6608568	*Eucalyptus albens*	White Box	
36	227658	6608583	*Eucalyptus crebra*	Narrow-leaved Ironbark	Lace Monitor

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Waypoint	Easting	Northing	Scientific name	Common name	Pre-clearing notes
37	227671	6608607	*Eucalyptus crebra*	Narrow-leaved Ironbark stag	
38	227703	6608609		Stag	
39	227734	6608625	*Eucalyptus* sp.	Box sp.	Lace Monitor
40	227725	6608637	*Eucalyptus* sp.	Box sp.	
41	227747	6608642	*Eucalyptus albens*	White Box	
42	227752	6608651	*Eucalyptus albens*	White Box	
43	227764	6608656	*Eucalyptus albens*	White Box	
44	227793	6608649	*Eucalyptus albens*	White Box	
45	227818	6608637	*Eucalyptus albens*	White Box	
46	227832	6608631	*Eucalyptus albens*	White Box	
47	227832	6608624		Stag	
48	227847	6608631	*Eucalyptus albens*	White Box	
49	227880	6608629	*Eucalyptus albens*	White Box	
50	227900	6608646	*Eucalyptus albens*	White Box	
51	227899	6608644	*Eucalyptus albens*	White Box	
52	227960	6608644	*Eucalyptus albens*	White Box	
53	227948	6608629	*Eucalyptus albens*	White Box	
54	227957	6608613	*Eucalyptus albens*	White Box	
55	227278	6608376	*Eucalyptus* sp.	Box sp.	
56	227310	6608484	*Eucalyptus* sp.	Box sp.	
57	227308	6608486	*Eucalyptus* sp.	Box sp.	
58	227296	6608484	*Eucalyptus pilligaensis*	Pilliga Box	species uncertain
59	227311	6608535	*Eucalyptus pilligaensis*	Pilliga Box	species uncertain
60	227336	6608590	*Eucalyptus albens*	White Box	species uncertain
61	227286	6608543	*Eucalyptus pilligaensis*	Pilliga Box	species uncertain
62	227283	6608498	*Eucalyptus pilligaensis*	Pilliga Box	species uncertain
63	227269	6608488	*Eucalyptus pilligaensis*	Pilliga Box	species uncertain
64	227275	6608460	*Eucalyptus pilligaensis*	Pilliga Box	species uncertain
65	227274	6608462	*Eucalyptus pilligaensis*	Pilliga Box	species uncertain
66	227286	6608454	*Eucalyptus pilligaensis*	Pilliga Box	species uncertain
67	227276	6608443	*Eucalyptus crebra*	Narrow-leaved Ironbark	
68	227261	6608431	*Eucalyptus crebra*	Narrow-leaved Ironbark	
69	227246	6608437	*Eucalyptus crebra*	Narrow-leaved Ironbark stump	
70	227241	6608441	*Eucalyptus crebra*	Narrow-leaved Ironbark	
71	227249	6608465	*Eucalyptus pilligaensis*	Pilliga Box	species uncertain
72	227241	6608480	*Eucalyptus pilligaensis*	Pilliga Box	species uncertain
73	227237	6608482	*Eucalyptus pilligaensis*	Pilliga Box	species uncertain
74	227278	6608523	*Eucalyptus pilligaensis*	Pilliga Box	species uncertain
75	227260	6608528	*Eucalyptus pilligaensis*	Pilliga Box	species uncertain

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Waypoint	Easting	Northing	Scientific name	Common name	Pre-clearing notes
76	227250	6608536	*Eucalyptus pilligaensis*	Pilliga Box	species uncertain
77	227258	6608547	*Eucalyptus pilligaensis*	Pilliga Box	species uncertain
78	227247	6608543	*Eucalyptus pilligaensis*	Pilliga Box	species uncertain
79	227245	6608575	*Eucalyptus pilligaensis*	Pilliga Box	species uncertain
80	227219	6608547	*Eucalyptus pilligaensis*	Pilliga Box	species uncertain
81	227211	6608531	*Eucalyptus pilligaensis*	Pilliga Box	species uncertain
82	227193	6608543	*Eucalyptus pilligaensis*	Pilliga Box	species uncertain
83	227193	6608531	*Eucalyptus pilligaensis*	Pilliga Box	species uncertain
84	227189	6608530	*Eucalyptus pilligaensis*	Pilliga Box	species uncertain
85	227189	6608501	*Eucalyptus pilligaensis*	Pilliga Box	species uncertain
86	227176	6608458	*Eucalyptus pilligaensis*	Pilliga Box	species uncertain
87	227188	6608404	*Eucalyptus crebra*	Narrow-leaved Ironbark stag	
88	227170	6608393	*Eucalyptus crebra*	Narrow-leaved Ironbark	
89	227158	6608373	*Eucalyptus crebra*	Narrow-leaved Ironbark	
90	227239	6608368	*Eucalyptus crebra*	Narrow-leaved Ironbark	
91	227122	6608389	*Eucalyptus crebra*	Narrow-leaved Ironbark	
92	226988	6608365	*Eucalyptus crebra*	Narrow-leaved Ironbark	
93	226984	6608349	*Eucalyptus pilligaensis*	Pilliga Box	species uncertain
94	227005	6608349	*Eucalyptus crebra*	Narrow-leaved Ironbark	
95	227066	6608358	*Eucalyptus crebra*	Narrow-leaved Ironbark stag	
96	227144	6608328	*Eucalyptus crebra*	Narrow-leaved Ironbark	
97	227183	6608348	*Eucalyptus crebra*	Narrow-leaved Ironbark	
98	227203	6608346	*Eucalyptus crebra*	Narrow-leaved Ironbark	
99	227208	6608328	*Eucalyptus crebra*	Narrow-leaved Ironbark	
100	227255	6608312	*Eucalyptus albens*	White Box	
101	227275	6608315		Tree stump	
102	227267	6608324	*Eucalyptus albens*	White Box	
103	227270	6608316	*Eucalyptus albens*	White Box	
104	227268	6608309	*Eucalyptus albens*	White Box	
105	227286	6608312	*Eucalyptus albens*	White Box	
106	227318	6608336	*Eucalyptus albens*	White Box	
107	227322	6608334	*Eucalyptus albens*	White Box	
108	227322	6608330	*Eucalyptus albens*	White Box	
109	227324	6608306	*Eucalyptus albens*	White Box	
110	227332	6608313	*Eucalyptus albens*	White Box	
111	227335	6608325	*Eucalyptus albens*	White Box	
112	227379	6608292	*Eucalyptus albens*	White Box	
113	227391	6608290	*Eucalyptus albens*	White Box	

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Waypoint	Easting	Northing	Scientific name	Common name	Pre-clearing notes
114	227411	6608292		Stag	
115	227437	6608304	*Eucalyptus albens*	White Box	
116	227451	6608299	*Eucalyptus albens*	White Box	
117	227458	6608306	*Eucalyptus albens*	White Box	
118	227471	6608300		Stag	
119	227477	6608306	*Eucalyptus albens*	White Box	
120	227476	6608304	*Eucalyptus albens*	White Box	
121	227470	6608287	*Eucalyptus albens*	White Box	
122	227496	6608323	*Eucalyptus albens*	White Box	
123	227409	6608393	*Eucalyptus crebra*	Narrow-leaved Ironbark	
124	227398	6608361	*Eucalyptus crebra*	Narrow-leaved Ironbark	
125	227388	6608347	*Eucalyptus crebra*	Narrow-leaved Ironbark	
126	227353	6608380		Stag	
127	227335	6608473	*Eucalyptus albens*	White Box	
128	227324	6608486	*Eucalyptus albens*	White Box	
129	227353	6608525	*Eucalyptus crebra*	Narrow-leaved Ironbark	
130	227363	6608531	*Eucalyptus crebra*	Narrow-leaved Ironbark	
131	227369	6608550	*Eucalyptus crebra*	Narrow-leaved Ironbark	
132	227385	6608539	*Eucalyptus albens*	White Box	
133	227410	6608537	*Eucalyptus albens*	White Box	
134	227441	6608552		Stag	
135	227447	6608566	*Eucalyptus albens*	White Box	
136	227456	6608533	*Eucalyptus crebra*	Narrow-leaved Ironbark	
137	227455	6608527	*Eucalyptus crebra*	Narrow-leaved Ironbark	
138	227643	6608549		Stag	
139	227636	6608548	*Eucalyptus crebra*	Narrow-leaved Ironbark	
140	227628	6608562		Tree stump	
141	227680	6608558	*Eucalyptus crebra*	Narrow-leaved Ironbark stag	
142	227695	6608579	*Eucalyptus albens*	White Box	
143	227693	6608524		Stag	
144	227718	6608521	*Eucalyptus albens*	White Box	
145	227740	6608551	*Eucalyptus albens*	White Box	
146	227746	6608557	*Eucalyptus albens*	White Box	
147	227749	6608571	*Eucalyptus albens*	White Box	
148	227744	6608583	*Eucalyptus albens*	White Box	
149	227728	6608594	*Eucalyptus albens*	White Box	
150	227745	6608599	*Eucalyptus albens*	White Box	
151	227764	6608604	*Eucalyptus albens*	White Box	
152	227794	6608614	*Eucalyptus albens*	White Box	

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Waypoint	Easting	Northing	Scientific name	Common name	Pre-clearing notes
153	227808	6608607	*Eucalyptus albens*	White Box	
154	227808	6608587	*Eucalyptus albens*	White Box	
155	227810	6608592	*Eucalyptus albens*	White Box	
156	227837	6608603	*Eucalyptus albens*	White Box	
157	227850	6608604	*Eucalyptus albens*	White Box	
158	227843	6608578	*Eucalyptus albens*	White Box	
159	227886	6608619	*Eucalyptus albens*	White Box	
160	227897	6608610	*Eucalyptus albens*	White Box	
161	227927	6608619	*Eucalyptus albens*	White Box	
162	227944	6608599	*Eucalyptus albens*	White Box	
163	227954	6608601	*Eucalyptus albens*	White Box	
164	227955	6608595	*Eucalyptus albens*	White Box	
165	227966	6608627	*Eucalyptus albens*	White Box	
166	227986	6608646	*Eucalyptus albens*	White Box	
167	227993	6608653	*Eucalyptus albens*	White Box	Brown Treecreeper
168	228025	6608641	*Eucalyptus albens*	White Box	
169	228037	6608617	*Eucalyptus albens*	White Box	
170	228007	6608623	*Eucalyptus albens*	White Box	
171	227993	6608615	*Eucalyptus albens*	White Box	
172	227986	6608620	*Eucalyptus albens*	White Box	
173	227971	6608593	*Eucalyptus albens*	White Box	
174	227970	6608586	*Eucalyptus albens*	White Box	
175	227988	6608581	*Eucalyptus albens*	White Box	
176	228018	6608595	*Eucalyptus crebra*	Narrow-leaved Ironbark	
177	227973	6608561	*Eucalyptus albens*	White Box	
178	227938	6608551	*Eucalyptus albens*	White Box	
179	227937	6608562	*Eucalyptus albens*	White Box	Possible scarred tree
180	227920	6608573	*Eucalyptus albens*	White Box	
181	227908	6608558		Stag	
182	227903	6608557	*Eucalyptus albens*	White Box	
183	227894	6608559	*Eucalyptus albens*	White Box	
184	227884	6608555		Tree stump	
185	227857	6608544	*Eucalyptus albens*	White Box	
186	227841	6608542	*Eucalyptus albens*	White Box	
187	227835	6608528	*Eucalyptus albens*	White Box	
188	227831	6608570	*Eucalyptus albens*	White Box	
189	227818	6608571	*Eucalyptus albens*	White Box	
190	227825	6608582	*Eucalyptus albens*	Stag	
191	227803	6608568	*Eucalyptus albens*	White Box	

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Waypoint	Easting	Northing	Scientific name	Common name	Pre-clearing notes
192	227785	6608574	*Eucalyptus albens*	White Box	
193	227761	6608520	*Eucalyptus albens*	White Box	
194	227757	6608504		Stag	
195	227744	6608517	*Eucalyptus crebra*	Narrow-leaved Ironbark	
196	227719	6608472	*Eucalyptus crebra*	Narrow-leaved Ironbark	
197	227701	6608499	*Eucalyptus crebra*	Narrow-leaved Ironbark	
198	227673	6608484		Stag	
199	227634	6608484	*Eucalyptus albens*	White Box	
200	227631	6608528	*Eucalyptus albens*	White Box	
201	227645	6608516	*Eucalyptus albens*	White Box	
202	227664	6608516	*Eucalyptus albens*	White Box	
203	227655	6608533	*Eucalyptus albens*	White Box	
204	227652	6608507	*Eucalyptus albens*	White Box	
205	227655	6608495	*Eucalyptus albens*	White Box	
206	227642	6608481	*Eucalyptus albens*	White Box	
207	227614	6608501		Stag	
208	227591	6608487	*Eucalyptus albens*	White Box	
209	227595	6608477	*Eucalyptus albens*	White Box	
210	227577	6608490	*Eucalyptus albens*	White Box	
211	227571	6608478	*Eucalyptus albens*	White Box	
212	227559	6608493	*Eucalyptus albens*	White Box	
213	227519	6608498	*Eucalyptus crebra*	Narrow-leaved Ironbark	
214	227477	6608483	*Eucalyptus crebra*	Narrow-leaved Ironbark	
215	227481	6608462	*Eucalyptus crebra*	Narrow-leaved Ironbark	
216	227524	6608443	*Eucalyptus albens*	White Box	
217	227526	6608441	*Eucalyptus albens*	White Box	
218	227542	6608448	*Eucalyptus albens*	White Box	
219	227549	6608453	*Eucalyptus albens*	White Box	
220	227557	6608453	*Eucalyptus albens*	White Box	
221	227554	6608446	*Eucalyptus albens*	White Box	
222	227582	6608466		Stag	
223	227610	6608447	*Eucalyptus albens*	White Box	
224	227591	6608418	*Eucalyptus albens*	White Box	
225	227578	6608422	*Eucalyptus albens*	White Box	
226	227569	6608422	*Eucalyptus albens*	White Box	
227	227575	6608407	*Eucalyptus crebra*	Narrow-leaved Ironbark	
228	227534	6608404	*Eucalyptus crebra*	Narrow-leaved Ironbark stump	
229	227518	6608413	*Eucalyptus albens*	White Box	
230	227482	6608364	*Eucalyptus albens*	White Box	
231	227521	6608346	*Eucalyptus albens*	White Box	

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Waypoint	Easting	Northing	Scientific name	Common name	Pre-clearing notes
232	227531	6608351	*Eucalyptus albens*	White Box	
233	227592	6608327		Stag	
234	227597	6608345	*Eucalyptus crebra*	Narrow-leaved Ironbark	
235	227597	6608354		Stag	
236	227597	6608369	*Eucalyptus crebra*	Narrow-leaved Ironbark	
237	227594	6608386	*Eucalyptus crebra*	Narrow-leaved Ironbark	
238	227596	6608391	*Eucalyptus albens*	White Box	
239	227613	6608391	*Eucalyptus albens*	White Box	
240	227624	6608372	*Eucalyptus crebra*	Narrow-leaved Ironbark	
241	227601	6608306	*Eucalyptus crebra*	Narrow-leaved Ironbark	
242	227559	6608286	*Eucalyptus crebra*	Narrow-leaved Ironbark	
243	227553	6608296	*Eucalyptus crebra*	Narrow-leaved Ironbark	
244	227564	6608269	*Eucalyptus crebra*	Narrow-leaved Ironbark	
245	227623	6608275	*Eucalyptus crebra*	Narrow-leaved Ironbark	
246	227637	6608284	*Eucalyptus crebra*	Narrow-leaved Ironbark	
247	227672	6608274	*Eucalyptus crebra*	Narrow-leaved Ironbark	stag
248	227683	6608257	*Eucalyptus crebra*	Narrow-leaved Ironbark	
249	227733	6608278	*Eucalyptus albens*	White Box	
250	227740	6608254	*Eucalyptus albens*	White Box	
251	227757	6608272	*Eucalyptus albens*	White Box	
252	227776	6608260	*Eucalyptus albens*	White Box	
253	227783	6608247	*Eucalyptus albens*	White Box	
254	227794	6608240	*Eucalyptus albens*	White Box	
255	227803	6608241	*Eucalyptus albens*	White Box	
256	227803	6608244	*Eucalyptus albens*	White Box	
257	227812	6608235		Tree stump	
258	227851	6608266	*Eucalyptus albens*	White Box	
259	227871	6608242	*Eucalyptus albens*	White Box	
260	227888	6608241	*Eucalyptus albens*	White Box	
261	227905	6608242	*Eucalyptus albens*	White Box	
262	227934	6608231	*Eucalyptus albens*	White Box	
263	227946	6608218	*Eucalyptus albens*	White Box	
264	227982	6608224	*Eucalyptus albens*	White Box	Fenced (heritage)
265	228037	6608214	*Eucalyptus albens*	White Box	
266	228101	6608199	*Eucalyptus albens*	White Box	
267	228113	6608204	*Eucalyptus albens*	White Box	
268	228112	6608214	*Eucalyptus albens*	White Box	
269	228123	6608213	*Eucalyptus albens*	White Box	
270	228158	6608231	*Eucalyptus albens*	White Box	
271	228164	6608244	*Eucalyptus albens*	White Box	

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Waypoint	Easting	Northing	Scientific name	Common name	Pre-clearing notes
272	228143	6608242	*Eucalyptus albens*	White Box	
273	228135	6608269	*Eucalyptus albens*	White Box	
274	228152	6608285	*Eucalyptus albens*	White Box	
275	228147	6608311		Stag	
276	228137	6608298	*Eucalyptus crebra*	Narrow-leaved Ironbark	
277	228141	6608324	*Eucalyptus albens*	White Box	
278	228136	6608332	*Eucalyptus albens*	White Box	
279	228141	6608341	*Eucalyptus albens*	White Box	
280	228131	6608369	*Eucalyptus albens*	White Box	
281	228092	6608518	*Eucalyptus crebra*	Narrow-leaved Ironbark stag	
282	228088	6608529	*Eucalyptus albens*	White Box	
283	228094	6608558	*Eucalyptus albens*	White Box	
284	228086	6608570	*Eucalyptus albens*	White Box	
285	228083	6608574	*Eucalyptus albens*	White Box	
286	228081	6608606	*Eucalyptus albens*	White Box	
287	228039	6608659	*Eucalyptus albens*	White Box	
288	228048	6608614	*Eucalyptus albens*	White Box	
289	228032	6608607	*Eucalyptus albens*	White Box	
290	228030	6608590	*Eucalyptus albens*	White Box	
291	228029	6608568	*Eucalyptus crebra*	Narrow-leaved Ironbark	
292	228037	6608565	*Eucalyptus crebra*	Narrow-leaved Ironbark	
293	228013	6608566	*Eucalyptus albens*	White Box	
294	227998	6608560	*Eucalyptus crebra*	Narrow-leaved Ironbark	
295	227983	6608551	*Eucalyptus albens*	White Box	
296	227976	6608535	*Eucalyptus albens*	White Box	
297	227952	6608523	*Eucalyptus albens*	White Box	
298	227409	6608416		Stag	
299	227391	6608422	*Eucalyptus crebra*	Narrow-leaved Ironbark	
300	227382	6608416	*Eucalyptus albens*	White Box	
301	227369	6608407		Stag	
302	227335	6608455	*Eucalyptus crebra*	Narrow-leaved Ironbark stag	
303	227348	6608464		Stag	
304	227358	6608480	*Eucalyptus crebra*	Narrow-leaved Ironbark stag	
305	227343	6608490	*Eucalyptus albens*	White Box	
306	227383	6608474	*Eucalyptus crebra*	Narrow-leaved Ironbark	
307	227399	6608501	*Eucalyptus crebra*	Narrow-leaved Ironbark	
308	227464	6608505		Stag	
309	227451	6608530	*Eucalyptus crebra*	Narrow-leaved Ironbark	
310	227651	6608338	*Eucalyptus crebra*	Narrow-leaved Ironbark	

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Waypoint	Easting	Northing	Scientific name	Common name	Pre-clearing notes
311	227657	6608357	*Eucalyptus crebra*	Narrow-leaved Ironbark	
312	227675	6608399	*Eucalyptus albens*	White Box	
313	227666	6608437	*Eucalyptus albens*	White Box	
314	227661	6608452	*Eucalyptus albens*	White Box	
315	227684	6608452	*Eucalyptus albens*	White Box	
316	227694	6608460		Tree stump	
317	227715	6608431	*Eucalyptus albens*	White Box	
318	227765	6608462	*Eucalyptus crebra*	Narrow-leaved Ironbark stag	
319	227782	6608491	*Eucalyptus albens*	White Box	
320	227799	6608475	*Eucalyptus albens*	White Box	
321	227794	6608488	*Eucalyptus albens*	White Box	
322	227797	6608491	*Eucalyptus albens*	White Box	
323	227788	6608520		Stag	
324	227794	6608525	*Eucalyptus albens*	White Box	
325	227798	6608532	*Eucalyptus albens*	White Box	
326	227820	6608505	*Eucalyptus albens*	White Box	
327	227842	6608501	*Eucalyptus albens*	White Box	
328	227851	6608498		Stag	
329	227868	6608507	*Eucalyptus albens*	White Box	
330	227893	6608509	*Eucalyptus albens*	White Box	
331	227918	6608507	*Eucalyptus albens*	White Box	
332	227921	6608513	*Eucalyptus albens*	White Box	
333	227923	6608527	*Eucalyptus albens*	White Box	
334	227939	6608537	*Eucalyptus albens*	White Box	
335	227975	6608517	*Eucalyptus albens*	White Box	
336	227977	6608510	*Eucalyptus albens*	White Box	
337	227974	6608492	*Eucalyptus albens*	White Box	
338	228000	6608497	*Eucalyptus albens*	White Box	
339	228003	6608529	*Eucalyptus albens*	White Box	
340	227989	6608539	*Eucalyptus albens*	White Box	
341	228018	6608544	*Eucalyptus albens*	White Box	
342	228015	6608530	*Eucalyptus albens*	White Box	
343	228029	6608553	*Eucalyptus crebra*	Narrow-leaved Ironbark	
344	228049	6608541	*Eucalyptus albens*	White Box	
345	228056	6608564	*Eucalyptus albens*	White Box	
346	228061	6608570	*Eucalyptus crebra*	Narrow-leaved Ironbark stag	
347	228067	6608596	*Eucalyptus albens*	White Box	
348	228039	6608515	*Eucalyptus albens*	White Box	
349	228055	6608510	*Eucalyptus albens*	White Box	
350	228045	6608496	*Eucalyptus crebra*	Narrow-leaved Ironbark	

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Waypoint	Easting	Northing	Scientific name	Common name	Pre-clearing notes
351	228021	6608511	*Eucalyptus albens*	White Box	
352	228018	6608493	*Eucalyptus albens*	White Box	
353	228018	6608477	*Eucalyptus albens*	White Box	
354	228003	6608483	*Eucalyptus albens*	White Box	
355	227990	6608470	*Eucalyptus albens*	White Box	
356	227967	6608469	*Eucalyptus albens*	White Box	
357	227934	6608461	*Eucalyptus albens*	White Box	
358	227919	6608455	*Eucalyptus crebra*	Narrow-leaved Ironbark	
359	227911	6608438	*Eucalyptus crebra*	Narrow-leaved Ironbark	
360	227907	6608449	*Eucalyptus albens*	White Box	
361	227896	6608445		Stag	
362	227875	6608478	*Eucalyptus albens*	White Box	
363	227867	6608457	*Eucalyptus albens*	White Box	
364	227851	6608472	*Eucalyptus albens*	White Box	
365	227806	6608450	*Eucalyptus albens*	White Box	
366	227770	6608424	*Eucalyptus albens*	White Box	
367	227757	6608407	*Eucalyptus albens*	White Box	
368	227748	6608403	*Eucalyptus albens*	White Box	
369	227769	6608404	*Eucalyptus albens*	White Box	
370	227762	6608397	*Eucalyptus albens*	White Box	
371	227722	6608409	*Eucalyptus albens*	White Box	
372	227711	6608377	*Eucalyptus albens*	White Box	
373	227683	6608304	*Eucalyptus albens*	White Box	
374	227735	6608315	*Eucalyptus crebra*	Narrow-leaved Ironbark	
375	227741	6608318	*Eucalyptus albens*	White Box	
376	227739	6608331	*Eucalyptus albens*	White Box	
377	227765	6608343	*Eucalyptus albens*	White Box	
378	227741	6608365	*Eucalyptus albens*	White Box	
379	227715	6608371	*Eucalyptus albens*	White Box	
380	227766	6608360	*Eucalyptus albens*	White Box	
381	227758	6608378	*Eucalyptus albens*	White Box	
382	227776	6608373	*Eucalyptus albens*	White Box	
383	227792	6608378	*Eucalyptus albens*	White Box	
384	227817	6608424	*Eucalyptus albens*	White Box	
385	227831	6608425	*Eucalyptus albens*	White Box	
386	227827	6608431	*Eucalyptus albens*	White Box	
387	227846	6608422	*Eucalyptus albens*	White Box	
388	227850	6608415	*Eucalyptus albens*	White Box	
389	227845	6608449	*Eucalyptus albens*	White Box	
390	227885	6608435	*Eucalyptus albens*	White Box	

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Waypoint	Easting	Northing	Scientific name	Common name	Pre-clearing notes
391	227900	6608418	*Eucalyptus albens*	White Box	
392	227892	6608417	*Eucalyptus albens*	White Box	
393	227916	6608421	*Eucalyptus albens*	White Box	
394	227954	6608422	*Eucalyptus albens*	White Box	
395	227968	6608460	*Eucalyptus albens*	White Box	
396	227965	6608443	*Eucalyptus crebra*	Narrow-leaved Ironbark	
397	228008	6608433	*Eucalyptus crebra*	Narrow-leaved Ironbark	
398	228017	6608446	*Eucalyptus albens*	White Box	
399	228021	6608450	*Eucalyptus albens*	White Box	
400	228023	6608429	*Eucalyptus albens*	White Box	
401	228034	6608467		Stag	
402	228047	6608462	*Eucalyptus crebra*	Narrow-leaved Ironbark	
403	228070	6608507	*Eucalyptus crebra*	Narrow-leaved Ironbark	
404	228061	6608506	*Eucalyptus crebra*	Narrow-leaved Ironbark	
405	228084	6608500	*Eucalyptus crebra*	Narrow-leaved Ironbark	
406	228095	6608429	*Eucalyptus crebra*	Narrow-leaved Ironbark	
407	228098	6608408	*Eucalyptus crebra*	Narrow-leaved Ironbark	
408	228105	6608392	*Eucalyptus crebra*	Narrow-leaved Ironbark	
409	228120	6608367	*Eucalyptus albens*	White Box	
410	228122	6608326	*Eucalyptus albens*	White Box	
411	228124	6608304	*Eucalyptus albens*	White Box	
412	228119	6608288		Stag	
413	228104	6608275	*Eucalyptus albens*	White Box	
414	228103	6608262		Tree stump	
415	228126	6608246	*Eucalyptus albens*	White Box	
416	228086	6608256	*Eucalyptus albens*	White Box	
417	228084	6608233	*Eucalyptus albens*	White Box	
418	228054	6608236	*Eucalyptus albens*	White Box	
419	228064	6608259	*Eucalyptus albens*	White Box	
420	228048	6608252	*Eucalyptus albens*	White Box	
421	228037	6608285	*Eucalyptus albens*	White Box	
422	228026	6608272	*Eucalyptus albens*	White Box	
423	228024	6608286	*Eucalyptus albens*	White Box	
424	228008	6608277	*Eucalyptus albens*	White Box	
425	228005	6608274	*Eucalyptus albens*	White Box	
426	227990	6608279	*Eucalyptus albens*	White Box	
427	228015	6608295	*Eucalyptus albens*	White Box	
428	228025	6608304	*Eucalyptus albens*	White Box	
429	228019	6608309	*Eucalyptus crebra*	Narrow-leaved Ironbark stag	

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Waypoint	Easting	Northing	Scientific name	Common name	Pre-clearing notes
430	228014	6608304		Stag	
431	228010	6608242	*Eucalyptus albens*	White Box	
432	227985	6608253	*Eucalyptus albens*	White Box	
433	227973	6608268	*Eucalyptus crebra*	Narrow-leaved Ironbark	
434	227970	6608266	*Eucalyptus crebra*	Narrow-leaved Ironbark	
435	227967	6608275	*Eucalyptus crebra*	Narrow-leaved Ironbark	
436	227963	6608267	*Eucalyptus crebra*	Narrow-leaved Ironbark	
437	227943	6608273	*Eucalyptus crebra*	Narrow-leaved Ironbark	
438	227954	6608269	*Eucalyptus crebra*	Narrow-leaved Ironbark	
439	227971	6608243	*Eucalyptus albens*	White Box	
440	227966	6608237	*Eucalyptus albens*	White Box	
441	227749	6608287	*Eucalyptus albens*	White Box	
442	227765	6608297	*Eucalyptus albens*	White Box	
443	227778	6608306	*Eucalyptus albens*	White Box	
444	227783	6608294	*Eucalyptus albens*	White Box	
445	227800	6608280	*Eucalyptus albens*	White Box	
446	227813	6608286	*Eucalyptus albens*	White Box	
447	227821	6608293	*Eucalyptus albens*	White Box	
448	227832	6608290	*Eucalyptus albens*	White Box	
449	227834	6608294	*Eucalyptus albens*	White Box	
450	227846	6608290	*Eucalyptus albens*	White Box	
451	227835	6608274	*Eucalyptus albens*	White Box	
452	227865	6608272	*Eucalyptus albens*	White Box	
453	227868	6608282		Stag	
454	227883	6608292		Stag	
455	227887	6608295	*Eucalyptus albens*	White Box	
456	227892	6608286	*Eucalyptus albens*	White Box	
457	227880	6608281	*Eucalyptus crebra*	Narrow-leaved Ironbark	
458	227928	6608277	*Eucalyptus crebra*	Narrow-leaved Ironbark stag	
459	227929	6608274	*Eucalyptus albens*	White Box	
460	227930	6608257	*Eucalyptus crebra*	Narrow-leaved Ironbark	
461	227947	6608244	*Eucalyptus albens*	White Box	
462	227962	6608232	*Eucalyptus albens*	White Box	
463	227975	6608237	*Eucalyptus albens*	White Box	
464	228005	6608335	*Eucalyptus crebra*	Narrow-leaved Ironbark	
465	228013	6608367	*Eucalyptus crebra*	Narrow-leaved Ironbark stag	
466	227997	6608362	*Eucalyptus albens*	White Box	
467	228010	6608376	*Eucalyptus crebra*	Narrow-leaved Ironbark	
468	227976	6608389		Tree stump	
469	227929	6608360	*Eucalyptus crebra*	Narrow-leaved Ironbark	

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Waypoint	Easting	Northing	Scientific name	Common name	Pre-clearing notes
470	227934	6608353	*Eucalyptus albens*	White Box	
471	227916	6608356	*Eucalyptus albens*	White Box	
472	227919	6608401		Stag	
473	227912	6608403	*Eucalyptus albens*	White Box	
474	227884	6608364	*Eucalyptus albens*	White Box	
475	227885	6608346	*Eucalyptus albens*	White Box	
476	227909	6608324	*Eucalyptus albens*	White Box	
477	227900	6608329		Tree stump	
478	228080	6608286		Tree stump	
479	228098	6608298	*Eucalyptus albens*	White Box	
480	228087	6608345	*Eucalyptus crebra*	Narrow-leaved Ironbark	
481	228076	6608366	*Eucalyptus crebra*	Narrow-leaved Ironbark	
482	228074	6608399	*Eucalyptus crebra*	Narrow-leaved Ironbark	
483	228070	6608319	*Eucalyptus crebra*	Narrow-leaved Ironbark	
484	228061	6608314	*Eucalyptus crebra*	Narrow-leaved Ironbark	
485	228054	6608304	*Eucalyptus albens*	White Box	
486	228044	6608300	*Eucalyptus albens*	White Box	
487	228037	6608307	*Eucalyptus albens*	White Box	
488	227967	6608353	*Eucalyptus albens*	White Box	
489	227961	6608356	*Eucalyptus albens*	White Box	
490	227946	6608323	*Eucalyptus albens*	White Box	
491	227953	6608327	*Eucalyptus albens*	White Box	
492	227948	6608309	*Eucalyptus albens*	White Box	
493	227979	6608312	*Eucalyptus albens*	White Box	
494	227968	6608310	*Eucalyptus albens*	White Box	
495	227975	6608302	*Eucalyptus crebra*	Narrow-leaved Ironbark	
496	227883	6608327	*Eucalyptus albens*	White Box	
497	227874	6608310	*Eucalyptus albens*	White Box	
498	227849	6608305	*Eucalyptus albens*	White Box	
499	227845	6608302	*Eucalyptus albens*	White Box	
500	227856	6608318	*Eucalyptus albens*	White Box	
501	227842	6608317	*Eucalyptus albens*	White Box	
502	227847	6608338	*Eucalyptus albens*	White Box	
503	227847	6608349	*Eucalyptus crebra*	Narrow-leaved Ironbark	
504	227865	6608359		Tree stump	
505	227882	6608384	*Eucalyptus crebra*	Narrow-leaved Ironbark	
506	227875	6608386	*Eucalyptus albens*	White Box	
507	227880	6608367	*Eucalyptus crebra*	Narrow-leaved Ironbark	
508	227878	6608373	*Eucalyptus crebra*	Narrow-leaved Ironbark	
509	227867	6608361	*Eucalyptus albens*	White Box	

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Waypoint	Easting	Northing	Scientific name	Common name	Pre-clearing notes
510	227846	6608383	*Eucalyptus albens*	White Box	
511	227859	6608394	*Eucalyptus albens*	White Box	
512	227864	6608413	*Eucalyptus albens*	White Box	
513	227854	6608414	*Eucalyptus albens*	White Box	
514	227848	6608408	*Eucalyptus albens*	White Box	
515	227827	6608360	*Eucalyptus albens*	White Box	
516	227813	6608358	*Eucalyptus crebra*	Narrow-leaved Ironbark	
517	227801	6608338	*Eucalyptus albens*	White Box	
518	227798	6608363	*Eucalyptus albens*	White Box	
519	227797	6608370	*Eucalyptus albens*	White Box	
520	227767	6608335	*Eucalyptus albens*	White Box	
521	227773	6608326	*Eucalyptus albens*	White Box	
522	227828	6608303	*Eucalyptus albens*	White Box	
523	227826	6608279	*Eucalyptus albens*	White Box	
524	227817	6608279	*Eucalyptus albens*	White Box	
525	228112	6608645	*Eucalyptus crebra*	Narrow-leaved Ironbark	
527	227975	6608350	*Eucalyptus microcarpa*	Grey Box	
528	229386	6607438		Stag	1M
529	229383	6607433		Stag	1S
530	229398	6607405	*Eucalyptus crebra*		1S
531	229389	6607380	*Eucalyptus crebra*		1M, 1S
532	229367	6607346	*Eucalyptus crebra*		1M
533	229424	6606957		Stag	2S
534	229395	6606949	*Eucalyptus crebra*		3S
535	229385	6606928		Stag	1S
536	229341	6606901		Stag	2M, 3S
537	229437	6606909	*Eucalyptus crebra*		2M, 2S
538	229461	6606891	*Eucalyptus crebra*		2M, 2S
539	229449	6606892		Stag	1S
540	229495	6606900	*Eucalyptus crebra*		2S
541	229497	6606902	*Eucalyptus crebra*		2M, 2S
542	229502	6606911		Stag	1S
543	229508	6606911		Stag	2S
544	229521	6606899		Stag	1M, 5S
545	229487	6606942		Stag	1L, 4M
546	229485	6606943		Stag	1L
547	229482	6606942		Stag	2S
548	229480	6606961		Stag	3M
549	229463	6606984		Stag	1S

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Appendix B Tree clearing protocol

The protocol used to fell the trees is recommended to be as follows:

1) As much as possible, plan and progress vegetation clearing that maximises the potential for displaced fauna to move ahead of the clearing towards remaining vegetation.
2) The nearest veterinary clinic, wildlife carer and/or an appropriately trained ecologist phone numbers should be on hand if any fauna is injured during clearing of trees.
3) All trees are to be visually inspected by a qualified ecologist or suitably trained person for fauna immediately prior to tree removal.
4) Care should be taken to allow all fauna to vacate a given tree prior to felling.
5) Felled hollow bearing trees should *in situ* for a minimum of 24 hours prior to mulching operations to provide fauna the opportunity to move to alternative habitat (for example, if they could not be captured and relocated).
6) Where possible and practical to do so, habitat trees and or habitat features (Large Woody Debris) should be utilised within appropriate rehabilitation area (or natural areas) for fauna habitat augmentation.
7) Pre-felling procedures for all trees to be felled include shaking or nudging tree trunks with the dozer blade to evacuate mobile fauna, such as birds. The following are possible scenarios and the appropriate procedure to manage these scenarios:
    a. If microchiropteran bats or other nocturnal hollow dwelling fauna are still observed within the tree following pre-felling procedures (i.e. tree shaking), the tree is to be retained in the short term and the following procedure should be applied:
        i. Appropriate licenses to “harm” fauna under the *National Parks and Wildlife Act 1974* are to be sourced prior to the felling works;
        ii. An appropriately trained and licensed ecologist with Lyssa Virus vaccination should be contacted and be present during the felling process (Note: Australian Microchiropteran bats can carry Lyssa Virus, a debilitating disease similar to rabies);
        iii. The nearest veterinary clinic and wildlife carer phone number should be on hand;
        iv. Each hollow-bearing section of the tree is to be lopped and carefully lowered to the ground;
        v. All data on species and number of hollow bearing fauna is to be recorded;
        vi. Once on the ground each hollow is to be inspected for resident fauna. And any injured fauna are to be cared for;
        vii. The hollow-bearing limb should then be removed from the tree and positioned in a nearby safe and appropriate location at the same aspect and height of its original location.
    b. All hollow-bearing trees are to undergo a controlled lowering.

For non-hollow-bearing trees, if no fauna are observed to be within a tree to be felled, the “slow drop” technique is to be used to fell the tree. This involves nudging and shaking the tree, followed by a slow drop.

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Appendix C Opportunistic observations

Species
Australian Hobby *Falco longipennis*
Australian King-Parrot *Alisterus scapularis*
Australian Magpie *Cracticus tibicen*
Australian Raven *Corvus coronoides*
Australian Wood Duck *Chenonetta jubata*
Brown Quail *Coturnix ypsilophora*
Brown Treecreeper *Climacteris picumnus*
Brown-headed Honeyeater *Melithreptus brevirostris*
Common Bronzewing *Phaps chalcoptera*
Crested Pigeon *Ocyphaps lophotes*
Crested Shrike-tit *Falcunculus frontatus*
Double-barred Finch *Taeniopygia bichenovii*
Dusky Woodswallow *Artamus cyanopterus*
Eastern Rosella *Platycercus eximius*
Eastern Yellow Robin *Eopsaltria australis*
Galah *Eolophus roseicapillus*
Grey Fantail *Rhipidura albiscapa*
Grey Shrike-thrush *Colluricincla harmonica*
Inland Thornbill *Acanthiza apicalis*
Jacky Winter *Microeca fascinans*
Laughing Kookaburra *Dacelo novaeguineae*
Magpie-lark *Grallina cyanoleuca*
Mistletoebird *Dicaeum hirundinaceum*
Nankeen Kestrel *Falco cenchroides*
Nankeen Night Heron *Nycticorax caledonicus*
Noisy Friarbird *Philemon corniculatus*
Noisy Miner *Manorina melanocephala*
Painted Button-quail *Turnix varia*
Peaceful Dove *Geopelia striata*
Pied Butcherbird *Cracticus nigrogularis*
Pied Currawong *Strepera graculina*
Rufous Whistler *Pachycephala rufiventris*
Shining Bronze-Cuckoo *Chalcites basalis*
Speckled Warbler *Chthonicola sagittata*
Spiny-cheeked Honeyeater *Acanthagenys rufogularis*
Spotted Pardalote *Pardalotus punctatus*

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Striated Pardalote *Pardalotus striatus*
Striped Honeyeater *Plectorhyncha lanceolata*
Superb Fairy-wren *Malurus cyaneus*
Turquoise Parrot *Neophema pulchella*
Variegated Fairy-wren *Malurus lamberti*
Wedge-tailed Eagle *Aquila audax*
Weebill *Smicrornis brevirostris*
White-bellied Cuckoo-shrike *Coracina papuensis*
White-browed Babbler *Pomatostomus superciliosus*
White-faced Heron *Egretta novaehollandiae*
White-plumed Honeyeater *Lichenostomus penicillatus*
White-throated Treecreeper *Cormobates leucophaea*
Willie Wagtail *Rhipidura leucophrys*
Yellow Thornbill *Acanthiza nana*
Yellow-faced Honeyeater *Lichenostomus chrysops*

Mammals:
*Fox *Vulpes vulpes*
*Hare *Lepus capensis*
*Rabbit *Oryctolagus cuniculus*
Common Wallaroo *Macropus robustus*
Eastern Grey Kangaroo *Macropus giganteus*
Swamp Wallaby *Wallabia bicolor*

Reptiles:
Lace Monitor *Varanus varius*
Tree Dragon *Amphibolurus muricatus*
Tree Skink *Egernia striolata*

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Project number – 837

16 January 2015

Dear Lachlan,

Re: Tarrawonga Mine Clearing Supervision (December, 2014)

Ecologist Ben Martin undertook clearing supervision at Tarrawonga Mine on 19th December, 2014. The weather during this period was hot and dry with the temperature ranging from 15.5°C – 34.1°C. Clearing supervision was undertaken on a number of stags and trees located within the open cut extension area to the east of current mining operations within Mining Lease 1685. A pre-clearing assessment was undertaken on 10 ha of woodland by Eco Logical Australia in November 2014, results of which are documented in '*Tarrawonga Coal Mine – Pre-clearing survey* (ELA 2014)[1]'.

A total of 59 habitat trees were removed during clearing works. Fauna observed within the disturbance area included four Robust Velvet Gecko's (*Oedura robusta*), which were captured and relocated during clearing. Table 1 below shows the location of fauna observed. No injury to fauna occurred during the clearing.

Table 1: Results from clearing supervision

Area	Easting	Northing	Fauna	Comments
Eastern extension area	229561	6607054	Robust Velvet Gecko	*Eucalyptus crebra*
	229539	6607190	2 x Robust Velvet Gecko	*Eucalyptus crebra*
	229538	6607249	Robust Velvet Gecko	*Eucalyptus crebra*

If you have any questions regarding the above, please do not hesitate to contact me on 02 8081 2686.

Yours sincerely,



Ben Martin

Ecologist

[1] Eco Logical 2014. *Tarrawonga Coal Mine – Pre-clearing survey (November, 2014).* Prepared for Tarrawonga Coal Pty Ltd

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Lachlan Johnson
Environmental Officer
Tarrawonga Coal Pty Ltd
PO Box 600
GUNNEDAH, NSW 2380

Project number: 1094

12 February, 2015

Dear Lachlan,

Re: Tarrawonga Mine pre-clearing survey – Northern Extension Area Stage 2 and Clean Water Diversion Drain.

Ben Martin and Linden Burch of Eco Logical Australia Pty Ltd (ELA) undertook a pre-clearing survey of the proposed Northern Extension Area Stage 2 and Clean Water Diversion Drain at Tarrawonga Mine on 10 and 11 February, 2015. Maximum daily temperatures ranged between 33°C and 35°C (Bureau of Meteorology - Gunnedah Airport AWS station 055202).

The purpose of this survey was to identify and flag any habitat and/or hollow-bearing trees and to identify any threatened species that occur within the proposed disturbance areas. We were also required to mark potential salvage trees. The proposed disturbance areas are located to the north, and east of current mining operations, within the Leard State Forest. Two distinct vegetation communities are present on site, Grey Box shrubby woodland, and Narrow-leaved Ironbark – Black Cypress Pine shrubby woodland (

Table 1).

Table 1: Vegetation description and ecological constraints

Area	Vegetation Community	Constraints
Northern Extension Area Stage 2 (Approximately 17 ha)	Grey Box shrubby woodland, Narrow-leaved Ironbark – Callitris glaucophylla shrubby woodland	352 Habitat features were identified, including 348 hollow-bearing trees (HBT) and 4 Large Woody Debris (LWD). 55 HBT and 4 LWD were marked for salvage. Two threatened bird species were observed, Turquoise Parrot and Brown Treecreeper.
Clean Water Diversion Drain (Approximately 2 ha)	Grey Box shrubby woodland, Narrow-leaved Ironbark – Callitris glaucophylla shrubby woodland	29 Habitat features were identified, including 27 HBT and 2 LWD. 6 HBT and 2 LWD were marked for

Area	Vegetation Community	Constraints
		salvage.

The proposed disturbance area consists of Grey Box shrubby woodland, and Narrow-leaved Ironbark – White Cypress Pine shrubby woodland. A total of 375 HBT and 6 LWD were recorded within the proposed disturbance area, of which 61 HBT and 6 LWD were marked for salvage. A full inventory of each habitat feature and the number of hollows can be found in Attachment A.

Two species listed as vulnerable under the *Threatened Species Conservation Act 1995* were observed in the proposed disturbance areas: *Climacteris picumnus* (Brown Treecreeper) and *Neophema pulchella* (Turquoise Parrot). The survey area joins onto Leard State Forest to the east and could be expected to support the same suite of threatened fauna species as recorded within the proposed disturbance area. Additional bird species that are likely to use this habitat include Glossy Black-Cockatoo, Little Lorikeet, Speckled Warbler and Varied Sittella (all listed under the TSC Act). The hollow-bearing trees detailed in Attachment A may also provide roosting habitat for a number of threatened microbat species.

The clearing protocol provided in Attachment B should be followed for the flagged trees within the survey area. As the proposed disturbance areas are located on the fringe of a large tract of suitable fauna habitat in the form of undisturbed woodland, it is likely that any fauna present will have an opportunity to move east away from clearing works. It is recommended that all clearing commences from the western edge and slowly moves east to maximise the potential for displaced fauna to move ahead of the clearing towards the large area of remaining vegetation. As per the provided clearing protocol (Attachment B), a suitably trained ecologist must be present during clearing and suitable equipment for capturing and storing injured fauna must be available during clearing operations.

Please contact me on 02 8081 2686 if you have any questions with regards to the above.

Yours sincerely,



Ben Martin
Ecologist

ATTACHMENT A: Inventory of habitat features and threatened species recorded

Easting	Northing	Species	Hollow Size*	Comments
804015	6607490	*Eucalyptus crebra*	2M	
803777	6607749	*Eucalyptus crebra*	5M	
803766	6607783	*Eucalyptus crebra*	1L	Salvage
803762	6607784	*Eucalyptus crebra*	2L 4M 2S	Salvage
803763	6607789	*Eucalyptus crebra*	2L 2M	Salvage
803772	6607723	*Eucalyptus crebra*	3M	
803802	6607690	*Eucalyptus crebra*	2M	
803863	6607600	*Eucalyptus crebra*	3S	
803995	6607475	*Eucalyptus crebra*	1M	
803337	6607531	*Eucalyptus crebra*	1L 2M	
803355	6607593	*Eucalyptus crebra*	2M 4S	
803394	6607810	*Eucalyptus crebra*	4L 2M	
803420	6607764	*Eucalyptus crebra*	1L 4M	
803419	6607713	*Eucalyptus crebra*	3L 3M	Salvage
803367	6607555	*Eucalyptus crebra*	1L	
803658	6607526	*Eucalyptus crebra*	3M	
803697	6607718	*Eucalyptus crebra*	1L	Salvage
803710	6607808	*Eucalyptus crebra*	2M 1S	
803688	6607795	*Eucalyptus crebra*	2L	
803590	6607585	*Eucalyptus crebra*	4S	
803488	6607724	*Eucalyptus crebra*	2L 2M	
803516	6607725	*Eucalyptus crebra*	3M	
803478	6607637	*Eucalyptus crebra*	3M	
803477	6607625	*Eucalyptus crebra*	1M	
803799	6607706	*Eucalyptus fibrosa*	2L 3M	Salvage
804033	6607418	*Eucalyptus microcarpa*	2M 1S	
804047	6607422	*Eucalyptus microcarpa*	1L	Salvage
804048	6607426	*Eucalyptus microcarpa*	1M	
804047	6607440	*Eucalyptus microcarpa*	3L 2M	
804025	6607436	*Eucalyptus microcarpa*	1L 3M	Salvage
804037	6607460	*Eucalyptus microcarpa*	3L	Salvage

Easting	Northing	Species	Hollow Size*	Comments
804019	6607466	*Eucalyptus microcarpa*	3L 2M	
803620	6607301	*Eucalyptus microcarpa*	1M 1S	
803617	6607298	*Eucalyptus microcarpa*	2L	
803605	6607320	*Eucalyptus microcarpa*	1L 3S	
803589	6607287	*Eucalyptus microcarpa*	2L 2M 2S	
803567	6607293	*Eucalyptus microcarpa*	5L 3M	Salvage
803565	6607308	*Eucalyptus microcarpa*	2L 3M 2S	
803543	6607326	*Eucalyptus microcarpa*	3L 3M	Salvage
803538	6607307	*Eucalyptus microcarpa*	1L 2M	
803520	6607305	*Eucalyptus microcarpa*	1S	
803533	6607331	*Eucalyptus microcarpa*	1M 1S	
803516	6607324	*Eucalyptus microcarpa*	2M	
803488	6607312	*Eucalyptus microcarpa*	1M	
803459	6607312	*Eucalyptus microcarpa*	2M 3S	
803450	6607311	*Eucalyptus microcarpa*	3M 4S	
803461	6607323	*Eucalyptus microcarpa*	2L 2M	
803468	6607328	*Eucalyptus microcarpa*	1M	
803450	6607343	*Eucalyptus microcarpa*	2M 2S	
803493	6607361	*Eucalyptus microcarpa*	2L	
803494	6607362	*Eucalyptus microcarpa*	2M	
803478	6607359	*Eucalyptus microcarpa*	2L 2M	
803465	6607360	*Eucalyptus microcarpa*	1L 1M	
803458	6607364	*Eucalyptus microcarpa*	2M 3S	
803442	6607360	*Eucalyptus microcarpa*	2L	
803445	6607384	*Eucalyptus microcarpa*	5L 3M	
803424	6607377	*Eucalyptus microcarpa*	2L 3M 1S	
803404	6607383	*Eucalyptus microcarpa*	2L 1M	
803378	6607419	*Eucalyptus microcarpa*	1L	
803371	6607425	*Eucalyptus microcarpa*	2M	
803369	6607427	*Eucalyptus microcarpa*	1L	
803342	6607419	*Eucalyptus microcarpa*	3L	
803309	6607408	*Eucalyptus microcarpa*	3L 3M	

Easting	Northing	Species	Hollow Size*	Comments
803323	6607429	*Eucalyptus microcarpa*	2L 3M	
803319	6607446	*Eucalyptus microcarpa*	4M	
803335	6607461	*Eucalyptus microcarpa*	2M	
803326	6607476	*Eucalyptus microcarpa*	2L 2M	
803339	6607483	*Eucalyptus microcarpa*	1M	
803333	6607488	*Eucalyptus microcarpa*	1L 1M	
803333	6607490	*Eucalyptus microcarpa*	1L	Salvage
803330	6607496	*Eucalyptus microcarpa*	4M	Salvage
803341	6607508	*Eucalyptus microcarpa*	1M	
803343	6607520	*Eucalyptus microcarpa*	1S	
803371	6607586	*Eucalyptus microcarpa*	3L 2M	Raptors nest
803373	6607610	*Eucalyptus microcarpa*	3M 2S	
803383	6607614	*Eucalyptus microcarpa*	2S	
803383	6607628	*Eucalyptus microcarpa*	2M 2S	
803375	6607625	*Eucalyptus microcarpa*	1M 1S	
803371	6607629	*Eucalyptus microcarpa*	2L 1M	Salvage
803367	6607634	*Eucalyptus microcarpa*	2L 2M	
803377	6607656	*Eucalyptus microcarpa*	2M 1S	
803382	6607671	*Eucalyptus microcarpa*	2L	
803368	6607698	*Eucalyptus microcarpa*	2L 3M	
803393	6607709	*Eucalyptus microcarpa*	2M 2S	
803390	6607770	*Eucalyptus microcarpa*	2L 2M	
803402	6607783	*Eucalyptus microcarpa*	2M 3S	
803406	6607824	*Eucalyptus microcarpa*	2L	
803423	6607830	*Eucalyptus microcarpa*	1L 2M	Salvage
803413	6607816	*Eucalyptus microcarpa*	3L 5M	
803428	6607790	*Eucalyptus microcarpa*	3L 2M	
803417	6607785	*Eucalyptus microcarpa*	1L	Salvage
803413	6607787	*Eucalyptus microcarpa*	2M 2S	
803432	6607783	*Eucalyptus microcarpa*	4L 6M 3S	Salvage
803414	6607727	*Eucalyptus microcarpa*	2L 3M	
803433	6607715	*Eucalyptus microcarpa*	1L 4M	

Easting	Northing	Species	Hollow Size*	Comments
803401	6607660	*Eucalyptus microcarpa*	3L	
803393	6607640	*Eucalyptus microcarpa*		
803393	6607643	*Eucalyptus microcarpa*	7L 5M 5S	Salvage
803405	6607609	*Eucalyptus microcarpa*	1L 2M	
803397	6607611	*Eucalyptus microcarpa*	1M	
803388	6607604	*Eucalyptus microcarpa*	1L 6M	
803367	6607533	*Eucalyptus microcarpa*	2L	
803365	6607526	*Eucalyptus microcarpa*	4M	
803364	6607502	*Eucalyptus microcarpa*	1L	
803361	6607503	*Eucalyptus microcarpa*	2L	
803370	6607491	*Eucalyptus microcarpa*	1L 3M	
803362	6607488	*Eucalyptus microcarpa*	4M	
803347	6607472	*Eucalyptus microcarpa*	1M	
803355	6607459	*Eucalyptus microcarpa*	2M	
803353	6607456	*Eucalyptus microcarpa*	2L	
803335	6607438	*Eucalyptus microcarpa*	1L	
803373	6607437	*Eucalyptus microcarpa*	1L 1M	
803381	6607434	*Eucalyptus microcarpa*	2M 2S	
803389	6607426	*Eucalyptus microcarpa*	4L 6M	
803409	6607396	*Eucalyptus microcarpa*	1L 1M 1S	
803420	6607393	*Eucalyptus microcarpa*	2M 2S	
803453	6607385	*Eucalyptus microcarpa*	2M 3S	
803465	6607375	*Eucalyptus microcarpa*	5L 5M	
803489	6607378	*Eucalyptus microcarpa*	1L	
803510	6607361	*Eucalyptus microcarpa*	1L 1M	
803625	6607377	*Eucalyptus microcarpa*	4L 7M 5S	Salvage
803628	6607390	*Eucalyptus microcarpa*	2M 1S	
803640	6607428	*Eucalyptus microcarpa*	4L 5M 3S	Salvage
803633	6607452	*Eucalyptus microcarpa*	1L 4M	Salvage
803638	6607465	*Eucalyptus microcarpa*	1M	
803638	6607478	*Eucalyptus microcarpa*	1M 1S	
803659	6607494	*Eucalyptus microcarpa*	3M	

Easting	Northing	Species	Hollow Size*	Comments
803669	6607507	*Eucalyptus microcarpa*	1M	
803657	6607547	*Eucalyptus microcarpa*	3S	
803666	6607581	*Eucalyptus microcarpa*	2M	
803664	6607603	*Eucalyptus microcarpa*	1M	
803666	6607645	*Eucalyptus microcarpa*	2L 3M	
803684	6607661	*Eucalyptus microcarpa*	2M	
803687	6607660	*Eucalyptus microcarpa*	3S	
803685	6607704	*Eucalyptus microcarpa*	1M 1S	
803655	6607810	*Eucalyptus microcarpa*	1L 2M 1S	
803666	6607813	*Eucalyptus microcarpa*	1L	
803627	6607824	*Eucalyptus microcarpa*	2L 4M	Salvage
803630	6607811	*Eucalyptus microcarpa*	3M	
803623	6607808	*Eucalyptus microcarpa*	3M	
803616	6607810	*Eucalyptus microcarpa*	2L 2M	
803590	6607825	*Eucalyptus microcarpa*	3L 7M 4S	
803584	6607813	*Eucalyptus microcarpa*	5L 10M 8S	
803562	6607814	*Eucalyptus microcarpa*	3L 7M	
803565	6607823	*Eucalyptus microcarpa*	1L	
803559	6607822	*Eucalyptus microcarpa*	2L 4M 4S	
803546	6607818	*Eucalyptus microcarpa*	3M	
803542	6607807	*Eucalyptus microcarpa*	1L 4M	
803540	6607807	*Eucalyptus microcarpa*	1L 5M 5S	
803537	6607811	*Eucalyptus microcarpa*	3M	
803531	6607809	*Eucalyptus microcarpa*	1M	
803529	6607802	*Eucalyptus microcarpa*	1L 1M 5S	
803485	6607821	*Eucalyptus microcarpa*	1M	
803448	6607835	*Eucalyptus microcarpa*	1L	
803429	6607839	*Eucalyptus microcarpa*	3M	
803461	6607799	*Eucalyptus microcarpa*	2M	
803450	6607782	*Eucalyptus microcarpa*	3L 5M 1S	
803469	6607781	*Eucalyptus microcarpa*	2L	Salvage
803475	6607783	*Eucalyptus microcarpa*	3L 3M	Salvage

Easting	Northing	Species	Hollow Size*	Comments
803451	6607767	*Eucalyptus microcarpa*	2L 1M	
803457	6607754	*Eucalyptus microcarpa*	1L 4M	
803469	6607724	*Eucalyptus microcarpa*	3L 2M	Salvage
803463	6607697	*Eucalyptus microcarpa*	1L 5M 5S	
803446	6607690	*Eucalyptus microcarpa*	1L	
803464	6607689	*Eucalyptus microcarpa*	1M	
803430	6607664	*Eucalyptus microcarpa*	1L 1M	
803416	6607666	*Eucalyptus microcarpa*	6L 3M 3S	
803417	6607631	*Eucalyptus microcarpa*	3M	
803410	6607626	*Eucalyptus microcarpa*	2L 1M 1S	
803427	6607625	*Eucalyptus microcarpa*	3M	
803434	6607615	*Eucalyptus microcarpa*	3S	
803417	6607604	*Eucalyptus microcarpa*	1L	
803413	6607588	*Eucalyptus microcarpa*	5M 4S	
803376	6607528	*Eucalyptus microcarpa*	1L	Salvage
803381	6607506	*Eucalyptus microcarpa*	4L	Salvage
803421	6607405	*Eucalyptus microcarpa*	2M	
803425	6607399	*Eucalyptus microcarpa*	2M	
803419	6607402	*Eucalyptus microcarpa*	1M 4S	
803411	6607437	*Eucalyptus microcarpa*	2L 4M 4S	Salvage
803418	6607448	*Eucalyptus microcarpa*	1L 4M	Salvage
803407	6607457	*Eucalyptus microcarpa*	3M	
803393	6607453	*Eucalyptus microcarpa*	4S	
803385	6607466	*Eucalyptus microcarpa*	3S	
803373	6607445	*Eucalyptus microcarpa*	2L 3M	
803378	6607453	*Eucalyptus microcarpa*	1L	Salvage
803357	6607447	*Eucalyptus microcarpa*	3M	
803395	6607472	*Eucalyptus microcarpa*	3L 3M	
803411	6607462	*Eucalyptus microcarpa*	3L 2M	Salvage
803407	6607483	*Eucalyptus microcarpa*	2L 5S	
803411	6607473	*Eucalyptus microcarpa*	1L 2M	Salvage
803434	6607471	*Eucalyptus microcarpa*	1L 2M	

Easting	Northing	Species	Hollow Size*	Comments
803458	6607468	*Eucalyptus microcarpa*	1L	
803466	6607452	*Eucalyptus microcarpa*	3L 5S	
803464	6607433	*Eucalyptus microcarpa*	1L 7M	
803450	6607447	*Eucalyptus microcarpa*	1L 4M	
803427	6607427	*Eucalyptus microcarpa*	3L 1M	
803464	6607397	*Eucalyptus microcarpa*	2M	
803475	6607397	*Eucalyptus microcarpa*	2L	
803490	6607382	*Eucalyptus microcarpa*	1L	
803521	6607385	*Eucalyptus microcarpa*	3L 2M	
803522	6607367	*Eucalyptus microcarpa*	4L 5M 2S	
803556	6607361	*Eucalyptus microcarpa*	3L 7M	Salvage
803562	6607339	*Eucalyptus microcarpa*	3M	Salvage
803584	6607349	*Eucalyptus microcarpa*	3L 1M	
803633	6607331	*Eucalyptus microcarpa*	2L 2M	Salvage
803638	6607320	*Eucalyptus microcarpa*	2L	
803609	6607397	*Eucalyptus microcarpa*	4L 5M	Salvage
803625	6607429	*Eucalyptus microcarpa*	3L 5M	
803624	6607458	*Eucalyptus microcarpa*	2L 3M 2S	
803622	6607471	*Eucalyptus microcarpa*	6L 6M 5S	Salvage
803632	6607494	*Eucalyptus microcarpa*	1M 2S	
803626	6607526	*Eucalyptus microcarpa*	3M	
803641	6607582	*Eucalyptus microcarpa*	3L 2M 2S	
803667	6607616	*Eucalyptus microcarpa*	1M 1S	
803648	6607654	*Eucalyptus microcarpa*	1L 2M	
803651	6607677	*Eucalyptus microcarpa*	1M 1S	
803653	6607718	*Eucalyptus microcarpa*	3M 1S	
803681	6607719	*Eucalyptus microcarpa*	3M 4S	
803675	6607725	*Eucalyptus microcarpa*	2L 1M	
803675	6607728	*Eucalyptus microcarpa*	2L 1M 1S	
803659	6607740	*Eucalyptus microcarpa*	4L 1M	Salvage
803682	6607759	*Eucalyptus microcarpa*	3L 3M 5S	
803645	6607756	*Eucalyptus microcarpa*	4L 5M 3S	

Easting	Northing	Species	Hollow Size*	Comments
803648	6607754	*Eucalyptus microcarpa*	2L 2M 1S	
803647	6607732	*Eucalyptus microcarpa*	2L 2M	Salvage
803644	6607725	*Eucalyptus microcarpa*	4L 1M	
803619	6607629	*Eucalyptus microcarpa*	1L 1M	
803608	6607473	*Eucalyptus microcarpa*	1M	
803598	6607448	*Eucalyptus microcarpa*	2M 1S	
803603	6607441	*Eucalyptus microcarpa*	1L 3M	
803605	6607429	*Eucalyptus microcarpa*	3L 4M	
803603	6607375	*Eucalyptus microcarpa*	2M 3S	
803588	6607407	*Eucalyptus microcarpa*	8L 12M 13S	Salvage
803584	6607435	*Eucalyptus microcarpa*	4L 5M	Salvage
803588	6607464	*Eucalyptus microcarpa*	2L	
803586	6607461	*Eucalyptus microcarpa*	2L	Salvage
803580	6607484	*Eucalyptus microcarpa*	1L	
803573	6607489	*Eucalyptus microcarpa*	1L 2M	
803598	6607608	*Eucalyptus microcarpa*	2L 7M	Salvage
803579	6607640	*Eucalyptus microcarpa*	3L 5M	
803604	6607710	*Eucalyptus microcarpa*	3L 4M 1S	
803610	6607728	*Eucalyptus microcarpa*	3M 4S	
803625	6607737	*Eucalyptus microcarpa*	3M 8S	
803631	6607734	*Eucalyptus microcarpa*	4M 5S	
803625	6607774	*Eucalyptus microcarpa*	3L 7M 4S	
803609	6607752	*Eucalyptus microcarpa*	2L 5M	
803576	6607709	*Eucalyptus microcarpa*	2M 3S	
803586	6607706	*Eucalyptus microcarpa*	1M 4S	
803575	6607629	*Eucalyptus microcarpa*	1L	
803576	6607624	*Eucalyptus microcarpa*	1L 2M	
803568	6607621	*Eucalyptus microcarpa*	1L	
803566	6607619	*Eucalyptus microcarpa*	3L 3M	
803570	6607617	*Eucalyptus microcarpa*	1M 3S	
803551	6607562	*Eucalyptus microcarpa*	3L 4M	Salvage
803543	6607519	*Eucalyptus microcarpa*	3L 1M	

Easting	Northing	Species	Hollow Size*	Comments
803538	6607455	*Eucalyptus microcarpa*	2L 1M	
803545	6607433	*Eucalyptus microcarpa*	4L 4M 3S	Bees present in tree hollow
803557	6607433	*Eucalyptus microcarpa*	1L	
803563	6607431	*Eucalyptus microcarpa*	1L	
803556	6607424	*Eucalyptus microcarpa*	3M 3S	
803548	6607406	*Eucalyptus microcarpa*	3L 9M	
803537	6607370	*Eucalyptus microcarpa*	3M 2S	
803539	6607398	*Eucalyptus microcarpa*	2L 1M	
803532	6607416	*Eucalyptus microcarpa*	3L	
803539	6607424	*Eucalyptus microcarpa*	2L 3M	
803518	6607411	*Eucalyptus microcarpa*	3L 5M	
803500	6607407	*Eucalyptus microcarpa*	2M	
803495	6607413	*Eucalyptus microcarpa*	2S	
803496	6607425	*Eucalyptus microcarpa*	1L 1M	
803498	6607433	*Eucalyptus microcarpa*	1L 3M 3S	
803491	6607426	*Eucalyptus microcarpa*	1L 3M 1S	
803484	6607448	*Eucalyptus microcarpa*	1M 3S	
803488	6607463	*Eucalyptus microcarpa*	4L 4M	Salvage
803492	6607472	*Eucalyptus microcarpa*	1L 1M	
803458	6607488	*Eucalyptus microcarpa*	5L 6M 1S	
803401	6607500	*Eucalyptus microcarpa*	1M 1S	
803420	6607535	*Eucalyptus microcarpa*	2M 1S	
803431	6607509	*Eucalyptus microcarpa*	3L 2M	
803440	6607503	*Eucalyptus microcarpa*	2L 2M 1S	
803462	6607505	*Eucalyptus microcarpa*	1L	Salvage
803477	6607518	*Eucalyptus microcarpa*	2L 2M	Salvage
803486	6607496	*Eucalyptus microcarpa*	2L 3M	
803498	6607507	*Eucalyptus microcarpa*	1L 4M	
803514	6607519	*Eucalyptus microcarpa*	1L 3M	
803524	6607478	*Eucalyptus microcarpa*	2L 3M	
803519	6607455	*Eucalyptus microcarpa*	3L 1M 3S	
803516	6607443	*Eucalyptus microcarpa*	2L 5M 6S	

Easting	Northing	Species	Hollow Size*	Comments
803527	6607522	*Eucalyptus microcarpa*	1L	
803519	6607544	*Eucalyptus microcarpa*	2M 2S	
803511	6607547	*Eucalyptus microcarpa*	2L 2M	
803514	6607535	*Eucalyptus microcarpa*	3L 5M	
803490	6607521	*Eucalyptus microcarpa*	3L 5M	
803477	6607551	*Eucalyptus microcarpa*	1L 1M 4S	
803456	6607525	*Eucalyptus microcarpa*	3M	
803458	6607517	*Eucalyptus microcarpa*	1L	
803523	6607562	*Eucalyptus microcarpa*	2M 2S	
803492	6607583	*Eucalyptus microcarpa*	1M	
803440	6607569	*Eucalyptus microcarpa*	2L 3M	Salvage
803417	6607579	*Eucalyptus microcarpa*	1M 1S	
803447	6607599	*Eucalyptus microcarpa*	1M	
803438	6607615	*Eucalyptus microcarpa*	1L 3M	
803448	6607630	*Eucalyptus microcarpa*	3L 2M	Salvage
803452	6607640	*Eucalyptus microcarpa*	4M 3S	
803472	6607662	*Eucalyptus microcarpa*	3L 5M	Salvage
803486	6607666	*Eucalyptus microcarpa*	1L	
803480	6607685	*Eucalyptus microcarpa*	7M	
803486	6607703	*Eucalyptus microcarpa*	3L	
803503	6607779	*Eucalyptus microcarpa*	3L 1S	
803534	6607776	*Eucalyptus microcarpa*	2L 3M 8S	Salvage
803541	6607772	*Eucalyptus microcarpa*	4L 6M	
803555	6607780	*Eucalyptus microcarpa*	3L 2M	
803571	6607790	*Eucalyptus microcarpa*	3L 1M 4S	
803578	6607795	*Eucalyptus microcarpa*	4L 3M	Salvage
803588	6607770	*Eucalyptus microcarpa*	1M	
803582	6607762	*Eucalyptus microcarpa*	1L	Salvage
803580	6607761	*Eucalyptus microcarpa*	2L 1M 1S	
803575	6607750	*Eucalyptus microcarpa*	3L 2M	Salvage
803504	6607739	*Eucalyptus microcarpa*	1M 2S	
803523	6607728	*Eucalyptus microcarpa*	1M	

Easting	Northing	Species	Hollow Size*	Comments
803529	6607735	*Eucalyptus microcarpa*	3M 3S	
803553	6607727	*Eucalyptus microcarpa*	3L 1M	
803573	6607728	*Eucalyptus microcarpa*	1L 1M	Salvage
803565	6607709	*Eucalyptus microcarpa*	2L 3M	Salvage
803549	6607698	*Eucalyptus microcarpa*	3M	
803495	6607661	*Eucalyptus microcarpa*	1M	
803496	6607648	*Eucalyptus microcarpa*	1L	
803456	6607613	*Eucalyptus microcarpa*	1L 2M	Salvage
803442	6607602	*Eucalyptus microcarpa*	1L 1M	
803460	6607595	*Eucalyptus microcarpa*	3L	Salvage
803511	6607618	*Eucalyptus microcarpa*	1L 4M	
803520	6607651	*Eucalyptus microcarpa*	3M	Salvage
803515	6607669	*Eucalyptus microcarpa*	1L	
803522	6607677	*Eucalyptus microcarpa*	2M	
803543	6607665	*Eucalyptus microcarpa*	4M	
803552	6607654	*Eucalyptus microcarpa*	1L	
803552	6607646	*Eucalyptus microcarpa*	2M	
803924	6607580	Large Woody Debris		Salvage
803872	6607598	Large Woody Debris		Salvage
803514	6607305	Large Woody Debris		Salvage
803373	6607675	Large Woody Debris		Salvage
803511	6607622	Large Woody Debris		Salvage
803418	6607734	Large Woody Debris		Salvage
804040	6607424	Stag	1M 1S	
804037	6607431	Stag	2M	
804006	6607504	Stag	2M 2S	
803749	6607762	Stag	1L	
803769	6607741	Stag	2L	Salvage
803811	6607677	Stag	4L 2M	Salvage
803954	6607527	Stag	5M	
803942	6607524	Stag	2M	
803965	6607516	Stag	1L	

Easting	Northing	Species	Hollow Size*	Comments
803995	6607492	Stag	2L 2M	
803465	6607314	Stag	3M 3S	
803377	6607422	Stag	2L	
803368	6607672	Stag	1L	
803413	6607711	Stag	1M	
803375	6607559	Stag	3L 9M 4S	Salvage
803341	6607479	Stag	1L 1M	
803497	6607370	Stag	3L 2M	
803614	6607361	Stag	4M	
803650	6607545	Stag	3S	
803690	6607811	Stag	1L 2M	
803383	6607530	Stag	2L 1M	
803636	6607542	Stag	6M 7S	
803654	6607593	Stag	1M 2S	
803644	6607693	Stag	2L	
803609	6607537	Stag	2M 1S	
803592	6607536	Stag	3M 4S	
803592	6607413	Stag	2L 3M 4S	
803560	6607538	Stag	2L	
803589	6607559	Stag	2L 5M	
803589	6607656	Stag	1L	
803597	6607672	Stag	5L 5M	Salvage
803575	6607674	Stag	1M 4S	
803586	6607583	Stag	3L 1M	
803501	6607393	Stag	1L	
803466	6607474	Stag	3L 2M	
803433	6607542	Stag	4L 4M	
803413	6607556	Stag	1L	Salvage
803600	6607330	Threatened fauna		Turquoise Parrot x 4
803408	6607477	Threatened fauna		Brown Treecreeper
803585	6607510	Threatened fauna		Turquoise Parrot x 2

* Number refers to the number hollows; S = small size hollow; M = medium sized hollow; L = large sized hollows

ATTACHMENT B: CLEARING PROTOCOL

The protocol used to fell the trees is recommended to be as follows:

1) The nearest veterinary clinic, wildlife carer and/or an appropriately trained ecologist phone numbers should be on hand if any fauna is injured during clearing of trees.

2) All trees are to be visually inspected by a qualified ecologist or suitably trained person for fauna immediately prior to tree removal.

3) Care should be taken to allow all fauna to vacate a given tree prior to felling.

4) Habitat trees and or habitat features (Large Woody Debris) should be utilised within appropriate offsetting or natural areas for fauna habitat purposes.

5) Pre-felling procedures for all trees to be felled include shaking or nudging tree trunks with the dozer blade to evacuate mobile fauna, such as birds. The following are possible scenarios and the appropriate procedure to manage these scenarios:

    a. If microchiropteran bats or other nocturnal hollow dwelling fauna are still observed within the tree following pre-felling procedures (i.e. tree shaking), the tree is to be retained in the short term and the following procedure should be applied:

        i. Appropriate licenses to “harm” fauna under the *National Parks and Wildlife Act 1974* are to be sourced prior to the felling works;

        ii. An appropriately trained and licensed ecologist with Lyssa Virus vaccination should be contacted and be present during the felling process (Note: Australian Microchiropteran bats can carry Lyssa Virus, a debilitating disease similar to rabies);

        iii. The nearest veterinary clinic and wildlife carer phone number should be on hand;

        iv. Each hollow-bearing section of the tree is to be lopped and carefully lowered to the ground;

        v. All data on species and number of hollow bearing fauna is to be recorded;

        vi. Once on the ground each hollow is to be inspected for resident fauna. And any injured fauna are to be cared for;

        vii. The hollow-bearing limb should then be removed from the tree and positioned in a nearby safe and appropriate location at the same aspect and height of its original location.

    b. All hollow-bearing trees are to undergo a controlled lowering.

    c. For non-hollow-bearing trees, if no fauna are observed to be within a tree to be felled, the “slow drop” technique is to be used to fell the tree. This involves nudging and shaking the tree, followed by a slow drop.

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PO Box 600
GUNNEDAH, NSW 2380

Project number: 1389

31 March 2015

Dear Lachlan,

Re: Tarrawonga Mine pre-clearing survey – Northern Extension Area stage 2 dam, and review of previously surveyed woodland.

Ben Martin of Eco Logical Australia Pty Ltd (ELA) undertook a pre-clearing survey of the proposed Northern Extension Area Stage 2 dam, and a review of previously surveyed woodland at Tarrawonga Mine on 16 and 17 March, 2015. Maximum daily temperatures ranged between 30.0°C and 30.8°C (Tarrawonga Mine on-site weather data).

The purpose of this survey was to identify and flag any habitat and/or hollow-bearing trees, mark salvage trees, and identify any threatened species that occur within the proposed disturbance areas. In addition to this survey, a review of previously surveyed woodland was undertaken to record any additional habitat features or threatened species that may have moved into the area. The proposed disturbance area is located to the north of current mining operations, within Leard State Forest.

Review of Previously Surveyed Woodland

Northern Extension Area and Clean Water Diversion Drain

A walkover of the previously surveyed Northern Extension Area Stage 2 and Clean Water Diversion Drain[1] was undertaken. The area surveyed was within Grey Box- Narrow-leaved Ironbark – White Cypress Pine shrubby woodland. One habitat tree and two sections of large woody debris (LWD) were recorded; the LWD was marked for salvage. One species listed as vulnerable under the *Threatened Species Conservation Act 1995* was observed within the proposed disturbance area, *Neophema pulchella* (Turquoise Parrot). Three fauna habitat quadrats were undertaken at the time of the survey, results are outlined in Appendix B.

[1] Eco Logical Australia (2015). *Tarrawonga Mine Pre-clearing Survey, February 2015.* Prepared for Tarrawonga Coal Mine, February 2015

Eastern Extension Area

A walkover of the previously surveyed Eastern Extension Area[2] was undertaken. No additional habitat features, or threatened flora and fauna were observed within the survey area. One fauna habitat quadrat undertaken at the time of the survey, results are outlined in Appendix B.

Pre-clearing survey of Northern Extension Area Stage 2 dam

The proposed disturbance area consists of Grey Box – Narrow-leaved Ironbark – White Cypress Pine shrubby woodland. A total of 117 hollow-bearing tree (HBT) and three sections of LWD were recorded within the proposed disturbance area, of which 10 HBT and 3 LWD were marked for salvage. A full inventory of each habitat feature and the number of hollows can be found in Attachment A. Additionally, a fauna habitat quadrat was undertaken at the time of the survey, results are outlined in Attachment B.

Two Turquoise Parrots were also recorded in this area. The survey area joins onto Leard State Forest to the east and could be expected to support a suite of threatened fauna species, including the Turquoise Parrot. Additional bird species that are likely to use this habitat include Glossy Black-Cockatoo, Brown Treecreeper, Little Lorikeet, Speckled Warbler and Varied Sittella (all listed under the TSC Act). The hollow-bearing trees detailed in Attachment A may also provide roosting habitat for a number of threatened microbat species.

The clearing protocol provided in Attachment C should be followed for the flagged trees within the survey area. As the proposed disturbance areas are located on the fringe of a large tract of suitable fauna habitat in the form of undisturbed woodland, it is likely that any fauna present will have an opportunity to move east away from clearing works. It is recommended that all clearing commences from the western edge and slowly moves east to maximise the potential for displaced fauna to move ahead of the clearing towards the large area of remaining vegetation. As per the provided clearing protocol (Attachment C), a suitably trained ecologist must be present during clearing and suitable equipment for capturing and storing injured fauna must be available during clearing operations.

Please contact me on 02 8081 2686 if you have any questions with regards to the above.

Yours sincerely,



Ben Martin
Ecologist (BEnvSc)

24/04/2015

[2] Eco Locical Australia (2014). *Tarrawonga Mine Pre-clearing Survey, November 2014.* Prepared for Tarrawonga Coal Mine, November 2014

ATTACHMENT A: Inventory of habitat features and threatened species recorded

Easting	Northing	Habitat Type/Species	Hollow Size*	Comments
Review of Northern Extension Area Stage 2				
803519	6607354	*Eucalyptus microcarpa*	1S	
803509	6607369	Large Woody Debris		Salvage
803422	6607570	Large Woody Debris		Salvage
Northern Extension Area Stage 2 Dam				
803877	6607254	*Eucalyptus crebra*	1M 1S	
803914	6607255	*Eucalyptus microcarpa*	1L	
803921	6607243	*Eucalyptus crebra*	2L 3M 2S	Salvage
803981	6607235	*Eucalyptus crebra*	3M	
804000	6607256	Stag	1L 1M	
804003	6607295	*Eucalyptus crebra*	3L 2M	
804024	6607331	*Eucalyptus microcarpa*	1L	
804013	6607335	*Eucalyptus microcarpa*	2L 1M	
804006	6607362	Stag	1L	Salvage
804013	6607359	*Eucalyptus microcarpa*	4S	
804013	6607378	*Eucalyptus crebra*	1L 1M	
804010	6607376	*Eucalyptus crebra*	1S	
804021	6607399	*Eucalyptus crebra*	1L	Salvage
804032	6607399	Eucalyptus crebra	1L 2S	
804030	6607412	*Eucalyptus microcarpa*	1L 4M	
804014	6607420	*Eucalyptus microcarpa*	3L 1M	Salvage
804023	6607422	*Eucalyptus microcarpa*	3L 3M 4S	
804002	6607422	Large Woody Debris		Salvage
803992	6607428	*Eucalyptus microcarpa*	1L 3M 2S	
803930	6607425	*Eucalyptus microcarpa*	1M 3S	
803918	6607416	*Eucalyptus microcarpa*	1L 2M	
803914	6607432	*Eucalyptus microcarpa*	2L	
803910	6607428	*Eucalyptus microcarpa*	1L	Salvage
803889	6607394	*Eucalyptus microcarpa*	1L	
803893	6607386	*Eucalyptus microcarpa*	3L 3S	
803896	6607380	Stag	1L	

Easting	Northing	Habitat Type/Species	Hollow Size*	Comments
803900	6607371	*Eucalyptus microcarpa*	3L 2M 3S	
803898	6607354	*Eucalyptus microcarpa*	1L 4M	Salvage
803878	6607349	*Eucalyptus microcarpa*	1L 1M 3S	
803884	6607332	Stag	1L	
803891	6607323	*Eucalyptus microcarpa*	2L 1M	
803897	6607304	*Eucalyptus microcarpa*	3L 3M	
803896	6607290	*Eucalyptus microcarpa*	1L 2M	
803910	6607275	*Eucalyptus microcarpa*	4M	
803907	6607268	*Eucalyptus microcarpa*	1L	
803924	6607285	*Eucalyptus microcarpa*	3L	
803909	6607306	*Eucalyptus microcarpa*	4M	
803925	6607321	*Eucalyptus microcarpa*	2L 5M 4S	
803907	6607331	*Eucalyptus microcarpa*	1L 4M 2S	Salvage
803910	6607355	*Eucalyptus microcarpa*	3L 3M 4S	
803917	6607350	*Eucalyptus microcarpa*	1L 3M	
803916	6607360	*Eucalyptus microcarpa*	3L 2M	
803906	6607372	*Eucalyptus microcarpa*	3L 1M	
803906	6607374	*Eucalyptus microcarpa*	1L 1M	
803910	6607379	*Eucalyptus microcarpa*	3L 1M	
803915	6607399	*Eucalyptus microcarpa*	1M	
803879	6607424	*Eucalyptus microcarpa*	2L 3M	
803884	6607428	*Eucalyptus microcarpa*	1L	Salvage
803868	6607443	*Eucalyptus microcarpa*	1L	Salvage
803861	6607444	*Eucalyptus microcarpa*	2S	
803799	6607451	*Eucalyptus microcarpa*	2L 3M 2S	
803729	6607465	*Eucalyptus microcarpa*	2L	
803717	6607485	*Eucalyptus microcarpa*	2M	
803709	6607485	Large Woody Debris		Salvage
803720	6607463	*Eucalyptus microcarpa*	2L	
803724	6607459	*Eucalyptus microcarpa*	2S	
803726	6607461	*Eucalyptus microcarpa*	3M	
803784	6607444	Large Woody Debris		Salvage

Easting	Northing	Habitat Type/Species	Hollow Size*	Comments
803790	6607441	*Eucalyptus microcarpa*	3L 5M	
803806	6607436	*Eucalyptus microcarpa*	2L 4M	
803854	6607419	*Eucalyptus microcarpa*	1M	
803864	6607421	*Eucalyptus microcarpa*	6S	
803882	6607413	*Eucalyptus microcarpa*	1L 5S	
803933	6607397	*Eucalyptus microcarpa*	2L 2M 1S	
803946	6607402	*Eucalyptus microcarpa*	1L 4M	
803953	6607398	*Eucalyptus microcarpa*	2M	
803946	6607386	*Eucalyptus microcarpa*	2M	
803935	6607345	*Eucalyptus microcarpa*	3L	
803936	6607342	*Eucalyptus crebra*	2M	
803935	6607334	*Eucalyptus microcarpa*	1L	
803928	6607342	*Eucalyptus microcarpa*	2L	
803920	6607335	*Eucalyptus microcarpa*	2L	Salvage
803942	6607307	*Eucalyptus microcarpa*	1L 1M	
803949	6607316	*Eucalyptus crebra*	1M	
803944	6607311	*Eucalyptus crebra*	3M	
803945	6607331	*Eucalyptus microcarpa*	7M 3S	
803951	6607329	*Eucalyptus microcarpa*	2L 1M	
803951	6607340	*Eucalyptus microcarpa*	4S	
803942	6607340	*Eucalyptus microcarpa*	1M	
803951	6607340	*Eucalyptus microcarpa*	2L	
803964	6607355	*Eucalyptus microcarpa*	1L	
803960	6607369	*Eucalyptus microcarpa*	4S	
803976	6607377	*Eucalyptus microcarpa*	1L 3M	
803973	6607394	*Eucalyptus microcarpa*	3L 2S	
803968	6607394	*Eucalyptus microcarpa*	2L 3S	
803968	6607388	*Eucalyptus microcarpa*	2M	
803960	6607394	*Eucalyptus microcarpa*	1L	
803962	6607405	*Eucalyptus microcarpa*	3S	
803959	6607402	*Eucalyptus microcarpa*	3S	
803956	6607402	Stag	1M	

Easting	Northing	Habitat Type/Species	Hollow Size*	Comments
803953	6607401	*Eucalyptus microcarpa*	2S	
803953	6607402	*Eucalyptus microcarpa*	3M 3S	
803951	6607402	*Eucalyptus microcarpa*	3S	
803972	6607415	*Eucalyptus microcarpa*	1M	
803981	6607398	*Eucalyptus microcarpa*	1L 2M 1S	
803998	6607378	*Eucalyptus microcarpa*	2L	
803978	6607361	*Eucalyptus microcarpa*	1L 3M	
803977	6607351	*Eucalyptus microcarpa*	3L 2M 2S	
803961	6607347	Stag	1L	
803989	6607333	*Eucalyptus microcarpa*	1L 7M	
803977	6607327	*Eucalyptus microcarpa*	3L	
803964	6607325	*Eucalyptus microcarpa*	2L 5M	
803971	6607320	Stag	3L 6M	
803986	6607322	*Eucalyptus microcarpa*	1M	
803995	6607315	Stag	1L	
804012	6607308	Stag	1M	
803981	6607301	*Eucalyptus microcarpa*	1L 4M	
803982	6607290	Stag	1L	
803979	6607284	*Eucalyptus crebra*	1L 12S	
803989	6607269	*Eucalyptus crebra*	2S	
803965	6607289	*Eucalyptus microcarpa*	1M	
803946	6607308	*Eucalyptus crebra*	2M	
803411	6607323	*Eucalyptus microcarpa*	1L	
803379	6607338	*Eucalyptus microcarpa*	4L 2M 2S	
803367	6607349	*Eucalyptus microcarpa*	2L 1M	
803364	6607348	*Eucalyptus microcarpa*	1S	
803339	6607340	*Eucalyptus microcarpa*	2S	
803336	6607336	*Eucalyptus microcarpa*	3M	
803326	6607342	*Eucalyptus microcarpa*	2L 1M	
803316	6607344	*Eucalyptus microcarpa*	4S	

* Number refers to the number hollows; S = small size hollow; M = medium sized hollow; L = large sized hollows

ATTACHMENT B: Fauna habitat quadrats

Site Name: NEGB01		Date: 16/03/15	
Area: Northern Extension Area Stage 2			
Vegetation Community: Grey Box – Black Cypress Pine shrubby Woodland			
Logs: 110 m		Rocks: 0 m	
Species	Hollows		
	Large	Medium	Small
E. microcarpa	2	3	5
E. microcarpa	1	5	1
E. microcarpa	-	2	1
E. microcarpa	-	1	5
E. microcarpa	4	-	3
E. microcarpa	1	-	1

Site Name: NEGB02		Date: 16/03/15	
Area: Northern Extension Area Stage 2			
Vegetation Community: Grey Box – Black Cypress Pine shrubby Woodland			
Logs: 58 m		Rocks: 0 m	
Species	Hollows		
	Large	Medium	Small
Stag	3	2	1
E. microcarpa	2	2	4

Site Name: NEGB03		Date: 16/03/15	
Area: Northern Extension Area Stage 2			
Vegetation Community: Grey Box – Black Cypress Pine shrubby Woodland			
Logs: 42 m		Rocks: 0 m	
Species	Hollows		
	Large	Medium	Small
No habitat trees	-	-	-

Site Name: NEGB04		Date: 16/03/15	
Area: Northern Extension Area Stage 2			
Vegetation Community: Grey Box – Black Cypress Pine – Broad-leaved Ironbark shrubby Woodland			
Logs: 28 m		Rocks: 0 m	
Species	Hollows		
	Large	Medium	Small
E. microcarpa	1	2	1

Site Name: EENI01		Date: 17/03/15	
Area: Eastern Extension Area			
Vegetation Community: Grey Box – Narrow-leaved Ironbark – Black Cypress Pine Woodland			
Logs: 115 m		Rocks: 0 m	
Species	Hollows		
	Large	Medium	Small
E. crebra	-	1	-
E. microcarpa	1	-	-
E. microcarpa	-	1	-
E. microcarpa	-	-	2
E. microcarpa	-	1	-
E. microcarpa	-	-	1

Site Name: EENI02		Date: 17/03/15	
Area: Eastern Extension Area			
Vegetation Community: Narrow-leaved Ironbark – Black Cypress Pine Woodland			
Logs: 66 m		Rocks: 0 m	
Species	Hollows		
	Large	Medium	Small
E. crebra	-	-	2
Stag	-	1	3
Stag	1	1	-
Stag	-	-	4
E. crebra	-	1	-

Site Name: NEDAMGB01		Date: 17/03/15	
Area: Northern Extension Area Stage 2 dam			
Vegetation Community: Grey Box – Narrow-leaved Ironbark – White Cypress Pine Woodland			
Logs: 176 m		Rocks: 0 m	
Species	Hollows		
	Large	Medium	Small
E. microcarpa	1	2	-
E. microcarpa	3	-	-
E. microcarpa	-	4	-
E. microcarpa	2	5	4

ATTACHMENT C: CLEARING PROTOCOL

The protocol used to fell the trees is recommended to be as follows:

1) The nearest veterinary clinic, wildlife carer and/or an appropriately trained ecologist phone numbers should be on hand if any fauna is injured during clearing of trees.

2) All trees are to be visually inspected by a qualified ecologist or suitably trained person for fauna immediately prior to tree removal.

3) Care should be taken to allow all fauna to vacate a given tree prior to felling.

4) Habitat trees and or habitat features (Large Woody Debris) should be utilised within appropriate offsetting or natural areas for fauna habitat purposes.

5) Pre-felling procedures for all trees to be felled include shaking or nudging tree trunks with the dozer blade to evacuate mobile fauna, such as birds. The following are possible scenarios and the appropriate procedure to manage these scenarios:

    a. If microchiropteran bats or other nocturnal hollow dwelling fauna are still observed within the tree following pre-felling procedures (i.e. tree shaking), the tree is to be retained in the short term and the following procedure should be applied:

        i. Appropriate licenses to “harm” fauna under the *National Parks and Wildlife Act 1974* are to be sourced prior to the felling works;

        ii. An appropriately trained and licensed ecologist with Lyssa Virus vaccination should be contacted and be present during the felling process (Note: Australian Microchiropteran bats can carry Lyssa Virus, a debilitating disease similar to rabies);

        iii. The nearest veterinary clinic and wildlife carer phone number should be on hand;

        iv. Each hollow-bearing section of the tree is to be lopped and carefully lowered to the ground;

        v. All data on species and number of hollow bearing fauna is to be recorded;

        vi. Once on the ground each hollow is to be inspected for resident fauna. And any injured fauna are to be cared for;

        vii. Any fauna that require relocation should be captured and released at designated relocation area away from clearing activities

        viii. The hollow-bearing limb should then be removed from the tree and positioned in a nearby safe and appropriate location at the same aspect and height of its original location.

    b. All hollow-bearing trees are to undergo a controlled lowering.

    c. For non-hollow-bearing trees, if no fauna are observed to be within a tree to be felled, the “slow drop” technique is to be used to fell the tree. This involves nudging and shaking the tree, followed by a slow drop.

Lachlan Johnson
Environmental Officer
Tarrawonga Coal Pty Ltd
PO Box 600
Gunnedah NSW 2380

ECO LOGICAL AUSTRALIA PTY LTD
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27 April 2015

Dear Lachlan,

Re: Tarrawonga Mine Clearing Supervision (April, 2015) – Project Number 1596

Ecologist Ben Martin undertook clearing supervision at Tarrawonga Mine on 20, 21 and 23 April, 2015. The weather during this period was cool and wet, improving to fine and sunny. Maximum daily temperatures ranged from 13.1°C – 23.5°C (Tarrawonga Mine site weather data). Clearing supervision was undertaken on a number of stags and trees located within the open cut extension area to the north, and east of current mining operations within Mining Lease 1685. Pre-clearing assessments were undertaken on the proposed eastern extension area and northern extension area by Eco Logical Australia between November 2014 and March 2015, results of which are documented in:

- *Tarrawonga Coal Mine – Pre-clearing survey (November, 2014)* (ELA 2014)[1]
- *Tarrawonga Coal Mine – Pre-clearing survey (February, 2015)* (ELA 2015a)[2]
- *Tarrawonga Coal Mine – Pre-clearing survey (March, 2015)* (ELA 2015b)[3].

A total of 588 habitat trees were felled during clearing works. Fauna observed within the disturbance area included; 17 *Oedura robusta* (Robust Velvet Gecko), four unidentified microbats, one *Amphibolurus nobbi* (Nobbi Dragon), one *Pseudonaja textilis* (Eastern Brown Snake) and one *Egernia striolata* (Tree Skink), all of which were captured and relocated during clearing except two of the unidentified microbats and one Eastern Brown Snake, which all fled once disturbed. All captured fauna were released into a designated fauna relocation area to the east of current mining operations, in the Leard State Forest. Table 1 below shows the location of fauna observed. No injury to fauna occurred during the clearing.

Table 1: Results from clearing supervision

Area	Fauna	Comments
Eastern extension area	4 x Robust Velvet Gecko	Found near fallen Narrow-leaved Ironbark trees and relocated.
	1 x Nobbi Dragon	Found near a fallen Narrow-leaved Ironbark tree and relocated.
Northern extension area	13 x Robust Velvet Gecko	Found near fallen Narrow-leaved Ironbark and Grey Box trees, and relocated.
	4 x unidentified microbats	2 were found in hollow of a fallen Grey Box and relocated. 2 were observed flying away.
	1 x Tree Skink	Found near a fallen Grey Box and relocated.
	1 x Eastern Brown Snake	Observed fleeing from the base of a fallen Grey Box.

[1] Eco Logical 2014. *Tarrawonga Coal Mine – Pre-clearing survey (November, 2014).* Prepared for Tarrawonga Coal Pty Ltd
[2] Eco Logical 2015a. *Tarrawonga Coal Mine – Pre-clearing survey (February, 2015).* Prepared for Tarrawonga Coal Pty Ltd
[3] Eco Logical 2015b. *Tarrawonga Coal Mine – Pre-clearing survey (March, 2015).* Prepared for Tarrawonga Coal Pty Ltd

If you have any questions regarding the above, please do not hesitate to contact me on 02 8081 2686.

Yours sincerely,



Ben Martin

Ecologist (BEnvSc)

Appendix 12

CULTURAL HERITAGE SALVAGE

Tarrawonga Coal Mine Aboriginal Cultural Heritage Salvage

Salvage of Surface Artefact Sites and Scarred Tree

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IMPORTANT NOTE

We have prepared this report for the sole purposes of Whitehaven Coal Limited ("**Client**") for the specific purpose of only for which it is supplied ("**Purpose**"). This report is strictly limited to the purpose and the facts and matters stated in it and does not apply directly or indirectly and will not be used for any other application, purpose, use or matter.

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In this note, a reference to loss and damage includes past and prospective economic loss, loss of profits, damage to property, injury to any person (including death) costs and expenses incurred in taking measures to prevent, mitigate or rectify any harm, loss of opportunity, legal costs, compensation, interest and any other direct, indirect, consequential or financial or other loss.

Document Status

Version	Purpose of Document	Orig	Review	Review Date	Approval for Issue	Date Issued
Draft	Draft for client review	K. Grant	T. Boer-Mah	21/03/2014	T. Boer-Mah	21/3/2014
Draft	Draft with additional salvage	K. Grant/ T.Boer-Mah	T. Boer-Mah	14/11/2014	T. Boer-Mah	14/11/2014
Final	Final	K. Grant/ T.Boer-Mah	T. Boer-Mah	13/02/2014	T. Boer-Mah	13/02/2014
Revised Final	Revised Final	K. Grant/ T.Boer-Mah/P.Sokol	T. Boer-Mah	26/02/2015	T. Boer-Mah	25/02/2015

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Executive Summary

RPS was commissioned by Whitehaven Coal Limited to undertake the salvage of Aboriginal surface artefacts in the northern part of the Tarrawonga Extension area and document the removal and conservation of a scarred tree. These salvage works were undertaken in accordance with Tarrawonga Heritage Management Plan (Tarrawonga Mine, 2013) which has been approved under major projects #11_0047. The methodology for salvage is outlined in the Tarrawonga HMP (Tarrawonga Mine, 2013). RPS completed these salvage and inspection works with participation from the Registered Aboriginal Parties (RAPs).

The Tarrawonga Coal Mine site is located approximately 15 kilometres (km) northeast of Boggabri and 42 kilometres (km) northwest of Gunnadah in central northern NSW. It is located in the Narrabri Local Government Area (LGA). The Project Area lies within the Tarrawonga Northern Extension Area, where the salvage works were carried out and is inside the area designated as ML 1685 (within the Leard State Forest Area). Six previously identified Aboriginal sites, including an artefact scatter and isolated finds, required salvage in this designated Project Area before open cut extension works could continue. In addition, the removal and conservation of one scarred tree was required.

This report documents Aboriginal consultation undertaken, the surface artefact sites salvaged from which 9 artefacts have been recovered and documentation of vegetation monitoring from which 4 artefacts have been recovered, as well as the inspection, removal and conservation of scarred tree TCEP-ST-010 (AHIMS# 20-4-0347). Aboriginal Site Impact Recording (ASIR) forms have been completed for these sites and submitted to OEH.

An inspection undertaken on 25 February, 2014 by the nine participants (representing the Registered Aboriginal Parties), the RPS Cultural Heritage consultants and a professional arborist, and it was concluded that of the three scarred trees, only one satisfied the criteria of the scar being the result of Aboriginal cultural practices. This tree was registered as TCEP-ST-010 (AHIMS# 20-4-0347). One other tree, TCEP-ST-001 (AHIMS# 20-4-0299) was determined by all parties not to be a result of Aboriginal cultural practices and is most likely a surveyor's mark. This site will be deregistered as an Aboriginal Cultural Heritage site. The location of the third tree TCEP-ST-011 (AHIMS# 20-4-0348) had been incorrectly recorded. With the new co-ordinates assessed, this scarred tree was found to be outside the impact zone of the Project Area (Tarrawonga Mine 2013).

The surface artefacts were salvaged with RAP representatives between February and May 2014. Monitoring of vegetation clearance was also undertaken by the RAPs on 25/2/2014, 12/3/2014, 10/4/2014, 17/4/2014 and 26/5/2014. Of the five isolated find sites, only one artefact was re-identified and recovered (BC18 [AHIMS# 20-4-0112]). No other artefacts were observed or recovered from the other three isolated find sites; BC17 (AHIMS# 20-4-0111), BC19 (AHIMS# 20-4-0113, and TCEP-IF-002 (AHIMS# 20-4-0303). Eight artefacts were collected at TCEP-OS-020 (AHIMS# 20-4-341). Four artefacts were collected at BC22 (AHIMS# 20-4-0116). Thirteen artefacts have been salvaged in total and these artefacts have been transferred to a secure storage area.

On 6 June 2014, TCEP-ST-010 (AHIMS# 20-4-0347) was subject to controlled salvage and removal to a storage facility which is opposite the mine office (Easting 228041, Northing 6606902).

The following recommendations are made in relation to Aboriginal heritage:

Recommendation 1

All relevant staff and contractors should be made aware of their statutory obligations for heritage under the *National Parks and Wildlife Act* 1974 and the *Heritage Act* 1977, which may be implemented as a heritage induction.

Recommendation 2

If unrecorded Aboriginal object/s are identified in the Project Application Area during works, then procedures under the Tarrawonga HMP must be followed.

Recommendation 3

This document should be kept and appended to the Tarrawonga HMP.

Terms, Definitions, and Abbreviations

Abbreviation/ Term	Meaning
Aboriginal Object	"any deposit, object or material evidence (not being a handicraft made for sale) relating to the Aboriginal habitation of the area that comprises NSW, being habitation before or concurrent with (or both) the occupation of that area by persons of non-Aboriginal extraction, and includes Aboriginal remains" (DECCW 2010:18).
Aboriginal Place	"a place declared under s.84 of the NPW Act that, in the opinion of the Minister, is or was of special significance to Aboriginal culture" (DECCW 2010:18). Aboriginal places have been gazetted by the minister.
Aboriginal Culturally Modified Tree	"means a tree that, before or concurrent with (or both) the occupation of the area in which the tree is located by persons of non-Aboriginal extraction, has been scarred, carved or modified by an Aboriginal person by: (a) the deliberate removal, by traditional methods, of bark or wood from the tree, or (b) the deliberate modification, by traditional methods, of the wood of the tree" NPW Regulation 80B (3). Culturally Modified trees are sometimes referred to as scarred trees
ACHCR	Aboriginal Cultural Heritage Consultation Requirements
Activity	A project, development, or work (this term is used in its ordinary meaning and is not restricted to an activity as defined by Part 5 EP&A Act 1979).
Activity Area	Activity Area is the area subject to the proposed activity
AHIMS	Aboriginal Heritage Information Management System
DECCW	Department of Environment, Climate Change and Water (is now the Office of Environment and Heritage – OEH)
Disturbed Land	"Land is disturbed if it has been the subject of a human activity that has changed the land's surface, being changes that remain clear and observable." (DECCW 2010:18).
EP&A Act	*Environmental Planning and Assessment Act 1979 (NSW)*
Harm	"destroy, deface, damage an object, move an object from the land on which it is situated, cause or permit an object to be harmed." (DECCW 2010:18)
HMP	Heritage Management Plan
LALC	Local Aboriginal Land Council
LGA	Local Government Area
NPWS	National Parks and Wildlife Service
NPW Act	*National Parks and Wildlife Act 1974* (NSW)
NPW Regulation	*National Parks and Wildlife Regulation 2009* (NSW)
OEH	Office of Environment and Heritage (formerly DECCW)
PAD	Potential Archaeological Deposit
Project Area	Project Area is the area subject to the salvage works in this report
RAP	Registered Aboriginal Party
UTMA	Urban Tree Management (Australia)

1.0 Introduction

RPS was commissioned by Whitehaven Coal Limited to undertake Aboriginal Cultural Heritage salvage works at their Tarrawonga Coal Mine, in association with the registered Aboriginal parties (RAPs). These salvage works were undertaken in accordance with Tarrawonga Heritage Management Plan (Tarrawonga Mine, 2013) which has been approved under major projects #11_0047.

1.1 The Project Area

The Tarrawonga Coal Mine site is located approximately 15 kilometres (km) northeast of Boggabri and 42 kilometres (km) northwest of Gunnadah in central northern NSW. It is located in the Narrabri Local Government Area (LGA) (**Figure 1**). The Project Area lies within the Tarrawonga Northern Extension Area, where the salvage works were carried out and is inside the boundary of Mining Lease 1685 (within the Leard State Forest Area).

1.2 Project Activity

The proposed activity in the Project Area is to undertake vegetation clearing, which will be later followed by stripping and subsequently by open cut mining. Prior to these activities taking place, the artefact scatters required salvage.

1.3 Methodology

RPS undertook the salvage in accordance with the relevant sections of the Tarrawonga Heritage Management Plan (HMP). As per the scope, the following sites require salvage:

- Salvage of artefact sites 2 (isolated find) and 45 (originally recorded as six artefacts); and
- Salvage of artefact sites BC17, 18, 19, 22 (all isolated find sites)

These artefact sites were salvaged in accordance with the Tarrawonga HMP. RPS supervised and documented the salvage of the scarred tree in partnership with an arborist; Danny Draper from Urban Tree Management Australia (UTMA). RAPs were consulted with and a selection of RAPs participated in the nominated salvage works. RPS worked at a ratio of a minimum of two RAP representatives per heritage consultant. Present at the artefact site salvage works were two RPS Cultural Heritage consultants and nine RAPs, with the arborist included at the scarred tree sites. In addition, vegetation monitoring and recording was undertaken by the RAPs, RPS has documented the artefacts recovered from this process.

RPS undertook the following tasks:

- Aboriginal consultation with the RAPs
- Field mapping of proposed salvage;
- On-site salvage of the artefact sites;
- On-site supervision of salvage of the scarred trees;
- Reporting in accordance with the HMP;
- Quality assurance, edit and review; and,
- Preparation of a salvage report and finalisation in consultation with the client.

The methodology for these works is also outlined in the Tarrawonga Heritage Management Plan (HMP).

The salvage works detailed in this report were undertaken by qualified archaeological heritage consultants of RPS, in consultation with the registered Aboriginal parties (RAPs).

1.4 Authorship and Acknowledgements

This report was prepared by RPS Cultural Heritage Consultant Kerrie Grant. The report was reviewed by RPS Newcastle Cultural Heritage Manager Tessa Boer-Mah.

1.5 Structure of this Report

This report outlines the statutory context under which the salvage works have been undertaken (Section 2.0) and documents the Aboriginal consultation which is required as part of the *Aboriginal Cultural Heritage Consultation Requirements for Proponents* (ACHCRs) (DECCW 2010) (Section 3.0).

Sections 4.0 and 5.0 outline the environmental and archaeological context relevant to the Project Area and set out the factors considered for the methodology, which is outlined in Section 6.0. The archaeological salvage works have been undertaken in accordance with the methodology outlined in Section 6.0.

Section 7.0 presents a general overview of the results of the salvage works. Section 8.0 addresses research questions posed in the methodology (Section 6.0) and builds on information in Section 4.0 to provide an archaeological interpretation of the sites and salvage results.

Section 9.0 states the assessment of significance in regards to rarity, scientific, cultural and educational purpose. Section 10.0 summarises the report with conclusions and recommendations.

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6607500
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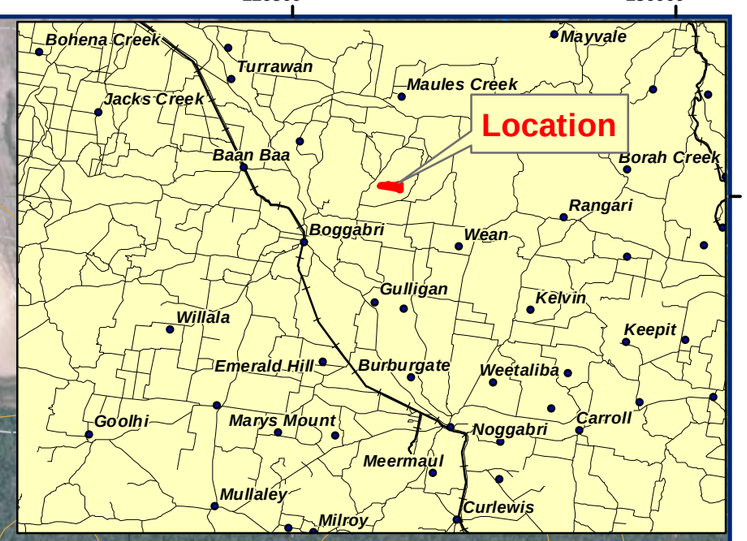
6606500

Legend

- Project Area
- 10m Contours
- Vehicle Track
- Drainage



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160 80 0 160 320 480 640 m

SCALE: 1:8,000 AT A3 SIZE

TITLE : **FIGURE 1: PROJECT AREA**

LOCATION : **WHITEHAVEN TARRAWONGA**

DATUM:GDA 1994

PROJECTION: GDA 1994 MGA Zone 56

DATE : **21/03/2014**

PURPOSE: **HERITAGE**

VERSION (PLAN BY): A A3 (Natalie.Wood)

PATH: J:\JOBS\120K\120627 Whitehaven Tarrawonga\10 - Drafting\Arcgis Map Documents\120627-1 Figure 1 A A3 20140321.mxd

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2.0 Statutory Context

Although there are a number of Acts and regulations which relate to the protection and management of cultural heritage in New South Wales, the primary ones which apply to this report include:

- *National Parks and Wildlife Act 1974*
- *National Parks and Wildlife Regulation 2009*

In brief, the *National Parks and Wildlife Act* protects Aboriginal heritage (places, sites and objects) within New South Wales; the National Parks and Wildlife Regulation provides a framework for undertaking activities and exercising due diligence.

2.1 *National Parks and Wildlife Act 1974*

The *National Parks & Wildlife Act 1974* (NPW Act) protects Aboriginal heritage (places, sites and objects) within NSW. Protection of Aboriginal heritage is outlined in s86 of the Act, as follows:

- "A person must not harm or desecrate an object that the person knows is an Aboriginal object" s86(1),
- "A person must not harm an Aboriginal object" s86(2),
- "A person must not harm or desecrate an Aboriginal place" s86 (4).

Penalties apply for harming an Aboriginal object or place. The penalty for knowingly harming an Aboriginal object (s86[1]) and/or an Aboriginal place (s86[4]) is up to $550,000 for an individual and/or imprisonment for 2 years; and in the case of a corporation the penalty is up to $1.1 million. The penalty for a strict liability offence (s86 [2]) is up to $110,000 for an individual and $220,000 for a corporation.

Harm under the NPW Act is defined as any act that; destroys defaces or damages the object, moves the object from the land on which it has been situated, causes or permits the object to be harmed. However, it is a defence from prosecution if the proponent can demonstrate 1) that harm was authorised under an Aboriginal Heritage Impact Permit (AHIP) (and the permit was properly followed), or 2) that the proponent exercised due diligence in respect to Aboriginal heritage. The **'due diligence' defence (s87 (2))**, states that if a person or company has exercised due diligence to ascertain that no Aboriginal object was likely to be harmed as a result of the activities proposed for the Project Area (subject area of the proposed activity); then liability from prosecution under the NPW Act will be removed or mitigated if it later transpires that an Aboriginal object was harmed.

Notification of Aboriginal Objects

Under section 89A of the NPW Act Aboriginal objects (and sites) must be reported to the Director-General (now Chief Executive) of OEH within a reasonable time (unless it has previously been recorded and submitted to AHIMS). Penalties of $11,000 for an individual and $22,000 for a corporation may apply for each object not reported.

2.2 *National Parks and Wildlife Regulation 2009*

The *National Parks and Wildlife Regulation 2009* ("NPW Regulation") provides a framework for undertaking activities and exercising due diligence in respect to Aboriginal heritage. The *NPW Regulation 2009* outlines the recognised due diligence codes of practice which are relevant to this report, but it also outlines procedures for Aboriginal Heritage Impact Permit (AHIP) applications and ACHCRs; amongst other regulatory processes.

2.3 Environmental Planning and Assessment Act 1979

The *Environmental Planning and Assessment Act* (EP&A Act) regulates a system of environmental planning and assessment for NSW. Land use planning requires that environmental impacts are considered, including the impact on cultural heritage and specifically Aboriginal heritage. Assessment documents prepared to meet the requirements of the EP&A Act including Reviews of Environmental Factors, Environmental Impact Statements, and Environmental Impact Assessments should address Aboriginal heritage. Planning documents such as Local Environmental Plans and Regional Environmental Plans typically contain provisions for Aboriginal heritage where relevant.

3.0 Aboriginal Community Consultation

The Office of Environment and Heritage (OEH) acknowledges that Aboriginal people are the primary determinants of the significance of their heritage, and that Aboriginal people should be involved in the Aboriginal cultural heritage planning process. OEH also acknowledges that Aboriginal people should be the primary source for determining the value of their heritage and how to best protect and conserve it, and recognise that Aboriginal people must be afforded control in the way cultural information, and in particular sensitive information, is handled. Aboriginal consultation is regarded as an integral part of the process of investigating and assessing Aboriginal cultural heritage (OEH 2011:2).

Aboriginal consultation is mandatory for undertaking salvage works (DECCW 2010:25 req. 15a). In cases when Aboriginal consultation is mandatory, the consultation process is stipulated in s80C of the NP&W Regulation and is further specified in the ACHCRs (DECCW 2010). As a general principal, OEH encourages consultation with Aboriginal people whenever there is uncertainty that a proposed activity could potentially harm Aboriginal objects or places.

3.1 Aboriginal Cultural Heritage Consultation Requirements (ACHCRs)

The ACHCRs incorporates a four stage consultation process which stipulates specific timeframes for components of each stage. Stage 1 requires that Aboriginal people who hold cultural information are identified, notified and invited to register an expression of interest in the assessment. This identification process should draw on reasonable sources of information including: the Registrar (*Aboriginal Land Rights Act,* 1983), the relevant OEH Environment Protection Regulation Group (EPRG) Regional Office, the Local Aboriginal Land Council(s), the National Native Title Tribunal, the Native Title Services Corporation Limited, the relevant Catchment Management Authority and the relevant local council(s). The identification process should also include an advertisement placed in a local newspaper circulating in the general location of the Project Area. Aboriginal organisations and/or individuals identified should be notified of the project and invited to register an Expression of Interest (EoI) for Aboriginal consultation. Once a list of Aboriginal community stakeholders has been compiled from the EoI process, they need to be consulted in accordance with Stages 2, 3 and 4 of the ACHCRs.

Stage 2 requires the provision by the proponent of relevant project information to the RAPs. This may include an outline of the project activities, the proposed impact areas and the environmental assessment process. The presentation of the project information should be documented and include any agreed outcomes with the Aboriginal community stakeholders. In some instances, depending on the nature, scale and complexity of the project, the proponent may create the opportunity for Aboriginal community stakeholders to visit the project site and/or may conduct additional project information sessions.

Stage 3 is concerned with the gathering of information regarding cultural significance. The aim is to facilitate a process by which Aboriginal community stakeholders can have input into the heritage assessment methodology and management options, and provide information on the cultural significance of Aboriginal objects or places. The proponent must provide a proposed methodology for the cultural heritage assessment and allow a minimum of 28 days to respond. If needed, protocols for the appropriate handling of culturally sensitive information may be developed with the Aboriginal community stakeholders. The proponent must also seek the views of the Aboriginal community stakeholders on potential management options for Aboriginal objects or places.

Stage 4 requires that the proponent prepare a draft cultural heritage assessment report and provide a copy to the registered Aboriginal stakeholders for comment. A minimum of 28 days must be provided for the registered Aboriginal stakeholders to comment on the draft report. To finalise the report the proponent must consider the submissions made by the registered Aboriginal stakeholders and include the proponent's

response to each submission. The finalised report must be provided to the registered Aboriginal stakeholders and the relevant Local Aboriginal Land Council (LALC).

In accordance with Stage 1 of the ACHCRs, relevant stake holders from the Aboriginal community were identified using a process consistent with the NSW Office of Environment and Heritage's *Aboriginal Cultural Heritage Community Consultation Requirements for Proponents* (DECCW, 2010) and the *Draft Guidelines for Aboriginal Cultural Impact Assessment and Community Consultation* (DEC, 2005). Letters were sent out inviting expressions of interest (November 2010), and as a result of conducting Stage 1 of the ACHCR process, the following organisations have been identified as Registered Aboriginal Parties (RAPs) (**Table 1**).

Table 1 Registered Aboriginal Parties

Organisation	Name of Representative	Date of Registration
Aboriginal Native Title Consultants	John & Margaret Matthews	2 November 2010
Bigundi Biame Traditional People	Wayne Griffiths	2 March 2011
Bullen Bullen Consultants	Lloyd Matthews	2 November 2010
Cacatua Culture Consultants	George & Donna Sampson	4 November 2010
Giwiir Consultants	Rodney Matthews	15 November 2010
Gunida Gunyah Aboriginal Corporation	Jane Bender	4 November 2010
Minniga Consultants	Clifford Matthews	25 January 2011
Min Min Aboriginal Corporation	Gwen Griffen	4 November 2010
Red Chief LALC	Toni Comber	1 March 2011

As per the HMP (Tarrawonga Mine 2013), RAP representatives were invited to participate in the salvage works. RAP representatives participated in the salvage and monitoring works as per **Table 2**.

Table 2 RAPs who participated in the fieldwork

Organisation	Name of Representative	Dates of Fieldwork
Aboriginal Native Title Consultants	John & Margaret Matthews	25 Feb 2014
Bigundi Biame Traditional People	Gary Griffiths	25 Feb 2014
Bullen Bullen Consultants	Karen Matthews	25 Feb 2014
Cacatua Culture Consultants	George Sampson	25 Feb 2014
Giwiir Consultants	Rodney Matthews	25 Feb 2014
Minniga Consultants	Clifford Matthews	25 Feb 2014
Min Min Aboriginal Corporation	Phillip Thomas	25 Feb 2014
Red Chief LALC	Tracy Wortly	25 Feb 2014
Red Chief LALC	Mat Talbott	12 Mar 14
Gomeroi Murri Ganuurr Yuuray Wadi Palinka	Greg Griffiths	12 Mar 14
Cacatua Culture Consultants	George Sampson	10 Apr 2014
Bullem Bullem	Tracey Wortley	10 Apr 2014
Mingga	Clifford Matthews	17 Apr 14
Giwirr	Rod Matthews	17 Apr 14
Aboriginal Native Title Consultants	John & Margaret Matthews	26 May 14
Min Min Corporation	Shaun Dixon	26 May 14
Red Chief LALC	Natasha Talbott	6 June 14
Min Min Corporation	Shaun Dixon	6 June 14
Mingga	Clifford Matthews	6 June 14
Bullem Bullem	Brent Matthew	6 June 14

Organisation	Name of Representative	Dates of Fieldwork
Giwirr	Rod Matthews	6 June 14
Cacatua Culture Consultants	Adam Sampson	6 June 14
Gomeroi Murri Ganuurr Yuuray Wadi Palinka	Greg Griffiths	6 June 14
Aboriginal Native Title Consultants	John & Margaret Matthews	6 June 14

4.0 Environmental Context

An understanding of environmental context is important for the predictive modelling and interpretation of Aboriginal sites. The local environment provided natural resources for Aboriginal people, such as stone (for manufacturing stone tools), food and medicines, wood and bark (for implements such as shields, spears, canoes, bowls and shelters), as well as areas for camping and other activities. The nature of Aboriginal occupation and resource procurement is inextricably linked to the local environment and therefore needs to be considered as part of the cultural heritage assessment process.

4.1 Geology and Soils

The subject area is located in the Gunnedah Basin, which contains Permian and Triassic sediments. The Gunnedah Basin forms the central part of the Sydney-Gunnedah-Bowen Basin which extends across the eastern fringe of Australia (Branagan and Packham 2000).

A north-south trending ridge of volcanic rocks, known as the Boggabri Volcanics, divides the Gunnedah Basin into the Maules Creek sub-basin to the east and the Mullaley sub-basin to the west and south. The subject area is situated on the western side of the Maules Creek sub-basin. The sedimentary stratigraphy of the subject area is dominated by lithic conglomerate, lithic sandstone, siltstone, minor claystone, coal seams and localised volcanic rocks.

The subject area comprises of low hills and ridges of volcanic and sedimentary bedrock, which gently slope down to alluvial plains. The summits of the two major hills in the vicinity of the subject area are remnants of the Boggabri Volcanics (rhyolitic to dacitic lavas and ashflow tuffs (Brown, Brownlow et al. 1992; Roberts, Offler et al. 2004) and Maules Creek Formation (sandstones and conglomerates). It is possible that the rhyolite in these formations could include stone suitable for manufacture of flaked artefacts.

Soil landscapes are important to define when contributing to the subject area's site formation processes. Field observations indicated that soils within the subject area are dominated by loam and gravely sand with contrasted solodic profiles. The sand to loam horizon lies on top of sandy, medium clays. The sandy topsoils become finer on the plains, and along the drainage lines the soil ranges from red clay loams to dark earths and heavy alluvial clay.

4.2 Flora and Fauna

The purpose of the following summary is to provide an indication of the types of flora and fauna which may have been available to Aboriginal people in the past for sustenance and raw material resources. This section does not replace more detailed ecological studies.

The Western Slopes Dry Sclerophyll Forest is characterised by ironbark eucalypts and cypress pines at heights of approximately 10 to 25 metres tall. Sclerophyll shrubs grow in prominence, while grasses are relatively scarce, placing this class in the shrubby subformation of the dry sclerophyll forests. Indicative species of tree include Tumbledown Red Gum, Mugga, Black Cypress Pine, White Cypress Pine, Dirty Gum, Narrow-leaved Ironbark and Blue-leaved Ironbark. Shrub species commonly present include several species of Wattle, Heath and Myrtle in addition to Hakea, Grevillea and Grass Trees (Keith 2006:166-167).

This vegetation community would have provided habitats for a variety of animals, as well as potential food and raw material sources for Aboriginal people. Grass trees, for example, were used by Aboriginal people to manufacture spears and resin, and also as a food source (Nash 2004:5). Eucalyptus trees were a particularly important resource; leaves were crushed and soaked for medicinal purposes, bowls, dishes, and canoes were made from the bark, and spears, boomerangs and shields were crafted from the hard wood (Nash 2004:4-8).

This vegetation community provides habitat for a variety of animals and would have also provided potential food and raw material sources for Aboriginal people. Typical animals which may have been harvested by Aboriginal people include kangaroos, wallabies, sugar gliders, possums, echidnas, a variety of lizards and snakes, birds, as well as rats and mice. The bones of such animals have been recovered from excavated Aboriginal sites in the NSW region suggesting that they were sources of food (Attenbrow 2003:70-76), although the hides, bones and teeth of some of the larger mammals may have been used for Aboriginal clothing, ornamentation, or other implements.

4.3 Topography and Hydrology

The subject area is situated in the foothills of the Willowtree Range approximately 12 km east of the Namoi River. The main local drainages within the vicinity of subject area are Nagero, Bollol and Goonbri Creek. These creeks drain west to the Namoi River. The Nagero Creek catchment rises along the southern margin of the Willowtree Range in the Leard State Forest north of the subject area. The section of Nagero Creek that is located in the vicinity of the subject area is ephemeral and only flows during or after prolonged rainfall events or periods of frequent rainfall.

The headwaters of Bollol Creek rise in timbered hilly terrain approximately 20 km east of the subject area. More than half of the southern portion of subject area is within the Bollol Creek catchment. Bollol Creek is also ephemeral, flowing for short periods during and following prolonged rainfall events. Goonbri Creek, which is a tributary of Bollol Creek, rises on the eastern slopes of the Willowtree Range. Similar to the other creeks in the vicinity of the Project, Goonbri Creek is an ephemeral creek and only flows during and following prolonged rainfall events (Gilbert and Associates 2010).

4.4 Synthesis

Although the Project Area would have broadly supported Aboriginal occupation; the lack of permanent water is likely to have affected the duration of habitation. The area thus may have been used on a seasonal basis and/or for short periods of time.

Legend

AHIMS

- Artefact Scatter
- Artefact Site (Number Unspecified)
- Isolated Find
- PAD
- Scarred Tree
- Artefacts Collected During Monitoring
- Project Area
- 10m Contours
- Vehicle Track
- Drainage

Artefacts Collected During Monitoring

Warning:
While all reasonable care has been taken to ensure the information contained on this map is up to date and accurate, no guarantee is given that the information portrayed is free from error or omission. Please verify the accuracy of all information prior to use.

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

900 450 0 900 1,800 2,700 3,600 m

SCALE: 1:43,655 AT A3 SIZE

TITLE : **FIGURE 2: PROJECT AREA WITH AHIMS**

LOCATION : **WHITEHAVEN TARRAWONGA**

DATUM:GDA 1994

PROJECTION: GDA 1994 MGA Zone 56

DATE : **17/09/2014**

PURPOSE: **HERITAGE**

VERSION (PLAN BY): A A3 (Natalie.Wood)

PATH: J:\JOBS\120K\120627 Whitehaven Tarrawonga\10 - Drafting\Arcgis Map Documents\120627-1 Figure 2 B A3 20140321.mxd

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5.0 Archaeological Context

This section synthesises the archaeological information pertinent to the subsurface archaeological investigation. This information, pertaining to the history and ethnography of the Project Area, as well as the regional and local archaeological context of the Project Area, will be drawn upon in presenting the excavation results and interpretation of the assemblage (Section 8.0 and 9.0).

5.1 Regional Archaeological Context

5.1.1 Aboriginal Occupation

Aboriginal people may have occupied the Gunnedah basin in the Late Pleistocene, from the end of the Last Glacial Maximum. At Lime Springs, south of Gunnedah, stone artefacts were found associated with megafauna within a deposit dated 19,300 + 500 BP (SUA-915). The artefact assemblage showed change over time in artefact size, types and raw material proportions. The earlier assemblage consisted of small flakes of a variety of siliceous rock types, while the latter industry was “Kartan” in nature with large horsehoof cores and scrapers, often of tuff (Gorecki, Morton et al. 1984). These artefact types were once thought to be Pleistocene in age, sometimes occurring in the Early Holocene and was part of the Australian Core Tool and Scraper industry (Lourandos 1997), but is not now thought to be a chronological marker.

In the middle Holocene several types of finely made small implements were added to the toolkit; in this region backed artefacts are the most frequent of these. The flaking technology was characterised by the production of blades, together with technological changes in core preparation and controlled flake production. Fine grained siliceous rock types were preferred (Lourandos, 1997). On the New England, excavations at Bendemeer showed that backed artefacts were used during the last 1,500 years or so and at Graman from about 5,500 BP (McBryde 1974).

Edge ground hatchets were also added to the toolkit, perhaps by 4,500 BP (McBryde, 1974). Petrological analysis of hatchets was combined with information on the distribution of hatchets across northern NSW (Binns and McBryde, 1972). Hatchets found in the Boggabri and Namoi River areas were predominantly Group 2B. These hatchets were of coarse and fine-grained greywackes with pale bluish-green inclusions, mostly derived from metamorphosed andesitic volcanic detritus, which originated from the Moore Creek quarry north of Tamworth. Hatchets from this quarry are numerous and widely distributed. They are abundant in the Liverpool Plains and extend northerly and north-westerly into the Western Slopes and Plains, along the Darling River to Wilcannia. They also occur on the New England Tableland from Walcha-Bendemeer to Inverell-Glen Innes, and one was found south of Willow Tree (Binns and McBryde 1972).

The distribution of 2B hatchets from the Moore Creek quarry is remarkably similar to the distribution of the Kamilaroi (Gamilaraay) and Anaiwan language areas (Wafer and Lissarrangue 2008). These hatchets may have usually been distributed by people related through language or some other social association, which may have been in place for the last few thousand years of prehistory. The current subject area falls within that distribution area.

5.1.2 European Impact on local Aboriginal groups

The subject area landscape appears to have undergone significant changes since European occupation began in the early–mid 19th century. The changes/impacts observed have occurred primarily as a consequence of European land management strategies. The survey area landscape is far removed from that which earlier Aboriginal inhabitants lived in. Due to the past historical land use and disturbances, this would affect the context of any potential archaeological sites. The removal of the vegetation and modification of the soils through agricultural practices and erosion in the past has reduced the potential for archaeological remains to survive (Kayandel Archaeological Services 2011).

5.2 Local Archaeological Context

The local Aboriginal heritage context provides a review of previous archaeological work conducted in the local landscape and determines whether Aboriginal sites have been previously identified in the Project Area. The review of previous archaeological work includes relevant local research publications and archaeological consultancy reports.

5.2.1 Aboriginal Heritage Information Management System (AHIMS)

A search of the Aboriginal Heritage Information Management System (AHIMS) was conducted for the Project Area on 14 February 2014. The coordinates searched for the Project Area were GDA Zone 56, Eastings 227516 to 234516 and Northings 6602037 to 6612037. This search revealed that there are 187 previously recorded Aboriginal sites within these coordinates (**Table 3**).

Table 3 AHIMS Summary

Site Type	Frequency	Percentage %
Isolated Find	111	59.4
Artefact Scatter	45	24.1
Scarred Tree	23	12.3
Artefact(s) unspecified	7	3.7
PAD	1	0.5
TOTAL	**187**	**100**

Source: AHIMS Extensive Report 14 February 2014

One site, AHIMS# 20-4-0198, has restricted information access attached. RPS has confirmed with Insite Heritage Limited that this site does not fall into this Project Area, and therefore is not affected by the proposed works **(Figure 2**).

5.2.2 Local Archaeological and Heritage Studies

5.3 Archaeological and Heritage Literature Review

A review of previous archaeological and heritage reports is required as part of the desktop assessment, and has been undertaken in accordance with the code (DECCW 2010:13).

ARAS (Hamm) (2005). Boggabri Coal Project Aboriginal Cultural Heritage Assessment Report

A survey was conducted of sites from the existing Boggabri Coal Mine within the disturbance footprint of the project. Sites documented included 30 open artefact scatters, 26 isolated finds and four scarred trees. Four sites were considered to have subsurface deposit potential, BC38, BC43, BC46, BC54. BC16 and BC50-52 were considered to have moderate significance with sites BCV 34, BC38 & BC54 given a high significance. Significance was based on artefact numbers & densities. A total of 35 sites were considered subject to Section 90 Consent; Sites BC1-16 within the mine footprint, BC34 adjacent to mine footprint and BC38 & BCHR 1-8 by the haul road. Scientific significance assessment identified that open sites were unlikely to be stratified, artefacts would be confined to the biomantle and that artefacts had been subjected to surface dispersal, down-slope movement and differential exposure or burial by bioturbation processes. Artefact burial was considered an ongoing process and that artefacts would only be revealed by erosion. It was also noted that the dating of sites was unlikely.

Artefact exposure due to erosion was confirmed by the salvage of TCEP-OS-020 (AHIMS# 20-4-0341) during these current salvage works. The artefacts recovered at this site were only found in the exposed erosion scowl on the southern bank of the creek line running through the site.

Insite Heritage (2010). Boggabri Coal Project Aboriginal Cultural Heritage Assessment Report

Insite Heritage recorded 62 artefact sites during this survey and salvage, with archaeological excavation occurring at BC35 and BC41. Grader scaping was also used with soil retrieved from scrapes being sieved and checked for artefacts. Surface artefacts were observed on the lower slopes and slope bases in both the Leard State Forest and the Baan Baa hills. Soil profile disruption was noted throughout the survey area. The potential for subsurface artefacts (PADs) was considered high in the Leard State forest particularly in the upper slope sections, as disturbance was assumed to be less than the lower slopes. The investigation identified 62 sites (artefact scatters and isolated finds), from which 453 artefacts were recorded, all of which were complete or broken flakes. Artefacts were manufactured from mudstone, tuff and silcrete. Concentrations of artefacts were observed in the lower drainage areas of the Leard State Forest and Baan Baa range, the spatial distribution of artefacts then became sparser with fewer sites found on the plain. Fourteen scarred trees, a possible stone cairn and one possible grinding groove site, in addition to the artefact sites, brought the total of sites in the study area to 78. It was noted that site preservation was varied throughout the study area, due to the eroded soil depths and the previous land use (Insite Heritage 2010).

Kayandal, 2011. Tarrawonga Coal Project. Aboriginal Cultural Heritage Assessment.

Fifty-seven sites were identified within the subject area. An additional four sites had been previously recorded in the subject area. These sites comprised of open artefact scatters, modified trees and isolated artefacts. The landform types in the subject area were identified and this was used to correlate the frequency of sites. Through management and mitigation measures, it was advised that where avoidance of known Aboriginal heritage sites is not practicable, site(s) were subject to baseline recording in consultation with representatives of the Aboriginal community, prior to disturbance. Artefacts were to be salvaged for safekeeping in consultation with the Aboriginal community. Baseline recording of sites would include completing an Aboriginal Site Impact Recording Form (or its equivalent) and submitting it to the AHIMS Registrar for each site. If appropriate in the context of the tree condition, culturally modified trees subject to direct disturbance were to be considered for salvage and a suitable location for the storage and/or display of the salvage were to be identified and managed in consultation with the Aboriginal community. It was anticipated that the Aboriginal community would provide advice on the storage of collected artefacts, management of artefacts at the completion of Project activities (e.g. artefact replacement onto the post-mining landscape) and the implementation of management measures for salvaged culturally modified trees.

A new Aboriginal Cultural Heritage Management Plan needed to be developed for the TCM in consultation with the Aboriginal community and OEH to define the agreed management and mitigation measures. The Aboriginal Cultural Heritage Management Plan should be developed prior to any works which would harm Aboriginal cultural heritage sites in the subject area and should be developed in consultation with the Aboriginal community and OEH. The Aboriginal Cultural Heritage Management Plan should include a protocol for the involvement of the registered Aboriginal stakeholders in future field salvage/investigations (Kayandel Archaeological Services 2011).

A Tarrawonga Heritage Management Plan was presented and approved by members of the registered Aboriginal parties in 2013. It is this HMP and the ongoing inclusion of RAPs that has been incorporated for present and future salvage works.

5.4 Synthesis of Heritage Context

A large number of Aboriginal archaeological sites have been recorded in the Project Area. The site types appear to reflect a pattern of low occupation. An assessment of the broader landscape indicates adequate water sources and ample food resources which provide some evidence that the area was suitable for use by medium to large numbers of people over extended periods of time. It is therefore likely that the Tarrawonga and Boggabri mining activity areas were used by Aboriginal people in the past; however the lack of permanent water in the Project Area is likely to have limited Aboriginal occupation to seasonal usage and/or short term habitation.

Alluvial deposits in the region include pebbles and cobbles of a suitable size and type to be used as raw material in the manufacture of stone implements. Previous Aboriginal Cultural Heritage assessment reports indicate that stone artefact sites are the most recurrent site type found in the Project Area and its surrounds, along with numerous scarred trees reported.

High levels of disturbance from past land uses have been observed in previous studies. It is therefore unlikely that Potential Archaeological Deposits (PADs) are present in the Project Area, especially given the infrequency of artefacts further away from the major watercourse. These visible high levels of disturbance have an effect on summarising probable Aboriginal occupation and cultural activity evidence in the area.

5.5 Predictive Model

The following predictive model aims to provide testable statements about the nature and distribution of evidence of Aboriginal occupation on the basis of environmental information, as well as the review of relevant archaeological and heritage reports. The predictive model is necessary for the formulation of appropriate field methodologies and to provide information for the assessment of archaeological significance.

There are a number of factors that influence Aboriginal occupation of an area. These include essential subsistence resources such as food (flora and fauna) and fresh water. However, other resources such as stone raw materials, wood and bark, animal skins, reeds, string, and similar, were also utilised. Landscape features such as ridges, flat elevated areas, rockshelters and similar, may have also influenced Aboriginal occupation of an area. In addition, cultural activities may have taken place at certain locations in the landscape for example corroborees, mythological places and initiation sites.

5.5.1 Site Type, Content and Location Predictions

The AHIMS results identified three major site types in the Project Application Area; artefact scatters, isolated finds and scarred trees. This was collaborated with the Aboriginal Cultural Heritage assessment reports reviewed for this salvage report. On the basis of the previous reports, artefact scatters appear to be located on the lower slopes and valley floors, close to creek lines. There is weak patterning and potential for some artefact scatters to be located in steeper areas. Scarred trees could be located anywhere in the Project Area, though historical logging makes it very difficult to predict where these scarred tress may have been and to what extent.

A review of AHIMS results indicate that artefact scatters and isolated finds generally consist of flaked stone artefacts made from the following raw materials: quartz, quartzite and mudstone. Of the 45 artefact scatters recorded, 12 sites had more than 10 artefacts present. Therefore there is a possibility that more than 10 artefacts may be found at an artefact scatter site. It is clear by the mapping of all the AHIMS sites identified that the vast majority of sites throughout the Project Area and its surrounds are located along creek lines. Scarred trees and isolated finds should also be observed throughout the Project Area.

5.6 Summary of the Aboriginal Heritage Context

The three major site types in the Project Area and surrounds are artefact scatters, isolated finds and scarred trees. The majority of these sites lie along the numerous creek lines running through the Project Area and its surrounds. All areas surrounding the Tarrawonga and Boggabri mine site activities have been heavily disturbed due to historical logging and numerous access tracks, along with the more recent large scale mining activities.

6.0 Salvage Methodology

6.1 Introduction

The salvage methodology for the Project Area below is in accordance with the Tarrawonga HMP (Tarrawonga Mine 2013).

This section outlines the fieldwork methodology which was implemented for the salvage in the Project Area, and includes the aims of the fieldwork, the sampling strategy and recording methods.

6.2 Aims and Research Design

The aim of the salvage programme was to retrieve Aboriginal cultural heritage objects that had previously been identified in the Project activity area.

This salvage was guided by the following questions;

(1) Is there any evidence of past Aboriginal occupation as indicated through the predictive model?

(2) If there is evidence of occupation, what is the extent of the site(s)?

(3) What cultural materials are present and are they typical of the region?

(4) What is the relative date of the site obtained from cultural materials?

(5) What is the distribution of cultural materials, and what does that distribution indicate in relation to models of occupation?

6.3 Salvaging Strategy

Under the approved methodology, employees of Whitehaven Coal Limited, RAPs and RPS Cultural Heritage consultants arrived at each identified site (a picket had been previously placed at each site location) and a thorough survey of the site location and surrounding area was carried out.

6.4 Salvage Methods

When Aboriginal objects were located at each site, they were firstly flagged. This allowed for an overall impression of the site to be observed before full recovery. Once the area was deemed by all parties to have been thoroughly inspected, the RPS Cultural Heritage consultants recorded the exact location of each Aboriginal object. Each Aboriginal object was then photographed *insitu*. All object/s were then placed in labelled bags, along with individually labelled tags for correct identification.

6.5 Monitoring

In accordance with the HMP (Tarrawonga Mine 2013). RAPs are to be given the opportunity to inspect ground surfaces after vegetation clearance prior to mine extension.

6.6 Post Salvage Methodology

The post salvage methodology outlines the artefact recording and analysis procedures to be employed and storage arrangements for recovered artefacts.

6.6.1 Storage of Artefacts

Storage arrangements are outlined in the Tarrawonga HMP (Tarrawonga Mine, 2013).

The artefacts will be held at a suitable location. Long term storage of salvaged artefacts is subject to a Care Agreement and a storage location decided in consultation with the RAPs.

6.6.2 Artefact Recording and Analysis

All artefacts are to be recorded in an appropriate manner. The information recorded included artefact types, database identification numbers, GPS locations, raw material types, weight, and all measurements and dimensions documented for all identified artefacts.

6.6.3 Photography

Photographic recording of the salvage process includes photographs of the sites and their surrounds. All artefacts were photographed as part of this investigation and are in the Plate section of this report.

7.0 Results of the Archaeological Salvage

This section reports on the archaeological salvage and inspection which was carried out on the 25 February 2014. Registered Aboriginal parties were commercially engaged by Whitehaven Coal Limited to provide fieldwork services during the salvage program, and all RAPs were consulted throughout the project, as detailed in Section 3. The archaeological field team was directed by RPS Senior Cultural Heritage Consultant Tessa Boer-Mah, with the assistance of RPS Cultural Heritage Consultant Kerrie Grant.

7.1 Condition of Project Area

The integrity of Aboriginal archaeological sites, and the natural and cultural post-depositional processes that may affect evidence, should be understood prior to the interpretation of salvage results. Once deposited, evidence of human occupation can be affected by a range of processes including natural factors (erosion, weathering, bioturbation) and cultural factors (impact by the original site occupants and impacts from historical logging and recent mining activities).

The Project Area is located between two large mining open cuts (Boggabri and Tarrawonga). A number of graded and vehicle tracks, in various stages of use and condition, criss-crossed throughout the Project Area. Historical logging was observed throughout the salvage area (which is located in the Leard State Forest). With the larger, older trees having been removed, the middle and lower understorey is scattered and scant in most places. Erosion and modern disturbance have had a considerable effect throughout the Project Area (**Figure 3**).

7.2 Salvage of Surface Artefact Sites

Six previously recorded Aboriginal cultural heritage sites were designated to be salvaged (AHIMS#20-4-0303, 20-4-0341, 20-4-0111, 20-4-0112, 20-4-0113 and 20-4-0116). These sites comprised five isolated finds and one artefact scatter (**Table 4**). In addition, the the northeast corner of the Boggabri Open Cut mine extension was monitored and artefacts salvaged.

Table 4 Artefact Sites to be salvaged

AHIMS Site No.	Site Name	Site Type	Easting	Northing
20-4-0303	TCEP-IF-002	Isolated Find	229020	6608474
20-4-0341	TCEP-OS-020	Artefact Scatter	228841	6608319
20-4-0111	BC17	Isolated Find	227644	6608315
20-4-0112	BC18	Isolated Find	227622	6608416
20-4-0113	BC19	Isolated Find	227622	6608492
20-4-0116	BC22	Isolated Find	227767	6608516
Monitoring	Monitoring	Artefact collection	227763	6608541

227000.000000 227500.000000 228000.000000 228500.000000 229000.000000 229500.000000

6607000.000000 6606500.000000 6606000.000000 6605500.000000

20-4-0116
20-4-0113
20-4-0112
20-4-0111
TCEP-ST-010
TCEP-ST-011
TCEP-IF-002
TCEP-ST-001
TCEP-OS-020

Storage Location of Scarred Tree

Legend

Project Area

SCEP-ST-010

- Storage Location of Scarred Tree
- 10m Contours
- Vehicle Track
- Drainage

Heritage Sites Salvaged

- Artefact Scatter
- Isolated Artefact
- Scar Tree
- Track Log

Warning:
While all reasonable care has been taken to ensure the information contained on this map is up to date and accurate, no guarantee is given that the information portrayed is free from error or omission. Please verify the accuracy of all information prior to use.

160 80 0 160 320 480 640 m

SCALE: 1:8,004 AT A3 SIZE

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TITLE : **FIGURE 3: SCARRED TREE SITES INSPECTED, ARTEFACT SITES SALVAGED AND STORAGE LOCATION FOR SCARRED TREE**

LOCATION : **WHITEHAVEN TARRAWONGA**

DATUM:GDA 1994

PROJECTION: GDA 1994 MGA Zone 56

DATE : **14/11/2014**

PURPOSE: **HERITAGE**

VERSION (PLAN BY): A3 (tessa.boer-mah)

PATH: J:\JOBS\120K\120627 Whitehaven Tarrawonga\10 - Drafting\Arcgis Map Documents\120627-1 Figure 3 A3 20140321.mxd

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7.2.2 Results of Surface Artefact Site Salvage

Thirteen artefacts were salvaged from previously recorded AHIMS sites. Two raw material samples were collected in association with AHIMS sites, as RAP representatives present felt these were associated with the recorded sites. A summary of each surface artefact site salvaged is presented below.

BC17 (AHIMS# 20-4-0111)

This salvage site was located on the western edge of a flat graded track which gently sloped towards the north (Plate 1). A number of large drainages lines and creek lines run throughout the Project Area, with the nearest drainage channel 200 metres to the north of this site. Overall soil exposure was extensive due to the site's location on a graded track. Soil exposure and ground visibility was high at 90% (Plates 2 & 3). The nearby vegetation comprised of medium sized eucalyptus, acacias and scattered native grasses (Plate 4). Previous disturbances in the general area include the clearance of trees during historical logging and the grading and use of vehicle tracks. Access was along the graded track the site was located on. BC18 (AHIMS# 20-4-0112) was located 50 metres to the north on the same track.

No Aboriginal cultural heritage items or objects were recovered during the salvage activities at this site location.

BC18 (AHIMS# 20-4-0112)

This salvage site was located on the western edge of a flat graded track which gently sloped towards the north (Plate 5). A number of large drainages lines and creek lines run throughout the Project Area with a with the nearest drainage channel 150 metres to the north of this site. Overall soil exposure was extensive due to the site's location on a graded track. Soil exposure and ground visibility was high at 90% (Plates 6 & 7). The nearby vegetation comprised of medium sized eucalyptus, acacias and scattered native grasses (Plate 8). Previous disturbances in the general area include the clearance of trees during historical logging and the grading and use of vehicle tracks. Access was along the graded track the site was located on. BC17 (AHIMS# 20-4-0111) was located 50 metres to the north on the same track with BC19 (AHIMS# 20-4-0113) located another 50 metres to the north and approximately 5 metres to the east of the graded track.

One artefact was recovered during the salvage activities at this site location (Plate 9).

BC19 (AHIMS# 20-4-0113)

This salvage site was located to the east of the flat graded track which BC17 and BC18 were located (Plate 10). A number of large drainages lines and creek lines run throughout the Project Area with the nearest drainage channel 120 metres to the north of this site. Overall soil exposure was low at 15% with ground visibility at 30% (Plates 11 & 12). The surrounding vegetation comprised of medium sized eucalyptus, acacias and scattered native grasses with old felled logs in the site area (Plate 13). Previous disturbances in the area include the clearance of trees during historical logging. Access was along the graded track that BC 17 and BC18 were also located on and then by foot across ungraded terrain for approximately 10 metres to the east of the track. All ground surfaces were inspected, but no Aboriginal objects identified.

No Aboriginal cultural heritage items or objects were recovered during the salvage activities at this site location.

BC22 (AHIMS# 20-4-0116)

This salvage site was located on a flat space on a creek edge (Plate 14). Overall soil exposure was low at 10% with ground visibility was medium at 30% (Plates 15 & 16). The nearby vegetation comprised of medium sized eucalyptus, acacias and scattered native grasses (Plate 17). A large creek line runs east to west along the southern boundary of the site area (Plate 18). Previous disturbances in the general area include the clearance of trees during historical logging, and vehicle and animal tracks. Access was on foot approximately 150 metres to the east of the graded track that BC17 and BC18 were located on. All ground surfaces were inspected, but no Aboriginal objects identified.

This site was previously recorded as an isolated find, however, four artefacts were recovered during the monitoring activities at this site location (**Plate 45**).

TCEP-OS-020 (AHIMS# 20-4-0341)

This salvage site was located on a graded track and large creek line (Plate 19). The creek line runs through the centre of the site, with heavy erosion sloping towards the creek on the southern side of the site (Plate 20). Overall soil exposure was high (70%), due to the site's location on a graded track. Ground visibility was also high at 60% (Plates 21). The nearby vegetation comprised of medium sized eucalyptus, acacias and scattered native grasses (Plate 22). Other previous disturbances in the area include the clearance of trees during historical logging, and the grading and use of vehicle tracks. Access was along the graded track the site was located on. One artefact was located on the flat graded track, 100m to the east of the main scatter of TCEP-02-020 (AHIMS# 20-4-0341). Access was along the graded track the site was located on (Plates 36, 37, 38 & 39).

Eight artefacts were recovered during the salvage activities at this site location (Plates, 23, 24, 25, 26, 27, 28, 29 and 35).

TCEP-IF-002 (AHIMS# 20-4-0303)

This salvage site was located to the north of a vehicle track, with the site area sloping to the west (Plate 31). A number of large drainages lines and creek lines run throughout the Project Area. Overall soil exposure was low (10%) due to large amounts of leaf litter. Ground visibility was also low at 20% (Plates 32 & 33). The surrounding vegetation comprised of medium to large sized eucalyptus, acacias and native grasses (Plate 34). Previous disturbances in the general area include the clearance of trees during historical logging and the use of vehicle tracks. Access was through the Leard State Forest, approximately 200 metres to the north east of the track that TCEP-OS-020 was located on.

No Aboriginal cultural heritage items or objects were recovered during the salvage activities at this site location.

7.3 Overview of Surface Artefacts Salvaged

Thirteen artefacts were recovered from previously recorded sites (**Table 5**, **Table 6 and Figure 3**), as well as the inspection of previously recorded scarred trees. Four artefacts were recovered during monitoring (**0**).

Table 5 Summary of Salvage and Inspection from the 25 February 2014

AHIMS Site No.	Site Name	Whitehaven Figure Nos.	Site Type	Actions Taken
20-4-0303	TCEP-IF-002	2	Isolated Find	No artefacts recovered
20-4-0341	TCEP-OS-020	45	Artefact Scatter	Seven artefacts collected
20-4-0299	TCEP-ST-001	47	Scarred Tree	Inspected

AHIMS Site No.	Site Name	Whitehaven Figure Nos.	Site Type	Actions Taken
20-4-0347	TCEP-ST-010	56	Scarred Tree	Inspected
20-4-0348	TCEP-ST-011	57	Scarred Tree	*To be deregistered with AHIMS
20-4-0111	BC17	BC17	Isolated Find	No artefacts recovered
20-4-0112	BC18	BC18	Isolated Find	One artefact recovered
20-4-0113	BC19	BC19	Isolated Find	No artefacts recovered
20-4-0116	BC22	BC22	Isolated Find	Four Artefact Recovered

All recovered artefacts were recorded by an RPS Cultural Heritage consultant (**Table 6**). Artefacts were returned to Whitehaven Coal Limited for appropriate storage as described in the Tarrawonga HMP.

Thirteen artefacts were recovered from previously identified sites were recorded. Seven flakes, two cores, one broken flake, two angular fragments and a flake scraper were recovered and recorded. The lithology comprises of mostly mudstone with some quartz present. Two of the artefacts had usewear evidence present also.

Table 6 Salvage Artefact Recording Results

Site Name	Artefact No.	Artefact Type	Raw Material	Colour	Length	Width	Thickness	Weight	Retouch/ Usewear
20-4-0112	0112-1	Core	Quartzite	Grey & white	37.16	33.66	19.82	34.0g	None
20-4-0341	0341-1	Flake	Quartz	White	20.26	16.12	6.94	2.3g	None
20-4-0341	0341-2	Flake	Mudstone	Pink	19.16	11.41	3.21	0.8g	None
20-4-0341	0341-3	Flake	Mudstone	Grey	22.6	20.3	3.58	0.9g	None
20-4-0341	0341-4	Core	Mudstone	Pink	39.34	33.37	23.74	34.8g	None
20-4-0341	0341-5	Flake	Mudstone	Pink	24.35	16.72	4.16	2.4g	None
20-4-0341	0341-6	Flake	Mudstone	Pink	26.67	12.63	4.92	1.4g	Usewear on both margins
20-4-0341	0341-7	Distal Flake	Mudstone	Grey	12.78	18.66	5.31	1.2g	None
20-4-0341	0341-8	Flake Scraper	Mudstone	Grey	23.13	14.85	7.53	2.5g	Usewear on left margin
Close to 20-4-0112	RM Sample 01		Mudstone	Cream					
Close to 20-4-0113	RM Sample 02		Quartz	White					
20-4-0116	M1	Flake	Mudstone	Grey	48.23	24.4	12.02	15.9	Possible Retouch left margin
20-4-0116	M2	Flake	Mudstone	Grey	30.56	18.93	2.39	2.2	No
20-4-0116	M3	Angular	Mudstone	Grey	23.32	18.69	5.65	2.2	No

Site Name	Artefact No.	Artefact Type	Raw Material	Colour	Length	Width	Thickness	Weight	Retouch/ Usewear
		Fragment							
20-4-0116	M4	Angular Fragment	Mudstone	Grey	23.87	18.7	9.38	4.0	No

7.4 Scarred Tree Salvage

The salvage of scarred tree (AHIMS 20-4-0347 [TCEP-ST-010]) was undertaken on Friday 6 June 2014. RAP representatives were present and the work was supervised by Lachlan Johnson (Whitehaven Coal), with specialist input from Danny Draper (Arborist – UTMA). Oliver Moore (Enright Land Management) undertook the chainsaw and Elevated Work Platform (EWP) for the tree removal. Tessa Boer-Mah RPS Cultural Heritage Manager documented the process.

A pre-start meeting was undertaken to ensure all RAP representatives understood the proposed methodology, as well as to allow RAP input into the methodology. The methodology for the scarred tree removal was to be undertaken in a series of steps the first of which was to trim all the branches from the tree, to remove the crown of the tree; then attach the crane sling to the top of the tree to keep it stable while the base of the tree was cut. The tree would then be transferred by crane to a pre-prepared lay down area and the tree laid out on car tyres to cushion and support the tree. The tree scar was to be inspected and protected with geotechnical fabric before transfer to the truck. Once secure to the truck the tree was to be transported to the safe keeping location near the mine office. The pre-start meeting also included an outline of safety measures and that when the EWP was in operation, then all observers had to maintain a safe distance from works.

This methodology was agreed to by the RAPs with the inclusion of their motion to have the opportunity to inspect the tree at each step. This suggestion was incorporated into the site procedures, so that the RAPs had the opportunity to inspect the scar prior to branch trimming and at each subsequent step works were halted to ensure RAPs had the opportunity to inspect the tree.

The scarred tree salvage was undertaken according to the methodology outlined. Prior to starting on-site works another briefing was held (Plate 46 and Plate 47). Danny Draper explained the methodology and provided some background on the nature of the Aboriginal scar (Plate 48 and Plate 49). Once the EWP was in operation all observers maintained a safe distance from the tree, so that works did not pose hazards to onlookers (Plate 50). The branch trimming targeted the lower branches first *Plate 51 and Plate 52), before trimming upper branches (Plate 53). The crown of the tree was then removed (Plate 54) and the top of the tree secured with the crane sling so the base could be cut (Plate 55). Once the tree was placed in the lay down area RAP representatives inspected the tree and affixed protective geotechnical fabric (Plate 56). The tree was then transported by truck (Plate 57) to the storage location/keeping place (Plate 58) which is opposite the mine office (Easting 228041, Northing 6606902).

A de-brief meeting was held after the tree was placed in the storage location. All RAP representatives indicated that they were satisfied with the process undertaken and that the tree was stored appropriately.

8.0 Interpretation of the Salvage Results

This section draws on the data presented in the previous section in order to address the aims/research questions posed in the methodology. This section provides an interpretation of past Aboriginal occupation of the area on the basis of archaeological evidence.

8.1 Aim and Results

The aim of this salvage was to recover a number of previously reported Aboriginal cultural objects within the designated Project Area. These included five isolated find sites, three scarred trees and one artefact scatter.

Of the four isolated find sites, only one artefact was recovered at BC18 (AHIMS# 20-4-0112). No other artefacts were observed and recovered from the other four designated sites; BC17 (AHIMS# 20-4-0111), BC19 (AHIMS# 20-4-0113) and TCEP-IF-002 (AHIMS# 20-4-0303).

Of the two artefact scatter sites, eight artefacts were recovered at TCEP-OS-020 (AHIMS# 20-4-341) and four artefacts were recovered at BC22 (AHIMS#20-4-0116).

Of the three scarred trees, it was determined through the inspection by RPS Cultural Heritage consultants, nine registered Aboriginal party members and a professional arborist that only one of the trees will be removed and recovered. TCEP-ST-010 (AHIMS# 20-4-0347) will be recovered and stored at a later date. TCEP-ST-001 (AHIMS# 20-4-0299) was determined by all parties not to be of an Aboriginal cultural practice but a surveyor's mark. This site will be deregistered as an Aboriginal Cultural Heritage site. The location of TCEP-ST-011 (AHIMS# 20-4-0348) was previously incorrectly recorded. With the new co-ordinates assessed, it was found that this scarred tree is no longer in the impact zone of the Project Area (Tarrawonga Mine 2013).

The RAPS were also involved in the monitoring of vegetation scrapes in the Boggabri Open Cut mine extension works area. During this monitoring, four artefacts were recovered at BC22 (AHIMS#20-4-0116).

8.2 Interpretation of Research Questions

The interpretation of the salvage results has been guided by the following questions:

(1) Is there any evidence of past Aboriginal occupation as indicated through the predictive model?

(2) If there is evidence of occupation, what is the extent of the site(s)?

(3) What cultural materials are present and are they typical of the region?

(4) What is the relative date of the site obtained from cultural materials?

(5) What is the distribution of cultural materials, and what does that distribution indicate in relation to models of occupation?

The salvage and original surveys show that the Project Area has been highly disturbed, due to the historical logging of the area and the continued disturbance produced from the ongoing works of large scale mining activities which surround the Project Area.

8.3 Interpretation of Past Aboriginal Occupation

The salvage results suggest that while there was Aboriginal occupation of this area, it was infrequent and/or low in intensity.

AHIMS site mapping clearly indicates that the majority of sites both in the Project Area and in the surrounding mining activity areas are located along the creek lines. Predictive modelling suggests that Aboriginal occupation was more intensive and frequent near major watercourses; this is likely due to the reliability of drinking water at these locations.

Few artefacts were recovered during the salvage which suggests the area was occupied infrequently and/or was low intensity. The lack of major watercourses in the area is likely a contributing factor to the pattern of occupation. The extent of the artefact sites identified are small which correlates with the lack of artefacts identified. The raw materials and artefact types identified are typical of the region, with tuff featuring heavily. No diagnostic tools such as backed artefacts were identified which would indicate relative date for the assemblage. However, the assemblage is similar enough to surrounding areas, that it is likely to be Holocene in date. Artefacts are sparsely distributed over the Project Area this broadly fits with the predictive model whereby areas which suggests that occupation further away from major watercourses was infrequent and/or low intensity. It is likely that the Project Area was used intermittently for resource gathering an hunting, rather than for large campsites and semi-permanent occupation.

9.0 Assessment of Significance

This significance assessment considers information gained from the surface collection to assess the significance of the Aboriginal site that was subject to archaeological investigation or collection. This assessment of significance follows the four values identified in the *Burra Charter* (Australia ICOMOS 1999) and the OEH guidelines (OEH 2011). The four values are: scientific, social, historical and aesthetic. Scientific value, also referred to as archaeological value, has been assessed herein by RPS archaeologists.

The RAPs will have the opportunity to re-assess the social, historical and aesthetic values as part of the finalisation of this report.

9.1 Aboriginal Cultural Significance Criteria and Assessment

An assessment of cultural significance incorporates a range of values which may vary for different individual groups and may relate to both the natural and cultural characteristics of places or sites. Cultural significance and Aboriginal cultural views can only be determined by the Aboriginal community using their own knowledge of the sites and their own value system.

As the cultural significance is a criterion that only Aboriginal people can assess, a copy of the draft report was sent to RAPs and an opportunity will be provided to comment on the significance of the Aboriginal sites identified.

9.2 Archaeological Significance Criteria

Archaeological significance, also referred to as scientific significance, is determined by assessing an Aboriginal heritage site or area according to archaeological criteria. The assessment of archaeological significance is used to develop appropriate heritage management and impact management strategies. Criteria for archaeological significance has been developed in accordance with the principles of the ICOMOS *Burra Charter* and the OEH Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW (OEH 2011). The criteria for assessing archaeological significance are shown in **Table 7** below.

Table 7 Archaeological Significance Criteria

Criteria	Description
Research Potential	This criterion is used to identify whether a site has the potential to contribute new information for the interpretation of Aboriginal occupation in the area.
Rarity	This criterion examines the frequency of the identified site types with others previously recorded in the local or regional landscape. The purpose of this criterion is to ensure a sample of sites is conserved for future generations.
Representativeness	All sites are representative of a site type; however some sites may be in better condition, or demonstrate more clearly a particular site type. Representativeness is based on the understanding of extant sites in the local or regional landscape and their connectivity. The purpose of this criterion is to ensure a sample of sites which is representative of a particular site type is conserved for future generations.
Education Potential	This refers to whether the site has the potential to contribute to the public understanding of Aboriginal cultural heritage. These sites are often well preserved and have recognisable features which would assist in teaching.

9.3 Assessment of Archaeological Significance

9.3.1 Surface Artefacts

Thirteen artefacts were recovered from the surface salvage and monitoring. Their raw material and artefact types are similar to those found in surrounding areas and therefore they are not particularly rare. While the

artefacts are broadly representative of other assemblages, there are better examples of such site types in the region and therefore the sites salvaged/monitored are assessed to have low significance for representativeness. These sites due to their disturbed context and low numbers of artefacts have been assessed to have low research and educational potential.

9.3.2 Scarred Tree

Scarred tree (AHIMS 20-4-0347 [TCEP-ST-010]) has been salvaged and removed to the storage area. The tree is in good condition and the scar is clearly defined. This is rare on a local scale and therefore the scarred tree still has high local significance, but is of moderate significance on a local scale. The tree has been conserved and therefore still retains its significance for representativeness on a local scale, but is of moderate significance on a regional scale. In terms of research potential it retains its local significance on a local scale, but is of moderate significance on a regional scale. The education potential of this tree is high on a local scale and moderate on a regional scale.

10.0 Conclusions and Recommendations

In accordance with the approved methodology, salvage procedures were carried out on all sites recorded as being impacted by the Project Area activities. These salvage activities were carried out as outlined in the Tarrawonga HMP. Thirteen surface artefacts were recovered. One scarred tree (AHIMS 20-4-0347 [TCEP-ST-010]) has also been salvaged and removed to a storage facility. Aboriginal Site Impact Recording (ASIR) forms have been completed for these sites and submitted to OEH.

Recommendation 1

All relevant staff and contractors should be made aware of their statutory obligations for heritage under the *National Parks and Wildlife Act* 1974 and the *Heritage Act* 1977, which may be implemented as a heritage induction.

Recommendation 2

If unrecorded Aboriginal object/s are identified in the Project Application Area during works, then procedures under the Tarrawonga HMP must be followed.

Recommendation 3

This document should be kept and appended to the Tarrawonga HMP.

11.0 References

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12.0 Plates



Plate 1 BC17 (AHIMS# 20-4-0111) Isolated find site (facing north) – no artefacts recovered



Plate 2 BC17 (AHIMS# 20-4-0111) Isolated find site (facing south)



Plate 3 BC17 (AHIMS# 20-4-0111) Isolated find site (facing east)



Plate 4 BC17 (AHIMS# 20-4-0111) Isolated find site (facing west)



Plate 5 BC18 (AHIMS# 20-4-0112) Isolated find site (facing north) – one artefact collected



Plate 6 BC18 (AHIMS# 20-4-0112) Isolated find site (facing south)

	
Plate 7 BC18 (AHIMS# 20-4-0112) Isolated find site (facing east)	**Plate 8 BC18 (AHIMS# 20-4-0112) Isolated find site (facing west)**
	
Plate 9 BC18 (AHIMS# 20-4-0112) Isolated artefact collected	**Plate 10 BC19 (AHIMS# 20-4-0113) Isolated Find site (facing north) – no artefacts recovered**
	
Plate 11 BC19 (AHIMS# 20-4-0113) Isolated Find site (facing south)	**Plate 12 BC19 (AHIMS# 20-4-0113) Isolated Find site (facing east)**



Plate 13 BC19 (AHIMS# 20-4-0113) Isolated find site (facing west)



Plate 14 BC22 (AHIMS# 20-4-0116) Isolated find site (facing north) – no artefacts recovered



Plate 15 BC22 (AHIMS# 20-4-0116) Isolated find site (facing south)



Plate 16 BC22 (AHIMS# 20-4-0116) Isolated Find site (facing east)



Plate 17 BC22 (AHIMS# 20-4-0116) Isolated Find site (facing west)



Plate 18 BC22 (AHIMS# 20-4-0116) South Boundary Creekline – running east to west



**Plate 19 TCEP-OS-020 (AHIMS# 20-4-0341)
Artefact Scatter (As x 7) site (facing north)**



**Plate 20 TCEP-OS-020 (AHIMS# 20-4-0341)
Artefact Scatter site (facing south)**



**Plate 21 TCEP-OS-020 (AHIMS# 20-4-0341)
Artefact Scatter site (facing east)**



**Plate 22 TCEP-OS-020 (AHIMS# 20-4-0341)
Artefact Scattter site (facing west)**



**Plate 23 TCEP-OS-020 (AHIMS# 20-4-0341)
Artefact No. 1**



**Plate 24 TCEP-OS-020 (AHIMS# 20-4-0341)
Artefact No. 2**



**Plate 25 TCEP-OS-020 (AHIMS# 20-4-0341)
Artefact No. 3**



**Plate 26 TCEP-OS-020 (AHIMS# 20-4-0341)
Artefact No. 4**



**Plate 27 TCEP-OS-020 (AHIMS# 20-4-0341)
Artefact No. 5**



**Plate 28 TCEP-OS-020 (AHIMS# 20-4-0113)
Artefact No. 6**



**Plate 29 TCEP-OS-020 (AHIMS# 20-4-0113)
Artefact No. 7**



**Plate 30 TCEP-OS-020 (AHIMS# 20-4-0341)
Overview of Scatter (facing west)**



Plate 31 TCEP-IF-002 (AHIMS# 20-4-0303) Isolated Find site (facing north) – no artefact recovered



Plate 32 TCEP-IF-002 (AHIMS# 20-4-0303) Isolated Find site (facing north)



Plate 33 TCEP-IF-002 (AHIMS# 20-4-0303) Isolated Find site (facing east)



Plate 34 TCEP-IF-002 (AHIMS# 20-4-0303) Isolated Find site (facing west)



Plate 35 TCEP-0S-020 (AHIMS# 20-4-0341) Artefact 8



Plate 36 TCEP-OS-0341 Artefact 8 (facing north)



Plate 37 TCEP-OS-020 Artefact 8 (facing south)



Plate 38 TCEP-OS-020 Artefact 8 (facing east)



Plate 39 TCEP-OS-020 Artefact 8 (facing west)



Plate 40 TCEP-ST-001 (AHIMS# 20-4-0299) Scar Tree to be recovered



Plate 41 TCEP-ST-010 (AHIMS#20-4-0347) To be recovered



Plate 42 TCEP-ST-010 (AHIMS# 20-4-0347) View of tree scar



Plate 43 TCEP-ST-011 (AHIMS# 20-4-0348) Not Aboriginal scar but Surveyor's mark (to be de-registered as Aboriginal site)



Plate 44 TCEP-ST-011 (AHIMS# 20-4-0348) View of Surveyor's Mark



Plate 45 Artefacts from monitoring BC22 (AHIMS#20-4-0116)



Plate 46 Scarred Tree



Plate 47 Meeting prior to works



Plate 48 Dany Draper explaining methodology



Plate 49 Close up of scar



Plate 50 Observation of works from a safe distance



Plate 51 Elevated Work Platform



Plate 52 Branch trimming



Plate 53 Scarred Tree and branch trimming



Plate 54 Removal of tree crown



Plate 55 Securing top of tree with crane sling and cutting tree at base



Plate 56 RAP representatives inspecting scar tree and lay down area and affixing protective geotechnical fabric



Plate 57 Loading tree on to truck



Plate 58 Scarred Tree in storage container supported by car tyres

Appendix 1

Aboriginal Consultation

Tarrawonga Mine

Pre Strip Inspection - Northern Box Cut (see attached plan
Dam footprint

Date: 12/3/14 Time 7.30 - 4pm

Name	Signature	Organisation
Greg Gissell	Greg Gissell	
Mat Talbott	M.S. Talbott	

Artefacts Found

Action Required

Supervisor Supervisor

Tarrawonga Mine

Pre Strip Inspection - Northern Box Cut Dam Footprint

Date: 12/3/14

Name	Organisation	Sign On	Sign Off
[illegible]	[illegible]	7.30	4.30
Matt Talbott	LALC	7.30	4.30
		7.30	4.30

Supervisor Signature

SOIL STRIPPING – ABORIGINAL SITE MONITORING

Date: 25 February 2014 **Commencement Time:** 1.45pm
Site: Tarrawonga **Soil Stripping Locality:** Strip 3110 - 3214

Site Monitors

Name	Organisation
1) Cliff Matthews	Mingga
2) Rod Matthews	Giriin
3) PHILLIP THOMAS	MIN MIN
4) [illegible]	BIGUNDI BIAMI
5) Tracy Wortley	R.C.L.C
6) MARGARET MATTHEWS	ANTC
7) JOHN MATTHEWS	ANTC.
8) Karen Matthews	Bullem Bullem
9) GEORGE SAMPSON	CACATUA CULTURE CONSULTANTS

Topsoil
Tick applicable boxes

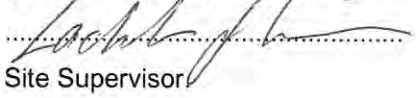
Surface check Yes No

Items discovered - Nil

I, as site monitor working for the above stipulated organisation, declare that all information stated above is a true and accurate account of the findings for this site, on the recorded date.

1) Print name Rod Matthews Sign [signature]
Finish Time – 3.00pm
2) Print name CLIFF MATTHEWS Sign [signature]
Finish Time – 3.00pm
3) Print name Tracy Wortley Sign [signature]
Finish Time – 3.00pm
4) Print name MARGARET MATTHEWS Sign [signature]
Finish Time – 3.00pm
5) Print name JOHN MATTHEWS Sign [signature]
Finish Time – 3.00pm
6) Print name Karen Matthews Sign [signature]
Finish Time – 3.00pm
7) Print name GEORGE SAMPSON Sign [signature]
Finish Time – 3.00pm
8) Print name GARY GRIFFITHS Sign [signature]
Finish Time – 3.00pm
9) Print name PHILLIP THOMAS Sign [signature]
Finish Time – 3.00pm

Certification of site monitoring



Site Supervisor

SOIL STRIPPING – ABORIGINAL SITE MONITORING

Date: 10 April 2014 **Commencement Time:**
Site: Tarrawonga **Soil Stripping Locality:** Northern extension box cut and ramp

Site Monitors

Name	Organisation
1) George Sampson	Eastern Corridor Consultants
2) Tracy Wortley	Bullen Bullen
3)	
4)	
5)	
6)	
7)	
8)	
9)	

Topsoil
Tick applicable boxes

Surface check Yes No

Items discovered - 5 artefacts located. GPS point – 0227 763 6608 SA1 Photos see attached. Sent to RPS for follow up.

Notes – Whole area was subject to surface check. NW quarter section subject to top soil stripping monitoring. See map detailing area.

I, as site monitor working for the above stipulated organisation, declare that all information stated above is a true and accurate account of the findings for this site, on the recorded date.

1) Print name George Sampson ..... Sign .....
Finish Time – 4.30
2) Print name Tracy Wortley ..... Sign .....
Finish Time – 4.30
3) Print name ..... Sign .....
Finish Time –

Certification of site monitoring

.....
Site Supervisor.

SOIL STRIPPING –
ABORIGINAL SITE MONITORING

Date: 17 April 2014 **Commencement Time: 1.45**
Site: Tarrawonga **Soil Stripping Locality:** Hill

Site Monitors

Name	Organisation
1) Rod Mathews	Giwlirr
2) Clifford Matthews	Mingga
3)	
4)	
5)	
6)	
7)	
8)	
9)	

Topsoil
Tick applicable boxes

Surface check Yes No

Items discovered - Nil

Notes –

I, as site monitor working for the above stipulated organisation, declare that all information stated above is a true and accurate account of the findings for this site, on the recorded date.

1) Print name..Rod Mathews.....Sign.....
Finish Time –
2) Print name..Clifford Mathew.Sign.....
Finish Time –
3) Print name.....Sign.....
Finish Time –

Certification of site monitoring

.....

Site Supervisor.

SOIL STRIPPING –
ABORIGINAL SITE MONITORING

Date: 17 April 2014 **Commencement Time:** 10.45am
Site: Tarrawonga **Soil Stripping Locality:** Northern extension – ~~Dump & Box Cut~~ Dump (part 1)

Site Monitors

Name	Organisation
1) Rod Matthews	Gilwirri
2) Clifford Matthews	Mingga
3)	
4)	
5)	
6)	
7)	
8)	
9)	

Topsoil
Tick applicable boxes

Surface check Yes No

Items discovered -

Notes – See attached plan Surface inspection

I, as site monitor working for the above stipulated organisation, declare that all information stated above is a true and accurate account of the findings for this site, on the recorded date.

1) Print name.....Rod Matthews.....Sign.....
   Finish Time –
2) Print name.....Clifford Matthews.....Sign.....
   Finish Time –
3) Print name.....Sign.....
   Finish Time –

Certification of site monitoring

.....

Site Supervisor.

SOIL STRIPPING –
ABORIGINAL SITE MONITORING

Date: 17 April 2014 **Commencement Time: 8.30**
Site: Tarrawonga **Soil Stripping Locality:** Northern extension – Box Cut

Site Monitors

Name	Organisation
1) Rod Matthews	Gilmiyr
2) Clifford Matthews	Mingan
3)	
4)	
5)	
6)	
7)	
8)	
9)	

Topsoil
Tick applicable boxes

Surface check Yes No

Items discovered - Nil

Notes – Subsurface stripping monitored within vicinity of previous artefact site. Two shallow passes were carried out removing 150mm and 300mm respectively following inspections. Nil artefacts were located.

I, as site monitor working for the above stipulated organisation, declare that all information stated above is a true and accurate account of the findings for this site, on the recorded date.

1) Print name..Rod Matthews.....Sign.....
Finish Time –
2) Print name.....Sign.....
Finish Time –
3) Print name..Clifford Matthews.....Sign.....
Finish Time –

Certification of site monitoring

.....

Site Supervisor.

SOIL STRIPPING –
ABORIGINAL SITE MONITORING

Date: 17 April 2014 **Commencement Time: 8.30**
Site: Tarrawonga **Soil Stripping Locality:** Northern extension – Box Cut & Ramp

Site Monitors

Name	Organisation
1) Clifford Matthews	Mingoo
2) Rod Matthews	Giiwir
3)	
4)	
5)	
6)	
7)	
8)	
9)	

Topsoil
Tick applicable boxes

Surface check Yes No

Items discovered - Nil

Notes – Subsurface inspection carried for box cut and ramp. No artefacts located.

I, as site monitor working for the above stipulated organisation, declare that all information stated above is a true and accurate account of the findings for this site, on the recorded date.

1) Print name Clifford Matthews Sign.....
Finish Time –
2) Print name Rod Matthews Sign.....
Finish Time –
3) Print name.....Sign.....
Finish Time –

Certification of site monitoring
.....
Site Supervisor.

SOIL STRIPPING – ABORIGINAL SITE MONITORING

Date: 26 May 2014 **Commencement Time:** 7.30am
Site: Tarrawonga **Soil Stripping Locality:** Northern extension – Dump & Eastern Pit Expansion

Site Monitors

Name	Organisation
1) John Matthews	ANTC
2) MARGARET MATTHEWS	ANTC
3) Shaun Dias	Min Min Corporation Limited
4)	
5)	
6)	
7)	
8)	
9)	

Topsoil
Tick applicable boxes

Surface check Yes ✓ No

Items discovered - Nil

Notes –

I, as site monitor working for the above stipulated organisation, declare that all information stated above is a true and accurate account of the findings for this site, on the recorded date.

1) Print name..John Matthews.....Sign..J Matthews.....
   Finish Time –
2) Print name..MARGARET MATTHEWS.....Sign..M Matthews.....
   Finish Time –
3) Print name..Shaun Dias.....Sign.....
   Finish Time –

Certification of site monitoring
.....
Site Supervisor.

Appendix 2

Aboriginal Site Impact Recording Forms

Aboriginal Site Impact Recording Form

AHIMS Registrar
PO Box 1967, Hurstville 2220 NSW
December 2010 DECCW 2010/1022

1 This form must be completed following impacts to AHIMS sites that are:
   a) an outcome of test excavation carried out in accordance with the *Code of Practice for the Archaeological Investigation of Aboriginal Objects in NSW*
   b) authorised by an Aboriginal Heritage Impact Permit (AHIP)
   c) undertaken for the purpose of complying with environmental assessment requirements issued by the Department of Planning under Part 3A of the *Environmental Planning and Assessment Act 1979* (EP&A Act), or
   d) authorised by a Part 3A project approval under the EP&A Act.
2 Completed forms must be submitted to the AHIMS Registrar (www.environment.nsw.gov.au/contact/AHIMSRegistrar.htm).
3 This form is intended to complement (not replace) the AHIMS Site Recording Form. Where there is a need to provide detailed information about the nature of a site, use the AHIMS Site Recording Form.
4 This form does not replace the need to submit reports to DECCW (as specified by a condition of an AHIP or Part 3A approval). This form must be submitted in addition to any reports.

AHIMS site ID: 20-4-0111

Site impact authorisation (select one)

Reference numbers, dates

☐ Archaeological Code (The impacts to this site were the result of test excavation carried out in accordance with the *Code of Practice for the Archaeological Investigation of Aboriginal Objects in NSW.*)

Date DECCW was notified (under requirement 15c of the Code):

DECCW Regional office notified:

☐ AHIP (The impacts to this site were authorised by an AHIP.)

AHIP number:

Date issued/signed:

AHIMS permit ID/number:

☐ Part 3A application (The impacts to this site were undertaken for the purposes of complying with Part 3A environmental assessment requirements issued by the Department of Planning.)

Major project number: 11_0047

Date environmental assessment requirements issued:

or

☒ Part 3A approved project (The impacts to this site were authorised by a project approval under Part 3A of the EP&A Act.)

Date of project approval:

Site status following impacts:

☐ Not a site (The investigations concluded that this is not a site.)

☐ Valid site (The investigations confirmed that this is an Aboriginal site.)

☐ Partially destroyed (The site was partially destroyed following authorised impacts; a portion of the site remains in situ.)

☒ Destroyed (The site was completely destroyed following authorised impacts.)

Geographic location

Site name: BC17

Easting: 227644 **Northing:** 6608315 **Coordinates must be in GDA (MGA)**

Map sheet: Boggabri 89364S

Zone: 56 **Location method:** Differential GPS

Primary recorder

(The person responsible for the completion and submission of this form)

Title	Surname	First name

Organisation: RPS Australia East Pty Ltd

Address: PO Box 428 Hamilton NSW 2303

Phone: 249404200 **E-mail:** newcastle@rpsgroup.com.au

Date recorded: 29/01/2015 **Fax:** 249616794

Site information

Open/closed site: Open

Features:

	1.	Aboriginal ceremony and dreaming		11.	Habitation structure
	2.	Aboriginal resource and gathering		12.	Hearth
	3.	Art		13.	Non-human bone and organic material
X	4.	Artefact		14.	Ochre quarry
	5.	Burial		15.	Potential archaeological deposit
	6.	Ceremonial ring		16.	Stone quarry
	7.	Conflict		17.	Shell
	8.	Earth mound		18.	Stone arrangement
	9.	Fish trap		19.	Modified tree
	10.	Grinding groove		20.	Water hole

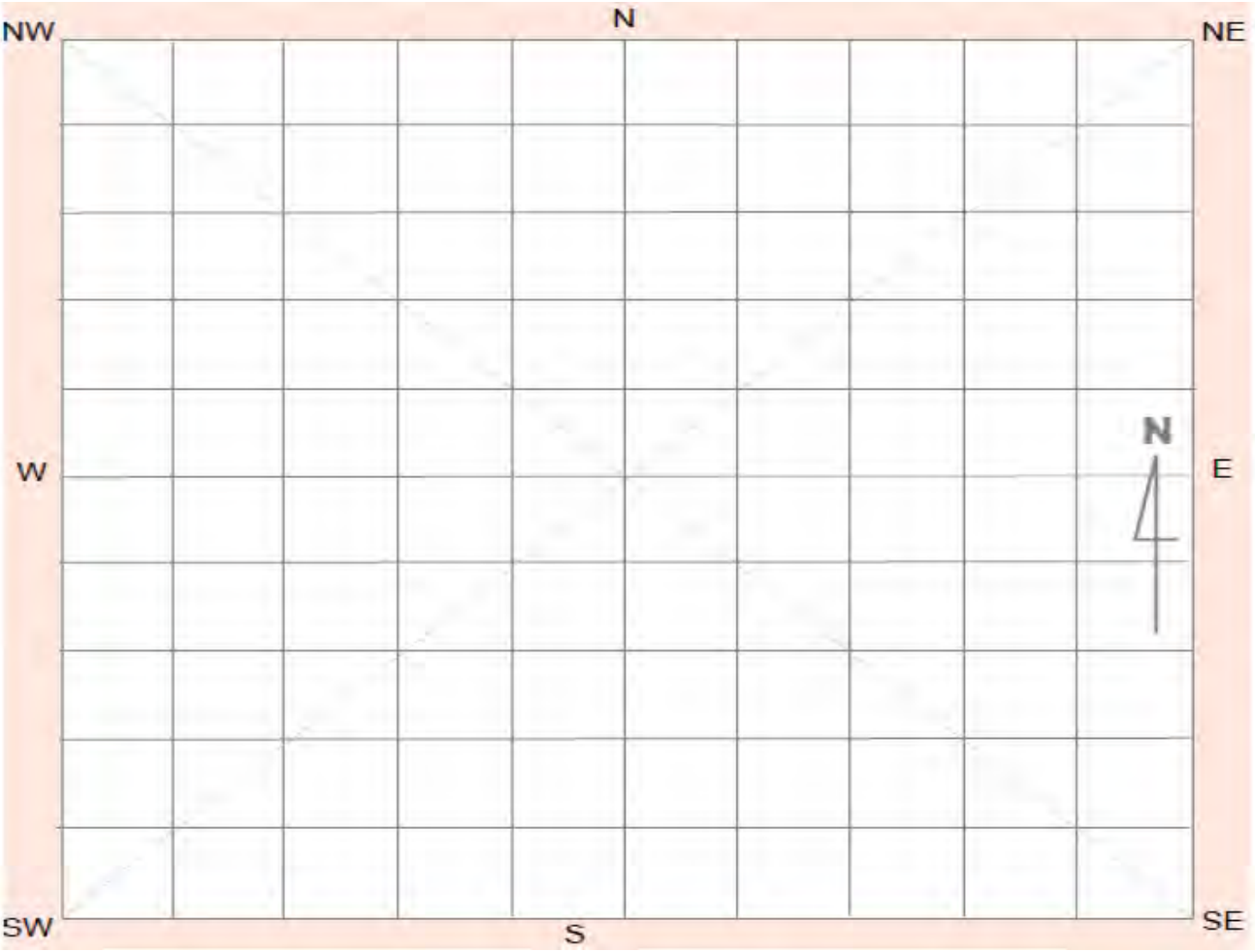
Site condition

Written description of the condition of the AHIMS site (including relevant features) following the authorised impact of the site

See attached information.

Site map

Clearly demarcate the original AHIMS site boundary, show the boundaries of impacted areas and the areas where the site remains in situ. Display map coordinates.



Methodology and results

Summary of the methodology and results of the activity or works undertaken through the authorised impacts, as relevant to the AHIMS site

See attached information.

Management recommendations

Summary of any management recommendations for the AHIMS site

See attached information.

Post-investigation significance

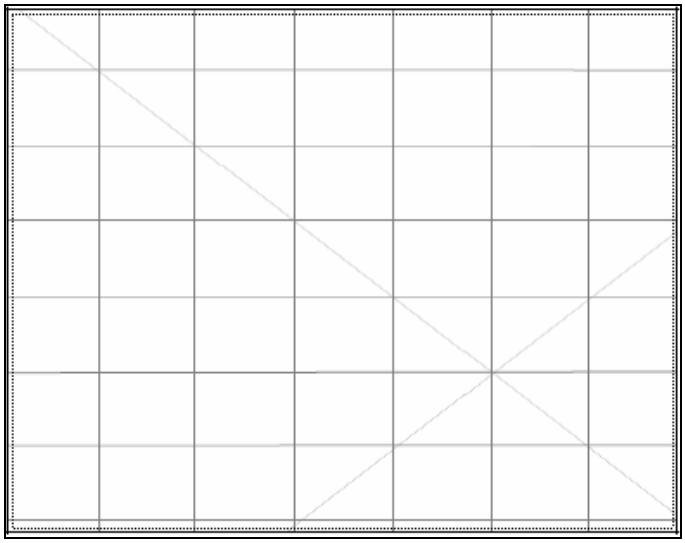
Discuss if the scientific/archaeological or cultural significance of the site has changed in light of the results of the investigations or works conducted at the site.

See attached information.

Additional comments

Site photographs

Include photographs of the authorised impacts activity, as relevant to the AHIMS site. Please keep photo size to a maximum of 200 kb.



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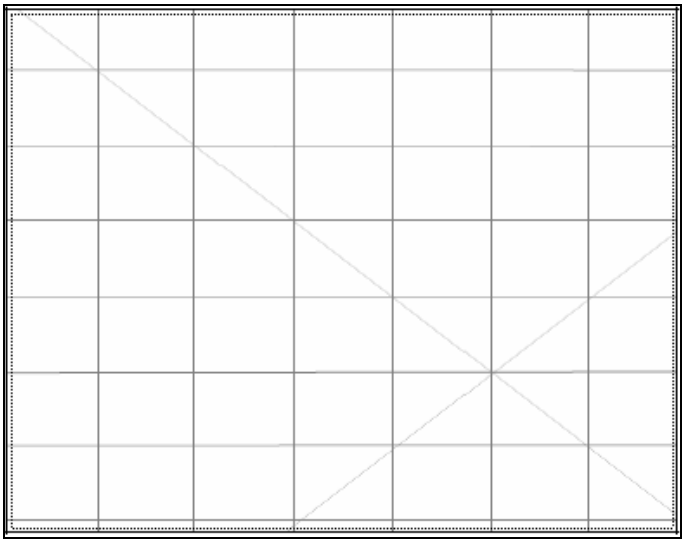

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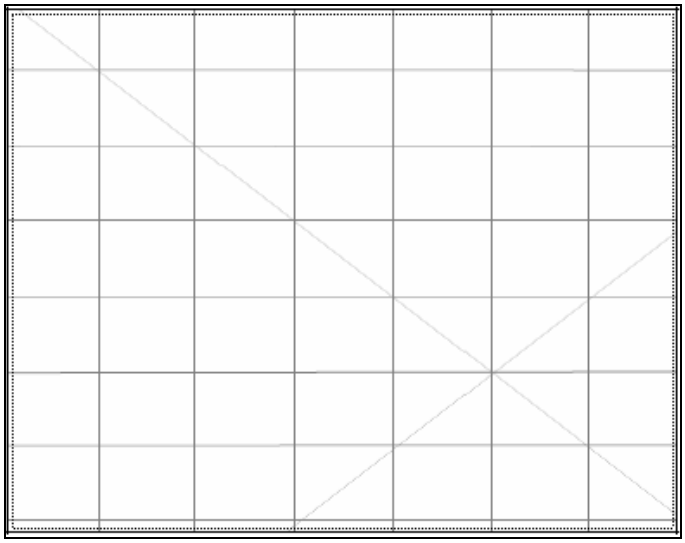

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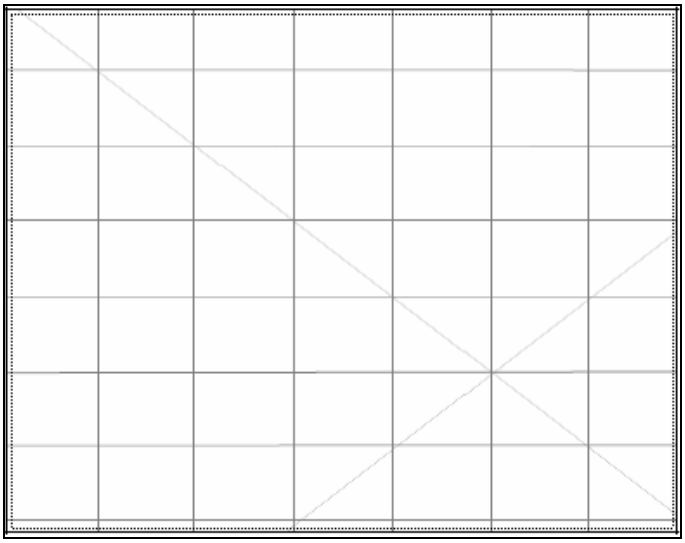

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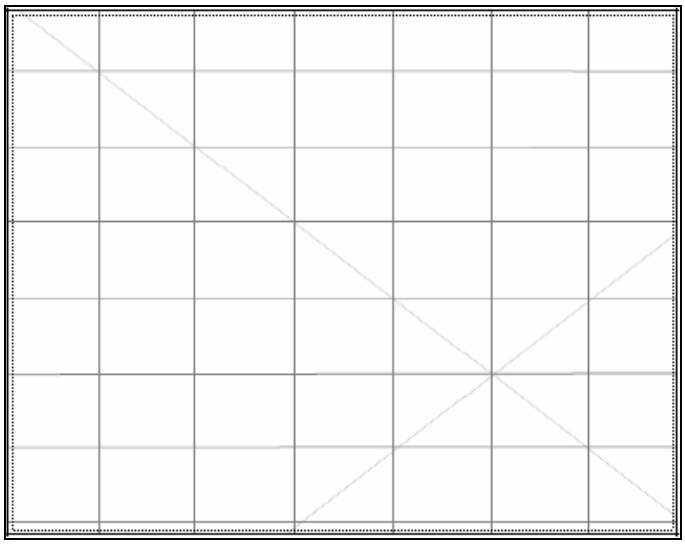

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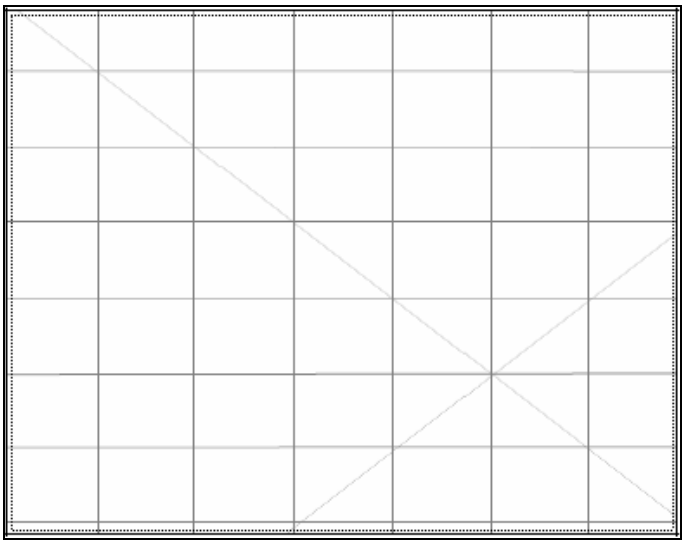


Description:

AHIMS#20-4-0111 BC17 – Isolated Find

The site was originally recorded situated atop a flat, simple sloped ridge crest. At the time of salvage works the site was located on the western edge of a flat graded track with a north facing gentle slope. The nearest drainage channel was approximately 200 metres to the north of this site. Soil exposure was high due to the sites location, with exposure and visibility at approximately 90%. The nearby vegetation comprised of medium sized eucalyptus, acacias and scattered native grasses (Plate 4). Previous disturbances in the general area include the clearance of trees during historical logging and the grading and use of vehicle tracks.

All ground surfaces were inspected, but no Aboriginal objects identified. Therefore an Assessment of Significance was not undertaken for this site.

Photos



Plate 1: View of AHIMS#20-4-0111 location facing north – no artefacts recovered



Plate 2: View of AHIMS#20-4-0111 location facing south – no artefacts recovered

Aboriginal Site Impact Recording Form

AHIMS Registrar
PO Box 1967, Hurstville 2220 NSW
December 2010 DECCW 2010/1022

1 This form must be completed following impacts to AHIMS sites that are:
   a) an outcome of test excavation carried out in accordance with the *Code of Practice for the Archaeological Investigation of Aboriginal Objects in NSW*
   b) authorised by an Aboriginal Heritage Impact Permit (AHIP)
   c) undertaken for the purpose of complying with environmental assessment requirements issued by the Department of Planning under Part 3A of the *Environmental Planning and Assessment Act 1979* (EP&A Act), or
   d) authorised by a Part 3A project approval under the EP&A Act.
2 Completed forms must be submitted to the AHIMS Registrar (www.environment.nsw.gov.au/contact/AHIMSRegistrar.htm).
3 This form is intended to complement (not replace) the AHIMS Site Recording Form. Where there is a need to provide detailed information about the nature of a site, use the AHIMS Site Recording Form.
4 This form does not replace the need to submit reports to DECCW (as specified by a condition of an AHIP or Part 3A approval). This form must be submitted in addition to any reports.

AHIMS site ID: 20-4-0112

Site impact authorisation (select one)

Reference numbers, dates

☐ Archaeological Code (The impacts to this site were the result of test excavation carried out in accordance with the *Code of Practice for the Archaeological Investigation of Aboriginal Objects in NSW.*)

Date DECCW was notified (under requirement 15c of the Code):

DECCW Regional office notified:

☐ AHIP (The impacts to this site were authorised by an AHIP.)

AHIP number:

Date issued/signed:

AHIMS permit ID/number:

☐ Part 3A application (The impacts to this site were undertaken for the purposes of complying with Part 3A environmental assessment requirements issued by the Department of Planning.)

Major project number: 11_0047

Date environmental assessment requirements issued:

or

☒ Part 3A approved project (The impacts to this site were authorised by a project approval under Part 3A of the EP&A Act.)

Date of project approval:

Site status following impacts:

☒ Not a site (The investigations concluded that this is not a site.)

☐ Valid site (The investigations confirmed that this is an Aboriginal site.)

☐ Partially destroyed (The site was partially destroyed following authorised impacts; a portion of the site remains in situ.)

☐ Destroyed (The site was completely destroyed following authorised impacts.)

Geographic location

Site name: TCEP-ST-001

Easting: 228998 **Northing:** 6608401 **Coordinates must be in GDA (MGA)**

Map sheet: Boggabri 89364S

Zone: 56 **Location method:** Differential GPS

Primary recorder

(The person responsible for the completion and submission of this form)

Title	Surname	First name

Organisation: RPS Australia East Pty Ltd

Address: PO Box 428 Hamilton NSW 2303

Phone: 249404200 **E-mail:** newcastle@rpsgroup.com.au

Date recorded: 29/01/2015 **Fax:** 249616794

Site information

Open/closed site: Open

Features:

	1.	Aboriginal ceremony and dreaming		11.	Habitation structure
	2.	Aboriginal resource and gathering		12.	Hearth
	3.	Art		13.	Non-human bone and organic material
	4.	Artefact		14.	Ochre quarry
	5.	Burial		15.	Potential archaeological deposit
	6.	Ceremonial ring		16.	Stone quarry
	7.	Conflict		17.	Shell
	8.	Earth mound		18.	Stone arrangement
	9.	Fish trap	X	19.	Modified tree
	10.	Grinding groove		20.	Water hole

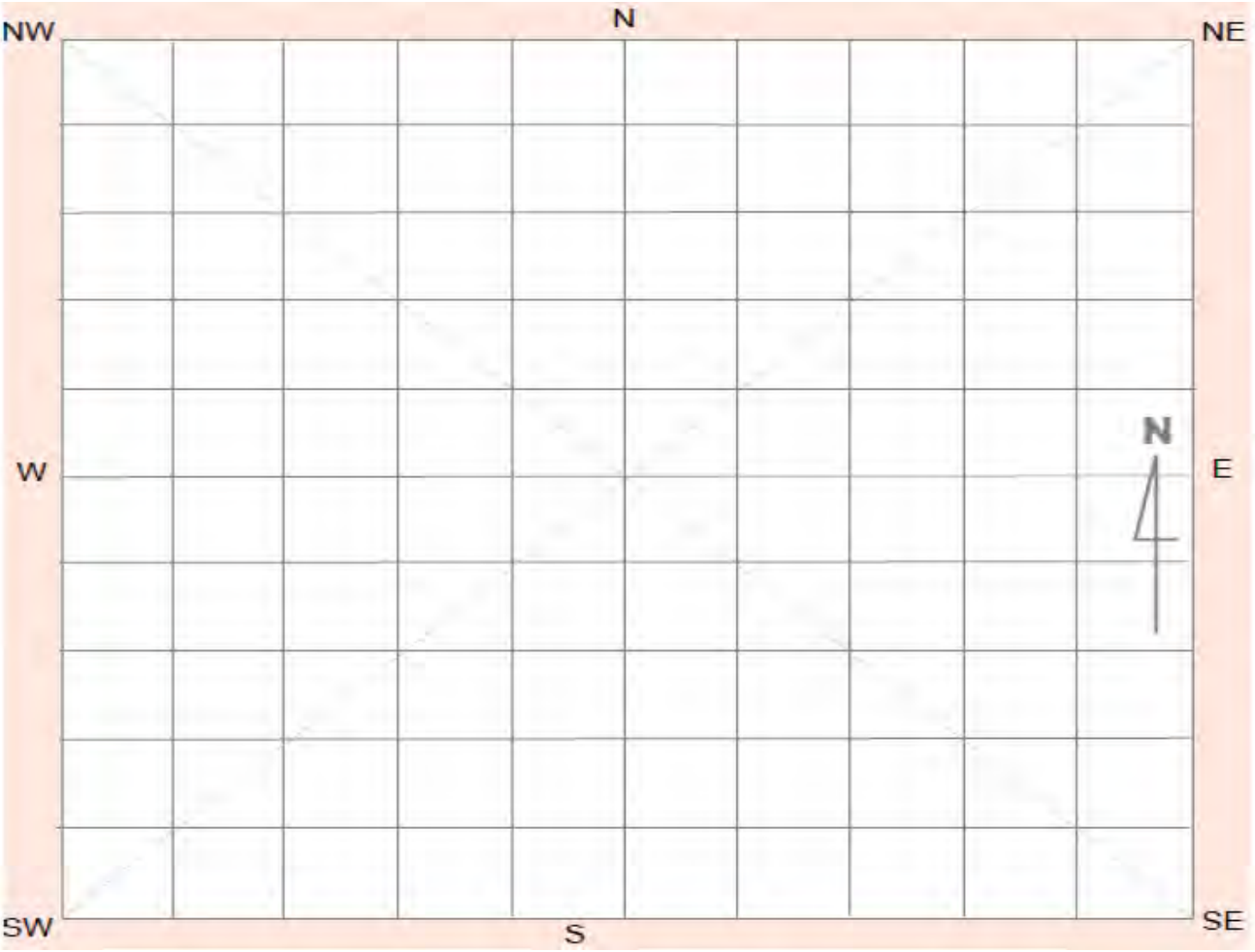
Site condition

Written description of the condition of the AHIMS site (including relevant features) following the authorised impact of the site

See attached information.

Site map

Clearly demarcate the original AHIMS site boundary, show the boundaries of impacted areas and the areas where the site remains in situ. Display map coordinates.



Methodology and results

Summary of the methodology and results of the activity or works undertaken through the authorised impacts, as relevant to the AHIMS site

See attached information.

Management recommendations

Summary of any management recommendations for the AHIMS site

See attached information.

Post-investigation significance

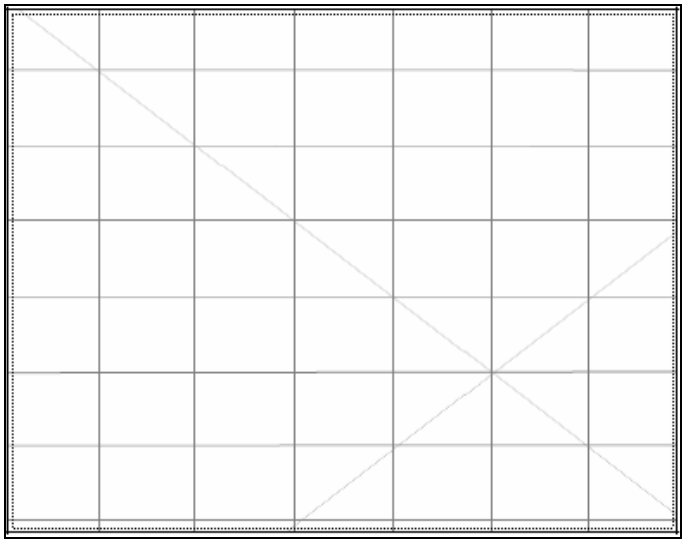
Discuss if the scientific/archaeological or cultural significance of the site has changed in light of the results of the investigations or works conducted at the site.

See attached information.

Additional comments

Site photographs

Include photographs of the authorised impacts activity, as relevant to the AHIMS site. Please keep photo size to a maximum of 200 kb.



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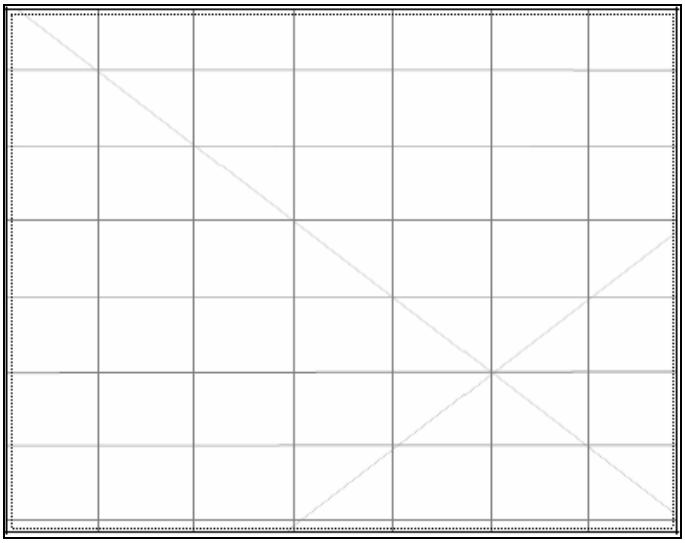

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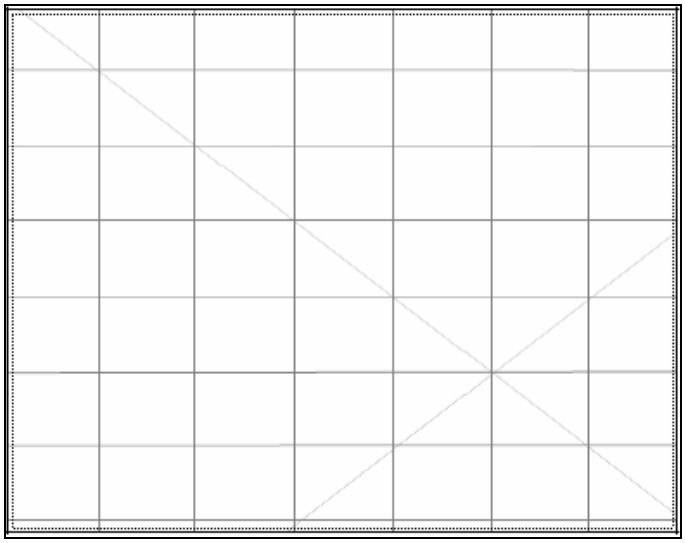

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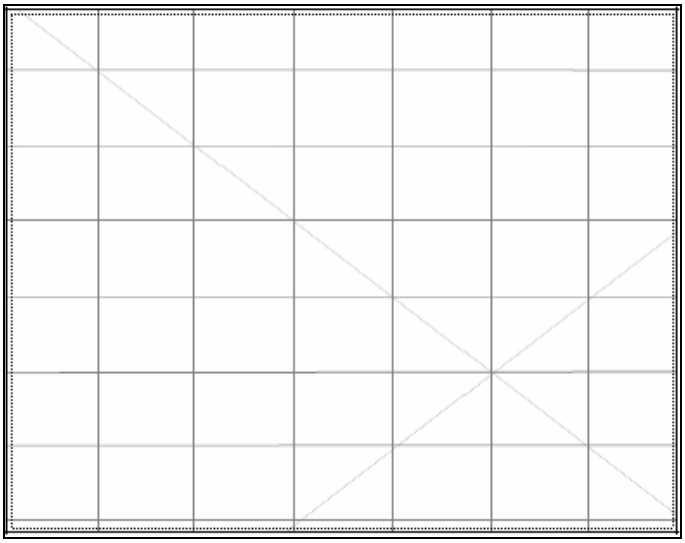

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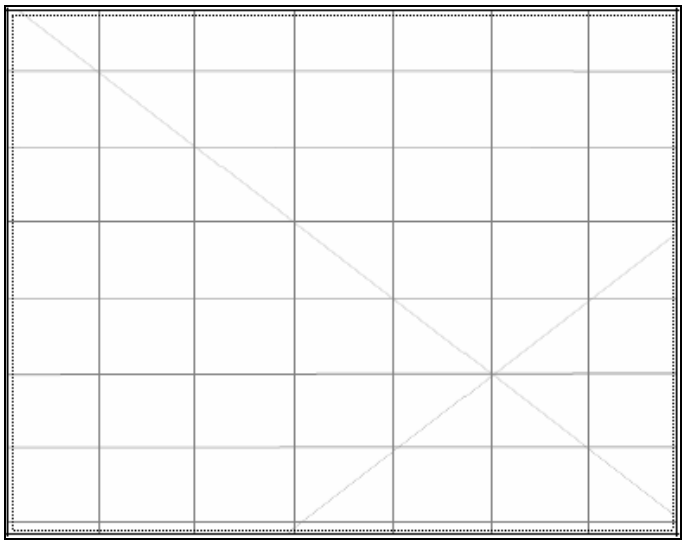

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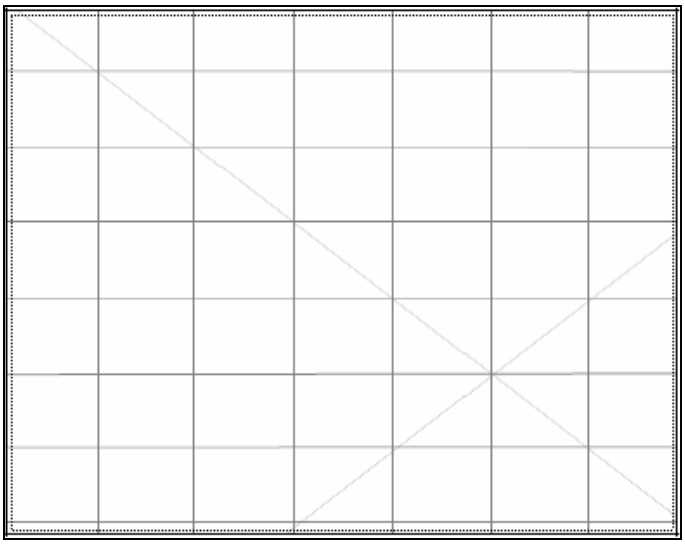

Description:

AHIMS#20-4-0112 BC18 – Isolated Find

The site was originally recorded situated atop a flat, simple sloped ridge crest. At the time of salvage works the site was located on the western edge of a flat graded track with a north facing gentle slope. The nearest drainage channel approximately 150 metres to the north. Soil exposure and ground visibility was high at 90%. The nearby vegetation comprised of medium sized eucalyptus, acacias and scattered native grasses. Previous disturbances in the general area include the clearance of trees during historical logging and the grading and use of vehicle tracks.

One quartzite core stone artefact was recovered during the salvage works at this site.

Assessment of Significance

The artefact recovered from the surface salvage of AHIMS#20-4-0112 comprised a raw material type similar to what has been identified in surrounding areas and therefore not particularly rare. This site is broadly representative of site artefact assemblages in the region and therefore is assessed to have low significance for representativeness. Given this site is an isolated find and is in a disturbed context it has been assessed to have low research and educational potential.

Photos



Plate 1: View of AHIMS#20-4-0112 location facing south



Plate 2: BC18 (AHIMS#20-4-0112) isolated artefact salvaged

Aboriginal Site Impact Recording Form

AHIMS Registrar
PO Box 1967, Hurstville 2220 NSW
December 2010 DECCW 2010/1022

1 This form must be completed following impacts to AHIMS sites that are:
   a) an outcome of test excavation carried out in accordance with the *Code of Practice for the Archaeological Investigation of Aboriginal Objects in NSW*
   b) authorised by an Aboriginal Heritage Impact Permit (AHIP)
   c) undertaken for the purpose of complying with environmental assessment requirements issued by the Department of Planning under Part 3A of the *Environmental Planning and Assessment Act 1979* (EP&A Act), or
   d) authorised by a Part 3A project approval under the EP&A Act.
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4 This form does not replace the need to submit reports to DECCW (as specified by a condition of an AHIP or Part 3A approval). This form must be submitted in addition to any reports.

AHIMS site ID: 20-4-0113

Site impact authorisation (select one)

Reference numbers, dates

☐ Archaeological Code (The impacts to this site were the result of test excavation carried out in accordance with the *Code of Practice for the Archaeological Investigation of Aboriginal Objects in NSW.*)

Date DECCW was notified (under requirement 15c of the Code):

DECCW Regional office notified:

☐ AHIP (The impacts to this site were authorised by an AHIP.)

AHIP number:

Date issued/signed:

AHIMS permit ID/number:

☐ Part 3A application (The impacts to this site were undertaken for the purposes of complying with Part 3A environmental assessment requirements issued by the Department of Planning.)

Major project number: 11_0047

Date environmental assessment requirements issued:

or

☒ Part 3A approved project (The impacts to this site were authorised by a project approval under Part 3A of the EP&A Act.)

Date of project approval:

Site status following impacts:

☐ Not a site (The investigations concluded that this is not a site.)

☐ Valid site (The investigations confirmed that this is an Aboriginal site.)

☐ Partially destroyed (The site was partially destroyed following authorised impacts; a portion of the site remains in situ.)

☒ Destroyed (The site was completely destroyed following authorised impacts.)

Geographic location

Site name: BC19

Easting: 227622 **Northing:** 6608492 **Coordinates must be in GDA (MGA)**

Map sheet: Boggabri 89364S

Zone: 56 **Location method:** Differential GPS

Primary recorder

(The person responsible for the completion and submission of this form)

Title	Surname	First name

Organisation: RPS Australia East Pty Ltd

Address: PO Box 428 Hamilton NSW 2303

Phone: 249404200 **E-mail:** newcastle@rpsgroup.com.au

Date recorded: 29/01/2015 **Fax:** 249616794

Site information

Open/closed site: Open

Features:

	1.	Aboriginal ceremony and dreaming		11.	Habitation structure
	2.	Aboriginal resource and gathering		12.	Hearth
	3.	Art		13.	Non-human bone and organic material
X	4.	Artefact		14.	Ochre quarry
	5.	Burial		15.	Potential archaeological deposit
	6.	Ceremonial ring		16.	Stone quarry
	7.	Conflict		17.	Shell
	8.	Earth mound		18.	Stone arrangement
	9.	Fish trap		19.	Modified tree
	10.	Grinding groove		20.	Water hole

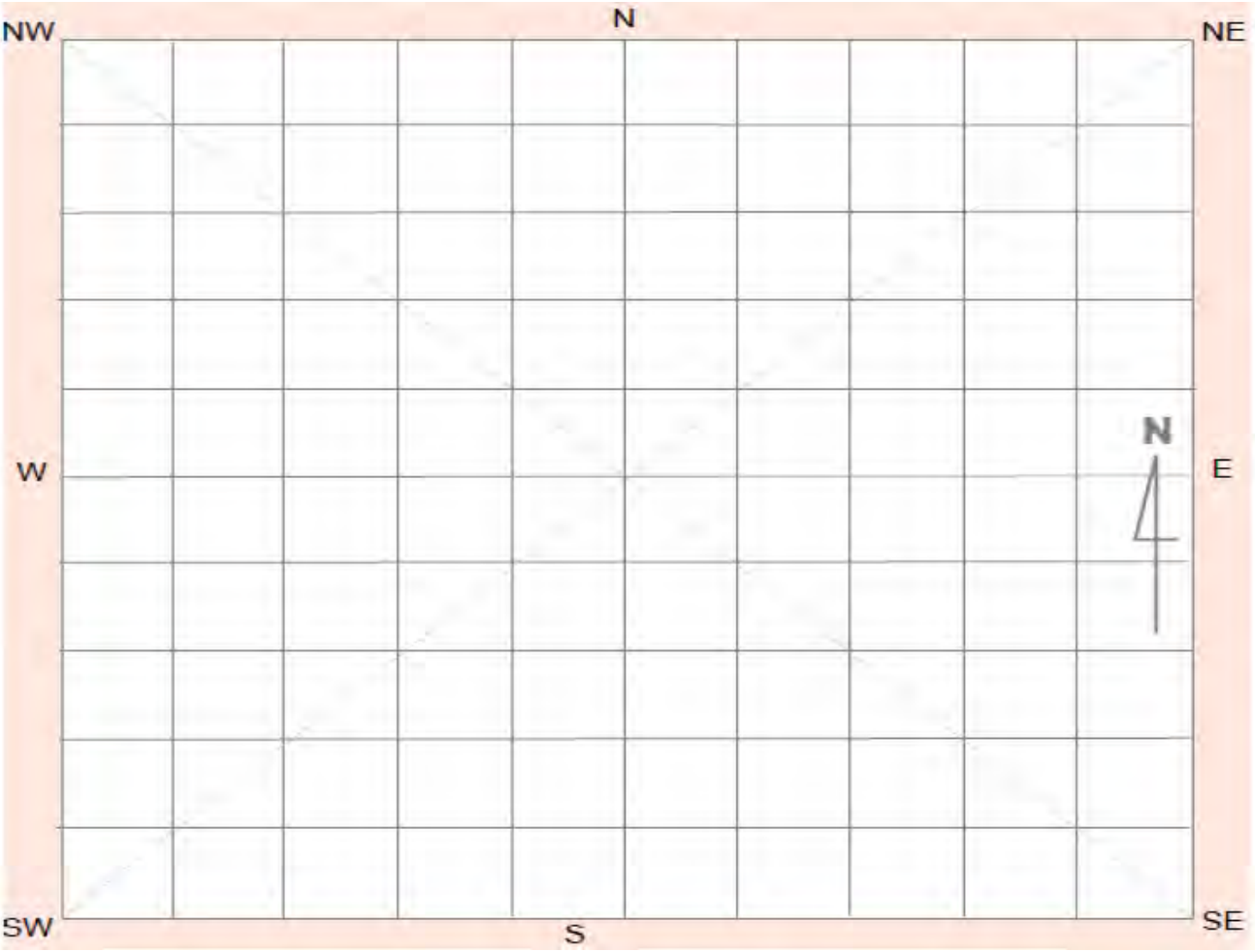
Site condition

Written description of the condition of the AHIMS site (including relevant features) following the authorised impact of the site

See attached information.

Site map

Clearly demarcate the original AHIMS site boundary, show the boundaries of impacted areas and the areas where the site remains in situ. Display map coordinates.



Methodology and results

Summary of the methodology and results of the activity or works undertaken through the authorised impacts, as relevant to the AHIMS site

See attached information.

Management recommendations

Summary of any management recommendations for the AHIMS site

See attached information.

Post-investigation significance

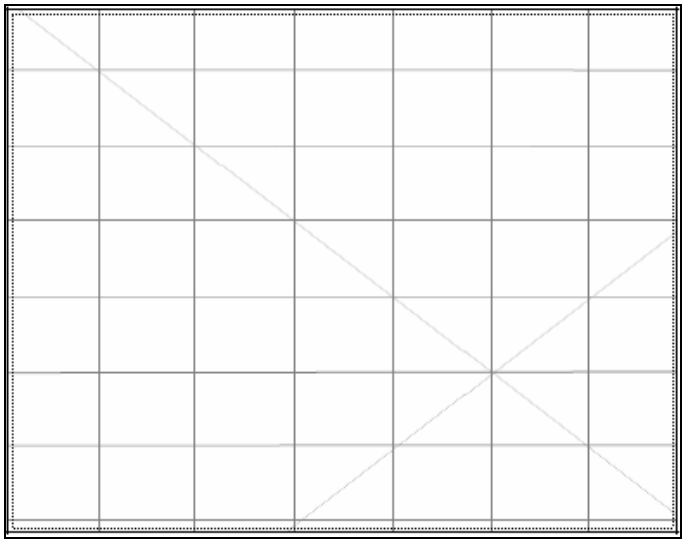
Discuss if the scientific/archaeological or cultural significance of the site has changed in light of the results of the investigations or works conducted at the site.

See attached information.

Additional comments

Site photographs

Include photographs of the authorised impacts activity, as relevant to the AHIMS site. Please keep photo size to a maximum of 200 kb.



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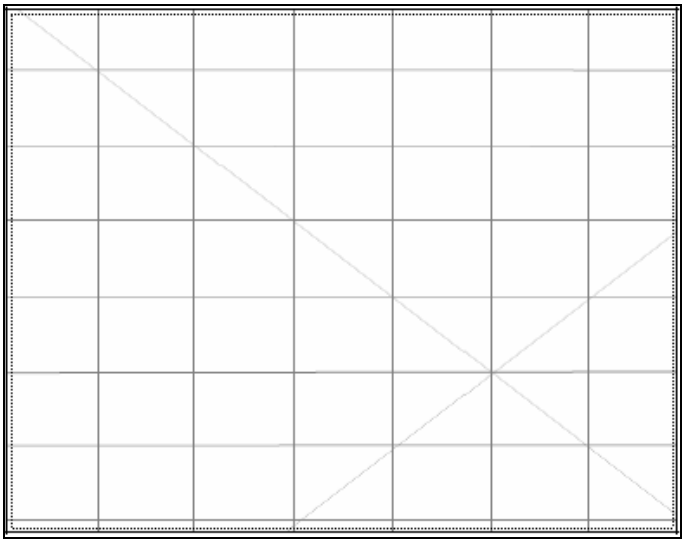

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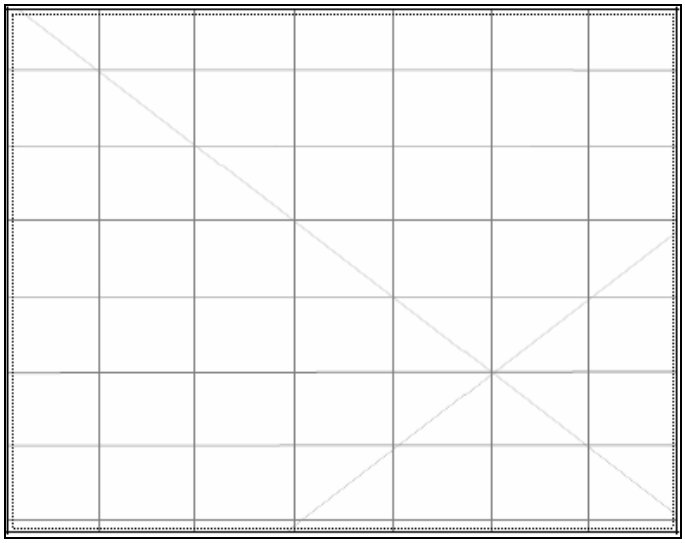

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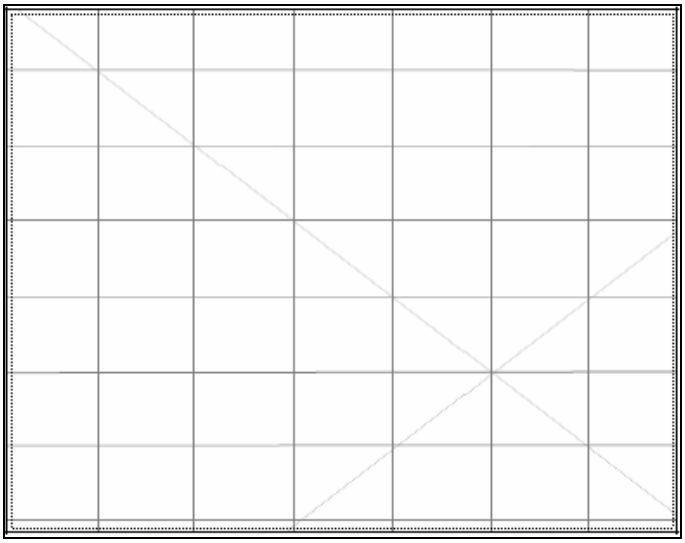

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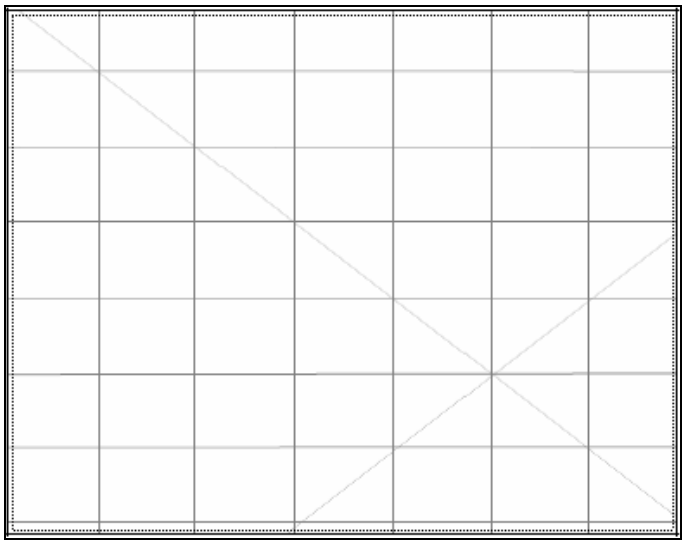

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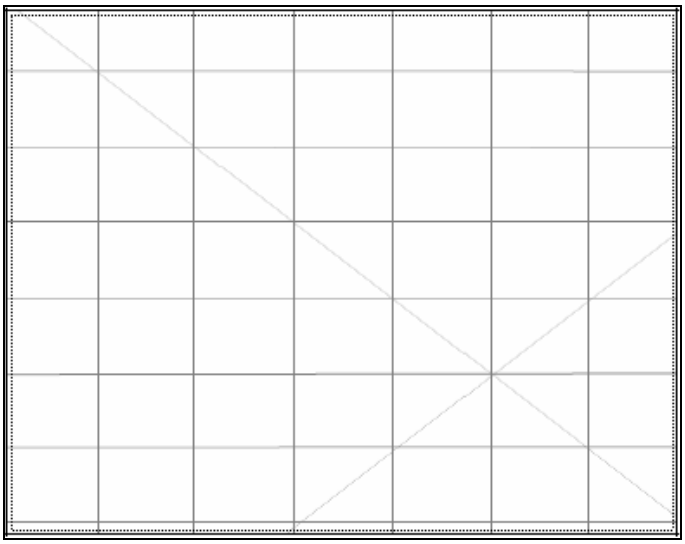

Description:

AHIMS#20-4-0113 BC19 – Isolated Find

The site was originally recorded situated atop a flat, simple sloped ridge crest. At the time of salvage works the site was located to the east of a flat graded track with a north facing gentle slope. The nearest drainage channel was approximately 120 metres to the north of this site. Overall soil exposure was low at 15% with ground visibility at 30%. The surrounding vegetation comprised of medium sized eucalyptus, acacias and scattered native grasses with old felled logs in the site area (Plate 13). Previous disturbances in the area include the clearance of trees during historical logging.

All ground surfaces were inspected, but no Aboriginal objects identified. Therefore an Assessment of Significance was not undertaken for this site.

Photos



Plate 1: View of AHIMS#20-4-0113 location facing north – no artefacts recovered



Plate 2: View of AHIMS#20-4-0113 location facing south – no artefacts recovered

Aboriginal Site Impact Recording Form

AHIMS Registrar
PO Box 1967, Hurstville 2220 NSW
December 2010 DECCW 2010/1022

1 This form must be completed following impacts to AHIMS sites that are:
   a) an outcome of test excavation carried out in accordance with the *Code of Practice for the Archaeological Investigation of Aboriginal Objects in NSW*
   b) authorised by an Aboriginal Heritage Impact Permit (AHIP)
   c) undertaken for the purpose of complying with environmental assessment requirements issued by the Department of Planning under Part 3A of the *Environmental Planning and Assessment Act 1979* (EP&A Act), or
   d) authorised by a Part 3A project approval under the EP&A Act.
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4 This form does not replace the need to submit reports to DECCW (as specified by a condition of an AHIP or Part 3A approval). This form must be submitted in addition to any reports.

AHIMS site ID: 20-4-0116

Site impact authorisation (select one)

Reference numbers, dates

☐ Archaeological Code (The impacts to this site were the result of test excavation carried out in accordance with the *Code of Practice for the Archaeological Investigation of Aboriginal Objects in NSW.*)

Date DECCW was notified (under requirement 15c of the Code):

DECCW Regional office notified:

☐ AHIP (The impacts to this site were authorised by an AHIP.)

AHIP number:

Date issued/signed:

AHIMS permit ID/number:

☐ Part 3A application (The impacts to this site were undertaken for the purposes of complying with Part 3A environmental assessment requirements issued by the Department of Planning.)

Major project number: 11_0047

Date environmental assessment requirements issued:

or

☒ Part 3A approved project (The impacts to this site were authorised by a project approval under Part 3A of the EP&A Act.)

Date of project approval:

Site status following impacts:

☐ Not a site (The investigations concluded that this is not a site.)

☐ Valid site (The investigations confirmed that this is an Aboriginal site.)

☐ Partially destroyed (The site was partially destroyed following authorised impacts; a portion of the site remains in situ.)

☒ Destroyed (The site was completely destroyed following authorised impacts.)

Geographic location

Site name: BC22

Easting: 227767 **Northing:** 6608516 **Coordinates must be in GDA (MGA)**

Map sheet: Boggabri 89364S

Zone: 56 **Location method:** Differential GPS

Primary recorder

(The person responsible for the completion and submission of this form)

Title	Surname	First name

Organisation: RPS Australia East Pty Ltd

Address: PO Box 428 Hamilton NSW 2303

Phone: 249404200 **E-mail:** newcastle@rpsgroup.com.au

Date recorded: 29/01/2015 **Fax:** 249616794

Site information

Open/closed site: Open

Features:

	1.	Aboriginal ceremony and dreaming		11.	Habitation structure
	2.	Aboriginal resource and gathering		12.	Hearth
	3.	Art		13.	Non-human bone and organic material
X	4.	Artefact		14.	Ochre quarry
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	8.	Earth mound		18.	Stone arrangement
	9.	Fish trap		19.	Modified tree
	10.	Grinding groove		20.	Water hole

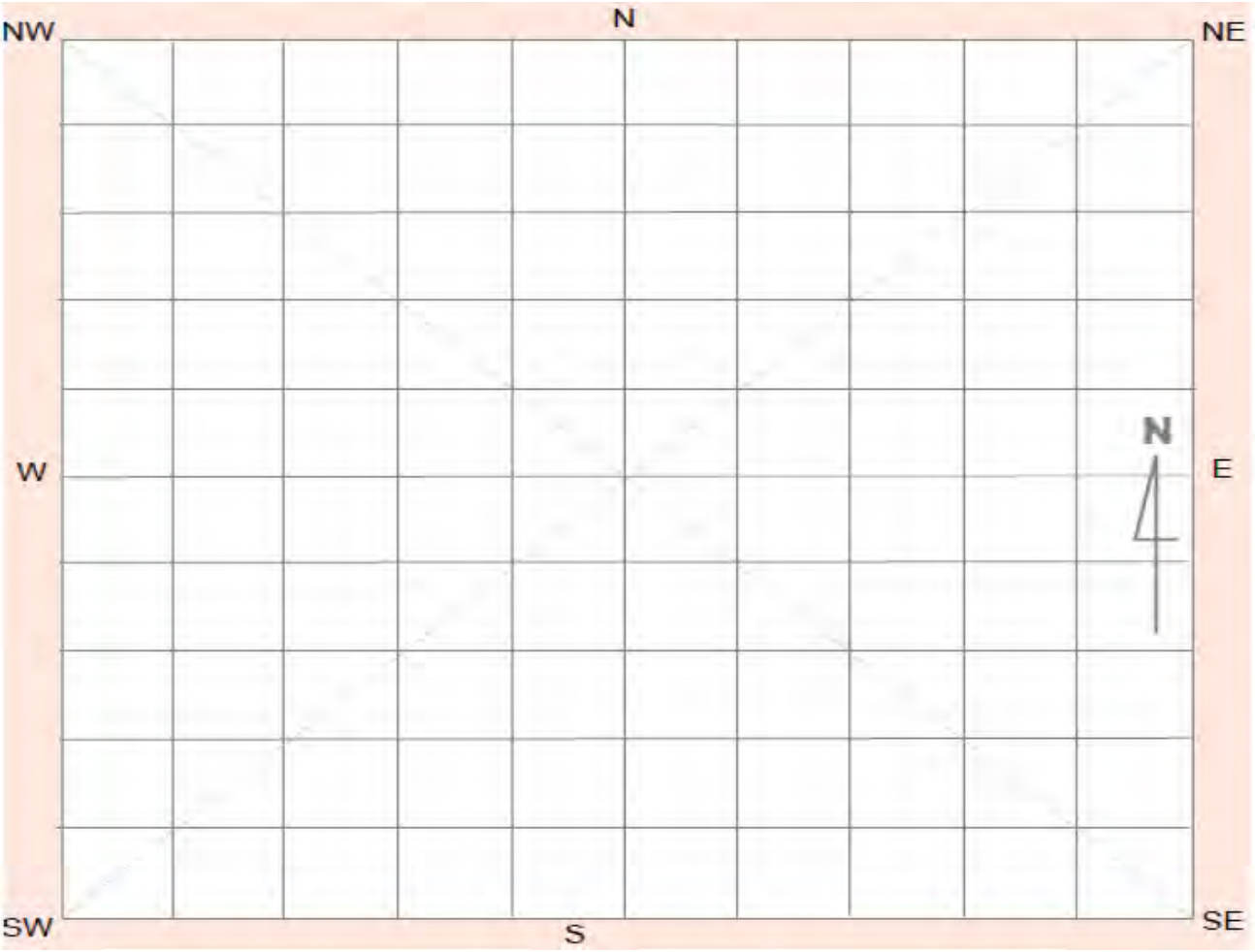
Site condition

Written description of the condition of the AHIMS site (including relevant features) following the authorised impact of the site

See attached information.

Site map

Clearly demarcate the original AHIMS site boundary, show the boundaries of impacted areas and the areas where the site remains in situ. Display map coordinates.



Methodology and results

Summary of the methodology and results of the activity or works undertaken through the authorised impacts, as relevant to the AHIMS site

See attached information.

Management recommendations

Summary of any management recommendations for the AHIMS site

See attached information.

Post-investigation significance

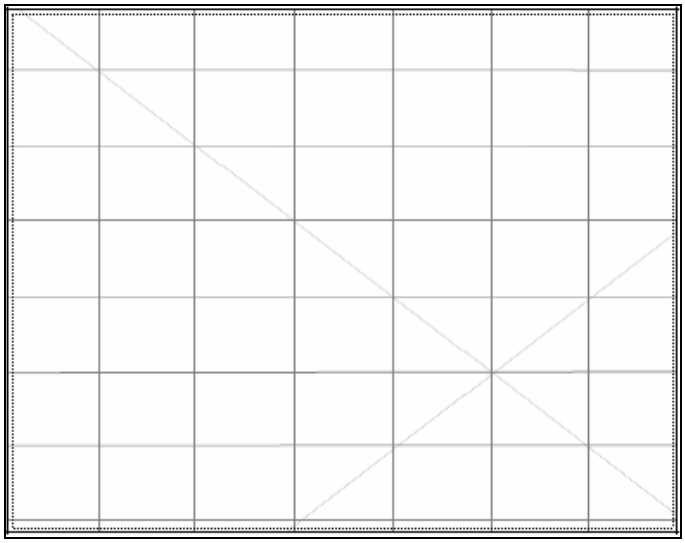
Discuss if the scientific/archaeological or cultural significance of the site has changed in light of the results of the investigations or works conducted at the site.

See attached information.

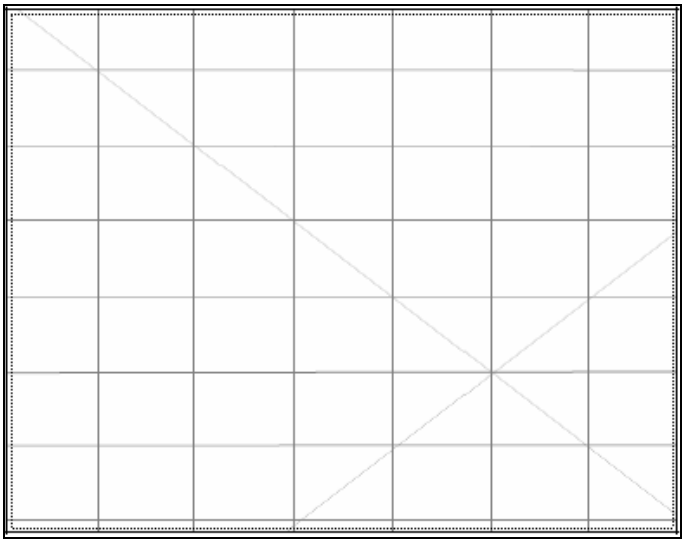
Additional comments

Site photographs

Include photographs of the authorised impacts activity, as relevant to the AHIMS site. Please keep photo size to a maximum of 200 kb.



Description:



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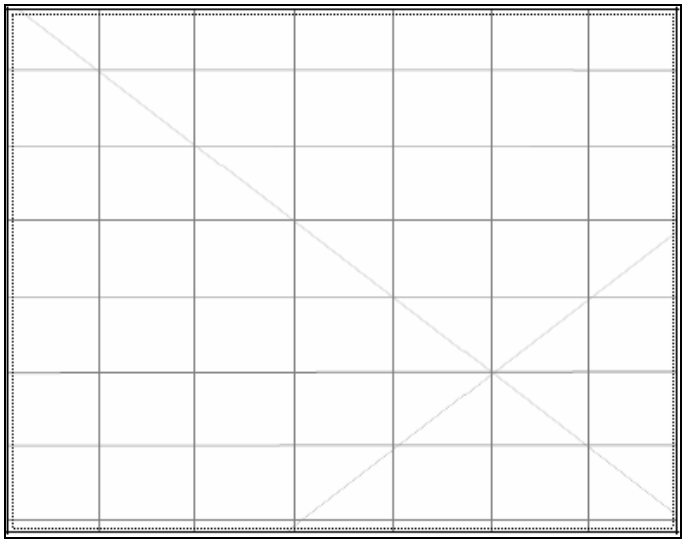

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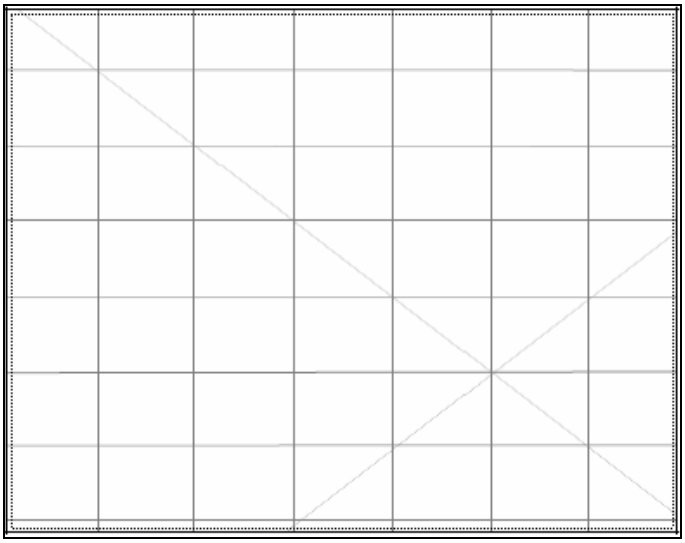

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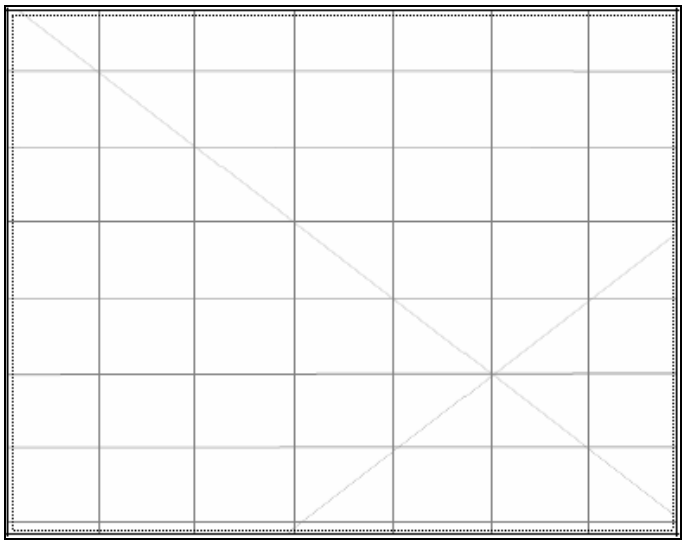

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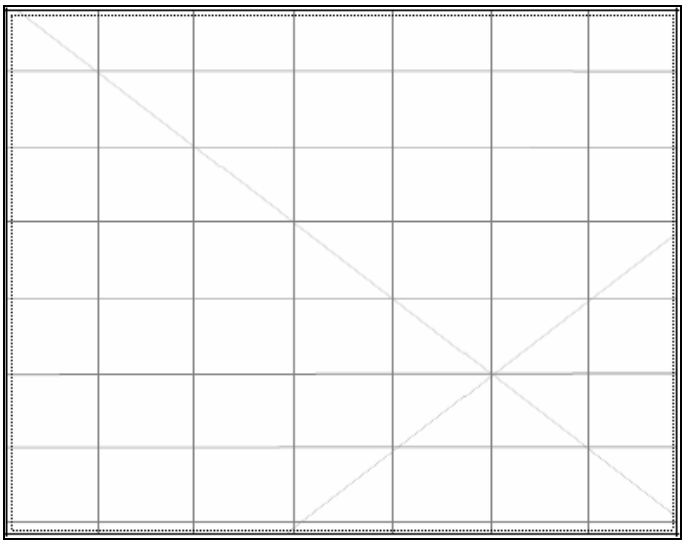

Description:

AHIMS BC22 – Artefact Scatter

The site was originally recorded situated atop a flat, simple sloped ridge crest and <50 metres from a drainage channel. At the time of salvage works the site was located on a flat space near to a creek edge. Overall soil exposure was low at 10% with ground visibility was medium at 30%. The nearby vegetation comprised of medium sized eucalyptus, acacias and scattered native grasses. A large creek line runs east to west along the southern boundary of the site area. Previous disturbances in the general area include the clearance of trees during historical logging, and vehicle and animal tracks.

Four stone artefacts comprising mudstone raw material were recovered during the salvage works at the location of this site.

Assessment of Significance

The artefacts were recovered from the surface salvage works for AHIMS#20-4-0116. The artefacts were manufactured from mudstone raw material, which is a raw material type similar to what has been identified in surrounding areas and therefore not particularly rare. This site is broadly representative of other artefacts assemblages found in the region and therefore is assessed to have low significance for representativeness. Given this site has a low artefact count and is in a disturbed context, it has been assessed to have low research and educational potential.

Photos



Plate 1: View of AHIMS#20-4-0116 location facing north



Plate 2: View of AHIMS#20-4-0116 location facing south



Plate 3: Mudstone artefacts identified at the location of AHIMS#20-4-0116

Aboriginal Site Impact Recording Form

AHIMS Registrar
PO Box 1967, Hurstville 2220 NSW
December 2010 DECCW 2010/1022

1 This form must be completed following impacts to AHIMS sites that are:
   a) an outcome of test excavation carried out in accordance with the *Code of Practice for the Archaeological Investigation of Aboriginal Objects in NSW*
   b) authorised by an Aboriginal Heritage Impact Permit (AHIP)
   c) undertaken for the purpose of complying with environmental assessment requirements issued by the Department of Planning under Part 3A of the *Environmental Planning and Assessment Act 1979* (EP&A Act), or
   d) authorised by a Part 3A project approval under the EP&A Act.
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4 This form does not replace the need to submit reports to DECCW (as specified by a condition of an AHIP or Part 3A approval). This form must be submitted in addition to any reports.

AHIMS site ID: 20-4-0299

Site impact authorisation (select one)

Reference numbers, dates

☐ Archaeological Code (The impacts to this site were the result of test excavation carried out in accordance with the *Code of Practice for the Archaeological Investigation of Aboriginal Objects in NSW.*)

Date DECCW was notified (under requirement 15c of the Code):

DECCW Regional office notified:

☐ AHIP (The impacts to this site were authorised by an AHIP.)

AHIP number:

Date issued/signed:

AHIMS permit ID/number:

☐ Part 3A application (The impacts to this site were undertaken for the purposes of complying with Part 3A environmental assessment requirements issued by the Department of Planning.)

Major project number: 11_0047

Date environmental assessment requirements issued:

or

☒ Part 3A approved project (The impacts to this site were authorised by a project approval under Part 3A of the EP&A Act.)

Date of project approval:

Site status following impacts:

☒ Not a site (The investigations concluded that this is not a site.)

☐ Valid site (The investigations confirmed that this is an Aboriginal site.)

☐ Partially destroyed (The site was partially destroyed following authorised impacts; a portion of the site remains in situ.)

☐ Destroyed (The site was completely destroyed following authorised impacts.)

Geographic location

Site name: TCEP-ST-001

Easting: 228998 **Northing:** 6608401 **Coordinates must be in GDA (MGA)**

Map sheet: Boggabri 89364S

Zone: 56 **Location method:** Differential GPS

Primary recorder

(The person responsible for the completion and submission of this form)

Title	Surname	First name

Organisation: RPS Australia East Pty Ltd

Address: PO Box 428 Hamilton NSW 2303

Phone: 249404200 **E-mail:** newcastle@rpsgroup.com.au

Date recorded: 29/01/2015 **Fax:** 249616794

Site information

Open/closed site: Open

Features:

	1.	Aboriginal ceremony and dreaming		11.	Habitation structure
	2.	Aboriginal resource and gathering		12.	Hearth
	3.	Art		13.	Non-human bone and organic material
	4.	Artefact		14.	Ochre quarry
	5.	Burial		15.	Potential archaeological deposit
	6.	Ceremonial ring		16.	Stone quarry
	7.	Conflict		17.	Shell
	8.	Earth mound		18.	Stone arrangement
	9.	Fish trap	X	19.	Modified tree
	10.	Grinding groove		20.	Water hole

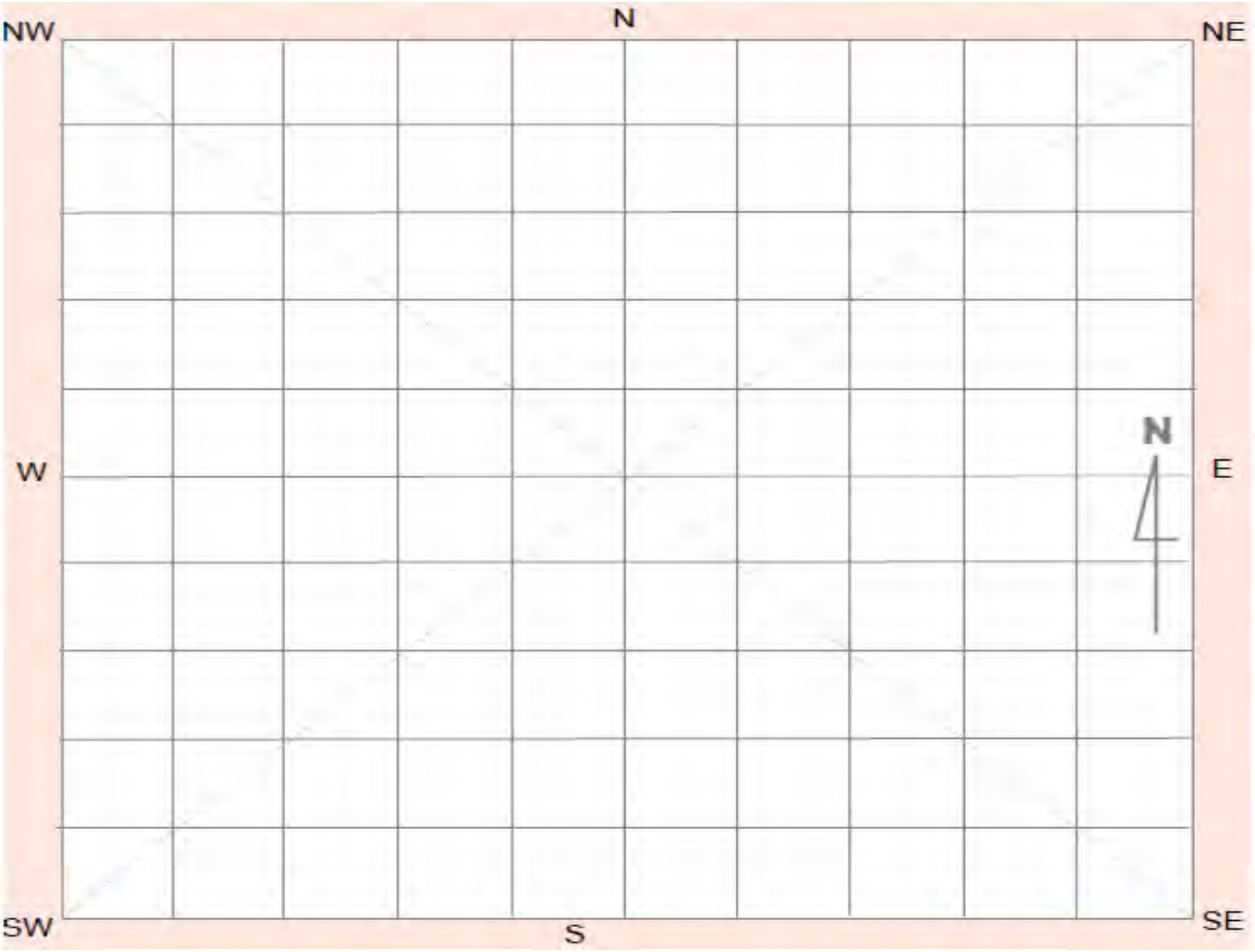
Site condition

Written description of the condition of the AHIMS site (including relevant features) following the authorised impact of the site

See attached information.

Site map

Clearly demarcate the original AHIMS site boundary, show the boundaries of impacted areas and the areas where the site remains in situ. Display map coordinates.



Methodology and results

Summary of the methodology and results of the activity or works undertaken through the authorised impacts, as relevant to the AHIMS site

See attached information.

Management recommendations

Summary of any management recommendations for the AHIMS site

See attached information.

Post-investigation significance

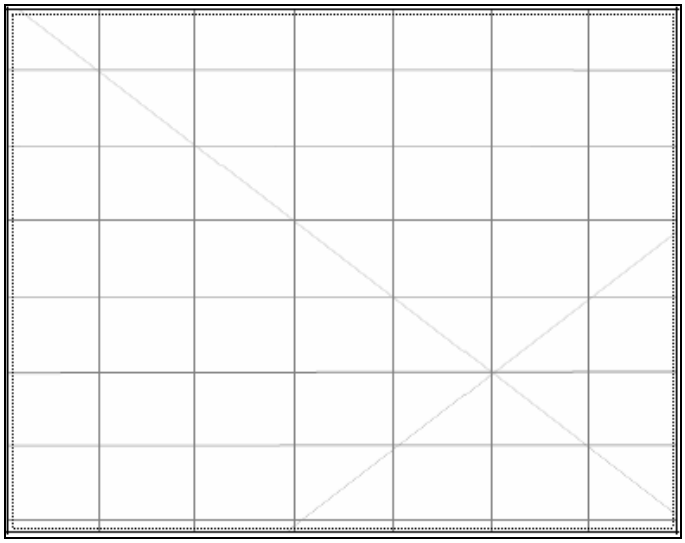
Discuss if the scientific/archaeological or cultural significance of the site has changed in light of the results of the investigations or works conducted at the site.

See attached information.

Additional comments

Site photographs

Include photographs of the authorised impacts activity, as relevant to the AHIMS site. Please keep photo size to a maximum of 200 kb.



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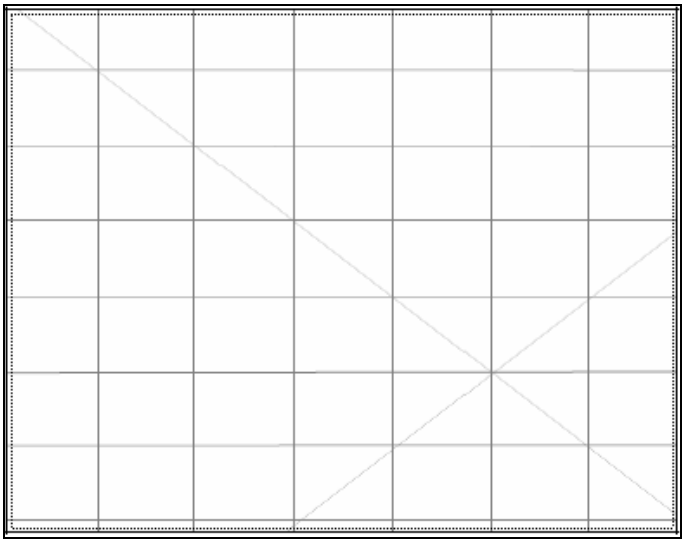

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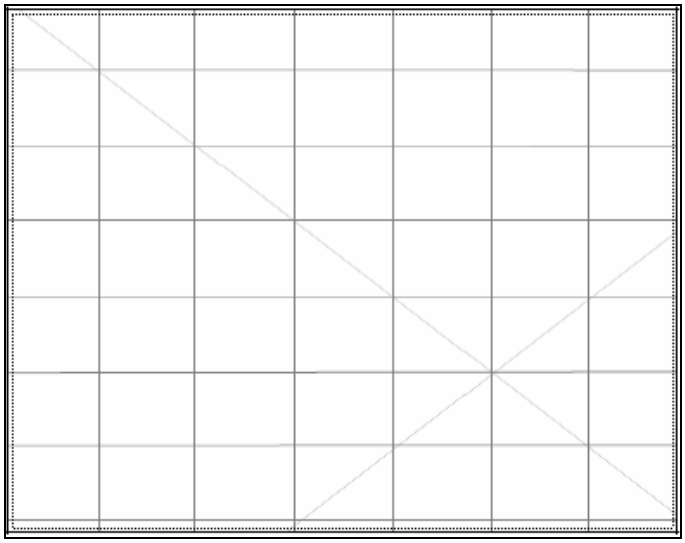

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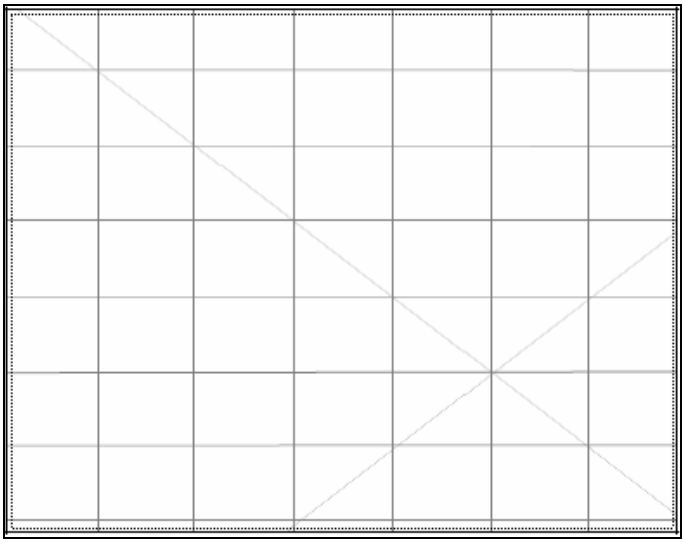

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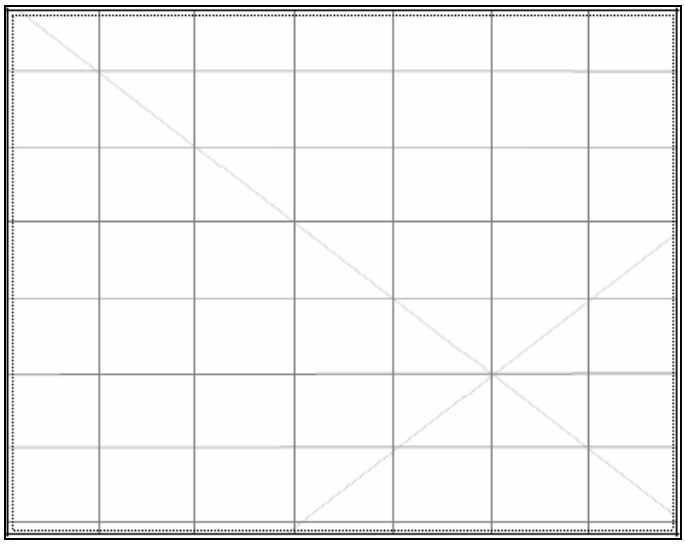

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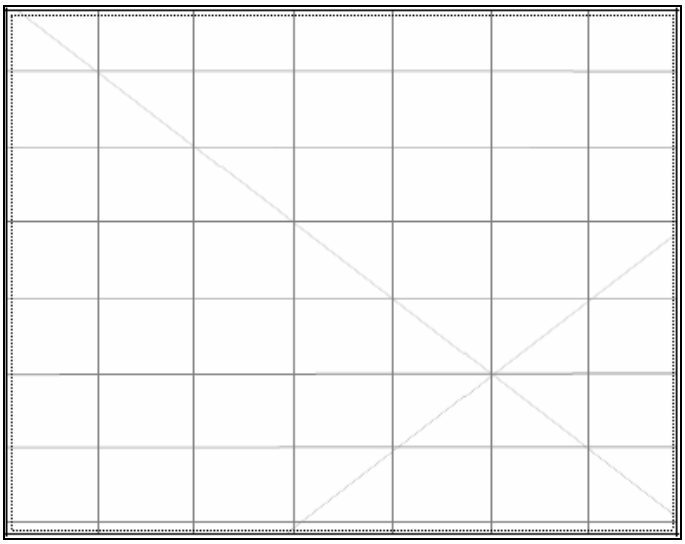

Description:

AHIMS#20-4-0299 TCEP-ST-001 – Scar Tree

TCEP-ST-001 (AHIMS# 20-4-0299) was determined by all stakeholders involved not to be of an Aboriginal cultural practice but a surveyor's mark.

This site will be deregistered as an Aboriginal Cultural Heritage site on the AHIMS database.

Photos

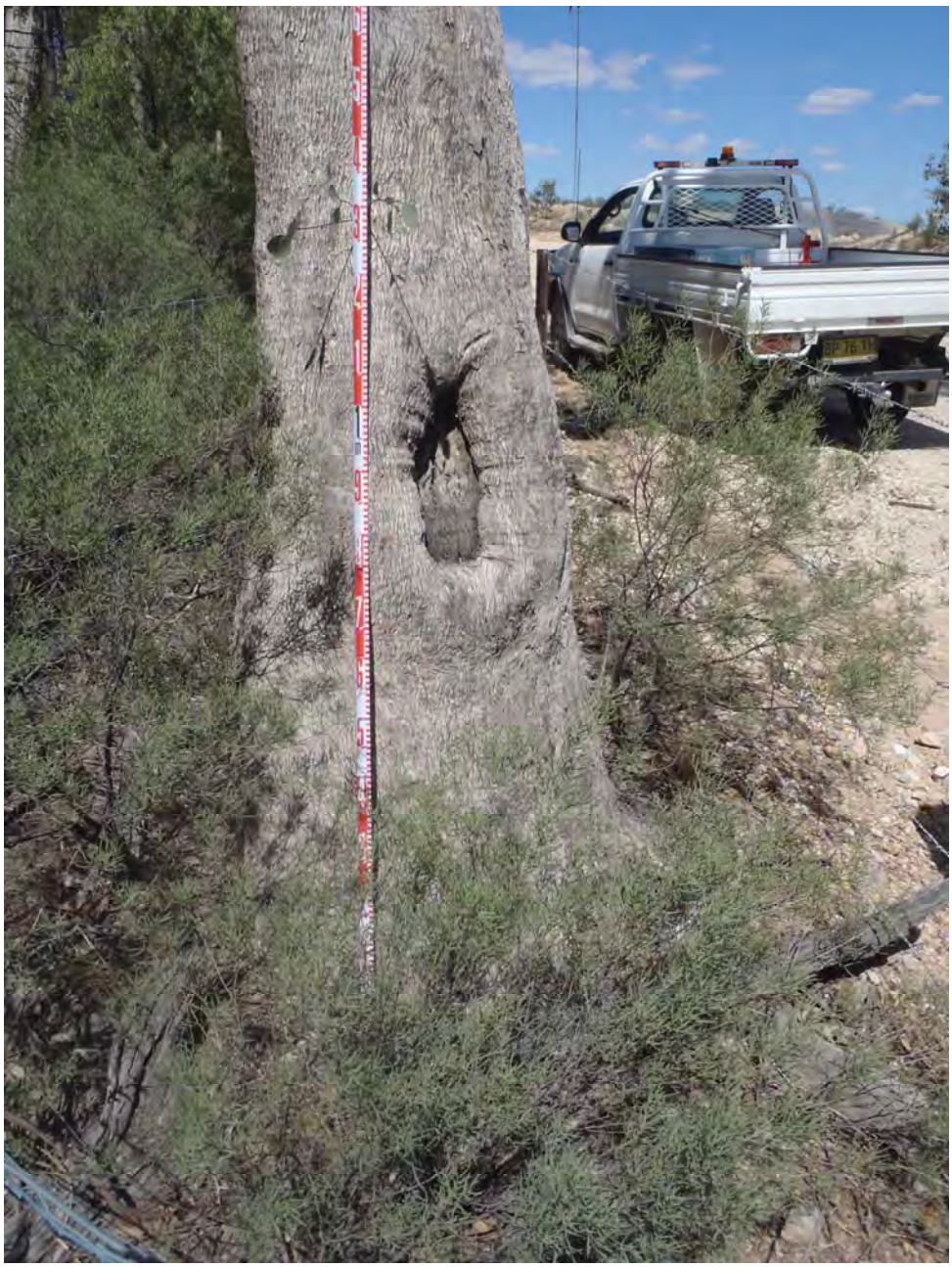

Plate 1: View of AHIMS#20-4-0299 – not an Aboriginal cultural heritage scar tree

Aboriginal Site Impact Recording Form

AHIMS Registrar
PO Box 1967, Hurstville 2220 NSW
December 2010 DECCW 2010/1022

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AHIMS site ID: 20-4-0303

Site impact authorisation (select one)

Reference numbers, dates

☐ Archaeological Code (The impacts to this site were the result of test excavation carried out in accordance with the *Code of Practice for the Archaeological Investigation of Aboriginal Objects in NSW.*)

Date DECCW was notified (under requirement 15c of the Code):

DECCW Regional office notified:

☐ AHIP (The impacts to this site were authorised by an AHIP.)

AHIP number:

Date issued/signed:

AHIMS permit ID/number:

☐ Part 3A application (The impacts to this site were undertaken for the purposes of complying with Part 3A environmental assessment requirements issued by the Department of Planning.)

Major project number: 11_0047

Date environmental assessment requirements issued:

or

☒ Part 3A approved project (The impacts to this site were authorised by a project approval under Part 3A of the EP&A Act.)

Date of project approval:

Site status following impacts:

☐ Not a site (The investigations concluded that this is not a site.)

☐ Valid site (The investigations confirmed that this is an Aboriginal site.)

☐ Partially destroyed (The site was partially destroyed following authorised impacts; a portion of the site remains in situ.)

☒ Destroyed (The site was completely destroyed following authorised impacts.)

Geographic location

Site name: TCEP-IF-002

Easting: 229020 **Northing:** 6608474 **Coordinates must be in GDA (MGA)**

Map sheet: Boggabri 89364S

Zone: 56 **Location method:** Differential GPS

Primary recorder

(The person responsible for the completion and submission of this form)

Title	Surname	First name

Organisation: RPS Australia East Pty Ltd

Address: PO Box 428 Hamilton NSW 2303

Phone: 249404200 **E-mail:** newcastle@rpsgroup.com.au

Date recorded: 29/01/2015 **Fax:** 249616794

Site information

Open/closed site: Open

Features:

	1.	Aboriginal ceremony and dreaming		11.	Habitation structure
	2.	Aboriginal resource and gathering		12.	Hearth
	3.	Art		13.	Non-human bone and organic material
X	4.	Artefact		14.	Ochre quarry
	5.	Burial		15.	Potential archaeological deposit
	6.	Ceremonial ring		16.	Stone quarry
	7.	Conflict		17.	Shell
	8.	Earth mound		18.	Stone arrangement
	9.	Fish trap		19.	Modified tree
	10.	Grinding groove		20.	Water hole

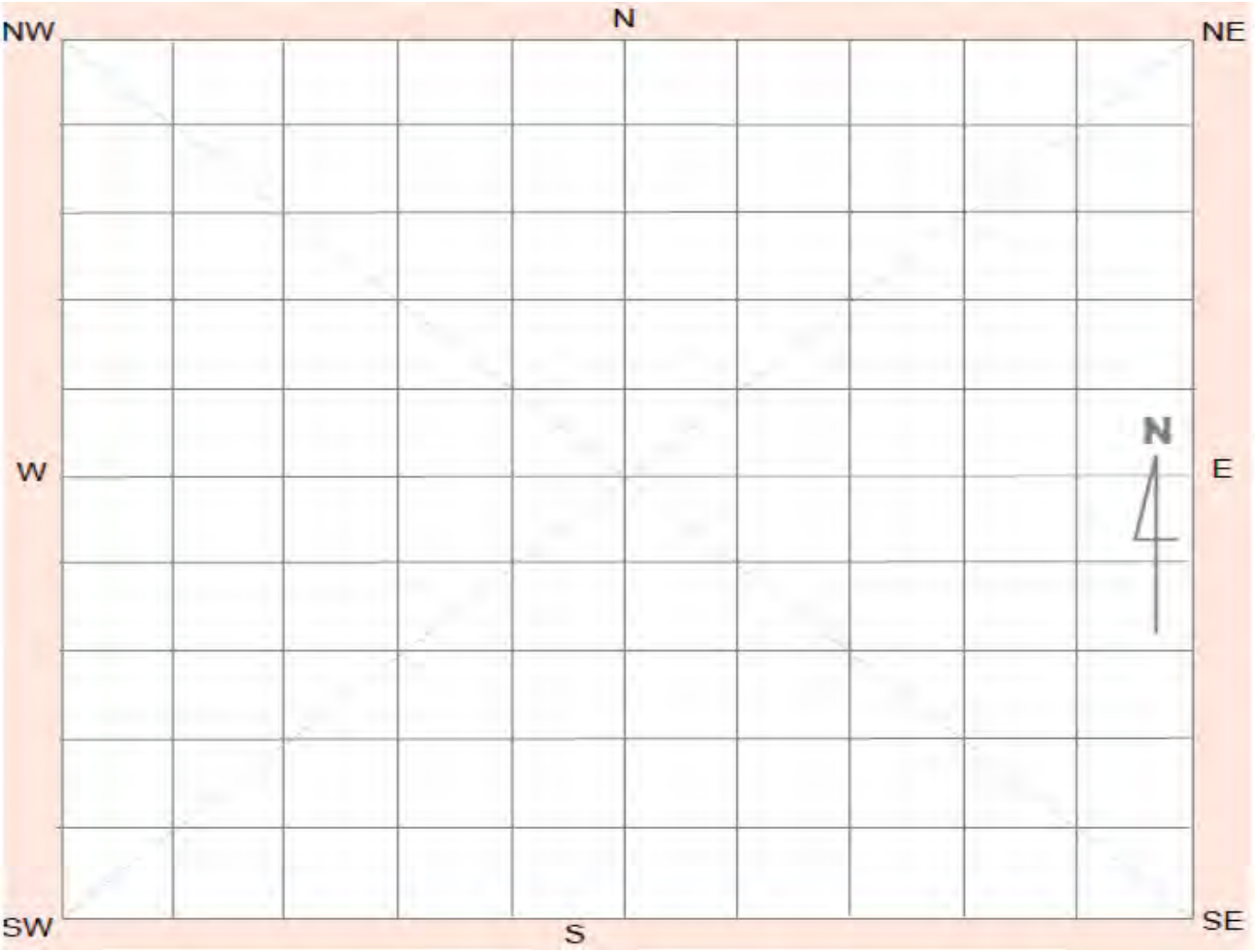
Site condition

Written description of the condition of the AHIMS site (including relevant features) following the authorised impact of the site

See attached information.

Site map

Clearly demarcate the original AHIMS site boundary, show the boundaries of impacted areas and the areas where the site remains in situ. Display map coordinates.



Methodology and results

Summary of the methodology and results of the activity or works undertaken through the authorised impacts, as relevant to the AHIMS site

See attached information.

Management recommendations

Summary of any management recommendations for the AHIMS site

See attached information.

Post-investigation significance

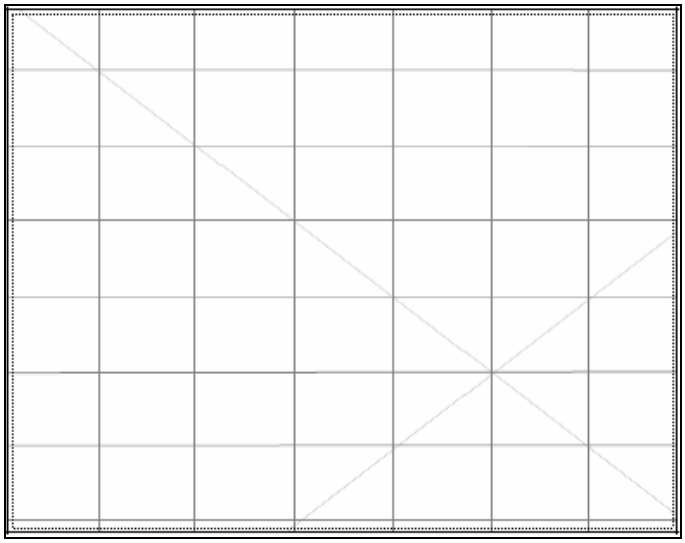
Discuss if the scientific/archaeological or cultural significance of the site has changed in light of the results of the investigations or works conducted at the site.

See attached information.

Additional comments

Site photographs

Include photographs of the authorised impacts activity, as relevant to the AHIMS site. Please keep photo size to a maximum of 200 kb.



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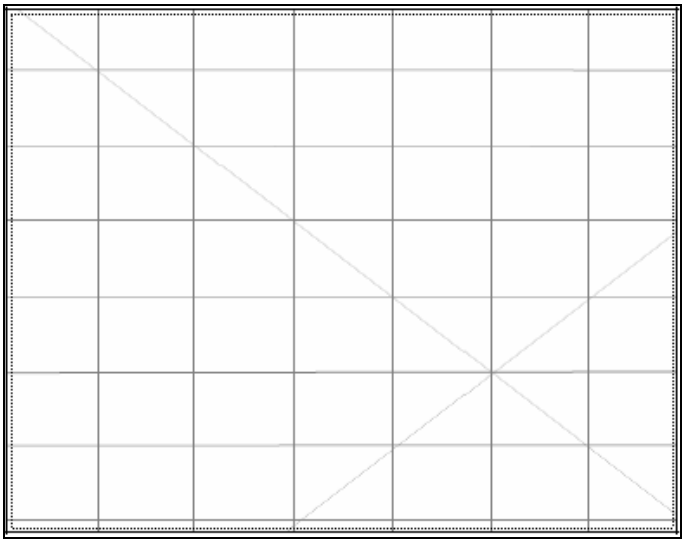

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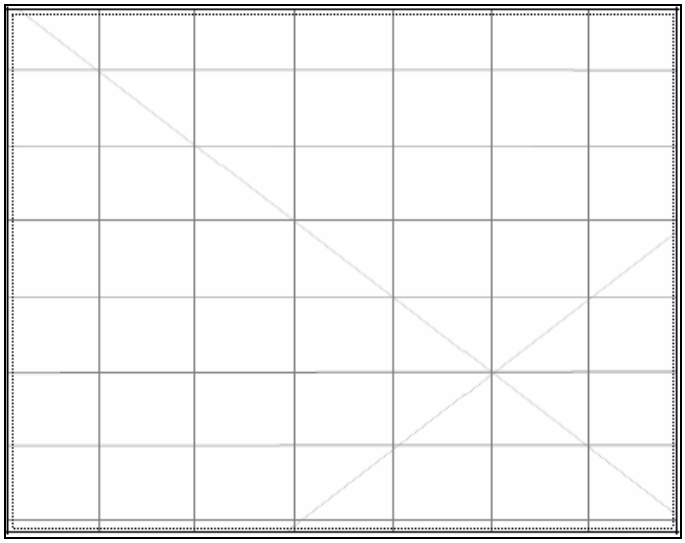

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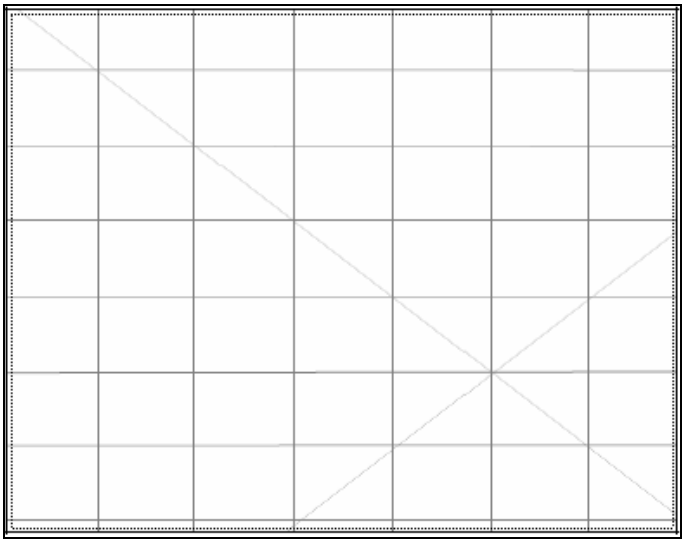

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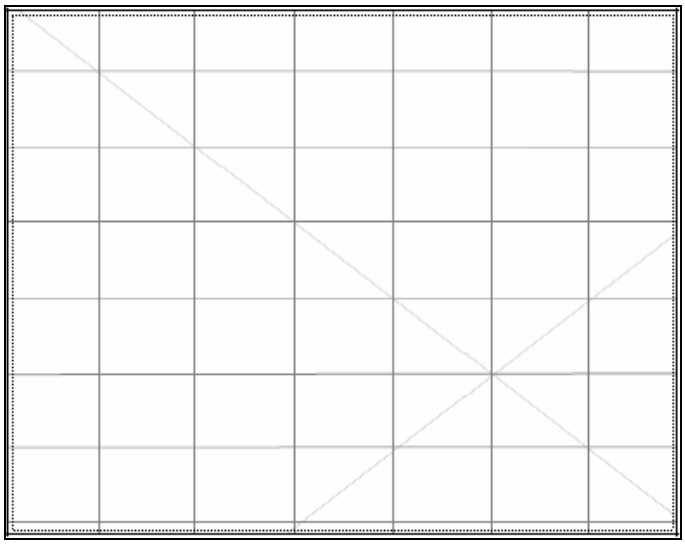

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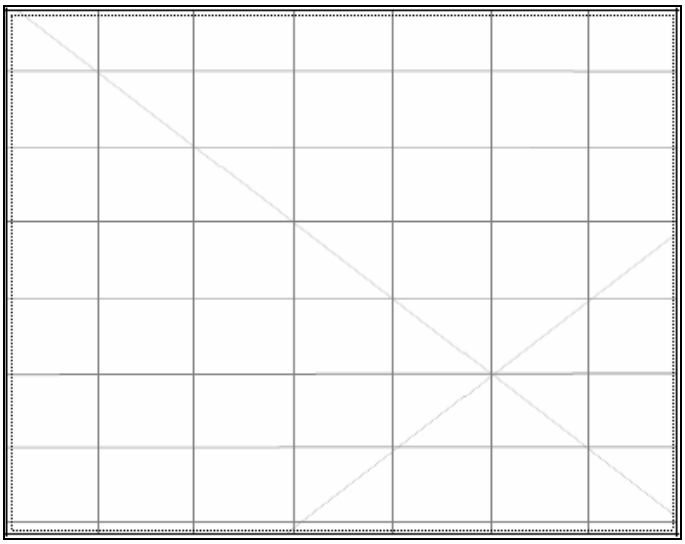

Description:

AHIMS#20-4-0303 TCEP-IF-002 – Isolated Find

The site was originally recorded on a ridge within a rolling hills landform with a north east to south west orientation. The nearest water source was Goonbri Creek at an approximate 500 metre distance from the site.

At the time of salvage works the site was located to the north of a vehicle track, with the site area sloping to the west. A number of drainage lines and creeks were identified in the vicinity of the site. Ground visibility was also low at 20%. The surrounding vegetation comprised of medium to large sized eucalyptus, acacias and native grasses (Plate 34). Previous disturbances in the general area include the clearance of trees during historical logging and the use of vehicle tracks.

All ground surfaces were inspected, but no Aboriginal objects identified. Therefore an Assessment of Significance was not undertaken for this site.

Photos



Plate 1: View of AHIMS#20-4-0303 location facing north – no artefacts recovered



Plate 2: View of AHIMS#20-4-0303 location facing south – no artefacts recovered

Aboriginal Site Impact Recording Form

AHIMS Registrar
PO Box 1967, Hurstville 2220 NSW
December 2010 DECCW 2010/1022

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AHIMS site ID: 20-4-0341

Site impact authorisation (select one)

Reference numbers, dates

☐ Archaeological Code (The impacts to this site were the result of test excavation carried out in accordance with the *Code of Practice for the Archaeological Investigation of Aboriginal Objects in NSW.*)

Date DECCW was notified (under requirement 15c of the Code):

DECCW Regional office notified:

☐ AHIP (The impacts to this site were authorised by an AHIP.)

AHIP number:

Date issued/signed:

AHIMS permit ID/number:

☐ Part 3A application (The impacts to this site were undertaken for the purposes of complying with Part 3A environmental assessment requirements issued by the Department of Planning.)

Major project number: 11_0047

Date environmental assessment requirements issued:

or

☒ Part 3A approved project (The impacts to this site were authorised by a project approval under Part 3A of the EP&A Act.)

Date of project approval:

Site status following impacts:

☐ Not a site (The investigations concluded that this is not a site.)

☐ Valid site (The investigations confirmed that this is an Aboriginal site.)

☐ Partially destroyed (The site was partially destroyed following authorised impacts; a portion of the site remains in situ.)

☒ Destroyed (The site was completely destroyed following authorised impacts.)

Geographic location

Site name: TCEP-OS-020

Easting: 228527 **Northing:** 6605098 **Coordinates must be in GDA (MGA)**

Map sheet: Boggabri 89364S

Zone: 56 **Location method:** Differential GPS

Primary recorder

(The person responsible for the completion and submission of this form)

Title	Surname	First name

Organisation: RPS Australia East Pty Ltd

Address: PO Box 428 Hamilton NSW 2303

Phone: 249404200 **E-mail:** newcastle@rpsgroup.com.au

Date recorded: 29/01/2015 **Fax:** 249616794

Site information

Open/closed site: Open

Features:

	1.	Aboriginal ceremony and dreaming		11.	Habitation structure
	2.	Aboriginal resource and gathering		12.	Hearth
	3.	Art		13.	Non-human bone and organic material
X	4.	Artefact		14.	Ochre quarry
	5.	Burial		15.	Potential archaeological deposit
	6.	Ceremonial ring		16.	Stone quarry
	7.	Conflict		17.	Shell
	8.	Earth mound		18.	Stone arrangement
	9.	Fish trap		19.	Modified tree
	10.	Grinding groove		20.	Water hole

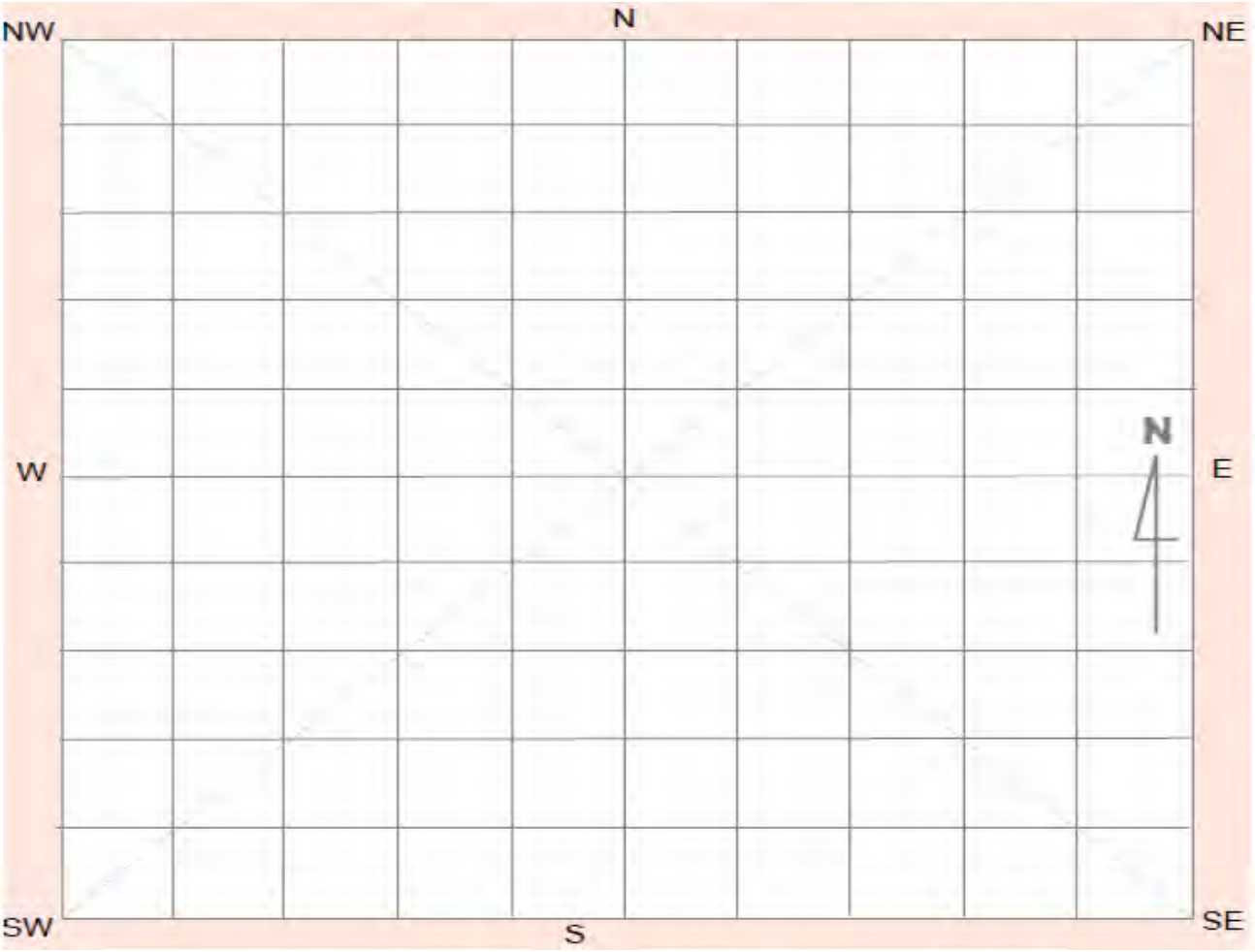
Site condition

Written description of the condition of the AHIMS site (including relevant features) following the authorised impact of the site

See attached information.

Site map

Clearly demarcate the original AHIMS site boundary, show the boundaries of impacted areas and the areas where the site remains in situ. Display map coordinates.



Methodology and results

Summary of the methodology and results of the activity or works undertaken through the authorised impacts, as relevant to the AHIMS site

See attached information.

Management recommendations

Summary of any management recommendations for the AHIMS site

See attached information.

Post-investigation significance

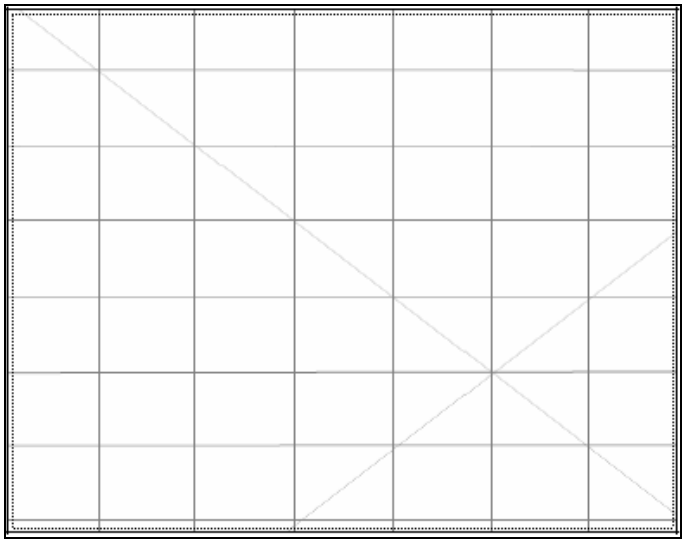
Discuss if the scientific/archaeological or cultural significance of the site has changed in light of the results of the investigations or works conducted at the site.

See attached information.

Additional comments

Site photographs

Include photographs of the authorised impacts activity, as relevant to the AHIMS site. Please keep photo size to a maximum of 200 kb.



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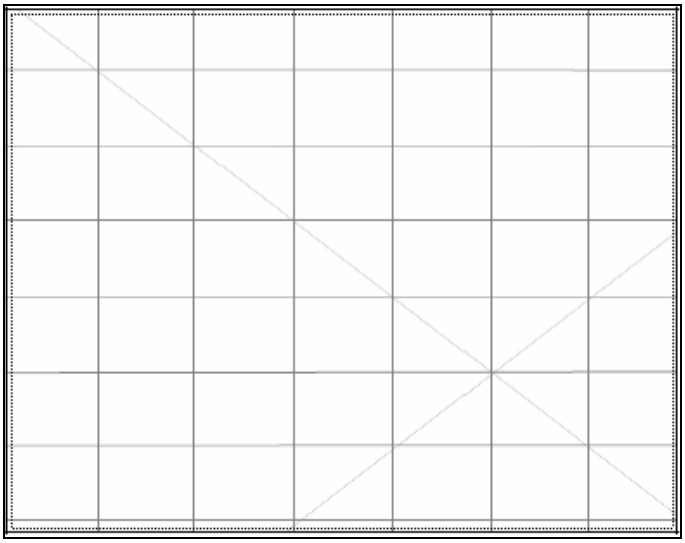

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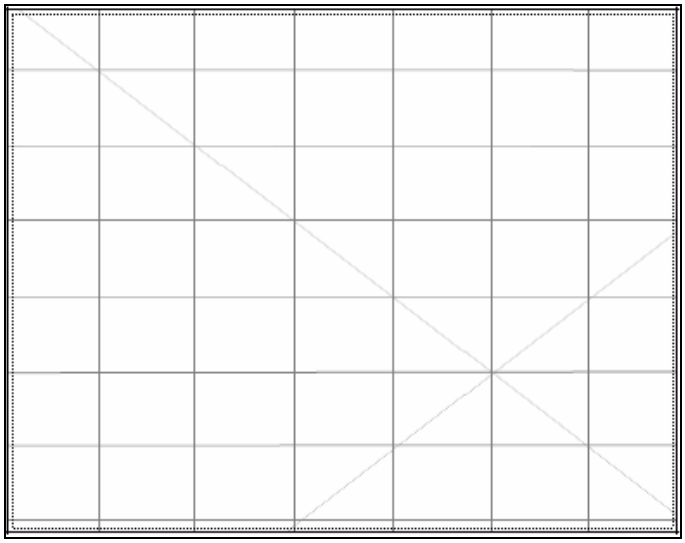

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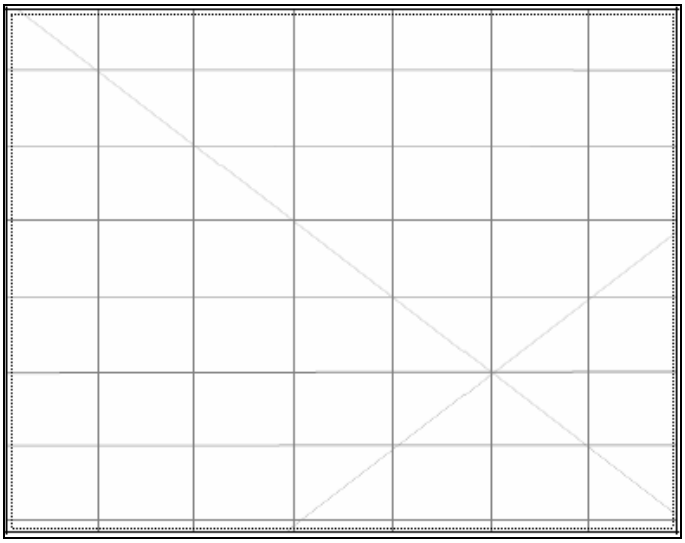

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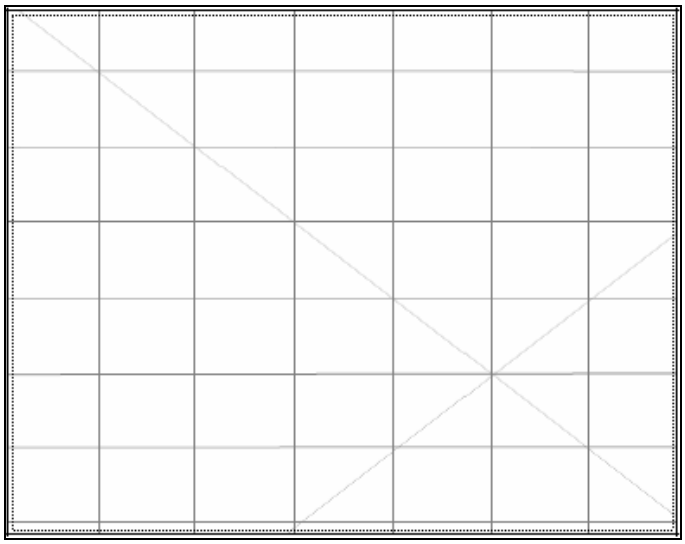
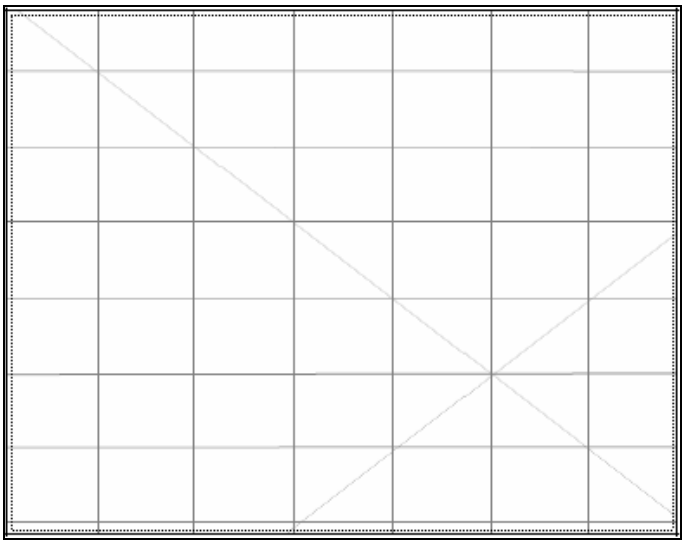


Description:



Description:

AHIMS#20-4-0341 TCEP-OS-020 – Open Site/Artefacts Scatter

The site was originally located on a landform classified as a plain with a south east to north west orientation. Goonbri Creek was the nearest water source at an approximate distance of 1500 metres. The site was recorded as approximately 10 metres x 10 metres. At the time of salvage works the site was located on a graded track. A creek line was noted running through the centre of the site, with heavy erosion sloping towards the creek on the southern side of the site. Overall soil exposure was high (70%) with a ground visibility at 60%. The nearby vegetation comprised of medium sized eucalyptus, acacias and scattered native grasses. Other previous disturbances in the area include the clearance of trees during historical logging, and the grading and use of vehicle tracks.

Eight stone artefacts comprising mudstone and quartz raw material were recovered during the salvage works at this site.

Assessment of Significance

The artefacts recovered from the surface salvage of AHIMS#20-4-0341 comprised a raw material type similar to what has been identified in surrounding areas and therefore not particularly rare. This site is broadly representative of site artefact assemblages in the region and therefore is assessed to have low significance for representativeness. Given this site is an isolated find and is in a disturbed context it has been assessed to have low research and educational potential.

Photos



Plate 1: View of AHIMS#20-4-0341 location facing north



Plate 2: AHIMS#20-4-0341 quartz artefact salvaged

Aboriginal Site Impact Recording Form

AHIMS Registrar
PO Box 1967, Hurstville 2220 NSW
December 2010 DECCW 2010/1022

1 This form must be completed following impacts to AHIMS sites that are:
   a) an outcome of test excavation carried out in accordance with the *Code of Practice for the Archaeological Investigation of Aboriginal Objects in NSW*
   b) authorised by an Aboriginal Heritage Impact Permit (AHIP)
   c) undertaken for the purpose of complying with environmental assessment requirements issued by the Department of Planning under Part 3A of the *Environmental Planning and Assessment Act 1979* (EP&A Act), or
   d) authorised by a Part 3A project approval under the EP&A Act.
2 Completed forms must be submitted to the AHIMS Registrar (www.environment.nsw.gov.au/contact/AHIMSRegistrar.htm).
3 This form is intended to complement (not replace) the AHIMS Site Recording Form. Where there is a need to provide detailed information about the nature of a site, use the AHIMS Site Recording Form.
4 This form does not replace the need to submit reports to DECCW (as specified by a condition of an AHIP or Part 3A approval). This form must be submitted in addition to any reports.

AHIMS site ID: 20-4-0347

Site impact authorisation (select one)

Reference numbers, dates

☐ Archaeological Code (The impacts to this site were the result of test excavation carried out in accordance with the *Code of Practice for the Archaeological Investigation of Aboriginal Objects in NSW.*)

Date DECCW was notified (under requirement 15c of the Code):

DECCW Regional office notified:

☐ AHIP (The impacts to this site were authorised by an AHIP.)

AHIP number:

Date issued/signed:

AHIMS permit ID/number:

☐ Part 3A application (The impacts to this site were undertaken for the purposes of complying with Part 3A environmental assessment requirements issued by the Department of Planning.)

Major project number: 11_0047

Date environmental assessment requirements issued:

or

☒ Part 3A approved project (The impacts to this site were authorised by a project approval under Part 3A of the EP&A Act.)

Date of project approval:

Site status following impacts:

☐ Not a site (The investigations concluded that this is not a site.)

☐ Valid site (The investigations confirmed that this is an Aboriginal site.)

☒ Partially destroyed (The site was partially destroyed following authorised impacts; a portion of the site remains in situ.)

☐ Destroyed (The site was completely destroyed following authorised impacts.)

Geographic location

Site name: TCEP-ST-010

Easting: 227984 **Northing:** 6608219 **Coordinates must be in GDA (MGA)**

Map sheet: Boggabri 89364S

Zone: 56 **Location method:** Differential GPS

Primary recorder

(The person responsible for the completion and submission of this form)

Title	Surname	First name

Organisation: RPS Australia East Pty Ltd

Address: PO Box 428 Hamilton NSW 2303

Phone: 249404200 **E-mail:** newcastle@rpsgroup.com.au

Date recorded: 06/06/2014 **Fax:** 249616794

Site information

Open/closed site: Open

Features:

	1.	Aboriginal ceremony and dreaming		11.	Habitation structure
	2.	Aboriginal resource and gathering		12.	Hearth
	3.	Art		13.	Non-human bone and organic material
	4.	Artefact		14.	Ochre quarry
	5.	Burial		15.	Potential archaeological deposit
	6.	Ceremonial ring		16.	Stone quarry
	7.	Conflict		17.	Shell
	8.	Earth mound		18.	Stone arrangement
	9.	Fish trap	X	19.	Modified tree
	10.	Grinding groove		20.	Water hole

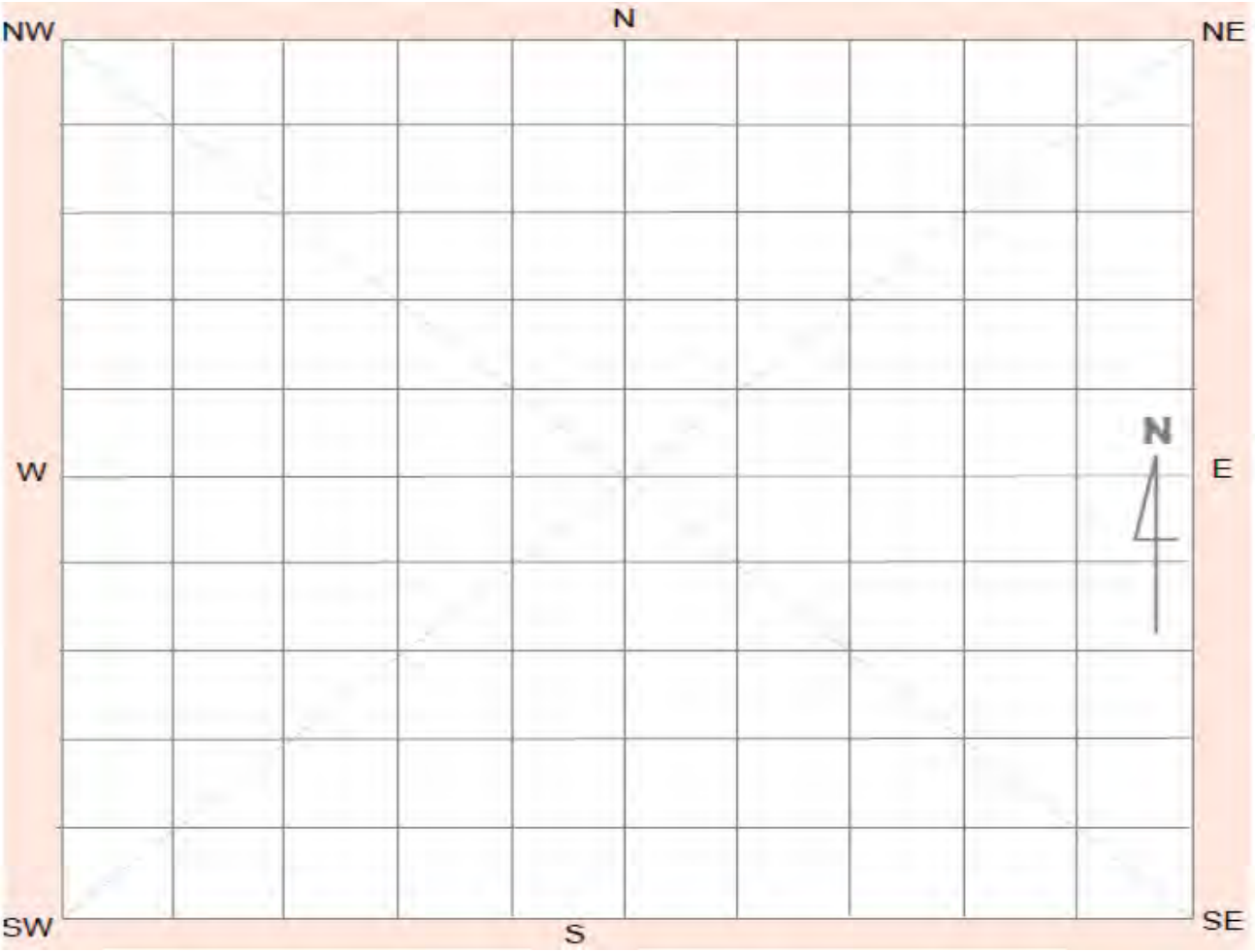
Site condition

Written description of the condition of the AHIMS site (including relevant features) following the authorised impact of the site

See attached information.

Site map

Clearly demarcate the original AHIMS site boundary, show the boundaries of impacted areas and the areas where the site remains in situ. Display map coordinates.



Methodology and results

Summary of the methodology and results of the activity or works undertaken through the authorised impacts, as relevant to the AHIMS site

See attached information.

Management recommendations

Summary of any management recommendations for the AHIMS site

See attached information.

Post-investigation significance

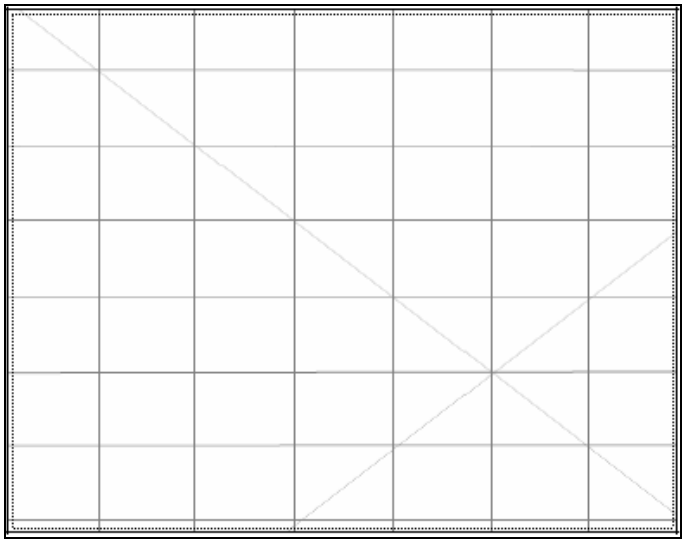
Discuss if the scientific/archaeological or cultural significance of the site has changed in light of the results of the investigations or works conducted at the site.

See attached information.

Additional comments

Site photographs

Include photographs of the authorised impacts activity, as relevant to the AHIMS site. Please keep photo size to a maximum of 200 kb.



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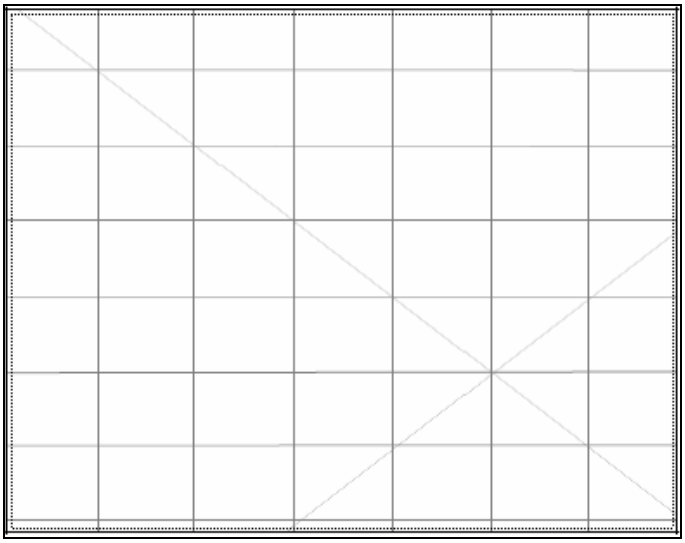

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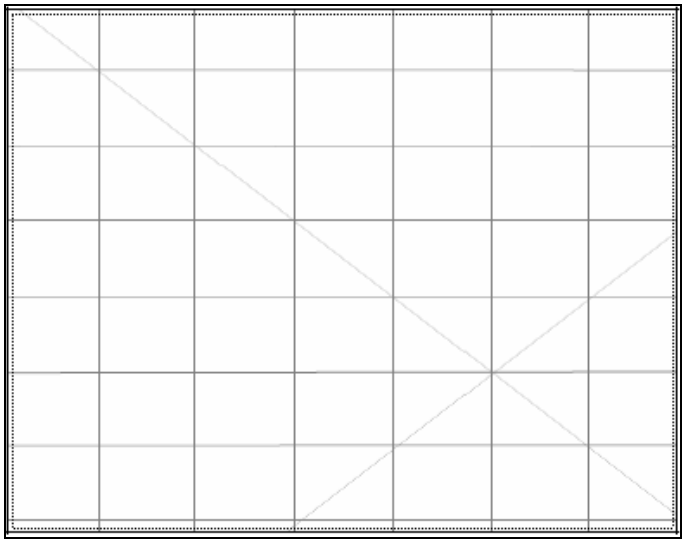

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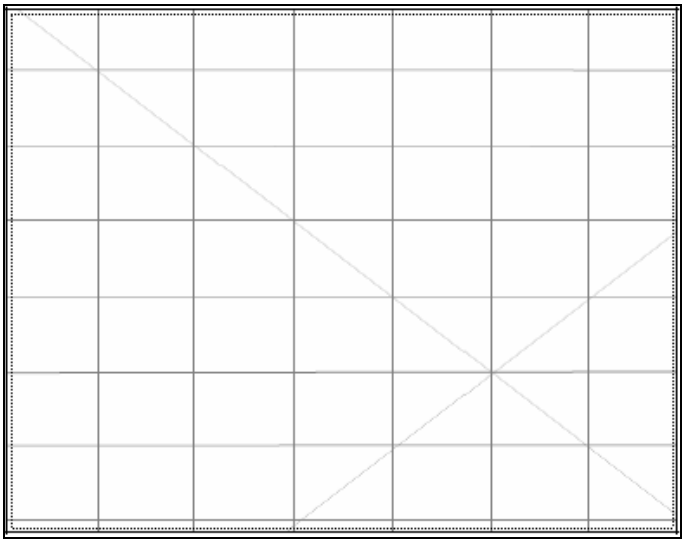

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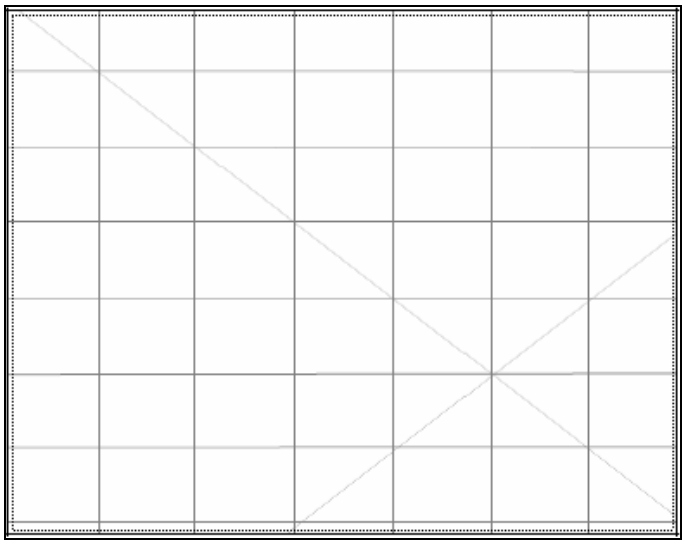

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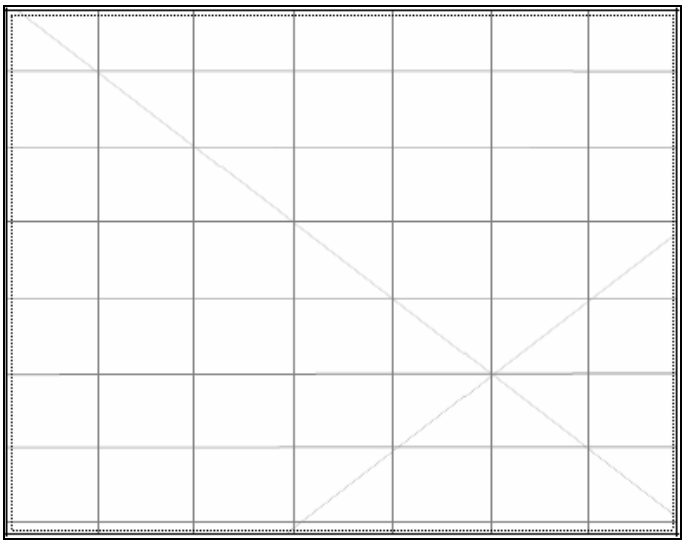

Description:

AHIMS#20-4-0347 TCEP-ST-010 – Scar Tree

The site was originally recorded situated on a ridge within an rolling hills landform with a north east to south west orientation. The nearest water source was Goonbri Creek at an approximate 500 metres from the site. The vegetation was characterised as closed forest with surrounding grasslands. The tree is identified was classified as being in good condition with a clearly defined scar.

Assessment of Significance

The scarred tree site (AHIMS#20-4-0347) has been salvaged and moved to an allocated storage area. This site is rare on a local scale and therefore the scarred tree still has high local significance, but is of moderate significance on a local scale. The tree has been conserved and therefore still retains its significance for representativeness on a local scale, but is of moderate significance on a regional scale. In terms of research potential it retains its local significance on a local scale, but is of moderate significance on a regional scale. The education potential of this tree is high on a local scale and moderate on a regional scale.

Once the tree was salvaged, it was transported by truck to the storage location/keeping place which is opposite the mine office (Easting 228041, Northing 6606902).

Photos



Plate 1: View of AHIMS#20-4-0347 *in situ* prior to being salvaged



Plate 2: View of AHIMS#20-4-0347 showing detail of scar panel

2014 Independent Environmental Audit

Tarrawonga Coal Pty Limited

22 December 2014



INDEPENDENT ENVIRONMENTAL AUDIT SUBMISSION FORM

Project

Consent Number	011-0047
Description of Project	Tarrawonga Coal Project
Project Address	Goonbri Road, Boggabri, NSW 2382
Proponent	Tarrawonga Coal Pty Limited
Proponent Address	PO Box 638, Newcastle, NSW 2300

Independent Audit

Certificate	I certify that I have prepared the contents of the attached independent audit and to the best of my knowledge: • It is in accordance with relevant approval conditions; • I have acted professionally, accurately and in an unbiased manner in conducting the audit; • I am not related to any owner or operator of the project as a spouse, partner, child, sibling, employer, or in a contractual arrangement outside the audit; • I do not have any pecuniary interest in the project, including where there is a reasonable likelihood or expectation of appreciable financial gain or loss to me or to a person to whom I am related; • Neither I nor my employer have provided consultancy services to the project that were subject to this audit; • I have not accepted, nor intend to accept any inducement, commission, gift or any other benefit (apart from fair payment) from any owner or operator of the project, their employees or any interested party. I have not knowingly allowed, nor intend to allow my colleagues to do so.
Signature	
Name	Peter Horn
Address	74 Hunter Street, Newcastle, NSW 2300
E-mail Address	Peter.horn@smec.com
Auditor Certification	Environmental Compliance and Environmental Management Systems Lead Auditor Certified through RAB-QSA
Date	22-12-2014

DOCUMENT CONTROL

File Location Name:	300123322/Final Report
Project Name:	Tarrawonga IEA
Project Number:	30012322
Revision Number:	Revision A

Revision History

Revision #	Date	Prepared by	Reviewed by	Approved for Issue by
Rev A	18-12-14	Peter Horn	Joy Duncan	Peter Horn
Rev B	22-12-14	Peter Horn	Joy Duncan	Peter Horn

SMEC Australia Pty Limited

74 Hunter Street

Newcastle NSW 2300

Tel:	+61 2 4925 9600	Fax:	+61 2 4925 3888
Email:	peter.horn@smec.com	Website:	www.smec.com

This report is confidential and is provided solely for the purposes of Tarrawonga Coal Pty Ltd. This report is provided pursuant to a Consultancy Agreement between SMEC Australia Pty Limited ("SMEC") and Tarrawonga Coal Pty Ltd under which SMEC undertook to perform a specific and limited task for Tarrawonga Coal Pty Ltd. This report is strictly limited to the matters stated in it and subject to the various assumptions, qualifications and limitations in it and does not apply by implication to other matters. SMEC makes no representation that the scope, assumptions, qualifications and exclusions set out in this report will be suitable or sufficient for other purposes nor that the content of the report covers all matters which you may regard as material for your purposes.

This report must be read as a whole. The executive summary is not a substitute for this.

Unless expressly agreed otherwise in writing, SMEC does not accept a duty of care or any other legal responsibility whatsoever in relation to this report, or any related enquiries, advice or other work, nor does SMEC make any representation in connection with this report, to any person other than Tarrawonga Coal Pty Ltd. Any other person who receives a draft or a copy of this report (or any part of it) or discusses it (or any part of it) or any related matter with SMEC, does so on the basis that he or she acknowledges and accepts that he or she may not rely on this report nor on any related information or advice given by SMEC for any purpose whatsoever.

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EXECUTIVE SUMMARY

SMEC Australia Pty Ltd (SMEC) was commissioned by Tarrawonga Coal Pty Ltd (TCPL) to conduct an Independent Environmental Audit (IEA) in accordance with the Project Approval 11_0047 (Schedule 5 Condition 10) for the Tarrawonga mine.

Tarrawonga mine is located approximately 13 km east north east of Boggabri New South Wales (NSW). TCPL is an open cut operation, with a history which dates back to 2005.

Project Approval (11_0047) was granted on 22 January 2013 to extend open cut operations. The project approval allows for the extraction of up to 3 million tonnes per annum of run of mine (ROM) coal until the end of December 2030. This IEA has been prepared to satisfy Condition 50 (Biodiversity Independent Audit) of Schedule 3 and Conditions 10 and 11 (Independent Environmental Audit) of Schedule 5 from the Project Approval 11_0047. The IEA was undertaken generally in accordance with AS/NZS ISO 19011:2003 – Guidelines for quality and/or environmental management systems auditing.

In the assessment of compliance, the status of each condition is described as:

- Compliant;
- Non-Compliant;
- Non-Compliant (Administrative);
- Observation; or
- Not Applicable (used where conditions have not yet been activated (due to activities not being commenced or requests not being made for example).

A total of 1910 conditions and commitments were assessed as part of this audit. 48 issues resulted in 82 non-compliances. 31 of the issues were administrative (that is, the issue was caused by not submitting a document or keeping a document on file, not by the omission of an action or measurement). Many of the non-compliances noted in this audit relate to the same issue which, due to the duplication of commitments between consent documents and management plans, raise the same non-compliance several times.

A basic risk assessment was conducted for all non-compliances with Low/Medium/High/Extreme risk levels as results. The risk assessment details are presented in Appendix C. For the non-compliances that were not administrative (there were 46 administrative non-compliances), there were 4 Low, 34 Medium and 2 High results. Both high results relate to the same issue and a recommendation has been made that is aimed at reducing the risk. The high risk issue was related to water, water collected from the coal loading area is located in Dam SB4, which then flows through a series of dams to Licensed Discharge Point 1 (LDP1 - EPL 12365) and potentially is discharged off-site. The site is currently developing a solution to the issue.

It should be noted that the site is currently in a state of flux with many management plans in draft and not approved. None of the management strategies were approved at the time of the audit as the Maules Creek approval was only recently granted. As such, some of the measures detailed in the plans have not been implemented due to uncertainty surrounding the content of the management plan once approved. Where there is no direct environmental

impact associated with not implementing these measures, they have not been identified as “not compliant”.

The audit has been able to give some direction to the site regarding environmental improvements and has identified a number of areas where documentation and reporting could be improved.

ABBREVIATIONS AND ACRONYMS

Abbreviation/ Acronym	Description
AEMR	Annual Environment Management Report
AMD	Acid Mine Drainage
AR	Annual Return (to the EPA)
AS/NZS	Australian Standard / New Zealand Standard
°C	Degrees Celsius
CCC	Community Consultative Committee
CMA	Catchment Management Authority
DP&E	NSW Department of Planning and Environment
DRE	Division of Resources and Energy
DTI	Department of Trade and Industry
EA	Environmental Assessment
EPA	Environment Protection Authority
EP&A Act	Environment Planning and Assessment Act 1979
EPL	Environment Protection License
EPBC	Environment Protection and Biodiversity Conservation Act 1999
GW	Groundwater Well
IEA	Independent Environmental Audit
LDP	Licensed Discharge Point
LLS	Local Land Services
m	Metres
ML	Mining Lease
MOP	Mining Operations Plan
NAG	Net Acid Generating
NATA	National Association of Testing Authorities, Australia
NOW	NSW Office of Water
OCE	Open Cut Examiner
OEH	NSW Office of Environment and Heritage
PA	Project Approval
PAG	Potentially Acid Generating
POEO	Protection of the Environment Operations Act 1997
SMEC	Snowy Mountains Engineering Corporation
TARP	Trigger, Action, Response Plan
TCPL	Tarrawonga Coal Pty Ltd

1. INTRODUCTION

1.1. Background

SMEC Australia Pty Ltd (SMEC) was commissioned by Tarrawonga Coal Pty Ltd (TCPL) to conduct an Independent Environmental Audit (IEA) in accordance with the Project Approval 11_0047 (Schedule 3, Condition 50 and Schedule 5 Condition 10) for the Tarrawonga mine.

The audit was designed and conducted to satisfy the planning approval conditions for TCPL and focused on the site's compliance with licences, approvals and supporting documents including management plans. This audit period is 22 January 2013 (date of approval of the project by NSW Department of Planning and Environment) to 10 September 2014.

1.2. Site Description

Tarrawonga mine is owned and operated by a joint venture between Whitehaven Coal Limited (70%) and Idemitsu Australian Resources Pty Ltd (30%). Project Approval was granted on 22 January 2013 to operate the Tarrawonga Coal Project under Project Approval 11_0047. Statements of compliance reported in this audit report are in relation to the conditions and commitments of Project Approval 11_0047.

Tarrawonga Mine is located approximately 13 km east north east of Boggabri New South Wales (NSW). TCPL is an open cut operation, with a history which dates back to 2005. The mine is operated on a two shift basis with mining conducted 7.00am till 3.30am the next morning Monday to Friday and 7.00am till 6.00pm on Saturdays. Maintenance can be conducted 24 hours per day 7 days a week.

Project Approval (11_0047) was granted on 22 January 2013 to extend open cut operations. The project approval allows for the extraction of up to 3 million tonnes per annum of run of mine (ROM) coal until the end of December 2030.

1.3. Audit Work

This IEA has been prepared to satisfy Condition 50 of Schedule 3 and Conditions 10 and 11, Schedule 5 of Project Approval 11_0047. Table 1 lists the requirements of this condition and shows where each is located in this IEA report.

Table 1.1 - List of Requirements for this IEA Report

Condition	Requirement	Location in report
Schedule 3		
50	By the end of December 2011, 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:	This Audit
50 a)	Include consultation with OEH, Namoi CMA, DPI Catchments and Lands, SEWPaC, CCC and DRE	Section 2 and Appendix B
50 b)	Assess the performance of the revegetation in the rehabilitation area completed to date (and the Goonbri Creek Diversion, once commenced) against the	Sections 4.18, 4.19, 4.20, 5.1 and 5.2

Condition	Requirement	Location in report
	completion criteria in the Rehabilitation Management Plan	
50 c)	Assess the performance of management and restoration in the offsite Biodiversity Offset Strategy areas completed to date against the completion criteria in the Rehabilitation Management Plan	Sections 4.18, 4.19, 4.20, 5.1 and 5.2
50 d)	Identify any measures that should be implemented to improve the performance of rehabilitation management and restoration within the biodiversity offset areas	Sections 6.1 and 6.2
50 d)	Identify any additional measures that should be applied in the establishment of native vegetation around the realigned Goonbri Creek, both before and after the realignment is undertaken	Section 5.2
50 e)	If the completion criteria have not been met, or are not adequately trending towards being met, determine the likely ecological value of the rehabilitation and restoration once completed, and recommend additional measures to augment the Biodiversity Offset Strategy to ensure that it adequately offsets the projects impacts on biodiversity.	Sections 5.1 and 5.2
50	If the audit recommends the implementation of additional measures to augment the Biodiversity Offset Strategy in accordance with e) above then within 6 months of the completion of the audit the Proponent shall revise the Biodiversity Offset Strategy, in consultation with the Department, OEH and SEWPaC and to the satisfaction of the Director General	Noted
Schedule 5		
9	By the end of December 2011, 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:	This Audit
9(a)	Be conducted by a suitably qualified, experienced and independent team of experts whose appointment has been endorsed by the Director-General;	Section 1.4
9(b)	Include consultation with the relevant agencies;	Section 2
9(c)	Assess the environmental performance of the project and assess whether it is complying with the requirements in this approval and any relevant EPL or Mining Lease (including any assessment, plan or program required under these approvals);	Section 4
9(d)	Review the adequacy of strategies, plans or programs required under the abovementioned approvals; and	Section 5
9(e)	Recommend appropriate measures or actions to improve the environmental performance of the project,	Section 6

Condition	Requirement	Location in report
	and/or any assessment, plan or program required under the abovementioned approvals.	
Notes:	This audit team must be led by a suitably qualified auditor and include experts in surface water, groundwater and any other fields specified by the Director-General.	Appendix A
10	Within 6 weeks of the completion of this audit, or as otherwise agreed by the Director-General, the Proponent shall submit a copy of the audit report to the Director-General, together with its response to any recommendations contained in the audit report.	Noted

1.4. Audit Approach

This IEA was undertaken generally in accordance with AS/NZS ISO 19011:2003 – Guidelines for quality and/or environmental management systems auditing by the following personnel:

- Peter Horn (Environmental Manager) – Lead Auditor and Rehabilitation Specialist from SMEC;
- Catherine Gallery (Senior Ecologist) – Biodiversity and Offsets Specialist from SMEC;
- Glen Homes (Principal Acoustics) – Acoustics from SMEC;
- Aleks Todoroski (Principal) – Air Quality Specialist from Todoroski Air Sciences;
- Glenn Mounser (Water Manager) – Surface Water Specialist from SMEC;
- Dr Yohannes Woldeyohannes (Senior Engineer) – Groundwater Modelling Specialist from SMEC;
- Matthew Harland (Environmental Engineer) – Assistant Auditor from SMEC; and
- Joy Duncan (Technical Principal - Environment) – Peer Review from SMEC.

The audit team were approved by the Department of Planning and Environment (DP&E) (on 23 July 2014) prior to conducting the audit (appended as Appendix A).

This IEA consisted of a detailed desktop review of documents supporting compliance, interviews with TCPL staff and a site inspection of Tarrawonga Mine from 8 - 10 September 2014. Interviewees included:

- Group Environment Manager;
- Environment Officer;
- Drill and Blast Engineer;
- Workshop Supervisor;

- Property Manager/Field Environmental Officer;
- Geologist;
- Safety and Training Coordinator;
- Manager Mining;
- Mine Planner; and
- An OCE.

Site opening and closing meetings were held with the site Environment team and Operations Manager in attendance with the audit team. The opening meeting discussed the approach and process of the audit while the closing meeting covered the findings to that point and the audit teams general impressions of the sites management.

The environmental conditions at the time of the audit were mild with daytime maximum temperatures in the mid 20's (degrees Celsius) and minimums between 0 and 10°C. There were mainly clear conditions during the site audit.

1.5. Report Structure

This report is structured as follows:

Executive Summary

Section 1.0 provides an introduction, background and description of Tarrawonga Mine, describes the requirements for the IEA and provides a guide to the structure of the report.

Section 2.0 discusses consultation with the relevant departments.

Section 3.0 lists the planning approvals in place at Tarrawonga Mine, provides a description of each and confirms those which have been the subject of this IEA.

Section 4.0 provides a discussion of non-compliances against the project approval, licences, permits and supporting documents.

Section 5.0 provides a review of the adequacy of the environmental management at the site both documented and observed

Section 6.0 provides recommendations for measures or actions to improve the environmental performance of TCPL.

2. CONSULTATION

The TCPL environment department notified the DP&E of the proposed scope of the areas requiring expert assessment for the audit. The DP&E confirmed the key scope areas requiring expert assessment to be rehabilitation, biodiversity, surface and groundwater, noise and air quality.

The audit team consulted the NSW Environment Protection Authority (EPA), Department of Trade and Investment, Regional Infrastructure and Services – Division of Mineral Resources (DRE), Tarrawonga Community Consultation Committee CCC), Department of Environment (Commonwealth) (DoE), NSW Office of Environment and Heritage requesting input into the audit scope and focus (appended as Appendix B). Local Land Services were contacted in place of the requirement to consult with the CMA but the suggested contact could not be reached for input in spite of several phone calls to establish contact.

Comments were as follows:

Department of Environment did not provide a response regarding the scope;

The EPA asked for a focus on:

- Surface water discharges;
- Particulate generation;
- Noise;
- The lack of rehabilitation on the southern emplacement; and
- Potential PRP for exposed areas.

DRE provided detailed feedback:

Desktop:

- Is there a current Mining Operations Plan (MOP) in place and has it been approved by DRE?
- Has the MOP been prepared in consultation with the relevant agencies as outlined in the Project Approval?
- Is the rehabilitation strategy as outlined in the MOP consistent with the Project Approval in terms of progressive rehabilitation schedule; and proposed final land use(s)?
- Has the rehabilitation objectives and completion criteria as outlined in the MOP been developed in accordance with the proposed final land(s) as outlined in the Project Approval?
- Has a rehabilitation monitoring program been developed and implemented to assess performance against the nominated objectives and completion criteria? – verified by reviewing monitoring reports and rehabilitation inspection records.

- Has a rehabilitation care and maintenance program been developed and implemented based on the outcomes of monitoring program? – verified by reviewing Annual Rehabilitation Programs or similar documentation.

Site Inspection:

- Are mining operations being conducted in accordance with the approved MOP (production, mining sequence etc.), including within the designated MOP approval boundary? – to be verified by site plans and site inspection.
- Is rehabilitation progress consistent with the approved MOP as verified by site plans and a site inspection? This should include an evaluation against rehabilitation targets and whether the final landform is being developed in accordance with conceptual final landform in Project Approval.
- Based on a visual inspection, are there any rehabilitation areas that appear to have failed or that have incurred an issue that may result in a delay in achieving the successful rehabilitation?

In addition to the above, the audit should note observations where rehabilitation procedures, practices and outcomes represent best industry practice.

OEH did not have any specific requests outside the scope already noted.

The Tarrawonga Community Consultative Committee (CCC) were contacted but chose not to offer any comment.

No other input was provided by the regulators prior to this audit report being finalised.

3. DOCUMENTS AUDITED

Table 3.1 lists the documents reviewed for compliance in this IEA along with where each document is addressed in the report. There were many other documents reviewed by the audit team as evidence or supporting information that are not listed here. Table 3.2 lists the sites approval documents.

Table 3.1 List of Documents Audited

Document	Location in Report
Project Approval 11_0047	4.2
Tarrawonga Coal Project Environmental Assessment - Statement of Commitments	4.1
EPL 12365	4.1
Mining Leases	4.4
Mining Operations Plan, November 2013 to October 2015	4.3
EPBC Approval, 2011	4.5
Environmental Management Strategy, May 2013	4.6
Environmental Monitoring Program, August 2009	4.7
Noise Management Plan, July 2014	4.8
Noise Management Strategy, Boggabri, Tarrawonga, Maules Creek Complex, March 2014	4.9
Blast Management Plan, September 2014	4.10
Blast Management Strategy, January 2013	4.12
Blast Monitoring Program, November 2008	4.11
Road Closure Management Plan, May 2013	4.25
Air Quality and Greenhouse Gas Management Plan, June 2014	4.13
Air Quality Management Strategy, March 2014	4.14
Water Management Plan, November 2013	4.15
Groundwater Contingency Plan, October 2006	4.16
Water Management Strategy, March 2013	4.17
Tarrawonga Biodiversity Management Plan, May 2013	4.18
Willeroi Biodiversity Offset Area Management Plan, February 2014	4.19

Document	Location in Report
Rehabilitation Management Plan, May 2013	4.20
Heritage Management Plan, January 2014	4.21
Aboriginal Cultural Heritage Strategy, August 2014	4.22
Bushfire Management Plan, April 2013	4.23
Waste Management Plan, May 2013	4.24

Table 3.2 Tarrawonga Coal Approvals

Approval	Regulator	Expiry Dates
Project Approval 11_0047	DP&E	31 December 2030
EPL 12365	EPA	Annual Renewal Date 09-01-15
Mining Lease ML1579	DTIRIS DRE Minerals	Various
Mining Lease ML 1685	DTIRIS DRE Minerals	
Mining Lease ML 1693	DTIRIS DRE Minerals	

4. ENVIRONMENTAL COMPLIANCE

In the assessment of compliance, the status of each condition is described as:

- Compliant;
- Not Compliant;
- Not Compliant Administrative (the issue was caused by not submitting a document or keeping a document on file, not by the omission of an action or measurement);
- Observation; or
- Not Applicable (used where conditions have not yet been activated (due to activities not being commenced or requests not being made for example).

A total of 1910 conditions and commitments were assessed as part of this audit. 48 issues resulted in 82 non-compliances. 31 of the issues were administrative. Many of the non-compliances noted in this audit relate to the same issue which, due to the duplication of commitments between consent documents and management plans, raise the same non-compliance several times. These numbers do not include the assessment of compliance with recommendations from the previous IEA, these issues are addressed separately in Section 4.26.

A basic risk assessment was conducted for all non-compliances with Low/Medium/High/Extreme risk levels as results. For the non-compliances that were not administrative (there were 46 administrative non-compliances), there were 4 Low, 34 Medium and 2 High results. Both high results relate to the same issue and a recommendation has been made that is aimed at reducing the risk. The high risk issue was related to water, water collected from the coal loading area is located in Dam SB4, which then flows through a series of dams to Licensed Discharge Point 1 (LDP1 - EPL 12365) and potentially is discharged off-site. The site is currently developing a solution to the issue.

It should be noted that the site is currently in a state of flux with many management plans in draft and not approved. None of the management strategies were approved at the time of the audit as the Maules Creek approval was only recently granted. As such, some of the measures detailed in the plans have not been implemented due to uncertainty surrounding the content of the management plan once approved. Where there is no direct environmental impact associated with not implementing these measures, they have not been identified as “not compliant”.

The audit has been able to give some direction to the site regarding environmental improvements and has identified a number of areas where documentation and reporting could be improved.

4.1. Issues Causing Non-Compliance

Each non-compliance was caused by an action, omission or event. These combined constitute the issues that the site needs to address to achieve compliance. For this reason, the issues are extracted from the non-compliances so they will be more readily addressed by TCPL.

The issues identified in this audit and the associated non-compliances are presented in Table 4.1.

Table 4.1 TCPL Issues Causing Non-compliance

Issue	Non-compliances
DA 88-4-2005 Not surrendered by December 2013	Administrative - PA 11-0047, Schedule 2 Condition 14
Enter into a Planning Agreement with Council by the end of March 2013	PA 11-0047, Schedule 2 Condition 21
The Groundwater Management Plan does not refer to stygo-fauna or groundwater dependent ecosystems	PA 11-0047, Schedule 3 Condition 39
Make arrangements for the long term security of the Willeroi offset area before the end of December 2013	Administrative - PA 11-0047, Schedule 3 Condition 46
By the end of May 2013, the Proponent shall lodge a Conservation and Biodiversity Bond with the Department to ensure that the biodiversity offset strategy is implemented. The details of the security bond are to be provided to the Minister DoE.	Administrative - PA 11-0047, Schedule 3 Condition 49 EPBC Approval, Condition 27
Soil testing and surveys not conducted prior to soil stripping	Administrative - PA 11-0047, Schedule 3 Condition 62 EPBC Approval, Condition 25 Tarrawonga Mine Biodiversity Management Plan, Section 4.3.2 Rehabilitation Management Plan, Section 6.4.2, 6.5.2,
The Rehabilitation Management Plan does not describe Interim rehabilitation techniques and triggers	Administrative - PA 11-0047, Schedule 3 Condition 64
This audit was commissioned after the due date of 30th June 2014	Administrative - PA 11-0047, Schedule 3 Condition 50 and Schedule 4 Conditions 10 and 11 Willeroi Biodiversity Offset Area Management Plan Section 9.5
The Proponent shall, within 3 months of the date of this approval: a) make the following information for the project publicly available on its website, on a daily basis and in a clearly understandable form: daily weather forecasts for the coming week; proposed operational responses to these weather forecasts; real-time noise and air quality monitoring data (subject to any necessary caveats); This information is not placed on the website on a daily basis, generally up to date but not every day.	Administrative - PA 11-0047, Schedule 4 Condition 13
Exceed activity scale in the EPL for coal produced	Administrative - EPL 121365 - Preamble

Air quality results not reported online daily	Administrative – PA 11-0047 Schedule 5, Conditions 12 and 13, MOP Section 3.2.1
Not all the requirements of the PA 11-0047 for the development of the AQGGMP have been addressed.	Administrative – PA 11-0047 Schedule 3, Condition 29
Overburden not tested for acid generating potential	MOP Section 3.2.5
Not all course rejects are not placed on the pit floor as required by the MOP but are placed at higher elevations, as part of the backfilling process.	Administrative - MOP Section3.2.12
Potential acid generating materials volumes managed not reported in the AEMR	MOP Section 3.3.3
Tubestock in the rehabilitated areas does not have tree guards nor is it mulched.	Administrative - MOP Section 5.4.5 Tarrawonga Mine Biodiversity Management Plan, Section 4.3.3, 4.7.2, 4.7.3, 5.2.1, 5.2.4, 5.3.1, 5.4.1 Rehabilitation Management Plan, Section 6.5.5
Performance of rehabilitation against key performance measures/indicators, regulatory requirements and TCPL commitments and trends in rehabilitation performance not reported in the AEMR	Administrative – MOP – Section 8.3
The Water Management Plan does not reference EPBC requirements or the National Water Quality Management Strategy.	Administrative – EPBC Approval, Condition 16
The Water Management Plan does not state the maximum amounts of drawdown in alluvial and hardrock aquifers risking not identifying a groundwater exceedence	EPBC Approval , Condition 17
No evidence of provision of the updated groundwater and surface water modelling and Management plans to DoE	Administrative – EPBC Approval, Condition 19
No evidence of the submission of the scoping report for the Willeroi Biodiversity Offset Area to DoE	Administrative – EPBC Approval, Condition 22
There is no evidence that Ecological survey data is collected in accordance with DoE Standards	Administrative – EPBC Approval, Condition 30
The AEMR reports on compliance with PA 11-0047, EPL 12365 and the Mining Leases but does not address compliance with the EPBC approval or water licences.	Administrative – EMS Section 4.8
Attended noise monitoring reports do not reference all the required standards.	Administrative - Noise Management Plan, Section 4.4
Attended noise monitoring reports do not record plant configuration when testing Sound Power levels of equipment	Administrative - Noise Management Plan, Section 4.4
Attended Noise Monitoring reports do not include the names of the personnel conducting the monitoring	Administrative - Noise Management Plan, Section 6.1
Some blast monitoring events have not been recorded.	Blast Management Plan, Section 5.1.1

Predictive air dispersion modelling is not used to inform operations planning	PA 11-0047 Schedule 3, Condition 28, Air Quality and Greenhouse Gas Management Plan, Section 3
No evidence of participation in an ACARP project to trial best practise measures for disturbing and handling overburden	Administrative – Air Quality and Greenhouse Gas Management Plan, Section 3
Deposited dust analysis to be conducted by a Nata certified laboratory, the analysis was not certified in the report provided as evidence	Administrative – Air Quality and Greenhouse Gas Management Plan, Section 4.3.2
The area around the coal loader drains to the dirty water system but this portion of the system has an off-site discharge point.	Water Management Plan, Section 2.3.2 Water Management Strategy, Section 4.1.1
The groundwater model has not been updated in the last two years.	Water Management Plan, Sections 2.3.2, 7.8
A series of in-stream monitoring locations and gauges have not been installed since the approval but were to be installed as soon as possible following approval.	Water Management Plan, Section 6.3
No evidence of water samplers being suitably qualified professionals	Administrative - Water Management Plan, Section 6.4
Groundwater wells are not purged prior to sampling	Water Management Plan, Section 7.5
Groundwater monitoring data not posted onto website within two weeks of sampling and not provided to NoW	Administrative - Water Management Plan, Section 7.5.1
The surface and groundwater response plan (TARP) does not detail how to manage complaints	Administrative - Water Management Plan, Section 8
Groundwater wells GW020432 and GW006013 were not recorded in the 2012-13 AEMR	Groundwater Contingency Plan, Section 2.3
In many places in the site documentation, information is to be provided to Narrabri Council and this does not occur	Administrative – Groundwater Contingency Plan, Section 2.3
Seed collection is currently done at the Whitehaven regional biodiversity bank area near Rocglen, no local seed is collected at Tarrawonga	Tarrawonga Mine Biodiversity Management Plan, Sections 4.1.2 and 4.3.3
The effects of salvaging and reusing habitat resources is not monitored annually	Tarrawonga Mine Biodiversity Management Plan, Section 4.3.3
Overburden is not tested for sodicity	Tarrawonga Mine Biodiversity Management Plan, Section 4.5.3
Vehicles are not inspected for weed seed propagules prior to entry to the offsets areas.	Tarrawonga Mine Biodiversity Management Plan, Section 4.7.2
Bushfire fuel load annual assessment is not documented	Administrative - Tarrawonga Mine Biodiversity Management Plan, Sections 4.10.2, 4.10.3, 5.2.2, 5.3.2 and 5.4.2.

	Bushfire Management Plan, Section 5.2.8, 5.3.4,
Internal audits will be conducted annually, none in the audit period	Administrative - Tarrawonga Mine Biodiversity Management Plan, Sections 10 and 10.1
Topsoil Stockpiles not signposted	Rehabilitation Management Plan, Section 6.4.2
Methodology for preservation of scar trees not strictly observed	Administrative - Heritage Management Plan, Section 4.1.1
The AEMR does not comment on waste minimisation effectiveness	Administrative - Waste Management Plan, Section 5

4.2. Project Approval PA 11_0047

Table 4.2 shows the conditions that were not compliant with the Project Approval PA 11_0047. An assessment of compliance for each condition in the PA 11_0047 is provided in the audit protocol in Appendix C.

Table 4.2 Non-Compliances for PA 11_0047

Schedule	Condition	Requirement	Finding
2	14	By the end of December 2013, or as otherwise agreed by the Director-General, the Proponent shall surrender the existing development consent (DA-88-4-2005) for the Tarrawonga Coal Mine in accordance with Section 104A of the EP&A Act. Prior to the surrender of this development consent, the conditions of this approval shall prevail to the extent of any inconsistency with the conditions of the development consent.	Not completed, work is underway to surrender the DA. Not Compliant Administrative
2	21	21 By the end of March 2013, unless otherwise agreed by the Director-General, the Proponent shall enter into a planning agreement with Council in accordance with: a) Division 6 of Part 4 of the EP&A Act; and b) the terms of the Proponent's offer provided in Appendix 3.	No evidence provided to support the establishment of a planning agreement Not Compliant
3	25	The Proponent shall ensure that particulate matter emissions generated by the project do not exceed the criteria listed in Table 9 at any residence on privately-owned land or on more than 25 percent of any privately-owned land, except on property 49 in year 16.	HVAS run on non-EPA sanctioned day. HVAS exceedences not investigated. No publicly available information to assess compliance with PM_{10} and TSP criteria. Not Compliant Administrative

Schedule	Condition	Requirement	Finding
3	28	The Proponent shall: (a) …..; (b) operate a comprehensive air quality management system on site that uses a combination of predictive meteorological forecasting, predictive and real time are dispersion modelling and real-time air quality monitoring data to guide the day-to-day planning of mining operations and implementation of both proactive and reactive air quality mitigation measures to ensure compliance with the relevant conditions of this approval;	B) Mine operates predictive meteorological forecasting, but does not appear to operate any predictive or real-time air dispersion modelling to guide day-to-day planning of the mining operations. Not Compliant Administrative
3	29	The proponent shall prepare and implement an Air Quality and Greenhouse Gas Management Plan for the project to the satisfaction of the Director-General. This plan must: (b) describe the measures that would be implemented to ensure: best practice management is being employed; the air quality impacts of the project are minimised during adverse meteorological conditions and extraordinary events; and compliance with the relevant conditions of this approval; (f) include and air quality monitoring program that: uses a combination of real-time monitors and supplementary monitors to evaluate the performance of the project; adequately supports the proactive and reactive air quality management system; includes PM2.5 monitoring; includes monitoring of occupied mine-owned residences and residences on the air quality affected land in Table 1, subject to the agreement of the tenant and/or landowner; evaluates and reports on the effectiveness of the air quality management system; includes sufficient random audits of operating responses to real time air quality management systems to determine the ongoing effectiveness of these responses in maintaining the project within the relevant criteria in this Schedule and the requirements of conditions 24 and 25, above; includes a protocol for determining any exceedences of the relevant conditions in this	b) AQGGMP incorporates such measures, but is not specific about extraordinary events, and does not contain a clear procedure to identify compliance with the 24-hour average PM_{10} criterion. F) AQMP includes most of these aspects, but does not appear to cover; - supplementary monitors; - protocol for determining exceedances of 24-hour PM10 and TSP criterion. AQMP includes an AQMS for the BTM complex, but the AQMP/S does not appear to cover; - a suitable control monitoring site at present (given that the "Will-gai" site is close to other mining activity, it is not a suitable control monitoring site representative of regional air quality.

Schedule	Condition	Requirement	Finding
		approval; and (g) includes a Leard Forest Mining Precinct Air Quality Management Strategy that has been prepared in consultation with the other coal mine in the Precinct to minimise the cumulative air quality impacts of all mines within the Precinct, that includes: systems and processes to ensure that all mines are managed to achieve their air quality criteria; a shared environmental monitoring network and data sharing protocol; control monitoring site (s) to provide real time data on background air quality levels (ie not influenced by mining in the Leard Forest Mining Precinct and representative of regional air quality); a shared predictive and real time air dispersion model covering the Lear Forest Mining Precinct to be used for assessment of cumulative impacts, optimising locations of the shared real time monitoring network, validation of air predictions and optimising mitigation measures; and procedures for identifying and apportioning the source/s and contribution/s to cumulative air impacts for both mines and other sources, using the air quality and meteorological monitoring network and appropriate investigative tools such as modelling of post incident plume dispersion, dual synchronised monitors and chemical methods of source apportionment (where possible).	Tamworth is not in the same air shed and is not a suitable control site either.) - AQMS is not clear that the proposed air dispersion model would cover all of these elements; - Conceptual strategy proposed in the AQMS to identify impacts may not be as effective as described in controlling day to day effects. AQMP includes an AQMS for the BTM complex, but the AQMP/S does not appear to cover; - a suitable control monitoring site at present (given that the "Will-gai" site is close to other mining activity, it is not a suitable control monitoring site representative of regional air quality. Tamworth is not in the same air shed and is not a suitable control site either.) - AQMS is not clear that the proposed air dispersion model would cover all of these elements; - Conceptual strategy proposed in the AQMS to identify impacts may not be as effective as described in controlling day to day effects. Not Compliant Administrative

Schedule	Condition	Requirement	Finding
3	39	i) Site Water Balance, that includes: details of: sources and security of water supply, including contingency for future reporting periods; water use and management on site; any off-site water discharges; reporting procedures, including the preparation of a site water balance for each calendar year; a program to validate the surface water model, including monitoring discharge volumes from the site and comparison of monitoring results with modelled predictions; and describes the measures that would be implemented to minimise clean water use on site; "ii) Surface Water Management Plan, that includes: detailed baseline data on surface water flows and quality in the water-bodies that could potentially be affected by the project; detailed baseline data on soils within the irrigation area; detailed baseline data on hydrology across the downstream drainage system of the Namoi River floodplain from the mine site to the Namoi River, including Barbers Lagoon and The Slush Holes; a detailed description of the water management system on site, including the: clean water diversion systems; erosion and sediment controls (mine water system); mine water management systems including irrigation areas; discharge limits in accordance with EPL requirements; and water storages; detailed plans, including design objectives and performance criteria for: design and management of final voids; design and management for the emplacement of reject materials, sodic and dispersible soils and acid or sulphate generating materials; the Goonbri Creek diversion and low permeability barrier; reinstatement of drainage lines on the rehabilitated areas of the site; and	There is a water balance included. The water balance meets these criteria though some of the criteria are met in the WMP. It is an updated version, created in 2014 in line with the requirement for annual updates but there is no specific reference to an annual update of the Water Balance. The WMP developed by URS in 2013 does not contain all of these details. The detailed baseline data on hydrology of the Namoi is not present. Not Compliant

Schedule	Condition	Requirement	Finding
		control of any potential water pollution from the rehabilitated areas of the site; performance criteria for the following, including trigger levels for investigating any potentially adverse impacts associated with the project: the water management system; soils within the irrigation area; downstream surface water quality; downstream flooding impacts, including flood impacts due to the flood bunds required for the project; and " "iii) Groundwater Management Plan, that includes: detailed baseline data of groundwater levels, yield and quality in the region, and privately-owned groundwater bores including a detailed survey/schedule of groundwater dependent ecosystems (including stygo-fauna), that could be affected by the project; detailed plans, including design objectives and performance criteria, for the design and management of; the proposed final void; and coal reject and potential acid forming material emplacement; groundwater assessment criteria including trigger levels for investigating any potentially adverse groundwater impacts; a program to monitor and assess: groundwater inflows to be open cut mining operations; the effectiveness of the LPB; the seepage/leachate from the LPB, water storages, emplacements and the final void; interconnectivity between the alluvial and bedrock aquifers; background changes in groundwater yield/quality against mine-induced changes; the impacts of the project on: regional and local (including alluvial) aquifers; groundwater supply of potentially affected landowners; groundwater dependent ecosystems (including potential impacts on stygo-fauna) and riparian vegetation; a program to validate the groundwater model for the project, including an independent review of the model every 3 years, and comparison of monitoring results	

Schedule	Condition	Requirement	Finding
		with modelled predictions; and a plan to respond to any exceedences of the performance criteria	
3	46	The Proponent shall make suitable arrangements to provide appropriate long-term security for the offset areas: a) for the Willeroi Offset Area the long-term security shall be provided by way of: the Proponent entering into a conservation agreement of agreements pursuant to section 69B of the National Parks and Wildlife Act 1974, recording the obligations assumed by the Proponent under the conditions of this approval in relation to these offset, and registering the agreement(s) pursuant to section 69F of the National Parks and Wildlife Act 1974; or a tenure of higher conservation status such as a National Park, or Nature Reserve, under the National Parks and Wildlife Act 1974, the conservation agreement(s) must be registered by the end of December 2013 unless agreed otherwise by the Director-General after consultation b) by the end of December 2030 unless otherwise agreed by the Director-General, for the woodland to the satisfaction of the Director-General. Note: The Department acknowledges that the Proponent is investigating the potential to transfer part of all of the Willeroi Offset Area directly to the national park estate, and accepts that interim conservation measures may be implemented prior to this transfer.	At the time of the audit not compliant with December 2013 submission date but negotiating with DP&E for an extension to this date. Not Compliant Administrative
3	49	By the end of May 2013, the Proponent shall lodge a Conservation and Biodiversity Bond with the Department to ensure that the biodiversity offset strategy is implemented in accordance with the performance and completion criteria of the Biodiversity Management Plan. The sum of the bond shall be determined by: a) calculating the full cost of implementing the biodiversity offset strategy (other than land acquisition costs); and b) employing a suitably qualified quantity surveyor to verify the calculated costs, to the satisfaction of the Director-General. If the offset strategy is completed generally in accordance with the completion criteria in the	Biodiversity Management Plan is not approved, site therefore not able to calculate bond amount, not compliant with deadline stated. Not Compliant Administrative

Schedule	Condition	Requirement	Finding
		Biodiversity Management Plan to the satisfaction of the Director-General, the Director-General will release the bond. If offset strategy is not completed generally in accordance with the completion criteria in the Biodiversity Management Plan, the Director-General will call in all, or part of, the conservation bond, and arrange for the satisfactory completion of the relevant works. With the agreement of the Director-General, this bond may be combined with rehabilitation security deposit administered by DRE. Notes: Alternative funding arrangements for long term management of the Biodiversity Offset Strategy, such as provision of capital and management funding as agreed by OEH as part of a Biobanking Agreement or transfer to conservation reserve estate can be used to reduce the liability of the conservation and biodiversity bond. The sum of the bond may be reviewed in conjunction with any revision to the biodiversity offset strategy.	
3	50	" By the end of June 2014 and every 3 years thereafter, unless both the Director-General and OEH agree to a different timeframe, the Proponent shall commission suitably qualified, experiences and independent person/s, whose appointment has been approved by the Director-General, to undertake an audit of the revegetation of the rehabilitation area and management and restoration within the Biodiversity Offset Strategy areas to the satisfaction of the Director-General. This audit must: a) include consultation with OEH, Namoi CMA, DPI Catchments and Lands, SEWPaC, CCC and DRE; b) assess the performance of the revegetation in the rehabilitation area completed to date (and the Goonbri Creek Diversion, once commenced) against the completion criteria in the Rehabilitation Management Plan; c) assess the performance of management and restoration in the off-site Biodiversity Offset d) identify any additional measures that should be implemented to improve the	This audit, non-compliant with timing requirements Not Compliant Administrative

Schedule	Condition	Requirement	Finding
		performance of rehabilitation, management and restoration within the rehabilitation and biodiversity offset areas; and d) identify any additional measures that should be applied in the establishment of native vegetation, including riparian vegetation around the realigned Goonbri Creek, both before and after the realignment is undertaken;" "e) if the completion criteria have not been met, or are not adequately trending towards being met, determine the likely ecological value of the rehabilitation and restoration once completed, and recommend additional measures to augment the Biodiversity Offset Strategy to ensure that it adequately offsets the project's impacts on biodiversity. If the audit recommends the implementation of additional measures to augment the Biodiversity Offset Strategy in accordance with (e) above, then within 6 months of the completion of the audit the Proponent shall revise the Biodiversity Offset Strategy, in consultation with the Department, OEH and SEWPaC, and to the satisfaction of the Director-General.	
3	62	The Proponent shall, in consultation with the Namoi CMA: a) develop a detailed soil management protocol that identifies procedures for: comprehensive soil surveys prior to soil stripping; assessment of top-soil and sub-soil suitability for mine rehabilitation; and annual soil balances to manage soil handling including direct respreading and stockpiling; b) maximise the salvage of suitable top-soils and sub-soils and biodiversity habitat components such as bush rocks, tree hollows and fallen timber for rehabilitation of disturbed areas within the site and for enhancement of biodiversity offset areas; and c) ensure that coal reject, or any potentially acid forming interburden materials, are not emplaced at elevations in the pit shell where they may promote acid or sulphate species generation and migration beyond the pit shell.	The requirements detailed here have been met in the Tarrawonga Rehabilitation Management Plan and the Clearing and Pre-strip Procedure apart from the comprehensive soil surveys prior to topsoil stripping. Not Compliant Administrative

Schedule	Condition	Requirement	Finding
3	64	The Proponent shall prepare and implement a Rehabilitation Management Plan to the satisfaction of the Executive Director, Mineral Resources. This plan must: a) be prepared in consultation with the Department, Forests NSW, NOW, OEH, Namoi CMA and Council; b) be submitted to the Executive Director, Mineral Resources for approval by the end of May 2013; c) be prepared in accordance with any relevant DRE guideline; d) describe how the rehabilitation of the site would be integrated with: the implementation of the biodiversity offset strategy; and the final landform for the Boggabri coal mine; e) include detailed performance and completion criteria for evaluating the performance of the rehabilitation of the site, and triggering remedial action (if necessary); f) describe the measures that would be implemented to ensure compliance with the relevant conditions of this approval, and address all aspects of rehabilitation including mine closure, final landform and final land use; g) include interim rehabilitation where necessary to minimise the area exposed for dust generation; h) include a program to monitor, independently audit and report on the effectiveness of the rehabilitation measures, and progress against the detailed performance and completion criteria; and i) build to the maximum extent practicable on the other management plans required under the approval.	Interim rehabilitation techniques and triggers are not described but are described in the Biodiversity MP. Not Compliant Administrative
5	10	"10 By the end of June 2014 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 a suitable qualified, experienced and independent team of experts whose appointment has been endorsed by the Director-General; b) include consultation with the relevant agencies;	This audit, non-compliant with timing requirements. Not Compliant Administrative

Schedule	Condition	Requirement	Finding
		c) assess the environmental performance of the project and assess whether it is complying with the requirements in this approval, and any other relevant approvals, relevant EPL/s and/or Mining Lease/s (including any assessment, plan or program required under these approvals); d) assess whether the Proponent is implementing best noise, blasting and air quality management practice; e) investigate and report on the measures taken to minimise the noise and air quality impacts of the project during meteorological conditions and/or extraordinary events when the relevant noise and air quality limits in this approval do not apply, including: the effectiveness of these measures in maintaining impacts within the relevant criteria in this approval and/or the limits in the relevant EPL; and any additional measures available to mitigate impacts under such conditions; f) review the adequacy of any approved strategy, plan or program required under the abovementioned approvals; and g) recommend measures or actions to improve the environmental performance of the project and/or any strategy, plan or program required under these approvals.	
5	11	Within 3 months of commissioning this audit, or as otherwise agreed by the Director-General, the Proponent shall submit a copy of the audit report to the Director-General, together with its response to any recommendations contained in the audit report.	This audit, non-compliant with timing requirements Not Compliant Administrative
5	13	The Proponent shall, within 3 months of the date of this approval: a) make the following information for the project publicly available on its website, on a daily basis and in a clearly understandable form: daily weather forecasts for the coming week; proposed operational responses to these weather forecasts; real-time noise and air quality monitoring data (subject to any necessary caveats); and any operational responses that were taken in response to the noise and air quality	Checked website, all present except real-time data due to data validation concerns and weather forecasts/operation management, ongoing discussion with the department regarding how to address this requirement. Not Compliant

Schedule	Condition	Requirement	Finding
		monitoring data, and b) make provision on its website for the provision of on-line and/or email comments by members of the community regarding this information, to the satisfaction of the Director-General.	Administrative

4.1. Statement of Commitments from the EA

The commitments in the Statement of Commitments were assessed and all commitments were either compliant or not applicable. No conditions were found to be “not compliant”. An assessment of compliance for each commitment in the Statement of Commitments is provided in the audit protocol in Appendix C.

4.2. Environmental Protection Licence

Table 4.3 shows the conditions that were not compliant with the Environmental Protection Licence 12365 (EPL 12365). An assessment of compliance for each condition in the EPL is provided in the audit protocol in Appendix C.

Table 4.3 Environmental Protection Licence

<table>
<tr><th>Condition</th><th>Requirement</th><th>Finding</th></tr>
<tr><td>Preamble</td><td>Fee Based Activity Scale
Coal works 0-2,000,000 T handled
Mining for coal > 500,000-2,000,000 T produced</td><td>2013-14 AEMR identified 2,008,613t sent to Narrabri CHPP.

Not Compliant Administrative</td></tr>
<tr><td>L4.1</td><td>Noise generated at the premises must not exceed the noise limits in the table below.
<table><tr><th>Locality and Location</th><th>Day- LAeq (15 minute)</th><th>Evening- LAeq (15 minute)</th><th>Night- LAeq (15 minute)</th><th>Night- LA1 (1 minute)</th></tr><tr><td>All other surrounding residences</td><td>35</td><td>35</td><td>35</td><td>45</td></tr></table></td><td>AEMR 2012/2013, Appendix 3 TABLE A3.2 Compliance Review – Environment Protection Licence 12365.
AEMR/Annual Review 2012/2013, Section 3.10.3.2 June 2012 Noise Monitoring - Attended.
AEMR/Annual Review 2012/2013, Section 3.10.3.4 September 2012 Noise Monitoring – Attended

Not Compliant Administrative</td></tr>
</table>

4.3. Mining Operations Plan

Table 4.4 shows the requirements and commitments that were not compliant with the Mining Operations Plan. An assessment of compliance for all requirements and commitments in the Mining Operations Plan is provided in the audit protocol in Appendix C.

Table 4.4 Mining Operations Plan

Reference	Requirement	Finding
3.2.1	Air quality is monitored in accordance with the Air Quality and Greenhouse Gas Management Plan, with meteorology and air quality being continuously monitored. Results are reported on a daily basis online and on an annual basis in the Annual Review and the EPL Annual Return.	Results are not being updated on a daily basis online (Section 4.3.2). Not Compliant Administrative
3.2.5	Tarrawonga will conduct further material testing during soil stripping campaigns and will manage any occurrences of PAF-LC material by selectively handling and emplacing the material so it is covered with at least 15 m of NAF material.	No records on file of further material testing following that done for the EA for management of occurrence of PAF_LC material Not Compliant Administrative
3.2.12	• Emplacing coarse rejects (back hauled from the Whitehaven CHPP) in the pit floor to maximise cover with inert material. Sampling of coarse reject by Geo Environmental Management in 2011 identified an average total sulphur content of 0.4%. The material is managed by emplacement in the pit floor and subsequent coverage by the advancing overburden emplacement. This is in accordance with the existing Section 100 approval at the Tarrawonga site for reject emplacement.	Site observations indicate that the rejects are not placed on the pit floor as required by the MOP but are placed at higher elevations, as part of the backfilling process with suitable cover to prevent spon com/AMD. Recommendation - the wording of the MOP should change at the next revision. Not Compliant Administrative
3.3.3	Tarrawonga will undertake testing to identify any PAF materials. PAF material will be selectively emplaced under at least 15 m of NAF material to minimise the potential for ARD. Volumes of PAF material identified and selectively emplaced will be reported in the Annual Review.	AEMR 2012-2013 does not include information on PAF materials Not Compliant
5.4.5	Tubestock plantings are mulched, watered and protected from grazing by tubestock bags and/or fencing where required. Tubestock planting methodologies are described in the Rehabilitation	Tubestock is not mulched at the site but is incorporated into the topsoil, no evidence of excessive grazing of

Reference	Requirement	Finding
	Management Plan and Rehabilitation Monitoring Report (2012 Annual Review, Appendix 7). Further specific rehabilitation methodologies for establishing the woodland and agricultural final land-uses are under development and will be documented in the Rehabilitation Management Plan.	tubestock in the site inspection. Recommendation - remove reference to guards and mulching from MOP. Not Compliant Administrative
8.3	Results of rehabilitation monitoring will be reported in the Annual Review. The Annual Review will record monitoring results and discuss rehabilitation performance against key performance measures/indicators; compliance with regulatory requirements and TCPL commitments. The Annual Review will also discuss identified trends and instances where potential rehabilitation failure has been identified triggering intervention in accordance with a Rehabilitation TARP (Section 9.2).	AEMR 2012-2013 includes rehab monitoring results but does not assess performance against key performance measures/indicators; compliance with regulatory requirements and TCPL commitments. AEMR 2012-2013 does not discuss identified trends and instances where potential rehabilitation failure has been identified triggering intervention in accordance with a Rehabilitation TARP. Not Compliant Administrative

4.4. Mining Leases

The conditions in the Mining Leases were assessed and all conditions were either Compliant or not applicable. No conditions were found to be “not compliant”. An assessment of compliance for each condition in the mining leases is provided in the audit protocol in Appendix C.

4.5. EPBC Approval

Table 4.5 shows the conditions that were not compliant with the EPBC Approval. An assessment of compliance for all conditions in the EPBC Approval is provided in the audit protocol in Appendix C.

Table 4.5 EPBC Approval

Condition	Requirement	Finding

Condition	Requirement	Finding
16	The *surface and groundwater management plans* must be consistent with the National Water Quality Management Strategy**.**	The existing Water Management Plan is not approved but does not reference EPBC requirements or the National Water Quality Management Strategy. Not Compliant Administrative
17	The person taking the action must, within six months of this approval, in collaboration with the proponent to develop and operate the Maules Creek Mine (EPBC 2009/5566), provide written advice to the Minister demonstrating how the NSW government approved surface and groundwater management plans, address the cumulative impact of groundwater drawdown as a result of mining and how this may impact on the consequent health of the remnant native vegetation in the Leard State Forest, the Leard State Conservation Area and surrounding areas. In particular the advice must address the following matters: a. maximum amount of allowable drawdown in the alluvial aquifer b. drawdown in hard rock c. trigger levels pertaining to drawdown in the alluvial aquifer when corrective actions will be required to be undertaken d. identify the depth of root zone of the native vegetation e. monitoring to assess the ongoing quality and quantity of both surface and groundwater to identify impacts on the native vegetation	a) not stated in WMP, therefore there is a risk of not identifying GW impacts b) not stated in WMP, therefore there is a risk of not identifying GW impacts Not Compliant
18	The person taking the action must within 6 months of the date of this approval, or such other timeframe specified by the Minister, provide to the Minister a report on: a. any updated modelling of surface and groundwater impacts that has been undertaken in preparing the surface and groundwater management plans b. how the surface and groundwater management plans addressed groundwater and surface water impacts on matters of national environmental significance	No evidence provided to confirm that this has occurred. Not Compliant Administrative

Condition	Requirement	Finding
22	The person taking the action must implement the regional biodiversity strategy as required under condition 41 of the NSW state government project approval dated 22 January 2013 (application number 11_0047). The required scoping report for the development of the strategy must be submitted to the **Minister** for approval on or before 31 July 2013. The approved strategy must be implemented.	Evidence of the submission of the scoping strategy has not been provided. Not Compliant Administrative
25	The mine site rehabilitation plan must include, at a minimum, the following information: a. targets and performance indicators to achieve effective restoration of potential habitat for the regent honeyeater, swift parrot and greater long-eared bat and White Box–Yellow Box–Blakely's Red Gum Grassy Woodland and Derived Native Grassland ecological community, including weed management; b. details of the vegetation communities to be rehabilitated and the timing of progressive rehabilitation (commencing as soon as practicable following disturbance); c. detailed soil depth surveys and analysis to inform the effective placement and restoration of solid underlying the proposed rehabilitation sites; including mapping of soils across the disturbance sites and soil sampling at no less than one sample point per 20 ha of each soil type identified. Sampling must identify; type, depth, water holding capacity, structure and physio-chemical properties of each of the soil and subsoil layers; d. processes and methodologies for the removal, storage and re-layering of the top soil and sub soil layer underlying the disturbed sites being prepared for rehabilitation. These processes and methodologies must ensure the replacement of top and sub soil layers as provided in the Environment Assessment.	c) This has not been done, some soil assessment was conducted in the EA. Not Compliant
27	The person taking the action is required to submit a Conservation and Biodiversity Bond under condition 49 of the New South Wales state government project approval dated 22 January 2013 (application 11_0047). It is noted that this bond may be	No evidence provided of provision of the details of the security bond to the Minister. Not Compliant

Condition	Requirement	Finding
	combined with the rehabilitation security deposit as required under the New South Wales *Mining Act 1992.* The person taking the action must submit details of this bond and the rehabilitation security deposit, to the **Minister,** within six months of this approval. If the **Minister** is not satisfied that the bond and rehabilitation security deposit lodged by the person taking the action is adequate to provide for the requirements referred to under conditions 19, 20, 22, 23 and 24, the **Minister** may require the person taking the action establish an additional bond or equivalent financial instrument in trust, under conditions approved in writing by the **Minister.**	Administrative
30	All survey data collected for the project must be recorded so as to conform to data standards notified from time to time by the **department.** When requested by the **department,** the proponent must provide to the **department** all species and ecological survey data and related survey information from ecological surveys undertaken for matters of national environmental significance. This survey data must be provided within 30 business days of request, or in a timeframe agreed to by the **department** in writing. the **department** may use the survey data for other purposes.	No evidence of compliance with the required survey standards Not Compliant Administrative

4.6. Environmental Management Strategy

Table 4.6 Environmental Management Strategy shows the conditions that were not compliant with the Environmental Management Strategy. An assessment of compliance for all conditions in the Environmental Management Strategy is provided in the audit protocol in Appendix C.

Table 4.6 Environmental Management Strategy

Condition	Requirement	Finding
4.8	A review of the mine's compliance with all conditions of PA 11_0047, ML 1579, EPL 12365 and all other approvals and licences will be undertaken prior to (and included within) each AEMR/Annual Review submitted to the Director-General and DRE. The AEMR will also be provided to Council, relevant agencies, the Community Consultative Committee (CCC) and to the	This is done, but not for all approvals and licenses, water licences and EPBC approval not covered. Not Compliant Administrative

Condition	Requirement	Finding
	public on Whitehaven's website.	
4.7.1	Copies of all management plans/strategies or monitoring programs, together with the results of independent audits undertaken in accordance with PA 11_0047 will also be provided to the CCC and the Councils, and made publicly available on the Whitehaven website.	These are on the website and provided to the CCC. No evidence that they are provided to Councils Not Compliant Administrative
4.7.1	The AEMR/Annual Review will be provided to both NSC and GSC, relevant agencies and to the CCC members and also made available to the public on Whitehaven's website.	No evidence of provision of these reports to Councils Not Compliant Administrative
4.7.1	In addition to the above, Tarrawonga Coal may also utilise the local press to present feature articles on the mine's progress. Other forms of communication with the community will include the provision of newsletters to the landholders around the mine site, with copies made available at the Council offices and on the Whitehaven website. These newsletters will provide updates as to site developments and will be issued generally every 6 months or following specific events at the site for which community updates are warranted.	On website Newsletters not sent to Council Not Compliant Administrative

4.7. Environmental Monitoring Program

The Environmental Monitoring Program was assessed and all conditions were either compliant or not applicable. No conditions were found to be "not compliant". An assessment of compliance for each condition in the Environmental Monitoring Program is provided in the audit protocol in Appendix C.

4.8. Noise Management Plan

Table 4.7 shows the requirements and commitments that were not compliant with the Noise Management Plan. An assessment of compliance for all requirements and commitments in the Noise Management Plan is provided in the audit protocol in Appendix C.

Table 4.7 Noise Management Plan

Reference	Requirement	Finding
4.4	Attended noise surveys will be conducted as follows: • All noise investigations will be carried out in accordance with NSW EPA's Industrial Noise Policy,	*Attended Noise Monitoring – March 2014 Tarrawonga Coal Mine Boggabri* only makes reference to the Industrial Noise policy

Reference	Requirement	Finding
	2000 (INP), Environmental Noise Control Manual (ENCM) and applicable Australian Standards; • Noise levels will be measured in one-third octave bands using an instrument with IEC Type 1 characteristics as defined in Australian Standard AS IEC 61672.1 – 2004 "Electroacoustics – Sound Level Meters – Specifications". The instrument will have current calibration as per manufacturer's instructions and field calibration will be confirmed before and after measurements with a sound level calibrator;	*Attended Noise Monitoring – March 2014 Tarrawonga Coal Mine Boggabri* does not make reference to this standard The noise monitoring consultant is very experienced and these issues are likely to be an administrative oversight in the report. Not Complaint Administrative
4.4	• Details regarding plant configuration, survey interval, weather conditions, extraneous noise sources, monitoring locations and times of measurement will be recorded for inclusion in the noise monitoring report.	Plant configuration is not recorded Not Compliant Administrative
6.1	Attended noise monitoring reports issued by the acoustic consultant will include details on the date and time of monitoring, location of monitoring and monitoring personnel (as required by Condition M1.3 of the EPL).	*Attended Noise Monitoring – March 2014* Monitoring personnel were not included in the report, only the names of author of the report and reviewer. Not Compliant Administrative

4.9. Noise Management Strategy

The Noise Management Strategy was assessed and all conditions were either compliant or not applicable. No conditions were found to be "not compliant". An assessment of compliance for each condition in the Noise Management Strategy is provided in the audit protocol in Appendix C.

4.10. Blast Management Plan

Table 4.8 shows the requirements and commitments that were not compliant with the Blast Management Plan. An assessment of compliance for all requirements and commitments in the Blast Management Plan is provided in the audit protocol in Appendix C.

Table 4.8 Blast Management Plan

Reference	Requirement	Finding

Reference	Requirement	Finding
5.1.1	EPL 12365 specifies the following monitoring parameters to be monitored. Monitoring must be undertaken for each blast as specified in Table 2. Table 2 Monitoring Parameters Parameter / Units of Measure / Frequency / Sampling Method Blast Noise / DB(Lin Peak) / Every Blast / Type 1 Noise Blast Logger Blast Vibration / mm/s / Every Blast / Geophone Logger or Similar	Some events don't comply due to missed monitoring data - blast results records show missed results due to lack of triggering. Interview with EO indicated that these results were from a period where a contractor managed blasting including monitoring. Currently, blasting and monitoring is managed by TCPL and there have been no missed results since the contractor left site. No action required by TCPL as the issue has been resolved. Not Compliant

4.11. Blast Monitoring Program

The Blast Monitoring Program was assessed and all conditions were either compliant or not applicable. No conditions were found to be “not compliant”. An assessment of compliance for each condition in the Blast Monitoring Program is provided in the audit protocol in Appendix C.

4.12. Blast Management Strategy

The Blast Management Strategy was assessed and all conditions were either compliant or not applicable. No conditions were found to be “not compliant”. An assessment of compliance for each condition in the Blast Management Strategy is provided in the audit protocol in Appendix C.

4.13. Air Quality and Greenhouse Gas Management Plan

Table 4.9 shows the requirements and commitments that were not compliant with the Air Quality and Greenhouse Gas Management Plan. An assessment of compliance for all requirements and commitments in the Air Quality and Greenhouse Gas Management Plan is provided in the audit protocol in Appendix C.

Table 4.9 Air Quality and Greenhouse Gas Management Plan

Reference	Requirement	Finding
3	• Use predictive meteorological forecasting and predictive air dispersion modelling, together with real time monitoring data to inform operational practices in advance of the commencement of shift. This will aid in the day to day planning of mining activities giving due consideration to prevailing weather conditions and potential for dust	This is not done yet, predictive air dispersion modelling has not been implemented, the plan is not yet approved. Not Compliant

Reference	Requirement	Finding
	generation and dispersion.	
3	• Participation in an Australian Coal Association Research Project (ACARP) study to trial best practice measures for disturbing and handling overburden.	No evidence provided to support the sites participation in the ACARP project. Not Compliant Administrative
4.3.2	For each deposited dust monitoring location, once each month the glass container used to capture the deposited dust will be removed, replaced and sent to a NATA accredited laboratory for analysis.	NATA certification is noted in laboratory reports Note the laboratory report provided as evidence notes that the results could not be certified as they claimed TCPL had collected the samples therefore the exposure time could not be verified, but the samples were collected by Lab staff who should have been able to verify exposure times from their records. Not Compliant Administrative

4.14. Air Quality Management Strategy

The Air Quality Management Strategy was assessed and all conditions were either compliant or not applicable. No conditions were found to be "not compliant". An assessment of compliance for each condition in the Air Quality Management Strategy is provided in the audit protocol in Appendix C.

4.15. Water Management Plan

Table 4.10 shows the requirements and commitments that were not compliant with the Water Management Plan. An assessment of compliance for all requirements and commitments in the Water Management Plan is provided in the audit protocol in Appendix C.

Table 4.10 Water Management Plan

Reference	Requirement	Finding
2.3.2	Saline groundwater, pumped from the mine pit, is deposited in the storage dams PW2, PW3 within the site. This water is used in dust suppression activities for the coal crusher or is allowed to evaporate. The use of pit water for dust suppression minimises the need to use clean water for this purpose and is seen as suitable way to recycle water onsite. The water will be applied at a suitable rate to ensure negligible runoff. Any water falling/applied onto the mine site	The area around the coal loader drains to dams that are in the dirty water circuit but have an offsite discharge point. Not Compliant

Reference	Requirement	Finding
	would be classed as 'dirty water' and collected in dirty water dams as discussed in Section 2.5. These dams are sized and operated to ensure that they only discharge in extreme high flows thus the water used for dust suppression has a minimal chance of discharging offsite. The water in these dirty water dams are regularly tested and monitored.	
2.3.2	The groundwater model will be updated every 2 years, using data recorded on site. If the estimates should show that additional groundwater licencing is required, this will be sought from the water markets.	The groundwater model was last updated for the EA for the current approval, report on model update is dated January 2012, an update of the groundwater model is overdue. Not Compliant
6.3	The water quality monitoring program has been designed to provide data on the flows leaving site as well as the flows in the receiving creeks. As the approved works are undertaken, the potential for impacting Goonbri Creek, Bollol Creek and the downstream watercourses is increased. For this reason the surface water monitoring program will be updated to include the following locations: • Two new surface water flow gauging stations on Goonbri Creek upstream (GC-U) and downstream (GC-D) of the permanent Goonbri Creek alignment; • Two water level (flood) gauges in the lower reaches and overflow areas of Bollol/Goonbri Creek (FG1 and FG2); • Water quality monitoring on Goonbri Creek at the two new gauging stations; • Water quality monitoring in new on-site water storages and licensed discharge points; and • Two pluviometers in the upper (PV1) and mid (PV2) reaches of the Goonbri Creek catchment. These locations will be introduced as soon as possible and will begin to establish baseline data.	This has generally not been conducted. Not Compliant
6.4	Monitoring is the responsibility of the Environmental Officer and should be conducted by a suitably qualified professional in accordance with the	There is no evidence that the ALS/ACIRL sampler is a suitably qualified professional. Letters of competency show no indication of professional

Reference	Requirement	Finding
	relevant Australian Standards. The frequency of monitoring and range of parameters analysed during flow and routine monitoring should be reviewed as part of the revision process for this document.	education. This is probably not necessary Recommendation - modifying the WMP to remove the requirement for sampling to be conducted by a professional. Not Compliant Administrative
7.5	• Bores will be purged of at least three well-volumes of groundwater using a submersible pump or bailer. The method of purging will be tailored for each site, dependant on the parameters being analysed to ensure the accuracy of results. • Collection of groundwater samples will be undertaken following the purging of each bore. • For groundwater samples, sampling devices will be dedicated and/or disposable for each sample or otherwise decontaminated between sampling locations. If rinsing is used, rinsate samples should be included in the QA/QC program as appropriate.	this does not happen, reference the field sheet 20-02 year not recorded but samples were submitted 24-02-14 This is not clear from the analysis and sampling data provided, there is no record in the QA report from the lab of rinsate samples being tested. The water sampled should be from the aquifer not that exposed to the atmosphere in the well. Not Compliant
7.5.1	An organised internal approach to data management and monitoring documentation will significantly enhance the intended benefits of the monitoring program. When set up, it will facilitate the identification of potential issues of concern in a timely manner, such that appropriate contingency actions can be implemented if warranted. In addition to this, the raw monitoring data will be published on the mine's website within two weeks of sampling and will be given to the local NOW hydrogeologist.	The data is not posted up within two weeks and is not supplied to NOW. Not Complaint Administrative
7.8	The groundwater model will be recalibrated 2 years after the approval of this Plan. Recalibration will then occur every 5 years thereafter and at least 12 – 18 months prior to cessation of mining. Following the first review, if necessary, the groundwater model will be recalibrated and confirmatory forward impact predictions made.	This has not occurred, Ground water model updated for the EA in January 2012. Not Compliant
8	The surface and ground water response plan will include a protocol	There is no Surface and Groundwater Response Plan, there is a TARP but it

Reference	Requirement	Finding
	for managing and reporting any: • incidents; • complaints; • non-compliances with statutory requirements; and • exceedances of the impact assessment criteria and or performance criteria; and; • a protocol for periodic review of the plan.	does not detail the management of complaints. Not Compliant Administrative

4.16. Groundwater Contingency Plan

Table 4.11 shows the requirements and commitments that were not compliant with the Groundwater Contingency Plan. An assessment of compliance for all requirements and commitments in the Groundwater Contingency Plan is provided in the audit protocol in Appendix C.

Table 4.11 Groundwater Contingency Plan

Reference	Requirement	Finding
2.3	In order to monitor for natural variation in groundwater level and quality, the following bores will also be monitored. • GW044997 – within the alluvial aquifer on the "Templemore" property. • GW020432 – within the volcanics aquifer on the "Merriown" property. • GW006013 – within the Permian Coal Measures on the "Bollol Creek Station"property.	2012-13 AEMR indicates that GW044997 is monitored but GW020432 and GW006013 are not recorded, no explanation is given in the text. Not Compliant
5	The results of all groundwater monitoring will be made publicly available at the offices of Narrabri Shire Council and Gunnedah Shire Council and at TCPL's Boggabri office. These results will be updated at least every three months. Each year, the results of the groundwater monitoring program will be summarised and presented in the AEMR. This will include an analysis of the monitoring results against the trigger levels listed in Table 2, previous monitoring results and the monitoring results of background variance. Based on these results, trends in the groundwater levels, quality and availability will be identified and the requirement to initiate the contingency	No data is sent to the Councils offices. Not Compliant Administrative

Reference	Requirement	Finding
	measures identified in Section 4.	

4.17. Water Management Strategy

Table 4.12 shows the requirements and commitments that were not compliant with the Water Management Strategy. An assessment of compliance for all requirements and commitments in the Water Management Strategy is provided in the audit protocol in Appendix C.

Table 4.12 Water Management Strategy

Reference	Requirement	Finding
4.1.1	Contaminated water, containing suspended solids and soluble salts, will be generated from coal stockpiles and the mining void, as well as groundwater inflows to the mining void. In addition, dirty water containing suspended solids will be generated from runoff from disturbed areas within the mine sites, including from infrastructure areas, unshaped spoil dumps and haul roads. For all mines, contaminated water will be retained onsite for use, and dirty water will be retained in settlement ponds prior to discharge or on-site use.	The water collected from the coal loading area is located in Dam SB4, which then flows through a series of dams to Licensed Discharge Point 1 (LDP1 - EPL 12365) and is discharged off-site. Not Compliant

4.18. Biodiversity Management Plan

Table 4.13 shows the requirements and commitments that were not compliant with Biodiversity Management Plan. An assessment of compliance for all requirements and commitments in the Biodiversity Management Plan is provided in the audit protocol in Appendix C.

Table 4.13 Biodiversity Management Plan

Reference	Requirement	Finding
4.1.2	A seed collection and propagation program will be implemented so that areas to be revegetated are genetically comparable with those in the surrounding woodland areas.	There is no seed collection program at Tarrawonga but the Biobank site has a seed collection program and the offset site will have a seed collection program. The ecologist in the audit team indicated that the distance between the seed collection area and the site could be significant in terms of the risk of genetic variation, local seed should be sought. Not Compliant

Reference	Requirement	Finding
4.3.2	Subsoils and topsoils will be characterised prior to re-spreading to determine the type and application rates for any required soil ameliorants (e.g. lime, gypsum, fertiliser and organics) to maximise the availability of soil reserves for rehabilitation works.	Not done in the audit period, respreading has occurred in the audit period. Not Compliant
4.3.3	The progress and effects of salvaging and reusing habitat resources are monitored annually.	The Tarrawonga Monitoring Report 2013 notes the reuse of materials in the plots used for rehabilitation monitoring but there is no assessment of or comment on the effects of reusing these materials. The AEMR also does not address this issue. Not Compliant Administrative
4.3.3	TCPL will arrange for the collection of seed at the site at appropriate times after flowering.	This has not occurred Not Compliant
4.3.3	Planting will preferentially be undertaken in the Autumn period on previously established riplines followed by mulching around each seedling.	This does not occur, no mulching is conducted. Not Compliant
4.6.2	Overburden and interburden will be characterised prior to emplacement in waste dumps to ensure the final outer surfaces of the overburden emplacements (and structures such as drainage elements) are constructed with suitable non-sodic or low sodicity material where possible.	This does not occur, no characterisation of overburden has taken place in the audit period. Not Compliant
4.7.2	Minimise the potential for seed and organic matter transport to or from the rehabilitation area by ensuring all plant and equipment are weed free (via inspection of vehicles and plant and use of the site's vehicle wash bay).	This does not occur - no inspections have taken place specifically for weed vector control. Not Compliant
4.7.2	Installation of fauna exclusion fencing and/or tree guards for newly planted tubestock.	This does not occur. Not Compliant
4.7.3	Fauna exclusion fencing and/or tree guards are installed to exclude vertebrate pest species from rehabilitation areas / juvenile vegetation.	This does not happen. Not Compliant
4.10.3	Fuel load/fire security will be inspected at a minimum of 12 monthly intervals, occurring prior to the commencement	This assessment has not been documented.

Reference	Requirement	Finding
	of each bushfire season	Not Compliant Administrative
5.2.1	Fauna exclusion fencing and/or tree guards are installed to exclude vertebrate pest species from rehabilitation areas / juvenile vegetation.	This is not conducted. Not Compliant
5.2.2	Fuel load/fire security will be inspected at a minimum of 12 monthly intervals, occurring prior to the commencement of each bushfire season	This assessment has not been documented. Not Compliant Administrative
5.2.4	TCPL will arrange for the collection of seed at the site at appropriate times after flowering and will extend this program to involve other contractors if required.	See above, seed not collected at the mine site. Not Compliant
5.2.4	Planting will preferentially be undertaken in the Autumn period on previously established riplines followed by mulching around each seedling.	See above, no mulching is done. Not Compliant
5.3.1	Fauna exclusion fencing and/or tree guards are installed to exclude vertebrate pest species from rehabilitation areas / juvenile vegetation.	This is not conducted. Not Compliant
5.3.2	Fuel load/fire security will be inspected at a minimum of 12 monthly intervals, occurring prior to the commencement of each bushfire season.	This assessment has not been documented. Not Compliant Administrative
5.4.1	Fauna exclusion fencing and/or tree guards are installed to exclude vertebrate pest species from rehabilitation areas / juvenile vegetation.	This is not conducted. Not Compliant
5.4.2	Fuel load/fire security will be inspected at a minimum of 12 monthly intervals, occurring prior to the commencement of each bushfire season.	This assessment has not been documented. Not Compliant Administrative
10	Whitehaven will undertake annual internal audits to align with its AEMR/Annual Review and MOP reporting requirements, as well as independent audits every 3 years	Internal audits not conducted in the audit period Not Compliant Administrative
10.1	An internal annual environmental audit will be undertaken to align with reporting requirements for the MOP	Internal audits not conducted in the audit period

Reference	Requirement	Finding
	and AEMR/Annual Review. The annual audit will focus on the compliance with the requirements of the BMP and where corrective action is required. An annual audit and compliance report will be prepared which will include the methodology of the audit, actions implemented in accordance with the BMP, non-compliances with the BMP, and corrective actions taken. A summary of this report will be included in the AEMR/Annual Review.	Not Compliant Administrative
10.2	In accordance with Schedule 5, Condition 10 of the Project Approval, an independent audit will be undertaken by the end of June 2014 and every 3 years thereafter, unless the Director-General directs otherwise.	This audit, not compliant with timing. Not Compliant Administrative

4.19. Willeroi Biodiversity Offset Area Management Plan

Table 4.14 shows the requirements and commitments that were not compliant with the Willeroi Biodiversity Offset Area Management Plan. An assessment of compliance for all requirements and commitments in the Willeroi Biodiversity Offset Area Management Plan is provided in the audit protocol in Appendix C.

Table 4.14 Willeroi Biodiversity Offset Area Management Plan

Reference	Requirement	Finding
9.5	In accordance with Schedule 5, Condition 10 of the DP&I PA, an independent audit will be undertaken by the end of June 2014 and every 3 years thereafter, unless the Director-General directs otherwise.	This audit, timing not compliant. Not Compliant Administrative

4.20. Rehabilitation Management Plan

Table 4.15 shows the requirements and commitments that were not compliant with the Rehabilitation Management Plan. An assessment of compliance for all requirements and commitments in the Rehabilitation Management Plan is provided in the audit protocol in Appendix C.

Table 4.15 Rehabilitation Management Plan

Reference	Requirement	Finding
6.4.2	Prior to soil stripping activities, additional investigations will be conducted to confirm the appropriate soil stripping depths for each soil type	This is done during stripping, not prior to. Not Compliant

Reference	Requirement	Finding
	recommended for salvage (refer to Section 4.3.2 and Figure 7 in the Biodiversity Management Plan). "The soil stripping and handling techniques described below have been developed to maximise the soil resource salvaged and minimise deterioration of the soil resource. Undertake soil testing to characterise subsoils and topsoils prior to stripping to determine the type and application rates for any required soil ameliorants (e.g. lime, gypsum, fertiliser and organics); Mulch all cleared vegetation not retained for habitat augmentation on site and mix into topsoils as a soil conditioner; Confirm the depth of soils to be stripped in accordance with the Biodiversity Management Plan and the MOP. Topsoils and subsoils are generally to be stripped and handled separately; Topsoil would be maintained in a slightly moist condition during stripping where possible. Material will not be stripped in either an excessively dry or wet condition; and Soil would be graded or pushed into windrows with excavators, graders or dozers for loading into rear dump trucks by front-end loaders, or will be collected by scraper fleets and replaced directly on rehabilitation areas where available or placed in temporary stockpile locations. "	
6.4.2	Clearly demarcate stockpiles with signage. Install appropriate erosion and sediment controls (e.g.: bunds along the upslope perimeter and sediment fences along the toes of the downslope batter;	Not observed in site visit Not Compliant
6.5.4	Tubestock plantings will be mulched, watered and protected from grazing by tubestock bags and/or fencing where required.	This does not occur. Not Compliant
6.5.5	Install fencing and/or tree guards to protect juvenile vegetation and tubestock from herbivores.	Not done Not Compliant

4.21. Heritage Management Plan

Table 4.16 shows the requirements and commitments that were not compliant with the Heritage Management Plan. An assessment of compliance for all requirements and commitments in the Heritage Management Plan is provided in the audit protocol in Appendix C.

Table 4.16 Heritage Management Plan

Reference	Requirement	Finding
4.1.1	• Depending on the structural integrity of the tree, the tree may need to be cut back to a manageable size before attempting to remove the tree. • Preparation of the tree for removal, by attaching lengths of rigid timber to the outside of the padding, to effectively create 'splints' that will spread pressure evenly along the tree surface during movement. • Lifting of the tree using a crane, with the tree supported by straps placed around the padded trunk or a heavy cargo net. During the initial stages of lifting, the crane would also support the tree when the final cut is made near the ground surface. • After the base cut is complete, the tree would be suspended by the straps and manoeuvred into a horizontal position so that it is possible to examine the underside of the tree. If the core is too fragile and is likely to drop out, a cap would be secured in place to prevent loss. During this stage, any termite debris and loose materials would also be removed from the hollow base, which would then be stabilised by insertion of expanding polyurethane foam to fill the cavity. • Movement of the tree onto the back of a flat bed truck, where it would be placed on a bed of foam and secured with straps for transport to the Cumbo Gunerah Keeping Place at the Red Chief Local Aboriginal Land Council office in Gunnedah or another suitable location agreed with the RAP's. • Unloading the tree using a crane, with the tree supported by straps. The tree will be supported on a well-drained bed of rubber or similar protective surface. Periodic treatment for termites or other	The methodology utilised to remove the tree was not precisely in accordance with the methodology described here due to a direction given by the arborist during the operation. The methodology in the HMP is too prescriptive making it difficult to comply with when on ground works occur and variations in tree size, location, tree condition and other factors need to be considered in the methodology for protection of the scar tree. Recommendation - at the next review of the HMP, the scar tree section be make more generic to allow for site conditions when recovering and preserving scar trees. Not Compliant Administrative

Reference	Requirement	Finding
	insect infestation would be undertaken as required during storage.	

4.22. Aboriginal Heritage Conservation Strategy

The Aboriginal Heritage Conservation Strategy was assessed and all conditions were either compliant or not applicable. No conditions were found to be "not compliant". An assessment of compliance for each condition in the Aboriginal Heritage Conservation Strategy is provided in the audit protocol in Appendix C.

4.23. Bushfire Management Plan

Table 4.17 shows the requirements and commitments that were not compliant with the Bushfire Management Plan. An assessment of compliance for all requirements and commitments in the Bushfire Management Plan is provided in the audit protocol in Appendix C.

Table 4.17 Bushfire Management Plan

Reference	Requirement	Finding
5.2.8	• Fuel load / fire security will be inspected at minimum 12 monthly intervals, occurring prior to the commencement of each bushfire season.	This has not been documented. Not Compliant Administrative
5.3.4	• Fire breaks will be inspected at a minimum of 6 monthly intervals.	This has not been documented. Not Compliant Administrative

4.24. Waste Management Plan

Table 4.18 shows the requirements and commitments that were not compliant with the Waste Management Plan. An assessment of compliance for all requirements and commitments in the Waste Management Plan is provided in the audit protocol in Appendix C.

Table 4.18 Waste Management Plan

Reference	Requirement	Finding
5	Waste management information (including review of the effectiveness of waste minimisation and management) will be documented and reported in each AEMR/Annual Review, where applicable. Details will be provided on the implementation success of the Waste MP and any areas that require improvement.	The AEMR addresses waste management but does not address the requirement to comment on waste minimisation effectiveness. Not Compliant Administrative

4.25. Road Closure Management Plan

The Road Closure Management Plan was assessed and all conditions were either compliant or not applicable. No conditions were found to be "not compliant". An assessment of compliance for each condition in the Road Closure Management Plan is provided in the audit protocol in Appendix C.

4.26. Previous Independent Environmental Audit

The issues raised in the previous audit (UMWELT, 2011) were reviewed and none have been carried forward into the non-compliances or recommendations for this audit, generally because they have been rectified or are no longer applicable.

5. ADEQUACY / EFFECTIVENESS OF ENVIRONMENTAL MANAGEMENT AND MANAGEMENT DOCUMENTATION

From an environmental perspective, the key potential impacts resulting from activities at the Tarrawonga Mine are ecological sustainability and loss of habitat, rehabilitation, surface water quality, ground water extraction, air quality and noise. The majority of the management plans are relatively new and most were not final or approved at the time of the audit. As such, the comments in this section of the audit potentially offer more value to the site in improving environmental performance than addressing areas found not compliant with the management plans and associated documents.

This section looks into the adequacy of the mitigation measures and the on ground applicability of the management measures proposed in the site environmental management documentation.

5.1. Ecology

The offset area associated with the Tarrawonga Extension approval PA 11-0047 has been approved as Willeroi West. A draft management plan has been prepared for the Willeroi West Biodiversity Offset Area (ELA January 2014), the plan was not approved at the time of the audit. The plan addresses requirements set out in approval conditions relating to management of the offset site under the EP&A Act, PA 11_0047 and the EPBC Act, PA 2011/5923.

All management zones on the Willeroi BOA were inspected on 9 September 2014. Albeit very brief, the inspection confirmed the condition and composition of vegetation identified in the management zones in the Willeroi Biodiversity Offset Management Plan (WBOMP). Specific site issues such as weeds (Coolatai, Sweet Briar), feral pests (goats), gully erosion and bulldozed tree clearing windrows were observed. Cattle had recently been removed from the grassland zone (MZ3).

In general the WBOMP met all the requirements identified in the approval conditions. However, two key recommendations have been made to improve the environmental performance in relation to the requirements off the WBOMP.

EPBC approval 2011/5923 – condition 13e details ongoing ecological monitoring programs, performance criteria, targets and provisions for adaptive management, including but not limited to "*a set of measurable ecological indicators for detecting changes to the White Box—Yellow Box—Blakely's Red Gum Grassy Woodland and Derived Native Grassland ecological community, including those that may be ascribed to ongoing water stress;"*

It is recommended that Tables 5.2 and Table 5.3 in the WBOMP be revised in accordance with Table 5.1 Ecological attributes measured in condition plots (modified from DECC 2009* & Sivertsen 2009*) and Table 5.2: Sampling units below. These tables set out ecological attributes and the scale of measurement in vegetation condition monitoring plots.

The attributes & methods outlined in these tables are not consistent with BioBanking methodology for site attributes (OEH 2012). For example, transects should be 50 m long (not 100 m), cover recorded along transects should be measured as percent foliage cover (not projected crown cover), groundcover should be separately recorded for grasses, sub-shrubs and other vascular plants <1m high, coarse woody debris should be recorded at the baseplot

scale (50m x 20m), and the number of trees with hollows should be included to make comparisons against all ten Biometric benchmark attributes.

Changes in site attributes over time provide an indication of trends in condition of threatened ecological communities and threatened fauna species habitat. Impacts of climate change on grassy woodlands include death of trees from moisture stress, altered shrub-grass balance potentially in favour of shrubs, and changes in groundcover composition (Prober et al. 2010). It is recommended that 2 additional attributes (tree health, and density) should be monitored in Box-gum Woodland vegetation types on Willeroi (White Box grassy woodland of the Nandewar and Brigalow Belt South Bioregions & Yellow Box - Blakely's Red Gum grassy woodland of the Nandewar Bioregion). Suggested revisions of ecological attribute tables are incorporated into revised tables provided below:

Table 5.1 Ecological attributes measured in condition plots (modified from DECC 2009* & Sivertsen 2009*)

Theme	Attribute	Description
Native overstorey (canopy)	Cover	Measured as Percent Foliage Cover along a 50m transect At 10 points along a 50-m transect (i.e. every 5 m), estimate the percentage foliage cover directly overhead. Divide the total by the number of points (i.e. 10) measured along the transect.
	Health	Categorised into categories based on proportion of canopy dieback: Normal healthy crown 100%, Slight dieback in crowns 70% - 99%, Moderate dieback in crowns 30% - 69%, Severe dieback in crowns 1% - 30%, Dead 0% for all native trees in baseplot (20m x 50m)
	Density (native species only)	Recorded as tally of woody stem sizes (DBH): 5-10cm, 10-20cm, 20-30cm, 30-60cm, >60cm -old growth (tally live and dead trees separately) for all native trees in baseplot (20m x 50m)
	Number of trees with hollow	Count of the number of living and dead trees with at least one hollow for all native trees in baseplot (20m x 50m)
	Recruitment	Presence/absence of native trees in the juvenile and sapling diameter classes in baseplot (20m x 50m)
	Richness	List of native overstorey species (including emergents)
Native midstorey (shrub and small tree)	Cover	Measured as Percent Foliage Cover along a 50m transect At 10 points along a 50-m transect (i.e. every 5 m), estimate the percentage foliage cover in mid-storey. Divide the total by the number of points (i.e. 10) measured along the transect .
	Richness	List of native midstorey species
Native ground layer	Cover	Measured as Percent Foliage Cover of native groundcover plants (grasses, sub-shrubs, other – non-woody not grass, <1m) at each of 50 points along a 50 m transect. At 50 points along the 50-m transect (i.e. every 1 m), record whether native grass, sub-shrub, or other intersects that point. Divide the total of 'hits' by the number of points measured along the transect (i.e. 50).
	Richness	List of native groundcover species

Theme	Attribute	Description
Exotic species	Cover	Measured as Percent Foliage Cover along a 50m transect for exotic canopy and exotic midstorey species. At 10 points along a 50-m transect (i.e. every 5 m). Measured as Percent Foliage Cover. Recorded as a 'hit' or 'miss' at each of 50 points along a 50 m transect, then calculated as % cover exotic ground layer species.
	Richness	List of exotic flora species in all strata
Groundcover	Large woody debris	Measured in the sub-plot as the total number and combined length of all sections of dead fallen timber ≥ 10 cm diameter, ≥ 0.5 m in length, and completely detached from living or dead standing trees in baseplot (20m x 50m)
	Organic litter	Recorded as a 'hit' or 'miss' at each of 50 points along a 50 m transect, then calculated as % litter cover
	Cryptograms	Recorded as a 'hit' or 'miss' at each of 50 points along a 50 m transect, then calculated as % cryptogram cover
	Bare ground	Recorded as a 'hit' or 'miss' at each of 50 points along a 50 m transect, then calculated as % bare ground cover
	Rock	Recorded as a 'hit' or 'miss' at each of 50 points along a 50m transect, then calculated as % rock cover

1. *DECC 2009. Field data sheets for BioBanking: biobank / development site proposal package February 2009. (BioBanking09083fdsbbdev.pdf).*
2. *Sivertsen, D 2009 Native Vegetation Interim Type Standard, Department of Environment, Climate Change and Water NSW, Sydney. (10060nvinttypestand.pdf).*

Table 5.2: Sampling units

Attributes	Sampling units
Photo Point	Point from which plot is located and oriented, and from which plot image is recorded 5 m back behind reference point (taken after plot laid out)
Reference point	Site marker post with ID tag and flagging tape attached
Alignment Point	Positioned 20 m from photo point along the transect
Baseplot (20 m x 50 m)	Native canopy health Tree density (native species only) Number of trees with hollows Recruitment of native canopy species Coarse woody debris (logs >10cm diameter)
Subplot (20 m x 20 m)	List of native and exotic species (all strata)
Transect (50 m)	Native and exotic canopy cover Native and exotic midstorey cover Native and exotic groundcover (grasses, sub-shrubs, other) Organic litter cover Cryptogram cover Rock cover Bare ground cover

Additional area (within 50m of baseplot, ie. a one hectare area surrounding the plot)	Additional native canopy species list Additional recruitment of native canopy species Additional number of trees with hollows

EP&A Act PA 11_0047– condition 47c "Detail the performance and completion criteria for evaluating the performance of the biodiversity offset strategy and for triggering remedial action"

It is recommended that a Trigger Action Response Plan (TARP) should be developed specifically for the Willeroi Biodiversity Offset Management Plan.

Section 7 of the Tarrawonga Biodiversity Management Plan (ELA 2013) describes the Trigger Action Response Plan (TARP) for managing risks to biodiversity management on the project and offset sites. Trigger values will be developed based on annual flora & fauna monitoring program outcomes for the Willeroi BOA.

5.2. Rehabilitation

The site has a long way to go time-wise with respect to rehabilitation and completion given the site will operate through until 2030. The rehabilitation that has been established is relatively stable but not of exceptional quality.

The opening up of the northern extension will further spread the rehabilitation effort reducing the operations ability to ensure rehabilitation keeps pace with mining. The southern emplacement presents an unrehabilitated emplacement face to the public, a steep unstable slope (angle of repose) to Goonbri Creek (120 metres distant) and a large disturbed area that allows the mobilisation of particulates.

Other issues identified in the audit included:

Lack of soil testing – this has impacts on the rehabilitation due to the lack of ability to target the use of soil ameliorants (gypsum, lime or dolomite etc), the site should consider implementing a testing regime for soils prior to topsoil spreading operations to allow the correct ameliorant to be applied at the time of spreading the topsoil. There was a section of recently established rehabilitation on the western end of the southern emplacement that showed evidence of rilling. Whilst not excessive at the time of the audit the correct ameliorant could reduce the potential for soil erosion prior to the establishment of competent vegetative cover. Correctly ameliorated soil will also assist with more rapid establishment of vegetation reducing erosion risks and reducing the area exposed to wind erosion and particulate generation.

Trending of Rehabilitation Progress and Failure of Rehabilitation – is not reported or tracked adequately in the Annual Rehabilitation Report. The lack of reporting and review of these issues reduces the opportunity to learn from poor results and ensure that the long term rehabilitation objectives will be met.

Local provenance seed collection – the ecologist on the audit team expressed concern that the seed used for rehabilitation at Tarrawonga was collected at Rocglen which is approximately 18 kilometres away. The risk of genetic variation over that distance should be considered and local seed from the mine site and surrounds used in preference. The sensitivity of this issue relates to maintaining the genetics of the Leard State Forest that the rehabilitation aims to support through replacement of species removed in the mining operation.

Rehabilitation Trials - Given the poor soils and rehabilitation quality to date, TCPL should commence trials of options for rehabilitation establishment at the site. Options to consider should include:

- Soil testing an ameliorant application;
- Fertiliser types and quantities;
- Seed application rates;
- Topsoil age – some of the topsoil stockpile have been in place since the site was established, up to ten years. These soils should be used or trials conducted to ensure they remain viable.

5.3. Acoustics

The acoustics results are generally within the predictions made in the Environmental Assessment (EA). During the audit period, the Tarrawonga residence was acquired following consistently high noise results. The Tarrawonga residence was the only residence to display consistently elevated noise levels, as was predicted in the EA.

Generally, monitoring of road noise found levels were compliant with the requirements of the EPL and PA (and Noise Management Plan).

TCPL have been utilising real time monitoring to inform operational management of noise at the site. This has assisted with modification of operations to keep the site within the noise limits specified.

There are a few quality assurance issues with the acoustic consultant's report but none that place the results in doubt.

5.4. Air Quality

The air quality comments are from the subsidiary report by Todoroski Air Sciences.

5.4.1. Air Quality Management Plan

The AQMP generally complies with the relevant PA requirements however it does not contain a procedure that can be reasonably followed to determine compliance with 24-hour average impact assessment criteria.

Whilst the AQMP discusses a procedure for determining exceedances that can be applied to evaluate deposited dust results, there is no procedure for determining 24-hr average PM_{10} compliance levels/ exceedances in the AQMP. The AQMP specifically excludes the TEOM data being used for compliance purposes. This aspect of the AQMP needs to be amended and a reasonable procedure for evaluating compliance with 24-hour average PM_{10} criteria,

such as the analysis provided for the elevated level on 15 November 2014, needs to be included.

The AQMP also does not consider TSP. It is however reasonable to infer TSP compliance on the basis of PM_{10} levels, as done at various other mines. It would be prudent to seek that approval for such a calculation procedure be confirmed in writing by DP&E.

As it is understood that a close receptor, Receptor 45 and other nearby receptors are now mine owned, it would appear that there are no privately owned receptors within 3 to 4 km of the mine, and hence the risk of adverse impacts at private receptors is relatively low. However, potential dust effects still need to be managed to minimise impacts at mine owned receptors that are occupied.

The risk profile for dust impacts has changed since the project was approved and the PA conditions developed.

This situation may have some effect on what is considered best practice in regard to dust control. Consideration of best practice includes financial and practical considerations.

5.4.2. Air Quality Management Strategy – Cumulative impacts from all mines

The AQMS is dated March 2014 and contains information generally regarding what actions are proposed to be carried out.

If the AQMS were to be implemented, it may technically meet many of the requirements of the PA in regard to managing cumulative impacts from the mines in the BTM complex. The AQMS outlines a conceptual strategy in regard to *"procedures for identifying and apportioning the source/s and contribution/s to cumulative air impacts for both mines and other sources"*.

Caution should be used in assessing the likely benefit of the conceptual strategy proposed in the AQMS given that it is based on generic, annual average emission factor calculations and may not be as effective as described in controlling day to day effects.

5.4.3. Assessment of Project implementation of best air quality management practice;

Overall, the AQMP lists a range of measures, outlined in Section 3 of the AQMP that can be considered to represent best practice management measures. The aspects considered include consideration of the position of the mine relative to the most potentially affected privately owned receptors which indicate a low risk of significant ongoing dust impacts arising.

Evidence was provided that some of these measures are being implemented, for example the measures include daily dust inspections of the operations that can lead to mine staff deciding to cease certain activities in response to observed emissions of excessive dust from the activities. An example of such inspections was provided for 1 August 2014.

The mine operates a predictive weather forecasting system, and a TEOM monitor (Flixton).

It is noted that the TEOM is not used for compliance purposes.

5.4.4. Measures taken to minimise air quality impacts of the project during extraordinary events when the relevant air quality limits in this approval do not apply.

As outlined above, evidence was provided of daily dust inspections that are triggered under adverse weather conditions. This appears to be in response to EPL pollution reduction program requirements. The Mine has defined adverse weather conditions to be a wind speed above 7 m/s (or approx. 25 km/h).

The audit was not able to identify specific actions under extraordinary conditions and it is assumed that mitigation actions occur regardless of extraordinary events, such as bushfires and dust storms. In many cases extraordinary events may coincide with adverse conditions, but this may not always be the case.

The condition is interpreted to mean that the mine needs to mitigate its impact despite extraordinary events causing high dust or particulate levels, even though there is no requirement to meet criteria levels (as it may not be possible to do so during an extraordinary event).

The mine needs to develop a procedure for identifying extraordinary events, and keeping records which show that all normally applicable mitigation measures relevant to the conditions are applied during such circumstances.

5.4.5. Project compliance with EPL air quality requirements.

The EPL contains the following key requirements:

- Operate a real-time TEOM monitor per sampling and analysis Method AM-22, at the Flixton Property to monitor PM_{10} on a continuous basis;
- Carry out all operations and activities in a manner that will minimise the emission of dust from the premises;
- Cover all trucks transporting coal from the premises;
- Operate a weather station at Point W1 (Templemore) per the EPA's standard requirements and sampling methods;
- Achieve and maintain a dust control efficiency of more than 80% on coal haul roads by 17 May 2013, per PRP U1 of the EPL;
- Alter or cease the use of equipment on overburden during adverse weather conditions, from 22 March 2013;
- Report on a trial of several measures to reduce dust arising from handling overburden.

The audit found evidence for the above as follows:

- A TEOM is operated at the Flixton Property to measure PM_{10}. Calibration records and monitoring data from January 2013 to December 2014 were provided to confirm this.
- Provided that the measures listed in the AQMP and AQMS are implemented, the operations would be carried out in a manner to minimise dust emissions from the premises. It is noted the measures in the AQMS (which related to cumulate

management of dust from three separate mines) are not presently implemented and it is assumed that this is due to the one of the mines not being operational.

The audit found that overall the mine management systems and documentation includes the majority of ameliorative controls that would need to be taken to manage the dust emissions from each of the activities, individually to an acceptable level.

- Procedures that include covering trucks were found to be in place.
- A weather station is operated at Point W1 (Templemore) and data from January 2013 to December 2014 were provided to confirm this.
- Documents showing that the Three PRP's relating to wheel generated dust, adverse conditions and a trial of mitigation to minimise dust from overburden handling were provided. It is clear that measures to mitigate impacts under adverse weather conditions had been carried out during the period covered by the audit.

5.4.6. Overall impressions – Observations

The audit found that much of the documentation related to management of air quality outlines what will be done, rather than what is being done. The PA is imprecise regarding when some of these actions need to be in place (rather than just existing in a management plan or strategy) thus it cannot be concluded that there is any non-compliance in this respect. However there is an impression that progress in implementing many required actions is slower than would be expected, and that perhaps this is due to delays in other Projects that form part of the cumulative management strategy.

There are also some areas where caution is advised in regard to the anticipated effectiveness of the conceptual cumulative management strategies being proposed. This is due in part to the inherent limitations of the proposed approach and the reduced risk of significant air quality impacts upon private receptors arising due to the acquisition of some of the nearest private properties since the time of the air assessment and development of the PA conditions.

In this context, given the small scale of the operations, the large distances to receptors, and thus small scope for actual impacts to arise, it may be reasonable for the mine to question the benefit to the community of some of the requirements in the PA. However, as some mitigation measures, especially those related to cumulative impacts do not yet appear to be in place, the issue cannot be examined by the audit due to the lack of hard data.

Whilst generally comprehensive and appropriate, a key deficiency in the AQMP is that there does not appear to be a procedure for determining whether compliance with 24-hour average PM_{10} criteria is being achieved at receptors. This needs to be rectified.

Other technical issues such as reliance on other's HVAS monitors when the monitor is not run on an EPA run day, can be corrected easily but are beyond the absolute control of the mine.

5.5. Surface Water Quality

In the 2012-13 AEMR reporting year, there were two wet weather discharges (rainfall in excess of the site design criteria) and three controlled discharges from the site. On all occasions except one (3/3/13) the site was able to demonstrate that the impacts were

negligible. The 3rd March discharge was a wet weather discharge and is therefore not reportable. There was a single discharge of water from the site in the 2013-14 AEMR reporting year following a high rainfall event. The site collected upstream and downstream samples in Bollol and Nagero Creeks that indicated that site water was lower in turbidity than the receiving waters.

During the site inspection, it was apparent that the surface water runoff from around the coal loader area (described in the Water Management Plan as dirty water) drained to a series of sediment dams aimed at keeping water from the rehabilitated area on the northern emplacement onsite till sediment was removed. These dams drain offsite. A review of the management of surface water in this area is required.

The other key potential surface water issue related to the establishment of the Goonbri Creek diversion. The diversion is required when mining operations enter the alluvials along the creek, this has not yet occurred and is still some time off due to economic constraints associated with mining this area.

5.6. Groundwater Resources

Groundwater inflows to the pit are low as predicted in the EA. As such, the draw down to date has been in line with the EA predictions, that is, low in areas away from the pit and low but measurable in the wells closest to the pit. As yet the alluvials have not been intercepted and Standing Water Level measurements have not indicated any measureable impact on those aquifers in the audit period.

The other key potential ground water issue related to the establishment of the Goonbri Creek diversion and associated groundwater cut-off wall. The diversion is required when mining operations enter the alluvials along the creek, this has not yet occurred and is still some time off due to economic constraints.

Chemical analysis of groundwaters has shown no increase in contaminants in the audit period.

Absolute trigger levels need to be stated in the groundwater TARP to ensure triggers are not missed during routine groundwater level analysis. Currently the TARP limits quoted are dependent on the modelled numbers plus 15%, this changes over time and is difficult to keep track of. An absolute change in standing groundwater level should be developed and quoted in the TARP to simplify assessment of results and annual reporting.

The groundwater model has not been updated in over two years and is overdue for a review in accordance with the Water Management Plan.

6. RECOMMENDATIONS

There are a number of issues noted at the start of this report not addressed below as these have been addressed by TCPL and do not need to be repeated here. The following recommendations have resulted from:

- Observations made by the specialists on the audit team;
- Issues where non-compliance required a recommendation; and
- Those made to improve environmental performance.

Some of these recommendations have not been noted in the document prior to this section as they do not all result from lack of compliance.

6.1. Biodiversity Offsets

As noted in section 5.1, Tables 5.2 and Table 5.3 in the WBOMP should be revised. These tables set out ecological attributes and the scale of measurement in vegetation condition monitoring plots. The attributes & methods outlined in these tables are not consistent with BioBanking methodology for site attributes (OEH 2012).

The baseline surveys for threatened species in offset areas should be conducted in accordance with the department's Survey Guidelines for Australia's Threatened Birds and the Survey Guidelines for Australia's Threatened Bats. The annual monitoring reports should confirm compliance with the two stated methodologies.

Given the sensitivity of the surrounding environment at TCPL, a more formal ground disturbance permitting system would be insurance against excessive clearing, unplanned impacts to flora and fauna or accidental disturbance of archaeological deposits.

Develop and implement a procedure for checking vehicles for weed vectors and cleaning them if necessary prior to entering the biodiversity offset area.

6.1. Bushfire Management

Conduct and document fuel load and fire break inspections annually.

6.2. Heritage

The scar tree preservation procedure in the Heritage Management Plan requires revision to ensure it can be complied with. It is currently too proscriptive and does not allow for flexibility in on ground application.

6.1. Public Safety

Traffic impacts associated with the Goonbri Road intersections and public road impacts were identified. This realignment has not yet occurred and has been postponed due to the sites financial situation. The residual risk to the public should be reassessed to establish if changes are still required to ensure public safety.

6.2. Rehabilitation

Work be conducted to soften the visual impact of the unrehabilitated southern emplacement, reduce risk of impacts to Goonbri Creek and to lessen the levels of fugitive particulate emissions.

Site observations indicated that rejects are not placed on the pit floor as required by the MOP but are placed at higher elevations, as part of the backfilling process with suitable cover to prevent spon com. There is nothing unacceptable in this approach provided there is adequate separation for the surface of the final landform of the emplacement. To rectify, TCPL should consider changing the wording of the MOP at the next revision.

The MOP and several other management plans refer to the use of mulching and tree guards to protect tubestock. This is not conducted and does not seem necessary based on the site inspection of rehabilitated areas that showed no excessive grazing of planted tubestock was occurring and the EO noted that there was no history of issues in this area. Reference to the use of these protective methods should be reduced to a contingency should excessive grazing become an issue rather than a requirement.

Seed collection should be conducted in the areas immediately surrounding the mine site to collect seed for rehabilitation.

No rehabilitation works were observed that did not comply with the rehabilitation management plan. However, revegetation quality could be improved, some trials have been conducted, further trials should be implemented to establish the most appropriate vegetation establishment methodologies.

Some topsoil at the site has been stored since the site inception. As soon as there is an opportunity to use this material it should be used. The longer topsoil is stored the less effective it is for vegetation establishment.

Topsoil should be characterised prior to striping to ensure stripping depths are suitable and that similar soil qualities are stored together allowing the application of suitable soil ameliorants when the topsoil is spread.

Topsoils should be characterised prior to spreading to allow the application of suitable ameliorants (predominantly gypsum and lime).

6.3. Water Management

The water in dirty water dams is regularly tested and monitored. When salt levels in these dams exceed acceptable limits; the water will be pumped into PW2 or PW3 and recycled. TCPL does not define "acceptable limits", this should be quantified and included in the Water Management Plan.

Dirty water management needs review in consideration of the water from around the coal loader going into the dirty water system but with a discharge point in this portion of the system. The water from the vicinity of the coal loader should not be able to leave site.

The groundwater model is overdue for an update and review to be based on monitoring to date.

To obtain groundwater samples that are representative of the water within the aquifer being sampled, groundwater wells should be purged (see *Groundwater sampling guidelines*, EPA Victoria 2000).

6.1. Management Plans

As a general comment, the management plans do not include enough information on the background data that was used to formulate them. Future revisions should consider ways to present this information to inform the measures described.

Some of the management plans cross into areas that are not core to the reason for the management plan. They should instead reference other management plans rather than reproducing slabs of information.

In a number of cases, non-compliances have resulted from unnecessary wording in management plans (e.g. water samplers are currently required to be “suitably qualified professionals” when in most instances they are technicians without professional qualifications). TCPL should review the findings of the audit and revise wording to ensure compliance in the future.

The management plans all include requirements for review and it is apparent that these occur. The site however needs to document these reviews in order to demonstrate they have occurred particularly when no changes to the management plan eventuate from the review.

6.1. Reporting

Life of mine monitoring data is reported in the AEMRs but commentary on trends and changes is not adequate to determine whether the site is trending towards compliance or out of compliance with requirements.

Include a description of the effectiveness of waste minimisation actions in the waste section of the AEMR.

APPENDIX A AUDIT TEAM APPROVAL

NSW GOVERNMENT | Planning & Environment

Development Assessment Systems & Approvals
Mining Projects
Contact: Stephen O'Donoghue
Phone: 0477 345 626
Email: stephen.o'donoghue@planning.nsw.gov.au

Mr Lachlan Johnson
Environmental Officer – Tarrawonga Coal Mine
Whitehaven Coal Limited
PO Box 600
GUNNEDAH NSW 2380

Dear Mr Johnson

Tarrawonga Coal Mine (MP 11_0047)
Approval Team for Independent Environmental Audit 2014

I refer to your email of 11 July 2014 seeking approval for SMEC supported by relevant environmental experts to undertake the independent environmental audit (Schedule 5 Condition 10) and biodiversity audit (Schedule 3 Condition 50) of the Tarrawonga Coal Mine in accordance with the project approval. The Acting Secretary has approved the following team to conduct this audit:

- Peter Horn, SMEC – Lead Auditor and Rehabilitation
- Catherine Gallery, SMEC – Biodiversity
- Glen Homes, SMEC – Acoustics
- Aleks Todoroski, Todoroski Air Sciences - Air Quality
- Glen Mounser, SMEC – Surface Water
- Yohannes Woldeyohannes, SMEC – Groundwater
- Matthew Harland, Joy Duncan – Audit Team Members

Should you have any enquiries in relation to the above, please contact Stephen O'Donoghue.

Yours sincerely

Mike Young
Manager
Mining Projects

23.7.14

APPENDIX B CONSULTATION WITH REGULATORY STAKEHOLDERS

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2 September 2014

Department of Trade and Investment
Division of Resources and Energy
Environmental Sustainability Unit
Maitland NSW 2320

Attention: John Trotter

John,

RE: Tarrawonga Coal – September 2014 Independent Environmental Audit

In accordance with Tarrawonga Coals Project Approval DA 11_0047 for the Tarrawonga Coal Project, an Independent Environmental Audit will be undertaken in mid September 2014. The audit team has been now been endorsed by Department of Planning and Environment (DP&E) and will include experts in biodiversity, surface water, groundwater, rehabilitation, air quality and noise.

The Independent Environmental Audit will assess the environmental performance of Tarrawonga Coal, and its compliance with the requirements of PA 11_0047, Environmental Protection Licence 12365, Mining Leases and management plans. The audit will also involve a review of the adequacy of strategies, plans and programs required under the above mentioned approvals and, where necessary, recommend appropriate measures or actions to improve the environmental performance of the project.

The audit will be comprehensive however, if there are any particular aspects within the items listed above that you would like the audit to take into consideration, please contact
the undersigned (02).

Regards,



Peter Horn
Lead Auditor
Environmental Manager - Newcastle & Northern NSW
SMEC Australia

CONSULT AUSTRALIA
Business | Engineering | Design

SMEC Holdings Ltd ABN 84 057 274 049 SMEC Operations Pty Ltd ABN 88 065 474 428
SMEC International Pty Ltd ABN 32 065 440 619 SMEC Australia Pty Ltd ABN 47 065 475 149
SMEC Services Pty Ltd ABN 79 066 504 792

From: John Trotter
Sent: Tuesday, 2 September 2014 2:52 PM
To: Horn, Peter
Subject: RE: Tarawonga Audit

Hello Peter,

DRE is currently looking to prepare a standard response to invitations to provide items for consideration during Independent Environmental Audits, however, this has not been completed.

In the meantime, Matthew Newton (Principal Officer, Rehabilitation Standards) has offered the following for your consideration:

Audit Component - Desktop

- Is there a current Mining Operations Plan (MOP) in place and has it been approved by DRE?
- Has the MOP been prepared in consultation with the relevant agencies as outlined in the Project Approval?
- Is the rehabilitation strategy as outlined in the MOP consistent with the Project Approval in terms of progressive rehabilitation schedule; and proposed final land use(s)?
- Has the rehabilitation objectives and completion criteria as outlined in the MOP been developed in accordance with the proposed final land(s) as outlined in the Project Approval?
- Has a rehabilitation monitoring program been developed and implemented to assess performance against the nominated objectives and completion criteria? – verified by reviewing monitoring reports and rehabilitation inspection records.
- Has a rehabilitation care and maintenance program been developed and implemented based on the outcomes of monitoring program? – verified by reviewing Annual Rehabilitation Programs or similar documentation.

Audit Component - Site Inspection

- Are mining operations being conducted in accordance with the approved MOP (production, mining sequence etc.), including within the designated MOP approval boundary? – to be verified by site plans and site inspection.
- Is rehabilitation progress consistent with the approved MOP as verified by site plans and a site inspection? This should include an evaluation against rehabilitation targets and whether the final landform is being developed in accordance with conceptual final landform in Project Approval.
- Based on a visual inspection, are there any rehabilitation areas that appear to have failed or that have incurred an issue that may result in a delay in achieving the successful rehabilitation?

In addition to the above, the audit should note observations where rehabilitation procedures, practices and outcomes represent best industry practice.

John Trotter
Inspector Environment
Environmental Sustainability Unit
Tel:
Mob:
Email:

www.resourcesandenergy.nsw.gov.au

From: Horn, Peter
Sent: Tuesday, 2 September 2014 12:07 PM
To: john.trotter
Subject: Tarrawonga Audit

Hi John,

Letter attached re the impending audit at Tarrawonga for DP&E Compliance Team.
Please respond with any comment or areas of focus.
If you are not the correct person in DRE, please let me know who I should be speaking with.

Cheers
Peter

Peter Horn | Environmental Manager - Newcastle & Northern NSW
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22 October 2014

Department of the Environment
Environment Assessment and Compliance Division
Post Approvals
Attention: Dr Dylan Horne

Dylan,

RE: Tarrawonga Coal – September 2014 Independent Environmental Audit

In accordance with Tarrawonga Coals Project Approval DA 11_0047 for the Tarrawonga Coal Project, an Independent Environmental Audit was be undertaken in mid September 2014. The audit team was endorsed by Department of Planning and Environment (DP&E) and included experts in biodiversity, surface water, groundwater, rehabilitation, air quality and noise.

The Independent Environmental Audit assessed the environmental performance of Tarrawonga Coal, and its compliance with the requirements of PA 11_0047, Environmental Protection Licence 12365, Mining Leases and management plans. The audit also involved a review of the adequacy of strategies, plans and programs required under the above mentioned approvals and, where necessary, will recommend appropriate measures or actions to improve the environmental performance of the project.

The audit will be comprehensive however, if there are any particular aspects within the items listed above that you would like the audit to take into consideration, please contact the undersigned so we can consider your thoughts in our analysis of the data and audit focus. Whilst the site aspect of the audit is complete, the audit documentation continues so it is not too late for your input into the process.

Regards,



Peter Horn
Lead Auditor
Environmental Manager - Newcastle & Northern NSW
SMEC Australia

Horn, Peter

From: Horne, Dylan
Sent: Thursday, 23 October 2014 8:02 AM
To: Horn, Peter
Cc: Taylor, Alex; Samarakoon, Manel
Subject: RE: Tarawonga Compliance Audit [SEC=UNCLASSIFIED]

Hi Peter

Thanks for the email. I was the contact for this earlier in the year but I've since moved to a different role in the department.

In the first instance please contact Manel Samarakoon (cc'd). I forwarded your other email with the attached letter.

Kind regards
Dylan

Dr Dylan Horne
Senior Regulatory Advisor
Regulatory Capability and Performance | Policy Analysis and Implementation Division
Department of the Environment
GPO Box 787 CANBERRA ACT 2600
t: (02) **e:**

From: Horn, Peter
Sent: Wednesday, 22 October 2014 4:22 PM
To: Horne, Dylan
Subject: Tarrawonga Compliance Audit

Hi Dylan,

Your contact details were provided to me by Tarrawonga as the DoE contact for
the site.
There is a letter attached re an audit of Tarrawonga Coal for the NSW DP&E Compliance Team.
Please respond with any comment or areas of focus.
If you are not the correct contact person in DoE for the site and this sort of request, please let me know who I should be speaking with.

Kind Regards
Peter

Peter Horn | Environmental Manager - Newcastle & Northern NSW
SMEC – Australia & New Zealand Division
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2 September 2014

Tarrawonga Coal Community Consultation Committee

Attention: John Turner

John,

RE: Tarrawonga Coal – September 2014 Independent Environmental Audit

In accordance with Tarrawonga Coals Project Approval DA 11_0047 for the Tarrawonga Coal Project, an Independent Environmental Audit will be undertaken in mid September 2014. The audit team has been now been endorsed by Department of Planning and Environment (DP&E) and will include experts in biodiversity, surface water, groundwater, rehabilitation, air quality and noise.

The Independent Environmental Audit will assess the environmental performance of Tarrawonga Coal, and its compliance with the requirements of PA 11_0047, Environmental Protection Licence 12365, Mining Leases and management plans. The audit will also involve a review of the adequacy of strategies, plans and programs required under the above mentioned approvals and, where necessary, recommend appropriate measures or actions to improve the environmental performance of the project.

The audit will be comprehensive however, if there are any particular aspects within the items listed above that you would like the audit to take into consideration, please contact
the undersigned (02).

Regards,



Peter Horn
Lead Auditor
Environmental Manager - Newcastle & Northern NSW
SMEC Australia

From: John Turner
Sent: Tuesday, 9 September 2014 5:06 PM
To: Horn, Peter
Cc: Jill Johnson
Subject: Re: Tarrawonga Independent Environmental Audit

Peter

I have not received any comments or requests in relation to this matter from CCC members.
Regards

John Turner

Sent from my iPhone

On 02/09/2014, at 2:45 PM, "Horn, Peter" wrote:

> Thanks very much John, I will still be onsite after the 9th and it would be good to get your comments then (finish up on-site on the 11th) in order to take them into consideration during the site inspection(as best I can in my limited time on-site).
>
> Kind Regards
> Peter
>
> **Peter Horn** | Environmental Manager - Newcastle & Northern NSW
> **SMEC Australia**
> **T** +61 2 | **M** +61
>
> ---
>
> **From:** John Turner
> **Sent:** Tuesday, 2 September 2014 2:40 PM
> **To:** Horn, Peter
> **Cc:** Jill Johnson
> **Subject:** RE: Tarrawonga Independent Environmental Audit
>
> Dear Peter,
>
> Thank you for your letter.
>
> As the committee has not previously discussed the proposed audit, I have sent an email to the committee asking if they have any specific comment in relation to the specifications of the audit they would like to make.
>
> I have asked for feed back by 9/9/14.
>
> I will be in touch with you after that date.
>
> Regards
>
> John Turner
> Chair, Tarrawonga CCC

From:
To:
Subject: Tarrawonga Independent Environmental Audit
Date: Tue, 2 Sep 2014 02:35:36 +0000

Hello John,

I'm writing to you to notify you and the CCC of an Independent Environmental Audit of Tarrawonga Coal. The audit is required as a condition of their new Project Approval.
Attached is a letter seeking comment and input into the audit focus.
Apologies for the short time frame.

Kind Regards
Peter
Lead Auditor

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2 September 2014

Environment Protection Authority
Armidale Office

Attention: Kharl Turnbull

Kharl,

RE: Tarrawonga Coal – September 2014 Independent Environmental Audit

In accordance with Tarrawonga Coals Project Approval DA 11_0047 for the Tarrawonga Coal Project, an Independent Environmental Audit will be undertaken in mid September 2014. The audit team has been now been endorsed by Department of Planning and Environment (DP&E) and will include experts in biodiversity, surface water, groundwater, rehabilitation, air quality and noise.

The Independent Environmental Audit will assess the environmental performance of Tarrawonga Coal, and its compliance with the requirements of PA 11_0047, Environmental Protection Licence 12365, Mining Leases and management plans. The audit will also involve a review of the adequacy of strategies, plans and programs required under the above mentioned approvals and, where necessary, recommend appropriate measures or actions to improve the environmental performance of the project.

The audit will be comprehensive however, if there are any particular aspects within the items listed above that you would like the audit to take into consideration, please contact
the undersigned (02).

Regards,



Peter Horn
Lead Auditor
Environmental Manager - Newcastle & Northern NSW
SMEC Australia

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4 September 2014

Office of Environment and Heritage
Dubbo Office

Attention: Phil Purcell

Phil,

RE: Tarrawonga Coal – September 2014 Independent Environmental Audit

In accordance with Tarrawonga Coals Project Approval DA 11_0047 for the Tarrawonga Coal Project, an Independent Environmental Audit will be undertaken in mid September 2014. The audit team has been now been endorsed by Department of Planning and Environment (DP&E) and will include experts in biodiversity, surface water, groundwater, rehabilitation, air quality and noise.

The Independent Environmental Audit will assess the environmental performance of Tarrawonga Coal, and its compliance with the requirements of PA 11_0047, Environmental Protection Licence 12365, Mining Leases and management plans. The audit will also involve a review of the adequacy of strategies, plans and programs required under the above mentioned approvals and, where necessary, recommend appropriate measures or actions to improve the environmental performance of the project.

The audit will be comprehensive however, if there are any particular aspects within the items listed above that you would like the audit to take into consideration, please contact the undersigned (02) or by e-mail
.

Regards,



Peter Horn
Lead Auditor
Environmental Manager - Newcastle & Northern NSW
SMEC Australia

APPENDIX C AUDIT PROTOCOL

Consequences

Level Descriptor		Consequences
A	Catastrophic	Long term environmental damage (5 years or longer), requiring $5million to correct or in penalties
B	Major	Medium-term (1-5 years) environmental damage, requiring $1 to 5million to correct or in penalties
C	Moderate	Short-term (less than 1 year) environmental damage, requiring up to $1million to correct or in penalties
D	Minor	Environmental damage, requiring up to $200,000 to correct
E	Insignificant	Negligible environmental impact, managed within operating budgets

Likelihood

Level Descriptor		Likelihood of the risk arising and leading to the assessed level of consequence	
1	Almost certain	Is expected to occur in most circumstances and has a history of occurrence	Once a year or more frequent
2	Likely	Will probably occur in most circumstances	Once in 1 to 3 years
3	Possible	Could occur at some time	Once in 3 to 10 years
4	Unlikely	Not likely to occur in normal circumstances	Once in 10 to 50 years
5	Rare	May occur only in exceptional circumstances	Once in 100 years or more

		Catastrophic	Major	Moderate	Minor	Insignificant
		A	B	C	D	E
Almost certain	1	Extreme	Extreme	High	High	Medium
Likely	2	Extreme	Extreme	High	Medium	Low
Possible	3	Extreme	High	Medium	Medium	Low
Unlikely	4	High	Medium	Medium	Low	Low
Rare	5	High	Medium	Low	Low	Low

Reference	Condition	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
	Schedule 2 - Administrative Conditions						
	OBLIGATION TO MINIMISE HARM TO THE ENVIRONMENT						
Project Approval 11-0047	1	In addition to meeting the specific performance criteria established under this approval, the Proponent shall implement all reasonable and feasible measures to prevent and/or minimise any material harm to the environment that may result from the construction, operation, or rehabilitation of the project.					
	OBLIGATION TO MINIMISE HARM TO THE ENVIRONMENT						
Project Approval 11-0047	2	The Proponent shall carry out the project generally in accordance with the: a) EA; b) statement of commitments; and c) conditions of this approval Notes: The E19 layout of the project is shown in Appendix E17; and The statement of commitments is reproduced in Appendix 4	Generally In compliance though exceptions are noted in various places throughout the audit findings	Compliant			
Project Approval 11-0047	3	If there's is any inconsistency between the above documents, the most recent document shall prevail to the extent of the inconsistency. However, the conditions of this approval shall prevail to the extent of any inconsistency.	Noted				
Project Approval 11-0047	4	The Proponent shall comply with any reasonable requirement/s of the Director-General arising from the Department's assessment of: a) any reports, strategies, plans, programs, reviews, audits or correspondence that are submitted in accordance with this approval; and b) the implementation of any actions or measures contained in these documents	Not in the audit period	Not Applicable			
	LIMITS ON APPROVAL						
	Mining Operations						
Project Approval 11-0047	5	The Proponent may carry out mining operations on the site until the end of December 2030. Note: Under this approval, the Proponent is required to rehabilitate the site and carry out additional undertakings to the satisfaction of both the Director-General and the Executive Director Mineral Resources. Consequently, this approval will continue to apply in all other respects - other than the right to conduct mining operations - until the rehabilitation of the site and these additional undertakings have been carried out satisfactorily.	15 years approved mining remaining	Not Applicable			
	Coal Extraction						
Project Approval 11-0047	7	For the period until up to 3 months after the commissioning of the Boggabri Rail Spur Line and Boggabri CHPP, the Proponent may transport up to: a) 2 million tonnes of ROM coal from the site to the Whitehaven CHPP along the dedicated haulage route in any calendar year; b) and150,000 tonnes of this ROM coal from the site in any calendar year for direct distribution to domestic markets via the dedicated haulage route to the Kamilaroi Highway. Note: For the avoidance of doubt, the total amount of coal permitted to be transported from the site by road in any calendar year is 2 million tonnes.	The rail spur is not commissioned yet.	Not Applicable			
Project Approval 11-0047	8	During this period, the Proponent shall only transport coal from the site or receive coal reject from the Whitehaven CHPP between the hours of: a) 7 am to 9.15 pm Monday to Friday; b) 7 am to 5.15 pm Saturday; and c) at no time on Sundays or public holidays	Included in induction, controlled by Tarrawonga loader operator, trucks GPS tracked. No observed truck transport outside hours in site inspection.	Compliant			
	Coal Transport - After Commissioning of the Boggabri Rail Spur Line and Boggabri CHPP						
Project Approval 11-0047	9	9 For the period commencing 3 months after the commissioning of the Boggabri Rail Spur Line & Boggabri CHPP, the Proponent: a) shall not transport more than 3 million tonnes of this ROM coal from the site in any calendar year for direct distribution to domestic markets via the dedicated haulage route to the Kamilaroi Highway; and c) shall transport all other coal from the site via the Boggabri rail spur line.	The rail spur is not commissioned yet.	Not Applicable			
Project Approval 11-0047	10	During this period, the Proponent shall only transport coal from the site by truck (excluding coal transport to the Boggabri coal mine for subsequent despatch via the Boggabri rail spur line) between 7 am and 6 pm Monday to Saturday.	The rail spur is not commissioned yet.	Not Applicable			
	Gravel Extraction and Transport						
Project Approval 11-0047	11	The proponent shall not extract more than 90,000m^3 of gravel from the site for distribution off-site in any calendar year.	Compliant, n very little gravel extraction in the audit period. (608 Tonnes in 2013, none 2012)	Compliant			
Project Approval 11-0047	12	The proponent shall not extract more than 90,000m^3 of gravel from the site by truck in any calendar year. This gravel is to be transported from the site to the Kamilaroi Highway via the dedicated haulage route	Compliant, n very little gravel extraction in the audit period. (608 Tonnes in 2013, none 2012)	Compliant			
Project Approval 11-0047	13	The proponent shall only transport gravel from the site by truck between 7 am and 6 pm Monday to Saturday.	Compliant, reviewed eslewhere, trucking is tightly controlled by site.	Compliant			
	SURRENDER OF EXISTING DEVELOPMENT CONSENT						

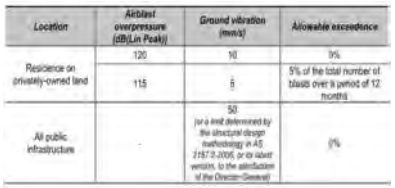
Reference	Condition	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Project Approval 11-0047	14	By the end of December 2013, or as otherwise agreed by the Director-General, the Proponent shall surrender the existing development consent (DA-88-4-2005) for the Tarraway Coal Mine in accordance with Section 104A of the EP&A Act. Prior to the surrender of this development consent, the conditions of this approval shall prevail to the extent of any inconsistency with the conditions of the development consent.	Not done work is underway to surrender the DA.	Not Compliant Administrative			
	STRUCTURAL ADEQUACY						
Project Approval 11-0047	15	The Proponent shall ensure that all new building and structures, and any alterations or additions to existing building and structures, are constructed in accordance with the relevant requirements of the BCA. Notes: Under Part 4Aof the EP&A Act, the Proponent is required to obtain construction and occupation certificates for the proposed building works; and Part 8 of the EP&A Regulation sets out the requirements for the certification of the project.	Two new buildings on-site, shipping containers with awning. No CC or OCs, buildings are borderline though and could be considered temporary as the infrastructure area is to be moved and the building fits the description of Temporary Buildings in the SEPP (exempt and complying development)	Compliant			
	DEMOLITION						
Project Approval 11-0047	16	The Proponent shall ensure that all demolition work on site is carried out in accordance with Australian Standard AS 2601-2001: The Demolition of Structures, or its latest version.	No demolition work	Compliant			
	PROTECTION OF PUBLIC INFRASTRUCTURE						
Project Approval 11-0047	17	Unless the Proponent and the applicable authority agree otherwise, the Proponent shall: a) repair, or pay the full costs associated with repairing, any public infrastructure that is damaged by the project; and b) relocate, or pay the full costs associated with relocation, any public infrastructure that needs to be relocated as a result of the project.	None noted	Not Applicable			
	OPERATION OF PLANT AND EQUIPMENT						
Project Approval 11-0047	18	18 The Proponent shall ensure that all the plant and equipment used on site, or to transport coal from the site, is: a) maintained in a proper and efficient condition; and b) operated in a proper and efficient manner.	Observed maintenance planning system on site, discussed with maintenance planner at interview. No loud or smoky equipment observed on site inspection.	Compliant			
	STAGED SUBMISSION OF STRATEGIES, PLANS AND PROGRAMS						
Project Approval 11-0047	19	With the approval of the Director-General, the Proponent may submit any strategy, plan or program requirement by this approval on a progressive basis. Notes: While any strategy, plan or program may be submitted on a progressive basis, the Proponent will need to ensure that the existing operations on site are covered by suitable strategies, plans or programs at all times. If the submission of any strategy, plan or program is to be staged, then the relevant strategy, plan or program must clearly describe the specific stage to which the strategy, plan or program applies, the relationship of this stage to any future stage, and the trigger for updating the strategy, plan or program.	Some plans submitted in this manner	Noted			
Project Approval 11-0047	20	Until they are replaced by an equivalent strategy, plan or program approved under this approval, the Proponent shall implement the existing strategies, plans or programs for the site that have been approved under DA-88-4-2005.	Noted and observed on -site where new commitments that provided environmental improvement were made in plans that were not approved, they had been implemented.	Compliant			
	COMMUNITY ENHANCEMENT						
Project Approval 11-0047	21	21 By the end of March 2013, unless otherwise agreed by the Director-General, the Proponent shall enter into a planning agreement with Council in accordance with: a) Division 6 of Part 4 of the EP&A Act; and b) the terms of the Proponent's offer provided in Appendix 3.	No evidence provided	Not Compliant	E	1	Medium
	Schedule 3 - Environmental Performance Conditions						
	ACQUISITION ON REQUEST						

Reference	Condition	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Project Approval 11-0047	1	Upon receiving a written request for acquisition from an owner of the privately-owned land listed in Table 1, the Proponent shall acquire the land in accordance with the procedures in conditions 8 and 0 of schedule 4. Table1: Land subject to acquisition upon request Notes: To interpret the locations referred to in Table 1 see the applicable figure(s) in Appendix 5. Properties 43, 44 and 45 also have acquisition rights under the approval for the Boggabri coal mine, and/or the existing consent (DA 88-4-2005) for the Tarrawonga mine. The proponent may acquire these properties on an equitable basis with the owner of the Boggabri mine. For the purposes of acquisition under this condition, parcels of land that are in close proximity and operated as a single agricultural enterprise should be included as part of the land to be acquired. Where the Proponent and the owner(s) cannot agree on whether non-contiguous parcels of land should be included, either party may refer the matter to the Director-General for resolution. The Director-General's decision as to the lands to be included for acquisition under the procedures in conditions 8 and 9 of Schedule 4 shall be final.	No formal written requests but two acquisitions have occurred in the audit period.	Not Applicable			
Project Approval 11-0047	1		Noted				
	ADDITIONAL NOISE AND/OR AIR QUALITY MITIGATION ON REQUEST						
Project Approval 11-0047	2	Upon receiving a written request from the owner of any residence on the land listed in Table 1, the Proponent shall implement additional noise and/or quality mitigation measures (such as double glazing, insulation, air filters, a first flush roof water drainage system and/or air conditioning) at the residence in consultation with the owner. These measures must be reasonable and feasible and directed towards reducing the noise and/pr air quality impacts of the project on the residence. If within 3 months of receiving this request from the owner, the Proponent and the owner cannot agree on the measures to be implemented, or there is a dispute about the implementation of these measures, then either party may refer the matter to the Director-General for resolution.	No written requests in the audit period	Not Applicable			
	NOISE AND VIBRATION						
	Noise Criteria						
Project Approval 11-0047	3	Except for the noise-affected land in Table1, the Proponent shall ensure that operational noise generated by the project does not exceed the criteria in Table 2 at any residence on privately-owned land. Table 2: Noise criteria dB(A) Land  Notes: Operational noise includes noise from the mining operation and the use of private and rail spurs. Noise is to be measured in accordance with the relevant requirements, and exemptions (including certain meteorological conditions (also see condition 13)), of the NSW Industrial Noise Policy. However, these noise criteria do no apply if the Proponent has an agreement with the owner/s of the relevant residence or land to generate higher noise levels, and the Proponent has advised the Department in writing of the terms of this agreement.	Noise levels at Tarrawonga in excess of criteria but Tarrawonga is listed as noise affected in the PA and was purchased by TCL in the audit period.	Compliant			
	Noise Acquisition Requirements - Residences						
Project Approval 11-0047	4	If the owner(s) of a privately-owned residence, that is not listed in Table 1, have reason to believe that operational noise from the project is causing the criteria in Table 2 to be exceeded at the residence, that owner(s) can request an independent noise impact assessment for the residence. The request shall be made in writing to the Director-General. If the Director-General considers that a noise impact assessment is warranted, then the Proponent shall commission the assessment.	This has not occurred in the audit period	Not Applicable			

Reference	Condition	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Project Approval 11-0047	4	If the noise impact assessment determines that the nouse generated by the project causes sustained exceedancies, or is likely to cause sustained exceedances, of the criteria in Table 2, the owner(s) can make a written request to the Proponent for one of the following: a) mitigation (such as double glazing, insulation and air conditioning) at the residence in consultation with the owner(s). These measures must be reasonable and feasible and directed towards reducing the noise impacts of the project on the residence. If within 3 months of receiving this request fromt he owner(s), the Proponet and owner(s) cannot agree on the measures to be implemented, or there is a dispute about the implementation of these measures, then either party may refer the matter to the Director-General for resolution; or b) acquisition of the residence and land in accordance with the procedures in conditions 8 and 9 of Schedule 4.	This has not occurred in the audit period	Not Applicable			
Project Approval 11-0047	4	Upon receiving a written request form the owner(s), the Proponent must undertake whichever option has been requested by the owner(s).	This has not occurred in the audit period	Not Applicable			
Project Approval 11-0047	4	However, this condition does not apply if the Proponent has an agreement with the owner(s) of the relevant residence to generate higher noise levels, and the Proponent has advised the Department in writing of the terms of this agreement.	Noted				
	Noise Acquisition Requirements - Land						
Project Approval 11-0047	5	If the owner(s) of land containing a privately owned residence, which is not listed in Table 1, have reason to believe that operational noise from the project is causing noise levels to exceed 40 dB(A) LAeq(15 min) over more than 25% of that land, the owner(s) can request an independent noise impact assessment for the land. The request shall be made in writing to the Director-General. If the Director-General considers tha a noise impact assessment is warranted, then the Proponent shall commission the assessment. If the noise impact assessment determines that the noise generated by the project causes sustained exceedances, or is likely to cause sustained exceedances, of the 40 dBA criteria, the owner(s) can make a witten request to tbe Proponent for acquisition of the residence and land in accordance with the provedures in conditions 8 and 9 of Schedule 4. Upon receibing a written request from the owner(s), the Proponent must purchase the residence and land in accordance with the procedures in conditions 8 and 9 of Schedule 4.	This has not occurred in the audit period	Not Applicable			
Project Approval 11-0047	5	However, this condition does not apply if the Proponent has an agreement with the owner(s) of the relevant residnece to generate higher noise levels, and the Proponent has an agreement with the owner(s) of the relevant residence to genrrate higher noise levels, and the Proponent has advised the Department in writing of the terms of this agreement. Note: The notes to condition 4 of this Schedule also apply to this condtion.	Noted				
	Cumulative Noise Criteria						
Project Approval 11-0047	6	Except for tha land listed in Table 1, the Proponent shall ensure that the operational noise generated by the project combined with the noise generated by other mines does not exceed the criteria in Table 3 at any residence on privately-owned land. Table 3: Cumulative noise criteria dB(A) $L_{Aeq(period)}$ Land: All privately-owned land — Day/Evening/Night $L_{Aeq(period)}$: 40 Notes: • Cumulative noise is to be measured in accordance with the relevant requirements, and exemptions (including certain meteorological conditions)(also see condition 13(j). of the NSW Industrial Noise Policy. • Operational noise includes noise from the mining operations and the use of private roads and rail spurs.	In discussion with DP&E re implementation. Not yet implemented.	Not Applicable			
	Cumulative Noise Acquisition Requirements						
Project Approval 11-0047	7	It the owner(s) of a privately-ownedresidence, which is not listed in Table 1, reasonably believes that the noise limits in Table 3 are being exceeded at the residence and that the exceedance is caused by operational noise from the project and one of more other mines (including use of private roads or rail spurs), the owner(s) can request an independent noise impact assessment for the residence. The request shall be made in writing to the Director-General. If the Director-General considers that a noise impact assessment is warranted, then the Proponent shall commission the assessment.	This has not occurred in the audit period	Not Applicable			

Reference	Condition	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Project Approval 11-0047	7	Where the noise impact assessment determines that the cumulative noise generated by the project combined with the noise from the other mine(s) cause, or is likely to cause, sustained exceedances of the criteriea in Table 3, then the owner(s) can make a written request to the Proponent for one of the following: a) mitigation (such as double glazing, insulation and air conditioning) at the residence in consultation with the owner(s). These measures must be reasonable and feasible and directed towards reducing the noise impacts of the project of the redience. If within 3 month of receiving this request from the owner(s), the Proponent and owner(s) cannot agree on the measures to be omplemented, or there is a dispute about the implementation of these measures, then either party may reger the matter to the Director-General for resolution; or b) acquisition of the residence and land in accordance with the procedures in conditions 8 and 9 of Schedule 4.	This has not occurred in the audit period	Not Applicable			
Project Approval 11-0047	7	Upon receiving a written request from the owner(s), the Proponent must undertake whichever option has been requested by the owner(s).	This has not occurred in the audit period	Not Applicable			
Project Approval 11-0047	7	However, this condition does not apply if the Proponent has an agreement with the owner(s) of the relevant residence to generate higher noise levels, and the Proponent has advised the Department in writing of the terms of this agreement.	Noted				
Project Approval 11-0047	7	The Proponent may seek to recover an equitable share of the costs incurred from the other mines contributing to the cumulative impact. Unless otherwise agree between the mines, the proportional contributions should be based on expert analysis of the monitoring results to asssess relative contribution to the impact. In the event of a dispute between the mines the Proponent, or one of the contributing mines, may submit the matter to the Director-General for resolution. The Director-General's decision shall be final.	Noted				
Project Approval 11-0047	7	Notes: 1 The notes to condition 4 of this Schedule also apply to this condition. 2 The noise impact assessment shall include assessment of the relative contribution of the mines to the impact at the residence.	Noted				
	Road Traffic Noise Criteria						
Project Approval 11-0047	8	The Proponent shall ensure that the noise generated by the project on public roads does not exceed the criteria in Table 4 at any existing residence on privately-owned land. *Table 4: Road traffic noise criteria dB(A)* Land: All privately-owned residences; Day $L_{Aeq(period)}$: 60; Evening $L_{Aeq(period)}$: 60; Night $L_{Aeq(period)}$: 55 However, these criteria do not apply if the Proponent has a written agreement with the relevant landowner to exceed the criteria, and the Proponent has advised the Department in writing of the terms of this agreement.	Spectrum reports indicate no exceedance of this criteria	Compliant			
	Attenuation of Plant						
Project Approval 11-0047	9	The Proponent shall: a) ensure that: all trucks, dozers, drills and excavators purchased for used on the site after the date of this approval are commisioned as noise suppressed (or attenuated) units; - All equipment and noise control measures deliver sound power levels that are equal to, or less than, the sound power levels identified in the EA, and correspond to best practive, or the application of best available economically achievable technology; - Improvements are made to existing noise suppression equipment as improved technology becomes availabel where reasonable and feasible; and b) monitor and report on the implementation of these requirements annually on its website.	No noise attenduated equipment. No new equipment purchased since the approval was granted.	Compliant			
Project Approval 11-0047	10	The Proponent shall: a) conduct an annual testing program of the plant on site; b) restore the effectiveness of any attenuation if it is found to be defective; and c) repr on the results of any testing and/or attenuation work within the Annual Review.	Spectrum reports sighted for SPL testing of equipment	Compliant			
	Operation Conditions						

Reference	Condition	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Project Approval 11-0047	11	11. The Proponent shall: a) implement best management practice to minimise all operational, low frequency, road and rail traffic noise levels associated witht the project; b) operate a comprehensive on-site noise management system that uses a combination of predictive meteorological forecasting and real-time noise monitoring data to guide the day to day planning of mining operations and the implementation of both proactive and reactive noise mitigation measures to ensure compliance with the relevant conditions of this approval; c) maintain the effectiveness of noise suppression equipment on plant at all times and ensure defective plant is not operationally used until fully repaired; d) ensure that noise attenuated plant is deployed preferentially in locations near to sensitivie receivers; e) minimise the noise impacts of the project during meteorogical conditions under which the noise limits in this approval do not apply (see condition 13); f) ensure that project related trains on the Boggabri spur line only use locomotives that are approved to operate on the NSW rail network in accordance with the noise limits in ARTC's EPL (No. 3142); g) use its best endeavours to ensure that project-related rolling stock supplied by service providers on the Boggabri rail spur line is designed, constructed and maintained to minimise noise; and	A) Noise levels have been acceptable and there have been no low frequency noise complaints. Since there has been no change in equipment, operational changes to minimise noise impacts appear to have been successful. B) site uses directional real time noise monitoring combined with supplied predictive meteorological data to manage the issue c) reviewed maintenance system, no noisy equipment identified on-site. d) not applicable, no new equipment e) confirmed during interview f) rail spur not constructed at the time of the audit g) not triggered	Compliant			
Project Approval 11-0047	11	h) co-ordinate the noise management on site with the noise management at other mines within the Leard Forest Mining Precinct, to minimise the cumulative noise impacts of these mines, to the satisfaction of the Director-General.	Noise Management Strategy BTM March 2014 submitted to DP&E but not yet approved.	Not Applicable			
	Noise Management Plan						
Project Approval 11-0047	12	12. The Proponent shall prepare and implement a Noise Management Plan for the project to the satisfaction of the Director-General. This plan must: a) be prepared in consultation with the EPA, and be submitted to the Director-General for approval by the end of May 2013; b) describe the measures that would be implemented to ensure: best management practice is being employed; the noise impacts of the project are minimised during meteorologicial conditions under which the noise limits in the approval do not apply; and compliance with the relevant conditions of this approval;	The Noise Management Plan details these requirments, and has been prepared in consultation with the EPA. Prepared before the end of May 2103.	Compliant			
Project Approval 11-0047	12	c) describe the proposed noise management system in detail; d) include a risk/response matrix to codify operational responses to varying levels of risk resulting from weather conditons and specfiic mining activiities; e) include commitments to provide summary reports and specific briefings at CCC meetings on issues arising from noise monitoring; f) include a monitoring program that; uses attended monitoring to evaluate the performance of the project, including a minimum of four days attended moniotring per quarter at locations agree to by the Director-General, or more regularly where required; uses real-time monitoring to support the proactive and reactive noise management system on site; includes monitoring of inverstion strength at an appropriate sampling rate to determine compliance with noise limits; evaluates and reports on the effectiveness of the noise management system on site; provides for the annual validation of the noise model for the project (including the tenth percentile methodology); and	The Noise MP satisfies these requirements	Compliant			
Project Approval 11-0047	12	g) includes a Leard Forest Mining Precinct Noise Management Strategy, that has been prepared in consultation with other coal mines in the Precinct, to minimise the cumulative noise impacts of all mines within the Precinct, and includes: a description of the measures that would be implemented to ensure that the noise managemenet of the mines is properly co-ordinatd to ensure comliance with the relevant noise criteria; a suitable monitoring network for the precinct; protocols for data sharing; and procedures for idenfitiying and apportioning the source/s and contribution/s to cumulative noise impacts for the operating mines and other sources, using the noise and meterorological monitoring network and appropriate investigative tools.	The Strategy has been prepared but has not been approved by DP&E yet. Once approved it will be included in the Noise MP.	Not Applicable			
Project Approval 11-0047	12	Note: The Leard Forest Mining Precinct Noise Management Stategy can be developed in stages and will need to be subject to ongoing review dependent upon the determination and commencement of other mining projects in the area.	Noted, first version not approved at the time of the audit.	Not Applicable			
	Noise Management						

Reference	Condition	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Project Approval 11-0047	13	13. Where conditions in this approval refer to measurement of noise inthe context of the NSW Industrial Noise Policy the inversion class to be applied to the project is Class G. However, the Proponent may undertake an investigation to determine whether a proposal for change in this classification could be considered for approval by the Director-General. Any such investigation must be conducted in consultation with the EPA and be conducted by a suitably qualified person whose appointment has been endorsed bythe EPA and approved by the Director-General. The report and recommendation must be submitted to the EPA for endorsement prior to submission to the Director-General . If the Director-General is satisfied that the recommendation is reasonable, then the Director-General may amend the inversion class applying to the project under this approval.	Spectrum acoustics monitoring reports specify Class G inversions	Compliant			
	BLASTING						
	Blasting Criteria						
Project Approval 11-0047	14	The Proponent shall ensure that blasting does not cause any exceedence of the criteria in Table 5. Table 5: Blasting criteria  However, these criteria do not apply if the Proponent has a written agreement with the relevant owner or infrastructure provider/owner to exceed the limits in Table 5, and the Proponent has advised the Department in writing of the terms of this agreement.	30-06-14 Matong Station 122.7dBA, this monitor is on project owned land. Otherwise compliant in the audit period	Compliant			
	Blasting Hours						
Project Approval 11-0047	15	The Proponent shall only carry out blasting on the site between 9 am and 5 pm Monday to Saturday inclusive. No blasting is allowed on Sundays, public holidays. Or at any time without the written approval from the Director-Gerneral	Compliant in the audit period	Compliant			
	Blasting Frequency						
Project Approval 11-0047	16	The Proponent may carry out a maximum of: (a) 1 blast a day; unless an additional blast is required following a blast misfire; and (b) 4 blasts a week, averaged over a calendar year, for the project. This condition does not apply to blasts that generate ground vibration of 0.5 mm/s or less at any residence on privately-owned land, or to blast required to ensure the safety of the mine or its workers. Note: for purposes of this condition a blast refers to a single blast event, which may involve a number of individual blasts fired in quick succession in a discrete area of the mine.	15th May 2014, two blasts on the same day, second blast fr safety and notifications made. 17-4-13 two blasts fired, the second was not notified to neighbours or the EPA. Both blasts were below 0.5mm/s at all monitors.	Compliant			
	Property Inspections						
Project Approval 11-0047	17	If the Proponent receives a written request from the owner of any privately-owned land within 2 kilometres of the approved open-cut pit on site, for a property inspection to establish the baseline conditon of any buildings and/or structures on his/her land, or to havr a previous property inspection report updated, then within 2 months of receiving this request the Proponent shall: (a) commission a suitably qualified, experienced and independent person, whose appointment is acceptable to both parties, to: (b) establish the baseline condition of any buildings and/or structures on the land, or update the previous property inspection report; and (c) identify any measures that should be implemented to minimise the potential blasting impacts of the project on these buildings and/or structures; and (d) give the landowner a copy of the new or updated property inspection report. If there is a dispute over the selection of the suitably qualified, experienced and independent person, or the Proponent or landowner disagres with the findings of the idependent property investigation, either party may refer the matter to the Director-General for resolution.	None received in the audit period	Not Applicable			
	Property Investigations						

Reference	Condition	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Project Approval 11-0047	18	If any owner of the privately-owned land within 2 kilometres of blasting operations, or any other landowner nominated by the Director-General, claims that the building and/or structures on his/her land have been damaged as a result of blasting on site, then within 2 months of receiving this claim in writing from the landowner, the proponent sall: (a) commission a suitably qualified, experienced and independent person, whose appointment is acceptable to both parties, to investigate the claim; and (b) give the landowner a copy of the property investigation report. If this independent property investigation confirms the landowner's claim, and both parties agree with these findings, then the Proponent shall repair the damages to the satisfaction of the Director-General. If there is a dispute over the selection of the suitably qualified, experienced and independent person, or the Proponent or landowner disagrees with the findings of the independent property investigation, either party may refer the matter to the Director-General.	This has not occurred in the audit period	Not Applicable			
	Property Investigations						
Project Approval 11-0047	19	During mining operations on site, the Proponent shall: (a) implement best practice blasting management to: protect the safety of people and livestock in the surrounding area; protect public or private infrastructure/property in the surrounding area from any damage; minimise the dust and fume emissions of any blasting; and minimise blasting impacts on heritage items in the vicinity of the site; (b) co-ordinate the timing of the blasting on site with the timing of blasting at other mines within the Leard Forest Mining Precinct to minimise the cumulative blasting impacts of the mines; and (c) operate a suitable system to enable the public to get up-to-date information on the proposed balsting schedule on site, to the satisfaction of the Director-General.	Verified in the Blast Management Plan section of the audit.	Compliant			
Project Approval 11-0047	20	The Proponent shall not undertake blasting on-site within 500 metres of: (a) any public road without the approval of Council; or (b) any land outside of the site not owned by the Proponent, unless: - the Proponent has a written agreement with the relevant landowner to allow blasting to be carried out closer to the land, and the Proponent have advised the Department in writing of the terms of this agreement; or the Proponent has: - demonstrated that the blasting can be carried out closer to the land without compromisign the safety of the people or livestock on the land, or damaging the buildings and/or structures on the land; and - updated the Blast management Plan to include the specific measures that would be implemented while blasting is being carried out within 500 metres of the land, to the satisfaction of the Director-General.	No blasting has triggered this condition through being located within the 500m limit	Not Applicable			
	Blast Management Plan						
Project Approval 11-0047	21	21 The Proponent shall prepare and implement a Blast Management Plan for the project to the satisfaction of the Director-General. This plan must: (a) be submitted to the Director-General for approval by the end of May 2013; (b) be prepared in consultation with the EPA and interested members of the local community who would potentially be affected by blasting; (c) propose and justify any alternative ground vibration limits for public infrastructure in the vicinity of the site; (d) describe the measures that would be implemented to ensure:best management practice is being employed; and compliance with the relevant conditions of this approval; (e) include a road closure protocol for blasting within 500 metres of a public road, that has been prepared in consultation with Council; (f) include a specific blast fume management protocol to demonstrate how emissions will be minimised, uncluding risk management studies if blast fumes are generated; (g) include a monitoring program for evaluating blasting performance, which includes: compliance with the applicable criteria; and minimising blast fume emissions; and	a) Compliant b) Compliant c)None proposed d) Best practise applied, not blast results are generally good indicative of good practise. e) Road Closure protocol not included but has been developed separately and approved. f) Fume Management Plan developed g) this is addressed and monitoring resuts were reviewed by the audit team as were investigations into blasts that did not trigger the monitors. There was no evidence of issues with fume.	Compliant			
Project Approval 11-0047	21	(h) include a Leard Forest Mining Precinct Blast Management Strategy, that has been prepared in consultation with other mines within the Leard forest Mining Precinct, to minimise cumulative blasting impacts. Note: The Leard Forest Mining Precinct Blast Management Strategy can be developed in stages, and will need to be subject to ongoing review dependent upon the determination of and commencement of other mining projects in the area.	The Leard Forest BMP has not been finalised or approved.	Not Applicable			
	AIR QUALITY AND GREENHOUSE GAS						
	Odour						
Project Approval 11-0047	22	Unless otherwise authorised by an EPL, the Proponent shall ensure that no offensive odours are emitted from the site, as defined under the POEO Act.	No evidenc of offensive odours and no odour complaints	Compliant			
	Greenhouse Gas Emissions						

Reference	Condition	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Project Approval 11-0047	23	The Proponent shall implement all reasonable and feasible measures to minimise the release of greenhouse gas emissions from the site to the satisfaction of the Director-General.	Air Quality and Greenhoue Gas Management Plan	Compliant			
	Air Quality Criteria						
Project Approval 11-0047	24	The Proponent shall ensure that all reasonable and feasible avoidance and mitigation measures are implemented so that particulate matter emissions generated by the project do not cause exceedances of the criteria in Table 6, Table 7 and Table 8 at any residence-on privately owned land or on more than 25 percent of any privately-owned land. The assessment acknowledges that it may not be reasonable and feasible to prevent exceedance of yhe PM10 criteria in Table 6 at property 45 and exceedance of the criteria in Table 7 in year 16 at property 49. (To interpret the property locations referred to see the applicable figure(s) in Appendix 5.)	Air Quality and Greenhoue Gas Management Plan	Compliant			
Project Approval 11-0047	24	Table 6: Long-term criteria for particulate matter Pollutant / Averaging Period / [a] Criterion Total suspended particulate (TSP) matter / Annual / [b] 90 µg/m³ Particulate matter < 10 µm (PM_{10}) / Annual / [b] 30 µg/m³ Table 7: Short-term criteria for particulate matter Pollutant / Averaging Period / [a] Criterion Particulate matter < 10 µm (PM_{10}) / 24 hour / [b] 50 µg/m³ Table 8: Long-term criteria for deposited dust Pollutant / Averaging Period / Maximum increase in deposited dust level / Maximum total deposited dust level [c] Deposited dust / Annual / [b] 2 g/m²/month / [b] 4 g/m²/month Notes to Table 6, Table 7 and Table 8 [b] Total impact (ie incremental increase in concentrations due to the project plus background concentrations due to all other sources).	PM10 data from the Tarrawonga D2 TEOM monitor from 1 January 2013 to 1 December 2014 were provided to the audit. The 24-hour average PM10 data from the monitor show that the monitor recorded three PM10 24-hour average levels greater than the applicable criteria of 50µg/m3. The annual average PM10 concentration for 2013 is 15.3µg/m3 which is below the applicable annual average criteria of 30µg/m3. Two of the three elevated 24-hour average PM10 levels recorded at the D2 TEOM monitor (which occurred on 19 April 2013 and 11 May 2013) were due to a large spike in the data at a time that the wind was not blowing from the Mine towards the monitor, and thus the elevated levels on these two days are likely to be due to localised sources which were unrelated to Tarrawonga. A detailed analysis was conducted of the third elevated level of 78.7µg.m3 which occurred on 15 November 2014. It was found that elevated PM10 levels were recorded when the wind direction was generally downwind to the monitor. Tarrawonga's contribution to the 24-hour average level recorded at the D2 monitor on 15 November 2014 was calculated as the total dust level recorded when the monitor was downwind of the mine. This analysis conservatively assumes all dust levels recorded during these periods were due to Tarrawonga (and no other sources) and on this basis the contribution was estimated to be up to 32.5% of the total level of 78.7µg/m3, or 28.1µg/m3. HVAS data were provided for two locations from May 2007 to June 2014, however the data at one of the locations are non-compliant as they are being measured on a non-EPA run day. In this case the data show levels above the 24-hr average criterion that are not explained by the Mine.	Compliant			
Project Approval 11-0047	24	[b] Incremental impact (ie incremental increase in concentrations due to the project on its own). [c] Deposited dust is to be assessed as insoluble solids as defined by Standards Australia, AS/NZS 3580.10.1:2003: Methods for Sampling and Analysis of Ambient Air - Determination of Particulate Matter - Deposited Matter - Gravimetric Method. [d] Excludes extraordinary events such as bushfires, prescribed burning, dust storms, sea fog, fire incidents or any other activity agreed by the Director-General. "Reasonable and feasible avoidance measures" includes, but is not limited to, the operational requirements in conditions 28 and 29 to develop and implement a real-time air quality management system that ensures operational responses to the risks of exceedance of the criteria.	Noted				
	Mine-Specific Air Quality Criteria						
Project Approval 11-0047	25	The Proponent shall ensure that particulate matter emissions generated by the project do not exceed the criteria listed in Table 9 at any residence on privately-owned land or on more than 25 percent of any privately-owned land, except on property 49 in year 16. Table 9: Short-term criteria for particulate matter Pollutant / Averaging Period / Criterion Particulate matter < 10 µm (PM_{10}) / 24 hour / 50 µg/m³ Note: As provided by the EP&A Act, the criterion in Table 9 may be amended to a more stringent criterion in an EPL, after the first review of the EPL under section 78 of the POEO Act.	The 24-hour average PM10 data from the Templemore and Merriown HVAS monitors for January 2013 to June 2014 are presented in Figure 3 and show three PM10 24-hour average levels greater than the applicable criteria of 50µg/m3. The Templemore and Merriown HVAS monitors recorded 2013 annual average PM10 levels of 19.7µg/m3 and 14.7µg/m3 respectively, which are below the applicable criteria of 30µg/m3. Analysis of the meteorological conditions on the three days with elevated HVAS PM10 levels show that the monitors would have been downwind of Tarrawonga approximately 32%, 2% and 11% of the time on 9 January 2013, 15 October 2013 and 15 February 2014 respectively. Based on the relatively small percentage of time the monitors were downwind of the mine, it is unlikely that Tarrawonga would have contributed significantly to the total levels measured on 15 October 2013 and 15 February 2014, and is unlikely to have contributed more than approximately 32% of 24-hour average PM10 result of 52.9µg/m3 recorded on 9 January 2013, or more than approximately 17µg/m3. It should be noted that the analysis assumes a constant dust level over the monitoring period to provide an indicative estimate of Tarrawonga's contribution. A more accurate analysis would subtract the level recorded at Merriown monitor, as it was generally upwind of the mine, from the corresponding downwind level at the Templemore monitor. However as noted above, the monitors do not record data on the same day as required, hampering such an analysis.	Not Compliant Administrative			

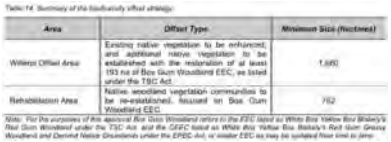
Reference	Condition	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Project Approval 11-0048	25		Three HVAS results exceeded 24-hr average PM_{10} criteria levels between January 2013 and June 2014, but no evidence of any investigation by the mine to determine whether there were extraordinary events. The three machines were not controlled by TCPL. No publically available information with which to assess compliance (or not) for PM_{10} and TSP. The AQMP states that the TEOMs are not used for compliance purposes, but there is no otherwise inferred assessment of compliance available for 2013-2014 for the audit.				
Project Approval 11-0049	25						
	Air Quality Acquisition Criteria						
Project Approval 11-0047	26	If particulate matter emissions generated by the project exceed the criteria, or contribute to an exceedance of the relevant cumulative criteria, in Table 10, Table 11 or Table 12, at any residence on privately-owned land or on more than 25 percent of any privately-owned land, then upon receiving a written request for acquisition from the landowner the Proponent shall acquire the land in accordance with the procedures in conditions 8 and 9 of schedule 4.	No acquisition due to air quality in the audit period.	Not Applicable			
Project Approval 11-0047	26	*Table 10: Long term land acquisition criteria for particulate matter* **Pollutant** / **Averaging period** / **[a] Criterion** Total suspended particulate (TSP) matter / Annual / [b] 90 µg/m³ Particulate matter < 10 µm (PM_{10}) / Annual / [b] 30 µg/m³ *Table 11: Short term land acquisition criteria for particulate matter* **Pollutant** / **Averaging period** / **[a] Criterion** Particulate matter < 10 µm (PM_{10}) / 24 hour / [b] 150 µg/m³ Particulate matter < 10 µm (PM_{10}) / 24 hour / [b] 50 µg/m³ *Table 12: Long term land acquisition criteria for deposited dust* **Pollutant** / **Averaging period** / **Maximum increase in deposited dust level** / **Maximum total deposited dust level** [c] Deposited dust / Annual / [b] 2 g/m²/month / [b] 4 g/m²/month *Notes to Table 10, Table 11 and Table 12:* [a] Total impact (ie incremental increase in concentrations due to the project plus background concentrations due to all other sources). [b] Incremental impact (ie incremental increase in concentrations due to the project on its own). [c] Deposited dust is to be assessed as insoluble solids as defined by Standards Australia, AS/NZS 3580.10.1:2003: Methods for Sampling and Analysis of Ambient Air - Determination of Particulate Matter - Deposited Matter - Gravimetric Method. [d] Excludes extraordinary events such as bushfires, prescribed burning, dust storms, sea fog, fire incidents, or any other activity agreed by the Director-General.	Noted, no acquisition in the audit period	Not Applicable			
	Mine-owned Land						
Project Approval 11-0047	27	The Proponent shall ensure that all reasonable and feasible avoidance and mitigation measures are implemented so that particulate matter emissions generated by the project do not exceed the criteria in Table 6, table 7 and Table 8 at any occupied residence on any mine-owned land (including land owned by adjacent mines), unless: (a) the tenant and/or landowner has been notified of any health risks in accordance with the notification requirements under schedule 4 of this approval; (b) the tenant on project-related land can terminate the tenancy agreement without penalty, subject to giving reasonable notice, and the Proponent uses its best endeavours to provide assistance with relocation and sourcing of alternative accomodation; (c) air mitigation measures such as air filters, a first flush roof water drainage system and/or air conditioning are installed at the residence, if requested by the tenant and landowner (where owned by another mine other than the Proponent); (d) particulate matter air quality monitoring is undertaken to inform the tenant and landowner of potential health risks; and (e) monitoring data is presented to the tenant in an appropriate format, for a medical practitioner to assist the tenant in making an informed decision on the health risks associated with occupying the property, to the satisfaction of the Director-General.	None of these scenarios have occurred in the audit period.	Not Applicable			
	Operating Conditions						

Reference	Condition	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Project Approval 11-0047	28	The Proponent shall: (a) implement best practice management to minimise the off-site odour, fume and dust emissions of the project; (b) operate a comprehensive air quality management system on site that uses a combination of predictive meteorological forecasting, predictive and real time are dispersion modelling and real-time air quality monitoring data to guide the day-to-day planning of mining operations and implementation of both proactive and reactive air quality mitigation measures to ensure compliance with the relevant conditions of this approval; (c) manage PM2.5 levels in accordance with any requirements of an EPL; (d) minimise the air quality impacts of the project during adverse meteorological conditions and extraordinary events (see note D under table 8); (e) minimise any visible off-site air pollution; (f) minimise the surface disturbance of the site generated by the project; and (g) co-ordinate the air quality management on site with the air quality management at other mines within the Leard Forest Mining Precinct to minimise the cumulative air quality impacts of the mines, to the satisfaction of the Director-General.	a) Reasonable and feasible measures to mitigate dust emissions appear to be listed in the AQMP. B) Mine operates predictive meteorological forecasting, but does not appear to operate any predictive or real-time air dispersion modelling to guide day-to-day planning of the mining operations. c)There are no PM2.5 requirements in the EPL. d) Mine has a protocol for operations under adverse meteorological conditions. e) Mine has a protocol for operations under adverse meteorological conditions. f) assessed elsewhere inthis audit as compliant with comments. g) Strategy is in place, and evidence of shared data.	Not Compliant	D	2	Medium
	Operating Conditions						
Project Approval 11-0047	29	29 The proponent shall prepare and implement an Air Quality and Greenhouse Gas Management Plan for the project to the satisfaction of the Director-General. This plan must: (a) be prepared in consultation with the EPA and be submitted to the Director-General for approval by the end of May 2013; (b) describe the measures that would be implemented to ensure: best practice management is being employed; the air quality impacts of the project are minimised during adverse meteorological conditions and extraordinary events; and compliance with the relevant conditions of this approval;	a) compliant b) AQMP incorporates such measures, but is not specific about extraordinary events, and does not contain a clear procedure to identify compliance with the 24-hour average PM10 criterion.	Not Compliant Administrative			
Project Approval 11-0047	29	c) describe the proposed air quality management system; (d) include a risk/response matrix to codify mine operational responses to varying levels of risk resulting from weather conditions and specific mining activities; (e) include commitments to provide summary reports and specidic briefings at CCC meetings on issues arising from air quality monitoring; (f) include and air quality monitoring program that: uses a combination of real-time monitors and supplementary monitors to evaluate the performance of the project; adequately supports the proactive and reactive air quality management system; includes PM2.5 monitoring; includes monitoring of occupied mine-owned residences and residences on the air quality affected land in Table 1, subject to the agreement of the tenant and/or landowner; evaluates and reports on the effectiveness of the air quality management system; includes sufficient random audits of operating responses to real time air quality management systems to determine the ongoing effectiveness of these responses in maintaining the project within the relevant criteria in this Schedule and the requirements of conditions 24 and 25, above; includes a protocol for determining any exceedences of the relevant conditions in this approval; and	c) AQMP outlines the system to manage air quality. D) AQMP outlines risk and response matrix as part of daily dust inspections. E) AQMP includes such commitments. F) AQMP includes most of these aspects, but does not appear to cover; - supplementary monitors; - protocol for determining exceedances of 24-hour PM10 and TSP criterion.				

Reference	Condition	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Project Approval 11-0047	29	(g) includes a Leard Forest Mining Precinct Air Quality Management Strategy that has been prepared in consultation with the other coal mine in the Precinct to minimise the cumulative air quality impacts of all mines within the Precinct, that includes: systems and processes to ensure that all mines are managed to achieve their air quality criteria; a shared environmental monitoring network and data sharing protocol; control monitoring site (s) to provide real time data on background air quality levels (ie not influenced by mining in the Leard Forest Mining Precinct and representative of regional air quality); a shared predictive and real time air dispersion model covering the Lear Forest Mining Precinct to be used for assessment of cumulative impacts, optimising locations of the shared real time monitoring network, validation of air predictions and optimising mitigation measures; and procedures for identifying and apportioning the source/s and contribution/s to cumulative air impacts for both mines and other sources, using the air quality and meteorological monitoring network and appropriate investigative tools such as modelling of post incident plume dispersion, dual synchronised monitors and chemical methods of source apportionment (where possible). Notes: the requirement for regionally based control sites can be firther reviewed if a regional air monitoring network is implemented and operated by the EPA as recommended in the drat Strategic Regional Land Use Plan for New England North West. The Leard Forest Mining Precinct Air Quality Management Strategy can be developed in stages and will need to be subject to ongoing review dependent upon the determination of and commencement of other mining projects in the area. The management plan should be cinsistent with the EPA's guidance on Best Management Practice reporting and Reactive Particulate Management Strategies.	AQMP includes an AQMS for the BTM complex, but the AQMP/S does not appear to cover; - a suitable control monitoring site at present (given that the "Will-gai" site is close to other mining activity, it is not a suitable control monitoring site representative of regional air quality. Tamworth is not in the same air shed and is not a suitable control site either.) - AQMS is not clear that the proposed air dispersion model would cover all of these elements; - Conceptual strategy proposed in the AQMS to identify impacts may not be as effective as described in controlling day to day effects. AQMP includes an AQMS for the BTM complex, but the AQMP/S does not appear to cover; - a suitable control monitoring site at present (given that the "Will-gai" site is close to other mining activity, it is not a suitable control monitoring site representative of regional air quality. Tamworth is not in the same air shed and is not a suitable control site either.) - AQMS is not clear that the proposed air dispersion model would cover all of these elements; - Conceptual strategy proposed in the AQMS to identify impacts may not be as effective as described in controlling day to day effects.				
	METEOROLOGICAL MONITORING						
Project Approval 11-0047	30	For the life of the project, the Proponent shall ensure that there is a meteorological station in the vicinity of the site that: (a) complies with the requirements in the Approved Methods for Sampling of Air Pollutants in New South Wales guideline; and (b) is capable of continuous real-time measurement of temperature lapse rate in accordance with the NSW Industrial Noise Policy, unless a suitable alternative is approved by the Director-General following consultation with the EPA.	Observed in site inspection Data reviewed was not able to sureity as to compliane with a) and b)	Noted			
	SOIL AND WATER						
Project Approval 11-0047		Note: Under the Water Act 1912 and/or the Water Management Act 2000, the Proponent is required to obtain the necessary water licences for the project.	Water Licenses provided and are adequate to cover groundwater extraction.	Compliant			
	SOIL AND WATER						
Project Approval 11-0047	31	The Proponent shall ensure that it as sufficient water for all stages of the projects, and if necessary, adjust the scale of mining operations on site to match its available water supply, to the satisfaction of the Director-General.	Noted, site has not run out of water and currently has an excess. The water balance is presented in the AEMR for the DGs approval.	Compliant			
	Compensatory Water Supply						
Project Approval 11-0047	32	The Proponent shall provide a compensatory water supply to any owner of privately-owned land whose water supply is adversely and directly impacted (other than negligible impact) as a result of the project, in consultation with NOW, and to the satisfaction of the Director-General. The compensatory water supply measures must provide an alternative long-term supply of water that is equivalent to the loss attributed to the project. Equivalent water supply should be provided (at least on an interim basis) within 24 hours of the loss being identified. If the Proponent and the landowner cannot agree on the measures to be implemented, or there is a dispute about the implementation of these measures, then either party may refer the matter to the Director-General for resolution. If the Proponent is unable to provide an alternative long-term supply of water, then the Proponent shall provide alternative compensation to the satisfaction of the Director-General.	No incidents relating to this condition	Not Applicable			
	Surface Water Discharges						
Project Approval 11-0047	33	The Proponent shall ensure that all surface water discharges from the site comply with the discharge limits (both volume and quality) set for the project in any EPL.	AEMR indicates that site complies and a review of the monitoring database supports this.	Compliant			
	Goonbri Creek Diversion and Low Permeability Barrier - Performance Objectives						

Reference	Condition	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Project Approval 11-0047	34	The Proponent shall ensure that the project has no greater environmental consequences than predicted in the EA and complies with the performance objective in Table 13, to the satisfaction of the Director-General. Table 13 Goonbri Creek and alluvial aquifer performance objectives **Feature** / **Objective** Goonbri Creek and the Upper Namoi alluvial aquifer: No more than negligible environmental consequences to the alluvial aquifer, including: • negligible change in groundwater levels; • negligible leakage through low permeability barrier; • negligible change in groundwater quality; and • negligible impact to other groundwater users. Goonbri Creek diversion: Hydrasically and geomurphiologically stable (including the low permeability barrier) Negligible change to off-site flooding characteristics (including flood levels, velocities and flood storage capacity) Riparian vegetation, habitat, energy management and dissipation, bedload transport, biophysical maintenance and pool holding capacity that is the same or better than existed prior to mining Revegetation of the riparian zone focused on establishment of self-sustaining vegetation characteristic of the Brachleate Honeymyrtle community (as proposed in the EA) Low permeability barrier, including associated flood bund: Hydraulically and geomorphologically stable The effectiveness of the Low Permeability Barrier shall be at least 10^{-9} metres/second. Negligible change to off-site flooding characteristics (including flood levels, velocities and flood storage capacity) Provides suitable protection for flood events up to and including the Probable Maximum Flood	Mining is currently not moving towards Goonbri Creek as quickly as predicted in the EA and there will be no impacts in the medium term. When mining returns to plan the Goonbri Creek Management Plan and design of the low permiability barrier will be developed for approval.	Not Applicable			
	Goonbri Creek Diversion and Flood Bund Concept Design Plan						
Project Approval 11-0047	35	"(a) be prepared in consultation with NOW, EOH and the Namoi CMA; (b) be submitted to the Director-General for approval by December 2016; (c) set out the vison statement for the creek diversion; (d) assess the surface water and groundwater quality, ecology, hydrological (including flooding) and geomorphic baseline conditions within the creek; (e) set out the construction program for the creek diversion and LPB, describing how the work would be staged, and integrated with mining operations; (f) describe the revegetation program for the creek diversion and the use of a range on suitable native species; (g) establish the water quality, ecology, hydrological (including flooding) and geomorphic performance and completion criteria for the creek diversion and LPB based on the assessment of baseline conditions; and (h) be revised in consultation with NOW, OEH and the Namoi CMA, and resubmitted for approval by the Director-General in response to the findings of the detailed technical design required in condition 36 and the Monitoring and Management Plan in condition 38.	Mining is currently not moving towards Goonbri Creek as quickly as predicted in the EA and there will be no impacts in the medium term. When mining returns to plan the Goonbri Creek Management Plan and design of the low permiability barrier will be developed for approval.	Not Applicable			
	Goonbri Creek Diversion and Low Permeability Barrier - Design and Construction						
Project Approval 11-0047	36	"36 The Proponent shall design the Goonbri Creek diversion and LPB to the satisfaction of NOW and the Director-General. The detailed designs must: (a) be designed by a suitably qualified and experienced expert/s; (b) be endorsed by NOW and approved by the Director-General prior to the commencement of any works or construction on the Goonbri Creek diversion and LPB; (c) be generally in accordance with the conceptual designs in the EA (and depicted in Appendix 6), and applicable to Australian Standards (including AS 3798-2007); (d) include detailed design, construction and engineering specifications, performance criteria and completion criteria; (e) deonstrate that the design would achienve the relevant performance objectives and criteria; and (f) demonstrate the LPB design would remain effective over an appropriate lifespan and would withstand mining operations, geological and weather events, decay and corrosive attack - including biological attack. 37 The Proponent shall: (a) construct the Goonbri Creek diversion and LPB prior to undertaking any mining operations within 200 metres of the Goonbru Creek alluvium, and at least 5 years prior to the planned mining in the alluvium; and (b) within 2 months of the construction of the Goonbri Creek diversion and LPB, submit an as-executed report to the Director-General and NOW, certified by a practising engineer, confirming that the diversion and barrier have been constructed: in accordance with the concept design in the EA, applicable Australian Standards)including AS 3798-2007) and the approved design (see condition 36 above); and in a manner that achieves the performance objectives in Table 13. "	Mining is currently not moving towards Goonbri Creek as quickly as predicted in the EA and there will be no impacts in the medium term. When mining returns to plan the Goonbri Creek Management Plan and design of the low permiability barrier will be developed for approval.	Not Applicable			

Reference	Condition	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Project Approval 11-0047	36	"Notes: The Goonbri Creek alluvium, diversion, conceptual low permeability barrier and flood bunds are shown in Appendix 6. The diversion and low permeability barrier may be constructed on a staged basis. In this case, the reports required under conditions 36 and 37 shall be submitted for each stage "	Noted				
Goonbri Creek Diversion and Low Permeability Barrier - Monitoring and Management Plan							
Project Approval 11-0047	38	The Proponent shall prepare and implement a Goonbri Creek Diversion and Low Permeability Barrier Monitoring and Management Plan to the satisfaction of the NOW and the Director-General. The plan must: a) be prepared by a suitably qualified and experienced expert/s; b) be endorsed by the NOW and approved to the Director-General prior to commencement of any works or construction on the Goonbri Creek diversion and LPB; c) describe the monitoring and maintenance procedures to be implemented and the scheduling of these procedures; d) demonstrate the monitoring system would be capable of timely detection of any failure of deficiency in the LPB and any impacts on Goonbri Creek and its associated alluvium; e) describe the contingency measures that would be implemented in the event of a failure or deficiency in the LPB, or other impoact on te Goonbri Creek and its associated alluvium; and f) identify the entity that would take responsibility for the future liabilities and costs associated with the long-term monitoring and maintenance of the LPB, flood bund, void and pit lake, and demonstrate that this entity's security and finances would be assured in the long term.	Mining is currently not moving towards Goonbri Creek as quickly as predicted in the EA and there will be no impacts in the medium term. When mining returns to plan the Goonbri Creek Management Plan and design of the low permiability barrier will be developed for approval.	Not Applicable			
Water Management Plan							
Project Approval 11-0047	39	The Proponent shalll prepare and implement a water Management Plan for the project to the satisfaction of the Director-General. This plan must: a) be prepared in consultation with OEH, NOW and Namoi Cma, by suitably qualified and experienced person/s whose appointment has been approved by the Director-General. b) be submitted to the Director-General for approval by the end of May 2013; and c) in addition to the standard requirements for management plans (see condition 3 of schedule 5), include a:	WMP issued to DP&E in accordance with project approval. Comments received, and being addressed at the time of the audit.	Compliant			
Project Approval 11-0047	39	i) Site Water Balance, that includes: details of: sources and security of water supply, including contingency for future reporting periods; water use and managemen on site; any off-site water discharges; reporting procedures, including the preparation of a site water balance for each calendar year; a program to validate the surface water model, including monitoring discharge volumes from the site and comparison of monitoring results with modelled predictions; and describes the measures that would be implemented to mininmise clean water use on site;	There is a water balance included. The water balance meets these criteria though some of the criteria are met in the WMP. It is an updated version, created in 2014 in line with the requirement for annual updates but there is no specific reference to an annual update fo the Water Balance.				
Project Approval 11-0047	39	ii) Surface Water Management Plan, that includes: detailed baseline data on surface water flows and quality in the water-bodies that could potentially be affected by the project; detailed baseline data on soils within the irrigation area; detailed baseline data on hydrology across the downstream drainage system of the Namoi River floodplain from the mine site to the Namoi River, including Barbers Lagoon and The Slush Holes; a detailed description of the water management system on site, including the: clean water diversion systems; erosion and sediment controls (mine water system); mine water management systems including irrigation areas; discharge limits in accordance with EPL requirements; and water storages; detailed plans, including design objectives and performance criteria for: design and management of final voids; design and management for the emplacement of reject materials, sodic and dispersible soils and acid or sulphate generating materials; the Goonbri Creek diversion and low permeability barrier; reinstatement of drainage lines on the rehabilitated areas of the site; and control of any potential water pollution from the rehabilitated areas of the site; performance criteria for the following, including trigger levels for investigating any potentially adverse impacts associated with the project: the water management system; soils within the irrigation area; downstream surface water quality; downstream flooding impacts, including flood impacts due to the flood bunds required for the project; and	The WMP developed by URS in 2013 does not contain all of these details. The detailed baseline data on hydrology of the Namoi is not present.	Not Compliant	5	1	Medium

Reference	Condition	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Project Approval 11-0047	39	stream and riparian vegetation health, including the Namoi River and its tributaries including Barbers Lagoon and The Slush Holes; a program to monitor and assess: the effectiveness of the water management system; soils withing the irrigation area; the effectiveness of the Goonbri Creek diversion and flood bunds (see conditions 34-38); surface water flows and quality in the watercourses that could be affected by the project; and downstream flooding impacts; reporting procedures for the results of the monitoring program; and a plan to respond to any exceedences of the performance criteria, and mitigate and/or offset any adverse surface water impacts of the project;		Not Compliant	2	1	Medium
Project Approval 11-0047	39	iii) Groundwater Management Plan, that includes: detailed baseline data of groundwater levels, yield and quality in the region, and privately-owned groundwater bores including a detailed survey/schedule of groundwater dependent ecosystems (including stygo-fauna), that could be affected by the project; detailed plans, including design objectives and performance criteria, for the design and management of; the proposed final void; and coal reject and potential acid forming material emplacement; groundwater assessment criteria including trigger levels for investigating any potentially adverse groundwater impacts; a program to monitor and assess: groundwater inflows to be open cut mining operations; the effectiveness of the LPB; the seepage/leachate from the LPB, water storages, emplacements and the final void; interconnectivity between the alluvial and bedrock aquifers; background changes in groundwater yield/quality against mine-induced changes; the impacts of the project on: regional and local (including alluvial) aquifers; groundwater supply of potentially affected landowners; groundwater dependent ecosystems (including potential impacts on stygo-fauna) and riparian vegetation; a program to validate the groundwater model for the project, including an independent review of the model every 3 years, and comparison of monitoring results with modelled predictions; and a plan to respond to any exceedences of the performance criteria; and	The Groundwater Management Plan does not refer to stygo-fauna or groundwater dependent ecosystems.				
Project Approval 11-0047	39	"iv) Leard Forest Mining Precinct Water Management Strategy, that has been prepared in consultation with other mines within the precinct to: minimise the cumulative water quality impacts of the mines; review opportunities for water sharing/water transfers between mines; co-ordinate water quality monitoring programs as far as practicable; undertake joint investigations/studies in relation to complaints/exceedences of trigger levels where cumulative impacts are considered likely; and co-ordinate modelling programs for validation, re-calibration and re-running of the groundwater and surface water models using approved mine operation plans. Note: The Leard Forest Mining Precinct Water Management Strategy can be developed in stages and will need to be subject to ongoing review, dependent upon the determination of and commencement of other mining projects in the area. "	The Strategy has been prepared and submitted but is the focus of ongoing improvements and has not been fully implemented.	Not Applicable			
	BIODIVERSITY						
	Biodiversity Offset Strategy						
Project Approval 11-0047	40	The Proponent shall implement the biodiversity offset strategy described in the EA, summarised in Table 14 and shown conceptually in Appendix 7, to the satisfaction of the Director-General. 	The BOS has only been recently developed and approved, implementation has commenced but is in it's infancy.	Compliant			
Project Approval 11-0047	40	Note: For the purposes of this approval Box Gum Woodland refers to the EEC listed as White Box Yellow Box Blakely's Red Gum Woodland under the TSC Act, and the CEEC listed as White Box Blakely's Red Gum Grassy Woodland and Derived Native Grassslands under the EPBC Act, or similar EEC as may be updated from time to time.	Noted				
	Leard Forest Mining Precinct Regional Biodiversity Strategy						

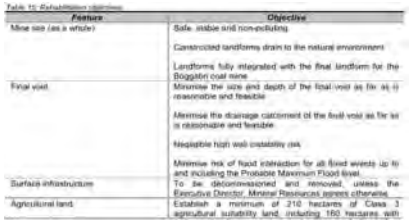
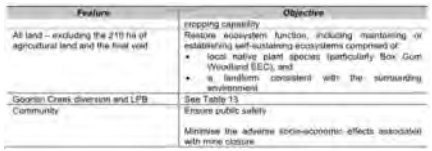
Reference	Condition	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Project Approval 11-0047	41	The Proponent shall contribute to the funding and preparation of the Leard Forest Mining Precinct Regional Biodiversity Strategy, as required under the approvals for the Boggabri coal mine and Maules Creek coal mine, to the satisfaction of the Director-General.	Submitted to Commonwealth but State have not approved	Not Applicable			
Project Approval 11-0047	41	*"Notes:* *The approvals for the Boggabri coal mine and Maules Creek coal mine require the proponents of the mines in the Leard Forest mining precinct to prepare the regional biodiversity strategy in 3 stages, including:* *Stage 1 Scoping Stage, by the end of January 2013;* *Stage 2 Stategy Development Stage, by the end of January 2014; and* *Stage 3 Stategy Review Stage, by the end of December 2018.* *The strategy is required to be prepared in collaboration with a working group comprising relevant government agencies and the Leard Forest mining precinct mines, and charied by an independent person.* *Funding of the strategy should be based on predicted clearing of native vegetation for the three project within the Leard Forest Mining Precinct. Based on the predicited clearing for the projects, the funding split would equate to total contributions of 36% from Boggabri (clearing of 1,385 ha), 54% from Maules Creek (clearing of 2,078 ha) and 10% from Tarrawonga (clearing of 397 ha). This funding arrangement can be further refined in the Stage 1 Scoping Stage.* *"*	Noted				
	Revised Biodiversity Offset Strategy						
Project Approval 11-0047	42	"Within 6 months of the approval of Stage 2 of the Leard Forest Mining Precinct Regional Biodiversity Strategy the Proponent shall review, and if necessary revise, the biodiversity offset strategy for the project to the satisfaction of the Director-General. The review/revision must: be prepared in consultation with OEH, Namoi CMA, Forests NSW, the CCC, DPI Catchments and Lands and SEWPaC; not reduce the size or quality of the offset area; and be consistent (as far as is possible) with the recommendations and objectives of the Leard Forest Mining Precinct Regional Biodiversity Strategy. "	The strategy is not yet approved and undergoing further negotiation with the regulatory authorities.	Not Applicable			
	Threatened Species						
Project Approval 11-0047	43	For the White Box – Yellow Box – Blakely's Red Gum Grassy Woodland Endangered Ecological Community the Proponent shall: a) ensure that the Biodiversity Offset Strategy and site Rehabilitation Strategy is focused on protection rehabilitation, re-establishment and long-term maintenance of viable stands of this community; b) investigate in consultation with OEH and the Namoi CMA, all factors likely to enhance or impede the effective long term restoration of degraded remnants of this EEC in offset areas or regeneration of this EEC on disturbed areas (both offset areas and the site); c) within 24 months of the date of this approval (and if possible in conjunction with Stage 2 of the Leard Forest Mining Precinct Regional Biodiversity Strategy), submit a report of this investigation and provide d) incorporate the approved implementation plan into the revised Biodiversity Management Plan, required under condition48.	a) Complies b) Not commenced c) Due 22-1-15 d) The Strategy is not approved and as in c) above, not yet required	Not Applicable			
Project Approval 11-0047	44	For all threatened species on site, the Proponent shall ensure that the Biodiversity Offset Strategy and Rehabilitation Strategy are focused on protection, rehabilitation and long-term maintenance of viable stands of suitable habitat for these species.	The BOS addresses these issues but they are better detailed in the Willeroi BOMP	Compliant			
Project Approval 11-0047	45	The Proponent shall: a) investigate, in consultation with OEH and the Namoi CMA, all factors likely to enhance or impede the effective long term provision of suitable habitat(s) for the following specieis: Speckled Warbler, Brown Treecreeper, Grey-crowned Babbler, Hooded Robin, Varied Sittella, Turquoise Parrot, Masked Owl, Yellow-bellied Sheath Tail Bat and Squirrel Glider; b) within 12 months of the date of this approval (and if possible, in conjunction with Stage 2 of the Leard Forest Mining Precinct Regional Biodiversity Strategy), submit a report of this investigation and provide an implementation plan to ensure delivery of suitable areas of viable habitat for the species included in (a) above, for approval by the Director-General; and c) incorporate the approved implementation plan into the revised Biodiversity Management Plan, required under condition 48.	See Tarrawonga Coal Mine Threatened Fauna Investigation Report	Compliant			
	Long Term Security of Offset						

Reference	Condition	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Project Approval 11-0047	46	The Proponent shall make suitable arrangements to provide appropriate long-term security for the offset areas: a) for the Willeroi Offset Area the long-term security shall be provided by way of: the Proponent entering into a conservation agreement of agreements pursuant to section 69B of the National Parks and Wildlife Act 1974, recording the obligations assumed by the Proponent under the conditions of this approval in relation to these offset, and registering the agreement(s) pursuant to section 69F of the National Parks and Wildlife Act 1974; or a tenure of higher conservation status such as a National Park, or Nature Reserve, under the National Parks and Wildlife Act 1974, the conservation agreement(s) must be registered by the end of December 2013 unless agreed otherwise by the Director-General after consultation b) by the end of December 2030 unless otherwise agreed by the Director-General, for the woodland to the satisfaction of the Director-General. Note: The Deparment acknowledges that the Proponent is invesitigating the potential to transfer part of all of the Willeroi Offset Area directly to the national park estate, and accepts that interim conservation measures may be implemented prior to this transfer.	Currently not compliant with December 2013 submission date but negotiating with DP&E for an extension to this date.	Not Compliant Administrative			
	Biodiversity Management Plan						
Project Approval 11-0047	47	"The Proponent shall prepare and implement a Biodiversity Management Plan for the project to the satisfaction of the Director-General. This plan must: a) be prepared in consultation with OEH, SEWPaC, Forests NSW, the CCC, DPI Catchments and Lands and the Namoi CMA, and be submitted to the Director-General for approval by the end of May 2013; b) describe the short, medium, and long term measures that would be implemented to: manage the remnant vegetation and habitat on the site and in the offset area; and implement the biodiversity offset strategy, including detailed performance and completion criteria; c) include detailed performance and completion criteria for evaluation the performance of the biodiversity offset strategy, and triggering remedial action (if necessary); d) include a detailed description of the measures that would be implemented for: enhancing the quality of existing vegetation and fauna habitat; restoring native vegetation and fauna habitat on the biodiversity offset area and rehabilitation area through focusing on assisted natural regeneration, targeted vegetation establishment and the introduction of naturally scarce fauna habitat features;	The Willeroi BOMP complies with these requirements	Compliant			
Project Approval 11-0047	47	maximising the salvage of resources within the approved disturbance area – including enhancement of the biodiversity offset area or rehabilitation area; collecting and propagating seed; minimising the impacts on fauna on site, including undertaking pre-clearance surveys; managing any potential conflicts between the proposed restoration works in the biodiversity offset area and any Aboriginal heritage values (both cultural and archaeological); managing salinity; controlling weeds and feral pests; controlling erosion; controlling access; and managing bushfire risk;	The Willeroi BOMP complies with these requirements	Compliant			
Project Approval 11-0047	48	"e) include a seasonally-based program to monitor and report on the effectiveness of these measures, and progress against the detailed performance and completion criteria; f) identify the potential risks to the successful implementation of the biodiversity offset strategy, and include a description of the contingency measures that would be implemented to mitigate against these risks; and g) include details of who would be responsible for monitoring, reviewing, and implementing the plan. Note: The Biodiversity Management Plan and Rehabilitation Management Plan need to be substantially integrated for achieving biodiversity objectives for the rehabilitated mine-site.	The Willeroi BOMP complies with these requirements	Compliant			

Reference	Condition	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Project Approval 11-0047	49	By the end of May 2013, the Proponent shall lodge a Conservation and Biodiversity Bond with the Department to ensure that the biodiversity offset strategy is implemented in accordance with the performance and completion criteria of the Biodiversity Management Plan. The sum of the bond shall be determined by: a) calculating the full cost of implementing the biodiversity offset strategy (other than land acquisition costs); and b) employing a suitably qualified quantitiy surveyor to verify the calculated costs, to the satisfaction of the Director-General. If the offset strategy is completed generally in accordance with the completion criteria in the Biodiversity Management Plan to the satisfaction of the Director-General, the Director-General will release the bond. If offset strategy is not completed generally in accordance with the completion criteria in the Biodiversity Managemenet Plan, the Director-General will call in all, or part of, the conservation bond, and arrange for the satisfactory completion of the relevant works. With the agreement of the Director-General, this bond may be combined with rehabilitation security deposit administered by DRE. Notes: Alternative funding arrangements for long term management of the Biodiversity Offset Strategy, such as provision of capital and management funding as agreed by OEH as part of a Biobanking Agreement or transfer to conservation reserve estate can be used to reduce the liability of the conservation and biodiversity bond. The sum of the bond may be reviewed in conjunction with any revision to the biodiversity offset strategy.	Biodiversity Management Plan not approved, not able to calculate bond amount, not compliant with deadline stated.	Not Compliant Administrative			
	Independent Biodiversity Audit						
Project Approval 11-0047	50	By the end of June 2014 and every 3 years thereafter, unless both the Director-General and OEH agree to a different timeframe, the Proponent shall commission suitably qualified, experiences and independent person/s, whose appointment has been approved by the Director-General, to undertake an audit of the revegetation of the rehabilitation area and management and restoration within the Biodiversity Offset Strategy areas to the satisfaction of the Director-General. This audit must: a) include consultation with OEH, Namoi CMA, DPI Catchments and Lands, SEWPaC, CCC and DRE; b) assess the performance of the revegetation in the rehabilitation area completed to date (and the Goonbri Creek Diversion, once commenced) against the completion criteria in the Rehabilitation Management Plan; c) assess the performance of management and restoration in the off-site Biodiversity Offset d) identify any additional measures that should be implemented to improve the performance of rehabilitation, management and restoration within the rehabilitation and biodiversity offset areas; and d) identify any additional measures that should be applied in the establishment of native vegetation, including riparian vegetation around the realigned Goonbri Creek, both before and after the realignment is undertaken;	This audit, non-compliant with timing requirements	Not Compliant Administrative			
Project Approval 11-0047	50	e) if the completion criteria have not been met, or are not adequately trending towards being met, determine the liekly ecological value of the rehabilitation and restoration once completed, and recommend additional measures to augment the Biodiversity Offset Strategy to ensure that it adequately offsets the project's impacts on biodiversity. If the audit recommends the implementation of additional measures to augment the Biodiversity Offset Strategy in accordance with (e) above, then within 6 months of the completion of the audit the Proponent shall revise the Biodiversity Offset Strategy, in consultation with the Department, OEH and SEWPaC, and to the satisfaction of the Director-General.					
	HERITAGE						
	Aboriginal Heritage Conservation Strategy						

Reference	Condition	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Project Approval 11-0047	51	The Proponent shall prepare and implement an Aboriginal Heritage Conservation Strategy for the project and the Biodiversity Offset Strategy areas to the satisfaction of the Director-General. This strategy must enhance and conserve the Aboriginal cultural heritage values (both cultural and archaelogical) and provide for their long-term protection and management. The Strategy must: a) be prepared by suitably qualified and experiences person/s whose appointment has been endorsed by the Director-General; b) be prepared in consultation with OEH, the local Aboriginal community and other mines within the Leard Forest Mining Precinct, and submitted the Director-General for approval within 12 months from the date of project approval; c) identify the Aboriginal cultural heritage values of the Biodiversity Offset Strategy areas; d) identify areas of high Aboriginal cultural heritage significance within both the site and the Leard Forest Mining Precinct; e) identify a range of options for enhancing and conserving Aboriginal cultural heritage values, with specific consideration of the potential for the long-term protection and management of significant sites within either the site, the Biodiversity Offset Strategy areas or other lands within the LEard Forest Minin Precinct identified as have high cultural heritage signigicance to the Aboriginal community; and	Submitted but not aproved. The TCL ACHMP ensures Aboriginal heritage is managed correctly in the interim.	Not Applicable			
Project Approval 11-0047	51	f) consider cumulative impacts and potential for developing joint initiatives with other mines within the Leard Forest Mining Precinct for enhancing and conserving Aboriginal cultural heritage values.					
	Heritage Management Plan						
Project Approval 11-0047	52	The proponent shall prepare and implement a Heritage Management Plan for the project to the satisfaction of the Director-General. This plan must: a) be prepared by suitably qualified and experienced person/s whose appointment has been endorsed by the Director-General; b) be prepared in consultation with OEH and local Aboriginal stakeholders (in relation to the management of Aboriginal heritage values); c) be submitted to the Director-General for approval prior to undertaking any activities that may impact heritage items or sites, unless the Director-General agrees otherwise;	a) Approval of the "suitably qualified person/s" by the DG provided as evidence b) consultation appears to be compliant c) Noted but prior to the audit period	Compliant			
Project Approval 11-0047	52	include the following for the management of Aboriginal cultural heritage: a detailed archaeological salvage program for Aboriginal sites/objects within the project disturbance area, including methodolog and procedures/protocols for: sub-surface testing; staged salvage, based on anticipated mine planning; pre-disturbance monitoring; site assessment and reporting; research objectives inform knowledge of Aboriginal occupation; protection, storage and management of salvaged Aboriginal objects; addressing relevant statutory requirements under the National Parks and Wildlife Act 1974; and long term protection of salvaged Aboriginal objects; a description of the measures that would be implemenetd for: protecting, monitoring and managing Aborignal sites outside the project disturbance area; mantaining and managing reasonable access for Aboriinal stakeholders to cultural heritage items on site and in the biodiversity offset area; managing the discovery of any human reamins or previously unidentified Aboriginal objects on site, including (in the case of human remains) stop work provisions and notificiation protocols; ongoing consultation with the local Aboriginal stakeholders in the conservation and management of Aboriginal cultural heritage both on-site and in the biodiversity offset area;	Existing Heritage Management plan contains most of these requirements, others are embedded in site procedures	Compliant			
Project Approval 11-0047	52	ensuring any workers on site receive suitable heritage induction prior to carrying out any activities which may disturb Aboriginal sites, and that suitable records are kept of these inductions; include the following for the management of historic heritage: a description of the measures that would be implemented for: managing the discovery of human remains or previously unidentified historic heritage items at the site, including (in the case of human remains) stop work provisions and notification protocols; and ensuring workers on site receive suitable heritage inductions prior to carrying out any development on site, and ensure that suitable records of these inductions are kept	This is addressed in the HMP	Compliant			
Project Approval 11-0047	52	*Note: The Department acknowledges that the initial Heritage Management Plan may not include a detailed plan for the implementation of the Aboriginal Heritage Conservation Strategy. If this occurs, the Proponent will be required to update the plan as soon as practicable following the Director-General's approval of the Aboriginal Heritage Conservaion Strategy.*	Noted				
	TRANSPORT						
	Roadworks						

Reference	Condition	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Project Approval 11-0047	53	The Proponent shall: a) construct the Goonbri Road realignments and associated mine access road intersection, Goonbri Road/private coal haulage road intersection and the Goonbri Road/Dripping Rock Road/Blair Athol Lane intersection as shown conceptually in the EA; and b) install appropriate advance warning signs lighting on Goonbri Road, the private coal haulage road at the intersection of the Northern Site Access Road, to the satisfaction of Council. The road realignments and associated intersection upgrades shall be undertaken: to a bitument sealed standard, unless otherwise agreed by Council; and prior to any project works occuring within 25 metres of the existing Goonbri Road alignment, or on the southern/eastern side of the existing road alignment.	Not yet occurred due to scaling back in activities	Not Applicable			
Project Approval 11-0047	53	*Note: The road upgrade works may be udnertaken in stages, with the agreement of Council.*	Noted				
	Coal Transport						
Project Approval 11-0047	54	Whilst coal transport by road is permitted under this approval, the Proponent shall ensure that: a) trucks travelling to and from the site do no exceed 40 kilometres per hour in the visinity of the school bus when it is operating on Hoad Lane, unless an alternative protocol is agreed by the Director-General; and b) spillage from coal haulage vehivles is minimised and promptly managed.	Radio comms, call up sight, notification within the site. All coal haulage is tarped to prevent spillage.	Compliant			
	Road Maintenance						
Project Approval 11-0047	55	The Proponent shall: a) keep records of the: amount of coal and gravel transported from the site (on a monthly basis); and date and time of each train movement on the Boggabri rail spur line generated by the project; and b) make these records available on its website at the end of each calendar year.	Website contains this information and is up to date till end 2013 which complies, Note the Boggabri rail spur is not yet in operation.	Compliant			
	VISUAL						
	Operating Conditions						
Project Approval 11-0047	57	The Proponent shall: a) implement all reasonable and feasible measures to minimise the visual and off-site lighting impacts of the project; b) ensure no outdoor lights shine above the horizontal; c) whereever possible, ensure that mobile equipment is appripriately designed and/or retroffitted to prevent light being directed above the horizontial; d) ensure that all external lighting associated with the project complies with Australian Standard AS4282 (INT) 1997 – Control of Obtrusive Effects of Outdoor Lighting or its latest version; e) provide for the establishment of trees and shrubs and/or the construction of mounding or bunding: along the realigned Goonbri Road and access road to the mine site; along the services corridor to the Boggabri Coal Mine; around the water storage dams; and at other areas identified as necessary for the maintenance of satisfactory visual amenity; ans f) ensure that the visual appearance of all buildings, structurs, facilities or works (including paint colours and specifications) is aimed at blending as far as possible with the surrounding landscape, to the satisfaction of the Director-General.	Annual inspections of the site by DP&E, lighting management procedure and OCE inspections at afternoon shift startup. Note no lighting related complaints.	Compliant			
	Additional Visual Impact Mitigation						
Project Approval 11-0047	58	Upon receiving a written request from the owner of any residence on privately-owned land which has, or would have, significant direct views of the mining operations and infrastructure on-site during the project, the Proponent shall implement additional visual impact mitigation measures (such as landscaping treatments or vegetation screens) to reduce the visibility of the mining operations and infrastructure from the residences on the privately-owned land. These mitigation measures must be reasonable and feasible, and must be implemented within a reasonable timeframe. If the Proponent and the owner cannot agree on the measures to be implemented, ir there is a dispute abdout the implementation of these measures, then either party may refer the matter to the Director-General for resolution.	No requests received in the audit period	Not Applicable			
Project Approval 11-0047	58	Notes: The additional visual impact mitigation measures must be aimed at reducing the visibility of the mining operations on site from affected residences, and do not require measures to reduce the visibility of the mining operations on site from affected residences, and do not require measures to reduce the visibility of the mining operations from other locations on the affected properties. The additional visual impact mitigation measures do not necessarily have to include the implementation of measures on the affected property itself (ie. The additional measures could involve the implementation of measures outside the affected property boundary that provide an effective reduction in visual impacts). Except in exceptional circumstances, the Director-General will not require additional visual impact mitigation to be undertaken for residences that are more than 5 kilometres form the mining operations.	Noted				

Reference	Condition	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
	BUSHFIRE MANAGEMENT						
Project Approval 11-0047	59	The Proponent shall: a) implement all reasonable and feasible measures to manage bushfire risks, including the suspension of activities that may have the potential to ignite a fire, during adverse conditions; b) ensure that the project is suitably equipped to respond to any fires on site; and c) assist the Rural Fire Service, Forests NSW, emergency services and National Parks and Wildlife Services as much as possible if there is a fire in the surrounding area.	a) Stated in Bushfire MP but not forcefully, a list of activities that are not allowed on High or above bishfire risk days could be included. Note the audit team don't have the sites hot works permiting documentation and most of these activities would be covered by this permitting system. b) Project is suitable equiped as discussed int he Bushfire MP. c) Interaction with extenal authorities in the suppression of regional fires is discussed in the Bushfire MP and considered adequate.	Compliant			
	WASTE						
Project Approval 11-0047	60	The Proponent shall: a) implement all reasonable and feasible measures to reduce waste, (including coal reject) generated by the project; b) ensure that the waste generated by the porject is appropriately stored, handled and disposed of; and c) monitor and report on the effectiveness of waste minimisation and management measures in the Annual Review.	Waste Management Plan Site Observations and is reported in the AEMR	Compliant			
	REHABILITATION						
Project Approval 11-0047	61	The Proponent shall rehabillitate the site to the satisfaction of the Executive Director Mineral Resources. This rehabilitation must be generally consistent with the proposed Rehabilitation Strategy describes in the EA (and depicted conceptually in Appendix 8) and comply with objectives in Table 15.  Table 15: Rehabilitation objectives Feature / Objective Mine site (as a whole) / Safe, stable and non-polluting Constructed landforms drain to the natural environment Landforms fully integrated with the final landform for the Boggabri coal mine Final void / Minimise the size and depth of the final void as far as is reasonable and feasible Minimise the drainage catchment of the final void as far as is reasonable and feasible Negligible high wall instability risk Minimise risk of flood interaction for all flood events up to and including the Probable Maximum Flood level Surface infrastructure / To be decommissioned and removed, unless the Executive Director, Mineral Resources agrees otherwise Agricultural land / Establish a minimum of 210 hectares of Class 3 agricultural suitability land, including 160 hectares with cropping capability	Site is not yet at the point where relinquishment is possible. The AEMR reports against rehabilitation objectives and annual inspections by DRE help guide the site towards these requirements. There are challenges for the saite associated with poor soil quality and weed seed bank in topsoils that are being addressed with varying success.	Compliant			
Project Approval 11-0047	61	 Feature / Objective All land – excluding the 210 ha of agricultural land and the final void / Restore ecosystem function, including maintaining or establishing self-sustaining ecosystems comprised of: • local native plant species (particularly 'Box Gum Woodland EEC); and • a landform consistent with the surrounding environment Goonbri Creek diversion and LPB / See Table 13 Community / Ensure public safety Minimise the adverse socio-economic effects associated with mine closure	As above	Compliant			
	Operating Conditions						
Project Approval 11-0047	62	The Proponent shall, in consultation with the Namoi CMA: a) develop a detailed soil management protocol that identifies procedures for: comprehensive soil surveys prior to soil stripping; assessment of top-soil and sub-soil suitability for mine rehabilitation; and annual soil balances to manage soil handling including direct respreading and stockpiling; b) maximise the salvage of suitable top-soils and sub-soils and biodiversity habitat components such as bush rocks, tree hollows and fallen timber for rehabilitation of disturbed areas within the site and for enhancement of biodiversity offset areas; and c) ensure that coal reject, or any potentially acid forming interburden materials, are not emplaced at elevations in the pit shell where they may promote acid or sulphate species generation and migration beyond the pit shell.	The requirments detailed here have been met in the Tarawonga Rehabilitation Management Plan and the Clearing and Pre-strip Procedure apart from the comprehensive soil surveys prior to topsoil stripping	Not Compliant Administrative			
	Progressive Rehabilitation						

Reference	Condition	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Project Approval 11-0047	63	The Proponent shall rehabilitate the site progressively, that is, as soon as reasonably practicable following disturbance. All reasonable and feasible meaures must be taken to minimise the total area exposed for dust generation at any time. Interim rehabilitation strategies shall be employed when areas prone to dust generation cannot yet be permanently rehabilitated. Note: It is accepted that the parts of the site that are progressively rehabilitated may be subject to further disturbance in future.	Based on site observations, rehabilitation is reasonable well staged with the exception of the southern face of out of pit emplacement area to the south of the site which is exposed to the publics view and is not planned ot be rehabilitated for some time. The site discussed the potential to aerially seed the slope which would assist with dust suppression but not visual impact. Recommendation - work be conducted to soften the visual impact of the unrehabilitated southern emplacement and to lessen the levels of fugitive particulate emissions.	Compliant			
	Rehabilitation Management Plan						
Project Approval 11-0047	64	The Proponent shall prepare and implement a Rehabilitation Management Plan to the satisfaction of the Executive Director, Mineral Resources. This plan must: a) be prepared in consultation with the Department, Forests NSW, NOW, OEH, Namoi CMA and Council; b) be submitted to the Executive Director, Mineral Resources for approval by the end of May 2013; c) be prepared in accordance with any relevant DRE guideline; d) describe how the rehabilitation of the site would be integrated with: the implementation of the biodiversity offset strategy; and the final landform for the Boggabri coal mine; e) include detailed performance and completion criteria for evaluating the performance of the rehabilitation fo the site, and triggering remedial action (if necessary); f) describe the measures that would be implemented to ensure compliance with the relevant conditions of this approval, and address all aspects of rehabilitatiion including mine closure, final landform and final land use; g) include interim rehabilitation where necessary to minimise the area exposed for dust generation; h) include a program to monitor, independently audit and report on the effectiveness of the rehabilitation measures, and progress against the detailed performance and completion criteria; and i) build to the maximum extent practicable on the other management plans required under the approval.	Consultation is detailed in the managment plan Submitted as a draft to DRE and DP&E in May 2013 Is in accordance with DRE guidelines The integration with Boggabri Coals landform to the north could be dealt with in more detail though it is in the MOP Completion Citeria are included, most are measurable. Closure is addressed as is compliance with other documentation **Interim rehabilitation techniques and triggers are not described but are described in the Biodiversity MP.** Monitoring and auditing is included Other management plans are referenced and included	Not Compliant Administrative			
Project Approval 11-0047	64	*Note: The Biodiversity Management Plan and Rehabilitation Management Plan require substantial integration to achieve biodiversity objectives for the rehabilitated mine site.*	Noted				
	Final Void Design and Closure						
Project Approval 11-0047	65	The Proponent shall prepare and implement an updated Final Void and Mine Closure Plan (as a component of the overall Rehabilitation Management Plan required under condition 64 of schedule 3) to the satisfaction of the Executive Director Mineral Resources, following consultation with the Director-General. A draft plan must be prepared and submitted to the Executive Director Mineral Resouces by the end of December 2019, and a final plan must be prepared and submitted to the Executive Director Mineral Resources by the end of December 2024. Each version of the plan must: a) be subject to independent review and verification by suitably qualified, experienced and independent person/s (including a groundwater expert) whose appointment has been approved by the Director-General; b) identify and consider: options for continued mining beyond current project life; interactions with the final landform of adjoining mines (including any direct or indirect interaction between final voids); opportunities for integrated mine planning with adjoining mines to minimise environmental impacts of the mines' final landforms; all reasonable and feasible landforms options for the final void (including filling); predicted stability of the proposed landforms; and predicted hydrochemistry and hydrogeology (including long-term groundwater recovery and void groundwater quality);	Not yet required	Not Applicable			
Project Approval 11-0047	65	c) include a detailed proposed landform design; and d) demonstrate that the proposed final landform: satisfies the relevant objecties in Table 15l minimises the extent of any resulting pit lake; avoids salt scalding; maximises the capacity of emplaced spoil to drain to the natural environment; and ensures that drained waters do not adversely affect the downstream environment.	Not yet required	Not Applicable			
	AGRICULTURE						

Reference	Condition	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Project Approval 11-0047	66	The Proponent shall use its best endeavours to ensure that the agricultural productivity and production of non-operational project-related land is maintained or enhanced. Note: This includes properties primarily used for agriculture that are acquired by the Proponent due to noise and/or air quality impacts. However, it does not include land where disturbance is permitted udner the conditions of this approval or land that forms part of the biodiversity offset area.	Land is either leased back to origjinal owners or is let to lease with these conditions backed up in the lease agreement.	Compliant			
	SCHEDULE 4						
	ADDITIONAL PROCEDURES						
	NOTIFICATION OF LANDOWNERS/TENANTS						
Project Approval 11-0047	1	Within 3 months of the date of this approval, the Proponent shall: a) notify in writing the owners of: the land listed in Table 1 of schedule 3 tha they have the right to require the Proponent to acquire their land in accordance with the procedures in conditions 8 and 9 below at any stage during the project; any residence on the land listed in Table 1 of schedule 3 that they have the right to request the Proponent to ask for additional noise and/or air quality mitigation measures to be installed at their residence at any stage during the prokect; and any privately-owned land within 2 kilometres of the approach open-cut mining pit/s that they are entitles to ask for a property inspection, to establish the baseline condition of any buildings or structures on their land, or to have a previous property inspection report updated; b) notify the tenants of any mine-owned land of their rights under this approval; and c) send a copy of the NSW Health fact sheet entitled ""Mine Dust and You"" as may be updated from time to time) to the owners and/or existing tenants of any land (including mine-owned land) where the predictions in the EA identify that dist emissions generated by the project are likely to be greater than the relevant air quality criteria in schedule 3 at any time during the life of the project.	Letters to Callandar, Crosby, Laird, Suey, Picton, Wellwood, McCormack, Gabriel, Mainey, Angwin and Griffiths sighted.	Compliant			
Project Approval 11-0047	2	Prior to entering into any tenancy agreement for any land owned by the Proponent that is predicted to experience exceedences of the recommended dust and/or noise criteria, or for any of the land listed in Table 1 that is subsequently purchased by the Proponent, the Propnent shall: a) advise the prospective tenants of the potential health and amenity impacts associated with living on the land, and give them a copy of the NSW Health fact sheet entitled ""Mine Dust and You"" (as may be updated from time to time); b) advise the prospective tenants of the rights they would have under this approval; and c) request the prospective tenants consult their medical practitioner to discuss the air quality to the satisfavtion of the Director-General	Copies sighted.	Compliant			
Project Approval 11-0047	3	As soon as practicable after obtaining monitoring results showing: a) an exceedence of the relevant criteria in schedule 3, the Proponent shall notify the affected landowner in writing of the exceedence, and provide regular monitoring results to the landowner until the project in complying with the relevant criteria again; b) an exceedende of the relevant air quality criteria schedule 3, the Proponent shall send to the affected landowners and/or existing tenants of the land (including the tenants of any mine-owned land) a copy of: the NSW Health fact shee entititled ""Mine Dust and You"" as may be updated from time to time); and the monitoring data, in an appropriate format so that a medical practitiioner can assist the resident in making an informed decision on the health risks associated with occupation of the property.	Not applicable as there have been no exceedences at privately owned properties.	Not Applicable			
	INDEPENDENT REVIEW						
Project Approval 11-0047	4	If an owner of privately-owned land considers the project to be exceeding the criteria in schedule 3 at his/her land, then he/she may ask the Director-General in writing for an independent review of the impacts of the project on his/her land. If the Director-General is satisfied that an independent review is warranted, then within 2 months of the Director-Genral's decision, the Proponent shall: a) commission a suitably qualified, experienced and independent expert, whose appoitment has been approved by the Director-General, to: consult with the landowner to determine his/her concerns; conduct monitoring to determine whether the project is complying with the relevant impact assessment criteria in schedule 3; and if the project is not complying with the relevant criteria, then: determine if the more than one mine is responsible for the exceedence, and if so the relative share of each mine towards the impact on the land; identify the measures that could be implemented to ensure compliance with the relevant criteria; and b) give the Director-General and landowner a copy of the independent review.	No such request received during the audit period	Not Applicable			

Reference	Condition	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Project Approval 11-0047	5	If the independent review determines that the project is complying with the relevant criteria in schedule 3, then the Proponent may discontinue the independent review with the approval of the Director-General. If the independent review determines that the project is not complying with the relevant criteria, and that the project is primarily responsible for this non-compliance, then the Proponent shall: a) implement all reasonable and feasible mitigation measures, in consultation with the landowner and appointed independent expert, and conduct further monitoring until the project complies with the relevent criteria; or b) secure a written agreement with the landowner to allow exceedances of the relevant criteria, to the satisfaction of the Director-General. If the independent review determines that the project is not complying with the relevant acquisition criteria, and that the project is primarily responsible for this non-compliance, then upon receiving a written request from the landowner, the Proponent shall acquire all or part of the landowner's land in accordance with the procedures in conditions 8 and 9 below.	No such request received during the audit period	Not Applicable			
Project Approval 11-0047	6	If the independent review determines that the relevant criteria are being exceeded, but that more than one mine is responsible for this exceedance, then together with the relevant mine/s the Proponet shall: a) implement all reasonable and feasible mitigation measures, in consultation with the landowner and appointed independent expert, and conduct further monitoring until there is compliance with the relevant critetia; or b) secure a written agreement with the landowner and other relevant mine/s to allow exceedances of to the satisfaction of the Director-General. If the indepenent review determines that the proect is not complying with the relevant acquisition criteria in schedule 3, but that more than one mine is responsible for this non-compliance, then upon receiving a written request from the landowner, the Proponent shall acquire all or part of the landowner's land on as equitable a basis as possible with the relevant mine/s, in accordance with the procedures in conditions 8 and 9 below	No such request received during the audit period	Not Applicable			
	Biodiversity & Heritage						
Project Approval 11-0047	7	If a person had good reason to believe the Proponent is not implementing the biodiversity and/or heritage conditions in schedule 3 satisfactorily, then he/she may ask the Director-General in writing for an independent review of the matter. If the Director-General is satisfied that an independent review is warranted, then within 2 months of the Director-general's decision, the Proponent shall: a) commission a suitably qualified, experienced and independent person, whose appointment has been approved by the Director-General, to: consult with the person and/or any relevant agencies; investigate the person's complaints/claims; review the environmental performance of the Proponent; determine whether the Proponent's performance is satisfactory or not; and if necessary recommend measures to improve the Proponent's performance; and b) give the Director-General and complainant a copy of the indepenent review.	No such request received during the audit period	Not Applicable			
	LAND ACQUISITION						
Project Approval 11-0047	8	Within 3 months of receiving a written request from a landowner with acquisition rights, the Proponent shall make a binding written offer to the landowner based on: a) the current market value of the landowner's interest in the land at the date of the written request, as if the land was unaffected by the project, having regard to the: existing and permissible use of the land, in accordance with the applicable planning instruments at the date of the written request; and presence of improvements on the land and/or any approved building or structure which has been physically commenced at the date of the landowner's written request, and is due to be completed subsequent to that date, by excluding any improvements that have resulted from the implementation of the additional mitigation measures required under condition 2 of schedule 3; b) the reasonable costs associated with: relocating within the Tamworth, Narrabri, Gunnedah or Moree local government areas, or to any other local government area as agreed by the Director-General; and obtaining legal advice and expert advice for determining the acquisition price of the land, and the terms upon which it is to be acquired; and	No such request received during the audit period	Not Applicable			

Reference	Condition	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Project Approval 11-0047	8	c) reasonable compensation for any disturbance cause by the land acquisition process. However, if the Proponent and landowner cannot agree on the acquisition price of the land and/or the terms upon which the land is to be acquired, then either party may refer the matter to the Director-General for resolution. Upon receiving such a request, the Director-General shall request the President of the NSW Division of the Australian Property Institute to appoint a qualified independent valuer to: consider submissionions from both parties; determine a fair and reasonable acquisition price for the land and/or the terms upon which the land is to be acquired, having regard to the matters referred to in paragraphs (a)-(c) above; prepare a detailed report setting out the reasons for any determination; and provide a copy of the report to both parties Within 14 days of receiving the independent valuer's report, the Proponent shall make a binding written offer to the landowner to purchase the land at a price not less than the independent valuer's determination. However, if either party disputes the independent valuer's determination, then within 14 days of receiving the independent valuer's report, they may refer the matter to the Director-General for review. Any request for a review must be accompanies by a detailed report setting out the reasons why the party disputes the independent valuer's determination. Following consultation with the independent valuer and both parties, the Director-General will determine a fair and reasonable acquisition price for the land, having regard to the matters referred to in paragraphs (a)-(c) above, the independent valuer's report, the detailed report of the party that disputes the independent valuer's determination and any other relevant submissions. Within 14 days of this determination, the Proponent shall make a binding written offer under this conditon within 6 months of the offer being made, then the Proponent's obligations to acquire the land shall cease, unless the Director-General determines otherwise.	No such request received during the audit period	Not Applicable			
Project Approval 11-0047	9	The Proponent shall pay all reasonable costs associated with the land acquisition process described in condition 5 above, including the costs associated with obtaining Council approval for any plan of subdiviion (where permissible), and registration of this plan at the Office of the Registrar-General.	No such request received during the audit period	Not Applicable			
	SCHEDULE 5						
	ENVIRONMENTAL MANAGEMENT, REPORTING AND AUDITING						
	ENVIRONMENTAL MANAGEMENT						
	Environmental Management Strategy						
Project Approval 11-0047	1	The Proponent shall prepare and implement an Environmental Management Strategy for the project to the satisfaction of the Director-General. The strategy must: a) be submitted to the Director-General for approval by the end of May 2013; b) provide the strategic framework for environmental management of the project; c) identify the statutory approvals that apply to the project; d) describe the role, responsibility, authority and accountability of all key peronnel involved in the environmental management of the project; e) describe the procedures that would be implemented to: keep the local community and relevant agencies informed about the operation and environmental performance of the project; reveive, record, handle, and respond to complaints; resolve any disputes that may arise during the course of the project; respond to any non-compliance; respond to emergencies; and f) include: copies of any strategies, plan and programs approved under the conditions of this approval; and a clear plan depicting all the monitoring to be carried out in relation to the project.	The copy provided was current and met all requirements	Compliant			
	Adaptive Management						
Project Approval 11-0047	2	The Proponent must assess and manage project-related risks to ensure that there are no exceedences of the criteria and/or performance measures in schedule 3. Any exceedence of these criteria and/or performance measures constitutes a breach of this approval and may be subject to penalty or offence provisions under the EP&A Act or EP&A Regulation. Where any exceedence of these criteria and/or performance measures has occurred, the Proponent must at the earliest opportunity: a) take all reasonable and feasible steps to ensure that the exceedence ceases and does not reoccur; b) consider all reasonable and feasible options for remediation (where relevant) and submit a report to the Department describing those options and any preferred remediation measures or other courses of action; and c) implement remediation measures as directed by the Director-General, to the satisfaction of the Director-General.	No such exceedences	Compliant			
	Management Plan Requirements						

Reference	Condition	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Project Approval 11-0047	3	The Proponent shall ensure that the management plans required under this approval are prepared in accordance with any relevant guideleines, and include: a) detailed baseline data; b) a description of: the relevant statutory requirements (including any relevant approval, licence or lease conditons); any relevant limits or performance measures/criteria; the specific performance indicators that are proposed to be used to judge the performance of, or guide the implementation of, the development or any management measures c) a description of the measures that would be implemented to comply with the relevant statutory requirements, limits, or performance measures/criteria; d) a program to monitor and report on the: impacts and environmental performance of the project; effectiveness of any management measures (see c above); e) a contingency plan to manage any unpredicted impacts and their consequences; f) a program to investigate and implement ways to improve the environmental performance of the project over time; g) a protocol for managing and reporting any: incidents; complaints; non-compliances with statutory requirements; and exceedences of the impact assessment criteria and/or performance criteria; and h) a protocol for periodic review of the plan.	a) Detailed baseline data not included in some of the draft plans. The only approived plan under the new EA is the CHMP which has adequate background info. Recommendation to revise draft plans to include adequate background information.	Compliant			
	Annual Review						
Project Approval 11-0047	4	By the end of June each year (or as otherwise agreed by the Director-General), the Proponent shall review the environmental performance of the project to the previous calendar year to the satisfaction of the Director-General. This review must: a) describe the development (including any rehabilitaiton) that was carried out in the past calendar year, and the development that is proposed to be carried out over the current calendar year; b) include a comprehensive review of the monitoring results and complaints records of the project over the past year, which includes a comparison of these results against the: relevant statutory requirements, limits or performance measures/criteria; monitoring results of previous years; and relevant predictions in the EA; c) identify any non-compliance over the last year, and describe what actions were (or are being) taken to ensure compliance; d) identify any trends in the monitoring data over the life of the project; e) identify any discrepancies betweem the predicted and actual impacts of the project, and analyse the potential cause of any significant discrepancies; and f) describe what measures will be implemented over the next year to improve the environmental performance of the project.	The 20012-13 AEMR contains all the requirements listed and addresses the requirements adequately.	Compliant			
	Revision of Strategies, Plans and Programs						
Project Approval 11-0047	5	Within 3 months of the submission of an: a) annual review under condition 4 above; b) incident report under condition 8 below; c) audit under condition 10 below; or d) any modification to the conditions of this approval, the Proponent shall review, and if necessary revise, the strategies, plans, and programs required under this approval to the satisfaction of the Director-General. Note: This is to ensure the strategies, plans and programs are updated on a regular basis, and incorporate any recommended measures to improve the environemental performance of the project.	The EMPs and Strategies have been revised on a regular basis and within the short audit period. Thus it is difficult to determine whether they were revised as a result of the above circumstances or for other reasons. Recommendation - Tarawonga should develop a method for documenting reviews so that if there are no changes resulting from the review there is evidence of the review being conducted.	Compliant			
	Management of Cumulative Impacts						
Project Approval 11-0047	6	In conjunction with the owners of the nearby mines in the Leard Forest Mining Precinct, the Proponent shall use its best endeavours to minimise the cumulative impacts of the project on the surrounding area, to the satisfaction of the Director-General.	None of the Leard State Forest strategies that formulate cumulative impact mitigation have been approved. They are all in draft.	Not Applicable			
	Community Consultative Committee						
Project Approval 11-0047	7	The Proponent shall establish and operate a Community Consultative Committee (CCC) for the project to the satisfaction of the Director-General. This CCC must be operated in general accordance with the Guidelines for Establishing and Operating Community Consultative Committees for Mining Projects (Department of Planning, 2007, or its latest version), and be operating by the end of May 2013. The CCC must seek to include joint membership with CCCs for other operating coal mines within the Leard Forest Mining Precinct, unless otherwise agreed by the Director-General. Notes: The CCC is an advisory committee. The Department and other relevant agencies are responsible for ensuring that the Proponent complies with this approval. In accordance with the Department's guideline, the CCC should be comprised on an independent chair and appropriate representation from the Proponent, Council and the local community	Minutes on website	Compliant			
	REPORTING						

Reference	Condition	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
	Incident Reporting						
Project Approval 11-0047	8	The Proponent shall notify, at the earliest opportunity, the Director-General and any other relevant agencies of any incident that has cause, or threatens to cause, material harm to the environment. For any other incident associated with thte project, the Proponent shall notify the Director-General and any other relevant agencies as soon as practible after the Proponent becomes aware of the incident. Within 7 days of the date of the incident, the Proponent shall provide the Director-general and any relevant agencies with a detailed report on the incident, and such further reports as may be requested.	No incidents reported	Not Applicable			
	Regular Reporting						
Project Approval 11-0047	9	The Proponent shall provide regular reporting on the environmental performance of the project on its website, in accordance with the reporting arrangements in any plan or programs approved under the conditions of this approval.	Noted				
	AUDITING						
	Independent Environmental Audit						
Project Approval 11-0047	10	"10 By the end of June 2014 and every 3 years thereafter, unless the Director-General directs otherwise, the Proponent shall commission and pay the full cost of an indepenent Environmental Audit of the project. This audit must: a) be conducted by a suitable qualified, experiened 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 requirements in this approval, and any other relevant approvals, relevant EPL/s and/or Mining Lease/s (including any assessment, plan or program required under these approvals); d) assess whether the Proponent is implementing best noise, blasting and air quality management practice; e) investigate and report on the measures taken to minimise the noise and air quality impacts of the project during meterological conditions and/or extraordinary events when the relevant noise and air quality limits in this approval do not apply, including: the effectiveness of these measures in maintaining impacts within the relevant criteria in this approval and/or the limits in the relevant EPL; and any additional measures available to mitigate impacts under such conditons; f) review the adequacy of any approved strategy, plan or program required under the abovementioned approvals; and g) recommend measures or actions to imprive the environmental performance of the project and/or any strategy, plan or program required under these approvals. "	This audit, non-compliant with timing requirements	Not Compliant Administrative			
Project Approval 11-0047	10	*Note: This audit team must be led by a suitably qualified auditor, and include experts in noise, air quality, water, ecology, and any other fields specified by the Director-General.*	Noted				
Project Approval 11-0047	11	Within 3 months of commissioning this audit, or as otherwise agreed by the Director-General, the Proponent shall submit a copy of the audit report to the Director-General, together with its response to any recommendations contained in the audit report.	This audit, non-compliant with timing requirements	Not Compliant Administrative			
	ASSESS TO INFORMATION						
Project Approval 11-0047	12	The Proponent shall: a) within 3 months of the date of this approval, make the following information publicly available on its website: the EA; all current statutory approvals for the project; approved strategies, plans and programs required under the conditions of this approval; a comprehensive summary of the monitoring results of the project, which have been reported in accordance with the various plans and programs approved under the conditions of this approval; a complaints register, which is to be updated on a monthly basis; minutes of CCC meetings; the last five annual reviews; any independent environmental audit, and the Proponent's response to the recommendations in any audit; any other matter required by the Director-General; and b) keep this information up to date, to the satisfaction of the Director-General.	see website, all this information is available	Compliant			
	On-line Communication of Onsite Activities and Monitoring of Noise and Air Quality						
Project Approval 11-0047	13	The Proponent shall, within 3 months of the date of this approval: a) make the following information for the project publicly available on its website, on a daily basis and in a clearly understandable form: daily weather forecasts for the coming week; proposed operational responses to these weather forecasts; real-time noise and air quality monitoring data (subject to any necessary caveats); and any operational responses that were taken in response to the noise and air quality monitoring data, and b) make provision on its website for the provision of on-line and/or email comments by members of the community regarding this information, to the satisfaction of the Director-General.	Checked website, all present but a longer term daily check by the AQ consultant on the audit team found that the data was not updated daily - every day.	Not Compliant Administrative			

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Tarrawonga Coal Project Environmental Assessment - Statement of Commitments							
SOC1.1 Proposed Project Environmental Management, Monitoring and Reporting							
TC EA Statement of Commitments	1.1	TCPL will review and revise the existing Tarrawonga Coal Mine management and monitoring plans listed in Table SOC-1. Table SOC-1 also lists new management and monitoring plans that are proposed to be prepared for the Project.	SOC-1 includes: Management and Monitoring Environmental Management Strategy Water Management Plan Site Water Balance Erosion and Sediment Control Plan Surface Water Monitoring Program Groundwater Monitoring Program Surface and Groundwater Response Plan Goonbri Creek Management Plan# Noise Management Plan Blast Management Plan Air Quality and Greenhouse Gas Management Plan Biodiversity Offset Strategy Biodiversity Management Plan# (new management plan) Offset Area Management Plan# (new management plan) Farm Management Plan# (new management plan) Aboriginal Heritage Management Plan Waste Management Plan Rehabilitation Strategy Rehabilitation Management Plan Bushfire Management Plan Reporting Requirements Annual Environmental Management Report and Mining Operations Plan or Rehabilitation and Environmental Management Plan Licences and Approvals Greenhouse Gas Reporting Note most of these plans have been revised but are not yet approved by the DG.	Compliant			
TC EA Statement of Commitments	1.1	The existing monitoring program at the Tarrawonga Coal Mine will be augmented to address additional Project disturbance areas and the open cut extensions.	Noted	Noted			
TC EA Statement of Commitments	1.1	Environmental management, monitoring and reporting will be conducted in accordance with finalised Project Approval conditions, with the final monitoring details (locations, parameters and frequencies) to be provided in the relevant management plans/monitoring programs.	Noted	Noted			
SOC1.2 Specific Environmental Commitments							
TC EA Statement of Commitments	1.2	Environmental management and offset measures to be implemented for the Project are described in Section 4. Key commitments include: • design and construction of an engineered low permeability barrier to the east and south-east of the open cut;	Tarrawonga Water Management Plan (May 2013, Draft) includes this measure. A low permeability barrier would be constructed in the alluvium, approximately 50-100 m to the east and south-east of the final open cut extent. Construction of the low permeability barrier would be completed before the open cut intersects the alluvium that feeds Goonbri Creek (approximately Year 12).	Not Applicable			

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
TC EA Statement of Commitments	1.2	• design, construction and implementation of a permanent Goonbri Creek alignment and associated flood bund;	Tarrawonga Water Management Plan (May 2013, Draft) includes this measure. In approximately Year 15 of the approved works, open cut mining would progress through a 3 km section of Goonbri Creek. Prior to the open cut advancing into this section of the creek, the permanent Goonbri Creek alignment would be established to the east of the open cut. The open cut has not advanced towards Goonbri Crk enough to trigger this requirment	Not Applicable			
TC EA Statement of Commitments	1.2	• integration of key aspects of the Project with the adjoining Boggabri Coal Mine (i.e. Northern Emplacement, coal processing and loading of Project product coal onto trains);	MOP and Project Approval PA 11_0047	Noted			
TC EA Statement of Commitments	1.2	• cessation of sized run-of-mine (ROM) coal road transport to the Whitehaven Coal Handling and Preparation Plant (once suitable approvals and upgrades are in place);	MOP In accordance with Project Approval PA 11_0047 Schedule 2 Condition 7 road transport of ROM coal to the Whitehaven CHPP may continue for up to three months after the commissioning of the Boggabri Infrastructure Facility upgrades. This is not tiggered as the rail loop is not completed.	Not Applicable			
TC EA Statement of Commitments	1.2	• management and mitigation of operational noise;	Noise Management Plan (June 2014) includes management and mitigation of operational noise	Compliant			
TC EA Statement of Commitments	1.2	• rehabilitation of Project disturbance areas, including the reinstatement of key agricultural and ecological values;	Rehabilitation Management Plan (2013)	Compliant			
TC EA Statement of Commitments	1.2	• provision of biodiversity offset measures for the Project;	BMP (2013)	Compliant			
TC EA Statement of Commitments	1.2	• management of the Project final void to minimise potential long-term impacts on water resources; and	Rehabilitation Management Plan (2013)	Compliant			

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
TC EA Statement of Commitments	1.2	• participation in joint air quality, operational noise and regional groundwater monitoring schemes with the adjoining Boggabri Coal Mine and the Maules Creek Coal Project.	AQMP (2013) states: TCM has been in consultation with the nearby Boggabri Coal Mine and Maules Creek Project in relation to developing an Air Quality Management Strategy for the Boggabri – Tarrawonga – Maules Creek (BTM) Complex incorporating cumulative air quality monitoring and management, as required under the conditions of consent for the Tarrawonga Coal Mine. The Strategy has been submitted to the Department of Planning and Environment (DPE) for approval. Once approved, the Strategy will be appended to this Plan. The Strategy has been drafted but is not yet approved.	Not Applicable			
	Low Permeability Barrier						
TC EA Statement of Commitments	1.2	A low permeability barrier will be constructed in the alluvium to the east and south-east of the open cut. Construction of the low permeability barrier will be completed before the Project open cut intersects the alluvium (approximately Year 12).	Tarrawonga Water Management Plan (May 2013, Draft) includes this measure. A low permeability barrier would be constructed in the alluvium, approximately 50-100 m to the east and south-east of the final open cut extent. Construction of the low permeability barrier would be completed before the open cut intersects the alluvium that feeds Goonbri Creek (approximately Year 12). Not triggered yet	Not Applicable			
TC EA Statement of Commitments	1.2	The design objectives of the low permeability barrier include minimising the potential for drainage of alluvial groundwater into the open cut during operations and post-mining, and maintaining the hydraulic character of Goonbri Creek.	Tarrawonga Water Management Plan (May 2013, Draft) includes this measure.	Not Applicable			
TC EA Statement of Commitments	1.2	TCPL commits to construction of the low permeability barrier to meet the following design objectives: • minimise the potential for local drainage of alluvial groundwater into the open cut during operations and post-mining; • minimise the potential for future instability of the open cut batters formed in the alluvium; • maintain the hydraulic character of Goonbri Creek by minimising the potential loss of baseflow; and • maintain the value of alluvial groundwater, by minimising potential interactions with the mine final void, post-mining.	Tarrawonga Water Management Plan (May 2013, Draft) includes this measure.	Not Applicable			

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
TC EA Statement of Commitments	1.2	In addition, TCPL will augment the existing piezometer network with additional sites to validate the performance of the low permeability barrier.	Tarrawonga Water Management Plan (May 2013, Draft) includes this measure: The existing TCM network of piezometers will be augmented, particularly prior to and during Years 12 to 17 of the extension and remain in place for 2 years post-mining.	Not Applicable			
Permanent Goonbri Creek Alignment and Associated Flood Bund							
TC EA Statement of Commitments	1.2	In approximately Year 15, open cut mining would remove a 3 kilometre (km) section of Goonbri Creek. Prior to the open cut advancing into this section of the creek, the permanent Goonbri Creek alignment will be established.	Tarrawonga Water Management Plan (May 2013, Draft) includes this measure. Not triggered	Not Applicable			
TC EA Statement of Commitments	1.2	A permanent flood bund will also be constructed to prevent inundation of the open cut during operations and post-mining. The permanent flood bund will generally coincide with the alignment of the low permeability barrier.	Tarrawonga Water Management Plan (May 2013, Draft) includes this measure. Not triggered	Not Applicable			
TC EA Statement of Commitments	1.2	TCPL commits to the design, construction and implementation of the permanent Goonbri Creek alignment to meet the following design objectives: • construct a low flow channel that approximates the existing section of Goonbri Creek upstream of the Project in terms of stream geometry, hydrology and geomorphology;	Tarrawonga Water Management Plan (May 2013, Draft) includes this measure. Not triggered	Not Applicable			
TC EA Statement of Commitments	1.2	• mimic the meandering path of the existing alignment of Goonbri Creek, such that the length of the permanent Goonbri Creek alignment is approximately the same length as the section of Goonbri Creek being removed;	Tarrawonga Water Management Plan (May 2013, Draft) includes this measure. Not triggered	Not Applicable			
TC EA Statement of Commitments	1.2	• minimise the disturbance to the reaches of Goonbri Creek upstream of the permanent Goonbri Creek alignment; and	Tarrawonga Water Management Plan (May 2013, Draft) includes this measure. Not triggered	Not Applicable			
TC EA Statement of Commitments	1.2	• provide a stable transition back to the existing Goonbri Creek alignment which results in no detectable change to the hydraulic conditions in the reaches of Goonbri Creek or the Bollol Creek floodplain area downstream.	Tarrawonga Water Management Plan (May 2013, Draft) includes this measure. Not triggered	Not Applicable			
TC EA Statement of Commitments	1.2	In addition, TCPL commits to the design and construction of the permanent flood bund to a height that will provide protection against the peak flood height associated with a Probable Maximum Precipitation rainfall event.	Tarrawonga Water Management Plan (May 2013, Draft) includes this measure. Not triggered	Not Applicable			

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
TC EA Statement of Commitments	1.2	TCPL will develop and implement a Goonbri Creek Management Plan prior to the commencement of construction activities associated with the low permeability barrier, permanent Goonbri Creek alignment and flood bund.	MOP 2013 Not triggered	Not Applicable			
TC EA Statement of Commitments	1.2	The Goonbri Creek Management Plan will describe: • the design and construction details of the permanent Goonbri Creek alignment and flood bund;	MOP 2013 Not triggered	Not Applicable			
TC EA Statement of Commitments	1.2	• revegetation objectives and activities;	MOP 2013 Not triggered	Not Applicable			
TC EA Statement of Commitments	1.2	• water quality, ecological, hydrological and geomorphic performance and completion criteria for the permanent Goonbri Creek alignment based on baseline conditions; and	MOP 2013 Not triggered	Not Applicable			
TC EA Statement of Commitments	1.2	• a monitoring/maintenance program for water quality, ecological, hydrological and geomorphic integrity of the permanent Goonbri Creek alignment.	MOP 2013 Not triggered	Not Applicable			
	Management of Operational Noise						
TC EA Statement of Commitments	1.2	TCPL will implement the following noise management and mitigation measures to appreciably reduce noise emissions associated with the Project: • installation of an earth bund on the southern side of exposed sections of the services corridor (i.e. ROM coal haul road to the Boggabri Coal Mine);	Noise Management Plan 2014 states: Installation of an earth bund on the southern side of exposed sections of the services corridor (ROM coal haul road to the Boggabri Coal Mine). This will not occur over the next 2 year term as it is reliant on construction of infrastructure at Boggabri Coal.	Not Applicable			
TC EA Statement of Commitments	1.2	• modified alignment of haul routes to reduce their exposure relative to nearby receivers; and	Noise Management Plan 2014 states: The key component of this strategy is to reduce exposure from the dump trucks hauling to the northern emplacement via a haul road located at the southern end of the emplacement area. A northern haul road is now also available, so in circumstances where noise levels approach compliance criteria, an alternate haul road is available. This northern haul road will also become more relevant as the northern extension area is developed.	Not Applicable			

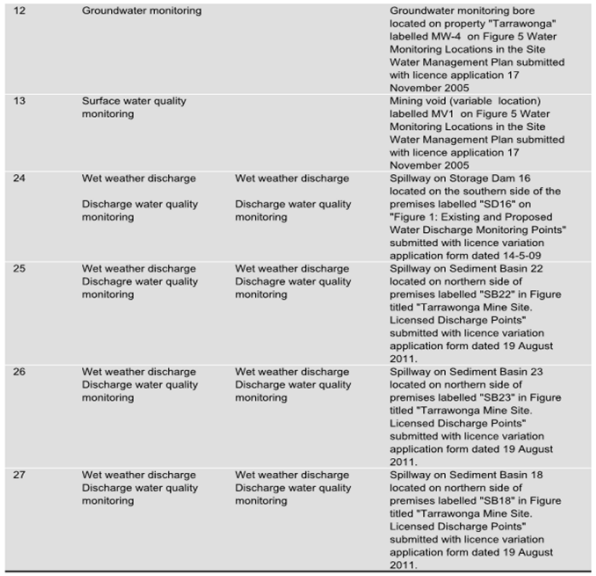
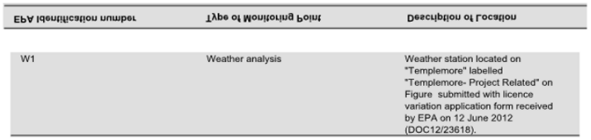
Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
TC EA Statement of Commitments	1.2	• a reduction in the number of mobile fleet items operating during the evening and night-time periods.	Noise Management Plan 2014 states: The reduction in operating fleet would be based on actual noise measurement, preliminary review of site operations to determine if alternate operating locations are available, followed by stand down of equipment if necessary. This was verified duringthe site inspection and in interview with several employees including the Env Officer and Mine Manager.	Compliant			
	Rehabilitation Objectives and Final Landform						
TC EA Statement of Commitments	1.2	The Project final landform and revegetation program will provide for a combination of approximately 752 ha of native woodland/forest and some 210 ha of Class 3 agricultural suitability land.	Rehabilitation Management Plan (2013) includes this Medium to Long Term Rehabilitation Objective	Noted			
TC EA Statement of Commitments	1.2	The agricultural land will be capable of being used for pasture production for grazing and occasional cropping. Revegetation of woodland/forest areas will include the planting of species characteristic of the local vegetation communities, including species from the Box-Gum Woodland endangered ecological community.	Rehabilitation Management Plan (2013) Not yet established, landform has not progressed to the point where the propsed areas area ready for rehab	Not Applicable			
TC EA Statement of Commitments	1.2	In addition, TCPL commits to a riparian vegetation enhancement program on a 3.2 km section of Goonbri Creek downstream of the Project open cut, through measures such as revegetation and stock exclusion.	Rehabilitation Management Plan (2013) does not mention commitment on a 3.2 km. It states: Biodiversity enhancement will be accomplished by native vegetation regeneration along riparian corridors and within remnant native vegetation patches. The work has not commenced, confirmed during site interview. Given the life of the current approval is throught to 2030, there is still time to complete this work.	Not Applicable			
TC EA Statement of Commitments	1.2	A Rehabilitation Management Plan will be developed and implemented for the Project, including a rehabilitation monitoring program designed to track the progress of rehabilitation and revegetation.	Rehabilitation Management Plan (2013)	Compliant			
	Biodiversity Offset Measures						
TC EA Statement of Commitments	1.2	TCPL commits to the provision of an area to offset the residual impacts of the Project on flora and fauna and maintain or improve the biodiversity values of the region in the medium to long-term.	BMP (2013)	Compliant			
TC EA Statement of Commitments	1.2	The biodiversity offset for the Project comprises approximately 1,600 ha of freehold land that has been purchased by Whitehaven.	BMP (2013)	Compliant			
TC EA Statement of Commitments	1.2	The offset is situated approximately 20 km to the north-east of the Project and adjoins Mount Kaputar National Park (Figure SOC-2). Prior to its recent purchase by Whitehaven the offset area was part of a larger agricultural property.	BMP (2013)	Compliant			

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
TC EA Statement of Commitments	1.2	Ecological gains from the biodiversity offset include: • Similar vegetation communities/fauna habitats, compared to the Project area, will be conserved/enhanced in the biodiversity offset area.	Noted	Noted			
TC EA Statement of Commitments	1.2	• The biodiversity offset area is suitably located to benefit flora and fauna populations (biodiversity values) potentially impacted by the Project.	Noted	Noted			
TC EA Statement of Commitments	1.2	• The biodiversity offset area is located adjacent to Mount Kaputar National Park.	Noted	Noted			
TC EA Statement of Commitments	1.2	• Ephemeral creeks occur within the biodiversity offset area, providing a diversity of habitats.	Noted	Noted			
TC EA Statement of Commitments	1.2	• Substantial areas of Box-Gum Woodland (232 ha) occur in the biodiversity offset area.	Noted	Noted			
TC EA Statement of Commitments	1.2	Through active management, particularly of areas previously cleared for agriculture, the ecological values of the biodiversity offset area can be further improved. TCPL commits to a number of management measures to enhance the offset area's flora and fauna values. These measures will be detailed in the Offset Area Management Plan to be prepared for the Project.	Biodiversity Management Plan (May 2013) Section 5 includes information on Biodiversity Management within the Biodiversity Offset Area Offset Area Management Plan as a separate doc not sighted	Compliant			
TC EA Statement of Commitments	1.2	The Offset Area Management Plan will also include a program to monitor and audit the effectiveness of the management measures and to evaluate performance against specified completion criteria.	Biodiversity Management Plan (May 2013) states: The monitoring results will be assessed and utilised in the continual improvement and refinement of rehabilitation/revegetation techniques and will be documented as part of the Annual Environmental Review Report. Tarrawonga Biodiversity Moniotoring Report Vols 1 & 2 - 2014 - EcoLogical	Compliant			
TC EA Statement of Commitments	1.2	TCPL intends to reach an agreement with the New South Wales (NSW) Government so that the biodiversity offset area can be permanently added to the adjoining Mount Kaputar National Park.	Biodiversity Management Plan (May 2013) - no information on this issue included in the BMP 2013.	Not Applicable			
TC EA Statement of Commitments	1.2	In the interim, TCPL will enter into a conservation arrangement with the NSW Government to ensure the protection and management of the offset area (e.g. a voluntary conservation agreement with the NSW Minister for the Environment).	Biodiversity Management Plan (May 2013) - no information on this issue included in the BMP 2013.	Not Applicable			
Management of the Project Final Void							
TC EA Statement of Commitments	1.2	TCPL commits to installing permanent perimeter bunds and/or diversion channels to limit the catchment area of the final void.	Rehabilitation Management Plan 2013 Not yet required	Not Applicable			

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
TC EA Statement of Commitments	1.2	In addition, TCPL will design and construct the final void to minimise the long-term drawdown and potential water quality effects on local groundwater aquifers. This will be achieved by adjusting the final void batter angles and/or placing additional waste rock backfill in the final void such that a permanent waterbody will form and reach an equilibrium level close to, but below, the local pre-mining groundwater level in the coal measures.	Rehabilitation Management Plan 2013 Not yet required	Not Applicable			
TC EA Statement of Commitments	1.2	TCPL will adopt an adaptive management approach to the final void design and mine closure planning for the Project. Final void design and mine planning will be undertaken by TCPL in consultation with relevant government agencies as a component of the Rehabilitation Management Plan.	Rehabilitation Management Plan 2013 Not yet required	Not Applicable			
Participation in Joint Air Quality, Operational Noise and Regional Groundwater Monitoring							
TC EA Statement of Commitments	1.2	TCPL will work with the proponents of the Boggabri Coal Mine and Maules Creek Coal Project to develop and implement a joint network of real-time particulate matter monitors, operational noise monitors and regional groundwater monitoring in the vicinity of the Project. The details of the joint network will be provided in the revised Air Quality and Greenhouse Gas Management Plan, Noise Management Plan and Water Management Plan.	Water Management Plan 2013 states: TCM has been in consultation with the nearby Boggabri Coal mine and Maules Creek Project in developing a Leard Forest Mining Precinct Air Quality Management Strategy. The aim of this strategy is to minimise cumulative impacts on the quality and availability of water resources in the catchment. At the time of developing this management plan, the Leard Forest Mining Precinct Water Management Strategy was currently in draft form awaiting approval. AQMP (June 2014) states: TCM has been in consultation with the nearby Boggabri Coal Mine and Maules Creek Project in relation to developing an Air Quality Management Strategy for the Boggabri – Tarrawonga – Maules Creek (BTM) Complex incorporating cumulative air quality monitoring and management, as required under the conditions of consent for the Tarrawonga Coal Mine. The Strategy has been submitted to the Department of Planning and Environment (DPE) for approval. Once approved, the Strategy will be appended to this Plan. NMP (June 2014) states: TCM have been in consultation with the nearby Boggabri Coal Mine and Maules Creek Project in relation to developing a Leard Forest Mining Precinct Noise Management Strategy incorporating cumulative noise impacts and management. The Strategy has been submitted to the Department of Planning and Environment (DPE) for approval. Monitoring of the proposed joint network has commenced but data sharing is not done yet as per the draft Strategy.	Not Applicable			

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
2 Discharges to Air and Water and Applications to Land							
P1 Location of monitoring/discharge points and areas							
EPL 12364	Preamble	**Fee Based Activity Scale** Coal works 0-2,000,000 T handled Mining for coal > 500,000-2,000,000 T produced	2013-14 AEMR identified 2,136,045t sent to Narrabri CHPP.	Not Compliant Administrative			
EPL 12365	P1.1	The following points referred to in the table below are identified in this licence for the purposes of monitoring and/or the setting of limits for the emission of pollutants to the air from the point. ***Air*** **EPA identification no.** / **Type of Monitoring Point** / **Type of Discharge Point** / **Location Description** 28 / Ambient air monitoring / / Real time air quality monitor located on 'Flixton' as referred to in map titled "Real Time Air Monitor Location- Tarrawonga Coal Mine" received by the EPA on 16 November 2011 (DOC11/56063).	AEMR/Annual Review 2012/2013, Section 3.1	Compliant			
EPL 12365	P1.2	The following points referred to in the table are identified in this licence for the purposes of the monitoring and/or the setting of limits for discharges of pollutants to water from the point.	Annual Return	Compliant			
EPL 12365	P1.3	The following utilisation areas referred to in the table below are identified in this licence for the purposes of the monitoring and/or the setting of limits for any application of solids or liquids to the utilisation area. ***Water and land*** **EPA identification no.** / **Type of Monitoring Point** / **Type of Discharge Point** / **Location Description** 1 / Wet weather discharge Discharge water quality monitoring / Wet weather discharge Discharge water quality monitoring / Discharge point located on the western boundary and labelled "SD17" on Figure 4: Proposed Water Discharge Points and Weather Station submitted with licence variation application form 13 October 2008. 2 / Wet weather discharge Discharge water quality monitoring / Wet weather discharge Discharge water quality monitoring / Spillway on Storage Dam 9 located on southern boundary of premises labelled "SD9" on Figure 4: Proposed Water Discharge Points and Weather Station submitted with licence variation application form 13 October 2008. 3 / Wet weather discharge Discharge water quality monitoring / Wet weather discharge Discharge water quality monitoring / Spillway on Sediment Basin 14 located east of Thuin house on southern boundary labelled "SB14" on Figure 4: Proposed Water Discharge Points and Weather Station submitted with licence variation application form 13 October 2008.	Annual Return	Compliant			

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
EPL 12365	P1.3	5 Ambient water quality monitoring — Bollol Creek upstream of discharge from premises labelled "BC-U" on Figure 4: Proposed Water Discharge Points and Weather Station submitted with licence variation application form 13 October 2008. 6 Ambient water quality monitoring — Bollol Creek downstream of discharge from premises labelled "BC-D" on Figure 4: Proposed Water Discharge Points and Weather Station submitted with licence variation application form 13 October 2008. 7 Ambient water quality monitoring — Nagero Creek upstream of discharge from premises labelled "NC-U "on Figure 4: Proposed Water Discharge Points and Weather Station submitted with licence variation application form 13 October 2008. 8 Ambient water quality monitoring — Nagero Creek downstream of discharge from premises labelled "NC-D "on Figure 4: Proposed Water Discharge Points and Weather Station submitted with licence variation application form 13 October 2008. 9 Groundwater monitoring — Groundwater monitoring bore located on property "Thuin" labelled MW-1 on Figure 5 Water Monitoring Locations in the Site Water Management Plan submitted with licence application 17 November 2005 10 Groundwater monitoring — Groundwater monitoring bore located on property "Bollol Ck Station" labelled MW-2 on Figure 5 Water Monitoring Locations in the Site Water Management Plan submitted with licence application 17 November 2005 11 Groundwater monitoring — Groundwater monitoring bore located on property "Nagero" labelled MW-3 on Figure 5 Water Monitoring Locations in the Site Water Management Plan submitted with licence application 17 November 2005	Annual Return	Compliant			

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
EPL 12365	P1.3		Annual Return	Compliant			
EPL 12365	P1.4	The following point(s) in the table are identified in this licence for the purpose of the monitoring of weather parameters at the point. 	AEMR/Annual Review 2012/2013, Section 3.22	Compliant			
	3. Limit Conditions						
	L1 Pollution of waters						
EPL 12365	L1.1	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.	AEMR/Annual Review 2012/2013, Appendix 3 TABLE A3.2 Compliance Review – Environment Protection Licence 12365.	Compliant			
	L2 Concentration Limits						
EPL 12365	L2.1	For each monitoring/discharge point or utilisation area specified in the table\s below (by a point number), the concentration of a pollutant discharged at that point, or applied to that area, must not exceed the concentration limits specified for that pollutant in the table.	Noted	Noted			
EPL 12365	L2.2	Where a pH quality limit is specified in the table, the specified percentage of samples must be within the specified ranges.	Noted	Noted			
EPL 12365	L2.3	To avoid any doubt, this condition does not authorise the pollution of waters by any pollutant other than those specified in the table\s.	Noted	Noted			

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
EPL 12365	L2.4	Water and/or Land Concentration Limits POINT 1,2,3,24,25,26,27 Pollutant / Units of Measure / 50 percentile concentration limit / 90 percentile concentration limit / 3DGM concentration limit / 100 percentile concentration limit Oil and Grease / milligrams per litre / / / / 10 pH / pH / / / / 6.5 - 8.5 Total suspended solids / milligrams per litre / / / / 50	AEMR/Annual Review 2012/2013, Appendix 3 TABLE A3.2 Compliance Review – Environment Protection Licence 12365.	Compliant			
EPL 12365	L2.5	The Total Suspended Solids concentration limits specified for Points 1, 2, 3, 24, 25, 26 and 27 may be exceeded for water discharged provided that: (a) the discharge occurs solely as a result of rainfall measured at the premises that exceeds 38.4 millimetres over any consecutive 5 day period immediately prior to the discharge occurring; and (b) all practical measures have been implemented to dewater all sediment dams within 5 days of rainfall such that they have sufficient capacity to store run off from a 38.4 millimetre, 5 day rainfall event. Note: 38.4 mm equates to the 5 day 90%ile rainfall depth for Gunnedah sourced from Table 6.3a Managing Urban Stormwater: Soils and Construction Volume 1: 4th edition, March 2004.	Noted	Noted			
	L3 Waste						
EPL 12365	L3.1	The licensee must not cause, permit or allow any waste generated outside the premises to be received at the premises for storage, treatment, processing, reprocessing or disposal or any waste generated at the premises to be disposed of at the premises, except as expressly permitted by the licence.	AEMR 2012/2013, Appendix 3 TABLE A3.2 Compliance Review – Environment Protection Licence 12365.	Compliant			
EPL 12365	L3.2	This condition only applies to the storage, treatment, processing, reprocessing or disposal of waste at the premises if those activities require an environment protection licence.	AEMR/ 2012/2013, Appendix 3 TABLE A3.2 Compliance Review – Environment Protection Licence 12365.	Compliant			
EPL 12365	L3.3	Reject material from the Whitehaven CHPP can be disposed of at the premises in accordance with the disposal method outlined in the Environmental Impact Statement titled "East Boggabri Joint Venture, Environmental Impact Statement for the Proposed East Boggabri Coal Mine, May 2005" prepared by R.W. Corkery & Co. Pty. Limited dated May 2005, or as otherwise approved by the EPA.	Noted	Noted			
	L4 Noise Limits						
EPL 12365	L4.1	Noise generated at the premises must not exceed the noise limits in the table below. Locality and Location / Day- LAeq (15 minute) / Evening- LAeq (15 minute) / Night- LAeq (15 minute) / Night- LA1 (1 minute) All other surrounding residences / 35 / 35 / 35 / 45	AEMR 2012/2013, Appendix 3 TABLE A3.2 Compliance Review – Environment Protection Licence 12365. AEMR/Annual Review 2012/2013, Section 3.10.3.2 J une 2012 Noise Monitoring - Attended. AEMR/Annual Review 2012/2013, Section 3.10.3.4 September 2012 Noise Monitoring – Attended	Not Compliant	D	3	Medium
EPL 12365	L4.2	For the purpose of the table above: a) Day is defined as the period from 7am to 6pm Monday to Saturday and 8am to 6pm Sundays and Public Holidays; b) Evening is defined as the period from 6pm to 10pm; c) Night is defined as the period from 10pm to 7am Monday to Saturday and 10pm to 8am Sundays and Public Holidays.	Noted	Noted			

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
EPL 12365	L4.3	To determine compliance: a) with the Leq(15 minute) noise limits in the Noise Limits table, the noise measurement equipment must be located: i) approximately on the property boundary, where any dwelling is situated 30 metres or less from the property boundary closest to the premises; or ii) within 30 metres of a dwelling façade, but not closer than 3m, where any dwelling on the property is situated more than 30 metres from the property boundary closest to the premises; or, where applicable iii) within approximately 50 metres of the boundary of a National Park or a Nature Reserve. b) with the LA1(1 minute) noise limits in the Noise Limits table, the noise measurement equipment must be located within 1 metre of a dwelling façade. c) with the noise limits in the Noise Limits table, the noise measurement equipment must be located: i) at the most affected point at a location where there is no dwelling at the location; or ii) at the most affected point within an area at a location prescribed by part (a) or part (b) of this condition.	AEMR 2012/2013, Appendix 3 TABLE A3.2 Compliance Review – Environment Protection Licence 12365.	Compliant			
EPL 12365	L4.4	The noise limits set out in the Noise Limits table apply under all meteorological conditions except for the following: a) Wind speeds greater than 3 metres/second at 10 metres above ground level; or b) Stability category F temperature inversion conditions and wind speeds greater than 2 metres/second at 10 metres above ground level; or c) Stability category G temperature inversion conditions. For the purposes of this condition: a) Data recorded by the meteorological station identified as EPA Identification Point(s) W1 must be used to determine meteorological conditions; and b) Temperature inversion conditions (stability category) are to be determined by the sigma-theta method referred to in Part E4 of Appendix E to the NSW Industrial Noise Policy.	Noted	Noted			
EPL 12365	L4.5	For the purposes of determining the noise generated at the premises the modification factors in Section 4 of the NSW Industrial Noise Policy must be applied, as appropriate, to the noise levels measured by the noise monitoring equipment.	Noted	Noted			
	L5 Blasting						
EPL 12365	L5.1	The overpressure level from blasting operations at the premises must not exceed 120dB (Lin Peak) at any time and at any point within 30 metres of any non project related residential building or other noise sensitive location. Error margins associated with any monitoring equipment used to measure this are not to be taken into account in determining whether or not the limit has been exceeded.	AEMR 2012/2013, Appendix 3 TABLE A3.2 Compliance Review – Environment Protection Licence 12365. 30-06-14 Matong Station 122.7dBA, located on TCL owned land, all other results compliant	Compliant			
EPL 12365	L5.2	The overpressure level from blasting operations at the premises must not exceed 115dB (Lin Peak) for more than five per cent of the total number of blasts over each reporting period at any time and at any point within 30 metres of any non-project related residential building or other noise sensitive location. Error margins associated with any monitoring equipment used to measure this are not to be taken into account in determining whether or not the limit has been exceeded.	AEMR 2012/2013, Appendix 3 TABLE A3.2 Compliance Review – Environment Protection Licence 12365.	Compliant			
EPL 12365	L5.3	Ground vibration peak particle velocity from the blasting operations at the premises must not exceed 10mm/sec at any time and at any point within 3.5 metres of any non project related residential building or other noise sensitive location. Error margins associated with any monitoring equipment used to measure this are not to be taken into account in determining whether or not the limit has been exceeded.	AEMR 2012/2013, Appendix 3 TABLE A3.2 Compliance Review – Environment Protection Licence 12365.	Compliant			

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
EPL 12365	L5.4	Ground vibration peak particle velocity from the blasting operations at the premises must not exceed 5mm/sec for more than five per cent of the total number of blasts over each reporting period at any point within 3.5 metres of any non project related residential building or other noise sensitive location. Error margins associated with any monitoring equipment used to measure this are not to be taken into account in determining whether or not the limit has been exceeded.	AEMR 2012/2013, Appendix 3 TABLE A3.2 Compliance Review – Environment Protection Licence 12365.	Compliant			
EPL 12365	L5.5	Blasting operations on the premises must only be carried out between the hours 9am to 5pm, Monday to Saturday, inclusive.	AEMR 2012/2013, Appendix 3 TABLE A3.2 Compliance Review – Environment Protection Licence 12365.	Compliant			
EPL 12365	L5.6	The hours of operation for blasting operations specified in condition L7.3 may be varied if the EPA, having regard to the effect that the proposed variation would have on the amenity of the residents in the locality, gives written consent to the variation.	AEMR 2012/2013, Appendix 3 TABLE A3.2 Compliance Review – Environment Protection Licence 12365.	Not Applicable			
EPL 12365	L5.7	Blasting at the premises is limited to 1 blast on each day on which blasting is permitted. Note: Additional blasts are permitted where it is demonstrated to be necessary for safety reasons and the EPA and neighbours have been notified of the intended blast prior to the additional blast being fired.	AEMR 2012/2013, Appendix 3 TABLE A3.2 Compliance Review – Environment Protection Licence 12365.	Compliant			
	4. Operating Conditions						
	01 Activities must be caried out in a competent manner						
EPL 12365	O1.1	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.	AEMR 2012/2013, Appendix 3 TABLE A3.2 Compliance Review – Environment Protection Licence 12365.	Compliant			
	O3 Dust						
EPL 12365	O3.1	All operations and activities occurring at the premises must be carried out in a manner that will minimise the emission of dust from the premises.	AEMR 2012/2013, Appendix 3 TABLE A3.2 Compliance Review – Environment Protection Licence 12365.	Compliant			
EPL 12365	O3.2	Trucks transporting coal from the premises must be covered immediately after loading to prevent wind blown emissions and spillage. The covering must be maintained until immediately before unloading the trucks.	AEMR 2012/2013, Appendix 3 TABLE A3.2 Compliance Review – Environment Protection Licence 12365.	Compliant			
	5. Monitoring and Recording Conditions						
	M2 Requirement to monitor concentration of pollutants discharged						
EPL 12365	M2.1	For each monitoring/discharge point or utilisation area specified below (by a point number), the licensee must monitor (by sampling and obtaining results by analysis) the concentration of each pollutant specified in Column 1. The licensee must use the sampling method, units of measure, and sample at the frequency, specified opposite in the other columns:	AEMR 2012/2013, Appendix 3 TABLE A3.2 Compliance Review – Environment Protection Licence 12365.	Compliant			
EPL 12365	M2.2	Air Monitoring Requirements POINT 28 Pollutant: PM10 — Units of measure: micrograms per cubic metre — Frequency: Continuous — Sampling Method: AM-22	Noted	Noted			

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
EPL 12365	M2.3	Water and/ or Land Monitoring Requirements POINT 1,2,3,24,25,26,27 Pollutant / Units of measure / Frequency / Sampling Method Conductivity / microsiemens per centimetre / Special Frequency 1 / Grab sample Oil and Grease / milligrams per litre / Special Frequency 1 / Grab sample pH / pH / Special Frequency 1 / Grab sample Total suspended solids / milligrams per litre / Special Frequency 1 / Grab sample POINT 5,6,7,8 Pollutant / Units of measure / Frequency / Sampling Method Conductivity / microsiemens per centimetre / Special Frequency 1 / Grab sample Oil and Grease / milligrams per litre / Special Frequency 1 / Grab sample pH / pH / Special Frequency 1 / Grab sample Total suspended solids / milligrams per litre / Special Frequency 1 / Grab sample POINT 9,10,11,12 Pollutant / Units of measure / Frequency / Sampling Method Conductivity / microsiemens per centimetre / Every 6 months / Grab sample Lead / milligrams per litre / Every 6 months / Grab sample pH / pH / Every 6 months / Grab sample Standing Water Level / metres / Every 6 months / In situ POINT 13 Pollutant / Units of measure / Frequency / Sampling Method Conductivity / microsiemens per centimetre / Quarterly / Grab sample Oil and Grease / milligrams per litre / Quarterly / Grab sample pH / pH / Quarterly / Grab sample Total suspended solids / milligrams per litre / Quarterly / Grab sample	Annual Return. All the land and water monitoring points were listed.	Compliant			
EPL 12365	M2.4	For the pruposes of the table(s) above Special Frequency 1 means the collection of samples as soon as practicable after a discharge from points 1, 2, 3, 24, 25, 26, and 27 commences and in any case not more than 12 hours after a discharge commences.	Noted	Noted			
EPL 12365	M2.5	For the purposes of condition M2.1, this licence acknowledges that points 15, 16, 20 and 21 are established, maintained and monitored by the licensee who holds Environment Protection Licence number 12407. The holder of environment protection licence 12365 obtains monitoring data from Licensee 12407 for these points to meet their obligations under this licence. The licensee is deemed to have not breached condition M2.1 of this licence where the licensee is unable to obtain the monitoring data to meet this condition.	Noted	Noted			
	M3 Testing methods - concentration limits						
EPL 12365	M3.1	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.	AEMR 2012/2013, Appendix 3 TABLE A3.2 Compliance Review – Environment Protection Licence 12365.	Compliant			

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
EPL 12365	M3.2	Subject to any express provision to the contrary in this licence, monitoring for the concentration of a pollutant discharged to waters or applied to a utilisation area must be done in accordance with the Approved Methods Publication unless another method has been approved by the EPA in writing before any tests are conducted. 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".	AEMR 2012/2013, Appendix 3 TABLE A3.2 Compliance Review – Environment Protection Licence 12365.	Compliant			
	M4 Weather Monitoring						
EPL 12365	M4.1	For each monitoring point specified in the table below the licensee must monitor (by sampling and obtaining results by analysis) the parameters specified in Column 1. The licensee must use the sampling method, units of measure, averaging period and sample at the frequency, specified opposite in the other columns. **Point W1** **Parameter** / **Units of Measure** / **Frequency** / **Averaging Period** / **Sampling Method** Temperature @ 2 metres / °C / Continuous / 15 minute / AM-4 Wind direction @ 10 metres / ° / Continuous / 15 minute / AM-2 & AM-4 Wind speed @ 10 metres / m/s / Continuous / 15 minute / AM-2 & AM-4 Sigma theta @ 10 metres / ° / Continuous / 15 minute / AM-2 & AM-4 Rainfall / mm/h / Continuous / 1 hour / AM-4 Solar Radiation / W/m2 / Continuous / 15 minute / AM-4 Temperature @ 10 metres / °C / Continuous / 15 minute / AM-4 Additional requirements - Siting - Measurement / / / / AM-1 & AM-4 AM-2 & AM-4	AEMR 2012/2013, Appendix 3 TABLE A3.2 Compliance Review – Environment Protection Licence 12365.	Compliant			
EPL 12365	M4.2	The meteorological weather station must be maintained so as to be capable of continuously monitoring the parameters specified in this section.	AEMR 2012/2013, Appendix 3 TABLE A3.2 Compliance Review – Environment Protection Licence 12365.	Compliant			
	M5 Recording of pollution complaints						
EPL 12365	M5.1	The licensee must keep a legible record of all complaints made to the licensee or any employee or agent of the licensee in relation to pollution arising from any activity to which this licence applies.	AEMR 2012/2013, Appendix 3 TABLE A3.2 Compliance Review – Environment Protection Licence 12365.	Compliant			
EPL 12365	M5.2	The record must include details of the following: a) the date and time of the complaint; b) the method by which the complaint was made; c) any personal details of the complainant which were provided by the complainant or, if no such details were provided, a note to that effect; d) the nature of the complaint; e) the action taken by the licensee in relation to the complaint, including any follow-up contact with the complainant; and f) if no action was taken by the licensee, the reasons why no action was taken.	AEMR 2012/2013, Appendix 3 TABLE A3.2 Compliance Review – Environment Protection Licence 12365.	Compliant			
EPL 12365	M5.3	The record of a complaint must be kept for at least 4 years after the complaint was made.	AEMR 2012/2013, Appendix 3 TABLE A3.2 Compliance Review – Environment Protection Licence 12365.	Compliant			
EPL 12365	M5.4	The record must be produced to any authorised officer of the EPA who asks to see them.	AEMR 2012/2013, Appendix 3 TABLE A3.2 Compliance Review – Environment Protection Licence 12365.	Compliant			
	M6 Telephone complaints line						

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
EPL 12365	M6.1	The licensee must operate during its operating hours a telephone complaints line for the purpose of receiving any complaints from members of the public in relation to activities conducted at the premises or by the vehicle or mobile plant, unless otherwise specified in the licence.	AEMR 2012/2013, Appendix 3 TABLE A3.2 Compliance Review – Environment Protection Licence 12365.	Compliant			
EPL 12365	M6.2	The licensee must notify the public of the complaints line telephone number and the fact that it is a complaints line so that the impacted community knows how to make a complaint.	AEMR 2012/2013, Appendix 3 TABLE A3.2 Compliance Review – Environment Protection Licence 12365.	Compliant			
EPL 12365	M6.3	The preceding two conditions do not apply until 3 months after: a) the date of the issue of this licence or b) if this licence is a replacement licence within the meaning of the Protection of the Environment Operations (Savings and Transitional) Regulation 1998, the date on which a copy of the licence was served on the licensee under clause 10 of that regulation.	Noted	Noted			
	M7 Other monitoring and recording conditions						
EPL 12365	M7.1	For each monitoring point specified below, the Licensee must monitor the noise or vibration parameter specified in Column 1. The Licensee must use the sampling method, units of measure, and sample at the frequency, specified opposite in the other columns. Points: N1 **Parameter** / **Units of Measure** / **Frequency** / **Sampling Method** Ambient Noise / LAeq (15 minute), LAmax, LA1, LA10, LA90, LAmin / Frequency of monitoring as detailed in the most recently approved "Noise Management Plan" and "Road Noise Management Plan" for the premises. / As detailed in the most recently approved "Noise Management Plan" and "Road Noise Management Plan" for the premises.	AEMR 2012/2013, Appendix 3 TABLE A3.2 Compliance Review – Environment Protection Licence 12365.	Compliant			
EPL 12365	M7.2	Point: N3 **Parameter** / **Units of Measure** / **Frequency** / **Sampling Method** Ambient Noise / LAeq (15 minute), LAmax, LA1, LA10, LA90, LAmin / Continuous real time noise monitoring as detailed in the most recently approved "Noise Management Plan" and "Road Noise Management Plan" for the premises. / As detailed in the most recently approved "Noise Management Plan" and "Road Noise Management Plan" for the premises.	AEMR 2012/2013, Appendix 3 TABLE A3.2 Compliance Review – Environment Protection Licence 12365.	Compliant			
EPL 12365	M7.3	Points: N1 **Parameter** / **Units of measure** / **Frequency** / **Sample Method** Blast Noise / DB(Lin Peak) / Every Blast / Type 1 Noise Blast Logger Blast Vibration / mm/s / Every Blast / Geophone Logger or Similar	AEMR 2012/2013, Appendix 3 TABLE A3.2 Compliance Review – Environment Protection Licence 12365.	Compliant			
EPL 12365	M7.4	For the purpose of conditions M7.1 and M7.2, the noise monitoring locations are described as: **EPA Identification No.** / **Description of Location** N1 / Within 30m of the residence on property "Tarrawonga" N3 / Portable monitor	AEMR 2012/2013, Appendix 3 TABLE A3.2 Compliance Review – Environment Protection Licence 12365.	Compliant			
EPL 12365	M7.5	Note: N3 is a portable monitor enabling the monitor to be relocated to areas of potential greatest impact. The licensee is responsible to ensure that it is located at the most suitable location.	AEMR 2012/2013, Appendix 3 TABLE A3.2 Compliance Review – Environment Protection Licence 12365.	Compliant			

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
EPL 12365	M7.6	Note: The location, frequency of monitoring and the parameters to be monitored may be varied by the EPA once the variability of the noise impact is established.	AEMR 2012/2013, Appendix 3 TABLE A3.2 Compliance Review – Environment Protection Licence 12365.	Compliant			
EPL 12365	M7.7	To assess compliance with the noise limits presented in the Noise Limits table, attended noise monitoring must be undertaken in accordance with the condition titled Determining Compliance, outlined above, and: a) at each one of the locations listed in the Noise Limits table; b) occur Quarterly in a reporting period; c) occur during each day, evening and night period as defined in the NSW Industrial Noise Policy for a minimum of: i) 1.5 hours during the day; ii) 30 minutes during the evening; and iii) 1 hour during the night. d) occur for three consecutive operating days.	AEMR 2012/2013, Appendix 3 TABLE A3.2 Compliance Review – Environment Protection Licence 12365.	Compliant			
	6 Reporting Conditions						
	R1 Annual return documents						
EPL 12365	R1.1	The licensee must complete and supply to the EPA an Annual Return in the approved form comprising: a) a Statement of Compliance; and b) a Monitoring and Complaints Summary. At the end of each reporting period, the EPA will provide to the licensee a copy of the form that must be completed and returned to the EPA.	AEMR 2012/2013, Appendix 3 TABLE A3.2 Compliance Review – Environment Protection Licence 12365.	Compliant			
EPL 12365	R1.2	An Annual Return must be prepared in respect of each reporting period, except as provided below.	Annual returns sighted in website from periods Jan 2007-Jan2008 to Jan 2013-Jan 2014	Compliant			
EPL 12365	R1.3	Where this licence is transferred from the licensee to a new licensee: a) the transferring licensee must prepare an Annual Return for the period commencing on the first day of the reporting period and ending on the date the application for the transfer of the licence to the new licensee is granted; and b) the new licensee must prepare an Annual Return for the period commencing on the date the application for the transfer of the licence is granted and ending on the last day of the reporting period.	Noted	Noted			
EPL 12365	R1.4	Where this licence is surrendered by the licensee or revoked by the EPA or Minister, the licensee must prepare an Annual Return in respect of the period commencing on the first day of the reporting period and ending on: a) in relation to the surrender of a licence - the date when notice in writing of approval of the surrender is given; or b) in relation to the revocation of the licence - the date from which notice revoking the licence operates.	Noted	Noted			
EPL 12365	R1.5	The Annual Return for the reporting period must be supplied to the EPA by registered post not later than 60 days after the end of each reporting period or in the case of a transferring licence not later than 60 days after the date the transfer was granted (the 'due date').	AEMR 2012/2013, Appendix 3 TABLE A3.2 Compliance Review – Environment Protection Licence 12365.	Compliant			
EPL 12365	R1.6	The licensee must retain a copy of the Annual Return supplied to the EPA for a period of at least 4 years after the Annual Return was due to be supplied to the EPA.	Noted	Noted			
EPL 12365	R1.7	Within the Annual Return, the Statement of Compliance must be certified and the Monitoring and Complaints Summary must be signed by: a) the licence holder; or b) by a person approved in writing by the EPA to sign on behalf of the licence holder.	AEMR 2012/2013, Appendix 3 TABLE A3.2 Compliance Review – Environment Protection Licence 12365.	Compliant			

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
EPL 12365	R1.8	A person who has been given written approval to certify a certificate of compliance under a licence issued under the Pollution Control Act 1970 is taken to be approved for the purpose of this condition until the date of first review of this licence. Note: The term "reporting period" is defined in the dictionary at the end of this licence. Do not complete the Annual Return until after the end of the reporting period. Note: An application to transfer a licence must be made in the approved form for this purpose.	AEMR 2012/2013, Appendix 3 TABLE A3.2 Compliance Review – Environment Protection Licence 12365.	Compliant			
	R2 Notification of environmental hard						
EPL 12365	R2.1	Notifications must be made by telephoning the Environment Line service on 131 555.	AEMR 2012/2013, Appendix 3 TABLE A3.2 Compliance Review – Environment Protection Licence 12365.	Compliant			
EPL 12365	R2.2	The licensee must provide written details of the notification to the EPA within 7 days of the date on which the incident occurred. Note: The licensee or its employees must notify all relevant authorities of incidents causing or threatening material harm to the environment immediately after the person becomes aware of the incident in accordance with the requirements of Part 5.7 of the Act.	AEMR 2012/2013, Appendix 3 TABLE A3.2 Compliance Review – Environment Protection Licence 12365.	Compliant			
	R3 Written report						
EPL 12365	R3.1	Where an authorised officer of the EPA suspects on reasonable grounds that: a) where this licence applies to premises, an event has occurred at the premises; or b) where this licence applies to vehicles or mobile plant, an event has occurred in connection with the carrying out of the activities authorised by this licence, and the event has caused, is causing or is likely to cause material harm to the environment (whether the harm occurs on or off premises to which the licence applies), the authorised officer may request a written report of the event.	No requests received by Tarrawonga Coal during reporting period. AEMR/Annual Review 2012/2013, Appendix 3 TABLE A3.2 Compliance Review – Environment Protection Licence 12365.	Not Applicable			
EPL 12365	R3.2	The licensee must make all reasonable inquiries in relation to the event and supply the report to the EPA within such time as may be specified in the request.	No requests received by Tarrawonga Coal during reporting period. AEMR/Annual Review 2012/2013, Appendix 3 TABLE A3.2 Compliance Review – Environment Protection Licence 12365.	Not Applicable			

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
EPL 12365	R3.3	The request may require a report which includes any or all of the following information: a) the cause, time and duration of the event; b) the type, volume and concentration of every pollutant discharged as a result of the event; c) the name, address and business hours telephone number of employees or agents of the licensee, or a specified class of them, who witnessed the event; d) the name, address and business hours telephone number of every other person (of whom the licensee is aware) who witnessed the event, unless the licensee has been unable to obtain that information after making reasonable effort; e) action taken by the licensee in relation to the event, including any follow-up contact with any complainants; f) details of any measure taken or proposed to be taken to prevent or mitigate against a recurrence of such an event; and g) any other relevant matters.	No requests received by Tarrawonga Coal during reporting period. AEMR/Annual Review 2012/2013, Appendix 3 TABLE A3.2 Compliance Review – Environment Protection Licence 12365.	Not Applicable			
EPL 12365	R3.4	The EPA may make a written request for further details in relation to any of the above matters if it is not satisfied with the report provided by the licensee. The licensee must provide such further details to the EPA within the time specified in the request.	No requests received by Tarrawonga Coal during reporting period. AEMR/Annual Review 2012/2013, Appendix 3 TABLE A3.2 Compliance Review – Environment Protection Licence 12365.	Not Applicable			
	R4 Other reporting conditions						
EPL 12365	R4.1	A noise compliance assessment report must be submitted to the EPA within thirty (30) days of the completion of the quarterly noise monitoring. The assessment must be prepared by a suitably qualified and experienced acoustical consultant and include: a) an assessment of compliance with noise limits detailed in the limit conditions of this licence; and b) an outline of any management actions taken within the monitoring period to address any exceedences of the limits detailed in the limit conditions of this licence.	AEMR 2012/2013, Appendix 3 TABLE A3.2 Compliance Review – Environment Protection Licence 12365.	Compliant			
	7 General Conditions						
	G1 Copy of licence kept at premises or plant						
EPL 12365	G1.1	A copy of this licence must be kept at the premises to which the licence applies.	AEMR 2012/2013, Appendix 3 TABLE A3.2 Compliance Review – Environment Protection Licence 12365.	Compliant			
EPL 12365	G1.2	The licence must be produced to any authorised officer of the EPA who asks to see it.	AEMR 2012/2013, Appendix 3 TABLE A3.2 Compliance Review – Environment Protection Licence 12365.	Not Applicable			
EPL 12365	G1.3	The licence must be available for inspection by any employee or agent of the licensee working at the premises.	AEMR 2012/2013, Appendix 3 TABLE A3.2 Compliance Review – Environment Protection Licence 12365.	Compliant			
	8 Pollution Studies and Reduction Programs						
	U1 Particulate Matter Control Best Practice Implementation - Wheel Generated Dust						

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
EPL 12365	U1.1	The Licensee must achieve and maintain a dust control efficiency of 80% or more on all active haul roads by 17 May 2013. Control efficiency is calculated as: CE = E (uncontrolled) - E (controlled) x 100 E (uncontrolled) Where E = the emission rate of the activity	AEMR 2012/2013, Appendix 3 TABLE A3.2 Compliance Review – Environment Protection Licence 12365.	Not Applicable			
EPL 12365	U1.2	To assess compliance with Condition U1.1, the Licensee must: - measure uncontrolled and controlled haul road emissions on at least 2 occasions using a mobile dust monitor; - continuously measure and record 'additional site data' including: · vehicle kilometres travelled (VKT), · meteorological conditions, · water use for dust suppression. - undertake silt content and soil moisture sampling during sampling events; and - determine if a site specific relationship can be derived between the measured control efficiency, additional site data, water use, meteorological data; and silt content and soil moisture levels. The measurement of uncontrolled and controlled haul road PM10 emissions must be undertaken under varying meteorological conditions, including at those times when analysis of meteorological data indicates that elevated levels of dust are most likely at the Premises. Note: The EPA acknowledges that in order to determine uncontrolled PM10 emissions, the section of haul road to be sampled will need to be left untreated for a period of up to 12 hours prior to the sampling taking place.	AEMR 2012/2013, Appendix 3 TABLE A3.2 Compliance Review – Environment Protection Licence 12365. Mechanism to test dust control efficiency attached to monitoring program currently pending final approval by EPA.	Not Applicable			
EPL 12365	U1.3	The Licensee must submit a report to the EPA which documents the results of the assessment undertaken in accordance with Condition U1.1. The report must include an assessment of: - the dust control effectiveness, - the dust levels recorded, and - any relationship established between control effectiveness and the additional site data.The report must be submitted by the Licensee to the Environment Protection Authority Regional Manager Armidale, at PO Box 494, ARMIDALE by 15 August 2014.	AEMR 2012/2013, Appendix 3 TABLE A3.2 Compliance Review – Environment Protection Licence 12365.	Not Applicable			
EPL 12365	U1.4	The report required by condition U1.3 must be made publicly available by the Licensee on the Licensee's website by (two weeks from submission date nominated in U1.3).	AEMR 2012/2013, Appendix 3 TABLE A3.2 Compliance Review – Environment Protection Licence 12365. No identification of adverse weather conditions impacting on dust generation on overburden during reporting period.	Compliant			
U2 Particulate Matter Control Best Practice Implementation - Disturbing and Handling Overbuden under advers weather conditions							

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
EPL 12365	U2.1	The licensee must alter or cease the use of equipment on overburden and the loading and dumping of overburden during adverse weather conditions to minimise the generation of particulate matter from 22 March 2013.	AEMR 2012/2013, Appendix 3 TABLE A3.2 Compliance Review – Environment Protection Licence 12365. No identification of adverse weather conditions impacting on dust generation on overburden during reporting period.	Compliant			
EPL 12365	U2.2	To assess compliance with Condition U2.1, the Licensee must: - undertake daily visual dust level assessments, continuously record real-time PM10 levels and continuously measure and record real-time meteorological conditions; and - record changes to mining activities due to adverse weather conditions.	AEMR 2012/2013, Appendix 3 TABLE A3.2 Compliance Review – Environment Protection Licence 12365. Pending approval of Monitoring Program	Not Applicable			
EPL 12365	U2.3	The Licensee must submit a report to the EPA which documents the results of the actions taken in accordance with Condition U2.1. The report must include an assessment of the effectiveness of changes made to mining activities due to adverse weather and document meteorological conditions and the resultant dust levels. The report must be submitted by the Licensee to the Environment Protection Authority Regional Manager Armidale, at PO Box 494, ARMIDALE by 15 August 2014.	AEMR/Annual Review 2012/2013, Appendix 3 TABLE A3.2 Compliance Review – Environment Protection Licence 12365.	Not Applicable			
EPL 12365	U2.4	The report required by Condition U2.3 must be made publicly available by the Licensee on the Licensee's website by (two weeks from submission date in 2.3 above).	AEMR 2012/2013, Appendix 3 TABLE A3.2 Compliance Review – Environment Protection Licence 12365.	Not Applicable			
U3 Particulate Matter Control Best Practice Implementation - Trial of Best Practice Measures for Disturbing and Handling Overbuden							
EPL 12365	U3.1	The Licensee must submit a report documenting an investigation and trial of best practice measures for the control of particulate matter from the use of equipment on overburden and the loading and dumping of overburden. Best practice measures may include, but should not be limited to, the following: • use of foggers; • use of water sprays; and • reduction of drop heights. The report must document the investigation and trial of each best practice measure. It must quantify the particulate matter control effectiveness and discuss the practicability of each best practice measure. The report must be submitted by the Licensee to the Environment Protection Authority Regional Manager Armidale, at PO Box 494, ARMIDALE by 14 April 2014.	AEMR 2012/2013, Appendix 3 TABLE A3.2 Compliance Review – Environment Protection Licence 12365.	Not Applicable			

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
	Mining Lease - 1579						
	Mining, Rehabilitation, Environmental Management Process (MREMP) Mining Operations Plan (MOP)						
ML 1579	2.1	Mining operations, including mining purposes, must be conducted in accordance with a Mining Operations Plan (the Plan) satisfactory to the Director-General. The Plan together with environmental conditions of development consent and other approvals will form the basis for:- (a) ongoing mining operations and environmental management; and (b) ongoing monitoring of the project.	AEMR/Annual Review 2012/2013, Appendix 3 TABLE A3.3 Compliance Review – ML1579 Initial MOP lodged with DMR and accepted on the 9th May 2006. MOP amendment for Section 75W extension approved in October 2010. Revised MOP for Tarrawonga Extension area lodged May 2013.	Compliant			
ML 1579	2.2	The Plan must be prepared in accordance with the Director-Generals guidelines current at the time of lodgement.	AEMR/Annual Review 2012/2013, Appendix 3 TABLE A3.3 Compliance Review – ML1579 Initial MOP lodged with DMR and	Compliant			
ML 1579	2.3	A Plan must be lodged with the Director-General:- (a) prior to the commencement of mining operations (including mining purposes); (b) subsequently as appropriate prior to the expiry of any current Plan; and (c) in accordance with any direction issued by the Director-General.	AEMR/Annual Review 2012/2013, Appendix 3 TABLE A3.3 Compliance Review – ML1579 Initial MOP lodged with DMR and accepted on the 9th May 2006. MOP amendment for Section 75W extension approved in October 2010. Revised MOP for Tarrawonga Extension area lodged May 2013.	Compliant			

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
ML 1579	2.4	The Plan must present a schedule of proposed mine development for a period of up to seven years and contain diagrams and documentation which identify: a. Area(s) proposed to be disturbed under the plan; b. mining and rehabilitation methods to be used and their sequence c. areas to be used for disposal of tailings/waste d. existing and proposed surface infrastructure; e. existing flora and fauna on the site; f. progressive rehabilitation schedules; g. areas of particular environmental, ecological and cultural sensitivity and measures to protect these areas; h. water management systems (including erosion and sediment controls); i. proposed resource recovery; and j. where the mine will cease extraction during the term of the plan, a closure plan including final rehabilitation objectives/methods and post mining landuse/vegetation	AEMR/Annual Review 2012/2013, Appendix 3 TABLE A3.3 Compliance Review – ML1579 Initial MOP lodged with DMR and accepted on the 9th May 2006. MOP amendment for Section 75W extension approved in October 2010. Revised MOP for Tarrawonga Extension area lodged May 2013.	Compliant			
ML 1579	2.5	The Plan when lodged will be reviewed by the Department	AEMR/Annual Review 2012/2013, Appendix 3 TABLE A3.3 Compliance Review – ML1579 Initial MOP lodged with DMR and accepted on the 9th May 2006. MOP amendment for Section 75W extension approved in October 2010. Revised MOP for Tarrawonga Extension area lodged May 2013.	Compliant			
ML 1579	2.6	The Director-General may within two months of the lodgement of a plan, require modification and re-lodgement	AEMR/Annual Review 2012/2013, Appendix 3 TABLE A3.3 Compliance Review – ML1579 Initial MOP lodged with DMR and accepted on the 9th May 2006. MOP amendment for Section 75W extension approved in October 2010. Revised MOP for Tarrawonga Extension area lodged May 2013.	Compliant			

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
ML 1579	2.7	If a requirement in accordance with clause (6) is not issued within two months of the lodgement of a Plan, the lease holder may proceed with implementation of the Plan	AEMR/Annual Review 2012/2013, Appendix 3 TABLE A3.3 Compliance Review – ML1579 Initial MOP lodged with DMR and accepted on the 9th May 2006. MOP amendment for Section 75W extension approved in October 2010. Revised MOP for Tarrawonga Extension area lodged May 2013.	Compliant			
ML 1579	2.8	During the life of the Mining operations Plan, proposed modifications to the Plan must be lodged with the Director-General and will be subject to the review process outlined in clauses (5) - (7) above.	AEMR/Annual Review 2012/2013, Appendix 3 TABLE A3.3 Compliance Review – ML1579 Initial MOP lodged with DMR and accepted on the 9th May 2006. MOP amendment for Section 75W extension approved in October 2010. Revised MOP for Tarrawonga Extension area lodged May 2013.	Compliant			
Annual Environmental Management Report (AEMR)							
ML 1579	3.1	Within 12 months of the commencement of mining operations and thereafter annually or, at such other times as may be allowed by the Director-General, the lease holder must lodge an Annual Environmental Management Report (AEMR) with the Director-General.	AEMR/Annual Review 2012/2013, Appendix 3 TABLE A3.3 Compliance Review – ML1579 AEMR was prepared in satisfaction with this condition. Content of AEMR follows guidelines.	Compliant			

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
ML 1579	3.2	The AEMR must be prepared in accordance with the Director-General's guidelines current at the time of reporting and contain a review and forecast of performance for the preceding and ensuing twelve months in terms of: (a) the accepted Mining Operations Plan; (b) development consent requirements and conditions; (c) Department of Environment and Conservation and Department of Planning licences and approvals; (d) any other statutory environmental requirements; (e) details of any variations to environmental approvals applicable to the lease area; and (f) where relevant, progress towards final rehabilitation objectives.	AEMR/Annual Review 2012/2013, Appendix 3 TABLE A3.3 Compliance Review – ML1579 AEMR was prepared in satisfaction with this condition. Content of AEMR follows guidelines.	Compliant			
ML 1579	3.3	After considering an AEMR the Director-General may, by notice in writing, direct the lease holder to undertake operations, remedial actions or supplementary studies in the manner and within the period specified in the notice to ensure that operations on the lease area are conducted in accordance with sound mining and environmental practice.	AEMR/Annual Review 2012/2013, Appendix 3 TABLE A3.3 Compliance Review – ML1579 AEMR was prepared	Compliant			
	Subsidence Management						
ML 1579	4.1	(a). The lease holder shall, as and when directed by the Minister, co-operate with the Director-General to conduct and facilitate review of the AEMR involving other government agencies and the local council	Noted	Noted			
ML 1579	4.1	(b) Underground mining operations which will potentially lead to subsidence include secondary extraction panels such as longwalls or miniwalls, associated first workings (gateroads, installation roads and associated main headings, etc), and pillar extractions, and are otherwise defined by the *Applications for Subsidence Management Approvals guidelines (EDG17)*		Not Applicable			
ML 1579	4.1	The lease holder must not commence or undertake underground mining operations that will potentially lead to subsidence other than in accordance with a Subsidence Management Plan approved by the Director-General, an approval under the *Coal Mines Regulation Act 1982*, or the document *New Subsidence Management Plan Approval Process – Transitional Provisions* (EDP09).		Not Applicable			
ML 1579	4.1	Subsidence Management Plans are to be prepared in accordance with the Guideline for Applications for Subsidence Management Approvals		Not Applicable			
ML 1579	4.1	(6) Subsidence Management Plans as approved shall form part of the Mining Operations Plan required under Condition 2 and will be subject to the Annual Environmental Management Report process as set out under Condition 3. The SMP is also subject to the requirements for subsidence monitoring and reporting set out in the document *New Approval Process for Management of Coal Mining Subsidence - Policy*.		Not Applicable			
	Blasting						

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
ML 1579	11	(a) Ground Vibration The lease holder must ensure that the ground vibration peak particle velocity generated by any blasting within the lease area does not exceed 10 mm/second and does not exceed 5 mm/second in more than 5% of the total number of blasts over a period of 12 months at any dwelling or occupied premises as the case may be, unless determined otherwise by the Department of Environment and Conservation.	AEMR 2012/2013, Appendix 3 TABLE A3.3 Compliance Review – ML1579 No exceedances recorded during the reporting period	Compliant			
ML 1579	11	(b) Blast Overpressure The lease holder must ensure that the blast overpressure noise level generated by any blasting within the lease area does not exceed 120 dB (linear) and does not exceed 115 dB (linear) in more than 5% of the total number of blasts over a period of 12 months, at any dwelling or occupied premises, as the case may be, unless determined otherwise by the Department of Environment and Conservation.	AEMR 2012/2013, Appendix 3 TABLE A3.3 Compliance Review – ML1579 No exceedances recorded during the reporting period	Compliant			
	Rehabilitation						
ML 1579	13	(a) Land disturbed must be rehabilitated to a stable and permanent form suitable for a subsequent land use acceptable to the Director-General and in accordance with the Mining Operations Plan so that:- • there is no adverse environmental effect outside the disturbed area and that the land is properly drained and protected from soil erosion • the state of the land is compatible with the surrounding land and land use requirements • the landforms, soils, hydrology and flora require no greater maintenance than that in the surrounding land • in cases where revegetation is required and native vegetation has been removed or damaged, the original species must be re-established with close reference to the flora survey included in the Mining Operations Plan. If the original vegetation was not native, any re-established vegetation must be appropriate to the area and at an acceptable density. • the land does not pose a threat to public safety.	AEMR 2012/2013, Appendix 3 TABLE A3.3 Compliance Review – ML1579 Current rehabilitation activities are in accordance with commitments identified in the MOP Tarrawonga Coal Mine, Rehabilitation Management Plan, May 2013, Section 3 and 6.5	Compliant			
ML 1579	13	b. Any topsoil that is removed must be stored and maintained in a manner acceptable to the Director-General.	AEMR 2012/2013, Appendix 3 TABLE A3.3 Compliance Review – ML1579 Topsoil is stockpiled and seeded in accordance with commitments identified in the MOP. Tarrawonga Coal Mine, Rehabilitation Management Plan, May 2013, Section 6.3.2	Compliant			
ML 1579	14	The lease holder must comply with any direction given by the Director-General regarding the stabilisation and revegetation of any mine residues, tailings or overburden dumps situated on the lease area.	AEMR 2012/2013, Appendix 3 TABLE A3.3 Compliance Review – ML1579 No directions issued.	Not triggered			

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
	Exploratory Drilling						
ML 1579	15.1	At least twenty eight days prior to commencement of drilling operations the lease holder must notify the relevant Department of Natural Resources regional hydrogeologist of the intention to drill exploratory drill holes together with information on the location of the proposed holes.	AEMR 2012/2013, Appendix 3 TABLE A3.3 Compliance Review – ML1579	Compliant			
ML 1579	15.2	If the lease holder drills exploratory drill holes he must satisfy the Director-General that:- (a) all cored holes are accurately surveyed and permanently marked in accordance with Departmental guidelines so that their location can be easily established; b) all holes cored or otherwise are sealed to prevent the collapse of the surrounding surface; (c) all drill holes are permanently sealed with cement plugs to prevent surface discharge of groundwaters; (d) if any drill hole meets natural or noxious gases it is plugged or sealed to prevent their escape; (e) if any drill hole meets an artesian or sub-artesian flow it is effectively sealed to prevent contamination of aquifers. (f) once any drill hole ceases to be used the hole must be sealed in accordance with Departmental guidelines. Alternatively, the hole must be sealed as instructed by the Director-General. (g) once any drill hole ceases to be used the land and its immediate vicinity is left in a clean, tidy and stable condition.	AEMR 2012/2013, Appendix 3 TABLE A3.3 Compliance Review – ML1579	Compliant			
	Prevention of Soil Erosion and Pollution						
ML 1579	16	Operations must be carried out in a manner that does not cause or aggravate air pollution, water pollution (including sedimentation) or soil contamination or erosion, unless otherwise authorised by a relevant approval, and in accordance with an accepted Mining Operations Plan. For the purpose of this condition, water shall be taken to include any watercourse, waterbody or groundwaters. The lease holder must observe and perform any instructions given by the Director-General in this regard.	AEMR 2012/2013, Appendix 3 TABLE A3.3 Compliance Review – ML1579	Compliant			
	Transmission lines, Communication lines and Pipelines						
ML 1579	17	Operations must not interfere with or impair the stability or efficiency of any transmission line, communication line, pipeline or any other utility on the lease area without the prior written approval of the Director-General and subject to any conditions he may stipulate.	AEMR 2012/2013, Appendix 3 TABLE A3.3 Compliance Review – ML1579	Compliant			
	Fences, Gates						

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
ML 1579	18	(a) Activities on the lease must not interfere with or damage fences without the prior written approval of the owner thereof or the Minister and subject to any conditions the Minister may stipulate. (b) Gates within the lease area must be closed or left open in accordance with the requirements of the landholder.	AEMR 2012/2013, Appendix 3 TABLE A3.3 Compliance Review – ML1579	Compliant			
ML 1579	19	(a) Operations must not affect any road unless in accordance with an accepted Mining Operations Plan or with the prior written approval of the Director-General and subject to any conditions he may stipulate. (b) The lease holder must pay to the designated authority in control of the road (generally the local council or the Roads and Traffic Authority) the cost incurred in fixing any damage to roads caused by operations carried out under the lease, less any amount paid or payable from the Mine Subsidence Compensation Fund.	AEMR 2012/2013, Appendix 3 TABLE A3.3 Compliance Review – ML1579	Compliant			
ML 1579	20	Access tracks must be kept to a minimum and be positioned so that they do not cause any unnecessary damage to the land. Temporary access tracks must be ripped, topsoiled and revegetated as soon as possible after they are no longer required for mining operations. The design and construction of access tracks must be in accordance with specifications fixed by the Department of Natural Resources.	AEMR 2012/2013, Appendix 3 TABLE A3.3 Compliance Review – ML1579	Compliant			
	Trees and Timber						
ML 1579	21	(a) The lease holder must not fell trees, strip bark or cut timber on the lease without the consent of the landholder who is entitled to the use of the timber, or if such a landholder refuses consent or attaches unreasonable conditions to the consent, without the approval of a warden.	AEMR 2012/2013, Appendix 3 TABLE A3.3 Compliance Review – ML1579	Compliant			
ML 1579	21	(b) The lease holder must not cut, destroy, ringbark or remove any timber or other vegetative cover on the lease area except such as directly obstructs or prevents the carrying on of operations. Any clearing not authorised under the Mining Act 1992 must comply with the provisions of the Native Vegetation Act 2003.	AEMR 2012/2013, Appendix 3 TABLE A3.3 Compliance Review – ML1579	Compliant			
ML 1579	21	(c) The lease holder must obtain all necessary approvals or licences before using timber from any Crown land within the lease area.	AEMR 2012/2013, Appendix 3 TABLE A3.3 Compliance Review – ML1579	Compliant			

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
	Mining Lease - 1685						
	Rehabilitation						
ML 1685	2	Any disturbance resulting from the activities carried out under this mining lease must be rehabilitated to the satisfaction of the Minister	Tarrawonga Rehabilitation Management Plan, May 2013 (SLR Consulting), Section 1.2 states that the Rehabilitation Management Plan has been prepared in accordance with all relevant approval consent conditions and commitments, relevant regulatory and industry policies and guidelines.	Compliant			
	Mining Operations Plan and Annual Rehabilitation Report						
ML 1685	3	(a) The lease holder must comply with an approved Mining Operations Plan (MOP) in carrying out any significant surface disturbing activities, including mining operations, mining purposes and prospecting. The lease holder must apply to the Minister for approval of a MOP. An approved MOP must be in place prior to commencing any significant surface disturbing activities, including mining operations, mining purposes and prospecting.	Sighted MOP Tarrawonga MOP Amendment, Dec 2013 (SLR Consulting)	Compliant			
ML 1685	3	(b) The MOP must identify the post mining land use and set out a detailed rehabilitation strategy which: (i) identifies areas that will be disturbed; (ii) details the staging of specific mining operations, mining purposes and prospecting; (iii) identifies how the mine will be managed and rehabilitated to achieve the post mining land use; (iv) identifies how mining operations, mining purposes and prospecting will be carried out in order to prevent and or minimise harm to the environment; and (v) reflects the conditions of approval under: • the *Environmental Planning and Assessment Act 1979*; • the *Protection of the Environment Operations Act 1997*; and • any other approvals relevant to the development including the conditions of this mining lease.	Sighted MOP Tarrawonga MOP Amendment, Dec 2013 (SLR Consulting) Tarrawonga Rehabilitation Management Plan, May 2013 (SLR Consulting), Section 1.2 states that the Rehabilitation Management Plan has been prepared in accordance with all relevant approval consent conditions and commitments, relevant regulatory and industry policies and guidelines.	Compliant			
ML 1685	3	(c) The MOP must be prepared in accordance with the *ESG3: Mining Operations Plan (MOP) Guidelines September 2013* published on the Department's website at: www.resources.nsw.gov.au/environment	Sighted MOP and mention of guidelines within MOP. Tarrawonga Rehabilitation Management Plan, May 2013 (SLR Consulting), Section 1.2 states that the Rehabilitation Management Plan has been prepared in accordance with all relevant approval consent conditions and commitments, relevant regulatory and industry policies and guidelines.	Compliant			
ML 1685	3	d. The lease holder may apply to the Minister to amend an approved MOP at any time.	Noted	Compliant			

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
ML 1685	3	(e) It is not a breach of this condition if: (i) the operations which, but for this condition 3(e) would be a breach of condition 3(a), were necessary to comply with a lawful order or direction given under the *Environmental Planning and Assessment Act 1979*, the *Protection of the Environment Operations Act 1997*, the *Mine Health and Safety Act 2004* / *Coal Mine Health and Safety Act 2002* and *Mine Health and Safety Regulation 2007* / *Coal Mine Health and Safety Regulation 2006* or the *Work Health and Safety Act 2011*; and (ii) the Minister had been notified in writing of the terms of the order or direction prior to the operations constituting the breach being carried out.	Noted	Compliant			
ML 1685	3	(f) The lease holder must prepare a Rehabilitation Report to the satisfaction of the Minister. The report must: (i) provide a detailed review of the progress of rehabilitation against the performance measures and criteria established in the approved MOP; (ii) be submitted annually on the grant anniversary date (or at such other times as agreed by the Minister); and (iii) be prepared in accordance with any relevant annual reporting guidelines published on the Department's website at www.resources.nsw.gov.au/environment. *Note: The Rehabilitation Report replaces the Annual Environmental Management Report.*	Sighted MOP and Rehabilitation section within report. Tarrawonga Rehabilitation Management Plan, May 2013 (SLR Consulting), Section 1.2 states that the Rehabilitation Management Plan has been prepared in accordance with all relevant approval consent conditions and commitments, relevant regulatory and industry policies and guidelines.	Compliant			
	5. Environmental Incident Report						
ML 1685	5	(a) The lease holder must notify the Department of all: (i) breaches of the conditions of this mining lease or breaches of the Act causing or threatening material harm to the environment; and (ii) breaches of environmental protection legislation causing or threatening material harm to the environment (as defined in the *Protection of the Environment Administration Act 1991*), arising in connection with significant surface disturbing activities, including mining operations, mining purposes and prospecting operations, under this mining lease. The notification must be given immediately after the lease holder becomes aware of the breach. *Note: Refer to www.resources.nsw.gov.au/environment for notification contact details.*	No notifications made in the audit period	Not Applicable			
ML 1685	5	(b) The lease holder must submit an Environmental Incident Report to the Department within seven (7) days of all breaches referred to in condition 5(a)(i) and (ii). The Environmental Incident Report must include: (i) the details of the mining lease; (ii) contact details for the lease holder; (iii) a map identifying the location of the incident and where material harm to the environment has or is likely to occur; (iv) a description of the nature of the incident or breach, likely causes and consequences; (v) a timetable showing actions taken or planned to address the incident and to prevent future incidents or breaches referred to in 5(a); (vi) a summary of all previous incidents or breaches which have occurred in the previous 12 months relating to significant surface disturbing activities, including mining operations, mining purposes and prospecting operations under this mining lease. *Note: The lease holder should have regard to any relevant Director General's guidelines in the preparation of an Environmental Incident Report. Refer to www.resources.nsw.gov.au/environment for further details.*	No notifications made in the audit period	Not Applicable			

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
ML 1685	5	(c) In addition to the requirements set out in conditions 5(a) and (b), the lease holder must immediately advise the Department of any notification made under section 148 of the *Protection of the Environment Operations Act 1997* arising in connection with significant surface disturbing activities including mining operations, mining purposes and prospecting operations, under this mining lease.	No notifications made in the audit period	Not Applicable			
	Mining Lease - 1693						
	Environmental Harm						
ML 1685	2	(a) The lease holder must implement all practicable measures to prevent and/or minimise any harm to the environment that may result from the construction, operation or rehabilitation of any activities under this lease.	Noted	Noted			
ML 1685	2	(b) For the purposes of this condition: (i) environment means components of the earth, including: (A) land, air and water, and (B) any layer of the atmosphere, and (C) any organic or inorganic matter and any living organism, and (D) human-made or modified structures and areas, and includes interacting natural ecosystems that include components referred to in paragraphs (A)–(C). (ii) harm to the environment includes any direct or indirect alteration of the environment that has the effect of degrading the environment and, without limiting the generality of the above, includes any act or omission that results in pollution, contributes to the extinction or degradation of any threatened species, populations or ecological communities and their habitats and causes impacts to places, objects and features of significance to Aboriginal people.	Noted	Noted			
	3. Mining Operations Plan						
ML 1685	3	(a) Mining operations must not be carried out otherwise than in accordance with a Mining Operations Plan (MOP) which has been approved by the Director-General.	Noted	Compliant			

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
ML 1685	3	(b) The MOP must: (i) identify areas that will be disturbed by mining operations; (ii) detail the staging of specific mining operations; (iii) identify how the mine will be managed to allow mine closure; (iv) identify how mining operations will be carried out in order to prevent and or minimise harm to the environment; (v) reflect the conditions of approval under: • the *Environmental Planning and Assessment Act 1979* • the *Protection of the Environment Operations Act 1997* • and any other approvals relevant to the development including the conditions of this lease; and • have regard to any relevant guidelines adopted by the Director-General.	Noted	Compliant			
ML 1685	3	c. The leaseholder may apply to the Director-General to amend an approved MOP at any time.	Noted	Noted			
ML 1685	3	(d) It is not a breach of this condition if: (i) the operations constituting the breach were necessary to comply with a lawful order or direction given under the *Mining Act 1992*, the *Environmental Planning and Assessment Act 1979*, *Protection of the Environment Operations Act 1997*, *Mine Health and Safety Act 2004 / Coal Mine Health and Safety Act 2002* and *Mine Health and Safety Regulation 2007 / Coal Mine Health and Safety Regulation 2006* or the *Occupational Health and Safety Act 2000*; and (ii) the Director-General had been notified in writing of the terms of the order or direction prior to the operations constituting the breach being carried out.	AEMR's for 2009 - 2010 to 201202013 sighted	Compliant			
ML 1685	3	A MOP ceases to have effect 7 years after date of approval or other such period as identified by the Director-General.	Noted	Noted			
	4. Environment Management Report						
ML 1685	4	(a) The lease holder must lodge Environmental Management Reports (EMR) with the Director-General annually or at dates otherwise directed by the Director-General.	AEMR's for 2009 - 2010 to 201202013 sighted	Compliant			
ML 1685	4	(b) The EMR must: (i) report against compliance with the MOP; (ii) report on progress in respect of rehabilitation completion criteria; (iii) report on the extent of compliance with regulatory requirements; and (iv) have regard to any relevant guidelines adopted by the Director-General;	AEMR's for 2009 - 2010 to 201202013 sighted	Compliant			
	5. Environmental Incident Report						
ML 1685	5	(a) The lease holder must report any environmental incidents. The report must: (i) be prepared according to any relevant Departmental guidelines; (ii) be submitted within 24 hours of the environmental incident occurring;	No notifications made in the audit period	Not Applicable			

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
ML 1685	5	(b) For the purposes of this condition, environmental incident includes: (i) any incident causing or threatening material harm to the environment (ii) any breach of Conditions 1 to 9 and 11 to 24; (iii) any breach of environment protection legislation; or, (iv) a serious complaint from landholders or the public.	No notifications made in the audit period	Not Applicable			
ML 1685	5	(c) For the purposes of this condition, harm to the environment is material if: (i) it involves actual or potential harm to the health or safety of human beings or to ecosystems that is not trivial, or (ii) it results in actual or potential loss or property damage of an amount, or amounts in aggregate, exceeding $10,000, where loss includes the reasonable costs and expenses that would be incurred in taking all reasonable and practicable measures to prevent, mitigate or make good harm to the environment.	No notifications made in the audit period	Not Applicable			
	7. Rehabilitation						
ML 1685	7	Any disturbance as a result of activities under this lease must be rehabilitated to the satisfaction of the Director-General.	Noted	Noted			
	8. Subsidence Management						
ML 1685	8	(a) The lease holder shall prepare a Subsidence Management Plan prior to commencing any underground mining operations which will potentially lead to subsidence of the land surface.		Not Applicable			
ML 1685	8	(b) Underground mining operations which will potentially lead to subsidence include secondary extraction panels such as longwalls or miniwalls, associated first workings (gateroads, installation roads and associated main headings, etc), and pillar extractions, and are otherwise defined by the Applications for Subsidence Management Approvals guidelines (EDG17)		Not Applicable			
ML 1685	8	(c) The lease holder must not commence or undertake underground mining operations that will potentially lead to subsidence other than in accordance with a Subsidence Management Plan approved by the Director-General, an approval under the *Coal Mine Health & Safety Act 2002*, or the document New Subsidence Management Plan Approval Process – Transitional Provisions (EDP09).		Not Applicable			
ML 1685	8	(d) Subsidence Management Plans are to be prepared in accordance with the Guideline for Applications for Subsidence Management Approvals.		Not Applicable			
ML 1685	8	(e) Subsidence Management Plans as approved shall form part of the Mining Operations Plan required under Condition 3 and will be subject to the Environmental Management Report process as set out under Condition 4. The SMP is also subject to the requirements for subsidence monitoring and reporting set out in the document New Approval Process for Management of Coal Mining Subsidence - Policy.		Not Applicable			

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
	10. Blasting						
ML 1685	10	(a) Ground Vibration The lease holder must ensure that the ground vibration peak particle velocity generated by any blasting within the lease area does not exceed 10 mm/second and does not exceed 5 mm/second in more than 5% of the total number of blasts over a period of 12 months at any dwelling or occupied premises as the case may be, unless determined otherwise by the Department of Environment, Climate Change and Water	This is also in line with PA 11_0047	Compliant			
ML 1685	10	(b) Blast Overpressure The lease holder must ensure that the blast overpressure noise level generated by any blasting within the lease area does not exceed 120 dB (linear) and does not exceed 115 dB (linear) in more than 5% of the total number of blasts over a period of 12 months, at any dwelling or occupied premises, as the case may be, unless determined otherwise by the Department of Environment, Climate Change and Water	AEMR 2012-2013, Section 3.9.2 This is also in line with PA 11_0047	Compliant			
	12. Prevention of soil erosion and pollution						
ML 1685	12	Prospecting operations must be carried out in a manner that does not cause or aggravate air pollution, water (including groundwater) pollution, soil contamination or erosion, unless otherwise authorised by a relevant approval, and in accordance with an accepted Mining Operations Plan	AEMR 2013-2013, Section 3.2.2 During late January 2013, after an extensive dry weather period, approximately 120mm of rain fell over a 24 hour period. This rainfall caused extensive pooling of water on top of the southern emplacement which ultimately overflowed down the rehabilitated area causing extensive washouts and silting of contour drains. It is noted that no wet weather discharge occurred during this event. Additional sediment control structures were installed during the reporting period. URS (2013), WATER MANAGEMENT PLAN, Section 3.2 (Erosion Management) reported that improved water balance modelling is currently under way and this will allow a more proactive approach to water management.	Compliant			
	15. Trees and Vegetation						

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
ML 1685	15	(a) The lease holder must not fell trees, strip bark or cut timber on any land subject of this lease without the consent of the landholder who is entitled to the use of the timber.	MOP, Section 2.4.1	Noted			
ML 1685	15	(b) The lease holder must contact Forests NSW and obtain any required permit, licence or approval before taking timber from any Crown land within the lease area. *Note: Any clearing not authorised under the Act must comply with the requirements of the Native Vegetation Act 2003. Any clearing or taking of timber on Crown land is subject to the requirements of the Forestry Act 1916.*	MOP, Section 8.2.1	Noted			

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Mining Operations Plan - November 2013 to October 2015							
3.2.1 Air Quality							
MOP (Nov 2013 to Oct 2015)	3.2.1	Air quality at Tarrawonga is managed and monitored through the Air Quality and Greenhouse Gas Management Plan, which will be revised and approved during the MOP period.	AQ and GHG Management Plan dated June 2014 (post MOP amendment - Oct 2013)	Compliant			
MOP (Nov 2013 to Oct 2015)	3.2.1	Air quality is monitored in accordance with the Air Quality and Greenhouse Gas Management Plan, with meteorology and air quality being continuously monitored. Results are reported on a daily basis online and on an annual basis in the Annual Review and the EPL Annual Return.	AQ and GHG Management Plan dated June 2014 (post MOP amendment - Oct 2013), Section 4.2.3 Continuous monitoring for deposited dust, PM2.5 and PM10. -Meteorology is currently being monitored contiuously (Section 4.1) -Results are being reported on a daily basis online (Section 4.3.2). -Results are being reportedon a annual basis in the AEMR. -Annual return Jan2013-Jan2014 only included real time data of monitoring point 28 for PM10	Compliant			
MOP (Nov 2013 to Oct 2015)	3.2.1	A Particulate Matter Control Best Practice Pollution Reduction Program has also been prepared for Tarrawonga in accordance with condition U1 of EPL 12365. This report provides best practice recommendations for the ongoing reduction of particulate matter emissions and includes options for the Tarrawonga Coal Project which have been incorporated into the Air Quality and Greenhouse Gas Management Plan.	AQ and GHG Management Plan dated June 2014 (post MOP amendment - Oct 2013), Section 3	Compliant			
MOP (Nov 2013 to Oct 2015)	3.2.1	Tarrawonga proposes to establish, in co-operation with the adjoining Boggabri and Maules Creek Coal Project, a cumulative particulate matter monitoring program. While this program is currently under development, a real time PM10 monitor (TEOM) has been installed to the south east of Tarrawonga, with additional monitoring equipment, including predictive meteorological forecasting and dispersion modelling, to be established in consultation with the Boggabri and Maules Creek operations.	AQ and GHG Management Plan dated June 2014 (post MOP amendment - Oct 2013), Section 1 states TCM has been in consultation with the nearby Boggabri Coal Mine and Maules Creek Project in relation to developing an Air Quality Management Strategy for the Boggabri – Tarrawonga – Maules Creek (BTM) Complex incorporating cumulative air quality monitoring and management, as required under the conditions of consent for the Tarrawonga Coal Mine. The Strategy has been submitted to the Department of Planning and Environment (DPE) for approval. Once approved, the Strategy will be appended to this Plan.	Compliant			
3.2.2 Surface Water and Groundwater							
MOP (Nov 2013 to Oct 2015)	3.2.2	Surface and groundwater at Tarrawonga is managed in accordance with the Tarrawonga Water Management Plan. In accordance with Project Approval PA 11_0047, a Water Management Plan (including Site Water Balance, Surface Water Management Plan, Groundwater Management Plan and a Leard Forest Mining Precinct Water Management Strategy) will be prepared during the MOP period.	Tarrawonga Water Management Plan (revision date: May 2013 - draft). The new plan has been drafted but was deemed inadequate and consultants have been engaged to develop another plan to satisfy this requirement A new plan is required for the new MOP period (Nov 2013 to Oct 2015)	Not Applicable			

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
MOP (Nov 2013 to Oct 2015)	3.2.2	The EPBC Approval 2011/5923 (see Table 2) also requires surface and groundwater management plans to be prepared during this MOP term to meet criteria specified in that Approval, including cumulative groundwater impacts from mining activities at Tarrawonga, Boggabri and Maules Creek Coal Project.	Tarrawonga Water Management Plan (revision date: May 2013 - draft). The new plan has been drafted but was deemed inadequate and consultants have been engaged to develop another plan to satisfy this requirement A new plan is required for the new MOP period (Nov 2013 to Oct 2015)	Not Applicable			
MOP (Nov 2013 to Oct 2015)	3.2.2	Project Approval PA 11_0047 and EPL 12365 impose requirements for managing surface and groundwater quality and quantity, monitoring requirements and water quality discharge criteria. EPL 12365 includes licenced discharge points (LDPs).	Noted	Noted			
MOP (Nov 2013 to Oct 2015)	3.2.2	The primary water use at Tarrawonga is dust suppression on internal haul roads and at the coal crushing and screening facility (pending the Boggabri Infrastructure Facilities).	Noted	Noted			
MOP (Nov 2013 to Oct 2015)	3.2.2	Surface water and groundwater quality monitoring and water discharge records are reported in the Annual Review and the EPL Annual Return.	AEMR/Annual Review 2012/2013 sighted EPL Annual Return Jan2013-Jan2014 sighted	Compliant			
	3.2.3 Erosion and Sedimentation						
MOP (Nov 2013 to Oct 2015)	3.2.3	Erosion and sediment control (ESC) at Tarrawonga is managed in accordance with the Tarrawonga Site Water Management Plan (including an Erosion and Sediment Control Plan), relevant regulatory requirements and the guideline documents titled Managing Urban Stormwater Volume 1: Soils and Construction (Landcom 2004) and Managing Urban Stormwater Volume 2E: Mines and Quarries (DECC 2008).	Tarrawonga Water Management Plan (revision date: May 2013 - draft). This seems to be a draft document. It needs to be confirmed if this plan has been formally approved and if ESC on site is indeed managed according to this plan. Erosion and sed control managed to this plan, but other water management actions not to this plan, currently under revision.	Compliant			

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
MOP (Nov 2013 to Oct 2015)	3.2.3	Key sources of erosion and sedimentation are generally related to surface water runoff from exposed surfaces, including cleared areas, stockpiles (coal, soil and waste rock) and unsealed roads, and to a lesser degree caused by wind erosion from emplacement areas and stockpiles. Key potential erosion and sediment risks are managed by: • Diverting clean water runoff around disturbed areas and detaining runoff from disturbance areas (dirty water); • Treating detained dirty water (for example, settling, flocculation) and discharging from site when water quality is within prescribed limits; • Minimising the volume of dirty water discharged from the site by maximising re-use (for example, dust suppression); • Providing engineering solutions to restrict runoff to sub-erosive velocities (for example, channels, dams, banks and drop structures); • Monitoring weather and undertaking mining activities in appropriate weather conditions; • Minimising disturbance areas; • Stabilising disturbance areas and stockpiles left dormant for extended periods (for example, establishing cover crops); and • Progressively rehabilitating disturbance areas.	Tarrawonga Water Management Plan (revision date: May 2013 - draft), Section 3.2 includes the erosion and sediment control measures listed in the previous column. There is a dirty water segregation issue but that is best dealt with elsewhere in this audit.	Compliant			
MOP (Nov 2013 to Oct 2015)	3.2.3	Erosion and sedimentation is monitored and reported in the Annual Review.	AEMR/Annual Review 2012/2013 Section 3.2 sighted	Compliant			
	3.2.4 Contaminated Land						
MOP (Nov 2013 to Oct 2015)	3.2.4	Preliminary and detailed land contamination investigations were undertaken for the Project EA in accordance with Managing Land Contamination – Planning Guidelines SEPP 55 – Remediation of Land (Department of Urban Affairs and Planning and Environment Protection Authority 1998). Land contamination associated with historic landfilling and derelict farm machinery was identified in the project area. All instances of land contamination will be remediated before the land is used for mining.	Noted	Not Applicable			
MOP (Nov 2013 to Oct 2015)	3.2.4	Remediation activities and outcomes will be reported in the Annual Review.	AEMR/Annual Review 2012/2013 Section 3.17.2 stated that: • No surface or groundwater contamination evident or reported by landowners; and • No requirement for off-site disposal of contaminated materials. Therefore no reporting on remediation activities.	Not Applicable			

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
MOP (Nov 2013 to Oct 2015)	3.2.4	A number of hazard control and mitigation measures for potential mine-related land contamination are described in the following management plans/systems in place at Tarrawonga: • Emergency Management System; • Pollution Incident Response Management Plan; • Contractor Management Standard; • Blast Monitoring Program; • Bushfire Management Plan (Appendix 12); • Surface Water and Groundwater Response Plan (part of the Water Management Plan) (Appendix 7); and • Waste Management Plan (Appendix 13).	Documents sighted: -PIRMP -Blast monitoring Program -Bushfire Management Plan (Appendix 12); -Surface Water and Groundwater Response Plan (part of the Water Management Plan) (Appendix 7); and -Waste Management Plan (Appendix 13). -Emergency Management System -Contractor Mangement Standard	Compliant			
MOP (Nov 2013 to Oct 2015)	3.2.4	The following controls will be implemented at Tarrawonga to prevent contamination: • All water from wash-down areas and workshops will be directed to an oil separator and containment system; • All storage tanks will either be self bunded or partitioned within an impermeable bund with a capacity to contain a minimum 110% of the largest storage tank capacity; • All hydrocarbon products will be securely stored; and • With the exception of less mobile mining equipment which will be refuelled within the open cut area, designated areas will be allocated for refuelling and minor maintenance work.	Noted	Noted			
MOP (Nov 2013 to Oct 2015)	3.2.4	Where land contamination is identified arising from mining activities, the affected area will be regularly inspected to ensure there is no on-going effect on the land that will prevent it from being successfully rehabilitated. A register of known and potential contaminated sites will be maintained by TCPL for remediation at conclusion of mining activities in relevant areas.	No register of known and potential contaminated sites was sighted. The EO notes at interview that there were no known contaminated sites at the time of the audit and therefore no need for the register. Note also tht the site is still nominally over 15 years from closure.	Compliant			
MOP (Nov 2013 to Oct 2015)	3.2.4	All contamination monitoring activities and mitigation measures will be reported in the Annual Review.	AEMR/Annual Review 2012/2013 Section 3.17.2 stated that: • No surface or groundwater contamination evident or reported by landowners; and • No requirement for off-site disposal of contaminated materials.	Compliant			
	3.2.5 Acid Rock Drainage						
MOP (Nov 2013 to Oct 2015)	3.2.5	Overburden and interburden at the northern and eastern open cut extension areas was assessed as part of the Project EA and it is generally expected to be non-acid forming (NAF). Consequently, the current management practice of blending ROM overburden and interburden for emplacement will continue.	Noted	Noted			

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
MOP (Nov 2013 to Oct 2015)	3.2.5	Acid generating materials will be managed in accordance with relevant requirements of Project Approval PA 11_0047 and EPL 12365, particularly in relation to surface water and groundwater management.	Noted	Noted			
MOP (Nov 2013 to Oct 2015)	3.2.5	Project Approval PA 11_0047 requires TCPL to develop a soil management protocol that includes management of coal reject or potentially acid forming interburden materials by emplacement in the pit shell such that there is no out of pit migration of acid or sulphate species. The soil management protocol will be developed in consultation with Namoi Catchment Management Authority and appended to the Biodiversity Management Plan during this MOP term. The BMP requires revision to address matters relating to the Commonwealth EPBC approval by the end of January 2014, which provides an appropriate timing for inclusion of the soil management protocol.	Soil management protocol was included in the rehab management plan 2013.	Compliant			
MOP (Nov 2013 to Oct 2015)	3.2.5	Tarrawonga will conduct further material testing during soil stripping campaigns and will manage any occurrences of PAF-LC material by selectively handling and emplacing the material so it is covered with at least 15 m of NAF material.	No records on file of further material testing following that done for the EA for management of occurrence of PAF_LC material	Not Compliant	D	2	Medium
MOP (Nov 2013 to Oct 2015)	3.2.5	Tarrawonga will continue to undertake water quality monitoring within on-site water storages during the life of the mine in accordance with the Surface Water Monitoring Program. If in the event acid rock drainage (ARD) is identified, a works program for the identification of any PAF-LC material would be undertaken and specific controls implemented. All monitoring activities and the management of any PAF materials will be reported in the Annual Review.	AEMR/Annual Review 2012/2013, no mention of PAF-LC material in this report. The water quality indicators for pH do not provide evidence of acid producing materials being exposed to the atmosphere.	Not Applicable			
	3.2.6 Flora and Fauna						
MOP (Nov 2013 to Oct 2015)	3.2.6	Flora and fauna is currently managed at Tarrawonga in accordance with the Tarrawonga Flora and Fauna Management Plan. Project Approval PA 11_0047 requires the preparation of a Biodiversity Management Plan, which will supersede the current Tarrawonga Flora and Fauna Management Plan, to manage impacts to native flora and fauna in remnant native vegetation communities within the mine boundary.	Tarrawonga Mine Biodiversity Management Plan, May 2013, sighted doc	Compliant			
MOP (Nov 2013 to Oct 2015)	3.2.6	Under the EPBC Approval 2011/5923, Tarrawonga is permitted to clear: • Up to 13 ha of White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland critically endangered ecological community; • Up to 279 ha habitat for the Regent Honeyeater; • Up to 54 ha of habitat for the Swift Parrot, and Up to 334 ha of habitat for the Greater Long-Eared Bat.	EPBC Approval 2011/5923 sighted	Compliant			

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
MOP (Nov 2013 to Oct 2015)	3.2.6	The impacts of clearing and loss of habitat will be minimised by: • Undertaking clearing on a progressive basis over the 17 years of mining, which will include: – Adopting clearing strategies to minimise impacts on fauna (timing, seasons); – Delineating areas to be cleared; and – Engaging a suitably qualified ecologist to be present during the clearing process. • Progressive rehabilitation of the post mine landforms, resulting in re-establishment of woodland/forest; • Salvaging and re-using material from the site where practical for habitat establishment; • Implementing a nest box program; • Enhancing farm dams; and • Controlling feral animals.	EPBC Approval 2011/5923, Section 1.1 sighted. All of this occurs with the exception of the farm dams to date, given there is no time limit there is still time left on the consent for this to occur.	Compliant			
MOP (Nov 2013 to Oct 2015)	3.2.6	Other key management and mitigation measures are: • The rehabilitation of 752 ha of native woodland community focused on Box Gum Woodland EEC. • Compensatory habitat offset (legally binding conservation covenant) comprising a minimum of 1,660 ha of existing native vegetation to be enhanced and restored, including 193 ha of Box Gum Woodland EEC at the Willeroi Offset Area. In addition, this area will require equivalent or better quality habitat of no less than: – 1,055 ha for the Regent Honeyeater; – 397 ha habitat for the Swift Parrot; – 1,355 ha habitat for the Greater Long-Eared Bat; and – 232 ha White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland EEC.	EPBC Approval 2011/5923, Conditions of approval sighted. Wileroi has been established though only recently so little work has been done to date	Compliant			
	3.2.7 Weeds and Pests						
MOP (Nov 2013 to Oct 2015)	3.2.7	Weeds and pests are currently managed in accordance with the Tarrawonga Flora and Fauna Management Plan. Once approved, weeds and pests will be managed in accordance with the Biodiversity Management Plan.	BMP 2013, Section 4.7 sighted, it includes weeds and pests management measures.	Compliant			

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
MOP (Nov 2013 to Oct 2015)	3.2.7	The objective of weed control activities at Tarrawonga is to limit the spread and colonisation of noxious and environmental weeds. Management measures include: • Regular inspections (minimum monthly) of proposed disturbance areas and adjacent land, topsoil stockpiles and rehabilitation areas are conducted for early identification of weed infestations. • Mechanical removal and/or the application of approved herbicides in areas identified as being affected by weeds (in accordance with the Pesticides Act 1999); • Follow-up site inspections to evaluate the effectiveness of weed control programs; • Follow-up weed control in previously treated areas where weed management has been suboptimal; and • Minimisation of potential seed transport to or from the site through the inspection of vehicles and use of the site's vehicle wash bay.	Noted	Noted			
MOP (Nov 2013 to Oct 2015)	3.2.7	TCPL will also liaise with local landholders and relevant government agencies as required to monitor the spread and management of weeds within the local area.	Noted	Noted			
MOP (Nov 2013 to Oct 2015)	3.2.7	Vertebrate pests are not considered a significant risk and control programs are currently only undertaken on an as-needs basis. Management activities include exclusion fencing, trapping and/or baiting programs, and follow-up monitoring programs.	Noted Also included in the BMP	Noted			
MOP (Nov 2013 to Oct 2015)	3.2.7	Vertebrate pest management procedures will be formalised in this MOP period and documented in the Biodiversity Management Plan. TCPL will participate in regional pest control programs undertaken by neighbouring landholders, coordinated by the North West Livestock Health and Pest Authority (LHPA). Tarrawonga recently participated in an aerial control program for pigs and goats with the LHPA and surrounding landholders, and this form of control will be considered on an as needs basis in consultation with these parties.	Described in MOP and Biodiversity Management Plan.	Compliant			
MOP (Nov 2013 to Oct 2015)	3.2.7	Weeds and vertebrate pests will be monitored in accordance with the Project Approval PA 11_0047 and the approved Biodiversity Management Plan. Monitoring results and any control activities will be reported in the Annual Review.	PA 11_0047,Biodiversity Management Plan and AEMR/Annual Review 2012/2013 sighted	Compliant			
	3.2.8 Blasting						

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
MOP (Nov 2013 to Oct 2015)	3.2.8	Blasting is currently managed in accordance with the Blast Management Plan. Project Approval PA 11_0047 requires the preparation of: • A new Blast Management Plan (including Leard Forest Precinct Blast Management Strategy); and • A new Noise Management Plan (including Leard Forest Precinct Noise Management Strategy).	Tarrawonga Mine, Blast Management Plan (Last revision May 2013- Draft) is a draft doc and the Leard Forest Mining Precinct Blast Management Plan Strategy is reported to be awaiting approval states that: TCM has been in consultation with the nearby Boggabri Coal Mine and Maules Creek Project in developingand has developed a Leard Forest Mining Precinct Blast Management Plan Strategy is in draft format awaiting approval. Noise Management Plan TCM have been in consultation with the nearby Boggabri Coal Mine and Maules Creek Project in relation to developing a Leard Forest Mining Precinct Noise Management Strategy incorporating cumulative noise impacts and management, as required under the conditions of PA 11_0047 for the Tarrawonga Coal Mine. The Strategy has been submitted to the Department of Planning and Environment (DP&E) for approval. Once approved, the Strategy will be appended to this Plan.	Compliant			
MOP (Nov 2013 to Oct 2015)	3.2.8	Measures to minimise potential impacts of blasting include: • Managing operations to comply with blast frequency limits; • Co-ordinating blasting days and times with Boggabri (and other mines within the Leard Forest Mining Precinct) to minimise disruptions and impacts on neighbouring landholders; and • Engaging with Narrabri Shire Council and private land owners if proposing to blast within 500 m of property not owned by TCPL/Whitehaven.	Noted	Noted			
MOP (Nov 2013 to Oct 2015)	3.2.8	Airblast overpressure and ground vibration will continue to be monitored at a selection of surrounding residences as provided in the Blast Management Plan and in accordance with the specifications presented in Table 10 in Section 4.0.	Noted	Noted			
MOP (Nov 2013 to Oct 2015)	3.2.8	In the event a landowner or resident claims property or infrastructure has been damaged as a result of blasting, TCPL will, within 3 months of receiving a written request, commission an investigation into the claim by a suitably qualified person whose appointment is approved by the Director-General of the DP&I. A copy of the investigation report will be provided to the landowner or resident and any damages caused by blasting repaired at the cost of TCPL.	Noted Also included in the existing noise management plan (Last revision 23/06/2014)	Noted			

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
MOP (Nov 2013 to Oct 2015)	3.2.8	Blasting will be monitored in accordance with Project Approval PA 11_0047 and the approved Blast Management Plan and Noise Management Plan. Results will be reported in the Annual Review.	AEMR/Annual Review 2012/2013 sighted, included blasting results	Compliant			
	3.2.9 Noise						
MOP (Nov 2013 to Oct 2015)	3.2.9	Noise is managed in accordance with the Tarrawonga Road Noise Management Plan and Tarrawonga Noise Monitoring Program. Project Approval PA 11_0047 and EPL 12365 prescribe operational noise limits and management requirements.	Tarrawonga Road Noise Management Plan not sighted, but a document prepared earlier in the site history when it was run under a different name was provided and is still followed.	Compliant			
MOP (Nov 2013 to Oct 2015)	3.2.9	As outlined in Section 3.2.8, TCPL will prepare and submit a Blast Management Plan and Noise Management Plan (including a Leard Forest Precinct Noise Management Strategy) to manage potential noise impacts in accordance with Project Approval PA 11_0047 during the MOP term. Road noise will continue to be managed under the Tarrawonga Road Noise Management Plan until coal ceases to be transported via public roads to the Whitehaven CHPP.	Tarrawonga Mine, Blast Management Plan (Last revision May 2013- Draft) is a draft doc and the Leard Forest Mining Precinct Blast Management Plan Strategy is reported to be awaiting approval. TCM has been in consultation with the nearby Boggabri Coal Mine and Maules Creek Project in developing and has developed a Leard Forest Mining Precinct Blast Management Plan Strategy that is in draft format awaiting approval. Noise Management Plan TCM have been in consultation with the nearby Boggabri Coal Mine and Maules Creek Project in relation to developing a Leard Forest Mining Precinct Noise Management Strategy incorporating cumulative noise impacts and management, as required under the conditions of PA 11_0047 for the Tarrawonga Coal Mine. The Strategy has been submitted to the Department of Planning and Environment (DPE) for approval. Once approved, the Strategy will be appended to the NMP. None of these plans are approved.	Compliant			
MOP (Nov 2013 to Oct 2015)	3.2.9	Noise mitigation measures for the mine within the MOP period will include: • Modification of the alignment of haul routes to reduce their exposure relative to nearby receivers; • A reduction in the number of mobile fleet items operating during the evening and night-time periods and/or consideration for relocation of equipment to other areas of the mine where noise monitoring indicates systemic noise impacts; and • Implementation of reasonable and feasible acoustical mitigation measures at impacted receivers in consultation with the affected landholder.	Noise complaints have been generally only as comments within air quality complaints. No haul routes have been altered in the MOP period to date. The number of mobile fleet items and moving operations lower into the pit during evening shifts has occurred. No acoustic miitigation measures have been implemented to date but none have been requested or triggered.	Compliant			

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
MOP (Nov 2013 to Oct 2015)	3.2.9	Implementation of the above mitigation measures will be guided by the operation of the real time noise management system and ongoing attended noise monitoring to verify noise performance.	Tarrawonga Noise Management Plan (June 2014) Section 1 , states that noise impacts are continuously monitored via a mobile real time noise monitor under all meteorological conditions, with measures to reduce noise impacts undertaken when required. Evidence of this was observed on-site.	Compliant			
MOP (Nov 2013 to Oct 2015)	3.2.9	Tarrawonga is approved to operate 24 hours a day seven days per week, however this is not expected to occur during this MOP period. Until the commissioning of the Boggabri Rail Spur Line and Boggabri CHPP, the transport of the coal from Tarrawonga to the Whitehaven CHPP is restricted to: • 7:00 am to 9:15 pm Monday to Friday; and • 7:00 am to 5:15 pm Saturdays.	Noted Tarrawonga Noise Management Plan (June 2014), information on restricting times not sighted in this document	Noted			
MOP (Nov 2013 to Oct 2015)	3.2.9	There will be no transport of coal between Tarrawonga and Whitehaven CHPP on Sundays or public holidays.	Noted Tarrawonga Noise Management Plan (June 2014), information on no transport of coal not sighted in this document	Noted			
MOP (Nov 2013 to Oct 2015)	3.2.9	The transport of gravel from Tarrawonga is limited to truck transport hours of 7:00 am to 6:00 pm Monday to Saturday.	Noted Tarrawonga Noise Management Plan (June 2014), information on transport limited to trucks not sighted in this document	Noted			
MOP (Nov 2013 to Oct 2015)	3.2.9	Project Approval PA 11_0047 requires TCPL to acquire up to five properties, which are identified as properties 43, 44, 45, 47 and 49 (see Appendix 5 of the Project Approval PA 11_0047), upon written request from the owners.	Tarrawonga Noise Management Plan (June 2014), Section 2.2 stated that: Of the properties identified in Table 1 from the Project Approval, properties 43, 44, 45 and 47 have now been acquired by either Tarrawonga or Boggabri Coal. Preliminary discussions have been held with property 49 in relation to their rights for acquisition.	Compliant			
MOP (Nov 2013 to Oct 2015)	3.2.9	Assessment of cumulative noise from the concurrent operation of Tarrawonga, Boggabri and the Maules Creek Coal Project as part of the Tarrawonga Coal Project EA indicated that cumulative noise levels will comply with the specified night-time maximum amenity criteria at all receivers and the specified night-time acceptable amenity criteria for all but two privately-owned receivers. Tarrawonga proposes to establish, in co-operation with Boggabri and the Maules Creek Coal Project, a cumulative noise monitoring program.	Tarrawonga Noise Management Plan (June 2014), foreword section, stated that: TCM have been in consultation with the nearby Boggabri Coal Mine and Maules Creek Project in relation to developing a Leard Forest Mining Precinct Noise Management Strategy incorporating cumulative noise impacts and management, as required under the conditions of PA 11_0047 for the Tarrawonga Coal Mine. The Strategy has been submitted to the Department of Planning and Environment (DPE) for approval. Once approved, the Strategy will be appended to this Plan.	Compliant			

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
MOP (Nov 2013 to Oct 2015)	3.2.9	Noise will be monitored in accordance with Project Approval PA 11_0047 and the approved Blast Management Plan and Noise Management Plan, and results will be reported in the Annual Review.	This occurs (AEMRS) and is reported.	Compliant			
	3.2.10 Visual and Lighting						
MOP (Nov 2013 to Oct 2015)	3.2.10	Whilst a specific visual management plan is not a requirement of Project Approval PA 11_0047, the PA does impose conditions on minimising visual impacts from operations and a response process to private landholders concerned about visual impacts when viewed from private residences.	Noted	Noted			
MOP (Nov 2013 to Oct 2015)	3.2.10	Visual impacts associated with the mining operations will be managed in accordance with Project Approval PA 11_0047 and the required, • Biodiversity Management Plan, and • Rehabilitation Strategy and the associated Rehabilitation Management Plan	Noted RMP and PA include visual impacts No visual impacts included in the BMP 2014 but it does address planting and rehab which address visual impact	Compliant			
MOP (Nov 2013 to Oct 2015)	3.2.10	TCPL commits to preparing these plans and strategy during the MOP term	Pland and strategy in place	Compliant			
MOP (Nov 2013 to Oct 2015)	3.2.10	The major aspects of Tarrawonga considered to have the potential to impact on the visual landscape include: • Modification of topographic features including: – the extension of the open cut; – the extension of the Northern and Southern Emplacements; – a temporary increase in height of the Southern Emplacement prior to a reduction in final height during rehabilitation; – construction of the permanent flood bund; – construction of the noise control earth bund; and – establishment of the permanent Goonbri Creek alignment; • Re-alignment of sections of Goonbri Road; and • Extension of lighting associated with extended night-time mining operations.	Noted	Noted			
MOP (Nov 2013 to Oct 2015)	3.2.10	The final elevation of the Northern Emplacement would remain unchanged at a height of 370 m AHD. The height of the Southern Emplacement would temporarily increase to a maximum height of 360 m AHD (i.e.: an increase of 20 m) during the operational life of the mine. The Southern Emplacement will be reduced to a final height of approximately 340 m AHD. The additional material will be rehandled and emplaced in-pit when space becomes available.	Noted Info not included in the Rehab Management Plan	Noted			

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
MOP (Nov 2013 to Oct 2015)	3.2.10	Cumulative visual impacts of Tarrawonga and the proposed Continuation of Boggabri Coal Mine are anticipated to be limited to viewpoints from the southern and western sides of Tarrawonga associated with elevated areas where no vegetation screening is present (e.g.: from portions of cleared paddocks and private roads).	Noted	Noted			
MOP (Nov 2013 to Oct 2015)	3.2.10	The mitigation and management measures that would be implemented for the maintenance of visual amenity at Tarrawonga include:- • Progressive rehabilitation of the Northern Emplacement, Southern Emplacement, open cut and mine infrastructure areas will be undertaken in order to reduce the contrast between the landforms at Tarrawonga and the surrounding environment. • Rehabilitation will be conducted in accordance with the Rehabilitation Strategy and Rehabilitation Management Plan (and as updated as required by the PA). • Visual screening (e.g.: a vegetation screen consisting of native plants that are compatible with the existing surrounding vegetation) will be used to reduce potential visual impacts from local sensitive viewpoints. Vegetation screens will be established on the noise control earth bund and along the re-aligned sections of Goonbri Road to reduce potential views of the Tarrawonga landforms. For the re-aligned sections of Goonbri Road, the vegetation screens would be planted in advance of the re-alignment works, in order to reduce direct views of the mine once the re-alignments are completed. • Responding to private landholder concerns about visual impacts, by investigating and if appropriate vegetative screening or other measures in consultation with the affected landholder.	Noted Info not included in the Rehab Management Plan There is no planned further rehabilitation of the southern emplacement in the MOP period, so progressive rehabilitation will not occur in this period.	Noted			
MOP (Nov 2013 to Oct 2015)	3.2.10	The potential for fugitive night-lighting emissions to be visible at additional locations may change during the MOP term due to the: • Increased elevation of light sources on the Southern Emplacement; • The increased extent of the mine waste rock emplacements; and • Potential increases in the mine fleet and operational hours and consequently there would be an increase in mobile vehicle-mounted night-lighting effects.	Noted	Noted			

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
MOP (Nov 2013 to Oct 2015)	3.2.10	Tarrawonga will seek to minimise light emissions by carefully selecting the sites where lighting plants or permanent lighting installations would be placed. Measures that would be employed to mitigate potential impacts from night-lighting would include one or more of the following, where practicable: • All external lighting associated would comply with AS 4282: 1997 – Control of the Obtrusive Effects of Outdoor Lighting; • Night-lighting would be restricted to the minimum required for operations and safety requirements; • Directional lighting techniques would be used; • Light shrouds and reflectors would be used to limit the spill of lighting; • The permanent flood bund and the noise control earth bund would be revegetated to establish visual screens; Note: Not required within this MOP period. • In consultation with the landholder, trees would be planted at nearby private dwellings to help screen identified adverse night-lighting impacts in the event that significant direct night-lighting views are available; and. • In consultation with the landholder, curtains, cladding and/or screens would be provided at nearby private dwellings to help screen identified adverse night-lighting impacts in the event that significant direct night-lighting views are available.	Noted	Noted			
MOP (Nov 2013 to Oct 2015)	3.2.10	Visual and lighting responses will be monitored in accordance with the Project Approval and results will be reported in the Annual Review.	Noted	Noted			
	3.2.11 Heritage (aboriginal and European)						
MOP (Nov 2013 to Oct 2015)	3.2.11	Aboriginal heritage is currently managed in accordance with the Aboriginal Heritage Management Plan. This Plan will be revised and updated to account for the proposed expansion of Tarrawonga in accordance with the PA to prepare a new Heritage Management Plan. This Plan will be developed in consultation with Aboriginal stakeholders and OEH.	Tarrawonga Heritage Management Plan (Last Revision: Jan 2014) mentions that the mine site operates under Project Approval (PA) 11_0047 (granted 22 January 2013).	Compliant			
MOP (Nov 2013 to Oct 2015)	3.2.11	The following general approach will be taken to manage Aboriginal cultural heritage during the life of the mine and be incorporated into the revised Heritage Management Plan:	Noted	Noted			
MOP (Nov 2013 to Oct 2015)	3.2.11	• A record of known Aboriginal sites, their status and location would be maintained by Tarrawonga and relevant site personnel aware of the site locations.	Tarrawonga Heritage Management Plan (Last Revision: Jan 2014), Appendix 2 Aboriginal Heritage Sites Recorded at the Tarrawonga Coal Mine	Compliant			

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
MOP (Nov 2013 to Oct 2015)	3.2.11	• Ongoing consultation would be undertaken with the Aboriginal community over the life of the mine. Appropriate Aboriginal representation would be facilitated during archaeological fieldwork (e.g. salvage of artefacts prior to disturbance).	Tarrawonga Heritage Management Plan (Last Revision: Jan 2014), Section 6.1. Maintain ongoing consultation with the RAP's over the life of the mine, including appropriate RAP representation during topsoil stripping, disturbance activities and archaeological fieldwork (e.g. collection of artefacts);	Compliant			
MOP (Nov 2013 to Oct 2015)	3.2.11	• Tarrawonga would provide opportunities for Aboriginal community members to access known Aboriginal sites located on Whitehaven-owned land (e.g. for cultural reasons or as part of scheduled field activities). Such access would be subject to Occupational Health and Safety requirements.	Tarrawonga Heritage Management Plan (Last Revision: Jan 2014), Section 4. If requested by the RAP's, TCPL will facilitate access to known sites within the mining lease areas, along the Haul Route and in the Biodiversity Offset Area, subject to satisfaction of required safety protocols.	Compliant			
MOP (Nov 2013 to Oct 2015)	3.2.11	• Erosion and sediment control works would be undertaken in accordance with the requirements of the Erosion and Sediment Control Plan and in consideration of Aboriginal cultural heritage management measures.	Noted	Noted			
MOP (Nov 2013 to Oct 2015)	3.2.11	• Any additional Aboriginal heritage sites which may be identified during the development of the mine would be recorded and registered with the OEH in consultation with Aboriginal stakeholders. Should additional Aboriginal heritage sites be identified, they would be managed in accordance with the measures described in the Heritage Management Plan.	Noted	Noted			
MOP (Nov 2013 to Oct 2015)	3.2.11	• Where avoidance of known Aboriginal heritage sites is not practicable, site(s) would be subject to baseline recording, in consultation with representatives of the Aboriginal community, prior to disturbance and artefacts would be salvaged for safekeeping in accordance with the wishes of the Aboriginal community and OEH.	Noted	Noted			
MOP (Nov 2013 to Oct 2015)	3.2.11	• Scar trees located in disturbance areas would be considered for salvage, if appropriate in the context of the tree's condition. A suitable location for the storage and/or display of the salvaged sections would be identified and managed in consultation with the Aboriginal community and OEH.	Noted	Noted			

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
MOP (Nov 2013 to Oct 2015)	3.2.11	• Culturally modified trees located outside of (but in close proximity to) the mine disturbance areas would be suitably demarcated and signed to reduce the risk of accidental damage if considered appropriate by the Aboriginal community.	Tarrawonga Heritage Management Plan (Last Revision: Jan 2014), Section 4.2 states: Culturally modified trees will be fenced at a distance of 5m from the tree where practicable. The fence line location will be subject to physical constraints such as other vegetation and topography Fence posts will be marked white and set vertically apart at approximate 5m intervals; Observed.	Compliant			
MOP (Nov 2013 to Oct 2015)	3.2.11	It is anticipated that the Aboriginal community would also provide advice on the management of salvaged artefacts at the completion of mine activities (e.g.: artefact replacement onto the post mining landscape).	Tarrawonga Heritage Management Plan (Last Revision: Jan 2014), Table 1 Roles and responsibilities states that the Operations Manager is responsible for following relevant procedures in relation to site salvage and identification of artefacts during operational activities.	Compliant			
MOP (Nov 2013 to Oct 2015)	3.2.11	In the event of inadvertent damage to any Aboriginal site or place, the activities causing the damage would cease immediately and procedures identified in the revised Heritage Management Plan followed. Subject to the nature of the damage, appropriate professional advice in addition to that provided by Tarrawonga's consultant archaeologist may be sought.	Tarrawonga Heritage Management Plan (Last Revision: Jan 2014), Section 3.1 In the event that other items of potential heritage significance are uncovered during mining operations, the following protocol will be followed: 1. Work will cease in the area of discovery immediately; 2. The person discovering the item will notify their supervisor immediately who will ensure that work has ceased and area(s) is (are) cordoned off with tape; 3. The supervisor will notify the Operations Manager or senior TCPL person on site; 4. The Operations Manager/Environmental Manager will: a. arrange a qualified heritage management consultant to attend the site and advise on its heritage significance at their earliest opportunity; and b. if the find is determined to be of heritage significance, notify OEH Heritage Branch with the advice from the heritage consultant and seek relevant advice as to appropriate protocols in terms of relocation and notification requirements. There has been no inadvertant damage to aboriginal heritage in the audit period.	Compliant			
MOP (Nov 2013 to Oct 2015)	3.2.11	Aboriginal cultural heritage will be monitored in accordance with the revised Heritage Management Plan and the results summarised in the Annual Review.	AEMR 2012-2013 includes results summarised	Compliant			
MOP (Nov 2013 to Oct 2015)	3.2.11	There are no items of state or regional non-Aboriginal heritage significance in the vicinity of Tarrawonga.	Noted No info included in the AHMP	Noted			

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
MOP (Nov 2013 to Oct 2015)	3.2.11	While of no heritage significance, a rubbish dump identified within the proposed mine contains objects that may be of interest to local historical collectors (e.g. old car and truck bodies, farm equipment, an oil engine and building materials). Prior to mine disturbance of the rubbish dump, these objects will be offered to the Boggabri Historical Society and the Gunnedah Museum.	Noted Information also included in the AHMP	Noted			
3.2.12 Spontaneous Combustion							
MOP (Nov 2013 to Oct 2015)	3.2.12	The EMS details the roles and responsibilities of site personnel and the procedures to be undertaken in the event of an environmental incident, such as spontaneous combustion. This includes notification requirements and contingency measures.	Noted	Noted			
MOP (Nov 2013 to Oct 2015)	3.2.12	Testing was conducted on each coal seam to be exposed by mining at Tarrawonga, with 0.44% sulphur content being the highest recorded value (Velyama Seam). The low percentage of inorganic sulphur is indicative of a low potential for exothermic oxidation reactions. This has been demonstrated over the past seven years of operation, with only one instance of spontaneous combustion occurring over that time.	Noted	Noted			
MOP (Nov 2013 to Oct 2015)	3.2.12	Protocols for managing potential spontaneous combustion on coal stockpiles include: • Regular inspection of ROM coal stockpiles as part of the site supervisor's check areas for evidence of combustion (visual and/or smell) and general stockpile maintenance.	Noted, no evidence of current or past spon com noted in the site inspection conducted for the audit	Noted			
MOP (Nov 2013 to Oct 2015)	3.2.12	• General short residence time of ROM coal stockpiles. Tarrawonga maintains three main stockpiles (TW07r, TW12r and TWxr) based on product type. General residence time of TW07r and TW12r is maintained at approximately 2 weeks. While the TWxr stockpile can have a residence time of up to 2 months, it is managed to minimise the potential for spontaneous combustion by the dumping of fresh coal on the northern side of the stockpile and coal being taken for loading from the southern side of the stockpile. This ensures continual cycling of coal through the stockpile.	Noted	Noted			
MOP (Nov 2013 to Oct 2015)	3.2.12	• Stockpile heights are retained at less than 15 m to assist in limiting residence time.	Noted	Noted			
MOP (Nov 2013 to Oct 2015)	3.2.12	• Stockpiles are subject to weekly survey to confirm height and volume.	Noted	Noted			
MOP (Nov 2013 to Oct 2015)	3.2.12	• In longer term stockpiles (for example, TWxr) shallow stockpile batter faces are created to the direction of the prevailing wind.	Noted	Noted			

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
MOP (Nov 2013 to Oct 2015)	3.2.12	• Mobile equipment is used to compact the stockpile area.	Noted	Noted			
MOP (Nov 2013 to Oct 2015)	3.2.12	Tarrawonga Coal personnel and contractors working in proximity to the ROM coal stockpiles have received appropriate training to be alert for, and respond to, indications of spontaneous combustion. Any incident would be followed by excavation of the stockpile to locate the source, and extinguishment by water saturation.	Noted	Noted			
MOP (Nov 2013 to Oct 2015)	3.2.12	Overburden and interburden sampling by Geo-Environmental Management in 2011 identified an average total sulphur content of 0.03% across both the eastern and northern extension areas and concluded overburden and interburden is unlikely to be reactive; Regardless, the site implements operational protocols to minimise the risk of spontaneous combustion.	Noted	Noted			
MOP (Nov 2013 to Oct 2015)	3.2.12	Protocols for overburden and rejects emplacement include: • Selectively handling partings, interleaves and other carbonaceous waste rock for in-pit emplacement in the pit floor to maximise cover with inert material.	Noted	Noted			
MOP (Nov 2013 to Oct 2015)	3.2.12	• Emplacing coarse rejects (back hauled from the Whitehaven CHPP) in the pit floor to maximise cover with inert material. Sampling of coarse reject by Geo Environmental Management in 2011 identified an average total sulphur content of 0.4%. The material is managed by emplacement in the pit floor and subsequent coverage by the advancing overburden emplacement. This is in accordance with the existing Section 100 approval at the Tarrawonga site for reject emplacement.	Noted Site observations indicate that the rejects are not placed on the pit floor as required by the MOP but are placed at higher elevations as part of the backfilling process with suitable cover to prevent spon com. There was no evidence of AMD. **Recommendation - the wording of the MOP should change at the next revision.**	Not Compliant Administrative			
MOP (Nov 2013 to Oct 2015)	3.2.12	Spontaneous combustion events (if any) will be reported in the Annual Review.	AEMR 2012-2013, Section 3.14 includes information on spontaneous combustion	Compliant			
	3.2.13 Bushfire						
MOP (Nov 2013 to Oct 2015)	3.2.13	Bushfire is currently managed under the Tarrawonga Environmental Management Strategy (EMS) and the Tarrawonga Bushfire Management Plan. The Biodiversity Management Plan will also address bushfire prevention and mitigation of bushfire impacts. TCPL commits to preparing the Biodiversity Management Plan and updating the Bushfire Management Plan during the MOP term.	Biodiversity Management Plan (May 2013) and updating the Bushfire Management Plan (Mar 2013) MOP term started in Nov 2013 (after the above plans were compiled). Therefore the above MP are to be updated	Compliant			
MOP (Nov 2013 to Oct 2015)	3.2.13	A range of management measures are in place to manage the behaviour of people at Tarrawonga and the overall risk of increased bushfire frequency due to mine activities is likely to be low.	Bushfire Management Plan 2013 - includes management measures. Environmental Risk Assessment 2011 (Appendix 4 of MOP (Nov 2013 to Oct 2015) confirms that increased bushfire risk is low.	Compliant			

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
MOP (Nov 2013 to Oct 2015)	3.2.13	The bushfire management measures in place at Tarrawonga include: • Clearing restrictions – clearing will not be undertaken during periods of extreme fire danger as defined by the Bureau of Meteorology.	Bushfire Management Plan 2013 - includes this management measure.	Compliant			
MOP (Nov 2013 to Oct 2015)	3.2.13	• Controlled grazing – controlled high intensity short-term grazing on vegetated areas where stock fencing is available may be employed (if appropriate).	Bushfire Management Plan 2013 - includes this management measure.	Compliant			
MOP (Nov 2013 to Oct 2015)	3.2.13	• Operational activities (eg. vehicle movements, welding, refuelling, blasting) – are managed to minimise the risk of ignition or spread of fire.	Bushfire Management Plan 2013 - includes this management measure.	Compliant			
MOP (Nov 2013 to Oct 2015)	3.2.13	• Fire breaks – fire breaks will be maintained around the perimeter of the mining leases.	Bushfire Management Plan 2013 - includes this management measure.	Compliant			
MOP (Nov 2013 to Oct 2015)	3.2.13	• No smoking areas – smoking will be prohibited in fire prone areas.	Bushfire Management Plan 2013 - includes this management measure.	Compliant			
MOP (Nov 2013 to Oct 2015)	3.2.13	• Fire fighting equipment – on-site fire fighting equipment will be provided, including a fully equipped fire tender to provide immediate response to a bushfire.	Bushfire Management Plan 2013 - includes this management measure.	Compliant			
MOP (Nov 2013 to Oct 2015)	3.2.13	• Training – all relevant mine personnel will receive basic fire control training.	Bushfire Management Plan 2013 - includes this management measure.	Compliant			
MOP (Nov 2013 to Oct 2015)	3.2.13	Assistance would be sought from the NSW Rural Fire Service in the event of significant bushfire incident or offsite bushfire potentially impacting upon the mine site.	Bushfire Management Plan 2013 - includes this management measure.	Compliant			
MOP (Nov 2013 to Oct 2015)	3.2.13	Bushfire events and mitigation measures will be reported in the Annual Review.	Bushfire Management Plan 2013 - includes this management measure.	Compliant			
	3.2.14 Other Issues identified in Risk Assessment						
MOP (Nov 2013 to Oct 2015)	3.2.14	Traffic impacts associated with the Goonbri Road intersections and public road impacts were identified in the ERA. These impacts are being alleviated by the reconstruction and realignment of Goonbri Rd and associated intersections.	This reallignment has not yet occurred and has been postponed due to the sites financial situation. **Recommendation - TCL should reassess the risk to the public and put in place other mitigation measures if the road reallignment is not taking place.**	Not Applicable			
MOP (Nov 2013 to Oct 2015)	3.2.14	Whilst identified in the ERA, rehabilitation is the key focus of this MOP and is covered in detail throughout this document.	Noted	Noted			
MOP (Nov 2013 to Oct 2015)	3.2.14	Mining activities at Tarrawonga will reduce the area of Class 4 agricultural suitability land at the site by approximately 125 ha in the long-term. The proposed rehabilitation of Class 3 agricultural suitability lands will result in no long-term change in the area of Class 3 agricultural suitability lands on the site.	Noted	Noted			

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
MOP (Nov 2013 to Oct 2015)	3.2.14	Agricultural land resource management at Tarrawonga will include the following key components: • Minimisation of disturbance to agricultural lands, where practicable; • Continued use of adjoining Whitehaven-owned land for agricultural uses; • Management of soil resources at the site so that they can be used for rehabilitation; and • Inclusion of agricultural lands in the Tarrawonga rehabilitation strategy (i.e. some 210 ha of Class 3 agricultural suitability land).	Noted, the area noted in the MOP as agricultural land will not be rehabilitated for a number of years from the time of the audit.	Noted			
MOP (Nov 2013 to Oct 2015)	3.2.14	Rehabilitation is a key focus of this MOP and the outcomes will be included in the Annual Review and during MOP reviews.	MOP reviews have not taken place but the MOP was not 12 months old when the audit took place AEMR 2012-2013 includes information on rehab performance	Not Applicable (Rehab information not included in MOP reviews) Compliant (Rehab information included in the AEMR)			
	3.3.3 Geology and Geochemistry						
MOP (Nov 2013 to Oct 2015)	3.3.3	Tarrawonga will undertake testing to identify any PAF materials. PAF material will be selectively emplaced under at least 15 m of NAF material to minimise the potential for ARD. Volumes of PAF material identified and selectively emplaced will be reported in the Annual Review.	AEMR 2012-2013 does not include information on PAF materials	Not Compliant	D	2	Medium
MOP (Nov 2013 to Oct 2015)	3.3.3	To minimise erosion, the final outer surfaces of the overburden emplacements will be constructed with suitable non-sodic or low sodicity material and/or will be treated with gypsum.	Noted, no evidence of sodicity in the rehabilitated faces of the emplacements.	Noted			
MOP (Nov 2013 to Oct 2015)	3.3.3	Sodic material identified in the final void highwalls and lowwalls will be covered with backfill and/or ameliorated in accordance with the Final Void and Mine Closure Plan incorporated in the Rehabilitation Management Plan.	Detailed in the Rehabilitation Management Plan (May 2013) though no sodic material identified to date, note the lack of testing may influence this outcome.....	Not Applicable			
	5 Rehabilitation Planning and Management						
	5.4.2 Decommissioning						

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
MOP (Nov 2013 to Oct 2015)	5.4.2	Tarrawonga will decommission fixed plant, built infrastructure and services progressively when infrastructure items and plant become redundant. All mining related infrastructure will be removed at mine closure. Decommissioning activities include: • Disconnection of all above ground and buried services and removal of associated infrastructure; • Removal of all built infrastructure and plant; • Removal of all wastes and hazardous materials; and • Removal (or on-site remediation) of any contaminated soils in accordance with a contaminated land assessment (where required).	Rehabilitation Management Plan (May 2013) Note no infrastructure decommissioned yet.	Not Applicable			
5.4.3 Landform Establishment and Surface Preparation							
MOP (Nov 2013 to Oct 2015)	5.4.3	The shape of the post mining landform is critical to achieving the rehabilitation objective of a safe, structurally stable, landform that complements the surrounding landscape. Final landforms will have acceptable slopes and unimpeded drainage lines. Slopes are generally to be graded to no more than 10 degrees and no more than 18 degrees without DRE's approval, as per DRE's guidelines.	Rehabilitation Management Plan (May 2013) No steep slopes noted in the site inspection	Compliant			
MOP (Nov 2013 to Oct 2015)	5.4.3	The Northern Emplacement will be shaped to integrate with the Boggabri Coal Mine waste rock emplacement to the north and the Leard State Forest to the east, providing continuity between the Tarrawonga and Boggabri Coal Mine post mining landforms, and habitat connectivity with undisturbed vegetation communities at Leard State Forest. Both the Northern Emplacement and Southern Emplacement will be shaped to integrate with the open cut infill area.	Rehabilitation Management Plan (May 2013)	Noted			
MOP (Nov 2013 to Oct 2015)	5.4.3	Waste rock will be selectively handled and blended to avoid emplacement of potentially acid forming material in concentrated areas. As outlined in Section 3.2.5 where PAF-LC material is identified it will be encapsulated with at least 15 m of NAF to minimise potential for acid leachate.	Rehabilitation Management Plan (May 2013) no PAL mateials identifed to date.	Not Applicable			
MOP (Nov 2013 to Oct 2015)	5.4.3	Dispersive materials will be avoided for material layers at the final landform surface where practical to minimise potential for significant scouring or land slumping. Non-sodic and low sodicity materials will be selectively handled and preferentially emplaced at or near the surface. Where there are potentially dispersive materials emplaced at or near the surface, appropriate amelioration with lime or gypsum will be undertaken to stabilise soils, particularly foundation materials for earthworks structures such as contour banks.	Rehabilitation Management Plan (May 2013)	Compliant			

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
MOP (Nov 2013 to Oct 2015)	5.4.3	By definition Agricultural Class 3 land requires soil conservation practices to support a cropping landuse. Lower terraces to be rehabilitated to a Class 3 standard will be graded at no more than 2 per cent grades, and incorporate contour banks to: • Produce free draining landforms that minimise soils at depth becoming water logged; and • Impede runoff velocities to sub-erosive levels.	Rehabilitation Management Plan (May 2013)	Compliant			
MOP (Nov 2013 to Oct 2015)	5.4.3	To optimise growing conditions for deeper rooted native grasses and crops, the surface layers of spoil will be: • Selectively emplaced with non-sodic or low sodicity spoils and subsoils; • Rock-raked to remove any large rocks that may impede ripping tynes and agricultural equipment; and • Deep ripped along the contour and ameliorated with coarse gypsum prior to soil re-spreading.	Rehabilitation Management Plan (May 2013)	Compliant			
MOP (Nov 2013 to Oct 2015)	5.4.3	General principles that may be adopted to make the final void safe and stable include: • Battering back the lowwalls and highwall to minimise potential for failures and mass movement; • Capping (or excavating) exposed coaliferous material with inert material to prevent ignition from spontaneous combustion, bushfires or human interference; • Constructing a physical barrier to isolate the perimeter of the void to prevent human access. The highwall areas will be secured by the construction of a trench and a safety berm, as well as a security fence along the entire length of the eastern and northern highwalls; • Suitable signs, clearly stating the risk to public safety and prohibiting public access will be erected at intervals along the entire length of the fence; and • Surface runoff from land surrounding the void will be diverted so as to prevent any potential development of instability of the void walls.	Rehabilitation Management Plan (May 2013)	Compliant			
MOP (Nov 2013 to Oct 2015)	5.4.3	Elements such as drainage paths, contour drains, ridgelines, and emplacements will be shaped, as much as practical, to undulating profiles in keeping with natural landforms of the surrounding environment. Contour and catch drains are designed to collect surface runoff from rehabilitation or disturbed areas. Sedimentation dams will be constructed and retained during rehabilitation to collect runoff from rehabilitated areas until discharge water quality meets regulatory criteria and dams can be decommissioned.	Rehabilitation Management Plan (May 2013)	Compliant			
	5.4.4 Growth Media Development						

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
MOP (Nov 2013 to Oct 2015)	5.4.4	In the context of this MOP, growth media development encompasses activities to reinstate soils with the required initial physical, chemical and biological characteristics; ongoing management actions to develop self-sustaining soil profiles are discussed in the Ecosystem Development Rehabilitation Phase (Section 5.4.5)	Rehabilitation Management Plan (May 2013)	Compliant			
MOP (Nov 2013 to Oct 2015)	5.4.4	Topsoil management procedures are described in Section 2.4.2. During this MOP term soil resources suitable for Woodland Rehabilitation Areas will be re-spread in rehabilitation areas at the Northern and Southern Emplacements (refer to Maps 3a to 3c).	Rehabilitation Management Plan (May 2013)	Compliant			
MOP (Nov 2013 to Oct 2015)	5.4.4	Installation of fauna refuge structures (habitat augmentation) will be undertaken during this MOP term in Woodland Rehabilitation Areas to encourage desired fauna species into the rehabilitation areas. Felled timber that is not mulched and salvaged during land clearing will be replaced on topsoiled areas and provides habitat for native reptiles. Hollow bearing timber will be reinstated in rehabilitation areas, and is supplemented with nest boxes and bat boxes (where appropriate) to improve habitat opportunities for native reptiles and mammals, birds and micro-bats.	Rehabilitation Management Plan (May 2013) , felled timber noted in stockpiles and on rehab areas during site inspection	Compliant			
MOP (Nov 2013 to Oct 2015)	5.4.4	Dams retained in the final landform will include habitat enhancements including woody debris placed adjacent to the wet edge of dams (where appropriate), submerged logs, and plain wire fencing to enclose portions of dams for habitat refuge and exclude vertebrate pest species. Final landform design may also include undulations to produce small drainage depressions (where appropriate) to provide habitat for frogs and water-borne invertebrates.	Rehabilitation Management Plan (May 2013), no dams in final rehab as yet	Not Applicable			
	5.4.5 Ecosystem Establishment						
MOP (Nov 2013 to Oct 2015)	5.4.5	In the context of this MOP, ecosystem establishment includes activities to establish the desired floristic composition including: • Seeding, tubestock planting and transplanting; and • Activities to manage risks to vegetation establishment such as weed and vertebrate pest management, and bushfire risk mitigation works.	Rehabilitation Management Plan (May 2013)	Noted			
MOP (Nov 2013 to Oct 2015)	5.4.5	Native vegetation areas are planted with native tubestock species, selected on a site by site basis considering factors such as adjacent remnant vegetation communities, aspect, slope, and soil types.	Rehabilitation Management Plan (May 2013)	Noted			

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
MOP (Nov 2013 to Oct 2015)	5.4.5	Woodland Rehabilitation Areas will include areas planted with species commensurate with the BoxGum Woodland EEC. Retained dams and watercourses including the Goonbri Creek Alignment will be planted with riparian species. The Final Void domain will be planted with native vegetation tubestock above the predicted permanent water line.	Rehabilitation Management Plan (May 2013)	Compliant			
MOP (Nov 2013 to Oct 2015)	5.4.5	Tubestock planting is preferentially undertaken in Autumn and early Winter when weather conditions are generally suited to avoid heat stress on newly planted seedlings; however opportunistic plantings are undertaken in spring and late summer following suitable rainfall. Tubestock seedlings are generally propagated from seed collected on-site and in adjacent areas or sourced from suppliers in the region. Tubestock is typically planted at approximately 400 trees per hectare in native vegetation areas. In areas of planting within the Leard State Forest and where the rehabilitation blends with the Boggabri Coal final landform, planting densities will increase consistent with the approach undertaken by Boggabri Coal	Rehabilitation Management Plan (May 2013)	Noted			
MOP (Nov 2013 to Oct 2015)	5.4.5	Tubestock plantings are mulched, watered and protected from grazing by tubestock bags and/or fencing where required. Tubestock planting methodologies are described in the Rehabilitation Management Plan and Rehabilitation Monitoring Report (2012 Annual Review, Appendix 7). Further specific rehabilitation methodologies for establishing the woodland and agricultural final land-uses are under development and will be documented in the Rehabilitation Management Plan.	Rehabilitation Management Plan (May 2013) Rehabilitation Monitoring Report (2012 Annual Review, Appendix 7), provided Tubestock is not mulched at the site but is incorporated into the topsoil, no evidence of excessive grazing of tubestock in the site inspection. **Recommendation - remove reference to guards and mulching from MOP.**	Not Compliant Administrative			
MOP (Nov 2013 to Oct 2015)	5.4.5	TCPL will also trial direct seeding of eucalypts and some understorey species for woodland areas. If these trials are successful consideration will be given to utilising direct seeding to rehabilitate open woodland rehabilitation areas. Direct seeding research trials are discussed further in Section 8.2.2.	Rehabilitation Management Plan (May 2013)	Compliant			
MOP (Nov 2013 to Oct 2015)	5.4.5	Preliminary species lists currently used for native vegetation planting at Tarrawonga are shown in Table 18. TCPL will consult relevant government agencies and stakeholders in this MOP period to finalise suitable native species mixes for all rehabilitation areas, and document the species lists in the Rehabilitation Management Plan. TCPL will consult Forests NSW regarding inclusion of commercially desirable species for future timber harvesting for rehabilitation areas adjacent to the Leard State Forest (Northern Emplacement Area).	Rehabilitation Management Plan (May 2013)	Compliant			
	Weed and Vertebrate Pest Control						

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
MOP (Nov 2013 to Oct 2015)	5.4.5	Management measures include: • Scalping any weeds from topsoil stockpiles prior to re-spreading in rehabilitation areas; • Ensuring all plant and equipment are weed free prior to mobilisation to rehabilitation areas; • Maximising the retention of ground cover (cover crop stubble) when planting tubestock to minimise opportunities for weed activity; and • Installation of fauna exclusion fencing and/or tree guards for newly planted tubestock where predation by grazing herbivores represents a risk to establishment.	Rehabilitation Management Plan (May 2013) Tree guards and fauna exclusion fencing not used.	Not Compliant	E	2	Low
	5.4.6 Ecosystem Development						
MOP (Nov 2013 to Oct 2015)	5.4.6	In the context of this MOP, the Ecosystem Development phase constitutes the medium to long term management of rehabilitation areas toward achieving the desired final land-use. This phase includes: • Ongoing environmental management to minimise risks to rehabilitation; • Comparing specific ecosystem characteristics such as soil profile development, floristic composition and structure and faunal diversity and abundance with the characteristics of appropriate analogue sites; and • Undertaking adaptive management and remedial works where characteristics of the rehabilitation are not trending toward desired outcomes	Rehabilitation Management Plan (May 2013), still early in this phase in most areas of the site that have been rehabilitated though the western face of the norther e emplacmeent is now well established	Compliant			
	Rehabilitation Monitoring						
MOP (Nov 2013 to Oct 2015)	5.4.6	Ecosystem Development phase incorporates rehabilitation monitoring programs to track progress toward the quantitative and qualitative completion criteria. Monitoring programs in suitable analogue sites is undertaken to refine rehabilitation benchmarks that constitute the indicators and completion criteria for Ecosystem Development phase.	Rehabilitation Management Plan (May 2013)	Compliant			
	Intervention and Adaptive Management						
MOP (Nov 2013 to Oct 2015)	5.4.6	Where monitoring results reveal that indicators are not trending towards the completion criteria as predicted, plans should be executed to promptly modify management practices to achieve the desired rehabilitation results.	Rehabilitation Management Plan (May 2013)	Compliant			
MOP (Nov 2013 to Oct 2015)	5.4.6	Early intervention will be actioned in the form of a Trigger Action Response Plan (TARP), to be developed for each rehabilitation domain, to minimise the risk of failure to achieve the desired rehabilitation outcomes for each domain	Rehabilitation Management Plan (May 2013)	Compliant			
	7 Rehabilitation Implementation						
	7.2 Proposed Rehabilitation and Disturbance Activities this MOP term						

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
MOP (Nov 2013 to Oct 2015)	7.2	During this MOP term rehabilitation activities will continue to be associated with progressive rehabilitation works at the Northern Emplacement and Southern Emplacement, as well as progressive back filling of the open cut pit as mining advances to the east.	Noted	Noted			
	8 Rehabilitation Monitoring, Research and Reporting						
	8.1 Rehabilitation Monitoring						
MOP (Nov 2013 to Oct 2015)	8.1	TCPL undertakes annual rehabilitation monitoring to provide quantitative and qualitative data to: • Assess rehabilitation progress against completion criteria and/or triggers for re-work and adaptive management; and • Assist in refining rehabilitation methods.	Rehabilitation Monitoring Reports sighted	Compliant			
	8.1.1 Active Mining Records						
MOP (Nov 2013 to Oct 2015)	8.1.1	TCPL maintains active mining records related to processes that may impact on future rehabilitation quality. These records contribute to future assessment of rehabilitation outcomes and inform the continual improvement process.	Rehabilitation Management Plan (May 2013)	Compliant			
MOP (Nov 2013 to Oct 2015)	8.1.1	Records maintained include the following: • Detailed rehabilitation procedures; • Register of hazardous and explosive materials; • Register of contaminated sites; • Records of production wastes and other waste streams and where they are located on site; • Environmental monitoring records, including surface and groundwater quality and detailed annual rehabilitation monitoring reports from qualified ecologists; • A topsoil and subsoil stockpile register which includes the date stockpiles were formed and maintenance works undertaken (e.g. weed control, planting with cover crops etc.), and • Environmental incident records.	Rehabilitation Management Plan (May 2013) No register of known and potential contaminated sites was sighted. The EO notes at interview that there were no known contaminated sites at the time of the audit and therefore no need for the register. Note also tht the site is still nominally over 15 years from closure.	Compliant			
	8.1.2 Rehabilitation Methodology Records						
MOP (Nov 2013 to Oct 2015)	8.1.2	TCPL records the details of each rehabilitation campaign so that they are available to provide context for rehabilitation monitoring results and assist the continuous improvement process.	Rehabilitation Management Plan (May 2013)	Compliant			

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
MOP (Nov 2013 to Oct 2015)	8.1.2	The key monitoring parameters to be included in the program include: • Landform and drainage design details; • Substrate (spoil) characterisation; • Site preparation techniques (for example, topsoil source and depth, soil ameliorants used etc.); • Revegetation methodologies (for example, rate and type of fertiliser, cover crop and rate, time of sowing /planting); • Weather conditions; • Photographic records; and • Initial follow-up care and maintenance works.	Rehabilitation Management Plan (May 2013)	Compliant			
	8.1.3 Annual Rehabilitation Surveys						
MOP (Nov 2013 to Oct 2015)	8.1.3	TCPL engage ecologists to undertake spring monitoring campaigns at: • Existing Woodland Rehabilitation Area sites at the Northern Emplacement and Southern Emplacement; • Regenerating native vegetation in the north east corner of ML 1579; and • Analogue sites located at the southern extent of ML 1579 (agricultural land control sites) and in undisturbed native vegetation to the east of ML 1579 (Woodland analogue site).	Rehabilitation Management Plan (May 2013)	Compliant			
MOP (Nov 2013 to Oct 2015)	8.1.3	Monitoring at rehabilitation areas and analogue sites includes survey programs tailored for both Agricultural and Woodland Rehabilitation Areas Secondary Domains.	Rehabilitation Management Plan (May 2013)	Compliant			
MOP (Nov 2013 to Oct 2015)	8.1.3	Vegetation and fauna surveys in Woodland sites monitor vegetation diversity and abundance in each stratum and presence of arboreal and terrestrial fauna species. Woodland surveys also include soil profile characterisation and measure the accumulation of leaf litter, bare patches and presence of weeds.	Rehabilitation Management Plan (May 2013)	Compliant			
MOP (Nov 2013 to Oct 2015)	8.1.3	Surveys in pastoral control sites monitor the pastoral vegetation species, total biomass per hectare and soil physical-chemical data. Rehabilitation monitoring outcomes are reported annually in the Annual Review.	Rehabilitation Management Plan (May 2013) AEMR 2012-2013 mentioned that as rehabilitation of pasture areas had only recently been undertaken, monitoring of the rehabilitated pasture will take place and be reported to during the next reporting period.	Compliant			
MOP (Nov 2013 to Oct 2015)	8.1.3	Monitoring at the analogue sites will be used for further development of quantitative indicators and completion criteria for Agricultural Rehabilitation Areas and Woodland / Forest Rehabilitation Areas (refer to Section 8.2 below).	Rehabilitation Management Plan (May 2013)	Not Applicable			

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
MOP (Nov 2013 to Oct 2015)	8.1.3	TCPL is trialling multi-spectral remote sensing monitoring techniques including the Normalised Difference Vegetation Index (NDVI) technique to detect any deterioration in vegetation health in rehabilitation areas. Should NDVI data indicate a deterioration in vegetation health, additional 'on the ground' monitoring will be undertaken to determine if any remedial actions are required in accordance with the rehabilitation TARP (refer to Section 9.2).	Rehabilitation Management Plan (May 2013)	Noted			
MOP (Nov 2013 to Oct 2015)	8.1.3	In addition to the scheduled monitoring events, Tarrawonga will be independently audited in June 2014 (and every 3 years thereafter) to assess compliance with the requirements of Project Approval PA 11_0047, EPL 12365, ML 1579 and any assessment, EMP, strategy or program required under those approvals.	Rehabilitation Management Plan (May 2013)	Compliant			
	8.1.4 Independent Biodiversity Audit						
MOP (Nov 2013 to Oct 2015)	8.1.4	In addition to the scheduled monitoring events, Tarrawonga will be independently audited in June 2014 (and every 3 years thereafter) to assess compliance with the requirements of Project Approval PA 11_0047, EPL 12365 and ML 1579, along with any assessment, management plan, strategy or program required under those approvals.	This Audit	Compliant			
MOP (Nov 2013 to Oct 2015)	8.1.4	All rehabilitation areas will be audited in the Independent Biodiversity Audit to verify rehabilitation progress documented in the MOP and Annual Review.	This audit	Compliant			
	8.2 Research and Rehabilitation Trials and Use of Analogue Sites						
	8.2.1 Use of Analogue Sites						
MOP (Nov 2013 to Oct 2015)	8.2.1	Monitoring at the pastoral control sites will be used to develop baseline data for pasture species densities and diversity, total biomass per hectare and agricultural soil physical-chemical data at representative productive pastoral control sites. Baseline data will be used to quantify indicators and completion criteria for Agricultural Rehabilitation Areas to be documented in the Rehabilitation Management Plan.	Rehabilitation Management Plan (May 2013)	Compliant			
MOP (Nov 2013 to Oct 2015)	8.2.1	Similarly, surveys in the Woodland/Forest analogue site is undertaken to build baseline data for soil profiles, vegetation features and presence of fauna and habitat features.	Rehabilitation Management Plan (May 2013)	Compliant			

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
MOP (Nov 2013 to Oct 2015)	8.2.1	The project will disturb the existing analogue woodland site when mining advances into ML 1693. TCPL will engage in consultation with Forests NSW to secure access to alternative appropriate analogue sites in this MOP period.	Rehabilitation Management Plan (May 2013) states that: The project will disturb the existing analogue woodland site when mining advances into MLA 2. TCPL will secure access to an alternative appropriate analogue site prior to disturbance at the existing site. Negotiation not yet commenced.	Not Applicable			
	8.2.2 Research and Rehabilitation Trials						
	Continuous Improvement						
MOP (Nov 2013 to Oct 2015)	8.2.2	Tarrawonga adopts a continuous improvement approach to rehabilitation; results from rehabilitation monitoring surveys and opportunistic monitoring observations are used to refine rehabilitation methodologies on an on-going basis. For example, the success rate for cool and warm climate seed mix variations are monitored to determine the most effective cover crop seed mixes.	Rehabilitation Management Plan (May 2013) Discussed in site interviews and some observations support this during the site inspection	Compliant			
	Direct Seeding Trials						
MOP (Nov 2013 to Oct 2015)	8.2.2	As outlined in Section 5.4.5.1 TCPL will trial direct seeding techniques in small areas to determine the effectiveness of direct seeding to establish native vegetation. TCPL will engage contractors to undertake direct seeding works. Rehabilitation progress will be monitored to identify potential benefits to supplementing tubestock planting with direct seeding. Trial results will be reported in the Annual Review and if successful, direct seeding methodologies will be formalised in the Rehabilitation Management Plan.	Rehabilitation Management Plan (May 2013)	Compliant			
	Native Vegetation Tubestock Trials						
MOP (Nov 2013 to Oct 2015)	8.2.2	TCPL and Boggabri share growth rate data for tubestock sourced from different areas to verify if stock from different sources produces better growth.	Rehabilitation Management Plan (May 2013)	Compliant			
	8.3 Reporting						
MOP (Nov 2013 to Oct 2015)	8.3	Results of rehabilitation monitoring will be reported in the Annual Review. The Annual Review will record monitoring results and discuss rehabilitation performance against key performance measures/indicators; compliance with regulatory requirements and TCPL commitments. The Annual Review will also discuss identified trends and instances where potential rehabilitation failure has been identified triggering intervention in accordance with a Rehabilitation TARP (Section 9.2).	Rehabilitation Management Plan (May 2013) AEMR 2012-2013 includes rehab monitoring results but does not assess performance against key performance measures/indicators; compliance with regulatory requirements and TCPL commitments. AEMR 2012-2013 does not discuss identified trends and instances where potential rehabilitation failure has been identified triggering intervention in accordance with a Rehabilitation TARP.	Not Compliant Administrative			

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
MOP (Nov 2013 to Oct 2015)	8.3	Annual Reviews and independent audits will be submitted to relevant government agencies and made publically available via the Whitehaven/Tarrawonga website: http://whitehavencoal.com.au/operations/tarrawonga_mine.cfm	The relevant docs are on the website	Compliant			
	9 Intervention and Adaptive Management						
	9.2 Trigger Action Response Plan						
MOP (Nov 2013 to Oct 2015)	9.2	A high-level Trigger Action Response Plan (TARP) has been developed in order to provide an initial framework to manage potential key risks to rehabilitation. It has been prepared in line with the TARP in Tarrawonga's Biodiversity Management Plan and includes: • Identification of the principal contributing factors and impacts for each major risk to rehabilitation; • Identification of upper limits (trigger values) for causes and impacts that are considered to represent an unacceptable level of risk; and • Identification of appropriate responses to mitigate or remediate the causes and impacts, including a notification protocol.	Rehabilitation Management Plan (May 2013)	Compliant			
	10 Review and Implementation of the MOP						
	10.1 Periodic Review Protocol						
MOP (Nov 2013 to Oct 2015)	10.1	Periodic reviews will be conducted to assess the effectiveness of this plan. This plan will be reviewed, and if necessary revised, annually or within three months of the submission of an: • Updated or additional management plan as required by conditions 12, 21, 29, 39, 47, and 64 of Schedule 3 of Project Approval PA 11_0047; • Annual Review undertaken in accordance with condition 4 of Schedule 5 of Project Approval PA 11_0047; • Incident report undertaken as per condition 8 of Schedule 5 of Project Approval PA 11_0047; • Audit undertaken to satisfy Schedule 10 of Project Approval PA 11_0047; and • Approval to modify Project Approval PA 11_0047.	Rehabilitation Management Plan (May 2013) **Recommendation - The review process needs to be documented.**	Compliant			
MOP (Nov 2013 to Oct 2015)	10.1	This plan may also be revised due to: • Deficiencies being identified; • Recommendations arising from the Rehabilitation Monitoring Programs; • Changes to environmental requirements due to (for example) changed legislation or regulatory requirements; and • Changes in the activities or mining operations described in this MOP.	Rehabilitation Management Plan (May 2013) Not required in the audit period	Not Applicable			
	10.2 Implementation						

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
MOP (Nov 2013 to Oct 2015)	10.2	Tarrawonga personnel responsible for the monitoring, review and implementation of this plan are defined in Table 27.	Rehabilitation Management Plan (May 2013)	Noted			

Reference	attached to th	Requirement	Evidence	Audit Finding	Risk			Responsibility
					Consequence	Likelihood	Risk	
	Tarrawonga Coal Mine Extension (EPBC 2011/5923)							
	Conditions attached to the approval							
	Conditions attached to the approval							
EPBC 2011/2013	1	The person taking the actions must not clear more than 13 hectares (ha) of the EPBC listed Wite Box-Yellw Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland critically endangered ecological community within the Tarrawonga Coal Extension **project area**, as identified in Attachment A of these conditions.	There are only 13ha within the project area, to clear more TCL would have to clear beyond the project boundary, there is no evidence of this occurring.	Compliant				
EPBC 2011/2013	2	The person taking the action must not clear more than: a. 279 ha of habitat for the regent honeyeater (Anthochaera phrygia: formerly Xanthomyza phrygia); b. 54 ha of habitat for the swift parrot (Lathamus discolor); and c. 334 ha of habitat for the greater long-eared bat (Nyctophilus corbeni), within the Tarrawonga Coal Extension project area.	The regent honeyeater habitat has only had minor areas clear to date, around 30ha.	Compliant				
EPBC 2011/2013	3	The person taking the action must submit to the Minister for approval within three months of commencement of construction, an approach that: a. limits the maximum disturbance (in hectares) specified for each of the years 5, 10, 15 and 17 from the date of this approval of the White Box-Yellow Box- Blakely's Red Gum Grassy Woodland and Derived Native Grassland ecological community and the habitat or potential habitat for the regent honeyeater, swift parrot and greater long-eared bat; b. incorporates an analysis, undertaken by independent ecological experts approved by the Department, that deomonstrates the maximum disturbance limits which will minimise any impacts on relevant matters of national environmental significance; c. demonstrates collaboration with the person taking the action to develop and operate the Boggabri Coal Project (EPBC 2009/5256) and the person taking the action to develop and operate the Maules Creek Coal Project (EPBC 2010/5566), in order to minimise progressive disturbance limits are to be reflected in the development of the Leard Forest Mining Precinct Biodiversity Strategy.	MOP and reahab plan detail these constraints, the plans were submitted prior to the audit period. The Limits of Disturbance analysis by EcoLogical was provided as evidence. The Strategy in c) has not yet been finalised following comment.	Not Applicable				
EPBC 2011/2013	4	The person taking the action must not clear more than the maximum **project area** disturbance limits specified for each of the years 5, 10, 15 and 17 as described in condition 3, unless otherwise approved by the **Minister**.	We are not yet at year 5.	Not Applicable				
EPBC 2011/2013	5	The person taking the action must publish the analysis under condition 3 on their website.	We are not yet at year 5.	Not Applicable				
	Direct Offsets							
EPBC 2011/2013	6	The person taking the action must register a leally binding conservation covenant over offset areas of no less than: a. 1055 ha of an equivalent or better quality of habitat for the regent honeyeater; b. 397 ha of an equivalent or better quality of habitat for swift parrot; c. 1355 ha of an equivalent or better quality of habitat for the greater long-eared bat; and d. 232 ha of an equivalent or better quality of the White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland ecological community. Note: Offset areas described in condition 6 do not necessarily need to be separate if the same areas can meet the listing criteria for the EPBC listed threatened species or communites as defined in the EPBC listing advise for that threatened species or community and meet the requirements of condition 6	Noted					

Reference	attached to th	Requirement	Evidence	Audit Finding	Risk			Responsibility
					Consequence	Likelihood	Risk	
EPBC 2011/2013	7	The person taking the action must verify through **independent review** the quantity and **condition class** of White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland ecological community and the quantity and quality of habitat for the regent honey-eater, swift parrot and greater long-eared bat within all proposed **offset areas** including those proposed in the **Environmental Assessment** and any additional offsets as required at condition 8. Details of all independently verified **offset areas** must be submitted to the M**inister** for approval by 31 January 2014. The findings of the independent review must be published on the proponent's website.	Condition class report submitted	Compliant				
EPBC 2011/2013	8	If the **independent review** finds that the **offset areas** do not meet the requirements of conditions 6, 7 and 9then additional areas must be included in the offset areas until all relevant criteria under these conditions are met.	The report found the areas were suitable in size and vege class.	Compliant				
EPBC 2011/2013	9	The offset areas must be of an overall equivalent or better quality than the areas being cleared. This means: a. for White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland ecological community, offset areas must meet the definition of the ecological community described in the listing advice, and must be of an overall equivalent or better condition class than the areas being cleared, based on the proportion of each condition class represented and other relevant ecological attributes;"" b. for the threatened species, the quality of the habitat for the species, taking account of its ecological requirements, must be equivalent to or better than the areas being cleared.	Noted, see classification assessment	Noted				
	Direct Offsets							
EPBC 2011/2013	10	The mechanism/s for registering a legally binding covenant must provide protection for the offset areas in perpetuity and be registered within 5 years of the date of this approval.	The approval is not yet 5 years old, there is no legally binding covenant in place	Not Applicable				
EPBC 2011/2013	11	If the person taking the action proposes to undertake any action within areas secured under conditions 6, other than thos management activiites related to managing the offset areas or as set out in the conditions of approval, then approval to undertake that action must be obtained in writing from the **Minister.** In seeking the **Minister's** approval, the person undertaking the action must provide a detailed assessment of the area where the action is proposed to take place and an assessment of all associated adverse impacts on **matters of national environmental significance.** If the **Minister** agrees to the action within the offset areas, the area identified for the action must be excised from the **offset area** and alternative offsets secured by the person taking the action at a ratio of at least 20:1 in relation to the impact on **matters of national environmental significance.**	Noted, no such actions considered to date	Not Applicable				
		Offset management plan						
EPBC 2011/2013	12	12. The person taking the action must submit to the **Minister** for approval an *Offset management plan* for all of the **offset areas,** specified in condition 6, within 12 months of the date of this approval. The approved *Offset management plan* must be implemented.	Willeroi Offset Management Plan letter with submission details sighted, includes response from DSEWPAC.	Compliant				
EPBC 2011/2013	12	Note: for consistency, the proponent may develop a Biodiversity Management plan that includes the requirements set for managing offsets and set out in these conditions, to align with the requirements of the NSW state government Project Approval dated 22 January 2013 (application number 11_0047) and this approval.	Noted					
EPBC 2011/2014	13	The Offset management plan must include:						

Reference	attached to th	Requirement	Evidence	Audit Finding	Risk			Responsibility
					Consequence	Likelihood	Risk	
EPBC 2011/2015	13a	a) a text description and map which clearly defines the location and boundaries of the offset areas. This must be accompanied by the offset attributes and shapefiles;	WBOMP 2.1, Figure 2.1, 2.2. Table 5.2 (Ecological attributes measured in condition plots). Appendix A, GIS Shape files	Compliant				
EPBC 2011/2016	13b	b) a description of the methodology and results of surveys measuring the baseline ecological conditions in the offset areas. This must be consistent with the State and Transition Model and include but not be limited to: i. the extent and condition of all vegetation communities, including a description of the structure, floristics and tree age class representation of each community; ii. the extent and condition class of all areas of the White Box—Yellow Box— Blakely's Red Gum Grassy Woodland and Derived Native Grassland ecological community; iii. surveys targeting the regent honeyeater, swift parrot and greater long-eared bat; iv. the extent and quality of all areas of habitat for the regent honeyeater, swift parrot and greater long-eared bat; v. the location of all survey sites (including co-ordinates); vi. photo reference points at survey sites.	Methods for baseline vegetation condition in BOA (WBOMP, Section 2.6 cited FloraSearch 2011 and independent review ELA 2013b). Methods for surveys of terrestrial fauna in the BOA (WBOMP Section 2.7 cited Cenwest Environmental Services 2011). Results of baseline surveys reported in WBOMP: i. & ii. Extent and condition of each of the vegetation types within the BOA (WBOMP Table 2.2, Figure 2.2). State and Transition Model for BGW has been applied to the EEC located within the BOA to provide a condition class (WBOMP Figure 2.3). iii. Methods for baseline surveys targeting regent honeyeater, swift parrot and greater long-eared bat in BOA (Cenwest Environmental Services 2011, Section 2.3.4 and 6.2). Methods for monitoring surveys targeting regent honeyeater, swift parrot and greater long-eared bat in BOA (MBOMP, Section 5.3) iv. The extent and quality of all areas of habitat for the regent honeyeater, swift parrot and greater long-eared bat in the BOA (WBOMP Table 2.4) v. Location of survey sites including coordinates in BOA (MBOMP, Flora survey sites: FloraSearch 2011, Attachment C Figure 2; Fauna survey sites: Figure 2.5) vi. Photo reference points in BOA: FloraSearch 2011, Offset Strategy, Vegetation of the 'Willeroi' Offset Area, Figure 2.	Compliant				
EPBC 2011/2017	13c	c) clearly defined ecological management objectives for the offset areas;	WBOMP Section 3 outlines strategic ecological management objectives relevant to each zone.	Compliant				
EPBC 2011/2018	13d	d) detailed description of all ecological management activities proposed to be undertaken, including maps and/or diagrams showing areas to be managed and the timing of the proposed activities;	Maps of biodiversity management zones are shown in WBOMP Section 3. Details of management actions are set out in WBOMP Section 4. Table 7.1 outines the timing of management activities.	Compliant				
EPBC 2011/2019	13e	e) details of ongoing ecological monitoring programs, performance criteria, targets and provisions for adaptive management, including but not limited to: i. a set of measurable ecological indicators for detecting changes to the White Box—Yellow Box—Blakely's Red Gum Grassy Woodland and Derived Native Grassland ecological community, including those that may be ascribed to ongoing water stress;	13e. details of ongoing ecological monitoring programs, performance criteria, targets and provisions for adaptive management have been presented in the WBOMP Section 5 – Ecological Monitoring, and Section 6 – Contingency Planning. Condition monitoring plots will be placed in control (reference) sites (one in each of the eight vegetation communities in benchmark condition) and intervention sites (two in each vegetation type/management zone combination). i. Tables 5.2 and Table 5.3 set out ecological attributes and the scale of measurement in vegetation condition monitoring plots. The attributes & methods outlined in these tables are not consistent with BioBanking methodology for site attributes (OEH 2012). It is recommended that these tables be revised. For example, transects should be 50 m long (not 100 m), cover recorded along transects should be measured as percent foliage cover (not projected crown cover), groundcover should be recorded for grasses, sub-shrubs and other vascular plants <1m high, coarse woody debris should be recorded at the baseplot scale (50m x 20m), and the number of trees with hollows should be included to make comparisons against ten Biometric benchmark attributes. Changes in site attributes over time provide an indication of trends in condition of threatened ecological communities threatened fauna species habitat. Impacts of climate change on grassy woodlands include death of trees from moisture stress, altered shrub-grass balance potentially in favour of shrubs, and changes in groundcover composition (Prober et al. 2010). It is recommended that 2 additional attributes (tree health, and density) should be monitored in Box-gum Woodland vegetation types on Willeroi (White Box grassy woodland of the Nandewar and Brigalow Belt South Bioregions & Yellow Box - Blakely's Red Gum grassy woodland of the Nandewar Bioregion). **Recommendation - Revision of ecological attribute tables.**	Compliant				

Reference	s attached to th	Requirement	Evidence	Audit Finding	Risk			Responsibility
					Consequence	Likelihood	Risk	
EPBC 2011/2020	13e	e) ii. a monitoring plan to assess the success of the management activities measured against the baseline condition. The monitoring must be statistically robust and able to quantify change in the condition of the White Box—Yellow Box—Blakely's Red Gum Grassy Woodland and Derived Native Grassland ecological community and habitat for the regent honeyeater, swift parrot and greater long-eared bat. This should include the use of control sites and periodic ecological surveys to be undertaken by a qualified ecologist. iii. a list of performance criteria based on the ecological management objectives for the White Box—Yellow Box—Blakely's Red Gum Grassy Woodland and Derived Native Grassland ecological community and habitat for the regent honeyeater, swift parrot and greater long-eared bat; iv. measures to exclude weeds from all offset areas for the period covered by this approval; v. a description of the potential risks to successful management against the performance criteria, and a description of the contingency measures that would be implemented to mitigate against these risks; vi. a process by which to report to the department the progress of management activities undertaken in the offset areas and the outcome of those activities, including identifying any need for improved management and activities to undertake such improvement.	e) ii. a monitoring plan to assess the success of the management activities measured against the baseline condition (Appendix C Willeroi BOA Works Program). The flora and fauna monitoring program is outlined in Tables 5.1, 5.2, 5.3 & 5.4 (see comments above regarding suggested changes to Tables 5.2 & 5.3). iii. Section 4 sets out management activities which will be implemented on Willeroi in order to counterbalance the loss in biodiversity value on the project site. Table 5.1 sets out performance criteria for biodiversity management activities in all management zones which are consistent with the objectives for White Box—Yellow Box—Blakely's Red Gum Grassy Woodland and Derived Native Grassland ecological community and habitat for the regent honeyeater, swift parrot and greater long-eared bat on Willeroi; iv. Section 4.8 details weed control measures in all offset areas for the period covered by this approval; v. Section 6 outlines potential risks to successful management against the performance criteria, and a description of the contingency measures that would be implemented to mitigate against these risks; Table 6.1 provides a risk assessment of potential incidents / failures, with potential consequences, impacts and proposed controls. Table 6.2 outlines planning to deal with contingencies identified in the risk assessment and linking response action, responsibility and reporting requirements. vi. Table 9.1, Section 9 outlines reporting requirements for progress of management activities undertaken in the offset areas and the outcome of those activities, including identifying any need for improved management and activities to undertake such improvement. Sections 9.4 & 9.5 detail review and auditing requirements for the management of the Willeroi BOA.					
EPBC 2011/2021	13f	f) details of all parties responsible for management, monitoring and implementing the management activities, including their position or status as a separate contractor.	Roles & responsibilities are summarised in WBOMP, Table 1.3					
EPBC 2011/2022	13g	g) details of the funding requirements for the ongoing management activities, including an estimate of the costs of the activities and details of the parties responsible for funding the activities	TCPL will be responsible for funding the offset management activities on the Willeroi BOA. Funding requirements are detailed in Table 7. 1. Funding requirements for each management period are shown in Table 7. 2	Compliant				
EPBC 2011/2013	14	Unless otherwise agreed to in writing by the **department,** the baseline surveys for threatened species must be conducted in accordance with the department's *Survey Guidelines for Australia's Threatened Birds* and the *Survey Guidelines for Australia's Threatened Bats.* Subsequent monitoring must be carried out annually at the same time of year as the baseline surveys, unless otherise agreed to in writing by the **department.**	EcoLogical report does not verify compliance with these requirements. **Recommendation - The consultant should confirm compliance with the two stated methodologies in their annual monitoring reports.**	Compliant				
Surface and groundwater management plans								
EPBC 2011/2013	15	The person taking the action must provide by the 31 May 2013, to the **Minister** for approval, the *surface and groundwater management plans* as identified in condition 39 of the NSW state government Project Approval dated 22 January 2013 (application number 11_0047).	This was submitted on time, the comments from the agencies are being addressed at present.	Compliant				
EPBC 2011/2013	16	The *surface and groundwater management plans* must be consistent with the **National Water Quality Management Strategy.**	The existing Water Management Plan is not approved but does not reference EPBC requirements or the National Water Quality Management Strategy.	Not Compliant Administrative				
EPBC 2011/2013	17	The person taking the action must, within six months of this approval, in collaboration with the proponent to develop and operate the Maules Creek Mine (EPBC 2009/5566), provide written advice to the Minister demonstrating how the NSW government approved *surface and groundwater management plans,* address the cumulative impact of groundwater drawdown as a result of mining and how this may impact on the consequent health of the remnant native vegetation in the Leard State Forest, the Leard State Conservation Area and surrounding areas. In particular the advice must address the following matters:	The Leard Forest WMS (6-03-13) addresses this requirement. Note however, the strategy does not acknowledge the TCL EPBC requirements as the TCL EPBC approval is date 11-03-13.	Compliant				

Reference	attached to th	Requirement	Evidence	Audit Finding	Risk			Responsibility
					Consequence	Likelihood	Risk	
EPBC 2011/2013	17	a. maximum amount of allowable drawdown in the alluvial aquifer b. drawdown in hard rock c. trigger levels pertaining to drawdown in the alluvial aquifer when corrective actions will be required to be undertaken d. identify the depth of root zone of the native vegetation e. monitoring to assess the ongoing quality and quantity of both surface and groundwater to identify impacts on the native vegetation	a) not stated in WMP, risk of not identifying GW impacts b) not stated in WMP, risk of not identifying GW impacts c) Stated in WMP d) Stated in Leard Forest Strategy e) This is adequately covered and the GDEs are addressed in the Leard Forest Strategy	Not Compliant	D	2	Medium	
EPBC 2011/2013	18	The person taking the action must witihin 6 months of the date of this approval, or such other timeframe specified by the Minister, provide to the Minister a report on: a. any updated modelling of surface and groundwater impacts that has been undertaken in preparing the surface and groundwater management plans b. how the surface and groundwater management plans addressed groundwater and surface water impacts on matters of national environemental significance	No evidence provided.	Not Compliant Administrative				
	Goonbri Creek Diversion and Low Permeability Barrier							
EPBC 2011/2013	19	The person taking the action must provide to the **Minister** for approval, before **commencement of the construction of the permanent Goonbri Creek alignment, permanent flood bund and low permeability barrier,** a *Goonbri Creek Diversiion and Flood Bund Concept Design Plan.* This approved *Goonbri Creek Diversion and Flood Bund Concept Design Plan* must be implemented.	This has not yet occurred, and is not planned for some time yet.	Not Applicable				
EPBC 2011/2013	20	The Goonbri Creek Diversiion and Flood Bund Concept Design Plan must include: a. an assessment of the surface water and groundwater quality, ecology, hydrological and geomorphic baseline conditions within the creek; b. a description of how restoration of the re-aligned riparian zone will be undertaken to best replicate the habitat of the existing creek, including plant species and fauna habitat features; c. water quality, ecology, hydrological and geomorphic performance and completion criteria for the creek diversion and low permeability barrier based on the condition 20 (a); and d. a risk assessment of the environmental consequences of the proposed low permeability barrier and the proposed Goonbri Creek realignment including the potential for impacts on groundwater and surface discharge. The risk assessment must be peer-reviewed. e. details for ongoing monitoring and management of downstream impacts on the adjacent floodplains and Namoi River floodplain.	This has not yet occurred, and is not planned for some time yet.	Not Applicable				
EPBC 2011/2013	21	The person taking the action must ensure that dispersed waters downstream of the Goonbri Creek re-alignment do not adversely affect the downstream environment and avoid any impacts on matters of national environmental significance.	This has not yet occurred, and is not planned for some time yet.	Not Applicable				
	Leard Forest Mining Precinct Regional Biodiversity Strategy							
EPBC 2011/2013	22	The person taking the action must implement the regional biodiversity strategy as required under condition 41 of the NSW state government project approval dated 22 January 2013 (application number 11_0047). The required scoping report for the development of the strategy must be submitted to the **Minister** for approval on or before 31 July 2013. The approved strategy must be implemented.	The Regional Biodivesity Plan has been developed but is not approved nor fully implemented. Evidence of the submission of the scoping strategy has not been provided.	Not Compliant Administrative				
	Mine site rehabilitation							

Reference	attached to th	Requirement	Evidence	Audit Finding	Risk			Responsibility
					Consequence	Likelihood	Risk	
EPBC 2011/2013	23	To mitigate the impacts to the White Box-Yellow Box–Blakely's Red Gum Grassy Woodland and Derived Native Grassland and the habitat of the regent honeyeater, swift parrot and greater long-eared bat, the person taking the action must, within 12 months of the commencement of construction, submit to the **Minister** for approval a *mine site rehabilitation plan* for the progressive rehabilitation and revegetation of no less than 752 ha of native forest and woodland in the **project area** including 13 ha using species consistent with a White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland Ecological Community. This approved *mine site rehabilitation plan* must be implemented.	Rehabilitation Management Plan completed but not yet approved. The RMP reflects the other requirements.	Compliant				
EPBC 2011/2013	24	The person taking the action must rehabilitate the site to be consistent with the proposed rehabilitation streategy as provided in the **Environmental Assessment** and, as required under the NSW state Government approval dated 22 January 2013 (Application 11_0047).	The RMP reflects the commitments in the EA	Compliant				
EPBC 2011/2013	25	The mine site rehabilitation plan must include, at a minimum, the following information: a. targets and performance indicators to achieve effective restoraton of potential habitat for the regent honeyeater, swift parrot and greater long-eared bat and White Box–Yellow Box–Blakely's Red Gum Grassy Woodland and Derived Native Grassland ecological community, including weed management; b. details of the vegetation communities to be rehabilitatied and the timing of progressive rehabilitation (commencing as soon as practivable following disturbance); c. detailed soil depth surveys and analysis to inform the effective placement and restoration of soild unerlying the proposed rehabilitation sites; including mapping of soils across the disturbance sites and soil sampling at no less than one sample point per 20 ha of each soil type identified. Sampling must identify; type, depth, water holding capacity, structure and physio-chemical properties of each of the soil and subsoil layers; d. processes and methodologies for the removal, storage and re-layering of the top soil and sub soil layer underlying the disturbed sites being prepared for rehabilitation. These processes and methodologies must ensure the replacement of top and sub soil layers as provided in the Environment Assessment.	a) These are in the RMP and BMP b) in the RMP, BMP **c) This has not been done, some soil assessment was conducted in the EA.** D) There are procedures and management controls to ensure this happens	Not Compliant	D	2	Medium	
EPBC 2011/2013	25	e. a process to report annually to the department the rehabilitation management actions undertaken and the outcome of those actions, and the mechanisms to be used to identify the need for improved management; f. a description of the potential risks to successful management and rehabilitation on the project site, including weed invasion, and a description of the contingency measures that would be implemented to mitigate these risks; g. details of long-tem management and protection of the mine site, including details of the commitment of funds to achieve this	e) Rehabilitation Monitoring Report and the AER f) Includes a risk assessment and analysis g) Includes closure management, final void management and information on financial support for closure and post closure.					
EPBC 2011/2013	26	The *mine site rehabilitation plan* must be subject to an **independent review** by a qualified ecologist prior to being submitted to the **Minister** for approval. The findings of the **independent review** must be published on the proponent's website.	The Rehab Mngt Plan has not been approved and independent review has therefore not been conducted.	Not Applicable				
	Conservation Bond							

Reference	attached to th	Requirement	Evidence	Audit Finding	Risk			Responsibility
					Consequence	Likelihood	Risk	
EPBC 2011/2013	27	The person taking the action is required to submit a Conservation and Biodiversity Bond under condition 49 of the New South Wales state government project approval dated 22 January 2013 (application 11_0047). It is noted that this bond may be combined with the rehabilitation security deposit as required under the New South Wales *Mining Act 1992.* The person taking the action must submit details of this bond and the rehabilitation security deposit, to the **Minister,** within six months of this approval. If the **Minister** is not satisfied that the bond and rehabilitation security deposit lodged by the person taking the action is adequate to provide for the requirements referred to under conditions 19, 20, 22, 23 and 24, the **Minister** may require the person taking the action establish an additional bond or equivalent financial instrument in trust, under conditions approved in writing by the **Minister.**	This has been done. No evidence provided of provision of the details of the security bond to the Minister.	Not Compliant Administrative				
		Final Landform						
EPBC 2011/2013		Note: for consistency, the person taking the action may develop a single mine rehabilitation plan to align with the requirements, including timing of reporting, of the NSW State Government approval dated 22 January 2013 (Application 11_0047_ and this approval. The Offset Management Plan and the Rehabilitation management plan need to be substantially integrated for achieving biodiversity objectives for the rehabilitated mine-site.	Noted					
EPBC 2011/2013	28	The person taking the action must undertake rehabilitation to ensure the final landform provides the optimum opportunity for the successful restoration of native forest and woodland including the critically endagered White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland ecological community.	Noted, not yet able to be verified but mineplanning reflects this rquirement	Not Applicable				
EPBC 2011/2013	28	Note: for consistency, the proponent may develop a single mine rehabilitation plan to align with the requirements of the NSW Governmeent and this approval. The Offset Management Plan and the Rahbilitation managemenet Plan need to be substatially integrated for achieving biodiversity objectives for the rehabilitated mine-site.	Noted					
EPBC 2011/2013	29	The person taking the action must undertake rehabilitation to ensure the final void and landform minimises the extent od any resulting pit lake, avoids salt scalding and ensures that drained waters do not adversely affect the downstream environment and avoids any impacts on **matters of national environmental significance.**	Noted. Final void management plan not triggered yet					
EPBC 2011/2013	29	Note: the State approval conditions for project 11_0047 require the preparation and implementation of a Final Void and Mine Closure Plan that considers interactions with the adjoining mines, including interaction between final voids, opportunities for integrated mine planning with adjoining mines to minimise environmental impacts, all reasonable and feasible landform options for the final void (including filling) and predicted hydrochemistry and hydrogeology (including long-term groundwater recovery and void groundwater quality).	Noted. Final void management plan not triggered yet					
	Survey data							

Reference	attached to th	Requirement	Evidence	Audit Finding	Risk			Responsibility
					Consequence	Likelihood	Risk	
EPBC 2011/2013	30	All survey data collected for the project must be recorded so as to conform to data standards notified from time to time by the **department.** When requested by the **department,** the proponent must provide to the **department** all species and ecological survey data and related survey information from ecological surveys undertaken for matters of national environmental significance. This survey data must be provided within 30 business days of request, or in a timeframe agreed to by the **department** in writing. the **department** may use the survey data for other purposes.	No evidence of compliance with the required survey standards	Not Compliant Administrative				
EPBC 2011/2013	30	In the event that any additional **matters of national environmental significance** are recorded within the **project area** and a significant impact on the matter/s is likely, the **department** must be notified in writing within 14 days of the matter/s being recorded. In accordance with conditon 36, the Minister may request that the person taking the action revise any relevant plans to ensure better protection of the relevant matter/s.	Noted, no such incidents to date	Not Applicable				
	Reporting and auditing							
EPBC 2011/2013	31	Within 14 days after the **commencement of construction,** the person taking the action must advise the **department** in writing of the actual date of **commencement of construction.**	Letter dated 26-03-14, construction commenced 12-3-14	Compliant				
EPBC 2011/2013	32	By the end of March of each year after the commencement of the action, the person taking the action must publish a report on their website addressing compliance with the conditions of this approval over the previous 12 months, including implementation of any management plans as specidied int he conditions. Non-compliance with any of the conditions of this approval must be reported to the **department** at the sane time as the compliance report is published.	Not yet due	Not Applicable				
EPBC 2011/2013	33	Upon the direction of the **Minister,** the person taking the action must ensure that an independent audit of compliance with the conditions of approval is conducted and a report submitted to the **Minister.** The independent auditor must be approved by the **Minister** prior to the commencement of the audit. Audit criteria must be agreed to by the **Minister** and the audit report must address the criteria to the satisfaction of the **Minister.**	No such direction to date	Not Applicable				
EPBC 2011/2013	34	If the person taking the action wishes to carry out any activity otherwise than in accordance with the plans, as specified in the conditions, the person taking the action must submit to the **department** for the **Minister's** written approval a revised version of that plan. The varied activity shall not commence until the Minister has approved the revised plan in writing. The **Minister** will not approve a revised plan, unless the revised plan would result in an equivalent or improved environmental outcome. If the **Minister** approves the revised plan that plan must be implemented in place of the plan originally approved.	No such request submitted in the audit period	Not Applicable				
EPBC 2011/2013	35	If the **Minister** believes that it is necessary or convenient for the better protection of listed threatened species and communities or listed mogratory species to do so, the **Minister** may request that the person taking the action make specified revisions to the management plan specified in the conditions and submit the revised plan for the **Minister's** written approval. The person taking the action must comply with any such request. The revised approved plan must be implemented. Unless the **Minister** has approved the revised plan then the person taking the action must continure to implement the originally approved plan, as specidied in the conditions.	This has not occurred in the audit period	Not Applicable				

Reference	attached to th	Requirement	Evidence	Audit Finding	Risk			Responsibility
					Consequence	Likelihood	Risk	
EPBC 2011/2013	36	If, at any time after 5 years from the date of this approval, the person taking the action has not **substantially commenced the action,** then the person taking the action must not substantially commence the action without the written agreement of the **Minister.**	Not 5 years since the approval.	Not Applicable				
Publication of plans								
EPBC 2011/2013	37	The person taking the action must maintain accurate records substantiating all activities and outcomes associated with or relevant to the above conditions of approval, including measures taken to implemenet the management plans required by this approval, and make them available upon request to the **department.** Such records maybe subject to audit by the **department** or an independent auditor in accordance with section 458 of the *Environment Protection and Biodiversity Conservation Act 1999,* or used to verify compliance with the conditions of approval. Summaries of audits will be posted on the **department's** website. The results of audtis may also be publicised through the general media.	Noted no such request or audit occurred in the audit period.	Not Applicable				
EPBC 2011/2013	38	Unless otherwise agreed to in writing by the **Minister,** the person taking the action must publish all management plans referred to in these conditions of approval on their website. Each management plan must be published on the website within 1 month of being approved.	The Willeroi BOMP is not approved	Not Applicable				

Reference	Clause	Requirement	Evidence	Audit Finding	Risk			Responsibility
					Consequence	Likelihood	Risk	
	WHC_PLN_TAR_Environmental Management Strategy							
	4.2 Training and Competancies							
EMS	4.2	All training, competency assessment and maintenance of training records in relation to this EMS must be conducted in accordance with the requirements of the Tarrawonga Coal Mine's Training and Competency Management Plan.	Noted, see induction	Compliant				
EMS	4.2	The Training and Competency Management Plan defines the induction and training requirements for each classification of employee based on the type of work and the work environments that each classification is exposed to.	Noted, see induction	Compliant				
	4.3 Tarrawonga Coal Mine Internal Communication							
EMS	4.3	Communication of information related to this EMS must be conducted and recorded in accordance with the requirements of the Whitehaven's Information and Communication Arrangements Standard.	Noted, see induction	Compliant				
	4.4 EMS Monitoring and Corrective Action							
	4.4.1 Audits							
EMS	4.4.1	The audit process and the completion and retention of audit records will be conducted in accordance with the requirements of the Whitehaven Audit and Review Standard.	Noted, see induction	Compliant				
EMS	4.4.1	The Environmental Officer will ensure that an internal audit of this EMS is conducted every 2 years and that an external audit is carried out at intervals outlined in PA 11_0047.	The EMS has not been audited lately but a new EMS has been developed in accordance with the latest approval for the site	Compliant				
	4.4.2 Reviews							
EMS	4.4.2	The review process and the retention of review records will be conducted in accordance with the requirements of the Audit and Review Standard. The Environmental Manager will ensure that a review of this EMS is conducted every 2 years, and following any event based trigger identified in the Audit and Review Standard that is relevant to the implementation of this EMS.	See above, there is no process for recording reviews so ther eis no evidenc eof a review being conducted, the document has been regularly revised	Compliant				
	4.4.3 Plan Monitoring							
EMS	4.4.3	In addition to the formal means of monitoring the performance of this EMS by scheduled audit and review, every person who performs a function defined by this EMS also has a responsibility to monitor the performance of this EMS and to bring to the attention of the Environmental Manager any non conformance, deviation or potential improvement of which they may become aware.	Noted, see induction	Compliant				
	4.4.4 Corrective Action							
EMS	4.4.4	Where monitoring of this EMS identifies the need for corrective action to be taken, the Environmental Manager will prepare a corrective action plan. Preparation of the plan may require the assistance of internal and external specialists. Details on the preparation of the corrective action plan will be included in the relevant AEMR/Annual Review and EPL Annual Return where relevant.	Noted, no requirement for this in the audit period	Compliant				
	4.5 Document Control							

Reference	Clause	Requirement	Evidence	Audit Finding	Risk			Responsibility
					Consequence	Likelihood	Risk	
EMS	4.5	This EMS will be maintained in accordance with the mine's document control system: • The master copy will be maintained electronically on the mine server; • Where alterations to the Plan are required, such as following formal review, the Document Controller will update the master copy and notify the Document Owner of the alteration; and • The Document Controller will be the only person with access to the master copy for the purpose of making alterations.	Noted					
EMS	4.5	Copies of the Plan printed from the mine server must be considered to be uncontrolled copies.	Noted					
	4.6 Retention of Records							
EMS	4.6	The assigned persons will ensure this EMS and associated records are retained on file at the mine for a period of at least 5 years.	Noted, EMS is over 5 years old and a copy is on the website					
	4.7 Information Dissemination, Complaints and Incident Management and Dispute							
	4.7.1 Information Dissemination							
EMS	4.7.1	TCPL is committed to a policy of community membership and a sense of mine ownership by employees and local community members, and will undertake a program of regular liaison/contact with local residents, landowners and the broader community to inform them of the mine's progress. Such a program will also provide an opportunity to discuss issues of "concern" which residents are reticent to register as complaints.	This occurs see consultation comments elsewhere in this audit	Compliant				
EMS	4.7.1	All such liaison/contacts/comments will be documented.	This occurs see consultation comments elsewhere in this audit	Compliant				
EMS	4.7.1	Dissemination of information to the local community and relevant agencies regarding the mining operation, its progress and environmental management performance, will be achieved by both formal and informal means including the following.	Noted					
EMS	4.7.1	The CCC will comprise an independent chair and appropriate representation from Tarrawonga Coal, Narrabri Shire Council, Gunnedah Shire Council and the local community.	This occurs see consultation comments elsewhere in this audit	Compliant				
EMS	4.7.1	The committee will act as local focal points for the provision of information to, and receipt of comments from, community members. CCC meetings will be held at least four times per year. TCPL representatives will provide advice on the status of construction activities, the mine's progress, environmental performance and monitoring results and complaints. The CCC meetings will also act as a forum for discussion of each of the above aspects or any other issue brought up by members of the community through the CCC representatives, or directly with the Tarrawonga Coal Mine.	CCC Minutes on web indicate site consistently hits this target	Compliant				
EMS	4.7.1	The minutes of the CCC meetings will be available on the Whitehaven website (www.whitehavencoal.com.au). In addition to their tabling at CCC meetings, relevant environmental monitoring results pertaining to individual landholders will be provided on request, and all results will be available for public examination on the Whitehaven website.	This is the case	Compliant				

Reference	Clause	Requirement	Evidence	Audit Finding	Risk			Responsibility
					Consequence	Likelihood	Risk	
EMS	4.7.1	Tarrawonga Coal Mine will provide the opportunity for the CCC and local residents, landholders, schools and community groups to visit the mine, as well as maintaining an open door policy for interested local residents, where practically possible. The extent of visitation to the site will ultimately be governed by ensuring site standards for safety are maintained at all times.	It has been some time since there was a site visit minuted in the CCC Minutes but there was evidence of requests for visits and the EO confirmed that some site inspections had taken place.	Compliant				
EMS	4.7.1	Copies of all management plans/strategies or monitoring programs, together with the results of independent audits undertaken in accordance with PA 11_0047 will also be provided to the CCC and the Councils, and made publicly available on the Whitehaven website.	These are on the website and provided to the CCC. No evidence that they are provided to Councils	Not Compliant Administrative				
EMS	4.7.1	Each year, TCPL will prepare an AEMR/Annual Review which will address both the ML and Project Approval conditions as follows:	This occurs	Compliant				
EMS	4.7.1	• Contain a review and forecast of performance for the preceding and ensuing twelve months in terms of: o the accepted Mining Operations Plan; o development consent requirements and conditions; o Department of Environment and Conservation (now EPA) and Department of Planning (now DoPI) licences and approvals; o any other statutory environmental requirements; o details of any variations to environmental approvals applicable to the lease area; and o where relevant, progress towards final rehabilitation objectives.	The AEMR contains these items	Compliant				
EMS	4.7.1	• Describe the development (including any rehabilitation) that was carried out in the past year, and the development that is proposed to be carried out over the next year;	The AEMR adresses this	Compliant				
EMS	4.7.1	• Include a comprehensive review of the monitoring results and complaints records of the development over the past year, which includes a comparison of these results against: o the relevant statutory requirements, limits or performances measures/criteria; o the monitoring results of previous years; and o the relevant predictions in any EIS or EA of the development;	The AEMR adresses this	Compliant				
EMS	4.7.1	• Identify any non-compliance over the last year, and describe what actions were (or are being) taken to ensure compliance;	The AEMR adresses this	Compliant				
EMS	4.7.1	• Identify any trends in the monitoring data over the life of the development;	Life of mine data is presented but comentary is negligable. **Recommendation - more detailed analysis of the life of mine environmental monitoring data trends would help the public and other stakeholders understand the sites impacts.**	Compliant				
EMS	4.7.1	• Identify any discrepancies between the predicted and actual impacts of the development, and analyse the potential cause of any significant discrepancies; and	Comparisons with EA in the AEMR	Compliant				
EMS	4.7.1	• Describe what measures will be implemented over the next year to improve the environmental performance of the development.	This is included	Compliant				

Reference	Clause	Requirement	Evidence	Audit Finding	Risk			Responsibility
					Consequence	Likelihood	Risk	
EMS	4.7.1	The AEMR/Annual Review will also address the matters identified in the DRE document entitled "Guidelines to the Mining, Rehabilitation and Environmental Management Process".	Noted, the AEMR is reviewed by DRE	Compliant				
EMS	4.7.1	The AEMR/Annual Review will be provided to both NSC and GSC, relevant agencies and to the CCC members and also made available to the public on Whitehaven's website.	No evidence of provision of these reports to Councils	Not Compliant Administrative				
EMS	4.7.1	Visits by relevant government agencies, e.g. EPA, DRE and DoPI, to inspect the mine site and verify Tarrawonga Coal's performance will be documented together with the provision of reports or information as requested.	This occurs, evidence sighted	Compliant				
EMS	4.7.1	TCPL will maintain regular formal and informal contact with relevant government agencies.	This occurs	Compliant				
EMS	4.7.1	TCPL will provide reports to relevant government agencies in the event of non-compliance or a potential non-compliance with respect to statutory criteria or guidelines.	Only one identified non-compliance in the audit period, evidence of communication with EPA provided along with hanged report and revised EPL	Compliant				
EMS	4.7.1	In addition to the above, Tarrawonga Coal may also utilise the local press to present feature articles on the mine's progress. Other forms of communication with the community will include the provision of newsletters to the landholders around the mine site, with copies made available at the Council offices and on the Whitehaven website. These newsletters will provide updates as to site developments and will be issued generally every 6 months or following specific events at the site for which community updates are warranted.	On website Newsletters not sent to to Council	Not Compliant Administrative				
	4.7.2 Complaints Management							
EMS	4.7.2	A complaints management protocol has been developed to ensure an appropriate and consistent level of reporting, response and follow-up is adopted by Tarrawonga Coal. At a minimum, the following complaints management protocol will be followed on all complaints received: • A publicly advertised telephone complaints line will be in place to receive complaints during operating hours and record complaints at other times.	See complaints elsewhere	Compliant				
EMS	4.7.2	• Each complaint received will be recorded on a Complaints Register, which will include the following details: o The date and time of complaint. o Any personal details the complainant wishes to provide or if no such details are provided a note to that effect. o The nature of the complaint. o The action taken by TCPL in relation to the complaint, including any follow-up contact with the complainant. o If no action was taken by TCPL, the reason why no action was taken.	See complaints elsewhere	Compliant				
EMS	4.7.2	• The Environmental Manager will be responsible for ensuring that an initial response is provided within 24 hours of receipt of a complaint (except in the event of complaints recorded when the mine is not operational).	See complaints elsewhere	Compliant				
EMS	4.7.2	• The cause of the complaint and any required remedial actions identified.	See complaints elsewhere	Compliant				

Reference	Clause	Requirement	Evidence	Audit Finding	Risk			Responsibility
					Consequence	Likelihood	Risk	
EMS	4.7.2	• Additional measures will be undertaken as required to address the complaint. This may include visiting the complainant, or inviting the complainant to the mine site.	See complaints elsewhere	Compliant				
EMS	4.7.2	• Once the identified measures are undertaken, the Environmental Manager will sign off on the relevant complaint within the Complaints Register.	See complaints elsewhere	Compliant				
EMS	4.7.2	• If necessary, the Environmental Manager will follow-up to confirm the source of the complaint is adequately mitigated.	See complaints elsewhere	Compliant				
EMS	4.7.2	• A copy of the Complaints Register will be kept by TCPL and made available to the CCC and the complainant (on request). A summary of complaints received every 12 months will be provided to DoPI, GSC, NSC, EPA, DRE and the CCC through the AEMR.	See complaints elsewhere	Compliant				
	4.7.3 Incident Management							
EMS	4.7.3	In addition to the protocol for complaints management, environmental incidents at the mine will be managed in accordance with the site's Emergency Management System and categories of environmental incidents will be determined using Whitehaven's Risk Matrix. Environmental incidents will be reported using Whitehaven's Incident Report Form and forwarded immediately to the Environmental Manager. Any corrective/preventative actions identified as a result of the incident will be implemented by the Environmental Manager in accordance with Section 4.4.4. The Tarrawonga site also operates in accordance with the requirements of its Pollution Incident Response Management Plan as required under the provisions of the Protection of the Environment Operations Act.	See incident management elsewhere	Compliant				
	4.7.4 Dispute Resolution							
EMS	4.7.4	In the event that any complainant does not consider Tarrawonga Coal's response or reactions adequately address their concerns, the following procedure will be adopted: 1. A meeting will be convened with the Environmental Manager, Manager Community Relations and/or Operations Manager to seek resolution of the matter. The complainant will be provided with a written response from Tarrawonga Coal detailing the results of investigations to date and the agreed actions to be taken in respect of the measures to be implemented.	This has not occurred in the audit period	Not Applicable				
EMS	4.7.4	2. Upon implementation of the nominated measures, a further meeting will be convened to seek advice of satisfaction or otherwise as to the outcomes.	This has not occurred in the audit period	Not Applicable				
EMS	4.7.4	If, after 21 days following Steps 1 and 2, the complainant believes the matter remains unresolved and no further agreement can be reached as to additional measures to be undertaken, the matter will be referred to DoPI (and the relevant authority) for investigation and action as appropriate.	This has not occurred in the audit period	Not Applicable				
	4.8 Response to Non-Compliance							
EMS	4.8	Compliance with all approvals, plans and procedures will be the responsibility of all personnel (staff and contractors) employed on or in association with the mine, and will be developed through promotion of mine ownership under the direction of the Operations Manager and Environmental Manager.	Noted					

Reference	Clause	Requirement	Evidence	Audit Finding	Risk			Responsibility
					Consequence	Likelihood	Risk	
EMS	4.8	The Environmental Manager or Environmental Officer and/or Operations Manager will undertake regular inspections, internal audits and initiate directions identifying any remediation/rectification work required, and areas of actual or potential non-compliance, with all directions provided to the relevant party in writing and/or diarised.	EO inspection checklist sighted, completed copies provided	Compliant				
EMS	4.8	Any non-compliance with regulations, licences or approvals will be reported to the relevant authority, together with details of the corrective actions taken to avoid future occurrences. Areas of potential non-compliance which have the potential to cause environmental harm or result in complaints will also be reported to the relevant authority	This has occurred.	Compliant				
EMS	4.8	Non-compliances with the requirements of the mine's EPL will also be reported in each EPL Annual Return.	these are reported in the annual return	Compliant				
EMS	4.8	A review of the mine's compliance with all conditions of PA 11_0047, ML 1579, EPL 12365 and all other approvals and licences will be undertaken prior to (and included within) each AEMR/Annual Review submitted to the Director-General and DRE. The AEMR will also be provided to Council, relevant agencies, the Community Consultative Committee (CCC) and to the public on Whitehaven's website.	This is done, but not for all approvals and licenses, water licences and EPBC approval not covered.	Not Compliant Administrative				
EMS	4.8	Additionally, an independent environmental audit will be undertaken a minimum of once every three years (commencing in June 2014) and the report submitted to the DirectorGeneral, Narrabri and Gunnedah Shire Councils, all relevant authorities and made available to the public on Whitehaven's website. The independent audit will be undertaken by an appropriately certified auditor in accordance with AS/NZS ISO 19011:2003 "Guidelines for Quality and/or Environmental Management Systems Auditing" or equivalent updated versions of these guidelines. A copy of all publicly available documents will be placed on Whitehaven's website.	This audit	Compliant				
	4.9 Response to Emergencies							
EMS	4.9	As part of routine mine operations, TCPL will undertake risk assessments to identify the risk probability and consequences of the proposed activities and aspects of the operation, the adequacy of existing controls to contain the hazards and, where identified as deficient, propose additional controls to further manage or eliminate hazards.	Noted					
EMS	4.9	The existing Emergency Management System developed for the mine which, though primarily prepared in accordance with OH&S requirements, extends to environmental emergencies.	Noted					
EMS	4.9	Although there are specific procedures for individual situations, all incorporate three basic steps: 1. Notification of the emergency (internal and/or external); 2. Protection of personnel as a first priority; and 3. Protection of the environment, plant and equipment.	No environmental emergency notifications .	Not Applicable				
EMS	4.9	Any emergency situations or incidents, which do or could potentially have caused environmental harm, will be reported to the EPA and other relevant authorities in accordance with the requirements of the sites Pollution Incident Response Management Plan	Only one identified non-compliance in the audit period, evidence of communication with EPA provided along with changed report and revised EPL. No risk of harm to the environment	Compliant				

Reference	Clause	Requirement	Evidence	Audit Finding	Risk			Responsibility
					Consequence	Likelihood	Risk	
EMS	4.9	All site personnel will be trained in situation recognition and emergency response procedures, with regular updates through tool box talks.	This is part of the Pegasus induction competed offsite. It was not possible to verfiy this information during the audit.	Not Applicable				
	5 Environmental Performance							
EMS	5	The success of TCPL's environmental performance will be assessed by way of its satisfaction of the conditions of PA 11_0047, Conditions of Authority appended to the Mining Lease, and conditions within the EPL, other approvals, licences or leases. This, in turn, will be measured by way of achievement of key performance outcomes and satisfaction of TCPL's objectives with respect to the management of: • Aboriginal cultural heritage; • Biodiversity; • Surface and groundwater; • Soil resources; • Bushfire; • Air quality; • Noise and blasting; • Visibility; • Waste; • Rehabilitation; and • Socio-economic issues.	Noted, assessed throughout this document	Not Applicable				
EMS	5	The assessment of performance, which may be quantitative and/or qualitative, will be reported in each relevant AEMR/Annual Review.	AEMRs provide this information	Compliant				
EMS	5	TCPL's objectives and key performance outcomes with respect to each of the above areas, with the key performance outcomes being used as a means by which Tarrawonga Coal and others can assess progress towards the achievement of the nominated objectives. Specific monitoring programs, either those developed in satisfaction of the development consent or other leases, licences or approvals (or others developed independently by Tarrawonga Coal), will be progressively appended to this document and updated as warranted.	Noted					
	5.1 Continuous Improvement							
EMS	5.1	TCPL will investigate and implement ways to improve the environmental performance of the project over time. This will be achieved by keeping abreast of best environmental management practices in the industry and reporting on environmental performance annually in the AEMR/Annual Review. Stakeholder feedback will form an integral part of assessing environmental performance and assist in outlining measures for continuous improvement.	Noted					

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
	Environmental Monitoring Program						
	2 Consent Requirements						
Environmental Monitoring Program	2	Consultation, with relevant government agencies as required by Condition 6(3), was undertaken as part of the preparation of the monitoring programs from which the EMonP provides a consolidated summary. These monitoring programs have been approved by the Director-General of the Department of Planning.	Noted				
	3 Environmental Monitoring Program						
Environmental Monitoring Program	3	Presented in tabular form, the following program consolidates monitoring commitments made in the following documents;	Noted				
Environmental Monitoring Program	3	• Air Quality Management Program	Noted				
Environmental Monitoring Program	3	•Archaeology and Cultural Heritage Management Plan	Noted				
Environmental Monitoring Program	3	• Blast Monitoring Program	Noted				
Environmental Monitoring Program	3	• Flora and Fauna Management Plan	Noted				
Environmental Monitoring Program	3	• Noise Monitoring Program	Noted				
Environmental Monitoring Program	3	• Road Noise Management Plan	Noted				
Environmental Monitoring Program	3	• Site Water Management Plan	Noted				
Environmental Monitoring Program	3	• Transport Route Management Plan	Noted				

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
	WHC_PLN_TAR_Noise Management Plan						
	2 Noise Impact Assessment Criteria						
Noise Management Plan	2.1	Except for the land referred to in Table 1, the Proponent shall ensure that operational noise generated by the project does not exceed the criteria in Table 2 at any residence on privately owned land. *Table 2: Noise Criteria dB(A)* Location: All privately-owned land — Day, Evening and Night $L_{Aeq\ (15\ min)}$: 35 — Night $L_{A1\ (1\ Min)}$: 45 Notes: • Operational noise includes noise from the mining operations and the use of private roads and rail spurs. • Noise is to be measured in accordance with the relevant procedures and exemptions (including certain meteorological conditions) of the NSW Industrial Noise Policy.	AEMR 2012-2013 included the following information: 3.10.3.2 June 2012 Noise Monitoring - Attended Noise monitoring was undertaken from the 25th to 27th June 2012. Monitoring was undertaken at "Bollol Creek Station" (N2), "Pine Grove", "Tarrawonga" (N3) and "Ambardo" (N4) properties. TCM did not exceed the operational noise criterion at either of the "Bollol Creek / Templemore", "Ambardo" or "Pine Grove" monitoring locations during the survey. However, TCM were in excess of the operational noise criterion at the Tarrawonga monitoring location during the evening and night of both June 26th and June 27th. THIS IS OUTSIDE THE AUDIT PERIOD	Compliant			
	2.2 Noise Acquisition Criteria						
Noise Management Plan	2.2	Upon receiving a written request for acquisition from an owner of the land listed in Table 1, the Applicant shall acquire the land in accordance with procedures in Conditions 8 – 9 of Schedule 4. • Properties 43, 44 and 45 also have acquisition rights under the approval for the Boggabri Coal mine, and/or the existing consent (DA 88-4-2005) for the Tarrawonga Mine. The Proponent may acquire these properties on an equitable basis with the owner of Boggabri mine • For the single purpose of acquisition under this condition, parcels of land that are in close proximity and operated as a single agricultural enterprise should be included as part of the land to be acquired. Where the Proponent and the owners(s) cannot agree on whether non contiguous parcels of land should be included, either party may refer the matter to the Director-General for resolution. The Director-General's decision as to the lands to be included for cquisition under the procedures in conditions 8 and 9 of Schedule 4 shall be final.	AEMR 2012-2013 included the following information: Of the properties identified in Table 1 from the Project Approval, properties 43, 44, 45 and 47 have now been acquired by either Tarrawonga or Boggabri Coal. Preliminary discussions have been held with property 49 in relation to their rights for acquisition.	Compliant			
Noise Management Plan	2.2	If the owner(s) of a privately owned residence, that is not listed in Table1, have reason to believe that operational noise from the project is causing the criteria in Table 2 to be exceeded at the residence, the owner(s) can request an independent noise impact assessment for the residence. The request shall be made in writing to the Director General. If the Director General considers that a noise impact assessment is warranted, then the Proponent shall commission the assessment.	Noted	Noted			
	3 Noise Controls and Management Procedures						

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Noise Management Plan	3	Management measures to be implemented to manage noise impacts on surrounding residents will include: • Noise monitoring on-site and within the community;	Attended noise Monitoring reports dated Jul 2013, Oct 2013, December 2013 and Mar 2014 by Spectrum Acoustics	Compliant			
Noise Management Plan	3	• Prompt response to any community issues of concern or complaints;	Complaints register includes noise related complaints lodged on 9/04/2014, 7:48am; 22/04/2014, 6:10pm; 8/04/2014, 4:15pm. Environmental Superintendent responded via email advising that the site Environmental Officer would contact the complainant to arrange a meeting to discuss the issues. Register does not include any information on follow up action taken to resolve the issue.	Compliant			
Noise Management Plan	3	• Refinement of on-site noise mitigation measures and mine operating procedures, where it is identified through monitoring that prevailing weather conditions are impacting on capacity to comply with noise criteria;	AEMR 2012-2013 reported the following complaint: Phone call to Environmental Manager 10/07/2012, 12:05pm Complaint received in relation to a blast held at Tarrawonga at 12:02pm. Blast shook the complainant's house. Written advice was issued to the complainant advising that the blast was compliant. An offer was made to place a blast monitor at the complainant's property when similar weather conditions are present.	Compliant			
Noise Management Plan	3	• Discussions with relevant landowners to assess concerns;	No discussions to date - noise complaints generally from one complainant how historically has had discussions and is seeking acquisition.	Compliant			
Noise Management Plan	3	• Implementation of private noise agreements, where acceptable to the impacted landholder, with the terms of the agreement provided to the DPE and EPA;	Noted	Not triggered			
Noise Management Plan	3	• Implementation of feasible and reasonable acoustical mitigation at receivers (which may include window glazing, insulation and/or air conditioning), where an independent noise impact assessment conducted under the terms of the Project Approval identifies systemic exceedances of the noise criteria, and the landowner requests such measures; and	None done to date. No knowledge of any requests to site for mitigation apart from acquisition.	Not triggered			

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Noise Management Plan	3	• Acquisition of the property where an independent noise impact assessment conducted under the terms of the Project Approval identifies systemic exceedances of the noise criteria, and the landowner requests acquisition. Acquisition would be undertaken in accordance with the terms of the Project Approval.	Not triggered, all acquisitions have been my agreement not driven by exceedences	Not Applicable			
Noise Management Plan	3	A continuous noise monitor will be installed at relevant reference locations to assist with noise management and enable real-time noise controls to be implemented. The continuous noise monitor is trailer mounted and can subsequently be relocated to appropriate positions depending upon prevailing conditions at the time. Preference will be given to locating the continuous noise monitor at or near locations most likely to be impacted by noise from the operation that are not subject to acquisition rights in the Project Approval.	AEMR 2012-2013 included the following information: In accordance with the requirements of PA 11_0047 and EPL 12365, TCPL undertook real time noise monitoring during the reporting period. Monitoring was confined to the "Northam" and "Kyalla" properties as well as project related properties "Templemore" and 'Blair Athol". During this period, Tarrawonga Coal has refined its procedures in relation to the real time noise monitoring.	Compliant			
	3.1 General and Specific Noise Mitigation measures						
Noise Management Plan	3.1	A number of general noise management measures will continue to be undertaken, including: • Mining operations are permitted to be undertaken 24 hours 7 days per week. Actual operating hours may vary from time to time depending on production requirements. At all times, operational activities will give appropriate consideration to prevailing conditions to minimise potential for noise levels to exceed the relevant criteria. This will be managed by the use of predictive forecasts in mine planning and the use of real time noise monitoring to enable reactive management to noise levels which may include relocation of equipment in pit to avoid impacts as well as stand down of equipment where noise limits associated with mining activities cannot be met.	Predicitive forecasts not yet as good as they could be but are being implemented and used.	Compliant			
Noise Management Plan	3.1	• Tarrawonga maintains a real time weather monitoring system which provides relevant meteorological conditions that may impact on noise propagation. The weather station monitors all parameters consistent with EPL requirements, including sigma theta. In addition to the Tarrawonga weather station, site can access temperature data from the Boggabri Coal communications tower (sensor at 50m), which provides additional relevant detail for site in terms of inversion impacts.	Noted	Noted			

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Noise Management Plan	3.1	• Contractors, including all personnel and sub-contractors, will undergo environmental training on noise control and awareness via the generic induction process. Any contractor or subcontractor whose work is likely to create loud noise will be given more detailed guidance on the site's noise criteria and noise management requirements.	Inductions checklist for contractors indictes that this is done.	Compliant			
Noise Management Plan	3.1	• The Sound Power Levels of mobile mining equipment will be tested annually in accordance with International Standards Organisation (ISO) 6395:1988 "Acoustics – Measurement of exterior noise emitted by earth-moving machinery – Dynamic test conditions". Equipment will be required to have noise levels that do not exceed the Sound Power Levels listed in Table 6-2 of the Noise Impact Assessment (see Appendix 2) from the Tarrawonga Extension Project EA. Any equipment found defective or not meeting the required sound power level will not be permitted to operate on site.	Spectrum reports, this work is done, there was no evidence of exceedance of the Noise Impact Assessment SPLs and so no way to determine whether any equipment had been prevented form operating.	Compliant			
Noise Management Plan	3.1	• Any new trucks, dozers, drills or excavators purchased for the Tarrawonga operation will be acquired as sound suppressed equipment.	No new purchases	Not Applicable			
Noise Management Plan	3.1	• Site equipment selection will require equipment to achieve sound power levels specified in Table 6-2 of the Noise Impact Assessment for the Tarrawonga Extension Project EA, and equipment will be maintained in good order.	No new purchases	Noted			
Noise Management Plan	3.1	• Personnel and contractors will be required to pay due attention to adverse weather conditions and make modifications to the work program where necessary.	Noted, see adverse conditions procedure	Compliant			

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Noise Management Plan	3.1	• All complaints will be managed as outlined in Section 5.2.	Section 5.2 includes: • Each complaint received will be recorded on a Complaints Register, which will include the following details: o The date and time of complaint. o Any personal details the complainant wishes to provide or if no such details are provided a note to that effect. o The nature of the incident that led to the complaint. o The action taken by TCPL in relation to the complaint, including any follow-up contact with the complainant. o If no action was taken by TCPL, the reason why no action was taken. Complaints register includes noise related complaints lodged on 9/04/2014, 7:48am; 22/04/2014, 6:10pm; 8/04/2014, 4:15pm. Environmental Superintendent responded via email advising that the site Environmental Officer would contact the complainant to arrange a meeting to discuss the issues. Register does not include any information on follow up action taken to resolve the issue but evidence of the follow up was provided in the form of an email to the complainant and a response in return agreeing to a meeting.	Compliant			
Noise Management Plan	3.1	• Monitoring of emitted noise levels will be undertaken during mining operations to verify compliance with noise criteria and to assess the need, if any, for additional noise attenuation measures.	Noted, real time unit tin place to support acoustics management	Noted			
Noise Management Plan	3.1	Where feasible and reasonable, operations have been modified to reduce noise emissions and include: • Installation of an earth bund on the southern side of exposed sections of the services corridor (ROM coal haul road to the Boggabri Coal Mine). This will not occur over the next 2 year term as it is reliant on construction of infrastructure at Boggabri Coal;	Noted, the two year period is not yet complete	Not Applicable			
Noise Management Plan	3.1	• A reduction in the number of mobile fleet items operating during the evening and night time periods where measured noise levels (real time monitoring) indicate likely exceedance of noise criteria. Based on the noise assessment for the Tarrawonga site and review of real time noise data, the key items of plant contributing to the potential for noise exceedance comprise dump trucks operating on the southern emplacement. The reduction in operating fleet would be based on actual noise measurement, preliminary review of site operations to determine if alternate operating locations are available, followed by stand down of equipment if necessary. Over the next 3 years, the key development area comprises the northern extension, which in effect is further removed from the Tarrawonga sensitive receivers located to the south. When operating on the southern emplacement during night time or adverse weather conditions, specific review of noise levels will be undertaken to ensure compliance is maintained; and	Confirmed in interviews	Compliant			

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Noise Management Plan	3.1	• Modified alignment of haul routes to reduce their exposure relative to nearby receivers. The key component of this strategy is to reduce exposure from the dump trucks hauling to the northern emplacement via a haul road located at the southern end of the emplacement area. A northern haul road is now also available, so in circumstances where noise levels approach compliance criteria, an alternate haul road is available. This northern haul road will also become more relevant as the northern extension area is developed.	Confirmed in interviews	Compliant			
Noise Management Plan	3.1	The controls and management procedures will be reviewed in response to the results of noise monitoring, complaints or comments identified through TCPL's consultation effort. Any changes made will be noted as part of annual environmental reporting in the AEMR/Annual Review.	Noted, no changes noted in the AEMRs reviewed for this audit. No evidence of reviews, as mentioned elsewhere, reviews require better documentation. (Recommendation made elsewhere)	Not Applicable			
	3.2 Cumulative Noise Mitigation Measures						
Noise Management Plan	3.2	TCM has been in consultation with the nearby Boggabri Coal Mine and Maules Creek Project in developing a Leard Forest Mining Precinct Noise Management Strategy in order to minimise cumulative impacts of mine generated noise on the surrounding community. The Strategy has been submitted to the Department of Planning and Environment (DPE) for approval. Once approved, the Strategy will be appended to this Plan.	Noted, the strategy is waiting approval	Not Applicable			
Noise Management Plan	3.2	Currently, TCM, Boggabri Coal and the Maules Creek Project participate in monthly meetings to discuss cumulative noise impact management measures.	Noted	Noted			
Noise Management Plan	3.2	The intention of the cumulative noise mitigation measures is to utilise an array of noise monitoring equipment utilised by each site to measure noise levels, with a process to apportion noise source for appropriate response. This plan will include agreed access to real time data, use of predictive forecast information to inform development of mine plans and a response protocol in the event of a triggered exceedance and/or community complaint.	Noted	Noted			
Noise Management Plan	3.2	As recommended in the BTM Complex Air Quality Management Strategy, a predictive forecast meteorology system is proposed based on the Weather Research & Forecasting (WRF) model and CALMET, specifically for the BTM complex, and a website will be developed to make data immediately available for sites, with half hourly forecasts up to 48 hours in advance. This system will download global meteorological data and forecasts on a daily basis and will indicate which receiver groups may be subjected to noise-enhancing meteorological conditions	A predicitve forecast system used but it could be from better data sources, the Strategy is not yet approved and implemented.	Not Applicable			

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Noise Management Plan	3.2	Once the meteorological system is configured and operating, the outcomes will be evaluated by a competent meteorologist or atmospheric science professional against actual meteorological measurements and the meteorological system will be validated and improved, where possible. It should be noted at the time of development of the Tarrawonga Noise Management Plan, the BTM complex strategy had not yet been approved, and consequently, the specific detail of the predictive forecast system may yet be subject to change. Under the BTM complex strategy, implementation of this system would be staged, with the predictive forecast component to be implemented post set-up of required noise monitoring equipment.	Noted. A predicitve forecast system used but it could be from better data sources, the Strategy is not yet approved and implemented.	Not Applicable			
	3.3 Noise Management Risk Assessment						
Noise Management Plan	3.2	A risk/response matrix has been developed for the site to identify risk associated with weather conditions that require specific action to mitigate potential noise impacts. The intent behind the risk/response matrix is to understand the prevailing wind conditions and stability strength of temperature inversions to then implement management practices accordingly to avoid subsequent noise impacts. The risk/response matrix has been developed based on colour coding and key operational and weather conditions. The Environmental Officer will be responsible for implementation of the risk/response matrix in consultation with the Operations Manager. Refer to Appendix 3 for further information regarding the noise impact risk matrix.	Noted	Noted			
Noise Management Plan	3.2	Whilst it is understood that under certain meteorological conditions, the noise compliance criteria do not apply, it is also acknowledged under the requirements of condition 12(b) that noise impacts from the project are minimised during these adverse conditions. The implementation of the real time monitoring network ensure site responsiveness to adverse conditions, with first response always targeting reduced noise levels by modified site operations. As previously mentioned, this occurs regardless of the meteorological conditions at the time.	Noted	Noted			
	4 Monitoring Program						
	4.1 Monitoring Activities						

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Noise Management Plan	4.1	Attended noise monitoring will be undertaken on a quarterly basis by an independent acoustic consultant for compliance purposes. All attended noise monitoring will be conducted in accordance with the NSW Industrial Noise Policy, AS 1055.1-1997 'Acoustics – Description and Measurement of environmental noise – General Procedures', and will expressly monitor the modification factors referred to in the NSW Industrial Noise Policy. Attended noise monitoring will be undertaken during day, evening and night time periods. It is noted that the inversion class to be applied to the project is Class G.	Spectrum Acoustics, ATTENDED NOISE MONITORING – MARCH 2014 Tarrawonga Coal Mine Boggabri, NSW stated: To determine compliance with the Leq (15 min) operational noise criteria the modification factors detailed in Section 4 of the NSW industrial Noise policy must be applied, as appropriate, to the measured noise levels.	Compliant			
Noise Management Plan	4.1	In order to actively manage noise emissions onsite and to adequately comply with the requirement for reactive noise control measures, TCPL will maintain, on site, a real time noise monitor equivalent to a Sentinex type, continuous noise management system. The real time system is not for compliance purposes but for operational management/proactive response to potential noise issues. The key features of a Sentinex type monitor are as follows: • Real time access to monitoring information; • Universal user interface platform (web browser); • Customised alarm settings; • Automatic daily reporting; • Streaming audio to PC; and • Continuous audio recording (.mp3).	Noted	Noted			
Noise Management Plan	4.1	This system will provide real time access to noise data, and provide the capacity to set the unit to a target noise goal. Upon noise emissions reaching the identified target level, an automated SMS message will be delivered to operational personnel on site which will trigger an investigation into the noise source, both through review of audio files, and on site knowledge of surface operations. Upon determination that the noise source is mine site related, active measures can be put in place to modify operations, or stand down the noise source to ensure compliance with noise criteria is maintained.	Noted, observed Barn-Owl interface	Noted			

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Noise Management Plan	4.1	The real time continuous noise management unit will be set to trigger an SMS alert to site personnel upon recording of a continuous noise source at 33dBA (low frequency filtered) for a period of 15 minutes. Upon the issue of the alert, site personnel will access the web interface of the real time noise management unit to identify the noise source and determine if it is project related. In the event that the noise source is identified as a low frequency, mine related noise, site personnel will closely monitor noise levels to verify if noise levels remain below threshold. In the event that a second SMS alert triggers within a 2 hour timeframe, is confirmed as mine related, and is indicative of noise levels increasing or trending to the compliance limit, the Environmental Officer and Operations Manager will investigate operational measures to ensure noise levels remain below 35dB(A). These operational measures may include, but will not be limited to, standing down of specific items of equipment, and or relocating equipment to alternate areas of the site, ie. discontinuing operations on the southern dump.	Noted, discussed with EO, reviewed real time outputs on computer screen	Noted			
Noise Management Plan	4.1	Attended monitoring will also be used to ensure calibration of the monitor and to provide specialist advice on monitoring outcomes on a quarterly basis.	Noted Spectrum Acoustics, ATTENDED NOISE MONITORING – MARCH 2014 Tarrawonga Coal Mine Boggabri, NSW stated: Field calibration is carried out at the start and end of each monitoring period.	Noted			
Noise Management Plan	4.1	In accordance with the requirements of the consent, TCM will seek validation of the tenth percentile methodology used in the noise impact assessment for the Tarrawonga Coal Project. This will be completed on an annual basis by the provision of a report from an appropriately qualified acoustical consultant, utilising the data obtained over a 12 month period from the monitoring program and providing a comparative assessment against the modelled predictions from the tenth percentile methodology. The outcomes of this review will be reported in the AEMR/Annual Review.	AEMR 2012-2013 stated: Wilkinson Murray has been engaged to undertake a validation of the tenth percentile methodology used in the noise modelling for Tarrawonga. This work was ongoing at the time of the Annual Report being released. The results will issue separately to the DoPI and EPA when available.	Compliant			
	4.2 Monitoring Locations						

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Noise Management Plan	4.2	The location of the real time monitor will be established in consultation with EPA, on the basis that it can be relocated on an as needs basis, based on prevailing weather conditions, community complaints/concerns, operations at site so as TCM has capacity to effectively measure noise levels at the most likely affected receiver. As part of the Leard Forest Precinct Noise Management Strategy, further discussions around the noise monitoring network will be initiated with Boggabri and Maules Creek. This will be done on the basis of identifying any potential monitoring measures that can address cumulative impacts and provide for streamlined monitoring and reporting for each operation.	Occurred prior to the audit period. Has been moved during the audit period, no auditable trail for consultation with EPA, done by phone (Lachlan Johnson).	Compliant			
	4.3 Monitoring Frequency						
Noise Management Plan	4.3	Noise monitoring frequencies are nominated in Table 2. If conditions on the day of monitoring are not suitable (ie. high winds, rain etc) then the monitoring event must be rescheduled to ensure ongoing compliance with monitoring frequency. Table 2 Noise Monitoring Summary with Roles and Responsibilities Type / Frequency / Responsibility / Comments Operational Noise Monitoring Attended noise monitoring / Quarterly / Suitably qualified acoustical consultant, in conjunction with Environmental Officer / Noise monitoring methodology provided in Section 4.1 Real time noise monitoring / Continuous / Environmental Officer, OCE and Operations Manager / Monitored in accordance with methodology provided in Section 4.1 Real time noise monitoring requiring operational changes / Continuous / Operations Manager/OCE, Environmental Officer / Reactive Management to achieve noise compliance Mobile Mine Equipment Sound Power Levels Mobile mine equipment / Annually / Environmental Officer / The sound power levels are to be recorded	Noted	Noted			
	4.4 Monitoring Procedures						
Noise Management Plan	4.4	Attended noise surveys will be conducted as follows: • All noise investigations will be carried out in accordance with NSW EPA's Industrial Noise Policy, 2000 (INP), Environmental Noise Control Manual (ENCM) and applicable Australian Standards;	Spectrum Acoustics, ATTENDED NOISE MONITORING – MARCH 2014 Tarrawonga Coal Mine Boggabri only makes reference to the Industrial Noise policy Sprectrum are very experienced and this is	Not Compliant Administrative			
Noise Management Plan	4.4	• Noise levels will be measured in one-third octave bands using an instrument with IEC Type 1 characteristics as defined in Australian Standard AS IEC 61672.1 – 2004 "Electroacoustics – Sound Level Meters – Specifications". The instrument will have current calibration as per manufacturer's instructions and field calibration will be confirmed before and after measurements with a sound level calibrator;	Spectrum Acoustics, ATTENDED NOISE MONITORING – MARCH 2014 Tarrawonga Coal Mine Boggabri does not make reference to this standard Sprectrum are very experienced and this is likely to be an administrative oversight in the report				
Noise Management Plan	4.4	• The instrument will be set to A-weighting, "fast" response and measurements of LAeq(15 minute) will be taken at the location in . Each measurement will be stored at a sampling rate of no greater than 5 seconds for further analysis;	Spectrum Acoustics, ATTENDED NOISE MONITORING – MARCH 2014 Tarrawonga Coal MineBoggabri stated: A-weighted noise levels were measured over the appropriate monitoring periods (90 minutes/day, 30 minutes/evening and 60 minutes/night) with data acquired at 1 or 2 second statistical intervals and the meter set to "fast" response.	Compliant			

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Noise Management Plan	4.4	• Attended surveys will be conducted during the approved hours of operation with at least three measurements taken during each day over four consecutive days (as required by PA 11_0047) at each location in Figure 2, so that noise levels during the full range of operating times (day, evening and night) are monitored. Monitoring timeframes will be consistent with requirements of the EPL which requires 1.5 hours during the day, 30 minutes during the evening and 1 hour during the night period;	Spectrum Acoustics, ATTENDED NOISE MONITORING – MARCH 2014 Tarrawonga Coal MineBoggabri	Compliant			
Noise Management Plan	4.4	• Field notes will be taken during each measurement recording the time and duration of noise events, noise sources, instantaneous noise levels and the frequency range of identified site noise sources. Where an obvious noise exceedance is detected, the noise monitor must notify the Group Environment Manager of the exceedance and obtain relevant information as to the possible source of the exceedance (ie. malfunctioning equipment, additional activity contributing to noise levels) to ensure appropriate reporting and action on the exceedance;	Noted	Noted			
Noise Management Plan	4.4	• Extraneous noise sources will be filtered from the measured signal using robust methods approved by EPA and DPE and the LAeq(15-minute) level attributable to TCPL activities will be identified and compared with the relevant criteria; and	This occurs, see Spectrum monitoring reports	Compliant			
Noise Management Plan	4.4	• Details regarding plant configuration, survey interval, weather conditions, extraneous noise sources, monitoring locations and times of measurement will be recorded for inclusion in the noise monitoring report.	Plant configuration is not recorded	Not Compliant Administrative			
Noise Management Plan	4.4	Real-time noise monitoring will be conducted as follows: • A mobile real-time noise monitoring system utilising IEC Type 1 sound level meter with statistical and third-octave band capabilities will be located at properties most likely to be impacted by mine noise, as assessed in noise modelling for the Extension Project, or at properties where a complaint has been made in relation to mine noise. Site selection will be based on location of operational activity most likely to impact on that receiver;	Noted, the real time unit is deployed.	Noted			
Noise Management Plan	4.4	• The unit will calculate, as a minimum, 15-minute statistics comprising LA90, LAeq and LA10 and low-frequency filtered LAeq (nominal threshold 800Hz but able to be changed);	Sighted at EOs desk computer	Compliant			
Noise Management Plan	4.4	• Each 15-minute statistic will have an accompanying third-octave band spectrum;	Sighted at EOs desk computer	Compliant			

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Noise Management Plan	4.4	• Statistical data and digital audio files (minimum duration one minute per 15 minute interval) will be continuously uploaded to the internet using an appropriate communications format;	Sighted at EOs desk computer	Compliant			
Noise Management Plan	4.4	• A computer accessible to site personnel will display statistical results in real time via an internet browser and daily charts will be stored for later reference or printing;	Sighted at EOs desk computer	Compliant			
Noise Management Plan	4.4	• Noise levels nominally at site noise criteria will be set as trigger points in the real-time system to send pre-programmed SMS messages to relevant personnel;	Messages are sent, confirmed at interview	Compliant			
Noise Management Plan	4.4	• On receipt of an SMS alert, audio files will be reviewed to determine the cause of the noise and, if necessary, the management safeguards and ameliorative actions in Section 3 and 4.1 will be initiated; and	Sighted procedure that drives this action	Complaint			
Noise Management Plan	4.4	• If the real-time noise monitor is situated at an attended monitoring location, both the attended and real-time results will be included in the attended monitoring report.	Noted, the real time monitor was not at any of the attended sites in the reports that were reviewed for the audit.				
	5 Management of Exceedances, Complaints and Non-Compliance						
	5.1 Noise Compliance Criteria Exceedance						
Noise Management Plan	5.1	If noise levels exceed the levels outlined in Section 2, advice will be sought from an appropriate acoustic consultant to verify the source of the elevated noise and identify options to address noise related impacts. Such actions will include: • Additional testing to confirm the elevated noise is sustained in nature. Elevated noise levels will be considered sustained in nature where two consecutive quarterly noise monitoring events identify an exceedance in noise criteria; • Consideration to changes to operational procedure or equipment type; and • The installation of sound attenuation measures to plant and equipment, where necessary.	Noted, to date, this has not been required (audit period)	Not Applicable			
Noise Management Plan	5.1	Where it is identified that the above options cannot achieve compliance with noise criteria identified through attended noise monitoring, TCPL will undertake negotiations with the affected landowners with a view to entering into private agreements. Such negotiations would include options with regard to provision of insulation, double-glazing of windows, airconditioning,or other measures designed to reduce noise impact at the affected property in accordance with conditional requirements.	Noted, this has not been required in the audit period.	Not Applicable			
	5.1.2 Independent Review and Land Acquisition						
Noise Management Plan	5.1.2	If an owner of privately-owned land considers the mine to be exceeding noise compliance criteria, they may ask the Director-General in writing for an independent review of the impacts on their land. Conditions 4, 5 and 6 of Schedule 4 of PA 11_0047 specify the independent review process.	Noted, this has not been required in the audit period.	Not Applicable			

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Noise Management Plan	5.1.2	Within 3 months of receiving a written request from a landholder with acquisition rights, TCPL shall make a binding written offer as detailed in Condition 4(8) of PA 11_0047. Noise acquisition criteria are specified in Condition 3(4) while Condition 4(9) requires TCPL to pay all reasonable costs associated with the land acquisition process.	Noted, this has not been required in the audit period.	Not Applicable			
	5.2 Complaints						
Noise Management Plan	5.2	Whilst all endeavours will be made by TCPL to avoid adverse noise impacts on local landowners / residents, it is acknowledged that from time to time such impacts may occur. In order to ensure an appropriate and consistent level of reporting, response and follow-up to any complaints is adopted by TCPL, the following complaints management protocol will be followed: • A publicly advertised telephone complaints line will be in place to receive complaints during operating hours and record complaints at other times.	Company website: http://www.whitehavencoal.com.au/environment/tarrawonga_mine_environmental_management.cfm Telephone Complaints Line 0429 497 730	Compliant			
Noise Management Plan	5.2	• Each complaint received will be recorded on a Complaints Register, which will include the following details: o The date and time of complaint. o Any personal details the complainant wishes to provide or if no such details are provided a note to that effect. o The nature of the incident that led to the complaint. o The action taken by TCPL in relation to the complaint, including any follow-up contact with the complainant. o If no action was taken by TCPL, the reason why no action was taken.	Section 5.2 includes: -If no action was taken by TCPL, the reason why no action was taken. Complaints register includes noise related complaints lodged on 9/04/2014, 7:48am; 22/04/2014, 6:10pm; 8/04/2014, 4:15pm. Environmental Superintendent responded via email advising that the site Environmental Officer would contact the complainant to arrange a meeting to discuss the issues. The meeting was arranged by e-mail.	Compliant			

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Noise Management Plan	5.2	• The Group Environment Manager will be responsible for ensuring that an initial response is provided within 24 hours of receipt of a complaint (except in the event of complaints recorded when the mine is not operational). • Data from the site weather station and the real time noise monitoring unit will be obtained for the time applicable to the complaint for use in determination of cause and identification of future remedial actions. • Additional measures will be undertaken as required to address the complaint. This may include visiting the complainant, or inviting the complainant to the mine site. • Once the identified measures are undertaken, the Group Environment Manager will sign off on the relevant complaint within the Complaints Register. • If necessary, follow-up monitoring will take place to confirm the source of the complaint is adequately mitigated. • A copy of the Complaints Register will be kept by TCPL and made available to the CCC and the complainant (on request). A summary of complaints received every 12 months will be provided to DPE, GSC, NSC, EPA, DRE and the CCC through the AEMR/Annual Review.	Section 5.2 includes: • Once the identified measures are undertaken, the Group Environment Manager will sign off on the relevant complaint within the Complaints Register. Complaints Register It seems measures were not identified in the complaint below: Complaint lodged on 9/04/2014, 7:48am; 22/04/2014, 6:10pm; 8/04/2014, 4:15pm. Environmental Superintendent responded via email advising that the site Environmental Officer would contact the complainant to arrange a meeting to discuss the issues. The meeting was arranged by e-mail.	Compliant			
Noise Management Plan	5.2	Based on the nature of individual complaints, specific contingency measures may be implemented to the (reasonable) satisfaction of the complainant. The Group Environment Manager retains ultimate responsibility to ensure that complaints received are properly recorded and addressed appropriately.	Noted				
	5.3 Non-Compliance						
Noise Management Plan	5.2	With the exception of noise compliance criteria exceedances (as discussed in Section 5.1), non-compliances relating to noise would most likely relate to not achieving the required quarterly attended monitoring events. If this was to occur, appropriate advice would issue to the DPE and EPA as soon as practicable, and arrangements made to reschedule the monitoring event as soon as practically possible. Any other non-compliances of this nature will be detailed in the EPL Annual Return and/or AEMR/Annual Review, and include details as to why the non-compliance occurred.	EPL Annual Return (Jan 2013 to Jan 2014) AEMR 2012-2013	Not Applicable			
	6 Record Keeping and Reporting Requirements						
	6.1 Record Keeping						
Noise Management Plan	6.1	Attended noise monitoring reports issued by the acoustic consultant will include details on the date and time of monitoring, location of monitoring and monitoring personnel (as required by Condition M1.3 of the EPL).	ATTENDED NOISE MONITORING – MARCH 2014 Monitoring personnel were not included in the report. Only the names of author of the report and reviewer.	Not Compliant Administrative			

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Noise Management Plan	6.1	Data obtained from the real-time noise monitor will be available in real time, as well as through daily reporting from the monitoring unit to selected personnel. Key personnel for the provision of daily reports will be the Group Environment Manager, the Operations Manager for the Tarrawonga site and the Environmental Officer. In addition to daily reports, the monitor will be downloaded at regular intervals with data available on an archival basis.	Availability observed on-site	Compliant			
Noise Management Plan	6.1	Noise monitoring results, both from attended and real time monitoring, will be maintained by the Environmental Officer. The results will be reviewed to determine any mining related exceedances in order to instigate an appropriate response.	Observed on-site	Compliant			
	6.2 Reporting Requirements						
Noise Management Plan	6.2	A summary of noise monitoring results will be reported internally on a monthly basis as well as on a quarterly basis to the CCC via the Environment Monitoring Report. This report will be periodically uploaded onto the company's website (www.whitehavencoal.com.au).	Company website CCC Environment Monitoring Report uploaded in company website	Compliant			
Noise Management Plan	6.2	Each year, the results of the noise monitoring program will be summarised and presented in the AEMR/Annual Review together with reference to prevailing meteorological data and site activities during the measurement period(s), where relevant. Reporting will also include an analysis of the monitoring results against the exceedance criteria, previous monitoring results and predictions made in the EA. Where attenuation of plant is required, and testing of attenuation and/or sound power level tests are completed, the results of these tests will also be made available in the AEMR/Annual Review.	AEMR 2012-2013	Compliant			
Noise Management Plan	6.2	The extent of notification and reporting requirements depends on the severity of the issue, and whether the noise level is within modelled noise exceedance limits, but generally includes notification to DPE and EPA and/or the affected landholder as well as discussion in CCC Environment Monitoring Reports and the AEMR/Annual Review.	Noted				
Noise Management Plan	6.2	In addition to the reporting requirements listed above, noise quality monitoring data will be made available to the public upon request. Relevant real time data and operational responses will also be made available to the public on the Whitehaven website.	Company website contains this data, no requests for residents for data in the audit period.	Compliant			
	7 Document Review and Continuous Improvement						
Noise Management Plan	7	This document will be reviewed internally on an annual basis following completion of the AEMR/Annual Review, and/or following a noise related incident, audit, or modification to the conditions of approval. In addition, every 2 years, the plan will be subject to review with consultation with the relevant agencies.	As noted eslewhere in this audit, the internal review cannot be verified as there is no system for recording such reviews, the document has been regularly updated though. Recommendation made elsewhere	Compliant			

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
	Noise Management Strategy - For Boggabri - Tarrawonga - Maules Creek Complex						
	3 Noise Criteria						
	3.1 Cumulative noise assessment criteria						
Noise Management Strategy - March 2014	3.1	Cumulative noise assessment criteria are contained in the most recent Boggabri Coal Project Approval (09_0182, 18 July 2012), the Maules Creek Coal Project Approval (10_0138, 23 October 2012) and the Tarrawonga Coal Project Approval (11_0047, 22 January 2013). Except for the noise affected land identified in Condition 3 of Project Approval 09_0182, Table 1 of Project Approval 10_0138, and Table 1 of Project Approval 11_0047, each mine is required to ensure that the operational noise generated by their respective project, combined with the noise generated by other mines in the BTM Complex, does not exceed the criteria in Table 3.1 at any residence on privately owned land. Table 3.1 Cumulative noise assessment criteria Location / Day ($L_{Aeq\ (period)}$) / Evening ($L_{Aeq\ (period)}$) / Night ($L_{Aeq\ (period)}$) All privately-owned land / 40 / 40 / 40 Note: Cumulative noise is to be measured in accordance with the relevant requirements, and exemptions (including certain meteorological conditions), of the NSW Industrial Noise Policy. Operational noise includes noise from the mining operations and use of private haul roads and rail spurs. and use of private haul roads and rail spurs.	Noted				
Noise Management Strategy - March 2014	3.1	Cumulative noise assessment and acquisition criteria applicable to each mine in the BTM Complex will be addressed in each mine's individual NMP.	Noted this is addressed	Compliant			
	4 Monitoring						
Noise Management Strategy - March 2014	4	The mines of the BTM Complex already have comprehensive noise management systems in place. The existing noise monitoring network will be upgraded to reflect the implementation of the BTM Complex cumulative noise monitoring network.	Not yet implemented as the strategy is still in draft.	Not Applicable			
	4.1 Existing monitoring network						
Noise Management Strategy - March 2014	4.1	Both Boggabri Coal Mine (BCM) and Tarrawonga Coal Mine (TCM) have noise monitoring programs in place with attended and unattended (in the case of BCM) noise monitoring conducted on a quarterly basis. A noise monitoring program has been developed for MCC and is outlined in its NMP.	Noted				
Noise Management Strategy - March 2014	4.1	In addition to the attended monitoring program, BCM and TCM currently utilise separate a mobile real-time noise monitors to investigate noise complaints or issues as they may arise. BCM's real-time noise monitor is currently located at the Cooboobinbi residence.	Noted				
	4.2 Cumulative noise monitoring						

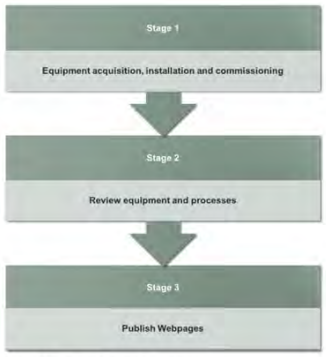
Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Noise Management Strategy - March 2014	4.2	The requirements of the cumulative monitoring network at the BTM Complex are to: - facilitate compliance with existing and likely future consent conditions - allow proactive management and real-time noise monitoring to assist in day to day operations of each mine site - develop an integrated and coordinated approach to noise management of the BTM Complex - potentially consolidate existing monitoring allow for predictive meteorological forecasting to guide operations - include procedures for identifying the source(s) and contribution(s) to cumulative noise impacts for mines and other sources include appropriate investigative tools such as noise modelling.	Noted				
	4.2.1 Real-time monitoring						
Noise Management Strategy - March 2014	4.2.1	A real-time monitoring network will be sourced and installed. The chosen system will have capabilities of sufficient resolution to allow noise emissions from each mine to be accurately determined. Four permanent real-time noise monitors will be installed as part of the Strategy, this will include a combination of the following: - one at the Wongalea (Morris) property in the W Zone (predominantly MCC and BCM noise) - one at Warriahdool (Younger) property north of the MCC project, - one unit at Olivedene (Bastardo) west of BCM and MCC - one at either the Sylvania, Goonbri or Matong property in the E Zone (predominantly BCM and TCM noise).	Not yet implemented as the strategy is still in draft.	Not Applicable			
Noise Management Strategy - March 2014	4.2.1	As part of the proposed real-time monitoring network, two additional mobile real-time units may also be employed to variously monitor cumulative coal haulage noise impacting on SW Zone receivers, noise impacts at the nearest privately owned receivers to the MCC in the NE, NW and SW zones, at a receiver in the S zone during the prevailing winter NW winds, or to investigate noise complaints from any receiver.	Not yet implemented as the strategy is still in draft.	Not Applicable			
Noise Management Strategy - March 2014	4.2.1	The BTM Complex is working with noise specialists to determine the best configuration of monitors for the combined monitoring network.	Noted				
	4.2.2 Attended monitoring						
Noise Management Strategy - March 2014	4.2.2	Attended noise monitoring has been conducted on a quarterly basis since inception of the TCM and BCM. Continued attended monitoring will be required to assess ongoing compliance with individual and cumulative noise criteria. Recommended monitoring locations sufficient to cover all potentially affected properties are listed in Table 4.2.	Noted				
	4.5 Predictive and real-time noise management						
	4.5.1 Overview of requirements						

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Noise Management Strategy - March 2014	4.5.1	A key method to ensure that noise management systems maintain standards of best available technology is to incorporate predictive and real-time reactive capability. It is proposed that a predictive and reactive noise management system be implemented for the BTM Complex that personnel will use to: - assess potential offsite impacts and evaluate community risk in advance and subsequently in real-time - develop a history/library of community impacts and noise incidents and events - evaluate community complaints and determine if BTM Complex activities may have caused an impact - accept information and data inputs from various instruments and data sources (e.g. web services, real-time monitoring, and/or emissions estimates based on activity data) - provide recommendations with respect to abatement or avoidance of potential issues and operational requirements based on outputs of the system	Not yet implemented as the strategy is still in draft.	Not Applicable			
	4.5.2 Components						
Noise Management Strategy - March 2014	4.5.2	It is proposed that the predictive and reactive noise management system will include: - a predictive component using forecast weather data - a reactive component using real-time meteorology and noise monitoring - short term tiered trigger levels and notifications for managing potential impacts - a daily forecast report providing information on temperature inversions, wind conditions at various heights, noise risk, and recommended control actions.	Not yet implemented as the strategy is still in draft.	Not Applicable			
Noise Management Strategy - March 2014	4.5.2	It is extremely important to maintain periodic review of any real-time noise management system to ensure that the system is operating using: - validated meteorological forecasts - data from calibrated monitoring equipment - accurate noise emission levels, informed by routine attended monitoring.	Noted				
Noise Management Strategy - March 2014	4.5.2	Periodic reviews of the model will be quarterly initially, extending to annually once performance is viewed to be satisfactory. Data inputs to the system will be updated quarterly to account for any changes to mine plans or other parameters that have bearing on model performance.	Noted				
	4.5.3 Predictive Forecast Meteorology						
Noise Management Strategy - March 2014	4.5.3	It is proposed that a predictive forecast meteorology system be implemented based on the Weather Research & Forecasting (WRF) model, specifically for the BTM Complex, and a website be developed to make data immediately available for each of the mine sites, with half hourly forecasts up to 48 hours in advance. This system will download global meteorological data and forecasts on a daily basis and process and run the WRF model to produce the information required for input into a realtime 3D dispersion model.	Not yet implemented as the strategy is still in draft. The site uses predictive meteorology but the modelling is not specific to the complex, real time particulate results are used in concert with the weather data to manage operations.	Not Applicable			

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Noise Management Strategy - March 2014	4.5.3	Once this meteorological system is configured and operating, the outcomes will be evaluated by a competent meteorologist or atmospheric science professional quarterly against actual meteorological measurements and the meteorological system will be validated and improved, where possible.	Noted				
	4.5.4 Local observed meteorology						
Noise Management Strategy - March 2014	4.5.4	Data from local automatic weather stations will be used to validate the predictive meteorological forecast data as time elapses.	Noted				
Noise Management Strategy - March 2014	4.5.4	Meteorological instrumentation or data communications equipment will be reviewed to confirm that the right quality of data is available to the system.	Noted				
	4.5.5 Integrated real-time monitoring data						
Noise Management Strategy - March 2014	4.5.5	To enable real-time reactive feedback from the system, a connection will be established to receive a data feed from weather stations in the BTM network. A connection will also be established to monitoring equipment located upwind and downwind of noise sources. These data feeds will be connected to the system from a central data repository or directly to loggers on permanent in-field equipment.	Not yet implemented as the strategy is still in draft.	Not Applicable			
Noise Management Strategy - March 2014	4.5.5	As required, the system will be connected with operational and other environmental data and management information systems. Real-time noise management capability builds on the information gained from predictive systems to proactively manage noise. The system will be improved further by incorporating real-time sound recording to identify the instantaneous main source of high emissions. Protocols will be put in place to immediately react to rising noise levels, e.g. automated notices sent to nominated mining personnel to alert the need to respond with control/mitigation, and focus can be given to the most significant identified noise source.	Noted				
Noise Management Strategy - March 2014	4.5.5	Real-time noise monitoring data will be used primarily to determine when noise emissions are approaching compliance and to allow sufficient time to manage noise generating activities from the operations so that the criteria are not breached.	Noted				
	4.5.6 System Outputs						

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Noise Management Strategy - March 2014	4.5.6	Once the predictive and reactive system is implemented and configured as described above, a range of user interfaces or simple reports or templates can be generated and used as part of standard operating procedure. Some system outputs that will be required include: - Daily forecast reports providing information on temperature inversions, wind conditions, noise risk, and recommended control actions. - Graphical representation of the forecasted meteorology and real-time monitoring data via the system's web interface. - Capability to analyse and confirm the likely source(s) of noise. This functionality is critical in apportioning responsibility to operations for mitigating noise emissions. - Automated alerts for relevant operations personnel so that the agreed protocol for reacting to a potential noise issue can be activated. These alerts may be generated as SMS or email messages, or by other systems integrated into operating processes (depending on needs). Alerts will be stored in the system for analysis, which will assist in refining trigger criteria over time.	Noted				
	4.6 Mitigation						
	4.6.1 Trigger levels						
Noise Management Strategy - March 2014	4.6.1	Trigger levels are proposed to be communicated via SMS, email and/or other systems integrated into operating processes (depending on needs). The following trigger levels are currently proposed for the system: 'Investigation' level criteria will be triggered initially when any of the real time monitors reaches a level 3 dB below the cumulative noise criteria. Investigation into the trend of increased noise levels will be conducted upon reaching this trigger level. This investigation will involve: - comparing the low-pass LAeq level with the total LAeq level to determine whether mine noise (predominantly lower-frequency) is a likely cause of elevated noise levels - listening to the most recent audio files to see if the source(s) of the increasing noise can be identified - reviewing meteorological data to determine whether increasing noise levels may be due to wind or temperature inversions. 'High' level criteria will be triggered initially when any of the real time monitors reaches a level 1 dB below the cumulative noise criteria. Implementation of individual mine noise mitigation actions will be instigated upon reaching this trigger level.	Noted, Tarrawonga had trigger levels and alarms in place at the time of the audit but does not coordinate the results with the surrounding mines				

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Noise Management Strategy - March 2014	4.6.1	Once the real-time noise management system is operational, trigger levels will be reviewed, updated and refined following a review of the data and calibration of the system. If the trigger levels are not appropriate to site operations (too many or too few investigation or action responses) they will be reviewed and updated. Different trigger levels may be set for each monitoring location within the cumulative network, for example be set lower for monitoring locations closer to noise sources. Trigger levels will also be regularly assessed as part of the ongoing review of this plan.	Noted				
	4.6.2 Processes to mitigate outcomes						
Noise Management Strategy - March 2014	4.6.2	The noise investigation instigated by the cumulative noise trigger levels will highlight which mine(s) is the cause of the increasing noise levels and the relevant mine(s) will also have individual trigger levels, based on their own noise criteria, which will be significantly lower than the cumulative noise triggers.	Noted				
Noise Management Strategy - March 2014	4.6.2	Processes to mitigate noise outcomes associated with operations are addressed in each sites individual NMPs. Examples of best practice mitigation options are: - moving identified sources to locations that are more distant from, or geographically shielded from, the receiver - stopping the activity/plant - installing temporary noise barriers - re-aligning directional sources (e.g., drills) so that the quietest side faces the noise-affected receiver(s).	Noted				
Noise Management Strategy - March 2014	4.6.2	Operational activities will be ranked based on noise generation potential. Of particular importance is the consideration of wind direction information provided by the predictive meteorology forecast and the local weather data. Receivers which are generally NW of the BTM Complex (nearest to the MCC) will be the potentially most affected during the prevailing S-SE winds during the warmer months. Conversely, the prevailing N-NW winds during the cooler months will reduce noise for receivers NW of the Complex and increase noise levels at receivers generally south of the Complex.	Noted				
Noise Management Strategy - March 2014	4.6.2	The "impact potential" rankings will be used as the basis for pro-actively scheduling operational activities when noise generation is predicted to reach trigger levels. Examples of pro-active mitigation measures are: - ensuring plant achieves required noise specification - making high-level and low-level OEAs available simultaneously. The low-level (often in-pit) emplacements can be used under inversion and adverse wind conditions - suspending the use of identified major noise sources (e.g., dozers on top of emplacement areas) until after nocturnal inversions have lifted	Noted				
Noise Management Strategy - March 2014	4.6.2	Noise generation assessment will be undertaken by experienced site personnel with the assistance of various specialists as required (e.g. environmental and acoustic specialists).	Noted, as is currently the position.	Compliant			
	4.7 Communication						

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Noise Management Strategy - March 2014	4.7	Regular meetings are being held (and will continue to be held at least quarterly) between BTM personnel to discuss various cumulative impacts. This includes discussing real-time and attended monitoring results and future operational events. Meeting minutes will continue to be documented and retained at each site.	These meetings occur monthly and all environmental issues are discussed.	Compliant			
Noise Management Strategy - March 2014	4.7	Trigger levels will initiate internal communication between the BTM mines to allow the BTM Complex to implement individual management measures in order to minimise noise generation.	Noted				
Noise Management Strategy - March 2014	4.7	When noise criteria are identified as exceeded, discussions will be held between BTM and the agencies and affected landholders (where an exceedance occurs on privately-owned land) advised.	Noted				
	4.8 Reporting						
Noise Management Strategy - March 2014	4.8	Internal management reports will be prepared regularly, noting performance against triggers and criteria.	Noted				
Noise Management Strategy - March 2014	4.8	External reporting will be undertaken by all mines within the BTM Complex and include: - Updates on individual Company websites - Presentations to Community Consultative Committees (CCCs) - Annual Environmental Management Reports (AEMRs)/Annual Reviews - exceedance reporting.	As per other documents, this is gennerally complied with, exceptions noted elsewhere in the audit.				
	5 Implementation						
	5.1 Staged approach						
Noise Management Strategy - March 2014	5.1	A staged approach will be taken to install the equipment and systems which are additional to individual mine's existing noise monitoring systems. This staged approach of implementation is detailed in Figure 5.1 and described in the following sections.  Figure 5.1 Staged approach to implementation	Noted				
	5.1.1 Stage 1 - Equipment acquisition, installation and commissioning						
Noise Management Strategy - March 2014	5.1.1	Stage 1 will include the acquisition, installation and commissioning of the proposed permanent realtime directional noise monitors. This equipment will complement the existing mobile real-time noise monitor owned by BCPL and TCPL.	Noted				

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
	5.1.2 Stage 2 - Review equipment and processes						
Noise Management Strategy - March 2014	5.1.2	Within three months of the installation and commissioning of Stage 1 equipment the following will be reviewed: - performance and reliability of the cumulative noise monitoring equipment - triggers proposed in this Strategy - central data repository and data interface.	Noted				
	5.1.3 Stage 3 - Publish webpages						
Noise Management Strategy - March 2014	5.1.3	Each mine site will establish or update an existing Company webpage. The webpage will present the summarised and validated results of the real-time noise monitoring on a monthly basis.	Noted				
	6 Document Control						
	6.1 Review and revision						
Noise Management Strategy - March 2014	6.1	This NMS, its operation and implementation, will be reviewed and revised at least every two years or on an 'as required' basis to incorporate improvements identified by the BTM Complex or appropriate requirements of government agencies. The NMS will be reviewed and updated at the end of each stage of the project rollout	Noted	Not Applicable			
Noise Management Strategy - March 2014	6.1	In accordance with the project approvals, the NMS will also be revised within three months of: - an annual review - incident threatening material harm, requiring notification of the Director-General / relevant agencies - statutory audit - modification of project approval.	Noted	Not Applicable			

Reference	Clause	Requirement	Evidence	Audit Finding	Risk			Responsibility
					Consequence	Likelihood	Risk	
WHC_PLN_TAR_Blast Management Plan								
2 Statutory Requirements								
Blast Management Plan	2.1	The Applicant shall prepare and implement a Blast Management Plan for the development to the satisfaction of the Director-General. The program must: (a) be submitted to the Director-General for approval by the end of May 2013;	Submitted prior to the required date but not yet approved.	Compliant				
Blast Management Plan	2.1	(b) be prepared in consultation with the EPA and interested members of the local community who would potentially be affected by blasting;	email is at back of mngt pln	Compliant				
Blast Management Plan	2.1	(c) propose and justify any alternative ground vibration limits for public infrastructure in the vicinity of the site;	Noted, no changes as yet	Not Applicable				
Blast Management Plan	2.1	(d) describe the measures that would be implemented to ensure: • best management practice is being employed; and • compliance with the relevant conditions of this approval;	Included in the BMP, FMP and RCMP	Compliant				
Blast Management Plan	2.1	(e) include a road closure protocol for blasting within 500 metres of a public road, that has been prepared in consultation with council;	Road Closure Management Plan	Compliant				
Blast Management Plan	2.1	(f) include a specific blast fume management protocol to demonstrate how emissions will be minimised, including risk management strategies if blast fumes are generated;	Blast Fume Management Protocol provided.	Compliant				
Blast Management Plan	2.1	(g) include a monitoring program for evaluating blasting performance, which includes • compliance with the applicable criteria; and • minimising blast fume emissions; and	There is a separate Blast Monitoring Program that addresses this requirement	Compliant				
Blast Management Plan	2.1	(h) include a Leard Forest Mining Precinct Blast Management Strategy, that has been prepared in consultation with other mines within the Leard Forest Mining Precinct, to minimise cumulative blasting impacts.	This is included though not yet approved. The sites share blasting timetables and tend to blast at different times of the day which helps prevent cumulative impacts.	Compliant				
Blast Management Plan	2.1	In accordance with Condition 3(14) of PA 11_0047, Conditions 11(a) and (b) of Mining Lease (ML) 1579 and Conditions L5.1 – L5.7 of Environment Protection Licence (EPL) 12365 the airblast overpressure and ground vibration blasting criteria is as follows: Table 1 Blasting Criteria Location / Airblast overpressure (dB(Lin Peak)) / Ground vibration (mm/s) / Allowable exceedance Residence on privately-owned land: 120 / 10 / 0% 115 / 5 / 5% of the total number of blasts over a period of 12 months All public infrastructure: - / 50 (or a limit determined by the structural design methodology in AS 2187.2-2006, or its latest version, to the satisfaction of the director general) / 0%	Noted				
Blast Management Plan	2.1	PA 11_0047 and EPL 12365 restrict blasting operations to 1 blast per day, unless an additional blast is required following a blast misfire. Furthermore, PA 11_0047 restricts blasting operations to 4 blasts a week, averaged over a calendar year. Blasting operations will be carried out between 9am and 5pm Monday to Saturday inclusive.	15-05-14 and 17-04-13, two blasts on the same day but second one was for safety reasons.	Compliant				
Blast Management Plan	2.1	All aspects of blast management will be undertaken in accordance with AS 2187.2-2006 - Storage and Use – Use of Explosives, a copy of which will be retained at the site office.	The Explosives plan and Explosives Security plan cover the application of AS2187.2	Compliant				
3 Blasting Controls and Management Procedures								

Reference	Clause	Requirement	Evidence	Audit Finding	Risk			Responsibility
					Consequence	Likelihood	Risk	
Blast Management Plan	3	Tarrawonga Coal Mine seeks to minimise air blast overpressure, ground vibration levels, flyrock, fume, dust and odour from blasting activities. Control of ground vibration, overpressure and flyrock impacts will be achieved by implementing the procedures and safe guards indicated as follows: • Comply with the relevant procedure prior to the commencement of any blast by referring to the internal documents WHC_STD_OC_EXPLOSIVES, WHC_PLN_TAR_EXPLOSIVES MANAGEMENT PLAN , and WHC_PLN_TAR_SITE SECURITY PLAN;	Noted, plans were provided for review and are the management documentation for these issues along with the BMP	Compliant				
Blast Management Plan	3	• Undertake a pre-blast environmental assessment with consideration given to meteorological conditions such as cloud cover, wind speed and direction and the strength of temperature inversions prior to each blast;	Observed on site	Compliant				
Blast Management Plan	3	• Comply with blast loading and pre blast designs, unless risks are determined by the shotfirer at the time of loading that may be mitigated through changes to design;	Confirmed at interview (D&B Eng)	Compliant				
Blast Management Plan	3	• Use of suitable quality stemming material and the use of adequate stemming lengths to ensure maximum internment of explosive charges, therefore minimising overpressure; and	25mm gravel	Compliant				
Blast Management Plan	3	• Use of monitoring data to establish and estimate the likely overpressure and vibration levels during the design process of subsequent blasts.	Yes this occurs, confirmed at interview (D&B Eng)	Compliant				
	3.1 Structural and Human Impacts							
Blast Management Plan	3.1	The Tarrawonga Coal Project Environmental Assessment assessed the potential for structural damage from blasting at surrounding project related and privately owned properties. The assessment identified that the potential for a marginal exceedance of structural damage vibration criteria was limited to the project related "Blair Athol" residence, located to the south-east of the project site, later in the project life. The residence will be vacated when structural damage criteria exceedances are predicted and a structural inspection will be undertaken prior to reoccupation if monitoring confirms an exceedancethat an exceedance in blast criteria occurred.	OC progress is not to the point where the Blair Athol residence is impacted by higher level vibration as yet.	Not Applicable				
Blast Management Plan	3.1	Predicted overpressure and ground vibration levels at all other receivers are such that the potential for structural damage or impacts on human comfort resulting from blasting is negligible	Noted					
Blast Management Plan	3.1	The blasting assessment also identified that there is no expected impact from blasting on the proposed low permeability barrier to be constructed on the eastern perimeter of the final extent of the open cut pit. It is proposed that the final design of the low permeability barrier would consider the potential impacts from blasting on the consolidation of the soil-bentonite mixture and the subsequent differential settlement to the adjacent geological sequences and keying in of the cut-off barrier. Upon completion of the design and construction of the low permeability barrier, this management plan will be updated to reflect any additional requirements identified for protection of the barrier from blast related impacts.	The barrier has not been constructed.	Not Applicable				
	3.2 Aboriginal Heritage							
Blast Management Plan	3.2	The nature of the known artefacts (isolated finds, artefact scatters and culturally modified trees) suggests that blasting is likely to have minimal impact on these features, with no predicted impacts from blast vibration and flyrock. Known artefact sites will be subject to regular inspections, as part of the site monthly inspection regime, to verify blasting activities.	Noted, no damage recorded to date and unlikely due ot the nature of the aboriginal heritage located on the site.	Not Applicable				
	3.3 Livestock							

Reference	Clause	Requirement	Evidence	Audit Finding	Risk			Responsibility
					Consequence	Likelihood	Risk	
Blast Management Plan	3.3	Avoidance of impacts on livestock from flyrock is managed via a procedure for blast clearance and firing which requires consideration to be given to the location of livestock when developing the Blast Clearance Plan. Where livestock are identified as being within the blast clearance zone, appropriate measures will be taken to relocate livestock from this location prior to blasts proceeding. At no stage throughout the life of the mine will blasting activities be within 500 metres of privately owned land.	No blasting has occurred within 500m of cattle.	Not Applicable				
	3.4 Management of Road Closures							
Blast Management Plan	3.4	A Tarrawonga Coal Mine Road Closure Management Plan, refer to Appendix 3 has been developed in consultation with Narrabri Shire Council (NSC), for approval by the Director General, to put in place protocols and procedures to minimise impacts on the local community. The main objectives are to: • Ensure safety and protection of the public, residents, property and livestock;	Noted, letter in response to submission of RCMP provided. The plan includes the requirements	Compliant				
Blast Management Plan	3.4	• Coordinating blast schedules with neighbouring mines to minimise cumulative impacts of blasting;	24 hour notification to other sites .	Compliant				
Blast Management Plan	3.4	• Notify in advance relevant stakeholders, including the public and nearby properties, of blasts that will temporarily close local roads;	No local roads closed yet.	Not Applicable				
Blast Management Plan	3.4	• Minimise road closures and the potential impacts on road users, local residents and businesses, through avoiding peak traffic periods;	No local roads closed yet.	Not Applicable				
Blast Management Plan	3.4	Blasting is planned to be undertaken within 500 metres of Goonbri Road within the next 3 years. Prior to submission of this BMP for approval by the Director-General, Whitehaven contacted landholders and tenants of properties closest to the proposed road closures who will likely be most affected by the closures. The local school bus driver was also contacted. No further comments were received from those contacted.	No local roads closed yet, no blasts within 500m.	Not Applicable				
	3.5 Air Vibrations (Overpressure)							
Blast Management Plan	3.5	Noise (the audible part of the air vibration spectrum) and airblast (the remaining sub-audible part of the air vibration spectrum) generation can be controlled by ensuring that all, or nearly all, of the explosion energy is consumed in fragmenting and displacing the overburden by the time the gases vent (via the broken burden rock and/or ejected stemming material) into the atmosphere.	Noted					
Blast Management Plan	3.5	This objective would be met by ensuring that: • Where practicable, the blast face is orientated away from or at an oblique angle to nearby residences; • Blasthole spacing is implemented in accordance with blast design; • The burden distance and stemming length are carefully selected and then implemented precisely; • Appropriate materials (eg. 20mm aggregates) are used for stemming; • Charges detonate in the correct sequence and with inter-row delays that provide good progressive release of burden; and • The maximum weight of explosive detonated in a given delay period (the MIC) is limited to conservative and proven levels. • Conducting blasting both before the establishment, and after the break-up of low-level atmospheric temperature inversions which typically occur after 4:00pm and can remain until 8.00am.	D&B Engineer - all confirmed at interview.	Compliant				
	3.6 Ground Vibrations							

Reference	Clause	Requirement	Evidence	Audit Finding	Risk			Responsibility
					Consequence	Likelihood	Risk	
Blast Management Plan	3.6	Ground vibration would be controlled by ensuring: • The minimum practicable weight of explosive detonates at an instant (ie. minimising the MIC) by using the maximum number of delay periods in each blast; and • Most of the energy liberated by the charge(s) on a given delay number is consumed in providing good fragmentation, adequate displacement and/or a loose, highly dig-able muckpile, rather than in creating ground vibrations (ie. by ensuring that the burden distance and effective sub-drilling are not too large).	Covered above, note also that there have been overpressure exceedances at company owned properties but vibration is well within limits.	Compliant				
	3.7 Dust and Other Post-Blast Emissions							
Blast Management Plan	3.7	Control of blast associated dust generation, odour and fumes will be achieved by the following: • Undertaking a pre-blast environmental assessment with consideration given to meteorological conditions such as cloud cover, wind speed and direction and the strength of temperature inversions prior to each blast;	Checklist sighted at site, also ran through checklist with EO for a shot.	Compliant				
Blast Management Plan	3.7	• Minimising the potential for the delay in firing of shots which have been loaded, especially into wet holes, considering the restrictions of existing weather conditions;	Confirmed at interview (D&B Eng)	Compliant				
Blast Management Plan	3.7	• Ensuring that blasts are fired in suitable weather conditions that lower the potential for blast generated dust and/or fumes to be blown towards neighbouring properties. A blast notification checklist is used to determine the wind speed and wind direction conditions for which the decision will be made on whether to proceed or postpone the blast;	Blasting checklist	Compliant				
Blast Management Plan	3.7	• If inversion conditions are detected or wind speeds are greater than 7m/s emanating from the West or North West, blasting may be delayed if it is considered these conditions pose a risk to environmental compliance, until more favourable weather conditions are encountered;	Noted, checklist considers these issues	Compliant				
Blast Management Plan	3.7	• After the blast initiation, monitor and photograph any blast fume to record the direction of travel and dispersion of the fume cloud; and	Yes including offsite monitoring, also sat with the offiste dust plume observer and observed the actions for a shot.	Compliant				
Blast Management Plan	3.7	• Fume Management Plan						
Blast Management Plan	3.7	• Pollution Incident Response Management Plan (PIRMP) is applicable across all Tarrawonga Coal Mine operations subject to EPL 12365 and is implemented in the event that of a pollution incident.	Noted					
Blast Management Plan	3.7	• In the event a blast fume cloud is created and is travelling in the direction of local residences, the fume cloud will by continually monitored by the Environmental Officer, Blast Controller and Shot Firer as well as blast sentries and every endeavour will be made to contact nearby personnel and residents to inform them of any impending fume with advice to remain indoors until the fume has passed.	Noted, no incidents to date, see noted above re blast observer	Not Applicable				
Blast Management Plan	3.7	Blast-generated dust would be minimised by ensuring that stemming columns are not ejected for considerable distances into the atmosphere. Stemming column lengths would be such that their ejection velocities are low.	Stemming is optimised, discussed at interview	Compliant				
Blast Management Plan	3.7	Additionally, the blasting contractor would be required to use aggregates for blasthole stemming and to use nonel delay-type or electronic detonators to initiate charges. The use of nonel-type delay or electronic detonators would avoid the requirement for detonating cord downlines and, with the absence of detonating cord trunklines (ie. surface lines), prevents the dust cloud that is formed when such trunklines detonate on a dry dusty surface.	Confirmed at interview (D&B Eng)	Compliant				

Reference	Clause	Requirement	Evidence	Audit Finding	Risk			Responsibility
					Consequence	Likelihood	Risk	
	3.8 Impacts on the Proposed Low Permeability Barrier							
Blast Management Plan	3.8	Blast controls or measures that shall be implemented to reduce the potential impacts of blasting on the proposed low permeability barrier will be addressed and appended to this management plan upon completion of the final design of the low permeability barrier.	Design of permiability barrier not completed and postponed.	Not Applicable				
	3.9 Cumulative Blast Management Strategy							
Blast Management Plan	3.9	TCM has been in consultation with the nearby Boggabri Coal Mine and Maules Creek Project and has developed a Leard Forest Mining Precinct Blast Management Strategy in order to minimise cumulative blasting impacts. The Leard Forest Mining Precinct Blast Management Strategy is currently under review by the Department of Planning and Infrastructure. Upon confirmation of its acceptance, it will be appended to this Management Plan and implemented accordingly.	Noted					
	4 Inspections and Notifications							
	4.1 Pre-Blasting Inspections							
Blast Management Plan	4.1	As a requirement of Condition 4(1), within 3 months of Project Approval, TCPL notified in writing the owners of any privately owned land within 2 kilometres of the approved open cut mining pit/s that they are entitled to ask for a property inspection, to establish the baseline condition of any buildings or structures on their land, or to have a previous property inspection report updated.	Letters provided as evidence	Compliant				
Blast Management Plan	4.1	In accordance with Condition 3(17) of PA 11_0047, if TCPL receives a written request from the owner of any privately owned land within 2 kilometres of the approved open cut mining pit on site for a property inspection to establish the baseline condition of any buildings and/or structures on their land, or to have a previous property inspection report updated, then within 2 months of receiving this request TCPL will: (a) Commission a suitably qualified, experienced and independent person, whose appointment is acceptable to both parties, to: (b) Establish the baseline condition of the buildings and/or structures on the land or update the previous property inspection report; (c) Identify any measures that should be implemented to minimise the potential blasting impacts of the development on these buildings and/or structures; and (d) Give the landowner a copy of the new or updated property inspection report.	No requests in the audit period	Not Applicable				
	4.2 Pre-Blasting Notification							
	4.2.1 Public Notification							
Blast Management Plan	4.2.1	Prior to TCM commencing, surrounding landholders were contacted to determine if they required notification prior to each blast. TCM provides notification to any person who registered an interest in being notified about the blasting schedule at the mine. Notification consists of an email or phone call (depending on the individual's preference) 24 hours prior to the blast and/or on the day of the blast. This notification procedure has been successfully implemented for approximately 8 years.	Surveyor sends notifications, adminstration makes calls and EO records contacts.	Compliant				
Blast Management Plan	4.2.1	Notification to the general public about proposed blasting dates and times is provided via the blast notification sign at the entrance to the mine site. In addition, details about each upcoming blast (including date, time and road closure information) are provided under the "Community" tab on the Whitehaven Coal website (www.whitehavencoal.com.au).	Observed on the web and on the gatepost sign	Compliant				
	4.2.2 Liaison with Adjacent Mines							

Reference	Clause	Requirement	Evidence	Audit Finding	Risk			Responsibility
					Consequence	Likelihood	Risk	
Blast Management Plan	4.2.2	TCM and the adjacent Boggabri Coal Mine have developed a procedure whereby 24 hours' notice is provided prior to a proposed blast. Notification is in the form of an email to all relevant mine personnel. TCM schedule blasts to initiate at 12:00pm & 2pm whereas Boggabri Coal initiates blasts at either 10.30am or 3pm (where possible). This ensures cumulative impacts are avoided if blasts are scheduled on the same day at both mines. Personnel from both mines liaise accordingly (eg. via email or phone) if blast times need to be altered.	This now also includes MC OC as they are progressing towards production.	Compliant				
Blast Management Plan	4.2.2	Cumulative impacts that may be generated between the TCM and Whitehaven's Rocglen Coal Mine are managed by the Environmental Officer's for both Tarrawonga and Rocglen mines ensuring blasts are not scheduled for the same time.	Noted see responses above.	Compliant				
	4.3 Property Investigations							
Blast Management Plan	4.3	In accordance with Schedule 3, Condition 18 of PA 11_0047, if any owner of privately-owned land within 2 kilometres of blasting operations, or any other landowner nominated by the Director-General, claims that the buildings and/or structures on his/her land have been damaged as a result of blasting on site, then within 2 months of receiving this claim in writing from the landowner, the Proponent shall: (a) commission a suitably qualified, experienced and independent person, whose appointment is acceptable to both parties, to investigate the claim; and (b) give the landowner a copy of the property investigation report.	No such claims	Not Applicable				
Blast Management Plan	4.3	If this independent property investigation confirms the landowner's claim, and both parties agree with these findings, then the Proponent shall repair the damages to the satisfaction of the Director-General.	Noted					
Blast Management Plan	4.3	If there is a dispute over the selection of the suitably qualified, experienced and independent person, or the Proponent or landowner disagrees with the findings of the independent property investigation, either party may refer the matter to the Director-General for resolution.	Noted					
	5 Monitoring and Reporting							
	5.1 Monitoring Program							
	5.1.1 Parameters Measured and Monitoring Frequency							
Blast Management Plan	5.1.1	EPL 12363 specifies the following monitoring parameters to be monitored. Monitoring must be undertaken for each blast as specified in Table 2. Table 2 Monitoring Parameters Parameter / Units of Measure / Frequency / Sampling Method Blast Noise / DB(Lin Peak) / Every Blast / Type 1 Noise Blast Logger Blast Vibration / mm/s / Every Blast / Geophone Logger or Similar	Some events don't comply due to missed monitoring data - blast results records show a number of missed results due to lack of triggering. Interview with EO indicated that these results were from a period where a contractor managed blasting including monitoring. Currently, blasting and monitoring is managed by TCL and there have been no missed results since the contractor left site. **No action required by TCL as the issue has been resolved.**	Not Compliant	E	3	Low	
Blast Management Plan	5.1.1	In addition to blast monitoring at the nominated sites, TCM also completes an Environmental Blast Checklist which includes a notification checklist, pre-blast weather conditions assessments every hour prior to the blast (commencing at 5 hours prior to the blast) and at the time of the blast and a post-blast assessment which includes fume rating (Appendix 4).	Sighted on-site	Compliant				
	5.1.2 Monitoring Locations							

Reference	Clause	Requirement	Evidence	Audit Finding	Risk			Responsibility
					Consequence	Likelihood	Risk	
Blast Management Plan	5.1.2	EPL 12365 currently requires monitoring to be conducted at the residence listed in Table 3 and shown in Figure 2. In addition to point N1, monitoring is also conducted at the project related "Matong" property for TCM purposes to account for any identified impacts to the South East of the mine (Table 3 and Figure 2). Table 3 Monitoring Locations EPA Identification No. | Description of Location N1 | Within 30m of the residence on property 'Tarrawonga'	These are the sites that are monitored regularly.	Compliant				
Blast Management Plan	5.1.2	The 'Tarrawonga' property has been acquired by Whitehaven and is now project related; therefore the blast monitor will be relocated to the 'Braymont' property located to the South-Southwest of the mine. This relocation will take place once EPL 12365 variation has been approved by the EPA. In the meantime, blast monitoring will continue at the "Tarrawonga" residence as it will continue to provide indicative blasting impacts given its close proximity to the Tarrawonga site.	Noted, License still specifies Tarrawonga as license monitoring point N1	Compliant				
Blast Management Plan	5.1.2	In addition to monitoring of blast overpressure and vibration, each blast is monitored visually for indications of fume or any ejection from the shot face. All blasts are also captured via video for playback in the event of a blast not performing to expectations. This allows for subsequent review and identification of possible contributors to a blast outcome.	Complies, observed whilst onsite	Compliant				
	5.1.3 Permanent Blast Monitors							
Blast Management Plan	5.1.3	Permanent Dynamate blast monitors are currently established at the project related "Matong" property and privately owned Tarrawonga property (refer to section 5.1.2 for update) to monitor air-blast overpressure (dBL) and peak particle velocity in a radial, vertical and transverse direction (mm/s), i.e. ground vibration. After each blast, information gathered on a blast can be downloaded via the internet or wireless download. These are then analysed by the blast technician and the environmental officer to check compliance with blasting criteria. The monitors are subject to quarterly maintenance inspections by the supplier, as well as annual calibration.	As noted in AEMR Maintenance and calibration records provided as evidence	Compliant				
Blast Management Plan	5.1.3	The Dynamate blast monitors do not require any pre-blast set up and operate continuously. The monitors do not require any post-blast download, with data available from the host platform immediately following the blast. The blast results will be delivered to the key personnel (Operations Manager, Blast Engineer and Environmental Officer) via text message and email immediately following the blast. Further analysis of blast results can then be undertaken by accessing the web platform. The monitors are compliant with Australian Standard AS2187.2-2006.	Noted					
	5.2 Reporting							
Blast Management Plan	5.2	Blast monitor results are available to relevant Whitehaven personnel, including the Environmental Department, immediately following the blast via SMS, Email or online. The Environmental Blast Checklist is filed onsite once completed.	Observed on-site post blast	Compliant				
Blast Management Plan	5.2	Blast monitoring results will be reported via quarterly Community Consultative Committee (CCC) meetings and annually to relevant government agencies through the AEMR/Annual Review.	AEMRs and CCC minutes support this	Compliant				
Blast Management Plan	5.2	Blast results are reported in accordance with EPL 12365 in the monthly and annual returns.	Exceedances reported in annual returns, and in monthly reporting that is on the website.	Compliant				

Reference	Clause	Requirement	Evidence	Audit Finding	Risk			Responsibility
					Consequence	Likelihood	Risk	
	6 Management of Incidents, Exceedances, Non Compliances and Complaints							
	6.1.1 Blasting Related Incidents							
Blast Management Plan	6.1.1	Safety related incidents (such as misfires) will be recorded and managed via the Whitehaven incident management process. Such incidents are managed in accordance with the Coal Mine Health and Safety Act 2002 and Coal Mine Health and Safety Act Regulation 2006, including notification to DRE NSW and the District Check Inspector by the site's Manager Mining Engineering.	Confirmed at interview (D&B Eng)	Compliant				
	6.1.2 Blasting Criteria Exceedance							
	6.1.2.1 Agency Notification							
Blast Management Plan	6.1.2.1	In the event that the monitoring results of a blast identify an exceedance of: • Peak vector sum velocity (ground vibration) – 5mm/s (ppv); and/or • Peak overpressure – 115dBL, TCM will initiate investigation with Orica Mining Services as to the cause of the exceedance.	Noted see blast register, Orica are no longer the drill and blast contractor. Sighted investigation documents whilst onsite.	Compliant				
Blast Management Plan	6.1.2.1	It is noted that the above criteria are able to be exceeded for up to 5% of the blasts in any one year but not to exceed a: • Peak vector sum velocity (ground vibration) - 10mm/s (ppv); and/or • Peak overpressure – 120dBL.	Blast register indicates that the 5% limit was not exceeded in the audit period. AEMRs support this.	Compliant				
Blast Management Plan	6.1.2.1	As required by Conditions 5(8) and 5(9) of PA 11_0047 and EPL 12365 Condition R2, TCM must notify DoPI and EPA of any blasting related non-compliances or exceedances as soon as practicable after TCM becomes aware of the issue. Additionally, within 7 days of the date of the incident, TCM must provide DoPI and EPA with a detailed written report on the incident. The report would include details such as the date, time and nature of the non-compliance or exceedance, the cause or likely cause, the action taken to date and proposed measures to minimise potential for non-compliances or exceedances with future blasts.	No exceedence of blast criteria in the audit period	Not Applicable				
Blast Management Plan	6.1.2.1	Exceedances will also be reported in the blasting discussion in the AEMR/Annual Review.	No exceedence of blast criteria in the audit period	Not Applicable				
	6.1.2.2 Landholder Notification							
Blast Management Plan	6.1.2.2	As required by Condition 3 of Schedule 4 of PA 11_0047, results obtained showing an exceedance of blasting criteria, TCM will notify the affected landowners and tenants in writing of the exceedance as soon as practicable, and provide regular monitoring results to each of these parties until the mine is complying with the relevant criteria.	No exceedence of blast criteria	Not Applicable				
	6.1.3 Complaints							

Reference	Clause	Requirement	Evidence	Audit Finding	Risk			Responsibility
					Consequence	Likelihood	Risk	
Blast Management Plan	6.1.3	Any complaints received will be managed in accordance with complaints management protocol described as follows: • A publicly advertised telephone complaints line will be in place to receive complaints during operating hours and record complaints at other times. • Each complaint received will be recorded on a Complaints Register, which will include the following details: o The date and time of complaint. o Any personal details the complainant wishes to provide or if no such details are provided a note to that effect. o The nature of the incident that led to the complaint. o The action taken by TCM in relation to the complaint, including any follow-up contact with the complainant. o If no action was taken by TCM, the reason why no action was taken.	See other complaints results elsewhere in the audit	Compliant				
Blast Management Plan	6.1.3	• The Environmental Manager will be responsible for ensuring that an initial response is provided within 24 hours of receipt of a complaint (except in the event of complaints recorded when the mine is not operational).	See other complaints results elsewhere in the audit	Compliant				
Blast Management Plan	6.1.3	• Additional measures will be undertaken as required to address the complaint. This may include visiting the complainant, or inviting the complainant to the mine site.	See other complaints results elsewhere in the audit	Compliant				
Blast Management Plan	6.1.3	• Once the identified measures are undertaken, the Environmental Manager will sign off on the relevant complaint within the Complaints Register.	See other complaints results elsewhere in the audit	Compliant				
Blast Management Plan	6.1.3	• If necessary, follow-up monitoring or will take place to confirm the source of the complaint is adequately mitigated.	See other complaints results elsewhere in the audit	Compliant				
Blast Management Plan	6.1.3	• A copy of the Complaints Register will be kept by TCM and made available to the Tarrawonga Coal Mine Community Consultative Committee (CCC) and the complainant (on request). Complaints are also listed on the Whitehaven website (www.whitehavencoal.com.au) and a summary of complaints received every 12 months will be provided to DoPI, NSC, GSC, EPA, DRE and the CCC through the AEMR/Annual Review.	CCC minutes show this takes place	Compliant				
Blast Management Plan	6.1.3	Based on the nature of individual complaints, specific contingency measures may be implemented to the (reasonable) satisfaction of the complainant. The Environment Manager retains ultimate responsibility to ensure that complaints received are properly recorded and addressed appropriately.	Noted					
7 Documentation and Continuous Improvement								
Blast Management Plan	7	This document will be reviewed following any significant changes (ie. changes to monitoring locations) and in accordance with Schedule 5, Condition 5 of PA 11_0047 which states: 5. Within 3 months of the submission of an: (a) annual review under condition 4 above; (b) incident report under condition 8 below; (c) audit under condition 10 below; or (d) any modification to the conditions of this approval, the Proponent shall review, and if necessary revise, the strategies, plans and programs required under this approval to the satisfaction of the Director-General.	Reviews occur, from interview with EO but there is no documentation to show the review has occurred. For example, there has been an Annual Review in the audit period but there is no evidence of review of the BMP following the Annual Review. Recommendation made	Compliant				
Blast Management Plan	7	Each review will be undertaken in consultation with relevant stakeholders and will be submitted to the Director-General for approval.	There is no evidence of consultation and approval by the DG of reviews of the BMP but the plan is not twelve months old and hs not yet been approved.	Not Applicable				

Reference	Clause	Requirement	Evidence	Audit Finding	Risk			Responsibility
					Consequence	Likelihood	Risk	
Blast Management Plan	7	TCM will investigate and implement ways to improve the environmental performance of the project over time. This will be achieved by keeping abreast of best practice in the industry for blast management and monitoring options and reporting on outcomes of blasting in the AEMR/Annual Review.	Networking - D&B Eng	Compliant				

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
	Blast Management Strategy - January 2013						
	3 Regional Strategies						
Blast Management Strategy - January 2013	3	The conditions of approval for the Boggabri Coal Mine and Maules Creek Coal specifically require the three mines of the BTM Complex produce joint strategies for: - noise management - blast management - air quality management - water management - regional biodiversity (developed over 3 stages) - biodiversity offsets.	Noted				
Blast Management Strategy - January 2013	3	Additionally, the conditions require cooperation and consultation between the mines with respect to: - Aboriginal heritage conservation - operational noise and air quality management, including online communications of onsite activities and monitoring; operating conditions and reactive dust management; and air quality and Greenhouse Gas (GHG) management - transport, specifically options for transporting workers - management of social impacts - membership of Community Consultative Committees (CCC).	Noted				
	4 Blasting criteria						
	4.1 Boggabri Coal Mine						
Blast Management Strategy - January 2013	4.1	The relevant blasting criteria have been extracted from the most recent BCPL Project Approval, and are summarised in Table 4.1. Table 4.1 Boggabri Coal Mine blasting assessment criteria Location / Airblast overpressure (dB(Lin Peak)) / Ground vibration (mm/s) / Allowable exceedance Residence on privately owned land: 120 / 10 / 0% 115 / 5 / 5% of the total number of blasts over a period of 12 months All public infrastructure: - / 50 (or alternatively a specific limit determined to the satisfaction of the Director-General by the structural design methodology in AS2187.3-2006, or its latest version) / 0%	Noted, these are the same criteria at each site.				
Blast Management Strategy - January 2013	4.1	The process for day to day management of compliance with respect to these conditions is outlined in the BCPL Blast Management Plan (BLMP).	Noted				
	4.4 BTM Complex						
Blast Management Strategy - January 2013	4.4.	Table 4.4 summarises the current assessment criteria for the three mines of the BTM Complex. Table 4.4 BTM Complex blasting assessment criteria Criteria / Boggabri / Tarrawonga / Maules Creek Blasting Hours: 9AM – 5PM / 9AM – 5PM / 9AM – 5PM Blasting Days: Monday to Saturday inclusive, excluding public holidays. Blasting outside of these days require written approval of the Director-General / Monday to Saturday inclusive, and no blasting is allowed on Sundays, public holidays or at any other time without the written approval of the Director-General / Monday to Saturday, excluding Sundays and public holidays unless prior approval from Office of Environment and Heritage (OEH) is given. Blasting Frequency: 1 blast per day, unless an additional blast is required following a blast misfire; and 4 blasts a week, averaged over a calendar year (i.e. maximum of 208 blasts per annum). / 1 blast per day, unless an additional blast is required following a blast misfire. / Up to an average of 4 blasts per week, or approximately 200 blasts per calendar year.	Noted				
	5 Blast monitoring						
	5.1 Existing monitoring network						

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Blast Management Strategy - January 2013	5.1	The mines of the BTM Complex already have comprehensive blast management systems in place. The existing blast monitoring network will continue to be used.	Noted				
Blast Management Strategy - January 2013	5.1	It is expected that little change will be required to the existing blast monitoring network to continue to ensure compliance with respect to blasting in the BTM Complex. However, there will need to be additional cooperation between mines of the BTM Complex, to minimise the potential for cumulative impacts. Protocols described in this BLMS will be used with the existing monitoring programs to ensure that blasting schedules are coordinated to avoid cumulative impacts on sensitive receivers.	Noted				
	5.2 Predictive forecast meteorology						
Blast Management Strategy - January 2013	5.2	It is proposed that more extensive changes will be made to the air quality networks within the BTM Complex in order to manage compliance. The changes, which are detailed in the BTM Complex Air Quality Strategy, include a proposed predictive forecast meteorology system, with half hourly forecasts up to 48 hours in advance. This system will download global meteorological data and forecasts on a daily basis that will be used to guide the planning of blasting activities.	Not yet implemented as the strategies are still draft.	Not Applicable			
Blast Management Strategy - January 2013	5.2	Once the proposed meteorological system is configured and operating, the outcomes will be evaluated by a competent meteorologist or atmospheric science professional against actual meteorological data and the meteorological system will be validated and improved, where possible.	Not yet implemented as the strategies are still draft so no peer review at this point.	Not Applicable			
	6 Cumulative blast management						
	6.1 Mitigation of cumulative blast impacts						
Blast Management Strategy - January 2013	6.1	The key management measure for the mitigation of cumulative blast impacts will be scheduling of blasts to ensure each mine fires their blast at a separate times. Processes to mitigate blasting impacts associated with operations will be addressed in each mines' individual BLMPs. Each mine has or will develop a BLMP that outlines a consistent approach for the scheduling of blasts in consultation with other mines in the BTM Complex.	See BMP, sites share blasting schedules and blast at different times of the day reducing the risk of cumulative impact.				
Blast Management Strategy - January 2013	6.1	At least 24 hours' notice will be provided prior to a proposed blast. If there is no conflict regarding the scheduled blast times, there will be no further correspondence. If there are conflicting blast times between the mines, a revised schedule for firing the blasts will be agreed upon. The schedule will be developed to ensure blasts are fired with a considerable time gap between them to reduce any potential cumulative impacts.	This occurs see Blast MP	Compliant			
	6.2 Communication						
Blast Management Strategy - January 2013	6.2	Regular meetings will be held by the BTM Complex to discuss monitoring results and future operational events. Meeting minutes will be documented and distributed to each site.	this occurs, confirmed in inertview with EO	Compliant			
Blast Management Strategy - January 2013	6.2	When blasting criteria are identified as exceeded, discussions will be held within the BTM Complex and the agencies and affected landholders (where an exceedance occurs on privately-owned land).	No exceedences have occurred so this cannot yet be tested.	Not Applicable			
Blast Management Strategy - January 2013	6.2	The mines of the BTM Complex will also, if required, share baseline property inspection reports that are completed at the request of neighbouring landholders, in accordance with each site's Project Approval. Process to identify main source of blasting impacts	No inspection reports have been completed (or requested)	Not Applicable			

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Blast Management Strategy - January 2013	6.2	If there is uncertainty around the source of a blasting related incident (e.g. exceedance of assessment criteria or damage to a neighbouring building or other infrastructure), a meeting will be held by the BTM Complex representatives to review relevant data and investigate the cause of the incident. If the cause cannot be determined, then the BTM Complex will engage a suitably qualified expert to undertake an independent blast impact investigation. The outcomes of the investigation will help determine the responsibility of the mines for any corrective actions.	Noted				
	6.3 Blasting related incidents						
Blast Management Strategy - January 2013	6.3	Blasting related incidents such as misfires or exceedances of assessment criteria will be reported and managed in accordance with each mines' BLMP and incident management process. Incidents will be managed in accordance with the requirements of the Protection of the Environment Operations Act 1997, Coal Mine Health and Safety Act 2002 and Coal Mine Health and Safety Act Regulation 2006.	Noted				
	6.4 Reporting						
Blast Management Strategy - January 2013	6.4	Management reports will be prepared regularly, noting performance against criteria. External reporting will include: - individual Company websites - Community Consultative Committees (CCCs) - Annual Environmental Management Reports (AEMRs) - annual returns - exceedance reporting.	See BMP	Compliant			
	7 Corrective and preventative actions						
	7.1 Blasting criteria exceedance						
Blast Management Strategy - January 2013	7.1	If the monitoring results of a blast identify an exceedance of the mines relevant criteria, written notification of the exceedance will be provided to the other mines within the BTM complex, in addition to any investigation undertaken according to the respective mine's BLMP.	Noted				
	8 Document control						
Blast Management Strategy - January 2013	8	The BLMS has been developed with the input of representatives of BCPL, TCM and MCC.	Noted				
	8.1 Review and revision						
Blast Management Strategy - January 2013	8.1	The BLMS will be reviewed and revised at least every two years or on an 'as required' basis to incorporate improvements identified by the BTM Complex or appropriate requirements of government agencies. It will be the collective responsibility of the BTM Complex to review the BLMS.	Plan is not 2 years old yet, not required	Not Applicable			

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
WHC_PLN_TAR_Blast Monitoring Program							
2 Pre-blasting Property Inspections							
Blast Monitoring Program	2	As a requirement of Conditions 4(20) and 4(21) of DA 88-4-2005, TCPL advised all landowners within a 2km radius of the planned blasting operations on the mine site, and additional landowners as advised by the Director-General, that they were entitled to a property inspection, at least 2 months prior to any blasting. Figure 2 depicts land ownership and residences around the Project Site.	Noted, the property inspections occurred prior to the audit period and there have been no new requests or direction from the DG in the audit period.	Not Applicable			
Blast Monitoring Program	2	In the event a written request is made by any of the private landowners / residents within 2km, or any other landowner nominated b the Director-General, TCPL will, within 2 months of receiving the request: • commission a suitably qualified person, whose appointment has been approved by the Director-General, to inspect the condition of any building or structure on the land, and recommended measures to mitigate any potential blasting impacts; and • give the landowner a copy of this property inspection report.	No such requests	Not Applicable			
3 Pre-Blasting Notification							
Blast Monitoring Program	3	In addition to notification to each landowner regarding their entitlement to a property inspection, TCPL will provide written notification, at least 2 weeks prior to the commencement of blasting, on the following. • The company's proposed blasting timetable and duration. • A plan showing Blast Monitoring Locations. • The procedure for reporting possible blasting related damage to a residence or other vibration infrastructure (such as water supply or underground irrigation mains), and the entitlement of any landowner within a 2km of proposed blasting activities, to an investigation of the damage claims. • The disputes resolution procedure of TCPL.	Noted - This occurred prior to the audit period.	Not Applicable			
Blast Monitoring Program	3	In addition, TCPL will provide specific notification of individual blasts to any person who registers an interest in being notified about the blasting schedule at the mine. Notification will involve: • a letter, nominating a planned blast date, will be hand delivered on the day before each blast. The letter would provide the indicative time for the blast; and • a telephone call during the morning of the blast to confirm the blast will proceed at the nominated (or varied) time.	Sighted phonecall list plus e-mail list, these are recorded with the preblast enviro checklist on the network.	Compliant			
Blast Monitoring Program	3	TCPL will also provide the adjacent Boggabri Coal Mine with a copy of its planned blasting schedule on a weekly basis to provide at least one weeks notice of blasts planned within the open cut area.	Done and they are on the blast e-mail list.	Compliant			
4 Blast Monitoring Locations							
Blast Monitoring Program	4	Air-blast overpressure and ground vibration will be measured at these monitoring locations for all blasts throughout the remaining life of the mine by Orica as the Blasting Contractor. Results of the monitoring will be forwarded to TCPL on the day of each blast. The three nominated blast monitoring locations (referred to as TB-1 and TB-2) are shown on Figure 2.	Orica are no the Blast contractor, TCL now use there own drill and blast team. Results are recieived by SMS	Compliant			

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Blast Monitoring Program	4	It should be noted that monitoring is not proposed on project related residences, except for "Templemore" (TB-2). However, in the event that the occupier of another project related resident lodges a complaint in relation to blasting, or requests monitoring at the residence, an additional monitor will be deployed.	Noted, the mobile monitor was located at Callendar for two blasts and did not trigger on both occasions	Compliant			
Blast Monitoring Program	4	In addition to the nominated sites, TCPL will also: • observe flyrock/blast rock distribution for each blast; and • video each blast to assist in the interpretation of results.	This occurs	Compliant			
	5 Blast Monitors						
Blast Monitoring Program	5	Only calibrated monitors will be used for blast monitoring with copies of calibration certificates or other means of verification available at the Tarrawonga Coal Mine. The date of last calibration is automatically printed on each monitor print-out.	Certificates provided as evidence	Compliant			
	6 Procedures						
	6.1 Noise Monitoring Procedures						
Blast Monitoring Program	6.1	All aspects of blast monitoring will be undertaken by Orica Explosives in accordance with AS 2187.2-1993- Storage, Transport and Use – Use of Explosives, a copy of which will be retained at the Tarrawonga Coal Mine Site Office.	See the Explosives Management plan and Explsives Security plan.	Compliant			
	6.2 Blast Impact Assessment Criteria						
Blast Monitoring Program	6.2	In accordance with Condition 4(13) and 4(14) of DA 88-4-2005, the air-blast overpressure and ground vibration impact assessment criteria will be as presented in Tables 2 and 3. Table 2 *Air-blast Overpressure Impact Assessment Criteria* Air-blast Overpressure Level (dB(Lin Peak)) / Allowable Exceedance 115 / 5% of the total number of blasts in a 12 month period 120 / 0% Note: The overpressure values in Table 2 apply when the measurements are performed with equipment having a lower cut-off frequency of 2 Hz or less. If the instrumentation has a higher cut-off frequency a correction of 5 dB should be added to the measured value. Equipment with a lower cut-off frequency exceeding 10 Hz should not be used. Table 3 *Ground Vibration Impact Assessment Criteria* Peak particle velocity (mm/s) / Allowable exceedance 5 / 5% of the total number of blasts in a 12 month period 10 / 0%	Noted, covered elsewhere	Compliant			
	6.3 Trigger Levels						
Blast Monitoring Program	6.3	In recognition of the distance between the proposed blast locations and local residences to be monitored, far field trigger levels of between 0.3mm/s and 0.4mm/s (for ground vibration) and 111.7dBL to 111.9dBL (for air-blast overpressure) have been adopted for the Tarrawonga Coal Mine.	noted				
	6.4 Pre-Check						

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Blast Monitoring Program	6.4	Prior to monitors being placed in the field, the following aspects will be verified for each instrument. (i) Battery is charged. Note: batteries will be placed on charge immediately following data downloading from each blast. (ii) Date and time are correct. (iii) Location (Site) for each monitor is marked on the carry case. (iv) Instrument "fields" are correctly set to reflect the distance from the blast site to identified monitor location. The instrument fields, i.e. near, medium and far, determine the period of recording for air-blast once the monitor is triggered on either ground vibration or air-blast itself. (v) Instrument trigger levels are set to minimize the potential for false initiation of the recording sequence by, for example, wind, but will record air-blast or ground vibration events approaching or greater than the standard vibration criteria of 115dBL and 5mm/s respectively. For the far field setting, triggers would typically be set between 0.3 and 0.4mm/s and 111.7 and 111.9dBL. (vi) Setting adjustment as necessary. (vii) Print off a confirmation of settings from the logger.	Not relevant as Datamaster system now used	Not Applicable			
Blast Monitoring Program	6.4	In order to ensure consistency, a sheet identifying the monitor settings for each blast monitoring site will be retained at the site office and adjusted as necessary to reflect, for example, increasing or decreasing distances to the blast site and monitoring results, e.g. false trigger frequency.	Not relevant as Datamaster system now used	Not Applicable			
	6.5 Field Set-Up						
Blast Monitoring Program	6.5	The instrument will be set up at the pre-selected location at each monitoring point, between 3.5m and 30m from the residence or building to be monitored. The instrument set-up procedures involve the following steps. (i) Insert the soil spike into the ground and level the geophone. (ii) Set up microphone. (iii) Connect microphone and geophone to the monitor. (iv) Turn power on. Powering up the monitor initiates a self check culminating in a VDU advice that the instrument is functioning properly. (v) Press "start". Following a countdown sequence, the monitor moves into a "standby mode" awaiting triggering.	Not relevant as Datamaster system now used	Not Applicable			
Blast Monitoring Program	6.5	Prior to initiation, a mine Site Blast Check List form which includes verification that the monitors are in place and records salient weather data, e.g. wind direction and cloud cover, will be completed and signed by the shot-firer.	Not relevant as Datamaster system now used	Not Applicable			
	6.6 Post Blast - In the Field						
Blast Monitoring Program	6.6	Following the completion of each blast, the following activities will be undertaken prior to the monitor being returned to the office for data downloading. (i) Press "stop" button. (ii) Turn power off. (iii) Disconnect microphone and geophone (iv) Remove soil spike. (v) Pack instrument up.	Not relevant as Datamaster system now used	Not Applicable			
	6.7 Post Blast - At the Office						

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Blast Monitoring Program	6.7	On the return of each monitor to the office, the blasting contractor will: (i) retrieve / download the data to the office computer; (ii) review the data and delete any data pertaining to false triggers, ie. triggers before the blast initiation time; (iii) generate a results print-out sheet (in Microsoft Word) and insert relevant data relating to the blast, e.g. blast pattern, hole spacing, number of rows, number of holes, blast-hole diameter, stemming, MIC, explosives type and weight, delay type (interval and duration (ms)) and any relevant comments or observations. An example of a typical results sheet from the Tarrawonga Coal Mine is attached as Appendix 2; (iv) print off and distribute the results to the nominated recipients. Prior to the commencement of blasting activities, the owner of each building where monitoring is undertaken, will be asked if they would like to receive copies of the relevant blast results. Result distribution may be by email, fax or in hardcopy as appropriate or requested. Copies of the printouts, the mine site blast checklist and details such as blast design, charging and tie-in pattern are retained on the mine site files; (v) transfer the data for the blast to an Excel spreadsheet; and	Not relevant as Datamaster system now used	Not Applicable			
Blast Monitoring Program	6.7	(vi) place monitor battery on charge to await the next blast. (vii) In the event of an exceedance of blast criteria, or if a complaint is received, the blast contractor, in consultation with the Environmental Officer, will review video footage of the blast to assist in determination of causes or conditions which may have contributed to the exceedance.	Not relevant as Datamaster system now used	Not Applicable			
	7 Flyrock Distribution Monitoring						
Blast Monitoring Program	7	Following each blast, the area surrounding the blast site will be inspected and flyrock distribution to the front, rear and both sides of the blast site observed.	Confirmed at interview D&B eng	Compliant			
	8 Blast Criteria Exceedance Management Reporting						
Blast Monitoring Program	8	In the event that the monitoring results of a blast identify an excedance of: • peak vector sum velocity (ground vibration) – 5mm/s (ppv); and/or • peak overpressure – 115dBL,					
Blast Monitoring Program	8	WCMPL, as the holder of an Environment Protection Licence under the Protection of the Environment Operations Act 1997, will report the incident to DECC (EPA) Armidale (6773 7000) and initiate investigations as to the cause. In accordance with the PA 06_0198, Schedule 4, Conditions 3, 4 and 5, any excedance in blast criteria will also result in notification to the Department of Planning (DoP) and DECC within 24 hours of the occurrence of the excedance. Additionally, within 6 days of the notification, WCMPL will provide a written report to both DoP and DECC identifying the date, time and nature of the excedance, the cause or likely cause of the excedance, the action that has been taken to date relating to the excedance, and proposed measures to minimise potential for excedance in future blasts. WCMPL will also report any excedance in blasting criteria in the Annual Environmental Management Report (AEMR).	No blast exceedences in the audit period	Not Applicable			

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Blast Monitoring Program	8	It is noted that the above criteria are able to be exceeded for up to 5% of blasts in any one year, but not to exceed a: • peak vector sum velocity (ground vibration) – 10mm/s (ppv); and/or • peak overpressure – 120dBL. In the event any blast causes these criteria to be exceeded, the DECC and DoP will similarly be notified in accordance with the requirements identified above.	5% not exceeded, no 5-10mm/s and 2 in 115-120dBA both investigated even though they were on company owned land.	Compliant			
9 Blast Complaint Management Procedures							
Blast Monitoring Program	9	Any general complaint received relating to any blast will be managed in accordance with the complaints receipt and response procedure presented in the Tarrawonga Coal Mine Environmental Management Strategy and summarised below. (i) Details of the complainant and complaint will be recorded in the complaints log. (ii) TCPL representatives will liaise with the complainant to ascertain all details, to identify the nature and source of the complaint and provide supplementary information for the log. (iii) Investigations will be initiated to verify or otherwise the basis for the complaint. (iv) Results of the investigation will be provided to the complainant together with advice as to any changed blast management practices to be implemented as a consequence of the investigation.	The complaints log supports this	Compliant			
Blast Monitoring Program	9	Complaints pertaining to blast-related damage will be managed in accordance with Condition 4(22) of DA 88-4-2005	No complaints in the audit period regarding damage associated with blasting, only loss of amenity	Not Applicable			

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
WHC_PLN_TAR_Road Closure Management Plan							
Road Closure Management Plan	NA	Ensure the public are well informed of any temporary road closures on Goonbri Road and Dripping Rock Road due to blasting at Tarrawonga and ensure minimal disturbance to traffic during blasting periods.	Noted, no road closures in the audit period to test.	Not Applicable			
Road Closure Management Plan	NA	Tarrawonga neighbours Those neighbours who have requested to be notified of blasts including the closure of local roads, will be advised by telephone on the day of the blast by the Environmental Officer or Site Clerk for Tarrawonga Coal.	Closure list of neighbours similar to blast list are contacted (note no road closures in the audit period)	Compliant			
Road Closure Management Plan	NA	Unless specifically requested, NSC will not receive advice for every road closure.	Noted				
Road Closure Management Plan	NA	All road closures will be performed, where possible, at a time to minimise impact on road users and the local school bus run. Blasting is not permitted before 9am which will avoid peak traffic times in the morning. Whitehaven will avoid blasting during the peak afternoon traffic time between 3:30pm and 5:30pm but reserves the right to blast until 5pm, in accordance with the Project Approval.	Blasting is generally between 11 and 2.	Compliant			
Road Closure Management Plan	NA	Where possible, blasts will be scheduled to occur at approximately 12 noon to maintain consistency of blast times.	Blasting is generally between 11 and 2.	Compliant			
Road Closure Management Plan	NA	Emergency Services Should any emergency services approach a road closure point and be required to pass to attend an emergency, the traffic controller will arrange for the emergency service vehicles to be escorted through the road closure station as soon as the route can be made safe. This may include contacting the blast controller to temporarily delay the firing of the blast.	Noted				
Road Closure Management Plan	NA	Traffic Control Traffic control points will be established on the affected road. These locations will remain relatively constant, however may require some modification due to prevailing conditions on the day of blasting. At a minimum a control point will be established at the intersection of the Goonbri Road and the Tarrawonga Haul Road and at the intersection of Goonbri Road and Dripping Rock Road. Control points will be revised as the pit progresses in an easterly direction. Any changes will be undertaken in consultation with NSC.	Noted				
Road Closure Management Plan	NA	As a minimum, the traffic control points will include one sentry for the purpose of traffic control, together with all equipment necessary for the safe control of the road. All sentries will be in two-way contact with the blast controllers.	Noted				
Road Closure Management Plan	NA	All road sentries will travel to the road closure points and open all necessary signage advising of the temporary road closure due to blasting. Once all signage is positioned the sentries will await direction from the blast controller.	Noted				
Road Closure Management Plan	NA	Traffic control point signage will consist of permanent fold out signs situated adjacent to the road.	Noted				

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Road Closure Management Plan	NA	Once the blast is ready to be fired, the traffic controllers will be directed to close the road. The road sentry shall drive the entire route to ensure all vehicles are clear of all road closure points. Once the area has been confirmed to be clear of vehicles the road sentry will notify the blast controller and the blast will be fired in accordance with the site procedure for blasting. At the completion of the blast, the "all clear" is given by the Shotfirer.	Noted				
Road Closure Management Plan	NA	All necessary signage will be closed at the conclusion of the road closure and be padlocked shut by the road sentry.	Noted				
Road Closure Management Plan	NA	Blasting frequency and requirements for road closure will vary with mine development. There will be no more than one blast per day, unless in the case of a misfire, and a maximum of four blasts per week, averaged over 12 months. Where road closure is required, it is expected that the road will be closed for approximately 15 minutes for each blast.	Noted, blast frequency complies with this				
Road Closure Management Plan	NA	Incident Reporting Incident reporting as per procedures identified in the Environmental Management Strategy for the Site.	No incidents	Not Applicable			
Road Closure Management Plan	NA	Complaints Management Complaints management as per procedures identified in the Environmental Management Strategy.	No incidents	Not Applicable			
Road Closure Management Plan	NA	Incident Response – Exceedance or Complaint Investigate event and identify operational location, timing and climatic conditions to determine if additional management measures are required.	No incidents	Not Applicable			
Road Closure Management Plan	NA	Any incidents will be reported in the Annual Environmental Management Report/Annual Review	No incidents	Not Applicable			

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
	WHC_PLN_TAR_Air Quality & Greenhouse Gas Management Plan						
	3 Air Quality Controls and Management Procedures						
	Vegetation Clearing and Soil Stripping						
Air Quality & Greenhouse Gas Management Plan	3	• Cleared trees and branches are retained where possible for the use in stabilising slopes identified for rehabilitation with native woodland communities.	This done as sighted on site	Compliant			
Air Quality & Greenhouse Gas Management Plan	3	• Where practicable, soil stripping is undertaken at a time when there is sufficient soil moisture to prevent significant dust lift-off.	Soil stripping procedure.	Compliant			
Air Quality & Greenhouse Gas Management Plan	3	• Stripping soil is avoided in periods of high winds.	Soil stripping procedure.	Compliant			
Air Quality & Greenhouse Gas Management Plan	3	• Dust suppression by water application is used to increase soil moisture if stripping occurs during periods of high wind or low soil moisture.	Soil stripping procedure.	Compliant			
Air Quality & Greenhouse Gas Management Plan	3	• Vegetation clearance and soil stripping will be confined to an area sufficient for the following 12 months mining activities. This will minimise impact on hibernating/roosting/nesting fauna, and minimise the areas exposed to dust lift off as much as practically possible.	Mine planning, Soil stripping procedure, Biodiversity Management Plan.	Compliant			
	Drilling and Blasting Activities						
Air Quality & Greenhouse Gas Management Plan	3	• Drill rigs utilise water injection or alternatively, are fitted with dust collectors.	Water injection	Compliant			
Air Quality & Greenhouse Gas Management Plan	3	• Blast hole stemming is used to prevent venting of explosion gases.	Sighted	Compliant			
Air Quality & Greenhouse Gas Management Plan	3	• Blasting is conducted both before the establishment, and after the break-up of low-level atmospheric temperature inversions.	Blast assessment enviro checklist	Compliant			
Air Quality & Greenhouse Gas Management Plan	3	• Blasting will be subject to a regular assessment of weather conditions prior to and on the day of a blast, to ensure that wind speed and direction will not result in significant dust emissions or blast fume impacts on neighbouring residences.	Blast assessment enviro checklist	Compliant			
Air Quality & Greenhouse Gas Management Plan	3	• Review of geological conditions to inform blast design;	Geology considered in design including faults and anomolies and general strata information	Compliant			
Air Quality & Greenhouse Gas Management Plan	3	• Minimise the time between drilling, loading and shooting the blast	Noted				
Air Quality & Greenhouse Gas Management Plan	3	• The following factors contributing to non-ideal detonation behaviour and higher emission (principally NO2) concentrations are avoided whenever possible. o weak overburden which reduces the necessary explosive confinement is ripped in preference to blasting. o water infiltration. o long explosive columns. o explosive pre-compression, caused by hole-to-hole shock propagation due to wet overburden and clay veins.	Noted				
	Overburden Ripping and Coal Mining						
Air Quality & Greenhouse Gas Management Plan	3	• Ripping of softer overburden material is avoided during periods of high wind.	OCE discussion	Compliant			

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Air Quality & Greenhouse Gas Management Plan	3	• Low moisture coal is sprayed with water prior to excavation to raise moisture content to > 5.5%.	OCE discussion	Compliant			
Air Quality & Greenhouse Gas Management Plan	3	• Use predictive meteorological forecasting and predictive air dispersion modelling, together with real time monitoring data to inform operational practices in advance of the commencement of shift. This will aid in the day to day planning of mining activities giving due consideration to prevailing weather conditions and potential for dust generation and dispersion.	This is not done yet, predictive air dispersion medelling has not been implemented, the plan is not yet approved..	Not Compliant	D	2	Medium
	Internal Road and Hardstand Area Construction						
Air Quality & Greenhouse Gas Management Plan	3	• Clearing ahead of construction activities is minimised.	All clearing is minimised, construction activities minimal apart from some road construction for the northern box cut.	Compliant			
Air Quality & Greenhouse Gas Management Plan	3	• Cleared areas are watered regularly during any construction activities, where appropriate.	Noted				
Air Quality & Greenhouse Gas Management Plan	3	• Unsealed roads used regularly for access will be watered utilising site water carts to minimise dust generation. Where necessary additional water applications will be made, and/or chemical dust suppressants will be used to minimise dust lift off from unsealed roads.	Dust suppressants trialled, not widely used, water cart is main dust suppression equipment.	Compliant			
Air Quality & Greenhouse Gas Management Plan	3	• Mine vehicles and coal haulage trucks will be subject to speed limits in place at the site. Speed limits are 60km/hr on the access road and in pit area, 10km/hr at the workshop area and 30km/hr at the ROM and load-out bin. At all times, operators are to drive to conditions and obey speed restriction signs.	Speed limit signage comprehensive, OCE manages open cut, workshop manager manages hardstand etc and ROM is also managed by the OCE.	Compliant			
	Coal Processing Area						
Air Quality & Greenhouse Gas Management Plan	3	• Water is applied to the coal at the feed hopper, crusher and at all conveyor transfer and discharge points.	Water injection at crusher and on loader and conveyors have water sprays fitted.	Compliant			
Air Quality & Greenhouse Gas Management Plan	3	• All conveyors are fitted with appropriate cleaning and collection devices to minimise the amount of material falling from the return of conveyor belts.	Conveyors did not exhibit excessive accumulations of spilt coal nor did they appear to be creating excessive particulates	Compliant			
Air Quality & Greenhouse Gas Management Plan	3	• Some flexibility exists to temporarily cease operation in the event of protracted dry periods, high winds, or significant dust generation and dispersal towards the surrounding residences.	noted				
Air Quality & Greenhouse Gas Management Plan	3	• Trucks transporting coal offsite from the Coal Processing Area must be covered immediately after loading to prevent windblown emissions and spillage. The covering must be maintained until immediately before unloading the trucks (as per Condition O3.2 of EPL 12365).	Observed on site and confirmed at interview.	Compliant			
Air Quality & Greenhouse Gas Management Plan	3	• In dry windy conditions, trucks on the loading bin loop will be speed limited to 10km/hr to reduce potential for dust lift off.	Trucks are GPS tracked and under instruction regarding relevant speeds under different conditions	Compliant			
	Wind Erosion Management						
Air Quality & Greenhouse Gas Management Plan	3	• The extent of clearing/site preparation in advance of mining is minimised.	Checked above	Compliant			
Air Quality & Greenhouse Gas Management Plan	3	• Progressive rehabilitation of areas of disturbance, including topsoil and subsoil stockpiles is undertaken.	site visit confirms this	Compliant			

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Air Quality & Greenhouse Gas Management Plan	3	• Bund walls and windbreaks are constructed as required.	No evidence of wind erosion (exception southern emplacement and trees or bunds will not protect this area), some bund walls and tree wind breaks around the site.	Compliant			
	Internal Transport						
Air Quality & Greenhouse Gas Management Plan	3	• The road for the transportation of coal product between the mine facilities area and mine entrance is sealed.	Observed on-site	Compliant			
Air Quality & Greenhouse Gas Management Plan	3	• Unsealed roads regularly used on the mine site will be watered utilising site water carts to minimise dust generation.	Observed on-site	Compliant			
Air Quality & Greenhouse Gas Management Plan	3	• Dust suppressants may be used from time to time to reduce dust and particulate generation, especially during excessive dry weather periods or when site water levels are low or restricted.	Trialled but not used extensively, may be used more extensively if water availability becomes critical.	Compliant			
Air Quality & Greenhouse Gas Management Plan	3	• All roads are speed limited and enforced to ensure that dust generation is at acceptable levels.	All roads limited	Compliant			
Air Quality & Greenhouse Gas Management Plan	3	• Earthmoving equipment and on-site vehicles: o are fitted with exhaust controls which satisfy NSW EPA emission requirements; o are properly maintained and any mobile equipment which does not comply with NSW EPA guidelines is removed; and o have the exhausts directed upwards or to the side (where applicable) so as not to cause dust lift-off.	Discussed with Maintenance team, 103 inspections and monthly or more frequent equipment inspections	Compliant			
Air Quality & Greenhouse Gas Management Plan	3	The controls and management procedures will be reviewed in response to the results of air quality monitoring, complaints or comments identified through TCPL's consultation effort. Any changes made will be noted as part of annual environmental reporting in the AEMR/Annual Review.	No requirement for review based on the parameters listed.	Not Applicable			
	Pollution Reduction Programs						
Air Quality & Greenhouse Gas Management Plan	3	Of relevance to the overall objective of minimising dust emissions from the Tarrawonga site, EPL 12365 has some Pollution Reduction Program (PRP) measures that the site is implementing. These include: • Wheel generated dust control efficiencies on active haul roads	Provided to EPA and PRP adapted in the EPL - 89% 94% efficiency compared to untreated	Compliant			
Air Quality & Greenhouse Gas Management Plan	3	• Assessment and implementation of best practice measures to minimise dust from disturbing and handling overburden in adverse weather conditions. Appendix 2 provides the Daily Dust Inspection which includes triggers for adverse weather conditions and the response taken by site to minimise dust impacts.	Provided to EPA and PRP adapted in the EPL 15-08-14	Compliant			
Air Quality & Greenhouse Gas Management Plan	3	• Participation in an Australian Coal Association Research Project (ACARP) study to trial best practice measures for disturbing and handling overburden.	No evidence Provided	Not Compliant Administrative			
Air Quality & Greenhouse Gas Management Plan	3	Where relevant, appropriate revisions/updates will be made to this management plan following the outcomes of the PRPs nominated above.	No changes to AQGGMP, the EPA signoff of the PRPs occurred in August, the onth before the audit took place	Not Applicable			
	4 Monitoring and Reporting						
	4.1 Risk/Response Matrix						

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Air Quality & Greenhouse Gas Management Plan	4.1	A risk/response matrix has been developed for the site to identify operational practices or weather conditions that require specific action to mitigate potential impacts. The intent behind the risk/response matrix is to understand the prevailing conditions and implement management practices accordingly to avoid subsequent air quality impacts. The risk/response matrix has been developed based on colour coding and key operational and weather conditions, and proximity of privately owned receptors to mining operations. The Environmental Officer will be responsible for implementation of the risk/response matrix in consultation with the Operations Manager.	Appended to AQGGMP	Compliant			
	4.2 Monitoring Program						
	4.2.1 Paramaters Measured						
Air Quality & Greenhouse Gas Management Plan	4.2.1	Activities on the mine site will emit dust in various forms, namely total suspended particulate matter (TSP), particulate matter with aerodynamic diameters less than 10µm (PM10), particulate matter with aerodynamic diameters less than 2.5µm (PM2.5), and deposited dust (which is assessed as insoluble solids as defined in Australian Standard AS 3580.10.1-2003 Methods for Sampling and Analysis of Ambient Air - Determination of Particulates - Deposited Matter - Gravimetric Method).	Noted, Dust gauges, HVAS with PM10 head and TEOM for use as an operational management tool	Compliant			
Air Quality & Greenhouse Gas Management Plan	4.2.1	Monitoring implemented to ensure compliance with these criteria will include monitoring of dust deposition rates as well as PM10 and PM2.5 concentrations at nominated residences surrounding the mine site. The location of monitoring points is shown on Figure 2. As PM10 and PM2.5 is being monitored continuously at nominated TEOM sites it is not intended to undertake monitoring by High Volume Air Samplers at 6 day cycles. No monitoring of TSP is proposed as PM10 concentrations are considered of greater significance given its synergies with health-related issues. This approach was accepted by DPE for all Whitehaven sites in a letter dated 5th August 2011.	Monitoring is conducted as per the AQ Management Plan.	Compliant			
Air Quality & Greenhouse Gas Management Plan	4.2.1	In addition to these monitoring sites, Tarrawonga will implement, in consultation with the other mining operations in the precinct and in accordance with the Air Quality Management Strategy for the BTM Complex, a predictive meteorological forecasting tool and dispersion model, to inform mine planning on a day to day basis, giving due consideration to the potential cumulative impacts of all mining operations in the area. Additional monitoring points to inform cumulative air quality management will also be established.	This is not yet done, Strategy is not approved.	Not Applicable			

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Air Quality & Greenhouse Gas Management Plan	4.2.1	A record of site activities undertaken and meteorological records during the period of recording will also be retained. This will initially be undertaken in accordance with the Daily Dust Inspection (Appendix 2) and updated once the cumulative network is implemented.	Evidence provided	Compliant			
	4.2.2 Monitoring Locations						
Air Quality & Greenhouse Gas Management Plan	4.2.2	Regional monitoring of PM2.5 concentrations will also be undertaken via a real time monitor located at the "Will-gai" Property, approximately 10km from the Tarrawonga mine.	Conducted, shared resource with Vickery	Compliant			
Air Quality & Greenhouse Gas Management Plan	4.2.2	The real time monitors are integrated with existing real time noise monitoring equipment and allow air quality results to be viewed from the site office in real time. This system also provides for site alerts in the event that air quality measurements approach compliance thresholds. The monitoring locations identified include mine owned land, that may, from time to time, be occupied under lease. Any lessees will be informed of any potential air quality impacts at the residence, and provided with any monitoring data as it comes available in accordance with the requirements of Condition 3(27).	Sentinex system, Sighted	Compliant			
Air Quality & Greenhouse Gas Management Plan	4.2.2	Not withstanding the above monitoring activities specific to Tarrawonga operations, under the terms of the Air Quality Management Strategy for the BTM Complex, it is intended to install additional E-Sampler (or similar) monitors in proximity to operations at Maules Creek, Boggabri and Tarrawonga. Data from these monitors will be used to inform performance against criteria, and the capacity to identify source contribution to enable active management. The specific detail around activation of these E-Samplers will be included in the BTM Complex Plan once a supplier has been confirmed.	This has not yet occurred at all the other sites, Tarrawonga will provide information from it's existing network and so is compliant with this.	Compliant			
	4.2.3 Monitoring Frequency						
Air Quality & Greenhouse Gas Management Plan	4.2.3	The monitoring frequency for deposited dust, PM10 and PM2.5 is as follows: • Deposited dust – continuous • PM10 – continuous (TEOM) • PM2.5 – continuous (TEOM)	Noted				
	4.3 Monitoring Procedures, Data Recording and Reporting						
	4.3.1 Monitoring Procedures						

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Air Quality & Greenhouse Gas Management Plan	4.3.1	Monitoring will be undertaken according to the DEC (2006) document Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales 2006. Specifically, monitoring will be conducted in accordance with the following Australian Standards: • AS/NZS 3580.1.1:2007 "Methods for sampling and analysis of ambient air – Guide to siting air monitoring equipment". • AS / NZS 3580.9.6 – 2003 "Methods for sampling and analysis of ambient air – Determination of suspended particulate matter PM10 high volume sampler with size–selective inlet – Gravimetric Method". • AS 3580.10.1-2003 "Methods for Sampling and Analysis of Ambient Air - Determination of Particulates - Deposited Matter - Gravimetric Method" (NSW DEC Method AM-19). • AS 3580.9.8-2001 "Methods for the Sampling and Analysis of Ambient Air (NSW DEC Method AM-22).	Reports provided, all compliant but unable to verify equipment siting requirements compliance, note the equipment reviewed at site appeared to be sited in accordance with the AS.	Compliant			
	4.3.2 Data Recording						
Air Quality & Greenhouse Gas Management Plan	4.3.2	For each deposited dust monitoring location, once each month the glass container used to capture the deposited dust will be removed, replaced and sent to a NATA accredited laboratory for analysis.	NATA certification noted in laboratory reports **Note the laboratory report provided as evidence notes that the results could not be certified as they claimed TCL had collected the samples therefore the exposure time could not be verified, but the samples were collected by ALS staff who should have been able to verify exposure times from their records.**	Not Compliant Administrative			
Air Quality & Greenhouse Gas Management Plan	4.3.2	Condition M1.3 of EPL 12365 requires the following records to be kept: • The date(s) on which the sample was taken; • The time(s) at which the sample was collected; • The point at which the sample was taken; and • The name of the person who collected the sample.	Records comply	Compliant			
Air Quality & Greenhouse Gas Management Plan	4.3.2	In addition to these requirements, any notable activities or conditions at or around the monitoring location should be noted at the time of sample collection. Site activities that could impact on air quality results as well as any relevant regional conditions (eg. bushfires, dust storms) should be noted when they occur.	Field sheet includes this content	Compliant			

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Air Quality & Greenhouse Gas Management Plan	4.3.2	Data obtained from the real-time air quality monitoring network will be available in real time via access to the web interface, as well as through daily reporting from the monitoring unit to selected personnel. Key personnel for the provision of daily reports will be the Group Environment Manager, the Operations Manager for the Tarrawonga site and the Environmental Officer. In addition to daily reports, the monitor will be downloaded at regular intervals with data available on an archival basis. Real time data will be maintained on an archival basis at a central repository that can be retrieved on an as needs basis.	Observed onsite, web information is provided to EO, Ops M and Genv Mng plus the real time data is provide dto OCEs for operations management in real time.	Compliant			
Air Quality & Greenhouse Gas Management Plan	4.3.2	Upon establishment of the BTM Complex monitoring network, data from the additional Esamplers (or similar) and other monitoring equipment will be accessible via the same methodology as proposed for the Tarrawonga monitoring program.	Noted, not yet implemented	Not Applicable			
	4.3.3 Data Reporting						
Air Quality & Greenhouse Gas Management Plan	4.3.3	A summary of air quality monitoring results will be reported internally on a monthly basis as well as on a quarterly basis to the Community Consultative Committee (CCC) via the Environment Monitoring Report. This report will be uploaded onto the company's website (www.whitehavencoal.com.au).	See CCC reports/minutes	Compliant			
Air Quality & Greenhouse Gas Management Plan	4.3.3	Air quality monitoring required by the EPL must be published on the Whitehaven website within 14 days of receiving the results.	Results go up within 14 days	Compliant			
Air Quality & Greenhouse Gas Management Plan	4.3.3	Each year, the results of the air quality monitoring program will be summarised and presented in the AEMR/Annual Review together with reference to the prevailing meteorological data and site activities during the measurement period(s). Reporting will also include an analysis of the monitoring results against the exceedance criteria, previous monitoring results and predictions made in the EA.	AEMR - AR includes this summary	Compliant			
Air Quality & Greenhouse Gas Management Plan	4.3.3	Dust monitoring results will be issued to EPA via the Annual Return for EPL 12365 for licenced monitoring points.	Included in the AR	Compliant			
Air Quality & Greenhouse Gas Management Plan	4.3.3	In addition to the reporting requirements listed above, air quality monitoring data will be made available to the public upon request. The real time air quality monitoring data, in the form of the 24hr average PM10 concentration for the preceding period, daily weather forecasts for the week ahead, and operational responses to forecasts and monitoring data for the preceding period will also be made available on the Whitehaven Coal website on a daily basis, in accordance with Project Approval requirements. It should be noted that the 24hr average PM10 concentration result is from all sources and not wholly related to mining activities, and therefore not validated to confirm mine related contributions.	No Such requests. Web data not updated on a daily basis.	Not Compliant Administrative			
	4.4 Cumulative Air Quality and GHG Management Strategy						

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Air Quality & Greenhouse Gas Management Plan	4.4	TCM has been in consultation with the nearby Boggabri Coal Mine and Maules Creek Project in developing the Air Quality Management Strategy for the BTM Complex in order to minimise cumulative impacts on air quality. The Strategy has been submitted to DPE for approval and will be appended to this Plan once approved.	Noted, not yet approved.				
Air Quality & Greenhouse Gas Management Plan	4.4	TCM and Boggabri Coal currently continue to operate shared air quality monitors, whilst Boggabri Coal, Tarrawonga and the Maules Creek Project participate in monthly meetings to discuss cumulative impact management measures.	Noted				
	4.5 Community Consultative Committee						
Air Quality & Greenhouse Gas Management Plan	4.5	As part of the quarterly Community Consultative Committee meeting, an environmental monitoring report is presented to the members with detailed explanation of the air quality monitoring results for the corresponding quarterly period. Dust deposition results and PM10 monitoring are summarised by month with an annual average also provided alongside the compliance criteria. Any exceedance is clearly explained as to the location and type of exceedance, as well a discussion on any queries or actions from the members of the committee.	CCC minutes	Compliant			
	5 Management of Exceedances, Complaints and Non-Compliance						
	5.1 Air Quality Compliance Criteria Exceedance						
	1 Confirmation of Exceedance						
Air Quality & Greenhouse Gas Management Plan	5.1	For deposited dust results, the analysing laboratory will be contacted to ensure no error has been made in storing, analysing or recording the sample or result. Should this investigation conclude the treatment, analysis and result recording for the sample are satisfactory, TCPL will proceed to response point 2.	Minor exceedances generally explained by bottle location and wind direction for the monitoirng period, no necessity for checking laboratory. Lab does run QA on all analyses.	Compliant			
Air Quality & Greenhouse Gas Management Plan	5.1	In terms of the triggering of alerts at site in relation to dust levels from the real time monitoring network, a trigger level of 40µg/m3 against the PM10 24hr criteria has been set where this level is maintained over a 30 minute period. A second trigger is set for peak 1hr PM10 concentrations at 90µg/m3 for a 1 hour period in order to take any management measures prior to potential impacts on maintaining compliance with the 24hr PM10 criteria. The alert triggers are constrained by wind direction so as to only trigger when within the zone of influence from the Tarrawonga site, being 310-350°. These alerts provide site with opportunities to modify operations where appropriate in order to minimise dust generation and potential exceedances of compliance criteria. The implementation of the BTM Complex Air Quality Monitoring network will impact on site alert arrangements, and any revisions to alert levels or monitoring networks will be reflected in an update to this plan.	Noted and observed on site	Compliant			
	2 Notification (of exceedance)						

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Air Quality & Greenhouse Gas Management Plan	5.1	The Group Environment Manager must determine whether there is a risk of material harm to the environment as a result of the exceedance. If so, the exceedance must be reported immediately as per the site's Pollution Incident Response Management Plan, and Condition 8 of Schedule 5 of the Project Approval. Section 147 of the POEO Act defines material harm as follows: 147 Meaning of material harm to the environment (1) For the purposes of this Part: (a) harm to the environment is material if: (i) it involves actual or potential harm to the health or safety of human beings or to ecosystems that is not trivial, or (ii) it results in actual or potential loss or property damage of an amount, or amounts in aggregate, exceeding $10,000 (or such other amount as is prescribed by the regulations), and (b) loss includes the reasonable costs and expenses that would be incurred in taking all reasonable and practicable measures to prevent, mitigate or make good harm to the environment.	No exceedences in the audit period	Not Applicable			
Air Quality & Greenhouse Gas Management Plan	5.1	(2) For the purposes of this Part, it does not matter that harm to the environment is caused only in the premises where the pollution incident occurs.	Noted				
Air Quality & Greenhouse Gas Management Plan	5.1	If the exceedance has not caused, or will not cause, material harm to the environment, and the exceedance is determined to be related to operations at Tarrawonga, the EPA should be notified as soon as practicable of exceedances for licenced monitoring points. Dust monitoring results are also provided in the EPL Annual Return and AEMR/Annual Review.	No exceedences in the audit period	Not Applicable			
	3 Corrective Action Plan and Re-assessment						
Air Quality & Greenhouse Gas Management Plan	5.1	If review of monitoring real time data or measured dust deposition indicate compliance related problems, a corrective action plan will be initiated.	No Corrective Action plans have been required to address air quality issues	Not Applicable			
Air Quality & Greenhouse Gas Management Plan	5.1	Where it is determined that a corrective action plan is necessary, TCPL will prepare the plan to reduce dust generation and thereby reduce dust deposition, PM2.5 and/or PM10 concentrations around the mine site and return the operation to compliance. Preparation of the plan may require the assistance of a specialist air quality consultant and the plan should include a schedule for re-assessment. Details on the preparation of the corrective action plan and re-assessment will be included in the relevant AEMR/Annual Review and EPL Annual Return and to EPA prior to implementation.	Noted	Not Applicable			
	4 Notification (of Compliance)						
Air Quality & Greenhouse Gas Management Plan	5.1	TCPL will notify EPA and other relevant government agency(ies) and local stakeholder(s) of the return to compliance following the successful completion of Step 3.	Noted	Not Applicable			
	5 Independent Review and Land Acquisition						

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Air Quality & Greenhouse Gas Management Plan	5.1	Within 3 months of receiving a written request from a landholder with acquisition rights, TCPL shall make a binding written offer as detailed in Condition 4(8) of PA 11_0047. Air quality acquisition criteria are specified in Condition 3(26) while Condition 4(8) requires TCPL to pay all reasonable costs associated with the land acquisition process.	No Such requests.	Not Applicable			
Air Quality & Greenhouse Gas Management Plan	5.1	It should be noted that under PA 11_0047, property ID 49 retains existing acquisition rights on the basis of air quality impacts, and can, on making a written request as per Condition 3(1), seek acquisition under the terms of Conditions 4(8) and 4(9). Property ID's 44 and 45, listed in PA 11_0047, have been acquired and are now project related properties.	No Such requests.	Not Applicable			
	6 Reporting						
Air Quality & Greenhouse Gas Management Plan	5.1	The recorded exceedance, corrective actions and reassessment will be reported to the CCC and included in each relevant AEMR/Annual Review.	AEMRs and CCC Minutes confirm this occurs	Compliant			
Air Quality & Greenhouse Gas Management Plan	5.1	The implementation of real time air quality monitoring will provide TCPL with additional information on which to make operational decisions on a day to day basis. The results of predictive meteorological forecasting and predictive real time air dispersion modelling, coupled with real time air quality monitoring will provide site management with appropriate tools to plan daily mining activities, identify causes of any elevated dust results and make changes to site operations accordingly to ensure compliance. This management tool should reduce the overall potential for TCPL to exceed operational air quality criteria on an annual average and 24 hour basis through the provision of alerts and active management on site where dust contributions are related to site activities. Exceedances in 24 hour or annual average results may still occur due to regional and/or other dust sources, however, the data available in real time, coupled with predictive forecasting will provide the relevant information to assess contributing sources and appropriate response at a site level.	Noted, observed to a certain extent on site though weather was benign at the time of the site inspection.	Compliant			
	5.2 Complaints						
Air Quality & Greenhouse Gas Management Plan	5.2	In order to ensure an appropriate and consistent level of reporting, response and follow-up to any complaints is adopted by TCPL, the following complaints management protocol will be followed: • A publicly advertised telephone complaints line will be in place to receive complaints during operating hours and record complaints at other times.	Advertised on the website.	Compliant			

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Air Quality & Greenhouse Gas Management Plan	5.2	• Each complaint received will be recorded on a Complaints Register, which will include the following details: o The date and time of complaint. o Any personal details the complainant wishes to provide or if no such details are provided a note to that effect. o The nature of the incident that led to the complaint, including the time of the dispersal and its duration. o The action taken by TCPL in relation to the complaint, including any follow-up contact with the complainant. o If no action was taken by TCPL, the reason why no action was taken.	Complaints register was reviewed and found to be compliant.	Compliant			
Air Quality & Greenhouse Gas Management Plan	5.2	• The Group Environment Manager will be responsible for ensuring that an initial response is provided within 24 hours of receipt of a complaint (except in the event of complaints recorded when the mine is not operational).	Noted, complaints register and response and follow provided as evidence confirm timing	Compliant			
Air Quality & Greenhouse Gas Management Plan	5.2	• Data from the site weather station will be obtained for the time applicable to the complaint for use in determination of cause and identification of future remedial actions.	Complaint investigation	Compliant			
Air Quality & Greenhouse Gas Management Plan	5.2	• Additional measures will be undertaken as required to address the complaint. This may include visiting the complainant, or inviting the complainant to the mine site.	Evidence of visits being organised presented	Compliant			
Air Quality & Greenhouse Gas Management Plan	5.2	• Once the identified measures are undertaken, the Group Environment Manager will sign off on the relevant complaint within the Complaints Register.	Sighted on site.	Compliant			
Air Quality & Greenhouse Gas Management Plan	5.2	• If necessary, follow-up monitoring will take place to confirm the source of the complaint is adequately mitigated.	Not required for any of the complaints that were followed through the system	Compliant			
Air Quality & Greenhouse Gas Management Plan	5.2	• A copy of the Complaints Register will be kept by TCPL and made available to the CCC and the complainant (on request). A summary of complaints received every 12 months will be provided to DPE, GSC, NSC, EPA, DRE and the CCC through the AEMR/Annual Review.	this is reported.	Compliant			
	5.3 Non-Compliance						
Air Quality & Greenhouse Gas Management Plan	5.3	With the exception of air quality criteria exceedances (as discussed in Section 5.1), noncompliances relating to air quality would most likely relate to issues with monitoring such as monitor interference/malfunction. Such non-compliances will be detailed in the EPL Annual Return and/or AEMR/Annual Review.	No exceedences in the audit period	Not Applicable			
	5.4 Unpredicted Impact Protocol						

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Air Quality & Greenhouse Gas Management Plan	5.4	In the event that unpredicted or unforeseen air quality impacts are identified, the following protocol will be adopted. Table 3 Unpredicted Impact Protocol Step 1: Review the unpredicted impact including consideration of: • Any relevant monitoring data; and • Current mine activities as well as activities in the vicinity of the issue. Step 2: Commission an investigation by an appropriate specialist into the unpredicted impact, if considered appropriate. Step 3: Develop appropriate ameliorative measures based on the results of the above investigations, in consultation with relevant government departments. Step 4: Implement additional monitoring, where relevant, to measure the effectiveness of the improvement measures.	No exceedences in the audit period	Not Applicable			
	6 Greenhouse Gas Management						
Air Quality & Greenhouse Gas Management Plan	6	TCPL will continue to record emissions generated by the site and assess and implement any identified feasible efficiencies in the future.	Noted				
	7 Document Review and Continuous Improvement						
Air Quality & Greenhouse Gas Management Plan	7	This document will be reviewed internally on an annual basis following completion of the AEMR/Annual Review, and/or following an air quality related incident, audit, or modification to the conditions of approval. In addition, every 2 years, the plan will be subject to review with consultation with the relevant agencies.	Noted. This review takes place but there is no auditable documented trail to provide evidence that the review has occurred. Recommendation made elsewhere	Compliant			
Air Quality & Greenhouse Gas Management Plan	7	TCPL will investigate and implement ways to improve the environmental performance of the project over time. This will be achieved by keeping abreast of best practice in the industry for air quality controls and reporting on outcomes of air quality monitoring annually in the AEMR/Annual Review.	Networking, workng with other mines in the area, input from specialists, input from regulatory authorities and audits. Monitoring is reported in the AEMR.	Compliant			

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
	Air Quality Management Strategy - March 2014						
	3 Air quality strategy criteria						
	3.1 Air quality assessment criteria						
Air Quality Management Strategy - March 2014	3.1	The conditions require that BCPL,MCC and TCM must ensure particulate emissions generated by BTM Complex operational activities do not exceed the criteria listed in Tables 3.1 to 3.3 at any residence on privately-owned land or on more than 25 per cent of any privately owned-land. **Table 3.1 Long term criteria for particulate matter** Pollutant | Averaging Period | d Criterion Total suspended particulate (TSP) matter | Annual | [a]90 ug/m3 Particulate matter < 10 um (PM10) | Annual | [a]30 ug/m3 **Table 3.2 Short term criteria for particulate matter** Pollutant | Averaging Period | d Criterion Particulate matter < 10 um (PM10) | 24 hour | [a] 50 ug/m3 **Table 3.3 Long term criteria for deposited dust** Pollutant | Averaging Period | Maximum Increase in Deposited Dust Level | Maximum Total Deposited Dust Level Deposited Dust | Annual | [b] 2 g/m2/month | [a] 4 g/m2/month Notes to Table 3.1, Table 3.2 and Table 3.3 [a] Total impact (i.e. incremental increase in concentrations due to the Project plus background concentrations due to other sources). [b] Incremental impact (i.e. incremental increase in concentrations due to the Project on its own). [c] deposited dust is to be assessed as insoluble solids as defined by Standards Australia, AS/NZS 3580:10.1:2003: Methods for Sampling and Analysis of Ambient Air – Determination of Particulate Matter – Deposited Matter – Gravimetric Method. [d] Excludes extraordinary events such as bushfires, prescribed burning, dust storms, fire incidents, or any other activity as agreed by the Director General.	Same criteria as PA, no exceedences.	Compliant			
	4 Monitoring						
Air Quality Management Strategy - March 2014	4	The mines of the BTM Complex already have comprehensive air quality monitoring systems in place. It is proposed that the existing air quality monitoring network will be upgraded to reflect the implementation of the BTM Complex cumulative air quality monitoring network.	Noted, not yet implemented.	Not Applicable			
	4.2 Proposed cumulative monitoring network						
Air Quality Management Strategy - March 2014	4.2	The requirements of the cumulative monitoring network at the BTM Complex are to: - facilitate compliance with existing and likely future consent conditions - allow proactive management and real-time dust monitoring to assist in day to day operations of each mine site - develop an integrated and coordinated approach to air quality management of the BTM Complex - consolidate existing monitoring - allow for predictive meteorological forecasting - include procedures for identifying and apportioning the source(s) and contribution(s) to cumulative air impacts for mines and other sources, using the air quality and meteorological monitoring network - include appropriate investigative tools such as modelling of post incident plume dispersion.	Noted.				

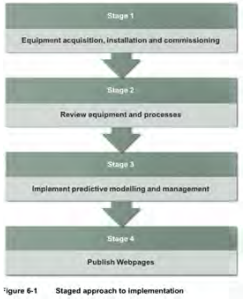
Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Air Quality Management Strategy - March 2014	4.2	The BTM Complex monitoring network will include: Installation of four TEOMs, which include: - one TEOM at Bradshaw's, next to the Fairfax Public School - one TEOM at the Flixton property south east of TCM - one TEOM south of the Boggabri Coal Mine and TCM at the "Tarrawonga" property and - one TEOM (proposed to be located) at the northwest of the Maules Creek Coal Mine at the "Murphy" property. All TEOMs will measure PM_{10}, with at least one capable of measuring $PM_{2.5}$. All but the "Murphy" TEOM has been installed to date.	Noted, not yet implemented.	Not Applicable			
Air Quality Management Strategy - March 2014	4.2	- Installation of four portable real-time PM_{10} monitors for day to day operational dust management (e.g. e-samplers or equivalent).	Noted, not yet implemented.	Not Applicable			
Air Quality Management Strategy - March 2014	4.2	- Implementation of a web based system to manage real-time monitoring data (as well as weather, emissions and modelled predictions for air quality and noise).	Noted, not yet implemented.	Not Applicable			
Air Quality Management Strategy - March 2014	4.2	Relocation of one HVAS: - the Boggabri HVAS should be moved from the "Merriown" residence to a location in the proximity of the "Roma / Glenhope" residences to the southwest of its current location. - the exact locations of the HVAS will need to be negotiated with landowners.	Not able to be verified as the online system is not set up yet and this is a Boggabri Mine initiative.	Noted			
Air Quality Management Strategy - March 2014	4.2	Review of the locations for dust deposition gauges. This will consider recent mine plan modifications, which may require the relocation of existing dust deposition gauges to accommodate mining activity, as well as improvements to the coverage of the dust deposition matrix around the BTM Complex by sharing the available network. It is likely that some of the dust deposition gauges that are currently located within mining leases or along the project boundaries could be moved to locations between the BTM Complex operations and nearest residences such that the array of dust deposition gauges better captures potential emissions under all wind directions.	Noted, not yet implemented.	Not Applicable			
	4.2.1 Real-time monitors						
Air Quality Management Strategy - March 2014	4.2.1	It is important to understand the different roles of monitors in the cumulative network. The real-time monitors for compliance purposes (e.g. TEOMs) will be fixed at the locations outlined above (and shown in Figure 4-1) and will be capable of measuring PM_{10} and $PM_{2.5}$. The monitors will be used to demonstrate compliance with air quality criteria and be fixed at relevant locations of exposure. They will also be used to determine (in real time) if pre-defined trigger levels have been breached and when additional dust control is required.	Noted				
	4.2.2 Portable real-time PM10 monitors						

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Air Quality Management Strategy - March 2014	4.2.2	The BTM Complex proposes to install up to four portable real-time PM_{10} monitors (e-samplers or equivalent) initially for day to day dust management. It is intended that these portable monitors will be placed at appropriate locations closer to mining operations. The portable monitoring locations will move periodically as BTM Complex mining operations progress. Their locations will take account of a number of factors, such as: - seasonally predominant daily wind patterns - the relative locations of each mines highest controllable dust generating sources - practicality of locating monitoring equipment close to the mining operations.	Noted, not yet implemented.	Not Applicable			
	4.3 Regional monitoring (control site)						
Air Quality Management Strategy - March 2014	4.3	As an interim control site, reference will be made to EPA monitoring data collected at Tamworth, which will provide an indication of regional air quality not influenced by mining from the BTM Complex.	Noted, not yet implemented.	Not Applicable			
	4.4 Responsibility of the individual mines						
Air Quality Management Strategy - March 2014	4.4	Each mine shares responsibility for the maintenance, calibration, repair, operating costs and site access agreements for the operation of the monitoring network. Arrangements have been confirmed between the mines regarding the ongoing logistics of operating the monitoring network.	Noted				
	4.5 Data management and interpretation						
Air Quality Management Strategy - March 2014	4.5	It is proposed that air quality monitoring data from the three mine sites will be stored in a central data repository. The data will be available for use by each mine site and will be able to be viewed in various formats on a secure website to display the data in real-time.	Noted				
Air Quality Management Strategy - March 2014	4.5	Air quality data will be summarised, validated and available for the public and agencies on a monthly basis, via each mine site's website. The availability of this data will be staged, as detailed in Section 6.1, as the air quality monitoring system is installed, commissioned and proven.	Noted				
	4.6 Predictiven and real-time air quality management						
	4.6.1 Overview of requirements						
Air Quality Management Strategy - March 2014	4.6.1	It is proposed that a predictive and reactive air quality management system will be implemented for the BTM Complex that personnel will use to: - assess potential offsite impacts and evaluate community risk in advance and in real-time - perform scenario modelling under predicted adverse or other operating conditions - develop a log of community complaints and air quality events - evaluate community complaints and determine if BTM Complex activities may have caused an impact - accept information and data inputs from various instruments and data sources (e.g. web services, real-time monitoring, and/or emissions estimates based on activity data) - provide alerts and recommendations with respect to abatement or avoidance of potential issues and operational requirements based on outputs of the system.	Noted				
	4.6.2 Components						

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Air Quality Management Strategy - March 2014	4.6.2	It is proposed that the predictive and reactive air quality management system will include: - a predictive component: using forecast weather data and dispersion modelling - a reactive component: using real-time meteorology, air quality monitoring and dispersion modelling - a non-steady state air quality dispersion model (that is capable of processing data at a sub-hourly time interval) - short term tiered trigger levels and notifications for managing potential impacts - a daily forecast report: providing information on temperature inversions, wind conditions at various heights, dust risk, and recommended control actions.	Noted, not yet implemented.				
Air Quality Management Strategy - March 2014	4.6.2	It is extremely important to maintain periodic review of any forecast and real-time air quality system to ensure that the system is operating using: - validated meteorological forecasts - data from calibrated monitoring equipment - accurate varying emission rates, informed by campaign monitoring where necessary - accurate emission source parameters, i.e. updated as the mine plan evolves.	Noted				
	4.6.3 Predictive forecast meteorology						
Air Quality Management Strategy - March 2014	4.6.3	It is proposed that a predictive forecast meteorology system be implemented based on the Weather Research & Forecasting (WRF) model and CALMET, specifically for the BTM Complex, and a website be developed to make data immediately available for each of the mine sites, with half hourly forecasts up to 48 hours in advance. This system will download global meteorological data and forecasts on a daily basis and process and run the WRF model to produce the information required for input to a real-time 3D dispersion model. An example of a forecast and dust risk summary is presented in Figure 4-2.	Noted, not yet implemented.				
Air Quality Management Strategy - March 2014	4.6.3	Once this meteorological system is configured and operating, the outcomes will be evaluated by a competent meteorologist or atmospheric science professional against actual meteorological and dust measurements and the meteorological system will be validated and improved, where possible.	Noted, not yet implemented.				
	4.6.4 Local observed meteorology						
Air Quality Management Strategy - March 2014	4.6.4	Data from local automatic weather stations will be used to validate weather forecasting model performance over time.	Noted.				
Air Quality Management Strategy - March 2014	4.6.4	Meteorological instrumentation or data communications equipment will be reviewed to confirm that the right quality of data is available to the system.	Noted.				
	4.6.5 Integrated real-time monitoring data						
Air Quality Management Strategy - March 2014	4.6.5	To enable real-time reactive feedback from the system, it is proposed that a connection be established to receive a data feed from weather stations and air quality monitoring equipment in the BTM Complex network.	Noted.				
	4.7 Predictive and reactive triggers						
Air Quality Management Strategy - March 2014	4.7	Predictive and 'near real-time' reactive triggers will be configured in the system. These triggers will be initially set based on analysis of the available monitoring data and experience from other similar operations where these systems are operating.	Noted				

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Air Quality Management Strategy - March 2014	4.7	An example of Investigation and Action trigger levels are shown in Table 4-1.These trigger levels have been set based on real-time monitoring data recorded at the Fairfax Public School. The relationship between peak 1-hour PM_{10} concentrations and mean 24-hour PM_{10} concentrations are analysed to determine the level of 1-hour PM_{10} concentrations that may result in elevated 24-hour PM_{10} concentrations. **Table 4.1 Investigation and trigger levels** Action level: Investigation — Trigger level: 1-hour average PM10 concentration above 100 µg/m3 — Description/action required: Relevant personnel are required to identify what activities are occurring and notify plant/equipment operators that dust emissions may be elevated and additional dust controls may need to be implemented. Preparatory measures will be implemented or ready to be implemented. Action — Consecutive 1-hour average PM10 concentration above 150 µg/m3 — Relevant personnel are required to implement controls such as additional water spraying or modifying work practices.	Noted, not yet implemented.				
Air Quality Management Strategy - March 2014	4.7	It is important to note that once the real-time air quality management system is operational, trigger levels will be reviewed, updated and refined following a review of the data and calibration of the system.	Noted				
Air Quality Management Strategy - March 2014	4.7	If the trigger levels are not appropriate to site operations, for example, there are too many or too few investigation or action responses, they will be reviewed and updated. Different trigger levels may be set for each monitoring location within the cumulative network. For example, they may be set higher for monitoring locations closer to dust sources. Trigger levels will also be regularly assessed as part of the ongoing review of this plan.	Noted				
Air Quality Management Strategy - March 2014	4.7	Actual predictive and reactive triggers will be reviewed regularly, and be based on the initial air quality data collected during commissioning of air quality monitoring equipment as well as ongoing monitoring results.	Noted				
Air Quality Management Strategy - March 2014	4.7	SMS and email alerts will be sent to relevant personnel and monitoring data will be displayed in near realtime on a customised web based reporting system.	Noted				
Air Quality Management Strategy - March 2014	4.7	Real-time dust management alerts are sent if the trigger conditions outlined above are met. The notification will also identify which criteria have triggered the alert.	Noted				
Air Quality Management Strategy - March 2014	4.7	Alerts will be sent when a new level is triggered, i.e. subsequent time periods that result in the same dust level will not generate multiple warnings. When the conditions increase to a higher alert level or when conditions return to a lower alert level, the system will send a new notification alerting all relevant personnel to the new dust management alert level.	Noted				
Air Quality Management Strategy - March 2014	4.7	All alerts are recorded by the system in an alert log that can be analysed at any time to identify trends or patterns in alerts that may lead to improvements in operational planning and/or dust control that is focussed on certain areas of operations or times of the day.	Noted				
	5 Corrective and preventative actions						
	5.1 Process to identify main source of dust impacts						

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Air Quality Management Strategy - March 2014	5.1	It is proposed that the reactive component of the dust management system will be designed to process real-time data from PM_{10} monitors and weather stations. It will generate outputs (such as those outlined in Section 4.7.1) that are used with predetermined triggers to assess the potential for dust impacts from operations. The system will notify operators when triggers are activated. The system will be used to analyse and provide information on potential dust sources that are responsible for the increase in monitored dust.	Noted				
Air Quality Management Strategy - March 2014	5.1	For the BTM Complex, real-time monitors will be used to measure PM_{10} concentrations at a number of locations around the operations (for example as shown in Figure 4-1). The dust monitoring data will be sent in short time steps to a web server where it will be processed by the air quality management system. Trigger levels will be set for the real-time monitors (i.e. TEOMs and portable samplers). As the system operates over time the trigger levels will be refined through consideration of historical data and any other relevant observations.	Noted				
Air Quality Management Strategy - March 2014	5.1	If a real-time monitor triggers an alert, the system will query the monitoring data to determine if mining operations are upwind of the triggered monitor. If so, it will be used to assess whether activities occurring between upwind and downwind monitors are creating an increased level of dust that has set off an alert. The system will use available weather data to determine the likely area of the operations that contains the dust generating source. This can be done by activating a reverse trajectory analysis of the plume that has triggered an alert.	Noted				
	5.2 Mitigation						
Air Quality Management Strategy - March 2014	5.2	Processes to mitigate air quality outcomes associated with operations are addressed in each mine sites individual AQGHGMPs.	These processes are noted in the Tarrawonga AQGGMP				
Air Quality Management Strategy - March 2014	5.2	Each mines rankings will be used as the basis for scheduling operational activities or increasing dust control measures to mitigate risks when dust generation is predicted to reach trigger levels.	Noted				
Air Quality Management Strategy - March 2014	5.2	Dust generation assessment will be undertaken by experienced site personnel with the assistance of various specialists (e.g. operations, environment and air quality specialists) as required.	Noted				
	5.3 Communication						
Air Quality Management Strategy - March 2014	5.3	Regular meetings will be held by nominated personnel representing each of the mines in the BTM Complex (at least quarterly) to discuss predictive model outcomes, monitoring results and future operational events. Meeting minutes will be documented and retained at each mine site.	These meetings currently occur but without specific focus on the issues here.				
Air Quality Management Strategy - March 2014	5.3	The trigger levels will initiate internal communication within the BTM Complex to allow the complex to implement management measures in order to reduce dust generation.	Noted				
Air Quality Management Strategy - March 2014	5.3	When air quality criteria are identified as exceeded, discussions will be held within the BTM Complex, regulatory agencies and affected landholders (where an exceedance occurs on privately-owned land).	Noted				
	5.4 Reporting						

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Air Quality Management Strategy - March 2014	5.4	Internal management reports will be prepared regularly, noting performance against triggers and criteria.	Sighted on site, included in presentations to crews, CCC and management meetings	Compliant			
Air Quality Management Strategy - March 2014	5.4	External reporting will include: - updates on individual company websites - presentations to Community Consultative Committees (CCCs) - Annual Environmental Management Reports (AEMRs)/Annual Reviews - exceedance reporting.as required.	Evidence quoted elsewhere inthis report indicates compliance.	Compliant			
	6 Implementation						
	6.1 Staged approach						
Air Quality Management Strategy - March 2014	6.1	It is proposed that a staged approach will be taken to install the equipment and systems which are additional to individual mine's existing air quality monitoring systems.  igure 6-1 Staged approach to implementation	Noted				
	6.1.1 Stage 1 - Equipment acquisition, installation and commissioning						
Air Quality Management Strategy - March 2014	6.1.1	Four real-time portable PM10 monitors are proposed that will be acquired and commissioned at locations relevant to current mining operations, as part of the day to day management of real-time dust. An indicative layout of these monitors is also shown in Figure 4-1. The installation of these portable PM10 monitors will be reviewed as part of Stage 2, to ensure they allow sufficient coverage to achieve the required monitoring goals. The configuration may change over time as each mining pit develops.	Noted				
	6.1.2 Stage 2 - Review equipment and processes						
Air Quality Management Strategy - March 2014	6.1.2	Within three months of the installation and commissioning of Stage 1 equipment the following will be reviewed: - performance and reliability of the cumulative air quality monitoring equipment - triggers proposed in this protocol - central data repository and data interface.	Noted, not yet implemented.	Not Applicable			
Air Quality Management Strategy - March 2014	6.1.2	Each mine's respective air quality management plans will be updated at the end of each stage to ensure consistency with the AQMS. This will include a review of trigger action response plans (TARPs).	Noted, not yet implemented.	Not Applicable			
	6.1.3 Stage 3 - Implement predictive modelling and management						
Air Quality Management Strategy - March 2014	6.1.3	Within six months of the installation and commissioning of Stage 1 equipment the predictive modelling system will have been acquired, installed and commissioned.	Noted, not yet implemented.	Not Applicable			
Air Quality Management Strategy - March 2014	6.1.3	This system's performance will be reviewed every three months and validation reports will be produced.	Noted, not yet implemented.	Not Applicable			
	6.1.4 Stage 4 - Publish webpages						

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Air Quality Management Strategy - March 2014	6.1.4	Each mine site will establish or update an existing Company webpage.	Noted, Tarrawonga has a suitable webpage	Compliant			
Air Quality Management Strategy - March 2014	6.1.4	The webpage will present the summarised and validated results of the real-time air quality monitoring on a monthly basis.	Tarrawonga post up results and management actions where applicable	Compliant			
Air Quality Management Strategy - March 2014	6.1.4	Air quality monitoring data must be reviewed via formal quality assurance processes before it can be considered valid data.	Noted, this occurs .	Compliant			
Air Quality Management Strategy - March 2014	6.1.4	Continuous data collected by the real-time monitors will undergo preliminary data validity checks (for example, to identify outliers, negatives etc.), however until formal validation/ratification has been conducted any continuous data reported to the community will need to be considered preliminary and subject to further validation.	Noted				
	7 Document Control						
	7.1 Review and revision						
Air Quality Management Strategy - March 2014	7.1	This AQMS, its operation and implementation, will be reviewed and revised at least every two years or on an 'as required' basis to incorporate improvements identified by the BTM Complex or appropriate requirements of government agencies. The AQMS will be reviewed and updated at the end of each stage of the project rollout, as described in Section 6.1.	Noted, not yet implemented.	Not Applicable			
Air Quality Management Strategy - March 2014	7.1	In accordance with the project approvals, the AQMS will also be revised within three months of: - an annual review - incident threatening material harm, requiring notification of the Director-General / relevant agencies - statutory audit - modification of project approval.	Noted, not yet implemented.	Not Applicable			

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
WHC_PLN_TAR_Water Management Plan							
2.2.3 Contaminated Water Management							
Water Management Plan	2.2.3	These dirty water areas include the: • Wash-down area; • Workshop; • Fuel, oil and grease storages; and • Refuelling bays. These areas will be managed as follows: • Runoff from these areas will drain to an oil separator to remove hydrocarbons before draining to SB16. The oily fraction enters a containment system for pump out and removal from site as necessary;	Yes observed onsite	Compliant			
Water Management Plan	2.2.3	• The surface facilities area has an impermeable surface and bunding that captures all flows and directs them to the oil separator;	Yes observed onsite	Compliant			
Water Management Plan	2.2.3	• All oil, grease, fuel and hydrocarbon products will be securely stored; and	Yes observed onsite	Compliant			
Water Management Plan	2.2.3	• Refuelling, oiling and greasing will take place in designated areas only.	Yes observed onsite	Compliant			
Water Management Plan	2.2.3	The following actions will be taken if a major hydrocarbon spill on an unsealed area occurs: • The contaminated soil at the site of the spill will be collected and transported to an approved waste depot or remediated on the mine site;	No records of major spills on unsealed areas	Not Applicable			
Water Management Plan	2.2.3	• Pits would be constructed around the spill with sufficient hydraulic gradient to capture seepage water and contaminated material, enabling the pits to be pumped out; and	Noted				
Water Management Plan	2.2.3	• The local groundwater will be monitored for signs of further contamination.	Noted				
2.3 Groundwater Management							
2.3.1 Management of Groundwater							
Water Management Plan	2.2.3	To avoid, and significantly reduce the risk of, higher groundwater inflows to the open cut mine pit from the alluvial groundwater system during the life of the Project, and in the long term, a low permeability barrier is proposed.	The OC has not progressed to the point where an alluvial barrier is required.	Not Applicable			
2.3.2 Management of Extracted Pit Water							

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Water Management Plan	2.3.2	Saline groundwater, pumped from the mine pit, is deposited in the storage dams PW2, PW3 within the site. This water is used in dust suppression activities for the coal crusher or is allowed to evaporate. The use of pit water for dust suppression minimises the need to use clean water for this purpose and is seen as suitable way to recycle water onsite. The water will be applied at a suitable rate to ensure negligible runoff. Any water falling/applied onto the mine site would be classed as 'dirty water' and collected in dirty water dams as discussed in Section 2.5. These dams are sized and operated to ensure that they only discharge in extreme high flows thus the water used for dust suppression has a minimal chance of discharging offsite. The water in these dirty water dams are regularly tested and monitored.	The area around the coal loader drains to dams that are not nominally dirty water dams and that subsequently drain through a number of other dams offsite. Management of pit water is generally acceptable based on site observations.	Not Compliant	D	1	High
Water Management Plan	2.3.2	Should salt levels in these dams exceed acceptable limits; the water will be pumped into PW2 or PW3 and recycled.	Noted, **Recommend that "acceptable limits" be quantified**				
Water Management Plan	2.3.2	Pump meters are currently used to measure flow extracted from the pit; however they are periodically compromised by sediments in the flow, creating an unreliable data record. Investigations are currently underway to find improved methods to measure pit water extraction more reliably.	Noted, not yet implemented. See also non-compliance in 2.3.2 below	Not Applicable			
Water Management Plan	2.3.2	The groundwater model will be updated every 2 years, using data recorded on site. If the estimates should show that additional groundwater licencing is required, this will be sought from the water markets.	Noted, given the implementation of the more reliable meters in 2.3.2 above has not occurred, this is problematic for accurate measurement of licensed ground water extraction in the open cut. The groundwater model was last updated for the EA for the current approval, report on modell update is dated January 2012, an up date of the groundwater model is overdue.	Not Compliant	E	2	Low
	3 Erosion and Sediment Control						
	3.2 On-going Erosion and Sediment Management Practices						
Water Management Plan	3.2	The following practices will be implemented to minimise potential for erosion and sedimentation: • Installation of all erosion and sediment control (ESC) and water management structures prior to any ground disturbance taking place;	Structures observed on-site, no ground disturbance observed that did not have erosion and sed control. Information from interviews	Compliant			
Water Management Plan	3.2	• Land disturbance will be minimised by clearing the smallest practical area of land ahead of disturbance activities;	Observed on site.	Compliant			
Water Management Plan	3.2	• Disturbance areas which will not be actively utilised will be revegetated as soon as practical following completion of works in that area;	No disturbed ares noted on site that were not being at least intermittently utilised.	Compliant			
Water Management Plan	3.2	• Where practical, disturbance areas will be shaped such as to provide a free draining surface to direct dirty water runoff into the dirty water drains for collection in the dams;	No dirty water from disturbed areas entering clean water dams	Compliant			

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Water Management Plan	3.2	• Where localised flooding or ponding occurs, access will be restricted until such time as the ground is no longer waterlogged in order to reduce the potential for additional sediment mobilisation;	No water logged areas observed	Compliant			
Water Management Plan	3.2	• The erosion and sediment control structures will be cleaned of accumulated sediment material (or extended or replaced) as soon as 20% capacity is lost due to the accumulation of material such that the specified capacities are maintained. This is reliant on the structures being empty to allow for access;	Dams are desilted when empty and are inspected monthly.	Compliant			
Water Management Plan	3.2	• The erosion and sediment control structures will be inspected monthly, or after a rainfall event of >25mm/24hr, to assess their success in preventing erosion, identify signs of potential erosion and determine the retained capacity, especially within the sediment basin;	Inspections sighted including regular monthly and post rainfall events	Compliant			
Water Management Plan	3.2	• As part of the surface water monitoring program, water flowing from all discharge points will be sampled for suspended sediment;	Sampling and analysis reports sighted	Compliant			
Water Management Plan	3.2	• If a high risk of site discharge is identified, excess surface water may be pumped into the newly created Box Cut PWD. This would rely on the availability of storage capacity within the pit water dam and all water moved to the dam would be treated as pit water.	Noted, this has not been required in the audit period.	Not Applicable			
Water Management Plan	3.2	• In the event the suspended sediment concentration in any discharged water exceeds 50mg/L: o The EPA will be advised and salient preceding weather information will be provided; o The upstream structures will be inspected and cleaned of consolidated sediment as required; and/or o A flocculant will be added to the water contained within the sediment basin or storage dam to increase the efficiency of sediment settlement; and/or o The sediment basin(s) will be enlarged to provide greater settlement time for the sediment containing water; and/or o An additional storage dam will be constructed downstream with this becoming the new site discharge point and monitoring location. EPA will be advised to enable amendment to the Environment Protection Licence.	No exceedences in the audit period	Not Applicable			
Water Management Plan	3.2	• All discharge from flumes will flow to sediment basins;	Observed on site.	Compliant			
Water Management Plan	3.2	• Water captured in the open cut void will be allowed time to settle within the sumps before being pumped to one or more of the pit water dams;	Observed on site.	Compliant			

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Water Management Plan	3.2	• If, following heavy rain, erosion is identified on the rehabilitated landform or in operational areas, it will be remediated as quickly as possible using one or a combination of the following: o Filling the erosion channels; o Cross-ripping (along the contour) to assist infiltration; and/or o Installation of additional controls, eg banks sown with a non-perennial cover crop. Areas previously identified as exhibiting and treated to prevent further erosion will be monitored on a minimum monthly basis or following a rainfall event of >25mm/24hr.	Inspections sighted including regular monthly and post rainfall events Erosion control requirements noted, the only erosion in rehab observed on site that required maintenance was programmed to be addressed.	Compliant			
Water Management Plan	3.2	• If erosion is identified on a rehabilitating landform or in the operational area, it will be remediated as quickly as practical to reduce the potential for significant erosion to develop. Areas previously rehabilitated will be inspected regularly to ensure rehabilitation works are effective; and	Some areas of rilling observed on the south east emplacement that require work, EO indicated that work to repair was planned. Planted quarter 4 2013. Difficult to remediate without damaging surrounding establishing vegetation.	Compliant			
Water Management Plan	3.2	• Where necessary, temporary ESC measures will be utilised to prevent and/or reduce the potential for adverse erosion developing. Temporary ESC structures and management practices will be constructed in accordance with the construction principles presented in the Blue Book (Landcom) and may include sediment fences, check dams, surface protection and advanced revegetation methods such as hydromulching.	Noted, observed in site inspection.	Compliant			
Water Management Plan	3.2	Improved water balance modelling is currently under way and this will allow a more proactive approach to water management. The modelling will allow the level of service of the system to be better understood, leading to improved management practices. The results of this modelling will be used to update future versions of this report.	Noted, consultants on site immediately after the audit.				
	3.3 Site Rehabilitation Management						
Water Management Plan	3.3	When an area of disturbance is no longer required by mine processes, it is re-vegetated in an effort to minimise erosion. Where rehabilitation is impractical disturbed ground will be covered with a geofabric or similar means.	Noted, no geofabric observed though.				
Water Management Plan	3.3	Once rehabilitated areas are established and stable, any operational sediment control structures will either be removed or left as passive water storages. This is detailed further in the Rehabilitation Management Plan.	Noted				
	4 Site Water Balance						

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Water Management Plan	4	Condition 39 of the project approval (application number 11_0047) requires a site water balance model to be produced. The existing model, developed for the conditions of the previous Notice of Modification (DA 88-4-2005 MOD 1), does not fulfil all of the requirements of the latest project approval. A new water balance model that fulfils these requirements will be developed. This is a significant undertaking and could not be completed within the time limits imposed on the completion of this Plan. The water balance model will be provided separately and incorporated into a future update of this WMP.	Noted				
Water Management Plan	4	This section summarises the work carried out to develop the previous water balance model and has been taken from the previous version of this WMP. The water balance model was constructed in Microsoft Excel and used a daily time step.	Noted				
Water Management Plan	4	The water balance model forecasts the following water movements within the water cycle: • Rainfall water source and security; • Demand of the water uses on site; • Export with the final coal product; • Import from bores; • Controlled release; and • Spillway discharge from the site.	Noted, this will be superceded by the new water balance.				
	4.1 Management Principles						
Water Management Plan	4	The water balance model forecasts the following water movements within the water cycle: • Rainfall water source and security; • Demand of the water uses on site; • Export with the final coal product; • Import from bores; • Controlled release; and • Spillway discharge from the site.	Noted				
Water Management Plan	4	As with any modelling, a water balance model incorporates a number of assumptions to represent the operations on site. These vary for each site and can also vary across a single site. The following general management principles were adopted for all elements of the Tarrawonga site: • Limiting the extent of site disturbance; • Using the minimum volume of water necessary during dry periods; • Optimising the storage available on site; • Segregation of water by quality or source; • Reducing contaminant concentrations by suitable treatment methods; • Avoiding the accumulation of large volumes of contaminated water on-site, and; • Protecting groundwater resources from contamination.	Noted				
	5 Management of Specific Site Elements						

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
5.4 Goonbri Creek Diversion, Low Permeability Barrier and Permanent Flood Bund							
Water Management Plan	5.4	It should be noted that the detailed design of these elements has not been undertaken. This work will be carried out at a later date when mining has progressed and the requirements of these elements are better understood.	Noted, not yet implemented.				
5.4.1 Low Permeability Barrier							
Water Management Plan	5.4.1	A low permeability barrier would be constructed in the alluvium, approximately 50-100 m to the east and south-east of the final open cut extent. Construction of the low permeability barrier would be completed before the open cut intersects the alluvium that feeds Goonbri Creek (approximately Year 12).	Noted, not yet implemented.				
Water Management Plan	5.4.1	The low permeability barrier would be constructed using a soil-bentonite mixture to meet the following design objectives: • Minimise the potential for local drainage of alluvial groundwater into the open cut during operations and post-mining;	Noted, not yet implemented.				
Water Management Plan	5.4.1	• Minimise the potential for future instability of the open cut batters formed in the alluvium (achieved by reducing the groundwater hydrostatic head in the alluvium immediately adjacent to the open cut/final void);	Noted, not yet implemented.				
Water Management Plan	5.4.1	• Maintain the hydraulic character of Goonbri Creek by minimising the potential loss of baseflow; and	Noted, not yet implemented.				
Water Management Plan	5.4.1	• Maintain the value of alluvial groundwater, by minimising potential interactions with the mine final void, post-mining.	Noted, not yet implemented.				
5.4.2 Permanent Flood Bund							
Water Management Plan	5.4.2	A permanent flood bund would be constructed to prevent inundation of the open cut during operations and post-mining. The permanent flood bund would generally coincide with the alignment of the low permeability barrier	Noted, not yet implemented.				
Water Management Plan	5.4.2	The permanent flood bund would be designed to a height that would provide protection against the peak flood height associated with a Probable Maximum Precipitation rainfall event. The width and geometry of the permanent flood bund would be such that it is stable under these extreme flow conditions.	Noted, not yet implemented.				
Water Management Plan	5.4.2	The permanent flood bund would consist of an engineered clay fill core, which would be sub-excavated into the natural surface. Rock fill armouring would be placed on the eastern side of the clay fill core. The bund would then be topsoiled for revegetation.	Noted, not yet implemented.				
Water Management Plan	5.4.2	For sections of the permanent flood bund running parallel to internal haul roads, the height of the bund would be increased to 6 m as a noise mitigation measure.	Noted, not yet implemented.				
5.4.3 Goonbri Creek Diversion							
Water Management Plan	5.4.3	In approximately Year 15 of the approved works, open cut mining would progress through a 3 km section of Goonbri Creek. Prior to the open cut advancing into this section of the creek, the permanent Goonbri Creek alignment would be established to the east of the open cut.	Noted, not yet implemented.				

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Water Management Plan	5.4.3	The permanent Goonbri Creek alignment would be constructed to meet the following design objectives: • Construct a low flow channel that approximates the existing section of Goonbri Creek upstream of the Project in terms of stream geometry, hydrology and geomorphology; • Mimic the meandering path of the existing alignment of Goonbri Creek, such that the length of the permanent Goonbri Creek alignment is approximately the same length as the section of Goonbri Creek being removed; • Minimise the disturbance to the reaches of Goonbri Creek upstream of the permanent Goonbri Creek alignment; and • Provide a stable transition back to the existing Goonbri Creek alignment which results in no detectable change to the hydraulic conditions in the reaches of Goonbri Creek or the Bollol Creek floodplain area downstream.	Noted, not yet implemented.				
	5.5 Rehabilitation Pollution Control						
Water Management Plan	5.5	It is expected that the water quality of runoff from portions of the mine waste rock emplacement which have been rehabilitated and where sufficient time has elapsed for vegetation to establish, would reflect runoff water quality from similar un-mined areas. Once this has occurred, runoff would be released to the environment. Prior to the stabilisation of rehabilitated areas, runoff would be managed via the actively managed sediment and erosion control system.	Not yet at the point where direct discharge could occur.	Not Applicable			
	5.6 Leard Forest Mining Precinct Water Management Strategy						
Water Management Plan	5.6	TCM has been in consultation with the nearby Boggabri Coal mine and Maules Creek Project in developing a Leard Forest Mining Precinct Air Quality Management Strategy. The aim of this strategy is to minimise cumulative impacts on the quality and availability of water resources in the catchment. At the time of developing this management plan, the Leard Forest Mining Precinct Water Management Strategy was currently in draft form awaiting approval. Upon its completion, the Leard Forest Mining Precinct Water Management Strategy will be appended to this management plan. TCM and Boggabri Coal currently continue to share surface and groundwater monitoring data, whilst Boggabri Coal, Tarrawonga and the Maules Creek Project participate in monthly meetings to discuss cumulative impact management measures.	Noted				
	6 Surface Water monitoring plan						
Water Management Plan	6.1	Tarrawonga Coal has a comprehensive monitoring program in place across the mine site that incorporates: • The collection of rainfall and meteorological data; and • The collection of water quality data in the onsite dams and surrounding creeks.	Noted, observed in monitoring results.	Compliant			
	6.3 Monitoring Locations						

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Water Management Plan	6.3	The water quality monitoring program has been designed to provide data on the flows leaving site as well as the flows in the receiving creeks. As the approved works are undertaken, the potential for impacting Goonbri Creek, Bollol Creek and the downstream watercourses is increased. For this reason the surface water monitoring program will be updated to include the following locations: • Two new surface water flow gauging stations on Goonbri Creek upstream (GC-U) and downstream (GC-D) of the permanent Goonbri Creek alignment; • Two water level (flood) gauges in the lower reaches and overflow areas of Bollol/Goonbri Creek (FG1 and FG2); • Water quality monitoring on Goonbri Creek at the two new gauging stations; • Water quality monitoring in new on-site water storages and licensed discharge points; and • Two pluviometers in the upper (PV1) and mid (PV2) reaches of the Goonbri Creek catchment. These locations will be introduced as soon as possible and will begin to establish baseline data.	This has generally not been conducted.	Not Compliant	D	2	Medium
Water Management Plan	6.3	There is a requirement to establish baseline data on soils within areas irrigated with pit water. This practice has not been used on the site and there are no current plans to introduce it in the future. The practice was kept as an option to be used should the available storage for pit water become restricted. If this option becomes likely in the future, more detailed plans will be developed and a system for testing soils introduced.	Noted				
	6.4 Water Quality Monitoring Schedule						
Water Management Plan	6.4	The proposed water quality monitoring program provides for the assessment of background data for flow events in the various creeks as well as regular grab samples from the mine water storages on-site to determine whether mine site runoff meets the adopted water quality compliance criteria. The samples will be collected during every flow event as well as quarterly for routine monitoring. The samples should be collected in a manner consistent with the Approved Method for Sampling and Analysis of Water Pollutants in NSW (OEH, 2004). • The event-based sampling should enable quantification of any pollutant loads from the mine site and their corresponding impact on the local creek water quality. • On-site regular sampling from the water storages allows for any potential problem areas with respect to pollutant generation on-site to be identified in advance ensuring appropriate remedial action can be taken.	The ALS monitoring reports and AEMR appendices indicate that this monitoring is occurring	Compliant			

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Water Management Plan	6.4	Monitoring is the responsibility of the Environmental Officer and should be conducted by a suitably qualified professional in accordance with the relevant Australian Standards. The frequency of monitoring and range of parameters analysed during flow and routine monitoring should be reviewed as part of the revision process for this document.	There is no evidence that the ALS/ACIRL sampler is a suitably qualified **professional**. Letters of competency show no indication of professional education. This is probably not necessary **Recommendation - modifying the WMP to remove the requirement for sampling to be conducted by a professional.**	Not Compliant Administrative			
	6.5 Surface Water Impact Assessment Criteria						
Water Management Plan	6.5	Impact assessment criteria for surface water are only relevant to water actually discharged from the mine site. The surface water compliance criteria are as prescribed by the EPA and specified as concentration limits within Environment Protection Licence (EPL) 12365. Condition L2 of EPL 12365 specifies the following concentration limits for licensed points/EPL ID No 1 (SD17), 2 (SD9), 3 (SB14), 24 (SD16), 25 (SB22), 26 (SB23B) and 27 (SB24B) (Table 6 3): Table 6-3 Surface Water Assessment Criteria Pollutant / Units of Measure / 50 percentile concentration limit / 90 percentile concentration limit / 3DGM concentration limit / 100 percentile concentration limit Oil and Grease / mg/L / – / – / – / 10 pH / pH / – / – / – / 6.5-8.5 Total Suspended Solids / mg/L / 20 / 35 / – / 50	Noted			
Water Management Plan	6.5	All monitoring events will be analysed against this criteria, and any surface water discharge events reported to the EPA as required. Tarrawonga Coal notes Condition L1.1 and Condition L2.3 of the EPL, as follows: Condition L1.1 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. Condition L2.3 To avoid any doubt, this condition does not authorise the pollution of waters by any pollutant other than those specified in the tables. (see Table 6 3 above).	ALS monitoring reports and AEMR, there have been some dischargesincluded in the AEMRs during the audit period but none were reportable either because they were below criteria or because the rainfall event exceeded the criteria for reporting uncontrolled discharges.	Compliant			
	6.6 Reporting Procedures						

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Water Management Plan	6.6	The Environmental Officer for the mine site will retain an active database of monitoring results which will be updated on a regular basis. Any discharge event off-site will result in the triggering of a sampling event. All sampling results will be made available in the Annual Return (where required) for the site, as well as on the TCM website via the Annual Environmental Management Report (AEMR)/Annual Review. Tarrawonga Coal will notify the EPA as soon as practicable after identification of an exceedance in concentration criteria. Tarrawonga Coal will also provide a written report within 7 days of the event to the relevant agencies which will: • Describe the date, time, duration and nature of the exceedance/incident; • Identify the type and concentration of every pollutant discharged; • Identify the cause (or likely cause) of the exceedance/incident; • Name and contact details of witnesses to the event; • Describe what action has been taken to date; and • Describe the proposed measures to address the exceedance/incident.	No eceedences in the reporting period All discharge events sampled in accordance with requirements	Compliant			
Water Management Plan	6.6	The ongoing monitoring program and collation of relevant data will provide the basis for continuing improvement in surface water management across the site.	Noted				
7 Groundwater Monitoring Program							
Water Management Plan	7	The additional monitoring, carried out for the investigation into the mine extension, will be formally incorporated into the site monitoring network. This will occur as the project proceeds. • MW-1: located in the Permian coal and measures (interburden) aquifer on the “Thuin” property, • MW-2: located in the alluvial aquifer on the “Thuin” property, • MW-3: located in the Boggabri volcanics aquifer on the “Nagero” property, • MW-4: located in the alluvial aquifer on the “Tarrawonga” property, • MW-5: located in the surface water drainage line to the southwest of the mine. This location would also serve as an indicator to impacts on the alluvial aquifer servicing the “Bollol Creek Station” aquifer, • MW-6: located in the alluvial aquifer of Nagero Creek, • MW-7: located in the Permian sediment up hydraulic gradient of the mine area, and • MW-8: located on the western side of the mining lease and is the most recent monitoring point.	Based on the content of the monitoring reports these sample points have not yet been incorporated into the monitoring network.	Not Applicable			
Water Management Plan	7	All bores used for groundwater monitoring will be licenced by the NOW.	licenses provided along with WALs	Compliant			

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Water Management Plan	7	The existing TCM network of piezometers will be augmented, particularly prior to and during Years 12 to 17 of the extension and remain in place for 2 years post-mining. (i.e. coincidental with the anticipated open cut intersection with the alluvial groundwater system inside the low permeability barrier). This network of piezometers would be installed for the purposes of monitoring: • the construction of the low permeability barrier (to quantify and validate the predicted short-term/localised dewatering impacts); • groundwater levels and water quality in the alluvial groundwater system on the inside of the low permeability barrier as mining advances (to validate the predicted mine inflow and dewatering rates); • groundwater pressures in the porous rock groundwater system/coal measures (to validate the predicted depressurisation effects at depth); and • groundwater levels and water quality in the alluvial groundwater system on the outside of the low permeability barrier as mining advances (to validate the predicted negligible impacts).	Not yet at years 12 to 17 of the extension.	Not Applicable			
	7.3 Baseline Data						
Water Management Plan	7.3	Pre-mining baseline groundwater level and quality information has been collected routinely since mid-2006. This is not true for all the monitoring locations; however readings are taken and maintained as soon as a bore is operational.	Noted				
	7.3.1 Groundwater Levels						
Water Management Plan	7.3.1	Groundwater levels are monitored, and will be monitored at all current and future locations in the monitoring system. The piezometer bores are monitored for groundwater level/pressure and quality information.	AEMR and monitoring reports, this occurs	Compliant			
	7.3.2 Groundwater Quality						
Water Management Plan	7.3.2	Groundwater quality monitoring has been conducted by TCM, with samples from all available standpipes in the monitoring network submitted for laboratory analysis of pH, electrical conductivity (EC), total dissolved solids (TDS), major anions, major cations and selected heavy metals (As, Cd, Cr, Cu, Ni, Pb, Zn, Hg, V, Mn). The main water quality characteristics (pH, TDS) in the mine area are summarised in Table 7 2.	AEMR and monitoring reports, this occurs	Compliant			
	7.4 Monitoring Schedule						

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Water Management Plan	7.4	Key components of the groundwater monitoring program will include: • Collaboration with surrounding mine (Boggabri Coal Mine and Maules Creek Coal Project) to establish a combined monitoring regime. • Quarterly measurement of water levels, field pH and EC in the existing network of piezometers to be monitored through the life of the project; • Quarterly measurement of water levels, field pH and EC in existing registered groundwater bores within 5 km of the Mine Lease as indicated in Table 7 1; • Six monthly collection of water samples from all standpipe piezometers for laboratory analysis of a broader suite of parameters including: o Physical properties (EC, TDS, TSS and pH) o Major cations and anions (Ca, Mg, Na, K, Cl, SO4, HCO3 and CO3) o Nutrients (ammonia, nitrate, phosphorus, reactive phosphorus) o Dissolved metals (aluminium, antinomy, arsenic, boron, cobalt, cadmium, chromium, copper, iron, lead, manganese, mercury, molybdenum, nickel, silver, selenium, zinc)	AEMR and monitoring reports, this occurs apart from completion of the collaboration with the neighbouring mines which will occur following the approval of the Water Strategy for all three mines.	Compliant			
Water Management Plan	7.4	Data collected from the piezometers will be compared against initial groundwater modelling predictions.	This occurs, see AEMR	Compliant			
Water Management Plan	7.4	The frequency of monitoring and range of parameters analysed during flow and routine monitoring should be reviewed after every two years of operations.	This has not occurred, the WMP is not approved and is not two years old.	Not Applicable			
Water Management Plan	7.4	All monitoring results will be reviewed annually and summarised in each Annual Return (where required) as well as the AEMR/Annual Review, together with an assessment of the need to modify the parameters measured or monitoring frequency. In addition to this, the raw monitoring data is published on the mine's website within two weeks of sampling. The groundwater model will also be re-calibrated using the latest data collected.	Data is published on website and included in AEMR. Monitoring results are reviewed. The groundwater model has not been updated every second year as required by the WMP.	Compliant			
	7.5 Groundwater Sampling Procedure						
Water Management Plan	7.5	The method of groundwater monitoring will be undertaken following the procedure outlined below. Note that these procedures are not exhaustive and will be complemented with 'best practice' sampling protocols. • Depth to water table will be measured using a calibrated water level meter or dip tape.	this is recorded	Compliant			
Water Management Plan	7.5	• Bores will be purged of at least three well-volumes of groundwater using a submersible pump or bailer. The method of purging will be tailored for each site, dependant on the parameters being analysed to ensure the accuracy of results.	this does not happen, reference the field sheet 20-02 year not recorded but samples were submitted 24-02-14				

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Water Management Plan	7.5	• Collection of groundwater samples will be undertaken following the purging of each bore.	this does not happen, reference the field sheet 20-02 year not recorded but samples were submitted 24-02-15	Not Compliant	D	2	Medium
Water Management Plan	7.5	• For groundwater samples, sampling devices will be dedicated and/or disposable for each sample or otherwise decontaminated between sampling locations. If rinsing is used, rinsate samples should be included in the QA/QC program as appropriate.	This is not clear from the analysis and sampling data provided, there is no record in the QA report from the lab of rinsate samples being tested. The water samped shold be from the aquifer not that exposed to the atmosphere in the well.				
Water Management Plan	7.5	• Groundwater samples will be collected in laboratory supplied sampling containers that will be appropriately dosed with the preservative for the analysis required.	This occurs	Compliant			
Water Management Plan	7.5	• The samples will be submitted for analysis to a NATA accredited laboratory within the relevant holding times with completed chain of custody documentation.	This occurs	Compliant			
Water Management Plan	7.5	• All sampling events will have a QA/QC program and the QA/QC sample analysis will be checked to validate the integrity of the collected data.	This occurs	Compliant			
	7.5.1 Document of monitoring and reporting on monitoring results						
Water Management Plan	7.5.1	All documentation related to groundwater will be kept on archive, and be readily accessible to facilitate ease of data analysis against regulatory criteria and monitoring trigger values. Depending on the medium for recording of field data, relevant monitoring documentation may include (but not limited to): • Hand recorded field observations and data recording; • Electronic data records and downloaded information; • Calibration records for field monitoring equipment; • Photographs of monitoring sites or potential issues of concern; • Laboratory analytical results reports, including chain of custody records; • Summary and records of quantities of releases of hazardous materials to the environment; • Internal technical memorandums detailing the results of monitoring programs; and • Monitoring reports prepared for submission to regulatory authorities.	All information is kept either by the sampling contractor (ALS) or by the EO.	Compliant			

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Water Management Plan	7.5.1	An organised internal approach to data management and monitoring documentation will significantly enhance the intended benefits of the monitoring program. When set up, it will facilitate the identification of potential issues of concern in a timely manner, such that appropriate contingency actions can be implemented if warranted. In addition to this, the raw monitoring data will be published on the mine's website within two weeks of sampling and will be given to the local NOW hydrogeologist.	The data is not posted up within two weeks and is not supplied to NOW.	Not Compliant Administrative			
	7.6 Groundwater Impact Assessment Criteria						
Water Management Plan	7.6	An observed inflow rate 100% in excess of the predicted mean monthly inflow rate at any stage during the mine life sustained for three consecutive months would require a response plan as detailed in Section 8.	This has not been observed.	Not Applicable			
	7.6.2 Impacts to Licenced Users						
Water Management Plan	7.6.2	The groundwater modelling carried out for the EA suggests that all but one of the surrounding bores draw water from the Namoi Alluvium and will experience a maximum draw down of 1m. The one remaining bore is located in the Leard State Forest (GW967859) and draws water from the shallow porous rock source. This bore will experience approximately 8m of drawdown as a result of the TCM and approximately 20m from all surrounding mines. TCM will consult with NOW to ascertain the use of this bore and to agree on any mitigating action, if required.	Noted				
	7.6.3 Mine Inflow Water Quality						
Water Management Plan	7.6.3	Should the water quality of the mine inflows or dewatering discharge indicate an inflow salinity of more than 20% above that predicted by the groundwater modelling, all relevant monitoring data will be provided to an approved experienced hydrogeologist for review and assessment of the impact on other users or the environment.	This has not occurred	Not Applicable			
	7.6.4 Groundwater Quality Criteria						
Water Management Plan	7.6.4	Groundwater quality would be assessed predominantly against the National Environment Protection Council (NEPC) livestock guidelines, given that this is the predominant use of groundwater in the vicinity of the mine site. These are outlined in Table 7 6. Impacts on the water quality parameters of pH, TDS, other anions and heavy metals (not considered by the NEPC criteria) would be based on comparisons to baseline monitoring of groundwater quality taken from all groundwater bores within the mine site.	AEMR reports against these criteria	Compliant			
Water Management Plan	7.6.4	A trigger to assess the cause and effects on groundwater quality will be implemented when there is a prolonged and extended non-conformance of the outlined criteria at a particular piezometer.	Noted (this has not occurred)				

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Water Management Plan	7.6.4	If a parameter is outside the designated criteria for at least three months in a sequence, or alternatively, exceeds its previous range of results by greater than a 20% variation for at least three months, then the cause will be investigated, and a remediation strategy proposed, if warranted.	Noted (this has not occurred)				
7.7 Reporting Procedures							
Water Management Plan	7.7	An active database of monitoring results, to be retained by the Environmental Officer, will be updated on a regular basis. Sampling results will be made available in the Annual Return (where required), as well as on the TCM website via the AEMR/Annual Review and Community Consultative Committee (CCC) report. The AEMR/Annual Review will present an overview of the performance of the groundwater monitoring network during the preceding 12 months and identify the proposed extraction, processing and rehabilitation activities and environmental management planned for the following 12 months.	This is done see AEMR/ARs	Compliant			
Water Management Plan	7.7	The ongoing monitoring program and collation of relevant data will provide the basis for continuing improvement in groundwater management across the site.	Noted				
7.7.1 Community Complaint Protocol							
Water Management Plan	7.7.1	In addition to monitoring of surface and groundwater quality, TCM records all complaints made by the community. For each complaint, the following information is recorded • Date and time of complaint; • Method by which the complaint was made; • Personal details of the complainant which were provided by the complainant or, if no such details were provided, a note to that effect; • Nature of the complaint; • The action(s) taken by TCM in relation to the complaint, including any follow-up contact with the complainant; and • If no action was taken, the reason why no action was taken.	See complaints from other sections of audit	Compliant			
7.8 Further Development of the Groundwater Model							
Water Management Plan	7.8	The groundwater model will be recalibrated 2 years after the approval of this Plan. Recalibration will then occur every 5 years thereafter and at least 12 – 18 months prior to cessation of mining. Following the first review, if necessary, the groundwater model will be recalibrated and confirmatory forward impact predictions made.	This has not occurred, Ground water model updated for the EA in January 2012.	Not Compliant	E	2	Medium
Water Management Plan	7.8	Should any review or audit indicate a significant variance from the model predictions with respect to either water quality or groundwater levels, then the implications of such variance will be assessed, and appropriate response actions implemented in consultation with NOW and EPA as appropriate.	Noted, no significant variations to date.	Not Applicable			

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Water Management Plan	7.8	If in-flows deviate significantly from predictions, regular review of the groundwater model predictions against monitoring data will be carried out. Should the recalibrated model show groundwater inflows beyond these cases described in the EA, a separate detailed impact assessment will be conducted and mitigating measures determined.	This has not occurred.	Not Applicable			
Water Management Plan	7.8	It is proposed to calibrate this model with ongoing monitoring data from the site. Other circumstances which may trigger further development or refinement of the groundwater model include: • A significant change to the mine plan; • Acquisition of new hydrogeological information, such as groundwater levels and aquifer properties (i.e. hydraulic conductivity) which are different to calibrated values used in the model; and • Groundwater drawdown and inflows which significantly exceed model predictions for that stage of mining.	Noted, none of these circumstances have eventuated.	Not Applicable			
	8 Surface and Groundwater Response Plan						
Water Management Plan	8	The surface and ground water response plan will include a protocol for managing and reporting any: • incidents; • complaints; • non-compliances with statutory requirements; and • exceedances of the impact assessment criteria and or performance criteria; and; • a protocol for periodic review of the plan.	There is no Surface and Groundwater Response Plan, there is a TARP but it does not detail the management of complaints.	Not Compliant Administrative			
Water Management Plan	8	Records of any of these items along with the data collected as outlined in this section are to be maintained and available for review by the appropriate agency/ authorities.	Records are kept	Compliant			
	8.1 Surface Water						

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Water Management Plan	8.1	If an exceedance of the monitoring criteria for wet weather discharges (listed in Section 6) is identified then Tarrawonga Coal will follow the procedure listed below: • Exceedance in monitoring criteria identified; • Record the timing, location, environmental conditions and any contributing factors to the exceedance; • Advice issued to relevant agencies as soon as practicable; • Sampling point and areas upstream inspected to ascertain cause of exceedance; • Operational practices reviewed to determine if any current operational practice contributed to the exceedance; • Implementation of ameliorative measures on site to minimise the potential for future exceedance, which may include clean out, redesign or alteration to structures and/or operational practice; • Further written advice to relevant agencies identifying actions undertaken to reduce future risk of exceedance, if not included in initial communication; • Where specific cause of exceedance cannot be identified, external advice may be sought; and • Ongoing future monitoring to ensure ameliorative measures have been successful with concentration criteria being met.	This has not occurred in the audit period	Not Applicable			
Water Management Plan	8.1	All other surface water monitoring will be discussed in the AEMR/Annual Review with reference to relevant guidelines, such as the ANZECC guidelines.	This is included in the AEMR	Compliant			
	8.2 Groundwater						
Water Management Plan	8.2	In the event of any exceedance in groundwater monitoring criteria, the following response action may be initiated: • TCM assessment to determine the reason for the exceedance. • Refer the matter to an independent hydrogeologist for review if TCM investigation is unable to identify reason for exceedance. • If assessed as being caused by the mining operation, and it is further assessed to be likely to cause an adverse impact on an existing beneficial or environmental use of surface water or groundwater, then an appropriate preventative and/or remedial strategy would be recommended, which may comprise: o Additional monitoring; o Modification to mine plans; o Provision of alternative water supply or other agreed compensation; o Introduction of engineering structures to break hydraulic coupling caused by mining; or o (If appropriate) no change to operations.	This has not occurred in the audit period	Not Applicable			

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Water Management Plan	8.2	The above response program would be carried out in consultation with EPA, NOW and other relevant government agencies.	Noted				
Water Management Plan	8.2	Specific trigger levels have been designed to alert TCM to observed parameter responses which are outside of normal variation and predicted responses, or where observed parameter values do not follow anticipated trends.	Noted				
Water Management Plan	8.2	The triggers for instigation of response actions would occur when observed changes to monitored parameters exceed specified levels. Such changes in observed parameters or conditions include: • Sudden inrush of groundwater into the mine pit in exceedance of predicted inflows; • Significant change in observed water quality or groundwater levels between sampling rounds; • Changes in trends over an extended period for groundwater levels and quality; and • A significant increase or variation from predicted models.	Noted, covered in the TARP	Compliant			
	8.3 Trigger Action Response Plan (TARP)						
Water Management Plan	8.3	The Trigger Action Response Plan (TARP) has been developed to focus upon appropriate trigger and response actions for mitigation of impacts to the natural environment as a result of mining.	Noted				
Water Management Plan	8.3	Monitoring serves to advise of changes to water levels or quality that occur, or to raise alert that an abnormal condition relating to mining has developed.	Noted				
Water Management Plan	8.3	Each monitoring program has established trigger levels for particular impacts at which a response is needed, and to help define an appropriate response (Table 8 1). Management of impacts within predictions follows standard assessment review and response protocols.	Noted				
Water Management Plan	8.3	The TARP has been designed to allow reference to risks of impact from mining to environmental aspects identified within the mining area and surrounds. These include both predicted and unpredicted impacts, and include: • Storage dam water quality; • Site discharge water quality; • Creek water quality; • Groundwater level; • Groundwater quality; • Unexpected impacts to alluvium associated with the Namoi River; and • Groundwater users (private bores).	Noted				
	8.4 Management Plan Review						

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Water Management Plan	8.4	The existing Surface Water and Groundwater Response Plan will be reviewed as part of the review cycle of this document. It will be revised to describe any additional measures/procedures that are implemented over the life of the project to respond to potential exceedances of water related criteria. It would also describe the contingent mitigation/compensation/offset options that would be enacted in the event that surrounding users are adversely affected by the project.	This has not been done but there will be a full review of the Water Management Plan and supporting documents in the coming weeks.	Compliant			
	8.5 Unforseen Impacts Protocol						
Water Management Plan	8.5	Table 8 2 outlines the procedure to be followed (in general accordance with the criteria exceedance protocols detailed in Section 5 and Section 7) in the event that any unforseen surface or groundwater impacts are detected. Table 8-2 Unforeseen Impact Procedure Stage / Procedure 1 — Review the unforeseen impact including consideration of: • Any relevant monitoring data; and • Current mine activities and land management practices in the relevant catchment 2 — Commission an investigation by an appropriate specialist into the unforeseen impact, if considered appropriate by the Environmental Specialist 3 — Develop appropriate ameliorative measures based on the results of the above investigations, in consultation with the relevant authorities 4 — Implement additional monitoring where relevant to measure the effectiveness of the improvement measures	Noted, covered in TARP.	Compliant			

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
	Groundwater Contingency Plan						
	2.3 Monitoring Locations						
Groundwater Contingency Plan	2.3	The GWMP applies to a total of sixteen locations where both groundwater levels and quality will be measured (see Figure 1). Eight of these locations will comprise specifically installed piezometers, positioned to provide relevant information on groundwater in close proximity to the mine.	Noted				
Groundwater Contingency Plan	2.3	In addition to these eight piezometers, TCPL will monitor groundwater levels within five representative bores on and surrounding the mine site, namely: • GW002501 – within the water bearing zone(s) of the mine site; • GW002129 – within the mine site for as long as this bore exists (prior to destruction by the advancing footprint of the mine); • GW031856 – within the alluvial aquifer on the "Ambardo" property; • GW052266 – within the alluvial aquifer on the "Tarrawonga" property; and • GW000507 – within the Permian coal measures and interburden on IBC's"Merriown" property	Results for these piezos are recorded in the AEMRs	Compliant			
Groundwater Contingency Plan	2.3	In order to monitor for natural variation in groundwater level and quality, the following bores will also be monitored. • GW044997 – within the alluvial aquifer on the "Templemore" property. • GW020432 – within the volcanics aquifer on the "Merriown" property. • GW006013 – within the Permian Coal Measures on the "Bollol Creek Station"property.	2012-13 AEMR indicates that GW044997 is monitored but GW020432 and GW006013 are not recorded, no explanation is given in the text.	Not Compliant	E	2	Low
	2.4 Monitoring Parameters and Frequency						
	2.4.1 Baseline Monitoring						
Groundwater Contingency Plan	2.4.1	Baseline monitoring of water chemistry (see Table 1) is to be conducted within GW002129 and GW002501 prior to the commencement of mining given the proximity of these to the mine and the predicted direction of groundwater flow. Baseline monitoring of Standing Water Level (SWL), electrical conductivity and pH will be undertaken at the remaining 14 piezometers and groundwater bores. Groundwater levels will be assessed to the nearest 0.01m and all monitoring locations surveyed to AHD so relative levels can be determined.	This was done prior to the audit period	Not Applicable			
Groundwater Contingency Plan	2.4.1	For those groundwater bores that are currently a source of water for one or more local properties, the yield will be tested prior to commencement of mining. This yield will reflect the pumping rate at the time of measurement, which may not be the maximum pumping rate, but will provide a reference for comparison should a complaint be received over future bore yields.	Noted, no evidence of the testing was provided and it occurred prior to the audit period.	Not Applicable			
	2.4.3 Monitoring of Operational Impacts						

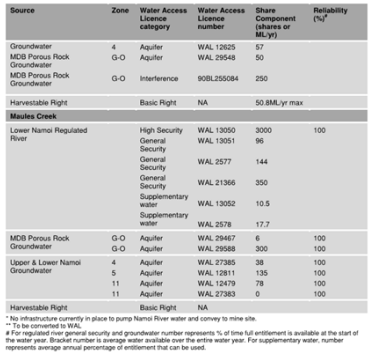
Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Groundwater Contingency Plan	2.4.3	Following the establishment of baseline conditions for standing water level (SWL), water chemistry and yield, the sixteen groundwater bores and piezometers will be monitored at varying frequencies to assess changes to groundwater SWL's, water chemistry and yield. Data loggers will be installed in the nested piezometer pair of MW-1 and MW-2 to obtain continuous data on fluctuations in the standing water level in the alluvial and coal measures aquifers. The SWL will be measured quarterly in the remaining fourteen bores and piezometers.	AEMRs confirm this monitoring	Compliant			
Groundwater Contingency Plan	2.4.3	The water chemistry parameters of electrical conductivity (EC), pH and Lead (Pb) will be measured every 6 months as required by Condition M2.1 of EPL 12365 and a complete assessment of water chemistry will be undertaken on a yearly basis to review any changes to assess any trends in groundwater chemistry over time. These parameters will include the following. • Total Petroleum Hydrocarbons (TPH) – these contaminants (typically oils and diesel) will be used during mining.	AEMRs confirm this occurs	Compliant			
Groundwater Contingency Plan	2.4.3	• Heavy Metals – some heavy metals may be associated with waste oils. These may include arsenic, cadmium, chromium, nickel, lead (already included in Table 7.1), copper, manganese and zinc.	AEMR confirms these analytes are covered	Compliant			
Groundwater Contingency Plan	2.4.3	• Major cations and anions – to assess overall changes in groundwater chemistry	AEMR confirms these analytes are covered	Compliant			
Groundwater Contingency Plan	2.4.3	In addition to the program identified in Table 1, and in the event that a complaint be made over deceasing yields within bores closer to the mine, TCPL will undertake monitoring of the yield within the background bores to establish whether the decrease is a consequence of mine related activities or due to natural fluctuation.	No complaints regarding this issue	Not Applicable			
Groundwater Contingency Plan	2.4.3	Monitoring will continue for a period of up to 10 years after mining has ceased. The frequency will be reassessed after mining is complete, however, as it may be possible, depending on results, to lengthen the intervals between monitoring campaigns.	Noted				
	3 Trigger Levels, Benchmarks and Contingency Criteria						

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Groundwater Contingency Plan	3	Table 2 presents the trigger levels for changes in groundwater level and chemistry. The trigger levels will be assessed against a benchmark of the natural conditions which have been and/or are currently being established through the baseline monitoring program, or ANZECC criteria. **Table 2** **Trigger Levels and Benchmarks** Parameter / Measure / Benchmark [*1] / Trigger Level Standing Water Level / Saturated Thickness / Established baseline +/- natural fluctuation / 15% Reduction Chemistry / EC / Established baseline +/- natural fluctuation / 15% Increase Chemistry / pH / Established baseline +/- natural fluctuation / 15% Increase or Decrease Chemistry / Lead / 0 / 0.1mg/L [*1] [*1] Based on criteria for livestock watering of ANZECC (2000)	Noted				
Groundwater Contingency Plan	3	In the event that routine monitoring indicates that a trigger has been reached or is being approached, TCPL will commission a hydrogeologist to review the data. The outcomes of that review, including any recommendations, will be subject to discussion and agreement with the Department of Natural Resources (DNR) hydrogeologists.	No triggers to date of the GCP	Not Applicable			
Groundwater Contingency Plan	3	A trigger of pH or EC would initially lead to an increase in the analytes monitored and/or frequency of sampling to confirm the magnitude and extent of the change in water chemistry and verify the change is a consequence of mining.	No triggers to date of the GCP	Not Applicable			
Groundwater Contingency Plan	3	Should the saturated thickness trigger level be achieved in any bore, TCPL will notify the affected landowner(s) and, if TCPL's and DNR's hydrogeologists are of the opinion that the reduction is a consequence of mining, initiate the mitigation measures identified in Section 4.2. An independent authority may also be used where a dispute arises as to the cause of the change, given that groundwater supply and quality can be affected by non-mining related factors such as bore siltation, aquifer depletion by large scale agricultural users, bacterial infection, fertilizer contamination etc.	No triggers to date of the GCP	Not Applicable			
	4 Mitigation Measures, Negotiated Agreements and Compensatory Measures						
	4.1 Groundwater Quality						
Groundwater Contingency Plan	4.1	The only potential major contaminant of groundwater on the mine site will be liquid hydrocarbons such as diesel fuel, oils and lubricants. In the event a major liquid hydrocarbon/contaminant spill does occur, TCPL will implement the following 3-phase mitigation remediation plan.	Noted - no hydrocarbons detected at significant levels to date	Not Applicable			
Groundwater Contingency Plan	4.1	Phase 1 – Recovery (of surface) Recover as much as possible at the source by pumping the contaminant from the surface and excavating the contaminated materials and stockpiling them on site, under cover and on an impermeable surface, eg. a high density polyethylene sheet. This material will later be bioremediated on site and/or transported to an approved waste depot.	Noted - no hydrocarbons detected at significant levels to date	Not Applicable			

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Groundwater Contingency Plan	4.1	Phase 2 – Source Control Begin hydraulic control of the source to prevent spreading of contamination. This will involve digging one or more holes close to the centre of the spill area, and pumping from these holes to create a cone of depression with a hydraulic gradient towards the holes. This will prevent movement of contamination away from the area of the spill.	Noted - no hydrocarbons detected at significant levels to date	Not Applicable			
Groundwater Contingency Plan	4.1	Phase 3 – Recovery (from groundwater) If necessary, install boreholes to remove and treat contaminated groundwater. Any contaminated surface water or groundwater recovered will be treated on site prior to release (or use for processing or dust suppression) under an EPA licence.	Noted - no hydrocarbons detected at significant levels to date	Not Applicable			
Groundwater Contingency Plan	4.1	No other potential contaminants will be used on the site in sufficient quantity as to require development of a specific contingency plan. However, any spillages of such materials, eg. explosives, will immediately be cleaned up and disposed of in an appropriate manner approved by DEC.	Noted				
Groundwater Contingency Plan	4.1	Notwithstanding the measures identified above, TCPL recognise that the potential remains for changes in groundwater quality to occur which may or may not be a consequence of potential contaminants used on the mine site. Should such a situation be demonstrated by monitoring, appropriate measures to mitigate impacts on groundwater quality will be developed in consultation with DNR's hydrogeologists, with the nature of the "appropriate solution(s)", eg. pumping and treatment, isolation or remediation, being dependent on the nature of the issue.	Noted				
Groundwater Contingency Plan	4.2	In the event that monitoring identifies a reduction in the saturated thickness and/or bore yield within any bore which is in excess of the identified trigger level and a consequence of mining, TCPL will enter into negotiations with the affected landowners with the intent of formulating an agreement which provides for one or a combination of: • re-establishment of saturated thickness in the affected bore(s) through bore deepening; • establishment of additional bores to provide a yield at least equivalent to the affected bore prior to mining; • provision of access to alternative sources of water; and • monetary compensation to reflect increased water extraction costs (if any), eg. as a consequence of lowering pumps or installation of additional or alternative pumping equipment.	This has not occurred to date	Not Applicable			

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Groundwater Contingency Plan	4.2	The proposed mitigation or compensation measures will be developed by TCPL following a review of all available data by a qualified hydrogeologist. Should the affected land owner consider the proposed measures to be inadequate, TCPL will request a review of these by a DNR hydrogeologist and/or the Director-General of the Department of Planning. Any recommendations provided by the Director-General in relation to the proposed mitigation or compensation measures will be reviewed by the TCPL's hydrogeologist and unless considered unreasonable will be incorporated and resubmitted to the affected land owner.	This has not occurred to date	Not Applicable			
Groundwater Contingency Plan	4.2	In the event, the affected land owner still rejects the proposed mitigation or compensation measures, or the recommendations provided by the Director-General are considered unreasonable or unlikely to benefit the affected land owner, TCPL will request the matter be referred to an Independent Dispute Resolution Process, as described under schedule 56 of DA-188-4-2005.	This has not occurred to date	Not Applicable			
5 Rocumentation and Record Keeping							
Groundwater Contingency Plan	5	Monitoring undertaken by TCPL personnel, eg. monthly data downloads from the continuous data loggers and quarterly monitoring of standing water levels and chemical parameters within the nominated bores, will also be recorded in an excel spreadsheet and the results graphed against local rainfall.	Spreadsheet provided as evidence, complies	Compliant			
Groundwater Contingency Plan	5	The following information will be recorded at each groundwater monitoring location. • Date and time of SWL monitoring or water sampling. • Condition of the monitoring bore. • Notable ground disturbances or activities ongoing in the general activity. • Information on recent bore pumping (if available). • Colour, odour or other noticeable characteristics of the water.	Included in monitoring field sheets	Compliant			
Groundwater Contingency Plan	5	In the event that pump testing is required from a bore operated on a neighbouring property for domestic or stock purposes, a hydrogeological consultant to TCPL will be commissioned to undertake the test and interpret the results. TCPL will require the results of the test within 1 month of the test.	Not been required to date	Not Applicable			
Groundwater Contingency Plan	5	The nominated Environmental Officer for the Tarrawonga Coal Mine will manage the scheduling, completion and interpretation of results with copies of monitoring results to be forwarded quarterly to the TCPL mine manager and area manager. An up to date copy of the excel spreadsheet in which the monitoring results are maintained is to be kept at both the mine site office and TCPL's Boggabri Office.	This occurs	Compliant			

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Groundwater Contingency Plan	5	The results of all groundwater monitoring will be made publicly available at the offices of Narrabri Shire Council and Gunnedah Shire Council and at TCPL's Boggabri office. These results will be updated at least every three months. Each year, the results of the groundwater monitoring program will be summarised and presented in the AEMR. This will include an analysis of the monitoring results against the trigger levels listed in Table 2, previous monitoring results and the monitoring results of background variance. Based on these results, trends in the groundwater levels, quality and availability will be identified and the requirement to initiate the contingency measures identified in Section 4.	No data sent to the Councils offices	Not Compliant Administrative			

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
	Water Management Strategy - March 2013						
	3.3 Water licences and rights						
Water Management Strategy - March 2013	3.3	Table 3.1 below sets out the water access licence (WAL) types and volumes currently held by BCM, TCM and MCC. Table 3.1 Current WAL associated with the BTM Complex mines  	Noted				
	4.1 Surface water						
	4.1.1 Contaminant export						
Water Management Strategy - March 2013	4.1.1	Contaminated water, containing suspended solids and soluble salts, will be generated from coal stockpiles and the mining void, as well as groundwater inflows to the mining void. In addition, dirty water containing suspended solids will be generated from runoff from disturbed areas within the mine sites, including from infrastructure areas, unshaped spoil dumps and haul roads. For all mines, contaminated water will be retained onsite for use, and dirty water will be retained in settlement ponds prior to discharge or on-site use.	The water collected from the coal loading area is located in Dam SB4, which then flows through a series of dams to Licensed Discharge Point 1 (LDP1 - EPL 12365) and is discharged off-site.	Not Compliant	D	1	High
	4.3 Supply and demand						

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Water Management Strategy - March 2013	4.3	All site water management plans for the BTM Complex mines aim to: - divert clean runoff from undisturbed catchment areas around the mine workings into local creeks ('Nagero Creek' for BCM, 'Nagero', Bollol and Goonbri Creeks for TCM, and Back Creek for MCC) or for use on-site, where appropriate licences are held. Clean water may also be stored temporarily for subsequent controlled discharge into local creeks if immediate diversion is not feasible	This was observed on-site.	Compliant			
Water Management Strategy - March 2013	4.3	- capture dirty water from disturbed areas in sedimentation dams. If the water quality meets licence requirements, and the water is not required for use on site, it will be discharged into the local creeks	Noted				
Water Management Strategy - March 2013	4.3	- use dirty water wherever possible for coal processing and dust suppression	Observed on site	Compliant			
Water Management Strategy - March 2013	4.3	- use imported water as follows: --> for BCM, use imported raw water for potable water, vehicle wash down and construction activities, as well as to meet dust suppression and coal processing demands when there is a site water deficit --> for TCM, use imported raw water for portable water, and use groundwater from a licensed production bore with an annual entitlement of 50ML during protracted dry periods --> for MCC, use imported raw water from an existing high security licence for 3000 ML/yr from the Namoi River for vehicle wash-down, construction activities and potable water, as well as for other site water deficits.	Noted				
	5.2.1 Surface water						
	Surface water flow and use						
Water Management Strategy - March 2013	5.2.1	The objectives of surface water flow and use monitoring are: - to provide baseline surface water flow data upstream of each mining operation over time	Noted				
Water Management Strategy - March 2013	5.2.1	- to record changes in surface water flows downstream of each mine over time	Noted				
Water Management Strategy - March 2013	5.2.1	- to record changes in downstream surface water flows in local creeks resulting from the cumulative impacts of mining operations	Noted				
Water Management Strategy - March 2013	5.2.1	- to record changes in downstream surface water flows in the Namoi river resulting from the cumulative impacts of all BTM Complex mine operations	Noted				
Water Management Strategy - March 2013	5.2.1	- to facilitate surface water hydraulic and/or hydrologic model evolution	Noted				
Water Management Strategy - March 2013	5.2.1	- to allow assessment of surface water access impacts on other users	Noted				
Water Management Strategy - March 2013	5.2.1	- as required by licence conditions, to record surface water volumes pumped from the Namoi River accurately in terms of volume and timing of pumping for input into mine water balances, and to quantify opportunities for water sharing between mines.	Noted				
	surface water quality						

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Water Management Strategy - March 2013	5.2.1	The objectives of surface water quality monitoring are: - to provide baseline surface water flow data upstream of each mining operation over time for a range of informative and diagnostic parameters	Noted				
Water Management Strategy - March 2013	5.2.1	- to record mining-induced changes in surface water quality in space and time	Noted				
Water Management Strategy - March 2013	5.2.1	- to assess whether any changes in surface water quality with time occur during and after mining, and whether such changes are likely to have a material effect on environmental values.	Noted				
	5.2.2 Groundwater monitoring objectives						
	Groundwater levels						
Water Management Strategy - March 2013	5.2.2	The objectives of groundwater level monitoring are (as outlined by Heritage Computing, 2012): - to provide baseline pre-mining groundwater levels in space and time	Noted				
Water Management Strategy - March 2013	5.2.2	- to quantify natural time variations in groundwater levels	Noted				
Water Management Strategy - March 2013	5.2.2	- to record mining-induced changes in groundwater levels in space and time	Noted				
Water Management Strategy - March 2013	5.2.2	- to provide a foundation for characterisation of aquifer and aquitard properties by numerical model calibration	Noted				
Water Management Strategy - March 2013	5.2.2	- to facilitate groundwater model evolution through verification of simulated heads against those measured	Noted				
Water Management Strategy - March 2013	5.2.2	- to reveal mining-induced changes in groundwater flow directions and hydraulic gradients	Noted				
Water Management Strategy - March 2013	5.2.2	- to provide evidence for the degree of stream-aquifer interaction, especially losses of stream water, and whether the losses are permanent or temporary	Noted				
Water Management Strategy - March 2013	5.2.2	- to allow assessment of potential impacts on groundwater dependent ecosystems	Noted				
Water Management Strategy - March 2013	5.2.2	- to allow assessment of yield/drawdown impacts on other groundwater users	Noted				
Water Management Strategy - March 2013	5.2.2	- to monitor post-mining rates of groundwater pressure recovery.	Noted				
	Groundwater quality						
Water Management Strategy - March 2013	5.2.2	The objectives of groundwater quality monitoring are (as outlined by Heritage Computing, 2012): - to provide baseline pre-mining groundwater quality data in space and time	Noted				
Water Management Strategy - March 2013	5.2.2	- to quantify natural changes in groundwater quality in time and space	Noted				
Water Management Strategy - March 2013	5.2.2	- to record mining-induced changes in groundwater quality in space and time	Noted				
Water Management Strategy - March 2013	5.2.2	- to facilitate confirmation or revision of the conceptual model for chemical evolution and groundwater flow directions	Noted				
Water Management Strategy - March 2013	5.2.2	- to assess whether any changes in groundwater quality with time occur during and after mining, and whether such changes are likely to have a material effect on beneficial uses	Noted				

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Water Management Strategy - March 2013	5.2.2	- in the case of open cut pits, to establish whether enhanced rainfall recharge through backfill provides a freshening effect on groundwater, or instead mobilises latent chemicals	Noted				
Water Management Strategy - March 2013	5.2.2	- in the case of a water-filled final void, to assess the risk of migration of saline void waters during the post-mining recovery phase whenever such waters are not contained as a groundwater sink	Noted				
Water Management Strategy - March 2013	5.2.2	- to assess whether acid rock drainage has occurred	Noted				
Water Management Strategy - March 2013	5.2.2	- to assess whether tailings dams are leaking.	Noted				
	Groundwater seepage						
Water Management Strategy - March 2013	5.2.2	The objectives of groundwater seepage monitoring are (as outlined by Heritage Computing, 2012): - to accurately record water volumes pumped from open cut pits, in terms of volume and timing of pumping, so that an assessment can be made of groundwater seepage through water balance modelling (allowing for evaporative losses and surface water inputs)	Noted				
Water Management Strategy - March 2013	5.2.2	- to develop a profile of mine inflow rates and variations with time as input to the mine water management systems	Noted				
Water Management Strategy - March 2013	5.2.2	- to facilitate groundwater model evolution through verification of simulated inflows against those measured or estimated.	Noted				
	Groundwater use						
Water Management Strategy - March 2013	5.2.2	The objectives of groundwater usage monitoring are (as outlined by Heritage Computing, 2012): - to record pumped groundwater volumes accurately in terms of volume and timing of pumping where dewatering bores are in use	Noted				
Water Management Strategy - March 2013	5.2.2	- to record pumped groundwater volumes accurately in terms of volume and timing of pumping from production bores operated or owned by the mine	Noted				
Water Management Strategy - March 2013	5.2.2	- to provide input information into ongoing groundwater model simulations	Noted				
Water Management Strategy - March 2013	5.2.2	- if declining water levels in a monitoring bore occur, to allow informed cause-and-effect analysis in establishing whether the cause is mining or abstraction from a bore.	Noted				
	5.3 Proposed BTM Complex cumulative impact monitoring networks						
	5.3.1 Surface water						
Water Management Strategy - March 2013	5.3.1	The proposed cumulative surface water monitoring program does not supersede surface water management plans currently in place. Rather the program has been developed to work in parallel. The monitoring locations selected for the cumulative monitoring network are part of the existing networks of each mine, with the exception of “Gauging Station”	Noted				

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Water Management Strategy - March 2013	5.3.1	The monitoring parameters and frequencies proposed for the cumulative surface water monitoring network are preliminary and draft in nature. The proposed cumulative monitoring program will form part of discussions with NOW and each mine as part of the consultation process required in the Project Approval. Table 5.3 Proposed cumulative surface water monitoring program Location / Frequency / Parameters / Rationale SW2 (BCM) — Monthly + event based until a baseline is established, then quarterly + event based — Flow measurement + field parameters[a], TSS, oil and grease, nutrients[b], metals[c] — Monitors ambient conditions on 'Nagero Creek' upstream of Boggabri Mine SW1 (BCM) — Quarterly + event based — Flow measurement + field parameters[a], TSS, oil and grease, nutrients[b], metals[c] — Monitors conditions on 'Nagero Creek' downstream of Boggabri Mine, and downstream of Tarrawonga Mine (Tarrawonga discharges to 'Nagero Creek' and Goonbri Creek) Gauging Station (TCM) — Monthly + event based until a baseline is established, then quarterly + event based — Flow measurement + field parameters[a], TSS, oil and grease, nutrients[b], metals[c] — Monitors ambient conditions on Goonbri Creek upstream of Tarrawonga Mine and proposed Goonbri Creek realignment BC-D (TCM) — Quarterly + event based — Flow measurement + field parameters[a], TSS, oil and grease, nutrients[b], metals[c] — Monitors conditions just downstream of the confluence of Goonbri and Bollol Creeks, downstream of Tarrawonga Mine and proposed Goonbri Creek realignment SW4 (MCC) — Monthly + event based until a baseline is established, then quarterly + event based — Flow measurement + field parameters[a], TSS, oil and grease, nutrients[b], metals[c] — Monitors ambient conditions on Back Creek upstream of proposed Maules Creek Mine SW9 (MCC) — Quarterly + event based — Flow measurement + field parameters[a], TSS, oil and grease, nutrients[b], metals[c] — Monitors conditions on Back Creek downstream of proposed Maules Creek Mine SW5 (MCC) — Monthly + event based until a baseline is established, — Flow measurement + field parameters[a], TSS, oil and — Upstream of mines on Namoi River Location / Frequency / Parameters / Rationale — then quarterly + event based — grease, nutrients[b], metals[c] — SW8 (MCC) — Monthly + event based until a baseline is established, then quarterly + event based — Flow measurement + field parameters[a], TSS, oil and grease, nutrients[b], metals[c] — Downstream of mines on Namoi River, downstream of confluence with Maules Creek a: pH, EC, temperature, dissolved oxygen, turbidity, ORP b: Nutrients; phosphorus (total), phosphorus (reactive), nitrogen (total) c: Listed in Table 6.5	Noted			
	5.3.2 Groundwater						
	Groundwater levels and quality						
Water Management Strategy - March 2013	5.3.2	A program has been developed by Heritage Computing (2012) to monitor and manage the cumulative impacts on groundwater conditions as a result of mining within the BTM Complex.	Noted				
Water Management Strategy - March 2013	5.3.2	The program proposes a network of monitoring bores and VWPs to monitor regional groundwater conditions, in addition to existing monitoring bore networks (see Table 5.2 in Section 5.1.2). Some sites selected for groundwater quality monitoring are aligned with existing bores that monitor alluvial aquifers, with the new bores placed to monitor underlying aquifers at the same location. Some sites are selected for water level monitoring only. All bores are recommended to have automatic dataloggers installed to collect continuous water level data, which can be downloaded during sampling rounds.	Noted				
	Groundwater seepage and use						
Water Management Strategy - March 2013	5.3.2	Monitoring of water accumulating in open cut pits is proposed across the BTM Complex to provide a dataset for periodic water balance modelling.	Noted.				
	6.1 Existing trigger levels and responses						

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
	6.1.1 Surface water						
Water Management Strategy - March 2013	6.1.1	A trigger event is also considered to occur when water quality between SW2 (upstream) and SW1 (downstream) differ by more than 20%. The intent of the variance check is to ensure trigger events occur where significant changes in water chemistry are evident over a short section of the creek line even though the actual stated parameter may be exceeded (Parsons Brinckerhoff, 2012). Table 6.1 Boggabri surface water triggers Parameter / 100th percentile *Discharge quality* Oil and grease (mg/L) 10 pH 6.5-8.5 Total suspended solids (mg/L)[a] 50 *Ambient quality* Phosphorus (total) 0.18 Nitrogen (total) 0.72 EC (µS/cm) 350 Parameter / 100th percentile pH 6.5-8.5 Total suspended solids (mg/L) 110 Nitrate (mg/L) TBC[b] Reactive Phosphorus (mg/L) TBC[b] a: TSS concentration limits for wet weather discharge points may be exceeded for water discharge provided that the discharge occurs solely as a result of rainfall measured at the premises that exceeds 38.4mm over any consecutive 5 day period immediately prior to discharge occurring, and all practical measures have been implemented to dewater all sediment dams within 5 days of rainfall such that they have sufficient capacity to store run off from a 38.4mm, 5 day rainfall event. b: There are no ANZECC guideline values for these parameters and trigger levels should be set on ambient water quality data once sufficient data is available.	Noted, note the table has been formulated fro Boggabri and may not be applicable for all three sites.				
Water Management Strategy - March 2013	6.1.1	Surface water quality triggers are specified for TCM in EPL 12365, and relate to discharge water quality. These concentration levels are the same as those included in the Boggabri EPL 12407, listed above in in Table 6.1.	Noted				
Water Management Strategy - March 2013	6.1.1	The Tarrawonga Surface Water Management Plan (Whitehaven, 2011) also includes a triggering EC value of 4000 µS/cm, based on the ANZECC (2000) concentration for moderately tolerant crops.	Noted				
Water Management Strategy - March 2013	6.1.1	Surface water flow monitoring is not part of the current TCM Surface Water Management Plan (Whitehaven Coal, 2011), and has not specifically been recommended for Maules Creek in the EA (WRM, 2011). TCM is updating its WMP to include monitoring of surface water flow in Goonbri Creek as a means of identifying the contribution of surface water discharge that TCM makes to stream flows in Goonbri Creek during significant rainfall events.	Noted				
	Response Plans						

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Water Management Strategy - March 2013	6.1.1	The surface water response plan for TCM is generally consistent with the overall BTM Complex surface water response strategy (outlined in Section 0). Key features of the TCM surface water response plan are: - exceedance in criteria identified - record of timing, location, conditions and contributing factors taken - advice issued to regulatory authorities as soon as possible - sampling points and areas upstream investigated to ascertain cause - operational practices reviewed to determine if any operational contribution to cause - implementation of ameliorative measures on site to minimise potential for future occurrences - written advice issued to regulatory authorities confirming actions taken to reduce potential for future incidences - ongoing monitoring to confirm return to expected parameters.	Noted				
Water Management Strategy - March 2013	6.1.1	In the event that any unforeseen surface water impacts are detected the aforementioned protocol will extend to include the following steps: - Review the unforeseen impact, including consideration of: --> Any relevant monitoring data; and --> Current mine activities and land management practices in the relevant catchment - Commission an investigation into the unforeseen impact by an appropriate specialist selected in consultation with appropriate regulatory authorities - Develop appropriate ameliorative measures based on the results of the above investigations, in consultation with the relevant authorities - Implement additional monitoring where relevant to measure the effectiveness of the ameliorative measures.	Noted				
	6.1.2 Groundwater						
	Trigger levels						
	Groundwater quality						

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Water Management Strategy - March 2013	6.1.2	The Tarrawonga Groundwater Contingency Plan (Corkery & Co, 2006) specifies triggers for groundwater quality, established through baseline information and a review of natural fluctuation. The triggers are listed in Table 6.3. A revision to the Groundwater Contingency Plan is currently being prepared for TCM, and this will be revised based on the approval conditions for the extension of TCM. **Table 6.3 TCM groundwater quality triggers** Parameter: Trigger level pH: 15% increase EC: 15% increase or decrease Lead: 0.1 mg/L[a] a: Based on criteria for livestock watering from ANZECC (2000)	Noted				
	Groundwater levels						
Water Management Strategy - March 2013	6.1.2	The Tarrawonga Groundwater Contingency Plan (Corkery & Co, 2006) sets a trigger for groundwater levels at 15% reduction, based on baseline information and a review of natural fluctuation.	Noted				
Water Management Strategy - March 2013	6.1.2	To counteract spurious measurements, which could occur for example during maintenance of a sensor or downloading or water sampling, a 7-day average will be calculated to cover such events. In addition, to ensure the "breach" of a trigger is sustained and is therefore significant, a 1-month exceedance duration will be adopted to allow water levels to stabilise. This would "trigger" an investigation in the first instance, not an immediately reportable incident.					
	Response Plans						
Water Management Strategy - March 2013	6.1.2	Corkery & Co (2006) outlines TCM's groundwater response plan. In summary, the plan dictates that if monitoring indicates that a trigger has been reached or is being approached, Tarrawonga will commission a hydrogeologist to review the data. The outcome of that review, including any recommendations, will be subject to discussion and agreement with NOW. If water quality triggers are exceeded, additional water quality monitoring is to be carried out to determine if the change is a consequence of mining.	Noted				
Water Management Strategy - March 2013	6.1.2	If an oil/chemical spill occurs, the response strategy is summarised as follows: - recover as much of the spill as possible - control the source through pumping - (if necessary) install boreholes to remove and treat contaminated groundwater.	See response in WMP, no major spills	Not Applicable			

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Water Management Strategy - March 2013	6.1.2	If monitoring identifies a reduction in aquifer saturated thickness and/or bore yield, the response strategy is as follows: - re-establishment of saturated thickness in the affected bore(s) through bore deepening - establishment of additional bores to provide a yield at least equivalent to the affected bore prior to mining - provision of access to alternative sources of water - monetary compensation to reflect increased water extraction costs (if any), e.g. as a consequence of lowering pumps or installation of additional or alternative pumping equipment.	This has not occurred - noted.	Not Applicable			
	6.2 Cumulative impact management objectives and triggers						
	6.2.1 Surface water						
	Surface water quanity						
Water Management Strategy - March 2013	6.2.1	The surface water quantity objectives adopted by this strategy are as follows, and have been adapted from the objectives contained in the WSP for the Namoi Unregulated and Alluvial Water Sources 2012, and from the Namoi Catchment Action Plan: to protect, preserve, maintain and enhance the important river flow dependent ecosystems	Noted				
Water Management Strategy - March 2013	6.2.1	- to ensure mine water use does not result in average surface water flow in local creeks being less than 66% of natural (pre-development) condition, with a sensitivity to natural frequency and duration	Noted				
Water Management Strategy - March 2013	6.2.1	- to minimise mine impacts on basic landholder rights, including: --> landholder extractions from local creeks --> flows to harvestable rights stock watering dams	Noted				
Water Management Strategy - March 2013	6.2.1	- to ensure mine water use does not result in the total water use within the Maules Creek unregulated river water source exceeding the long term average annual extraction limit identified for that water source in the WSP for the Namoi Unregulated and Alluvial Water Sources	Noted				
Water Management Strategy - March 2013	6.2.1	- to minimise the impacts of altered flood flows on catchment landholders	Noted				
Water Management Strategy - March 2013	6.2.1	- to provide opportunities for enhanced market based trading of access licences and water allocations between BTM Complex mines	Noted				
Water Management Strategy - March 2013	6.2.1	- to contribute to the maintenance of water quality in the local creeks and the Namoi River.	Noted				
	6.2.2 Groundwater						
	Groundwater quality						
Water Management Strategy - March 2013	6.2.2	The groundwater quality objectives of this strategy are: - to maintain the most sensitive identified beneficial use (or EV) of all groundwater systems potentially affected by the BTM Complex operations, consistent with the NSW State Groundwater Quality Protection Policy	Noted				

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Water Management Strategy - March 2013	6.2.2	- within this, to maintain the annual average EC values within the historical 95th percentile.	Noted				
	Groundwater quantity						
Water Management Strategy - March 2013	6.2.2	The groundwater quantity objectives adopted by this strategy are as follows, and have been adapted from the objectives contained in the WSPs for the Upper and Lower Namoi Groundwater Sources, and the Murray-Darling Basin Porous Rock Groundwater Sources, as well as from the Namoi Catchment Action Plan: - to protect the structural integrity of the alluvial aquifers by ensuring mining activities and their groundwater extraction do not result in more than minimal alluvial aquifer compaction, aquitard compaction or land subsidence	Noted				
Water Management Strategy - March 2013	6.2.2	- to account for all BTM Complex groundwater use and quantity impacts through the statutory licensing and allocation systems	Noted				
Water Management Strategy - March 2013	6.2.2	- to ensure there are no long-term declines in alluvial groundwater levels resulting from BTM Complex mining activities and their groundwater extraction	Noted				
Water Management Strategy - March 2013	6.2.2	- to maintain basic landholder rights access to groundwater sources that may be impacted by the BTM Complex mines	Noted				
Water Management Strategy - March 2013	6.2.2	- to identify and offset any unacceptable interference to irrigation bore supply in groundwater sources that may be impacted by the BTM Complex mines	Noted				
Water Management Strategy - March 2013	6.2.2	- to provide opportunities for enhanced market based trading of groundwater access licences and groundwater allocations between BTM Complex mines.	Noted				
Water Management Strategy - March 2013	6.2.2	- to minimise the impact of changes to groundwater levels and flows resulting from BTM Complex activities on groundwater dependent ecosystems, including vegetation	Noted				
	6.3 Proposed BTM Complex cumulative impact mitigation						
	6.3.1 Surface water						
	Trigger levels						
	Groundwater quantity						
Water Management Strategy - March 2013	6.3.1	Proposed trigger levels for ambient surface water quality are based on the WQOs, ANZECC (2000) guidelines and available ambient data for the BTM Complex, as outlined in Table 6.5. Table 6.5 sets out the concentrations of key water quality parameters given in each of the WQOs, ANZECC (2000) guidelines and available ambient data. The proposed trigger values are based on the cumulative management objectives discussed in Section 6.2.1. It is proposed that the ambient surface water trigger levels be reviewed once further data becomes available with continued monitoring.	Noted				

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Water Management Strategy - March 2013	6.3.1	**Table 6.5 Proposed BTM Complex ambient surface water quality trigger levels** Parameter / WQO[a] / ANZECC[b] / Historical upstream[c] / Proposed trigger Total Phosphorus (µg/L) / 20 / 20 / 110-360 / 110-360 Total Nitrogen (µg/L) / 250 / 250 / 500-3000 / 500-3000 Turbidity (NTU) / 2-25 / 2-25 / 1300 / 1300 EC (µS/cm) / 30-350 / 30-350 / 33-275 / 30-350 Dissolved oxygen (% saturation) / 90-110 / 90-110 / NA / 90-110 pH / 6.5-8.0 / 6.6-8.0 / 5.9-7.8 / 5.9-8.0 Total suspended solids (mg/L) / <40 / NA / 32-220[d] / 32-220 Nitrate (mg/L) / NA / NA / TBC[f] / TBC[e] Reactive phosphorus (mg/L) / NA / NA / TBC[f] / TBC[e] Aluminium (µg/L) / Refer to ANZECC / 150 / 2160 / 2160 Arsenic (As III) (µg/L) / Refer to ANZECC / 360 / NA / 360 Arsenic (As V) (µg/L) / Refer to ANZECC / 140 / NA / 140 Boron (µg/L) / Refer to ANZECC / 1300 / NA / 1300 Cadmium (µg/L) / Refer to ANZECC / 0.8 / NA / 0.8 Chromium (Cr VI) (µg/L) / Refer to ANZECC / 40 / NA / 40 Copper (µg/L) / Refer to ANZECC / 2.5 / NA / 2.5 Iron (µg/L) / Refer to ANZECC / NA / 1680 / 1680 Lead (µg/L) / Refer to ANZECC / 9.4 / NA / 9.4 Manganese (µg/L) / Refer to ANZECC / 3600 / 45 / 45 Mercury (µg/L) / Refer to ANZECC / 5.4 / NA / 5.4 Nickel (µg/L) / Refer to ANZECC / 17 / NA / 17 Selenium (total) (µg/L) / Refer to ANZECC / 34 / <10 / <10 Silver (µg/L) / Refer to ANZECC / 0.2 / NA / 0.2 Zinc (µg/L) / Refer to ANZECC / 31 / NA / 31 a: Most sensitive EV is aquatic ecosystems. b: Trigger values for freshwater at a level of 80% of protection of species. c: Based on the envelope of BCM, TCM, MCC available ambient monitoring data. d: TSS range does not include data from MCC available ambient monitoring data (1983/84), as it is significantly higher than levels recorded by BCM in 2008/09 and are at present considered to be outliers. Concentration levels to be reviewed once further ambient monitoring data becomes available. e: There are no ANZECC guideline values for these parameters and trigger levels should be set on ambient water quality data once sufficient data is available. f: To be updated once Maules Creek data is available. Also need to look at any data collected by Boggabri Coal.	Noted			
Water Management Strategy - March 2013	6.3.1	Proposed triggers for surface water quantity management responses to achieve the objectives described in Section 6.2.1 are shown in Table 6.6. **Table 6.6 Proposed BTM Complex surface water quantity triggers** Trigger / Rationale For each mine: Annual surface water take > 0.9 x (dirty surface water volume + contaminated surface water volume + harvestable right + surface water allocations used) / Contribute to maintaining total water use within the Maules Creek unregulated river water source within the identified long term average annual extraction limit Complaints regarding impacts on stock and domestic local surface water catchments / Minimise the impacts on stock and domestic rights in local catchments Complaints regarding perceived unacceptable flooding of downstream properties in location catchments / Minimise the impacts of altered flood flows on catchment landholders For each mine, total water supply < 120% demand / Triggers potential requirement for market based trading of access licences and water allocations, or other supply shortfall management options	Noted			
	6.3.2 Groundwater						
	Triggers						
	Groundwater quality						

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Water Management Strategy - March 2013	6.3.2	Groundwater quality triggers for the BTM Complex are set out in Heritage Computing (2012), and relate to the measured EC values in proposed monitoring bores Reg1, Reg2, Reg3, Reg6 and Reg7 (see Table 5.1 and Figure 3.2). A response is triggered is when the annual average EC value exceeds the historical 95th percentile.	Noted				
	Groundwater levels						
Water Management Strategy - March 2013	6.3.2	Heritage Computing (2012) has developed groundwater level triggers for the BTM Complex to detect potential regional impacts to the hydrogeological environment as a result of the BTM Complex. These triggers cover groundwater levels in the alluvial aquifers and Maules Creek Formation (hard rock aquifer).	Noted				
Water Management Strategy - March 2013	6.3.2	In addition to the above triggers proposed by Heritage Computing, the following are recommended: - Groundwater take or volumetric impacts not accounted for within the long-term average extraction limit of the applicable Groundwater Sharing Plan. - Complaints regarding groundwater stock and domestic or irrigation supply impacts	Noted				
	Responses						
	Groundwater quality						
Water Management Strategy - March 2013	6.3.2	Heritage Computing (2012) has proposed the following response to groundwater quality triggering events. If groundwater triggers are exceeded, measured values are to be compared between sites. If the cause of cannot be directly attributed to natural seasonal variations, a groundwater specialist is to be engaged to determine the reason for the exceedance, and advise on corrective action.	Noted				
	Groundwater levels						
Water Management Strategy - March 2013	6.3.2	Site specific groundwater trigger levels for groundwater levels are set out in the respective water management plans for each operation.	Noted				
Water Management Strategy - March 2013	6.3.2	In the event that trigger levels are exceeded, preventative actions will be identified, communicated and agreed on with proponents of the BTM complex. Actions will likely occur in the following sequence: - Compare water levels to control site to determine if the cause cannot be directly attributed to natural seasonal variations,	Noted				
Water Management Strategy - March 2013	6.3.2	- Engage the services of a groundwater specialist to ascertain cause for the decline in water level,	Noted				
Water Management Strategy - March 2013	6.3.2	- If deemed that activities of the BTM complex are contributing to the decline in water level, potential impacts on groundwater dependent ecosystems are to be assessed in accordance with the BTM Complex biodiversity strategy, and appropriate groundwater management responses developed in consultation with NOW,	Noted				

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Water Management Strategy - March 2013	6.3.2	- An action plan to reduce the impact will be developed in consultation with NOW, with additional monitoring implemented as necessary.	Noted				
Water Management Strategy - March 2013	6.3.2	- Reporting of incidents and responses will form part of the Annual Environmental Management Report.	Noted				
Water Management Strategy - March 2013	6.3.2	In addition: - If groundwater take or volumetric impacts not accounted for within the long-term average extraction limit of the applicable Groundwater Sharing Plan, then: - The relevant mine should report status to BTM Complex, and the overall precinct status should be determined. - NOW should be consulted to determine the need to offset volumetric impacts, and mechanisms for such. - An assessment of market opportunities within the applicable groundwater source should be undertaken	Noted				
Water Management Strategy - March 2013	6.3.2	If there is a complaint regarding groundwater stock and domestic or irrigation supply impacts: - It should be reported to the BTM Complex. - The complaint should be investigated both technically, and with landholder/s. - If impacts are verified, landholders should be compensated, consistent with an agreed BTM Complex landholder compensation 4 policy and strategy.	Noted				
	7 Modelling						
	7.1 Existing models						
	7.1.1 Surface water						
Water Management Strategy - March 2013	6.3.2	Hydrologic and hydraulic modelling has also been carried out for the TCM by Gilbert & Associates (2011). The purpose of the modelling was to design the realignment of Goonbri Creek around the eastern edge of the proposed extended open cut pit. Hydrological modelling was carried out using RORB software, to predict peak design flows for the 2, 20 and 100 ARIs and the Probable Maximum Flood (PMF). 1D hydraulic modelling was carried out using HEC-RAS software to assess the viability of the channel design.	Noted, the Goonbri diversion is unlikely to happen in the near future and this work is unlikely to continue in the medium term.	Not Applicable			
Water Management Strategy - March 2013	6.3.2	Gilbert & Associates (2011) recommend further hydraulic modelling be carried out using additional survey data, to model the hydraulic characteristics of Goonbri Creek down to Bollol Creek, and downstream to Barbers Lagoon and the Slush Holes. The results of the recommended additional modelling could then be used to provide a more accurate baseline characterisation of existing conditions in Goonbri Creek and Bollol Creek in the final design of the realigned section of Goonbri Creek. Recommendations of the report (among others) include the placement of flow gauging stations on Goonbri Creek to verify and calibrate the completed models, and to assist in performance evaluation during and post construction.	Noted				

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
	7.2 Cumulative modelling objectives						
Water Management Strategy - March 2013	7.2	The overall goal of modelling is to demonstrate the conceptual understanding of the cumulative behaviour of surface and groundwater resources in the BTM Complex area, and as such: 1. to estimate quantitatively the cumulative impacts from the BTM Complex on groundwater and surface water resources, so as to determine appropriate management responses (e.g. licence acquisition, compensatory measures for affected landholders, structural measures, additional monitoring, etc.)	Noted				
Water Management Strategy - March 2013	7.2	2. to estimate the contribution to impacts by individual mines in order to determine appropriate responsibilities for management responses	Noted				
Water Management Strategy - March 2013	7.2	3. to verify the predicted impacts over the course of mining operations through evaluation of design hydraulic behaviour, mine inflows and groundwater drawdown magnitude/extent, with this information feeding back into the above management responses.	Noted				
	7.3 Proposed BTM Complex modelling						
	7.3.1 Surface water						
Water Management Strategy - March 2013	7.3.1	To achieve the objectives set out above, it is proposed that a detailed review of the individual mine surface water models be undertaken to determine if and how cumulative flow behaviour has been incorporated, in terms of flow distribution, timing, depth and velocities throughout the BTM Complex area and downstream. The models should be assessed for their capabilities and limitations with respect to prediction of cumulative surface water impacts as a result of the BTM Complex.	This has not yet occurred, once the Strategy is approved the revision will go ahead.	Not Applicable			
Water Management Strategy - March 2013	7.3.1	It is recommended that the review also be used to scope the need for, and practicality and efficacy of, a 'whole of catchment' surface water model (incorporating groundwater baseflows) for the BTM Complex. A whole of catchment model may be used to: - predict changes to surface water behaviour from the BTM Complex cumulatively and consistently - more accurately predict required licence volumes - attribute surface water impacts to individual mines and direct mitigation measures - provide a quantitative basis for complaint verification and subsequent management.	Noted				
	7.3.2 Groundwater						

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Water Management Strategy - March 2013	7.3.2	The following recommendations of Heritage Computing (2012) in relation to BTM Complex groundwater modelling are adopted for this strategy: - The MCC and TCM models be maintained separately, as they give similar predictions for the one metre drawdown extent. Both models are at numerical stability limits, and expanding their functionality might be counteractive. - Each of the BCM, TCM and MCC models undergo regular maintenance and recalibration as additional data on groundwater responses to progressive mining improves the understanding of the groundwater systems.	Noted, note that the TC GW model has not been updated since the EA and is now overdue to be revised.	Compliant			
	8 Complaint Management						
Water Management Strategy - March 2013	8	It is recognised that BCM and TCM have their own well developed complaint management systems, including hotlines, and that these will continue to operate independently. MCC will also establish its own protocols. This strategy supports the use of the existing mechanisms, with individual mining operations investigating complaints that are raised with them. If the investigating mine considers the complaint to be potentially related to a cumulative impact, it will: - seek comments from other mines on the complaint/issue - refer any draft response to the complaint to other mines for comment - resolve any differences prior to finalising response - log the complaint and its resolution on a cumulative impact response register.	See complaints section elsewhere in the audit	Compliant			
	9 Implementation						
Water Management Strategy - March 2013	9	This strategy is one of a number of cumulative environmental impact management strategies being developed in response to current, and draft mine development approval conditions. As such, the following will be established outside of this strategy and will apply to this and all other cumulative environmental impact management strategies: - governance and communication protocols - data sharing protocols and/or shared databases - reporting procedures, formats and frequencies.	Noted				
	9.1 Summary of strategic actions						
Water Management Strategy - March 2013	9.1	Specific groundwater data management recommendations have also been made by Heritage Computing (2012), as follows - Groundwater monitoring data from the three sites should be stored in a central data repository, available for use by each site. The repository should hold data from the regional monitoring network and from the individual mine monitoring networks.	Noted				

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Water Management Strategy - March 2013	9.1	- Current site data management is through Excel spreadsheet software rather than database software. While this is workable for a single mine, and easy for mine personnel to maintain and interrogate, there would be an advantage in standardisation of data formats and data management software as part of a cumulative monitoring strategy. Relational database software is recommended for adoption, preferably a system that is tailored to groundwater data and includes automatic quality control procedures and automatic graphics and report production. It should be able to import directly from field equipment formats (e.g. data logger records) and chemical laboratory templates, and should support linkages to common GIS and graphics software packages.	Noted				
	10 Document control						
Water Management Strategy - March 2013	10	This BTM Complex Water Management Strategy has been developed with the input of representatives of BCM, TCM, MCC and Parsons Brinckerhoff.	Noted				
Water Management Strategy - March 2013	10	This Strategy, its operation and implementation, will be reviewed and revised at least every two years or: - in response to strategic actions set out in the Plan - to incorporate proposed new or expanded mining operations at an early stage - on an 'as required' basis to incorporate improvements identified by BTM Complex, or - as required by government agencies.	Strategy still in draft, no revisions as yet.	Not Applicable			

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
	Tarrawonga Mine Biodiversity Management Plan						
	4 Biodiversity Management within the Project Area						
	4.1 Enhancing the Quality of Existing Vegetation and Fauna Habitat						
	4.1.2 Management Strategies						
Tarrawonga Mine Biodiversity Management Plan 2013	4.1.2	Land clearing for the Project will be undertaken progressively. Areas to be cleared will be delineated, restricting clearing to the minimum area necessary to undertake the approved activities.	There were no clearing activities in progress at the site during the inspection. Some had been recently completed. It was not possible to verify on the ground that delineation had taken place. It would bebetter practise to control ground disturbance by a permit system.	Compliant			
Tarrawonga Mine Biodiversity Management Plan 2013	4.1.2	A seed collection and propagation program will be implemented so that areas to be revegetated are genetically comparable with those in the surrounding woodland areas.	There is no seed collection program at Tarrawonga but the Biobank site has a seed collection program and the offset site will have a seed collection program. The ecologist in the audit team indicated that the distance between the seed collection area and the site could be significant in terms of the risk of genetic variation, local seed should be sought.	Not Compliant	D	2	Medium
Tarrawonga Mine Biodiversity Management Plan 2013	4.1.2	The faunal value of farm dams surrounding the Project area will be improved by: o excluding livestock grazing planting a range of submerged and fringing vegetation (rushes) o placing a partially submerged log in the dam for use by a variety of fauna o placing a log pile for refuge habitat on the dam shores o limited woodland tree plantings, including some shrub species.	This has not been done as yet.	Not Applicable			
Tarrawonga Mine Biodiversity Management Plan 2013	4.1.2	The use of supplementary habitat measures to provide suitable habitat, including the use of naturally scarce fauna habitat features will be investigated by WCL.	Noted, no work on this to date.	Not Applicable			
Tarrawonga Mine Biodiversity Management Plan 2013	4.1.2	Felled timber that is not mulched and salvaged during land clearing will be replaced on topsoiled areas to provide habitat for native reptiles.	This has been observed in the rehabilitation areas on the site.	Compliant			
Tarrawonga Mine Biodiversity Management Plan 2013	4.1.2	A Farm Management Plan will be developed by WCL.	This has not been developed yet.	Not Applicable			
Tarrawonga Mine Biodiversity Management Plan 2013	4.1.2	Implement weed control measures (see Section 4.7 below) to prevent the establishment and spread of weeds throughout the mining tenement.	Some weed control was conducted.	Compliant			

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Tarrawonga Mine Biodiversity Management Plan 2013	4.1.2	All revegetation works will be undertaken in accordance with the Rehabilitation Management Plan.	No works were observed that did not comply with the rehab management plan. Revegetation quality could be improved, some trials have been conducted, further trials should be implemented. **Recommendation - conduct further rehbilitation trials to research optimal rehabilitation results.**	Compliant			
	4.1.3 Performance / Completion Criteria						
Tarrawonga Mine Biodiversity Management Plan 2013	4.1.3	The progress and effects of measures to enhance the quality of existing vegetation and fauna habitat are monitored and reported annually as part of the Annual Environmental Management Report (AEMR)/Annual Review.	Included in the AEMR	Compliant			
Tarrawonga Mine Biodiversity Management Plan 2013	4.1.3	Commencement of revegetation in the riparian zone along 3.1 km of Goonbri Creek south of the Project area.	Not commenced, Goonbri Creek diversion postponed	Not Applicable			
Tarrawonga Mine Biodiversity Management Plan 2013	4.1.3	Adherence to Farm Management Plan.	Noted. Plan not developed yet	Not Applicable			
Tarrawonga Mine Biodiversity Management Plan 2013	4.1.3	A report detailing the investigation of factors likely to enhance or impede the effective long term provision of suitable habitat(s) shall be submitted for approval by the Director-General. An implementation plan will also be provided for approval at the same time, to ensure delivery of suitable areas of viable habitat for the nominated species (being Speckled Warbler, Brown Treecreeper, Grey-crowned Babbler, Hooded Robin, Varied Sittella, Turquoise Parrot, Masked Own, Yellow-bellied Sheath Tail Bat and Squirrel Glider). This plan will then be incorporated into the revised Biodiversity Management Plan.	Incorporated into the next revision of the Biodiversity MP, not yet acted on.	Not Applicable			
	4.2 Restoring Native Vegetation and Fauna Habitat						
	4.2.2 Management Strategies						
Tarrawonga Mine Biodiversity Management Plan 2013	4.2.2	A Rehabilitation Management Plan (RMP) will be developed and implemented in accordance with Schedule 3, Condition 64 of the Project Approval. Ecosystem establishment within the rehabilitation area will take place according to the measures described in the RMP.	Completed and submitted	Compliant			
Tarrawonga Mine Biodiversity Management Plan 2013	4.2.2	The disturbance areas will be progressively rehabilitated and revegetated to either native bushland and/or agricultural land.	The MOP details this.	Compliant			

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Tarrawonga Mine Biodiversity Management Plan 2013	4.2.2	The rehabilitated areas shall be protected by the following measures: o Establishment and maintenance of perimeter fencing around the active mine site and rehabilitated areas to exclude stock. o Installation of biodegradable plastic or cardboard tree guards around the planted seedlings to protect against wind and cold and rabbit/hare grazing (if required). The necessity for tree guards will be determined during each tree planting campaign and based on likely impacts of grazing. o Temporary fencing around tree lots on the re-created agricultural land. Fencing will be removed at the completion of mining or once the trees attain a height of 4 - 5 m and are not liable to damage from stock. o Permanent fencing of native bushland re-establishment areas to prevent stock access. o Exotic vertebrate pest control (see Section 4.7). o Fire protection (see Section 4.10). o Restriction of vehicles within revegetated areas.	All of these measures were observed on site except the tree protection measures (hares and Rabbits), these were deemed unneccessary. The agricultural land has not yet been established. Cattle are kept off the site by boundary fencing.	Compliant			
Tarrawonga Mine Biodiversity Management Plan 2013	4.2.2	Revegetation of woodland/forest areas would include the planting of species characteristic of the local vegetation communities, including species from the Box-Gum Woodland EEC/CEEC (e.g. White Box overstorey as well as appropriate understorey). Other species would include Bulloak (Allocasuarina luehmannii) and Belah (Casuarina cristata).	This is conducted.	Compliant			
Tarrawonga Mine Biodiversity Management Plan 2013	4.2.2	Irrigation shall be used to promote revegetation where practically possible.	Noted				
Tarrawonga Mine Biodiversity Management Plan 2013	4.2.2	A Goonbri Creek Management Plan will be developed and implemented to describe the measures to revegetate the permanent Goonbri Creek alignment, including the revegetation of the low flow channel (within and approximately 40 m either side) using species characteristic of the Bracteate Honeymyrtle (Melaleuca bracteata) community. The design of the creek alignment will include in-stream and riparian habitats including the establishment of a pool-riffle system and wetland spaces.	Not commenced, Goonbri Creek diversion postponed	Not Applicable			
Tarrawonga Mine Biodiversity Management Plan 2013	4.2.2	The use of supplementary habitat measures to provide suitable habitat, including the use of naturally scarce fauna habitat features will be investigated by WCL.	Noted, no work on this to date.	Not Applicable			
Tarrawonga Mine Biodiversity Management Plan 2013	4.2.2	Implement weed control measures (see Section 4.7) to prevent the establishment and spread of weeds throughout the mining tenement.	Conducted internally, no extensive spread of weeds apart from skeleton weed (turnip weed) in the rehab. Note that the skeleton weed is generated from the topsoil seedbank.	Compliant			
	4.2.3 Performance / Completion Criteria						
Tarrawonga Mine Biodiversity Management Plan 2013	4.2.3	Native vegetation species associations are established in accordance with the approved species mix and tubestock and seed planting density specifications.	This occurs though density has been reduced by attrition, this is being corrected by interplanting with tubestock when conditions are suitable.	Compliant			

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Tarrawonga Mine Biodiversity Management Plan 2013	4.2.3	Vegetation health is within the range of analogue sites.	Rehab is not advanced enough to assess this requirement.	Not Applicable			
Tarrawonga Mine Biodiversity Management Plan 2013	4.2.3	Minimum tree height and girth standards for selected indicator species of the vegetation association are within the range of analogue site benchmarks at 1, 5 and 15 years.	Site rehab establishment is poor in some areas and better established in others. The scope of the audit does not allow a full rehabilitation survey to be conducted. The annual rehabilitation review (perviously conducted by EcoLogical) addresses this requirement.	Compliant			
Tarrawonga Mine Biodiversity Management Plan 2013	4.2.3	Canopy cover is within the range of analogue sites for the vegetation association at 1, 5 and 15 years.	There is no canopy, to be determined in future surveys	Not Applicable			
Tarrawonga Mine Biodiversity Management Plan 2013	4.2.3	Species are capable of setting viable seed, flowering or otherwise reproducing.	Not yet advanced enough	Not Applicable			
Tarrawonga Mine Biodiversity Management Plan 2013	4.2.3	Vegetation develops and maintains a litter layer evidenced by a consistent mass and depth of litter over subsequent seasons. .	Not yet advanced enough	Not Applicable			
Tarrawonga Mine Biodiversity Management Plan 2013	4.2.3	Rehabilitation of 752 ha of the woodland/forest post-mine landform.	Not yet advanced enough	Not Applicable			
Tarrawonga Mine Biodiversity Management Plan 2013	4.2.3	Performance criteria are provided in Table 4-1. **Table 4-1: Performance criteria for restoration of native vegetation and fauna habitat (TCPL 2012)** TIMING: Long-term (greater than 12 years) PERFORMANCE CRITERIA: The final landform and revegetation program will provide for approximately 752 ha of native woodland/forest areas, including the planting of species characteristic of the local vegetation communities.	Noted				
	4.3 Maximising the Salvage of Resources						
	4.3.2 Management Strategies						
Tarrawonga Mine Biodiversity Management Plan 2013	4.3.2	Soil resource management will be undertaken in accordance with measures provided in the RMP.	Noted				
Tarrawonga Mine Biodiversity Management Plan 2013	4.3.2	Identify and quantify potential soil resources for rehabilitation.	Soil stripping map done for the EA provides minimum depths then any extra depths are assessed through observation of the stripping operation.	Compliant			

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Tarrawonga Mine Biodiversity Management Plan 2013	4.3.2	Depth for soil stripping for the disturbance area are as follows (Figure 4-1): o Cleared creek flats (relatively recent alluvium; Stratic Rudosols), there is potential to collect soil (from an average depth of 3 m) with the high quality soil to be used as topdressing material for agricultural post-mining land use, following treatment with coarse-grade gypsum (approximately 80 ha total). o Sub-sections of the vegetated areas in the north of the Project site have soil conditions that allow a cut of 0.25 m (approximately 30 ha total). o Due to major subsoil constraints, a cutting depth of 0.10 m is recommended elsewhere in the remaining Project disturbance areas (approximately 405 ha). These soils could be used for woodland/forest rehabilitation (McKenzie Soil Management 2011). o In addition to the high quality soil resources described above, large volumes of other soils could be used in rehabilitation and without amelioration to provide conditions suitable for the native woodland/forest. This additional soil could be obtained from the Class 3 Agricultural Suitability areas that are not Stratic Rudosols to a depth of approximately 1 m.	No evidence of the site exceeding these requirements	Compliant			
Tarrawonga Mine Biodiversity Management Plan 2013	4.3.2	Areas of disturbance will be stripped progressively to reduce potential erosion and sediment generation, and to minimise the extent of topsoil stockpiles and the period of soil storage.	noted in site inspection	Compliant			
Tarrawonga Mine Biodiversity Management Plan 2013	4.3.2	Areas of disturbance requiring soil stripping will be clearly defined following vegetation clearing.	Sites to be cleared are pegged by surveyors	Compliant			
Tarrawonga Mine Biodiversity Management Plan 2013	4.3.2	Topsoil and subsoil stripping during periods of high soil moisture content (i.e. following heavy rain) will be avoided to reduce the likelihood of damage to soil structure.	None done that has damaged soil structure, soil dries quickly	Compliant			
Tarrawonga Mine Biodiversity Management Plan 2013	4.3.2	Stripped soil will either be directly re-emplaced in rehabilitation areas or stockpiled for future reuse. Preference will be given to placing subsoils and topsoil (in reverse stripping order) directly onto re-contoured areas.	Noted onsite thought here are large stockpiles of soils that have been there since the inception of the site that could be preferentially used.	Compliant			
Tarrawonga Mine Biodiversity Management Plan 2013	4.3.2	Subsoils and topsoils will be characterised prior to re-spreading to determine the type and application rates for any required soil ameliorants (e.g. lime, gypsum, fertiliser and organics) to maximise the availability of soil reserves for rehabilitation works.	Not done in the past, but will be in the future, minor amount of topsoil spread in the audit period	Not Compliant	D	2	Medium
Tarrawonga Mine Biodiversity Management Plan 2013	4.3.2	Erosion and sediment control measures will be installed prior to the commencement of soil stripping and rehabilitation activities. Erosion control measures, including the management of soil stockpiles, are outlined in Section 4.8.	Sighted in inspection	Compliant			
Tarrawonga Mine Biodiversity Management Plan 2013	4.3.2	All cleared vegetation not retained for habitat augmentation is mulched on site and mixed into topsoil as a soil conditioner.	Sighted in inspection	Compliant			
Tarrawonga Mine Biodiversity Management Plan 2013	4.3.2	The ground-layer vegetation and low shrubs will be incorporated into the topsoil when it is stripped to assist rehabilitation by increasing the seed bank and organic matter within the stockpiled soil.	Sighted in inspection	Compliant			

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Tarrawonga Mine Biodiversity Management Plan 2013	4.3.2	Recover vegetation and habitat resources during clearing activities where available and practical for re-use in rehabilitated areas to provide habitat resources for fauna.	Sighted in inspection	Compliant			
Tarrawonga Mine Biodiversity Management Plan 2013	4.3.2	Vegetation from Project areas in Leard State Forest, plus the vegetation within other Project disturbance areas that is not salvaged for other purposes and is suitable for habitat enhancement, will be re-used in the mine rehabilitation program. Where insufficient area is available for the direct transfer of cleared debris, the material will be stockpiled for later use. Tree hollows and logs will be selectively chosen for placement in areas where habitat enhancement is required. These features will be fixed to mature trees or placed on the ground.	Noted				
Tarrawonga Mine Biodiversity Management Plan 2013	4.3.2	Habitat features (e.g. trunks, logs, branches, small stumps and roots) will be salvaged during vegetation clearance activities where practical, and relocated to areas undergoing rehabilitation.	Sighted in inspection	Compliant			
Tarrawonga Mine Biodiversity Management Plan 2013	4.3.2	Hollow tree trunks and branches used for roosting by threatened fauna will be relocated into alternative locations close by. These resources will be identified during pre-start inspections.	During the audit period, some clearing has occurred with an ecologist in attendance, reports by the ecologist were sighted.	Compliant			
Tarrawonga Mine Biodiversity Management Plan 2013	4.3.2	TCPL will develop and adopt an Aboriginal Heritage Conservation Strategy and a Heritage Management Plan. These plans will detail methods for salvaging Cultural Heritage Resources, as well as protocols for surface works to reduce the risk of accidental damage to known sites.	These have been developed	Compliant			
Tarrawonga Mine Biodiversity Management Plan 2013	4.3.2	Where practical, known Aboriginal and Cultural Heritage sites will be avoided, or sites marked on site plans and relevant Project documentation.	Noted				
Tarrawonga Mine Biodiversity Management Plan 2013	4.3.2	Where avoidance of sites is not practicable, site(s) will be subject to baseline recording in consultation with representatives of the Aboriginal community prior to disturbance and artefacts salvaged for safekeeping in consultation with the Aboriginal community. Baseline recording of sites will include completing an Aboriginal Site Impact Recording Form (or its equivalent) and submitting it to the AHIMS Registrar for each site.	See Heritage Management plan	Compliant			
Tarrawonga Mine Biodiversity Management Plan 2013	4.3.2	Culturally modified trees located outside (but in close proximity) of any Project disturbance areas will be suitably fenced and signed to reduce the risk of incidental damage.	See Heritage Management plan	Compliant			
Tarrawonga Mine Biodiversity Management Plan 2013	4.3.2	If appropriate in the context of the tree condition, culturally modified trees subject to direct disturbance will be considered for salvage. A suitable location for the storage and/or display of the salvaged sections will be identified and managed in consultation with the Aboriginal community.	See Heritage Management plan	Compliant			

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Tarrawonga Mine Biodiversity Management Plan 2013	4.3.2	The Aboriginal community will, where necessary, provide advice on the storage of collected artefacts, management of artefacts at the completion of Project activities (e.g. artefact replacement onto the post-mining landscape) and the implementation of management measures for salvaged culturally modified trees.	See Heritage Management plan	Compliant			
Tarrawonga Mine Biodiversity Management Plan 2013	4.3.2	Appropriate Aboriginal representation will be provided during archaeological fieldwork (e.g. collection of artefacts prior to disturbance).	See Heritage Management plan	Compliant			
4.3.3 Performance / Completion Criteria							
Tarrawonga Mine Biodiversity Management Plan 2013	4.3.3	The progress and effects of salvaging and reusing habitat resources are monitored annually.	The Tarrawonga Monitoring Report 2013 notes the reuse of materials in the plots used for rehabilitation monitoring but there is no assessment of or comment on the effects of reusing these materials. The AEMR also does not address this issue.	Not Compliant Administrative			
Tarrawonga Mine Biodiversity Management Plan 2013	4.3.3	Topsoils and subsoils are mapped and soil resources for Agricultural and Woodland land-uses are selectively stripped and managed.	This is conducted and will be documented in the topsoil register	Compliant			
Tarrawonga Mine Biodiversity Management Plan 2013	4.3.3	Habitat features (hollow bearing logs, felled timber and large rocks) are salvaged during prestripping operations for re-use where practical.	This occurrs, sighted stockpiles and materials in the rehab areas during the site inspection.	Compliant			
Tarrawonga Mine Biodiversity Management Plan 2013	4.3.3	Photographic evidence and documentation of salvaging resources and reusing in the rehabilitation area for beneficial reuse is to be monitored and reported annually as part of the Biodiversity Monitoring Program.	Photos are taken and reported	Compliant			
4.4 Collecting and Propagating Seed]							
4.4.2 Management Strategies							
Tarrawonga Mine Biodiversity Management Plan 2013	4.3.3	TCPL will arrange for the collection of seed at the site at appropriate times after flowering.	This has not occurred at the mine site	Not Compliant	D	2	Medium
Tarrawonga Mine Biodiversity Management Plan 2013	4.3.3	The seed collection program will be aimed at producing the maximum quantity and quality of seed incorporating the correct degree of maturity for maximum germination.	Noted				
Tarrawonga Mine Biodiversity Management Plan 2013	4.3.3	Trees will not be felled solely for seed collection reasons. Where trees are cleared for mining purposes, available seed will be collected. Wherever practicable, tree felling will be timed to coincide with maximum seed load (but avoiding times when native fauna would be using trees for roosts, nests).	Noted				

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Tarrawonga Mine Biodiversity Management Plan 2013	4.3.3	Seed collection undertaken to date has involved hand collection from the ground and collection from felled trees; however, a variety of additional seed collection techniques may be adopted, including: o For plants with a low density of occurrence, collection may require the placing of bags over the flowers after pollination. Alternatively, dropped seed may be collected by placing plastic on the ground below. o Seed from small plants close to the ground could be collected by machine harvesters or hand picking/pruning. o Seed pods from the upper and middle portions of the crown of trees are more desirable as they tend to be of better quality. Collection techniques for trees may include cherry picker, ladder or hoist attached to a vehicle, long handled pruners, rope saw, etc. o For grasses and other groundcover species, use of a forage harvester to collect seed and mulch material after seed maturity and the direct placement of this material on the post-mining landscapes is an appropriate means of collection and transferral of seed where safe machine access is possible.	Noted				
Tarrawonga Mine Biodiversity Management Plan 2013	4.3.3	Seed handling and storage varies with the type of seed and will require specialised techniques and equipment. This task will be contracted to the personnel undertaking seed collection and/or propagation works.	Noted				
Tarrawonga Mine Biodiversity Management Plan 2013	4.3.3	Seedling propagation activities will be undertaken by personnel who are experienced in the propagation of native species.	Noted				
Tarrawonga Mine Biodiversity Management Plan 2013	4.3.3	TCPL will advise the nursery / propagation contractor of its rehabilitation requirements (in terms of area) sufficiently in advance of the programmed planting time to enable seedling propagation, hardening-off (if required) and planting each year.	Noted				
Tarrawonga Mine Biodiversity Management Plan 2013	4.3.3	Planting will preferentially be undertaken in the Autumn period on previously established riplines followed by mulching around each seedling.	This does not occur, no mulching	Not Compliant	D	3	Medium
	4.4.3 Performance / Completion Criteria						
Tarrawonga Mine Biodiversity Management Plan 2013	4.4.3	Monitoring of plant flowering and seeding cycles by the seed collectors and their establishment of a comprehensive database and detailed strategy.	Noted				
Tarrawonga Mine Biodiversity Management Plan 2013	4.4.3	Adaptive management undertaken and documented if required.	Noted				
	4.5 Minimising the Impacts on Fauna						
	4.5.2 Management Strategies						
Tarrawonga Mine Biodiversity Management Plan 2013	4.5.2	Some potential impacts have been avoided/reduced through refinement of the mine design, and other impacts are likely to be mitigated by progressive rehabilitation as well as local habitat restoration, management and supplementation strategies.	Noted				

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Tarrawonga Mine Biodiversity Management Plan 2013	4.5.2	Residual impacts will be addressed by the long-term conservation and enhancement of significant areas of fauna habitats in the offset area that can be enhanced by appropriate management and/or the creation of significant areas of fauna habitat resulting from the revegetation programme.	Noted				
Tarrawonga Mine Biodiversity Management Plan 2013	4.5.2	Progressive backfilling of the open cut mine voids instead of only out-of-pit dumping to avoid additional native vegetation clearance.	Noted and observed on site	Compliant			
Tarrawonga Mine Biodiversity Management Plan 2013	4.5.2	Land clearance for the Project will be undertaken progressively, and the area cleared at any particular time would generally be no greater than that required to accommodate the mine‟s needs for the following twelve months.	Noted and observed on site	Compliant			
Tarrawonga Mine Biodiversity Management Plan 2013	4.5.2	Areas requiring clearing will be clearly delineated and would be restricted to the minimum area necessary to undertake the approved activities.	this occurs, reviewed the northern extension cleared area during the site inspection	Compliant			
Tarrawonga Mine Biodiversity Management Plan 2013	4.5.2	Clearing will be subject to a pre-clearance survey by an appropriately qualified ecologist to ensure clearing activities are managed to minimise impacts on fauna. The Vegetation Clearance Protocol will be implemented for clearing activities in accordance with Appendix A of this BMP.	This occurs, reviewed Ecologicals report on the Northern Extension area	Compliant			
Tarrawonga Mine Biodiversity Management Plan 2013	4.5.2	Clearing of trees and shrubs will, where practical, be restricted to late summer and autumn in order to avoid the spring when birds are nesting, winter when bats are hibernating and early to mid-summer when bats are bearing young.	Noted				
Tarrawonga Mine Biodiversity Management Plan 2013	4.5.2	Suitably trained or qualified person(s) will be present during the felling of identified hollow bearing trees to provide assistance with the identification, and if necessary, rescue and care of any injured fauna.	This occurrs - ecologist, archaeologist and aboriginal groups present dueing northern extension clearing, evidence presented for all.	Compliant			
Tarrawonga Mine Biodiversity Management Plan 2013	4.5.2	The species, number and condition of fauna identified during clearing activities will be recorded and a summary provided in the Annual Environmental Management Report (AEMR)/Annual Review.	Noted, none in the audit period	Not Applicable			
Tarrawonga Mine Biodiversity Management Plan 2013	4.5.2	The chainsaw felling and/or bulldozing of larger vegetation to just above the ground to minimise soil disturbance. Groundcover will be retained and subsequently collected when the topsoil is stripped.	Not able to observe this during the audit. EO states that this occurs.	Compliant			
Tarrawonga Mine Biodiversity Management Plan 2013	4.5.2	Translocation of fauna will not be undertaken unless appropriate licences have been obtained from OEH. Although unlikely, if a Koala is found, it will be left to move away from the clearance area on its own accord.	Noted				
Tarrawonga Mine Biodiversity Management Plan 2013	4.5.2	The salvage of cleared trunks, logs, branches, small stumps and roots will be transferred directly to an area that has been prepared to the post mining landform, or alternatively stockpiled for later use in the rehabilitation.	Observed in the site inspection	Compliant			
Tarrawonga Mine Biodiversity Management Plan 2013	4.5.2	The salvage of hollow tree trunks and branches will be placed on rehabilitated areas to provide fauna habitat.	Observed	Compliant			

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Tarrawonga Mine Biodiversity Management Plan 2013	4.5.2	Pre-clearance surveys of ancillary infrastructure areas (e.g. water management structures, monitoring equipment areas) for threatened flora species will be undertaken. Relocation (if practicable) of ancillary infrastructure areas (e.g. water management structures, monitoring equipment) should be considered to avoid any threatened species.	Noted				
Tarrawonga Mine Biodiversity Management Plan 2013	4.5.2	Feral animal and weed control shall be undertaken.	This occurrs - property manager	Compliant			
Tarrawonga Mine Biodiversity Management Plan 2013	4.5.2	Adequate noise and dust management, controlling the use of artificial lighting and fire management will also assist in minimising the impact on fauna within the Project Area. Lighting strategies/control measures to minimise potential artificial lighting impacts will include the use of unidirectional lighting fixtures.	Noted				
Tarrawonga Mine Biodiversity Management Plan 2013	4.5.2	The on-site speed limit of 40 km/hr will continue to be applied to new haul roads and internal roads.	Noted				
	4.5.3 Performance / Completion Criteria						
Tarrawonga Mine Biodiversity Management Plan 2013	4.5.3	Pre-clearing reports verify that clearing has been undertaken in accordance with the measures described above.	Evidence provided for arch and ecology pre-clearance reports for the northern extension	Compliant			
Tarrawonga Mine Biodiversity Management Plan 2013	4.5.3	The species, number and condition of fauna identified during clearing activities would be recorded and a summary provided in the Annual Environmental Management Report (AEMR)/Annual Review.	None identified to date	Not Applicable			
	4.6 managing Salinity						
	4.6.2 Management Strategies						
Tarrawonga Mine Biodiversity Management Plan 2013	4.6.2	Overburden and interburden will be characterised prior to emplacement in waste dumps to ensure the final outer surfaces of the overburden emplacements (and structures such as drainage elements) are constructed with suitable non-sodic or low sodicity material where possible.	This does not occur, no characterisation of overburden.	Not Compliant	D	2	Medium
Tarrawonga Mine Biodiversity Management Plan 2013	4.6.2	Any sodic materials that may be exposed or near-surface will be ameliorated (e.g. treated with gypsum) to minimise dispersivity	Noted				
Tarrawonga Mine Biodiversity Management Plan 2013	4.6.2	Irrigation activities of pasture areas will be undertaken to maximise evapo-transpiration but avoid surface runoff to minimise the risk of impacts on downstream water resources	This doesn't happen on the mine site, no pasture areas established in the rahab to date. The times when water has been in excess have conincided with saturated soils preventing the irrigation option being used.	Not Applicable			
Tarrawonga Mine Biodiversity Management Plan 2013	4.6.2	Water quality monitoring of sites on Goonbri Creek shall continue to be undertaken on an event based frequency	This occurs	Compliant			
	4.6.3 Performance / Completion Criteria						
Tarrawonga Mine Biodiversity Management Plan 2013	4.6.3	Soil tested for chemical properties, including salinity.	The site has not progressed to the point where areas are being considered for relinquishment.	Compliant			
Tarrawonga Mine Biodiversity Management Plan 2013	4.6.3	Salinity down the soil profile is within the range of analogue sites at year 5.	Not at year 5	Not Applicable			
	4.7 Controlling Weeds and Feral Pests						
	4.7.2 Management Strategies						

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Tarrawonga Mine Biodiversity Management Plan 2013	4.7.2	Weeds from topsoil stockpiles will be scalped prior to re-spreading in rehabilitation areas	topsoil stockpiles are sprayed	Compliant			
Tarrawonga Mine Biodiversity Management Plan 2013	4.7.2	Maximising the retention of ground cover (cover crop stubble) when planting tubestock to minimise opportunities for weed activity.	This was observed	Compliant			
Tarrawonga Mine Biodiversity Management Plan 2013	4.7.2	Regular inspections (at least six monthly) of revegetated areas and other parts of the mining tenements will be undertaken to identify and demarcate areas of noxious and environmental weeds	Monthly inspections by the EO provide this information.	Compliant			
Tarrawonga Mine Biodiversity Management Plan 2013	4.7.2	Mechanical removal and/or the application of approved herbicides in areas identified as being affected by weeds (in accordance with the Pesticides Act 1999).	This was observed	Compliant			
Tarrawonga Mine Biodiversity Management Plan 2013	4.7.2	Follow-up site inspections to evaluate the effectiveness of weed control programs.	This occurs - Monthly inspections	Compliant			
Tarrawonga Mine Biodiversity Management Plan 2013	4.7.2	Follow-up weed control in previously treated areas where weed management has been suboptimal	This occurs - Monthly inspections and actions resulting	Compliant			
Tarrawonga Mine Biodiversity Management Plan 2013	4.7.2	Minimise the potential for seed and organic matter transport to or from the rehabilitation area by ensuring all plant and equipment are weed free (via inspection of vehicles and plant and use of the site's vehicle wash bay).	This does not occur - no inspections	Not Compliant	D	2	Medium
Tarrawonga Mine Biodiversity Management Plan 2013	4.7.2	Focused weed management/suppression measures will be undertaken on stockpiles, roadsides and disturbance areas.	This occurs	Compliant			
Tarrawonga Mine Biodiversity Management Plan 2013	4.7.2	Regular liaison with local landholders and relevant government agencies to monitor the spread and management of weeds within the local area.	This occurs	Compliant			
Tarrawonga Mine Biodiversity Management Plan 2013	4.7.2	Installation of fauna exclusion fencing and/or tree guards for newly planted tubestock.	This does not occur	Not Compliant	D	3	Medium
Tarrawonga Mine Biodiversity Management Plan 2013	4.7.2	Trapping and/or baiting of animal pests (e.g. Rabbits and Red Foxes), in accordance with the requirements of the Livestock Health and Pest Authorities	This occurs - Property Manager	Compliant			
Tarrawonga Mine Biodiversity Management Plan 2013	4.7.2	Follow-up site monitoring to determine the effectiveness of trapping and/or baiting programs.	This occurs - Property Manager	Compliant			
4.7.3 Performance / Completion Criteria							
Tarrawonga Mine Biodiversity Management Plan 2013	4.7.3	Known weed and feral animal populations do not increase in size or distribution as a result of Project activities.	No evidence to confirm spread of ferals or weeds	Compliant			
Tarrawonga Mine Biodiversity Management Plan 2013	4.7.3	Weed species presence and densities are monitored and control programs implemented when required.	This occurs. No evidence to confirm spread of ferals or weeds	Compliant			
Tarrawonga Mine Biodiversity Management Plan 2013	4.7.3	Faunal exclusion fencing and/or tree guards are installed to exclude vertebrate pest species from rehabilitation areas / juvenile vegetation.	This does not happen	Not Compliant	D	3	Medium
Tarrawonga Mine Biodiversity Management Plan 2013	4.7.3	Vertebrate pest species presence and densities are monitored, and control programs implemented when required.	No evidence to confirm spread of ferals or weeds	Compliant			
Tarrawonga Mine Biodiversity Management Plan 2013	4.7.3	Monitoring results and any control activities will be reported in the Annual Environmental Management Report (AEMR)/Annual Review.	Included in the AEMR	Compliant			
4.8 Controlling Erosion							
4.8.2 Management Strategies							

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Tarrawonga Mine Biodiversity Management Plan 2013	4.8.2	Erosion and sediment control plans will be developed over the life of the Project as part of the Water Management Plan. These plans will describe the specific controls (including locations, function and water monitoring structure capacities) that will be used to minimise the potential for soil erosion and transport of sediment off-site. These plans will be updated periodically to meet the particular changes to the Project over the life of the mine. All erosion and sediment control storages will have sufficient capacity to manage disturbed area runoff in accordance with design criteria recommended in the Landcom (2004) guidelines.	See WMP	Compliant			
Tarrawonga Mine Biodiversity Management Plan 2013	4.8.2	Approved drainage and sediment and erosion controls will be implemented progressively, including sediment basins and contour banks	See WMP	Compliant			
Tarrawonga Mine Biodiversity Management Plan 2013	4.8.2	General soil resource management practices will include the stripping and stockpiling of soil resources prior to any mine-related disturbance for use in rehabilitation, including. o Identify and quantify potential soil resources for rehabilitation o Optimise the recovery of useable topsoil and subsoil during stripping operations o Manage topsoil and subsoil reserves so as not to degrade the resource when stockpiled o Establish effective soil amelioration procedures to maximise the availability of soil reserves for future rehabilitation works o Disturbance areas will be stripped progressively in order to reduce sediment generation and the extent of topsoil stockpiles, and to enable use of stripped topsoil as soon as possible for rehabilitation.	See WMP	Compliant			
Tarrawonga Mine Biodiversity Management Plan 2013	4.8.2	Erosion and sediment control measures will be installed prior to the commencement of soil stripping and rehabilitation activities.	See WMP	Compliant			
Tarrawonga Mine Biodiversity Management Plan 2013	4.8.2	Areas of disturbance will be stripped progressively, as required, to reduce potential erosion and sediment generation, and to minimise the extent of topsoil stockpiles and the period of soil storage.	See WMP	Compliant			
Tarrawonga Mine Biodiversity Management Plan 2013	4.8.2	Areas of disturbance requiring soil stripping will be clearly defined following vegetation clearing.	See WMP	Compliant			
Tarrawonga Mine Biodiversity Management Plan 2013	4.8.2	Cover crops will be planted on newly rehabilitated mine landform areas as soon as possible after completing earthworks.	See WMP	Compliant			
Tarrawonga Mine Biodiversity Management Plan 2013	4.8.2	New infrastructure disturbance areas (e.g. road and dam embankments) will be stabilised as soon as possible by topsoiling and seeding.	See WMP	Compliant			
Tarrawonga Mine Biodiversity Management Plan 2013	4.8.2	Topsoil and subsoil stripping during periods of high soil moisture content (i.e. following heavy rain) will be avoided to reduce the likelihood of damage to soil structure.	See WMP, soil stripping procedure	Compliant			

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Tarrawonga Mine Biodiversity Management Plan 2013	4.8.2	Any long-term soil stockpiles will be managed to maintain long-term soil viability through the implementation of the following management practices: o Topsoil and subsoil stockpiles will be retained at a height of 3 m, with slopes no greater than 1:2 (vertical to horizontal [V:H]) and a slightly roughened surface to minimise erosion o Topsoil stockpiles will be constructed to minimise erosion, encourage drainage, and promote revegetation o Where additions such as lime, gypsum and fertiliser are needed to improve the condition of cut soil, they will be applied to the stockpiles in-between the application of separate layers from the scrapers o Wherever practicable, soil will not be trafficked, deep ripped or removed in wet conditions to avoid breakdown in soil structure o All topsoil and subsoil stockpiles will be seeded with a non-persistent cover crop to reduce erosion potential as soon as practicable after completion of stockpiling o Where seasonal conditions preclude adequate development of a cover crop, stockpiles will be treated with a straw/vegetative mulch to improve stability o Soil stockpiles will be located in positions to avoid surface water flows. Silt stop fencing will be placed immediately down-slope of stockpiles until stable vegetation cover is established	See WMP, soil stripping procedure	Compliant			
Tarrawonga Mine Biodiversity Management Plan 2013	4.8.2	o An inventory of soil resources (available and stripped) on the Project site will be maintained and regularly reconciled with rehabilitation requirements o In preference to stockpiling, wherever practicable, stripped topsoil and subsoil will be directly replaced on completed sections of the final landform.	See WMP	Compliant			
	4.8.3 Performance / Completion Criteria						
Tarrawonga Mine Biodiversity Management Plan 2013	4.8.3	Surface Water Management Plan is developed and implemented, including erosion and sediment control plans. Periodic review of these plans is undertaken regularly.	See WMP, developed and implemented but not approved. Plan is not old enough to require review but there are comments on reviews elsewhere in the audit.	Compliant			
Tarrawonga Mine Biodiversity Management Plan 2013	4.8.3	Sediment control structures are in accordance with the relevant site management plans and standards.	See WMP - design documentation sighted and inspections of the operation of the structures sighted.	Compliant			
Tarrawonga Mine Biodiversity Management Plan 2013	4.8.3	Erosion and sediment control measures meet the requirements of the Landcom (2004) guideline.	See WMP - design report	Compliant			
Tarrawonga Mine Biodiversity Management Plan 2013	4.8.3	Absence of slumping and/or uncontrolled erosion.	See WMP - no evidence of either slumping or erosion (uncontrolled) in the site visit.	Compliant			
	4.9 Controlling Access						
	4.9.2 Management Strategies						
Tarrawonga Mine Biodiversity Management Plan 2013	4.9.2	Maintain access roads and tracks within the Project Boundary	This occurs	Compliant			
Tarrawonga Mine Biodiversity Management Plan 2013	4.9.2	Maintain boundary fencing	This occurs	Compliant			

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Tarrawonga Mine Biodiversity Management Plan 2013	4.9.2	Maintain signage to advise not to enter Project Boundary.	This occurs	Compliant			
	4.9.3 Performance / Completion Criteria						
Tarrawonga Mine Biodiversity Management Plan 2013	4.9.3	All fences are maintained in good working order	This occurs	Compliant			
Tarrawonga Mine Biodiversity Management Plan 2013	4.9.3	Designated access roads and tracks are maintained	This occurs	Compliant			
Tarrawonga Mine Biodiversity Management Plan 2013	4.9.3	Signage is installed and clearly visible.	This occurs	Compliant			
	4.10 Managing Bushfire Risk						
	4.10.2 Management Strategies						
Tarrawonga Mine Biodiversity Management Plan 2013	4.10.2	Clearing will not be undertaken during periods of extreme fire danger as defined by the Bureau of Meteorology	This occurs	Compliant			
Tarrawonga Mine Biodiversity Management Plan 2013	4.10.2	Controlled high intensity, short-term grazing will be employed to assist in the reduction of vegetative fuel loads on areas on which active mining operations are not occurring and appropriate fencing is available	This has not yet happened as there are no large areas where cattle could access rehab that would not place then into contact with site equipment.	Not Applicable			
Tarrawonga Mine Biodiversity Management Plan 2013	4.10.2	All personnel and contractors would be required to use diesel vehicles and/or remain on defined roads or tracks	See Bushfire Management Plan	Compliant			
Tarrawonga Mine Biodiversity Management Plan 2013	4.10.2	A fire break shall be established and maintained around the perimeter of the mining leases.	See Bushfire Management Plan	Compliant			
Tarrawonga Mine Biodiversity Management Plan 2013	4.10.2	Prohibition of smoking in fire prone areas	See Bushfire Management Plan	Compliant			
Tarrawonga Mine Biodiversity Management Plan 2013	4.10.2	Fire fighting equipment shall be provided on-site including water carts equipped with water cannons to provide immediate response to a bushfire	See Bushfire Management Plan	Compliant			
Tarrawonga Mine Biodiversity Management Plan 2013	4.10.2	Appropriate mine personnel will receive basic fire control training	See Bushfire Management Plan	Compliant			
Tarrawonga Mine Biodiversity Management Plan 2013	4.10.2	Fire prevention and fuel load reduction in rehabilitated mine areas will be undertaken if required and will involve measures such as a combination of fire breaks and short periods of high intensity grazing. Controlled burns may also be used through consultation with Narrabri Shire Council and the local fire brigades.	See Bushfire Management Plan	Compliant			
	4.10.3 Performance / Completion Criteria						
Tarrawonga Mine Biodiversity Management Plan 2013	4.10.3	Fuel load/fire security will be inspected at a minimum of 12 monthly intervals, occurring prior to the commencement of each bushfire season	This is not documented	Not Compliant Administrative	D	2	Medium
Tarrawonga Mine Biodiversity Management Plan 2013	4.10.3	All fire equipment will be kept in a serviceable condition and inspected at least once every 6 months by a fire equipment service provider (3 months for mining equipment)	See Bushfire Management Plan	Compliant			
Tarrawonga Mine Biodiversity Management Plan 2013	4.10.3	Bushfire incidents will be recorded and managed via the Whitehaven incident management process. Occurrence of bushfires will be reported to the relevant authorities and discussed in the Annual Environmental Management Report (AEMR)/Annual Review.	See Bushfire Management Plan	Compliant			
Tarrawonga Mine Biodiversity Management Plan 2013	4.10.3	The bushfire management plan will be reviewed every two years and following any significant changes in bushfire management at the site.	See Bushfire Management Plan	Compliant			
	5 Biodiversity Management within the Biodiversity Offset Area						

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
5.2.1 Weed and Feral Animal Control							
Tarrawonga Mine Biodiversity Management Plan 2013	5.2.1	Weeds will be controlled and monitored by an appropriately qualified contractor.	See Biodiversity Offset Management Plan - Property Manager	Compliant			
Tarrawonga Mine Biodiversity Management Plan 2013	5.2.1	Mechanical removal and/or the application of approved herbicides may be used in areas identified as being affected by weeds.	Noted				
Tarrawonga Mine Biodiversity Management Plan 2013	5.2.1	Follow-up site inspections to evaluate the effectiveness of weed control programs. Follow-up weed control in previously treated areas will be undertaken where weed management has been sub-optimal.	See Biodiversity Offset Management Plan - Property Manager	Compliant			
Tarrawonga Mine Biodiversity Management Plan 2013	5.2.1	Potential carriers of weed seeds and propagules (including vehicles, machinery and boots) will be cleaned before entering BOAs and when moving between weed infested sites to minimise the potential for the spread of weeds.	See Biodiversity Offset Management Plan - not yet implemented	Noted			
Tarrawonga Mine Biodiversity Management Plan 2013	5.2.1	Three noxious weeds listed under the NSW Noxious Weeds Act, 1993 for the Narrabri Shire Council area were recorded in the BOA: Galvanised Burr (Sclerolaena birchii), Noogoora Burr (Xanthium occidentale) and Prickly Pear (Opuntia stricta). Two environmental weeds that are common in the offset area include Coolatai Grass (Hyparrhenia hirta) and Sweet Briar (Rosa rubiginosa). Where available, weed management for these species should be undertaken in accordance with the Weeds Management Plans developed by the Narrabri Shire.	Noted				
Tarrawonga Mine Biodiversity Management Plan 2013	5.2.1	Regular liaison with local landholders and relevant government agencies to monitor the spread and management of weeds within the local area.	Biodiversity Offset Management Plan. Various levels of contact with local landholders, no high risk weed outbreaks in the audit period.	Compliant			
Tarrawonga Mine Biodiversity Management Plan 2013	5.2.1	Eight introduced species have been identified within the offset area: Common Starling, Domestic Dog (Canis lupus familiaris), Goat (Capra hircus), House Mouse, Rabbit, Black Rat, Pig and Red Fox. Animal pests would be controlled and monitored by an appropriately qualified contractor, and will be undertaken in accordance with the requirements of the Livestock Health and Pest Authorities.	See Biodiversity Offset Management Plan, the Property Manager will conduct the monitoring and control of feral species	Compliant			
Tarrawonga Mine Biodiversity Management Plan 2013	5.2.1	Follow-up site monitoring to determine the effectiveness of trapping and/or baiting programs.	See Biodiversity Offset Management Plan, Property Manager	Compliant			
Tarrawonga Mine Biodiversity Management Plan 2013	5.2.1	Known weed and feral animal populations do not increase in size or distribution as a result of Project activities.	See Biodiversity Offset Management Plan, to early to determine at the offset site, no increase on the mine site or the biobank site	Compliant			
Tarrawonga Mine Biodiversity Management Plan 2013	5.2.1	Weed species presence and densities are monitored and control programs implemented when required.	See Biodiversity Offset Management Plan, Property Manager for offset areas and EO for site areas, both run inspection regimes.	Compliant			
Tarrawonga Mine Biodiversity Management Plan 2013	5.2.1	Fauna exclusion fencing and/or tree guards are installed to exclude vertebrate pest species from rehabilitation areas / juvenile vegetation.	This is not conducted	Not Compliant	D	3	Medium
Tarrawonga Mine Biodiversity Management Plan 2013	5.2.1	Vertebrate pest species presence and densities are monitored, and control programs implemented when required.	See Biodiversity Offset Management Plan, Property Manager for offset areas and EO for site areas, both run inspection regimes.	Compliant			

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Tarrawonga Mine Biodiversity Management Plan 2013	5.2.1	Monitoring results and any control activities will be reported in the Annual Environmental Management Report (AEMR)/Annual Review.	AEMR covers both weeds and feral animal controls and moniotoring in the reporting year.	Compliant			
	5.2.2 Bushfire Management						
Tarrawonga Mine Biodiversity Management Plan 2013	5.2.2	A Bushfire Management Plan has been developed for the Tarrawonga Coal Mine and referred to the Rural Fire Service Narrabri and Narrabri Shire Council. The Bushfire Management Plan provides bushfire controls (including fire equipment and locations), emergency response (community/mine personnel), and bushfire training. The Bushfire Management Plan should be updated to address control measures for the BOA.	See Bushfire Management Plan	Compliant			
Tarrawonga Mine Biodiversity Management Plan 2013	5.2.2	The Offset Area Management Plan will also address fire management procedures applicable to the BOA. Specifically, within areas of intact vegetation communities: Access tracks through the BOA will be maintained for fire management. Any fire regime implemented will require the approval from relevant authorities and a site specific Fire Management Plan should be developed. Mosaic burning shall be prescribed to reduce potential negative impacts.	See Bushfire Management Plan	Compliant			
Tarrawonga Mine Biodiversity Management Plan 2013	5.2.2	Fuel load/fire security will be inspected at a minimum of 12 monthly intervals, occurring prior to the commencement of each bushfire season	See Bushfire Management Plan, this is not recorded	Not Compliant Administrative	D	2	Medium
Tarrawonga Mine Biodiversity Management Plan 2013	5.2.2	All fire equipment will be kept in a serviceable condition and inspected at least once every 6 months by a fire equipment service provider (3 months for mining equipment)	See Bushfire Management Plan	Compliant			
Tarrawonga Mine Biodiversity Management Plan 2013	5.2.2	Bushfire incidents will be recorded and managed via the Whitehaven incident management process. Occurrence of bushfires will be reported to the relevant authorities and discussed in the Annual Environmental Management Report (AEMR)/Annual Review.	See Bushfire Management Plan	Compliant			
Tarrawonga Mine Biodiversity Management Plan 2013	5.2.2	The bushfire management plan will be reviewed every two years and following any significant changes in bushfire management at the site.	See Bushfire Management Plan, this is not yet due	Not Applicable			
	5.2.3 Controlling Access						
Tarrawonga Mine Biodiversity Management Plan 2013	5.2.3	Access tracks through the offset area will be maintained.	See Above	Compliant			
Tarrawonga Mine Biodiversity Management Plan 2013	5.2.3	Offset areas will be designated “Restricted Access” areas to members of the community and all personnel and contractors (with the exception of those with approval of TCPL management to enter for legitimate purposes including weed and feral animal control, or for monitoring purposes).	See Above	Compliant			
Tarrawonga Mine Biodiversity Management Plan 2013	5.2.3	Maintain boundary fencing.	See Above	Compliant			
Tarrawonga Mine Biodiversity Management Plan 2013	5.2.3	Maintain signage at primary access points to advise not to enter project boundary.	See Above	Compliant			
Tarrawonga Mine Biodiversity Management Plan 2013	5.2.3	Access gates will be locked. Key distribution will be controlled by the Environmental Officer.	See Above	Compliant			

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Tarrawonga Mine Biodiversity Management Plan 2013	5.2.3	All fences are maintained in good working order.	See Above	Compliant			
Tarrawonga Mine Biodiversity Management Plan 2013	5.2.3	Designated access roads and tracks are maintained.	See Above	Compliant			
Tarrawonga Mine Biodiversity Management Plan 2013	5.2.3	Signage is installed and clearly visible.	See Above	Compliant			
	5.2.4 Collecting and Propagating Seed						
Tarrawonga Mine Biodiversity Management Plan 2013	5.2.4	TCPL will arrange for the collection of seed at the site at appropriate times after flowering and will extend this program to involve other contractors if required.	See above, seed not collected at the mine site	Not Compliant	D	2	Medium
Tarrawonga Mine Biodiversity Management Plan 2013	5.2.4	The seed collection program will be aimed at producing the maximum quantity and quality of seed incorporating the correct degree of maturity for maximum germination.	Noted				
Tarrawonga Mine Biodiversity Management Plan 2013	5.2.4	Trees will not be felled solely for seed collection reasons.	Noted, no evidence of this occurring				
Tarrawonga Mine Biodiversity Management Plan 2013	5.2.4	Seed collection undertaken to date has involved hand collection from the ground and collection from felled trees; however, a variety of additional seed collection techniques may be adopted, including: o For plants with a low density of occurrence, collection may require the placing of bags over the flowers after pollination. Alternatively, dropped seed may be collected by placing plastic on the ground below. o Seed from small plants close to the ground could be collected by machine harvesters or hand picking/pruning. o Seed pods from the upper and middle portions of the crown of trees are more desirable as they tend to be of better quality. Collection techniques for trees may include cherry picker, ladder or hoist attached to a vehicle, long handled pruners, rope saw, etc. o For grasses and other groundcover species, use of a forage harvester to collect seed and mulch material after seed maturity and the direct placement of this material on the post-mining landscapes is an appropriate means of collection and transferral of seed where safe machine access is possible.	Noted				
Tarrawonga Mine Biodiversity Management Plan 2013	5.2.4	Seed handling and storage varies with the type of seed and will require specialised techniques and equipment. This task will be contracted to the personnel undertaking seed collection and/or propagation works.	Noted, seed is passed onto the nursery immediately following collection	Compliant			
Tarrawonga Mine Biodiversity Management Plan 2013	5.2.4	Seedling propagation activities will be undertaken by personnel who are experienced in the propagation of native species.	See above, The nursery used is familiar with the required processes for native seed propagation	Compliant			
Tarrawonga Mine Biodiversity Management Plan 2013	5.2.4	TCPL will advise the nursery / propagation contractor of its rehabilitation requirements (in terms of area) sufficiently in advance of the programmed planting time to enable seedling propagation, hardening-off (if required) and planting each year.	Noted				
Tarrawonga Mine Biodiversity Management Plan 2013	5.2.4	Planting will preferentially be undertaken in the Autumn period on previously established riplines followed by mulching around each seedling.	See above, no mulching done	Not Compliant	D	3	Medium

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Tarrawonga Mine Biodiversity Management Plan 2013	5.2.4	Monitoring of plant flowering and seeding cycles by the seed collectors and their establishment of a comprehensive database and detailed strategy.	See above, this has not yet occurred	Not Applicable			
Tarrawonga Mine Biodiversity Management Plan 2013	5.2.4	Adaptive management will be undertaken and documented if required.	See above - Noted				
	5.3 Degraded or Regeneration Areas						
	5.3.1 Weed and Feral Animal Control						
Tarrawonga Mine Biodiversity Management Plan 2013	5.3.1	Known weed and feral animal populations do not increase in size or distribution as a result of Project activities.	See above	Compliant			
Tarrawonga Mine Biodiversity Management Plan 2013	5.3.1	Weed species presence and densities are monitored and control programs implemented when required.	See above	Compliant			
Tarrawonga Mine Biodiversity Management Plan 2013	5.3.1	Faunal exclusion fencing and/or tree guards are installed to exclude vertebrate pest species from rehabilitation areas / juvenile vegetation.	See above	Not Compliant	D	3	Medium
Tarrawonga Mine Biodiversity Management Plan 2013	5.3.1	Vertebrate pest species presence and densities are monitored, and control programs implemented when required.	See above	Compliant			
Tarrawonga Mine Biodiversity Management Plan 2013	5.3.1	Monitoring results and any control activities will be reported in the Annual Environmental Management Report (AEMR)/Annual Review.	See above	Compliant			
	5.3.2 Bushfire Management						
Tarrawonga Mine Biodiversity Management Plan 2013	5.3.2	"Hot fires‟ may be used to stimulate regeneration from the seed bank in the soil	Noted				
Tarrawonga Mine Biodiversity Management Plan 2013	5.3.2	"Cool fires‟ may be used to control established weeds.	Noted				
Tarrawonga Mine Biodiversity Management Plan 2013	5.3.2	Fire management is an important tool for biodiversity management, any fire management (e.g. implemented to control biomass, manage nutrients and manipulate species germination) must be carefully considered in light of detrimental impacts. Suitable alternative management measures should be considered in the first instance.	Noted				
Tarrawonga Mine Biodiversity Management Plan 2013	5.3.2	Any fire regime implemented will require the approval from relevant authorities and a site specific Fire Management Plan should be developed. Mosaic burning shall be prescribed to reduce potential negative impacts.	Noted				
Tarrawonga Mine Biodiversity Management Plan 2013	5.3.2	Fuel load/fire security will be inspected at a minimum of 12 monthly intervals, occurring prior to the commencement of each bushfire season.	This is not documented	Not Compliant Administrative	D	2	Medium
Tarrawonga Mine Biodiversity Management Plan 2013	5.3.2	All fire equipment will be kept in a serviceable condition and inspected at least once every 6 months by a fire equipment service provider (3 months for mining equipment).	Noted				
Tarrawonga Mine Biodiversity Management Plan 2013	5.3.2	Bushfire incidents will be recorded and managed via the Whitehaven incident management process. Occurrence of bushfires will be reported to the relevant authorities and discussed in the Annual Environmental Management Report (AEMR)/Annual Review.	Noted				
Tarrawonga Mine Biodiversity Management Plan 2013	5.3.2	The bushfire management plan will be reviewed every two years and following any significant changes in bushfire management at the site.	Noted				
	5.3.3 Controlling Access						

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Tarrawonga Mine Biodiversity Management Plan 2013	5.3.3	All fences are maintained in good working order.	See above	Compliant			
Tarrawonga Mine Biodiversity Management Plan 2013	5.3.3	Designated access roads and tracks are maintained.	See above	Compliant			
Tarrawonga Mine Biodiversity Management Plan 2013	5.3.3	Signage is installed and clearly visible.	See above	Compliant			
	5.3.4 Enhancing the Quality of Existing Vegetation and Fauna Habitat						
Tarrawonga Mine Biodiversity Management Plan 2013	5.3.4	Ecological thinning of White Cypress Pine regrowth will be undertaken as required to prevent the establishment of a dense locked growth monoculture.	Not yet required				
Tarrawonga Mine Biodiversity Management Plan 2013	5.3.4	Plantings or seeding of White Box using local seed sources will also be undertaken as necessary following procedures prescribed in the RMP.	RMP	Compliant			
Tarrawonga Mine Biodiversity Management Plan 2013	5.3.4	Selective thinning of regenerating woodland that grows back in forest formation will be undertaken to create an optimal outcome for species diversity.	Not yet required				
Tarrawonga Mine Biodiversity Management Plan 2013	5.3.4	The use of supplementary habitat measures to provide suitable habitat, including the use of naturally scarce fauna habitat features will be investigated by WCL.	Noted - occurs at the site, logs and rocks in the rahab as additional structure				
Tarrawonga Mine Biodiversity Management Plan 2013	5.3.4	Permanent fencing of the BOA to exclude livestock.	Noted				
Tarrawonga Mine Biodiversity Management Plan 2013	5.3.4	Ongoing monitoring of the landscape of the available range of habitat types, stages and niches present in the landscape to demonstrate enhancement of native vegetation.	Noted - Ecological Monitoring Report	Compliant			
Tarrawonga Mine Biodiversity Management Plan 2013	5.3.4	Implementation of the revised offset strategy, if required, following approval to Stage 2 of the Leard Forest Mining Precinct Regional Biodiversity Offset Strategy. Annual revegetation surveys undertaken with a detailed monitoring report provided	Noted - Leard Forest Mining Precinct Regional Biodiversity Offset Strategy notapproved or implemented	Not Applicable			
Tarrawonga Mine Biodiversity Management Plan 2013	5.3.4	A programme would be undertaken to monitor and report on the effectiveness of the measures and the performance of the offset	Noted - not yet developed	Not Applicable			
Tarrawonga Mine Biodiversity Management Plan 2013	5.3.4	The proposed offset area would be independently audited at intervals agreed with relevant authorities.	Noted - This audit	Compliant			
Tarrawonga Mine Biodiversity Management Plan 2013	5.3.4	A report detailing the investigation of factors likely to enhance or impede the effective long term provision of suitable habitat(s) shall be submitted for approval by the Director-General. An implementation plan will also be provided for approval at the same time, to ensure delivery of suitable areas of viable habitat for the nominated species (being Speckled Warbler, Brown Treecreeper, Grey-crowned Babbler, Hooded Robin, Varied Sittella, Turquoise Parrot, Masked Own, Yellow-bellied Sheath Tail Bat and Squirrel Glider). This plan will then be incorporated into the revised Biodiversity Management Plan.	These have been provide to the DG	Compliant			
	5.4 Grasslands						

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Tarrawonga Mine Biodiversity Management Plan 2013	5.4	Intensive restoration management activities are required within the grassland areas to restore native vegetation and fauna habit, focussing on assisted natural regeneration, targeting vegetation establishment and the introduction of naturally scarce fauna habitat features. Areas requiring restoration include derived native grasslands (c) and grasslands dominated by exotics (d)	These are not yet planned or commenced.	Not Applicable			
	5.4.1 Weed and Feral Animal Control						
Tarrawonga Mine Biodiversity Management Plan 2013	5.4.1	Known weed and feral animal populations do not increase in size or distribution as a result of Project activities.	See Above	Compliant			
Tarrawonga Mine Biodiversity Management Plan 2013	5.4.1	Weed species presence and densities are monitored and control programs implemented when required.	See Above	Compliant			
Tarrawonga Mine Biodiversity Management Plan 2013	5.4.1	Faunal exclusion fencing and/or tree guards are installed to exclude vertebrate pest species from rehabilitation areas / juvenile vegetation.	See Above	Not Compliant	D	3	Medium
Tarrawonga Mine Biodiversity Management Plan 2013	5.4.1	Vertebrate pest species presence and densities are monitored, and control programs implemented when required.	See Above	Compliant			
Tarrawonga Mine Biodiversity Management Plan 2013	5.4.1	Monitoring results and any control activities will be reported in the Annual Monitoring Program.	See Above	Compliant			
	5.4.2 Bushfire Management						
Tarrawonga Mine Biodiversity Management Plan 2013	5.4.2	Fuel load/fire security will be inspected at a minimum of 12 monthly intervals, occurring prior to the commencement of each bushfire season.	See Above	Not Compliant	D	2	Medium
Tarrawonga Mine Biodiversity Management Plan 2013	5.4.2	All fire equipment will be kept in a serviceable condition and inspected at least once every 6 months by a fire equipment service provider (3 months for mining equipment).	See Above	Compliant			
Tarrawonga Mine Biodiversity Management Plan 2013	5.4.2	Bushfire incidents will be recorded and managed via the Whitehaven incident management process. Occurrence of bushfires will be reported to the relevant authorities and discussed in the Annual Environmental Management Report (AEMR)/Annual Review.	See Above	Compliant			
Tarrawonga Mine Biodiversity Management Plan 2013	5.4.2	The bushfire management plan will be reviewed every two years and following any significant changes in bushfire management at the site.	See Above	Compliant			
	5.4.3 Controlling Access						
Tarrawonga Mine Biodiversity Management Plan 2013	5.4.3	All fences are maintained in good working order.	See above	Compliant			
Tarrawonga Mine Biodiversity Management Plan 2013	5.4.3	Designated access roads and tracks are maintained.	See above	Compliant			
Tarrawonga Mine Biodiversity Management Plan 2013	5.4.3	Signage is installed and clearly visible.	See above	Compliant			
	5.4.4 Restoring Native Vegetation and Fauna Habitat						
Tarrawonga Mine Biodiversity Management Plan 2013	5.4.4	Revegetation of derived grassland areas (refer to RMP).	See RMP	Not Applicable			
Tarrawonga Mine Biodiversity Management Plan 2013	5.4.4	Management threatening processes that inhibit natural regeneration, including destocking by implementing ongoing stock exclusion from grassland areas.	See RMP - destocking complete	Compliant			

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Tarrawonga Mine Biodiversity Management Plan 2013	5.4.4	Ongoing monitoring of Eucalypt regeneration in the derived grasslands to identify any shortterm suppression due to the dense grassy layer in the derived grasslands may indicate that management options causing disturbance to the grassland may be required. Management options could include slashing or low-intensity controlled burning around paddock trees before seed fall and seasonal rains. In areas with no paddock trees, disturbance could be caused before seasonal rains to encourage regrowth from soil seed stores.	See RMP and Monitoring Report Actions have not commenced	Not Applicable			
Tarrawonga Mine Biodiversity Management Plan 2013	5.4.4	The use of supplementary habitat measures to provide suitable habitat, including the use of naturally scarce fauna habitat features will be investigated by WCL.	See RMP	Compliant			
Tarrawonga Mine Biodiversity Management Plan 2013	5.4.4	Revegetation of derived native grasslands and cleared land to revegetated woodland/open woodland habitat areas.	See RMP	Compliant			
Tarrawonga Mine Biodiversity Management Plan 2013	5.4.4	Implementation of the revised offset strategy if necessary following approval of the Stage 2 Leard Forest Mining Precinct Regional Biodiversity Offset Strategy. Annual revegetation surveys undertaken with a detailed monitoring report provided.	See RMP	Not Applicable			
Tarrawonga Mine Biodiversity Management Plan 2013	5.4.4	A programme would be undertaken to monitor and report on the effectiveness of the measures and the performance of the offset area.	See RMP	Compliant			
Tarrawonga Mine Biodiversity Management Plan 2013	5.4.4	A report detailing the investigation of factors likely to enhance or impede the effective long term provision of suitable habitat(s) shall be submitted for approval by the Director-General. An implementation plan will also be provided for approval at the same time, to ensure delivery of suitable areas of viable habitat for the nominated species (being Speckled Warbler, Brown Treecreeper, Grey-crowned Babbler, Hooded Robin, Varied Sittella, Turquoise Parrot, Masked Own, Yellow-bellied Sheath Tail Bat and Squirrel Glider). This plan will then be incorporated into the revised Biodiversity Management Plan.	These have been provide to the DG	Compliant			
	5.4.5 Enhancing the Quality of Existing Vegetation and Fauna Habitat						
Tarrawonga Mine Biodiversity Management Plan 2013	5.4.5	Implementation of the revised offset strategy if necessary following approval of the Stage 2 Leard Forest Mining Precinct Regional Biodiversity Offset Strategy	Noted	Not Applicable			
Tarrawonga Mine Biodiversity Management Plan 2013	5.4.5	Annual revegetation surveys undertaken with a detailed monitoring report provided	Ecological report	Compliant			
Tarrawonga Mine Biodiversity Management Plan 2013	5.4.5	A programme would be undertaken to monitor and report on the effectiveness of the measures and the performance of the offset	Not yet developed or implemented	Not Applicable			
Tarrawonga Mine Biodiversity Management Plan 2013	5.4.5	The proposed offset area would be independently audited at intervals agreed with relevant authorities.	This audit	Compliant			
	5.4.6 Managing any Potential Conflicts						
Tarrawonga Mine Biodiversity Management Plan 2013	5.4.6	No surface disturbance works are planned for the BOA. Activities that will be undertaken include revegetation, stock exclusion and bushfire management. The Aboriginal Heritage Information Management System (AHIMS) register will be referred to should any surface disturbance works be undertaken.	No actions yet	Not Applicable			

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
	9 Reporting						
	9.1 Incident Reporting						
Tarrawonga Mine Biodiversity Management Plan 2013	9.1	TCPL shall notify, at the earliest opportunity, the Director-General and any other relevant agencies of any incident that has caused, or threatens to cause, material harm to the environment. For any other incident associated with the project, TCPL will notify the Director-General and any other relevant agencies as soon as practicable after the TCPL becomes aware of the incident. TCPL will provide the Director-General and any relevant agencies a report on the incident, within seven days of the date of the incident, and such further reports as may be requested.	No incidents in the audit period	Not Applicable			
	9.2 Annual Biodiversity Monitoring						
Tarrawonga Mine Biodiversity Management Plan 2013	9.2	Annual biodiversity monitoring will be undertaken to assess the effectiveness and progress of biodiversity management against the performance/completion criteria, and identify triggers for adaptive management.	Ecological monitoring reports	Compliant			
Tarrawonga Mine Biodiversity Management Plan 2013	9.2	Monitoring will be undertaken within both the Rehabilitation Area and the BOA, as described in Section 6. An annual monitoring report will be prepared that includes record monitoring results and discusses performance against key performance/completion criteria and TCPL commitments. Trends will also be identified and any non-compliances or triggers identified. Results of the annual biodiversity monitoring will be reported in the Annual Environmental Management Report.	Ecological monitoring reports	Compliant			
	9.3 Regular Reporting and Review						

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Tarrawonga Mine Biodiversity Management Plan 2013	9.3	By the end of June each year, TCPL will prepare an Annual Review which reviews the environmental performance of the project for the previous calendar year (Schedule 5, Condition 5 of Project Approval (PA 11_0047) Approval. This review will: Describe the development, including any rehabilitation, that was carried out in the past calendar year, and the development that is proposed to be carried out over the current calendar year Include a comprehensive review of the monitoring results and complaints records of the Project over the past year, which includes a comparison of these results against the: o Relevant statutory requirements, limits or performance measures/criteria o Monitoring results of previous years o Relevant predictions in the EA Identify any non-compliance over the last year, and describe what actions were (or are being) taken to ensure compliance Identify any trends in the monitoring data over the life of the project Identify any discrepancies between the predicted and actual impacts of the project, and analyse the potential cause of any significant discrepancies Describe what measures will be implemented over the next year to improve the environmental performance of the project.	SEE AEMR results in PA section of protocol	Compliant			
Tarrawonga Mine Biodiversity Management Plan 2013	9.3	The AEMR/Annual Review also addresses the matters identified in the Department of Trade and Investment (Resources and Energy) document entitled "Guidelines to the Mining, Rehabilitation and Environmental Management Process" (n.d).	SEE AEMR results in PA and MOP	Compliant			
Tarrawonga Mine Biodiversity Management Plan 2013	9.3	The AEMR/Annual Review is provided to relevant agencies, the CCC members and is made available for public viewing on the Whitehaven Coal website. Copies of all management plans / strategies or monitoring programs, together with the results of independent audits undertaken in accordance with PA 11_0047 are provided to relevant authorities, and made publicly available on the Whitehaven Coal Website.	Sited CCC minutes, agencies distribution message and is available on the website.	Compliant			
	9.4 Complaint Receipt and Response Procedure						
Tarrawonga Mine Biodiversity Management Plan 2013	9.4	In order to receive, record and respond to any complaints in a timely manner, TCPL maintains a telephone complaints line for the purpose of receiving complaints from any member of the public in relation to its activities. The complaints line operates 24 hours per day, seven days per week, is publicly advertised and the details are supplied to adjacent landowners (TCPL 2009).	See elsewhere	Compliant			

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Tarrawonga Mine Biodiversity Management Plan 2013	9.4	All complaints are recorded and responded to within 24 hours of the receipt of a complaint. A message bank will capture calls when they cannot be answered. The recorded message records the time of receipt and requests the following information. 1. Complainant's name 2. Telephone number 3. Preferred contact time 4. Nature of complaint.	See elsewhere	Compliant			
Tarrawonga Mine Biodiversity Management Plan 2013	9.4	The nature of the response depends on the nature and source of complaints but includes one or more of the following actions. 1. Liaison with the complainant to ascertain all details and to identify the nature and source of the complaint and provide supplementary details for the log. Details recorded in the log include: a. the date and time of the complaint b. the method by which the complaint was made c. personal details d. the nature of the complaint e. action taken by TCPL in relation to the complaint including any follow-up contact and f. if no action, the reason why. This activity may extend to other landowners /residents to determine the overall extent of the perceived problem. 2. As appropriate, the initiation of monitoring or other investigations to verify or otherwise the exceedance or non-compliance with consent, licence or lease conditions 3. Initiation of appropriate changes in operating practices or procedures 4. Conducting a follow-up interview with the resident to determine their level of satisfaction with the mine's response and the resultant outcome.	See elsewhere	Compliant			
Tarrawonga Mine Biodiversity Management Plan 2013	9.4	A copy of the report sheet is supplied to the complainant, if requested.	See elsewhere	Compliant			
Tarrawonga Mine Biodiversity Management Plan 2013	9.4	A summary of the complaints received in each 12 month period is included in each AEMR/Annual Review, together with a comparison with the number and nature of complaints received in the previous five years (TCPL 2009).	See elsewhere	Compliant			
	9.5 Response to Non-Compliances						
Tarrawonga Mine Biodiversity Management Plan 2013	9.5	Compliance with all approvals, plans and procedures is the responsibility of all personnel and contractors employed on or in association with the mine, and is developed through promotion of project ownership under the direction of the Operations Manager and Environmental Manager (TCPL 2009).	See elsewhere	Compliant			
Tarrawonga Mine Biodiversity Management Plan 2013	9.5	The Environmental Manager undertakes regular inspections, internal audits and initiates directions identifying any remediation/rectification work required, and areas of actual or potential non-compliance, which have the potential to cause environmental harm or result in complaints are also reported to the relevant authority (TCPL 2009).	See elsewhere	Compliant			

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Tarrawonga Mine Biodiversity Management Plan 2013	9.5	Non-compliances with the requirements of the mine site's Environment Protection Licence (EPL) are reported on each Annual Licence Return (TCPL 2009).	See elsewhere	Compliant			
Tarrawonga Mine Biodiversity Management Plan 2013	9.5	A review of TCPL‟s compliance with all conditions of the Development Consent, mining lease and all other approvals and licences is undertaken as part of each AEMR/Annual Review submitted to the Director-General and DPI. and also made publically available on the Whitehaven Coal website.	See elsewhere	Compliant			
Tarrawonga Mine Biodiversity Management Plan 2013	9.5	Additionally an independent audit is undertaken a minimum of once every three years and report submitted to the Director-General, and any other relevant authorities and made available to the public on the Whitehaven Coal Website.	See elsewhere	Compliant			
Tarrawonga Mine Biodiversity Management Plan 2013	9.5	A set of environmental procedures that deal with the renewal of licences, leases and approvals, and also prescribe the means to ensure compliance with the regulatory requirements has been established to ensure ongoing compliance in the event of personnel changes (TCPL 2009).	See elsewhere	Compliant			
	10 Auditing						
Tarrawonga Mine Biodiversity Management Plan 2013	10	Whitehaven will undertake annual internal audits to align with its AEMR/Annual Review and MOP reporting requirements, as well as independent audits every 3 years	Internal audits not conducted in the audit period	Not Compliant Administrative			
	10.1 Annual Internal Auditing						
Tarrawonga Mine Biodiversity Management Plan 2013	10.1	An internal annual environmental audit will be undertaken to align with reporting requirements for the MOP and AEMR/Annual Review. The annual audit will focus on the compliance with the requirements of the BMP and where corrective action is required.	Internal audits not conducted in the audit period	Not Compliant Administrative			
Tarrawonga Mine Biodiversity Management Plan 2013	10.1	An annual audit and compliance report will be prepared which will include the methodology of the audit, actions implemented in accordance with the BMP, non-compliances with the BMP, and corrective actions taken. A summary of this report will be included in the AEMR/Annual Review.	Internal audits not conducted in the audit period				
	10.2 Independent Audit						
Tarrawonga Mine Biodiversity Management Plan 2013	10.2	In accordance with Schedule 5, Condition 10 of the Project Approval, an independent audit will be undertaken by the end of June 2014 and every 3 years thereafter, unless the Director-General directs otherwise.	This audit, not compliant with timing	Not Compliant Administrative			
Tarrawonga Mine Biodiversity Management Plan 2013	10.2	The audit will be led by a suitably qualified auditor, and include experts in noise, air quality, water, ecology, and any other fields specified by the Director-General, who are endorsed by the Director General.	This audit	Compliant			
Tarrawonga Mine Biodiversity Management Plan 2013	10.2	Specifically in relation to this BMP, the audit will include: Consultation with relevant agencies Assessment of the environmental performance in complying with this BMP Review of the adequacy of this BMP and Recommend measures or actions to improve the environmental performance in relation to the requirements off this BMP.	This audit	Compliant			

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Tarrawonga Mine Biodiversity Management Plan 2013	10.2	A document will be prepared within 3 months of commissioning the audit, or as otherwise agreed with the Director-General, which includes the audit report, together with responses to recommendations contained in the audit report.	This audit, agreement re the extension of time noted.	Compliant			
11 Review of this BMP							
Tarrawonga Mine Biodiversity Management Plan 2013	11	Consequently, it is proposed that this BMP is reviewed and, if required, revised following completion of the related State and Commonwealth approval requirements, including: Stage 2 of the Leard Forest Mining Precinct Regional Biodiversity Management Strategy (State Condition 41 and Commonwealth Condition 22) Revised Biodiversity Offset Strategy (State Condition 42) Independent verification of Offset areas (Commonwealth Condition 7) Offset Management Plan (Commonwealth Condition 12 to15) Mine Site Rehabilitation Plan (Commonwealth Condition 23 to 26).	Will be reviewed following its approval	Not Applicable			
Tarrawonga Mine Biodiversity Management Plan 2013	11	Following the review described above, the BMP will be reviewed and, if required, revised every 3 years following the findings of the independent audit (Section 10.2). The review will be undertaken in consultation with key stakeholders (including OEH, SEWPaC, Forests NSW, the CCC, DPI Catchments and Lands and the Namoi CMA) and approved by DP&I.	Will be reviewed following its approval	Not Applicable			
Tarrawonga Mine Biodiversity Management Plan 2013	11	A review of this BMP should be undertaken after 12 months and from then on at least every three years. The BMP review should examine trends, investigate the sampling effort in terms of redundancy or shortfalls, and provide the opportunity to incorporate new monitoring technologies or techniques if required. Regular review of this BMP will allow for adaptive management of both the Project Area and the BOS to be adopted and ensure that the BMP is consistent to overarching management plans, environmental policies, objectives and legal requirements. If preventative measures indicate that amendments to the BMP are necessary, the BMP will also be reviewed. Any review will be undertaken in consultation with key stakeholders and with the approval of relevant agencies.	Will be reviewed following its approval	Not Applicable			

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Willeroi Biodiversity Offset Area Management Plan							
3 Offset Management Zones							
Willeroi Biodiversity Offset Area Management Plan	3	For the purposes of biodiversity and offset management, the Willeroi BOA has been divided into three management zones according to condition and resilience (Figure 3 1): • Management zone 1 - maintenance of remnant vegetation • Management zone 2 - enhancement of regenerating native vegetation • Management zone 3: o 3a - restoration of DNG o 3b - restoration of exotic dominated grasslands o 3c – restoration of DNG and erosion areas.	Noted				
Willeroi Biodiversity Offset Area Management Plan	3	Each management zone has strategic ecological management objectives and relevant actions to achieve these objectives for a sustainable landscape in perpetuity. Each management zone and their broad management actions/objectives is described briefly below.	Noted				
3.1.1 Management Zone 1 - Maintenance of remnant Vegetation							
Willeroi Biodiversity Offset Area Management Plan	3.1.1	The primary management objective of MZ1 is to maintain vegetation structural and species diversity, exclude stock, remove threats to biodiversity and implement ongoing monitoring of condition to detect changes in vegetation condition to inform adaptive management procedures.	Noted				
Willeroi Biodiversity Offset Area Management Plan	3.1.1	Management actions in this zone include: • Conduct baseline monitoring for flora and fauna to identify original reference condition for measuring future changes in condition, and to inform extent and location of weed management interventions	Done in the original assessment, included in this document	Compliant			
Willeroi Biodiversity Offset Area Management Plan	3.1.1	• Grazing exclusion to promote understorey recovery and reduce competition for food with native fauna species	Grazing exclusion has been recently completed	Compliant			
Willeroi Biodiversity Offset Area Management Plan	3.1.1	• Management of human disturbance including signage (and compliance checks) to prevent unauthorised entry/use	Not yet completed	Not Applicable			
Willeroi Biodiversity Offset Area Management Plan	3.1.1	• Retain dead timber (prevent fire wood collection)	Gates locked, no evidence of firewood collection	Compliant			
Willeroi Biodiversity Offset Area Management Plan	3.1.1	• Minor weed removal and ongoing monitoring to compliment adjacent areas. Opuntia stricta (Prickly Pear) does occur within areas of intact vegetation	Not yet completed	Not Applicable			
Willeroi Biodiversity Offset Area Management Plan	3.1.1	• Targeted control of foxes, rabbits, goats and pigs required across whole BOA.	Not yet completed	Not Applicable			
3.1.2 Management Zone 2 - Enhancement of regenerating native vegetation							
Willeroi Biodiversity Offset Area Management Plan	3.1.2	The management objectives of MZ2 are to restore native species richness to all strata, initially through passive regeneration assisted by removal and treatment of threats, followed by active regeneration if required. The high resilience of the vegetation in MZ2 should enable natural regeneration in structural and species diversity to improve fauna habitat capacity over time (McIntyre et al. 2001). MZ2 will augment and buffer the core conservation areas in MZ1.	Noted				

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Willeroi Biodiversity Offset Area Management Plan	3.1.2	• Periodic, light grazing permitted e.g. cell grazing. Grazing removal to be timed to coincide with maximum native ground cover (typically associated with seasonal rains in mid-late summer) and minimum exotic species dominance of ground cover to avoid interim deterioration of condition and avoid resource competition for native fauna. Grazing must be actively managed to balance the objectives of overstorey regeneration and agricultural weed suppression. Temporary stock exclusion fencing will be required to protect high conservation areas (MZ1). In the mid-term (> 5yrs) grazing will be excluded to accommodate supplementary plantings or promote further maturation of natural regeneration	Noted, this has not occurred yet and may not be feasible as it is difficult to attract agistment when it is short term or requires intensive management to keep the cattle in each area for a short time. It is also not feasible for Tarrawonga to purchase cattle for te purpose as they have no other property to put them on when thay are not on the Willeroi property. Tarrawonga will continue to investigate the issue.	Not Applicable			
Willeroi Biodiversity Offset Area Management Plan	3.1.2	• Management of human disturbance including signage at external access points to the Willeroi Offset Area (and compliance checks) to prevent unauthorised entry/use	see above	Compliant			
Willeroi Biodiversity Offset Area Management Plan	3.1.2	• Retain dead timber including standing and fallen (prevent fire wood collection) to protect habitat niches	see above	Compliant			
Willeroi Biodiversity Offset Area Management Plan	3.1.2	• Minor weed removal and ongoing monitoring to compliment adjacent areas. Opuntia stricta (Prickly Pear) does occur within areas of intact vegetation	see above	Compliant			
Willeroi Biodiversity Offset Area Management Plan	3.1.2	• Targeted control of foxes, rabbits, goats and pigs required across whole Offset Area	see above	Compliant			
Willeroi Biodiversity Offset Area Management Plan	3.1.2	• Revegetation will be undertaken in instances where monitoring indicates that natural regeneration is poor after three years.	see above	Compliant			
	3.1.3 Management Zone 3 - Restoration of DNG and exotic dominated grasslands						
Willeroi Biodiversity Offset Area Management Plan	3.1.3	While natural regeneration is optimal for species integrity, a revegetation regime to compliment threat abatement and conservation management is recommended to reduce establishment times. Direct seeding is recommended in MZ3 as a cost-effective way to re-establish native vegetation over broad areas that often results in a more natural distribution of species across a site than planting. If direct seeding proves to be ineffective, then the revegetation works will be supplemented with tube stock planting to meet the completion criteria for MZ3.	Noted				
Willeroi Biodiversity Offset Area Management Plan	3.1.3	Management actions in MZ3 include: • Develop and implement a weed control regime (prior to any revegetation planting). Note additional environmental and noxious weed species may be present at the time of survey	Not yet completed	Not Applicable			
Willeroi Biodiversity Offset Area Management Plan	3.1.3	• Conservation grazing to reduce weed infestations and fire hazards until direct seeding events, thereafter grazing exclusion	Grazing has been removed	Compliant			
Willeroi Biodiversity Offset Area Management Plan	3.1.3	• Control of over abundant native herbivores in consultation with adjacent landholders (including OEH)	Not yet completed	Not Applicable			
Willeroi Biodiversity Offset Area Management Plan	3.1.3	• Develop and implement a feral animal management control plan. Targeted control of foxes, rabbits, goats and pigs required across whole Offset Area	Not yet completed	Not Applicable			
Willeroi Biodiversity Offset Area Management Plan	3.1.3	• Targeted revegetation of the DNG and exotic dominated grassland areas using direct seeding with local endemic species of pre-clearing vegetation type to enhance native flora diversity and increase fauna habitat values	Not yet completed	Not Applicable			
Willeroi Biodiversity Offset Area Management Plan	3.1.3	• If direct seeding proves to be ineffective, then the revegetation works will be supplemented with tube stock planting	Not yet completed	Not Applicable			

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Willeroi Biodiversity Offset Area Management Plan	3.1.3	• Active erosion control measures (MZ3c only)	Not yet completed	Not Applicable			
Willeroi Biodiversity Offset Area Management Plan	3.1.3	• Management of human disturbance including signage (and compliance checks) to prevent unauthorised entry/use.	Not yet completed	Not Applicable			
4 Land Management Activities							
Willeroi Biodiversity Offset Area Management Plan	4	Unauthorised access to the whole Willeroi property will be prohibited and actively enforced. This will reduce the risk of disturbance to intact vegetation, regenerating areas, or revegetated areas and prevent soil disturbance, weed dispersal, fauna habitat disturbance and illegal rubbish dumping.	Not yet completed	Not Applicable			
Willeroi Biodiversity Offset Area Management Plan	4	TCPL will appoint a Property Manager who will be responsible for coordinating the implementation and reporting on all aspects of this management plan. The approval of the Property Manager must be obtained for any access to or to undertake any activities on or in the BOA. Personnel will only be permitted into the offset area to undertake management and monitoring actions identified through this plan	Property Manager appointed.	Compliant			
Willeroi Biodiversity Offset Area Management Plan	4	TCPL will maintain external fencing around the entire Willeroi BOA to restrict human and stock access. Signage will be erected to identify the site as an Offset Area and prohibit 4WD, trail bikes, rubbish dumping, camping, shooting, fires and unauthorised access. The signage will be supplemented by a direct communication strategy with adjoining landholders to encourage compliance and support for conservation objectives.	Not yet completed	Not Applicable			
Willeroi Biodiversity Offset Area Management Plan	4	Some fencing will be required to protect revegetation works and to meet interim conservation grazing objectives. Internal fencing will be maintained as an interim management measure where it excludes stock to enable natural regeneration. Temporary stock exclusion fencing is recommended to supplement existing fencing to manage grazing pressure appropriate to each zone. Barbed wire is not recommended for new temporary, internal fencing. The long term objective will be to remove all internal fencing to minimise obstructions to fauna movements.	Not yet completed	Not Applicable			
Willeroi Biodiversity Offset Area Management Plan	4	Fencing that is erected within or on the boundary of the offset area should be in accordance with the following 'wildlife friendly' specifications (Rawlings et al. 2010): • Use plain, non-barbed wire only • Limit the number of wire strands used on the fence • Boundary fences may use barbed wire to protect the offset areas from grazing cattle but the top two strands should be plain, non-barbed wire • A night-visible fencing material should be installed along the fence adjacent to high risk areas such as woodlands and wetlands • If new internal or temporary fencing is required, it should be polywire electric using either tape or braid.	Not yet completed	Not Applicable			
Willeroi Biodiversity Offset Area Management Plan	4	All access tracks, fence lines and signage erected within the offset areas will be inspected and maintained regularly.	Not yet completed	Not Applicable			
4.2 Stock management							

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Willeroi Biodiversity Offset Area Management Plan	4.2	Grazing management on Willeroi property will be conducted to support primary conservation objectives in a deliberate shift from historical productivity objectives. Grazing by domestic stock reduces food and habitat resources for native animals, however, light to moderate grazing by stock can be compatible with native grassland management as it may be used to suppress weeds (McIntyre et al. 2002).	Noted				
Willeroi Biodiversity Offset Area Management Plan	4.2	Stock should be excluded from the offset area prior to revegetation works commencing. Exclusion of stock will continue in areas where the removal of stock has allowed natural regeneration to occur without an increase in weed density. However, where stock exclusion has seen a marked increase in weed density and limited natural regeneration of native vegetation, cattle may be reintroduced to these areas.	This has occured	Compliant			
Willeroi Biodiversity Offset Area Management Plan	4.2	Grazing activities within offset areas will adhere to the specifications shown in *Grassy Guide* (Barlow 1998) and *A Guide to Managing Box Gum Grassy Woodlands* (Rawlings et. al. 2010). Strategic grazing should: • Be undertaken as 'pulse' or 'crash' grazing, where fencing restricts stock movement to a limited area for a brief amount of time at deliberate intervals • Take into account variability within the Biodiversity Offset and Management Areas. Pulse grazing is most effective in grasslands and less effective in woodlands • Be undertaken in such a way as to promote patchiness (i.e. areas of different age, density, and species) • Take into account the ecological requirements of the native species being targeted for promotion • Not be undertaken during spring unless for control of annual exotics • Not be undertaken during wet conditions • Utilise 'clean' (i.e. weed free) stock. For instance, if sheep are used they should be introduced off-shears and with empty stomachs • Incorporate adequate rest time for the patch after grazing to promote native recovery. Weed and erosion control may also be required.	Not yet completed	Not Applicable			
Willeroi Biodiversity Offset Area Management Plan	4.2	Monitoring of the impact of grazing will be required. The objectives of grazing and grazing monitoring criteria should be developed in a 'Farm Management Plan'. This will include stocking rates, and triggers to initiate and remove grazing.	Farm Management Plan not completed	Not Applicable			
4.3 Enhancing the quality of existing vegetation and fauna habitat							
Willeroi Biodiversity Offset Area Management Plan	4.3	The quality of existing vegetation and fauna habitat within the areas marked for maintenance or enhancement within the BOA (MZ1 and MZ2) will be enhanced through specific land management activities including stock management and weed control. These activities will help to restore internal connectivity of woodland and forest habitats.	Noted				
Willeroi Biodiversity Offset Area Management Plan	4.3	Specific strategies that will be implemented in the BOA Area to enhance the quality of existing vegetation include: • MZ1 - No active planting is proposed within these areas, active regeneration will be encouraged through weed and stock management.	Noted				

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Willeroi Biodiversity Offset Area Management Plan	4.3	• MZ2 - No initial plantings are proposed; if natural regeneration is poor after the first management period (as indicated by the monitoring program), targeted planting should be undertaken. Thinning of the White Cypress Pine regrowth communities to prevent a dense locked growth monoculture becoming established should be undertaken in areas that are dominated by thick regrowth to create an optimal outcome for species diversity	Noted				
Willeroi Biodiversity Offset Area Management Plan	4.3	• MZ3c – restoration of native vegetation	Noted				
4.4 Restoring native vegetation							
Willeroi Biodiversity Offset Area Management Plan	4.4	Restoring native vegetation and fauna habitat will be undertaken within MZ3 only. Activities to restore native vegetation and fauna habitat within the grasslands of the Offset Area will focus on assisted natural regeneration complemented by targeted vegetation establishment. Areas of DNG and grasslands dominated by exotics are planned to be revegetated to woodland/open woodland habitat areas.	Not yet completed	Not Applicable			
Willeroi Biodiversity Offset Area Management Plan	4.4	Generic management strategies for restoring native vegetation include: • Management of threatening processes that inhibit natural regeneration (including stock management, vertebrate pest control and weed control) • Ongoing monitoring of Eucalypt regeneration to identify whether the dense grassy layer is inhibiting growth of eucalypt seedlings. Monitoring results would be used to determine whether disturbance to the grassland is required to encourage Eucalypt growth. Management options include o Slashing around paddock trees o Low-intensity controlled burning around paddock trees o Disturbance to soil before seasonal rain.	Noted				
Willeroi Biodiversity Offset Area Management Plan	4.4	Wherever possible, the seed for the planting program will be collected from the BOA. Seeds should be prepared for direct seeding (% mix) or propagated for planting as 'Hiko' tube stock by a specialist native species propagation nursery.	Noted				
Willeroi Biodiversity Offset Area Management Plan	4.4	Plant density will depend on the amount of existing vegetation and the results of natural regeneration. All vegetation types are to be managed towards the benchmark range canopy cover per Biometric vegetation type (Table 4 1). As a guide, a density of one tree per 100 m2 (one every 10 metres) will achieve a final density of one tree every 200 m2 or a canopy cover of between 5-25% as per the benchmark for the 'White Box grassy woodland' vegetation type, assuming a 50% success rate. This planting density allows for time lag to maturation and mixed success of plantings.	Noted				
Willeroi Biodiversity Offset Area Management Plan	4.4	Species selection will be determined by parent vegetation type	Noted				
4.4.1 Management zone 3a							

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Willeroi Biodiversity Offset Area Management Plan	4.4.1	Areas of DNG that show low rates of natural regeneration establishment after the first three years (MZ3a) shall be direct seeded in improve establishment. Areas to be direct seeded will be slashed prior to planting (MZ3a). Direct seeding is only to be undertaken during the optimum period of growth for the majority of species being seeded (typically late winter / early spring). Methods of direct seeding depend on safe machine access with minimal disturbance of existing native vegetation and soil erosion. Two main methods may be used for revegetation: • Mechanised direct seeding: A direct seeding machine, or seed box, is used; typically towed by a tractor on a three point linkage system. This approach is useful as it prepares the seed bed and plants the seed in one operation. Limitations include that it is only suited to seed which can easily pass through the machinery, such as Acacia species, and to areas with a slope of 3:1 or less • Hand seeding: Hand seeding (or other air delivery systems) is useful for native grass and eucalyptus seed which is unable to pass through a seed box. Hand seeding also allows for revegetation in restricted areas. The approach is usually more labour intensive than using a seed box.	Noted				
Willeroi Biodiversity Offset Area Management Plan	4.4.1	The following rates for direct seeding of native species (per ha) is recommended based on experience with broad-acre revegetation in similar climatic regions (ELA 2011): • Tree species - 200g/ha • Shrub species - 300g/ha • Grass species - 5,000g/ha.	Noted				
	4.4.2 Management zones 3b and 3c						
Willeroi Biodiversity Offset Area Management Plan	4.4.2	Targeted vegetation establishment will require tubestock planting with MZ3b and MZ3c in areas where natural regeneration of native species is unlikely to occur in a timely mannr. Revegetation of woodland/forest areas would include the planting of species characteristic of the local vegetation communities, including species from the BGW (e.g. White Box overstorey as well as appropriate understorey).	Noted				

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Willeroi Biodiversity Offset Area Management Plan	4.4.2	Ripping will be undertaken in revegetation areas prior to tubestock planting when appropriate. The following guidelines should be followed when conducting ripping activities. • The preferred method of ripping is with a dozer (or similar piece of equipment) and a single tine, with planting occurring shortly after • Rip line spacing will be determined by the planting density of the tube stock required • Rip lines will follow the contours of the site in sloping areas to avoid formation of erosion channels and loss of topsoil • Ripping should be undertaken when the soil is moist but not saturated to allow a suitable medium for seedling establishment • Ripping prior to forecasted rainfall is preferable to allow moisture penetration within the rip line prior to tubestock planting • Operation of heavy equipment on wet areas will result in excessive soil compaction and should be avoided • In areas where ripping is likely to result in further weed infestation, additional weed management activities will be undertaken prior to ripping occurring.	Not yet completed	Not Applicable			
Willeroi Biodiversity Offset Area Management Plan	4.4.2	Tube stock are to be planted in 'Hiko' cells in autumn and spring to capitalise on greater soil moisture and reduced heat stress with follow up watering as required. Weed control including knockdown and pre-emergent herbicide are likely to be required prior to and after planting.	Not yet completed	Not Applicable			
	4.5 Collecting and propagating seeds						
Willeroi Biodiversity Offset Area Management Plan	4.5	A seed collection program targeting local provenance species required for revegetation of the Willeroi property is required to ensure that the biodiversity values of the offset area is maintained. Table 4 2 contains the list of species associated with each vegetation community planned for revegetation within Willeroi Offset Area. The species list should be used as a guide for seed collection and propagation.	Not yet completed	Not Applicable			
Willeroi Biodiversity Offset Area Management Plan	4.5	Within the offset areas, local provenance seed will be targeted for collection. Seed collection will occur in other suitable areas when viable seed is considered to be available. Supplementation with non-local provenance seed (with the exception of horticultural varieties) may be required when adverse seasonal conditions (i.e. drought) affect the availability of local provenance seed. Alternatively, revegetation works may be delayed until sufficient stocks of local provenance species are available.	Not yet completed	Not Applicable			

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Willeroi Biodiversity Offset Area Management Plan	4.5	The seed collection program will focus on: • Collection of seed at an appropriate time post flowering • Aiming for the maximum quantity and quality of seed to be collected, and incorporate the correct degree of maturity to maximise germination • Collection of seed from the ground and felled trees. However, where additional seed collection methods are required, these may include: o For plants with a low density of occurrence, collection may require the placing of bags over the flowers after pollination. Alternatively, dropped seed may be collected by placing plastic on the ground below o Seed from small plants close to the ground could be collected by machine harvesters or hand picking/pruning o Seed pods from the upper and middle portions of the crown of trees are more desirable as they tend to be of better quality. Collection techniques for trees may include cherry picker, ladder or hoist attached to a vehicle, long handled pruners, rope saw etc o For grasses and other groundcover species, use of a forage harvester to collect seed and mulch material after seed maturity and the direct placement of this material on the post-mining landscapes is an appropriate means of collection and transferral of seed where safe machine access is possible • Meeting the volume of local provenance seed required in order to propagate the numbers of tubestock required for revegetation works.	Not yet completed	Not Applicable			
Willeroi Biodiversity Offset Area Management Plan	4.5	A detailed recording of the seed collection and propagation process should be maintained. Details to be recorded include the seed collection methods, timing, seed storage, seed quantity, viability testing, propagation methods and successes. Such records will be fed back into the process to allow for continual improvement.	Not yet completed	Not Applicable			
Willeroi Biodiversity Offset Area Management Plan	4.5	Propagation of seed collected will be undertaken by personnel who are experienced in the propagation of native species. Propagation requirements will be determined by TCPL and communicated to the contractor responsible for seed propagation to ensure that seedlings are ready for planting each year. Planting activities will occur in autumn each year.	Not yet completed	Not Applicable			
4.6 Minimising the impacts on fauna							
Willeroi Biodiversity Offset Area Management Plan	4.6	Impacts on fauna during activities being undertaken within the BOA are expected to be minimal. Any impacts will be minimised through implementation of the following management actions. • Creation of significant areas of fauna habitat resulting from the revegetation program • Weed control (Section 4.8) and feral animal control (Section 4.9) shall be undertaken • The on-site speed limit of 40 km/hr will be applied to access roads within the BOA.	Not yet completed	Not Applicable			
4.7 Managing any potential conflicts between the proposed restoration works and any Aboriginal heritage values							

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Willeroi Biodiversity Offset Area Management Plan	4.7	Minimal surface disturbance works are planned for the BOA. Activities that will be undertaken include restoration and revegetation, stock exclusion and bushfire management. The Aboriginal Heritage Information Management System (AHIMS) register will be referred to should any surface disturbance works be undertaken.	Noted				
Willeroi Biodiversity Offset Area Management Plan	4.7	Any surface disturbance works will be managed as it is on the mine site in relation to Aboriginal cultural heritage, including: • In areas where there is a low potential for archaeological material and the disturbance footprint is considered minor, e.g. soil stripping in areas previously cleared for agriculture and >100 meters from a drainage line, works will be undertaken without the presence of site monitors. In areas other than those outlined previously, a representative member of the Narrabri LALC and representative member of the Gomeroi Narrabri People will be invited to monitor areas subject to any soil stripping activities	Not yet completed	Not Applicable			
Willeroi Biodiversity Offset Area Management Plan	4.7	• In the event of the discovery of a potential site or artefact, the following procedure will be followed: 1. Work will cease in the area of discovery 2. If the area of discovery is in deposited material, then work will also cease in the area where the material originated from 3. The person discovering the artefact will notify the Property Manager who will ensure that work has ceased and area(s) is(are) cordoned off with tape 4. The Property Manager will: (a) Request a qualified archaeologist to attend the site and advise on its archaeological significance; (b) Request the site monitor from the Narrabri LALC and the Gomeroi Narrabri People if not already present to attend and advise on its cultural significance in consultation with the qualified archaeologist (c) If the find is determined to be a site, notify the OEH with the advice from the archaeologist and the Narrabri LALC and Gomeroi Narrabri People for determination of further procedures. 5. If the find is confirmed as a site, the archaeologist will complete a Sites Register Card and forward to the OEH for inclusion on the Aboriginal Heritage Information Management System (AHIMS) database	Not yet completed	Not Applicable			

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Willeroi Biodiversity Offset Area Management Plan	4.7	6. Subject to the recommendations of the archaeologist, the Narrabri LALC and Gomeroi Narrabri People, the appropriate permit to transfer (under Section 85A of the National Parks and Wildlife Act 1974 (NPW Act)) will be applied for prior to further work being undertaken in the vicinity of the site. Any such action to disturb or transfer Aboriginal items will also require the development of excavation and/or salvage plans, which require the approval of the Director-General, in consultation with OEH. 7. The Property Manager will implement any other procedures or recommendations issued by the OEH • In addition to the procedure outlined above, any trees identified as having a culturally made scar(s) will be retained in situ. Where this is not possible, the tree will be cut down to preserve the scar and relocated to a designated protected area in consultation with the Aboriginal stakeholders and archaeologist • Should any bone(s) be uncovered, work should cease immediately in the area of the find, a suitably qualified person should be contacted to clearly identify the bone(s). If the bone(s) cannot be identified as animal bones, the police and Aboriginal stakeholder representatives will be advised of the discovery. Work will not recommence until both the police and the representatives of the Aboriginal community have given their permission to do so • Failure to report a discovery and those responsible for the damage or destruction occasioned by unauthorised removal or alteration to a site or to archaeological material may be prosecuted under the NPW Act (as amended).	Not yet completed	Not Applicable			
	4.8 Controlling weeds						
Willeroi Biodiversity Offset Area Management Plan	4.8	Weed species within revegetation and regeneration areas have the potential to be a significant impediment to the success of revegetation and restoration activities as weeds compete with the tubestock species for moisture, nutrients and light. There are two aspects to weed control at the Willeroi Offset Area: 1. General control of environmental weeds 2. Targeted control of noxious weeds.	Not yet completed	Not Applicable			
Willeroi Biodiversity Offset Area Management Plan	4.8	Weeds will be controlled and monitored by an appropriately qualified contractor. Weeds may be removed from offset areas using mechanical means, or through the application of an approved herbicide. Herbicide application will occur in accordance with the requirements detailed on the relevant Material Safety Data Sheet.	Not yet completed	Not Applicable			
Willeroi Biodiversity Offset Area Management Plan	4.8	Once weeds have been removed from offset areas, inspections of weed controlled areas should be conducted to establish whether weed control programs have been successful. Where weed control activities have not been successful, further treatment of these areas will be undertaken. Seasonal conditions influence the extent of weed infestations and as such TCPL will continually monitor and update weed management areas.	Not yet completed	Not Applicable			

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Willeroi Biodiversity Offset Area Management Plan	4.8	Noxious weeds that have been identified within the offset area should be treated in accordance with the Narrabri Shire Council's Weeds Management Plan specific to each weed species. Liaison should occur with local landholders, Narrabri Shire Council and other relevant government agencies to monitor the spread of weeds locally, and the extent of management activities being undertaken.	Not yet completed	Not Applicable			
Willeroi Biodiversity Offset Area Management Plan	4.8	Prior to entry into offset areas and when moving between sites of weed infestations, vehicles, machinery and boots will need to be cleaned in order to minimise the potential for further spread of weeds.	Not yet completed	Not Applicable			
4.9 Controlling feral pests							
Willeroi Biodiversity Offset Area Management Plan	4.9	Feral pests will be controlled and monitored by an appropriately qualified and experienced contractor. All feral pest control activities will be undertaken in accordance with the requirements of the North West Local Land Services.	Not yet completed	Not Applicable			
Willeroi Biodiversity Offset Area Management Plan	4.9	Fencing of the BOA may be required to exclude feral pests from revegetation and regeneration areas. However, not all feral species will be controlled through this method and further implementation of management actions will need to occur. These actions may include trapping and/or baiting programs. Follow-up monitoring of the offset areas will be used to determine the effectiveness of trapping and/or baiting programs. Where feral species are detected within the monitoring program, these species will be targeted as part of the feral species management program in the following year.	Not yet completed	Not Applicable			
Willeroi Biodiversity Offset Area Management Plan	4.9	A 'Vertebrate Pest Management Program' will be developed in consultation with adjoining landholders (including OEH) for maximum efficacy. The proposed strategy includes: • Shooting feral goats using a high powered (calibre) rifle as humanely as possible (i.e. a single shot to head) • Joint aerial control of feral goats with OEH • Fox baiting using 1080 poison or pindone baits with safety precautions. Fox control will be undertaken through a baiting programme across the Offset Area as necessary. Fox control should be undertaken in autumn, when young foxes are leaving the den and dispersing and in spring, when foxes are breeding • Rabbit baiting (as fox) with warren destruction if found.	Not yet completed	Not Applicable			
4.10 Controlling erosion							
Willeroi Biodiversity Offset Area Management Plan	4.10.	Erosion and sediment control is required in MZ3c and along drainage lines that will undergo restoration works as part of MZ3. The proposed treatment is to: • Remove stock grazing in riparian areas to prevent further erosion • Actively manage areas mapped as MZ3c including jute matting to limited further erosion • Periodically monitor the status of creek lines to identify significant erosion hotspots that require remediation (methods may include retaining natural snags to slow water velocity, battering off steep areas, jute matting and rock lining of creek banks) • Increase vegetation cover in the creek lines and on the banks, making them more stable and less vulnerable to soil erosion.	Not yet completed	Not Applicable			

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Willeroi Biodiversity Offset Area Management Plan	4.10.	Control of grassy or herbaceous weeds along the creek lines will be selective until there is greater than 50% cover of native vegetation, as all vegetation cover (native and exotic) will aid in the stabilisation of the creek line. Selective weed control works will be required to prevent the creation of bare areas of soil. All woody weeds found occurring in the creek line will be controlled by the cut and paint method as this will retain the root structure of the plant in the bank and assist in holding the soil together. Woody debris from weed control is to be left in the creek bed provided the species cannot shoot from vegetative material.	Not yet completed	Not Applicable			
4.11 Managing bushfire risk							
Willeroi Biodiversity Offset Area Management Plan	4.11	TCPL has developed a Bushfire Management Plan which outlines bushfire controls, emergency response actions and bushfire training requirements. This Offset Management Plan outlines further fire management procedures that are applicable to offset areas and should be incorporated into the Tarrawonga Bushfire Management Plan.	Noted				
Willeroi Biodiversity Offset Area Management Plan	4.11	The actions specific to the Willeroi property are: • Maintenance of access tracks within the offset area is required for fire management activities. • Use of a fire regime as a management strategy within the Willeroi Offset Area will require approval from relevant authorities prior to activities commencing. A site specific Fire Management Plan will be required in addition to the approvals required • Small fire breaks will be maintained along existing or new fence lines installed as part of this OMP. These breaks will double as access for the Rural Fire Service (RFS) in the event of wildfire, and will be maintained annually by slashing the fire breaks • Any wildfires that do occur in the Willeroi BOA in the interim will be managed through an appropriate response from the RFS to extinguish or contain the spread of the fire, including to let the fire burn to minimise potential damage caused by fire suppression activities • Mosaic burning shall be prescribed to reduce potential negative impacts. No prescribed burning will be implemented in MZ3 until planted trees are mature and able to withstand the impact of fire.	Not yet completed	Not Applicable			
Willeroi Biodiversity Offset Area Management Plan	4.11	Inspections of fuel load in offset areas will occur at a minimum of 12 monthly intervals, prior to the commencement of each bushfire season. Additional inspection of fire equipment is required every 6 months, and must be conducted by a fire equipment service provider.	Not yet completed	Not Applicable			
Willeroi Biodiversity Offset Area Management Plan	4.11	Any bushfire incident that occurs will be managed via the Whitehaven incident management process, and reported to relevant authorities as they occur. Reporting of bushfire incident details will also form a part of the Annual Environmental Monitoring Report (AEMR).	Not yet completed	Not Applicable			
Willeroi Biodiversity Offset Area Management Plan	4.11	Access tracks through the BOA will be maintained for fire management.	Not yet completed	Not Applicable			
4.12 Rubbish management							

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Willeroi Biodiversity Offset Area Management Plan	4.12	Rubbish is present around the homestead site on the northern boundary of the Willeroi property. Rubbish within the BOA should be removed where it is appropriate. In some cases, rubbish may need to be left in-site as it presents major health concerns if removed, or it is providing an important habitat value.	Not yet completed				
5 Ecological Monitoring							
Willeroi Biodiversity Offset Area Management Plan	5	Monitoring will be undertaken over a period of 20 years or until the completion criteria are met. Should the key completion criteria not be met in this timeframe or if some environmental event delays the recovery of the offset area, for example bushfire, TCPL will continue to manage the BOA until the completion criteria are met.	Noted, not commenced as yet apart from initial assessment	Not Applicable			
Willeroi Biodiversity Offset Area Management Plan	5	Once this is achieved, the offset area will then be managed in perpetuity via the security mechanism which is yet to be finalised. The monitoring program is based on sound statistical principals and is generally consistent with the standard flora and fauna assessment guidelines (DECC 2004). The monitoring program is broken up into the following components of quarterly visual inspections of disturbance factors including weeds and feral animals and annual flora and fauna monitoring.	Not yet completed	Not Applicable			
5.1 Visual inspections							
Willeroi Biodiversity Offset Area Management Plan	5.1	Visual inspections of the BOA will be undertaken by the Property Manager quarterly, or in response to incidents, to detect: • Physical condition of fencing and gates • Disturbance factors including fire and unauthorised access e.g. fire wood collection • Presence/activity of feral animal species informed by regular inspections of the property (at least quarterly) and analysis of results of control measures (i.e. number of baits taken, number of animals shot) • Grazing pressure from over-abundant native herbivores (quarterly) • Presence of exotic weed species (as part of weed control measures).	Visual inspections have commenced	Compliant			
Willeroi Biodiversity Offset Area Management Plan	5.1	Inspection results will be reported annually as part of the Reporting Protocol	Noted, Offset has not been running for 12 months as yet.	Not Applicable			
5.2 Flora monitoring							
Willeroi Biodiversity Offset Area Management Plan	5.2	The flora monitoring program outlined is adapted from DEC (2004) and ELA (2012a, 2012b). It is proposed that field surveys in permanent plots will occur annually and will be supplemented with additional photo monitoring. Field survey is to be undertaken in spring to maximise the detection of cryptic species.	Not yet completed	Not Applicable			
Willeroi Biodiversity Offset Area Management Plan	5.2	The location of permanent monitoring plots will be determined during the first year of monitoring to establish baseline data. Plots will be located by applying a random, stratified sampling regime. The Willeroi BOA will be divided into 26 strata (environmental sampling units) based on vegetation type, condition and management zone. To determine plot locations in the first round of survey, random points are allocated in each strata on a field map prior to field surveys to avoid potential sampling bias.	Noted				

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Willeroi Biodiversity Offset Area Management Plan	5.2	Flora monitoring sites will be established to measure changes to vegetation condition in control (reference) sites (one in each of the seven vegetation communities in benchmark condition) and intervention sites (two in each vegetation type/management zone combination). The total number of permanent sites may be varied following baseline surveys.	Noted				
Willeroi Biodiversity Offset Area Management Plan	5.2	Flora monitoring plots are undertaken in a standard 50 m by 20 m plot	Noted				
	5.3 Fauna monitoring						
Willeroi Biodiversity Offset Area Management Plan	5.3	The fauna monitoring program comprises three elements: • Targeted surveys for the Regent Honeyeater, Swift Parrot and Greater Long-eared Bat in preferred habitat • Quarterly inspections and monitoring for presence of feral animal species.	Noted Note that there are only two elements listed in the management plan				
Willeroi Biodiversity Offset Area Management Plan	5.3	Except for the quarterly visual inspections, any fauna monitoring, including targeted surveys, will be undertaken by appropriately qualified, licensed and trained ecologists.	Noted				
Willeroi Biodiversity Offset Area Management Plan	5.3	The first year of monitoring will establish baseline data sets for ongoing comparison (i.e. ongoing data collected will be directly comparable using the same methodology). An adaptive management approach will be applied if early surveys detect significant species).	Noted				
Willeroi Biodiversity Offset Area Management Plan	5.3	Targeted surveys for the Swift Parrot and Regent Honeyeater in their preferred habitat (i.e. wintering flowering eucalypt species such as White Box) will be included in the monitoring program. Winter surveys will be undertaken at times when White Box is flowering (as informed by other inspections and monitoring, to be prescribed in the Offset Management Plan), and will consist of a suitably experienced ecologist traversing the offset area when White Box is confirmed flowering to detect the presence and habitat utilisation of either species. Remote recording devices (e.g. bird song meters) will be set up in areas of suitable habitat and left to record bird activity over a three to four week period during likely peak visitation periods (i.e. when there is mass flowering of White box). Targeted surveys will be conducted when local information (i.e. local bird observers and/or information from the National Recovery teams indicates Swift Parrots and/or Regent Honeyeaters are in the area).	Not yet completed	Not Applicable			

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Willeroi Biodiversity Offset Area Management Plan	5.3	Targeted surveys for the Greater Long-eared Bat will be undertaken within a representation of the potential habitat across the offset property (maximum of five sites). The targeted surveys will consist of both Anabat ultrasonic detection devices and harp trapping. The use of Anabat detection devices will identify the use of an area by Long-eared bats; however, they cannot be identified down to species level via Anabats. Two Anabat detection devices will be placed within potential habitat (fly-ways within woodland or over open bodies of water) over a period of two nights during spring. At each targeted site, harp traps will also be set up, given that the species forages below the tree canopy, often to ground level. Two harp traps will be placed within potential habitat (fly-ways within woodland) over a two over a period of two nights during spring.	Not yet completed	Not Applicable			
Willeroi Biodiversity Offset Area Management Plan	5.3	The results of monitoring will be analysed and compared to previous survey results to determine general population trends, including trends in the presence of feral animals. In the event that negative trends are identified indicating the decline of particular threatened species, appropriate amelioration measures will be recommended.	Noted				
Willeroi Biodiversity Offset Area Management Plan	5.3	If new populations of existing threatened species or additional threatened species are identified through the course of monitoring or other observations, records will be assessed by a qualified ecologist to advise on any changes required to the management of the BOA . This may result in: • Certain planned activities being postponed or modified • Modification of the monitoring program • Immediate survey and assessment of the new record, and an assessment of the impact of any proposed revegetation activities on it.	Noted				
Willeroi Biodiversity Offset Area Management Plan	5.3	If further threatened species or significant new records of existing threatened species are collected, the significance of such records will be reviewed, as will the likely impact of existing or proposed management activities, and any options for minimising impacts on these species.	Noted				
6 Contingency Planning							
Willeroi Biodiversity Offset Area Management Plan	6	Condition 13.e of EPBC Act Approval 2011/5923 requires TCPL to describe the potential risks to successful management against the performance criteria, and provide a description of the contingency measures that would be implemented to mitigate against these risks.	Noted				
Willeroi Biodiversity Offset Area Management Plan	6	The following risk assessment considers the impact of risks from management actions in this OMP. The risk model is based on the Australian Standard ISO 31000:2009 (Standards Australia 2009).	Noted				

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Willeroi Biodiversity Offset Area Management Plan	6	To address the risks identified in Table 6 1 the Property Manager will: • Educate TCPL staff, contractors and neighbouring property owners/managers of the BOA objectives and location • Avoid potential impacts by following the recommended protocol in this OMP for each management action • Mitigate potential impacts by regular monitoring (Section 5) and applying corrective action under an adaptive management framework • Report incidences and responses in the Annual Report to facilitate managerial review and if necessary trigger systemic change of practices.	Not yet completed	Not Applicable			
Willeroi Biodiversity Offset Area Management Plan	6	Contingency plans are required if issues of non-compliance, exceedence, or new information about the management of the offset area present comes to light. The responsible agent for each incident, response management actions and reporting requirements are outlined in Table 6 3. Risks and their associated controls that relate to rehabilitation works on the Project area are provided in the RMP (GSS Environmental 2013).	Noted				
	7 Funding Requirements						
Willeroi Biodiversity Offset Area Management Plan	7	Condition 13.g of EPBC Act Approval 2011/5923 requires TCPL to provide details of the funding requirements for the ongoing management activities within the BOA. TCPL will be responsible for funding the offset management activities on the Willeroi BOA.	Noted				
	8 Incidents and Non-Compliances						
	8.1 Incident Reporting						
Willeroi Biodiversity Offset Area Management Plan	8.1	TCPL shall notify, at the earliest opportunity, the Director-General and any other relevant agencies of any incident that has caused, or threatens to cause, material harm to the environment. For any other incident associated with the project, TCPL will notify the Director-General and any other relevant agencies as soon as practicable after the TCPL becomes aware of the incident. TCPL will provide the Director-General and any relevant agencies a report on the incident, within seven days of the date of the incident, and such further reports as may be requested.	Noted, no such incidents	Not Applicable			
	8.2 Complaint Receipt and Response Procedure						
Willeroi Biodiversity Offset Area Management Plan	8.2	In order to receive, record and respond to any complaints in a timely manner, TCPL maintains a telephone complaints line for the purpose of receiving complaints from any member of the public in relation to its activities. The complaints line operates 24 hours per day, seven days per week, is publicly advertised and the details are supplied to adjacent landowners (TCPL 2013).	See other sections of the audit	Compliant			

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Willeroi Biodiversity Offset Area Management Plan	8.2	All complaints are recorded and responded to within 24 hours of the receipt of a complaint. A message bank will capture calls when they cannot be answered. Each complaint will be recorded on the Complaints Register, which will include the following details: 1. Date and time of complaint 2. Any personal details the complainant wishes to provide (alternatively, if no such details are provided then a note to that effect is recorded) 3. Nature of the complaint 4. The action taken by TCPL in relation to the complaint, including any follow-up contact with the complainant 5. If no action was taken by TCPL, the reason why no action was taken.	See other sections of the audit	Compliant			
Willeroi Biodiversity Offset Area Management Plan	8.2	The following protocol will be followed on all complaints received TCPL 2013): • The Environmental Manager will be responsible for ensuring that an initial response is provided within 24 hours of receipt of a complaint (except in the event of complaints recorded when the mine is not operational) • The cause of the complaint and any required remedial actions identified • Additional measures will be undertaken as required to address the complaint. This may include visiting the complainant, or inviting the complainant to the mine site • Once the identified measures are undertaken, the Environmental Manager will sign off on the relevant complaint within the Complaints Register. If necessary, the Environmental Manager will follow-up to confirm the source of the complaint is adequately mitigated.	See other sections of the audit	Compliant			
Willeroi Biodiversity Offset Area Management Plan	8.2	A copy of the Complaints Register will be kept by TCPL and made available to the CCC and the complainant (on request). A summary of complaints received every 12 months will be provided in the AEMR.	See other sections of the audit	Compliant			
Willeroi Biodiversity Offset Area Management Plan	8.2	Based on the nature of individual complaints, specific contingency measures may be implemented to the (reasonable) satisfaction of the complainant. The Environmental Manager retains ultimate responsibility to ensure that complaints received are properly recorded and addressed appropriately.	See other sections of the audit	Compliant			
	8.3 Response to Non-Compliances						
Willeroi Biodiversity Offset Area Management Plan	8.3	Compliance with all approvals, plans and procedures is the responsibility of all personnel and contractors employed on or in association with the mine, and is developed through promotion of project ownership under the direction of the Operations Manager and Environmental Manager.	See other sections of the audit	Compliant			
Willeroi Biodiversity Offset Area Management Plan	8.3	The Environmental Manager or Environmental Officer and/or Operations Manager undertakes regular inspections, internal audits and initiates directions identifying any remediation/rectification work required, and areas of actual or potential non-compliance, with all directions provided to the relevant party in writing and/or diarised (TCPL 2013).	See other sections of the audit	Compliant			

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Willeroi Biodiversity Offset Area Management Plan	8.3	Non-compliances with regulations, licences or approvals will be reported to the relevant authority, together with details of the corrective actions taken to avoid future occurrences (TCPL 2013).	See other sections of the audit	Compliant			
Willeroi Biodiversity Offset Area Management Plan	8.3	A review of TCPL's compliance with all conditions of the Development Consent, mining lease and all other approvals and licences is undertaken as part of each AEMR/Annual Review.	See other sections of the audit	Compliant			
9 Reporting and Documentation							
Willeroi Biodiversity Offset Area Management Plan	9	EPBC Approval (2011/5923) requires TCPL to prepare and submit reports that detail the progress of management activities undertaken in the BOA, and the outcomes of those activities. These reports should contain the results of any monitoring, inspections or surveys undertaken in the previous 12 months including details of date, time, location, nature of inspection/activity, name of person undertaking inspection/activity, observations and the photographs from the monitoring plots. Annual reports shall be provided every 12 months by March 31. The annual report will also include the results of monitoring undertaken as required by this OMP	Not twelve months into the BOMP	Not Applicable			
Willeroi Biodiversity Offset Area Management Plan	9	The annual 'Willeroi' BOA report will be incorporated into TCPL's Annual Environmental Management Report (AEMR) and Annual Review reporting period, i.e. 1 April-31 March, and will consist of two parts: • Summary of the implementation of management actions within the BOA including inspection results and review findings; and • The results of the flora and fauna monitoring program.	Not twelve months into the BOMP	Not Applicable			
Willeroi Biodiversity Offset Area Management Plan	9	A series of reporting protocols also need to be completed	Not yet completed	Not Applicable			
9.1 Vegetation monitoring and reporting							
Willeroi Biodiversity Offset Area Management Plan	9.1	Annual vegetation monitoring reporting is to include a written summary of the methodology and the current year's findings for each vegetation plot, including the average results of each variable recorded. Photo monitoring records and field data sheets will be included in an appendix. A flora species list with corresponding plot numbers where species were recorded is also to be included in an appendix.	Not yet completed	Not Applicable			
Willeroi Biodiversity Offset Area Management Plan	9.1	A discussion section is to be included that compares the results from the current monitoring year with previous years either through actual annual records or a mean value where several previous years are being compared. The annual report is to include statistical graphs illustrating changes in diversity and cover/abundance of each attribute recorded within each management zone.	Not yet completed	Not Applicable			
9.2 Fauna monitoring reporting							
Willeroi Biodiversity Offset Area Management Plan	9.2	The report is to include the results of any surveys/monitoring undertaken for the Swift Parrot, Regent Honeyeater and Greater Long-eared Bat, and habitat assessments. The results of monitoring will be analysed and compared to previous survey results to determine general habitat usage trends (if any).	Noted				
9.3 Report recommendations and conclusion							

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Willeroi Biodiversity Offset Area Management Plan	9.3	The annual OMP implementation report will provide a summary of all the actions implemented during the previous year. Any significant events that occurred during the year (e.g. wildfire, outbreak of any weeds or incidence of any new threats) and any recommended changes to the management actions, their duration, intensity or relative priority identified through the annual review will be included.	Noted				
Willeroi Biodiversity Offset Area Management Plan	9.3	A concluding section is to be prepared within the annual on-site BOA report that highlights and describes significant findings, either positive or negative. Changes to any management recommendations for the following year will also be suggested.	Noted				
	9.4 Review and Audit						
Willeroi Biodiversity Offset Area Management Plan	9.4	The annual OMP implementation report will provide a summary of all the actions implemented during the previous year. Any significant events that occurred during the year (e.g. wildfire, outbreak of any weeds or incidence of any new threats) and any recommended changes to the management actions, their duration, intensity or relative priority identified through the annual review will be included.	Noted				
Willeroi Biodiversity Offset Area Management Plan	9.4	The OMP is to undergo a review and revision every five years. It is expected that baseline environmental data can be supplemented over time as seasonal trends are recorded. These results should be considered to provide for adaptive management	Noted				
Willeroi Biodiversity Offset Area Management Plan	9.4	The land management activities (Section 4) should be the focus of the review: • Investigate how these strategies are measuring up against the overall objectives and the performance criteria set in the previous three years • Identify any poor results / non-conformances and rectify any problems encountered or better approaches identified in reporting and auditing processes • Revise or set performance criteria for the next three year period.	Noted				
Willeroi Biodiversity Offset Area Management Plan	9.4	Improved information gathered as a result of BOA monitoring or recent studies should be used to refine land management activities and performance criteria. Any updates to the OMP will be provided to DP&I and DoE for approval.	Noted				
Willeroi Biodiversity Offset Area Management Plan	9.4	TCPL shall review and if necessary revise this OMP within six months of the completion of the Leard Forest Mining Precinct Regional Biodiversity Strategy (condition 47 of the PA).	Not approved	Not Applicable			
Willeroi Biodiversity Offset Area Management Plan	9.4	In general, the OMP will be revised due to: • Deficiencies being identified • Recommendations from the annual report • Changing environmental requirements (including any project conditions of approvals) • Improvements in knowledge or new technology becomes available • Change in legislation or relevant approvals • Change in the activities or operations associated with the Tarrawonga Mine.	Noted				
	9.5 Auditing						

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Willeroi Biodiversity Offset Area Management Plan	9.5	TCPL will undertake annual internal audits to align with its AEMR/Annual Review and Mining Operations Plan reporting requirements, as well as independent audits every 3 years. The annual audit will focus on the compliance with the requirements of the OMP and where corrective action is required.	Noted, not yet required	Not Applicable			
Willeroi Biodiversity Offset Area Management Plan	9.5	An annual audit and compliance report will be prepared which will include the methodology of the audit, actions implemented in accordance with the OMP, non-compliances with the OMP, and corrective actions taken. A summary of this report will be included in the AEMR/Annual Review.	Noted, not yet required	Not Applicable			
Willeroi Biodiversity Offset Area Management Plan	9.5	In accordance with Schedule 5, Condition 10 of the DP&I PA, an independent audit will be undertaken by the end of June 2014 and every 3 years thereafter, unless the Director-General directs otherwise.	This audit, timing not compliant	Not Compliant Administrative			
Willeroi Biodiversity Offset Area Management Plan	9.5	The audit will be led by a suitably qualified auditor, and include experts in noise, air quality, water, ecology, and any other fields specified by the Director-General, who are endorsed by the Director-General. Specifically in relation to this OMP, the audit will include: • Consultation with relevant agencies • Assessment of the environmental performance in complying with this OMP • Review of the adequacy of this OMP and • Recommend measures or actions to improve the environmental performance in relation to the requirements off this OMP.	This audit	Compliant			
Willeroi Biodiversity Offset Area Management Plan	9.5	A document will be prepared within 3 months of commissioning the audit, or as otherwise agreed with the Director-General, which includes the audit report, together with responses to recommendations contained in the audit report.	This audit	Compliant			

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
	Rehabilitation Management Plan						
	3 Post Mining Land Use and Rehabilitation Objectives						
	3.1 Post Mining Land Use						
Rehabilitation Management Plan	3.1	Tarrawonga's post-mining land use vision is to reinstate a sustainable balance of pre-mining land-uses, being biodiversity conservation (Leard State Forest) and agriculture. Consequently, the post mining landform will include areas of native vegetation analogous to the adjacent native vegetation communities, and agricultural areas capable of sustainable agricultural productivity comparable with the pre-mining capability of agricultural areas disturbed by the project.	Noted				
Rehabilitation Management Plan	3.1	Biodiversity conservation areas will integrate with the adjoining Leard State Forest to provide connectivity and enhance the regional biodiversity outcomes. Agricultural areas will be proximate to existing agricultural lands	See MOP Plans - complies	Compliant			
Rehabilitation Management Plan	3.1	The final void will be designed and constructed to have a minimal adverse impact upon the desired land use outcomes and minimise impacts to surface and groundwater quality and hydrology	See MOP Plans - complies Final design not yet required but it will further detail how the final void will meet these requirements	Compliant			
	3.2 Tarrawonga Rehabilitation Goal and Objectives						
Rehabilitation Management Plan	3.2	Tarrawonga's mine closure goal for the Project is that the status of rehabilitation at relinquishment will be to the satisfaction of the relevant Minister(s) and that all relevant mining tenement and Project Approval conditions have been met.	Noted				
Rehabilitation Management Plan	3.2	Disturbed land would be considered suitable for surrender when the nominated standards and/or completion criteria for land use, landform reconstruction, landform stability, revegetation, and beneficial water use have been met or the relevant Minister(s) otherwise accept the rehabilitation status.	No rehab is yet suitable for relinquishment.	Not Applicable			
	4.1.1 Tarrawonga Environmental Risk Management						
Rehabilitation Management Plan	4.1.1	Tarrawonga has implemented an Environmental Management Strategy (EMS), supported by a comprehensive set of Environmental Management Plans (EMPs) to manage environmental risks on all Tarrawonga lands, including rehabilitation areas. These plans have been developed and implemented by TCPL in accordance with Project Approval PA 11_0047 and regulatory requirements including EPL 12365. EMPs are supported by an environmental monitoring program which includes monitoring meteorological conditions, air quality, noise, blasting, surface water and groundwater.	Noted				
	4.2 Key Risks to Rehabilitation						

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Rehabilitation Management Plan	4.2	Key risks to rehabilitation and mine closure will be formally assessed in a Mine Closure Risk Assessment undertaken prior to submission of the draft Final Void and Mine Closure Plan in 2019.	Noted	Not Applicable			
	4.2.1 Landform Stability						
	Surface Water Management and Erosion Control						
Rehabilitation Management Plan	4.2.1	Erosion and sedimentation is managed in accordance with the TCPL Erosion and Sediment Control Plan, which is a component of the Water Management Plan. Failure to adequately manage surface water in rehabilitation areas may result in landform instability, significant erosion features and offsite transport of sediment.	Noted				
Rehabilitation Management Plan	4.2.1	Management and mitigation measures include but are not limited to: - Installation of all erosion and sediment controls in accordance with an area-specific Erosion and Sediment Control Plan (ESCP);	Sighted on-site	Compliant			
Rehabilitation Management Plan	4.2.1	- Selective handling and amelioration of spoils and soils to minimise exposure of unsuitable (e.g.: dispersive) materials;	Sighted on-site and noted in a number of management pans and procedures	Compliant			
Rehabilitation Management Plan	4.2.1	- Constructing final landform drainage structures to meet design storm events in accordance with regulatory requirements and industry guidelines (refer to Section 6.3.2); and	MOP plans, approved by DRE and EA plans approved by DP&E, no steep slopes observed on-site, no long slopes observed, some erosion but not unmanagable and not ignored.	Compliant			
Rehabilitation Management Plan	4.2.1	- Rapid stabilisation of topsoiled rehabilitation areas with cover crops and / or mulches.	Sighted on-site, note no mulches are used at present	Compliant			
	Saline and Sodic Materials						
Rehabilitation Management Plan	4.2.1	Management and mitigation measures include but are not limited to: - Overburden and interburden selective handling to ensure the final outer surfaces of overburden emplacements (and structures such as drainage elements) are constructed with suitable non-sodic or low sodicity material where possible;	Overburden not tested for sodicity, no evidence of dispersive materials destabilising slopes. Slopes are generally holding up well even with some poorly vegetated areas.	Compliant			
Rehabilitation Management Plan	4.2.1	- Ameliorating any sodic materials that may be exposed or near-surface to minimise dispersivity. Management of sodic materials is discussed further in Section 6.3.2; and	No amelioration has been required in the audit period.	Not Applicable			
Rehabilitation Management Plan	4.2.1	- Treating any identified occurrence of sodic material in the final void walls in accordance with procedures to be documented in Section 10.	Noted, not yet required.	Not Applicable			
	Major Storms and Flooding (Goonbri Creek)						
Rehabilitation Management Plan	4.2.1	Management and mitigation measures include: - All landforms and drainage structures will be designed to withstand major storm events in accordance with regulatory requirements and industry guidelines	Erosion and sediment control design report sighted. Report stated complaince with the Blue Book and other relevant guidelines.	Compliant			
Rehabilitation Management Plan	4.2.1	- The final void design will consider the optimal catchment reporting to the void to minimise the potential for flooding the void; and	Noted, design not finalised to this degree yet	Not Applicable			

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Rehabilitation Management Plan	4.2.1	Riparian corridors (Goonbri Creek alignment and key drainage paths) will be stabilised with strategic placement of structures (including large rocks and woody debris). Riparian vegetation species able to withstand high velocity flows (e.g.: lomandras) will be established in riparian corridors.	This work has not been completed.	Not Applicable			
	Bushfire						
Rehabilitation Management Plan	4.2.1	Bushfire risk on all Tarrawonga owned lands is managed in accordance with the Bushfire Management Plan and procedures in the Biodiversity Management Plan. Management and mitigation measures to minimise the impacts of bushfire are outlined in Section 6.5.7 and include: Selection of fire-tolerant species in native vegetation areas; Maintaining fire breaks by maintaining cleared easements and fence-lines; Maintain fire-fighting access tracks and water sources (sediment dams) in rehabilitation areas; Monitoring fuel loads and considering mosaic back-burning programs (where appropriate) to reduce fuel loads; and Maintaining sufficient viable seed for key native vegetation species to re-seed areas after bushfire events.	Generally compliant with the Bushfire MP though fuel load monitoring is not done. To date no fuel load reduction programs have been undertaken, there was no evidence of excessive fuel load build up in the site inspection.	Compliant			
	Severe or Prolonged Drought						
Rehabilitation Management Plan	4.2.1	Management and mitigation measures include but are not limited to: Optimise use of local provenance seed tolerant of the region's drought regime within the species mix for rehabilitation areas. Deep rooted native grassland species will be included in pasture mixes to maximise retention of ground cover in pasture and native grassland areas during drought events; Ameliorate soils where necessary to optimise infiltration and water holding capacity in the soil profile prior to tubestock planting and direct seeding. Tarrawonga is also trialling tubestock planting methods including mounding and direct seeding / over-sowing through cover crop stubble to increase drought tolerance by maximising moisture retention; and Monitor rehabilitation following drought periods to identify areas where re-seeding and replanting is required. Tarrawonga will maintain a contingency supply of viable seed for key native vegetation species until relinquishment that is sufficient to re-seed rehabilitation areas in the event of a widespread rehabilitation failure.	Generally compliant … see seed collection elsewhere in audit	Compliant			
	Regional Insect Attack and Disease						
Rehabilitation Management Plan	4.2.1	Management and mitigation measures include but are not limited to: Source disease-free local provenance seed and trial seed from multiple sources to identify seed sources that produce resilient vegetation;	This occurs	Compliant			

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Rehabilitation Management Plan	4.2.1	Monitor vegetation health and use controls such as fungicide / insecticide spraying to protect juvenile vegetation where appropriate; and	Not required in the audit period	Not Applicable			
Rehabilitation Management Plan	4.2.1	Monitor rehabilitation following periods of disease or insect attack to identify areas where re-seeding and replanting is required.	Property Manager, monthly inspections	Compliant			
	4.2.3 Rehabilitation for Agricultural Suitability Class 3 Land						
	Agricultural Soil Management						
Rehabilitation Management Plan	4.2.3	Management and mitigation measures include but are not limited to: Characterise soil resources prior to stripping to identify suitable growth media resources and any amelioration required to meet rehabilitation objectives; and	See comments elsewhere, no agricultural class soil stripped as yet.	Not Applicable			
Rehabilitation Management Plan	4.2.3	Topsoil stripping, stockpiling and respreading will be undertaken in accordance with the procedures documented in this plan and the MOP to protect and enhance soil biochemical and physical properties.	See comments elsewhere	Compliant			
	4.2.4 Water Quality						
	Acid Mine Drainage						
Rehabilitation Management Plan	4.2.4	Tarrawonga will identify and emplace all PAF materials under at least 15 m of non-acid forming (NAF) material to minimise the potential for AMD.	No PAF materials identified in the audit period	Not Applicable			
	4.2.5 Regulator and / or Community Expectations						
	Failure to Integrate Rehabilitation with Boggabri Coal mine						
Rehabilitation Management Plan	4.2.5	Tarrawonga and Boggabri have committed to integrating the final landform and vegetation communities across the shared mine lease boundary. Failure to adequately consult with Boggabri regarding landform design and native vegetation species selection presents a risk to realising the Tarrawonga Rehabilitation Strategy	TCL and BC have been in consultation and mine planning is well advanced for the integration of the two dumps.	Compliant			
Rehabilitation Management Plan	4.2.5	Tarrawonga will work closely with Boggabri mine planners and engineers to design and construct an integrated final landform across the shared mine lease boundary. Tarrawonga will also liaise with Boggabri regarding native vegetation species selection and propagation. Progressive rehabilitation planning for the Northern Emplacement Area will be developed well in advance of the integration of the overburden dumps. The detail relating to rehabilitation actions within this shared zone will then be included in a future revision of this Rehabilitation Management Plan.	This is occurring	Compliant			
	Regulator and Community Expectations						
Rehabilitation Management Plan	4.2.5	Evolution of regulator or community expectations regarding post-mining land-uses may present a risk to achieving relinquishment. Tarrawonga propose to undertake ongoing consultation with key stakeholders as mining progresses and adopt an open approach to evolving expectations regarding post-mining landuse at Tarrawonga.	CCC, annual DRE inspections, DP&E inspections, meetings and managemtn plus coordination with surrounding sites.	Compliant			

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Rehabilitation Management Plan	4.2.5	Tarrawonga employs a continual improvement approach to rehabilitation implementation and will proactively identify advances in technical knowledge and scientific literature, and industry best management practices related to rehabilitation.	Noted				
	5 Rehabilitation Planning						
	5.1 Overview						
Rehabilitation Management Plan	5.1	The rehabilitation planning process for Tarrawonga commenced with the project feasibility and approval process. Initial rehabilitation objectives and land-use outcomes were established in the stakeholder consultation process undertaken for the Project EA, and initial risks to rehabilitation identified and documented in the ERA.	Noted				
Rehabilitation Management Plan	5.1	Development of rehabilitation methodologies and completion criteria draws upon; scientific knowledge and research projects, industry best management practices and Whitehaven's experiences across all mining operations. Tarrawonga adopts a continuous improvement process to assess the effectiveness of rehabilitation works and refine methodologies, indicators and completion criteria that includes monitoring, analysis, regular risk review and on-going stakeholder engagement.	Noted				
	5.2 Stakeholder Engagement						
	5.2.1 Consultation in the Project EA Process						
Rehabilitation Management Plan	5.2.1	Tarrawonga consulted extensively with agencies and stakeholders during preparation and assessment of the Project EA.	Noted				
	5.2.2 Stakeholder Engagement for the Rehabilitation Management Plan						

Table 5.1 – Summary of Consultation

Agency	Date	Rehabilitation Themes Discussed
DTIRIS	19 April and 5 October 2011	• Rehabilitation • Fisheries and aquatic assessment including consideration of threatened species, populations and ecological communities, and waterway crossings.
NSW Office of Water (NOW)	28 April 2011	• Potential impacts on surface water and groundwater resources including, adjacent licensed water users and groundwater dependent ecosystems.
Tarrawonga Community Consultative Committee	Multiple meetings	• Diverting/changing the Goonbri Creek watercourse. • Final land use and rehabilitation.
Naomi Catchment Management Authority (CMA)	7 April 2011	• Diversion of Goonbri Creek including geomorphic, fauna and flora considerations. • Groundwater and surface water management including diversion of Goonbri Creek and impacts of mine waste rock emplacements and final voids. • Adequacy of rehabilitation of the mine site including assessment of soil types, soil stripping, land capability, land use and final landforms.
Local Community and Affected Landholders	7 October 2011	• Long-term performance of the permanent Goonbri Creek alignment, permanent flood bund and the low permeability barrier.

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Rehabilitation Management Plan	5.2.2	In accordance with Project Approval PA 11_0047 this Rehabilitation Management Plan was prepared in consultation with the Department of Planning and Infrastructure (DP&I), DTIRIS-DRE, New South Wales (NSW) Office of Water (NOW), NSW Office of Environment and Heritage (OEH), Namoi Catchment Management Authority (Namoi CMA) and Gunnedah Shire Council.	Noted				
Rehabilitation Management Plan	5.2.2	Stakeholders and agencies identified above were contacted in May 2013 and provided a draft of this Rehabilitation Management Plan and invited to make comment. The first version of the Rehabilitation Management Plan was also referred to DTIRIS_DRE and DP&I during May, with a commitment to provide a revised draft for approval upon receipt of relevant comments from the above mentioned stakeholders and agencies.	Noted				
Rehabilitation Management Plan	5.2.2	Tarrawonga will engage in further ongoing consultation with all key stakeholders during the life of mine specific to: Rehabilitation methodology and management of rehabilitation areas; Mine closure requirements and activities; and Post-mining land use.	See above - Noted, the rehab methodology consultation is on-going, the others are not yet required.	Compliant			
	5.3 Rehabilitation Domain Selection						
	Final Void						
Rehabilitation Management Plan	5.2.2	Tarrawonga has approval to retain one final void at the eastern extent of the project site (Figure 1.3). Tarrawonga has developed a conceptual final void design described in the Project EA. To provide landform stability the void highwall (at the eastern and northern faces) will be cut at an angle of approximately 60° while the lowwalls will be re-graded to between (approximately) 10 and 15°.	Noted				
Rehabilitation Management Plan	5.2.2	The final void design will be developed to optimise the void size and catchment reporting to the void to minimise long term surface water and groundwater impacts. The void will be designed to slowly fill to an initial target equilibrium water level (based on pre-mining groundwater data) of 240 to 260 AHD. A low permeability groundwater barrier will be constructed to minimise groundwater losses into the final void	Noted				
	Water Management Areas						
Rehabilitation Management Plan	5.2.2	The Water Management Area domain constitutes all areas with a final land-use of water diversion and collection, including the major rock lined channels and drop structures, and dams that are retained in the final landform.	Noted				
	Agricultural Rehabilitation Areas						

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Rehabilitation Management Plan	5.2.2	A total of 210 ha of agricultural land (Class 3 Agricultural Suitability) will be re-established in the final rehabilitated landform. Up to 160 ha of agricultural land capable of being used for a combination of pasture production for grazing and occasional cropping will be re-established on the lower terraces of the open cut infill area (Figure 1.2). This area, combined with the rehabilitated mine facilities area (40 ha) and the temporary soils stockpile location near the permanent Goonbri Creek realignment (10 ha) will provide for the total of 210 ha of Class 3 Agricultural Suitability land in the final landform.	Noted, no yet established, nor is the soil stripped from the agricultural area adjacent to Goonbri creek	Not Applicable			
Rehabilitation Management Plan	5.2.2	Agricultural soil resources are not anticipated to be disturbed prior to Year 12 of the project. Consequently this Rehabilitation Management Plan includes conceptual methodologies for rehabilitating Class 3 agricultural land only; detailed methodologies to rehabilitate Class 3 agricultural lands will be developed following further research and consultation with stakeholders and will be documented in a revision to this plan and in future MOPs.	Not yet occurred	Not Applicable			
	Woodland Rehabilitation Areas						
Rehabilitation Management Plan	5.2.2	In accordance with EPBC Referral 2011/5923 Condition 23, Tarrawonga's rehabilitation program will result in no less than 752 ha of native vegetation open woodland and forest communities within the Project boundary. Woodland Rehabilitation Areas will include at least 13 ha commensurate with White Box Yellow Box Blakely's Red Gum Grassy Woodland and Derived Native Grassland Endangered Ecological Community (Box-Gum Woodland EEC/CEEC) on areas disturbed by mining.	Noted, see Ecological report - Tarrawonga Disturbance Limits Analysis (2014)	Compliant			
Rehabilitation Management Plan	5.2.2	Woodland areas will be established on slopes and upper terraces of the Northern and Southern Emplacement Areas. Tree species selection and planting densities adjacent to Boggabri and Leard State Forest will be determined considering integration with the Boggabri waste emplacement area and Leard State Forest. The Biodiversity Management Plan provides further detail on the rehabilitation of woodland species and integration with Boggabri Mine.	the MOP details these measures though some are outside the current MOP period. Not yet established	Not Applicable			
Rehabilitation Management Plan	5.2.2	The Woodland Rehabilitation Area domain also includes riparian corridors along constructed channels and the permanent Goonbri Creek Realignment	Noted				
	Permanent Goonbri Creek Realignment						

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Rehabilitation Management Plan	5.2.2	Works will be undertaken between approximately Year 12 and Year 15 of the project to construct a realigned section of Goonbri Creek. The low flow channel of the alignment, and an (approximate) 40 m buffer on either bank will be revegetated with species that are commensurate to the existing Goonbri Creek riparian and floodplain vegetation (refer to Table 7.1) prior to commissioning in (approximately) Year 15.	Currently in year 1 of the project	Not Applicable			
Rehabilitation Management Plan	5.2.2	The Goonbri Creek Realignment works will include construction of a low permeability barrier between the creek alignment and final void to limit alluvial groundwater draw-down into the void. A flood bund will also be constructed to minimise risks of flooding the void. As outlined in Section 4.1.2 Tarrawonga will develop a Permanent Goonbri Creek Alignment Management Plan prior to commencing construction that will include: Detailed design specifications; Rehabilitation objectives and activities including vegetation selection and geomorphic performance and completion criteria based on baseline data from Goonbri Creek; and A monitoring and maintenance program.	Not yet required	Not Applicable			
	6 Rehabilitation Methodology						
	6.2 Recommissioning Phase						
	6.2.1 Decommissioning Strategy						
Rehabilitation Management Plan	6.2.1	Tarrawonga will decommission all mining related infrastructure (except some sediment dams retained in the final landform) prior to relinquishment of the mine lease. Fixed plant, built infrastructure and services will be rehabilitated progressively as infrastructure items and plant become redundant to facilitate timely rehabilitation and relinquishment.	Not yet required	Not Applicable			
Rehabilitation Management Plan	6.2.1	A decommissioning plan will be prepared for all significant infrastructure and fixed plant. The decommissioning plan will include a risk assessment to identify potential risks such as land contamination. If required a land contamination assessment will be completed and remediation will be undertaken in accordance with the recommendations of the assessment.	Not yet required	Not Applicable			
Rehabilitation Management Plan	6.2.1	Decommissioning works will be undertaken in accordance with the decommissioning plan and will be verified prior to issuance of a decommissioning certificate.	Not yet required	Not Applicable			
	6.3 Landform Establishment						
	6.3.1 Landform Establishment Strategy						
Rehabilitation Management Plan	6.3.1	The post-mining landform will be profiled to produce a safe, structurally stable landform that complements the surrounding landscape. Final landforms will have acceptable slopes and unimpeded drainage lines. Slopes are generally to be graded to no more than 10 degrees and no more than 18 degrees without DTIRIS approval, as per DTIRIS guidelines.	Noted, no steep slopes identified in the site inspection	Compliant			

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Rehabilitation Management Plan	6.3.1	The Northern Emplacement will be shaped to integrate with the Boggabri waste rock emplacement to the north and the Leard State Forest to the east, providing continuity between the Tarrawonga and Boggabri Coal post-mining landforms, and habitat connectivity with undisturbed vegetation communities at Leard State Forest. Both the Northern Emplacement and Southern Emplacement will be shaped to integrate with the open cut infill area and include lower terraces to be graded to achieve a Class 3 agricultural land class suitable for the desired agricultural land-use.	See MOP, planned but implementation is a number of years from from the audit date.	Not Applicable			
Rehabilitation Management Plan	6.3.1	Waste rock will be selectively handled and blended to enhance landform stability and avoid emplacement of potentially acid forming material in concentrated areas. As outlined in Section 3.2.5 where PAF-LC material is identified it will be encapsulated with at least 15 m of NAF to minimise potential for acid leachate.	No PAF materials identifed to date (Mine Planner)	Not Applicable			
Rehabilitation Management Plan	6.3.1	Dispersive materials will be avoided for material layers at the final landform surface where practical to minimise potential for significant scouring or land slumping. Non-sodic and low sodicity materials will be selectively handled and preferentially emplaced at or near the surface. Where there are potentially dispersive materials emplaced at or near the surface, appropriate amelioration with lime or gypsum will be undertaken to stabilise soils, particularly foundation materials for earthworks structures such as contour banks.	Dispersive materials are separated and dealt with differently to general overburden and other topsoils (Mine Planner)	Compliant			
	Agricultural Rehabilitation Areas						
Rehabilitation Management Plan	6.3.1	By definition Agricultural Suitability Class 3 land requires soil conservation practices to support grazing and rotational cropping land-use. Lower terraces to be rehabilitated to an Agricultural Suitability Class 3 standard will be graded to be no more than 2 per cent and incorporate contour banks to: • Produce free draining landforms that minimise soils at depth becoming water logged; and • Impede runoff velocities to sub-erosive levels.	SEE MOP, not yet required	Not Applicable			
Rehabilitation Management Plan	6.3.1	To optimise growing conditions for deeper rooted native grasses and crops, the surface layers of spoil will be: • Selectively emplaced with non – sodic or low sodicity spoils and subsoils; • Rock-raked to remove any large rocks that may impede ripping tynes and agricultural equipment; and • Deep ripped along the contour and ameliorated with coarse gypsum prior to soil re-spreading.	This is done, detailed in MOP and confirmed at site interview	Compliant			
	Woodland Rehabilitation Areas						

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Rehabilitation Management Plan	6.3.1	Woodland rehabilitation areas will be graded to generally 10° and incorporate contour banks as per agricultural rehabilitation areas for surface water control. To optimise growing conditions for deeper rooted native trees, the surface layers of spoil will be: • Selectively emplaced with non – sodic or low sodicity spoils and subsoils (refer Section 6.2.3); and • Deep ripped along the contour and ameliorated with coarse gypsum (where required) prior to soil respreading.	This is done, detailed in MOP and confirmed at site interview	Compliant			
	Final Void						
Rehabilitation Management Plan	6.3.1	The principal objective of landform establishment activities associated with the final void is to create a safe and stable landform that is non-polluting and has no long term impacts on surface and groundwater resources. A detailed methodology to treat the final void will be developed in a Final Void and Mine Closure Plan that will be developed prior to mine closure when more certainty about the final void conditions will be known.	Noted				
Rehabilitation Management Plan	6.3.1	General principles that may be adopted to make the final void safe and stable include: • Battering back the lowwalls and highwall to minimise potential for failures and mass movement; • Capping (or excavating) exposed coaliferous material with inert material to prevent ignition from spontaneous combustion, bushfires or human interference; • Constructing a physical barrier to isolate the perimeter of the void to prevent human access. The highwall areas will be secured by the construction of a trench and a safety berm, as well as a security fence along the entire length of the eastern and northern highwalls; • Suitable signs, clearly stating the risk to public safety and prohibiting public access will be erected at intervals along the entire length of the fence; and • Surface runoff from land surrounding the void will be diverted so as to prevent any potential development of instability of the void walls.	Noted				
	Water Management Rehabilitation Areas						
Rehabilitation Management Plan	6.3.1	Sediment dams will be designed and constructed to meet the relevant criteria as prescribed by NSW industry guidelines Managing Urban Stormwater Volume 1: Soils and Construction (Landcom 2004) and Managing Urban Stormwater Volume 2E: Mines and Quarries (DECC 2008) (the 'Blue Book'). Sediment dams are maintained throughout rehabilitation to capture runoff from rehabilitated areas until discharge water quality meets regulatory criteria and dams can be decommissioned.	Reviewed latest sed dam design report , design states complaince with the required guidelines.	Compliant			

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
	6.4 Growth Media Development Phase						
	6.4.1 Growth Media Development Strategy						
	Agricultural Rehabilitation Areas						
Rehabilitation Management Plan	6.4.1	Subsoils and topsoils with the appropriate physical and chemical properties will be selectively stripped and handled for re-use in Agricultural Rehabilitation Areas. The Agricultural Resources and Productivity Assessment (McKenzie, 2011) undertaken for the Project EA identified Stratic Rudosols located within the alluvial creek flats at the south-eastern project disturbance boundary as a suitable resource for agricultural rehabilitation activities. This soil type was identified as suitable due to: Favourable pH values; Low Exchangeable Sodium Percentage (ESP) requiring minimal amelioration with gypsum; Predominantly non-saline soils; and Cation Exchange Capacity (CEC) of the clay-rich subsoils is generally high enough to produce selfmulching soils through shrink-swell processes (McKenzie 2011).	See elsewhere in the audit, the agricultural areas are not scheduled to be mined for a number of years from the time of the audit.	Not Applicable			
Rehabilitation Management Plan	6.4.1	These agricultural soil resources will not be disturbed until mining advances to the east, in approximately Year 12 of the mine life. Conceptual methodologies to manage agricultural soil resources are presented in this Rehabilitation Management Plan. Detailed methodologies to handle, stockpile and reinstate agricultural soil resources require further consultation with stakeholders and will be developed prior to Year 12 and documented in subsequent revisions of this plan.	This has not yet occurred	Not Applicable			
	6.4.2 Topsoil Management						
	Selective Soil Stripping and Handling						
Rehabilitation Management Plan	6.4.2	Topsoil and subsoil resources suitable for rehabilitation are stripped in accordance with the soil stripping procedures identified in this plan and the MOP. Soil resources appropriate for agricultural and native vegetation rehabilitation outcomes, and suggested stripping depths, have been assessed documented in the Agricultural Resources and Productivity Assessment (McKenzie, 2011) and are documented in the Biodiversity Management Plan.	MOP and soil stripping procedure - otherwise noted.				
Rehabilitation Management Plan	6.4.2	Prior to soil stripping activities, additional investigations will be conducted to confirm the appropriate soil stripping depths for each soil type recommended for salvage (refer to Section 4.3.2 and Figure 7 in the Biodiversity Management Plan).	This is done during stripping, not prior to.				

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Rehabilitation Management Plan	6.4.2	The soil stripping and handling techniques described below have been developed to maximise the soil resource salvaged and minimise deterioration of the soil resource. Undertake soil testing to characterise subsoils and topsoils prior to stripping to determine the type and application rates for any required soil ameliorants (e.g. lime, gypsum, fertiliser and organics); Mulch all cleared vegetation not retained for habitat augmentation on site and mix into topsoils as a soil conditioner; Confirm the depth of soils to be stripped in accordance with the Biodiversity Management Plan and the MOP. Topsoils and subsoils are generally to be stripped and handled separately; Topsoil would be maintained in a slightly moist condition during stripping where possible. Material will not be stripped in either an excessively dry or wet condition; and Soil would be graded or pushed into windrows with excavators, graders or dozers for loading into rear dump trucks by front-end loaders, or will be collected by scraper fleets and replaced directly on rehabilitation areas where available or placed in temporary stockpile locations.	Based on the MOP and soil stripping procedure and site inspections, this is all conducted apart from the soil testing	Not Compliant	D	1	Medium
	Soil Stockpiling						
Rehabilitation Management Plan	6.4.2	Where direct subsoil and topsoil re-spreading is not practicable, the stripped soils are stockpiled in accordance with the procedures documented in the Biodiversity Management Plan. Soils anticipated to be stockpiled for extended periods may be seeded with native vegetation. Prior to re-spreading, weed growth is scalped from stockpiles to minimise the introduction of weeds into rehabilitated areas.	See BOMP - site inspection indicated that the topsoil storage was adequate and compliant with these commitments.	Compliant			
Rehabilitation Management Plan	6.4.2	Preliminary topsoil handling and stockpiling processes include: Windrow topsoil stockpiles on relatively flat areas along the contour. Consider ease of access and minimising rehandling (i.e. avoid locations that will be required for future mining activities);	Complies based on site observations	Compliant			
Rehabilitation Management Plan	6.4.2	Topsoil stockpile heights are designed to prevent biological and structural degradation. Generally stockpiles will be no higher than 3 m. Clayey soils (e.g.: Stratic Rudosols) will be stored in lower stockpiles for shorter periods of time (where feasible) compared to soils that have a coarser texture;	Complies based on site observations	Compliant			
Rehabilitation Management Plan	6.4.2	Shape stockpiles to be free-draining stockpiles to minimise the formation of anaerobic zones, with batters graded to achieve slopes approaching 18°. Retain a surface condition to enhance infiltration and minimise erosion until vegetation is established;	Complies based on site observations	Compliant			

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Rehabilitation Management Plan	6.4.2	Where long-term stockpiling is planned (i.e. greater than six months), fertilise and seed stockpiles with an annual cover crop species that produces sterile florets or seeds. The annual pasture species would not persist in the rehabilitation areas but would provide sufficient competition for emerging weed species and enhance desirable microbial activity in the soil. Additional ameliorants may be periodically applied (e.g. biosolids) to assist retain desirable microorganism activity in the soil; and	Complies based on site observations	Compliant			
Rehabilitation Management Plan	6.4.2	Clearly demarcate stockpiles with signage. Install appropriate erosion and sediment controls (e.g.: bunds along the upslope perimeter and sediment fences along the toes of the downslope batter;	Not observed in site visit	Not Compliant	E	1	Medium
Rehabilitation Management Plan	6.4.2	Conduct regular inspections to identify erosion and weed infestation and maintain stockpiles where issues are identified. Prior to respreading stockpiled topsoil assess any weed infestation and if required treat weeds with herbicide application and/or "scalp" weed species prior to topsoil spreading.	EOs monthly inspections review weed status and drive control actions	Compliant			
	Soil respreading and Seedbed Preperation						
Rehabilitation Management Plan	6.4.2	Where possible, topsoil would be re-spread directly onto reshaped landforms. Appropriate soil resources have been identified and quantified in the Agricultural Resources and Productivity Assessment (McKenzie, 2011). Topsoil and subsoil will be spread in accordance with the re-spreading depths indicated in the Agricultural Resources and Productivity Assessment (Figure 12) (McKenzie 2011) for the desired final land use outcome.	Noted, confirmed at interview. **Recommendation - there are large amounts of soil stockpiled from the construction period that should be worked into the rehab process rather than leaving in storage.**	Compliant			
	Agricultural Areas						
Rehabilitation Management Plan	6.4.2	All topsoils intended for re-use in agricultural rehabilitation areas will be assessed prior to stripping to determine their suitability for re-use and determine specific amelioration requirements. Once soils are respread, ameliorants such as gypsum are applied and the area is deep-ripped along the contour.	Not yet occuring	Not Applicable			
Rehabilitation Management Plan	6.4.2	To achieve the rehabilitation objective of an effective rooting depth (ERD) greater than 1.5 m, the soil profile will be reconstructed in a staged approach to achieve the necessary structure, chemical properties and microbes in the entire soil profile. A staged re-spreading methodology will be developed prior to the anticipated timing of the reinstatement of agricultural soils to optimise the structure, chemical and biological properties throughout the soil profile. The re-spreading methodology will be developed in consultation with stakeholders and agencies and documented in future revisions of the Rehabilitation Management Plan.	Noted, not yet required.	Not Applicable			
	6.4.3 Habitat Augmentation						

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Rehabilitation Management Plan	6.4.3	TCPL will develop procedures to salvage and re-use materials from site for habitat establishment in the Biodiversity Management Plan.	The BOMP details some of these measures but there is inadequate detail to ensure that on ground activities are properly targeted.	Compliant			
	6.5.2 Native Vegetation Species Selection						
Rehabilitation Management Plan	6.5.2	Native vegetation tubestock and seeds will be planted / seeded over the rehabilitation area once the initial cover crop dies down. Native vegetation areas are planted with native tubestock species, selected on a site by site basis considering factors such as adjacent remnant vegetation communities, aspect, slope, and soil types.	This occurs onsite, noted in site inspection and also in MOP	Compliant			
Rehabilitation Management Plan	6.5.2	In accordance with Project Approval PA 11_0047 Schedule 3 Condition 43 and EPBC Referral 2011/5923 Condition 23, Woodland Rehabilitation Areas will include at least 13 ha planted with species representative of the Box-Gum Woodland EEC/CEEC. The Final Void domain will be planted with native vegetation tubestock above the predicted permanent water line.	The woodland areas established to date include the species required to re-establish the EEC. There is a lack of understory species in the established rehab as discussed in the EcoLogical Monitoring Report. Recommendation - Using tubestock or seed additional understory species to be added into existing rehab and future rehab to have some trials established to determine the best way to ensure these species survive along with the canopy and grass species.	Not Applicable			
Rehabilitation Management Plan	6.5.2	TCPL will rehabilitate the permanent Goonbri Creek alignment and Goonbri Creek Enhancement Area with riparian species to enhance riparian habitat. Riparian species will be characteristic of the Bracteate Honeymyrtle (Melaleuca bracteata) Low Riparian Forest community. Final riparian species selection will be documented in the Permanent Goonbri Creek Alignment Management Plan.	This is some years away at the time of the audit.	Not Applicable			
	6.5.3 Seed Collection and Propagation						
Rehabilitation Management Plan	6.5.3	Tarrawonga will engage appropriately qualified contractors to undertake seed collection from remnant native vegetation in onsite and offset areas. Seed collection and propagation will be conducted in accordance with the procedures described in the Biodiversity Management Plan.	This occurs, Field Nursery conduct seed collection.	Compliant			
	6.5.4 Tubestock Plantings and Direct Drill Seeding						
	Tubestock Planting						

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Rehabilitation Management Plan	6.5.4	Tubestock plantings will be mulched, watered and protected from grazing by tubestock bags and/or fencing where required.	This does not occur.	Not Compliant	D	3	Medium
	Direct Drill Seeding						
Rehabilitation Management Plan	6.5.4	TCPL will trial direct seeding of eucalypts and some understorey species for woodland areas. If these trials are successful consideration will be given to utilising direct seeding to rehabilitate open woodland rehabilitation areas. Direct seeding trials will assess factors including: Sowing rates and species proportions; Seed pre-treatment; Equipment selection; Soil amelioration and fertilizer types and application rates; and Timing.	This has not yet occurred but may be useful in light of the lack of understory plants in the existing rehab noted by EcoLogical.	Not Applicable			
	6.5.5 Weed and Vertebrate Pest Control						
Rehabilitation Management Plan	6.5.5	Ecosystem Establishment includes initial management actions to limit the introduction of weeds and vertebrate pest species in rehabilitation areas as described in Section 3.2.7. Management measures are documented in the Biodiversity Management Plan and include: Minimise potential weed seed transport to or from the site by inspecting all vehicles and plant used in vegetation clearing and rehabilitation activities. Plant and vehicles are to be clean and weed-free before permitted on to site.	BOMP details this, no evidence of actual vehicle checks though the offset area has only recently been established. **Recommendation - establish a weed vector management procedure for the site and offset areas or tie the requirements into existing procedures.**	Compliant			
Rehabilitation Management Plan	6.5.5	Stabilise topsoil stockpiles (and disturbance areas where possible) with mulches and cover crops to suppress weed germination. Weeds will be scalped from stockpiles prior to re-use to minimise introduction of weeds in rehabilitation areas.	BOMP - based on site observations this is conducted.	Compliant			
Rehabilitation Management Plan	6.5.5	Prior to over-sowing cover crops with native vegetation spray isolated broadleaf weed occurrences with targeted herbicide application. If weed infestations occur on rehabilitation areas delay native vegetation sowing and spray weeds and sow repeat cover crops until the weed seedbank is exhausted and weed control will be manageable prior to establishing native vegetation.	AEMR and BOMP, this process needs better implementation or rewriting in the BOMP. The weed seed bank in the topsoil is quite heavy in some areas and competition with the planted/seed natives is strong.	Compliant			
Rehabilitation Management Plan	6.5.5	Monitor weeds at least every six months on rehabilitation areas and undertake appropriate control actions (mechanical removal or targeted herbicide spraying) using an appropriately qualified contractor.	This is done more regularly at monthly intervals.	Compliant			
Rehabilitation Management Plan	6.5.5	Install fencing and/or tree guards to protect juvenile vegetation and tubestock from herbivores.	Not done	Not Compliant	D	3	Medium

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Rehabilitation Management Plan	6.5.5	Monitor vertebrate pest species on all Tarrawonga land at least every six months. Where required, TCPL will engage suitably qualified contractors to undertake appropriate control programs (such as baiting and trapping) in consultation with the North West Livestock Health and Pest Authority.	AEMR and BOMP, EO and Property Manager record occurrences of ferals and Property Manager or contractors implment controls.	Compliant			
	6.5.6 Erosion and Sediment Control						
Rehabilitation Management Plan	6.5.6	Temporary erosion and sediment controls (ESCs) will be installed in accordance with the Blue Book to minimise erosion prior to rehabilitation areas being considered stable (i.e. greater than 70% cover). Temporary ESCs will be installed in accordance with an area-specific Erosion and Sediment Control Plan (ESCP) and will be retained and maintained until no longer required.	In WMP and reported in the AEMR, the iste inspection did not identify any areas where erosion and sed control was required and had not been implemented.	Compliant			
	6.5.7 Bushfire Mitigation						
Rehabilitation Management Plan	6.5.7	As outlined in Section 4.2.2 uncontrolled bushfire events have the potential to significantly damage biodiversity in rehabilitation areas. Bushfire risks in rehabilitation areas are managed in accordance with the Bushfire Management Plan and the Biodiversity Management Plan.	See Bushfire Managemrnt Plan	Compliant			
Rehabilitation Management Plan	6.5.7	Management and mitigation measures include but are not limited to: Selection of fire-tolerant species in native vegetation areas; Maintaining fire breaks by maintaining cleared easements and fence-lines; All mine personnel will receive basic fire-fighting training and appropriate fire fighting equipment will be maintained and available onsite; Maintain fire-fighting access tracks and water sources (sediment dams) in rehabilitation areas; All vehicles will be diesel fuelled only and are to be driven only on demarcated roads and tracks; Controlled high intensity, short-term grazing will be employed to assist in the reduction of vegetative fuel loads on areas on which active mining operations are not occurring and appropriate fencing is available; Monitoring fuel loads and undertaking mosaic back-burning programs (where appropriate and in consultation with Narrabri Shire Council) to reduce fuel loads. Back burning frequency will be varied to minimise disadvantaging regeneration of particular ground cover and shrub species; and Maintaining sufficient viable seed for key native vegetation species to re-seed areas after major bushfire events.	See Bushfire Managemrnt Plan, crash grazing not conducted but otherwise compliant, fuel loads acceptable.	Compliant			
	6.6 Ecosystem Development Phase						

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Rehabilitation Management Plan	6.6	In the context of this plan, the Ecosystem Development phase constitutes the medium to long term management of rehabilitation areas toward achieving the desired final land-use. This phase includes: - Ongoing environmental management to minimise risks to rehabilitation; - Comparing specific ecosystem characteristics such as soil profile development, floristic composition and structure and faunal diversity and abundance with the characteristics of appropriate analogue sites; and - Undertaking adaptive management and remedial works where characteristics of the rehabilitation are not trending toward desired outcomes.	The rehab has been monoitored by EcoLogical in the audit period and measures recommended are undergoing implementation. With the poor soils and weed seed bank in topsoil this will require more attention as the rehab progresses.	Compliant			
	6.6.2 Intervention and Adaptive Management						
Rehabilitation Management Plan	6.6.2	Where monitoring results reveal that indicators are not trending towards the completion criteria as predicted, plans should be executed to promptly modify management practices to achieve the desired rehabilitation results.	Rehab not yet at the point where completion should be considered	Not Applicable			
Rehabilitation Management Plan	6.6.2	Early intervention will be actioned in the form of a Trigger Action Response Plan (TARP), to be developed for each rehabilitation domain, to minimise the risk of failure to achieve the desired rehabilitation outcomes for each domain.	There is evidence of intervention in failed rehab on the site, the TARP is located in the Rehabilitation Management Plan	Compliant			
	6.8 Completion Criteria						
Rehabilitation Management Plan	6.8	Indicators and completion criteria specific to each phase of rehabilitation have been developed for each Rehabilitation Domain,	Noted				
Rehabilitation Management Plan	6.8	Domain rehabilitation indicators and completion criteria at Tarrawonga are based on: - Review of regulatory and approval requirements (Section 2); - Industry knowledge including industry guidelines and scientific literature; and - Characteristics of comparable environments, determined by selecting and analysing appropriate analogue sites (Section 8.2.1).	Noted				
	6.8.1 Inspection and Test plans and As Built Surveys						
Rehabilitation Management Plan	6.8	TCPL employs quality assurance tools such as hold points, Inspection and Test Plans (ITPs) and 'as built' surveys, to verify that key rehabilitation tasks have been completed in accordance with specifications. Tables 6.4 to 6.8 document the records, inspections and surveys required to verify satisfactory completion of each completion criteria. Rehabilitation records are discussed further in Section 8.1.	Noted				
	7 Rehabilitation Implementation						

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Rehabilitation Management Plan	7	In accordance with EPBC referral 2011/5923 Condition 3, TCPL must submit to SEWPaC an approach to limit the maximum disturbance of Box-Gum Woodland EEC/CEEC (for each of the years 5, 10, 15 and 17) within three months of commencement of construction of the Tarrawonga Coal Project (eastern extension).	The Tarrawonga Disturbance Limits Analysis report by EcoLogical addresses this requirment.	Compliant			
Rehabilitation Management Plan	7	TCPL will develop mine planning for life of the mine that will provide staged plans for years 5, 10, 15 and 17 showing anticipated disturbance and rehabilitation progress for the site. This Rehabilitation Management Plan will be revised prior to submission to SEWPaC for Commonwealth approval to include the staged rehabilitation plans for life of mine.	The Tarrawonga Disturbance Limits Analysis report by EcoLogical addresses this requirment.	Compliant			
Rehabilitation Management Plan	7	Progressive mine plan and rehabilitation plans are prepared for each year of the currently approved MOP period. Figure 7.1 below shows the anticipated mine plan and rehabilitation progress for the end of the current MOP period (2015).	See MOP	Noted			
	8 Monitoring, Trials and						
Rehabilitation Management Plan	7	In accordance with EPBC referral 2011/5923 Condition 3, TCPL must submit to SEWPaC an approach to limit the maximum disturbance of Box-Gum Woodland EEC/CEEC (for each of the years 5, 10, 15 and 17) within three months of commencement of construction of the Tarrawonga Coal Project (eastern extension).	The Tarrawonga Disturbance Limits Analysis report by EcoLogical addresses this requirment.	Compliant			

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
	WHC_PLN_TAR_Heritage Management Plan						
	3 Cultural Heritage of the Mine Site						
	3.1 Cultural Heritage Assessments						
Heritage Management Plan	3.1	In the event that other items of potential heritage significance are uncovered during mining operations, the following protocol will be followed: 1. Work will cease in the area of discovery immediately; 2. The person discovering the item will notify their supervisor immediately who will ensure that work has ceased and area(s) is (are) cordoned off with tape; 3. The supervisor will notify the Operations Manager or senior TCPL person on site; 4. The Operations Manager/Environmental Manager will: a. arrange a qualified heritage management consultant to attend the site and advise on its heritage significance at their earliest opportunity; and b. if the find is determined to be of heritage significance, notify OEH Heritage Branch with the advice from the heritage consultant and seek relevant advice as to appropriate protocols in terms of relocation and notification requirements.	This has not occurred in the audit period	Not Applicable			
Heritage Management Plan	3.1	The importance of Heritage items and the associated obligations under relevant legislation will be included in the induction process for site so all personnel are aware of their requirements.	Inductions include hertiage issues and there are other controls in clearing and ground disturbance	Compliant			
	4 Management Program						
Heritage Management Plan	4	TCPL recognises the importance of Aboriginal places and objects to the Aboriginal community and its obligations under the NPW Act the EP&A Act, and the provisions of the Project Approval, and will undertake all activities in a manner that conserves the cultural heritage values of the area.	Noted				
Heritage Management Plan	4	Central to the satisfaction of this commitment, there will be the continuation of the existing open and honest relationship between TCPL management and the RAP's.	Noted				
Heritage Management Plan	4	The management program has been prepared principally based upon the recommendations of the Tarrawonga Coal Project Environmental Assessment (Resource Strategies, 2011) and in consultation with registered stakeholders.	Noted				
	4.1 Collection of Aboriginal Cultural Heritage						
Heritage Management Plan	4.1	This management plan focuses on the management of these sites only, with additional details to be developed for the management of the remaining identified sites over the life of the project in consultation with the RAP's. This will be achieved through the development of updated Heritage Management Plans every two years throughout the life of the project. The purpose of the collection program is to retrieve culturally significant items from these Aboriginal cultural heritage places to avoid their destruction prior to disturbance proceeding in accordance with the project approval. Table 3 lists the cultural heritage sites requiring collection over the next two years whilst Table 4 lists the sites requiring collection over the life of the project.	Noted, some sites in the extension area have been salvaged during the audit period				
Heritage Management Plan	4.1	Collection must be supervised by a suitably qualified archaeologist in partnership with the RAP's.	This occurred noted in RPS salvage report	Compliant			
	4.1.1 Collection Procedure						

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Heritage Management Plan	4.1.1	This research design provides for the recording, collection, curation and storage of identified Aboriginal cultural heritage items from areas that will be disturbed as a result of the construction and operational activities associated with expansion of the mine. Prior to active salvage occurring, the cultural values associated with the artefacts for salvage, and the specific area in which the salvage is undertaken, will also be considered and assessed, with specific input sought from the RAP's in relation to cultural values, how sites may have been used in the past, and their overall significance in the wider landscape. This information will be recorded and incorporated into the salvage report to be produced at the conclusion of each salvage event.	This occurred noted in RPS salvage report	Compliant			
Heritage Management Plan	4.1.1	All previously identified archaeological sites and isolated finds outside the mine disturbance areas will be avoided with protection measures, such as fencing, in place to avoid disturbance. This fencing will take place progressively, with those areas in closest proximity to current operations fenced first. All sites will have protective fencing in place within 12 months of approval of this management plan. Identified archaeological sites and isolated finds within the expanded open-cut pit, waste emplacements, infrastructure areas and associated disturbance areas will be collected (Table 3). Collection of all artefactual material will be undertaken with the relevant details recorded on the Aboriginal Site Impact Recording Form, as available from the Office of Environment and Heritage Website. Those site locations noted as being impacted by infrastructure will be subject to additional review, prior to disturbance, to ascertain if these sites can be practically avoided, and hence left in- situ, during the life of the project.	Sighted, photos on file	Compliant			
Heritage Management Plan	4.1.1	Prior to commencing salvage works, the archaeologist will review and consider the outcomes/findings from prior salvage works in the vicinity of the area, and use this information to develop the salvage program, with specific consideration to identifying key research questions/opportunities during the salvage. A key aspect of the research questions relevant to salvage will be consistency with other cultural heritage programs in the area, and in particular, how the knowledge gained from the salvage works can be utilized in the development of the broader Aboriginal Heritage Conservation Strategy required under Condition 51 of Schedule 3 of the Project Approval PA 11_0047, and in the context of any other cultural heritage programs being developed by the OEH.	This occurred noted in RPS salvage report	Compliant			
Heritage Management Plan	4.1.1	A broad research question for the project site relates to the identification of any patterns of stone artefact discard behaviour or location of culturally modified trees, and how it relates to the topographic features in the landscape. Refinement and consideration of specific questions for the salvage program will be determined in consultation with the archaeologist prior to commencement of on ground works.	This occurred noted in RPS salvage report	Compliant			

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Heritage Management Plan	4.1.1	At the conclusion of the salvage works, the archaeologist will provide written clearance to the Tarrawonga mine that all known artefacts have been salvaged and that mining activities may commence in that area. Ongoing management of the area will include the opportunity for representatives of the RAP's to participate in a soil stripping monitoring program on a roster basis. This will provide capacity to monitor for additional uncovering of artefacts during the soil stripping program.	This occurred noted in RPS salvage report. The RAPs are engaged on a rotating basis managed by the site. Evidnence of the engagement basis and roatation provided by the site	Compliant			
Heritage Management Plan	4.1.1	Prior to any vegetation clearance, archaeological work at each disturbance site will include the following: 1. Stone Artefacts: The following methodology is required for collection of stone artefacts: • Commissioning of a suitably qualified archaeologist to inspect and record each known site to identify surface Aboriginal objects within the proposed disturbance area. The archaeologist will engage with the RAP's during this process who will be invited to observe and participate in the works (e.g. recording, excavation and collection). • In relation to each identified Aboriginal object, the archaeologist will, prior to any disturbance, record its position with a GPS and/or map, and measure and describe the site or find. All identified Aboriginal objects will be recovered and separately bagged, labelled, and stored temporarily in the Cumbo Gunerah Keeping Place at the Red Chief LALC office in Gunnedah, or other temporary keeping place as agreed with the RAP's. If appropriate, a temporary keeping place could be established at site to retain artefacts up to the period prior to in- situ replacement. A Care and Control Permit will be obtained for the storage of the artefacts in consultation with OEH and the RAP's. • The collected Aboriginal objects will be recorded in sufficient detail to allow description of the lithic technology and reduction strategies adopted. The regional and local contexts of the collected objects will also be analysed and described.	This occurred noted in RPS salvage report	Compliant			
Heritage Management Plan	4.1.1	Following the completion of rehabilitation activities or during the rehabilitation program at a time when works within the specific area do not pose a threat, the salvaged Aboriginal objects will be replaced in a location as close as possible to their original location in consultation with OEH and the RAP's. Aboriginal object replacement will be conducted by a suitably qualified archaeologist, with the RAP's invited to observe and participate in replacement works.	Noted in salvage report All salvaged artifacts retained in shipping container on-site. Final location to be determined with RAPS when site is at closure.	Not Applicable			

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Heritage Management Plan	4.1.1	2. Culturally Modified Trees: The following methodology is proposed for scarred tree removal and relocation. Prior to any actions to remove the tree, relevant advice will be obtained from a suitably qualified arborist to ensure the integrity of the tree prior to movement. Advice will be sought from an archaeologist to verify archival recording requirements of the trees prior to removal: • Protection of the tree prior to removal, by padding the exterior with layers of foam rubber or similar padding, to protect the surface and structure of the tree during movement. It may also be necessary to fill the hollows of the tree with two part liquid polyurethane foam, which expands and fills the cavity, thereby further supporting the surface. The requirement for this treatment will be confirmed with the arborist.	One tree removed and in storage, done in consultation with aborist. Final location to be determined in consultation with RAPs	Compliant			
Heritage Management Plan	4.1.1	• Depending on the structural integrity of the tree, the tree may need to be cut back to a manageable size before attempting to remove the tree. • Preparation of the tree for removal, by attaching lengths of rigid timber to the outside of the padding, to effectively create 'splints' that will spread pressure evenly along the tree surface during movement. • Lifting of the tree using a crane, with the tree supported by straps placed around the padded trunk or a heavy cargo net. During the initial stages of lifting, the crane would also support the tree when the final cut is made near the ground surface. • After the base cut is complete, the tree would be suspended by the straps and manoeuvred into a horizontal position so that it is possible to examine the underside of the tree. If the core is too fragile and is likely to drop out, a cap would be secured in place to prevent loss. During this stage, any termite debris and loose materials would also be removed from the hollow base, which would then be stabilised by insertion of expanding polyurethane foam to fill the cavity. • Movement of the tree onto the back of a flat bed truck, where it would be placed on a bed of foam and secured with straps for transport to the Cumbo Gunerah Keeping Place at the Red Chief Local Aboriginal Land Council office in Gunnedah or another suitable location agreed with the RAP's. • Unloading the tree using a crane, with the tree supported by straps. The tree will be supported on a well-drained bed of rubber or similar protective surface. Periodic treatment for termites or	The methodology utilised to remove the tree was not precisely in accordance with the methodology described here due to specialist advice from the arborist during the tree preservation operation conflicting with this requirement 4.1.1. The Methodology in the HMP is too proscriptive makng it difficult to comply with when on ground works occur and variations in tree size, location, tree condition and other factors need to be considered in the methodology for protection of the scar tree. **Recommendation - at the next review of the HMP, the scar tree section be make more generic to allow for site conditions when recovering and preserving scar trees.**	Not Compliant Administrative			
Heritage Management Plan	4.1.1	It may be necessary to undertake insect eradication of the section of tree removed to minimise the potential for termite or other insect damage to the tree. This will be assessed with the arborist at the time of tree removal, and where required, appropriate fumigation by a certified pest controller will be undertaken prior to its permanent relocation.	This was not required for the report reviewed	Not Applicable			

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Heritage Management Plan	4.1.1	Upon agreement with the RAP's as to suitable placement locations, specific measures will be taken depending on whether the tree is kept in an indoor or outdoor location. If the tree is to be retained in an outdoor location, it should be positioned such that it has shelter from rain and direct sunlight. Placement of a metal cap of the top of the trunk will also reduce potential for water ingress. If kept upright, an excavation will be made in the ground surface at least 3m in diameter and 1m deep. This will be filled with concrete and then covered in gravel to minimise moisture being drawn into the wood and discouraging termites from accessing the tree. A suitable mechanism for supporting the trunk will be established in consultation with the RAP's, which may include a steel shaft through the centre of the trunk, set in the concrete described above, or such other alternate measure that will not result in damage to the cultural scar. These methods are in accordance with the "Guidelines for the Preservation and Management of Carved and Scarred Trees" as produced by the Australian Museum 2010.	Noted, not yet completed and to be determined with RAPs as discussed.	Not Applicable			
	4.1.2 Reporting						
Heritage Management Plan	4.1.2	TCPL will commission an archaeologist to produce reports detailing the results of the investigation programs. These reports will include: • the aims and methodology of the investigation program; • the location and characteristics of sites; • the cultural values associated with the artefacts and the specific area from which the artefacts were salvaged; • the number of Aboriginal objects collected from each site; • the nature of the cataloguing system used; • the lithic technology and reduction strategies adopted; • an analysis of the regional and local contexts of the artefacts; and, • a summary of consultation undertaken with the RAP's.	This occurred noted in RPS salvage report	Compliant			
Heritage Management Plan	4.1.2	These reports will form part of the Annual Environmental Management Report/Annual Review (AEMR/Annual Review). They will be provided to the NSW DPI and OEH within 12 months of the completion of each investigation program. The reports will also be provided to the RAP's at the conclusion of each salvage event.	AEMR 2013-14 summarises the outcomes of these reports.	Compliant			
Heritage Management Plan	4.1.2	Following completion of the salvage event, the archaeologist will provide relevant notification to the OEH to enable updating of the AHIMs records.	This occurred noted in RPS salvage report	Compliant			
	4.2 Site Protection						
Heritage Management Plan	4.2	Twenty-five cultural heritage features comprising open scatters, isolated finds and scarred trees occur outside areas planned for future expansion and development of the mine.	Noted				

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Heritage Management Plan	4.2	In order to protect and conserve these features, TCPL will undertake the following: • Culturally modified trees will be fenced at a distance of 5m from the tree where practicable. The fence line location will be subject to physical constraints such as other vegetation and topography Fence posts will be marked white and set vertically apart at approximate 5m intervals; • Isolated Artefacts will be fenced with a 10m radius from the centre point from the identified GPS coordinate; • Artefact scatters will be assessed in terms of their extent based on the site record from the archaeological survey. Where the extent cannot be confirmed as within 20m of a central coordinate, Tarrawonga will consult with the RAP's as to determining the relevant extent for the purpose of protective fencing.	Sighted, photos on file	Compliant			
Heritage Management Plan	4.2	The fencing works will be completed within 12 months of the date of management plan approval. Sites that have already been fenced for protection are highlighted yellow.	Not twelve months since the approval of the plan (January 2014), most sites are fenced (if not all) already	Not Applicable			
Heritage Management Plan	4.2	All fenced sites will be subject to 12 monthly inspections to verify the sites remain secure. RAP's will be invited to participate in annual reviews of the protective measures. Inspections of these sites will also consider any potential impacts associated with drainage lines and erosive processes and any options to mitigate impacts.	Not yet required	Not Applicable			
Heritage Management Plan	4.2	Blasting will be a regular feature of operations at site. The nature of the known artefacts (isolated finds, artefact scatters and culturally modified trees) suggests that blasting is likely to have minimal impact on these features, with no predicted impacts from blast vibration and flyrock unlikely to impact on those artefacts to be retained in-situ. Known artefact sites will be subject to regular inspections, as part of the site monthly inspection regime, to verify no detrimental impact from blasting activities, and in accordance with the management measures specified in the Blast Management Plan.	No known sites within damage range of site blasting	Compliant			
Heritage Management Plan	4.2	Cultural heritage awareness will be included in the induction, as discussed in Section 4.7.	Included in the induction	Compliant			
4.4 Contingency Plan for the Management of Previously Unidentified Cultural Heritage							
Heritage Management Plan	4.4	Notwithstanding the recognised low potential for other archaeological material to be present within the areas to be disturbed by mining and mining-related activities, TCPL will continue to invite representatives of the RAP's on a rotational roster to monitor all ground disturbance works throughout the life of the mine.	This occurs, documnetation supporting this sighted includeding the observations of the RAPs for the clearance of the northern extension area	Compliant			

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Heritage Management Plan	4.4	In the event of the discovery of a new potential site or artefact, the following procedure will be followed. 1. Work will cease in the area of discovery immediately. 2. If the area of discovery is in deposited material, then work will also cease immediately in the area where the material originated. 3. The person discovering the artefact will notify their supervisor immediately who will ensure that work has ceased and area(s) is (are) cordoned off with tape. 4. The supervisor will notify the Operations Manager or senior TCPL person on site. 5. The Operations Manager/Environmental Manager will: a. arrange a qualified archaeologist to attend the site and advise on its archaeological significance at their earliest availability; b. arrange for heritage officers representing the local Aboriginal community, if not already present, to attend and advise on its cultural significance in consultation with the qualified archaeologist; c. if the find is determined to be a site, notify OEH with the advice from the archaeologist and the RAP's for determination of further procedures.	This occurs, though sites and artifacts that have been found in this way have generally been sites previously found but not able to be relocated during salvage.	Compliant			
Heritage Management Plan	4.4	6. If the find is confirmed as a site, the archaeologist will complete a Sites Register Card and forward to OEH for inclusion on the Aboriginal Heritage Information Management System (AHIMS) database. 7. If the find is confirmed as a site, TCPL will offer to facilitate inspection of the new site by other registered Aboriginal groups prior to salvage. 8. Subject to the recommendations of the archaeologist and the RAP's, artefacts from the site will be collected following the protocols outlined in Section 4.1 prior to further work being undertaken in the vicinity of the site.	Noted				
Heritage Management Plan	4.4	Should any bone(s) be uncovered by mining staff or subcontractors working on the mine site, work should cease immediately in the area of the find, a suitably qualified person should be contacted to clearly identify the bone(s). If the bone(s) cannot be identified as animal bones, the police and RAP's will be advised of the discovery. Work will not recommence until both the police and the RAP's have given their permission to do so.	No human remains found in the audit period	Not Applicable			
	4.5 Biodiversity Offset Area						

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Heritage Management Plan	4.5	The biodiversity offset area ("Willeroi") established for the Tarrawonga extension project was not subject to a cultural heritage assessment, and as such is not covered by the provisions of the Part 3A Project Approval relating to cultural heritage. On this basis, the provisions of the NPW Act apply in full at the "Willeroi" property in relation to the protection of items of cultural heritage. The biodiversity offset area is being set aside for conservation purposes, in perpetuity, and is unlikely to be subject to any surface disturbance activity other than those activities associated with general land management and enhancement of vegetation communities. As a consequence, any disturbance activities within the "Willeroi" property will be subject to the Due Diligence Code of Practice for the Protection of Aboriginal objects in NSW. The completion of the Aboriginal Cultural Heritage Strategy, as required under the Project Approval, will include additional consideration to the Aboriginal heritage values associated with the area, and the potential opportunities to enhance and conserve Aboriginal heritage within the biodiversity offset site.	No work done at Willeroi to date so this has not been required.	Not Applicable			
	4.6 Aboriginal Heritage Conservation Strategy						
Heritage Management Plan	4.6	Recognising the cumulative impact of proposed mining activities within the wider Leard State Forest area, in addition to this HMP, an Aboriginal Heritage Conservation Strategy will be prepared and implemented for the Boggabri-Tarrawonga-Maules Creek complex, to enhance and conserve the Aboriginal Cultural Heritage Values (both cultural and archaeological) of this area and provide for their long term management. The Strategy will be developed in accordance with the following requirements of the Tarrawonga Project Approval:	Noted				
Heritage Management Plan	4.6	The Aboriginal Cultural Heritage Strategy will focus on opportunities to conserve and enhance areas of cultural heritage significance that are not impacted by the approved projects, and how these areas can be used to enhance knowledge and cultural understanding in the wider community.	Noted				
Heritage Management Plan	4.6	Development of the Aboriginal Cultural Heritage Strategy will be undertaken progressively with the Boggabri and Maules Creek projects, with an approved expert, as endorsed by the Director General, and in consultation with the RAP's for each project. It is expected that the strategy will be submitted for approval by 30th June 2014.	Noted				
	4.7 Workforce Education						
Heritage Management Plan	4.7	Prior to any person undertaking work on the mine site, they will undergo cultural awareness training as provided in the general mine site induction. Any person undertaking soil stripping activities will undertake such works in consultation with the Environmental Officer and RAP's undertaking site monitoring during pre-strip works.	The Induction includes information on arch heritage and there are further controls and training for those involved in ground distrubance.	Compliant			

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Heritage Management Plan	4.7	The Environmental Officer at site will also provide general education to the workforce via toolbox talks on a range of environmental issues relevant to operations. This will include discussion on matters relating to cultural heritage and the obligations of personnel to preserve and protect items of cultural heritage significance. This will be further embodied in pre-clearance procedures at site that requires Environmental Officer sign off prior to site disturbance to ensure Aboriginal heritage items are considered in site operations.	This occurs, per OCE and EO	Compliant			
	5 Consultation, Monitoring and Reporting						
	5.1 Consultation Protocol						
Heritage Management Plan	5.1	Subject to any modifications initiated by the RAP's, the following protocol will be followed with respect to consultation: 1. Prior to any topsoil stripping campaign, the Operations Manager, or authorised delegate, will notify the RAP's and advise of the extent, location, timing and expected duration of the planned campaign and invite a representative to monitor the topsoil stripping activities. For safety and logistical reasons, RAP involvement will be rotated such that one representative from each of three groups will be on site each day as required (i.e. three rotations of three groups of representatives to ensure inclusion of the nine Aboriginal stakeholder organisations). A minimum of three days' notice will be provided in advance of each campaign to enable representation as required.	Evidence sighted of the RAPs involvement in this activity	Compliant			
Heritage Management Plan	5.1	2. At the request of the RAP's, the Operations Manager, or authorised delegate, will avail themselves to attend community meetings at the RAP's offices or to arrange site visits for interested personnel or members. A meeting will be held with RAP's prior to each salvage event to ensure the stakeholders are informed of the intended works and a clear line of communication is established for those works, outlining the expectations of the RAP's, the Archaeologist and TCPL throughout the process.	No such requests	Not Applicable			
Heritage Management Plan	5.1	3. In the event that any possible archaeological sites are identified in the absence of the RAP's, the Operations Manager, or authorised delegate, will notify the RAP's following the initiation of the procedures identified in Section 4.4.	This has not occurred in the audit period	Not Applicable			
Heritage Management Plan	5.1	4. If requested by the RAP's, TCPL will facilitate access to known sites within the mining lease areas, along the Haul Route and in the Biodiversity Offset Area, subject to satisfaction of required safety protocols. The Aboriginal Heritage Conservation Strategy, required under Condition 51 of PA 11_0047 requires determination of cultural heritage values within the Biodiversity Offset Strategy Areas. Development of this strategy, in consultation with the other mining projects and Aboriginal Stakeholders will further define heritage values of the offset areas, and any ongoing access arrangements to those sites.	No such requests	Not Applicable			

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Heritage Management Plan	5.1	5. If requested by members of the Aboriginal community, TCPL will facilitate access to any artefact material salvaged from the TCM and stored within an agreed Keeping Place either at the site or other Whitehaven controlled property. Any material held at the Cumbo Gunerah Keeping Place would be subject to any access requirements of the Red Chief LALC.	No such requests	Not Applicable			
Heritage Management Plan	5.1	The effectiveness and value of the consultation with the RAP's will be periodically reviewed. In the event there is agreement that the approach to consultation needs to change, the changed procedures would be documented and a copy forwarded to the Director-General and recorded in the relevant AEMR/Annual Review. All consultation will be diarised.	Noted				
Heritage Management Plan	5.1	For the purposes of initial communication procedures, the following will be adopted:- - At the first RAP consultation session, a contacts register will be distributed comprising the RAP's name, address, phone and mobile phone numbers, as well as the Tarrawonga mine representatives contact details. Upon confirmation that all details are correct, copies of the contacts register will be distributed between the RAP's and Tarrawonga Mine. - The first point of contact for matters pertaining to cultural heritage at the Tarrawonga Mine will be the Tarrawonga Environmental Officer. The Tarrawonga Environmental Officer will coordinate with the RAP's, the requirements for attendance at site for salvage activities, soil stripping monitoring and revisions to this management plan. The Tarrawonga Environmental Officer will also retain the register of work activities, and the status of the rotation system for engagement of the RAP's for monitoring works. - The Tarrawonga Environmental Officer will ensure that at a minimum, 3 days' notice will be provided to the RAP's on rotation for soil stripping monitoring at site. In the event that a RAP is not available for a monitoring event, the next RAP in rotation will be contacted for that event.	Evidence provided that supports this approach.	Compliant			
Heritage Management Plan	5.1	The responsibilities for each party in relation to these communication procedures are as follows:- - Tarrawonga will generate and distribute a contacts register for ratification at the first RAP consultation session prior to the initial salvage works.	Noted				
Heritage Management Plan	5.1	- The RAP's will provide current contact details for inclusion on the register. In the event of any change of contact details, the RAP's will provide notification to the Tarrawonga Environmental Officer to update the contacts register accordingly.	Noted				

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Heritage Management Plan	5.1	- Tarrawonga will provide reasonable notice to the RAP's (at a minimum 3 days) for soil stripping monitoring requirements. Upon provision of notice, and where a message has been left with the RAP's requesting confirmation of availability, and availability is not confirmed within 24hrs of notice, Tarrawonga will contact the next RAP for the work as per the rotation register. For salvage works undertaken under this plan, at least 1 weeks notice will be provided to the RAP's. All RAP's will be invited to participate in the cultural values assessment prior to salvage works commencing. Actual salvage works will be undertaken in accordance with the rotation system.	Evidence provided that supports this approach.	Compliant			
Heritage Management Plan	5.1	- The RAP's will attend the works programs at Tarrawonga site in accordance with the timeframes provided in the notification process. The RAP's will abide by all instructions given to them by Tarrawonga site personnel when on the Tarrawonga Mine Site. The RAP's will abide by Tarrawonga safety standards as advised by personnel and undertake required induction processes to access the site. The RAP's will provide information, advice and knowledge of artefactual material identified on the site and assist the archaeologist in the salvage procedure.	Noted				
Heritage Management Plan	5.1	The intent and suitability of this communication protocol will be discussed at the initial RAP's meeting to verify agreement with the process. Any suggested modifications to this process will be considered and where appropriate, modifications to the protocol will be made and this management plan updated accordingly.	All parties currently satisfied with the operation of the communication protocol, meeting minutes sighted during site visit	Not Applicable			
	5.2 Monitoring and Reporting						
Heritage Management Plan	5.2	Monitoring undertaken by the RAP's will be documented. In the event that an Aboriginal artefact or site is identified, and in accordance with the procedure documented in Section 4.4, a site register card will be completed and forwarded to OEH for entry onto the AHIMS database.	Salvage report and RAPs soil stripping notes provided as evidence	Compliant			
Heritage Management Plan	5.2	In addition, the results of monitoring undertaken on the mine site will be summarised in each relevant AEMR/Annual Review, with the RAP's kept informed as to developments by virtue of the ongoing consultation with those groups. TCPL will discuss the measures implemented to preserve and protect Aboriginal cultural heritage in the AEMR/Annual Review.	The AEMR provides this information	Compliant			
	6 Management of Incidents, Complaints and Non-Compliances						
	6.1 Compliance and Incident Management						
Heritage Management Plan	6.1	To ensure compliance with the requirements of the NPW Act, EP&A Act and the conditions of PA 11_0047, the following measures will be implemented: • Continue to include information relating to Aboriginal cultural heritage in inductions for all site personnel (refer to Section 4.7);	see above	Compliant			
Heritage Management Plan	6.1	• Maintain protection measures for sites;	see above	Compliant			
Heritage Management Plan	6.1	• Maintain ongoing consultation with the RAP's over the life of the mine, including appropriate RAP representation during topsoil stripping, disturbance activities and archaeological fieldwork (e.g. collection of artefacts);	see above	Compliant			

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Heritage Management Plan	6.1	• Maintain a record of known Aboriginal heritage sites (e.g. status and location) including identification of these sites on mine plans. Copies of the site cards completed for each heritage site will be retained in the site office for detailed information about each site;	see above	Compliant			
Heritage Management Plan	6.1	• Require a site disturbance protocol be followed at site whereby site disturbance does not commence until sign off is provided by the Environmental Officer;	see above	Compliant			
Heritage Management Plan	6.1	• Undertake all salvage works in accordance with requirements outlined in Section 4.1;	see above	Compliant			
Heritage Management Plan	6.1	• Undertake all consultation as outlined in Section 5.1;	see above	Compliant			
Heritage Management Plan	6.1	• Undertake regular reviews of this HMP as outlined in Section 7.	see above	Compliant			
Heritage Management Plan	6.1	Any incidents will be recorded and managed via the Whitehaven incident management process. Incident reporting will be conducted in accordance with the requirements of Condition 8 of Schedule 5 of PA 11_0047, requiring notification at the earliest possible opportunity, the Director General, and any other relevant agency, of any incident that has caused or threatens to cause material harm to the environment, or other breach or incident associated with the Project. Any notification would be followed by a written report within 7 days of the incident, and provision of any other information as may be requested.	see above	Compliant			
Heritage Management Plan	6.1	A discussion of any incidents will also be provided in the AEMR/Annual Review.	see above	Compliant			
Heritage Management Plan	6.1	For the purposes of this plan, an incident is defined as any activity or action that results in the damage to, or destruction of heritage sites within the Tarrawonga project boundary.	see above	Compliant			
	6.2 Complaints						
Heritage Management Plan	6.2	A complaints management protocol has been developed to ensure an appropriate and consistent level of reporting, response and follow-up is adopted by TCPL. A complaint is verbal or written advice from any party in response to activities undertaken at the Tarrawonga Mine site. The following complaints management protocol will be followed on all complaints received relating to Aboriginal cultural heritage: • A publicly advertised telephone complaints line will be in place to receive complaints during operating hours and record complaints at other times.	No complaints regarding Heritage issues	Not Applicable			
Heritage Management Plan	6.2	• Each complaint received will be recorded on a Complaints Register, which will include the following details: o The date and time of complaint. o Any personal details the complainant wishes to provide or if no such details are provided a note to that effect. o The nature of the incident that led to the complaint. o The action taken by TCM in relation to the complaint, including any follow-up contact with the complainant. o If no action was taken by TCM, the reason why no action was taken.	No complaints regarding Heritage issues	Not Applicable			
Heritage Management Plan	6.2	• The Environmental Manager will be responsible for ensuring that an initial response is provided within 24 hours of receipt of a complaint (except in the event of complaints recorded when the mine is not operational).	No complaints regarding Heritage issues	Not Applicable			

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Heritage Management Plan	6.2	• Additional measures will be undertaken as required to address the complaint. This may include visiting the complainant, or inviting the complainant to the mine site.	No complaints regarding Heritage issues	Not Applicable			
Heritage Management Plan	6.2	• Once the identified measures are undertaken, the Environmental Manager will sign off on the relevant complaint within the Complaints Register.	No complaints regarding Heritage issues	Not Applicable			
Heritage Management Plan	6.2	• If necessary, follow-up monitoring or will take place to confirm the source of the complaint is adequately mitigated.	No complaints regarding Heritage issues	Not Applicable			
Heritage Management Plan	6.2	• A copy of the Complaints Register will be kept by TCM and made available to the Tarrawonga Coal Mine Community Consultative Committee (CCC) and the complainant (on request). Complaints are also listed on the Whitehaven website (www.whitehavencoal.com.au) and a summary of complaints received every 12 months will be provided to DPI, NSC, GSC, OEH/EPA, DRE and the CCC through the AEMR/Annual Review.	No complaints regarding Heritage issues	Not Applicable			
Heritage Management Plan	6.2	Based on the nature of individual complaints, specific contingency measures may be implemented to the (reasonable) satisfaction of the complainant. The Environmental Manager retains ultimate responsibility to ensure that complaints received are properly recorded and addressed appropriately.	No complaints regarding Heritage issues	Not Applicable			
	6.3 Dispute Resolution Process						
Heritage Management Plan	6.3	In the event of a dispute arising between TCPL and the RAP's in relation to implementation of this management plan, the following protocol will be followed: 1. The Environmental Manager will discuss the issue with the disputer within 2 weeks (10 working days) of becoming aware of the dispute. TCPL may engage a Heritage Advisor to assist in this process. 2. If a resolution is not reached from the above discussions, a meeting will be convened at site between TCPL, the RAP's and the Heritage Advisor to discuss the issue and reach consensus. This meeting is to be convened within 1 month of the discussion identified in 1 above. 3. If a resolution is still not achieved, the matter will be referred to the Director General for a decision within 2 weeks (10 working days) of the meeting identified in 2 above.	No disputes in the audit period	Not Applicable			
Heritage Management Plan	6.3	Where a dispute is technical in nature (ie. relates to methodology or interpretive issues) for implementation of the management plan, the same process will be followed, however if a consensus is not reached, TCPL may refer the matter to an independent third party for review. As TCPL will have the right of engagement of an independent third party, the costs associated with engagement of an independent third party will be borne by TCPL. The independent third party will be identified by writing to one of the following: The President Australian Archaeological Association School of Social Science University of Queensland Brisbane QLD 4072 or The President Australian Association of Consulting Archaeologists Inc PO Box 8382 Armadale Vic 3143	No disputes in the audit period	Not Applicable			

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
7 Document Review and Continuous Improvement							
Heritage Management Plan	7	This document will be reviewed internally on an annual basis following completion of the Annual Review, and/or following a heritage related incident, audit, or modification to the conditions of approval. In addition, every 2 years, the plan will be subject to review and update in consultation with the RAP's and relevant agencies.	Not yet required.	Not Applicable			
Heritage Management Plan	7	TCM will investigate and implement ways to improve the environmental performance of the project over time. This will be achieved by keeping abreast of best practice in the industry for cultural heritage management and controls and reporting on outcomes of surveys and monitoring in the AEMR/Annual Review.	see other comments in other sections of audit	Compliant			

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Aboriginal Heritage Conservation Strategy for the BTM Complex and Biodiversity Offset Areas							
	2 Legislative Context and Guidelines						
	2.1 Environmental Planning and Assessment Act 1979						
Aboriginal Heritage Conservation Strategy for the BTM Complex and Biodiversity Offset Areas	2.1	The EP&A Act regulates a system of environmental planning and assessment for New South Wales. Land use planning requires that environmental impacts are considered, including the impact on cultural heritage and specifically Aboriginal heritage. Within the EP&A Act, Parts 3, 4 and 5 relate to Aboriginal heritage.	Noted				
Aboriginal Heritage Conservation Strategy for the BTM Complex and Biodiversity Offset Areas	2.1	The MCoA have been used under Section 4.1 of EP&A Act, as the mines in the BTM complex are State Significant Developments (SSDs).	Noted				
	2.2 NSW Legislation Regulating Aboriginal Cultural heritage						
Aboriginal Heritage Conservation Strategy for the BTM Complex and Biodiversity Offset Areas	2.2	Although a number of Acts and regulations protect and manage cultural heritage in New South Wales; the primary ones that apply to this report include: • National Parks and Wildlife Act 1974 (as amended) • National Parks and Wildlife Regulation 2009 • Environmental Planning and Assessment Act 1979	Noted				
Aboriginal Heritage Conservation Strategy for the BTM Complex and Biodiversity Offset Areas	2.2	In brief, the NPW Act (as amended) protects Aboriginal heritage (places, sites and objects) within NSW; and the National Parks and Wildlife Regulation 2009 provides a framework for undertaking activities and exercising due diligence.	Noted				
	2.2.1 National Parks and Wildlife Act 1974						
Aboriginal Heritage Conservation Strategy for the BTM Complex and Biodiversity Offset Areas	2.2.1	The National Parks and Wildlife Act 1974 (as amended) (NPW Act) protects Aboriginal heritage (places, sites and objects) within NSW. Protection of Aboriginal heritage is outlined in s86 of the NPW Act, as follows: • "A person must not harm or desecrate an object that the person knows is an Aboriginal object" s86(1), • "A person must not harm an Aboriginal object" s86(2) • "A person must not harm or desecrate an Aboriginal place" s86(4).	Noted				
	2.2.2 National parks and Wildlife Regulation 2009						
Aboriginal Heritage Conservation Strategy for the BTM Complex and Biodiversity Offset Areas	2.2.2	The National Parks and Wildlife Regulation 2009 (NPW Regulation) provides a framework for undertaking activities and exercising due diligence with respect to Aboriginal heritage. The NPW Regulation outlines the recognised due diligence codes of practice which are relevant to this report, but it also outlines procedures for AHIP applications and ACHCRs (DECCW 2010a); amongst other regulatory processes.	Noted				
	2.2.3 Aboriginal Land Rights Act 1983						

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Aboriginal Heritage Conservation Strategy for the BTM Complex and Biodiversity Offset Areas	2.2.3	The purpose of this legislation is to provide land rights for Aboriginal people within NSW and to establish Local Aboriginal Land Councils (LALCs). The land able to be claimed by LALCs, on behalf of Aboriginal people, includes Crown Land that (s36): Is able to be lawfully sold, leased, reserved or dedicated; Is not lawfully used or occupied; Does not comprise lands which, in the opinion of the Crown Lands Minister, are needed or are likely to be needed for residential purposes; Are not needed, nor likely to be needed for an essential public purpose; Does not comprise land under determination by a claim for native title; and Is not the subject of an approved determination under Native Title.	Noted				
2.3 Federal Legislation regulating Aboriginal Cultural Heritage							
2.3.1 Native Title Act							
Aboriginal Heritage Conservation Strategy for the BTM Complex and Biodiversity Offset Areas	2.3.1	The Commonwealth Government enacted the Native Title Act (1993) to formally recognise and protect native title rights in Australia following the decision of the High Court of Australia in Mabo & Ors v Queensland (No. 2) (1992) 175 CLR 1 ("Mabo").	Noted				
Aboriginal Heritage Conservation Strategy for the BTM Complex and Biodiversity Offset Areas	2.3.1	Although the presumption of native title can be in any area where an Aboriginal community or group can establish a traditional or customary connection with that area, native title can be extinguished by a number of ways: land that was designated as having freehold title before 1 January 1994 any commercial, agricultural, pastoral or residential lease. Land that has been used for the construction or establishment of public works for as long as they are used for that purpose.	Noted				
6 Aboriginal Values Assessment Methodology							
Aboriginal Heritage Conservation Strategy for the BTM Complex and Biodiversity Offset Areas	6	The methodology for Aboriginal consultation for the AHCS was mailed to the RAPs (7 April 2014) to allow all knowledge holders the opportunity for input into the proposed framework for consultation. The methodology adopted for this AHCS is provided below and is followed by a summary of the documentation of consultation.	Evidence in appendix to AHCS	Compliant			
6.1 Methodology for Aboriginal Consultation							
Aboriginal Heritage Conservation Strategy for the BTM Complex and Biodiversity Offset Areas	6.1	The methodology for Aboriginal consultation followed the Ask First Principles and adhered to the guiding principles of the ACHCR process. Five formal opportunities for input into the strategy were provided to the RAPs as part of this AHCS process (Figure 13). Informal opportunities for input (written or verbal) were also provided throughout the six month process.	The reply letter from the RAPs disputes this. But the dopcumentation attached to the strategy regarding consultation supports this approach being followed. Note this strategy is not yet approved.	Compliant			
7 Aboriginal Values Assessment							

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Aboriginal Heritage Conservation Strategy for the BTM Complex and Biodiversity Offset Areas	7	Consultation for this process was undertaken in accordance with the OEH ACHCRs guideline and the Australian Heritage Commission's Ask First guideline. The BTM Complex had already completed Stage One of the ACHCR process and was able to provide RPS with a list of identified RAPs. The identification of RAPs was drawn from government regulatory bodies which included: Registrar (Aboriginal Land Rights Act, 1983), relevant OEH Environmental Protection Regulation Group (EPRG) Regional Office, National Native Title Tribunal, Native Title Services Corporation Limited, relevant Catchment Management Authority, Local Aboriginal Land Council and relevant local councils.	Noted, consultation is almost complete.				
Aboriginal Heritage Conservation Strategy for the BTM Complex and Biodiversity Offset Areas	7	A RAP Tender Document, identifying the processes for the AHCS, was sent to the RAPs. The RAP tender document was the first opportunity for the RAPs to express interest in the AHCS. A second opportunity for participation in the AHCS was Workshop 1, which outlined the AHCS in more detail. Workshop 2, the third opportunity to participate in the AHCS, provided an opportunity to put forward conservation strategies and culturally map the BOAs. The draft report was sent to all RAPs and a 28 day review period was given (in accordance with the ACHCR process) so RAPs could comment on the draft AHCS. The review period was the fourth opportunity for the RAPs to comment on the AHCS. Following the draft report, the third workshop (and fifth opportunity) was for the RAPs to comment on the draft AHCS. The third workshop was the final opportunity for the RAPs to supply comments on the AHCS and inclusion into the final report. The table below summarises the five opportunities for the RAPs to supply comments on the AHCS.	Noted				
	9 Implementation						
Aboriginal Heritage Conservation Strategy for the BTM Complex and Biodiversity Offset Areas	9	This AHCS will be implemented using a staged approach (Figure 14). Stage 1 will involve evaluation of conservation options. This evaluation process would assess the effectiveness of the options in conserving archaeological and Aboriginal cultural values, as well as considering the practicalities of their implementation. Options would be prioritised on this basis. The most practicable and effective option(s) would be selected. Stage 2 will involve conducting the activity associated with the selected conservation option(s). Stage 3 will monitor the activity during implementation, to ensure it is meeting its purpose and will consider inputs from the RAPs and OEH, where relevant. Stage 3 would also evaluate if changes to the implementation of the activity are required, or if additional conservation options should be considered. Stage 4 will document the activities undertaken for the conservation option(s) in an appropriate format and provide this information to the RAPs and OEH at end of the implementation phase.	Noted				
	10 Conclusion						

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Aboriginal Heritage Conservation Strategy for the BTM Complex and Biodiversity Offset Areas	10	A Cultural Heritage Strategy for the BTM Complex and BOA's has been developed in compliance with the approval conditions for the three mines. Its objective is to enhance and preserve cultural heritage. The strategy has been developed on the basis of an extensive desktop analysis complemented by the provision of extensive opportunities for consultation.	Noted				
Aboriginal Heritage Conservation Strategy for the BTM Complex and Biodiversity Offset Areas	10	The strategy includes a high level implementation plan which will be implemented in the future.	Noted				
Aboriginal Heritage Conservation Strategy for the BTM Complex and Biodiversity Offset Areas	10	The next step in finalising the strategy is another round of consultation followed by submission to DoPE.	Noted				

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
	Bushfire Management Plan						
	3 Responsibilities						
Bushfire Management Plan	3	The Operations Manager has the overall responsibility for the management of the mine, including the responsibility for compliance with the commitments within the Bushfire Management Plan and the mine's Emergency Management System developed in accordance with the Coal Mines Health and Safety Regulations 2006.	Noted				
Bushfire Management Plan	3	The Operations Manager must ensure that all the onsite safeguards and controls are in place and are effective for the prevention and control of bushfires, and that the desired environmental outcomes are achieved.	Noted				
Bushfire Management Plan	3	All mine personnel have responsibilities to observe and comply with the requirements of the Bushfire Management Plan, to participate in fire training if requested, and to observe best practice when handling flammable or hazardous materials and operating heavy machinery within the ML and MLAs.	The induction process addresses incident management and fires/bushfires	Compliant			
Bushfire Management Plan	3	A Fire Officer will be appointed by the Manager of Mining Engineering as required by the Coal Mines Health and Safety Regulations 2006. The Fire Officer's responsibilities will include: • Recruiting sufficient volunteers to establish fire fighting teams, of up to 5 persons per team, on each shift and training them in fire fighting theory and practice at 3 monthly intervals;	OCE on duty is the nominated fire officer for each shift and they have suitable levels of volunteers	Compliant			
Bushfire Management Plan	3	• Carrying out inspections and arranging for the repair and maintenance of fire extinguishers in accordance with (Australian Standard) AS1851, part 1 (Portable fire extinguishers and fire blankets) and fire hoses in accordance with AS1851, Part 9 (Delivery lay flat fire hose);	Contractor checks site equipment, maintenance team supervise fire fighting equipment.	Compliant			
Bushfire Management Plan	3	• Arranging for the replacement of fire fighting equipment reported as damaged in the book kept for the purpose and reporting to the Operations Manager any matter unable to be rectified;	Contractor checks site equipment, maintenance team supervise fire fighting equipment.	Compliant			
Bushfire Management Plan	3	• Checking that fire fighting equipment at the mine, and following repair or replacement, is compatible with NSW fire brigades;	Contractor checks site equipment, maintenance team supervise fire fighting equipment.	Compliant			
Bushfire Management Plan	3	• Clearly marking with signs all fire fighting equipment on the mine site; and	Observed on site	Compliant			
Bushfire Management Plan	3	• Maintaining an up-to-date Fire Control Plan that delineates any fixed fire control installations and displaying a copy of the Plan in the Mining Supervisor's Office.	This is the case, sighted	Compliant			
Bushfire Management Plan	3	The Fire Officer will report directly to the Operations Manager and Manager of Mining Engineering and will be required to complete monthly reports of his/her inspections.	This occurs	Compliant			
	5 Controls						
Bushfire Management Plan	5	TCPL is conscious of the need to ensure adequate bushfire controls are maintained to minimise the potential bushfire hazard of the mine.	Noted				
	5.2 Mobile Equipment and Mine Operations						
	5.2.1 Earthmoving Machinery						
Bushfire Management Plan	5.2.1	• All earthmoving machinery will be maintained in good working order with efficient exhaust systems and spark arrestors. Regular inspections will be carried out.	see EPL section of audit	Compliant			

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
		• All earthmoving machinery and mobile equipment will be fitted with appropriate sized and approved fire extinguishers and/or fire suppression systems suitable for the control of flammable liquid and electrical fires.	This occurs	Compliant			
	5.2.2 Clearing Operations						
Bushfire Management Plan	5.2.2	• TCPL will enforce clearing restrictions. Clearing operations will not be undertaken during periods of extreme fire danger as defined by the Bureau of Meteorology.	See MOP, BOMP	Compliant			
Bushfire Management Plan	5.2.2	• The retention of cleared debris for use in the rehabilitation program will be strictly adhered to and there will be no burning of debris.	See MOP, BOMP	Compliant			
Bushfire Management Plan	5.2.2	• All vehicle movements within ML and MLA areas will be confined to defined roads or tracks, unless otherwise authorised.	See MOP, BOMP	Compliant			
Bushfire Management Plan	5.2.2	• Where appropriate, controlled high intensity short term grazing will be employed to assist in the reduction of vegetative fuel loads.	See MOP, BOMP this has not been utilised to date but here is no significant buildup of fuel on the site.	Not Applicable			
	5.2.3 Blasting Operations						
Bushfire Management Plan	5.2.3	• All flammable material will be removed by pre-stripping the topsoil prior to any drilling and blasting operations taking place.	This occurs	Compliant			
Bushfire Management Plan	5.2.3	• Blast design will be undertaken by qualified personnel	This occurs	Compliant			
Bushfire Management Plan	5.2.3	• All blasting will be carried out in accordance with the Explosives Act 2003 and Coal Mines Health and Safety Regulations 2006.	This occurs	Compliant			
	5.2.4 Welding Operations						
Bushfire Management Plan	5.2.4	• All welding activities will, as far as practicable, be conducted and confined to the main workshop area. In the event that welding or cutting is to be conducted outside the main workshop area the mine's Hot Work Permit system will be implemented.	This occurs	Compliant			
	5.2.5 Fixed Plant and Buildings						
Bushfire Management Plan	5.2.5	• Maintenance of housekeeping by mine management.	Housekeeping was reasonable with respect to fire risk	Compliant			
Bushfire Management Plan	5.2.5	• All workshops and offices will be installed with an appropriate fire fighting equipment and their location will be indicated by signs compliant with Australian Standards.	Observed on site	Compliant			
	5.2.6 Exploration Activities						
Bushfire Management Plan	5.2.6	• Exploratory drilling on any WHC exploration areas near TCM will not be undertaken during periods of extreme fire danger as defined by the Bureau of Meteorology or on total fire ban days as defined by the NSW Rural Fire Service.	Inductions for contractors and prework risk assessments cover this issue	Compliant			
Bushfire Management Plan	5.2.6	• The slashing or clearing of access tracks to exploratory drill sites will not be permitted during total fire bans days as defined by the NSW Rural Fire Service.	This has not occured in the audit period.	Not Applicable			
	5.2.6 Exploration Activities						
Bushfire Management Plan	5.2.6	• Exploratory drilling on any WHC exploration areas near TCM will not be undertaken during periods of extreme fire danger as defined by the Bureau of Meteorology or on total fire ban days as defined by the NSW Rural Fire Service.	Inductions for contractors and prework risk assessments cover this issue	Compliant			
	5.2.7 Fuel and Oil Management						

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Bushfire Management Plan	5.2.7	• All fuel and oil storage will be located and constructed in accordance with the requirements of the Work Health and Safety Act 2011.	The audit team were not qualified to review this requirement	Not Applicable			
Bushfire Management Plan	5.2.7	• Undertake refuelling within designated fuel bays or within cleared areas of the mine site.	This occurs except for inpit refuelling	Compliant			
Bushfire Management Plan	5.2.7	• Turn vehicles off during refuelling.	This occurs	Compliant			
Bushfire Management Plan	5.2.7	• Fuel and oil storage areas will be signposted as to the contents of the storages and will be fitted with approved fire extinguishers.	The site inspection confirmed this	Compliant			
Bushfire Management Plan	5.2.7	• All fuel tanks on-site will be fully or self bunded to ensure that in the event of a leak or rupture, no fuel escapes from the bunded area. Each bunded area will have the capacity of at least 110% of the largest tank. Bunds may be integrated, (ie. form part of the tank structure) or be external.	This occurs and was inspected	Compliant			
Bushfire Management Plan	5.2.7	• Drainage from the workshop, workshop apron and wash down areas will be directed to an oil separator and containment system for subsequent pump out and disposal.	This occurs, observed in site inspection	Compliant			
Bushfire Management Plan	5.2.7	A foam generator and an adequate supply of high expansion foam will be available on-site for fighting oil-based fires.	This is available, no such fires in the audit period (interview with EO)	Compliant			
	5.2.8 Mine Site Protocols						
Bushfire Management Plan	5.2.8	• Designated "No Smoking" areas will be clearly marked and enforced onsite. These will include: o Fuel and oil storage areas; o Within areas flagged or barricaded areas in preparation for blasting; o When transporting explosives or within 20m of a vehicle transporting explosives; o Within workshops; o All buildings and offices; and o Any gas cylinder storage areas.	Observed on site	Compliant			
Bushfire Management Plan	5.2.8	• Equipment will not be stored on uncleared ground.	Observed on site	Compliant			
Bushfire Management Plan	5.2.8	• Vehicular access will be maintained around all areas of mining-related activities.	Observed on site	Compliant			
Bushfire Management Plan	5.2.8	• The following measures will be adopted to minimise the potential for spontaneous combustion: o Regularly inspect and water stockpiles. o Control stockpile height and volume to limit the duration coal is retained in stockpiles. o Routinely turn over coal in the ROM and product coal stockpile areas to minimise stockpile residence time. o In longer term stockpiles, creation of a shallow stockpile batter face to the direction of the prevailing wind. o Compaction of the stockpile area by use of mobile equipment. o Visual inspections for evidence (visual or smell) of combustion.	No occurrances of spon com on record	Not Applicable			
Bushfire Management Plan	5.2.8	• Fire prevention and fuel load reduction (if required) in rehabilitated mine areas or the biodiversity offset areas will be undertaken and will involve measures such as a combination of fire breaks and short periods of high intensity grazing. It is also conceivable that controlled burns may also be used through consultation with the NSC and the local fire brigades.	This has not been necessary to date	Not Applicable			

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Bushfire Management Plan	5.2.8	• Fuel load / fire security will be inspected at minimum 12 monthly intervals, occurring prior to the commencement of each bushfire season.	This has not been documented	Not Compliant Administrative			
	5.3 Fire Fighting Equipment and Protection						
Bushfire Management Plan	5.3	• Maintain fire extinguishers within all site vehicles.	DRE requirement	Compliant			
Bushfire Management Plan	5.3	• Provision of fire equipment on-site will be in accordance with the requirements of the Coal Mines Health and Safety Regulation 2006.	DRE requirement	Compliant			
Bushfire Management Plan	5.3	• All fire extinguishers will comply with Australian Standards and will be compatible with those of the Rural Fire Brigades.	DRE requirement	Compliant			
Bushfire Management Plan	5.3	• All fire equipment will be kept in a serviceable condition and be inspected at least once every 6 months by a fire equipment service provider (3 months for mining equipment). Daily inspections will also be conducted by operators during pre-start inspections while monthly inspections will be conducted by the Fire Officer.	DRE requirement	Compliant			
Bushfire Management Plan	5.3	• Fire response equipment will be maintained on site to provide immediate response to a bushfire.	DRE requirement	Compliant			
	5.3.2 Fire Response Equipment						
Bushfire Management Plan	5.3.2	• Fire response equipment will be: o available for use when the mine is in operation; o tested regularly for mobility and operation of the water pump; and o properly maintained, with operators trained in the use of all equipment.	Maintenance staff manage this	Compliant			
Bushfire Management Plan	5.3.2	• Additionally, the mine water trucks are fitted with water cannons for fire fighting purposes and are kept filled, even when parked. One water truck is also fitted with aqueous fire fighting foam.	Maintenance staff manage this	Compliant			
Bushfire Management Plan	5.3.2	• All fire equipment will be compatible with that of the local Rural Fire Brigades.	Maintenance staff manage this	Compliant			
	5.3.3 Water Supply						
Bushfire Management Plan	5.3.3	• Ensure water cart is available to assist in extinguishing any fire ignited.	This has occurred in the past.	Compliant			
Bushfire Management Plan	5.3.3	• The water for fire fighting purposes will be sourced from the various water storages and licenced bores within the mine site or associated landholdings.	Noted				
	5.3.4 Fire Breaks						
Bushfire Management Plan	5.3.4	• A suitable fire break will be established and maintained around the perimeter of the ML and MLA areas and/or associated landholdings. The fire breaks will be a minimum of 6m wide and kept free of flammable material. Additional fire breaks will be maintained around flammable materials storage areas.	Fire break maintained arount the site by slashing and grading	Compliant			
Bushfire Management Plan	5.3.4	• Fire breaks will be inspected at a minimum of 6 monthly intervals.	This is not documented	Not Compliant Administrative			
	5.4 Training						
Bushfire Management Plan	5.4	• All mine personnel will receive basic fire control training at the commencement of employment and regular refresher training.	This occurs, discussed in interview with safety officer	Compliant			
Bushfire Management Plan	5.4	• Mine fire teams will be formed and trained in accordance with coal mining legislation.	This occurs, discussed in interview with safety officer	Compliant			

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Bushfire Management Plan	5.4	• All sub-contractors will receive basic fire training during their site induction.	This occurs, discussed in interview with safety officer	Compliant			
Bushfire Management Plan	5.4	• All mine personnel, visitors and sub-contractors will be advised of the nominated muster area in the case of an emergency	This occurs, discussed in interview with safety officer	Compliant			
	5.5 External Assisstance						
Bushfire Management Plan	5.5	TCPL management will liaise with the RFS and adjacent landowners regarding fire hazard minimisation at the mine and on associated landholdings.	EO has discussions with the RFS, there is an RFS person on the CCC	Compliant			
Bushfire Management Plan	5.5	In the event that a fire cannot be controlled by the mine fire fighting teams, or threatens public property, the mine emergency procedures, as defined in the mine's Emergency Management System, will be followed. These procedures include evacuation and notification of external emergency services.	Noted				
Bushfire Management Plan	5.5	Additionally TCPL will, where possible, respond to any community fire emergency situation and provide assistance by way of machinery, water, equipment and labour.	Noted				
	6 Record Keeping and Reporting						
Bushfire Management Plan	6	Records of all inspections of fire fighting equipment and fire prevention measures (eg. fire breaks) will be retained at the mine.	DRE requirement	Compliant			
Bushfire Management Plan	6	Bushfire management and performance will be reported on via the AEMR/Annual Review	The AEMR addresses this issue	Compliant			
	7 Management of Incidents and Complaints						
Bushfire Management Plan	7	Bushfire incidents will be recorded and managed via the Whitehaven incident management process. Occurrence of bushfires will be reported to the relevant authorities and discussed in the AEMR/Annual Review.	This occurs though ther have been none in the audit period	Not Applicable			
Bushfire Management Plan	7	Any complaints received will be managed in accordance with complaints management protocol described as follows: • A publicly advertised telephone complaints line will be in place to receive complaints during operating hours and record complaints at other times.	See Complaints elsewhere	Compliant			
Bushfire Management Plan	7	• Each complaint received will be recorded on a Complaints Register, which will include the following details: o The date and time of complaint. o Any personal details the complainant wishes to provide or if no such details are provided a note to that effect. o The nature of the incident that led to the complaint, including the time of the dispersal and its duration. o The action taken by TCM in relation to the complaint, including any follow-up contact with the complainant. o If no action was taken by TCM, the reason why no action was taken.	See Complaints elsewhere	Compliant			
Bushfire Management Plan	7	• The Environmental Manager will be responsible for ensuring that an initial response is provided within 24 hours of receipt of a complaint (except in the event of complaints recorded when the mine is not operational).	See Complaints elsewhere	Compliant			
Bushfire Management Plan	7	• Additional measures will be undertaken as required to address the complaint. This may include visiting the complainant, or inviting the complainant to the mine site.	See Complaints elsewhere	Compliant			

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Bushfire Management Plan	7	• Once the identified measures are undertaken, the Environmental Manager will sign off on the relevant complaint within the Complaints Register.	See Complaints elsewhere	Compliant			
Bushfire Management Plan	7	• If necessary, follow-up monitoring will take place to confirm the source of the complaint is adequately mitigated.	See Complaints elsewhere	Compliant			
Bushfire Management Plan	7	• A copy of the Complaints Register will be kept by TCM and made available to the Tarrawonga Coal Mine Community Consultative Committee (CCC) and the complainant (on request). Complaints are also listed on the Whitehaven website (www.whitehavencoal.com.au) and a summary of complaints received every 12 months will be provided to DoPI, NSC, GSC, EPA, DTIRIS – DRE and the CCC through the AEMR/Annual Review.	See Complaints elsewhere	Compliant			
Bushfire Management Plan	7	Based on the nature of individual complaints, specific contingency measures may be implemented to the (reasonable) satisfaction of the complainant. The Environmental Manager retains ultimate responsibility to ensure that complaints received are properly recorded and addressed appropriately.	See Complaints elsewhere	Compliant			
8 Document Review and Continuous Improvement							
Bushfire Management Plan	8	This document will be reviewed at least every two years and following any significant changes in bushfire management at the site.	Not yet required (BMP last revision 29-4-13)	Not Applicable			
Bushfire Management Plan	8	TCPL will investigate and implement ways to improve the environmental performance of the project over time. This will be achieved by keeping abreast of best practice bushfire management measures as well as maintaining regular contact with local brigades.	Noted				

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
WHC_PLN_TAR_Waste Management Plan							
	4.1 General Site Waste Management						
Waste Management Plan	4.1	The following actions/strategies will be put into practice to minimise the accumulation/generation of waste onsite. • All personnel working on the mine site will undergo a site induction which will include details on environmental management requirements;	The induction addresses waste management	Compliant			
Waste Management Plan	4.1	All waste areas will be clearly identified as waste storage areas. This includes bins and other receptacles which will be marked according to the type of waste accepted (eg. scrap metal, oil filters, waste oil, paper and cardboard, other recyclables, general waste);	Observed on-site	Compliant			
Waste Management Plan	4.1	Clear written instructions will be erected at appropriate locations detailing recycling and waste separation information; and	Observed on-site	Compliant			
Waste Management Plan	4.1	With the exception of mined waste rock, coal washery coarse reject and used tyres there will be no long term storage of any waste materials on the mine site.	Observed on-site	Compliant			
	4.2 Waste Minimisation						
Waste Management Plan	4.2	The following methods will be used to minimise waste production: - The ordering of stock will be regularly reviewed to ensure efficient stock control and to avoid wastage; and	This occurs, interview with EO	Compliant			
Waste Management Plan	4.2	Alternate products or bulk storages will be considered in an effort to reduce the volume of packaging.	Generally, as observed on-site	Compliant			
	4.3 Recycling and Reuse						
Waste Management Plan	4.3	TCM will provide appropriate storage areas or receptacles for all materials that are suitable for recycling. The main recyclable waste materials that will be generated by the mine and their primary source(s), storage and collection requirements are as follows: • Paper, cardboard, aluminium cans and plastic bottles: primarily generated within the administration facilities, crib rooms and to a lesser extent in the workshop. Wheelie bins for these recyclables are located adjacent to these facilities with collections occurring on a weekly basis by Whitehaven's Environmental Field Technician for recycling at the Gunnedah Recyclit centre.	Noted, these areas are set aside	Compliant			
Waste Management Plan	4.3	• Scrap metal: placed into large skip bins, which will be collected by a metal recycler as sufficient quantities are available.	Observed on-site	Compliant			
Waste Management Plan	4.3	• Oil filters and oily rags: generated at the maintenance workshop, with oil filters collected in designated, bunded 1000L pods for recycling and oily rags disposed of in general waste skip bins. Oil filters will be collected by a licenced waste oil contractor during the collection of waste oil.	Observed on-site	Compliant			
Waste Management Plan	4.3	• Waste oil and grease: waste hydrocarbons are stored in a bunded area at the maintenance workshop and are collected and disposed of by a licenced contractor approximately every 3 months.	Observed on-site	Compliant			

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Waste Management Plan	4.3	Waste material from the sump of the wash down bay is collected and analysed on an as needs basis to determine concentration thresholds for hydrocarbons. In the event that the material sampled is below concentration thresholds as specified by the EPA, the material will be disposed of in the open pit and covered with overburden material. The GPS location of disposed materials will be recorded. Where materials do not meet concentration threshold criteria for classification as general waste, they will be stored on site for bio-remediation within the designated bioremediation area within the overburden dump footprint.	Observed on-site, EO reviewes the hydrocarbon rehab site every two months	Compliant			
Waste Management Plan	4.3	• Batteries: removed from site for delivery to a facility able to despatch them to an appropriate recycling facility.	Observed on-site	Compliant			
Waste Management Plan	4.3	• Timber: timber products such as pallets will be reused or recycled where possible. If recycling or reuse is not feasible, waste timber products will be disposed of in general waste.	Observed on-site	Compliant			
Waste Management Plan	4.3	• Miscellaneous recyclables: such as printer cartridges will be stored at appropriate locations prior to collection by, or delivery to, appropriate recycling facilities.	Observed on-site	Compliant			
Waste Management Plan	4.3	TCM's Environmental Officer will undertake regular inspections of all waste storage locations to ensure that the appropriate separation and collection of waste is being undertaken.	Monthly Inspections	Compliant			
Waste Management Plan	4.3	Opportunities for the re-use of materials on site will be evaluated on a regular basis.	Noted				
	4.4 Waste Disposal						
Waste Management Plan	4.4	General domestic wastes are collected on-site and placed into large storage receptacles. A contracted industrial waste collector removes the storage receptacles from the site on a fortnightly basis, or as required. Disposal of other wastes will be viewed as the last option in the management of waste, only if the avoidance, re-use or recycling of the waste in question is not practical. The following systems will be implemented at the mine in regard to waste disposal: • Only transport operators or companies that are licensed by the appropriate authorities will be contracted to remove waste from the mine site;	done by Contractor JR Richards	Compliant			
Waste Management Plan	4.4	• Waste materials which cannot be either re-used or recycled will be sent to a landfill licenced to accept that category of waste; and	done by Contractor JR Richards	Compliant			
Waste Management Plan	4.4	• Wastes, which are required to be tracked, will be done so in accordance with the relevant legislation.	done by Contractor JR Richards	Compliant			
	4.5 Effluent						
Waste Management Plan	4.5	TCM has installed adequate toilet and hand-washing facilities within the mine facilities and amenities area for the site workforce and visitors. These facilities incorporate a biocycle sewage treatment system approved by Narrabri Shire Council. The system is serviced by licensed waste collection and disposal contractors as required. Treated effluent disposal will be pumped to a small waste water utilisation area located close to the administration facilities on the southern side of the administration area.	Noted				
	4.6 Tyres						

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Waste Management Plan	4.6	Used mine equipment tyres are stockpiled on-site until they can be safely disposed of within the mined out areas of the open cut. Records on the number of tyres disposed of and the location of disposed tyres are maintained.	Observed on-site and noted in the AEMR	Compliant			
	4.7 Potentially Contaminated Runoff						
Waste Management Plan	4.7	Potentially contaminated run-off from the workshop, wash-down bay and fuel storage areas is directed to an oil separator and containment system	Observed on-site	Compliant			
	4.8 Waste Rock						
Waste Management Plan	4.8	Waste rock removed during mining will be disposed of in the northern and southern waste emplacements and in-pit, as defined in the Tarrawonga Coal Project Environmental Assessment (2012) and Mining Operations Plan (MOP).	Observed on-site	Compliant			
	4.9 Whitehaven CHPP Coal Rejects						
Waste Management Plan	4.8	TCPL has an approved Reject Emplacement Area designated within the open cut and approved under Section 100 of the CMHSA on the 6th January 2010. It is estimated that up to 2,000 tonnes/day of coarse reject may be transported to the Tarrawonga reject emplacement up to 5 days/week. As the emplacement area is within the pit void, the reject material will be covered by up to 20m of overburden material (and a minimum of 3m) within the in pit dump and will be subsequently rehabilitated consistent with the remainder of the in-pit dump area.	Reject emplacement is generally in accordance with this requirement.	Compliant			
	5 Monitoring, Reporting and Review						
Waste Management Plan	5	As far as practical, TCM will maintain a register of recycled material and general waste at the mine site. The register will include the quantities and type of waste removed from site for recycling or disposal, the contractor engaged to remove the wastes, the date the waste or recyclables were removed from site, the final destination for all waste products and any other relevant information. All waste receipts will be retained. The register will enable TCM to review waste volumes and performance on an ongoing basis.	Contractor documentation retained by the site with quantities.	Compliant			
Waste Management Plan	5	Waste management information (including review of the effectiveness of waste minimisation and management) will be documented and reported in each AEMR/Annual Review, where applicable. Details will be provided on the implementation success of the Waste MP and any areas that require improvement.	The AEMR addresses waste management but does not address the requirement to comment on waste minimisation effectiveness.	Not Compliant Administrative			
	6 Management of Incidents, Complaints and Non-Compliances						
	6.1 Incidents and Non-Compliances						
Waste Management Plan	6.1	Any incidents will be recorded and managed via the Whitehaven incident management process.	Noted, no incidents in the reporting period	Not Applicable			
Waste Management Plan	6.1	EPA and DoPI will be notified of all waste related incidents and non-compliances either after the incident/non compliance has occurred (for more significant issues) or via the AEMR/Annual Review and/or EPL Annual Return (for minor issues).	Noted, no incidents in the reporting period	Not Applicable			
	6.2 Complaints						

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Waste Management Plan	6.2	Based on the proposed waste management measures, it is considered unlikely that the site will receive complaints relating to waste. Despite this, any complaints received will be managed in accordance with complaints management protocol described as follows: • A publicly advertised telephone complaints line will be in place to receive complaints during operating hours and record complaints at other times.	See Complaints Elsewhere	Not Applicable			
Waste Management Plan	6.2	• Each complaint received will be recorded on a Complaints Register, which will include the following details: o The date and time of complaint. o Any personal details the complainant wishes to provide or if no such details are provided a note to that effect. o The nature of the incident that led to the complaint. o The action taken by TCM in relation to the complaint, including any follow-up contact with the complainant. o If no action was taken by TCM, the reason why no action was taken.	See Complaints Elsewhere	Not Applicable			
Waste Management Plan	6.2	• The Environmental Manager will be responsible for ensuring that an initial response is provided within 24 hours of receipt of a complaint (except in the event of complaints recorded when the mine is not operational).	See Complaints Elsewhere	Compliant			
Waste Management Plan	6.2	• Additional measures will be undertaken as required to address the complaint. This may include visiting the complainant, or inviting the complainant to the mine site.	See Complaints Elsewhere	Compliant			
Waste Management Plan	6.2	• Once the identified measures are undertaken, the Environmental Manager will sign off on the relevant complaint within the Complaints Register.	See Complaints Elsewhere	Compliant			
Waste Management Plan	6.2	• If necessary, follow-up monitoring or will take place to confirm the source of the complaint is adequately mitigated.	See Complaints Elsewhere	Compliant			
Waste Management Plan	6.2	• A copy of the Complaints Register will be kept by TCM and made available to the Tarrawonga Coal Mine Community Consultative Committee (CCC) and the complainant (on request). Complaints are also listed on the Whitehaven website (www.whitehavencoal.com.au) and a summary of complaints received every 12 months will be provided to DoPI, NSC, GSC, EPA, DRE and the CCC through the AEMR/Annual Review.	See Complaints Elsewhere	Compliant			
Waste Management Plan	6.2	Based on the nature of individual complaints, specific contingency measures may be implemented to the (reasonable) satisfaction of the complainant. The Environmental Manager retains ultimate responsibility to ensure that complaints received are properly recorded and addressed appropriately.	See Complaints Elsewhere	Compliant			
7 Document Review and Continuous Improvement							
Waste Management Plan	7	This document will be reviewed at least every two years and following any significant changes (ie. changes to consent/licence requirements or waste management measures). Each review will be undertaken in consultation with relevant stakeholders and will be submitted to the Director-General for approval.	Latest revision 1-5-13, not required yet.	Not Applicable			

Reference	Clause	Requirement	Evidence	Audit Finding	Risk		
					Consequence	Likelihood	Risk
Waste Management Plan	7	TCM will investigate and implement ways to improve the environmental performance of the project over time. This will be achieved by keeping abreast of best practice in the industry for waste management and recycling options and reporting on outcomes of waste management in the AEMR/Annual Review.	Noted				