
INDEPENDENT ENVIRONMENTAL AUDIT

for

THE DENDROBIUM MINE

FOR

BHP Billiton

**Dendrobium Coal Pty Ltd
PO Box 275
Unanderra NSW 2526**

December 2011

By

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Dendrobium Project

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EXECUTIVE SUMMARY

Background:

The Dendrobium Project comprises the development of a new underground coal mine, and construction and operation of associated surface facilities (“the Development”).

The Original Consent for the project was dated 20 November 2001 and construction work on the site commenced in January 2002. The Consent has been modified a number of times but the most recent modification is dated 8 December 2008 and that consent still applies. A copy of the Consent is attached as Appendix A. Consent Condition 6 of Schedule 8 of the Revised Consent dated 8 December 2008 which is reproduced here calls for an Independent Environmental Audit. More specifically:

INDEPENDENT ENVIRONMENTAL AUDIT

6. By 31 December 2011, and every 3 years thereafter, unless the Director-General directs otherwise, the Applicant shall commission and pay the full cost of an Independent Environmental Audit of the development. This audit must:

(a) be conducted by suitably qualified, experienced and independent team of experts whose appointment has been endorsed by the Director-General;

(b) include consultation with the relevant agencies;

(c) assess the environmental performance of the development and assess whether it is complying with the relevant requirements in this approval and any relevant EPL or mining lease (including any strategy, plan or program required under these approvals);

(d) review the adequacy of strategies, plans or programs required under these approvals; and, if appropriate,

(e) recommend measures or actions to improve the environmental performance of the development, and/or any strategy, plan or program required under these approvals.

Note: This audit team must be led by a suitably qualified auditor and include experts in the fields of a) mine subsidence impacts and remediation and b) stream hydrology and water quality.

7. Within 6 weeks of the completing of this audit, or as otherwise agreed by the Director-General, the Applicant shall submit a copy of the audit report to the Director-General, together with its response to any recommendations contained in the audit report.

8. Within 3 months of submitting the audit report to the Director-General, the Applicant shall review, and if necessary revise the strategies/plans/programs required under this consent to the satisfaction of the Director-General.

Dennis Zines of KADENZ Pty Ltd – Environmental Consultancy was commissioned by BHP Billiton to undertake the independent environmental audit. KADENZ was supported by several specialist consultants as follows:

- Air Quality – Damon Roddis of PAEHolmes
- Noise – Glenn Homes/Damon Roddis of PAEHolmes
- Subsidence - Steve Ditton of Ditton Geotechnical Services (DgS)

In accordance with the condition 6 (a) of Schedule 8, the Director-General of Planning and Infrastructure endorsed the audit team (Refer Appendix B).

The first audit under consent condition 8.1 of the original consent (first audit under the condition) covered the period from the date of the Consent to 31 December 2004 for site activities and to 31 March 2005 for approval documentation. The second Audit covered the period from the completion of the second audit to September 2008. This Audit covers the period from the completion of the second Audit to end September 2011.

Longwall mining commenced in April 2005 in Area 1. At present, longwall mining is taking place in LW7 in Area 3A.

The audit process consisted of:

- Pre-audit preparations and review of documentation;
- Consultation with Department of Planning and Infrastructure as a follow up to their letter approving the Audit Team (condition 6(b));
- Consultation with DP&I, Sydney Catchment Authority (SCA), OEH and DPI-Mineral Resources (condition 6(b));
- Site inspection of the main aspects of the mining operation (Dennis Zines and Damon Roddis), inspection of the West Cliff Emplacement Area (Dennis Zines) on 26 October 2011 and subsidence areas (4 November 2011 Steve Ditton);
- Review of documentation, files, reports, records and data at the Mine Site Office
- Interviewing relevant Dendrobium personnel Joanne Page, Richard Walsh, Gary Brassington, Scott Coleman, and Peter McMillan,
- Assessment against conditions 6 (c) and (d); and
- Preparation of this Audit Report including Recommendations as per condition 6 (e).

SUMMARY OF FINDINGS

This summary addresses the findings under the Schedules included with the 8 December 2008 consent. No comment is required in this summary on Schedules 1 and 2 which are largely administrative or not related to environmental performance.

SCHEDULE 3 – SPECIFIC ENVIRONMENTAL CONDITIONS – MINING AREA

SUBSIDENCE ISSUES

The Subsidence Environmental Management Plan (SEMP) for the landscape elements of Dendrobium Area 1 was prepared by GSSE in November 2004. This plan has been subsequently modified to include Area 2 (GSSE, 2006) and the revised document was incorporated into the Subsidence Management Plan (SMP) prepared for Area 3A in accordance with DPI NSW guidelines. This SMP fulfils the requirement for landscape monitoring and management for Area 3A as required by the Dendrobium Consent and the SMP Guidelines.

Observed subsidence movements and impacts in Areas 1, 2 and 3A (LWs 1- 7) for the reporting period 2009-2011 have been generally within predictions and environmental impacts are considered to be 'negligible' to 'minor'. There have been only a few surface landscape impacts due to rock falls and overhang collapse that have been described as 'moderate' in Area 2, with no 'severe' impact occurrences identified.

Monitoring details / frequency requirements and potential impact / management response outcomes for each feature are defined in several Impact Management Trigger action Response Plans (TARPs) as required by the Consent Conditions. The results of monitoring of impacts are presented in monthly, 6th monthly and annual environmental management reports as well as End of Panel Reports.

Several Area 2 and 3A sites were inspected by DgS on 4/11/11 and found to concur with the reported impacts.

Some of the issues raised in regards to the Dendrobium monitoring reports during this audit period include:

- The request for on-going reporting of past monitoring results in Areas 1 and 2 has been requested to be included in the AEMRs by the Dendrobium CCC.
- The assessment of the impacts to Swamp 1 above LWs 4 and 5 in a letter from DRE to BHPBIC requires further scrutiny as the assessment that the lowering of groundwater levels is questionable, considering the possibility that strata dilation may be the primary cause. The groundwater levels would however, be expected to recover in the short to medium term at a rate dependent on climate.
- Further explanation on the likely short to long-term impacts of iron/manganese oxide / hydroxide precipitation and oxygen sag impacts along creeks where they have occurred after mine subsidence. *Note: Based on discussions with the IC Environmental Team manager and a representative of GSS*

Environmental, it is understood that an independent water chemistry consultant has assessed that the effects of iron staining and precipitation on aquatic biota is temporary and unlikely to become a serious issue.

All of the above issues could be dealt with as stand-alone reports and included in the future AEMRs.

SCHEDULE 4 - SPECIFIC ENVIRONMENTAL CONDITIONS – SURFACE FACILITIES

NOISE

Minor exceedances of the noise impact assessment criteria have been recorded at non-mine related receptors during the audit period.

It is anticipated that a route towards compliance may be made through the Continual Improvement Consent requirements relating to noise management.

All other Dendrobium actions under this section of the Consent comply. The strategies, plans or programs required relating to noise management appear adequate. There are no additional measures or actions recommended for this condition.

BLASTING AND VIBRATION

Reportedly no blasting operations have been undertaken at the surface facilities during the audit period, therefore requirements relating to blasting and vibration have been satisfied.

AIR QUALITY

Some exceedances of the dust deposition and short term PM₁₀ criteria have been observed at times during the audit period. These exceedances are considered to be minor, and the contextual information surrounding reasons for these exceedances, as provided by the Dendrobium, are considered adequate.

All other Dendrobium actions under this section of the Consent comply. The strategies, plans or programs required relating to air quality management appear adequate.

Given the location of Dust Deposition Gauge Point 15 (adjacent to a dirt bike circuit), it is recommended that the siting of this instrument be reviewed, or this monitoring point be removed altogether.

METEOROLOGICAL MONITORING

Dendrobium maintains a 10m automatic weather station located adjacent to the main car park, on the roof of the main building. Monitoring has been undertaken for the period of the audit. Requirements relating to meteorological monitoring have therefore been satisfied.

WATER MANAGEMENT

There is appropriate catchment and treatment facilities on site as observed in earlier audits including clean, oily and dirty water at the pit top and clean and dirty at Kemira Valley.

The Recycled Water Project which won an award from Sydney Water has significantly reduced freshwater use.

Water from the old Kemira Mine workings is discharged through Licensed Discharge Point 5 (LDP5), located at Marley Place. The previous audit discussed the issue of non-compliances from the LDP5 sampling tank. Further non-compliances occurred during 08/09 while using the original system. On September 3, 2008, Dendrobium wrote to DECC seeking a change in the sampling point and the sampling system which received approval. The new system eliminated non-conformances in the 08/09 AEMR reporting period.

Discharges for the most part comply with the Environmental Protection Licence (EPL) conditions. Non-conformances are reported in the AEMR and the EPL Annual Return. The observed non-conformances are not considered significant.

PRPs 11, 12 and 13 were completed within the audit period.

The surface water monitoring program enables Dendrobium to maintain a database of regional water quality and to determine any changes to surrounding water quality.

The data (summarised in the AEMRs) suggests that neither the mine site nor the KVCLF has had an impact on the surrounding water quality during the 2010/2011 AEMR period. The Auditor agrees with the conclusion.

A review of the photos taken during the reporting period suggests that neither the mine site nor the KVCLF has had an impact on stream stability during the reporting period. Any changes observed have been the result of increased flows during heavy rainfall periods.

Dendrobium is in compliance with this section of the consent.

LANDSCAPE MANAGEMENT

During the 2009/2010 AEMR reporting period, rehabilitation of disturbed land (excluding infrastructure areas) was completed at Vent Shaft 2/3 and Stage 1 of the Mt Kembla Mine Memorial Pathway (between Cordeaux Road and Stones Road) during the reporting period. Other rehabilitation occurred and is scheduled to occur in 2012.

No significant land pollution events occurred during the 2010/2011 AEMR reporting period. Minor spills that occurred were cleaned up as soon as practical and had no environmental impact.

The 2008/2009 AEMR notes that a draft Landscape Management Plan has been developed as a requirement under the Development Consent. In addition the

Dendrobium Mine Conceptual Closure Plan has been developed in line with I&I NSW and internal BHP Billiton requirements (updated in June 2010).

A letter from the Department of Planning dated 22/12/09 indicated the Landscape Management Plan had not at that stage been developed to the satisfaction of the Director-General of the Department of Industry and Investment (DII). The Department requested that this plan be submitted to the Department (i.e. Planning) after it received approval from DII.

DII advised in a letter dated 28 Feb 2011 and signed by the Director-General that the Landscape Management Plan had been prepared and implemented to his satisfaction. Dendrobium advised that the approved plan has since been sent to the Department of Planning and Infrastructure but at the time of the audit has not received their approval.

The Conceptual Closure Plan for Dendrobium Colliery was submitted to I & I – Mineral Resources on 12 January 2010.

An updated Security Assessment for the Rehabilitation Cost Estimates sent to I & I – Mineral Resources in October 2011.

The Bushfire Management Plan submitted and approved prior to this audit. There are regular actions, inspections and responses according to the Bushfire Management Plan.

Dendrobium is in compliance with this section of the consent.

TRANSPORT

The allowable hours of operation on the Kemira Valley Rail Line were reduced on 30 April 2010 in accordance with the conditions of consent. There were no breaches of the curfew times during the audit period, records of train numbers and movements were kept.

The Department of Planning letter of 22/12/2009 indicates that the Traffic Management Plan has been submitted and approved as per the consent condition.

The AEMRs report on Road Safety initiatives.

The auditor has sighted the Stones Road Maintenance Deed agreement with WCC. The agreement with the SCA has not been sighted by the auditor, but the approved remediation of Vent shafts 2/3 in the SCA area provides evidence of agreed procedures for road maintenance.

The Dendrobium actions under this condition comply but the 2010/2011 AEMR did not fully report in accordance with consent in respect of coal transport by rail and future AEMRs need to ensure this happens.

VISUAL

A Lighting Impact Assessment did not reveal any of Dendrobium Mine operations to exceed any of the requirements of AS 4282 at any of the identified sensitive receivers at any time. The Dendrobium actions under this condition comply.

WASTE

Dendrobium currently has six main waste streams. These waste streams include general waste, paper/cardboard, scrap steel, timber, industrial waste (diesel particulate filters) and waste oil.

The AEMRs list both the amounts of the materials generated on site and indicated whether they were recycled or disposed of. The AEMRs also identify on-site training and improvement initiatives.

The 2010/2011 AEMR reports that an off-site waste sorting trial will be conducted in FY12 and results will be included in the FY12 AEMR.

The Dendrobium actions under this condition comply.

SCHEDULE 5 - SPECIFIC ENVIRONMENTAL CONDITIONS – OTHER SITE COMPONENTS –

COAL WASHERY

The auditor has seen BHPB advice that the Dryer never got past the trial stage and was shut down on the 25/10/2006. Accordingly the two conditions relating to Hot Gas Exhaust Stack Discharges and Fuel Source are no longer relevant.

WEST CLIFF COAL WASH EMPLACEMENT

Dendrobium is complying with the conditions of monitoring amounts of coal washery reject placed, reuse options and reporting.

Pollution Reduction Program (PRP) 10 was negotiated by Illawarra Coal as required by Condition 3 of the Further Approval (Dendrobium Mine development consent) with the Department of Environment, Climate Change and Water (DECCW) in 2008. The PRP was incorporated into the West Cliff Environment Protection Licence (EPL) 2504 via a Section 58 notice on the 2nd July 2008. The first part of the PRP, PRP 10.1 has been completed and submitted in March 2010. The auditor has viewed the correspondence to OEHL of 27 June 2011. The company is currently in the process of negotiating a new PRP with OEHL following on from the outcomes of PRP10.1. PRP10.1 specifically addressed salinity as required. The PRP work has been in train since 8 December 2008 and will continue for a minimum of 5 years.

Dendrobium personnel advise that the water quality monitoring plan for West Cliff mine been developed with DECC and DWE as required. This plan is part of the

overarching West Cliff Emplacement Management Plan. Monitoring is ongoing and reviewed regularly. The most recent review was for the submission of the Water Management plan for the Stage 3 Emplacement Area Environmental Assessment (which has been approved).

On 17 Sept 07 Dendrobium received the DPI Permit for the reclamation of Brennans Creek. The Brennans Creek Bypass Channel Rehabilitation Features West Cliff Colliery report (Rev 0) prepared by Cardno Forbes Rigby was submitted to the Department of Planning (DoP) in December 2008. After several iterations, the Final Report 001 Rev 2 dated June 2009 was re-submitted before the required date and the revised report did satisfy the consultation part of the condition. The Rehabilitation Plan is now in place and has been approved. Rehabilitation had not commenced at the date of this audit.

The West Cliff Emplacement Management Plan (approved) outlines Monitoring for ground water, emplacement settlement, compaction and combustibility, subsurface drainages inspections, water monitoring, erosion and sediment control, Vegetation and Fauna Monitoring and Dust monitoring.

The annual emplacement rehabilitation monitoring program, conducted by Niche, kicked off in 2010 following consultation with DPI. The 2011 report has been viewed by the auditor. The West Cliff AEMR also has a section of Emplacement Operations/Management Internal monitoring of rehabilitation also takes place with set photo points with other measures on a quarterly basis (internal monitoring).

The Niche report supplemented by the internal reporting satisfies this condition.

The Dendrobium actions under this condition comply. The resolution of the transfer of 154 ha of land from Dendrobium needs to be reported in the next AEMR.

SCHEDULE 6 - - SPECIFIC ENVIRONMENTAL CONDITIONS – EXTENDED SITE

GREENHOUSE GASES AND ENERGY EFFICIENCY

The Auditor has seen the advice from the Department of Planning and Infrastructure dated 22/12/09 which notes approval of the plans and documents relevant to this condition.

The development's greenhouse gas emissions and minimisation measures are reported in the AEMRs.

Each of the AEMRs identifies that there are no GHG abatement projects currently in place at the Dendrobium mine site due to the relatively low methane content in the vent air. However, Illawarra Coal has current GHG abatement measures in place at its other mines (Appin and West Cliff) which satisfy this condition. The Consent conditions allow for the Dendrobium mine to be considered within the ambit of the Southern Coalfield Operations and related operations. The reviews of the AEMRs by the Director-General indicate acceptance or identify areas which need further information.

The Dendrobium actions under this condition comply.

SCHEDULE 7 – ADDITIONAL PROCEDURES FOR AIR QUALITY AND NOISE MANAGEMENT

NOTIFICATION OF LANDHOLDERS

Minor exceedances of the noise and air quality criteria have been noted at times during the audit period.

No information has been provided indicating that the Director-General and affected landowners were notified at these times.

However, noise and air quality monitoring results indicate that while these exceedances have been recorded, they have neither been high in magnitude, nor protracted in duration.

Further, recent monitoring results indicate that Dendrobium is currently in compliance with respect to noise and air quality criteria.

In view of the above contextual information, this condition is deemed to have been satisfied.

INDEPENDENT REVIEW

It is understood that no requests for independent review of impacts on private land have been made during the audit period. Thus, this condition has been satisfied.

LAND ACQUISITION

It is understood that no requests for private land to be acquired have been made during the audit period. Thus, this condition has been satisfied.

SCHEDULE 8 – ENVIRONMENTAL MANAGEMENT, MONITORING, AUDITING AND REPORTING

ENVIRONMENTAL MANAGEMENT STRATEGY

The Department of Planning letter dated 22/12/09 indicates the Department's approval of the Environmental Management Strategy. In addition to the requirements of this consent condition, Dendrobium supplements their environmental compliance with a number of additional internal audits which demonstrates the desire for environmental compliance.

ENVIRONMENTAL MONITORING PROGRAM

The Department of Planning letter dated 22/12/09 indicates the Department's approval of the Environmental Monitoring Program.

REPORTING

There have been no incidents that trigger reporting to date.

The annual production of the AEMRs and their posting on the web satisfies this condition. The auditor supports the efficiencies applied to the 2010/2011 AEMR, but recommends that the future AEMRs cross-check the 8 December 2008 consent requirements with the information reported.

INDEPENDENT ENVIRONMENTAL AUDIT

This document represents compliance with this condition.

COMMUNITY CONSULTATIVE COMMITTEE

The DCCC was established in January 2002 in accordance with the Dendrobium Development Consent. Meetings are usually scheduled every 2 months.

In November 2002, Dendrobium, the community and WCC developed an agreement called the Dendrobium Community Enhancement Program (DCEP). The program received an upfront payment of \$600,000 directed to a WCC controlled trust fund at the commencement of the Dendrobium operations. Since 2005, a further three cents per saleable tonne of coal from the Dendrobium operations (adjusted for CPI) has been contributed to the fund. Following a change in the administration of the funds in FY10, the funds previously managed by the WCC and future contributions are now managed by the Dendrobium Community Enhancement Program Trust/DCEC.

ACCESS TO INFORMATION

The Dendrobium actions under this condition and the other conditions in this Schedule comply.

OVERVIEW OF ENVIRONMENTAL PERFORMANCE AND COMPLIANCE

The project has reached a mature stage where systems and procedures for running the operation and complying with the consent conditions are now well established. Virtually all of the required Management Plans have been prepared and approved and the process is now largely one of continuing compliance in respect of monitoring, reporting, and responding where and when appropriate. An exception to this overview statement relates to the continued interest in the issue of Subsidence and in particular to the potential impact on Swamps (see later discussion).

The modified Consent Conditions of 8 December 2008 have simplified the compliance and reporting process while still maintaining a comprehensive approach to a comprehensive project.

The Dendrobium management has demonstrated a very high level of compliance with approvals, licences and consents for approval conditions that are seen as being very comprehensive.

The audit has observed that there have been a limited number of non-compliances during the audit period, but that most of the non-compliances have been not resulted in significant adverse impacts. Dendrobium has demonstrated its willingness to respond to non-compliances in a positive manner and has also demonstrated several internal initiatives that extend beyond the consent and are seen to be beneficial.

The principal environmental issue of greatest concern to authorities and some community members appears to relate the impacts of subsidence on swamps (although in an associated matter, SCA is also concerned about the protection of its water catchments). This audit notes that Dendrobium is required in the near future to respond in detail to (a) the letter from Trade and Investment dated 22 November 2011, and (b) the request from the Department of Planning and Infrastructure in respect of the letter from Dr Ann Young (attached in Appendix C). These responses are seen as significant contributors to the ongoing compliance under the Schedule 3 consent conditions.

The auditor notes that the consent conditions for this matter are extensive and there are many authorities and community members involved. Dendrobium has been assessed as complying with the consent conditions but consensus under the circumstances with respect to perceived subsidence impacts for natural areas is a difficult matter and will require further cooperation between BHPB, the relevant authorities and the interested community. The auditor considers that consent condition **Swamp Impact Management 6. (g)** “incorporate means of updating the plan based on experienced gained as mining progresses” is key to achieving satisfactory resolutions to the noted requests for further analysis and assessment.

Overall, the environmental management for the project is also assessed as being very effective. The audit has made a number of **recommendations** which should be investigated in future compliance reporting. These include:

Subsidence

- It is recommended that environmental monitoring sites for groundwater below swamps be installed as early as possible and impact explanations to consider limitations of available base line readings. It is considered by DgS that the ‘flat-lining’ piezometers is due to groundwater levels lowering in dilated strata, but are likely to recover over time and at a rate dependant on climatic conditions.
- In the interests of transparency, it would probably be a beneficial exercise to present on-going monitoring data for previously mined areas in the AEMRs.
- Further comment should probably be sought from GHD on the draw down in the Bulli Seam that has been raised by stakeholders (DCCC). Despite the comments already made by them on the effects and likely cause, is the

interaction between the igneous intrusion and old workings to the south of Area 3A.

- It is considered that the precipitation of iron oxide is a common occurrence when mine subsidence cracking in the Southern Coalfield results in the release or exposure of groundwater to the atmosphere. Expert water chemistry consultants have assessed that the impact of iron oxide precipitates observed in Areas 1 and 3A to-date are only short term effects and unlikely to result in any significant impact on aquatic ecology.
- Although there are no reported aquatic flora/fauna kills due to the precipitation of iron oxide along flowing groundwater fed water courses above LW7, the direct or indirect impacts of the release is yet to be dealt with in future AEMRS and EoP reports. It is suggested that this issue be included as a discussion point or impact item in the next AEMR.
- It is also considered that the term 'environmental consequences' in the Conditions of Consent is also a rather negative term to apply to 'environmental impacts'. 'Consequences' infers all mine subsidence impacts degrade the environment permanently in some way. The purpose of the TARPs is to mitigate impacts and re-establish environmental function after mining is completed. Therefore, it is requested that the DoP&I consider changing the word 'consequences' to 'impacts'.

Air Quality

- Given the location of Dust Deposition Gauge Point 15, it is recommended that the siting of this instrument be reviewed, or this monitoring point be removed altogether.

Water Management

- Dendrobium should discuss with OEH the merit of applying for a discharge licence point from the pond which takes the pit top overflow;
- Dendrobium should review the TSS and conductivity data before and after the KVCLF in the next period to ascertain whether the minor changes in these parameters represent a real increase or are just within natural variations.

Transport

- The AEMR needs to specifically report on compliance with the consent conditions. The first two AEMRs are compliant but the 2010/2011 is deficient in some details. Future AEMRs need to ensure these details are provided.

Access to Information

- BHPB to consider additional website information to include all reports in archive files since the project commencement.

1. INTRODUCTION

1.1 Dendrobium Mine Outline

The Dendrobium Mine comprises the development of a new underground coal mine, and construction and operation of associated surface facilities (“the Development”).

The Dendrobium Mine Proposal was subject to extensive environmental examination under the NSW *Environmental Planning & Assessment Act 1979 (EP&A Act)* and received Approval from the Minister for Urban Affairs and Planning for the Project to proceed on 20 November 2001, subject to conditions of approval (“the Consent”). A listing of the conditions and the state of compliance of each condition is kept by Dendrobium and included with their Annual Environment Management Report (AEMR) which is provided to the government authorities each year.

The Dendrobium Mine is owned and operated by Dendrobium Coal Pty Ltd, a wholly owned subsidiary of BHP Billiton (BHPB) and is located at Mt Kembla, approximately 8 km west of Wollongong NSW on the Illawarra Escarpment.

The Dendrobium Project consists of a number of sites in addition to the mine site. The sites associated with the Project and discussed in this audit are:

- Dendrobium Pit Top – administration, workshop and people and materials access, via the Dendrobium Tunnel, to the underground workings;
- Kemira Valley Coal Loading Facility (KVCLF) – coal clearance via the Kemira Valley Tunnel, stockpile and train loading facility (now including a new coal sizer);
- No.1 Ventilation Shaft – originally operating as an upcast ventilation shaft but since decommissioned;
- Nos.2 & 3 Ventilation Shaft – upcast ventilation shaft and fan providing fresh air to the mine for Area 3;
- Kemira Valley Rail Line – transport route from stockpile facilities to the Port Kembla Steel Works;
- Dendrobium Coal Preparation Plant – located within Port Kembla Steel Works providing washing and drying facilities for the Dendrobium coal product;
- The West Cliff coal emplacement area; and
- Mining Areas 1 (Longwalls 1 and 2), 2 (Longwalls 3 to 5a) and 3 (Longwalls 6 and 7).

Figure 1 in Section 9 of this report shows the location of all of the above apart from the West Cliff coal emplacement area. Figures 2-4 show the set out of the Pit Top, the set out of Kemira Valley, and the long wall progress at the end of the audit reporting period.

The new Dendrobium Mine Pit Top facilities have been developed on the site previously known as Nebo Colliery, which was formerly combined with Wongawilli Colliery in 1993 to form Elouera Colliery. The Nebo Portal site was relinquished from the ownership and responsibility of Elouera Colliery in December 2001 to enable the Dendrobium Mine to acquire formal responsibility, ownership and identity of the site.

The Dendrobium Mine is designed to access and mine coal from the No.3 Seam of the Illawarra Coalfields, known as the Wongawilli Seam. Coal will be mined from 3 mining areas, known as Areas 1, 2 and 3 as shown in Figure 2 (previously noted as Areas A, B and C in the Environmental Impact Statement (EIS)).

The principal market for the coal is currently the Port Kembla Steel Works for steel making with domestic and export markets as required.

Mt Kembla Village is located immediately adjacent to and below the Pit Top area and Kembla Heights is located immediately above the Pit Top area. The village has intimate historical links with mining in the area.

1.2 Project Status

Construction on the works commenced in January 2002. The mine became operational during early 2003. As at end 2008, all of the surface facilities and the underground development for Areas 1 and 2 were completed. This allowed commencement of the long wall mining in these areas. Longwall mining commenced in April 2005.

This audit reviews the information contained in the AEMRs for 2008-2009; 2009-2010 and from 2010-2011. The activities undertaken in each of these periods is summarised in the AEMRs and is repeated here for convenience.

Significant activities undertaken during 2008/2009 included:

- Completion of Ventilation Shafts 2 and 3;
- Underground mine development continued to provide access to future longwall blocks in Area 3A;
- Completion of longwall mining in LW4, Area 2 - October 2008;
- Commencement of longwall mining in LW5, Area 2 - December 2008;
- Community Attitude Survey conducted;
- Upgrade to the waste oil collection facility;
- Decommissioning of composite sample tank at LDP5;
- Completed review of the key site environmental management plans as per Development Consent requirements.
- Modification to Development Consent received;
- Internet page reviewed to meet Development Consent requirements; and
- Implementation of a water recycling project.

Significant activities undertaken during the 2009/2010 period included:

- Completion of longwall mining in LW5, Area 2 - December 2009;
- Commencement of LW6 in Area 3A - February 2010;

- Key site environmental management plans approved by DoP as per Development Consent requirements.

Significant activities undertaken during the 2010/2011 period included:

- Completion of LW6 in March 2011;
- Commencement of longwall mining in LW7 in April 2011
- Application for renewal of the consolidated coal lease in October 2010;

Coal Production and Other Activities

Coal production in 2003 was 242,195 tonnes (ROM).

Coal recovery during 2002 to end 2005 was 3,329,322 tonnes (run of mine – ROM). In 2005, the Coal Preparation Plant processed 2.505 million tonnes averaging 61% saleable product.

Coal Wash emplacement occurred at Wongawilli during January to March 2005 and thereafter at West Cliff Area 2.

The 2006 reporting period was the first full year of longwall production at Dendrobium Mine resulting in an increase in Run of Mine (ROM) tonnes compared to previous years. ROM product for the period January 2006 to December 2006 was 2,799,426 tonnes. Saleable product yield was 50.6% of ROM production for the reporting period with a total of 1,381,574 tonnes of coal wash emplaced at the West Cliff emplacement.

Run of Mine (ROM) product for the period January 2007 to December 2007 was 2,496,344 tonnes, with a saleable product yield of 71.9% for the reporting period. 1,084,109 tonnes of coal wash was emplaced at the West Cliff emplacement.

Run of Mine (ROM) product for the reporting period 1 January 2008 to 30 June 2009 was 4,944,988 tonnes with a saleable product yield of 69%. ROM product for FY09 was 3,000,160 tonnes, with a saleable product yield of 68%.

Run of Mine (ROM) product for the reporting period (FY10) was 3,338,763 tonnes with a saleable product yield of 73.6%.

Run of Mine (ROM) product for the reporting period (AEMR 2010 to 2011) was 3,670,043 tonnes with a saleable product yield of 78.8%.

The AEMRs contain summary tables of cumulative coal production totals.

Project Changes since the date of Consent

Changes to the project since the Consent include:

- Some minor amendments were made to the consent reported in the Annual Environmental Management Reports (AEMR) for 2002 and 2003 which addressed changes to names of government authorities, additional traffic

conditions, the approval to submit an application for second workings, and specific limits on mine water discharge to Allans Creek.

- Dendrobium altered the longwall mining plan for Area 1 to reduce the number of longwalls from 3 to 2, which would result in less coal being mined from the area and correspondingly a reduction in associated subsidence impacts.
- The rail transport from KVCLF introduced longer rail cars, reducing the number of train journeys.
- In April 2006 there was a further modification to the consent which included the addition of the coal sizer and a number of conditions arising from the Department of Planning Audit of March 2006. In particular, the new conditions required upgrades to the Air Quality Management Plan and the Noise Management Plan.
- In April 2007, Dendrobium applied for a further modification to the consent to address proposed changes to Mining Area 3, incorporating the requirements of Staged Development Area C, and an administrative review of the conditions of consent. On 8 December 2008, the then Minister for Planning approved the modification of the Consent which applies to this audit.
- In 2007, Dendrobium withdrew longwall panel 5A from Area 2 to manage mining impacts at Sandy Creek Water Fall.

1.3 Purpose and Status of This Report

This report addresses Consent Condition 6 of Schedule 8 of the Revised Dendrobium Consent dated 8 December 2008 (which is reproduced here for convenience) which calls for an Independent Environmental Audit. More specifically:

INDEPENDENT ENVIRONMENTAL AUDIT

6. By 31 December 2011, and every 3 years thereafter, unless the Director-General directs otherwise, the Applicant shall commission and pay the full cost of an Independent Environmental Audit of the development. This audit must:

(a) be conducted by suitably qualified, experienced and independent team of experts whose appointment has been endorsed by the Director-General;

(b) include consultation with the relevant agencies;

(c) assess the environmental performance of the development and assess whether it is complying with the relevant requirements in this approval and any relevant EPL or mining lease (including any strategy, plan or program required under these approvals);

(d) review the adequacy of strategies, plans or programs required under these approvals; and, if appropriate,

(e) recommend measures or actions to improve the environmental performance of the development, and/or any strategy, plan or program required under these approvals.

Note: This audit team must be led by a suitably qualified auditor and include experts in the fields of a) mine subsidence impacts and remediation and b) stream hydrology and water quality.

7. Within 6 weeks of the completing of this audit, or as otherwise agreed by the Director-General, the Applicant shall submit a copy of the audit report to the Director-General, together with its response to any recommendations contained in the audit report.

8. Within 3 months of submitting the audit report to the Director-General, the Applicant shall review, and if necessary revise the strategies/plans/programs required under this consent to the satisfaction of the Director-General.

The date of the Initial Consent was 20 November 2001 meaning that the first Audit report was due on 20 November 2004. Dendrobium sought from the Director-General and was granted a postponement of this date to 30 April 2005. Within the first audit report, there were three AEMRs for the periods Jan-Dec 2002, 2003 and 2004.

The three year anniversary for the second Audit was the end of April 2008. Due to the application for a change to the consent conditions of 11 April 2007 and the Director-General's agreement to do so (scheduled granting of the modified consent due approximately in September/October 2008 – pers. comm. Department of Planning), it was agreed between Dendrobium and Department of Planning that the second audit period would cover from May 2005 to end September 2008.

For the second Audit, there were the three AEMRs for the periods Jan-Dec 2005, 2006 and 2007. The AEMRs provide a substantial amount of data for the audit. In addition, there were several monitoring and investigation reports that have been undertaken during 2008 which have been referred to in the second audit.

The third audit (this document) includes data from the AEMRs for the periods 1 January 2008 -30 June 2009, (2008-2009 AEMR); 1 July 2009 – 30 June 2010 (2009-2010 AEMR) and 1 July 2010 – 30 June 2011 (2010-2011 AEMR). Among other things, the AEMRs identify the relevant approvals pertaining to the operations.

1.4 Authorities Names

There have been a number of organisational changes to State government authorities since the date of the Consent. The EPA and NPWS became part of the Department of Environment and Conservation (DEC) which name was subsequently altered to the Department of Environment and Climate Change (DECC) and later to Department of Environment, Climate Change and Water (DECCW) but now is part of the Office of Environment and Heritage (OEH).

The DMR became part of the Department of Primary Industries (DPI – Mineral Resources) after DPI became Industry and Investment (I&I) and is now DPI - Resources and Energy (DRE) after I&I became Trade and Investment, Regional Infrastructure and Services (NSW Trade & Investment).

DUAP became the Department of Infrastructure and Planning (DIPNR), then became the Department of Planning (DoP), but is now the Department of Planning and Infrastructure (DP&I). DLWC which was referred to as the Department of Natural

Resources (DNR) is now the Office of Water. NSW Agriculture and NSW Fisheries became part of Department of Primary Industries.

While it is intended that the latest names be used in this document, direct references to the Consent Conditions may require use of the names included in the original consent.

1.5 Report Contents

This report consists of a further 9 Sections.

Section 2 of this report deals with Consent Conditions and Consultation,

Section 3 of this report deals with Subsidence issues in the Mining Area

Section 4 of this report deals with Environmental Issues at the Surface Facilities

Section 5 of this report deals with Environmental Issues at the Other Site Components

Section 6 of this report deals with Environmental Issues at the Extended Site

Section 7 of this report deals with additional procedures for Air and Noise

Section 8 of this report deals with Management, Monitoring and Reporting

Section 9 of this report contains the Figures referred to in the audit report.

Section 10 contains the Appendices referred to in the audit report.

1.6 Preparation of the Report and Sign-Off

Dennis Zines of KADENZ Pty Ltd – Environmental Consultancy was commissioned by BHP Billiton to undertake an independent environmental audit of the Dendrobium Mine to address their Consent Condition 6 of Schedule 8 Independent Environmental Audit. KADENZ was supported by several specialists as follows:

- Air Quality – Damon Roddis of PAE Holmes
- Noise – Glen Homes/Damon Roddis of PAE Holmes
- Subsidence - Steve Ditton of Ditton Geotechnical Services

The appointment of the KADENZ team was approved by the Department of Planning by a letter dated 5 October 2011 (refer Appendix B).

The audit process consisted of:

The audit process consisted of:

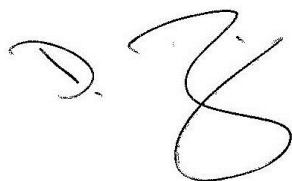
- Pre-audit preparations and review of documentation;
- Consultation with Department of Planning and Infrastructure as a follow up to their letter approving the Audit Team (condition 6(b));

- Consultation with Sydney Catchment Authority (SCA) by Dennis Zines and DRE by Steve Ditton to enquire as to specific issues regarding subsidence impact management; OEH by Damon Roddis to enquire as to specific air quality / noise issues relating to the Dendrobium mine(condition 6(b));
- Site inspection of the main aspects of the mining operation (Dennis Zines and Damon Roddis), inspection of the West Cliff Emplacement Area (Dennis Zines) on 26 October 2011 and subsidence impacts in Areas 2 and 3A (4 November 2011 Steve Ditton);
- Review of documentation, files, reports, records and data at the Mine Site Office
- Interviewing relevant Dendrobium personnel Joanne Page, Richard Walsh, Gary Brassington, Scott Coleman, and Peter McMillan,
- Assessment against conditions 6 (c) and (d); and
- Preparation of this Audit Report including Recommendations as per condition 6 (e).

Information contained in the report is predominantly sourced from the Dendrobium reports supported by their consultants' reports backed up by the original approval Project EIS documents. Dendrobium personnel have also provided copies of certain correspondence between them and their approval authorities.

KADENZ and the specialist consultants have relied solely on these processes in respect of the integrity of the data included in this report.

KADENZ Representative:



Dennis Zines

Director

Date: 22 December 2011

2. CONSENT CONDITIONS AND CONSULTATION

2.1 CONSENT CONDITIONS

The Revised Consent of 8 December 2008 (Appendix A) consists of a series of Schedules. The main headings of the list of schedules are included here with associated discussion (as relevant) or reference to other Sections of the Audit document where the conditions are assessed in detail.

SCHEDULE 1 – Identifies that the Minister for Urban Affairs and Planning granted approval for the Dendrobium Project on 20 November 2001.

SCHEDULE 2 – ADMINISTRATIVE CONDITIONS

This updates the Original Consent to the 8 December 2008 Consent and sets out the relevant Administrative Conditions:

- Obligation to Minimise Harm to the Environment
- The Terms of the Approval
- Limits on Approval
 - Mining Operations may take place in the mining Area until 31 December 2030 – **Complies**
 - The Applicant shall not extract more than 5.2 million tonnes of ROM coal a year from the mining area – **Complies**
 - The Applicant shall only transport coal from the surface facilities by rail – **Complies**
- Staged Submission of Management Plans/Monitoring Programs
- Structural Adequacy
- Demolition
- Operation of Plant and Equipment
- Community Enhancement
- Cost of Management Measures

The Audit does not address these issues except where they relate specifically to environmental matters. Such discussion is included in Sections 3 to 8 of this document.

SCHEDULE 3 – SPECIFIC ENVIRONMENTAL CONDITIONS – MINING AREA

All of the topics below are assessed in **Section 3** of this Audit.

SUBSIDENCE including:

- Watercourse Impact Management
- Swamp Impact Management
- Subsidence Management Plans
- End of Panel Reporting
- Subsidence Expert Assessments

ABORIGINAL HERITAGE

GROUNDWATER MONITORING

ENVIRONMENTAL OFFSETS

SCHEDULE 4 - SPECIFIC ENVIRONMENTAL CONDITIONS – SURFACE FACILITIES

All of the topics below are assessed in **Section 4** of this Audit.

NOISE including:

- Land Acquisition Criteria
- Rail Haulage Impact Assessment Criteria
- Additional Noise Mitigation Measures
- Monitoring

BLASTING AND VIBRATION

AIR QUALITY including:

- Impact Assessment Criteria
- Vibration

METEOROLOGICAL MONITORING

WATER MANAGEMENT including:

Discharges

- Water Management Plan
- Site Water Balance
- Erosion and Sediment Control
- Surface Water Monitoring Program
- Surface and Ground Water Response Plan

LANDSCAPE MANAGEMENT including:

- Rehabilitation
- Landscape Management Plan
- Rehabilitation Management Plan
- Mine Closure Plan
- Bushfire Management Plan

TRANSPORT including:

- Rail Transport of coal
- Road Transport
- Road Maintenance

VISUAL including:

- Visual Amenity
- Lighting Emissions

WASTE

SCHEDULE 5 - SPECIFIC ENVIRONMENTAL CONDITIONS – OTHER SITE COMPONENTS

All of the topics below are assessed in **Section 5** of this Audit.

COAL WASHERY including:

- Hot Gas Exhaust Stack Discharges
- Fuel Source

WEST CLIFF COAL WASH EMPLACEMENT including:

- Coal Washery Reject
- Pollution Reduction Program
- Water Quality Monitoring Program
- Brennans Creek Diversion Bypass Rehabilitation Plan
- General Management of the Emplacement

SCHEDULE 6 – SPECIFIC ENVIRONMENTAL CONDITIONS – EXTENDED SITE

All of the topics below are assessed in **Section 6** of this Audit.

GREENHOUSE GASES AND ENERGY EFFICIENCY

SCHEDULE 7 – ADDITIONAL PROCEDURES FOR AIR QUALITY AND NOISE MANAGEMENT

All of the topics below are assessed in **Section 7** of this Audit.

NOTIFICATION OF LANDHOLDERS

INDEPENDENT REVIEW

LAND ACQUISITION

SCHEDULE 8

All of the topics below are assessed in **Section 8** of this Audit.

ENVIRONMENTAL MANAGEMENT STRATEGY

ENVIRONMENTAL MONITORING PROGRAM

REPORTING

- Incident Reporting
- Annual Reporting

INDEPENDENT ENVIRONMENTAL AUDIT

COMMUNITY CONSULTATIVE COMMITTEE

ACCESS TO INFORMATION

2.2 CONSULTATION WITH AUTHORITIES

TO SATISFY CONDITION 6(b)

2.2.1 Department of Planning and Infrastructure

The Department was contacted and replied by email in substance that:

“The Department does have some particular requirements for your audit. The Department forwarded a letter from Dr Ann Young who had written to Ministers Hazzard and Hartcher in respect of the Dendrobium AEMR for the 09-10 year and also to the EOP (end of plan) report for LW 6, but more broadly to ongoing subsidence management and monitoring of Area 2 and Area 1, and baseline data gathering in Area 3B. The Department has asked for a report from IC regarding the claims made by Dr Ann Young, a retired upland swamp specialist and member of the Dendrobium CCC, regarding IC's monitoring, reporting and management of subsidence impacts. Dr Young also requested certain information and better briefing of the CCC.

The Department has requested that this audit address these claims in particular. It is also appropriate that the audit examine monitoring, reporting and management in the context of the company's existing Subsidence Management Plan and its sub-components.”

Mr Howard Reed of the Department was subsequently contacted by Dennis Zines and it was agreed that the BHPB responses to both the Dr Young letter and a letter from Trade and Investment dated 22 November 2011 with similar queries will fall outside of the period of the audit but that the audit document would note the responses received and that the BHPB actions in reply would need to be reported in the next audit.

It was also agreed that the audit would examine whether BHPB has satisfied its responsibilities in the audit period in respect of monitoring and interpretation during and post the mining in a particular area and whether the data collected is still readily accessible to the community and the authorities. The concern (*inter alia*) is that each AEMR and associated reporting focuses on the current mining location and excludes continued assessment of impacts on previous areas.

Copies of the letters from Dr Young and Trade and Investment are included in Appendix C.

These issues are considered in the Section 3 in this report dealing with Subsidence issues.

2.2.2 Office of Environment and Heritage

It is understood that the OEH is currently working with SCA and DRE on the review of the TARP's relating to Upland Swamps (see Section 2.2.4).

Damon Roddis contacted Andrew Couldridge of the NSW Office of Environment (OEH) and Heritage on 22 November 2011 to enquire as to whether OEH have any current issues with respect to air quality or noise impacts associated with the Dendrobium mine.

Mr Couldridge did not identify any specific issues, and commented that recent AEMRs had not shown any significant non-compliance in these areas.

2.2.3 DPI – Mineral Resources

It is understood that the DRE is currently working with SCA and OEH on the review of the TARPs relating to Upland Swamps (see Section 2.2.4).

2.2.4 Sydney Catchment Authority

The following response from the SCA (Ravi Sundaram - Manager Mining & Utilities) was received.

“The only issues the SCA have are as follows:

- 1. Implementation of 2 additional surface water flow monitoring sites in Wongawilli Creek (either side of the Dendrobium Coal Mine Area 3A).** The SCA most recent letter to the Department of Planning & Infrastructure (DoP&I) summarises the issue (refer attached copy of letter D2011/016188). The SCA has not yet had a response from the Department to this letter. Mining of longwall panels 6 in Dendrobium Area 3A has been completed and longwall panel 7 has progressed to 75% completion by the first week of November 2011. Longwall 8 and longwall 19 in Area 3A in the Wongawilli Creek catchment are yet to be mined and two additional Areas 3B and 3C in Dendrobium Area 3 will be mined in the near future. The layout of longwall panels in Area 3B and 3C is not known at this stage and will be detailed in future SMPs. Mining operations in this area are expected to occur until December 2030. The additional flow monitoring stations will provide valuable data about the impact of progressive mining in the catchment. The SCA continues to maintain that the installation of additional flow monitoring stations in Wongawilli Creek with regards to Dendrobium Mine current and future operations are required for control purposes, long term correlation with upstream gauges currently in place which in the near future have potential to be destabilised due to mining induced subsidence, and for determining the impacts on surface water and groundwater resources (water losses).
- 2. Review of TARPs particularly in relation to surface impacts and impact on upland swamps:** The SCA is working with the Office of Environment & Heritage (OEH) and Department of Energy & Resources, DTIRIS and Illawarra Coal on this matter. The OEH has reviewed groundwater monitoring data from 2009 to 2011 relating to longwall mining operations and impacts on Swamp 1 overlying Dendrobium Mine Area 2 where mining has been completed. The review indicates the impacts on Swamp 1 to be significant. Under the current TARPs, Illawarra Coal considers the impacts on Swamp 1 not to be of sufficient magnitude that requires a management response. A review of the TARPs and the need for additional controls or management actions is currently being undertaken to minimise or prevent damage to swamps in Dendrobium Area 3 that is currently being mined.

As mentioned previously, the SCA finds the reports prepared by Dendrobium Mine - Illawarra Coal and their consultants documenting surface impacts to be very useful and that you may wish to recommend to DoP&I that such reports should be required from other mine operators in the Special Areas.”

These issues are considered in the Section 3 in this report dealing with Subsidence issues.

3. SPECIFIC ENVIRONMENTAL CONDITIONS – MINING AREA

This section applies the following consent conditions to assess the technical areas covered under Schedule 3 of the 2008 Development Consent.

(c) assess the environmental performance of the development and assess whether it is complying with the relevant requirements in this approval and any relevant EPL or mining lease (including any strategy, plan or program required under these approvals);

(d) review the adequacy of strategies, plans or programs required under these approvals; and, if appropriate,

(e) recommend measures or actions to improve the environmental performance of the development, and/or any strategy, plan or program required under these approvals.

The 2008 consent specifically applies to Area 3A, 3B and 3C. Reference has also been made to the SMP Approval for Area 2 (1/5/07).

Appendix D contains the Subsidence Consultant DgS Report and Site Inspection Photo Log.

3.1 SUBSIDENCE

3.1.1 Watercourse Impact Management

The SMP for Area 2 (LWs 3-5) required an Environmental Monitoring Plan for surface water (quality and quantity) that was to be developed in consultation with the relevant stakeholders. It is understood that the SMP for Areas 1 and 2 will now be integrated into the Conditions of Consent for Area 3 (A, B, C).

The Conditions of Consent required the following impact limitations on mining in Area 3A (LWs 6-10):

- No impact to the over hangs or rock pools within 30 m of Sandy Creek Waterfall.
- Minor Impacts (ref: Table 23.2 in Draft SMP for Area 3A) only at Sandy Creek and Wongawilli Creek.
- Negligible reduction in surface and ground water inflows to Lake Cordeaux, Lake Avon, and surface water inflows to the Cordeaux River at its confluence with Wongawilli Creek.
- Prepare a suitable on-going monitoring and reporting program which includes surface water levels, flows, water quality, changes in surface gradients, erodibility, aquatic flora and fauna (including Macquarie Perch & other threatened species & their habitats) and ecosystem function.
- Include an impact management program to demonstrate how impacts are to be measured and defining an appropriate mine planning, corrective action or

mitigation response to predicted and unpredicted impacts, based on a Trigger, Action, Response Plan (TARP) management structure.

- Third Order and higher streams to be addressed individually and 1st and 2nd Order streams to be addressed collectively.
- Plans to be prepared in consultation with OEH, SCA and DPI.
- Incorporate an adaptive approach to mine planning based on knowledge gained from previously mined longwalls.

The mine has assessed pre-and post-mining conditions of the watercourses with stakeholders via IC Environmental Field Team inspections and specialist consultant assessments.

Watercourse impacts such as surface alluvium and rock bar cracking, flow path adjustment, iron staining, and gradient changes have been monitored and reported at monthly (IC Environmental Team) and 6-monthly (GSSE Pty Ltd) intervals during mining and up to 2 years after mining.

IC also established a “technical committee” of IC, DRE, MSEC and independent subsidence and geotechnical experts to prepare an appropriate TARP to monitor and manage mining impacts at Sandy Creek Water Fall as LW 6 approached its finishing point. The longwall was stopped 50 m short of the approved location, based on the stringent valley closure and horizontal strain limits applied to avoid impact.

Comparisons between predicted and observed subsidence effects and impacts have been assessed in End of Panel and Annual Environmental Management Reports by Comur Pty Ltd and the IC Environmental Field Team.

Overall, the subsidence predictions have generally been greater than observed movements and impacts have been within the limits defined in the revised Watercourse Monitoring TARP for the 1st, 2nd and 3rd Order watercourses within the study areas.

GSSE in their 6-monthly review of impacts to landscape and watercourses indicated the following impacts to an ephemeral watercourse, WC17 (below Swamp 12) due to LW 6 and 7:

- No surface cracking in Swamp 12.
- Rock bar fracturing and displacements of 1 mm to 160 mm.
- A small rock shelf / step collapse.
- Some loss of mid-reach surface flow and pond levels with a downstream discharge point noted at the back of a larger collapsed rock shelf (just outside extraction limits of LW7s start position).
- Iron oxide staining or deposits along flowing sections of watercourse.

The results of an inspection of ephemeral watercourse WC17 above LW7 by DgS on 4/11/11 concurred with the impacts reported by GSSE.

3.1.2 Swamp Impact Management

The SMP for Area 2 (LWs 3-5) required an Environmental Management Plan for swamps that are likely to be affected by subsidence impacts. The Plan must:

- Be prepared by suitably qualified persons and implemented before longwall mining occurs
- Include base line information on the condition of the swamps
- Detail procedures for rehabilitation of the swamps if impacted, and
- Include completion criteria and a programme to monitor the effectiveness of the rehabilitation.

It is understood that the SMP conditions have now been integrated into the Conditions of consent for Area 3 (A, B, C).

The conditions of consent required the following impact limitations to be implemented on longwall mining in Area 3A (LWs 6-10):

- Subsidence does not cause erosion of the surface or changes in ecosystem functionality of Swamp 15a and that the structural integrity of its controlling rock bar is maintained or restored.
- Prepare a Swamp Impact Monitoring, Management and Contingency Plan in consultation with OEH, SCA and DPI that demonstrates how the subsidence impact limits for maintaining the functionality of Swamp 15a are to be achieved.
- The monitoring program and reporting mechanisms must enable the DoP&I and DRE to complete on-going review of the impacts of individual and cumulative effects of the Area 3A longwalls on Swamp 15a.
- The monitoring and reporting program must include surface water and near-surface ground water levels, water quality, surface slope and gradient (changes), erodibility, flora and ecosystem function.
- The management plan should include a plan that will avoid, minimise, mitigate and remediate impacts to Swamp 15a and other headwater and valley infill swamps due to longwall mining and includes a TARP that focuses on remediation measures.
- Incorporate an adaptive approach to mine planning based on knowledge gained from previously mined longwalls.

- The management plans to be implemented prior to any longwall effects on swamps occurring to the satisfaction of the Director General.

The mine has assessed the pre-and post-mining conditions of Swamps 12, and 16 above LWs 6 and 7 using the IC Environmental Field Team and specialist consultants based on the Dendrobium Area 3A Swamp Impact, Monitoring, Management and Contingency Plan, April 2010. The plan includes monitoring frequency and timing and impacts to landscape (cracking of rock bars and soils) and flora and fauna (vegetation dieback and alteration of fauna and habitat).

Surface water and shallow groundwater (level/flows and quality) have been monitored in accordance with the Watercourse Impact TARP.

The outcome of the monitoring program in Area 3A after LWs 6 and 7 has indicated no fracturing of rock bars in Swamps 12 and 16 after LW6 or surface flow losses through fractured rock bars or changes to geochemistry or hydrology of the swamps has occurred. No fracturing to rock bars has occurred in Swamp 15a either. The impacts to all swamps in Areas 2 to 3 have been assessed as Minor in regards to the TARPs. It is understood, however, that the mine has been requested to provide further information for Swamp 1 based on concerns by the DoP&I/DPI as to whether the impacts are actually higher. This review is required to be submitted by the 16th December 2011.

3.1.3 Subsidence Management Plans

The Subsidence Management Plans (SMP) for Areas 3A, 3B and 3C are required to:

- include plans for monitoring subsidence effects
- integrate with on-going impact management in Areas 1 and 2
- integrate with Watercourse and Swamp Impact TARPs
- include the SCA Assets Protection Plan
- include impact management TARPs for all other significant natural and man-made features such as:
 - cliffs and steep slopes
 - groundwater
 - terrestrial flora and fauna and ecological communities and their habitats
 - Aboriginal Heritage sites
 - Power, communications and other infrastructure
- Be prepared in consultation with OEH, SCA and DPI

In regards to Areas 2 (LWs 4 and 5) and 3A (LWs 6-10) the mine has obtained subsidence effect predictions and subsidence impact assessment from MSEC and prepared the relevant TARPs for the following features:

- Cliffs
- Steep Slopes
- Watercourses (1st, 2nd and 3rd Order Streams)
- Sandy Creek Water Fall
- Swamps
- Terrestrial flora and fauna
- Aquatic ecology in creeks and tributaries
- Aboriginal Archaeology
- 4WD track and Fire Trails
- 330 kV Power Transmission line
- 33 kV Power line
- Upper Cordeaux Dam Wall
- Upper Cordeaux Reservoir Stored Waters and Mine Inflow (Groundwater)
- State Survey Control Marks

The Subsidence Environmental Management Plan (SEMP) for the landscape elements of Dendrobium Area 1 was prepared by GSSE in November 2004. This plan has been subsequently modified to include Area 2 (GSSE, 2006) and the revised document was incorporated into the Subsidence Management Plan (SMP) prepared for Area 3A in accordance with DPI NSW guidelines. This SMP fulfils the requirement for landscape monitoring and management for Area 3A as required by the Dendrobium Consent and the SMP Guidelines.

The TARPs include monitoring details / frequency requirements and potential impact / management response outcomes. The results of monitoring and impacts are presented in monthly, 6 monthly and Annual Environmental Management Reports as well as End of Panel Reports.

Overall, there have only been a few minor exceedances noted for the predictions with impacts typically assessed as either 'negligible' or 'minor'. 'Moderate' impacts are the highest level of impact noted to-date (from cliff line rock fall impacts in Area 2) with no 'Severe' or unexpected impacts occurring. *Note: the revised TARPs now*

refer to either Level 1 or 2 Impacts that are Within Predictions and Exceeding Predicted Impact Criteria.

Several Area 2 and 3A sites were inspected by DgS on 4/11/11 and found to concur with the reported impacts. The impacts observed included cracking and displacement of rock beds along watercourse WC17 (LW7), cracking in Swamp No. 1 (LW4/5), the collapsed rock shelf site outside the starting position of LW7 on WC17, the iron oxide staining or precipitate along watercourses WC17, and an open vertical joint near an Aboriginal Archaeology Site (Shelter with Rock Art) above LW6 (SCR25). No impacts were observed at the Sandy Creek Water Fall and monitoring sites, Sandy Creek and the Transgrid Tower with cruciform footing and 33 kV power line easements above LW5.

Iron staining has been identified in WC17. It is considered that the precipitation of iron oxide is a common occurrence when mine subsidence cracking occurs in the Southern Coalfield which results in the release or exposure of groundwater to the atmosphere.

There are no reported aquatic flora/fauna kills due to the precipitation of iron oxide along flowing, ground water fed water courses. This issue should continue to be discussed in subsequent AEMRs.

GSSE in their EoP Report for LW6 indicated that some of the previous Landscape TARPs did not provide a clear definition of the surface impacts, such that the Level of Impact was difficult to assign. It is noted that the TARPs have been revised and are now being reviewed by DoP&I, OEH, SCA and DRE and subsidence impact levels are likely to be amended to be more consistent with actual impacts and the consent following this process.

It is understood that there are several outstanding issues for which DRE, SCA, OEH and DoP&I require further explanation (responses are provided below for each issue raised in context of system requirements):

- Ground water level drops below Swamp No. 1 above LWs 4 and 5 are considered to be a higher impact than the 'Minor' impact assessed by IC and its consultants.

Response: Explanation of ground water level drops being related to climate and not subsidence impacts may be premature due to timing of the drops and available pre-mining base line data. Monitoring of perched water tables has also been identified by IC as a difficult process, so it is recommended that environmental monitoring sites be installed as early as possible and impact explanations to consider limitations of available base line readings. It is noted that the TARPs indicate that base line readings for a minimum of 12 months are planned for; however, instrument malfunction can cause data loss. It is also likely that the groundwater levels will recover in the short to medium term (depending on climate) if the groundwater level drops are associated with strata dilation from mine subsidence.

- The available environmental impact monitoring reports only present data on current mining area (i.e. Area 3A - LWs 6 and 7) and do not update data or provide on-going assessment of previous mining areas, and in particular, the groundwater level response in Swamp 1 above LWs 4 & 5 in Area 2.
- *Response: The mine is required to continue monitoring for a minimum period of 2 years after mining first occurs. Whilst this data has not always been reported in the AEMRs, the data has been collected and is understood to have been presented at CCC meetings and to government agencies.*

In the interests of transparency, it would probably be a beneficial exercise to present on-going monitoring data for previously mined areas in the AEMRs as well as current mining areas.

- Groundwater level drawdown of 40 m to 60 m in Bulli Seam below Sandy Creek after extraction of LW6 (Area 3) remains unexplained with contradictory statements regarding mine inflows made between the AEMR and EoP Reports (e.g. The AEMR states that the higher water makes experienced were not considered to be inflows, whereas the EoP discusses several high inflows that triggered DSC alarms with high inflows recorded). Overall, the concern of the author is that the height of fracturing above the longwalls has resulted in greater interconnection between the overlying aquifers than has been reported.

Response: Specialist hydrogeological reports (GHD-Longmacs) have reviewed impacts of Areas 1 and 2 and indicate that no impact to Lake Cordeaux storage or subsurface aquifers in the rock mass has occurred based on the suite of deep vibrating wire piezometers and water quality testing data. The draw down in the Bulli Seam may be related to the igneous intrusion and flow paths to old workings as explained in the GHD report. High inflows may be due to delayed responses to groundwater flow paths affected by dykes around the extracted areas. Further comment should be sought from GHD.

3.1.4 End of Panel Reporting

End of Panel reports are required to be submitted within 4 months of completion of each longwall panel in Areas 2 and 3, and should include:

- All measured subsidence effects (both individual and cumulative)
- Discussion of all subsidence and environmental impacts and consequences for watercourses, swamps, water yield, water quality, aquatic ecology, terrestrial ecology, groundwater, cliffs and steep slopes, and
- Comparison of the above impacts and environmental consequences to predictions.

EoP reports are to be submitted to DP&I, DRE-DPI, SCA, OEH and any other relevant agency.

It is understood that IC has prepared its EOPRs to the satisfaction of the government agencies to-date.

The term environmental consequences is also a rather negative term to apply to what are more positively defined as 'changes' or impact 'levels'. 'Consequences' also infers all mine subsidence impacts are permanent impacts and degrade the environment in some way. The purpose of the TARPs is to mitigate impacts and re-establish environmental function after mining is completed.

3.1.5 Subsidence Expert Assessments

IC engages numerous expert consultants to prepare subsidence impact studies and provide advice for mitigation against significant long-term impacts.

These include the following Mine Subsidence Engineering Consultants, Eco Engineer, Biosis, Niche, Comur Consulting, Geoterra, GHD, Manly Hydraulics Laboratory and GSS Environmental. All of these companies have good experience with assessing and predicting longwall mining impacts in the Southern Coalfield.

3.2 ABORIGINAL HERITAGE

The Cultural Heritage Management Plan (CHMP) is based on the cultural heritage requirements in the Dendrobium Development Consent and the Dendrobium SMP.

Subsidence predictions and potential impacts have included fracturing of sandstone, isolated rock falls and seepage through joints. To-date no impacts to rock shelters with art have occurred, with Low to Moderate likelihood of impact assessed. The only impact identified within Area 3A to date was associated with the expansion of an existing vertical joint at the back of the shelter No. SCR 26.

3.3 GROUNDWATER MONITORING

Deep and shallow groundwater levels and quality monitoring have been obtained before (base line), during and after longwall mining effects. Net groundwater inflows into the mine (water make or balance) are based on water pumped out of the mine less water pumped in.

Specialist hydrogeological reports (GHD-Longmacs) have reviewed impacts of Areas 1 and 2 and indicate that no impact to Lake Cordeaux storage or subsurface aquifers in the rock mass has occurred based on the suite of deep vibrating wire piezometers and water quality testing data.

A 40 to 60 m draw down was noted as an exceedance above an expected draw down of around 20 m after the extraction of LW6 in Area 3A. The draw down in the Bulli Seam may be related to the igneous intrusion and flow paths to old workings, as explained in the GHD report. High inflows may be due to delayed responses to groundwater flow paths affected by dykes around the extracted areas. Further comment should be sought from GHD on this issue.

Shallow groundwater monitoring below existing swamps indicate that only minor impacts or fracturing of rock mass below the swamps has occurred in Areas 2 and 3A, with no significant impact on geochemistry or hydrology of the swamps. Soil moisture contents have reduced across all of the monitoring sites in Swamp 1 and considered to be in-line with climatic conditions. Other swamps outside of the mining area have also shown similar decreases.

Shallow piezometers in the Hawkesbury Sandstone have shown a decline in water level, however it is likely that this is due to similar increases to rock mass permeability caused by strata dilation during mine subsidence. The water levels are likely to recover in the short to medium term and will be dependent on climatic conditions.

It is understood however, that monitoring results for Swamp 1 groundwater impacts in Area 2 are of concern with the DRE (and the CCC) and likely to require further review and response from IC.

3.4 ENVIRONMENTAL OFFSETS

On 19 May 2009, Illawarra Coal wrote to SCA offering a land transfer of 33 ha as an environmental offset against this condition. On 10 July 2009, SCA wrote back to Illawarra Coal agreeing to the offer. Subsequently on 28 July 2009, Illawarra Coal wrote to Planning who agreed to the offer on 18 November 2010 while noting the possibility of further offsets should unforeseen impacts occur.

Accordingly, this condition has been satisfied.

CONCLUSIONS:

- (a) No exceedances of the subsidence impact assessment criteria have been recorded during the audit period;
- (b) The strategies, plans or programs required under these approvals appear adequate; and
- (c) The following recommendations apply:

- It is recommended that environmental monitoring sites for groundwater below swamps be installed as early as possible and impact explanations to consider limitations of available base line readings. It is considered by DgS that the 'flat-lining' piezometers is due to groundwater levels lowering in dilated strata, but are likely to recover over time and at a rate dependant on climatic conditions.
- In the interests of transparency, it would probably be a beneficial exercise to present on-going monitoring data for previously mined areas in the AEMRs.
- Further comment should be sought from GHD-Longmacs on the draw down in the Bulli Seam, despite the comments already made by them on the effects of the likely cause is the interaction between the igneous intrusion and old workings to the south of Area 3A.

- It is considered that the precipitation of iron oxide is a common occurrence when mine subsidence cracking in the Southern Coalfield results in the release or exposure of groundwater to the atmosphere. Expert water chemistry consultants have assessed that the impact of iron oxide precipitates observed in Areas 1 and 3A to-date are only short term effects and unlikely to result in any significant impact on aquatic ecology.
- Although there are no reported aquatic flora/fauna kills due to the precipitation of iron oxide along flowing groundwater fed water courses above LW7, the direct or indirect impacts of the release is yet to be dealt with in future AEMRS and EoP reports. It is suggested that this issue be included as a discussion point or impact item in the next AEMR.
- It is also considered that the term ‘environmental consequences’ in the Conditions of Consent is also a rather negative term to apply to ‘environmental impacts’. ‘Consequences’ infers all mine subsidence impacts degrade the environment permanently in some way. The purpose of the TARPs is to mitigate impacts and re-establish environmental function after mining is completed. Therefore, it is requested that the DoP&I consider changing the word ‘consequences’ to ‘impacts’.

4. SPECIFIC ENVIRONMENTAL CONDITIONS – SURFACE FACILITIES

This section uses the following consent conditions to assess the technical areas covered under Schedule 4 of the 2008 Consent.

(c) assess the environmental performance of the development and assess whether it is complying with the relevant requirements in this approval and any relevant EPL or mining lease (including any strategy, plan or program required under these approvals);

(d) review the adequacy of strategies, plans or programs required under these approvals; and, if appropriate,

(e) recommend measures or actions to improve the environmental performance of the development, and/or any strategy, plan or program required under these approvals.

Appendix E contains a photolog of the site inspections by PAEHolmes.

4.1 NOISE

4.1.1 Noise Impact Assessment Criteria

Consent Condition 1 of Schedule 4 reads:

The Applicant shall ensure that the noise generated at the surface facilities does not exceed the noise impact assessment criteria in Table 1 at any residence on privately-owned land, or on more than 25% of any privately-owned land. The applicable criteria for any residence not listed in Table 1 shall be the criteria applying at the nearest listed residence.

These noise impact assessment criteria are shown below.

Table 1: Noise impact assessment criteria dB(A)

| Day L _{Aeq} (15min) | Evening L _{Aeq} (15min) | Night | | Residence (as shown in the Noise Monitoring Program) |
|---------------------------------|-------------------------------------|--------------------------|------------------------|------------------------------------------------------------|
| | | L _{Aeq} (15min) | L _{A1} (1min) | |
| 42 | 42 | 38 | 48 | R2 |
| 41 | 41 | 40 | 50 | R22 |
| 40 | 40 | 39 | 49 | R1 |
| | | | | R9 |
| | | | | R15a |
| 40 | 40 | 37 | 47 | R3a |
| | | | | R5a |
| | | | | R6a&b |
| 37 | 35 | 35 | 45 | R39a |

Notes:

- To determine compliance with the L_{Aeq(15 minute)} limit, noise from the development is to be measured at the most affected point within the residential boundary, or at the most affected point within 30 metres of a dwelling (rural situations) where the dwelling is more than 30 metres from the boundary. Where it can be

demonstrated that direct measurement of noise from the development is impractical, DECC may accept alternative means of determining compliance (see Chapter 11 of the NSW Industrial Noise Policy). The modification factors in Section 4 of the NSW Industrial Noise Policy shall also be applied to the measured noise levels where applicable.

- *To determine compliance with the $L_{A1(1\text{ minute})}$ limit, noise from the development is to be measured at 1 metre from the dwelling façade. Where it can be demonstrated that direct measurement of noise from the development is impractical, DECC may accept alternative means of determining compliance (see Chapter 11 of the NSW Industrial Noise Policy).*
- *The noise emission limits identified in the above table apply under meteorological conditions of: wind speeds of up to 3 m/s at 10 metres above ground level ; or up to 3C/100 m temperature inversion strength for all receivers, plus a 2 m/s source-to-receiver component drainage flow wind at 10 metres above ground level for those receivers where applicable.*
- *These limits do not apply if the Applicant has an agreement with the relevant owner/s of these residences to generate higher noise levels, and the Applicant has advised the Department and DECC in writing of the terms of this agreement..*

Ten monitoring events were conducted during the audit period to evaluate performance against the L_{AMax} criterion (referred to as $L_{A1(1\text{-min})}$ above).

Exceedances of the L_{AMax} criterion were measured on the following sites / occasions:

- R1 (17 High St): six exceedances of the 49dBA criterion recorded – maximum of 53dBA recorded. Observations indicate that operational noise from the pit top was audible on all occasions;
- R6a (374 Cordeaux Road): seven exceedances of the 47dBA criterion recorded – maximum of 57dBA recorded. Observations indicated that operational noise from the pit top was audible on the majority of occasions;
- R15a (View St): one exceedance of the 49dBA criterion recorded – maximum of 53dBA recorded. Observations indicate that pit top noise was audible during this event;

Twelve monitoring events were conducted during the audit period to evaluate each of the daytime / evening / nighttime criteria.

Exceedances of the $L_{Aeq(15\text{-min})}$ criteria were measured on the following sites / occasions:

- R1 (17 High Street): daytime criterion exceeded during five monitoring events (July 2009 – up to 45dBA recorded, April 2010 – up to 51dBA recorded, October 2010 – up to 50dBA recorded, January 2011 – up to 54dBA recorded, April 2011 – up to 47dBA recorded);
- R1 (17 High Street): evening criterion exceeded during two monitoring events (July 2009 – up to 41dBA recorded, April 2010 – up to 51dBA recorded);
- R6a (374 Cordeaux Road): daytime criterion exceeded during six monitoring events (April 2009 – up to 41dBA recorded, July 2009 – up to 43dBA recorded, April 2010 – up to 44dBA recorded, July 2010 – up to 42dBA recorded, January 2011 – up to 55dBA recorded, April 2011 – up to 46dBA recorded);

- R6a (374 Cordeaux Road): evening criterion exceeded during three monitoring events (February 2010 – up to 41 dBA recorded, July 2010 – up to 45dBA recorded, April 2011 – up to 42dBA recorded);
- R6a (374 Cordeaux Road): night time criterion exceeded during five monitoring events (October 2009 – up to 42dBA recorded, February 2010 – up to 42 dBA recorded, April 2010 – up to 41dBA recorded, July 2010 – up to 40dBA recorded, October 2010 – up to 42dBA recorded);
- R39a (Figtree Farm): daytime criterion exceeded during two monitoring events (April 2010 – up to 49dBA recorded, October 2010 – up to 40dBA recorded); and
- R39a (Figtree Farm): evening criterion exceeded during three monitoring events (October 2009 – up to 44dBA recorded, July 2010 – up to 43dBA, October 2010 – up to 45dBA recorded).

All other criteria set out in Table 1 have been met for the period of this audit.

Regarding exceedances at Receptor R1, this location is noted to be within ~100m of the portal entrance in Kembla Heights. The Mine Manager's residence is owned by Illawarra Coal but is leased. As such, it is considered that compliance with impact assessment criteria should be evaluated at this receptor.

Receptor 39a (Fig Tree Farm) is located in the Kemira Valley, and is potentially impacted by both coal handling and train noise. The mine notes that exceedances have been identified as being a result of train loading, specifically the powering up of locomotives. Six monthly noise testing of the (three) locomotives that are regularly used by the mine to transport coal were reported to all be in compliance, and no complaints from the Fig Tree Farm residence have been reported.

Some minor exceedances of the noise impact assessment criteria at non-mine related receptors indicate a technical non-compliance with this Condition.

It is anticipated that rectification of this may be achieved through the Continuous Improvement Consent Conditions (refer Section 4.1.4).

4.1.2 Land Acquisition Criteria

Consent Condition 2 of Schedule 4 reads:

If the noise generated at the surface facilities exceeds the relevant criteria in Table 2 at any residence on privately-owned land or on more than 25% of any privately-owned land, the Applicant shall, upon receiving a written request for acquisition from the landowner, acquire the land in accordance with the procedures in conditions 8 - 10 of schedule 4. The applicable criteria for any residence not listed in Table 2 shall be the criteria applying at the nearest listed residence. These noise impact assessment criteria are shown below.

Table 2: Noise acquisition criteria dB(A)

| Day L_{Aeq} (15min) | Evening L_{Aeq} (15min) | Night L_{Aeq} (15min) | Residence (as shown in the Noise Monitoring Program) |
|----------------------------------------------|--------------------------------------------------|------------------------------------------------|-----------------------------------------------------------------------|
| 47 | 47 | 43 | R2 |
| 46 | 46 | 45 | R22 |
| 45 | 45 | 44 | R1 |
| | | | R9 |
| | | | R15a |
| 45 | 45 | 42 | R3a |
| | | | R5a |
| | | | R6a&b |
| 42 | 40 | 40 | R39a |

Notes:

- Noise generated by the development is to be measured in accordance with the notes to Table 1.

In view of the results provided to PAEHolmes, it is noted that exceedances of the above criteria have been noted at the following receptors / times: R1 (17 High St): five exceedances of the day time criterion;

R1 (17 High St): one exceedance of the night time criterion;

R6a (374 Cordeaux Road): one exceedance of the day time criterion;

R39a (Fig Tree Farm): one exceedance of the day time criterion; and

R39a (Fig Tree Farm): three exceedances of the evening criterion.

Since Receptor R1 is the mine manager's residence and owned by Dendrobium, the land acquisition criteria are never anticipated to be triggered.

It is understood that no written request for acquisition has been received from either Receptors R6a or R39a, and accordingly the above exceedances are considered to be technical non-compliances only.

As such this condition is deemed to be satisfied.

4.1.3 Rail Haulage Impact Assessment Criteria

Consent Condition 3 of Schedule 4 reads:

The Applicant shall ensure that noise generated by locomotives using the Kemira Valley rail line does not exceed the rail noise impact assessment criteria in Table 3.

Table 3: Rail noise impact assessment criteria

| Operating Condition | Measurement Conditions | Criteria L_{A1} (1-min) |
|---------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|
| Locomotive at idle, with compressor radiator fans and air conditioning operating at maximum load | Stationary 15m contour | 70dB(A) |
| All other throttle settings under self-load, with compressor radiator fans and air conditioning operating at maximum load | Stationary 15m contour | 87dB(A) 95dB(Lin) |
| All service conditions | Up to 50 km/hour, 15m from centreline of rail track | 87dB(A) 95dB(Lin) Must be non-tonal Linear noise levels must not exceed A-weighted noise levels by more than 15dB |

Notes:

All measured noise levels must be assessed for tonality in accordance with the NSW Industrial Noise Policy, unless otherwise specified.

As reported within Dendrobium's AEMRs corresponding to the audit period, attended rail haulage noise measurements were conducted on three occasions (October 2008, April 2009 and February 2010). Additional rail haulage monitoring reports were provided by Dendrobium corresponding to an additional two occasions (October 2010 and April 2011).

The results indicated compliance with the overall dBA noise levels. Tonality and low frequency emission requirements were also satisfied on all occasions.

This condition has been satisfied.

4.1.4 Continuous Improvement

Consent Conditions 4 and 5 of Schedule 4 read:

4. The Applicant shall:

(a) continue to investigate ways to reduce the noise generated by the development (including off-site road noise, noise and vibration impacts from the operation of the Kemira Valley rail line and maximum noise levels which may result in sleep disturbance);

(b) continue to implement all reasonable and feasible best practice noise mitigation measures; and

(c) report on these investigations and the implementation and effectiveness of these measures in the AEMR, to the satisfaction of the Director-General.

5. The Applicant shall use its best endeavours to minimise wheel squeal, brake squeal and locomotive wheel slippage arising from rail haulage on the Kemira Valley rail line.

Significant noise abatement has been conducted within the Kemira Valley area, including the use of polyethylene rollers on the conveyor, acoustic lining / rubber doors at the top of the rill tower and lining of the rill tower bash plate.

During the site inspection, periodic noise was observed associated with the conveyor belt splice (~8 joints within the conveyor belt causing additional noise as they traverse the conveyor rollers).

The mine is beginning investigations into the exceedances of the L_{AMax} criterion through the purchase of directional monitoring equipment ("Barn Owl" instrument) that will allow the evaluation of pit top traffic impacts. In the interim, the mine has acted to reduce vehicle exit times to ameliorate noise impacts.

Investigations into the augmentation of the pit top noise barriers are reportedly continuing.

This condition has been satisfied.

4.1.5 Additional Noise Mitigation Measures

Consent Condition 6 of Schedule 4 relates to the implementation of additional noise mitigation (e.g. double glazing, insulation or air conditioning) should the mine receive a written request from the owner of any residence where subsequent noise monitoring shows the noise generated by the development is 3 dB(A) greater than the noise impact assessment criteria in Table 1.

It was reported that no such requests have been received.

As such this condition is deemed to be satisfied.

4.1.6 Monitoring

A noise monitoring program has been developed by Dendrobium mine and is documented within Section 6 of their Noise Management Plan. This document now has a Version 4, dated April 2009. The changes made within this version of the document reflect the review as required by the revised Development Consent (issued 8 December 2008).

This condition has been satisfied.

4.2 BLASTING AND VIBRATION

Reportedly no blasting operations have been undertaken at the surface facilities during the audit period.

This condition has been satisfied.

CONCLUSIONS:

- (a) Minor exceedances of the noise impact assessment criteria have been recorded at non-mine related receptors during the audit period;
- (b) It is anticipated that a route towards compliance may be made through the Continual Improvement Consent requirements;
- (b) All other Dendrobium actions under this section of the Consent comply;
- (b) The strategies, plans or programs required under these approvals appear adequate; and
- (c) There are no additional measures or actions recommended for this condition.

4.3 AIR QUALITY

4.3.1 Impact Assessment Criteria

The Condition 9 of Schedule 4 of the Development Consent sets out relevant air quality impact assessment criteria for Total Suspended Particulates (TSP) and Particulate Matter less than 10 µm in aerodynamic diameter (PM₁₀) (Tables 4 and 5) and in Table 6 (for dust deposition).

These air quality criteria are shown below.

Table 4: Long term impact assessment criteria for particulate matter

| Pollutant | Averaging Period | Criterion |
|-------------------------------------------------------------|-------------------------|----------------------|
| Total suspended particulate (TSP) matter | Annual | 90 µg/m ³ |
| Particulate Matter less than 10 Microns (PM ₁₀) | Annual | 30 µg/m ³ |

Table 5: Short term impact assessment criteria for particulate matter

| Pollutant | Averaging Period | Criterion |
|-------------------------------------------------------------|-------------------------|----------------------|
| Particulate Matter less than 10 Microns (PM ₁₀) | 24-Hour | 50 µg/m ³ |

Table 6: Long term impact assessment criteria for deposited dust

| Pollutant | Averaging Period | Maximum Increase | Maximum Total |
|------------------|-------------------------|---------------------------|---------------------------|
| Deposited Dust | Annual | 2 g/m ² /month | 4 g/m ² /month |

Note: Deposited dust is assessed as insoluble solids as defined by Standards Australia, 1991, AS/NZS 3580.10.1-2003: Methods for Sampling and Analysis of Ambient Air - Determination of Particulates - Deposited Matter – Gravimetric Method.

Rolling annual average dust deposition results have been elevated at times during the auditing period at the following locations:

- Point 10 (374 Cordeaux Road): rolling annual average dust deposition was above the $4\text{g/m}^2\text{/month}$ criterion between October 2010 – November 2010. Subsequent results have maintained compliance;
- Point 13 (Dendrobium Colliery Surface; PAEHolmes photolog Picture A1): rolling annual average dust deposition was above the $4\text{g/m}^2\text{/month}$ criterion between September 2008 and August 2010. Following discussions with mine personnel, it is anticipated that the drop in deposition rates after this time are related to the sealing (concreting) of the lower portal road.
- Point 15 (Harry Graham Drive, Kembla Heights; PAEHolmes photolog Picture A2): rolling annual average dust deposition was above the $4\text{g/m}^2\text{/month}$ criterion between January 2009 – July 2011. Compliance was achieved in the last month of available results for the audit period (August 2011). This monitor is located adjacent to a dirt bike circuit (PAEHolmes photolog Picture A3), and it is anticipated that dust deposition results at this location are heavily influenced by this activity; and
- Point 18 (Old Loading Bins – Kemira Valley): rolling annual average dust deposition was above the $4\text{g/m}^2\text{/month}$ criterion between August 2009 – July 2010. Subsequent results have maintained compliance.

Observed exceedances at Point 10 were principally related to a highly elevated sample ($28.2\text{g/m}^2\text{/month}$) recorded in October 2010. Observations on this sample are given as “70% dirt”.

Points 13 and 18 are both located within the boundary of the mining lease. As such, these are not considered to be used for compliance monitoring, but are instructive for operational dust management purposes.

Given the location of Point 15, it is queried whether this monitoring location is of value. Consideration may be given to either relocating or removing this dust deposition gauge.

High Volume Air Sampling (HVAS) is conducted at two locations:

- Point 20 (located at the entrance to Kemira Valley; PAEHolmes Photolog Picture A4); and
- Point 21 (located on top of the bathhouse building, Pit Top; PAEHolmes Photolog Picture A5).

Consistent with the Air Quality Monitoring Program, monitoring undertaken for TSP and PM_{10} at these locations on alternate weeks (i.e. TSP monitoring is undertaken at Point 20 concurrent with PM_{10} monitoring at Point 21, and vice versa).

The long term TSP and PM_{10} criteria have been satisfied at both locations for the duration of the audit period.

The short-term PM₁₀ criterion of 50µg/m³ has been exceeded on two occasions, both at Point 21, during sampling in November 2008 and November 2009. The maximum recorded 24-hour average concentration at this location was 52.7 µg/m³.

4.3.2 Monitoring

An air quality monitoring program has been developed by Dendrobium mine and is documented within Section 6 of their Air Quality Management Plan. This document now has a Version 3, dated April 2009. The changes made within this version of the document reflect the review as required by the revised Development Consent (issued 8 December 2008).

This condition has been satisfied.

CONCLUSIONS:

- (a) Some exceedances of the dust deposition and short term PM10 criteria have been observed at times during the audit period;
- (b) These exceedances are considered to be minor, and the contextual information surrounding reasons for these exceedances, as provided by the mine, are considered adequate;
- (c) The Dendrobium actions under this section of the Consent comply;
- (d) The strategies, plans or programs required under these approvals appear adequate; and
- (e) Given the location of Dust Deposition Gauge Point 15, it is recommended that the siting of this instrument be reviewed, or this monitoring point be removed altogether.

4.4 METEOROLOGICAL MONITORING

This condition has been noted to be satisfied in earlier audits. The AEMRs note at various points the collection of relevant rainfall and other meteorological data.

Dendrobium maintains a 10m automatic weather station located adjacent to the main car park, on the roof of the main building. Monitoring has been undertaken for the period of the audit.

This condition has been satisfied.

4.5 WATER MANAGEMENT

Underground and surface operations at Dendrobium utilise fresh water and recycled mine water. The Recycled Water Project was implemented during the first quarter of 2008, which resulted in recycled water being used for all general-purpose applications on the surface.

Fresh Water use

Fresh water, supplied by Sydney Water, is currently used for the longwall hydraulic roof supports, which require high quality water for use in the emulsion process, and for kitchen and bathhouse facilities. Fresh water usage for FY10 was 22.2ML. Usage is tracked on a weekly basis and annual consumption.

Recycled Water use

The recycled water component, sourced from the Nebo Workings, is pumped to the surface and used in the Portal Road dust suppression system, wash down bay, general hose down and cleaning and fire fighting. Recycled water underground is used in secondary support, development units, dust suppression and fire fighting.

The Recycled Water Project led to a reduction in freshwater usage from 105 (in 07), to 89 (in 08), to 21.8 (in 09), to 22.8 (in 10) and to 23.8 (in 11) ML/a of fresh water. The Recycled Water Project won an award from Sydney Water for the significant reduction of water usage achieved in 2008.

There are appropriate catchment and treatment facilities on site as observed in earlier audits including clean, oily and dirty water at the pit top and clean and dirty at Kemira Valley. The AEMRs also include details of maintenance activities.

The auditor was able to observe these systems during the site inspection.

4.5.1 Discharges

Licensed Discharge Point 5 (LDP5) Monitoring Program

Water from the old Kemira Mine workings is discharged through Licensed Discharge Point 5 (LDP5), located at Marley Place. The monitoring results from the LDP5 sampling program are reviewed regularly and reported to site management, via EPL Annual Returns and the AEMR. The AEMRs contain listings of non-compliances.

The previous audit discussed the issue of non-compliances from the LDP5 sampling tank. Further non-compliances occurred during 08/09 while using the original system. On September 3 08, Dendrobium wrote to DECC seeking change in sampling point and the sampling system which received approval. The new system eliminated non-conformances in the 08/09 AEMR reporting period.

A total volume of 364.56 ML was discharged in FY10. The monitoring regime and a summary of the results are provided below.

All EPL breaches are recorded and tracked via an event reporting system, reported to site management and via EPL Annual Returns.

A total volume of 1343 ML was discharged in FY11. The results were compliant with the EPL criteria.

Related Pollution studies and reduction programs

Monitoring associated with PRP13, to verify the predictions reported under PRP11, continued throughout the reported period and is ongoing. The requirements of this PRP are as follows:

The licensee must undertake a monitoring program to verify predictions of hydrodynamic and hydro chemical modelling carried out under PRP11. The investigation must determine the concentrations of copper and zinc in Allans Creek

due to the discharge of mine water and the discharge of brine from licence discharge point 5, according to the table included in the AEMR.

PRP13 was completed during FY11 to verify the predictions reported under PRP11.

The report associated with PRP13 was submitted to DECCW in February 2011. The conclusion from the PRP13 was that there were no exceedances of the EPL limits for copper and zinc for the duration of PRP 13 at any location. This indicates that the discharge of mine water and brine has not caused elevated concentrations of copper or zinc in Allans Creek.

Results of this investigation indicate that ANZECC trigger levels for copper and zinc (8 µg/L and 43 µg/L, respectively) have been achieved at least 50 percent of the time in Allans Creek.

Pollution Reduction Program 14

PRP14 was completed during FY11 to increase the reliability of flow monitoring at LDP5. The requirements of PRP14 were as follows:

Improve Reliability of LDP5 Flow Monitoring - The aim of this Pollution Reduction Program is to improve the reliability of flow monitoring conducted under condition M6 of this licence. The Licensee must investigate and implement action(s) to minimise the number of occasions and duration of time that the flow rate of water from LDP5 is not measured and recorded.

A data logger was installed in November 2010 to satisfy the requirements of this PRP. In addition to the information recorded via the wireless link to the SCADA system, data is now also downloaded manually (by USB) which is independent of the wireless link. The logger stores data for up to a year.

4.5.2 Water Management Plan

The AEMR 08-09 notes that the WMP was submitted (Section 3.2 of AEMR). A letter from Department of Planning dated 22/12/09 indicated approval of the WMP.

The WMP condition (c) must include the following four items:

Site Water Balance

The AEMR reports details of sources, usage on site and in mine; water management; off-site transfers and disposal as well as minimisation efforts.

Erosion and Sediment Control

The Erosion and Sediment Control Management Plan (ESCMP) was previously approved as noted in earlier audits.

This plan addresses erosion and sediment controls for the Dendrobium Pit Top, KVCLF, Ventilation Shaft 1 and 2/3 sites and the Kemira Valley Rail Line. A Construction Soil and Water Management Plan was developed for the Ventilation Shaft 2/3 site.

Surface Water Monitoring Program

The surface water monitoring program enables Dendrobium to maintain a database of regional water quality and to determine any changes to surrounding water quality.

The surface water monitoring program has been developed in accordance with the requirements of the Dendrobium Consent and in consultation with relevant stakeholders. The monitoring programs for Areas 1 and 2 have been established with the methodology being finalised during the baseline data collection program and approved in subsequent SMPs. The surface water monitoring program is reported in the Area 1 SEMP, Area 2 SMP and Area 3A SMP. The auditor notes that monitoring is primarily related to Subsidence management.

Monitoring Regime

At the end of the 2008/2009 reporting period (08-09 AEMR), the surface water-monitoring network consisted of seven regular sites (Figure 14 of the AEMR) including sites upstream and downstream of both the Pit Top and Kemira Valley sites. Samples may also be taken from additional sites during/after rainfall events when requested by Dendrobium personnel. This occurred on a number of occasions during the reporting period.

At the end of the FY10 reporting period, the surface water monitoring network consisted of five regular sites (Figure 14 of the AEMR) including sites upstream and downstream of both the Pit Top and Kemira Valley sites (which was a reduction in sites from the previous year). Samples may also be taken from additional sites during/after rainfall events when requested by Dendrobium personnel. This occurred on four occasions during the reporting period (October 2009, February 2010, March 2010 and May 2010).

The data suggests that neither the mine site nor the KVCLF has had an impact on the surrounding water quality during the 2010/2011 AEMR period. A summary of the results is provided in the AEMR. The Auditor agrees with the conclusion.

At the end of the FY11 reporting period, the surface water monitoring network consisted of five regular sites (See Plans 7A and 7B of the AEMR) including sites upstream and downstream of both the Pit Top and Kemira Valley sites. Additional samples were taken during or after rainfall events during December 2010 and March 2011, in line with the Site's Water Management Plan.

Data before and after the KVCLF show no discernible difference. Data before and after the pit top has a mild suggestion of increased TSS and conductivity but doesn't appear to represent a significant adverse effect. It is suggested that this be reviewed in the next period to determine if the increase is real or just within natural variations.

Stream Stability

Stream stability is monitored by a series of photo points. Photos are taken both upstream and downstream at each monitoring point. Any changes identified,

particularly where there has been evidence of erosion, will be investigated to determine the root cause.

A review of the photos taken during the reporting period suggests that neither the mine site nor the KVCLF has had an impact on stream stability during the reporting period. Any changes observed have been the result of increased flows during heavy rainfall periods.

Surface and Ground Water Response Plan

The Dendrobium groundwater monitoring program is defined in the Groundwater Management Plan (April 2010) as required by the Dendrobium Development Consent. The purpose of the program is to analyse the water quality and quantity within the mine to satisfy health, safety and environmental aspects and DSC, SCA, DoP, NOW and I&I NSW requirements. Weekly and monthly water sampling is performed underground with samples analysed onsite and at NATA registered laboratories. Mine water usage, water flows within the mine and volumes are analysed and reported on a daily basis. Surface and underground vibrating wire piezometers are also utilised to monitor the impact of mining on surrounding groundwater levels. Monthly reports are prepared and submitted to the DSC, SCA and I&I NSW summarising the water quality and water balance at Dendrobium.

09/10 - During the reporting period, mining conditions were normal as per the Dendrobium Water Inflow, Trigger Action Response Plans with the exception of two inflow events.

In addition to the exploration holes in the 2010/2011 AEMR reporting period, 20 boreholes were drilled to conduct geotechnical investigations to satisfy the requirements of the DSC. The purpose of these boreholes was to help assess the impact of longwall mining on ground water movement, to monitor the groundwater flows and to monitor stress on the Sandy Creek Waterfall.

CONCLUSIONS:

- (c) The Dendrobium actions under this condition comply;
- (d) The strategies, plans or programs required under these approvals appear adequate; and
- (e) The auditor recommends the following measures or actions for this condition.
 - Dendrobium should discuss with OEHL the merit of applying for a discharge licence point from the pond which takes the pit top overflow;
 - Dendrobium should review the TSS and conductivity data before and after the KVCLF in the next period to ascertain whether the minor changes in these parameters represent a real increase or are just within natural variations.

4.6 LANDSCAPE MANAGEMENT

4.6.1 Rehabilitation

Rehabilitation of Disturbed Land

Rehabilitation associated with subsidence related impacts is detailed in Section 3 of this audit report. Evidence of rehabilitation of surface facilities is provided below (from the AEMRs). Sign-off of the AEMRs by the authorities indicates their satisfaction.

Rehabilitation of disturbed land (excluding infrastructure areas) was undertaken at the Ventilation Shaft 2/3 site during the 2009/2010 AEMR reporting period. Ventilation Shaft 2/3 is on ML1566, located in the Metropolitan Special Area administered by the SCA. Rehabilitation of this area was undertaken in accordance with the Post-Construction Rehabilitation Plan, developed by Biosis Research, and reviewed by the relevant regulatory agencies and approved by the SCA.

The spoil associated with the construction of the shafts was reshaped and re-contoured to optimise sediment and erosion control and to replicate (as much as possible) the surrounding landscape. Sediment ponds have been retained and will remain until there has been sufficient vegetation establishment for effective erosion control. Top soil was spread to facilitate revegetation. The rehabilitated area was mulched to reduce soil erosion and retain moisture for plant growth.

The area was planted with tubestock and direct seeded with species endemic to the local area (with seeds collected from within a radius of 10km of the shaft site).

Vegetation types present in the area include Tall Open Peppermint-Blue Gum Forest, Sandstone Gully Peppermint Forest and Exposed Sandstone Scribbly Gum Woodland. The site was divided into zones, with ground-layer plants planted in the zone in closest proximity to infrastructure (Zone 1), with Zone 2 comprised of ground-layer and shrubby plants, and Zone 3 ground-layer, shrub and tree species. Given the remote location of the site, the establishment and maintenance of an effective asset protection zone for bushfire risk is vital.

Planting was undertaken progressively post construction. Monitoring of rehabilitation success is being undertaken every six months for a period of three years. This involves the setting up of four quadrats across the site and measuring germination levels, species diversity and growth rates (for key species). This monitoring will provide data to determine how successful the direct seeding has been. A detailed photographic record is also being established.

Maintenance activities will include watering as required, repair of tree guards as necessary and any weed control that may be required. The site is regularly inspected to review the integrity of sediment and erosion control structures. Adequate sediment control structures are in place to reduce the risk of offsite contamination. A clean water diversion bund has been constructed to divert clean water around the site, and drainage channels have been established within the site to divert seepage around infrastructure areas.

During the 2009/2010 AEMR reporting period, rehabilitation of disturbed land (excluding infrastructure areas) was completed at Stage 1 of the Mt Kembla Mine Memorial Pathway (between Cordeaux Road and Stones Road) during the reporting period. This portion of land was previously the rail corridor to the old Nebo and Mt Kembla coal bins. Activities involved erosion control, site stability works, weed tree removal and the planting of native trees and shrubs.

Maintenance activities include watering as required, repair of tree guards as necessary and any weed control that may be required. Maintenance has been and will continue to be undertaken. Rehabilitation maintenance activities will be completed in FY11. Rehabilitation monitoring will continue to occur every six months during FY11.

The site is regularly inspected to review the integrity of sediment and erosion control structures. Adequate sediment control structures are in place to reduce the risk of off-site contamination. A clean water diversion bund has been constructed to divert clean water around the site, and drainage channels have been established within the site to divert seepage around infrastructure areas.

The agreed post rehabilitation land use is native bushland. Further rehabilitation will be undertaken at mine closure following decommissioning of site infrastructure.

Other Infrastructure

A project has been approved to commence the removal of structures associated with O'Briens Drift (OBD). Some of the old offices are currently being removed. A plan is being developed for the removal of the tipping sheds at the top of the drift and the bins and conveyors at the bottom of OBD. This is likely to occur in FY12.

During FY10, a number of portals (5 in total) were sealed according to I&I NSW Standards by Gujarat NRE. These portals were previously used to access the Elouera and Nebo mine workings, for which ownership has been transferred to NRE.

Access to the portals to undertake the work was required from the Dendrobium Pit Top.

No significant land pollution events occurred during the 2010/2011 AEMR reporting period. Minor spills that occurred were cleaned up as soon as practical and had no environmental impact.

A preliminary contamination assessment for Dendrobium Mine and KVCLF was undertaken by BASIX Environmental Services which recommended that soil sampling be undertaken around the historical Incinerator Site. The Site was tested for Polychlorinated biphenyls (PCB), Total Petroleum Hydrocarbons (TPH) and Benzene, Toluene, Ethylbenzene and Xylene (BTEX) by SEMF (Independent Samplers). The sampling conducted by SEMF indicated that:

- PAH levels were below the NEPM HIL criteria for parks, recreation open space and playing fields;

- TPH levels were below the Dutch Intervention Value of 5,000 mg/kg.

Information regarding the contamination around the historical Incinerator Site was included in the Mine Conceptual Closure Plan (updated in June 2010).

The rehabilitation security cost estimate for the Dendrobium operations was reviewed in August 2011. No changes to the existing security estimate were identified.

4.6.2 Landscape Management Plan

The 2008/2099 AEMR notes that a draft Landscape Management Plan has been developed as a requirement under the Development Consent. This document outlines rehabilitation and closure requirements for the sites associated with Dendrobium Mine. In addition, and referenced in the Landscape Management Plan, the Dendrobium Mine Conceptual Closure Plan has been developed in line with I&I NSW and internal BHP Billiton requirements. The Conceptual Closure Plan document outlines the areas required to be rehabilitated after the closure of the mine. Information regarding the contamination around the historical Incinerator Site was included in the Mine Conceptual Closure Plan (updated in June 2010).

Later a letter from the Department of Planning dated 22/12/09 indicated the Landscape Management Plan had not at that stage been developed to the satisfaction of the Director-General of the Department of Industry and Investment (DII). The Department requested that this plan be submitted to the Department (i.e. Planning) after it received approval from DII.

DII advised in a letter dated 28 Feb 2011 and signed by the Director-General that the Landscape Management Plan had been prepared and implemented to his satisfaction. Dendrobium advised that the approved plan has since been sent to the Department of Planning and Infrastructure but at the time of the audit has not received their approval.

The Landscape Management Plan includes the following two items:

Rehabilitation Management Plan

Note that this deals with the surface facilities sites excluding Mine subsidence areas.

Mine Closure Plan

In a letter dated 18 Aug 2009, the Department of Planning noted as follows:

“Delayed submission of the Mine Closure Plan should be formally requested by the company. At this point, the Department is unlikely to agree to a delay beyond 31 December 2020”.

The Conceptual Closure Plan for Dendrobium Colliery was submitted to I & I – Mineral Resources on 12 January 2010.

An updated Security Assessment for the Rehabilitation Cost Estimates sent to I & I – Mineral Resources in October 2011.

CONCLUSIONS:

- (c) The Dendrobium actions under this condition comply;
- (d) The strategies, plans or programs required under these approvals appear adequate; and
- (e) There are no measures or actions recommended for this condition.

4.6.3 Bushfire Management Plan

The Bushfire Management Plan submitted and approved prior to this audit.

Asset protection zones were maintained or established in the following areas over all three AEMR periods in accordance with the Bushfire Management Plan:-

- Dendrobium Mine Pit Top
- Windy Gully - Cordeaux Road - Kembla Heights
- 28 -38 Harry Graham Drive - Kembla Heights
- Benjamin Road Fire Trail - Kembla Heights
- Containment Line southern side of Dendrobium Mine Pit Top
- Major upgrade works to Ridge Track Fire Trail from Mount Brisbane to the Mount Kembla Scramble track.

During the 08/09 reporting period, bushfire upgrade works on the No 1 Gate Fire Trail (Bulli Tops) were also carried out.

A site inspection was undertaken by the Rural Fire Service in February 2009. Issues identified during the inspection have been progressively addressed.

A Bushfire Hazard Reduction Inspection was undertaken in September/October 2009 of the Dendrobium Pit Top, Kemira Valley, Ventilation Shaft 1 and Ventilation Shaft 2/3 sites. Issues identified during the inspection have been addressed.

The Rural Fire Service completed hazard reduction on the large parcel of land located to the south of the Dendrobium Pit Top in Mt Kembla during the reporting period.

A Bushfire Hazard Reduction Inspection was undertaken in December 2010 of the Dendrobium Pit Top, Kemira Valley, Ventilation Shaft 1 and Ventilation Shaft 2/3 sites. Issues identified during the inspection have been addressed.

There are regular actions, inspections and responses according to the Bushfire Management Plan.

CONCLUSIONS:

- (c) The Dendrobium actions under this condition comply;
- (d) The strategies, plans or programs required under these approvals appear adequate; and
- (e) There are no measures or actions recommended for this condition.

4.7 TRANSPORT

4.7.1 Rail Transport of Coal

Condition 23

There were no breaches of the curfew times associated with the Kemira Valley Rail Line during the 2008/2009 AEMR reporting period.

There were no breaches of the curfew times associated with the Kemira Valley Rail Line during the 2009/2010 AEMR reporting period. The allowable hours of operation on the Kemira Valley Rail Line were reduced on 30 April 2010 in accordance with the conditions of consent. The allowable hours of operation on the rail line are now 6am to 11pm seven days a week (previously 6am to midnight seven days a week).

The 2010/2011 AEMR notes the curfew times but does not state compliance which is a deficiency in reporting.

There were a total of 6,102 train movements on the Kemira Valley Rail Line during the period from January 2008 to June 2009, with a total of 4,988,881 tonnes of ROM coal transported from the Kemira Valley facility to the Dendrobium Coal Preparation Plant located at the Port Kembla Steelworks.

There were a total of 4,116 train movements on the Kemira Valley Rail Line during the FY10 reporting period, with a total of 3,396,979 tonnes of ROM coal transported from the Kemira Valley facility to the DCP.

The ROM coal production for the FY11 period was reported as 3,670,043 tonnes. The number of train movements during the 2010/2011 AEMR reporting period were not reported which is a deficiency in reporting. The previous AEMR data allow a calculation of trains to be made but this is not the job of the reader.

Condition 24

This condition requires a record of the date and time of each train movement in the Kemira Valley and the amount of coal transported from the KVCLF each year.

The auditor has sighted copies of documents confirming compliance with this condition.

The condition requests “a comprehensive summary and discussion of the results of this monitoring in each AEMR”. The auditor believes that evidence that the curfew is being met, the volumes of ROM coal are within the approval and the proper records of each train movement are sufficient to meet this condition.

CONCLUSIONS:

- (c) The Dendrobium actions under this condition comply;
- (d) The strategies, plans or programs required under these approvals appear adequate; and
- (e) The AEMR needs to specifically report on compliance with these conditions. The first two AEMRs are compliant but the 2010/2011 is deficient in some details. Future AEMRs need to ensure these details are provided.

4.7.2 Road Transport

The Department of Planning letter of 22/12/2009 indicates that the Traffic Management Plan has been submitted and approved as per the consent condition.

The AEMRs report on Road Safety initiatives as follows:

A Drivers' Code of Conduct is in place at Dendrobium to ensure appropriate driver behaviour by all those who drive through the village to the mine including employees, contractors and truck transports, as required by the Dendrobium Development Consent and Traffic Management Plan. The Code of Conduct is communicated to all employees and contractors during the site induction and copies are periodically distributed to major suppliers and transport companies. Compliance with the Code of Conduct is strictly enforced.

Dendrobium Mine took the opportunity to temporarily install a variable message sign on Cordeaux Road in November 2009. The purpose was to reinforce the speed limits along Cordeaux Road. The sign which was located approximately 500m down the hill from the mine site entrance, alerted drivers of the speed limits in and around the school zone. The radar on the unit identified drivers not observing the speed limit. The speed limits, and the need for safe driving, along Cordeaux Road were also reinforced during the Environment and Community Awareness Training Package presented during November 2009 and various tool box talks.

If the public have any safety related concerns regarding the Dendrobium operations they are invited to use the 24 hour call line. Complaints received during the reporting period are recorded.

CONCLUSIONS:

- (c) The Dendrobium actions under this condition comply;
- (d) The strategies, plans or programs required under these approvals appear adequate; and
- (e) There are no measures or actions recommended for this condition.

4.7.3 Road Maintenance

The auditor has sighted the Stones Road Maintenance Deed agreement with WCC. The agreement with the SCA has not been sighted by the auditor, but the approved remediation of Vent shafts 2/3 in the SCA area provides evidence of agreed procedures for road maintenance.

CONCLUSIONS:

- (c) The Dendrobium actions under this condition comply;
- (d) The strategies, plans or programs required under these approvals appear adequate; and
- (e) There are no measures or actions recommended for this condition.

4.8 VISUAL

4.8.1 Visual Amenity

The earlier audits noted that this condition had been satisfied and that compliance was linked to the preparation of the Landscape Management Plan. Sections 4.6 and 4.8.2 of this audit indicate that this condition is being satisfied.

4.8.2 Lighting Emissions

All three AEMRs in the Audit period included the following:

Lighting at Dendrobium is managed in accordance with the Lighting Management Plan. During the reporting period the Dendrobium Pit Top site was well shielded by established vegetation. The KVCLF is mostly shielded within the valley. To minimise the potential for light to impact on residential properties, the KVCLF has the majority of lighting turned off at night unless work is being carried out at the site. The ventilation shaft sites are located in remote locations within the Metropolitan Special Area.

In addition, the 08/09 AEMR reports the following:

Cardno Lawson Treloar Pty Ltd undertook a Lighting Impact Assessment of the Dendrobium Mine in May 2008. The assessment included:

- A visual inspection of all external lighting fixtures present at both the main entrance to the mine (Pit Top) and the Kemira Valley Coal Loading Facility.
- The GPS marking of each fixture point, and
- The identification of the type of Luminaire used.

The Lighting Impact Assessment was conducted in response to concerns about light spillage resulting from Dendrobium Mine's operations during night time hours. A daylight visual inspection of the suburbs surrounding the mine, along with indications of possible sensitive receiver locations allowed the identification of seven locations possibly detrimentally affected by light spill from the mine. Measurements of both vertical illuminance and luminance were taken at these locations at 18:00 and 23:00 on 6 May 2008. These measurements were then compared to the requirements of the Australian Standard (AS) 4282-1997 *Control of the Obtrusive Effects of Outdoor Lighting*.

The results of the Lighting Impact Assessment did not reveal any of Dendrobium Mine operations to exceed any of the requirements of AS 4282 at any of the identified sensitive receivers at any time.

No complaints regarding lighting were received during the 09/10 or 10/11 AEMR reporting periods.

CONCLUSIONS:

(c) The Dendrobium actions under this condition comply;

- (d) The strategies, plans or programs required under these approvals appear adequate; and
(e) There are no measures or actions recommended for this condition.

4.9 WASTE

Dendrobium currently has six main waste streams. These waste streams include general waste, paper/cardboard, scrap steel, timber, industrial waste (diesel particulate filters), oily water and waste oil.

The 2008/2009 AEMR reports that specifically designed hydrocarbon bunded areas, located along the Pit Top site portal road and at the rear of the workshop, and a bunded diesel refuelling area were utilised during the reporting period. Bunded areas are checked on a daily basis and are pumped out when required to ensure that sufficient capacity is maintained at all times.

In addition to the permanent bunded areas, portable bunds were used for transient storage or transportation of oils and fuels around the site. Various spill kits and/or bins containing oil absorbent material were located around the site in areas where there is greatest potential for a spill to occur. Site personnel are made aware of the locations of these spill kits and absorbent material bins in their work area. The contents of the spill kits and the oil absorbent material bins are checked on a regular basis. Hydrocarbon management was covered within the Environment and Community Awareness Training Package that was rolled out during November 2008.

General waste collected from site is transported to one of two sites for disposal; Port Kembla Builders Landfill and Recycling Centre (Cleary Bros Pty Ltd), or Huntley Heritage.

Timber, steel/scrap metal, paper and cardboard are recycled at licensed off site facilities. These wastes are transported to the following facilities:

- Timber: Port Kembla Builders Landfill and Recycling Centre (Cleary Bros Pty Ltd) for recycling into mulch.
- Steel and scrap metal: OneSteel Recycling, Unanderra, for recycling
- Paper and cardboard: The Flagstaff Group, Unanderra, for recycling

Particulate filters are classified as industrial waste and are disposed of at the Elizabeth Drive Landfill Facility (SITA Australia Pty Ltd), Kemps Creek.

Waste oil is collected by Nationwide Oil Pty Ltd (Transpacific Industries Group Pty Ltd) on an as needed basis and is recycled. Solcenic waste is collected from the Dendrobium site (solcenic bund) by Worth Recycling and transported to the Worth Recycling facility (Port Kembla) where it undergoes treatment and separation. Oil extracted from the separation process is used by BlueScope Steel in the steel making process.

The AEMRs list both the amounts of the materials generated on site and indicated whether they were recycled or disposed of. The AEMRs also identify on-site training and improvement initiatives.

The 2010/2011 AEMR reports that an off-site waste sorting trial will be conducted in FY12 and results will be included in the FY12 AEMR.

The consent conditions require that the Applicant shall:

- Monitor the amount of waste generated by the development. This is being done.
- Investigate ways to reuse, recycle, or minimise waste. The AEMRs indicate that this is being done.
- Implement reasonable and feasible measures to minimise this waste. The records of the fate of the wastes indicate that this is being achieved.
- Report on waste management and minimisation in the AEMR. This is being done.

CONCLUSIONS:

(c) The Dendrobium actions under this condition comply;

(d) The strategies, plans or programs required under these approvals appear adequate;
and

(e) There are no measures or actions recommended for this condition.

5. SPECIFIC ENVIRONMENTAL CONDITIONS – OTHER SITE COMPONENTS

This section uses the following consent conditions to assess the technical areas covered under Schedule 5 of the 2008 Consent.

(c) assess the environmental performance of the development and assess whether it is complying with the relevant requirements in this approval and any relevant EPL or mining lease (including any strategy, plan or program required under these approvals);

(d) review the adequacy of strategies, plans or programs required under these approvals; and, if appropriate,

(e) recommend measures or actions to improve the environmental performance of the development, and/or any strategy, plan or program required under these approvals.

5.1 COAL WASHERY

The drying plant is located at the back end of the coal washery. The auditor has seen BHPB advice that the Dryer never got past the trial stage and was shut down on the 25/10/2006. Accordingly the next two conditions are no longer relevant.

5.1.1 Hot Gas Exhaust Stack Discharges

Not in use.

5.1.2 Fuel Source

Not in use.

5.2 WEST CLIFF COAL WASH EMPLACEMENT

5.2.1 Coal Washery Reject

As described in the Area 2 and 3 MOPs, long term experience and known characteristics of the coal wash material produced from Dendrobium Mine have resulted in it being defined as 'inert waste'. Therefore, coal wash may be deposited to landfill without further processing. This has also been confirmed through leachate analysis.

Coal wash is the material produced as a by-product of processing run-of-mine coal at the Dendrobium coal preparation plants.

During the reporting period of the 2008/2009 AEMR, 1,560,195 tonnes of coal wash was emplaced at the West Cliff Emplacement Area using methods that enable it to be recovered as a future resource. During the reporting period for the 2009/2010 AEMR, 2,163,114 (1,010,750 tonnes from Dendrobium) tonnes of coal wash was emplaced at

the West Cliff Emplacement Area using methods that enable it to be recovered as a future resource.

Illawarra Coal received approval to expand the West Cliff Emplacement Area (i.e. Stage 3) from the DoP during FY08. Water management works and associated infrastructure for Stage 3 commenced in October 2008 were completed in September 2009, and have been carried out in accordance with current industry best practice. The Stage 3 Emplacement Area provides an additional 33.5 million tonnes (refer Table below) of coal wash emplacement with an expected life of 13 years. Completion of Stage 3 construction was achieved in 2009.

Table - West Cliff Emplacement Area status table.

| Emplacement Stage | Estimated Capacity (Mt) | Emplacement Status |
|--------------------------|--------------------------------|---------------------------|
| 1 | 4.6 | Complete |
| 2 | 20.8 | Current |
| 3 | 33.5 | current |

As of 1 November 2009, DECCW introduced a \$15 levy applicable to coal wash generated at Dendrobium Washery and emplaced at the West Cliff Emplacement Area.

Approximately five hectares of the West Cliff Stage 2 Coal Wash Emplacement was rehabilitated with native vegetation during 2009-10.

As part of the Ministerial Approval for the West Cliff Stage 3 Coal Wash Emplacement, Illawarra Coal is in the process of transferring ownership of 154 hectares of land at Bulli Tops to the National Parks and Wildlife Service for incorporation into the Illawarra State Conservation Area.

Dendrobium advises that their submission to OEHL has been rejected and that alternative agreements and agencies' arrangements being reviewed.

Illawarra Coal has and will continue to research, develop and implement alternative uses for coal wash. To help fast track this process, Illawarra Coal has become a member of Sustainability Advantage, a business support service within DECCW. As part of this program DECCW will provide tailored support and technical assistance to help implement alternative uses for coal wash.

During FY10, Illawarra Coal diverted 140,000 tonnes of coal wash to beneficial uses. During the reporting period FY11, Illawarra Coal diverted 230,968 tonnes of coal wash to beneficial uses such as engineered fill.

These actions demonstrate compliance with this condition.

5.2.2 Pollution Reduction Program

The first part of the PRP, PRP 10.1 has been completed and submitted in March 2010. The auditor has viewed the correspondence to OEHL of 27 June 2011. Pollution Reduction Program (PRP) 10 was negotiated by Illawarra Coal as required by Condition 3 of the Further Approval (Dendrobium Mine development consent) with the Department of Environment, Climate Change and Water (DECCW) in 2008. The PRP was incorporated into the West Cliff Environment Protection Licence (EPL) 2504 via a Section 58 notice on the 2nd July 2008. The company is currently in the process of negotiating a new PRP with OEHL following on from the outcomes of PRP10.1. PRP10.1 specifically addressed salinity as required.

The PRP work has been in train since 8 December 2008 and will continue for a minimum of 5 years.

5.2.3 Water Quality Monitoring Program

Dendrobium personnel advise that the water quality monitoring plan for Westcliff mine been developed with DECC and DWE as required. This plan is part of the overarching West Cliff Emplacement Management Plan.

Monitoring is ongoing and reviewed regularly. The most recent review was for the submission of the Water Management plan for the Stage 3 Emplacement Area Environmental Assessment (which has been approved).

5.2.4 Brennans Creek Diversion Bypass Rehabilitation Plan

On 17 Sept 07 Dendrobium received the DPI Permit for the reclamation of Brennans Creek.

The Brennans Creek Bypass Channel Rehabilitation Features West Cliff Colliery report (Rev 0) prepared by Cardno Forbes Rigby was submitted to the Department of Planning (DoP) in December 2008, and forwarded to the relevant Government agencies for review.

DoP wrote back on 9/6/09 noting that the plan had not been prepared in consultation with the relevant Government authorities but that DoP had consulted with these agencies. The DoP letter included a number of issues requiring to be addressed by a revised plan to be submitted by August 2009.

The Final Report 001 Rev 2 dated June 2009 was re-submitted before the required date and the revised report did satisfy the consultation part of the condition.

The Rehabilitation Plan is now in place and has been approved. Rehabilitation had not commenced at the date of this audit.

5.2.5 General Management of the Emplacement

The West Cliff Emplacement Management Plan (approved) outlines Monitoring for ground water, emplacement settlement, compaction and combustibility, subsurface

drainage inspections, water monitoring, erosion and sediment control, Vegetation and Fauna Monitoring and Dust monitoring.

The annual emplacement rehabilitation monitoring program, conducted by Niche, kicked off in 2010 following consultation with DPI. The 2011 report has been viewed by the auditor.

The West Cliff AEMR also has a section of Emplacement Operations/Management Internal monitoring of rehabilitation also takes place with set photo points with other measures on a quarterly basis (internal monitoring).

The Niche report supplemented by the internal reporting satisfies this condition.

CONCLUSIONS:

- (c) The Dendrobium actions under this condition comply;
- (d) The strategies, plans or programs required under these approvals appear adequate; and
- (e) There are no measures or actions recommended for this condition.

6. SPECIFIC ENVIRONMENTAL CONDITIONS – EXTENDED SITE

This section uses the following consent conditions to assess the technical areas covered under Schedule 6 of the 2008 Consent.

(c) assess the environmental performance of the development and assess whether it is complying with the relevant requirements in this approval and any relevant EPL or mining lease (including any strategy, plan or program required under these approvals);

(d) review the adequacy of strategies, plans or programs required under these approvals; and, if appropriate,

(e) recommend measures or actions to improve the environmental performance of the development, and/or any strategy, plan or program required under these approvals.

6.1 GREENHOUSE GASES AND ENERGY EFFICIENCY

The Auditor has reviewed the Illawarra Coal Environmental Management System Greenhouse Gas & Energy Plan dated November 2010 which addresses all coal mining related operations in the Illawarra and Wollondilly regions south of Sydney.

There is a further document also reviewed by the Auditor – Greenhouse Gas & Energy Efficiency Plan Version 2.0 dated 26/08/11 which is a sub-plan to the Management Plan noted above. The Efficiency Plan was prepared to satisfy this condition of the 5 December 2008 consent. The Document appears to satisfy **Consent Conditions 1 (a) to (f) inclusive**. The Consent conditions allow for the Dendrobium mine to be considered within the ambit of the Southern Coalfield Operations and related operations.

The Auditor has seen the advice from the Department of Planning and Infrastructure dated 22/12/09 which notes approval of the following relevant documents:

- Illawarra Coal Greenhouse Gas and Energy Management Plan
- Dendrobium Mine Greenhouse Gas and Energy Efficiency Plan
- Dendrobium Coal Preparation Plant Greenhouse Gas and Energy Efficiency Plan
- West Cliff Coal Wash Emplacement Area Greenhouse Gas and Energy Efficiency Plan

Consent Condition 1. (g) requires the AEMRs to report on the development's greenhouse gas emissions and minimisation measures in the AEMRs. Each AEMR identifies the volumes of greenhouse gases emitted as follows:

AEMR 08/09 - During the reporting period, the underground workings were ventilated via fresh air drawn in through the Dendrobium Tunnel transport road, and Ventilation Shafts 1 and 2. The air was then extracted via Ventilation Shafts 1 (two fans until relocated to Shaft 3 in 2008) and 3 where three exhaust fans are installed. A total quantity of 11,867,126,400 cubic metres of air was extracted, which included 32,185,255 cubic metres of methane and 12,068,622 cubic metres of carbon dioxide. Diesel fuel used on site has low sulphur content i.e. 0.02%. The total quantity of diesel used during the reporting period was 1,021.48 KL.

AEMR 09/10 - During the reporting period, the underground workings were ventilated via fresh air drawn in through the Dendrobium Tunnel transport road, and Ventilation Shafts 1 and 2. The air was then extracted via Ventilation Shaft 3 where three exhaust fans are installed. A total quantity of 9,780,307,200 cubic metres of air was extracted, which included 13,265,511 cubic metres of methane and 7,150,629 cubic metres of carbon dioxide. Diesel fuel used on site has low sulphur content i.e. 0.02%. The total quantity of diesel used during the reporting period was 729 kL.

AEMR 10/11 – During the reporting period, the underground workings were ventilated via fresh air drawn in through the Dendrobium Tunnel transport road, and Ventilation Shafts 1 and 2. The air was then extracted via Ventilation Shaft 3 where three exhaust fans are installed. The average ventilation air flow rate for the reporting period was 318m³/s with an average CO₂ concentration of 0.10% and an average CH₄ concentration of 0.13%.

Each of the AEMRs identifies that there are no GHG abatement projects currently in place at the Dendrobium mine site due to the relatively low methane content in the vent air.

However, Illawarra Coal has the following current GHG abatement measures in place at its other mines:

- Appin and Tower EDL Methane Gas Engine Power Plants – involves the use of mine drainage gas from Appin and West Cliff as primary fuel to generate electricity - routinely abate ~ 2.0 to 2.2 Mt CO₂e pa.
- WestVAMP - utilisation of mine ventilation air at West Cliff - this project abates ~ 200 kt CO₂e pa.
- Surface Gas Well Flaring - West Cliff Surface Gas Wells - this project abates ~ 25 kt CO₂e pa.
- Utilisation of surface well gas at Appin (this project commenced in May 2010 and performance has not yet reached steady state for forecasting effectiveness of the utilisation aspects of this project).

As indicated above, the Consent conditions allow for the Dendrobium mine to be considered within the ambit of the Southern Coalfield Operations and related operations. The reviews of the AEMRs by the Director-General indicate acceptance or identify areas which need further information. The lack of any comment on the topic of GHG in the DP&I AEMR reviews is a de facto approval by the Director-

General that the abatement measures identified above satisfies the **Consent Condition 2:**

“The Applicant shall implement all reasonable and feasible measures to minimise the greenhouse gas emissions from the development to the satisfaction of the Director-General.”

CONCLUSIONS:

(c) The Dendrobium actions under this condition comply;

(d) The strategies, plans or programs required under these approvals appear adequate; and

(e) There are no measures or actions recommended for this condition.

7. ADDITIONAL PROCEDURES FOR AIR QUALITY AND NOISE MANAGEMENT

This section uses the following consent conditions to assess the technical areas covered under Schedule 7 of the 2008 Consent.

(c) assess the environmental performance of the development and assess whether it is complying with the relevant requirements in this approval and any relevant EPL or mining lease (including any strategy, plan or program required under these approvals);

(d) review the adequacy of strategies, plans or programs required under these approvals; and, if appropriate,

(e) recommend measures or actions to improve the environmental performance of the development, and/or any strategy, plan or program required under these approvals.

7.1 NOTIFICATION OF LANDHOLDERS

Consent Condition 1 of Schedule 7 reads:

1. If the results of monitoring required in Schedule 4 identify that the impacts generated by the development are greater than the relevant impact assessment criteria in Schedule 4, except where this is predicted in the documents listed in condition 2 of schedule 2 or where a negotiated agreement has been entered into in relation to that impact, then the Applicant shall notify the Director-General and the affected landowners and/or existing or future tenants (including tenants of mine-owned properties) accordingly, and provide quarterly monitoring results to each of these parties until the results show that the development is complying with the criteria in Schedule 4.

As noted in Section 4.1.1 and Section 4.3.1, minor exceedances of the noise and air quality criteria have been noted at times during the audit period.

No information has been provided indicating that the Director-General and affected landowners were notified at these times.

However, noise and air quality monitoring results indicate that while these exceedances have been recorded, they have neither been high in magnitude, nor protracted in duration.

Further, recent monitoring results indicate that Dendrobium is currently in compliance with respect to noise and air quality criteria.

In view of the above contextual information, this condition is deemed to have been satisfied.

7.2 INDEPENDENT REVIEW

Conditions 2 to 5 of Schedule 7 relate to the right of a landowners to ask the Director-General in writing for an independent review of the impacts of the development on his/her land.

It is understood that no such requests have been made during the audit period.

This condition has been satisfied.

7.3 LAND ACQUISITION

Condition 6 of Schedule 7 relates to the right of landowners to request their land be acquired in the event that unacceptable noise / air quality impacts are recorded, per Conditions 2 to 5.

It is understood that no such requests have been made during the audit period.

This condition has been satisfied.

8. ENVIRONMENTAL MANAGEMENT, MONITORING, AUDITING AND REPORTING

This section uses the following consent conditions to assess the technical areas covered under Schedule 8 of the 2008 Consent.

(c) assess the environmental performance of the development and assess whether it is complying with the relevant requirements in this approval and any relevant EPL or mining lease (including any strategy, plan or program required under these approvals);

(d) review the adequacy of strategies, plans or programs required under these approvals; and, if appropriate,

(e) recommend measures or actions to improve the environmental performance of the development, and/or any strategy, plan or program required under these approvals.

8.1 ENVIRONMENTAL MANAGEMENT STRATEGY

The Department of Planning letter dated 22/12/09 indicates the Department's approval of the Environmental Management Strategy.

In addition to the requirements of this consent condition, Dendrobium supplements their environmental compliance with a number of additional internal audits as indicated below:

During the 2009/2010 reporting period the performance of Dendrobium's Environmental Management System (EMS) and overall HSEC Management System was assessed in a comprehensive series of audits. These audits are briefly discussed in the following paragraphs.

Group Level Document Audits

In 2008, BHP Billiton updated the corporate management system to create the Group Level Documents (GLDs). It is a requirement that all sites within BHP Billiton are compliant with the GLDs. In October 2009, an internal audit was undertaken against a range of performance requirements in the following GLDs:

- Environment Standard
- Community Standard
- Fatal Risk Control Standard
- HSEC Management Standard
- Asset Protection Standard
- Health and Hygiene Standard

Non-compliances identified during these audits were assigned to site personnel to address and were entered into the internal event reporting system where progress against completing these actions is tracked. 100% compliance was recorded for the performance requirements audited in the Environment and Community GLDs.

EMS Internal Audits

Internal EMS audits were conducted in November 2009 and June 2010. The objectives of the audits were to follow up on audit actions from the internal EMS audits and ISO14001 surveillance audits and to review compliance of Dendrobium's EMS with ISO 14001 requirements. These internal audits help to identify opportunities that may exist to enhance the site's EMS and promote continual improvement, which is a requirement of the ISO14001 certification.

Hazardous Substances/Dangerous Goods Audits

During the reporting period, a number of audits were undertaken of dangerous goods and hazardous substances. These included a:

- A hazardous substance review of all chemicals on site in November 2009 to ensure that they had been approved for use on site and recorded in the site chemical database.
- A Hazardous Materials Survey was conducted at Dendrobium Mine in March 2010 by Hibbs & Associates Pty Ltd. The purpose of this survey was to identify possible asbestos containing materials as well as any electrical components containing the class of compounds known as polychlorinated biphenyls (PCBs). The results of the survey identified no electrical capacitors containing PCBs. No friable asbestos containing materials were identified on site. Bonded asbestos containing materials were identified; however, they do not present a significant asbestos related health risk whilst they remain undisturbed.

CONCLUSIONS:

- (c) The Dendrobium actions under this condition comply;
- (d) The strategies, plans or programs required under these approvals appear adequate; and
- (e) There are no measures or actions recommended for this condition.

8.2 ENVIRONMENTAL MONITORING PROGRAM

The Department of Planning letter dated 22/12/09 indicates the Department's approval of the Environmental Monitoring Program.

CONCLUSIONS:

- (c) The Dendrobium actions under this condition comply;
- (d) The strategies, plans or programs required under these approvals appear adequate; and
- (e) There are no measures or actions recommended for this condition.

8.3 REPORTING

8.3.1 Incident Reporting

These conditions require notification to the Department of Planning & Infrastructure of an incident that causes or may cause material harm to the environment within 24 hours and supplemented by detailed written reports within 21 days.

It is understood that no such incident has occurred within the period that this audit covers, so that the application of this condition has not been triggered.

8.3.2 Annual Reporting

This condition requires that at the end of each year and for at least 3 years following the cessation of mining at the development, the Applicant shall submit an AEMR to the Director-General, CCC and all relevant agencies. The condition sets out the requirements of the AEMRs in headings (a) to (j).

This audit has relied on the AEMRs for the periods 1 January 2008 -30 June 2009, (2008-2009 AEMR); 1 July 2009 – 30 June 2010 (AEMR 2009-2010) and 1 July 2010 – 30 June 2011 (AEMR 2010-2011). Accordingly, each AEMR has been carefully reviewed and found to be compliant with the requested conditions.

Each AEMR is submitted to all relevant agencies as per the requirements of Schedule 8 Condition 5 of the Dendrobium Development Consent. A copy of the report is publicly available via the BHP Billiton website under Dendrobium Mine:

<http://www.bhpbilliton.com/home/aboutus/regulatory/Pages/default.aspx>

Note that the 2008/2009 AEMR covered a period of 18 months (by agreement with the approval authorities) whereas the subsequent AEMRs have reverted to annual periods corresponding to a financial year period.

The 1 January 2008 to 30 June 2009 AEMR was accepted in Dec 2009 by DPI – MR.

Prior to signing off on the 2008/2009 AEMR, representatives from I&I NSW-MR, SCA, WSC and WCC met in November 2009 with Dendrobium personnel to discuss the report. Outcomes from the meeting, which was held at the Dendrobium Pit Top site, are addressed in the 2009/2010 AEMR.

The 2009/2010 Dendrobium AEMR review resulted in an acceptance letter of the AEMR from Industry and Investment NSW which detailed an agreed set of actions which are addressed in the 2010/2011 AEMR.

The 2010/2011 AEMR has been prepared and submitted but not yet assessed by the authorities. The auditor noted that this document was briefer than previous similar documents which reflected certain efficiencies, but at the same time excluded some information required by the consent. – e.g. the record of the number of trains from the KVCLF; evidence that train movements that have been recorded; the Reference list in the Appendices have no dates.

CONCLUSIONS:

- (c) The Dendrobium actions under this condition comply;
- (d) The strategies, plans or programs required under these approvals appear adequate; and
- (e) While the auditor supports efficiencies in reporting, it is recommended that the future AEMRs cross-check the 8 December 2008 consent requirements with the information reported.

8.4 INDEPENDENT ENVIRONMENTAL AUDIT

This Audit document satisfies this condition.

8.5 COMMUNITY CONSULTATIVE COMMITTEE

Dendrobium Community Consultative Committee (DCCC)

The DCCC was established in January 2002 in accordance with the Dendrobium Development Consent. The purpose of the DCCC is to provide a forum for open discussion between representatives of Dendrobium Mine, the community, the relevant Councils and other stakeholders on issues directly relating to the mine's operations, environmental performance and community relations, and to keep the community informed on these matters. The committee is chaired by a government appointed independent chairperson and is comprised of four community members, two environmental group representatives, one representative from the Wollongong City Council and two BHP Billiton representatives as outlined in Table 23 of the 2008/2009 AEMR. A representative from the Department of Primary Industries – Mineral Resources and various BHP Billiton representatives also attend meetings as required. Meetings are usually scheduled every 2 months and regular site visits are conducted.

In November 2002, Dendrobium, the community and WCC developed an agreement called the Dendrobium Community Enhancement Program (DCEP). The program received an upfront payment of \$600,000 directed to a WCC controlled trust fund at the commencement of the Dendrobium operations. Since 2005, a further three cents per saleable tonne of coal from the Dendrobium operations (adjusted for CPI) has been contributed to the fund. Following a change in the administration of the funds in FY10, the funds previously managed by the WCC and future contributions are now managed by the Dendrobium Community Enhancement Program Trust/DCEC and accounting is managed by external accounting firm Daley and Co.

There were nine DCCC meetings and seven field trips during the 2008/2009 AEMR reporting period.

As at June 2010, the DCEC was comprised of an independent Chairperson, five community representatives and two Dendrobium representatives. The committee met

on five occasions during the reporting period. The 2010/2011 AEMR did not identify the number of meetings held but indicated that meetings occur every two months.

The DCEC has recently adopted a strategic approach to the way applications for funding are received and considered. The focus of the DCEP is to facilitate access to funding for community projects with a vision to create a strong community and good living environment for the residents in the zone of influence of Dendrobium Mine. Individuals and organisations in the local community are encouraged to apply for funding. Applications for funding under the DCEP are assessed against a range of selection criteria, which can be viewed on the application form (available at <http://www.bhpbilliton.com/home/aboutus/regulatory/Pages/default.aspx>)

The AEMRs identify a range of projects that have received approval for funding.

In addition to the financial support provided through the DCEP, Illawarra Coal has committed to providing a 5-metre wide corridor of land through parts of Mt Kembla village for the Mt Kembla Mine Memorial Pathway. The Mount Kembla Pathway Group, comprising community and Dendrobium representatives will continue to meet to progress the design and development of Stage 2 (Stones Road to Kirkwood Place) and Stages 3 and 4 (Benjamin Road to the Breaker Emplacement and from the Bradford Breaker to Kembla Heights respectively) of the pathway.

CONCLUSIONS:

- (c) The Dendrobium actions under this condition comply;
- (d) The strategies, plans or programs required under these approvals appear adequate; and
- (e) There are no measures or actions recommended for this condition.

8.5.1 ACCESS TO INFORMATION

This condition calls for posting of various pieces of information on the website. The AEMRs indicate that the AEMR is posted on the website. The 2008/2009 and 2009/2010 AEMRs indicate an extensive list of Appendices – e.g.

List of Appendices

- A Dendrobium Organisational Chart
- B Rehabilitation – Security Cost Estimate
- C Subsidence Monitoring – 2008/2009 Water Reports
- D Subsidence Monitoring – 2008/2009 Landscape Reports
- E Subsidence Monitoring – 2008/2009 Terrestrial Ecology Reports
- F Subsidence Monitoring – 2008/2009 Aquatic Ecology Reports
- G Subsidence Monitoring – 2008/2009 Cultural Heritage Reports
- H Community Complaints Reports
- I Dendrobium Mine Compliance Report - June 2009.

This information would satisfy this condition.

The 2010/2011 AEMR does not include all of these Appendices and they now need to be accessed via the website.

The auditor visited the website several times and identified that many reports were available although there did not seem to be an archive of earlier reports from commencement of the project which should be worth considering.

In addition to the website, Dendrobium has the following activities designed to keep the community informed.

- Community Call Line
- Community Open Days
- Community Attitude surveys
- Regular meetings of the DCCC and DCEC committees
- Events
- Project activities
- Newsletters and Information sheets.
- CONCLUSIONS:
 - (c) The Dendrobium actions under this condition comply;
 - (d) The strategies, plans or programs required under these approvals appear adequate; and
 - (e) BHPB to consider additional website information to include all reports in archive files since the project commencement.

9. FIGURES

Figure 1 – Location Plan for the Various Dendrobium Mine Sites including the Rail Line and BlueScope Steel.

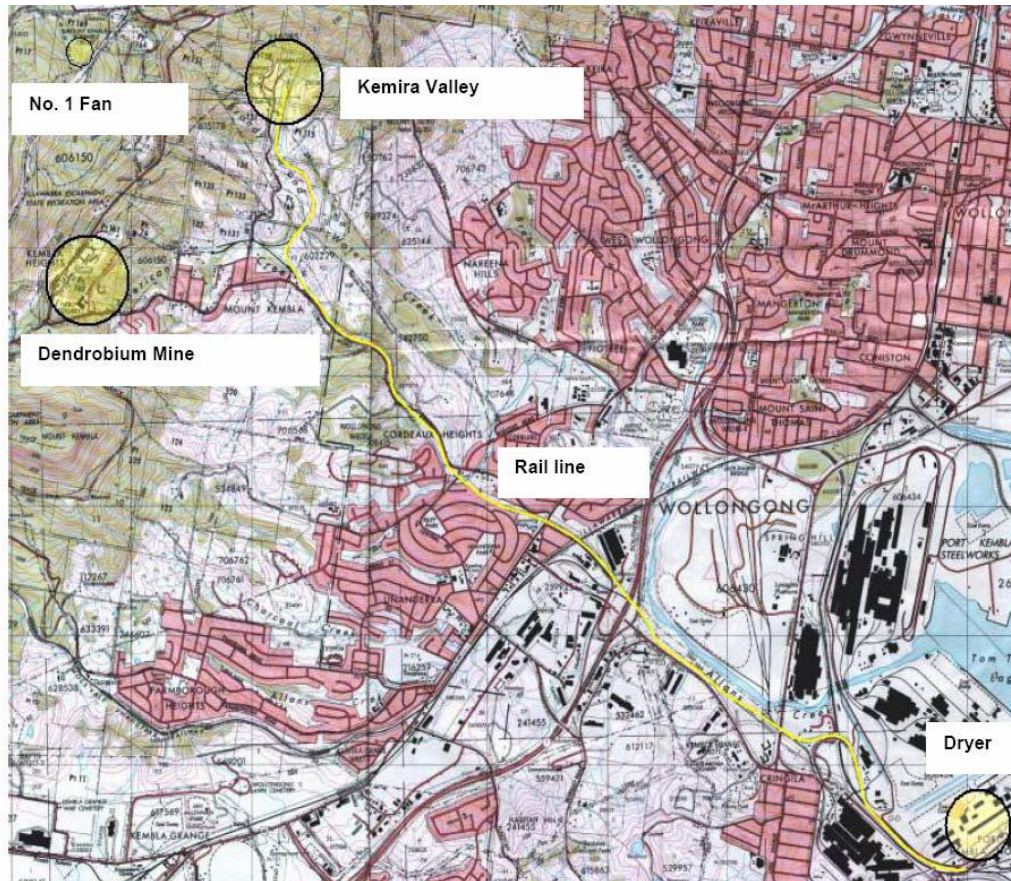


Figure 2 – Site Layout – Pit Top

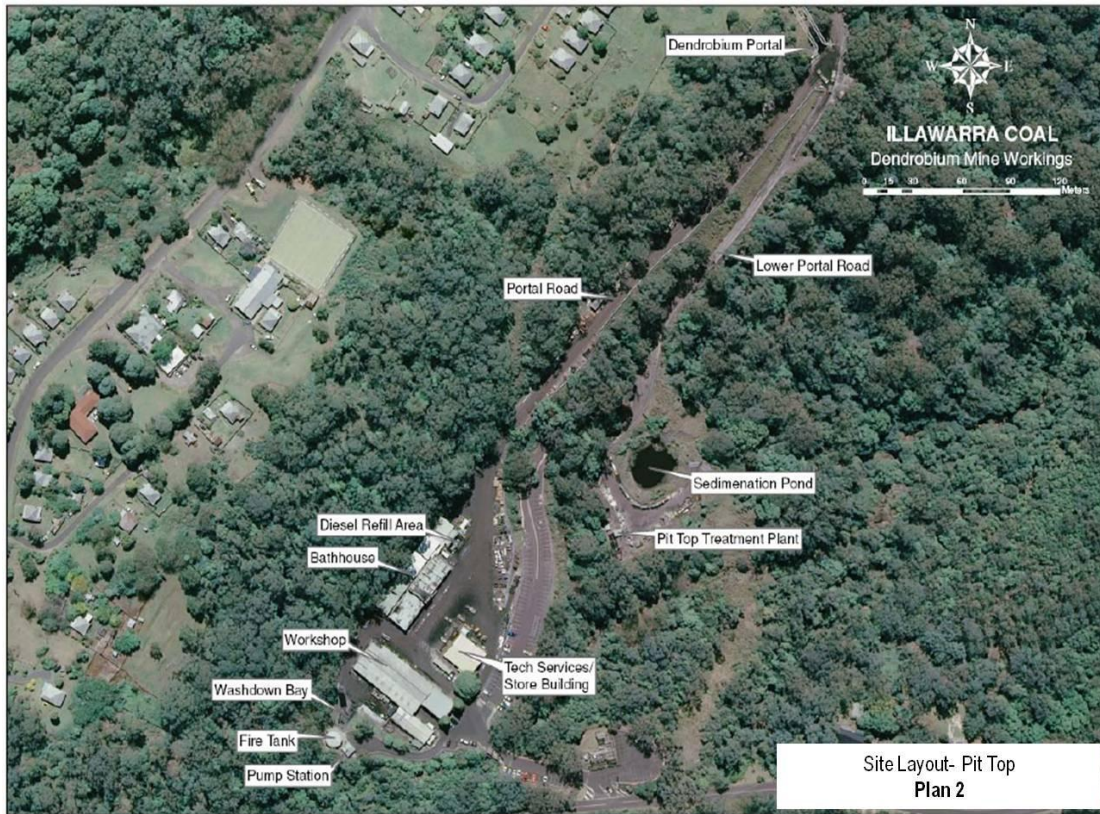
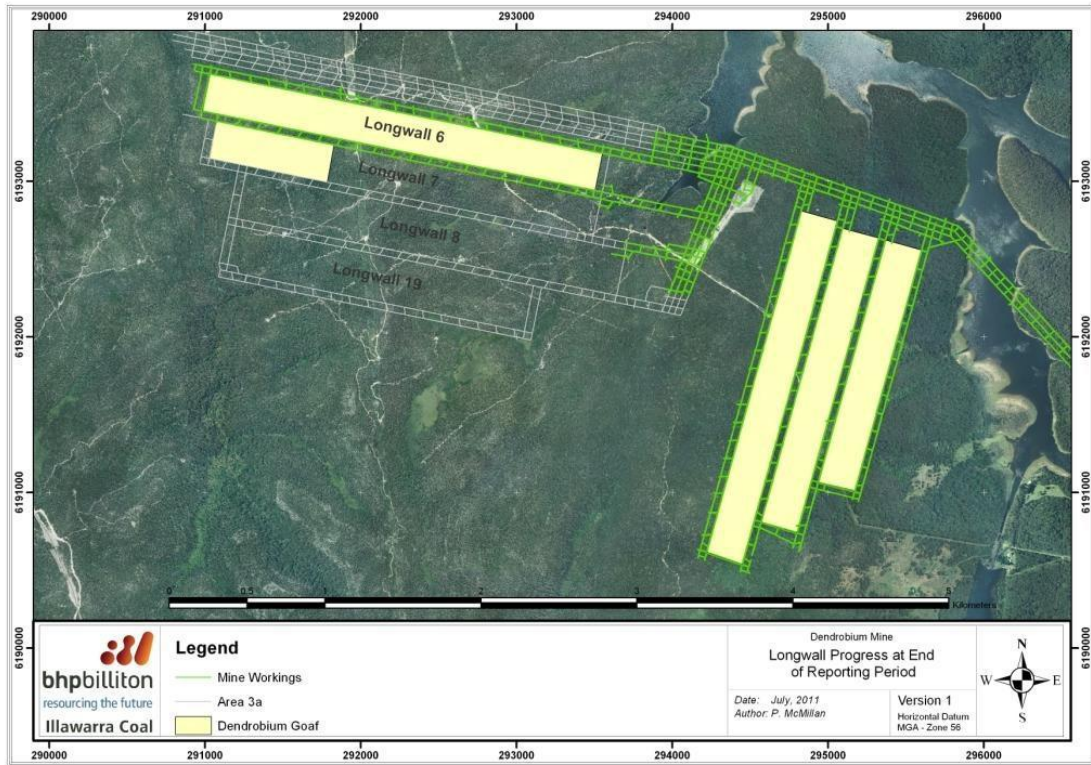


Figure 3 – Site Layout – Kemira Valley



Figure 4 – Long Wall Progress for end of reporting period.



10. APPENDICES

Appendix A – 8 December 2008 Dendrobium Consent

Appendix B - Copy of letter from NSW Department of Planning dated 14 July 2008 approving the audit team.

Appendix C – Subsidence correspondence from Trade and Investment dated 22 Nov 11 and from Dr Ann Young.

Appendix D – Subsidence Consultant DgS Report and Site Inspection Photo Log.

Appendix E – PAEHolmes Site Inspection Photo Log.

Notice of Modification

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

I modify the development consent referred to in Schedule 1, subject to the conditions in Schedule 2.

These conditions are required to:

- prevent, minimise, and/or offset adverse environmental impacts;
- set standards and performance measures for acceptable environmental performance;
- require regular monitoring, reporting and independent review; and
- provide for the ongoing environmental management of the development.



The Hon Kristina Keneally MP
Minister for Planning

Sydney



2008

SCHEDULE 1

The development consent for the Dendrobium underground coal mine and associated infrastructure granted by the Minister for Urban Affairs and Planning on 20 November 2001 (DA 60-03-2001).

SCHEDULE 2

1. Delete Schedule 1, Schedule 2 and all subsequent text and figures and replace with the following:

Schedule 1

| | |
|----------------------------|---------------------------------------------------------------------------------------|
| Application Number: | DA 60-03-2001 |
| Applicant: | BHP Billiton Illawarra Coal Holdings Pty Limited |
| Site: | See Appendix 1 |
| Development: | Dendrobium Underground Coal Mine and associated surface facilities and infrastructure |

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DEFINITIONS

| | |
|----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| AEMR | Annual Environmental Management Report |
| Affected councils | Wingecarribee Shire Council, Wollondilly Shire Council and Wollongong City Council |
| Applicant | BHP Billiton Illawarra Coal Holdings Pty Ltd, or its successors |
| BCA | Building Code of Australia |
| CCC | Community Consultative Committee |
| Coal washery | Dendrobium coal washery and drying facility located within the Steelworks |
| Consent | This development consent |
| Construction | The demolition of buildings or works, carrying out of works and erection of buildings covered by this consent |
| CPI | Consumer Price Index, as published by the Australian Bureau of Statistics |
| DA | Development application |
| Day | The period from 7am to 6pm on Monday to Saturday, and 8am to 6pm on Sundays and Public Holidays |
| DECC | Department of Environment and Climate Change |
| Department | Department of Planning |
| Director-General | Director-General of Department of Planning, or delegate |
| DPI | Department of Primary Industries |
| DSC | Dams Safety Committee |
| DWE | Department of Water and Energy |
| EA | <i>Dendrobium Colliery Modification to Dendrobium Area 3 Environmental Assessment</i> (including Attachments A to I), prepared for the Applicant by Cardno Forbes Rigby and dated November 2007 |
| EIS | <i>Environmental Impact Statement for the Dendrobium Underground Coal Mine</i> , prepared for the Applicant by Olsen Environmental Consulting and dated March 2001, including the Species Impact Statement prepared by Biosis Research and dated April 2001 |
| Environmental consequences | Environmental consequences of Subsidence Impacts, including loss of surface flows to the subsurface, loss of standing pools, adverse water quality impacts, development of iron bacterial mats, cliff falls, rock falls, damage to Aboriginal heritage sites, impacts on aquatic ecology, ponding, etc |
| EP&A Act | <i>Environmental Planning and Assessment Act 1979</i> |
| EP&A Regulation | <i>Environmental Planning and Assessment Regulation 2000</i> |
| EPL | Environment Protection Licence issued under the <i>Protection of the Environment Operations Act 1997</i> |
| Evening | The period from 6pm to 10pm |
| Extended site (or site) | All land to which the development application applies, comprising the mining area, surface facilities, coal washery and the West Cliff Coal Wash Emplacement (see Appendix 1) |
| First workings | Development of main workings and gateroads to establish access within the mining area |
| Independent Dispute Resolution Process | The independent dispute resolution process as described in Appendix 5 |
| Land | Land means the whole of a lot, or contiguous lots owned by the same landowner, in a current plan registered at the Land Titles Office at the date of this approval |
| KVCLF | Kemira Valley Coal Loading Facility and coal sizer |
| Kemira Valley rail line | The rail line and associated infrastructure between the KVCLF and the coal washery |
| Mining operations | First workings and second workings |
| Mining area | Area 1, Area 2, Area 3A, Area 3B and Area 3C, as shown in Appendix 2 |
| Minister | Minister for Planning, or delegate |
| MSB | Mine Subsidence Board |
| Mtpa | Million tonnes per annum |
| Night | The period from 10pm to 7am on Monday to Saturday, and 10pm to 8am on Sundays and Public Holidays |
| Privately-owned land | Land that is not owned by a public agency, or a mining company (or its subsidiary) |
| Reasonable and feasible | Reasonable relates to the application of judgement in arriving at a decision, taking into account: mitigation benefits, cost of mitigation versus benefits provided, community views and the nature and extent of potential |

| | |
|----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | improvements. Feasible relates to engineering considerations and what is practical to build |
| Response to Submissions | The Applicant's response to issues raised in submissions, dated 24 April 2008 |
| RTA | Roads and Traffic Authority |
| ROM coal | Run-of-mine coal |
| SCA | Sydney Catchment Authority |
| Second workings | Extraction of coal from longwall panels, miniwall panels or pillar extraction |
| SMP | Subsidence Management Plan |
| Statement of Commitments | The Applicant's Statement of Commitments for Area 3A – 3C (see Appendix 4) |
| Steelworks | Port Kembla Steelworks |
| Subsidence or subsidence effects | Deformation of the ground mass due to mining, including all mining-induced ground movements, including both vertical and horizontal displacement, tilt, strain and curvature |
| Subsidence impacts | Physical changes to the ground and its surface caused by Subsidence Effects, including tensile and shear cracking of the rock mass, localised buckling of strata caused by valley closure and upsidence and surface depressions or troughs |
| Surface facilities | Pit top facilities, mine access drift portal, conveyors, three ventilation shafts and fans, ROM coal stockpile, Kemira Valley Coal Loading Facility, Kemira Valley rail line, access roads and all associated development allowed to be constructed under the consent |
| TARP | Trigger, Action, Response Plan |
| WCC | Wollongong City Council |
| West Cliff Coal Wash Emplacement | Stage 3 of the West Cliff Coal Wash Emplacement, located at West Cliff Coal Mine |

SCHEDULE 2 ADMINISTRATIVE CONDITIONS

Obligation to Minimise Harm to the Environment

1. The Applicant shall implement all reasonable and feasible measures to prevent and/or minimise any harm to the environment that may result from the construction, operation, or rehabilitation of the development.

Terms of Approval

2. The Applicant shall carry out the development generally in accordance with the:
 - (a) Development Application (DA 60-03-2001), EIS and associated submissions to the Dendrobium Underground Coal Mine Project Commission of Inquiry, and in particular its:
 - Primary Submission (the Dendrobium Project, dated 30 July 2001);
 - Submission in Reply (the Dendrobium Project, undated); and
 - Environmental Effects of Subsidence Associated with the Dendrobium Project, prepared by National Environmental Consulting Services and dated August 2001;
 - (b) Modification Application dated 12 February 2002 and supporting information dated 27 January 2002;
 - (c) Modification Application and supporting information dated 24 May 2002 and additional supporting information dated 14 June 2002;
 - (d) Modification Application and Statement of Environmental Effects for the Dendrobium Coal Sizer, prepared by Olsen Environmental Consulting and dated March 2005;
 - (e) Application for Further Approval of West Cliff Emplacement Area Stage 3, Vol 2 (including Appendices), prepared by Cardno Forbes Rigby and dated July 2007, associated Response to Submissions dated 1 November 2007 and associated Statement of Commitments dated 28 November 2007 (see Appendix 3);
 - (f) Modification Application – Modification of Area 3 Footprint and Review of Conditions of Consent dated 27 November 2007, EA and associated Statement of Commitments (see Appendix 4); and
 - (g) conditions of this consent.

Note: The general layout of the development is shown in Figure 1 of Appendix 2.

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 consent shall prevail to the extent of any inconsistency.
4. The Applicant shall comply with any reasonable and feasible requirement/s of the Director-General arising from the Department's assessment of:
 - (a) any reports, plans, programs, strategies or correspondence that are submitted in accordance with the conditions of this consent; and
 - (b) the implementation of any actions or measures contained in these reports, plans, programs, strategies or correspondence.

Limits on Approval

5. Mining operations may take place in the mining area until 31 December 2030.

Note: Under this consent, the Applicant is required to rehabilitate the site to the satisfaction of the Director-General and DPI. Consequently this consent will continue to apply in all other respects other than the right to conduct mining operations until the site has been rehabilitated to a satisfactory standard.

6. The Applicant shall not extract more than 5.2 million tonnes of ROM coal a year from the mining area.
7. The Applicant shall only transport coal from the surface facilities by rail.

Staged Submission of Management Plans/Monitoring Programs

8. With the approval of the Director-General, the Applicant may submit any management plan or monitoring program required by this consent on a progressive basis.
9. The Applicant shall ensure that monitoring programs, management plans and the Environmental Management Strategy, as in existence at the date of modification of consent in November 2008, continue to

be implemented (to the satisfaction of the Director-General) until replaced by monitoring programs and management plans approved in accordance with the conditions of this consent.

Structural Adequacy

10. The Applicant 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.

Notes:

- *Under Part 4A of the EP&A Act, the Applicant is required to obtain construction and occupation certificates for the proposed building works.*
- *Part 8 of the EP&A Regulation sets out the requirements for the certification of the development.*

Demolition

11. The Applicant shall ensure that all demolition work is carried out in accordance with *Australian Standard AS 2601-2001: The Demolition of Structures*, or its latest version.

Operation of Plant and Equipment

12. The Applicant shall ensure that all plant and equipment used on site is:
- (a) maintained in a proper and efficient condition; and
 - (b) operated in a proper and efficient manner.

Community Enhancement

13. The Applicant shall contribute \$0.03 per tonne of saleable coal production each financial year to fund the provision of significant present and future benefits to local communities directly affected by the development. These funds shall be:
- (a) administered and expended in accordance with procedures which are to the satisfaction of WCC and the Director-General;
 - (b) provided by 30 September each year over the life of the consent;
 - (c) based on saleable coal production in the previous financial year; and
 - (d) indexed in accordance with the CPI, with April 2005 used as the commencement date for indexation calculations.

Any dispute over the operation of this fund shall be referred to the Director-General for resolution.

Costs of Management Measures

14. The Applicant shall be responsible for the costs of all management measures (including measures to minimise, mitigate, offset or remediate impacts of the development which are not recoverable by a third party through the *Mine Subsidence Compensation Act 1961* or the *Mining Act 1991*) including but not limited to remediation of natural features, rehabilitation of ecological systems, the provision of supplementary waters and monitoring of the effectiveness of the works, as determined by the Director-General.

SCHEDULE 3
SPECIFIC ENVIRONMENTAL CONDITIONS – MINING AREA

SUBSIDENCE

Note: These conditions should be read in conjunction with the Statement of Commitments.

Watercourse Impact Management

1. The Applicant shall ensure that, as a result of the development:
 - (a) no rock fall occurs at Sandy Creek Waterfall or from its overhang;
 - (b) the structural integrity of the waterfall, its overhang and its pool are not impacted;
 - (c) cracking in Sandy Creek within 30 m of the waterfall is of negligible environmental and hydrological consequence; and
 - (d) negligible diversion of water occurs from the lip of the waterfall to the satisfaction of the Director-General.

2. The Applicant shall ensure that underground mining operations do not cause subsidence impacts at Sandy Creek and Wongawilli Creek other than “minor impacts” (such as minor fracturing, gas release, iron staining and minor impacts on water flows, water levels and water quality) to the satisfaction of the Director-General.

Note: In this condition, “minor impacts” are those defined as minor triggers in Table 23.2 of the draft SMP submitted by the Applicant for Dendrobium Area 3A.

3. The Applicant shall ensure the development does not result in reduction (other than negligible reduction) in the quality or quantity of surface water or groundwater inflows to Lake Cordeaux or Lake Avon or surface water inflow to the Cordeaux River at its confluence with Wongawilli Creek, to the satisfaction of the Director-General.

4. Prior to carrying out any underground mining operations that could cause subsidence in either Area 3A, Area 3B or Area 3C, the Applicant shall prepare a Watercourse Impact Monitoring, Management and Contingency Plan to the satisfaction of the Director-General. Each such Plan must:
 - (a) demonstrate how the subsidence impact limits in conditions 1 - 3 are to be met;
 - (b) include a monitoring program and reporting mechanisms to enable close and ongoing review by the Department and DPI of the subsidence effects and impacts (individual and cumulative) on Wongawilli Creek, Sandy Creek and Sandy Creek Waterfall;
 - (c) include a general monitoring and reporting program addressing surface water levels, water flows, water quality, surface slope and gradient, erodibility, aquatic flora and fauna (including Macquarie Perch, any other threatened aquatic species and their habitats) and ecosystem function;
 - (d) include a management plan for avoiding, minimising, mitigating and remediating impacts on watercourses, which includes a tabular contingency plan (based on the Trigger Action Response Plan structure) focusing on measures for remediating both predicted and unpredicted impacts;
 - (e) address third and higher order streams individually but address first and second order streams collectively;
 - (f) be prepared in consultation with DECC, SCA and DPI;
 - (g) incorporate means of updating the plan based on experience gained as mining progresses;
 - (h) be approved prior to the carrying out of any underground mining operations that could cause subsidence impacts on watercourses in the relevant Area; and
 - (i) be implemented to the satisfaction of the Director-General.

Notes:

- *Should review by the Department of reports by the Applicant under paragraph (b) indicate that subsidence impacts have exceeded or threaten to limits imposed in conditions 1-3, then under condition 4 of Schedule 2 the Director-General may instruct the Applicant to implement reasonable and feasible requirements, which may include to cease mining within the operative longwall, shorten the length of that longwall or shorten the length and/or width of future longwalls.*
- *Requirements under paragraphs (a) and (b) in respect of Sandy Creek and Sandy Creek Waterfall relate only to the Watercourse Impact Monitoring, Management and Contingency Plan for Area 3A.*

Swamp Impact Management

5. The Applicant shall ensure that subsidence does not cause erosion of the surface or changes in ecosystem functionality of Swamp 15a and that the structural integrity of its controlling rockbar is maintained or restored, to the satisfaction of the Director-General.
6. Prior to carrying out any underground mining operations that could cause subsidence in either Area 3A, Area 3B or Area 3C, the Applicant shall prepare a Swamp Impact Monitoring, Management and Contingency Plan to the satisfaction of the Director-General. Each such Plan must:
 - (a) demonstrate how the subsidence impact limits in condition 5 are to be met;
 - (b) include a monitoring program and reporting mechanisms to enable close and ongoing review by the Department and DPI of the subsidence effects and impacts (individual and cumulative) of each Area 3A longwall on Swamp 15a;
 - (c) include a general monitoring and reporting program addressing surface water levels, near-surface groundwater levels, water quality, surface slope and gradient, erodibility, flora and ecosystem function;
 - (d) include a management plan for avoiding, minimising, mitigating and remediating impacts on swamps, which includes a tabular contingency plan (based on the Trigger Action Response Plan structure) focusing on measures for remediating both predicted and unpredicted impacts;
 - (e) address headwater and valley infill swamps separately and address each swamp individually;
 - (f) be prepared in consultation with DECC, SCA and DPI;
 - (g) incorporate means of updating the plan based on experience gained as mining progresses;
 - (h) be approved prior to the carrying out of any underground mining operations that could cause subsidence impacts on swamps in the relevant Area; and
 - (i) be implemented to the satisfaction of the Director-General.

Notes:

- *Should review by the Department of reports by the Applicant under paragraph (b) indicate that subsidence impacts have exceeded or threaten to exceed limits imposed in condition 5, then under condition 4 of Schedule 2 the Director-General may instruct the Applicant to implement reasonable and feasible requirements, which may include to cease mining within the operative longwall, shorten the length of that longwall or shorten the length and/or width of future longwalls.*
- *Requirements under paragraphs (a) and (b) relate only to the Swamp Impact Monitoring, Management and Contingency Plan for Area 3A.*

Subsidence Management Plans

7. Prior to carrying out any underground mining operations that could cause subsidence in either Area 3A, 3B or 3C, the Applicant shall prepare a Subsidence Management Plan (SMP) to the satisfaction of the Director-General and the Director-General of DPI. Each such SMP must:
 - (a) integrate ongoing management of Areas 1 and 2;
 - (b) integrate the Watercourse and Swamp Impact Monitoring, Management and Contingency Plans required under conditions 4 and 6;
 - (c) include monitoring of subsidence effects;
 - (d) include a SCA Assets Protection Plan;
 - (e) include monitoring, management, and contingency plans for all other significant natural features and all significant man made features which may be impacted by subsidence, including:
 - landscape (including cliffs and steep slopes);
 - groundwater (see condition 13);
 - terrestrial flora and fauna and ecology (including all threatened species assessed as being likely to be significantly affected by the development and their habitats);
 - Aboriginal and other cultural heritage (see condition 12); and
 - electrical, communications and other infrastructure;
 - (f) be prepared in consultation with DECC, SCA and DPI;
 - (g) be approved prior to the carrying out of any underground mining operations that could cause subsidence in the relevant Area; and
 - (h) be implemented to the satisfaction of the Director-General and the Director-General of DPI.

Notes:

- *The SCA Assets Protection Plan required under this condition must also be prepared and implemented to the satisfaction of the SCA.*
- *The contingency plans required under paragraph (e) must address remediation (as appropriate) and be based on a TARP structure.*

8. The SMPs prepared under condition 7 for Areas 3B and 3C must:
 - (a) include a mine plan for the relevant Area;
 - (b) include a detailed subsidence impact assessment, clearly setting out all predicted subsidence effects, subsidence impacts and environmental consequences;
 - (c) include a minimum of 2 years of baseline data, collected at appropriate frequency and scale, for all significant natural features;
 - (d) identify and assess the significance of all natural features located within 600 m of the edge of secondary extraction;
 - (e) distinguish between, clearly describe and adequately quantify all subsidence effects, subsidence impacts and environmental consequences;
 - (f) propose limits on subsidence impacts and environmental consequences to be applied within the relevant Area;
 - (g) be otherwise prepared in accordance with any guidelines for SMPs developed by the Department and/or DPI;
 - (h) be approved prior to the carrying out of any underground mining operations that could cause subsidence in the relevant Area; and
 - (i) be implemented to the satisfaction of the Director-General and the Director-General of DPI.

Note: In approving an SMP, the Director-General may impose conditions containing subsidence impact limits (similar to conditions 1- 3 & 5), subsidence management mechanisms (similar to conditions 4 & 6) or other conditions.

End of Panel Reporting

9. Within 4 months of the completion of each longwall panel, or as otherwise permitted by the Director-General, the Applicant shall:
 - (a) prepare an end-of-panel report:
 - reporting all subsidence effects (both individual and cumulative) for the panel and comparing subsidence effects with predictions;
 - describing in detail all subsidence impacts (both individual and cumulative) for the panel;
 - discussing the environmental consequences for watercourses, swamps, water yield, water quality, aquatic ecology, terrestrial ecology, groundwater, cliffs and steep slopes; and
 - comparing subsidence impacts and environmental consequences with predictions; and
 - (b) submit the report to the Department, DPI, SCA, DECC, DWE and any other relevant agency to the satisfaction of the Director-General.
10. The Applicant shall include a comprehensive summary, analysis and discussion of the results of monitoring of subsidence effects, subsidence impacts and environmental consequences in each AEMR.

Note: Conditions 9 and 10 apply to Area 2, as well as to Areas 3A, 3B and 3C.

Subsidence Expert Assessments

11. The Applicant shall pay the reasonable costs of the Department in engaging independent experts to advise it when it assesses SMPs prepared under condition 7 for Areas 3B and 3C.

ABORIGINAL HERITAGE

12. The SMPs prepared under condition 7 must include an Aboriginal Heritage Plan, which must include a:
 - (a) description of known Aboriginal heritage sites;
 - (b) protocol for the ongoing consultation and involvement of the Aboriginal community in the conservation and management of Aboriginal heritage;
 - (c) description of the measures that would be implemented to protect Aboriginal sites generally, including measures that would be implemented to secure, analyse and record sites at risk of subsidence;
 - (d) description of the measures that would be implemented to protect Aboriginal site 52-2-1646, including:
 - a full recording and assessment of the site's rock art;
 - a more detailed subsidence assessment for the site;
 - measures which seek to avoid any significant impact on the site and any necessary contingency plans to protect the site against collapse or substantial impact on its rock art; and
 - (e) description of the measures that would be implemented if any new Aboriginal objects or skeletal remains are discovered during the development.

GROUNDWATER MONITORING PROGRAM

13. The SMPs prepared under condition 7 must include a Groundwater Monitoring Program, which must include:
- (a) proposals to develop a detailed regional and local groundwater model, with special reference to flows to and from nearby water storages;
 - (b) detailed baseline data to benchmark the natural variation in groundwater levels, yield and quality;
 - (c) groundwater impact assessment criteria;
 - (d) a program to monitor the impact of the development on:
 - groundwater levels, yield and quality (particularly any potential loss of flow to, or flow from, SCA water storages);
 - coal seam aquifers and overlying aquifers; and
 - groundwater springs and seeps; and
 - (e) consideration of the requirements of the latest version (or subsequent replacement) of SCA's *The Design of a Hydrological and Hydrogeological Monitoring Program to Assess the Impacts of Longwall Mining in SCA Catchment*.

ENVIRONMENTAL OFFSETS

14. The Applicant shall provide suitable offsets for loss of water quality or loss of water flows to SCA storages, clearing and other ground disturbance (including cliff falls) caused by its mining operations and/or surface activities within the mining area, unless otherwise addressed by the conditions of this consent, to the satisfaction of the Director-General. These offsets must:
- (a) be submitted to the Director-General for approval by 30 April 2009;
 - (b) be prepared in consultation with SCA;
 - (c) provide measures that result in a beneficial effect on water quality, water quantity, aquatic ecosystems and/or ecological integrity of SCA's special areas or water catchments.

**SCHEDULE 4
SPECIFIC ENVIRONMENTAL CONDITIONS – SURFACE FACILITIES**

NOISE

Noise Impact Assessment Criteria

- The Applicant shall ensure that the noise generated at the surface facilities does not exceed the noise impact assessment criteria in Table 1 at any residence on privately-owned land, or on more than 25% of any privately-owned land. The applicable criteria for any residence not listed in Table 1 shall be the criteria applying at the nearest listed residence.

Table 1: Noise impact assessment criteria dB(A)

| Day <i>L_{Aeq}(15 min)</i> | Evening <i>L_{Aeq}(15 min)</i> | Night | | Residence <i>(as shown in the Noise Monitoring Program)</i> |
|----------------------------------------------|--------------------------------------------------|--------------------------------|------------------------------|-----------------------------------------------------------------------|
| | | <i>L_{Aeq}(15 min)</i> | <i>L_{A1}(1 min)</i> | |
| 42 | 42 | 38 | 48 | R2 |
| 41 | 41 | 40 | 50 | R22 |
| 40 | 40 | 39 | 49 | R1 |
| | | | | R9 |
| | | | | R15a |
| 40 | 40 | 37 | 47 | R3a |
| | | | | R5a |
| | | | | R6a&b |
| 37 | 35 | 35 | 45 | R39a |

Notes:

- To determine compliance with the *L_{Aeq}(15 minute)* limit, noise from the development is to be measured at the most affected point within the residential boundary, or at the most affected point within 30 metres of a dwelling (rural situations) where the dwelling is more than 30 metres from the boundary. Where it can be demonstrated that direct measurement of noise from the development is impractical, DECC may accept alternative means of determining compliance (see Chapter 11 of the NSW Industrial Noise Policy). The modification factors in Section 4 of the NSW Industrial Noise Policy shall also be applied to the measured noise levels where applicable.
- To determine compliance with the *L_{A1}(1 minute)* limit, noise from the development is to be measured at 1 metre from the dwelling façade. Where it can be demonstrated that direct measurement of noise from the development is impractical, DECC may accept alternative means of determining compliance (see Chapter 11 of the NSW Industrial Noise Policy).
- The noise emission limits identified in the above table apply under meteorological conditions of:
 - wind speeds of up to 3 m/s at 10 metres above ground level ; or
 - up to 3°C/100 m temperature inversion strength for all receivers, plus a 2 m/s source-to-receiver component drainage flow wind at 10 metres above ground level for those receivers where applicable.
- These limits do not apply if the Applicant has an agreement with the relevant owner/s of these residences to generate higher noise levels, and the Applicant has advised the Department and DECC in writing of the terms of this agreement.

Land Acquisition Criteria

- If the noise generated at the surface facilities exceeds the relevant criteria in Table 2 at any residence on privately-owned land or on more than 25% of any privately-owned land, the Applicant shall, upon receiving a written request for acquisition from the landowner, acquire the land in accordance with the procedures in conditions 8 - 10 of schedule 4. The applicable criteria for any residence not listed in Table 2 shall be the criteria applying at the nearest listed residence.

Table 2: Noise acquisition criteria dB(A)

| Day <i>L_{Aeq}(15 min)</i> | Evening <i>L_{Aeq}(15 min)</i> | Night <i>L_{Aeq}(15 min)</i> | Residence <i>(as shown in the Noise Monitoring Program)</i> |
|----------------------------------------------|--------------------------------------------------|------------------------------------------------|-----------------------------------------------------------------------|
| 47 | 47 | 43 | |
| 46 | 46 | 45 | R22 |
| 45 | 45 | 44 | R1 |
| | | | R9 |
| | | | R15a |
| 45 | 45 | 42 | R3a |
| | | | R5a |
| | | | R6a&b |
| 42 | 40 | 40 | R39a |

Note: Noise generated by the development is to be measured in accordance with the notes to Table 1.

Rail Haulage Impact Assessment Criteria

3. The Applicant shall ensure that noise generated by locomotives using the Kemira Valley rail line does not exceed the rail noise impact assessment criteria in Table 3.

Table 3: Rail noise impact assessment criteria

| Operating Condition | Measurement Conditions | Criteria <i>L_{A1}(1 min)</i> |
|---------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|
| Locomotive at idle, with compressor radiator fans and air conditioning operating at maximum load | Stationary 15 metre contour | 70 dB(A) |
| All other throttle settings under self-load, with compressor radiator fans and air conditioning operating at maximum load | Stationary 15 metre contour | 87 dB(A) 95 dB(Lin) |
| All service conditions | Up to 50 kilometres per hour, 15 metres from centreline of rail track | 87 dB(A) 95 dB(Lin) Must be non-tonal Linear noise levels must not exceed A-weighted noise levels by more than 15 dB |

Note: All measured noise levels must be assessed for tonality in accordance with the NSW Industrial Noise Policy, unless otherwise specified.

Continuous Improvement

4. The Applicant shall:
- continue to investigate ways to reduce the noise generated by the development (including off-site road noise, noise and vibration impacts from the operation of the Kemira Valley rail line and maximum noise levels which may result in sleep disturbance);
 - continue to implement all reasonable and feasible best practice noise mitigation measures; and
 - report on these investigations and the implementation and effectiveness of these measures in the AEMR,
- to the satisfaction of the Director-General.
5. The Applicant shall use its best endeavours to minimise wheel squeal, brake squeal and locomotive wheel slippage arising from rail haulage on the Kemira Valley rail line.

Additional Noise Mitigation Measures

6. Upon receiving a written request from the owner of any residence where subsequent noise monitoring shows the noise generated by the development is 3 dB(A) greater than the noise impact assessment criteria in Table 1 (except where a negotiated noise agreement is in place) the Applicant shall implement reasonable and feasible noise mitigation measures (such as double glazing, insulation and/or air conditioning) at any residence on the land in consultation with the landowner.

If within 3 months of receiving this request from the landowner, the Applicant 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.

Monitoring

7. The Applicant shall prepare and implement a Noise Monitoring Program for the development to the satisfaction of the Director-General. This program must:
- be submitted to the Director-General for approval by 30 April 2009;
 - be prepared in consultation with DECC;
 - provide for quarterly attended noise monitoring and real-time noise monitoring (where appropriate) to monitor the performance of the development, especially in residential areas close to the surface facilities; and

- (d) include a noise monitoring protocol for evaluating compliance with the noise impact and land acquisition criteria in this consent.

Note: This program must expressly monitor the modifying factors referred to in the NSW Industrial Noise Policy (such as intermittency, tonality and low frequency)

BLASTING AND VIBRATION

8. The Applicant is not permitted to undertake blasting operations at the surface facilities except with the prior written approval of DECC and subject to any conditions which DECC may impose.

AIR QUALITY

Impact Assessment Criteria

9. The Applicant shall ensure that dust generated by the development does not cause additional exceedances of the criteria listed in Tables 4 to 6 at any residence on privately-owned land, or on more than 25 percent of any privately-owned land.

Table 4: Long term impact assessment criteria for particulate matter

| Pollutant | Averaging period | Criterion |
|------------------------------------------------|------------------|----------------------|
| Total suspended particulate (TSP) matter | Annual | 90 µg/m ³ |
| Particulate matter < 10 µm (PM ₁₀) | Annual | 30 µg/m ³ |

Table 5: Short term impact assessment criteria for particulate matter

| Pollutant | Averaging period | Criterion |
|------------------------------------------------|------------------|----------------------|
| Particulate matter < 10 µm (PM ₁₀) | 24 hour | 50 µg/m ³ |

Table 6: Long term impact assessment criteria for deposited dust

| Pollutant | Averaging period | Maximum increase in deposited dust level | Maximum total deposited dust level |
|----------------|------------------|------------------------------------------|------------------------------------|
| Deposited dust | Annual | 2 g/m ² /month | 4 g/m ² /month |

Note: Deposited dust is assessed as insoluble solids as defined by Standards Australia, 1991, AS/NZS 3580.10.1-2003: Methods for Sampling and Analysis of Ambient Air - Determination of Particulates - Deposited Matter - Gravimetric Method.

Monitoring

10. The Applicant shall prepare and implement an Air Quality Monitoring Program for the surface facilities (excepting those surface facilities within the mining area) to the satisfaction of the Director-General. This program must:
- be submitted to the Director-General for approval by 30 April 2009;
 - be prepared in consultation with DECC;
 - use a combination of high volume samplers and dust deposition gauges to monitor the performance of the development; and
 - include an air quality monitoring protocol for evaluating compliance with the air quality impact assessment criteria in this consent.

METEOROLOGICAL MONITORING

11. During the development, the Applicant shall ensure that it has a suitable meteorological station in the vicinity of the site that is generally in accordance with the requirements in the guideline *Approved Methods for Sampling of Air Pollutants in New South Wales*.

WATER MANAGEMENT

Discharges

12. The Applicant shall ensure all surface water discharges from the surface facilities:
- (a) meet the relevant ANZECC water quality objectives for the protection of aquatic ecosystems and water quality of existing receiving waters; and
 - (b) comply with the discharge limits (both volume and quality) set for the development in any EPL.

Water Management Plan

13. The Applicant shall prepare and implement a Water Management Plan for the surface facilities to the satisfaction of the Director-General. This plan must:
- (a) be submitted to the Director-General for approval by 30 April 2009;
 - (b) be prepared in consultation with DECC, SCA and DWE by suitably qualified expert/s whose appointment/s have been approved by the Director-General; and
 - (c) include a:
 - Site Water Balance;
 - Erosion and Sediment Control Plan;
 - Surface Water Monitoring Program; and
 - Surface and Ground Water Response Plan.

Site Water Balance

14. The Site Water Balance must:
- (a) include details of:
 - sources and security of water supply;
 - water use on site;
 - water intercepted by mining operations;
 - water management on site;
 - off-site water transfers and water stored or disposed of underground;
 - reporting procedures; and
 - (b) describe measures to minimise water use by the development.

Erosion and Sediment Control

15. The Erosion and Sediment Control Plan must:
- (a) be consistent with the requirements of the *Managing Urban Stormwater: Soils and Construction Manual* (Landcom 2004, or its latest version);
 - (b) identify activities that could cause soil erosion and generate sediment;
 - (c) describe measures to minimise soil erosion and the potential for transport of sediment to downstream waters;
 - (d) describe the location, function, and capacity of erosion and sediment control structures; and
 - (e) describe what measures would be implemented to monitor and maintain the structures over time.

Surface Water Monitoring Program

16. The Surface Water Monitoring Plan must include:
- (a) baseline data on surface water flows and quality in streams and other waterbodies that have been or could be affected by the surface facilities;
 - (b) surface water quality and stream health assessment criteria, including trigger levels for investigating any potentially adverse surface water impacts;
 - (c) a program to monitor the impact of the surface facilities on surface water flows and quality, stream health and channel stability; and
 - (d) procedures for reporting the results of this monitoring.

Surface and Ground Water Response Plan

17. The Surface and Ground Water Response Plan must describe what measures and/or procedures would be implemented to:
- (a) respond to any exceedances of the surface water, stream health, and groundwater assessment criteria; and

- (b) mitigate and/or offset any adverse impacts on groundwater dependent ecosystems, aquatic ecosystems or riparian vegetation.

LANDSCAPE MANAGEMENT

Rehabilitation

- 18. The Applicant shall rehabilitate the surface facilities sites to the satisfaction of DPI. For rehabilitation works within the Metropolitan Special Area, the Applicant shall also ensure that these works are carried out to the satisfaction of SCA.

Landscape Management Plan

- 19. The Applicant shall prepare and implement a Landscape Management Plan for the surface facilities to the satisfaction of the Director-General and the Director-General of DPI. This plan must:
 - (a) be submitted for approval by 30 April 2009;
 - (b) be prepared by suitably qualified expert/s whose appointment/s have been endorsed by the Director-General;
 - (c) be prepared in consultation with DECC and SCA; and
 - (d) include a:
 - Rehabilitation Management Plan; and
 - Mine Closure Plan.

Note: The Mine Closure Plan may be submitted at a date agreed by the Director-General, provided that this date is at least 2 years prior to the planned cessation of mining at the site.

Rehabilitation Management Plan

- 20. The Rehabilitation Management Plan must include:
 - (a) the rehabilitation objectives for the surface facilities sites;
 - (b) a general description of the short, medium and long term measures that would be implemented to rehabilitate these sites;
 - (c) performance and completion criteria for the rehabilitation of these sites;
 - (d) a description of how the performance of the rehabilitation works would be monitored over time to achieve the stated objectives and against the relevant performance and completion criteria;
 - (e) any measures necessary to ensure that abandoned mine workings do not impact on stored waters or dams; and
 - (f) details of who is responsible for monitoring, reviewing and implementing the plan.

Mine Closure Plan

- 21. The Mine Closure Plan must:
 - (a) be prepared in consultation with the affected councils and CCC;
 - (b) define the objectives and criteria for mine closure;
 - (c) investigate options for the future use of the surface facilities sites;
 - (d) include the proposed management and use of any heritage-listed buildings;
 - (e) investigate ways to minimise the adverse socio-economic effects associated with mine closure, including reduction in local and regional employment;
 - (f) describe the measures that would be implemented to minimise or manage the on-going environmental effects of the development; and
 - (g) describe how the performance of these measures would be monitored over time.

Bushfire Management Plan

- 22. The Applicant shall prepare and implement a Bushfire Management Plan for the site, with particular reference to the mining area, in consultation with SCA and to the satisfaction of the Rural Fire Service.

TRANSPORT

Rail Transport of Coal

- 23. The Applicant shall ensure that trains do not travel on the Kemira Valley rail line:
 - (a) between 12 midnight and 6 am, until 29 April 2010; and
 - (b) between 11 pm and 6 am, from 30 April 2010unless written approval is obtained from DECC for emergency use of the rail line.

24. The Applicant shall record the:
- (a) date and time of each train movement on the Kemira Valley rail line; and
 - (b) amount of coal transported from the KVCLF each year
- and include a comprehensive summary and discussion of the results of this monitoring in each AEMR.

Road Transport

25. The Applicant shall prepare and implement a Traffic Management Plan for the development to the satisfaction of the Director-General. This plan must:
- (a) be submitted to the Director-General for approval by 30 April 2009;
 - (b) be prepared in consultation with the WCC, Mt Kembla Primary School and the CCC;
 - (c) include traffic control measures for truck movements through residential areas, including Stones Road and its intersection with Cordeaux Road;
 - (d) provide that mine shift changeover times and deliveries by heavy vehicle to the pit top facilities and KVCLF do not conflict with pick-up and drop-off times for Mt Kembla Primary School students;
 - (e) provide heavy vehicle speed limits;
 - (f) include a Driver's Code of Conduct to be applied to the Applicant's employees and contractors working at the development and measures for the enforcement of this code; and
 - (g) include procedures for regular monitoring of compliance with this plan.

Road Maintenance

26. The Applicant shall enter into an agreement with SCA, to the satisfaction of the Director-General, to share the reasonable costs of maintenance of all access roads, bridges and creek crossings located on land controlled by SCA and used by the Applicant.
27. The Applicant shall establish an agreement with WCC to share the reasonable costs of maintenance of Stones Road for the life of the development. Prior to decommissioning of the mine, Stones Road must be inspected, to the satisfaction of WCC, and the road restored by the Applicant to a standard not less than its condition prior to the development's approval. If roadworks are not carried out by the Applicant within one month of being informed by WCC that these works are required under the maintenance agreement, WCC shall be entitled to carry out such maintenance work at the Applicant's cost. Any dispute over implementation of this condition is to be referred to the Director-General for resolution.

VISUAL

Visual Amenity

28. The Applicant shall minimise the visual impacts of the surface facilities to the satisfaction of the Director-General.

Lighting Emissions

29. The Applicant shall:
- (a) ensure that all external lighting associated with the surface facilities complies with *Australian Standard AS4282 (INT) 1995 – Control of Obtrusive Effects of Outdoor Lighting*;
 - (b) take all practicable measures to mitigate off-site lighting impacts from the surface facilities;
 - (c) ensure that light emitted from headlights of locomotives operating on the Kemira Valley rail line are screened from residences; and
 - (d) report on the effectiveness of lighting emission controls in the AEMR to the satisfaction of the Director-General.

WASTE

30. The Applicant shall:
- (a) monitor the amount of waste generated by the development;
 - (b) investigate ways to reuse, recycle, or minimise this waste;
 - (c) implement reasonable and feasible measures to minimise this waste; and
 - (d) report on waste management and minimisation in the AEMR to the satisfaction of the Director-General.

**SCHEDULE 5
SPECIFIC ENVIRONMENTAL CONDITIONS – OTHER SITE COMPONENTS**

COAL WASHERY

Hot Gas Exhaust Stack Discharges

1. The Applicant shall:
 - (a) ensure that the concentration of pollutants discharged from the coal dryer hot gas exhaust complies with discharge limits set for the development in any EPL;
 - (b) regularly monitor the concentration of pollutants discharged from the coal dryer hot gas exhaust; and
 - (c) report on waste management and minimisation in the AEMR to the satisfaction of the Director-General.

Fuel Source

2. The Applicant shall ensure the coal drying plant only uses blast furnace offgas or natural gas as fuel for the drier.

WEST CLIFF COAL WASH EMPLACEMENT

Coal Washery Reject

3. The Applicant shall:
 - (a) monitor the amount of coal washery reject emplaced in the West Cliff Coal Wash Emplacement;
 - (b) investigate ways to reduce emplacement of coal washery reject at West Cliff, including beneficial use or improved disposal options; and
 - (c) report on these matters in the West Cliff AEMR to the satisfaction of the Director-General.

Pollution Reduction Program

4. The Applicant shall develop with DECC a new Pollution Reduction Program (PRP) to be incorporated into the West Cliff Colliery's EPL. Subject to the satisfaction of DECC, the PRP shall:
 - (a) include investigation, trial and implementation of appropriate strategies, technologies or works to achieve agreed water quality discharge criteria for licensed discharges from the West Cliff Colliery site with particular reference to salinity; and
 - (b) cover a period of not less than five years.

Water Quality Monitoring Program

5. The Applicant shall review its water quality monitoring program for the West Cliff Mine in consultation with DECC and DWE and to the satisfaction of the Director-General.

Brennans Creek Diversion Bypass Rehabilitation Plan

6. The Applicant shall, by 30 June 2009, develop a Brennans Creek Diversion Bypass Rehabilitation Plan in consultation with DECC, DWE and DPI and to the satisfaction of the Director-General.

General Management of the Emplacement

7. Subject to condition 2 of schedule 2 and conditions 3- 6 above, the Applicant shall monitor and manage the West Cliff Coal Wash Emplacement as part of the Environmental Management Plan for the West Cliff Mine. Monitoring and management of the Emplacement shall be reported within the West Cliff AEMR, rather than the AEMR for this development.
8. All references in this consent (including conditions 3 – 7 of this schedule and Appendix 3) that have direct application to the West Cliff Coal Wash Emplacement shall cease to have force and effect subsequent to the grant of any project approval under Part 3A of the Environmental Planning & Assessment Act 1979 which includes the West Cliff Colliery and the West Cliff Coal Wash Emplacement Area.

SCHEDULE 6
SPECIFIC ENVIRONMENTAL CONDITIONS – EXTENDED SITE

GREENHOUSE GASES & ENERGY EFFICIENCY

1. The Applicant shall prepare and implement a Greenhouse and Energy Efficiency Plan for the development. This plan must:
 - (a) be prepared in consultation with DECC and generally in accordance with the Guidelines for Energy Savings Action Plans (DEUS 2005, or its latest version);
 - (b) be submitted to the Director-General by 30 April 2009 for approval;
 - (c) include a program to monitor greenhouse gas emissions and energy use generated by the development;
 - (d) include a framework for investigating and implementing measures to reduce greenhouse gas emissions and energy use at the development;
 - (e) include a research program to inform the continuous improvement of the greenhouse gas minimisation measures at the development;
 - (f) describe how the performance of these measures would be monitored over time; and
 - (g) report on the development's greenhouse gas emissions and minimisation measures in the AEMR to the satisfaction of the Director-General.

Note: The Applicant may consider the Dendrobium Mine's greenhouse gas minimisation measures within its overall greenhouse gas minimisation measures across its Southern Coalfield mines and related operations.

2. The Applicant shall implement all reasonable and feasible measures to minimise the greenhouse gas emissions from the development to the satisfaction of the Director-General.

**SCHEDULE 7
ADDITIONAL PROCEDURES FOR AIR QUALITY AND NOISE MANAGEMENT**

NOTIFICATION OF LANDOWNERS

1. If the results of monitoring required in Schedule 4 identify that the impacts generated by the development are greater than the relevant impact assessment criteria in Schedule 4, except where this is predicted in the documents listed in condition 2 of schedule 2 or where a negotiated agreement has been entered into in relation to that impact, then the Applicant shall notify the Director-General and the affected landowners and/or existing or future tenants (including tenants of mine-owned properties) accordingly, and provide quarterly monitoring results to each of these parties until the results show that the development is complying with the criteria in Schedule 4.

INDEPENDENT REVIEW

2. If a landowner considers the development to be exceeding the impact assessment criteria in schedule 4, except where this is predicted in the EA, then he/she may ask the Director-General in writing for an independent review of the impacts of the development on his/her land.

If the Director-General is satisfied that an independent review is warranted, the Applicant shall within 2 months of the Director-General's decision:

- (a) consult with the landowner to determine his/her concerns;
 - (b) commission a suitably qualified, experienced and independent person, whose appointment has been approved by the Director-General, to conduct monitoring on the land, to:
 - determine whether the development is complying with the relevant impact assessment criteria in schedule 4; and
 - identify the source(s) and scale of any impact on the land, and the development's contribution to this impact; and
 - (c) give the Director-General and landowner a copy of the independent review.
3. If the independent review determines that the development is complying with the relevant impact assessment criteria in schedule 4, then the Applicant may discontinue the independent review with the approval of the Director-General. If the landowner disputes the results of the independent review then either the Applicant or the landowner may refer the matter to the Director-General for resolution.

Where matters referred to the Director-General under this condition cannot be resolved by the Director-General within 28 days, the Director-General shall refer the matter to an Independent Dispute Resolution Process.

4. If the independent review determines that the development is not complying with the relevant impact assessment criteria in Schedule 4, and that the development is primarily responsible for this non-compliance, then the Applicant shall:
 - (a) take all reasonable and feasible measures, in consultation with the landowner, to ensure that the development complies with the relevant criteria and conduct further monitoring to determine whether these measures ensure compliance; or
 - (b) secure a written agreement with the landowner to allow exceedances of the relevant criteria; or
 - (c) offer to acquire all or part of the landowner's land in accordance with the procedures in conditions 6-8 belowto the satisfaction of the Director-General.
5. If further monitoring under condition 4(a) determines that the development is complying with the relevant impact assessment criteria, then the Applicant may discontinue the independent review with the approval of the Director-General.

If further monitoring under condition 4(a) determines that measures implemented under that condition have not achieved compliance with the impact assessment criteria in schedule 4, and the Applicant cannot secure a written agreement with the landowner under condition 4(b) to allow these exceedances, then the Applicant shall, upon receiving a written request from the landowner, acquire all or part of the landowner's land in accordance with the procedures in conditions 6-8 below.

LAND ACQUISITION

6. Within 3 months of receiving a written request from a landowner with acquisition rights, the Applicant shall make a binding written offer to the landowner based on:
- (a) the current market value of the landowner's interest in the property at the date of this written request, as if the property was unaffected by the development the subject of the development application, 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 property 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, but excluding any improvements that have resulted from the implementation of the 'additional noise mitigation measures' in condition 6 of schedule 4;
 - (b) the reasonable costs associated with:
 - relocating within the local government areas of the affected Councils, or to any other local government area determined by the Director-General;
 - obtaining legal advice and expert advice for determining the acquisition price of the land, and the terms upon which it is required; and
 - (c) reasonable compensation for any disturbance caused by the land acquisition process.

If, within 28 days of the Applicant making this offer, the Applicant 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 referral, the Director-General shall request the President of the NSW Division of the Australian Property Institute (the API) to appoint a qualified independent valuer to:

- consider submissions from both parties;
- establish a fair market valuation for the land and determine reasonable costs and compensation for the acquisition, in accordance with paragraphs (a)-(c) above and any guidance or guidelines that the Director-General may prepare relating to this condition; and
- propose any appropriate fair and reasonable terms of acquisition.

The appointed valuer is to provide a full report and explanation of their valuation, determinations and proposed terms of acquisition to the Director-General, the Applicant and the landowner. The Director-General shall consider the report and decide whether the valuation, determinations and any proposed terms of acquisition are fair and reasonable and advise the parties accordingly.

Within 14 days of receiving the Director-General's decision that the independent valuer's report is fair and reasonable, the Applicant shall make a written offer to purchase the land at a price and according to terms not less than set out in the independent valuer's report.

If the Director-General is of the opinion that the valuation and/or determination is not fair and/or reasonable, they shall give notice to the parties that a further independent valuation and determination will be undertaken in accordance with this condition and duly request a further appointment by the API.

If the landowner refuses to accept within 6 months a written offer duly made by the Applicant under this condition, then the Applicant's obligations to acquire the land shall cease, unless otherwise agreed by the Director-General.

7. The Applicant shall bear the full costs of any independent valuer's valuation, determination and report.
8. If the Applicant and landowner agree that only part of the land shall be acquired, then the Applicant shall pay all reasonable costs associated with obtaining Council approval for any plan of subdivision (where permissible), and registration of the plan at the Office of the Registrar-General.

SCHEDULE 8

ENVIRONMENTAL MANAGEMENT, MONITORING, AUDITING AND REPORTING

ENVIRONMENTAL MANAGEMENT STRATEGY

1. The Applicant shall prepare and implement an Environmental Management Strategy for the development to the satisfaction of the Director-General. This strategy must be submitted to the Director-General for approval by 30 April 2009, and:
 - (a) provide the strategic framework for environmental management of the development;
 - (b) identify the statutory requirements that apply to the development;
 - (c) describe in general how the environmental performance of the development would be monitored and managed for the:
 - mining area;
 - surface facilities;
 - other site components; and
 - extended site;
 - (d) describe the procedures that would be implemented to:
 - keep the local community and relevant agencies informed about the operation and environmental performance of the development;
 - receive, handle, respond to, and record complaints;
 - resolve any disputes that may arise during the course of the development;
 - respond to any non-compliance;
 - manage cumulative impacts; and
 - respond to emergencies; and
 - (e) describe the role, responsibility, authority and accountability of all key personnel involved in the environmental management of the development.

ENVIRONMENTAL MONITORING PROGRAM

2. The Applicant shall prepare and implement Environmental Monitoring Programs for the:
 - (a) mining area; and
 - (b) surface facilitiesto the satisfaction of the Director-General. These programs must consolidate the various monitoring requirements in Schedules 3-6 of this consent into single documents, include plans showing the monitoring sites and be submitted to the Director-General by 30 April 2009.

REPORTING

Incident Reporting

3. Within 24 hours of detecting the occurrence of an incident that causes (or may cause) material harm to the environment, the Applicant shall notify the Department and other relevant agencies of the incident.
4. Within 21 days of notifying the Department and other relevant agencies of such an incident, the Applicant shall provide the Department and these agencies with a written report that:
 - (a) describes the date, time, and nature of the incident;
 - (b) identifies the cause (or likely cause) of the incident;
 - (c) describes what action has been taken to date; and
 - (d) describes the proposed measures to address the incident.

Annual Reporting

5. By the end of September each year, and for at least 3 years following the cessation of mining at the development, the Applicant shall submit an AEMR to the Director-General, CCC and all relevant agencies. This report must relate to the previous financial year and:
 - (a) identify the standards and performance measures that apply to the development;
 - (b) describe the works carried out in the previous financial year;
 - (c) describe the works that would be carried out in the current financial year;

- (d) include a summary of the complaints received during the past year, and compare this to the complaints received in previous years;
- (e) include a summary of the monitoring results for the development during the past year;
- (f) include an analysis of these monitoring results against the relevant:
 - impact assessment criteria/limits;
 - monitoring results from previous years; and
 - predictions in the EIS, EA or other documents listed in condition 2 of schedule 4;
- (g) identify and discuss all exceedances of consent and licence conditions and other applicable standards and performance measures;
- (h) identify any trends in the monitoring results over the life of the development;
- (i) identify any non-compliance during the previous year; and
- (j) describe what actions were, or are being, taken to ensure compliance.

INDEPENDENT ENVIRONMENTAL AUDIT

6. By 31 December 2011, and every 3 years thereafter, unless the Director-General directs otherwise, the Applicant shall commission and pay the full cost of an Independent Environmental Audit of the development. This audit must:
 - (a) be conducted by suitably qualified, experienced and independent team of experts whose appointment has been endorsed by the Director-General;
 - (b) include consultation with the relevant agencies;
 - (c) assess the environmental performance of the development and assess whether it is complying with the relevant requirements in this approval and any relevant EPL or mining lease (including any strategy, plan or program required under these approvals);
 - (d) review the adequacy of strategies, plans or programs required under these approvals; and, if appropriate,
 - (e) recommend measures or actions to improve the environmental performance of the development, and/or any strategy, plan or program required under these approvals.

Note: This audit team must be led by a suitably qualified auditor and include experts in the fields of a) mine subsidence impacts and remediation and b) stream hydrology and water quality.

7. Within 6 weeks of the completing of this audit, or as otherwise agreed by the Director-General, the Applicant shall submit a copy of the audit report to the Director-General, together with its response to any recommendations contained in the audit report.
8. Within 3 months of submitting the audit report to the Director-General, the Applicant shall review, and if necessary revise the strategies/plans/programs required under this consent to the satisfaction of the Director-General.

COMMUNITY CONSULTATIVE COMMITTEE

9. The Applicant shall maintain a Community Consultative Committee (CCC) for the development 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)* to the satisfaction of the Director-General.

Note: The CCC is an advisory committee. The Department and other relevant agencies are responsible for ensuring that the Applicant complies with this consent. In accordance with the Guideline, the Committee should comprise an independent chair and appropriate representation from the Applicant, affected councils, recognised environmental groups and the general community in Mt Kembla and the area of the development.

10. If required by the CCC, the Applicant shall establish and maintain a trust fund, or other funding arrangement that may be agreed between the Applicant and the CCC. This fund shall be:
 - (a) managed by the Chair of the CCC to facilitate the functioning of the CCC;
 - (b) used only if required for the engagement of consultants to interpret technical information and the like;
 - (c) provided with \$8,000 per annum (indexed according to the CPI) by the Applicant for the duration of mining operations and other activities under the consent, or as otherwise directed by the Director-General;
 - (d) managed so that any monies unspent during each year are returned to the Applicant;
 - (e) managed so that the Chair of the CCC causes a record of the finances of the fund to be kept and provided to the Applicant and the Director-General at the end of each year the fund is used.

ACCESS TO INFORMATION

11. Within 3 months of the approval of any strategy/plan/ program required under this consent (or any subsequent revision of these strategies/plans/ programs), or the completion of the audits or AEMRs required under this consent, the Applicant shall:
 - (a) provide a copy of the relevant document/s to the relevant agencies and CCC; and
 - (b) put a copy of the relevant document/s on its website.

12. From 30 April 2009, and thereafter during the development, the Applicant shall:
 - (a) provide a copy of this consent as may be modified from time to time on its website;
 - (b) provide a comprehensive, running summary of monitoring results required under this consent on its website; and
 - (c) update these results on a regular basis (at least every three months).

**APPENDIX 1
SCHEDULE OF DEVELOPMENT LAND – EXTENDED SITE**

| PLAN | LOT NUMBER | Site Component |
|-----------|------------|-------------------------|
| DP606434 | Part 1 | Coal Washery |
| DP227274 | 1 | Kemira Valley Rail Line |
| DP1061983 | 1 | Kemira Valley Rail Line |
| DP606431 | 1 | Kemira Valley Rail Line |
| DP606430 | 1 | Kemira Valley Rail Line |
| DP41756 | 1 | Kemira Valley Rail Line |
| DP221602 | 1 | Kemira Valley Rail Line |
| DP157009 | 1 | Kemira Valley Rail Line |
| DP156521 | 1 | Kemira Valley Rail Line |
| DP602229 | 102 | Kemira Valley Rail Line |
| DP41756 | 2 | Kemira Valley Rail Line |
| DP1061983 | 2 | Kemira Valley Rail Line |
| DP157009 | 2 | Kemira Valley Rail Line |
| DP208440 | 2 | Kemira Valley Rail Line |
| DP208744 | 2 | Kemira Valley Rail Line |
| DP216637 | 25 | Kemira Valley Rail Line |
| DP214572 | 3 | Kemira Valley Rail Line |
| DP157009 | 3 | Kemira Valley Rail Line |
| DP203034 | 3 | Kemira Valley Rail Line |
| DP159797 | 3 | Kemira Valley Rail Line |
| DP203034 | 4 | Kemira Valley Rail Line |
| DP867936 | 6 | Kemira Valley Rail Line |
| DP259919 | 67 | Kemira Valley Rail Line |
| DP259919 | 68 | Kemira Valley Rail Line |
| DP432516 | 70 | Kemira Valley Rail Line |
| DP751278 | 19 | Mining Area |
| DP196993 | 2 | Mining Area |
| DP606150 | 2 | Mining Area |
| DP751278 | 216 | Mining Area |
| DP751278 | 217 | Mining Area |
| DP751278 | 275 | Mining Area |
| DP751278 | 276 | Mining Area |
| DP751278 | 277 | Mining Area |
| DP751278 | 278 | Mining Area |
| DP751278 | 279 | Mining Area |
| DP751278 | 284 | Mining Area |
| DP751278 | 285 | Mining Area |
| DP751278 | 289 | Mining Area |
| DP751278 | 74 | Mining Area |
| DP401354 | 8 | Mining Area |
| 259 - 672 | | Mining Area |
| | | |

| PLAN | LOT NUMBER | Site Component |
|--------------------------|-------------------|-----------------------------------------|
| DP196406 | 1 | Surface facilities - Kemira Valley |
| DP164689 | 1 | Surface facilities - Kemira Valley |
| DP615178 | 1 | Surface facilities - Kemira Valley |
| DP159797 | 1 | Surface facilities - Kemira Valley |
| DP41756 | 1 | Surface facilities - Kemira Valley |
| DP221602 | 1 | Surface facilities - Kemira Valley |
| DP44334 | 1 | Surface facilities - Kemira Valley |
| DP157009 | 1 | Surface facilities - Kemira Valley |
| DP156521 | 1 | Surface facilities - Kemira Valley |
| DP250762 | 11 | Surface facilities - Kemira Valley |
| DP1101896 | 11 | Surface facilities - Kemira Valley |
| DP751278 | 114 | Surface facilities - Kemira Valley |
| DP751278 | 115 | Surface facilities - Kemira Valley |
| DP751278 | 116 | Surface facilities - Kemira Valley |
| DP250762 | 12 | Surface facilities - Kemira Valley |
| DP751278 | 134 | Surface facilities - Kemira Valley |
| DP751278 | 137 | Surface facilities - Kemira Valley |
| DP751278 | 138 | Surface facilities - Kemira Valley |
| DP41756 | 2 | Surface facilities - Kemira Valley |
| DP157009 | 2 | Surface facilities - Kemira Valley |
| DP196371 | 2 | Surface facilities - Kemira Valley |
| DP157009 | 3 | Surface facilities - Kemira Valley |
| DP159797 | 3 | Surface facilities - Kemira Valley |
| DP196371 | 3 | Surface facilities - Kemira Valley |
| | | |
| DP751278 | Part 160 | Surface facilities - Nebo |
| DP751278 | Part 161 | Surface facilities - Nebo |
| DP1076092 | Part 21 | Surface facilities - Nebo |
| DP1076092 | Part 22 | Surface facilities - Nebo |
| DP751278 | Part 74 | Surface facilities - Nebo |
| | | |
| DP1055279 | Part 11 | Surface facilities - Ventilation Shafts |
| DP751278 | Part 169 | Surface facilities - Ventilation Shafts |
| | | |
| Crown Land under CCL 724 | | West Cliff Coal Wash Emplacement |

**APPENDIX 2
SITE MAPS OF THE DEVELOPMENT**

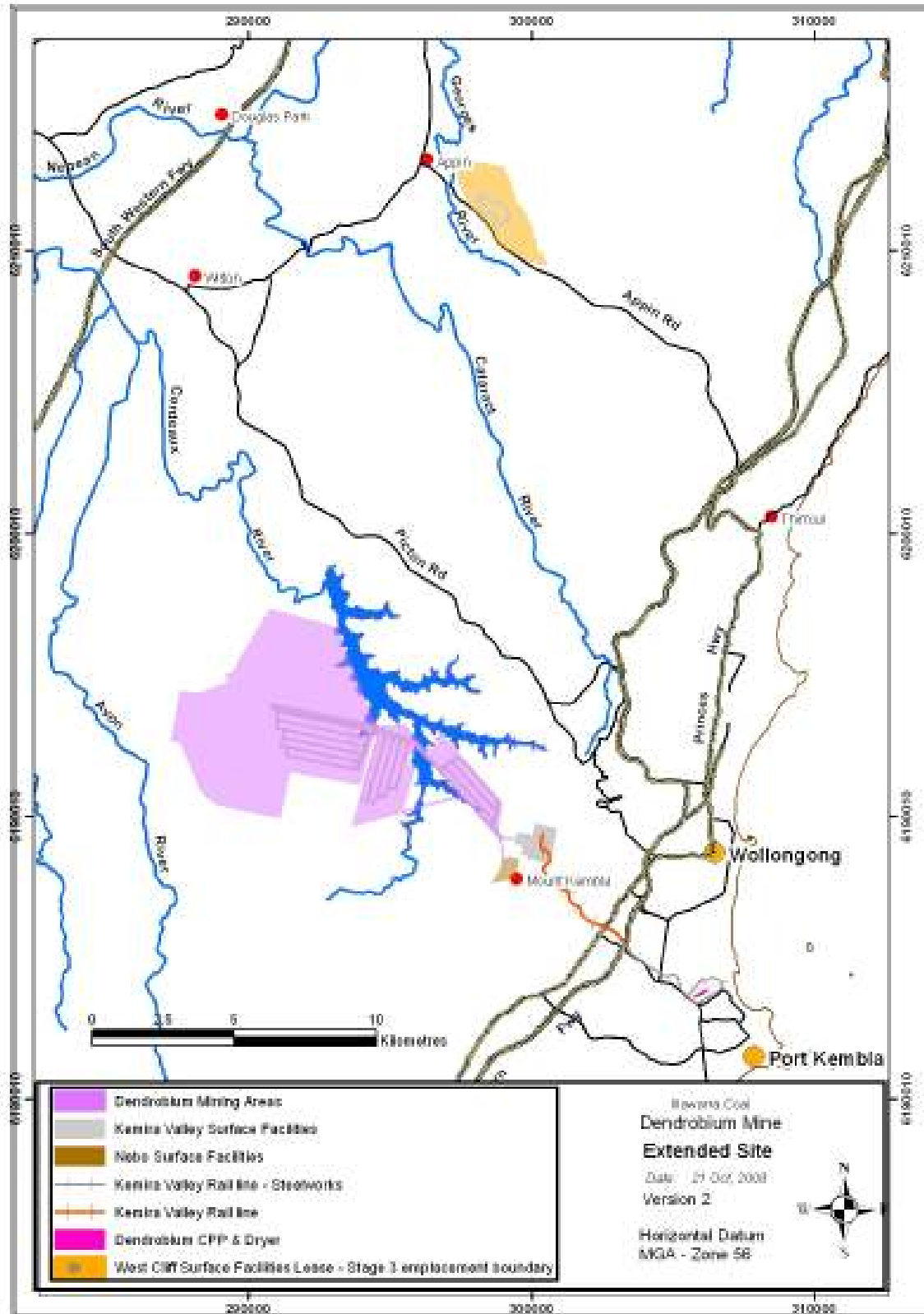


Figure 1 – Extended Site

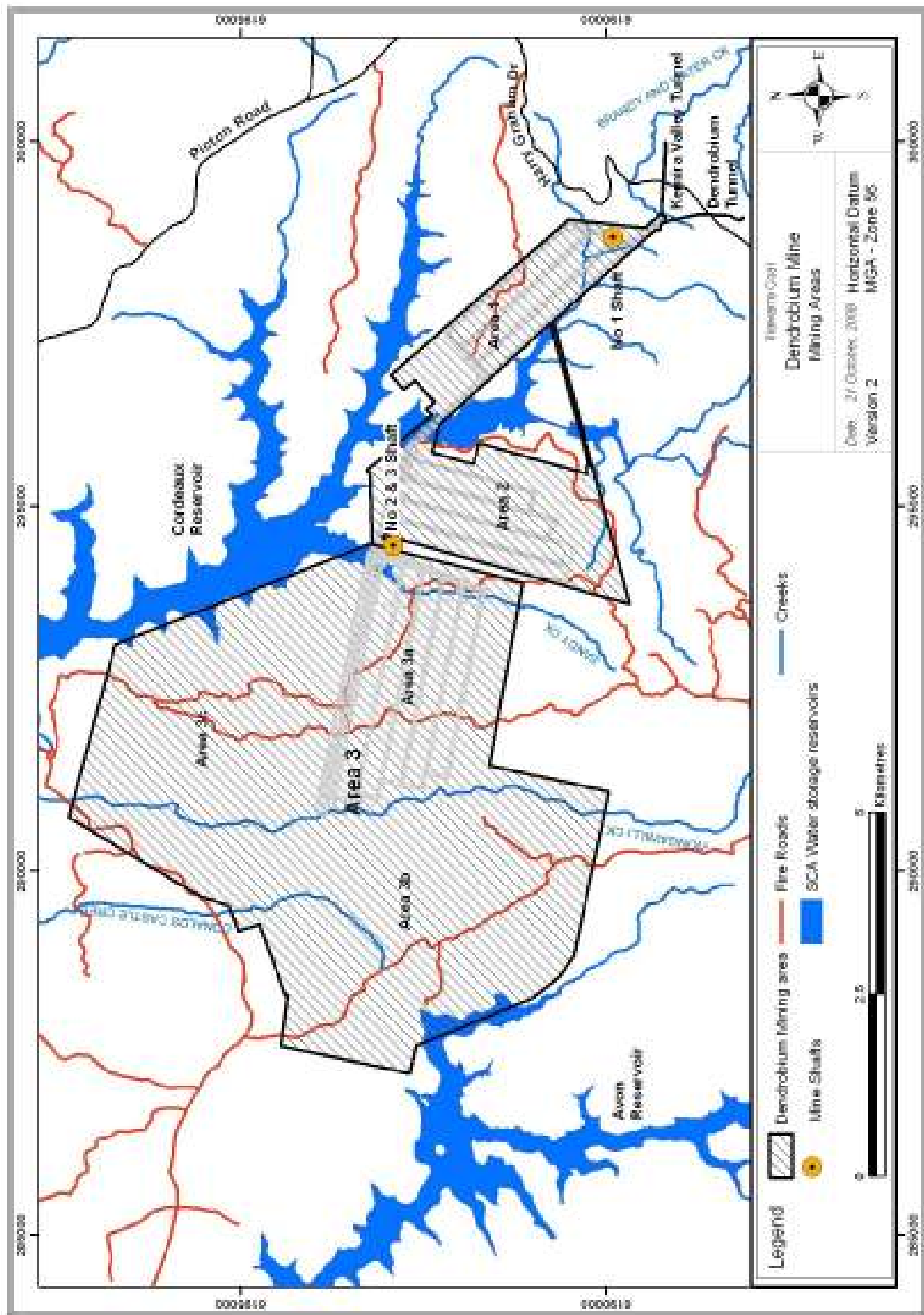


Figure 2 – Mining Area

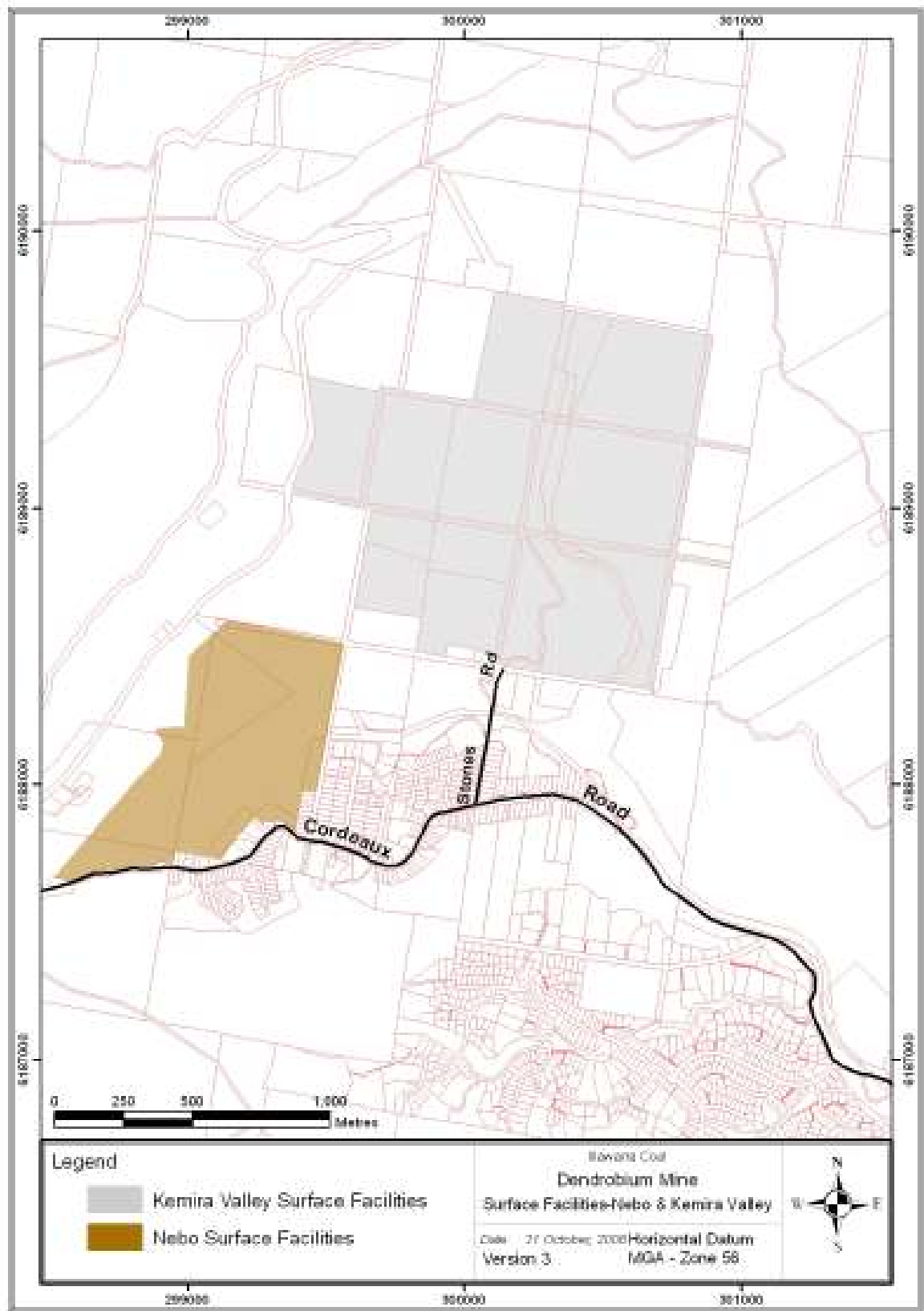


Figure 3 – Surface Facilities

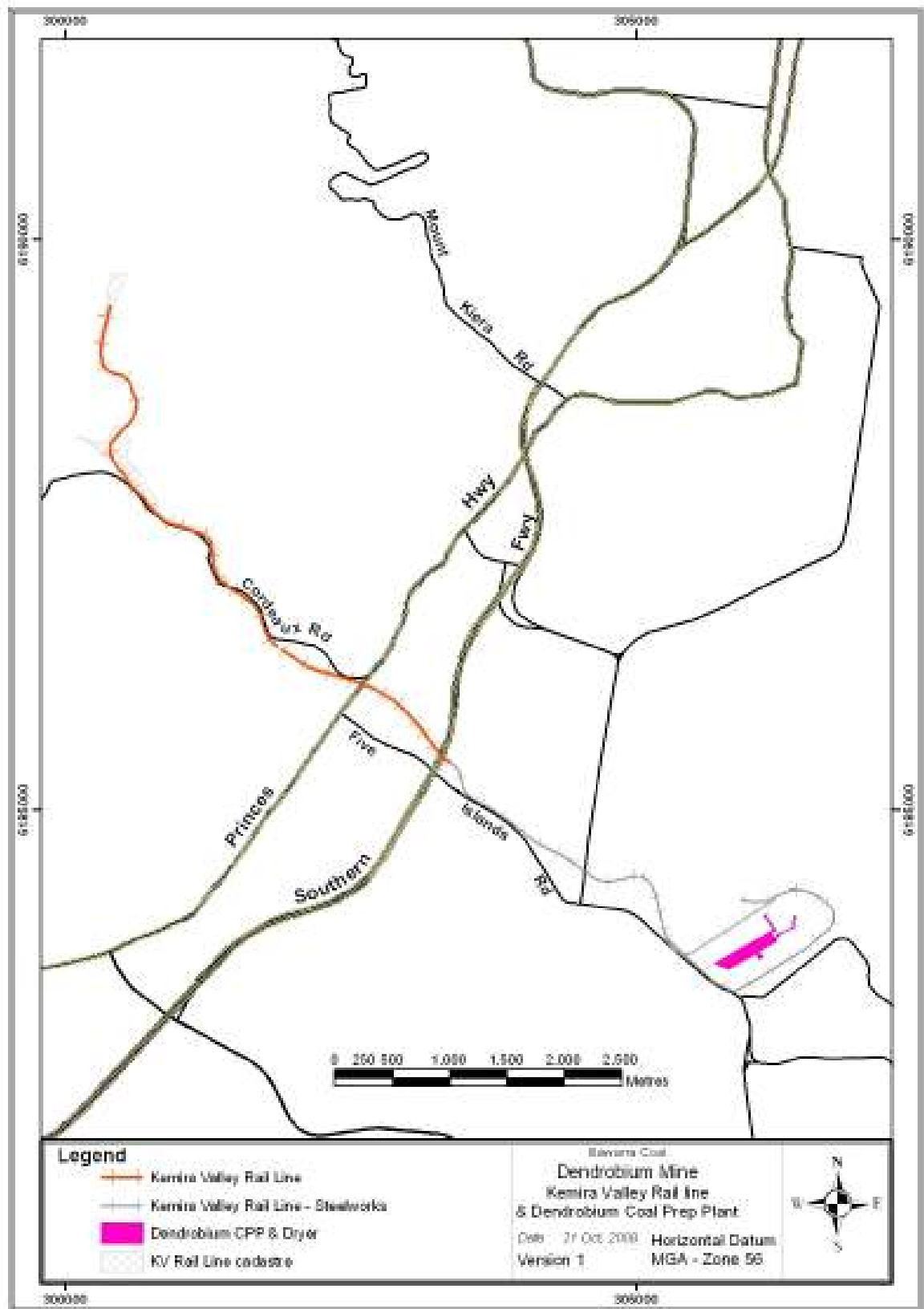


Figure 4 – Kemira Valley Rail Line and Dendrobium Coal Washery & Drying Facility

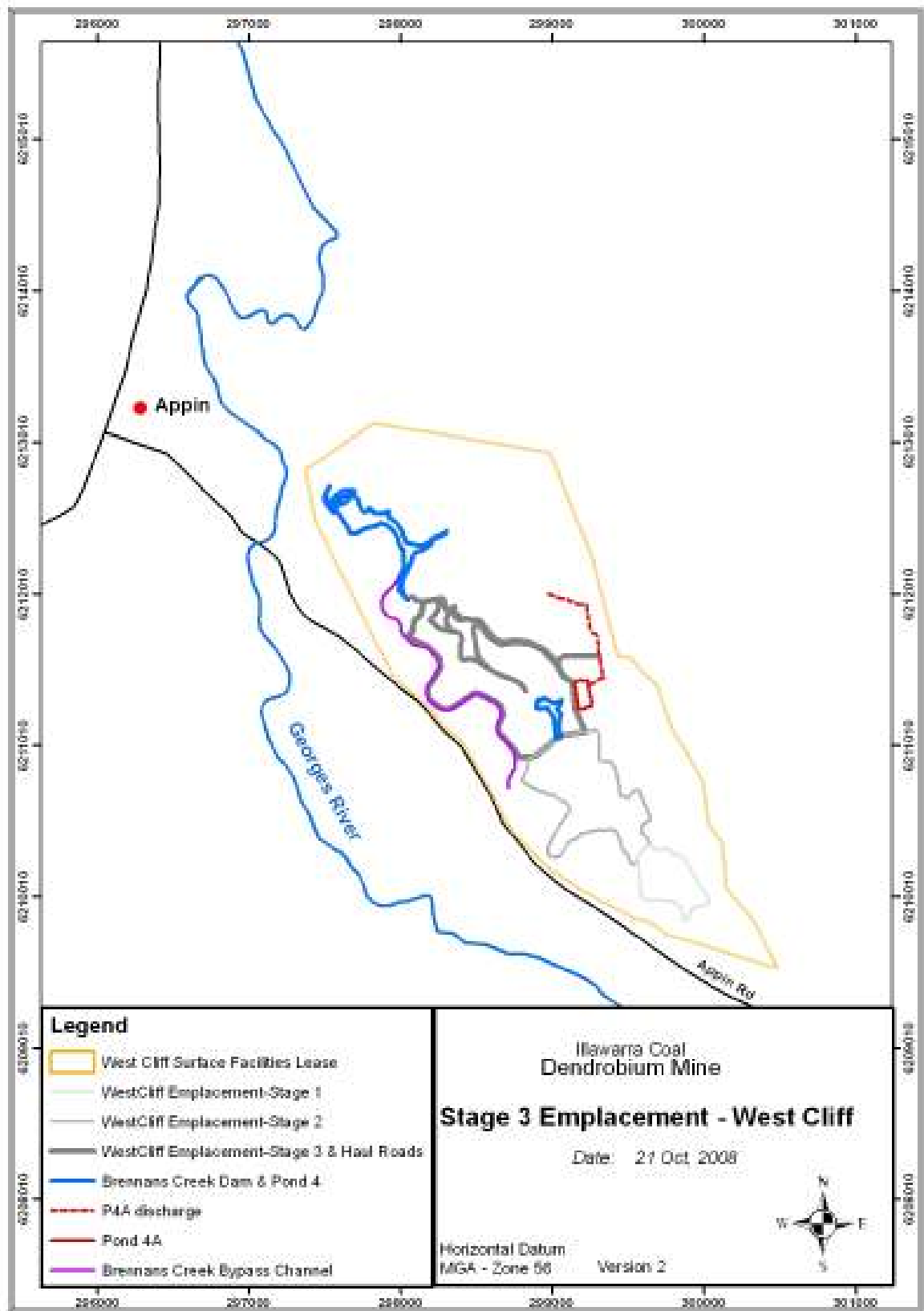


Figure 5 – West Cliff Coal Wash Emplacement Area

**APPENDIX 3:
WEST CLIFF STAGE 3 COAL WASH EMPLACEMENT
STATEMENT OF COMMITMENTS**

Coal Wash Alternatives

- (a) Prepare an implement an End of Resource coal wash strategy within 5 years of the issue of the Stage 3 emplacement approval issue date. The strategy should be reviewed every three years from the date of the State 3 emplacement approval. The strategy should be provided to the Department of Planning (DoP), Department of Environment and Climate Change (DECC) and Department of Primary Industries – Minerals (DPIM).
- (b) Give priority to the development and implementation of coal wash management solutions and strategies that maximise the beneficial use of coal wash and offer long term, large volume and sustainable opportunities.
- (c) Maximise the reuse of coal wash as fill in development sites. Reusing should be carried out in a safe, practical and commercially effective way.
- (d) Report the volume of coal wash reuse and the annual progress on the development of coal wash management solutions to the Government via the West Cliff Colliery Annual Environment Management Report (AEMR), submitted to DPI and copied to the DoP and DECC.

Stage 3 Emplacement

- (e) The West Cliff Stage 3 Emplacement and associated infrastructure will be entirely contained within the footprint shown in Figure 1.
- (f) The management and operation of the Stage 3 emplacement will be undertaken in accordance with the Emplacement Management Plan as amended from time to time in light of current best practice.

Vegetation and Fauna

- (g) No more than 60.5 ha of native vegetation will be cleared for the West Cliff Stage 3 emplacement.
- (h) The management of vegetation and fauna at the West Cliff site (including the Stage 3 coal wash emplacement) will be undertaken in accordance with the Vegetation and Fauna Management Plan as amended from time to time in light of current best practice.
- (i) The Vegetation and Fauna Management Plan will be implemented to achieve the following performance indicators and targets.

| Performance Indicator | Performance Target | Proposed Monitoring Methods |
|----------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Weed management | <ul style="list-style-type: none"> Zone 1; Low levels of weed infestation in soil translocation compartments. Zone 2; A reduction in weed cover of perennial exotic grasses on disturbed edges. Zone 3; Weed free condition maintained. Eradication of noxious and serious environmental weeds from the colliery. Focus particularly on <i>Cortaderia selloana</i> and <i>Juncus acutus</i>. | <ul style="list-style-type: none"> Control methods used and justification Species treated and rates of herbicide application Weed density/condition of bushland mapping Inspections targeting noxious weeds |
| Success of Emplacement Area Rehabilitation (Zone1) | <ul style="list-style-type: none"> Adequate regeneration of translocated communities, Exposed Sandstone Scribbly Gum Woodland and Sandstone Gully Peppermint Forest. Regeneration to reflect composition and structure of the two communities. Condition; no more than 20 per cent weed cover in translocated compartments after 2 years. 15 per cent accepted plant losses over 2 years. Additional losses to be replaced by tubestock. 50 per cent vegetative cover of compartments achieved after 2 years. The degree to which fauna, threatened or otherwise, use the rehabilitated emplacement area including constructed habitats and nest boxes. | <ul style="list-style-type: none"> Permanent photographic points within translocated compartments. Monitoring vegetation quadrats in translocated patches measuring species richness, structure and composition, condition, death rates and replacement requirements, growth rates of key indicator species. Control sites to be set up in remnants. Random meanders for threatened flora that may have regenerated from translocation. Site assessments. Condition of bushland mapping. An assessment of areas regenerated per unit effort. A comparison of the environmental outcome to the type and size of the input. Soil testing (materials characterisation where revegetation fails). A BHPBIC staff member qualified and experienced in natural area restoration to project manage monitoring system. |
| Site stabilisation | <ul style="list-style-type: none"> Success of translocation as per the above targets. Stabilisation of sediment and erosion control measures. | <ul style="list-style-type: none"> Regular self audit and inspections including photographs of structures and the Emplacement benching, especially post storm flows. |
| Protection of Threatened Flora | <ul style="list-style-type: none"> Loss of threatened plants (<i>Persoonia hirsuta</i>, <i>Acacia bynoeana</i> and <i>Pultenaea aristata</i>) restricted to those identified in area described by Figure 1. | <ul style="list-style-type: none"> Inspections of on-site exclusion zones to ensure protection of remnant populations. Inspections and assessment of translocated <i>Persoonia hirsuta</i> (if required) |
| Protection of Threatened Fauna Habitats | <ul style="list-style-type: none"> No additional losses or loss of potential habitat outside the area described by Figure 1. | <ul style="list-style-type: none"> Annual habitat level surveys. |
| Phytophthora infection | <ul style="list-style-type: none"> Prevention of the introduction of Phytophthora Identification of Phytophthora infection If detected, development and implementation of a Phytophthora infection control plan | <ul style="list-style-type: none"> Annual soil sampling in vegetation within proximity to on site traffic (track, drainage and roadside edges) and areas of previous disturbance. If detected, further sampling from areas within the stage 3 footprint pre-construction and post construction will be undertaken. |
| Bushfire | <ul style="list-style-type: none"> The entire West Cliff mine lease currently operates under a fire exclusion policy. This policy will continue. Boundary and internal fire trails and other | <ul style="list-style-type: none"> Reporting by exception on the extent and intensity of unplanned bushfire. |

| Performance Indicator | Performance Target | Proposed Monitoring Methods |
|-----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | <p>suppression advantages will be maintained.</p> <ul style="list-style-type: none"> • A hot work permit system will be maintained on the site. • The Rural Fire Service will be offered regular orientations of the lease site. • West Cliff Colliery is not currently subject to a hazard reduction burn regime and hazard reduction burns are not planned for the site. Any future bushfire management will consider fire regimes that are appropriate to ecological requirements (including management of threatened species and their habitats) of the site. Any proposed hazard reduction activities will only be undertaken in consultation with all relevant stakeholders. | |
| Reporting | <ul style="list-style-type: none"> • Annual Report to be supplied to regulatory authorities addressing outcomes of the project to date in relation to the above performance targets. | <ul style="list-style-type: none"> • Reporting of project to regulatory authorities. • Annual review of monitoring system and management methods. • Adjustments made to systems and methods as required. • Pro formas. |

(j) Emplacement clearing and rehabilitation actions will take place in the following manner as specified in the Vegetation and Fauna Management Plan.

Vegetation clearing

Pre-clearing actions

- Flagging area to be cleared and habitat features to be preserved or redistributed

Two staged vegetation clearing

- Clearing of sub-canopy vegetation first to allow fauna opportunity to move
- Relocation of any fauna species encountered during the initial clearing of non-habitat trees
- Removal of habitat trees the next day
- Relocation of any remaining fauna prior to and during clearing of habitat trees

Habitat reinstatement

- Transplanting dead stags
- Addition of habitat logs and woody debris
- Nest box use and installation
- Reconstruction of rocky outcrops
- Maintenance and monitoring

Rehabilitation

Pre-translocation actions

- Identify clearing compartments
- Timing of vegetation clearing
- Collection and storage of seed
- Identification and preparation of recipient sites

Soil salvage and handling

- Vegetation clearing and stockpiling
- Stripping of soil in relevant horizons

- Soil and rock stockpiling

Soil replacement

- Respreading soil horizons
- Redistribution of rocks, logs, cleared/stockpiled vegetation and habitat features on recipient sites
- Sediment and erosion control

Revegetation supplementary to soil translocation

- Direct seeding of previously collected seed
- Weed control (where necessary)

- (k) The Broad headed Snake Management Plan will be implemented in three key stages including:
- Relocation of Broad headed snakes during the pre-clearing period, preferably during the winter season;
 - Progressive two-stage clearing and habitat translocation;
 - Monitoring and maintenance during the post-clearing period

Water

- (l) All stormwater runoff storage and treatment systems will be designed to cater for a 1:10 year ARI 72 hour duration rainfall event.
- (m) All emplacement stormwater runoff will be captured and treated in a *two pond in series* treatment system. The first pond will provide passive setting and the second pond chemically assisted settling. An automated chemical dosing system will be installed and operated between the first and second pond.

(Note: During the last phase of emplacement, there will be only one stormwater treatment pond available. The area of the active emplacement will be minimised during this phase.)

- (n) Clean water will be separated from dirty water to minimise dirty water volumes that must be captured and treated.
- (o) The Brennans Creek diversion channel will be designed and constructed to cater for a 1:100 year ARI 2 hour duration storm event.
- (p) The Brennans Creek diversion channel will be rehabilitated to incorporate; riffles, pools, bedslope, channel roughness, floodplain pockets and riparian vegetation that approximate as close as possible the characteristics of Brennans Creek.
- (q) Illawarra Coal will negotiate a Pollution Reduction Program (PRP) with the Environment Protection Authority that will be incorporated into the West Cliff Colliery Environment Protection Licence to investigate, trial and implement appropriate strategies, technologies or works to achieve an agreed water quality discharge criteria from Brennans Creek Dam over an agreed time period.

Final landform

- (r) The emplacement final landform will be contoured to form a stable landform that is sympathetic to the surrounding landscape.

Dust

- (s) The emission of dust generated at the emplacement will be minimised by the use of water spray cart.

Compensatory measure

- (t) Illawarra Coal will transfer ownership of 153.4 ha of land at Bulli Tops to the Minister for the Environment and Climate Change for gazettal under the National Parks and Wildlife Act and/or the Sydney Water Catchment Management Act. This commitment also includes:
- funding the transfer costs to transfer land title from Illawarra Coal to the NSW Government;
 - funding the agreed scope of site improvement works

Aboriginal cultural heritage

- (u) Aboriginal cultural heritage site impacted by the Stage 3 Coal Wash Emplacement will be restricted to:

| Site | Impact |
|------------------------------|-----------------------------------------------------------|
| BC2 (Shelter with Art) | Destroyed by Emplacement landform |
| BC5 (Axe Gr. Groove) | Destroyed by Emplacement landform |
| BC6 (Shelter with Art) | Destroyed by Emplacement landform |
| WC4 (Shelter with Art) | Destroyed by Emplacement landform |
| BCPAD4 | Destroyed by Emplacement landform |
| BCPAD5 | Destroyed by Emplacement landform |
| BC7 (Shelter with Art) | Indirect via Landscape context – low potential for damage |
| D11 (Shelter with Artefacts) | Indirect via Landscape context – low potential for damage |

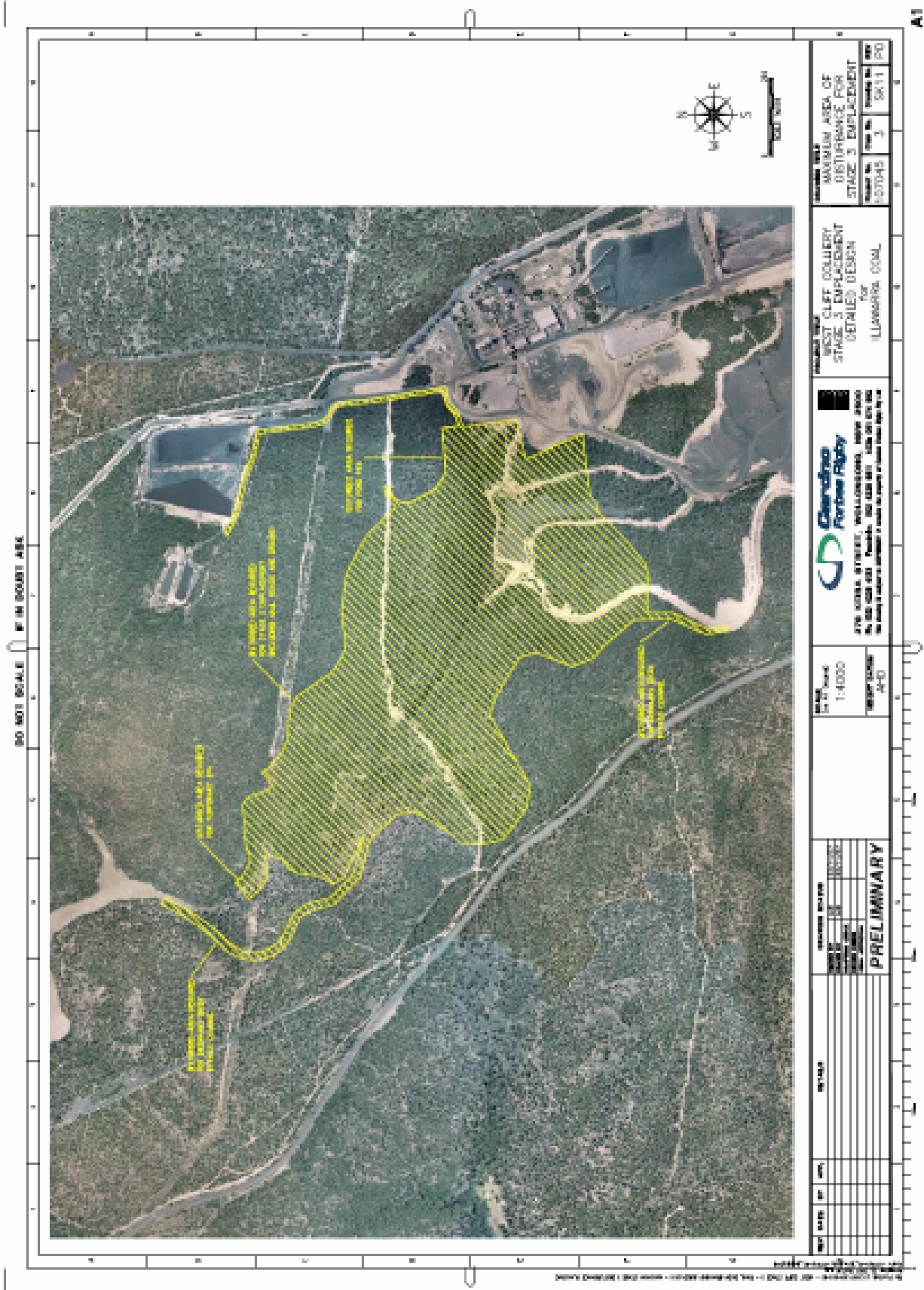
(Note: relevant s87/90 consents under the National Parks and Wildlife Act will be sought for the Aboriginal cultural heritage site impacted by the Stage 3 Coal Wash Emplacement)

- (v) An Aboriginal Cultural Heritage Management Plan will be developed and implemented in consultation with relevant Aboriginal stakeholders for all sites located at West Cliff.
- (w) Illawarra Coal will enter into an agreed Aboriginal Community Enhancement Program with the Tharawal Local Aboriginal Land Council.

Community consultation

- (x) Illawarra Coal will continue to operate an office in a local Shopping Precinct to enable the community easy access to information and Illawarra Coal staff
- (y) Illawarra Coal will continue to operate the 24-hour contact telephone line.

Figure 1: Areal extent of the Stage 3 Coal Wash Emplacement



**APPENDIX 4:
STATEMENT OF COMMITMENTS**

**Dendrobium Area 3
Amended Statement of Commitments**

1. Longwall layouts in Dendrobium Area 3

Optimal longwall layouts will be designed to achieve the following objectives for Dendrobium Area 3:

- Avoid fracturing in controlling rockbars of Sandy and Wongawilli Creek that is sufficient to result in water loss from pools (e.g. lower pool levels due to increased flow through controlling rockbars due to fracturing),
- Avoid fracturing in the Sandy Creek waterfall that is sufficient to result in increased water flow through the rockmass (e.g. water flowing through the rock overhang at the Sandy Creek waterfall), and
- Minimise volume of sterilised coal which could be efficiently extracted within the mining and environmental constraints of the area.

2. Subsidence Impact – Monitoring

Pre, during and post mining subsidence impact monitoring will be undertaken in accordance with the approved Subsidence Management Plan. The monitoring component of the Subsidence Management Plan includes but is not necessarily limited to:

- Subsidence movement of natural and man made features
- Surface waters
- Groundwater
- Terrestrial flora and fauna
- Aquatic flora and fauna
- Aboriginal cultural heritage sites
- Swamps

3. Subsidence Impact – Avoidance, Mitigation and Rehabilitation

If the monitoring program identifies impacts to natural features that exceed those predicted, the following contingent measures will be implemented.

| Description of Item | Key Potential Impacts | Avoidance, Mitigation and Rehabilitation |
|------------------------------------------|------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>Permanently Flowing Creeks (Flow)</i> | Predicted Impacts Minor fracturing in the beds of Wongawilli and Sandy Creeks. | Avoidance & Mitigation Not mining under Wongawilli & Sandy Creeks to avoid major fracturing and loss of surface flow. Commitment to avoid significant impacts to major natural features in Area 3b |

| Description of Item | Key Potential Impacts | Avoidance, Mitigation and Rehabilitation |
|--------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | | and 3C |
| | Fracturing in the bed of SC10 leading to pool water level loss in some pools or loss of stream flow at some controlling rockbars. | Grouting and repair of significant surface water controlling features within SC10, where it is appropriate to do so, in consultation with SCA, DPIM, DECC and other stakeholders. |
| | Impacts Exceeding Those Predicted | Contingent Measure |
| | Major fracturing in the beds of Wongawilli and Sandy Creeks leading to pool water level loss or loss of stream flow. | Grouting and repair of significant surface water controlling features where it is appropriate to do so in consultation with SCA, DPIM, DECC and other stakeholders. |
| | Major fracturing in the bed of SC10 leading to pool water level loss in all pools or loss of stream flow at all controlling rockbars. | |
| | Major fracturing in the rockmass of Sandy Creek waterfall leading to significant flow through the rock overhang. | Grouting and repair of the waterfall rockmass where it is appropriate to do so in consultation with SCA, DPIM, DECC and other stakeholders. |
| <i>Ephemeral watercourses (Flow)</i> | Predicted Impacts | Avoidance & Mitigation |
| | Fracturing of the beds of some minor streams & diversion of flows. | Not mining under Wongawilli & Sandy Creeks reducing subsidence movements in the more deeply incised parts of the tributaries. Commitment to avoid significant impacts to major natural features in Areas 3B and 3C. |
| | Impacts Exceeding Those Predicted | Contingent Measure |
| | Major fracturing in the beds of streams leading to total pool water loss or complete loss of surface flow through controlling rockbars. | Grouting and repair of significant surface water controlling features where it is appropriate to do so in consultation with SCA, DPIM, DECC and other stakeholders. |
| <i>Lakes</i> | Predicted Impacts | Avoidance & Mitigation |
| | Negligible impacts. | The layout has been designed to avoid or minimise impacts on the lake. Potential impacts are considered negligible. |

| Description of Item | Key Potential Impacts | Avoidance, Mitigation and Rehabilitation |
|----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | <p>Impacts Exceeding Those Predicted</p> <p>Connectivity of the lake with the mining area.</p> | <p>Contingent Measure</p> <p>As per the DSC Contingency Plan.</p> |
| <i>Cliffs</i> | <p>Predicted Impacts</p> <p>Isolated rockfalls estimated to occur along ~ 10% of the cliff lines.</p> | <p>Avoidance & Mitigation</p> <p>Monthly monitoring during subsidence.</p> <p>Signage & Fencing where they present safety risks.</p> <p>Communication strategy to stakeholders where they present safety risks.</p> |
| | <p>Impacts Exceeding Those Predicted</p> <p>Rock falls occurring along >10% of the cliff lines or total cliff failure (e.g. entire length of cliff impacted).</p> | <p>Contingent Measure</p> <p>As above.</p> <p>Scaling rocks loosened by subsidence where they present safety risks.</p> <p>Minor civil/earthworks to prevent erosions such as overland flow diversion works, establishment of banks, smoothing and re-contouring, where this is practical.</p> <p>Revegetation works such as planting, seeding, mulching, weed control and plant maintenance, where this is practical.</p> |
| <i>Steep slopes</i> | <p>Predicted Impacts</p> <p>Some impacts are possible if slopes are marginally stable.</p> <p>Large cracks or compressive ridges. No significant diversion of surface water flow direction or increase in soil erosion/sedimentation of waterways.</p> | <p>Avoidance & Mitigation</p> <p>Monthly monitoring during subsidence.</p> <p>Signage & Fencing where they present safety risks.</p> <p>Communication strategy to stakeholders where they present safety risks.</p> <p>Minor sediment control works such as silt fencing.</p> |
| | <p>Impacts Exceeding Those Predicted</p> <p>Large cracks, large compressive ridges or mass movements causing</p> | <p>Contingent Measure</p> <p>As above.</p> <p>Minor civil/earthworks to prevent erosions such as</p> |

| Description of Item | Key Potential Impacts | Avoidance, Mitigation and Rehabilitation |
|-------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | significant erosion if left untreated. | <p>overland flow diversion works, establishment of banks, smoothing and re-contouring, where this is practical.</p> <p>Revegetation works such as planting, seeding, mulching, weed control and plant maintenance, where this is practical.</p> <p>Erosion control and revegetation establishment where required to prevent further impacts.</p> <p>Infill of surface cracks with soil or other suitable material where appropriate, local regrading or compacting of the surface. Temporary sediment and erosion control measures.</p> <p>Monitoring – event specific mitigation and rehabilitation.</p> |
| <i>Aquatic fauna and flora</i> | <p>Predicted Impacts</p> <p>Impacts on fauna are possible due to ‘loss’ of water from pools. Impacts on vegetation expected to be very small.</p> <p>Impacts Exceeding Those Predicted</p> <p>Major reduction in pool water level or complete loss of pool water.</p> <p>Major reduction in aquatic habitat for an extended timeframe or complete loss of habitat.</p> <p>Identified mortality of fauna/flora in proximity to identified mining impact.</p> | <p>Avoidance & Mitigation</p> <p>Not mining under Wongawilli & Sandy Creeks to avoid major fracturing and loss of surface flow.</p> <p>Commitment to avoid significant impacts to major natural features in Areas 3B and 3C.</p> <p>Contingent Measure</p> <p>Grouting and repair of significant surface water controlling features where it is appropriate to do so in consultation with SCA, DPIM, DECC and other stakeholders.</p> <p>Active preservation of life such as relocation of stranded fish.</p> <p>Temporary ecosystem maintenance such as watering aquatic plants until final rehabilitation completed, where this is practical.</p> |
| <i>Terrestrial fauna and flora</i> | <p>Predicted Impacts</p> <p>Impacts on fauna are possible</p> | <p>Avoidance & Mitigation</p> <p>Monthly monitoring during</p> |

| Description of Item | Key Potential Impacts | Avoidance, Mitigation and Rehabilitation |
|--------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>including endangered ecological communities</i> | due to 'loss' of water in creeks. Proposal assessed as likely to have a significant local impact on three frog and one dragonfly species. | subsidence. Not mining under Wongawilli & Sandy Creeks to avoid major fracturing and loss of surface flow. Commitment to avoid significant impacts to major natural features in Areas 3B and 3C. |
| | Impacts Exceeding Those Predicted | Contingent Measure |
| | Large areas of impacted vegetation (by rockfalls, soil slippage) that is unlikely to commence natural regeneration within 6 months. | Site rehabilitation to reinstate habitat values – increased monitoring. |
| | Significant surface soil cracking or rock bar fracturing resulting in loss of standing water and or erosion in creeks or swamps. | Remediation of subsidence related fracturing or dilation within creek beds and surface cracks where it is appropriate to do so in consultation with SCA, DPIM, DECC and other stakeholders. |
| | Gas emissions with extensive vegetation die off and no evidence of self regeneration within 6 months of cessation of gas release. | Minor civil/ earthworks to prevent erosions such as overland flow diversion, establishment of banks, smoothing and re-contouring, where this is practical. |
| | | Revegetation such as planting, seeding, mulching, weed control and plant maintenance, where this is practical. |
| | | Active preservation of life such as relocation of stranded fauna and watering of stressed vegetation where this is beneficial and practical. |
| | | Temporary ecosystem maintenance such as watering plants until final rehabilitation completed, where this is practical. |
| <i>Aboriginal Places of Cultural Significance - Archaeological sites</i> | Predicted Impacts | Avoidance & Mitigation |
| | Unlikely that the sites will sustain structural impacts. Empirical data suggests the probability of impacts to a site is less than 10%. | Baseline, active subsidence and post mining monitoring. Appropriate consultation and approvals. |

| Description of Item | Key Potential Impacts | Avoidance, Mitigation and Rehabilitation |
|----------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | <p>Impacts Exceeding Those Predicted</p> <p>Change in shelter conditions not attributable to natural weathering or preservation – cracking or exfoliation of art panel, movement of existing planes and joints at panel, block fall within shelter or overhang, shelter or overhang collapse.</p> | <p>Contingent Measure</p> <p>Site and event specific mitigation and rehabilitation will be developed with appropriate Aboriginal representatives, DECC and SCA.</p> <p>Techniques may involve installing artificial drip lines, detailed recording of art, stabilising and cleaning rock faces. Refer Area 3A SMP section 22.9.</p> |
| <p><i>Water quality– Permanently Flowing Creeks Wongawilli Creek Sandy Creeks.</i></p> | <p>Predicted Impacts</p> <p>Impacts on water quality are possible due to reduced flow and/or increased interaction of ground and surface water. These impacts are likely to include reduced oxygen, higher dissolved ions and precipitates. There is also a possibility of lower pH and lower temperature variation as a result of groundwater inflows.</p> <p>Impacts Exceeding Those Predicted</p> <p>Major reduction in water quality when comparing baseline period to mining period, i.e. comparing baseline data to mining period:</p> <p>pH drop of >2 EC increase >100 uS/cm ORP* drop >200 mV</p> <p>A > 2 standard deviation reduction in water quality apparent at downstream monitoring site when comparing pre-mining to baseline data.</p> | <p>Avoidance & Mitigation</p> <p>Not mining under Wongawilli & Sandy Creeks to avoid major fracturing and loss of surface flow.</p> <p>Commitment to avoid significant impacts to major natural features in Areas 3B and 3C.</p> <p>Contingent Measure</p> <p>Grouting and repair of surface water controlling features and the beds of streams where fracturing is evident where it is appropriate to do so in consultation with SCA, DPIM, DECC and other stakeholders.</p> <p>Limestone emplacement to raise pH where it is appropriate to do so in consultation with SCA, DPIM, DECC and other stakeholders.</p> |
| <p><i>Water quality– ephemeral streams</i></p> | <p>Predicted Impacts</p> <p>Some buckling and fracturing of creek beds & diversion of flows.</p> <p>Impacts on water quality are</p> | <p>Avoidance & Mitigation</p> <p>Monitoring, measurement and reporting.</p> |

| Description of Item | Key Potential Impacts | Avoidance, Mitigation and Rehabilitation |
|-------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | <p>possible due to reduced flow and/or increased interaction of ground and surface water. These impacts are likely to include reduced oxygen, higher dissolved ions and precipitates. There is also a possibility of lower pH and lower temperature variation as a result of groundwater inflows. However, volumes of pooled water in ephemeral streams are small relative to the entire catchment.</p> <p>Impacts Exceeding Those Predicted</p> <p>Major reduction in water quality when comparing baseline period to mining period, i.e. comparing baseline data to mining period: pH drop of >2 EC increase >100 uS/cm ORP* drop >200 mV</p> <p>A > 2 standard deviation reduction in water quality apparent at downstream monitoring site when comparing pre-mining to baseline data.</p> | <p>Contingent Measure</p> <p>Grouting and repair of surface water controlling features and the beds of streams where fracturing is evident where it is appropriate to do so in consultation with SCA, DPIM, DECC and other stakeholders.</p> <p>Limestone emplacement to raise pH where it is appropriate to do so in consultation with SCA, DPIM, DECC and other stakeholders.</p> |
| <i>Groundwater quality, quantity and levels</i> | <p>Predicted Impacts</p> <p>Impacts on groundwater are possible due to increased interaction of ground and surface water as well as increased interaction of groundwater with existing and freshly created fractures within the rock and soil mass. These impacts are likely to include reduced oxygen, higher dissolved ions and lower pH. Shallow groundwater systems are likely to be depressed by increased permeability as a result of fracturing.</p> <p>Impacts Exceeding Those Predicted</p> <p>Major reduction (monitoring bore dry where it has not been prior to mining) in</p> | <p>Avoidance & Mitigation</p> <p>Monitoring, measurement and reporting.</p> <p>Not mining under Wongawilli & Sandy Creeks to avoid major fracturing and loss of surface flow.</p> <p>Commitment to avoid significant impacts to major natural features in Areas 3B and 3C.</p> <p>Contingent Measure</p> <p>Mitigation of flow-on ecological effects as described above.</p> |

| Description of Item | Key Potential Impacts | Avoidance, Mitigation and Rehabilitation |
|----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | <p>groundwater level at the majority of bores within any particular aquifer or swamp system or complete loss of groundwater.</p> <p>High reduction in water quality, i.e. comparing baseline data to mining period: pH drop of >2 EC increase >100 uS/cm ORP* drop >200 mV</p> | |
| <i>Surface of the land</i> | <p>Predicted Impacts</p> <p>Some surface cracking posing safe access constraints.</p> <p>Impacts Exceeding Those Predicted</p> <p>Major surface cracking preventing safe access.</p> | <p>Avoidance & Mitigation</p> <p>Monitoring, measurement and reporting during active subsidence.</p> <p>Signage & Fencing where they present safety risks.</p> <p>Communication strategy to stakeholders where they present safety risks.</p> <p>Fill crack with appropriate material in consultation with infrastructure owner. Install temporary erosion and sediment controls where appropriate.</p> <p>Contingent Measure</p> <p>As above.</p> <p>Establishment of alternative access to critical areas.</p> |
| <i>Swamps</i> | <p>Predicted Impacts</p> <p>No change in hydrology or ecological function of swamps.</p> <p>Impacts Exceeding Those Predicted</p> <p>Major controlling rockbar cracking leading to water loss in swamp</p> <p>Burning and/or erosion of peat material.</p> | <p>Avoidance & Mitigation</p> <p>Monitoring before, during and after active subsidence.</p> <p>Contingent Measure</p> <p>Implement swamp contingency plan.</p> |

4. Swamp Contingency Plan

Prior to the commencement of mining within Dendrobium Area 3A, 3B and 3C, Illawarra Coal will prepare a swamp remediation contingency plan for all swamps within each area.

5. Water Quality Offset

Illawarra Coal will negotiate an offset with the SCA to account for the small and unquantifiable water quality impact resultant from the proposal.

6. Sandy Creek Waterfall

Prior to the commencement of longwall mining within Dendrobium Area 3A, Illawarra Coal will:

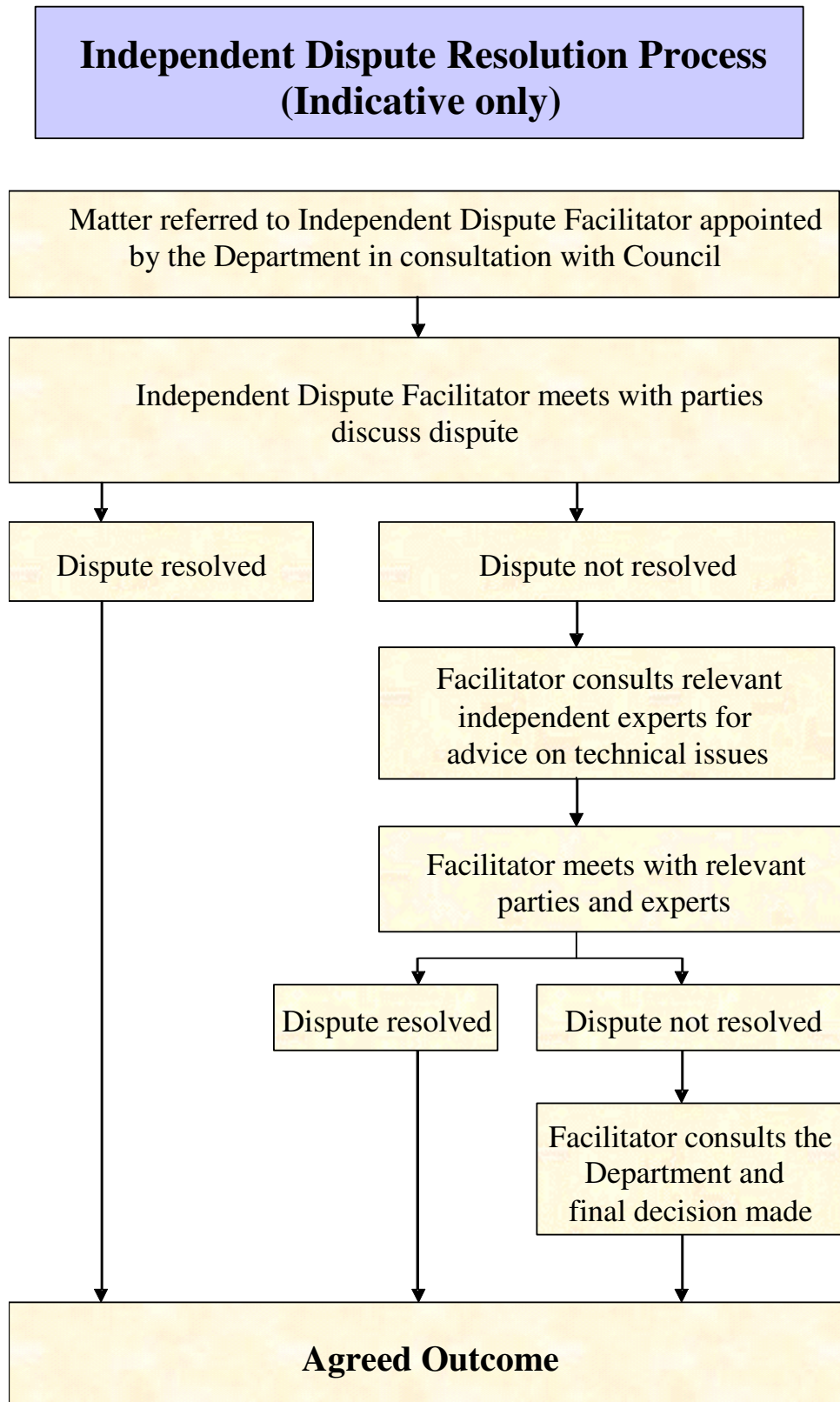
- establish a "technical committee" that includes BHPB, DPI, MSEC, and independent subsidence and geotechnical experts to advise on Sandy Creek Waterfall,
- develop and implement detailed management outcomes such as a Trigger Action Response Plan (TARP) that identifies detailed monitoring and management triggers, including but not necessarily limited to a decision to stop mining, where Longwalls 6-8 extract coal within 400 m of the Sandy Creek Waterfall.

Illawarra Coal will establish cut throughs at 50 m intervals at the finishing end of Longwalls 6 and 7 in order to be able to comply with any decision to stop mining based on the triggers in the TARP. Consideration will be given in the design of development roads for Longwalls 8-10 in regard to the provision of Longwall take off cut throughs in order to achieve compliance with the triggers in the TARP.

7. Green House Gas Emission - Measuring and Reporting

Illawarra coal is required to monitor and report green house gas emissions from Dendrobium Mine in accordance with the National Greenhouse and Energy Reporting Act 2007. This emissions data will be reported in the AEMR. The AEMR will also discuss current and proposed future action to minimise and/or abate green house gas emissions.

**APPENDIX 5:
INDEPENDENT DISPUTE RESOLUTION PROCESS**





Ms Joanne Page
Manager – Environment, Illawarra Coal
Dendrobium Mine
PO Box 275
Unanderra NSW 2526

Our Ref: DA-60-03-2001

Dear Ms Page

**DENDROBIUM COAL MINE
Triennial Independent Environmental Audit**

I refer to your letter, dated 8 September 2011, regarding the selection of an audit team to undertake a compliance audit at the Dendrobium mine in accordance with condition 8.1 of the Dendrobium development consent.

The Department has considered the information supplied concerning the qualifications and experience of the nominees and approves the audit team of KADENZ Pty Ltd to undertake the environmental compliance audit. The approved audit team consists of:

- Dennis Zines – Lead Auditor;
- Damon Roddis and Glen Holmes – Noise Assessment;
- Damon Roddis – Air Quality Assessment; and
- Steve Ditton – Subsidence.

Should you have any queries, please contact Clay Preshaw on (02) 9228 6305.

Yours sincerely

Howard Reed 5.10.11
A/Director
Mining and Industry Projects
as Delegate for the Director-General

Dr Ann Young
4 Roxburgh Ave
Thirroul 2515

The Hon. Brad Hazzard
Minister for Planning and Infrastructure
Level 33, 1 Farrer Place
Sydney 2000

The Hon. Chris Hartcher
Minister for Resources and Industry
Level 37, 1 Farrer Place
Sydney 2000



17th September 2011

Dear Ministers *Hazzard*

Re: the AEMR and End-of-Panel Longwall 6 Reports
Dendrobium Coal Mine , Illawarra Coal

These reports are required under the provisions of the Modified Development Consent and SMP granted to Dendrobium mine, and I wish to make some comments about the conclusions reached in them. There is of course considerable and understandable overlap in the material reported, as they cover essentially the same period.

1. The scope of the reports

As required by the regulatory provisions, the company reports on their activities in Area 3A. **The problem with this is that the relation to impacts in Areas 1 and 2 completely drop out of sight.** The most obvious example for me is that the impacts on Swamp 1 in Area 2 are no longer being considered in any document that is being assessed by your departments or made available as part of the company's public environmental reporting. Thus, for example, any assessment of how piezometers reacted to the rainfalls in early 2011 (after the preparation of the LW5 EoP report), or how vegetation may be changing over the long term are not routinely being considered.

2. Groundwater inflows

The exception to my last comment is the discussion of groundwater inflows, as both Area 2 and Area 3A are considered. The AEMR comments that:

The groundwater reporting to the mine workings during normal conditions is characteristic of coal measure water, relatively higher salinity and older water based on Tritium analysis. Although the mine experienced periods of higher water make, none of these events were considered inflows. No contemporary surface, dam or rain water has been reported through the mine workings to date. [my emphasis]

Yet the EOP section 4.2 explicitly refers to mine inflows, and notes that DSC alarms were triggered in Sept and Oct 2010, 3SD alarms in Feb, Apr and June 2010, and high inflow occurred across the mine in June and Dec 2010. Fig 4.2 shows a roughly constant make in Area 3A but continuing significant fluctuations in the input from Area 2. Hence it seems that the bulk of the inflows can be related to water entering in Area 2, but that the flow travels to

Area 3A. Hence the assertion in the AEMR seems at odds with the EOP – **there are certainly inflows, not just ‘periods of higher water make’!**

Further, the AEMR comments that:

The piezometers in Area 2 primarily monitor the groundwater between the longwall extraction and the reservoir to the east of the longwalls. The piezometers in Area 3A monitor the groundwater towards the eastern end of the longwalls 6 and 7. There has been no response from the piezometers head pressure readings which indicated no fluctuations within the mines water make

Yet the EOP section 5.3.1 states that ‘elevated salinity values in November 2010 to January 2010 were in good agreement with the timing of enhanced mine inflows in both areas’. It also records an unexplained drawdown of 25m in the lower Hawkesbury Sandstone at Bore S1889 over LW7, and a widespread unexplained drawdown of 40-60m in the Bulli Seam.

I am not aware of any clear explanation of the water inflows to Area 2 but the evidence of timing and water quality seem to be compatible with considerably increased interconnection between the aquifers above the Wongawilli Seam. I accept that there is no direct flow of surface water into the goaf but **at a minimum it seems there is post-mining pressure transference between the aquifers. This again brings into question the oft-quoted assumption that the Bald Hill Claystone continues to be an impermeable barrier after mining between the Hawkesbury sandstone and the underlying strata.**

3. Groundwater monitoring

Figure 5.5 of the EOP shows shallow groundwater monitoring sites in Area 3A and deep monitoring sites in Areas 3A and 3B. Does this mean there is no shallow monitoring yet established in the swamps of Area 3B? Given that the development workings are likely to be started along the line of Wongawilli Creek within months, and LW 7 has already been started, extraction in Area 3B will presumably planned to begin in less than 2 years. This leaves little time for baseline data for the several very significant swamps in Area 3B to be collected, if indeed monitoring has not yet started.

4. Shallow groundwater

The EOP section 5.2 comments that:

mining of Longwall 6 did not appear to have any noticeable adverse effect on local groundwater levels in and around Swamps 15a, 15b, 12 and 16. Fluctuations in the groundwater levels occurred in response to rainfall events in the catchment.

The implication is that adverse effect might have been expected but has not happened. In fact it would have been most surprising if there had been any effect on swamp 16 (above the roads where no subsidence should occur) or on Swamp 15a (which is well distant). Or even on Swamps 12 and 15b which are above LW7.

The idea that mining leads to no adverse effect and that any loss of shallow groundwater is due to climatic fluctuations is repeated:

it was observed that many of the piezometers either show regular occurrences of ‘drying up’ or appear to maintain a consistent water level during the mining and post-mining period. Comparison of the shallow groundwater levels record with the cumulative monthly rainfall mass residual showed that the general decline in water levels and the drying out (‘flat lining’) of most piezometers after the end of the Longwall 6 mining period (see Attachment C) was a consequence of the general drying of the Dendrobium Area 3A area over the June 2008 to March 2010 period.

It would be more helpful if the evidence apparently presented in Attachment C had been included in the EOP, as it is not available with the EOP on the company website. From the piezometer and rainfall information given to the DCCC, **I am unconvinced that this assertion is valid.** For example, the piezometers in Swamp 12 only began to yield consistent information in mid-2009 (2 piezos) and Mar and May 2010 (3 piezos), so how could the assertion be tested there? Certainly if it is meant to apply to Swamp 1 in Area 2, I do not agree with the assertion!

5. Implications for future activities

As I discussed with Minister Hartcher at the Cabinet's Community Meeting in Kiama on 15th August, **I am concerned that Illawarra Coal will be moving its activities into Area 3B before an SMP for that area has even been prepared, let alone been assessed and approved.** I am concerned especially because of the significant swamps in Area 3B, in light of the increased recognition of the value of the swamps both as ecological communities and as components of the catchment hydrology.

I ask therefore for your consideration of the points I raise above, and for **stringent review of the environmental impacts of mining in Areas 1, 2 and 3A when your departments consider the plans to move into Area 3B.** The Modified Consent for Area 3A required protection of Sandy Creek waterfall, which has been achieved. It also required protection of the rock bar and water level in Swamp 15a, which has not been tested because that swamp will not be undermined in the current program. It also required protection for Wongawilli Creek but did not specify protection for any of the swamps in Area 3B.

I draw your attention to the Report of the PAC on the Bulli Seam Operation recognised at least some swamps as features of special significance which would require 'a much higher level of scrutiny and consideration of protection and may therefore require changes to the mining proposal' (p iv). Further it noted that **'if mine subsidence has the potential to impact on near surface formations to an extent that could cause changes in the hydrology of a swamp, then the swamp is at risk of serious negative environmental consequences'** (p 88). Further the PAC commented that **'none of these techniques has a track record in swamp remediation'** (p 122) and 'the capacity of the proposed maintenance responses to maintain the physical state and function of a swamp is completely unproven and has been commented upon adversely by most stakeholders' (p 123). [my emphasis]

Because

- there is no proven technique to remediate a damaged swamp, and
 - the piezometric record in Swamp 1 shows unequivocally that the cracking of the bedrock base leads to long-term drop in the swamp water level and
 - the entire base of the swamp needs protection and not just a rock bar at the mouth,
- the conditions in any SMP for Area 3B need to be more wide-ranging and stringent than those in the Modified Consent for Area 3A.

Also the implications of the continuing groundwater inflows need to be understood and taken into account, as the surface and near-surface impacts may take some years to become apparent.

Yours sincerely

Ann Young



Mr Gary Brassington
Manager Environmental Approvals
BHP Billiton Illawarra Coal
PO Box 514
UNANDERRA NSW 2526

OUT11/21889
File N°: 07/1109

Dear Mr Brassington

Re: Dendrobium Mine – Subsidence Management Plan Area 2 - Impacts to Swamp 1

I refer to the Dendrobium Mine Subsidence Landscape Monitoring and Management Program – Area 2, Six Monthly Monitoring Report (March 2011 to August 2011). This document has been reviewed by Environmental Officers of this Department and we offer the following comments.

Vegetation in Swamp 1 (A2-SW1) appears to have changed, evident by the photos attached to the monitoring report comparing the vegetation between 11/4/2007 (baseline) and 24/08/2011. Based on the photos and field observations by Environmental Officers, it appears the swamp vegetation is changing in composition and is a likely indication of subsidence impacts to the shallow groundwater system in the vicinity of the swamp.

A review of the previous monitoring reports and End of Panel reports has revealed very little information on the impacts to Swamp 1. The Dendrobium Colliery, Area 2, Longwall 5 End of Panel Report indicated "possible impact on the water level in Swamp 1", but no information on the water levels in Swamp 1 have been received by this Department since the issue of the End of Panel Report in April 2010.

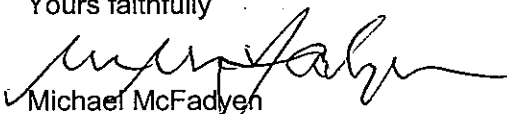
Therefore, in accordance with Condition 10(f) of the Dendrobium Area 2 Longwalls 3 to 5, Subsidence Management Plan Approval, you are requested to report on the identified subsidence impacts to Swamp 1. The report must include the following:

- Groundwater Monitoring and other hydrological data in the vicinity of Swamp 1 up until October 2011, and presentation of this data in graphical form. The start and finishing date of Longwalls 3 to 5 must be shown clearly on the graphs.
- Summary of landscape monitoring data and observations in the vicinity of Swamp 1, including observation of seepage flow at outlets from the swamp.
- Flora monitoring results undertaken in the vicinity of Swamp 1 up until October 2011.
- An assessment of the above data by a suitably qualified hydrogeologist to assess any subsidence related impacts to the shallow groundwater system in Swamp 1.
- An assessment of rehabilitation options (Corrective Management Actions) and justifications that may be required to return the function of Swamp 1 pre-mining levels.

The report must be provided to this Department no later than **16 December 2011**.

If you require further information on this matter, please contact Chris Rudens, Regional Environmental Officer on (02) 4222 8321.

Yours faithfully


Michael McFadyen
Acting Director Environmental Sustainability
Dated: 22 NOV 11

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20 December, 2011

Dennis Zines
Kadenz Pty Limited
1 Fairweather Street
Bellevue Hill NSW 2023

Report No. DEN-002/1

Dear Dennis,

Subject: Subsidence Impact Management Compliance Assessment for the 3rd Triennial Independent Audit of Dendrobium Mine, Mount Kembla

1.0 Introduction

This report provides a review by Ditton Geotechnical Services Pty Ltd (DgS) of the performance of the Subsidence Management Plans (SMP) prepared by Illawarra Coal (BHP Billiton) for Areas 2 and 3A at the Dendrobium Mine, Mount Kembla.

This report forms part of the 3rd Triennial Independent Audit Report by KADENZ Pty Ltd, which is required by the NSW Department of Planning's Development Consent Condition 8.1 Third Party Monitoring/Auditing for the Dendrobium Mine.

This audit has included the outcomes of mining impacts for the period from October 2008 to September 2011. Mining activities resulting in the development of subsidence and associated impacts during this period include the extraction of longwalls LW4 and 5 in Area 2 (Oct 2008 - Dec 2009) and LWs 6 & 7 in Area 3A (Feb 2010 to Oct 2011).

The Subsidence Environmental Management Plan (SEMP) for the landscape elements of Dendrobium Area 1 was prepared by GSSE in November 2004. This plan has been subsequently modified to include Area 2 (GSSE, 2006) and the revised document was incorporated into the Subsidence Management Plan (SMP) prepared for Area 3A in accordance with I&I NSW guidelines. This SMP fulfils the requirement for landscape monitoring and management for Area 3A as required by the Dendrobium Consent and the SMP Guidelines.

2.0 Scope of Work

The scope of the work consisted of the following:

- (i) A desktop review of the Dendrobium Mine's Conditions of Consent, Subsidence Management Plan (SMP) and Annual Environmental Management Reports (AEMRs) for 2008/2009, 2009/2010 and 2010/2011. The review included review of periodic impact monitoring reports referred to in the AEMRs (i.e. End of Panel Reports, SLMMP 6-monthly Reports and IC Environmental Team inspection reports).
- (ii) A brief walkover inspection of Areas 2 (LW 4 and 5) and Area 3 (LWs 6 to 7) to confirm claimed surface impacts and identify possible inconsistencies in the application of the SMP.
- (iii) Provide an assessment of the effectiveness of the SMP in regards to subsidence related impacts and possible avoidance of remediation measures or strategies.
- (iv) Provide recommendations on any changes to the SMP and or the overall reporting process such that it may improve the effectiveness of SMP in future mining areas.

3.0 Desktop Review

3.1 Conditions of Consent and Subsidence Management Plan (SMP) Review

The Conditions of Consent and SMPs for Areas 2 and 3A provides a framework for addressing monitoring and impact management requirements for the following features within the area of mining influence:

- Watercourses (1st, 2nd and 3rd Order)
- Steep slopes up to 2V:1H and cliff lines up to 20 m high.
- Sandy Creek Water Fall in Area 3A
- Upland Swamps.
- Igneous intrusions (Crinanite Sill) overlying the south-eastern corner of Area 2.
- Shallow and deep groundwater aquifers.
- Aboriginal archaeology (mainly rock shelters with or without art).
- Cordeaux dam and storage area integrity between Areas 1 and 2.
- 330 kV Transgrid Powerline easement in Area 3A.
- 33 kV Powerline easement in Area 2.
- Telstra telecommunications.
- Fire trails.
- Terrestrial and aquatic flora and fauna.

Subsidence contour predictions and impact management plans have been developed in association with the relevant stakeholders for each feature by MSEC. Baseline studies of pre-mining conditions for each feature have been prepared and used for monitoring outcome and impact assessment purposes.

Trigger Action Response Plans (previously referenced in Table 23.2 in Draft SMP for Area 3A) have been provided to (i) assess if subsidence impacts were significantly higher than predicted and (ii) ascertain if Corrective Management Actions (CMAs) are necessary to either remediate damage or review/adjust proposed mine plans.

It is understood that the TARPs have been reviewed by IC and DRE and amended to improve consistency between impacts and the appropriate CMA response. The revised TARPs now refer to either Level 1 or 2 Impacts that are Within Predictions and Exceeding Predicted Impact Criteria.

It is of note that the mine has taken a pro-active approach to adjusting proposed mining layouts if the uncertainties and consequences of possible subsidence damage are considered too great a risk to the environment and the mine operations. An example of this action was the deletion of LW 5a to avoid potential damage to Cordeaux reservoir.

IC also established a “technical committee” of IC, DRE, MSEC and independent subsidence and geotechnical experts to prepare an appropriate TARP to monitor and manage mining impacts at Sandy Creek Water Fall as LW 6 approached its finishing point. The longwall was stopped 50 m short of the approved location, based on the stringent valley closure and horizontal strain limits applied to avoid impact.

Comparison between predicted v. observed subsidence effects and impacts have been assessed in End of Panel and Annual Environmental Reports by Comur Pty Ltd and the IC Environmental Team.

The performance of the SMPs during and after mining of LWs 4 to 6 has been assessed in the AEMRs for 2008/2009, 2009/2010, 2010/2011 and the outcomes summarised in **Section 3.2**. The impacts of LW 7 to date (approximately 75% complete) is documented in the 6-monthly SLMMP Report by GSSE (Feb-Jul 2011).

3.2 Annual Environmental Management Reports (AEMRs)

Three AEMR's have been submitted to the DoP&I during the audit period. Maximum subsidence above the Area 2 panels was 2.4 m and 2.0 m above the Area 3A panels.

The Landscape TARP trigger levels were originally defined as 'minor', 'moderate' and 'severe' impact categories, based on visual assessment by GSSE and IC's Environmental Management team. Consideration of CMAs were only invoked when mine subsidence damage is assessed by mining representatives as being 'moderate' or 'severe'.

One Corrective Management Action (CMA) was invoked during the current audit period by the Dendrobium Landscape Impact Assessment Trigger Levels (recently reviewed) along the fire trail within the 33kV power line easement in Area 2. The CMA required the back filling of surface cracks to make the road safe and serviceable.

Monitoring of all features will now only continue for a period of 2 after mining is completed with periodic inspections by IC's environmental management team of the subsided areas to identify any new damage that may require CMAs to be implemented.

A summary of the predicted subsidence effects and associated impacts within the completed mining areas and responses by Dendrobium Mine management are presented below:

Area 1 - LWs 1 and 2

- No further subsidence (< 3 mm) has been observed above Area 1 Panels.

Area 2 - LWs 3 to 5

- Subsidence predictions along the D 2000 Line across LWs 3 to 5 were slightly exceeded by 14% (930 mm v. 1063 mm). The predicted tilts and strains were also exceeded. The higher observed results were explained by MSEC as likely to have been due to the interaction with the steep slope above the panels.
- Valley closures of 4 mm to 12 mm across Lake Cordeaux were < 155 mm predicted. No surface impacts observed.
- Upper Cordeaux Dam is > 890 m (2.0 to 2.5 x cover depth) from LWs 3 to 5 and it was predicted that it may be affected by small closure and upsidence or regional horizontal

movements. The measured wall movements after mining of the above panels were within survey tolerances (measured subsidence of 0 - 1 mm, -2 mm to 4 mm north and -2 mm to 2 mm east) with no impacts detected.

- Fire Trails were predicted to be impacted by minor cracking and buckling with 10 to 30 mm cracks observed which self-healed and did not require repair works.
- The power poles (Integral) supporting the 33 kV power line not been adversely affected by the subsidence of up to 2 m and tilts of about 20 mm/m. The timber poles have also been recently replaced with galvanised-steel up grades by Integral Energy.
- Areal Laser scanning data for Area 2 was obtained but not reported.
- Surface cracks and soil/rock displacements were expected to occur due to the predicted strains and were typically < 150 mm wide with some cracks up to 500 mm wide on steep slopes. Crack depths ranged from 1 m to 3 m with lengths of 2 m to 40 m. The majority of surface cracks were assessed as 'minor' with the larger cracks assessed as 'moderate' and were located within the accessible areas of the 33 kV power line easement. The larger cracks were infilled with crushed and screened sandstone in consultation with Sydney Catchment Authority (SCA).
- Discontinuous cliff lines < 20 m in length and < 15 m high exist on the ridges above LWs 4 & 5 with some isolated cliffs and overhangs noted along water courses > 5 m high. It was expected that a small percentage of cliff line (<10%) would be damaged by predicted tilts and strains. One rock small rock fall (3 m³) occurred above LW4 with two occurring above LW5.
- The steep slopes along the ridges and below the cliff lines were expected to be effected by surface cracking of up to 150 mm wide or more and down slope soil slippage. It was considered unlikely that large-scale landslide would occur. Observed impacts included soil and rock displacements ranging from 30 to 150 mm typically with several cracks between 200 to 400 mm and two tree falls. Soil erosion or significant impact to vegetation suggests the impacts were only 'minor' and within the predicted range.
- Minor cracking also developed in the sandstone rock bars in Swamp 1 however, the cracks were generally shallow and were considered by IC not to have made an impact on surface water levels or flows through the swamp. Soil erosion has not been detected at this stage. Soil moisture contents have reduced across all of the monitoring sites in Swamp 1 and considered to be in-line with climatic conditions. Other swamps outside of the mining area have also shown similar decreases.

Shallow piezometers in the Hawkesbury Sandstone have shown a decline in water level, however it is likely that this is due to similar increases to rock mass permeability caused by strata dilation during mine subsidence. The water levels are likely to recover in the short to medium term and will be dependent on climatic conditions.

Note: It has been noted however by SCA and DRE that the groundwater levels have 'flat lined or dropped below the base of the instruments in Swamp 1. Although IC has stated that this indicates that the drop in water level is due to rainfall deficits and unlikely to be a response to mining, further information and assessment of this issue has been requested by DRE recently.

- It was expected that the creeks (WC-1, WC-11 and WC-13) would be affected by minor cracking, ponding and erosion due to the predicted subsidence. Only minor surface cracking (< 150 mm width) and rock movement occurred along WC-13 after LWs 4 and 5 have been observed. No change to catchment yield or water quality has occurred.
- Minor fracturing with no flow diversions were predicted along reaches of Wongawilli and Sandy Creeks within 400 m of the longwalls. No cracking has been reported to-date.
- No damage to the Crinanite Sill or groundwater system (as reflected by there being no impact to surface groundwater interaction, no flow from the dam to workings, no loss of catchment yield etc) has been detected by the monitoring programs to-date. Several higher than normal groundwater inflows did occur during the and
- The water quality monitoring results along creeks WC10, 11, 12 and 13 after LW5 extraction, indicate that there has been no change to pH, eC, or Mn except for several spikes of Filterable Iron. The impacts of the spikes are not considered to be a significant long-term issue to the environment.
- There has been no detectable change to terrestrial plant communities, fauna habitats, threatened species and aquatic biota according to specialist environmental consultants.
- Depressurisation of stratigraphic units below Wombarra Claystone (i.e. Bulli, Balgownie and Wongawilli Seam strata) have not eventuated to the same extent as predicted. Many deep piezometers do not show a response to mining meaning that the integrity of intervening claystones has remained intact and are still behaving as aquitards. The Wombarra and Stanwell Park Claystone units are still intact after LW6 and continue to behave as aquitards between mine workings and upper level groundwater regimes in the overburden.

Minor depressurisation of several metres has occurred in Scarborough and Bulgo Sandstone, however these are probably due to bedding separation and storage capacity increases above the caved and fractured zones associated with the goaf.

- Shallow piezometers in the Hawkesbury Sandstone have shown a decline in water level, however it is likely that this is due to similar increases to rock mass permeability caused by strata dilation during mine subsidence. The water levels are likely to recover in the short to medium term and will be dependent on climatic conditions.
- Aboriginal Heritage Site (D4 - Rock Shelter with Art) was assessed to have moderate significance. Consent to damage was granted despite the risk of impact assessed to be low due to predicted subsidence of 1.18 m, tilt of 22 mm/m and tensile and compressive

strains of 4.8 mm/m and 4.2 mm/m respectively. Potential impacts were assessed to include cracking, exfoliation or minor rock fall. Minor changes to the rock shelter and art were noted after LW4 was extracted, with the opening of an existing joint at the back of the shelter.

Area 3A - LWs 6 and 7

- Subsidence predictions across SCW North above LW 6 were higher than measured values (1450 mm v. 1220 mm). The ALS data indicated observed subsidence ranged from 1.0 m to 1.6 m (0.1 m above to 0.5 m below the predicted profiles) with only slight exceedences of the predicted tilts of 13 mm/m and tensile and compressive strains of 2 to 3 mm/m.
- Valley closures of 6 mm to 36 mm were measured across water courses with no surface impacts observed.
- IC established a “technical committee” of IC, DRE, MSEC and independent subsidence and geotechnical experts to prepare an appropriate TARP to monitor and manage mining impacts at Sandy Creek Water Fall as LW 6 approached its finishing point. The longwall was stopped 50 m short of the approved location, based on the stringent valley closure and horizontal strain limits applied to avoid impact. Measured closure on High Resolution Survey Lines was only 1 mm when the longwall was stopped.
- Surface cracks and soil/rock displacements were expected to occur along water courses with rock bars and steep slopes due to the predicted strains and were typically < 160 mm wide with some cracks up to 300 mm wide on steep slopes. The majority of surface cracks were assessed as ‘minor’ with the larger cracks assessed as ‘moderate’. No CMAs have been initiated at this stage.
- Rock outcrops and sandstone ledges 0.5 m to 5 m high exist along the watercourses and ridge lines above LWs 6 and 7. It was expected that a small percentage of would be damaged by predicted tilts and strains. Eight rock falls have occurred that range from between 0.5m³ and 75 m³ in volume. One moderate sized rock fall (240 m³) occurred along WC17 and just outside the extraction limits of LW7.
- The steep slopes along the watercourses and ridgelines were expected to be effected by surface cracking and down slope soil slippage. It was considered unlikely that large-scale landslip would occur. Observed impacts included soil and rock fracturing / displacements ranging from 15 mm to 300 mm. Soil erosion or significant impact to vegetation suggests the impacts were only ‘minor’ and within the predicted range.
- It was expected that the creeks (WC-17 and WC-19) would be affected by minor cracking, ponding and erosion due to the predicted subsidence. Only minor surface cracking (< 160 mm width) and rock movement occurred after LWs 6 and 7 have been observed. An underlying section of a 1.2 m deep rock ledge or step along WC17 collapsed after first fracturing was first noted on a previous inspection 3 weeks earlier.

- Some loss of stream flow and pool levels was indicated downstream of Swamp 12 with no change to catchment yield or water quality detected except for iron oxide / hydroxide deposits and staining from groundwater discharges along the creeks. *Note: Based on discussions with the IC Environmental Team manager and a representative of GSS Environmental, it is understood that an independent water chemistry consultant has assessed that the effects of iron oxide staining and precipitation on aquatic biota is temporary and unlikely to become a serious issue.*
- Minor fracturing with no flow diversions were predicted along reaches of Wongawilli and Sandy Creeks within 250 m of the longwalls. No cracking or water quality impacts have been reported to-date and were not expected due to the intention of providing adequate set-back distances from the longwall panels.
- The impacts of subsidence tilt and strain on the Transgrid 330 KV power line towers have been controlled through the installation of cruciform footings on the towers.
- The water quality monitoring included pH, Ec, Oxidation-Reduction Potential readings to be taken immediately downstream of LW6. The results obtained did not exceed TARP limits or any other geomechanical effects of aquatic ecological concern. There were however, minor increases in sulphate and sharp increases in filterable iron and manganese. Iron oxide staining/deposits have also been noted along the flowing creek beds, however, water chemistry experts do not consider this to be a significant impact.
- There has been no detectable change to terrestrial plant communities, fauna habitats, threatened species and aquatic biota according to specialist environmental consultants.
- A regional approach has now been adopted for groundwater monitoring in Area 3A. A local 3D numerical model has been developed recently to give more quantitative groundwater predictions than has been possible in the past. Based on field testing, there is a clear increase in salinity with depth from the Hawkesbury Sandstone to the Bulgo Sandstone and down to the goaf. No drawdown of groundwater levels developed in Hawkesbury Sandstone and was consistent with the predicted impacts.
- Minor depressurisation of several metres has occurred in Scarborough and Bulgo Sandstone, however, these are probably due to bedding separation and storage capacity increases above the caved and fractured zones associated with the goaf.
- Shallow piezometers in the Hawkesbury Sandstone have shown a decline in water level, however it is likely that this is due to similar increases to rock mass permeability caused by strata dilation during mine subsidence. The water levels are likely to recover in the short to medium term and will be dependent on climatic conditions.
- Measured groundwater inflows of 1.3 to 3.6 ML/day into the workings were much less than predicted flows of 3-4 ML/day.
- Groundwater level drawdowns typically ranged from 5 to 20 m in the Wongawilli Seam of 40 m to 60 m in the Bulli Seam was observed in deep piezos below Sandy Creek after extraction of LW6 (Area 3A) and remains unexplained at this stage in AEMRs.

Specialist hydrogeological reports (GHD-Longmacs) have reviewed impacts of Areas 1 and 2 and indicate that no impact to Lake Cordeaux storage or subsurface aquifers in the rock mass has occurred based on the suite of deep vibrating wire piezometers and water quality testing data.

The draw down in the Bulli Seam may be related to the igneous intrusion and flow paths to old workings as explained in the GHD report. High inflows may be due to delayed responses to groundwater flow paths affected by dykes around the extracted areas. Further comment should be sought from GHD to resolve this issue.

- As expected, some surface cracking and soil displacement has developed along the Fire Trails in Area 3A. Several cracks observed along the Fire Trail were within the predicted values, with no CMA required at this stage.

An inspection of some of the features described above in Areas 2 and 3 (including un-remediated and remediated areas) were completed on 4 November 2011. The purpose of the inspection was to (i) confirm that the assessed impacts and outcomes of the remediation measures described in the AEMRs were consistent with the TARPs defined in the SMP and (ii) determine if any un-remediated areas should be considered for CMA or remediation.

4.2 Site Inspection Results

Several impacted sites in Areas 2 and 3A were visited on 4/11/2011. The photos show typical subsidence management of following sites visited in Area 2 and 3A and notes / photographs made of the impact of LWs 4 to 7 and any remediation works observed.

5.0 Discussion and Recommendations

5.1 SMP Compliance with Consent Conditions

Based on the review of the SMP and AEMR documents for 2008 to 2011, it is concluded that Dendrobium Mine has complied with the relevant Conditions of Consent for mine subsidence impact management for this reporting period.

5.2 Actual v. Expected Impacts

Actual subsidence and impact predictions at surface features within the area of influence of mining have generally been less than or consistent with the EIS predictions.

Actual impacts have been assessed as ranging from negligible or no impact to ‘minor’ and ‘moderate’ impact, based on the trigger level definitions provided in the SMP.

5.3 Effectiveness of SMP

Overall, the SMP is considered to be performing well in regards to subsidence related impacts.

The audit notes that on-going monitoring is occurring and that it includes a specific recommendation from the Dendrobium specialist if any CMAs are required – at this stage none have been recommended.

6.0 Conclusions

It is assessed that the SMP has performed satisfactorily in terms of subsidence impact management in the Areas 2 and 3 and the Conditions of Consent during the 2008 – 2011 reporting period.

For and on behalf of
Ditton Geotechnical Services Pty Ltd

A handwritten signature in black ink, appearing to read 'Steven Ditton', written in a cursive style.

Steven Ditton
Principal Engineer and Director
BE(Civil/Hons) C.P.Eng(Civil), M.I.E.(Aust)

NPER 342140

Attachments:

Photos

Photo 1 - Down stream Rock Bar (minor cracking) at Swamp 1 in Area 2 (>2 years since mining of LWs 4 and 5)



Photo 2 - 500 mm Wide Tension crack on steep slope above Watercourse LW 5 (Photo courtesy of IC Environmental Team dated Dec, 2009)



Photo 3 - 150 mm Wide Rock Movement in Area 2 (Photo courtesy of IC Environmental Team dated Aug, 2008)



Photo 4 - Typical Area 3A Surface Crack in Near Surface Sandstone Outcrops



Photo 5 - Swamp 12 Environment Monitoring Cluster of Boreholes in Area 3A



Photo 6 - Rock Shelf Collapse on Watercourse WC17 in Area 3A



Photo 7 - Tensile (left) and shear cracking (SE) in Area 3A Along WC17



Photo 8 - Undermined Creek WC 17 in Area 3A (pond levels still apparent).



Photo 9 - Iron Staining in WC17 Below Swamp 12 in Area 3A



Photo 10 - Further Iron Staining Downstream in Area 3A



Photo 11 - Collapsed Section of Rock Face on WC17 (down stream of Swamp 12)



Photo 12 - Cruciform Footings Installed on Measured Subsidence Contours in Area 2



Photo 13 - Undamaged Aboriginal Rock Art in Area 2 above LW4



25 November 2011

Dennis Zines
Kadenz Consulting

Dear Dennis

Re: Dendrobium Mine Statutory Compliance Audit 2011 – PAEHolmes Photolog

The attached Appendix provides a photographic record of key components of the subject audit site inspection, as it relates to the air quality and noise aspects of the audit.

This correspondence should be read in conjunction with the final Statutory Compliance Audit documentation.

Yours sincerely



Damon Roddis
General Manager (NSW)
PAEHolmes

APPENDIX A

Site Visit Photo Log



Picture A1: Dust Deposition Gauge Point 13 (Dendrobium Colliery Surface)



Picture A2: Dust Deposition Gauge Point 15 (Harry Graham Drive, Kembla Heights)



Picture A3: Dirt Bike Course Adjacent to Dust Deposition Gauge Point 15



Picture A4: High Volume Air Sampler Point 20 with PM₁₀ sampling head - located at the entrance to Kemira Valley



Picture A5: High Volume Air Sampler Point 21 with TSP sampling head - located on top of the bathhouse building, Pit Top