AngloAmerican

Real Mining. Real People. Real Difference.

Drayton South Coal Project

Justification

February 2014

EXECUTIVE SUMMARY

INTRODUCTION

Anglo American Metallurgical Coal Pty Ltd has made Project Application 11_0062 for the Drayton South Coal Project. The Project facilitates the continuation of mining at Drayton Mine for an additional 27 years. The Project will utilise the existing infrastructure, equipment and workforce at Drayton Mine.

MATTERS RELEVANT TO DETERMINATION

The Minister for Planning and Infrastructure is the consent authority for Part 3A projects. In this instance, the Minister has delegated this function to the Planning Assessment Commission. In accordance with section 75J of the Environmental Planning and Assessment Act 1979 and established common law principles, the Planning Assessment Commission is bound to consider the following when determining the Project:

- The Director-General's Assessment Report;
- The Planning Assessment Commission's report on its review of the Project;
- The objects of the Environmental Planning and Assessment Act 1979;
- The principles of Ecologically Sustainable Development;
- The public interest; and
- Community responses that are based on logically probative evidence (as opposed to unjustified fears or concerns).

DIRECTOR-GENERAL'S ASSESSMENT REPORT

The Project is awaiting the preparation of the Director-General's Assessment Report. This report must consider all aspects of the Project, having regard to the Environmental Assessment, Preferred Project Report, and the Planning Assessment Commission's report.

The Drayton South Coal Project has been assessed in accordance with the Director-General's Requirements, the Environmental Planning and Assessment Act 1979, relevant environmental planning instruments, and relevant government policies and guidelines. The Project has been subject to an extensive environmental impact assessment, including an Environmental Assessment, Response to Submissions and Preferred Project Report. Technical assessments have been conducted for all issues identified in the Director-General's Requirements. All assessments have been undertaken by suitably qualified experts, with peer reviews conducted for key studies to ensure the integrity of assessment methodologies. Prior to the Environmental Assessment being placed on public exhibition, the Director-General declared that the Environmental Assessment had adequately addressed the Director-General's requirements.

Environmental impacts have been assessed using established scientific principles, which allow most impacts to be predicted with sufficient scientific certainty. Where there is some scientific uncertainty, it has been assumed that the worst case scenario will eventuate, consistent with the precautionary principle.

The Environmental Assessment determined that the Project will not result in any unacceptable environmental or social impacts. The key findings of the Environmental Assessment include:

- Predicted amenity impacts (air quality, noise, blast effects) are within the non-discretionary development standards specified under clause 12AB of State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007;
- The dust, noise and vibration levels generated by the Project will not adversely affect horse health;
- Visual effects on Woodlands Studs are limited to non-sensitive locations that are unlikely to be used by Darley as part of its operations. Visual effects on Coolmore Studs will only occur for a short period (during construction of the visual bund);

- The biodiversity offset strategy developed by Anglo American will compensate for the impacts of the Project, resulting in a long-term improvement in biodiversity values;
- The Project will not disturb any land identified as critical industry cluster land. The construction of the discharge pipeline will disturb 3 ha of Biophysical Strategic Agricultural Land. Topsoil will be re-instated immediately so productivity of this land is unlikely to be significantly affected; and
- As the existing Drayton Mine workforce will be afforded continued employment with no increase in workforce, no additional social impacts are predicted to occur whilst very material social benefits will be realised.

The Benefit Cost Analysis estimated the net benefit of the Project to be $490 million (present value). The net benefits consist of $320 million (present value) in royalties to the New South Wales Government and $170 million (present value) in company tax to the Commonwealth Government.

The Director-General's Assessment Report must consider all of the benefits and costs that are likely to result from the Project. These benefits and costs have been technically assessed in the Environmental Assessment and Preferred Project Report.

PLANNING ASSESSMENT COMMISSION'S REPORT

The consent authority is required to consider the report of the Planning Assessment Commission. Anglo American and its experts have undertaken a comprehensive review of the Planning Assessment Commission's report. Anglo American submits that little or no weight should be given to the Planning Assessment Commission Report for the following reasons:

- The Ministers terms of reference for the 'review' were very narrow, requiring the Planning Assessment Commission to consider only one aspect of the Project (its impacts on the operations of Coolmore and Woodlands horse studs);
- The Planning Assessment Commission went beyond its terms of reference and the scope of its delegated authority. The Planning Assessment Commission recommended that the Project should not be approved, which is not an appropriate conclusion given that it only reviewed one aspect of the Project. This excess of authority invalidates the Planning Assessment Commission's review;
- Anglo American was denied the opportunity to review and respond to the expert reports commissioned by the Planning Assessment Commission. This is contrary to the rules of natural justice and renders the Planning Assessment Commission's review invalid;
- The Planning Assessment Commission did not act as an impartial decision-maker as it relied on the expert reports of Mr Terry Short and Dr Richard Lamb without questioning their independence, objectivity and their expertise to give evidence on particular issues;
- The expert reports of Mr Terry Short and Dr Richard Lamb have a number of shortcomings. Due to the Planning Assessment Commission's reliance on these reports, its conclusions and recommendations are tainted by legal and procedural errors, including:
- Reliance on perceived environmental impacts concerning equine health impacts and impacts on the commercial viability of the studs which were not based on probative evidence or objective fact;
- Reliance on biased sources as evidence – Mr Short adopting statements in public submissions (including submissions from Darley and Coolmore) which he acknowledged may be biased and driven by self-interest;
- Reliance on incorrect facts – Mr Short's conclusions are inconsistent with the fact that Woodlands Stud is only used by Darley for agistment of its own broodmares, making it unlikely that Darley's clients would visit Woodlands Stud;
- Reliance on the threat by the horse-studs that they will leave the region if the mine is approved without any basis other than a claim they will do so; and
- Inappropriate application of statements from the report of a previous Planning Assessment Commission's review of the Bickham Coal Project.

Furthermore, the Planning Assessment Commission has not given due consideration to the findings of the technical studies undertaken for the Environmental Assessment, Response to Submissions or Preferred Project Report. The Planning Assessment Commission has essentially adopted the opinions of its experts without testing those opinions against the findings of the technical studies.

For these reasons, the consent authority should give little to no weight to the Planning Assessment Commission's conclusions and recommendations.

OBJECTS OF THE ENVIRONMENTAL PLANNING AND ASSESSMENT ACT 1979

The Project will facilitate the development of a valuable coal resource, thereby promoting the social and economic welfare of the community by providing ongoing employment for over 500 persons and stimulating economic activity.

The Benefit Cost Analysis indicates that the Project has a positive net benefit, indicating that its benefits outweigh its costs. The Project is therefore an economic use of the land. The Project is not predicted to result in any unacceptable impacts, indicating that the Project is also an "orderly" use of the land.

The biodiversity offset strategy facilitates the conservation of flora, fauna, populations and ecological communities. Therefore, the Project is consistent with the relevant objects of the Environmental Planning and Assessment Act 1979.

PRINCIPLES OF ECOLOGICALLY SUSTAINABLE DEVELOPMENT

The environmental impact assessments have determined that the Project does not pose a threat of serious or irreversible harm. Therefore, the precautionary principle is not applicable.

The Project will supply thermal coal, which is necessary for the current generation to meet its needs. The impacts on water and land resources have also been minimised so as not to compromise the ability of future generations to meet their needs. The Project is therefore consistent with the principle of intergeneration equity.

The biodiversity offset strategy will conserve 3,653 ha of land which more than compensates for the impacts of the Project. The biodiversity offset strategy furthers the conservation of biological diversity and ecological integrity.

Therefore, the Project is consistent with the relevant principles of ecologically sustainable development.

THE PUBLIC INTEREST

The Project will generate $320 million (present value) in royalties to the New South Wales Government and $170 million (present value) in company tax to the Commonwealth Government. These revenues will be used by governments to fund the provision of public services and infrastructure. These benefits will be enjoyed by the wider public. These benefits are foregone if the Project does not proceed.

The Project will provide ongoing employment for over 500 persons in the region. The capital expenditure will stimulate the regional economy, with flow-on benefits for the state. The continuation of Drayton Mine will also allow Anglo American to continue its support of local programs and initiatives.

The Project has been designed to avoid incompatibility with surrounding land uses. Anglo American has undertaken extensive consultation with Coolmore and Darley (more than 25 meetings). Modifications were made to the Project to address the concerns raised by the horse studs. These modifications have resulted in significantly reduced air quality, noise and visual impacts. These impacts have been managed to a level that allows the developments to co-exist. Therefore, the Project does not prejudice the public interest served by the horse studs.

CONCLUSION

When determining the Project, the Planning Assessment Commission must consider all the positive and negative implications. The environmental assessments have determined that the Project provides significant social and economic benefits, whilst maintaining environmental impacts within acceptable levels.

The Planning Assessment Commission must have regard to the Director-General's Assessment Report and the Planning Assessment Commission's report on its review. The Director-General's Report should be given greater weight because it considers all aspects of the Project. Conversely, the Planning Assessment Commissions' report holds less weight because it only considers one particular aspect of the Project. Furthermore, the validity of the Planning Assessment Commissions' report is undermined by the numerous shortcomings identified. As a result, this report should be given little to no weight.

The Project is consistent with the objects of the Environmental Planning and Assessment Act 1979, including the principles of ecologically sustainable development. Approval of the Project is in the public interest due to economic and social benefits outweighing the environmental and social costs.

If the Project is not allowed to proceed, there would be an opportunity cost to NSW and Australia. The immediate opportunity cost would be the foregoing of royalties to NSW and company tax to Australia. There will also be significant impacts at a regional level as a result of direct job losses (over 500 persons) and negative flow on effects to the local economy.

The Director-General's Assessment Report has not yet been prepared. However, in light of all relevant considerations, the only conclusion that this report can reasonably reach is that the Project should proceed. Further, such a report should compel the Planning Assessment Commission to grant project approval.

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1 INTRODUCTION

1.1 BACKGROUND

Anglo American Metallurgical Coal Pty Ltd (Anglo American) has made Project Application 11_0062 (PA 11_0062) for the Drayton South Coal Project (the Project).

The Project has been subject to the assessment process under Part 3A of the *Environmental Planning and Assessment Act 1979* (EP&A Act). The Minister for Planning and Infrastructure (the Minister) directed the Planning Assessment Commission (PAC) to carry out a "*review"* of the Project and conduct public hearings. The PAC completed its review and provided its report (the PAC Report) to the Minister on 10 December 2013. The Project is currently at the determination stage of the assessment process.

Director General (DG) of Department of Planning and Infrastructure (DP&I) issued a request for advice to the Chairperson of the Mining & Petroleum Gateway Panel (the Panel) regarding the Project. Although the Panel has provided an advice, it should be noted that Part 4AA of the EP&A Act does not apply to the environmental planning process for the Project as the application was prior to the introduction of the gateway process.

1.2 DOCUMENT PURPOSE

This document provides:

- An overview of the assessment process to date and summarises the assessed impacts of the Project;
- An overview of the considerations that the consent authority must and may have regard to when determining the Project;
- A formal response on the Planning Assessment Commission (PAC) *'review'* process and the PAC Report. This incorporates a review of the scope, relevance, appropriateness and propriety of the PAC review and any relevance of the PAC Report to the determination of the Project. A detailed response is provided in **Appendix A**;
- A formal response to the Mining & Petroleum Gateway Panel (Gateway Panel) advice requested by the DG of DP&I. A detailed response is provided in **Appendix B**; and
- A summary of the matters that justify the granting of Project Approval.

A full description of the Project and a detailed assessment of its environmental impacts are provided in the *Drayton South Coal Project Environmental Assessment* (EA) and the *Drayton South Coal Project Preferred Project Report* (PPR). This document does not deal with the public exhibition process, the submissions received, and Anglo American's responses to these submissions. These matters are dealt with in the *Drayton South Coal Project Response to Submissions* (RTS).

1.3 THE PROJECT

Drayton Mine commenced production in 1983 and currently operates under PA 06_0202. Drayton Mine is an open cut mining operation extracting up to 8 million tonnes per annum (Mtpa) of ROM coal. The mine is a significant employer within the local community, employing over 500 full time equivalent personnel.

The Project facilitates the continuation of mining at Drayton Mine for an additional 27 years. The Project will facilitate the development of a known viable coal resource within Exploration Licence (EL) 5460. Mining will be undertaken using open cut and highwall methods. The Project will utilise the existing Drayton Mine infrastructure and plant to extract up to 7 Mtpa of ROM coal, providing ongoing employment for the current workforce at Drayton Mine and all of the existing socio-economic benefits currently afforded to the local region.

1.4 HISTORIC LAND USE

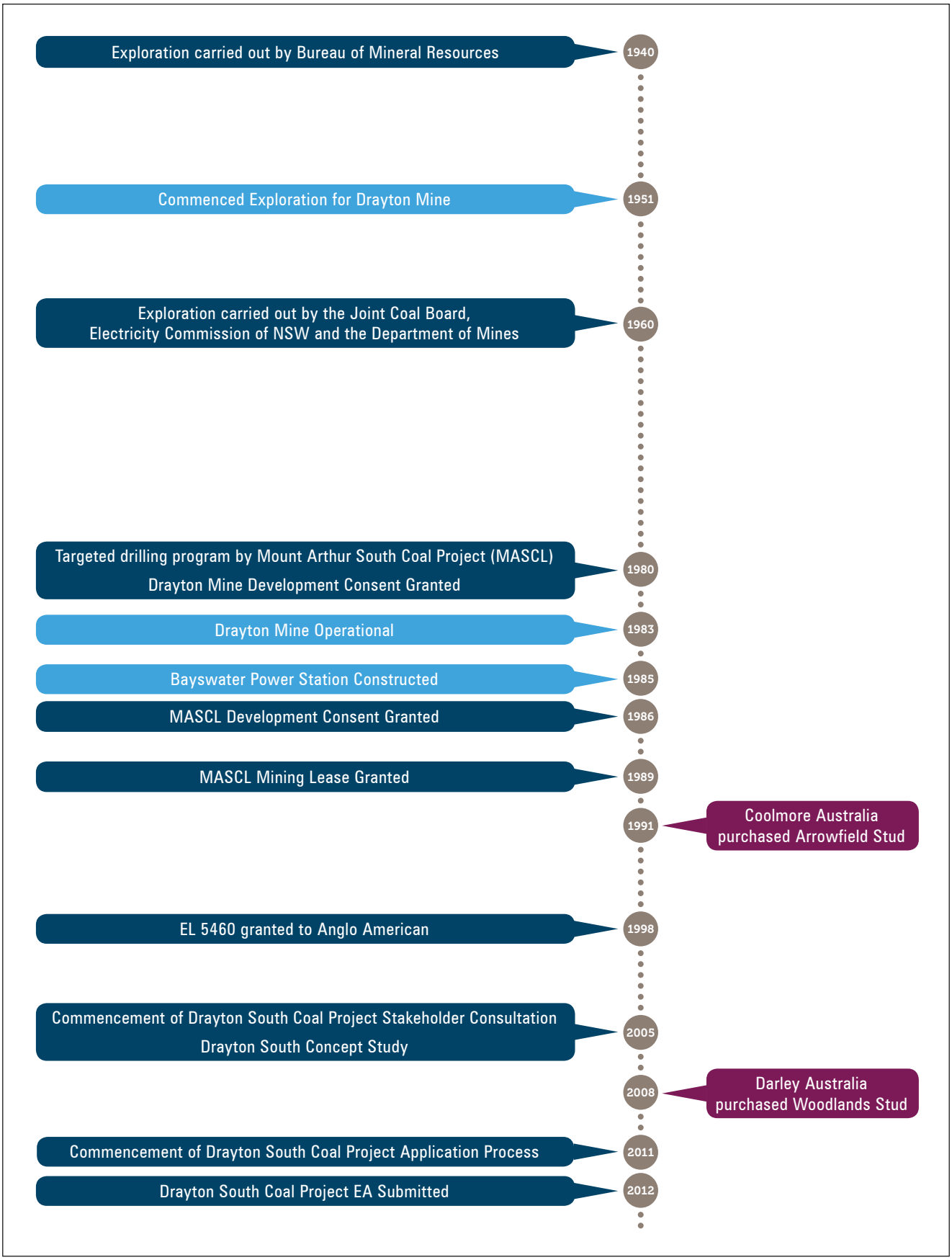
Coal mining and electricity production have long been a dominant land uses in the Hunter Valley and more specifically in the vicinity of the Project. This is depicted in **Figure 1** and described below.

Exploration of the Drayton South area was initially undertaken during the late 1940s and early 1950s by the then Bureau of Mineral Resources. Further exploratory drilling work was undertaken by the Joint Coal Board, the Electricity Commission of NSW and the Department of Mines during the 1960s and 1970s. In the 1970s and 1980s extensive drilling was also undertaken for the Mount Arthur South Coal Project which was approved in 1986 with a valid mining lease granted in 1989. During this time, the Drayton South area land was also purchased by the then Electricity Commission of NSW for the purpose of establishing a mine, along with land for the present Mt Arthur Coal Mine.

Coolmore Australia purchased Arrowfield Stud from the Arrowfield Group in 1991. At the time, the Drayton South area was subject to a development consent and valid mining lease for the Mount Arthur South Coal Project.

Exploration drilling and pre-feasibility studies have been carried out by Anglo American within EL 5460 since 1998 (when it was granted). These have identified an estimated in situ coal resource of 556 Million tonnes.

Darley Australia purchased the Woodlands Stud from the Ingham Brothers in 2008.



DRAYTON SOUTH COAL PROJECT

AngloAmerican

Land Use Timeline

FIGURE 1

2 ASSESSMENT PROCESS

This section summarises the environmental assessment of the Project under Part 3A of the EP&A Act.

Table 1 provides a summary of the assessment process to date.

On 3 August 2011, the DG of DP&I issued the Director-General's Environmental Assessment Requirements (DGRs) for the Project

Hansen Bailey conducted an environmental assessment of the Project in accordance with the DGRs, the provisions of the EP&A Act and relevant government policies and guidelines. The findings of the environmental assessments are summarised in **Section** 4. This process involved extensive consultation with stakeholders, including the Coolmore and Darley horse studs (more than 25 meetings), to ensure that their concerns were addressed in the EA. Significant modifications to the Project were made to address issues raised by these stakeholders (as discussed in **Section 7.2**). The EA was lodged in November 2012.

The EA was publicly exhibited for a period of six weeks between 7 November and 21 December 2012. Following further consultation with stakeholders, including Government agencies and the horse studs, the RTS was provided to the DP&I on 7 May 2013.

Following submission of the RTS, further changes were made to the Project to minimise potential impacts on the horse studs. The PPR proposed:

- A modified visual bund (Option 4A);
- Reduced footprint for the Houston Mining Area;
- Changes to the conceptual final landform; and
- Minimum setback from Saddlers Creek of 40 m.

The environmental assessments undertaken for the EA, RTS and PPR were conducted by appropriately qualified experts. The assessments of key environmental issues were peer reviewed and / or provided to the appropriate Government agencies to confirm the suitability of the assessment methodology and compliance with Government policies and standards.

On 16 March 2013, the Minister requested the PAC to "assess the merits of the Project as a whole". However, the Minister revised the terms of reference on 27 August 2013 to restrict the PAC review to an assessment of the Project's potential impacts on the Coolmore and Woodlands horse studs.

The PAC provided its report to the Minister on 10 December 2013. On 17 December 2013, DP&I requested Anglo American to respond to the PAC Report prior to the preparation of the DG's Assessment Report.

The DG of DP&I issued a request for the Panel to provide an advice on the Project. The Gateway Process does not apply to the Project as the application was made prior to the implementation of the Gateway Process.

Table 1
Assessment Process Summary

Date	Process
March 2011	Project Application submitted (accompanied by a PEA) to DP&I
August 2011	DGRs Issued by DP&I
March 2011 – November 2012	Preparation of EA and associated stakeholder consultation
November 2012	EA submitted to DP&I
November – January 2012	Public Exhibition of EA by DP&I
March 2013	Minister requested PAC review (suspended May 2013)
May 2013	RTS submitted to DP&I
August 2013	PPR submitted to DP&I
August 2013	Revised terms of reference sent to PAC
December 2013	PAC Report submitted to Minister

3 DETERMINATION CONSIDERATIONS

This section identifies the powers, obligations and processes for the Minister to determine the Project under the EP&A Act and the issues relevant to the remaining stages in the determination process.

3.1 POWER TO DETERMINE

The Project constitutes a transitional Part 3A project, and as such, has been subject to the provisions of the repealed Part 3A of the EP&A Act.

Section 75J(1) of the EP&A Act provides the Minister with the power to determine applications under Part 3A of the EP&A Act. The Minister's determination power is activated when the DG submits his or her assessment report.

Pursuant to section 75J(2), the Minister must consider the DG's assessment report, including the reports, advice and recommendations contained in the report. The Minister must also consider any findings or recommendations of the PAC following a review in respect of the Project. For the reasons set out in **Section 5**, Anglo American submits that little or no weight should be given to the PAC Report.

Under section 75J(3), the Minister may also take into account the relevant provisions of any Environmental Planning Instrument (EPI) when determining the Project. Accordingly, the Minister may (but is not required to) consider the provisions of the Mining SEPP.

3.2 EXERCISE OF THE DETERMINATION POWER

The Minister's determination powers and obligations were considered in Bulga Milbrodale Progress Association Inc v Minister for Planning and Infrastructure & Warkworth Mining Limited [2013] NSWLEC 48 (Warkworth case).

Chief Justice Preston held that the Minister must consider a number of "implied relevant matters" in addition to the DG's Report and the PAC Report. These being:

- The Objects of the EP&A Act;
- The principles of ecologically sustainable development;
- The public interest; and
- Community responses to adverse effects on amenity but only where they "*reflect more than an unjustified fear or concern and where based on logically probative evidence*" (Warkworth Case at par 65).

The "public interest" in the context of the EP&A Act refers to the people and state of NSW. The people in the locality of the Project form only a small part of those to whom the public interest test applies.

The Land and Environment Court explained how community responses should be considered in *Telstra Corporation Limited v Hornsby Shire Council* [2006] NSWLEC 133 at 193 and 195 (Telstra Case). Chief Justice Preston stated:

> ".. *in considering community responses, an evaluation must be made of the reasonableness of the claimed perceptions of adverse effect on the amenity of the locality. An evaluation of reasonableness involves the identification of evidence that can be objectively assessed to ascertain whether it supports a factual finding of an adverse effect on the amenity of the locality. A fear or concern without rational or justified foundation is not a matter which, by itself, can be considered as an amenity or social impact*"

In *Deemco Pty Ltd v Campbelltown City Council* [2008] NSWLEC 1469 (Deemco Case), the Court concluded that "*whilst [residents] views should be considered, they can be given little, if any, weight when balanced against the evidence of the experts*".

The decision maker must consider all issues relevant to the Project, including issues raised in the DG's report, the PAC report and the implied relevant matters. It is the decision maker's task to "*determine the weight to be given to each factor … and to balance the factors in favour of and against granting approval*" (Warkworth Case at par 70).

3.3 ENVIRONMENTAL PLANNING INSTRUMENTS

LEPs and SEPPs apply principles of government policy to the State to secure the meeting of the public interest in the determination of planning applications.

The Mining SEPP specifically addresses the 'public interest' through its aims and guidance on matters for consideration in the determination of mining projects.

Clause 12 of the Mining SEPP requires the consent authority to consider the compatibility of the mining project with surrounding land uses. This includes an evaluation of the respective benefits of the mining project and the other land uses. The compatibility of the Project with surrounding land uses, including the Woodlands and Coolmore studs, is discussed in **Section 7.2**.

The Mining SEPP was amended on 4 November 2013 to introduce additional matters for the decision maker to consider. Clause 12AA requires the Minister to consider the significance of the resource. Clause 12AA states:

1) *In determining an application for consent for development for the purposes of mining, the consent authority must consider the significance of the resource that is the subject of the application, having regard to:*

   a) *the economic benefits, both to the State and the region in which the development is proposed to be carried out, of developing the resource, and*

   b) *any advice by the Director-General of the Department of Trade and Investment, Regional Infrastructure and Services as to the relative significance of the resource in comparison with other mineral resources across the State.*

2) *The following matters are (without limitation) taken to be relevant for the purposes of subclause (1) (a):*

   a) *employment generation,*

   b) *expenditure, including capital investment,*

   c) *the payment of royalties to the State.*

3) *The Director-General of the Department of Trade and Investment, Regional Infrastructure and Services is, in providing advice under subclause (1) (b), to have regard to such matters as that Director-General considers relevant, including (without limitation):*

   a) *the size, quality and availability of the resource that is the subject of the application, and*

   b) *the proximity and access of the land to which the application relates to existing or proposed infrastructure, and*

   c) *the relationship of the resource to any existing mine, and*

   d) *whether other industries or projects are dependent on the development of the resource.*

4) *In determining whether to grant consent to the proposed development, the significance of the resource is to be the consent authority's principal consideration under this Part.*

It is understood that DP&I have requested an advice from the Director-General of the Department of Trade and Investment, Regional Infrastructure and Services (DTIRIS) as to the relative significance of the resource.

Pursuant to clause 12AA(4), the consent authority's principal consideration is the significance of the resource. The weight that the consent authority gives to other matters must be assessed proportionately against the importance of the significance of the resource, pursuant to clause cl12AB(5).

Clause 12AB of the Mining SEPP introduces "non-discretionary development standards for mining" relating to cumulative air quality, cumulative noise, airblast overpressure, ground vibration and aquifer interference. If a project complies with these development standards, the decision maker cannot require that the project adhere to more onerous standards. The Project meets all of these standards.

The Minister has an obligation to appropriately exercise the discretion given to him by section 75J(3) as to whether to apply the Mining SEPP. The Minister has the obligation to take into account the 'public interest'.

As a SEPP is the expression of the Government's policy to be applied in determining applications for mining approvals it is not only available to him, but incumbent on him, to apply the Mining SEPP as part of the taking into account of the 'public interest'.

3.4 THE REMAINING PROCESS

Section 75I requires the DG to prepare an Assessment Report and provide it to the Minister invoking the Minister's determination power under section 75J. The Minister has delegated his determination power to the PAC. As the Minister's delegate, the PAC must exercise the determination power consistently with the powers, responsibilities and duties of the Minister.

The requirements of section 75J(2) apply to the determination PAC (as the Minister's delegate). Accordingly, the determination PAC must consider the following when determining the Project:

- The findings and recommendations in the PAC report with respect to interactions with the horse studs; and
- The Director-General's Environmental Assessment Report, which will address all other relevant considerations.

The determination PAC's task is to consider these reports and the "implied relevant matters", and to determine whether the factors in favour of granting project approval outweigh the factors against granting approval.

4 ASSESSED IMPACTS OF THE PROJECT

This section provides a summary of the assessed impacts of the Project.

4.1 AIR QUALITY AND GREENHOUSE GAS

The predicted cumulative annual average PM_{10} levels are within the non-discretionary development standard specified under clause 12AB of *State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007* (Mining SEPP). This clause states that the consent authority cannot require the proponent to comply with a more onerous standard.

The air quality and greenhouse gas impact assessment was undertaken by PAEHolmes using best practice methods to predict air quality impacts on receivers in the vicinity of the Project, in accordance with the requirements of the DGRs, NSW government policy and standards for the assessment of mining development and the NSW Environment Protection Authority.

A review was completed of all potential air quality emission control options outlined in the *NSW Coal Mining Benchmarking Study: International Best Practice Measures to Prevent and/or Minimise Emissions of Particulate Matter from Coal Mining* (Donnelly et. al, 2011). All reasonable, feasible and practicable controls have been adopted for the Project.

Modelling concluded that the offsite air quality impacts can be maintained within the appropriate goals at all privately owned residences including those on Coolmore Stud and Woodlands Stud.

Any Project approval will require an air quality and greenhouse gas management plan approved by the Director General.

4.2 NOISE

The predicted cumulative noise levels are within the non-discretionary development standards specified in clause 12AB of the Mining SEPP.

The acoustics impact assessment was undertaken by Bridges Acoustics using best practice methods to predict noise impacts and to recommend appropriate mitigation and management measures, in accordance with the DGRs for the assessment of the Project, NSW government policy and standards for the assessment of mining development and the requirements of the NSW Environment Protection Authority.

In preparing the acoustics impact assessment, a review was completed of the numerous potential control options. All controls that were deemed reasonable, feasible and practicable have been adopted for the Project.

Modelling determined that cumulative noise levels would be below the amenity criteria at all privately owned residences on Coolmore Stud and Woodlands Stud.

Any Project approval will require a noise management plan approved by the Director General.

4.3 BLASTING

The predicted blasting effects are within the non-discretionary development standards specified in clause 12AB of the Mining SEPP.

The acoustics impact assessment was undertaken by Bridges Acoustics using best practice methods to predict blasting effects and to recommend appropriate mitigation and management measures in accordance with the DGRs for the assessment of the Project, the NSW government policy and standards for the assessment of mining development and the requirements of the NSW Environment Protection Authority.

The assessment concluded that overpressure and vibration levels can be maintained below the appropriate blasting criteria at all private receivers, provided that smaller MICs are used when blasting near Arrowfield. As such, offsite impacts are within the appropriate goals and will not affect any privately owned residence or any thoroughbred horse breeding enterprises at Coolmore Stud and Woodlands Studs.

Any Project approval will require a blasting management plan approved by the Director General.

4.4 EQUINE HEALTH

An equine health impact assessment was undertaken by Dr. Nicholas Kannegieter, Specialist Equine Surgeon, to determine whether the air quality, noise and blasting impacts of the Project will have any adverse impacts on the health of thoroughbred horses.

Air quality, noise and blasting levels predicted to be received by horses are all within the human health criteria.

Dr. Kannegieter conducted an extensive literature review and compared the findings of the literature review to the predicted impacts of the Project (based on the air quality and acoustic assessments). Dr Kannegieter confirmed that the predicted effects on air quality in the region will not impact the health or performance of thoroughbred horses and foals at Coolmore and Woodlands Studs. The major cause of adverse effects due to dust exposure is not the particulate matter itself but rather the endotoxins, bacteria and fungi that are attached to the particulate matter. There are no endotoxins, bacteria or fungi present in the dust generated by the Project.

Dr. Kannegieter concluded that the Project will not have any adverse impacts on equine health or behaviour at Coolmore and Woodlands Studs.

4.5 VISUAL

A visual impact assessment was undertaken by JVP Visual Planning and Design (JVP) to define the character of the surrounding landscape, assess the visual impacts of the Project and to recommend measures to mitigate and manage any impacts. This included an assessment against the gateway criteria contained within the draft Strategic Regional Land Use Plan (draft SRLUP) (March 2012) to determine whether the Project would lead to a significant impact on either the Equine or Viticulture Critical Industry Clusters (CICs).

The visual impact assessment applied the appropriate standards and methodologies and concluded that when proposed visual screening and amelioration are implemented, the Project's visual impacts will be extremely limited. Existing ridgelines shield views of the Project from the operational areas on Woodlands Stud. The Project is visible from Trig Hill at Woodlands Stud, but this is not used as part of Darley's thoroughbred breeding operations.

The Houston visual bund shields views of the Project that would otherwise be visible from the eastern portion of Coolmore Stud. Overburden emplacement areas have been designed to remain out of view. The only impact on Coolmore will be the construction of the bund itself. This impact has been reduced by adopting the smaller visual bund design (Option 4A proposed by Coolmore). This impact will occur over an eight month period and will account for less than 2.5% of the primary view catchment. Rehabilitation will be undertaken during the construction of the bund to ameliorate the visual effect. The cover crop is expected to establish within 1-2 months.

The visual assessment further identifies that the Golden Highway approaches to both studs and from various vantage points on Coolmore Stud currently include views of existing mining and power generation activities.

4.6 ECOLOGY

An ecology impact assessment was undertaken by Cumberland Ecology Pty Ltd (Cumberland Ecology) to characterise the terrestrial and aquatic flora and fauna at Drayton Mine and within the Drayton South area, quantify any impacts and to develop an appropriate biodiversity offset strategy for the Project. This assessment was carried out in accordance with the requirements of the DGRs, NSW government policies and the requirements of the Office of Environment and Heritage.

The Project will result in the disturbance of 1,928 ha of vegetation, including 181 hectares of Box-Gum Woodland, 107 ha of Box-Gum woodland derived native grassland and 208 ha of other native forest and woodland communities.

To compensate for these impacts, Anglo American has developed a biodiversity offset strategy, including onsite rehabilitation and the purchase of an offsite offset property. The biodiversity offset strategy will conserve 3,653 ha of vegetation, ensuring that the Project will not result in any net loss of biodiversity values.

Any Project approval will require a rehabilitation and offset management plan approved by the Director-General.

4.7 ABORIGINAL ARCHAEOLOGICAL AND CULTURAL HERITAGE

An Aboriginal archaeological and cultural heritage impact assessment was undertaken by AECOM Australia in accordance with the appropriate requirements to describe the nature of the archaeological landscape within Drayton South area, assess the potential impacts that the Project may have on Aboriginal archaeological and cultural heritage values, and recommend measures to mitigate and manage these impacts. This assessment was carried out in accordance with the requirements of the DGRs, the NSW government and the Office of Environment and Heritage and National Parks Wildlife Service of NSW.

The Project will impact a total of 175 aboriginal sites. Anglo American will develop an Aboriginal Cultural Heritage Management Plan which will ensure the appropriate management of any impacts on cultural heritage.

4.8 NON-ABORIGINAL HERITAGE

- A non-Aboriginal heritage impact assessment was undertaken by AECOM to identify and determine the impacts on non-Aboriginal heritage items within and adjacent to the Drayton South area and to recommend measures to mitigate and manage these impacts as required.
- The Project will directly impact two items of local historical significance: a fence and a Nissan hut with stockyard. Heritage items located outside the disturbance footprint, including historic homesteads, will not be impacted.

Any Project approval will require a non-Aboriginal heritage management plan which will ensure the appropriate management of potential impacts on non-Aboriginal heritage..

4.9 SURFACE AND GROUNDWATER

A surface and groundwater impact assessment was undertaken by WRM Water and Environment Australasian Groundwater and Environmental Consultants (AGE) respectively in accordance with the appropriate requirements including those of the NSW Office of Water. The groundwater assessment was independently peer reviewed by Dr Noel Merrick (Heritage Computing Pty Ltd) and found to be robust.

These studies characterised the existing catchments and groundwater regimes and assessed the impacts of the Project on all water sources and other water users. A detailed water balance for the entire Drayton Complex has been developed.

Under most climatic conditions, the Project is predicted to operate with a water surplus. That is, the volumes of rainfall runoff and groundwater inflows will be sufficient to satisfy operational water requirements. The Project is only likely to require water from the Hunter River during exceptionally dry conditions. Any water taken from the environment will be taken in accordance with existing water licensing entitlements under the *Water Management Act 2000.* Compliance with these licensing regimes will ensure no discernible impacts to the surrounding surface or groundwater water regimes.

During high and flood flow conditions in the Hunter River, the Project will release water in accordance with the Hunter River Salinity Trading Scheme. Due to the high streamflows, discharges will be substantially diluted, resulting in negligible impacts on water salinity.

No impacts to privately owned bores are predicted.

Any Project approval will require a water management plan approved by the Director General

4.10 SOIL AND LAND CAPABILITY

A soil and land capability impact assessment was undertaken by Environmental Earth Sciences (EES), in accordance with the appropriate NSW government requirements.

The land capability classification within the disturbance boundary is poor, varying from Class IV to Class VII however the four soil types located within the disturbance boundary were all deemed to be suitable for reuse as topdressing material in rehabilitation.

Any Project approval will require a land management plan approved by the Director General.

4.11 AGRICULTURE

An Agricultural Impact Statement was prepared by Scott Barnett and Associates in accordance with the appropriate requirements of the NSW government including the Department Trade Industry Resources Investment and Services.

The predominant agricultural land use at Drayton South is beef cattle grazing. The current agricultural production in the Drayton South area has a gross value of approximately $701,208 and a net value of approximately $432,479. The use of this land for mining will result in the loss of this agricultural production from the land used for Project.

The Agricultural Impact Statement included an assessment of impacts on Biophysical Strategic Agricultural Land (BSAL) and CIC land. This assessment was based on the mapping in the draft SRLUP. The BSAL and CIC mapping has since been revised. Based on the latest mapping, there is no equine or viticulture CIC within the disturbance boundary. The Project will only disturb 3 ha of BSAL during the construction of the discharge pipeline. The topsoil will be reinstated and rehabilitated after the laying of the pipeline. Consequently, the productivity of this BSAL is unlikely to be affected.

Any Project approval will require a land management plan approved by the Director General.

4.12 TRAFFIC AND TRANSPORT

A traffic and transport impact assessment was undertaken by DC Traffic Engineering applying best practice and accepted methodology and requirements in accordance with NSW government and relevant departmental and Council policy to:

- Quantify the additional traffic generated during the construction and operation phases of the Project;
- Assess the impacts of the proposed Edderton Road realignment on traffic;
- Assess the road safety implications of the Project;
- Assess the impacts of the Project on rail traffic; and
- Recommend measures to mitigate and manage the identified impacts.

Since the Project will utilise the existing workforce, there is not anticipated to be a significant increase in traffic associated with the mine.

Mt Arthur Coal Mine is required to upgrade the Thomas Mitchell Drive / Denman Road and Thomas Mitchell Drive / New England Highway intersections. These intersections will be able to accommodate cumulative traffic volumes once upgraded. Anglo American will also contribute funding to the upgrade of Thomas Mitchell Drive, proportionate to Drayton Mine's use of this road. To avoid disruption to motorists, the existing alignment of Edderton Road will remain operational until the realignment is completed. Therefore, the Project is not predicted to have any adverse impacts on the local road network.

The number of rail movements required for the Project will remain consistent with existing operations.

4.13 SOCIAL

A social impact assessment was undertaken by Hansen Bailey. Given that the Project will utilise the existing workforce, the Project is unlikely to place any significant additional demands on local infrastructure or services. Anglo American has offered to enter into a Voluntary Planning Agreement with Muswellbrook to compensate for any potential social impacts and to benefit the community. Anglo American has also supported a number of initiatives, as outlined in **Section 7.1.2**.

Should the Project not be approved, Drayton Mine will close, resulting in the loss of:

- Employment for the residents of Muswellbrook and Singleton (and beyond);
- The benefits proposed in the Anglo American VPA offer; and
- The economic benefits of the existing Drayton Mine and the Project to the region, state and nation.

4.14 ECONOMIC

An economic impact assessment was undertaken by Gillespie Economics applying best practice and accepted methodology and requirements and in accordance with the requirement of the DGRs for the economic impact assessment of the Project and relevant NSW government policies.

A benefit cost analysis (BCA) determined that the Project will have net production benefits of $870 million (present value), including benefits of $490 million (present value) accruing to Australia. The net production benefits to Australia consist of $320 million (present value) in royalties to the NSW government and $170 million (present value) in company tax payable to the Commonwealth government.

Input-output analysis was used to determine the economic impacts of the Project on the state and regional economies. The Project is predicted to provide the following economic stimuli to the regional economy:

- $588 million in annual direct and indirect regional output or business turnover;
- $264 million in annual direct and indirect regional value added;
- $86 million in annual direct and indirect household income; and
- 785 direct and indirect jobs.

In addition, the Project is predicted to provide the following economic stimuli to the NSW economy:

- $930 million in annual direct and indirect regional output or business turnover;
- $443 million in annual direct and indirect regional value added;
- $195 million in annual direct and indirect household income; and
- 2,089 direct and indirect jobs.

The positive value for net production benefit indicates that the Project's benefits outweigh its costs. The Project is therefore justifiable from an economic efficiency perspective.

4.15 FINAL LANDFORM

The conceptual final landform for the Project was presented in the PPR. The design used the Geo-Fluv technology to achieve a natural landscape with rolling hills and ridgelines in line with the surrounding landforms. This reduces the visual impacts on Coolmore Stud. The final void proposed in the PPR is significantly smaller than that presented in the EA, allowing improved drainage to natural catchments. The Houston visual bund will also be designed using Geo-Fluv.

5 PLANNING ASSESSMENT COMMISSION PROCESS

This section discusses the legal, procedural and technical deficiencies that undermine the validity of the PAC's merits review of the Project and the extent the decision-maker should have regard to the PAC report. This section provides a summary of Anglo American's formal response to the PAC report. The full response is provided in ***Appendix A****.*

5.1 MINISTER'S REQUEST

On 16 March 2013, the Minister for Planning and Infrastructure (the Minister) made a request to the Planning Assessment Commission (PAC) to '*review*' the Project and hold '*public meetings*'. This request was made under section 23D of the EP&A Act. On 27 August 2013, the Minister made a revised request containing new terms of reference. The revised terms of reference required the PAC to:

1. Carry out a review of the Drayton South Coal Project, and

a) consider the EA for the project, the issues raised in submissions, the formal response to submissions, the Preferred Project Report, the review of the mine plan by Runge Pincock Minarco, and any other information provided on the project during the course of the review;

b) assess the potential impacts of the project on the operations of the Coolmore and Woodlands horse studs; and

c) recommend any additional measures required to avoid and/or minimise the potential impacts of the project on the horse studs.

2. Conduct public hearings during the review as soon as practicable after the proponent provides its Preferred Project Report.

5.2 PAC REVIEW

Under section 23D of the EP&A Act, the Minister may direct the PAC to review a project or any aspect of a project. The terms of reference issued by the Minister on 27 August 2013 only required the PAC to consider a particular aspect of the Project, namely its potential impacts on the operations of the Coolmore and Woodlands horse studs.

Article 1(a) of the Minister's request requires the PAC to have regard to a number of documents, including the EA, RTS and PPR. However, article 1(b) indicates that these documents should only be considered to the extent that they relate to impacts on Coolmore and Darley. Article 1(c) requested the PAC to recommend additional mitigation measures, but only to mitigate impacts on the horse studs.

The PAC is not able to effectively perform its duties under articles 1(b) and 1(c) of the Minister's request unless it has considered the sources of information listed in article 1(a). The PAC explained that:

> "*The Commission has considered all this information primarily in the context of the impacts on the Coolmore and Woodlands studs and the possible measures to avoid and / or minimise the potential impacts on the horse studs. Other impacts and issues raised in submissions would need to be considered in detail by the assessing and determining authorities prior to any determination of the project*" (p. 9)

This confirms that the PAC intended to limit its assessment to the specific issue of impacts on the Coolmore and Woodlands studs. The PAC has largely focused its assessment on this issue. Although the PAC did not intend to undertake a comprehensive review of the Project as a whole, it did have some regard to issues other than impacts on the Coolmore and Woodlands Studs (as explained in **Section 5.4.3**).

To assist in its assessment, the PAC sought the expert opinion of Mr Terry Short (Mr Short) and Dr Richard Lamb (Dr Lamb). Anglo American requested an opportunity to review and respond to these expert reports. The PAC refused to make these reports available.

5.3 PUBLIC HEARING

Article 2 of the Minister's request required the PAC to "*Conduct public hearings during the review*". The PAC reports that:

> "*In accordance with the Commissions terms of reference, public hearings were held on Thursday 10 October 2013 at the Denman Memorial Hall. A total of 26 verbal submissions were made … all those seeking to be heard were heard.*" (p. 8)

At the public hearing, over a period of approximately six hours, verbal submissions were made by 26 individuals representing Anglo American, Coolmore, Darley, the Hunter Thoroughbred Breeders Association, other equine entities, mine suppliers and other special interest groups. Submitters were allocated between 10 and 20 minutes to address the PAC. A number of written submissions were also made.

Due to the brief nature of the verbal submissions, no probative evidence was provided to support the views of the presenters. Many of the submissions were unsubstantiated personal views motivated by self-interest. Due to time constraints, consultants only provided limited explanations of their views. No interaction, questions or discussion occurred by way of clarification or explanation of any issue.

5.4 VALIDITY OF THE PAC REVIEW

Anglo American has identified a number of legal issues that affect the validity of the PAC review. These issues are explained in detail in Section 2 of **Appendix A**.

5.4.1 Excess of Authority

The PAC's role was to assess the potential impacts on the two horse studs and, if an impact was identified, recommend additional measures to avoid or minimise the impact. The PAC exceeded its role by determining that the Project should not proceed. Such a determination is reserved for the ultimate decision-maker and involves weighing up all the positive, neutral and negative impacts of the whole Project. It was inappropriate for the PAC to make such a determination having considered only one aspect of the Project.

KDC Pty Ltd, a planning and development consultancy, provided the following planning advice (see **Appendix C**):

> *"The PAC Report is merely an analysis of one aspect of the potential impacts of the Project. It is not a comprehensive report investigating a wide range of issues which could be the basis for decision making about whether the Project should be approved, refused or modified in some manner. The PAC Report does not pretend to be a comprehensive investigation and acknowledges in the first paragraph of the Executive Summary that it is focused only on the potential impact of the Project on the Coolmore and Woodlands horse studs. It is therefore inappropriate that the PAC Report draws the conclusion that the Project should not be approved."*

By acting beyond its terms of reference, the PAC has its delegated authority. Therefore, the PAC has acted in excess of the power conferred to it (*ultra vires*), rendering the PAC review and PAC report invalid. Further, by erroneously going beyond its terms of reference, the PAC has taken into account a number of irrelevant considerations, as discussed in **Section 5.4.3**.

5.4.2 Denial of Natural Justice

All administrative decisions are to be made in accordance with the rules of natural justice. The two rules of natural justice are the hearing rule and the bias rule.

The hearing rule requires that where a person's interests may be adversely affected by a decision, the decision maker must give that person an opportunity to present his or her case. As explained in **Section 5.2**, Anglo American was denied the opportunity to review and respond to the experts reports. Given that the PAC's decision had the potential to affect Anglo American's interests, Anglo American should have been given the opportunity to present its case. Therefore, the PAC review process has contravened the hearing rule.

The appearance of bias rule operates to invalidate a decision where the decision-maker has failed to act impartially in the decision-making process. Once it became apparent to the PAC that Mr Short was not an expert in equine health or the equine industry (as discussed in **Section 5.5**), and was simply acting as a partisan advocate for the horse studs rather than as an independent expert, the PAC should have disregarded Mr Short's evidence. Instead by adopting and relying on Mr Short's evidence without questioning its independence and objectivity, the PAC has effectively delegated its role to Mr Short to assess the potential impacts on the horse studs. The findings in the PAC report that rely on Mr Short's evidence have become infected with his bias and should be disregarded.

Anglo American is also concerned about potential conflict of interests arising from Mr Short's involvement in the following matters at the time when he was advising the PAC:

- His role as chair of the Gateway Panel when the Minister requested advice on the potential impacts of the Project on nearby CICs; and
- His role as advisor on the Gateway Application for the Spur Hill Underground Coking Coal Project which is located adjacent to the Project.

5.4.3 Irrelevant Considerations

Anglo American asserts that the PAC has taken into account a number of irrelevant considerations. This has the effect of rendering a decision to be *ultra vires* (beyond the decision maker's authority).

Perceived Impacts

The PAC gives material weight to "perceived impacts", which refers to consequences that people may expect to occur, but which do not actually materialise. The PAC raises the possibility that even though there are no actual impacts on horse health, visitors to the studs may perceive the presence of the mine as being a risk to horse health. The PAC states:

> *"Any perceived impact on the bloodstock could be detrimental from a business perspective. Even in the absence of any risks to the horses, the visible presence of the mine in such close proximity has the potential to tarnish the reputational image that has been so carefully developed on and around the properties"* (p. 15).

In the case of *Bulga Milbrodale Progress Association Inc v Minister for Planning and Infrastructure & Warkworth Mining Limited [2013] NSWLEC 48* (Warkworth case), Chief Justice Preston held that the decision maker must consider *"community responses to adverse affects on amenity, where those responses reflect more than an unjustified fear or concern and where based on logically probative evidence".* The perceived impacts on horse health raised by the PAC are contrary to the available expert evidence. These perceived impacts are therefore contrary to "logically probative evidence" and as such, are irrelevant considerations.

KDC Pty Ltd provides the following planning advice:

> *"The deliberation of the proposed development having a perceived negative impact is subjective and therefore is not pertinent in a complex decision making process which should base its decision upon factual assessment of potential impacts."*

Land Acquisition

The PAC states that *"In this instance option to purchase, acquire or grant acquisition rights to the two highly significant and valuable thoroughbred breeding studs are not considered either appropriate or practical"* (p. 14). However, the Project is not predicted to have any impacts that will give rise to acquisition liabilities. Therefore, the PAC should not have given any consideration to the feasibility of acquiring the Coolmore and Woodlands studs.

Other Irrelevant Considerations

The PAC has considered issues that are not relevant to the potential impacts of the Project on the Coolmore and Woodlands studs. These include:

- Potential impacts on the equine CIC as a whole;
- Potential impacts on the viticulture and tourism industries;
- Air quality impacts at Jerrys Plains; and
- Government policies in other international horse breeding centres.

These extraneous considerations are discussed in Section 2.2.4 of **Appendix A**.

Anglo American also challenges the suitability of Mr Short as an expert in the equine industry. This argument is outlined in **Section 5.5.1**. In the absence of specialised knowledge of the equine industry, Mr Short's opinions on this issue should be considered irrelevant.

5.4.4 Failure to Take into Account Relevant Considerations

The PAC has based some of its conclusions on generalisations about the mining industry, such as:

- "Open cut mining by its nature is an intrusive industry. Impacts from activities associated with coal mining can only be controlled to a certain degree" (p. 14);
- "The Commission expects the mine would make genuine attempts to appropriately manage water on the site, however unintended incidents do sometimes occur at mine sites, whether during day to day activities, or in response to severe weather events" (p. 17); and
- "Nonetheless the mine site is large and has four pits so both direct and diffuse lighting impacts can be experts" (p. 20).

These statements indicate that the PAC has failed to consider the technical studies in the EA, RTS and PPR that have specifically assessed the impacts for the Project. By relying on generalisations rather than predictions specific to the Project, the PAC has failed to sufficiently consider the actual impacts of the Project (which is a relevant consideration).

The PAC also concluded that the Project poses a risk to horses, contrary to the findings in the Equine Health Impact Assessment (EHIA). This suggests that the PAC has not given sufficient consideration to the EHIA.

5.5 EXPERT REPORTS TO THE PAC

5.5.1 La Tierra Report

The PAC engaged Mr Short (Agricultural Scientist at La Tierra) to provide expert advice on the horse studs, the broader equine industry, and the potential impacts of the Project on the horse studs.

Anglo American submits that Mr Short lacks the specialist knowledge required to be considered an expert in the equine industry. Mr Short's qualifications relevant to his role at La Tierra could not be ascertained, as the website provided in his report (www.latierra.com.au) does not exist. However, Mr Short was recently attached to "iMine" and was involved in the preparation of a report for the Caroona Coal Project (August 2013). Mr Short's curriculum vitae for "iMine" indicates that prior to 2009, he worked exclusively in the mining industry. Since 2009, Mr Short has been involved with matters regarding land use conflicts between agriculture and mining. There is no evidence that Mr Short has any experience in the equine industry.

Nevertheless, Anglo American has analysed the merits of Mr Short's report. Mr Short concludes that the Project "*will likely trigger the exit of Coolmore and Woodlands Horse Studs from the cluster. If these studs leave the cluster, this will cause the immediate decline and possible demise of the CIC*" (p. 37). Mr Short bases his conclusion on the following key findings:

- Thoroughbred horse studs and open cut mining are incompatible land uses;
- Particulate matter poses a risk to horse health;
- Perceived impacts on horse health will have a detrimental effect on the business of the horse studs;
- Visual quality of the landscape is fundamental to the success of Darley and Coolmore;
- The Houston visual bund will permanently have a high visual impact on the studs; and
- Approval of the Project will force Darley and Coolmore to leave.

Anglo American has identified serious flaws in the approach used by Mr Short to arrive at these conclusions. Mr Short relies on public submissions as evidence to support his views. Submissions from Coolmore, Darley and other equine organisations are likely to be biased and motivated by self-interest. By adopting these submissions as evidence, Mr Short fails to exercise the independence and objectivity expected of an expert advisor.

The conclusion that horse breeding enterprises and open cut mining are incompatible land uses is based on a submission from Coolmore, which is not an appropriate source. Mr Short also relies on a statement to this effect made by the PAC for the Bickham Coal Project. This statement was specific to the Bickham Coal Project, and was not intended to be applied to mining in general.

Mr Short accepted that visual quality of the landscape is fundamental to the success of the studs. He also accepted that the Houston visual bund will have significant impacts on the visual quality of the landscape. Again, these findings were supported only by submissions made by the horse studs, which are not appropriate sources.

Mr Short references three studies to establish the risk to horse health posed by particulate matter. However, the health conditions addressed in these studies only arise if certain substances are present in the soil. These substances are not present in the soil to be disturbed by the Project. Therefore, the studies cited by Mr Short are not relevant to the Project. It was misleading for Mr Short to reference these studies without confirming that the findings are applicable to the Project.

Mr Short concludes that the Project will force the studs to leave the region. This is based solely on a statement from the Hunter Thoroughbred Breeders Association (HTBA). Any submission from the HTBA is likely to be driven by self interest, and is therefore unreliable. Mr Short also fails to establish that the HTBA has the basis to make claims about the intentions of Coolmore and Darley.

Due to these numerous shortcomings and Mr Short's lack of objectivity and relevant expertise, Anglo American asserts that Mr Short's advice to the PAC should be given little or no weight. The full analysis of Mr Short's report is provided in Section 3 of **Appendix A**.

5.5.2 Richard Lamb and Associates Report

The PAC engaged Dr Richard Lamb (Visual and Landscape Heritage Consultant at Richard Lamb and Associates) to provide independent advice on the "visual and associated amenity impacts" of the Project. The report prepared by Dr Lamb forms Appendix 5 of the PAC report.

Anglo American accepts Dr Lamb as a credible expert in the field of visual impact assessment. However, Dr Lamb has considered "impacts on image" and implications for cultural heritage, which are not "visual or associated amenity impacts". Dr Lamb's findings regarding these issues are therefore beyond the scope of his engagement.

In addition, the "impacts on image" identified by Dr Lamb are perceived impacts. Dr Lamb does not provide any "logically probative evidence" to support these concerns. Accordingly, and little or no weight should be given to his views on this issue.

Dr Lamb found that the direct views of the Project from the mine have been accurately assessed. Dr Lamb concluded that the Project would have significant visual impacts on the horse studs and recommended setback distances. The key conclusion in Dr Lamb's report is that the visual impact created by the Houston visual bund will be greater than the visual impact it mitigates. Dr Lamb's conclusion appears to have been heavily influenced by his concerns regarding the ability to achieve successful rehabilitation of the bund. As a result, Dr Lamb has reached this conclusion based on the assumption that the visual bund will create long-term visual effects.

Anglo American has prepared a Houston Visual Bund Rehabilitation Plan that address Dr Lamb's concerns regarding the prospects of rehabilitation. Once rehabilitation is successfully established, the visual bund will achieve integration with the surrounding landscape. As a result, the visual bund will only result in significant visual impacts during the 8 month construction period. As explained in **Section 5.4.2**, Anglo American was denied the opportunity to review the expert reports commissioned by the PAC. If Anglo American was given the opportunity to respond to Dr Lamb's concerns, as is required by the hearing rule, Dr Lamb's conclusions may have been substantially different. In fact, Dr Lamb commented that *"If the vegetation was successfully established as intended, the appearance of the bund, if considered in isolation of all other effects it would have, would be acceptable"* (p. 11).

Dr Lamb's recommended mitigation measures are based on his conclusions regarding the acceptability of the Houston visual bund. These conclusions may have been materially affected by the PAC's failure to adhere to the rules of natural justice. The setbacks recommended by Dr Lamb will result in the sterilisation of significant coal reserves, without achieving any improvement in visual outcomes. Therefore, Anglo American does not consider these recommended setbacks to be justifiable.

5.6 PAC FINDINGS AND RECOMMENDATIONS

The PAC concluded that "this open cut mine should not proceed at the planned scale in this location" (p. 27). This conclusion is based on two key findings:

- Any impacts on Coolmore and Darley have the potential to cause these studs to leave the region, which would affect the equine CIC as a whole; and
- The Project threatens the significance of the surrounding landscape.

These key findings are heavily reliant on the opinions provided by Mr Short and Dr Lamb. Consequently, the merits of the PAC's conclusions are affected by the shortcomings of the reports by Mr Short and Dr Lamb.

The first key finding is based on the opinions provided by Mr Short. As explained in **Section 5.5.1**, the conclusion that the Project will trigger the departure of the studs is based only on unsubstantiated evidence from the HTBA. Furthermore, Anglo American disputes that Mr Short has any training or experience that entitles him to act as an expert on the equine industry. Therefore, the PAC's first key finding is undermined by the shortcomings in the advice from Mr Short.

Dr Nicholas Kannegieter advises that the following factors would deter the horse studs from relocating (see **Appendix D**):

- Darley and Coolmore have established significant infrastructure on their properties, which would require significant cost to establish on a new location;
- The Hunter Valley has the highest concentration of thoroughbred broodmares in Australia; and
- The sales prices achieved at other potential locations in the southern hemisphere (South Africa and New Zealand), are not as high as the prices achieved in Australia.

The second key finding is based on the opinions provided by Dr Lamb. The PAC has accepted Dr Lamb's suggestion that if subject to "a more thorough and comprehensive assessment" (p. 8), the stud properties may be listed on the State Heritage Register. As explained in **Section 5.5.1**, the consideration of cultural heritage was beyond the scope of Dr Lamb's engagement. As a result, Dr Lamb has commented that the properties are likely to be listed, but did not undertake any substantive assessment of the potential impacts of the Project on the cultural heritage values.

Dr Susan Lampard of AECOM Australia (2014) has considered the potential heritage values of the stud properties. Dr Lampard agrees that the properties are of State significance and are likely to be listed on the State Heritage Register if they were nominated, and that Coolmore cultural landscape is potentially of national significance. However, Dr Lampard also notes that impacts to the Coolmore cultural landscape are considered to be minimised through the construction of the revised Houston visual bund (Option 4A) and that "*the design and construction of the Houston bund to mimic the surrounding undulating landscape, along with a staged revegetation process that includes locally occurring species will reduce the visual impacts to the Strowan homestead and therefore not detract from the surrounding cultural landscape*".

It is also noted that neither Darley nor Coolmore have made an application for heritage listing of the properties.

The PAC states that risks to heritage values derive from *"short term amenity impacts, but the greater and more significant risk is that thoroughbred breeding operations on the sites would be discontinued"* (p. 22). The "short term amenity impacts" appear to be the direct and indirect visual impacts identified by Dr Lamb. As explained in **Section 5.5.1**, Dr Lamb's conclusions on visual impacts have been materially affected by the failure to observe the hearing rule. The risk of breeding operations being discontinued is based on Mr Short's advice, which should be given minimal or no weight.

The PAC also relies on a statement from the Bickham Coal Project PAC to support the claim that *"open-cut coal mining and a viable international-scale thoroughbred horse breeding are incompatible land uses"*. This reasoning was also sourced from Mr Short's report. This statement was intended to apply only to the Bickham Coal Project, and has been used out of context by Mr Short and ultimately the PAC. The Bickham Coal Project PAC specifically states that *"the context is the Bickham Project Proposal itself rather than open-cut coal mines in general"* (PAC, 2010, p. 48). The PAC has erroneously applied the principles of the Bickham Coal Project PAC to the Project.

The PAC recommends that substantial setbacks need to be imposed on the mine plan. Since the recommendations are based on the PAC's key findings, which are affected by the issues in Mr Short's and Dr Lamb's reports, the recommendations cannot be relied on and should be given little to no credence. These setbacks will result in the sterilisation of a valuable coal resource. The cost to Anglo American is highly disproportionate to the minimal perceived benefit to the horse studs. The relative costs and benefits of the recommended setbacks are evaluated in detail in Section 3.2.8 of **Appendix A**.

Further, KDC Pty Ltd advises that it is not appropriate to impose buffers based on perceived impacts (see **Appendix C**). KDC explains:

> *"Rather than specify minimum buffers it would have been more appropriate to examine the potential impacts against accepted criteria and require that the relevant criteria should not be exceeded. This is a far more scientific and quantitative way to establish what (if any) buffers may be required. Selecting arbitrary distances because of some perceived potential impact which is not demonstrated when scientific modelling is undertaken is not an appropriate way to go about assessing a major project like the Drayton South Coal Project".*

The merits of the PAC's conclusions and recommendations are compromised by the errors in the reports of Mr Short and Dr Lamb. Due to the PAC's reliance on these reports, its conclusions and recommendations are tainted by the same errors, including:

- Undue consideration of perceived environmental impacts;
- Reliance on findings that the proponent was not given an opportunity to respond to (i.e. denial of natural justice);
- Reliance on biased sources as evidence;
- Reliance on incorrect facts;
- Inappropriate application of statements by the Bickham Coal Project PAC; and
- Consideration of statements beyond Mr Short and Dr Lamb's areas of expertise.

Furthermore, the PAC has not given due consideration to the findings of the technical studies undertaken for the EA, RTS and PPR. The PAC has essentially adopted the views of its experts without testing these against the findings of these technical studies. For these reasons, the PAC's conclusions and recommendations should be given minimal weight in the determination of the Project under section 75J of the EP&A Act.

Most importantly, it must be noted that the PAC review process was restricted to only one aspect of the Project. **Section** 3 outlines the numerous considerations that a decision maker must take into account when determining a project application. It is improper for the PAC to provide an opinion on whether a project should be approved when it has only been requested to consider one aspect of the Project. Such a conclusion is only available to the PAC when it has been requested to undertake a complete review of a project. The PAC has therefore exceeded the authority delegated to it by the Minister.

6 MINING AND PETROLEUM GATEWAY PANEL

This section considers the Gateway Panel Advice and its environmental planning context and relevance to the determination of the Project.

6.1 CONTEXT

On 13 November 2013, the Director General of Department of Planning and Infrastructure (DP&I) issued a request for advice to the Chairperson of the Mining & Petroleum Gateway Panel (the Panel) regarding the Project. The advice sought is on:

- The significance of the Project's potential impacts on the nearby Critical Industry Clusters (CICs); and
- Whether any additional reasonable and feasible mitigation measures could be implemented to materially reduce the potential impacts of the Project on these CICs.

The Director General requested this advice be provided by 10 December 2013.

6.2 APPLICATION OF GATEWAY PROCESS TO THE PROJECT

Anglo American made PA 11_0062 on 2 March 2011 and the DG issued his DGRs on 3 August 2011. Part 4AA of the Mining SEPP, which implements the Gateway Process, was enacted on 4 October 2013. Since the project application was made prior to the enactment of Part 4AA, the Gateway Process does not apply to the environmental planning process for the Project.

Based on the draft SRLUP mapping at the time of submission of the Preferred Project Report (August, 2013), the Project was predicted to impact six hectares of Equine and Viticulture CIC.

On 28 January 2014 the revised CIC mapping was released and as a result no land proposed to be disturbed by the Project is mapped as either Equine CIC or Viticulture CIC. As the Project disturbance boundary is not part of equine CIC land as defined under the State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007 (Mining SEPP), the specific criteria under the Mining SEPP for equine CICs and the Gateway Panel assessment in that context is not relevant.

6.3 MINISTERS REQUEST

Nevertheless the Minister "*made a request to the Chairperson*" of the Panel on "*The significance of the project's potential impacts on the nearby CICs*" and "*whether any additional reasonable and feasible mitigation measures could be implemented to materially reduce impacts of the project on these CICs*."

Anglo American notes with concern that the Chairperson is Terry Short of consultants La Tierra who also provided an expert report to the PAC on the '*equine industry*' on which the PAC placed material reliance for its conclusions and recommendations. Mr Short has also assisted neighbouring mining competitor over its Gateway Application.

Despite Anglo American's view that this document is now no longer relevant for assessing potential impacts on the horse studs, it has nevertheless provided a detailed response to the Panel report's findings in order to dispel the various perception arguments that have been raised.

6.4 RESPONSE TO FINDINGS

The relevant impacts of the Project identified by the Panel include:

- Coal mining dust impacts on horse health;
- Vibration and overpressure impacts on horse health and behaviour;
- Visual impacts affecting the "idyllic rural landscape" which is said to form an integral part of the stud business model;
- The potential for clients' perceptions of impact due to proximity of the mine and the implications of these perceptions on the studs' businesses; and
- Any threat to the vitality of Coolmore and Woodlands studs is a threat to the sustainability of the Equine CIC in itself.

6.4.1 Dust, Vibration and Blast Overpressure

An Equine Health Impact Assessment (EHIA) was carried out for the Project (Kannegieter, 2012). The EHIA provides numerous comparative studies as to the impacts of dust, noise, vibration and blasting overpressure impacts and concludes that the Project will have no impact on horse health and/or behaviour.

The Panel claims that "*dust, noise, vibration and blasting overpressure impacts on the horse studs are poorly considered*". This statement is not supported by objective evidence or testimony and suggests that the Panel has not considered the significant amount of evidence to the contrary before them. The findings of the EHIA cannot be totally discounted as the Panel has done, with a generalised statement that the impacts of the Project on the adjacent thoroughbred studs have been "*poorly considered*" without citing of any further evidence or detail. The Panel has not provided any objective scientific evidence to support its conclusions contrary to the expert opinions in the EHIA.

The Panel has failed to consider the large body of detailed scientific data and documentation which has been provided in the EHIA which clearly demonstrates that there will be no detrimental impact on equine health or behaviour as a result of dust, changes in lighting, noise or vibration (Kannegieter, 2014).

6.4.2 Loss of Scenic and Landscape Values

The visual bund will result in visual impacts during its construction, which will be a temporary impact over an eight month period. Rehabilitation of the bund will achieve integration with the surrounding landscape, resulting in low visual impact. Based on the land form and planting design for the bund, it will not be discernible from existing hills and vegetation patterns.

The Panel has vastly overstated the impact of the Project on the landscape and its relevance to the studs and exaggerated the threat to the viability of the businesses. The claim that the importance of landscape values to Coolmore and Woodlands Studs "*cannot be overstated*" is rhetorical hyperbole and is not supported by any evidence before the Panel. No single issue should be afforded complete priority, especially when dealing with a subjective topic.

Dr Kannegieter (**Appendix D**) explains that *"the attraction of Coolmore and Darley to breeders is primarily the stallions they stand."* He adds that *"The best stallions, which can demand the highest service fees, are determined purely by the success of their progeny on the racetrack. Owners do not choose a stallion based on the visual impact the stud presents."*

Accordingly, the statement that the minor and temporary visual impact of the Project upon the stud properties will "threaten (their) viability" is not supported by objective fact or evidence. It should also be noted that the purported loss of "idyllic rural landscape" values would not affect Darley's operations. As discussed further in **Appendix A**, the Woodlands Stud is used solely for the agistment of Darley's broodmares. Darley stands its stallions and agists some of its clients' broodmares exclusively at the Kelvinside Stud. As a result, client visits are generally to the Kelvinside Stud rather than the Woodlands Stud. .

Dr Kannegieter notes "*If the studs were to relocate it is most likely to be elsewhere in the Hunter Valley, which would also not negatively affect the CIC.*" Should either Coolmore or Darley choose to relocate, other stud owners are likely to fill the place. Dr Kannegieter also adds that *"if as a worst case scenario, either or both studs chose to leave their current locations it is likely to have only a short term effect on the CIC."*

In consideration of this expert advice and in light of the extensive reasons listed by Dr Nick Kannegieter and Gillespie Economics (**Appendix D** and **Appendix E** respectively) regarding the likelihood that either horse stud would relocate, little or no weight should be given to this consideration in the decision making process.

6.5 CONCLUSION

The principle effects reported by the Panel in its advice relate to and are based upon the same unsound planning considerations, assumptions and conclusions as those relied on by the PAC concerning perceived effects of noise, vibration, blasting, visual amenity and reputation.

The conclusions of the Panel are erroneously based on speculative assumptions including the departure of the Coolmore and Woodlands stud owners, the consequent loss of the existing lands and facilities to the Hunter Valley equine industry and the collapse of the Hunter Valley equine industry. Since these conclusions and assumptions are not supported by probative evidence, they should be given no consideration or minimal weight in the preparation of the DG's Assessment Report.

7 PROJECT JUSTIFICATION

This section explains the reasons why the Project is justifiable, having regard to the considerations that are relevant to the determination of the Project.

7.1 NEED FOR THE PROJECT

7.1.1 Economics Considerations

The Benefit Cost Analysis (BCA) estimated the net benefit of the Project to be $490 million (present value). The net benefits consist of $320 million (present value) in royalties to the NSW government and $170 million (present value) in company tax to the Commonwealth government. The BCA attributes costs to the environmental impacts of the Project, as summarised in **Section 4**. Since the net production benefits amount to a positive value, the economic benefits of the Project outweigh the environmental costs. The Project is therefore justifiable from an economic perspective.

The economic impact assessment predicted that the Project will provide the following economic stimuli to the regional economy per year:

- $588 million in annual direct and indirect regional output or business turnover;
- $264 million in annual direct and indirect regional value added;
- $86 million in annual direct and indirect household income; and
- 785 direct and indirect jobs.

Pursuant to clause 12AA(2) of the Mining SEPP, the employment, investment and royalties generated by the Project are applicable to assessing the significance of the coal resource.

If the Project is not allowed to proceed, there would be an opportunity cost to NSW and Australia. The opportunity cost to the public would be the foregoing of royalties to NSW and company tax to Australia.

The Director-General of DTIRIS is providing an advice on the relative significance of the coal resource. Pursuant to clause 12AA(4) of the Mining SEPP, the significance of the resource is to the consent authority's principal consideration.

7.1.2 Social Considerations

The Project will provide ongoing employment for the existing Drayton Mine workforce, thereby avoiding the retrenchment of over 500 workers that would result from the closure of Drayton Mine. The majority of the workforce (>85%) live in the Singleton, Muswellbrook and Upper Hunter LGAs. The loss of these jobs would result in some residents leaving the region. This would have a profound negative effect on local community groups and services that rely on volunteers such as schools, sporting groups, charities, the State Emergency Service, community fundraisers like Relay for Life and the Westpac Rescue Helicopter. Many local community groups and organisations will not be able to continue providing services at their current levels. The loss of these jobs would result in an increased unemployment rate in the area with the associated social implications.

A significant shift in the unemployment rate in the Muswellbrook LGA has occurred over the last 24 months (i.e. to September 2013) associated with the downturn in the coal mining industry. In September 2011, the unemployment rate for the Muswellbrook LGA was 2.2% which was slightly higher compared to the Singleton LGA, which was 1.1% (Department of Employment, 2013). In contrast, the unemployment rate in September 2013 in the Muswellbrook LGA was 4.5%, and 3% in the Singleton LGA.

Drayton Mine has contributed significantly to local community groups since its commencement in 1983. Since 2009, Drayton Mine has developed partnerships with over 120 diverse community groups. Major funding partnerships include:

- $200,000 to the Upper Hunter Shire Council for redevelopment of Taylor Park in Aberdeen;
- Three year sponsorship partnership with the Aberdeen Highland Games;
- $200,000 to the Muswellbrook Shire Council for a Local Area Command Emergency Services Building;
- $240.000 over 3 years to the Westpac Rescue Helicopter;
- 12 year sponsorship of the Bursting with Energy Expo at the Upper Hunter Regional Show; and
- $50,000 to Muswellbrook Shire Council to jointly fund a Mine Affected Roads Strategy paper.

These contributions will no longer be available to the community, if the Project does not proceed. The potential for other partnerships in the future would also be foregone.

7.2 ENVIRONMENTAL CONSIDERATIONS

The Environmental Assessment determined that the Project will not result in any unacceptable environmental or social impacts. The key findings of the Environmental Assessment include:

- Predicted amenity impacts (air quality, noise, blast effects) are within the non-discretionary development standards specified under clause 12AB of *State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007*;
- The dust, noise and vibration levels generated by the Project will not adversely affect horse health;
- Visual effects on Woodlands Studs are limited to non-sensitive locations that are unlikely to be used by Darley as part of its operations. Visual effects on Coolmore Studs will only occur for a short period (during construction of the visual bund);
- The biodiversity offset strategy developed by Anglo American will compensate for the impacts of the Project, resulting in a long-term improvement in biodiversity values; and
- The Project will not disturb any land identified as critical industry cluster land. The construction of the discharge pipeline will disturb 3 ha of Biophysical Strategic Agricultural Land. Topsoil will be re-instated immediately so productivity of this land is unlikely to be significantly affected.

7.3 COMPATIBILITY OF LAND USES

Clause 12 of the Mining SEPP requires the consent authority to consider the land uses surrounding the mining project and whether the project would be incompatible with those land uses. The land uses in the vicinity of the Project are the Mt Arthur Coal Mine, Hunter Valley Operations Mine, Bayswater Power Station, Woodlands Stud and Coolmore Stud. The Project is undoubtedly compatible with the neighbouring mines and power station. These developments have co-existed since the commencement of Drayton Mine in 1983.

The Project is also able to co-exist with the Coolmore and Woodlands studs. The proposed mitigation and management measures allow any potential impacts of the Project on the horse studs to be below acceptable levels. Neither of the studs is predicted to experience any events that exceed the relevant noise and blasting criteria. The overpressure and vibration criteria are satisfied provided that blasting near Arrowfield Estate (now owned by Coolmore) is undertaken using smaller MICs as proposed. There are no exceedances of any annual average air quality criteria. There are some predicted exceedances of the 24-hour average PM_{10} criterion at Arrowfield Estate. These exceedances occur only during unfavourable climatic conditions, and will be avoided by modifying operations during such conditions. Therefore, the Project is not expected to have any unacceptable or unmanageable amenity impacts on the horse studs or viticulture.

The Project has been designed so that visual impacts on the horse studs are minimised. The Houston Visual Bund will be established to eliminate all potential views of mining activities from Coolmore Stud. The only visual impact on Coolmore will be the construction of the bund itself. Anglo American has adopted the Option 4A visual bund proposed by Coolmore. This bund is the smallest and most distant of five bund designs considered. The bund will produce high visual impacts during the construction phase of eight months which is a relatively short time compared to the effective screening it affords of the mine for the mine life.

Due to topography and vegetation, there are no views of the Project from any operational areas on Woodlands Stud. The Project is visible from the elevated area known as Trig Hill. This location has existing views of Mt Arthur Coal Mine and it is unlikely that Darley will use this location to present their operations to clients. More importantly, client visits to Woodlands Stud are unlikely given that this property is used only for Darley's own broodmares (see explanation in Section 1.3 of **Appendix A**).

As explained in **Section 5.6** and **6.4**, the reputations that Darley and Coolmore have built are primarily derived from the credentials of the stallions. There is no objective evidence that the surrounding landscape is "fundamental" to the success of the studs. It is expected that these studs will remain successful if they continue to stand highly sought after stallions even if there is an adjacent coal mine behind the ridgeline to the north of their properties. Anglo American therefore asserts that the limited visual impacts of the Project are unlikely to result in any material economic impact to the studs.

The EHIA has definitively established that dust, noise and vibration levels generated by the Project will not have any detrimental impacts on horse health. The PAC has raised the concern that visitors to the studs may perceive that there is an impact on health. Besides the fact that perceived impacts are irrelevant considerations in a planning context (see **Section 5.4.3**), Darley and Coolmore can allay such concerns with the substantial body of research that supports the absence of health impacts. This is undoubtedly a more practical and feasible solution than the refusal of the Project based on perception.

In the absence of unacceptable impacts on horse health and human amenity, Anglo American asserts that the Project is not incompatible with the continued operation of the Coolmore and Woodlands studs.

Clause 12(b) of the Mining SEPP requires the consent authority to consider the respective public benefits of the development and its surrounding land uses. **Table 2** provides a comparison of the economic contributions of the Project compared to the contributions of the horse studs. This comparison is discussed in greater detail in **Appendix E**.

Clearly, the Project provides greater economic benefits in every respect. Anglo American maintains that the Project can operate without causing economic loss to Darley and Coolmore. The departure of the horse studs, as suggested by the PAC, is a very improbable worst case scenario. However, even if the horse studs did decide to relocate for their own business reasons, the approval of the Project and the consequent benefit is the economically preferable outcome for the public interest.

Table 2
Relative Economic Benefits of the Project and the horse studs

Economic Indicator	Coolmore and Darley	Project[3]
Annual revenue	$100M ($124M)[1]	$417M
Annual royalties	$0M2	$33M
Annual company tax	$0M2	$29M
Annual direct employment	229 (280) [1]	463
Annual direct and indirect employment	591[1]	785
Direct value added	$79M[1]	$210M
Direct and indirect value added	$122M[1]	$264M

[1] Based on Marsden Jacobs Associates (2013) Economic Impact of the Proposed Drayton South Open-cut Coal Mine Development on the Hunter Valley Thoroughbred Industry, report prepared for Coolmore Australia and Darley Australia
[2] Based on 2010 and 2011 financial statements.
[3] Based on Gillespie Economics (2012) Drayton South Coal Project Economic Impact Assessment.
Note: the brackets indicate conflicting information.

The BCA did not consider the costs associated with the departure of Darley and Coolmore because this was considered a highly improbable outcome. Even if it is assumed that the studs will relocate overseas, there will be no measurable loss to Australia. This is because Darley and Coolmore are foreign owned, are not required to pay royalties, and do not pay company tax (according to 2010 and 2011 financial statements). Again, Anglo American considers the departure of the horse studs to be extremely unlikely, based on advice from Dr Kannegieter (**Appendix D**) and Gillespie Economics (**Appendix E**).

Clause 13(c) of the Mining SEPP requires the consent authority to consider the measures proposed by the proponent to avoid land use incompatibility. Extensive consultation was undertaken with Coolmore and Darley during the preparation of the EA. In response to the concerns raised by Coolmore and Darley, Anglo American has made a number of modifications to the Project to avoid unacceptable impacts on the horse studs:

- Adopting the Option 4A visual bund designed by Coolmore to reduce visual impacts during construction of the bund;
- Adopting the double benching construction method for the visual bund to reduce noise impacts;
- Reduced intensity of operations in the Redbank mining area to reduce air quality impacts;
- Design of the final landform using leading practice Geo-Fluv technologies to achieve optimal topography and rehabilitation; and
- Committing to leading practice dust and noise controls.

As a result of these modifications, Anglo American has foregone a total of $6 Billion to ensure that the Project co-exists with the two adjacent horse studs. Nevertheless, Henry Plumptre made comment to Seamus French and Graham Bradley on the 31 January 2013, stating "*no matter what you (Anglo American) do, we (Darley) would still oppose the project*." In consideration of these modifications and the statement above, Anglo American believes that adequate concessions have been made to the mine plan in consideration of two stakeholders who are not predicted to experience environmental impacts outside relevant criteria.

7.4 PUBLIC INTEREST

As observed in the Warkworth Case, the decision maker must consider the public interest when determining a project under section 75J of the EP&A Act. In the context of the EP&A Act, the "public" refers to the people of NSW.

The economic impact analysis predicted that the Project would provide the following economic stimuli to the state economy:

- $930 million in annual direct and indirect regional output or business turnover;
- $443 million in annual direct and indirect regional value added;
- $195 million in annual direct and indirect household income; and
- 2,089 direct and indirect jobs.

As noted above, the BCA estimated the net benefit of the Project to NSW to be approximately $320 million in royalties. Revenue generated through mining royalties is used by the state government to provide infrastructure and services to the people of NSW. Therefore, the Project provides benefits to a wide segment of society.

In contrast, the public interest served by the horse studs is more limited. Mr Short's report identifies "landscapes of conspicuous consumption" as one of the important landscape values for the studs. Mr Short explains:

> *"Landscapes of conspicuous consumption project an image of status, of wealth, to attract similarly wealthy customers. Thoroughbred breeding studs like Coolmore and Woodlands are landscaped to attract investment. These studs are customer focused and this makes them different from most other agricultural land uses. As McManus (2013) explains, even the electronic gates are a symbol that most people are excluded and those who are invited inside are special, part of the "experience economy"* (p. 35).

The pursuance of this landscape value indicates that the horse studs seek to appeal to a specific demographic. Since Darley and Coolmore only aim to serve a small subset of the population, the public interest advanced by the studs is limited. In contrast, the infrastructure and services that are funded by mining royalties benefit people of all demographics.

The positive value for net benefits to NSW, as determined by the BCA, indicates that the Project is in the public interest. Anglo American submits that the public interest is best served by the concurrent operation of the Project and the horse studs. However, if the land use incompatibility concluded by the PAC is assumed, the Project serves the greater public interest because it benefits society as a whole rather than only a limited subset.

7.5 THE OBJECTS OF THE EP&A ACT

The judgement in the Warkworth Case makes it clear that that the consent authority must consider the objects of the EP&A Act when determining a project under section 75J of the EP&A Act. It has been shown that the Project is consistent with the relevant objects of the EP&A Act.

> *"To encourage the proper management, development and conservation of natural and artificial resources, including agricultural land, natural areas, forests, minerals, water, cities, towns and villages for the purpose of promoting the social and economic welfare of the community and a better environment"*

The Project will facilitate the ongoing development of the Wittingham Coal Measures. The development of this resource will promote the social and economics welfare of the community by providing ongoing employment for over 500 persons and stimulating economic activity in the region (with flow-on benefits to the state).

Anglo American has committed to comprehensive mitigation measures to minimise the impacts of the Project. This ensures that the development of the resource is "proper".

> *"To encourage the promotion and co-ordination of the orderly and economic use and development of the land"*

The BCA determined that the Project has a positive net benefit value. This indicates that the Project is an economically efficient use of the land (i.e. the benefits outweigh the costs). The management and mitigation measures committed to by Anglo American will ensure that the land is developed in an 'orderly' fashion without impediment to adjoining and nearby land uses.

As explained in **Section 2**, the Project has been modified to avoid incompatibility with surrounding land uses. Therefore, the Project will not prejudice the orderly and economic development of the surrounding land.

The Project has not been shown during the assessment process to be in conflict with the other objects of the EP& A Act.

> *"To encourage the provision of land for public purposes"*

Anglo American has established a biodiversity offset strategy to compensate for the impacts of the Project on biodiversity values. The 2,079 ha offsite offset property will be dedicated for conservation purposes.

> *"To encourage the provision of and co-ordination of community services and infrastructure"*

The Project will generate an estimated $320 million (present value) in royalties, which will be used by the NSW government to provide infrastructure and services. Anglo American will also offer to enter a voluntary planning agreement with Muswellbrook Shire Council (MSC). This contribution will allow MSC to provide infrastructure and services.

> *"To encourage the protection of the environment, including the protection and conservation of native animals and plants, including threatened species, populations and ecological communities and their habitats"*

To compensate for the impacts of the Project on biodiversity, Anglo American will dedicate 3,653 ha of land for conservation purposes. The biodiversity offset strategy consists of onsite rehabilitation (1,574 ha) and an offsite offset property (2,079 ha). This land will be conserved in perpetuity, result in a long term improvement in biodiversity values.

> *"To provide increased opportunity for public involvement and participation in environmental planning and assessment"*

Anglo American established working groups with the horse studs and distributed a number of newsletters that invited members of the public to provide feedback on the Project. Face-to-face meetings were held with persons that requested a briefing. The public was also given the opportunity to offer feedback during the exhibition of the EA.

During the operation of the Project, the working groups with the horse studs are proposed to be maintained and the public will continue to be informed and given the opportunity to participate through the Drayton Mine Community Consultation Committee.

7.6 PRINCIPLES OF ECOLOGICALLY SUSTAINABLE DEVELOPMENT

The promotion of ecologically sustainable development (ESD) is one of the objects of the EP&A Act. The four principles of ecologically sustainable development are:

- The Precautionary Principle;
- Intergenerational Equity;
- Conservation of Biological Diversity and Ecological Integrity; and
- Improved valuation, pricing and incentive mechanisms.

The first three principles are relevant to the proponent.

7.6.1 The Precautionary Principle

Both the Panel and the PAC (and its experts) have relied on the precautionary principle. The precautionary principle is only triggered when there is a threat of serious or irreversible harm. The Panel and PAC have not established this prerequisite for the application of the precautionary principle. Conversely, the environmental impact assessments for the Project have determined that the Project does not create a risk of serious or irreversible harm. Therefore, the precautionary principle is not applicable to the Project.

7.6.2 Intergenerational Equity

The Project will supply thermal coal for 27 years, which is required to meet the needs of the current generation. The water management system ensures that impacts on the Hunter River are minimized. The land will be rehabilitated following the completion of mining. These measures ensure that water and land resources will still be available for future generations to satisfy their needs. Therefore, the Project is consistent with the principle of intergenerational equity.

7.6.3 Conservation of Biological Diversity and Ecological Integrity

Anglo American has developed a biodiversity offset strategy. The biodiversity offset strategy consists of onsite rehabilitation (1,574 ha) and an offsite offset property (2,079 ha). This land will be conserved in perpetuity. Therefore, the Project will assist in the conservation of biological diversity and ecological integrity.

7.7 IMPLICATIONS OF THE PAC RECOMMENDATIONS

The PAC recommended mining setbacks with the intention of protecting the horse studs. As discussed in **Appendix E,** the removal of the Houston mining area and a portion of the Whynot mining area will result in the sterilisation of approximately 30 Mt of coal. This would reduce royalties to NSW by approximately $18 million (present value) and company tax to Australia by approximately $55 million (present value). The setbacks proposed would also materially affect the viability of the Project and put at risk the significant benefits that it would provide to the public. The purpose of the setback is to protect the commercial interests of Darley and Coolmore, even though the PAC was not presented with any probative evidence demonstrating that there would be any commercial impact to either stud. In addition, given that these studs do not pay royalties or company tax, there is no ensuing benefit to the public. Therefore, the setbacks recommended by the PAC are contrary to the public interest.

8 CONCLUSION

The determination PAC, as the Minister's delegate, will determine the Project in accordance with section 75J of the EP&A Act. Accordingly, the PAC will be bound to consider:

- The findings of the PAC following a review of the Project; and
- The Director General's Assessment Report.

The determination PAC must also consider the 'objects' of the EP&A Act (including the principles of ESD) and the 'public interest'. None of these considerations were taken into account by the review PAC.

The PAC exceeded its delegated authority for a review of the Project by determining that the Project should not proceed. This is not a valid conclusion given that the PAC only considered one aspect of the Project.

In addition, the validity of the PAC report is undermined by the following legal and procedural errors:

- Anglo American was denied the opportunity to review and respond to the reports of Mr Short and Dr Lamb, which amounts to a denial of natural justice;
- The PAC did not act as an impartial decision maker. The PAC adopted the findings of Mr Short's report despite an apparent lack of objectivity on the part of Mr Short;
- Consideration of perceived impacts (including the "impacts on image" raised by Dr Lamb), which should be given little to no weight when contradicted by scientific evidence;
- Reliance on the evidence of Mr Short, who does not appear to have the requisite expert knowledge;
- Reliance on public submissions that are biased and driven by self-interest;
- Consideration of issues that are beyond its terms of reference; and
- Insufficient consideration of the technical assessments in the EA, RTS and PPR.

The Director-General of DP&I must prepare an Assessment Report in accordance with section 75I of the EP&A Act. The Director-General's Assessment Report should redress the errors in the PAC report.

The Director-General's Assessment Report should be given greater weight because it considers all aspects of the Project. Conversely, the PAC report holds less weight because it only considers one particular aspect of the Project. Given that the validity of the PAC report is undermined by several legal and procedural errors, this report should be given little to no weight.

The determination PAC is also required to have regard to the "implied relevant matters" outlined in the Warkworth Case, namely:

- The Public Interest;
- Objects of the EP&A Act; and
- Principles of ESD.

This report considers these matters and definitively concludes that the Project is in the public interest and consistent with the objects of the EP&A Act (including the principles of ESD).

Having regard to all relevant considerations, the only conclusion that the Director-General's Assessment Report can reasonably reach is that the Project should proceed. Further, such a report should compel the determination PAC to grant project approval.

9 ABBREVIATIONS

Abbreviation	Description
AGE	Australasian Groundwater and Environmental Consultants
Anglo American	Anglo American Metallurgical Coal Pty Ltd
BCA	benefit cost analysis
BSAL	Biophysical Strategic Agricultural Land
CIC	Critical Industry Clusters
Cumberland Ecology	Cumberland Ecology Pty Ltd
Deemco Case	*Deemco Pty Ltd v Campbelltown City Council* [2008] NSWLEC 1469
DG	Director General
DGRs	Director-General's Environmental Assessment Requirements
DP&I	Department of Planning and Infrastructure
Dr Lamb	Dr Richard Lamb
draft SRLUP	Draft Strategic Regional Land Use Plan
EA	Drayton South Coal Project Environmental Assessment
EES	Environmental Earth Sciences
EHIA	Equine Health Impact Assessment
EL	Exploration Licence
EP&A Act	*Environmental Planning and Assessment Act 1979*
EPI	Environmental Planning Instrument
ESD	ecologically sustainable development
Gateway Panel	Mining & Petroleum Gateway Panel
ha	Hectare
Hansen Bailey	Hansen Bailey Environmental Consultants
HTBA	Hunter Thoroughbred Breeders Association
JVP	JVP Visual Planning and Design
LEPs	Local Environment Plans
LGA	Local Government Area
Mining SEPP	*State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007*
Mr Short	Mr Terry Short
Mtpa	million tonnes per annum
Option 4A	A modified visual bund
PA 11_0062	Project Application 11_0062
PAC	Planning Assessment Commission
PEA	Preliminary Environmental Assessment
PPR	Drayton South Coal Project Preferred Project Report

ROM	Run of Mine
RTS	Drayton South Coal Project Response to Submissions
SEPP	State Environment Planning Policy
Telstra Case	*Telstra Corporation Limited v Hornsby Shire Council* [2006] NSWLEC 133 at 193 and 195
The Minister	Minister for Planning and Infrastructure
The PAC Report	The report produced by PAC in response to it's review.
The Panel	Mining & Petroleum Gateway Panel
The Project	Drayton South Coal Project
VPA	Voluntary Planning Agreement
Warkworth case	*Bulga Milbrodale Progress Association Inc v Minister for Planning and Infrastructure & Warkworth Mining Limited* [2013] NSWLEC 48

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Planning Assessment Commission (2010) The Bickham Coal Project Report

Appendix A

Response to Planning Assessment Commission Report

AngloAmerican

Real Mining. Real People. Real Difference.

Drayton South Coal Project

Response to Planning Assessment Commission Report

February 2014

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1 INTRODUCTION

1.1 BACKGROUND

Anglo American Metallurgical Coal Pty Ltd (Anglo American) has submitted project application 11_0062 for the Drayton South Coal Project (the Project). The Project has been subject to the assessment process under Part 3A of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

On 16 March 2013, the Minister for Planning and Infrastructure (the Minister) made a request to the Planning Assessment Commission (PAC) to '*review*' the Project and hold '*public meetings*'. This request was made under section 23D of the EP&A Act. On 27 August 2013, the Minister made a revised request containing new terms of reference. The revised terms of reference required the PAC to:

1. *Carry out a review of the Drayton South Coal Project, and*
    a) *consider the EA for the project, the issues raised in submissions, the formal response to submissions, the Preferred Project Report, the review of the mine plan by Runge Pincock Minarco, and any other information provided on the project during the course of the review;*
    b) *assess the potential impacts of the project on the operations of the Coolmore and Woodlands horse studs; and*
    c) *recommend any additional measures required to avoid and/or minimise the potential impacts of the project on the horse studs.*
2. *Conduct public hearings during the review as soon as practicable after the proponent provides its Preferred Project Report.*

Pursuant to Article 1(b) and (c) of the Minister's revised request, the PAC was only required to assess the Project's potential impacts on the Coolmore and Woodlands horse studs and recommend any additional measures to avoid and / or minimise the potential impacts of the Project on the horse studs.

The PAC review for the Project did not require a review of all aspects of the Project.

The required public hearing was held at Denman on 10 October 2013. The PAC provided its report (the PAC report) to the Minister on 10 December 2013. The PAC report concluded that the Project, as currently proposed, should not be approved. The PAC recommended that significant reductions in the extent of mining will be necessary before the Project can be considered suitable for approval.

The Department of Planning and Infrastructure (DP&I) requested Anglo American to respond to the PAC Report prior to the preparation of the Director General's (DG's) Assessment Report, as required under section 75I of the EP&A Act. This document provides a comprehensive analysis of both the validity and merits of the PAC report (including appendices).

1.2 PROJECT DESCRIPTION

Drayton Mine commenced production in 1983 and currently operates under PA 06_0202. Drayton Mine is an open cut mining operation extracting up to 8 Mtpa of ROM coal. The mine is a significant employer within the local community, currently employing over 500 full time equivalent personnel. PA 06_0202 is due to expire in 2017.

The Project facilitates the continuation of mining at Drayton Mine for an additional 27 years. To enable mining to continue after the exhaustion of the coal resource at Drayton Mine, the Project will develop the coal resource within Exploration Licence 5460. The Project is an open cut mining operation, extracting up to 7 Mtpa of ROM coal. The Project will utilise the existing infrastructure at Drayton Mine and will provide ongoing employment for the existing workforce.

1.3 BACKGROUND OF COOLMORE AND DARLEY

1.3.1 Coolmore Australia

Coolmore is a multi-national thoroughbred breeding operation with headquarters in Tipperary, Ireland and supported by operations in Kentucky and the Hunter Valley. Coolmore Stud in the Hunter Valley is Coolmore's only operation in Australia. Coolmore acquired this property from the Arrowfield Group in 1991.

Coolmore is a thoroughbred breeding operation with revenue generated primarily through standing fees for its stallions. The Coolmore website identifies the property as the best in Australia with three main reasons for success being stallions; Danehill, Encosta de Lago and Fastnet Rock. Many of the premium Coolmore stallions are shuttled between Australia and Ireland to enable full year breeding across both hemispheres. Coolmore also generates revenue through agistment of clients' broodmares and rearing of foals. Coolmore generally does not breed its own horses for racing. Coolmore does not normally stand stallions other than its own.

1.3.2 Darley Australia

Darley is a multi-national thoroughbred breeding operation standing stallions in six countries. The Darley business model is quite different to Coolmore with a focus on breeding and raising thoroughbreds for the Darley racing operation. Darley Australia operates studs in both NSW and Victoria. In NSW, Darley operates the Kelvinside Stud at Aberdeen, Woodlands Stud at Jerrys Plains and Twin Hills Stud at Cootamundra. Within the Hunter Valley, Darley purchased the Kelvinside Stud from Hilton Cope in 2003 and the Woodlands Stud from the Ingham Brothers in 2008.

Darley's business model incorporates a number of revenue streams including:

- Standing fees for its stallions;
- Fees for agistment of clients broodmares;
- Sales of horses produced by its own bloodstock; and
- Prize money earned through racing.

Darley offers the services of its stallions to its clients exclusively at the Kelvinside Stud. Many stallions are shuttled between the northern and southern hemisphere operations to enable breeding operations throughout the year. Darley also agists clients' broodmares at Kelvinside Stud.

The Woodlands Stud is used exclusively for the agistment of Darley's own broodmares. The offspring of Darley's internal breeding operations are either offered for sale at local and international sales or retained for participation in Darley's racing operations.

1.4 HISTORIC LAND USE

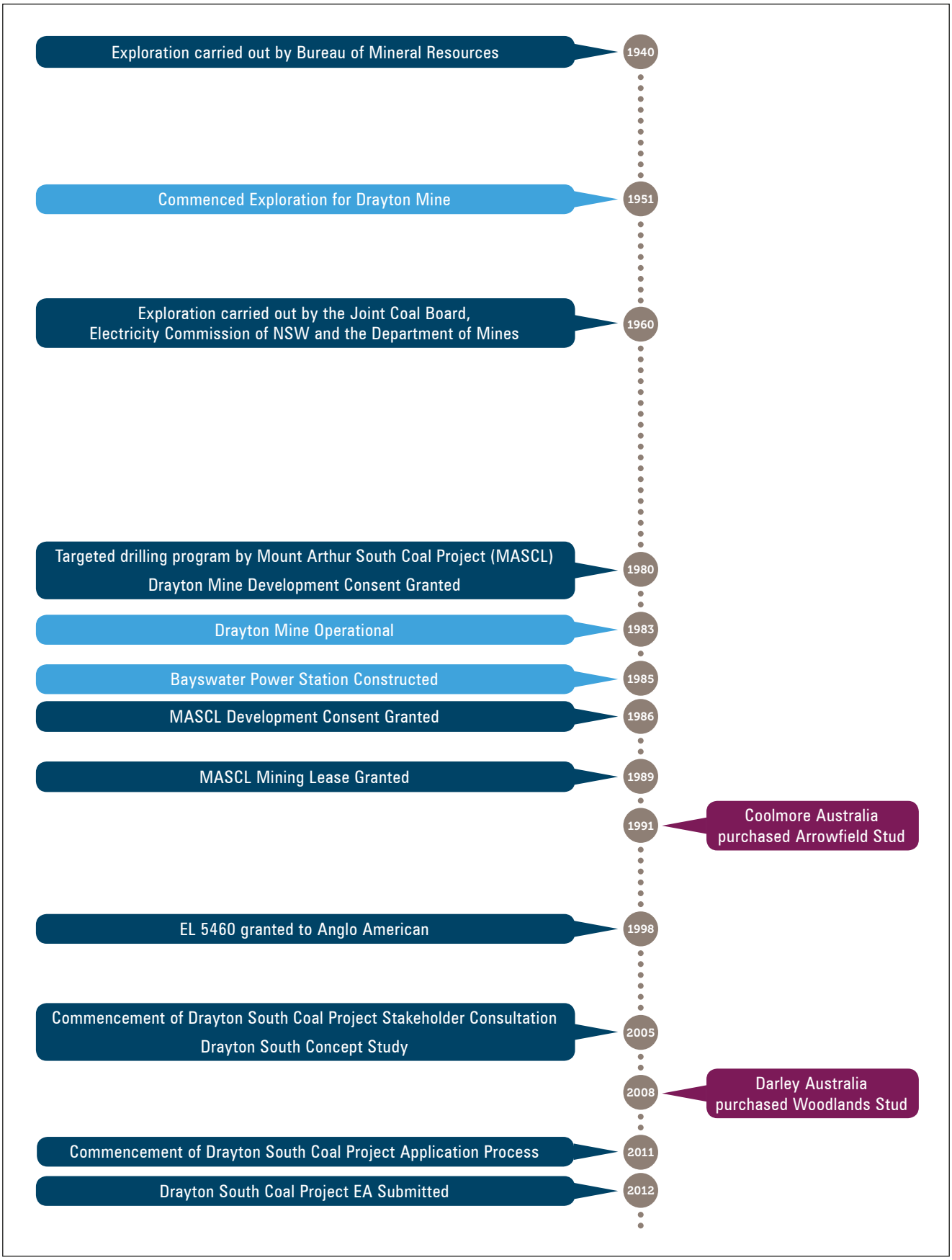
Coal mining and electricity production have long been a dominant land uses in the Hunter Valley and more specifically in the vicinity of the Project. This is depicted in **Figure 1** and described below.

Exploration of the Drayton South area was initially undertaken during the late 1940s and early 1950s by the then Bureau of Mineral Resources. Further exploratory drilling work was undertaken by the Joint Coal Board, the Electricity Commission of NSW and the Department of Mines during the 1960s and 1970s. In the 1970s and 1980s extensive drilling was also undertaken for the Mount Arthur South Coal Project which was approved in 1986 with a valid mining lease granted in 1989. During this time, the Drayton South area land was also purchased by the then Electricity Commission of NSW for the purpose of establishing a mine, along with land for the present Mt Arthur Coal Mine.

Coolmore Australia purchased Arrowfield Stud from the Arrowfield Group in 1991. At the time, the Drayton South area was subject to a development consent and valid mining lease for the Mount Arthur South Coal Project.

Exploration drilling and pre-feasibility studies have been carried out by Anglo American within EL 5460 since 1998 (when it was granted). These have identified an estimated in situ coal resource of 556 Million tonnes.

Darley Australia purchased the Woodlands Stud from the Ingham Brothers in 2008.



DRAYTON SOUTH COAL PROJECT

AngloAmerican

Land Use Timeline

FIGURE 1

2 VALIDITY OF PAC REPORT

This section discusses the validity of the PAC's merits review of the Project and the extent to which the decision-maker should have regard to the PAC report.

2.1 EXCESS OF AUTHORITY

Anglo American submits that the PAC has acted in excess of its authority (*ultra vires*). The PAC's duty was to assess the potential impacts on the two horse studs and, if an impact was identified, to recommend additional measures to mitigate the impact. The PAC review and PAC report went beyond the Minister's terms of reference and its delegated authority. Since the PAC was only required to assess one aspect of the Project, the PAC lacked the authority to provide a conclusion as to whether or not the Project should be approved. In breach of its remit, the PAC wrongfully recommended that the project application should be disallowed. Such a determination is reserved for the ultimate decision-maker and involves weighing up all the positive, neutral and negative impacts of the Project. By recommending that the Project should be refused, the PAC has acted beyond the scope of its remit and improperly truncated the approval process by usurping the role of the ultimate decision maker.

For the above reasons, the PAC has acted in excess of the power conferred to it, rendering the PAC review and PAC report invalid. By acting beyond its terms of reference, the PAC has taken into account a number of irrelevant considerations, as discussed in **Section 2.3**.

2.2 DENIAL OF NATURAL JUSTICE

Anglo American considers the conduct of the PAC review to be contrary to the rules of natural justice (also referred to as procedural fairness). The rules of natural justice consist of two principles:

1. The hearing rule; and
2. The bias rule.

Anglo American considers the PAC review for the Project to be in contravention of both principles.

2.2.1 The Hearing Rule

The hearing rule provides that where a person's interests may be adversely affected by a decision, the decision maker must give that person an opportunity to present his or her case.

During the PAC review process, Anglo American requested that the PAC provide access to the expert reports that it would rely on in its review of the Project. The purpose of the request was to afford Anglo American the opportunity to respond to statements in these reports (if necessary). The PAC refused access to the reports prepared by Terry Short (of La Tierra), Dr Richard Lamb (of Richard Lamb and Associates) and Richard Jennings and John Janetzki (of R A Jennings and Associates).

The PAC's decision had the potential to adversely affect Anglo American's interests. The PAC's refusal to make the expert reports available for comment has denied Anglo American the opportunity to present its case, which constitutes a violation of the hearing rule.

2.2.2 The Bias Rule

The bias rule requires that a decision maker must not be self-interested or prejudiced. The appearance of bias invalidates a decision where the decision maker has not acted impartially in the decision making process.

The PAC relied materially on the purported expert advice of Mr Terry Short (Mr Short) in reaching its conclusions. As explained in **Sections 3.1.2** and **3.1.3**, Mr Short has based his findings on submissions from Darley, Coolmore and the Hunter Thoroughbred Breeders Association (HTBA). Mr Short relies on these submissions as evidence despite acknowledging the "*real or perceived conflicts of interest that submitters may have"* (p. 4). By adopting the views of the horse studs, Mr Short has performed the role of advocate for the horse studs. Hence, he has failed to exercise the impartiality required of an expert advisor.

The PAC has relied on Mr Short's report without questioning his independence and objectivity. The PAC ought to have recognised that Mr Short has improperly relied on biased submissions, and ought to have disregarded his evidence. By adopting Mr Short's evidence without objectively assessing it, the PAC has effectively delegated its role to Mr Short. As a result, the findings in the PAC report that rely on Mr Short's opinions have become tainted by Mr Short's bias and should be disregarded. Therefore, the PAC review is contrary to the bias rule.

It has also been discovered that Mr Short was integrally involved in the preparation of the Gateway Application for the Spur Hill Underground Coking Coal Project (Spur Hill, 2014) (Spur Hill Project). Mr Short (in his capacity as director of La Tierra) prepared the Agricultural Impact Assessment for this Gateway Application. The Spur Hill Project is located within Exploration Licence (EL) 7429, which is adjacent to the Project. The Spur Hill Project has previously expressed interest in accessing the existing and currently fully utilised Drayton infrastructure and is likely to be heavily influenced by whether or not the Drayton South Coal Project proceeds. Mr Short's involvement in both the Spur Hill Project and the Drayton South PAC review could give rise to a conflict of interest.

2.3 IRRELEVANT CONSIDERATIONS

The PAC has acted inappropriately by having regard to the following irrelevant considerations:

- Perceived impacts;
- Improper Expert Opinion; and
- Matters beyond its Terms of Reference.

2.3.1 Perceived Impacts

The PAC report makes references to "perceived impacts". These "perceived impacts" are impacts that people may expect to occur, but which do not actually materialise. The PAC gives material weight to "perceived impacts" on horse health. The PAC states:

> *"Any perceived impact on the bloodstock could be detrimental from a business perspective. Even in the absence of any risks to the horses, the visible presence of the mine in such close proximity has the potential to tarnish the reputational image that has been so carefully developed on and around the properties"* (p. 15).

The Equine Health Impact Assessment (EHIA), prepared by Dr Nicholas Kannegieter, establishes that the Project is unlikely to have any adverse impacts on horse health. However, the PAC asserted that persons visiting the studs may perceive that the presence of the Project will be detrimental to horse health. The PAC unjustifiably concludes that due to these perceived impacts, the Project poses an unacceptable risk to the horse studs.

The issue of "perceived impacts" has been considered in a number of cases in the Land and Environment Court (LEC). In *Telstra Corporation Limited v Hornsby Shire Council* [2006] NSWLEC 133 at 193 and 195 (Telstra Case), Chief Justice Preston stated that:

> "*in considering community responses, an evaluation must be made of the reasonableness of the claimed perceptions of adverse effect on the amenity of the locality. An evaluation of reasonableness involves the identification of evidence that can be objectively assessed to ascertain whether it supports a factual finding of an adverse effect on the amenity of the locality. A fear or concern without rational or justified foundation is not a matter which, by itself, can be considered as an amenity or social impact".*

The LEC recently applied this principle to a Part 3A project in *Bulga Milbrodale Progress Association Inc v Minister for Planning and Infrastructure & Warkworth Mining Limited [2013] NSWLEC 48 at 65* (Warkworth case). In this case, Chief Justice Preston held that the relevant considerations for the decision maker included *"community responses to adverse affects on amenity, where those responses reflect more than an unjustified fear or concern and where based on logically probative evidence".*

The Telstra Case and Warkworth Case establish that unjustified fears, concerns or perceptions are not relevant considerations in a planning context. Little, if any weight, should be given to these community perceptions. The relevance of the "perceived impacts" identified by the PAC therefore depends on whether those perceived impacts are justified by an objective assessment and logically probative evidence.

The reasonableness of community responses was considered by the LEC in *Deemco Pty Ltd v Campbelltown City Council* [2008] NSWLEC 1469 (Deemco Case). In this case, residents near a proposed gas facility raised concerns about the safety of the facility. The Preliminary Hazard Analysis undertaken for the development determined that the level of risk posed by the development was acceptable. The Court held that "*residents' perceptions about the hazard posed by the facility and the safety risk to their locality are without justification in objective, observable, likely consequences"* (par 35). The Court concluded that "*Whilst these views should be considered, they can be given little, if any, weight when balanced against the evidence of the experts"* (at par 37).

The Deemco Case establishes that perceived impacts are unjustified if they are contrary to the available expert evidence. In the current case, the perceived impacts raised by the PAC (adopted from Mr Short's report) are contrary to the expert evidence provided by Dr Kannegieter.

Following the principles of the Telstra, Warkworth and Deemco Cases, these perceived impacts should be given little to no weight. In reaching its conclusions regarding the Project, the PAC has given material weight to the perceived impacts on equine health. Therefore, the PAC has given disproportionate weight to an irrelevant consideration.

KDC Pty Ltd (2014) advises that *"The deliberation of the proposed development having a perceived negative impact is subjective and therefore is not pertinent in a complex decision making process which should base its decision upon factual assessment of potential impacts."*

Nevertheless, Anglo American and its experts have provided factual responses to each of the perceived impacts on horse health. **Section 4.4** addresses the perceived impacts of noise and blasting on horses and foals. **Section 4.6** addresses the perceived impact of night lighting on horse breeding cycles.

The PAC has also considered the "impacts on image" raised by Dr Lamb. These are also perceived impacts rather than actual visual impacts. The issue of "impacts on image" is discussed in **Section 3.1.8**.

2.3.2 Improper Expert Opinion

The PAC has relied heavily on the opinion provided by Mr Short of La Tierra. The PAC engaged Mr Short to *"provide expert advice to assist it in its consideration of the project, its understanding of the horse studs and the broader equine industry and the potential impacts of the project on the horse studs"*.

If an expert opinion is to be relied on by the PAC, the standards that the Courts apply to expert witnesses should be applied to Mr Short. According to *Rhoden v Wingate* (2002) NSWCA 165 at 86, this requires Mr Short to demonstrate:

- His specialised expertise by reason of specified training, study or experience;
- His opinion is based wholly or substantially on his expert knowledge; and
- The facts upon which his opinion is based have a proper foundation (i.e. by reference to relevant scientific information rather than perception).

Anglo American asserts that Mr Short lacks specialised knowledge regarding the equine industry. The website provided in the La Tierra report (www.latierra.com.au) does not exist. As such, a current curriculum vitae for Mr Short was unable to be obtained. However, Mr Short prepared a report for the Caroona Coal Project as part of an entity named "iMine" in August 2013. Mr Short's curriculum vitae for iMine indicates that prior to 2009, he worked exclusively in the mining industry. Since 2009, Mr Short has been involved with matters regarding land use conflicts between agriculture and mining. It is accepted that Mr Short has expertise in the broader agriculture industry. However, there is no evidence that Mr Short has any experience specifically in the equine industry.

Given that Mr Short lacks the ability to provide an expert opinion on the equine industry, his opinions on this subject are irrelevant considerations.

Mr Short has chosen to rely on public submissions while acknowledging they may well be biased and driven by self-interest. His role, as expert advisor to the PAC, was to objectively test the validity of those submissions. He did not fulfil this role. Instead, he took into account irrelevant considerations in the form of untested public submissions based on either perception and / or self-interest.

In principle, it is appropriate for the PAC to engage experts to assist in the discharge of its referral. However, given Mr Short's lack of expertise in the requisite field, the PAC either should not have engaged him or should have given his report little to no weight.

2.3.3 Property Acquisition

The PAC has considered the feasibility of acquiring the horse stud properties. The PAC states that *"In this instance option to purchase, acquire or grant acquisition rights to the two highly significant and valuable thoroughbred breeding studs are not considered either appropriate or practical"* (p. 14).

As explained further in **Section 4.1.4**, the Project is not predicted to have any impacts that will give rise to acquisition liabilities. Therefore, the issue of acquisition is an irrelevant consideration and should not have been considered by the PAC.

2.3.4 Matters beyond its Terms of Reference

The Ministerial direction to the PAC only required a review of "the potential impacts of the project on the operations of the Coolmore and Woodlands horse studs". The PAC has considered a number of matters that are not related to the Coolmore and Woodlands horse studs. These matters are beyond the PAC's terms of reference and beyond its delegated authority and are therefore irrelevant considerations.

Impacts on Equine CIC

The PAC was given authority to assess impacts on the Coolmore and Woodlands studs. In this respect, the PAC concluded that the Project may trigger the departure of the horse studs. The PAC goes further to conclude that the departure of the horse studs may result in the decline and possible demise of the equine CIC. The PAC's findings with regard to flow-on impacts on the equine CIC are beyond its terms of reference and should be disregarded.

Air Quality at Jerrys Plains

As discussed in **Section 4.5**, the PAC has considered the issue of 24-hr average PM_{10} concentrations at Jerrys Plains. Impacts on the air quality at Jerrys Plains are not relevant to the horse studs and are therefore beyond the PAC's terms of reference.

Impacts on Viticulture and Tourism

The PAC has considered the potential impacts of the Project on the viticulture and tourism industries. The PAC states that *"Any decline in the visual amenity of the area has the potential to also affect the image of the Upper Hunter as a region for viticulture, horses and tourism"* (p. 14). The PAC also states that *"If the mine was approved there may well be implications for the whole equine critical industry cluster as well as the broader tourism and wine industries which it complements"* (p. 21).

Impacts on the viticulture and tourism industries are beyond the PAC's terms of reference, even if they are purported flow-on impacts due to impacts on the equine industry. Therefore, the potential implications for the tourism and viticulture industries should not have been considered by the PAC.

Other Developments

The PAC has also considered the example of the equine industry in Kentucky (USA) where the government has prohibited certain developments near horse breeding areas. Expert advice from Stephen O'Connor (Principal Planner) of KDC Pty Ltd (2014), advises that it is not appropriate to rely on precedent (particularly international examples) to justify the exclusion of mining near horse breeding areas. Instead, planning decisions should be based on a case by case assessment of the impacts of a project. Therefore, the international precedent endorsed by the PAC is an irrelevant consideration and should not have been used as a basis for recommending refusal of the Project.

2.4 FAILURE TO TAKE INTO ACCOUNT RELEVANT CONSIDERATIONS

The PAC makes a number of statements about impacts that are usually associated with mining. Such statements include:

- *"Open cut mining by its nature is an intrusive industry. Impacts from activities associated with coal mining can only be controlled to a certain degree" (p. 14);*
- *"The Commission expects the mine would make genuine attempts to appropriately manage water on the site, however unintended incidents do sometimes occur at mine sites, whether during day to day activities, or in response to severe weather events" (p. 17); and*
- *"Nonetheless the mine site is large and has four pits so both direct and diffuse lighting impacts can be experts" (p. 20).*

Clearly, the PAC makes speculative statements about potential impacts based on its expectations of mines in general. This indicates that the PAC has failed to consider the technical studies in the EA, RTS and PPR that have specifically assessed the impacts for the Project. By relying on general expectations rather than the predictions specific to the Project, the PAC has failed to sufficiently consider the actual impacts of the Project.

The PAC also concludes that *"combined risks to horses and breeding operations from the mine's noise, blasting, lighting and perhaps even air quality impacts are considered to represent a real concern for the studs and their clients"* (p. 21). This is contrary to the EHIA which determined that the dust, noise and vibration generated by the Project will not impact horse health. This indicates that the PAC has not sufficiently considered the technical studies for the Project, which are relevant considerations.

3 ANALYSIS OF EXPERT REPORTS

This section discusses the issues concerning the reliability and validity of statements made in the expert reports relied upon by the PAC.

3.1 LA TIERRA REPORT

3.1.1 Overview

The PAC engaged La Tierra to provide advice on the potential impacts of the Project on the equine CIC in the Upper Hunter. The report prepared by Terry Short of La Tierra (Mr Short's report) forms Appendix 4 of the PAC report.

Mr Short concludes that the Project "will likely trigger the exit of Coolmore and Woodlands Horse Studs from the cluster. If these studs leave the cluster, this will cause the immediate decline and possible demise of the CIC" (p. 37). Mr Short bases his conclusion on the following key findings:

- Thoroughbred horse studs and open cut mining are incompatible land uses;
- Particulate matter poses a risk to horse health;
- Perceived impacts on horse health will have a detrimental effect on the business of the horse studs;
- Visual quality of the landscape is fundamental to the success of Darley and Coolmore;
- The Houston visual bund will permanently have a high visual impact on the studs; and
- Approval of the Project will force Darley and Coolmore to leave.

Anglo American strongly disputes the validity and merits of all these findings in Mr Short's report.

3.1.2 Objectivity

Section 2.2 of Mr Short's report lists a number of "*unstated impacts*". Many of these unstated impacts are supported only by statements in Coolmore's and Darley's submissions on the EA. The statements made by Coolmore and Darley have been accepted by Mr Short without any analysis or justification. Examples of such statements include:

- *"The very high visual sensitivity of the thoroughbred breeding landscape and the high-impact landscape of open cut coal mining are incompatible (Coolmore, 2013a)" (p. 15);*
- *"It is likely that the bund will remain an extraordinary and unnatural feature in the proximate landscape, and will be immediately and highly visible to Coolmore and Woodlands and their clients (who may visit the property numerous times during a stabling) and staff (Coolmore, 2013a)" (p. 16); and*
- *"It is likely that the highly-calibre of bloodstock at both properties would be directly and immediately impacted by any perception of equine health impacts – including from dust, noise and vibration (Coolmore, 2013a)" (p. 16).*

To fulfil his duty as an expert, Mr Short is obligated to provide an objective and unbiased opinion on matters within his expertise (as discussed in **Section 2.2.2**). By adopting solely the views of Coolmore and Darley without question, Mr Short's objectivity becomes compromised.

Mr Short, without the expertise to do so and without any probative evidence, relies on these submissions to support a number of key findings, such as the incompatibility of mining and horse breeding, sensitivity of horse breeding to landscape impacts, and the risks posed by perceived impacts on equine health. Submissions from Darley, Coolmore and the HTBA are subjective and motivated by self-interest. The inherent bias in these submissions is highlighted by the fact that Mr Henry Plumptre, the Managing Director of Darley, stated to Anglo American that "no matter what changes the Project makes … Darley will object to it". By relying on such submissions, Mr Short has effectively performed the role of partisan advocate rather than objective expert advisor to the PAC.

3.1.3 Reliance on Public Opinion

Mr Short's report relies on the submissions made to the PAC to establish that there is a risk of adverse impacts on the Coolmore and Woodlands studs. Mr Short concludes that:

> *"With regard to submissions about the Project, and irrespective of any real or perceived conflicts of interest that submitters may have, there is enough consistent and well-informed argument to establish reasonable doubt about many aspects of the potential impacts on Coolmore and Woodlands, and the CIC, put forward in the Project's Environmental Assessment*" (p. 4).

The reasoning adopted by Mr Short is seriously flawed. Consensus amongst public submissions does not prove that the assertions in those submissions are correct. At best, such consensus merely indicates that there is a common perception or view held by certain members of the public regarding the truth of these assertions. Adopting a more stringent approach, consensus does not even necessarily provide evidence that the views expressed are genuinely held. As acknowledged by Mr Short, the submissions may well be biased and driven by self-interest. The PAC required Mr Short to provide an independent, objective expert assessment of the potential impacts on the Coolmore and Woodlands Studs. Mr Short's analysis of public submissions merely indicates that there are "perceptions" that the Project will impact the horse studs. As explained in **Section 2.3.1**, planning decisions should not be influenced by perceptions that there will be adverse impacts, especially when the perceptions are held by objectors driven by self–interest.

The fact that the PAC sought expert assistance demonstrates that it is improper to rely solely on public submissions as evidence. As explained in **Section 2.3.2**, Mr Short does not appear to have any qualifications or experience relevant to the equine industry. Mr Short's reliance on submissions only serves to highlight his lack of actual expertise. In the absence of the requisite expertise, Mr Short's advice should have been disregarded by the PAC.

3.1.4 Adequacy of Assessment

Mr Short's report purported to address the terms of reference of the Minister's direction to the PAC. The Minister directed the PAC to *"assess the potential impacts of the project on the operations of the Coolmore and Woodlands horse studs"*.

Mr Short's report addresses this term of reference as follows (at p. 38):

> *"The potential impacts on Coolmore and Woodlands are ranked qualitatively as follows:*
>
> - *Loss of Landscape Values;*
> - *Dust;*
> - *Noise;*
> - *Vibration and blast overpressure;*
> - *Ground and surface water;*
> - *Transport and traffic; and*
> - *Economic."*

This is not an adequate response to the terms of reference. Mr Short's report has merely listed potential impacts based on public submissions and a limited literature review. There is no evidence of any objective and quantitative assessment of the potential impact on the horse studs. To adequately "assess" the impacts of the Project, there needs to be an analysis of the likelihood and magnitude of impacts, and the effect of proposed mitigation measures. It is not sufficient to merely state the effects that could conceivably occur.

3.1.5 Incompatibility of Land Uses

Mr Short's report concludes that open-cut coal mining and thoroughbred horse studs are incompatible land uses. The only evidence used to support this conclusion is a quote from PAC (2010), which states: *"available evidence supports the view that open-cut coal mining and a viable international-scale thoroughbred breeding enterprise are incompatible land uses"* (p. 35 of Mr Short's report).

Although the reference "PAC (2010)" has not been identified in the reference list of Mr Short's report, it appears that the reference is to the "Bickham Coal Project Report" (PAC, 2010) (Bickham PAC).

Mr Short has inappropriately applied the findings of the Bickham PAC to the present case. The Bickham PAC's conclusion regarding compatibility of mining and horse breeding was specific to that particular case. This was not intended to be a statement about the compatibility of these industries in general. Section 6.4 of the Bickham PAC explicitly states that "*the context is the Bickham Project Proposal itself rather than open-cut mines in general*" (PAC, 2010, p. 48).

The context for the Bickham Coal Project materially differs from the context for the Drayton South Coal Project. The Bickham Coal Project was proposed in the Upper Hunter LGA. There are no active open cut coal mines in the Upper Hunter LGA.

In contrast, the Drayton South Coal Project is proposed within the Muswellbrook LGA, which is a well established mining region. Unlike the Bickham Coal Project, the Drayton South Coal Project will not be introducing open cut mining to a region. The Bickham PAC's concerns associated with the introduction of mining are not applicable to the Project and should not have been considered by the PAC.

The Bickham PAC's statement was directed at the compatibility of the Bickham Coal Project and horse breeding enterprises in the Upper Hunter LGA. Mr Short has erred by applying these principles to the Project, which is proposed in a materially different context.

3.1.6 Equine Health

Mr Short's report references three studies that address the impacts of dust on equine health. Dr Nicholas Kannegieter has reviewed these studies and concluded that the findings are not applicable to the Project. It is therefore highly misleading for Mr Short to be raising the findings of these studies (Kannegieter, 2014).

The study by Martin and Harwood (2002) compares human asthma with recurrent airway obstruction (RAO) in horses. Mr Short relies on this study to establish a correlation between human and equine responses to particulate matter (p. 17). Dr Kannegieter explains that humans and horses have many physiological features in common, by virtue of both being mammalian species. However, unlike humans, a horse's nostrils and windpipe are located below their lungs. This is conducive to the removal of dust and irritants from the respiratory tract. For this reason, it is highly probable that horses are more resistant to particulate matter than humans. As such, the air quality criteria (which protect human health) are more than adequate for the protection of equine health (Kannegieter, 2014).

Martin and Harwood (2002) state that "equine RAO is a hypersensitivity reaction to mould spores present in hay and straw dust and / or other allergens". Mr Short's report does not establish the presence of mould or allergens in the dust generated by the Project. Therefore, Mr Short has failed to establish that the health conditions identified in Martin and Harwood (2002) are applicable to the Project. Consequently, there is no basis for suggesting that horses at the Woodlands and Coolmore studs are at risk of equine RAO (or chronic obstructive pulmonary disease). Furthermore, Dr Kannegieter (2014) advises that RAO is common in the Northern Hemisphere but extremely rare in the Southern Hemisphere.

Mr Short also cites Schwartz et al (1981) and Arenz et al (2011) to support the argument that exposure to particulate matter is harmful to horses. Both these studies deal with a rare condition known as silicate pneumoconiosis (or pulmonary silicosis). This disease only arises in arid or desert areas where the soils are rich in silicates. Mr Short's report does not establish the presence of silicates in the soil at Drayton South. Again, Mr Short has failed to establish that the health conditions identified in these studies are applicable to the Project. Mr Short has no basis for suggesting that the Project will induce the risk of silicate pneumoconiosis amongst horses at Woodlands and Coolmore studs.

It is misleading for Mr Short to cite the studies by Martin and Harwood (2002), Schwartz et al (1981) and Arenz et al (2011) without establishing a connection between those health conditions and the Project.

Mr Short's report also argues that the Precautionary Principle should be triggered to prevent open cut mining from occurring. Mr Short's report states:

> *"There is a dearth of scientific literature concerning the potential impacts of open-cut coal mining on nearby equine breeding enterprises, particularly with respect to equine responses to environmental stressors. No information does not equal no impact, and the Precautionary Principle must apply" (p. 38).*

In the Telstra Case, Chief Justice Preston explained that the precautionary principle is only triggered when two conditions are satisfied:

- *There is a threat of serious or irreversible damage; and*
- *There is a lack of full scientific certainty regarding that damage.*

The threat of serious or irreversible environmental damage must be adequately sustained by scientific evidence or scientifically plausible reasoning. Mr Short has concluded that there is a threat of serious harm to the horse studs, but this conclusion is based on submissions from the horse studs. Mr Short has failed to establish the existence of such a threat using scientific evidence or scientifically plausible reasoning. As explained in **Section 3.1.4**, Mr Short has also failed to objectively assess the scale, probability and magnitude of the possible impact. Therefore, the first condition of the precautionary principle has not been satisfied.

Mr Short's claim that there is *"a dearth of scientific literature"* is incorrect. With respect to equine responses to environmental stressors, there is a significant body of scientific research available. The EHIA presented in the EA considered over 100 scientific studies into the effects of dust, noise and vibration on horses and concluded that the Project is unlikely to impact upon equine health. Therefore, the second condition of the precautionary principle has not been satisfied.

Mr Short has not satisfied the conditions required to trigger the application of the precautionary principle. In this case, the planning decision should have been based on the available scientific knowledge rather than irrelevant considerations.

3.1.7 Equine Industry

Potential Departure of Horse Studs

Compatibility with surrounding land uses, including the horse studs, was a key consideration during the design of the Project.

A fundamental conclusion in Mr Short's report is that the Project will force Darley and Coolmore to leave the Hunter Valley. Section 4.7 of Mr Short's report states:

> *"The trigger-point for Coolmore and Woodlands to commence planning to exit the cluster can only be speculated. Perhaps it has already begun"* (p. 36 of Mr Short's report).

Given the uncertainty evident in this statement, it is contradictory for Mr Short to conclude that "*Project approval will likely trigger the withdrawal of Coolmore and Woodlands horse studs from the CIC*" (p. 37). Mr Short also relies on a statement from Dr Cameron Collins to the effect that *"approval of the Project, at least in its current form, will signal the exit of these studs and the immediate contraction of the CIC*" (p. 36). Dr Collins is the President of the HTBA and a senior partner at the Scone Equine Hospital. This statement was made at the public hearing, and was not supported by any documentation or direct advice from Darley or Coolmore. Without supporting evidence, Dr Collins' statement can only be taken as speculation of Darley's or Coolmore's intentions.

Based on the reasoning above, Mr Short can only conclude (at best) that the horse studs may potentially leave. There is no basis for the assertion that the studs are "*likely*" to leave the Hunter Valley.

On the contrary, Dr Kannegieter (2014) explains the factors that would deter Coolmore and Darley from leaving the Hunter Valley. The studs have established extensive infrastructure on their properties, including staff facilities and accommodation, veterinary facilities and pasture improvements. It would require significant time and cost to establish the required infrastructure in a new location.

Both Darley and Coolmore require operations in the southern hemisphere to take advantage of the southern hemisphere breeding season. If the studs were to relocate overseas, New Zealand and South Africa are considered the only realistic options in the southern hemisphere. Compared to Australia, the racing industries in these countries are comparatively weak. There are fewer broodmares and owners, making it more difficult to achieve the covering rates achieved in Australia. In addition, the prices achieved at the major sales in Australia are unlikely to be achieved in New Zealand or South Africa. The studs could transport the progeny to Australia for sale, but this would involve additional expense and risk. For these reasons, Dr Kannegieter (2014) argues that relocating to another southern hemisphere country is unlikely to be appealing to Darley and Coolmore.

Dr Kannegieter (2014) has also considered the feasibility of the studs relocating to another region in Australia. Compared to the Hunter Valley, there are few locations that have the same availability of equine infrastructure and access to major sale centres. More importantly, the Hunter Valley has the highest concentration of broodmares in Australia. Relocating to another region could make the studs less accessible to potential clients. For these reasons, Dr Kannegieter concludes that if the studs were to relocate, it would most likely be to another location in the Hunter Valley. In such an instance, the Upper Hunter equine CIC would not be adversely affected.

The previous conduct of Coolmore and Darley does not support the assertion that the Project will force the studs to relocate. Coolmore acquired its property from the Arrowfield Group in 1991. At the time of purchase, the land at Drayton South was the subject of a development consent and mining lease for the Mt Arthur South Coal Project. Darley purchased the Woodlands Stud in 2008. At the time of purchase, there was an active EL over the Drayton South area (EL 5460 was issued on 2 April 1998). Therefore, both Coolmore and Darley purchased their properties with the knowledge that there was the potential for mining at the site of the Project. This undermines the argument that open

cut mining and horse breeding are incompatible, and that the Project will force Coolmore and Darley to relocate.

Mr Short relies on an invalid assumption when concluding that Darley is likely to leave the CIC. As explained in **Section 1.3**, Darley only uses the Woodlands Stud for agistment of its own broodmares. All of Darley's stallions and all of its clients' broodmares are maintained at Kelvinside Stud. The Project will not have any impacts on the Kelvinside Stud. Mr Short's report concludes that the perceived impact on the Woodlands Stud is likely to force Darley to leave the Hunter Valley. This conclusion assumes that the Kelvinside Stud cannot operate without the Woodlands Stud. Mr Short's report states that *"These two studs are inseparable, critical components of the same private thoroughbred breeding business and it is doubtful that one would exist without the other"* (p. 33). However, Mr Short did not provide any evidence to support the assumption that Kelvinside Stud cannot operate without Woodlands Studs. Mr Short has failed to consider the scenarios that would allow Kelvinside Stud to operate without Woodlands Stud, such as:

- Agistment of Darley's broodmares at Kelvinside Stud (i.e. moving broodmares back to Kelvinside); and
- Ability for Darley to acquire another property in the Upper Hunter for agistment of its broodmares.

These possibilities must be discounted before it can be assumed that Woodlands Stud is essential for the operation of Kelvinside Stud. Mr Short has not considered these scenarios. By failing to establish that Kelvinside Stud cannot operate without Woodlands Stud, Mr Short lacks the basis for concluding that the Project will cause Darley to leave the Hunter Valley.

Potential Impacts on the Equine CIC

Mr Short's report concludes that the departure of Darley and Coolmore will result in the decline and possible demise of the equine CIC.

Dr Kannegieter explains that the thoroughbred horse breeding industry has thrived in the Hunter Valley for over 100 years. The history of the Hunter Valley equine industry shows that some studs have had periods of dominance followed by periods of less influence. Power and influence within the industry shifts back and forth between different studs, depending largely on the success of the stallions at a particular time. Dr Kannegieter provides the example of Patinack Farm, which had a rapid rise in prominence but is now non-operational. The loss of Patinack Farm from the equine CIC did not have a significant impact on the equine industry in the Hunter Valley. The horses owned by Patinack Farm were acquired by other studs, so the "gap" left by the loss of Patinack Farm was rapidly filled by other studs.

The history of the industry shows that the Hunter Valley equine industry was successful long before the emergence of Coolmore and Darley. This suggests that the presence of Coolmore and Darley is not fundamental to the survival of the equine CIC. Past experience in the industry has shown that when a stud leaves the industry, other studs or new enterprises will gain influence and prominence. Therefore, there is evidence to suggest that the departure of Coolmore and Darley would not result in the demise of the equine CIC.

3.1.8 Visual and Landscape

Sensitivity of Horse Studs to Visual Impacts

Mr Short's report is underpinned by the premise that thoroughbred horse studs are highly sensitive to visual impacts, and that loss of visual amenity will have significant impacts on their business. These assumptions are supported only by statements from the horse studs, such as a quote from the Chairman of Coolmore: *"the visual quality of both Coolmore and Woodlands and the surrounding landscape setting is fundamental to the successful operation of our stud farms".* As explained in **Section 3.1.2**, it is inappropriate to rely on statements from the horse studs as evidence, given that the assessment must be objective.

On the contrary, Dr Kannegieter argues that the appearance of the surrounding landscape is not a dominant consideration for potential clients. The overriding factor that influences a client's choice of breeder is the quality of the stallions. Dr Kannegieter explains that:

> *"The attraction of Coolmore and Darley to breeders is primarily the stallions they stand. Success in racing and breeding is determined mostly by genetics. Owners wish to breed the best with the best and will do so irrespective of where the horse stands. The best stallions, which can demand the highest service fees, are determined purely by the success of their progeny on the racetrack. Owners do not choose a stallion based on the visual impact the stud presents. They will send a mare to a stallion anywhere in Australia if they consider him the most suitable mating for that mare".*

Therefore, whilst the appearance of the landscape is valued by Coolmore and Darley, it is not fundamental to the successful operation of the studs. The fundamental element of the horse studs' businesses is the quality of their stallions (Kannegieter, 2012).

Landscape Values

Mr Short's report recognises the four landscape values identified in McManus (2013). These are:

- Rural idyll;
- Landscapes of conspicuous consumption;
- Brandscape; and
- Landscapes of work.

McManus (2013) explains that the rural idyll image is *"intended to convey the message that the stud is organized and caring, and that the care shown in the landscaping is transferred into care for the horses."* If the purpose of maintaining a visually pleasing environment is to demonstrate care for the livestock, changes to the landscape beyond the property boundaries should not detract from this positive impression. The reasonable person would understand that the breeder does not have control over the landscape outside of their property, and would not associate changes in the surrounding landscape with lack of care on the part of the stud owner. Since the entrances to Coolmore Stud and Woodlands Stud are located on the southern side of the Golden Highway, it would be apparent to visitors that the land to the north of the highway is not part of these properties.

Mr Short has failed to consider that Anglo American will maintain sustainable farming practices on available agricultural land outside of the disturbance footprint. Consequently, the land use activities (beef grazing) that are currently visible will continue to the visible from the horse studs. This mitigates the perceived loss of "idyllic rural landscape" values for Coolmore and Woodlands.

As described by Mr Short, "landscapes of work" give visitors the impression that the studs' take pride in maintaining their land. Again, the reasonable person would understand that the studs do not have control over the landscape to the north of the Golden Highway. Changes to the landscape beyond the stud boundaries are unlikely to give visitors the impression that Coolmore and Darley do not maintain their land.

"Brandscape" refers to the reputation of the studs that is built on the visual landscape. As explained above, the dominant contributor to the reputation of the horse studs is the quality of their stallions. The appearance of the landscape makes only a minor contribution to the reputation of the studs.

The Project has been designed to minimise visual impacts on the studs. The Woodlands Stud is rarely visited by Darley's clientele because the property only accommodates Darley's own broodmares. Further, the Project is only visible from Trig Hill, which Darley is unlikely to take visitors to due to existing views of Mt Arthur Coal Mine from this location. Therefore, the Project is not expected to detract from Darley's brandscape. The only visual impact on Coolmore Stud will occur during the construction of the Houston visual bund. Due to the short duration of this impact (8 months) and the low significance of landscape values in brandscape, the Project is unlikely to impact Coolmore's brandscape.

Visual Impacts

The "unstated impacts" section of Mr Short's report states that the visual landscape will be permanently damaged. This conclusion is supported by Coolmore's submission, which states that *"It is likely that the bund will remain an extraordinary and unnatural feature in the proximate landscape"*. Again, it is inappropriate to rely on statements from Coolmore as evidence (see **Section 3.1.2**), especially when there has been an expert assessment of the visual impacts of the bund in the EA and PPR.

Rehabilitation of the visual bund will help to achieve visual integration. To facilitate the early visual integration of the visual bund with its surroundings, rehabilitation of the bund will occur during its construction. The visual bund will be constructed in 7 stages over a period of 8 months. Topsoil spreading and seeding will take place after each stage of construction to facilitate earlier visual integration. Anglo American will utilise a three component seed mix to achieve both short and long term vegetation cover. The seed mix will include a cover crop species that will establish rapidly (within 1-2 months) and provide early "greening". This will reduce the temporary visual effect during the construction program. The seed mix will also contain longer lived pasture, shrub and tree species that will take over once the cover crop dies back. These longer lived species will allow the bund to resemble the surrounding landscape in the long term. Full details of proposed rehabilitation measures are provided in **Appendix 1**.

3.1.9 Summary

Anglo American does not accept Mr Short as a credible expert on the equine industry. As explained in **Section 2.3.2**, Mr Short does not appear to have any training or experience relevant to the equine industry. Mr Short's lack of expertise is reflected in his reliance on public submissions (from parties with a self-interest) to support his opinions and findings. Submissions from Darley, Coolmore and the HTBA have been relied upon as evidence. These submissions are biased and motivated by self-interest. By adopting these submissions as evidence, Mr Short has failed to undertake his assessment with the objectivity required of an expert advisor to the PAC.

Mr Short has used an improper approach or flawed reasoning to arrive at all of the key findings in his report. Anglo American raises the following objections to Mr Short's approach:

- The conclusion that horse breeding enterprises and open cut mining are incompatible land uses is based on a submission from Coolmore, which is not an appropriate source. Mr Short also relies on a statement from the Bickham Coal Project PAC that was specific to the Bickham Coal Project, and was not intended to be applied to mining in general;
- The studies used by Mr Short to establish the risk to horse health posed by particulate matter are not applicable to the Project;
- Perceived impacts on equine health are irrelevant considerations where expert evidence establishes that there is no actual health risk (see Section 2.3.1);
- Mr Short has accepted that the visual quality of the landscape is fundamental to the success of the studs, based only on statements made by the studs. In reaching this conclusion, Mr Short has not considered the key drivers that make horse studs successful or the fact that Darley is only used for agistment of Darley's broodmares;
- Mr Short has accepted that the Houston visual bund will have significant long term visual impacts, based only on statements made by the studs; and
- The conclusion that the Project will force the studs to relocate is based solely on a statement from the HTBA; and
- Mr Short has failed to take objective expert evidence into account before the PAC in forming his opinions.

Due to these numerous shortcomings and Mr Short's lack of objectivity and relevant expertise, Mr Short's advice to the PAC should be given minimal or no weight. The PAC findings based on Mr Short's opinion should be disregarded.

3.2 RICHARD LAMB AND ASSOCIATES REPORT

3.2.1 Overview

The PAC engaged Richard Lamb and Associates to provide independent advice on the visual impacts of the Project. The report prepared by Dr Richard Lamb (Dr Lamb's report) forms Appendix 5 of the PAC report.

Dr Lamb found that the direct views of the Project from the mine have been accurately assessed. Dr Lamb concluded that the Project would have significant visual impacts on the horse studs and recommended setback distances.

3.2.2 Scope of Work

Section 7 of Dr Lamb's report considers the potential heritage values of the stud properties. It is accepted that issues pertaining to landscape heritage are within Dr Lamb's area of expertise. However, the PAC has requested advice on "visual and associated amenity impacts of the Project Drayton South Coal Project" (p. 3 of Dr Lamb's report). The potential impacts on the heritage values of the stud properties are not considered to be visual impacts or associated amenity impacts. Accordingly, this aspect of Dr Lamb's report is beyond the scope of his engagement by the PAC and should be disregarded.

Dr Lamb identifies three classes of visual impacts: direct, indirect and impacts on image. The direct and indirect visual impacts are the components of the mine and the impacts of mining that are visible from surrounding area. These are accepted as being "visual and associated amenity impacts". The third class of impact identified by Dr Lamb, referred to as "impacts on image", is described as follows:

> *"For those assembling the dynamic visual imagery of the place from memory, advertising material and other disparate sources and this would apply to a great many of the clientele and those promoting it to them, the presence of a large coal mine in the immediate vicinity may be seen as clashing with the stereotypes of clean air, clean water, clean pastures, immaculate landscape designs, quietness, wide open spaces and picturesque scenery"* (p. 13).

Based on this explanation, it appears that this class of impact relates to the 'mental picture' that people have of the studs, rather than the actual views. Since this is an impact on people perceptions rather than the visible landscape, the impacts on image identified by Dr Lamb cannot be considered "visual and associated amenity impacts". Accordingly, the assessment of impacts on image and people's perceptions is beyond Dr Lamb's scope and should be disregarded.

3.2.3 Visual Sensitivity

Dr Lamb argued that the Visual Impact Assessment did not ascribe the horse studs with *"a level of sensitivity that is sufficient to acknowledge their unique qualities or conclude that there is a heightened standard to which visual impact mitigation should aspire in that context".*

The areas on Coolmore Stud that may be visited by customers have been ascribed a high level of visual sensitivity. Such areas include the Coolmore office, reception building, stud facilities and paddocks. Dr Lamb may be suggesting that the horse studs properties have such a high level of sensitivity that any visual impact on these properties is unacceptable. The importance of landscape values to the success of the studs is an argument based on perception rather than objective factual analysis. As explained in **Section 3.1.8**, it is ultimately the quality of the stallions that determines the success of the studs. Landscape values are not so fundamental to the studs' operations that absolute protection from visual impacts is justified.

The key operating areas of Coolmore were deemed to be high sensitivity locations, and the Project has been carefully designed to minimise visual impacts and ensure they only occur for only a short period. The Houston visual bund has been designed in consultation with Coolmore. In fact, the Option 4A visual bund proposed by Coolmore has been adopted. This level of protection is considered appropriate and acceptable when balanced against the level of sensitivity.

As explained in **Section 1.3**, the Woodlands Stud is only used for agistment of Darley's broodmares. Consequently, potential clients would rarely visit the Woodlands Stud. Furthermore, the operational areas at Woodlands Stud have no views of the Project due to screening provided by topography. The Redbank and Blakefield mining areas are visible from Trig Hill due to its high elevation. Since the mining operations of Mt Arthur Coal are currently visible from this location, it is unlikely that Darley would guide customers to that location. Therefore, all locations on Woodlands Stud are considered to be of low sensitivity.

3.2.4 Dynamic Views

Dr Lamb's criticises the lack of consideration of dynamic views in the Visual Impact Assessment.

John van Pelt (see **Appendix 2**) explains that the assessment was undertaken using "fixed points" rather than drive bys because fixed views illustrate visual effects more clearly. Due to their dynamic nature, drive bys are less effective because elements of the mine are visible for only limited periods of time.

John van Pelt (see **Appendix 2**) also explains that dynamic views will vary from person to person, based on each individual's current and past experiences, knowledge and expectations. In this instance, the staff at the horse studs will have the knowledge that the visual bund is a mitigation measure designed to screen views of the mine. These staff members will be aware that the visual bund is not a part of the natural landscape. In contrast, visitors to the studs or motorists on the Golden Highway will probably be unaware of the bund and its purpose. Once rehabilitation of the bund is complete, persons without knowledge of the bund are unlikely to recognise that it is not a natural structure.

3.2.5 Photomontages

Dr Lamb's report raised some concerns about the depiction of the Houston visual bund in the photomontages. Dr Lamb advised:

> *"I consider that the colours used in the montages depicting the final form of the bund before compaction and rehabilitation begins ought to have been lighter, appear more highly textured and with less green or yellow tones in them, which tended to allow the bund depicted to blend into the background of grassed ridges" (p. 11).*

It is accepted that Dr Lamb's suggestions would better illustrate the contrast between the bund (prior to rehabilitation) and the surrounding landscape. Nevertheless, the photomontages achieve the purpose of showing the development of the bund.

The Visual Impact Assessment determined that the construction of the bund will create a high visual effect. The use of different colours in the photomontages, as suggested by Dr Lamb, will still show a high visual effect on the horse studs. Therefore, this does not materially alter the predicted visual impacts of the Project. In fact, Dr Lamb comments that "the amendment of the montages to present a more realistic colour and texture quality would slightly increase the visual effects of the bund, but would not significantly alter the perception of the impacts of the bund on the landscape.

Therefore, the photomontages presented in the Visual Impact Assessment are suitable for representing the visual impacts of the Project. The PAC should have given due consideration to the actual views depicted in the photomontages.

3.2.6 Indirect Visual Impacts

Dr Lamb identified night lighting, dust plumes and blasting gas as potential indirect visual impacts.

As explained in **Section 1.3**, Darley's clients will predominantly visit Kelvinside Stud rather than Woodlands Stud. Accordingly, indirect visual impacts will not have any material impact on Darley's business.

With respect to lighting impacts, client visits to the horse studs will generally occur during the day. Therefore, transient glimpses of night lighting are not expected to adversely affect clients' perceptions of the studs.

Dust plumes and gas generated by blasting may occasionally be visible from the horse studs. These effects are generally short-lived, as dust and gases will dissipate. Blasting will generally occur only once a day. Anglo American can provide advance notice of blasting so that the horse studs can have an opportunity to implement precautionary measures (if required).

As discussed in the RTS, Anglo American has recently installed a proactive dust and blast fume management system at the existing Drayton Mine in preparation for the Project. This includes:

- Real time air quality and meteorological monitoring;
- Meteorological forecasting;
- Processes to guide the day to day planning of mining operations;
- Proactive dust mitigation measures;
- Proactive planning to manage potential blast fume impacts;
- Approaches to ensure that air quality criteria are achieved; and
- Procedures for identifying the source(s) contributing to air quality impacts using the air quality and meteorological monitoring network and appropriate investigative tools, such as back track modelling of plume dispersion, as part of an integrated system.

Anglo American has committed to preparing a detailed air quality management plan for the Drayton Complex, which would include transition and extension of the proactive dust and blast fume management system to the Drayton South operations. Therefore, indirect impacts on the studs will be occasional and short lived, and are therefore considered acceptable.

3.2.7 Visual Bund

A fundamental conclusion of Dr Lamb's report is that the visual bund will cause significant visual impacts on the studs. As explained in **Section 3.2.3**, Anglo American does not dispute that the visual bund will result in high visual impacts during its construction. However, rehabilitation of the bund will achieve integration with the surrounding landscape, resulting in low visual impact over the remainder of the Project life.

Rehabilitation

Dr Lamb states that *"If the vegetation was successfully established as intended, the appearance of the bund, if considered in isolation of all other effects it would have, would be acceptable"* (p. 11). Dr Lamb expressed a number of concerns over the prospects of successful rehabilitation. The fact that the visual bund was deemed to be an unacceptable impact indicates that these concerns had considerable bearing on Dr Lamb's conclusion.

Dr Lamb's concerns about the rehabilitation of the bund may arise from not being aware of the proposed rehabilitation or a design of the bund. Global Soils Systems (GSS) has provided a rehabilitation plan for the Houston visual bund (see **Appendix 1**). This rehabilitation plan is based on GSS' experience at similar mine sites in the Hunter Valley.

Dr Lamb also noted that the visual bund needs to be assigned an agricultural capability class, which will govern the depth of topsoil that can be placed. GSS advises that the visual bund would be classified as Class 6 agricultural land. Topsoil will be spread to a depth of 200 mm. which is considered adequate for this Class 6 land.

Dr Lamb raised the risk to effective rehabilitation where the depth of topsoil is shallow:

> *"Shallow soil over compacted but unsecured overburden would be subject to intense desiccation by sun and wind and would require special treatment to retain moisture, resist erosion, provide a substrate for grass and tree growth and produce a rural visual character essentially the same as the adjacent land"* (p. 12).

GSS advises that placing topsoil on overburden is an accepted practice in mine rehabilitation. The greatest risk to the establishment of effective rehabilitation is lack of moisture. Anglo American will implement a rotating irrigation system (on an as needs basis) to ensure that there is sufficient water for effective rehabilitation of the visual bund. The seed mix to be used includes a combination of cover crops and longer lived native species. The cover crops will establish quickly (within 1 to 2 months) and provide soil enhancement for the longer lived native shrub and tree species. Fertiliser will be also be used in all stages of vegetation. Therefore, the rehabilitation strategy developed by the visual bund can overcome the risks raised by Dr Lamb. Full details of the proposed rehabilitation are provided in **Appendix 1**.

The option 4A visual bund, as suggested by Coolmore, will be designed using the Geo-fluv program, resulting in a more undulating and natural bund profile. This design achieves superior integration with the surrounding landscape. The planting design has been developed in consultation with the horse studs and will be supervised by Global Soils Systems (or another expert in mine rehabilitation).

Based on the landform and planting design for the bund, it will not be discernible from existing hills and vegetation patterns once established. Examples of effective visual bunds are provided in **Appendix 3**.

Merits of Visual Bund

Dr Lamb argues that the Houston visual bund is not justifiable because the impact it creates is greater than the impact it prevents. Dr Lamb explains:

> *"In terms of the potential to block views therefore, the imposition of the bund on the landscape, which is to hide the operations in the smallest pit, is in visual impacts terms out of proportion to the extent to which it mitigates the potential impacts on views and also the indirect visual impacts of the operations" (p. 16).*

Dr Lamb's conclusion was influenced by his concerns regarding the rehabilitation of the bund. As explained above, the rehabilitation practices proposed by Anglo American are capable of providing visual integration with the surrounding landscape. Whether or not the bund can be integrated into the landscape is a very significant factor in determining the merits of the visual bund. If the bund remains a distinctive structure, as assumed by Dr Lamb, the bund will permanently have a visual impact. However, if the bund can be integrated into the landscape, the impact will only be significant during its construction and rehabilitation. Once rehabilitation is completed, the visual impact will be low.

Clearly, Dr Lamb's concerns regarding rehabilitation would have significantly impacted his assessment. If the details of rehabilitation provided above were available to Dr Lamb during his assessment, his conclusion regarding the merits of the visual bund may have been different.

As recognised by Dr Lamb, the Houston and Whynot mining areas would potentially be visible from parts of the Coolmore property if no mitigation was implemented. Dr Lamb states that "an effect of the construction of the bund will be the blocking of the view and its replacement with a high, constructed bund" (p. 10). The visual bund is a mitigation measure to eliminate direct views of the mining areas. By its very nature, a visual bund will be visible from the locations that it is intended to protect. If the visual bund is not constructed, open cut mining will be visible for at least the duration of mining in the Houston mining area (from year 5 of the Project onwards). In comparison, the duration of impact associated with construction of visual bund is approximately eight months. Open cut mining (if visible) would have a greater visual effect than construction of the bund. Therefore, the impact mitigated by the bund is greater than the impact it generates.

The visual bund is located approximately 2.5 km from the nearest residence. John van Pelt explains that the construction of the bund will account for less than 2.5% of the primary view and less than 1% of the total view from this location. The visual bund will be constructed in a series of lifts so that construction activities are only visible for approximately 5.25 months of the eight month construction program. Given its small scale and limited duration, the visual impact of construction is not considered disproportionate to the visual mitigation provided by the bund (see **Appendix 2**).

3.2.8 Recommended Mitigation Measures

Houston Mining Area

Dr Lamb recommended that the Houston mining area and visual bund should be removed from the Project. Dr Lamb acknowledges that there would still be views of the Whynot mining area:

> *"the nearest part of the Whynot pit would be "a further 1.5 km away and only partly and obliquely visible from the eastern and more elevated parts of Coolmore" (p. 16).*

The visual bund will completely eliminate views of the Whynot mining area from Coolmore. As explained in **Section 3.2.7**, the visual impact created by the bund is considered lower than the impact of the mining areas that would otherwise be visible. The removal of the Houston mining area would also sterilise approximately 30 Mt of coal resources. Given the loss of resource values, and the absence of any improvement in visual outcomes, the removal of the Houston mining area and visual bund is not justifiable.

Redbank and Blakefield Mining Areas

Dr Lamb recommended that "consideration should be given to requiring wider setbacks from the Golden Highway of the Redbank and part of the adjacent Blakefield Pit in the order of 1-2 km" (p. 18). Dr Lamb suggests that such a setback would assist in reducing direct and indirect visual impacts on the studs.

The Redbank and Blakefield mining areas are not visible from the key operational areas of Coolmore Stud. Therefore, imposing a setback does not provide any benefit in reducing direct visual impacts on Coolmore Stud.

As explained in **Section 3.2.3**, there are no highly sensitive viewing locations on the Darley property. Due to the fact that Darley's clients would rarely visit the Woodlands Stud, views of the Project are unlikely to have any material impact on Darley's business. Furthermore, views of the Redbank and Blakefield mining areas are only available from Trig Hill, to which Darley is unlikely to provide client access (due to existing views of Mt Arthur Coal Mine).

As explained in **Section 3.2.6**, indirect visual impacts will occasionally be experienced but are not significant visual effects. Dust and gas plumes generated by blasting may occasionally be visible, but only for a short duration of time. Lighting impacts are not expected to affect the studs' businesses because client visits would generally not occur at night. The setbacks suggested by Dr Lamb would result in the sterilisation of a significant quantity of coal. The indirect visual impacts are not significant and do not justify the relinquishment of these coal resources. The loss of coal resources also has an opportunity cost to NSW and Australia. The sterilisation of 30 Mt of coal would reduce royalties by approximately $348 million ($55 million present value) and company tax by approximately $223 million ($18 million present value).

3.2.9 Summary

Anglo American accepts Dr Lamb as a credible expert in the field of visual impact assessment. However, Dr Lamb has exceeded the scope of his engagement by considering “impacts on image” and implications for cultural heritage.

Although Dr Lamb is acknowledged as a suitably qualified expert, Anglo American's experts disagree with the conclusions of his report. The key conclusion in Dr Lamb’s report is that the visual impact created by the Houston visual bund will be greater than the visual impact it mitigates. Dr Lamb’s conclusion appears to have been heavily influenced by his concerns regarding the ability to achieve successful rehabilitation of the bund. As a result, Dr Lamb has reached this conclusion based on the assumption that the visual bund will create long-term visual effects.

Dr Lamb’s concerns regarding the prospects of rehabilitation have been addressed in **Section 3.2.7**. Once rehabilitation is successfully established, the visual bund will achieve integration with the surrounding landscape. As a result, the visual bund will only result in Dr Lamb’s “significant visual impacts” during the eight month construction period. As explained in **Section 2.2.1**, Anglo American was denied the opportunity to review and respond to the expert reports commissioned by the PAC. If Anglo American had been given the opportunity to respond to Dr Lamb’s concerns, Dr Lamb’s conclusions may have been substantially different. In fact, Dr Lamb commented that *“If the vegetation was successfully established as intended, the appearance of the bund, if considered in isolation of all other effects it would have, would be acceptable”* (p. 11).

Dr Lamb’s recommended mitigation measures are based on his erroneous conclusions regarding the acceptability of the Houston visual bund, the sensitivity of Woodlands Stud and the importance of landscape values to the commercial interests of the both studs. Nevertheless, Anglo American has responded to these recommendations in **Section 3.2.8**. The setbacks recommended by Dr Lamb will result in the sterilisation of significant coal reserves, without achieving any improvement in visual outcomes. The sterilisation of 30 Mt of coal would affect the public interest by reducing royalties by approximately $348 million ($55 million present value) and company tax by approximately $223 million ($18 million present value). Therefore, Anglo American does not consider Dr Lamb’s recommended setbacks to be justifiable.

4 KEY FINDINGS OF THE PAC REPORT

This section provides a response to the key findings of the PAC report including impacts relating to the Coolmore and Woodlands horse studs; visual amenity and landscape values.

4.1 COOLMORE AND DARLEY

4.1.1 Differences in Operations

PAC Statement

Within the PAC report, the breeding operations of Coolmore and Darley are outlined. These operations were further discussed in **Section 1.3**. The PAC report states that Coolmore Stud stands stallions and subsequently broodmares travel to the site for live covering and on some occasions remain there to have and rear their foals. Under this business model, Coolmore will regularly have clients and perspective clients travelling to their stud to view stallions or visit their mares and foals.

On the other hand, the PAC outlined that Darley's operations are quite different in that they operate two integrated stud properties in the Hunter Valley. These are Kelvinside Stud near Aberdeen and Woodlands Stud at Jerrys Plains. The PAC report states that "*the stallions are based at Kelvinside and the broodmares (and foals) reside at Woodlands. The Woodlands broodmares travel to Kelvinside for covering, but otherwise reside at Woodlands*". (pg. 10)

Response

Based on the fact that Darley breeds its own horses (with live covering taking place at Kelvinside Stud). the operations undertaken at Woodlands Stud are significantly different to those at Coolmore Stud. Darley's stallions and its client's mares are located at Kelvinside Stud. Woodlands Stud is used only for agistment of Darley's broodmares. Therefore, Darley's clients would visit the Kelvinside Stud rather than the Woodlands Stud. As a result, the visual sensitivity of Woodlands Stud is low.

All modelling and environmental studies for the Project show that the Project is able to comply with all relevant environmental criteria and standards. With regard to Woodlands Stud, the visual impacts are very limited due to the vast majority of the property being screened by existing topography with the exception of Trig Hill. Trig Hill has existing views of Mt Arthur Coal Mine and is not utilised as part of the routine breeding operations at Woodlands Stud.

In this regard, there is no basis for the PAC to accept the argument that "*any perceived impact on the bloodstock could be detrimental from a business perspective"* (pg. 15) or that the Project *"would have significant impacts on the visual amenity, landscape and image associated with the …Woodlands stud*." (pg. 17)

Further it is stated in the PAC report that these studs "*are likely the most important of all central actors*" and that they "*are central to the functioning of the cluster*". (pg. 11) While this may be true for Coolmore Stud and Darley's Kelvinside Stud at Aberdeen, it is misleading to infer that Woodlands Stud (where Darley keep their own Broodmares) is "*central to the functioning to the cluster*". (pg. 11) The other stud farms in the Upper Hunter equine CIC that rely on Darley would utilise their stallions for live covering at Kelvinside Stud but would have limited interactions with Darley's operations at Woodlands Stud.

They also quote Mr Short in stating that "*nearly half of all stallion standing fees in Australia are attributable to Coolmore and Darley*" (p. 12). It is misleading for Mr Short to make this statement because it implies that the Project will have an impact on the Darley's revenue from standing fees. Darley stands its stallions at Kelvinside Stud, which the Project will not have any impact on.

4.1.2 Cultural Heritage of the Landscape

PAC Statement

In their report the PAC materially rely on a submission made by the HTBA at the public hearing where their consultant, Ms Sharon Veale, put forward an argument that the properties now owned by Coolmore and Darley could be considered as significant cultural landscapes. In their conclusion the PAC use this as one of the key reasons for recommending that the Project should not proceed stating that "*the Commission heard during the public hearings and in submissions that the landscape in this area is a significant cultural landscape which may qualify for listings of heritage significance at both a State and National level*". (p. 27)

Response

It is noted that the landscapes of the studs are not currently listed nor proposed to be listed on the State or National heritage listing.

Dr Susan Lampard of AECOM Australia (see **Appendix 4**) has considered the potential heritage values of the stud properties. Dr Lampard agrees that the properties are of State significance and are likely to be listed on the State Heritage Register if they were nominated, and that Coolmore cultural landscape is potentially of national significance. However, Dr Lampard also notes that impacts to the Coolmore cultural landscape are considered to be minimised through the construction of the revised Houston visual bund (Option 4A) and that "*the design and construction of the Houston bund to mimic the surrounding undulating landscape, along with a staged revegetation process that includes locally occurring species will reduce the visual impacts to the Strowan homestead and therefore not detract from the surrounding cultural landscape*".

4.1.3 Relocation of Horse Studs

PAC Statement

The PAC states that *"In this fiercely competitive industry the Commission has little doubt that the studs would have to consider their futures in the area." (p. 15)*

Response

This statement is based on the PAC's assertion that the studs will experience economic losses due to perceived impacts on horse health. As explained in **Section 2.3.1** perceived impacts should be given little or no weight where there is expert evidence establishing that there are no actual impacts. The potential action of the horse studs in reaction to a perceived impact should similarly be given little or no weight.

Further, Dr Kannegieter explains that:

> *"the attraction of Coolmore and Darley to breeders is primarily the stallions they stand. Success in racing and breeding is determined mostly by genetics. Owners wish to breed the best with the best and will do so irrespective of where the horse stands. The best stallions, which can demand the highest service fees, are determined purely by the success of their progeny on the racetrack. Owners do not choose a stallion based on the visual impact the stud presents. They will send a mare to a stallion anywhere in Australia if they consider him the most suitable mating for that mare."*

Dr Kannegieter also advises that:

> *"owner's perceptions will not be affected by the presence of the mine provided the studs can give full assurance that the mine will not have any adverse impact on the health of the mare or any progeny born or raised on the stud. The scientific evidence strongly supports there will be no adverse impact on equine health, including mares, foals or reproductive rates."*

Gillespie Economics (2014) notes that:

> *"from an economic perspective one of the key barriers to the relocation of Coolmore and Darley is the level of physical infrastructure that has been sunk into the properties... While bloodstock is easily relocatable, the physical infrastructure is not."...*
>
> *..."the Brand of Coolmore and Darley is largely around the racing credentials of the stallions and brood mares it uses and the progeny that has been produced. Consequently, where no substantive physical impacts arise, the land would continue to have the same agricultural capability and suitability for horse breeding. Together with the physical infrastructure invested by Coolmore and Darley, the properties could continue to be used by Coolmore and Darley or, in the event of their relocation for their own commercial and other reasons, other horse breeders."*

In consideration of the expert advice provided by Dr Kannegieter and Gillespie Economics, it is considered highly unlikely that Coolmore and Darley would relocate to another region (outside the Hunter Valley).

4.1.4 Acquisition Issues Raised

PAC Statement

The PAC made the general statement that mining companies are often required to acquire properties that are adversely impacted:

> *"Impacts from activities associated with coal mining can only be controlled to a certain degree and it is often necessary for the mine to purchase any neighbouring properties with sensitive uses, such as dwellings, where the impacts to people living in close proximity are considered unacceptable. Conditions usually establish acquisition criteria, so that if the mine impacts on particular properties, it will have to purchase the properties, or provide the residents with mitigation measures for particular impacts, such as double glazing for noise impacts.*
>
> *In this instance options to purchase, acquire or grant acquisition rights to the two highly significant and valuable thoroughbred breeding studs are not considered either appropriate or practical"* (p. 14).

Response

The merits of the Project should be assessed on the basis of model predictions for this particular project, as opposed to general trends for the mining industry (as alluded to by the PAC).

The obligation to acquire properties may arise where there are exceedances of air quality or noise criteria.

Table 1 shows DP&I adopted acquisition criteria for air quality, and compares these to the predicted concentrations at residences on the Darley and Coolmore properties. Clearly, pollutant concentrations at these residences are predicted to be below the acquisition criteria for all measures of air quality. Therefore, the air quality impacts of the Project do not give rise to any acquisition obligations.

Table 1
DP&I Acquisition Criteria for Air Quality

Pollutant	Averaging Period	Application	Criterion	Predicted Concentrations at Horse Studs
TSP	Annual	Cumulative	90 µg/m^3	46 – 65 µg/m^3
PM_{10}	Annual	Cumulative	30 µg/m^3	17 – 24 µg/m^3
PM_{10}	24 hour	Cumulative	150 µg/m^3	< 130 µg/m^3
PM_{10}	24 hour	Incremental	50 µg/m^3	6 – 26 µg/m^3
Deposited Dust	Annual	Cumulative	4 g/m^2/month	0 g/m^2/month
Deposited Dust	Annual	Incremental	2 g/m^2/month	1 g/m^2/month

In relation to noise, DP&I has generally imposed acquisition requirements where the intrusive criteria have been exceeded by 5 dBA. In addition, acquisition of properties is required where the amenity criteria have been exceeded. The noise modelling for the Project has demonstrated that there are no exceedances of the intrusive or amenity criteria at any of the residences on the Darley and Coolmore properties. Since there are no predicted exceedances of the acquisition criteria for air quality and noise, the issue of acquisition is irrelevant and should not have been considered by the PAC.

4.2 VISUAL AND LANDSCAPE IMPACTS

The PAC has relied materially on Dr Lamb's report with regard to visual impacts. **Section 3.2** provides a response to Dr Lamb's findings.

PAC Statement

The PAC has recognised that indirect visual impacts are occasionally visible from the horse studs under existing conditions. The PAC states that *"From Coolmore in particular, the presence of coal mining activities in the vicinity is evident, with distant blast plumes visible from the site at certain times"* (p. 14).

Response

The PAC has not established that these existing indirect visual impacts result in any impact on the operations of the horse studs. The PAC therefore has no basis for concluding that intermittent indirect visual impacts resulting from the Project would impact the success of the horse studs.

4.3 WATER

PAC Statement

The PAC states that *"There is a risk that some polluted water may be discharged by the mine at some point over the life of the mine and this is a particular risk for Coolmore, who has extraction points downstream"* (p. 17).

Response

The Water Management System for the Project has been designed to minimise impacts on downstream water quality. All mine affected water, which contains elevated salinity, will be captured in mine water dams. The water balance model predicted that there will be no offsite discharges of saline water due to mine water dams overflowing.

The only offsite discharges of mine water will be controlled discharges in accordance with the Hunter River Salinity Trading Scheme (HRSTS). The HRSTS was established by the *Protection of the Environment Operations (Hunter River Salinity Trading Scheme) Regulation 2002* (HRSTS Regulation). As provided by clause 4 of the HRSTS Regulation, the object of the scheme is to "minimise the impact of discharges of saline water on irrigation, other water uses and on aquatic ecosystems in the Hunter River catchment". Therefore, compliance with the rules of the HRSTS ensures that suitable water quality is maintained for downstream users, including Coolmore.

The PAC seems to suggest that there may be discharges due to unforeseen incidents, which is highly unlikely given the proposed Water Management System for the Project. Anglo American will implement all reasonable and feasible management measures to prevent environmental incidents. In the highly unlikely event that a pollution incident occurs, Anglo American will comply with the requirements of its Pollution Incident Response Management Plan, prepared in accordance with the *Protection of the Environment Operations Act 1997.* This plan will be modified to include notification to Coolmore and Woodlands and any other neighbours of the Project.

PAC Statement

The PAC notes that *"The availability of sufficient credits under the salinity trading scheme also needs to be confirmed as other mines would also be holding or competing for discharge credits"* (p. 17).

Response

Anglo American has previously committed to obtaining the required credits under the HRSTS. Discharges of mine water will not be undertaken unless the required credits have been obtained. Therefore, there will be no adverse impacts on water quality arising from unavailability of credits. Further, this is an operational concern and should not be a consideration in the determination of the Project.

4.4 NOISE AND BLASTING

PAC Statement

The PAC concludes that *"The proposed blasting operations would have a noticeable amenity impact on people at Darley and Coolmore (and other neighbouring properties, particularly Arrowfield)"* (p. 19).

Response

Article 1.1 of the Blasting Guideline stipulates that the criteria for airblast overpressure and vibration are “comfort criteria” and that “the intent of these criteria is to minimise annoyance and discomfort to persons at noise sensitive sites”. As such, compliance with these criteria ensures that there are no impacts on amenity.

The acoustics impact assessment demonstrated that the criteria are not predicted to be exceeded at residences on the Woodlands and Coolmore studs. There are predicted to be exceedances of the criteria at Arrowfield Estate if blasting is undertaken using larger Maximum Instantaneous Charges (MICs) (> 1,000 kg). However, the assessment has demonstrated that the criteria are not exceeded for a MIC of 500 kg. The Project can adhere to the overpressure and vibration criteria, provided that restrictions on MIC are implemented for blasting near Arrowfield Estate (now owned by Coolmore). As such, the Project can operate without causing any unreasonable impacts on the amenity of Darley and Coolmore personnel.

As discussed in the EA, a Blast Management Plan will be developed to ensure criteria are not exceeded. The Blast Management Plan will also outline the public notification process. Any private landholder that registers an interest in being informed of the blasting schedule shall be notified via telephone, e-mail or as otherwise agreed between the parties.

PAC Statement

The PAC noted that *“This requirement for 10 blasts per week would not comply with the ANZEC guidelines (1990) which specify that “Blasting should generally take place no more than once a day” (ANZEC 1990, p. 3)”* (p. 18).

Response

The relevant guideline for blasting is the *Technical Basis for Guidelines to Minimise Annoyance Due to Blasting Overpressure and Ground Vibration* (ANZEC, 1990) (Blasting Guideline). Article 2.3.2 of the Blasting Guideline provides that “blasting should generally take place no more than once a day”. However, Article 1.4 of the Blasting Guideline states that the “recommended criteria are for guidance only and may be varied to suit local site conditions”.

The acoustics impact assessment for the Project has determined that the overpressure and vibration criteria may be exceeded at Arrowfield Estate when larger MICs are used. To avoid exceedances of the blasting criteria, Anglo American will adopt the strategy of conducting an increased number of blasts using smaller MICs (as opposed to fewer blasts utilising larger MICs). This strategy will allow the overpressure and vibration criteria to be satisfied. Since the overarching objective of the Blasting Guideline is to avoid impacts on amenity, adherence to the overpressure and vibration criteria is considered the more critical outcome. Therefore, a deviation from the recommended blasting frequency criteria is considered justifiable in this instance. It should be recognised that the neighbouring Mt Arthur Coal Mine conducts up to 12 blasts per week.

The Project will generally comply with the blast frequency criteria. Conducting an increased number of blasts using smaller MICs is only required when blasting occurs in close proximity to Arrowfield Estate. Therefore, multiple blasts per day will only be required for short periods during the Project. The Blast Management Plan will outline how Anglo American will manage multiple blasts on the same day. All blasts will be managed to ensure compliance with the overpressure and vibration criteria.

PAC Statement

“The neighbouring horse studs are considered to be particularly sensitive to noise and blasting impacts. Sensitivities relate to both people (including residents and also visitors and guests) and horses (said to have a highly evolved flight response). Evidence on the effect of mine noise and blasting on horses is scarce and it seems reactions may depend to some extent on past exposure (which will vary between all the horses on both sites). Views and opinions presented to the Commission on this issue are contradictory and the information that is readily available lacks consensus (BHP Billiton, 2009; Hansen Bailey, 2012; Huybregts, 2008; Noise Quest, undated; Wyle, undated; US Department of the Interior, 1988 and Larkin, 1996). Given there is uncertainty regarding the actual impact on horses, blasting could be perceived to put the horses on the studs at risk. Consequently, the way noise and blasting is perceived by people on the studs, particularly visitors and guests, could have a significant impact on the studs' reputation and brand.” (p. 19)

Response

This statement is based on perception and rather than fact. There is no evidence to suggest that residents on the studs are more sensitive to noise and blasting effects than other persons. Hence, there is no need to develop "special" amenity criteria for persons at the studs. As discussed above, Article 1.1 of the Blasting Guideline stipulates that the criteria for airblast overpressure and vibration are "comfort criteria" and that "the intent of these criteria is to minimise annoyance and discomfort to persons at noise sensitive sites". As such, compliance with these criteria ensures that there are no impacts on amenity. Similarly the noise criteria set out in the *NSW Industrial Noise Policy* (INP) (EPA, 2000) states that "*the criteria in this document (Section 2) have been selected to protect at least 90 per cent of the population living in the vicinity of industrial noise sources from the adverse effects of noise for at least 90 per cent of the time. Provided the criteria in this document are achieved, then it is unlikely that most people would consider the resultant noise levels excessive.*"

Bridges Acoustics (see **Appendix 5**) concludes "*The EIS clearly demonstrates additional buffer distances suggested by the PAC are not required to achieve compliance with well accepted criteria for noise and blasting. In addition, considering advice provided by Dr Kannegieter, noise and blasting impacts predicted for the Project will not negatively impact on thoroughbred horses or the studs.*"

With respect to impacts on horses, Dr Kannegieter notes that "*The noise from blasting... When heard would not cause any alarm to any horses much less affect their breeding capacity. Horses would be at far greater risk from thunder and lightning strikes than they would be from mine blasts. During a single storm horses may be exposed to more noise, accompanied by sudden flashes of light, than they might during the entire life of the Project."*

The expert advice of Dr Kannegieter establishes that noise and blasting effects would not have any impact on the health of horses. As explained in **Section 2.3.1**, perceived impacts on horse health should be given minimal or no weight where there is evidence that no actual impacts will occur.

As stated in the EA, Anglo American will support the continuation of working groups with Coolmore Australia and Darley Australia to discuss the construction and operation of the Project. It has always been recognised that these important stakeholders will require special considerations.

4.5 AIR QUALITY

4.5.1 Cumulative 24hr Average PM10 Assessment

PAC Statement

"Submissions and presentations to the Commission raised concerns about air quality impacts from the mine. These included those from the NSW Environment Protection Authority (EPA), NSW Health, the horse studs and the Hunter Thoroughbred Breeders Association. Concerns particularly related to human health impacts, as well as the suitability and reliability of the modelling predictions provided by the Proponent. Some questions were also raised about the potential for air quality impacts on equine health.

Air quality in the Upper Hunter has come under increasing scrutiny in recent years. Human health criteria for particulates (24 hour average PM_{10} levels) are being exceeded near some key coal mining precincts (OEH, 2013). Annual average $PM_{2.5}$ levels around Muswellbrook and Singleton are also exceeding or close to exceeding the reporting standards (OEH, 2013).

Upper Hunter air quality monitoring data shows that the air quality (annual and 24 hour average PM_{10} levels) at Jerrys Plains, near the project site is generally well within the health criteria (OEH, 2013). Nonetheless, by year 10 of the proposed mine, the Proponent's modelling suggests that background air quality levels would exceed the 24 hour average PM_{10} criteria on 25 days that year. This proposed mine would add further emissions and would result in additional days when particulate levels would exceed the health criteria. When emissions from this proposed mine are included in the most recent modelling it is predicted that the human health criteria would be exceeded on 38 days in year 10 of mining."

EPA Statement

"Based on the available information, 24-hour PM_{10} is the constraining air quality assessment criteria for the proposal"

Response

The PAC has asserted that the Project will cause cumulative 24-hr average PM_{10} to exceed the criteria at Jerrys Plains. The issue of dust concentrations at Jerrys Plains is beyond the PAC's terms of reference (as explained in **Section 2.3.4**). Accordingly, the PAC's conclusions on this issue should be disregarded. However, since this issue has been raised, a scientific analysis is provided below.

Due to the assessment being based on worst-case operations, and the limited ability of dispersion models to reliably predict the time and location of maximum short-term average concentrations, it is considered that the predictions of Project-only contribution to ambient air quality are conservative.

The number of cumulative concentrations predicted above the 24-hour average PM_{10} criteria has been heavily influenced by the high number of exceedances in the background data for 2006 (and earlier) than would typically occur in a single year (which occurred as a result of one sampling site originally being located near a cultivated farming paddock which was moved to a more representative location at the end of 2006). This resulted in an extremely conservative assessment of potential cumulative impacts.

In their summary of the meeting held with the PAC, EPA noted:

"There are inherent difficulties associated with assessing large scale extractive industry operations, particularly where existing mining activities occur in the vicinity of the proposal. This issue is aptly raised in Section 4.2.1 of the RTS, which advises that there is uncertainty associated with predicting 24-hour PM10 impacts from mining operations due to factors such as accurately resolving variability, intensity, duration and location of proposed activities. Additionally, predicting peak 24-hour PM impacts is confounded by variation in weather and background PM concentration, including impacts from existing mines.

On this basis, when advising on recent mining proposals, the EPA has focused its comments on the requirement for best management practice source control. This approach is consistent with the Dust Stop program administered by the EPA for existing open cut coal mines".

Fifty percent of the predicted concentrations due to the Project-alone at the closest residence (226B) are below 10 µg/m^3. As such it is considered that the cumulative assessment presented was very conservative. Nevertheless, the modelling is a useful tool for highlighting potential (albeit unlikely) impacts in that area and can therefore aid the planning of the day-to-day management of operations and dust-generating operations accordingly by utilising the identified management and mitigation measures, consistent with the approach required by EPA.

4.5.2 Silt and Moisture Assumptions

PAC comments

"Concerns have been raised regarding the suitability and reliability of the modelling results provided. The Department engaged SKM to undertake a peer review of the air quality assessment provided by the Proponent. SKM raised a number of concerns and these were subsequently corroborated by the EPA. While some of these concerns have now been addressed (Pacific Environment Limited, 2013), some of the inputs used (silt and moisture contents) require further verification." (pg. 20)

EPA comments

"SKM (2013) provides a thorough review of the air quality assessment included in the EA and RTS. The SKM review appears technically accurate and EPA agrees with the general recommendations contained within the review.

As noted above, the air quality assessment(s) generally fulfil the EPA's published assessment requirements and the scale of predicted impact appears consistent with similar proposals. However; there are several anomalies that could materially change the results of the assessment(s), including the number of receptors predicted to experience exceedances of the PM impact assessment criteria. A summary list of significant issues is provided below, with more detail provided in SKM (2013):

- Representativeness and applicability of moisture content used in emission estimation equations;
    - Representativeness and applicability of silt content used in emission estimation equations;"

Response

It is noted that the EPA comments (dated 26 November 2013) are based on a meeting held between EPA and PAC on 16 October 2013, prior to Anglo American and/or Pacific Environment being aware of the SKM review. A copy of the SKM Review was provided to Anglo American on 22 October 2013 and a detailed response was provided by Pacific Environment on 6 November 2013 (and reviewed by the PAC).

It was noted in that response that the silt and moisture inputs were based on site specific data. NSW EPA and the PAC have both previously stated that site specific data should be used in emission estimation (see EPA submission on the EA and PAC Review Main Report for the Coalpac Consolidation Project).

As detailed in the Response to SKM comments, whilst there are no additional data for Drayton Mine, recent bulk samples from two mines in the Hunter Valley and one mine in the Gunnedah area have been collected and analysed for silt and moisture contents as part of a current ACARP project. At the time, the average silt and moisture values were 4.6% and 5.6%, respectively. More data have subsequently been obtained as part of the ACARP project resulting in average silt and moisture contents of 3.8% and 5.8%, respectively.

If the industry sample average values for overburden are substituted into the Year 10 Revised Project inventory, there is an increase in total site TSP emissions of 4.9%. Extensive experience of dispersion modelling has shown that a change of ±10 to 20% in calculated emissions is unlikely to result in any significant change to the predicted concentrations.

4.5.3 Assumed Controls

PAC comments

The PAC notes that *"some of the assumptions (for example the 85% control of emissions in Redbank pit haul roads) appear optimistic given that the EPA has indicated 80% control is considered best practice. In short the Commission is not convinced the modelling represents the worst case impact scenario."* (p. 20)

EPA comments

It is not clear if the assessed emission controls, as proposed, will be achieved in practice.

Response

Anglo American have committed to the application of best-practice controls on dust-generating activities and are fully prepared to respond to the current, and any future, Dust Stop Pollution Reduction Programs (PRPs).

It is considered that Table 2 of the EPA letter demonstrates that the assumed controls are consistent with the Best Practice report.

With respect to aerial seeding, page 171 of Best Practice Report states that aerial seeding "*is a technique that has been used successfully to quickly establish vegetative cover at mine sites. Similarly, aerial seeding can be used to establish vegetative cover over broad and otherwise inaccessible areas at mine sites*." On this basis, it is considered that the assumption of 70% control is appropriate, as this is the level of control given in Table 71 of the Best Practice report for vegetative cover.

Regarding the haul road controls, Table 2 of the EPA letter (20 November 2013), and Table 66 of the 'Best Practice' report, show a control efficiency of 84% for the use of dust suppressants. As the Project is proposing to use a dust suppressant, it is not considered unreasonable to have assumed 85% control for Redbank mining area. It is noted that an 85% control has only been assumed for Redbank mining area as this was identified as having the most risk to the community, all the roads have an assumed control 80%.

An Australian Coal Industry's Research Program (ACARP) study (Cox & Isley, 2012) contained an extensive literature review of the research into the control efficiency achievable by the use of dust suppressants. Whilst the literature shows a wide range in control efficiencies achieved in different conditions with a variety of measurement techniques, the results from the mobile sampling studies completed by Midwest Research Institute are considered to be the most reliable as the study was completed on behalf of the US EPA under the Environmental Technology Verification Program. As such extensive quality assurance (QA) was employed and full documentation on the QA and methods used are readily available. The sampling was also completed on the same roads with the same traffic and as such the inherent variability between the other studies was minimised on haul roads.

As is further discussed in **Appendix 6** it is noted of the five studies completed by Midwest Research Institute, all but one study showed that a control efficiency of 85% (or greater) was achieved for TSP, PM_{10} and $PM_{2.5}$.

4.5.4 Air Quality Health Impacts to Residents Living on the Stud

PAC Statement

The Proponent has proposed to implement best practice dust control measures, with particular attention to the Redbank pit, which is closest to the studs. Nonetheless dust control would be a significant challenge as the mine plan includes four pits and a large surface area would be exposed for much of the 27 year mine life.

The air quality impacts of the project are not considered acceptable due to the combined concerns about the additional amenity and health impacts to residents living on the studs (noting that the properties cannot be acquired by the mine as would usually be allowed) and the reputational damage that may be caused with the deterioration in air quality.

Response

All residences located on the horse-studs are predicted to experience air quality concentrations below the relevant assessment criteria for annual averages, even when other mines and other sources are considered. The maximum predicted contribution to 24-hour average PM_{10} concentrations from the Project-alone is below 20 µg/m^3 for the majority of the residences which is well below the criteria of 50 µg/m^3.

When the frequency distribution of the most affected residences (228M and 227F) predicted 24-hour average PM_{10} concentrations from the Project alone are considered, it shows that the vast majority of the predicted concentration at both residences are 1 µg/m^3 or less. It is therefore considered unlikely that the cumulative criteria of 50 µg/m^3 would be exceeded at any of the residences located on the horse stud.

It is further noted that none of the residences located on the horse-studs are predicted to experience concentrations above the DP&I acquisition criteria. The acquisition criteria and the range of predicted concentrations at the horse-stud residences presented in **Table 2**.

Table 2
Acquisition criteria and predicted concentrations at horse-stud residences

Pollutant	Criterion	Averaging Period	Application	Range of predicted concentrations at horse-stud residences
TSP	90 µg/m^3	Annual	Cumulative	46 – 65 µg/m^3
PM_{10}	150 µg/m^3	24-hour	Cumulative	Maximum predicted at most impacted = 130 µg/m^3
	50 µg/m^3	24-hour	Incremental	6 – 26 µg/m^3
	30 µg/m^3	Annual	Cumulative	17 – 24 µg/m^3
Deposited Dust	2 g/m^2/month	Annual	Incremental	0 g/m^2/month
	4 g/m^2/month	Annual	Cumulative	1 g/m^2/month

The potential for any exceedance would be further minimised by the use of the identified management and mitigation measures, which include:

- real time air quality and meteorological monitoring;
- meteorological forecasting;
- processes to guide the day to day planning of mining operations;
- proactive dust mitigation measures;
- proactive planning to manage potential blast fume impacts;
- approaches to ensure that air quality criteria are achieved; and
- procedures for identifying the source(s) contributing to air quality impacts, using the air quality and meteorological monitoring network and appropriate investigative tools such as back track modelling of plume dispersion, as part of an integrated system.

In conclusion, the PAC statement is based on unsubstantiated perception arguments, a misunderstanding of the air quality assessment criteria from the *Approved Methods for the Modelling and Assessment of Air Pollutants in NSW* (Approved Methods) and a failure to fully consider and weigh up the Project predictions.

Other EPA Comments

SKM (2013) provides a thorough review of the air quality assessment included in the EA and RTS. The SKM review appears technically accurate and EPA agrees with the general recommendations contained within the review.

As noted above, the air quality assessment(s) generally fulfil the EPA's published assessment requirements and the scale of predicted impact appears consistent with similar proposals. However; there are several anomalies that could materially change the results of the assessment(s), including the number of receptors predicted to experience exceedances of the PM impact assessment criteria. A summary list of significant issues is provided below, with more detail provided in SKM (2013):

- *Representativeness and applicability of moisture content used in emission estimation equations;*
- *Representativeness and applicability of silt content used in emission estimation equations;*
- *Calculation errors in the application of emission estimation equations;*
- *Confirmation of the total estimated material handled including assumptions of overburden material density;*
- *Confirmation of correct prognostic meteorological model (TAPM) setup; and*
- *Demonstration that assumed and assessed PM emission controls are achievable in practice.*

Response

As noted previously, the EPA letter was based on a meeting held prior to Anglo American or Pacific Environment being aware of the SKM Review. A detailed response was provided on 6 November 2013.

Further detail regarding the representativeness of the silt and moisture contents used in the emission estimation equations is provided in above and in **Appendix 6**.

As discussed further in **Appendix 6**, the assumed controls are considered to be achievable in practice.

With respect to the other issue raised by EPA, the Response to the SKM noted the following:

- There were no errors in the emission estimation equations. There were some typographical errors in Appendix C of the AQIA.
- Details regarding the total material handled and confirmed that the overburden material density used was 2.4 t/bcm.
- The TAPM model was setup correctly.

4.6 NIGHT LIGHTING

PAC Statement

The PAC considered the potential impacts of lighting on the breeding cycles of horses. The PAC stated:

> *"The Commission understands that artificial lighting is used by the studs to manipulate the mares' oestrous cycles to facilitate breeding. There is some concern that additional lighting from the proposed mine could disrupt this management of breeding."*

Response

This concern was previously addressed in Section 4.6.4 of the RTS. The response provided in the RTS was based on advice provided by Dr Kannegieter.

The RTS acknowledged that the use of artificial light is commonly adopted to alter the normal equine breeding season. During winter, mares do not cycle and require approximately 16 h/day of increased artificial light over the course of 60 days, which mimics longer day light hours, before they begin cycling again. Kooistra and Ginther (1975) investigated the effect of fixed daily photoperiods on the onset of the equine breeding season. The study found that exposure to light of 16 or 24 h induced early onset of the breeding season.

The majority of lighting utilised at a mine site is associated with the CHPP, workshops and load out infrastructure, all of which are currently in place at the existing Drayton Mine. These sources are situated over 14 km from the horse studs and remain shielded by existing topography and vegetation. In this regard, light generated from the sources at Drayton Mine will not be visible from Coolmore Stud and Woodlands Stud and as such will not impact on the breeding cycle of their horses.

Lighting impacts within the Drayton South operational area will predominantly be caused by lights fitted to mobile equipment operating outside of active mining areas. In most cases, direct light effects will be limited as a result of existing topography and vegetation. However, there may be intermittent direct light effects due to truck movements associated with the 8 month construction of the Houston visual bund, although the majority of this work will be carried out during the day time. The mobile plant used in the construction of the visual bund will be located approximately 2.8 km from Coolmore Stud. The construction of the bund will not be visible at all from Woodlands Stud.

Where practical, other operational lighting at Drayton South, such as lighting plants, will be hooded or directed away from receivers to reduce impacts. The direct lighting associated with construction of the visual bund will only be intermittently visible from the horse studs. Given that prolonged exposure to light is required to alter breeding cycles (16 hours per day of continuous exposure to artificial light), the Project is not anticipated to affect the breeding cycle of horses on Coolmore Stud or Woodlands Stud.

Lights from vehicles on the Golden Highway immediately adjacent both horse studs will be more prominent than any short term light spill during the construction of the Houston Visual Bund. If breeding cycles are not affected by light sources on the Golden Highway, the intermittent lighting impacts of the Project will not affect horse breeding cycles.

4.7 SOCIAL AND ECONOMIC

PAC Statement

"The Proponent noted that the mine would generate royalties for the state and suggested that the equine industry is only a very small component of the Hunters diverse economy (Hansen Bailey 2013c). Nonetheless the Commission considers that there is value in maintaining a wide range of industries within a diversified economy. The Commission notes that this one mine has the potential to severely impact on the studs, putting the equine industry at risk."...

..."The Commission's assessment has found the project would nonetheless have considerable impacts on the studs and considers that the mine as proposed represents a serious risks to the equine critical industry cluster."

Response

As discussed in **Section 4.1.3,** this statement should be disregarded because the PAC's conclusion is based on unsubstantiated perception based arguments that the studs will experience economic losses due to perceived impacts on horse health. As explained in **Section 2.3.1**, perceived impacts should be given little or no weight where there is expert evidence that establishes the absence of real impacts. The potential action of the horse studs in reaction to a perceived impact should similarly be given little or no weight, particularly in light of the invalid assumptions about the Woodlands Stud.

Based on the expert advice provided by Dr Kannegieter (2014) and Gillespie Economics (2014), and in the absence of any proven actual or potential impact, it is highly unlikely that Coolmore and Darley would leave the Hunter Valley. Dr Kannegieter (2014) further advises that the departure of either or both studs is unlikely to pose a serious risk to the survival of the Equine CIC.

4.8 CULTURAL LANDSCAPE AND HERITAGE

PAC Statement

"The Commission has found that the studs have significant cultural landscape value tied to the existing land use activities that would be threatened by the proposed mining operations. Obvious threats derive from short term amenity impacts, but the greater and more significant risk is that thoroughbred breeding operations on the sites would be discontinued. Without the continuation of this land use it seems likely that the evolution of the cultural landscape would lose its significance, just as the continued use and maintenance ofthe built heritage items would no longer be assured."

Response

A response to issues raised by the PAC concerning cultural landscape and heritage is provided in **Section 4.1.2** and discussed further in **Appendix 4**. Further, as discussed in **Section 3.1.7**, thoroughbred breeding operations only occur at the Coolmore Stud and it is unlikely that either property would cease to be used by the equine industry given the significant amount of investment in physical infrastructure that has been made.

5 RECOMMENDATIONS OF THE PAC REPORT

This section provides a response to the PAC's recommendations regarding additional measures intended to avoid and / or minimise the potential impacts of the mine on horse studs.

Anglo American and its experts do not agree with the findings presented in the PAC Report (as discussed in **Sections 2, 3 and 4**). The advices of Mr Short and Dr Lamb, upon which the PAC has relied, contain conclusions based on unsubstantiated and incorrect perception based arguments, as opposed to a rigorous independent expert assessment of the potential impacts of the Project. Further, the PAC does not appear to have given due consideration to the large amount of objective and factual expert evidence presented in the EA and PPR. Consequently, the PAC Review has significantly over stated both the potential impacts on the Coolmore and Woodlands studs and the value of these studs to the equine CIC. Therefore, Anglo American considers that no additional measures recommended by the PAC are necessary to avoid or minimise any potential impacts on the horse studs. Nevertheless, for completeness, the following response is included.

The PAC has recommended that the "*mine plan proposed for the site should not be approved*". The PAC also recommended that "*it would be essential to set the mine back behind the natural ridgeline and remove the majority of the Redbank pit (to the second ridge)*". The PAC stated that "*these setbacks are the absolute minimum required and additional work would be needed to demonstrate that mining in the remaining northern area of the site would not cause any significant impacts to the two studs.*"

The PAC's recommendations are based on the advice of Dr Lamb and Mr Short, who both recommend that additional setbacks should be imposed. As explained in **Section 3.1**, there are numerous shortcomings in Mr Short's report. Mr Short has relied on public submissions as evidence to support his conclusions, which is not a valid means of establishing actual environmental impacts. Mr Short has relied on "perceived impacts" on equine health as well as the importance of landscape values to the studs as a basis for concluding that the Project is unacceptable. As explained in **Section 3**, perceived impacts are not relevant considerations in a planning context. Due to the lack of scientific merit in Mr Short's assessment, his recommended mitigation measures (which adopt what the Studs consider to be acceptable) are unsubstantiated and lack any tangible basis.

Dr Lamb has recommended that the Houston mining area should be removed from the Project, which would also result in the removal of the visual bund. As explained in **Section** 3.2.8, the removal of the Houston mining area and visual bund would result in some views of active mining areas from the eastern portion of Coolmore Stud. Whereas if the visual bund was constructed, all views of mining areas from Coolmore Stud will be eliminated. Provided that the visual bund is appropriately rehabilitated, the visual impact of the bund itself will be minimal after the construction period. Therefore, removing the visual bund would result in a greater impact than the retention of the Option 4A visual bund (Coolmore Bund). Removal of the Houston mining area would result in loss of a valuable coal resource and cannot be justified in the absence of an improvement in landscape values.

Dr Lamb also recommends setbacks for the Redbank and Blakefield mining areas. As explained in **Section** 3.2.8, these mining areas are only visible from elevated areas on Woodlands Stud. Given that Darley's clients are very unlikely to visit Woodlands Stud, the visibility of Redbank and Blakefield mining areas is not expected to affect Darley's business. Therefore, there is no significant impact that justifies the sterilisation of part of the coal reserves in these areas.

Anglo American considers that the recommended setbacks would cause the Project to become economically unviable. Anglo American asserts that the economic costs it will suffer as a result of the setbacks are disproportionate to the minimal benefits to the horse studs. As such, Anglo American concludes that the recommendations of the PAC Report would not achieve fair, reasonable and practical environmental outcomes.

In addition, the recommended setbacks will result in opportunity costs to NSW and Australia. The sterilisation of coal resources will reduce the values of royalties and company tax generated by the Project. Revenue generated through royalties and company tax is used by the NSW and Commonwealth governments to provide public infrastructure and services. Hence, the loss of coal resources results in a cost to the general public. In contrast, the setbacks recommended by the PAC only serve to benefit Coolmore and Darley. The horse studs primarily cater for the wealthy demographic, which represents only a small portion of the public. Therefore, the benefits of the recommended setback are substantially outweighed by the costs to the wider public.

6 CONCLUSION

Anglo American and its specialist consultants have undertaken a comprehensive analysis of the PAC report, including the expert reports considered by the PAC. Based on this analysis, Anglo American concludes that there are a number of legal, factual and scientific shortcomings that undermine the PAC review and ultimately render PAC Report invalid.

Anglo American has identified a number of legal and procedural errors that have been made by the PAC and its purported experts. In particular:

1. The PAC's role was to assess (i.e. measure) the potential impacts on the two horse studs and, if an impact was identified, recommend additional measures to mitigate the impact. The PAC was only required to review this one aspect of the Project. Instead, the PAC exceeded this limited role and determined that the Project should not be approved. By erroneously going beyond its terms of reference and the scope of its delegated authority, the PAC acted in excess of the power conferred to it, rendering the PAC review and PAC report invalid.
2. Anglo American was denied the opportunity to respond to the PAC experts' findings during the PAC review process. This had a material bearing on the findings in Dr Lamb's report, which were subsequently adopted by the PAC.
3. The PAC failed to properly discharge its limited remit and as a consequence, failed to act impartially, by effectively delegating its role to Mr Terry Short. The PAC adopted Mr Short's findings without questioning his qualifications and without independently analysing the factors Mr Short took into account. Further, the PAC's failure in this regard meant that it failed to properly consider relevant objective evidence provided by Anglo American in assessing the potential impacts of the Project on the horse studs.
4. The PAC had regard to a number of irrelevant considerations, including perceived impacts (which were not substantiated through probative evidence) and matters beyond its terms of references.
5. The PAC did not have regard to a number of relevant considerations in the expert evidence regarding the likelihood and magnitude of potential impacts on the horse studs in assessing whether or not there was any potential impact and whether any mitigation measure was required.
6. The PAC inappropriately applied the precautionary principle to this case to justify its findings.

All of these legal grounds have the effect of rendering the PAC report invalid at law.

Anglo American has also identified serious issues concerning the reports by Mr Short and Dr Lamb. Anglo American strongly challenges the credibility of Mr Short as an expert on the equine industry. In addition to lacking specialist knowledge in this field, Mr Short has failed to act objectively, as demonstrated by his reliance on public submissions as supporting evidence, even after acknowledging they may be biased and driven by self-interest. As an expert advisor to the PAC, Mr Short's was required to objectively test the validity of those submissions. He did not fulfil this role. Due to the serious flaws in his methodology and his lack of specialist knowledge, Anglo American asserts that the findings and recommendations in Mr Short's report should be given little or no weight.

Anglo American does not dispute the credibility of Dr Lamb as an expert on visual and landscape impacts. Anglo American asserts that if it was given an opportunity to respond to Dr Lamb's concerns, the findings regarding the impacts of the Houston visual bund may have been markedly different. Dr Lamb's assertion that the visual bund will have significant visual impacts was a key consideration the PAC's assessment. The denial of natural justice has therefore caused material prejudice to Anglo American's interests.

Given the numerous issues affecting the PAC report, the recommended mitigation measures are based on findings that are flawed and should be disregarded. Furthermore, the setbacks recommended by the PAC result in significant economic costs to Anglo American, which significantly outweigh the minimal perceived benefit to the horse studs.

The PAC has given considerable weight to the expert opinions of Mr Short and Dr Lamb. As a result, the merits of the PAC's decision have been tainted by the procedural and scientific inadequacies of these reports, particularly Mr Short's report. Consequently, the decision-maker should place little weight (if any) on the findings contained in the PAC report when making a determination.

7 ABBREVIATIONS

Abbreviation	Description
ACARP	Australian Coal Industry's Research Program
µg/m^3	Micrograms per cubic metre
Anglo American	Anglo American Metallurgical Coal Pty Ltd
Approved Methods	*Approved Methods for the Modelling and Assessment of Air Pollutants in NSW*
AQIA	Air Quality Impact Assessment
bcm	Bulk cubic metres
Bickham PACc	"Bickham Coal Project Report" (PAC, 2010) (Bickham PAC).
Blasting Guideline	*Technical Basis for Guidelines to Minimise Annoyance Due to Blasting Overpressure and Ground Vibration* (ANZEC, 1990)
CIC	Critical Industry Cluster
Coolmore	Coolmore Australia
Darley	Darley Australia
Deemco Case	*Deemco Pty Ltd v Campbelltown City Council* [2008] NSWLEC 1469
DG	Director-General
DP&I	NSW Department of Planning and Infrastructure
EA	*Drayton South Coal Project Environmental Assessment* (Hansen Bailey, 2012)
EARs	Environmental Assessment Requirements
EHIA	Equine Health Impact Assessment
EL	Exploration Licence
EP&A Act	*Environmental Planning and Assessment Act 1979*
EPA	NSW Environment Protection Authority
g	Gram
GSS	Global Soil Systems
ha	Hectare
Hansen Bailey	Hansen Bailey Environmental Consultants
hr	Hour
HRSTS	Hunter River Salinity Trading Scheme
HRSTS Regulation	*Protection of the Environment Operations (Hunter River Salinity Trading Scheme) Regulation 2002*
HTBA	Hunter Thoroughbred Breeders Association
INP	*NSW Industrial Noise Policy* (EPA, 2000)
kg	Kilogram
km	Kilometre
LEC	NSW Land and Environment Court
m	Metre
m^2	Metres squared

Abbreviation	Description
m^3	Metres cubed
MIC	Maximum Instantaneous Charge
Mr Short	Mr Terry Short
Mt	Million tonne
Mtpa	Million tonnes per annum
NSW	New South Wales
PA	Project Approval
PAC	Planning Assessment Commission
PAC Report	The Report written by the PAC in response to it's review
PM_{10}	Particulate matter less than 10 microns
$PM_{2.5}$.	Particulate matter less than 2.5 microns
PPR	*Drayton South Coal Project Preferred Project Report* (Hansen Bailey, 2013b)
PRPs	Dust Stop Pollution Reduction Programs
QA	Quality Assurance
RAO	Recurrent Airway Obstruction
ROM	Run-of-Mine
RTS	*Drayton South Coal Project Response to Submissions* (Hansen Bailey, 2013a)
Spur Hill Project	Spur Hill Underground Coking Coal Project (Spur Hill, 2014)
Telstra Case	*Telstra Corporation Limited v Hornsby Shire Council* [2006] NSWLEC 133 at 193 and 195
The Minister	The Minister for Planning and Infrastructure
The Project	Drayton South Coal Project
TOR	Terms of Reference
TSP	Total suspended particulates
Warkworth Case	*Bulga Milbrodale Progress Association Inc v Minister for Planning and Infrastructure & Warkworth Mining Limited [2013] NSWLEC 48 at 65*
Symbol	**Description**
%	Percent

8 REFERENCES

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Appendix 1

Houston Visual Bund Rehabilitation Strategy

HOUSTON VISUAL BUND REHABILITATION STRATEGY - PROPOSED DRAYTON SOUTH COAL PROJECT

Prepared for: *Hansen Bailey*

Prepared by: *Global Soil Systems*

Date: *January 2014*

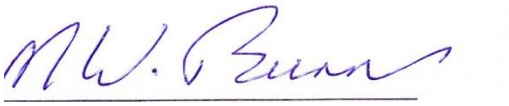
GLOBAL SOIL SYSTEMS
Land Rehabilitation and Revegetation
- Contractors and Consultants

HOUSTON VISUAL BUND REHABILITTION STRATEGY-
PROPOSED DRAYTON SOUTH COAL PROJECT

January 2014

Prepared for: *Hansen Bailey*

Prepared by: *Global Soil Systems*



Dr Mark Burns

(PhD, Master of Resource Science, BSc (Forestry – Honours 1))

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1.0 BACKGROUND

The Planning Assessment Commission (PAC) Review Report on the Drayton South Coal Project (NSW Government, Planning Assessment Commission, Kibble *et al*. December 2013) raised concerns (page 16, 4th paragraph) regarding the revegetation of the Houston Visual Bund as follows:

'The effectiveness of efforts to revegetate the bund was a particular concern to a number of parties, including Dr Lamb. Dr Lamb raised particular concerns about the lack of detail in the plans for establishment and maintenance of the vegetation cover, including the availability and depth of topsoil to be applied and the need for watering and long term moisture availability.'

This report has been prepared in response to the above and contains the specific methodology that will be adopted to achieve successful and rapid rehabilitation of the Houston Visual Bund.

2.0 PREVIOUS HOUSTON VISUAL BUND REHABILITATION STRATEGIES

A Rehabilitation Strategy for the Drayton South Coal Project was initially prepared by Hansen Bailey (*Drayton South Coal Project, Rehabilitation Strategy, Hansen Bailey - May 2013*). General information on the revegetation strategy for all disturbed areas (not specific to the visual bund) was presented in Section 5.4 of this report. This section generally described the topsoil and cover crop strategy as well as general revegetation recommendations (relevant to all rehabilitated areas) relating to the establishment of the two woodland communities (Central Hunter Box – Ironbark Woodland and the Narrabeen Foot Slopes - Slay Gum woodland).

General revegetation recommendations were described in Section 5.4.1 (Disturbance Areas) of this report and were linked to the Houston Visual Bund and other areas such as Saddlers Creek restoration. Section 6 of the report (Rehabilitation Monitoring and Performance – page 36) described the monitoring program that would be implemented to ensure revegetation objectives will be met. Collectively, these sections provided good general detail but few revegetation specifics.

Section 2.3 of the above report did provide general guidance on the rehabilitation of the Houston Visual Bund but was also lacking in specific revegetation methodology.

Linked to the revegetation of the bund, and in response to a DPI request, a revised landform design for the visual bund was proposed (*Option 4A – Drayton South Preferred Project Report – Hansen Bailey – August 2013*). The intention of this revised option was to mitigate the residual visual impacts identified in the earlier Option 4.

Of particular relevance to the revegetation strategy of the bund is that the Option 4A bund will involve a seven stage construction program from Year 3 for a period of approximately eight months. It is proposed that each stage be revegetated progressively at the completion of earthworks and topsoiling.

3.0 PROPOSED REVEGETATION STRATEGY

One of the principal concerns expressed in various submissions during the public comment phase centred on the concern that vegetation will be slow to establish following construction, topsoiling and seeding/planting of the bund. As a result, there was a concern that visible areas will remain bare for extended periods of time while vegetation is establishing- particularly if drought conditions prevail.

In order to address this concern progressive revegetation of each stage was proposed in earlier reports (see Section 2.0 above) and this concept continues to be a central theme in the proposed revegetation strategy. As a result, seeding (both tree, pasture and cover crop) will occur immediately after completion of topsoiling and deep ripping of each of the seven construction stages of the Bund. If sown seed can be made to quickly germinate and establish (and survive) rapid revegetation and hence visual amelioration of the visible face of each stage (lift) can be achieved. This will greatly reduce the period of bare ground exposure and will result in a progressive 'greening' of the outward face of each stage as the visual bund increases in height.

There are several issues in this process which have the potential to stop rapid vegetation of the slope. These need to be considered in the overall strategy.

Firstly, the revegetation strategy must be designed to achieve both short and long term vegetation cover. In this context, a three component seed mix is proposed in which the initial seed mix will contain a combination of (1) rapid establishing cover crops species (Oats or Japanese millet), (2) slightly less rapid pasture species and (3) longer term native tree and shrub species. The later will significantly enhance both the long term visual appearance of the bund as well as increase the area of higher ecological value across the site.

In summary, an initial and one-off seed mix will be sown (with fertilizer) and will contain the following:

- Cover crop species – these will rapidly establish and will provide quick soil binding and surface coverage.
- Longer lived pasture species designed to take over from the cover crop once it dies back. These will provide medium to long term vegetation coverage.
- Long lived native tree and shrub species.

A selection of photographs (Plates), taken at similar mine sites in the upper Hunter Valley, are contained in ***Appendix 1*** of this report and are indicative of what can be expected in terms of vegetation establishment and progression. The plates indicate how the site will be permanently covered with vegetation at all stages following germination of the cover crop.

Plate 1 shows a site being deep ripped immediately following topsoil placement and immediately prior to sowing. Approximately 4 to 5 hectares can be deep ripped in one day.

Plate 2 shows a typical cover crop 2 to 3 months after sowing and germination. At this stage the cover crop is still actively growing. This crop can persist and provide good erosion control for up to 12 months thus providing both stabilization of soil and visual amelioration of the soil surface. The two main cover crop species are Japanese Millet and Oats.

Plate 3 shows the cover crop at maturity. This normally occurs 3 to 4 months after sowing and germination.

Plate 4 shows a typical cover crop as it starts to hay (die-) off. Despite this natural decline in the plants organic cover crop material will still persist for some time and will provide good stabilization of the slope for up to 12 months.

Plate 5 is typical of sites approximately 1 to 2 years old and shows emerging native trees and shrubs, with an underlying pasture cover

Plate 6 shows a more mature scenario with well-developed native trees and shrubs in conjunction with underlying and adjacent pasture cover. In many cases a perimeter of grasses is found outside the sown tree area.

4.0 REVEGETATION IN THE CONTEXT OF THE TOTAL REHABILITATION PROCESS

It should be appreciated that revegetation is only one component of the overall revegetation strategy. The sequence of events which will be followed on the Houston Visual Bund will be as follows:

Earthworks

Bulk earthworks will be undertaken to create each stage (lift). It is understood that Geofluv technology will be used to design the visual bund and also to design other landforms on the proposed Drayton South Project. This technology is proving to be very effective in creating stable and visually harmonious landforms on other mines in the Hunter Valley. It will be a key tool in achieving bund revegetation objectives.

Surface Drainage

Relevant contour banks and surface water management structures will be constructed as required. Their design will be consistent with best practice surface water management.

Topsoil Placement

Following completion of bulk earthworks for each stage, topsoil will be spread to a depth of 200 mm. Note that the quality of topsoil used is very important in order to reduce weed invasion and to achieve the desired vegetation results. As a result, only the best quality topsoil will be identified and used on the bund. That is, the Houston Visual Bund will receive priority in topsoil allocation over other areas in this regard. The two key topsoil elements, relevant to revegetation success, are quality and depth.

Deep Ripping

Immediately following topsoiling each stage will be deep ripped to a depth of approximately 400 mm (see ***Plate 1***). Ripping will be undertaken parallel to the contour to avoid channelized gully formation. The objective is to create a decompacted surface layer (seed bed) which will maximise rainfall infiltration and in turn maximize germination and consequent root and shoot growth. The surface may need to be ripped several times in order to create the required surface conditions.

Seeding

As discussed a multi-purpose seed and fertiliser mix will be applied evenly across the entire ripped area. As previously discussed this mix will include:

1) Cover crop – Japanese millet (5 kg/ha - August to February) or Oats (8 kg/ha - March to July).

2) Light Pasture Mix – Couch (5 kg/ha), Kikuyu (3kg/ha), Perennial rye grass (3 kg/ha).

3) Native tree and shrub seed -

Acacia decora	-	0.3 kg/ha
Acacia salicina	-	0.3 kg/ha
Acacia decurrens	-	0.4 kg/ha
Corymbia maculata	-	1.5 kg/ha
Eucalyptus moluccana	-	1.5 kg/ha
Eucalyptus crebra	-	1.5 kg/ha
Eucalyptus tereticornis	-	1.0 kg/ha
Total		6.0 kg/ha

Note: The native shrub/tree seed mix is itself a two stage mix with wattles germinating and emerging more quickly followed by the slower emerging E*ucalyptus* and *Corymbia* species. As such, the revegetation strategy will be effectively a four stage process.

Maintenance

The only maintenance required will involve spraying of weeds such as *Galenia*. This will not affect the visual appearance of the slope from a distance.

Timing/Season

Depending on the season in which topsoiling is completed the above strategy may have to be slightly adjusted. If topsoiling of a specific stage is completed in the warmer months of September to May a single sowing event, as discussed above, and containing all the above components, will be undertaken. If sowing is required in the colder months of June to September (due to completion of topsoiling in this period) only a dense cover crop of oats (20 kg/ha plus fertiliser) will be initially sown. This will provide rapid temporary

vegetation cover and visual screening of the slopes as shown in ***Plates 2*** to ***4.*** In October, this temporary oats cover crop will be ripped in and the above steps 1 to 3 will be undertaken using Japanese Millet as the cover crop species in conjunction with the other longer term pasture and native tree and shrub species. Due to the mulched appearance of the ripped-in Oats significant areas of bare soil will not be apparent and the Japanese Millet will quickly provide rapid re-greening of the slope.

Need For Watering

The major potential problem in getting sown seed to establish quickly (and to survive) is soil water availability. Germination will obviously be delayed until soil moisture is adequate. The only way to obviate this problem, should drought occur, is to artificially irrigate each stage immediately after sowing. Once irrigation results in adequate seed germination and vegetation establishment it can then be removed and reused on higher stages. Should a long term drought set in after sowing of the bund is completed the watering system will be progressively rotated between all stages thus ensuring that each stage is kept alive until adequate rain falls. A suitable source of water (non-saline) will be identified and a pumping system and pipeline will be established prior to commencement of bund construction. Once each stage is sown the portable irrigation system will be connected and activated on that stage.

Timing and Long Term Appearance of the Bund

Plates 2 to ***6*** provide guidance on the likely appearance of vegetation at different ages after sowing. In the short term, each seeded section of the bund will appear as grassland from a distance (the cover crop). A greening of each stage should occur within 2 to 4 weeks of rainfall or irrigation. More substantial pasture coverage will be evident in the following months such that the bund will appear as grassland up to approximately 12 months. After 12 months trees, and particularly *Acacias,* will become visually apparent from a distance and will appear as small green dots scattered across the slope. Over time trees will become increasingly more apparent and distinct from a distance. After three years each stage should demonstrate relatively dense tree cover with small intervening patches of pasture. After this time (three years +) trees and shrubs should start to close canopy and distance viewers will see a largely tree covered slope.

Cover crop and pasture species can compete with young tree germinates and kill them For this reason the above sowing specification has been designed to regulate competition and allow adequate numbers of native trees and shrubs to establish.

APPENDIX 1

PLATES

Plate 1: Site preparation (decompaction) prior to sowing.

Plate 2: Rapid emergence of sown cover crop 1 to 2 months after sowing.

Plate 3: Mature cover crop 3 to 4 months after sowing.

Plate 4. Cover crop (6 to 8 months old) beginning to hay-off.

Plate 5: Trees emerging through grassland after cover crop has disappeared (1 to 2 years).

Plate 6: Site 4 to 6 years after sowing showing dense tree cover and fringing grassland.

Appendix 2

Response to Visual Impact Considerations in: Planning Assessment Commission Drayton South Coal Project Report

Response to Visual Impact considerations in:

Planning Assessment Commission
Drayton South Coal Project Report

December 2013

Report prepared by

JVP Design

February 2014

This report was prepared by:

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1. GENERAL

This section provides a detailed response to the assessment undertaken by the PAC on the Drayton South Coal Project. In doing so it considers and provides a response to the key findings of the expert reports commissioned by the PAC and responds to the overall key findings of the PAC in their report.

This short report prepared by John van Pelt is based on a review of the:

Planning Assessment Commission

Drayton South Coal Project Report

December 2013;

And as part of that report Appendix 5:

Advice to the NSW Planning Assessment Commission:

Visual impact of proposed Drayton South Coal Project with regard to

Terms of Reference of the Minister for Planning

27th August 2013

Prepared by Dr Richard Lamb B Sc PhD

2. SECTION A: RESPONSE TO PAC REPORT

2.1 KEY FINDINGS OF THE PAC REPORT

2.1.1 Visual and Reputational Issues

PAC Statement

"Both studs have raised considerable concerns about the visual impact of the proposed coal mine".

Response

Anglo American refutes this statement.

The PAC fails to recognise or report on the actual visual impacts of the Project that have been assessed in the visual impact assessment (VIA) for the Project. With regard to Woodlands Stud the visual impacts are very limited with the vast majority of the property being screened by exiting topography. The only exception is the high point of Trig Hill. Trig Hill has existing views of Mt Arthur Coal Mine and is not utilised as part of the routine breeding operations of Darley.

With regard to Coolmore Stud the Project has been designed to prevent all views to the key mining areas by staying behind the natural ridgeline. The only exception is with regard to the Houston mining area and parts of the Whynot mining area (located approximately 2 km from Coolmore's property). To prevent views into these areas, the Houston visual bund is proposed to be constructed. Anglo American have worked extremely closely with Coolmore on the design of the Houston visual bund and have even adopted the Option 4A visual bund which was proposed by them. As such the only visual impacts that would be experienced by Coolmore would be during the construction of the Houston visual bund which when Option 4A is taken into consideration would represent a period of approximately 8 months.

PAC Statement

"The views of the studs for those travelling past along the Golden Highway are likely to also be significant to how the studs are perceived. Any decline in the visual amenity of the area has the potential to also affect the image of the Upper Hunter as a region for viticulture, horses and tourism".

Response

As demonstrated within the EA and PPR for the Project the views from the Golden Highway are not predicted to be significantly impacted by the Project. The only views that would be available will be to the construction of the Houston visual bund which when Option 4A is taken into consideration would represent a period of approximately 8 months. The PAC fails to acknowledge this in their report.

Further as described in the RTS based on advice from John Van Pelt (Visual and Landscape Architect) it is noted that motorists trafficking the Golden Highway upon approach into Jerrys Plains (Gateway to the Upper Hunter Valley) currently experience views of the Warkworth Mine, Wambo Mine and rail facilities, United Mine, Hunter Valley Operations Mine, Redbank Power Station and the Bayswater Power Station.

PAC Statement

"Dr Lamb suggests that there are several kinds of visual impact relevant to this assessment. Direct visual effects (e.g. where mining activities are visible, including overburden removal and emplacement and the transport of materials). Indirect visual effects ("where there is no direct visibility of the mining operations, but there is evidence of them" (p8)). "Impacts on the image of the studs, a significant part of which is based on appearances" (Appendix 1, p8) were also considered."

Response

I agree with Dr Lamb, but differ in my interpretation and disagree on the significance of indirect views and impact on image.

The three "views" are described by Dr Lamb: direct, indirect and "impacts on image". I consider the first two classes to be visual effects of mining operations. The third, I consider to be a combination of visual effects over time and importantly other factors that influence perception, evaluated in terms of the VIA as visual sensitivity.

In terms of there being two visual effects, he describes one as "direct" and considers these are generally well screened by natural ridge lines, the Houston Bund and tree screen planting. The third effect he describes as 'dynamic" being made up of views through time as well as perceptions gained from all sources such as brochures, the literature etc

Indirect effects, I would describe as ephemeral in that they are temporary and / or infrequent and could include: dust effects; night light; signage; etc. Dust cloud associated with blasting are infrequent and of short duration and will be timed and co-ordinated through ongoing working grous with the studs and would avoid visitation times where possible, e.g. early morning. Dust associated with truck movement will be managed by dust suppression techniques that will control this visual effect. The frequency, duration and intensity of such events are defined by the Air Quality Expert.

The "dynamic" effect is based on sequential views experienced over time, including the current trip as well as general knowledge based on all sources of information to create perceptions. In this context, staff and management at the horse studs as well as other locals would have a greater source of knowledge by following development applications, etc. Generally this level of knowledge would not be held by visitors to the studs. They would however have knowledge of mining through trips to the studs past existing mines and infrastructure along the 50km journey along the Golden Highway. However, this journey would not include views to the proposed Drayton South mine operation.

Mining has been a visible part of the land use pattern of the valley for many years and any visitor to the studs would be aware of this activity. They would not necessarily have the knowledge of the exact location and detail of the Drayton South project, as many locals may have, relying therefore for the greater part on direct and ephemeral views to make interpretations impacting on image. In this context I consider the visual impact on visitors' "dynamic" or "image" perception to be limited due to screening of operations and the short, infrequent and time separation for ephemeral effects on visitor experience.

PAC Statement

"In relation to the direct visual impacts, Dr Lamb found that the Proponent's Visual Impact Assessment "reasonably represents the likely visibility of the proposal in most views" (p8). The assessment was found to have focused on

fixed viewing locations, "while acknowledging that some land uses such as wineries and horse studs make use of the scenic amenity values of the surrounding landscape as part of their business image" (Appendix 1 p9)."

Response

Fixed views were used to enable detail analysis and illustration of visual effects (photomontage). The general use of the area including horse stud, vineyard and scenic road (Golden Highway) was acknowledged and reflected in the definition of visual sensitivity of the area. Extensive consultation with the studs identified locations that are visited by outsiders frequently and these area were given a higher sensitivity. Visual avoidance and mitigation works were designed to remove mining activity from the viewsheds of these sensitive areas and has successfully done so. These areas have been better defined in Figure 1. These areas and the Golden Highway as well as other rural residences and Jerrys Plains Village have been given a high sensitivity rating in this context and mitigation treatments designed to remove detrimental visual effects from their viewsheds.

PAC Statement

"While most of the Woodlands stud would have no fixed views of the mine, the exception is the high land in the north eastern part of the property. Dr Lamb found that "The relative relief is such that there is no practical way to mitigate the impacts on the view and since the operations proceed generally from north to south, advancing toward Darley Woodlands over many years, with the rehabilitation following behind, there will be visual exposure of the mining throughout the operational life of the Redbank and Blakefield pits."

Response

The area referred to by Dr Lamb is the high ground and ridges associated with Trig Hill. These areas are the most elevated on both Darley and Coolmore. However as Dr Lamb also states at 11.2.2:

"The Redbank Pit is at its closest to both studs, with high wall mining drives under the area between the Pit and the Golden Highway. Tree bands may block some views, but will have no effect on others and the Redbank and Blakefield Pits will have a significant direct visual impact on views from some elevated locations of both studs, but most notably from Trig Hill in Darley Woodlands Stud and high land in the vicinity in Coolmore. While the view will be significantly affected by the proposed mining operations, the viewing places are not considered to be of the highest intrinsic sensitivity, as they would not be accessible to most visitors to the stud and would in all likelihood be avoided as a place for staff to take visitors to because of the unimpeded views they provide over the Redbank and Blakefield Pits."

These elevated areas already have existing and extensive views of open cut mining at Mt Arthur and Drayton as well as views over Bayswater and Liddell Power Stations and other regional infrastructure. On this basis visitors are not taken to this location, hence development of Drayton South and its visibility from these non visited areas will not affect visitor experience.

Further setting back Blakefield and Redbank Pits with 1-2km buffers will not eliminate views to these pits from this high ground that is not currently visited by guests to the studs.

PAC Statement

"Dr Lamb considered that the proposed densely planted tree screen along the Golden Highway, opposite the Woodlands stud could provide some screening, but required more detailed planning and design to ensure its effectiveness, particularly through the use of a range of trees, shrubs and under plantings maturing at different heights."

Response

I agree with Dr Lamb that a well designed, planted and maintained tree screen will achieve effective screening for the Golden Highway and the exposed frontage areas of Darley/Woodlands.

Such detail design would be part of the management plan and would be subject to review by the working party. Tree screens would contain tall trees and lower trees and shrubs that will retain foliage low down to complement the larger trees that may develop clean trunks. Such planting will include a minimum of 6 rows 3-5m apart and could be mixed to achieve a more natural woodland setting, where trees and small trees/shrubs are planted in clumps of 3-7 within rows to ensure that in any cross section there are three rows of trees and small trees/shrubs. Alternatively 3 rows of

small trees and shrubs could be planted in front of 3 rows of larger trees although this will not create as natural an outcome.

As with design, implementation and maintenance would be subject to working group review and monitoring. Implementation and maintenance would include watering and fertilizing to ensure successful establishment and growth.

At a minimum such planting will include:

Species

- *To be defined in management plan and to include tall trees and long lived small trees and shrubs*

Spacing

- *6 rows (4 rows 5x5m spacing for large trees with 2 rows 3x3m spacing for shrub)*
- *Shrub row at front with tree rows at back (as per photo montage along new Edderton Road alignment)*
- *Total width of tree screen would be approx. 30m, on the mine side of the Edderton Rd re-alignment.*

Water

- *No irrigation was planned for tree screen, but Anglo would water trees if required.*

Fertiliser and Maintenance

- *Anglo would access the tree screen to undertake weed control and follow up fertiliser (if required).*
- *After 4-5 year period, maintenance could be undertaken by crash grazing.*
- *Plant loss replacement strategy to be outlined in management plan.*

PAC Statement

"In considering the Houston visual bund, Dr Lamb found:

The proposed Option 4A bund is still a substantial structure, at approximately 1km in length and up to 79m in height. … The bund is designed to mitigate impacts on all views, including those from rising topography in the eastern part of Coolmore, which is undulating and rises to a series of ridges, from which and along the alignment of Oak Range Rood for example, the Houston Bund will be prominent. As a result, it has a significant negative effect on the view from the Golden Highway, isolated parts of Jerrys Plains and parts of Coolmore, including those on the lower eastern slopes, on the flood plain north of the Highway and as seen from the setting of the heritage property Strowan. In those lower areas, the bund is unlikely to be significantly screening activity behind it as the viewing angle is steeply upward from the Highway and vicinity. In other words, the visibility of the bund in the public domain is significant but of little benefit to mitigation of the impacts of proposed mining on those views. (Appendix 5, p10)"

Response

The visual bund will screen activity behind and to the north of it. When completed and rehabilitated, the bund will be seen as a landscape element (albeit created) that is well integrated with the local landscape setting of surrounding hills.

The bund by definition is intended to screen views from sensitive locations to the south including parts of Coolmore, other rural residences, Jerrys Plains and the Golden Highway. The montage from Oak Range Road illustrates this screening (Figure 2). Similar montages from Ellerslie (Figure 3) and the Golden Highway (Figure 4) illustrate the effectiveness of screening created by the Houston Bund.

What the montages do not show due to bund design developments are the optimum bund design and planting design outcomes. Figure 5 illustrates bund formation on other parts of Drayton using new computer design programmes such as Geo Fluv to achieve more modulated landform within the overall bund. Similarly planting patterns would be finalised in conjunction with the working group to ensure that the landscape pattern of open forest / woodland / scattered trees and grassland are modelled and achieved. There are numerous examples within the valley where this has been achieved.

PAC Statement

"The effectiveness of efforts to revegetate the bund was a particular concern to a number of parties, including Dr Lamb. Dr Lamb raised particular concerns about the lack of detail in the plans for establishment and maintenance of the vegetation cover, including the availability and depth of topsoil to be applied and the need for watering and long term moisture availability."

Response

I consider that the Houston Visual Bund Rehabilitation Strategy developed by Global Soil Systems illustrates the achievability of establishing and maintaining the vegetation cover that is specified in a final vegetation cover plan for the Bund. Proper soil preparation, addition of moisture and fertiliser during the establishment phase and using appropriate establishment techniques including seeding will achieve long term goals. The rehabilitation strategies outlined by Global Soil Systems will allow the bund to integrate with the surrounding landscape.

PAC Statement

"Indirect impacts that may be evident to visitors included "night time lighting of the operations that may be perceived as causing a glowing effect on the atmosphere, particularly in ideal circumstances for that phenomenon to occur, that may conflict with the image of cleanliness, safety, isolation and the absence of light that is typical of the rural, high quality experience in the imagery projected by the studs. Blasting noise and dust plumes from blasting or haul roads and unconsolidated overburden may also be perceived as alien to that imagery. In that regard, the sensitivity of the studs to impacts on the imagery that is inherent in their branding and identities deserves acknowledgement and special consideration with regard to the acceptability of the proposed mine, either as proposed or as may be acceptable, subject to recommendations to minimise visual impacts. (Appendix 5, p13)"

Response

These indirect or ephemeral visual effects are discussed in Section B of this report and in more detail by the noise and air quality experts.

Indirect lighting effects are unlikely to be created by the small amount of light generated by a shovel and trucks. The concentration of lights at the CHPP, rail loading and administration and maintenance offices and buildings could generate such effects. However these development clusters are well removed from the sensitive operational areas of Coolmore and Darley being between 15-18km away.

Noise and dust effects from blasting will be infrequent, timed to not coincide with visitor timing, be co-ordinated with the working group and be of short duration. This would minimise the potential of such events creating this indirect effect.

Other dust sources will be managed by various techniques to minimise any visual effect on Darley and Coolmore.

PAC Statement

The Commission agreed that "As a general principle, the closer the operations approach the boundaries of the studs, the more likely there are to be indirect visual exposure effects" (p14). Consequently the proximity of the mine and the Redbank Pit in particular, is of concern.

Response

The indirect effects are ephemeral and are short lived, noise effects of blasting being the shortest with dust effects lasting a little longer. The experience of these short lived visual effects on visitors to the studs will be minimised through co-ordination with the working group (including stud management) to optimise separation in time between potential views by visitors and when such events occur.

PAC Statement

In regard to the overall acceptability of the impacts, the low hills on the mine site have been able to be used to shield most direct views of mining on the site, and the location of the infrastructure and coal handling facilities "distant from the subject horse studs is a significant advantage with regard to management and mitigation of the overall level of visual impacts" (Appendix 1, p14).

Response

I agree with the visual benefits of the ridge line and the use of the existing and very distant coal processing facilities at Drayton.

The whole mining operation is screened from southerly views by natural ridge lines. The two small exceptions are to the east where the Houston Bund is to be built to screen views up a minor re-entrant and to the west where tree planting will screen views from a small section of the Golden Highway and the small part of the Darley frontage that adjoins the Golden Highway to the east and visually separated from the entry zone and road into the stud.

Further the use of the existing facilities some 15-18km away from sensitive stud operational areas eliminates risks of light impacts.

PAC Statement

A critical consideration has been missed, concerning the importance of impacts on dynamic views and the fragility of the image of the studs in the context of features that contrast with, appear out of context with, or clash with aspects of that image. The image is not just what is visible at a given point in time or from a single or a range of locations

Response

I differ in interpretation of what dynamic views are from Dr Lamb and consequently deal with the issues differently.

Dynamic views as defined by Dr Lamb can be interpreted as being the collective of views during a trip, a day or even longer. These views form an amalgam of perceptions about certain landscapes from all information sources and sequential views experienced over time as well as a view from a particular location.

I can appreciate collective views or sequential views as part of a trip say from Newcastle and or Sydney to one of the horse studs. Along the way many views are taken in and perceptions formed or reinforced. This includes rural views, views of horse studs, towns, villages, bush areas etc. In this context it is assumed that even the smallest view of a mine area would elicit the perception of whole range of mining images and that this would be inappropriate in the context of a horse stud experience. However the whole intent of visual mitigation in this project is total removal of operational areas from view. This being achieved it is difficult to see how the image of the horse studs can be affected.

It has been suggested by Dr Lamb that image is not just what is visible from a fixed location or a range of location but also based on knowledge gained from other sources. It is suggested that such input into the perception varies from individual to individual and is strongest with stud management and weakest with visitors to the locality and the studs.

Stud management and staff would generally have good knowledge about the location of the mine regardless of the success of screening. Their image perception could be affected. However visitors are less likely to have this knowledge and would require visual triggers to compromise the real and perceived image of the horse studs in a mine free landscape setting.

This mine free visual setting is achieved by the Drayton South Project using natural topography and the visual and landscape mitigation strategies which include mimicking natural topography and or vegetation patterns in the visual bund and roadside tree screens.

3. SECTION B: RESPONSE TO DR LAMB'S REPORT

3.1 AT SECTION 7 DR LAMB'S REPORT: NON INDIGENOUS CULTURAL HERITAGE VALUES

There would be potential impacts on these values arising from the mining activity, arising from the direct and indirect visual impacts on both fixed and dynamic views.

I agree with the landscape settings as described by Dr Lamb in Section 5 & 6 (Landscape Quality) and Section 7 (Non indigenous cultural heritage values) and that they have high landscape quality, but disagree with the conclusion that proposed mining will have a visual impact on these values through various views, described as fixed and dynamic.

My reasoning for this is as follows:

To create an impact, mining operations must create a strong visual effect and be visible. With little exception, the natural northern boundary of the visual catchment of these distinctive landscapes is the ridge line to the north of these landscapes.

The exceptions are narrow view corridors to the east and west, which will be treated by created natural land forms and tree planting. This will completely screen sensitive view locations, including the sensitive cultural landscapes of Coolmore and Darley as well as the Golden Highway and Jerrys Plains from any view of mine areas. Such treatments will potentially have a high to moderate visual effect during the short construction period with potential for high visual impact. However, once constructed and rehabilitated, the bund will blend into existing landscapes by borrowing visual character from them and thereby eliminating the significance of any visual effect created by them as well as removing any potential view to mining areas.

The ridge line and landscape treatments will screen mining areas from all viewing locations with the exception of the rarely visited high ground associated with Trig Hill at Woodlands Stud. This high ground is perhaps rarely used, as suggested by Dr Lamb at Section 11.2 of his report, as it has views to existing mining at Mt Arthur Coal Mine and Drayton Mine as well as Bayswater and Liddell Power Stations and other infrastructure in the locality (ie Plashett Dam).

Further the Houston visual bund will be built to have a character similar to and visually integrated with the existing hills and 'edges' to the heritage landscapes and screening it from mining activity to the north. Tree planting along roads on adjoining properties is part of the existing landscape and is also part of landscape treatments carried out by the horse studs themselves, especially Coolmore.

3.2 AT SECTION 8.1 OF DR LAMB'S REPORT: FIXED VIEW LOCATIONS

At paragraph 3 in this section Dr Lamb states:

"Most of Darley Woodlands has no fixed views of the proposed mine site. The exception is the high land that includes a trig. station, Trig Hill and hilly grazing land in the vicinity in the north east part of the property, as well as the frontage of the property to part of the Golden Highway. The view from the Trig Hill location and part of Cool more on the side slopes of the same ridge system will include the operations in the Redbank and Blakefield pits in the foreground of the view composition, with at least part of the Whynot pit in the middle distance. The relative relief is such that there is no practical way to mitigate the impacts on the view and since the operations proceed generally from north to south, advancing toward Darley Woodlands and Cool more over many years, with the rehabilitation following behind, there will be visual exposure of the mining throughout the operational life of the Redbank and Blakefield pits.

In this section there is reference to Darley 'frontage' that will have views to Redbank and Blakefield but this is only a part of this frontage and does not include the Gateway entry and surrounding more sensitive landscape to Darley. Rather, this 'frontage' refers to the lower slopes of the ridge line and not part of the intensive operation area of Darley.

These frontage areas will be screened by existing and proposed plantings along the Golden Highway, removing any view from these locations. I note that Dr Lamb acknowledges "appropriate tree screens will be effective in mitigating impacts on the views Darley, Coolmore and the Golden highway in the general vicinity" (p. 10).

Considerations of views from the higher ground is considered in Section 3.10 of this report, suffice to say here that such areas already have views of existing mining and power generating infrastructure and are not likely to be visited by guests to the Studs.

At Paragraph 10 in this section, Dr Lamb states:

"The bund is designed to mitigate impacts on all views, including those from rising topography in the eastern part of Coolmore, which is undulating and rises to a series of ridges, from which and along the alignment of Oak Range Road for example, the Houston Bund will be prominent. As a result, it has a significant negative effect on the view from the Golden Highway, isolated parts of Jerrys Plains and parts of Coolmore, including those on the lower eastern slopes, on the flood plain north of the Highway and as seen from the setting of the heritage property Strowan. In those lower areas, the bund is unlikely to be significantly screening activity behind it as the viewing angle is steeply upward from the Highway and vicinity. In other words, the visibility of the bund in the public domain is significant but of little benefit to mitigation of the impacts of proposed mining on those views."

I disagree with Dr Lamb's conclusion that that the Houston Bund will have a negative effect on the view beyond its construction period, and that it will not achieve the screening for which it is intended. Due to its high levels of visual integration based on land form and planting detail design, the bund will not be discernible from existing hills and vegetation patterns. Further its elevation and location have been designed and tested to screen views from elevated locations and certainly screen views from lower locations such as the highway Strowan and Jerrys Plains.

The bund and its effectiveness have been dealt with in Section 3.7 of this report.

3.3 AT SECTION 8.2 OF DR LAMB'S REPORT: FIXED VIEWS AND PHOTOMONTAGE

By definition, to illustrate the project you must use 'Fixed points" or drive bys. However the latter do not illustrate visual effects as powerfully as "fixed points" as the visual effects are limited due to the small proportion of time the view would include mining areas.

I agree the colours are not perfect in montage work but they are there to illustrate the different layers and do not attempt to hide the 'temporary' visual effects of unfinished layers.

I note that in Paragraph 4 of Section 8.2, Dr Lamb states that "If the vegetation was successfully established as intended the appearance of the bund if considered in isolation of other effects it would have, would be acceptable."

This is contrary to what he says at Section 11.1 of his report, where he states it is of no value in screening as seen from Golden Highway and Jerrys Plains.

3.4 AT SECTION 8.3 OF DR LAMB'S REPORT: DYNAMIC VIEWS

Dr Lamb suggests that Dynamic views are 4 Dimensional and include the 3D experience of the landscapes you see and a fourth dimension that includes all general and specific knowledge about the landscape in general and mining in particular both in a broad sense and in relation to specific projects, even where something is not directly seen from any particular *'fixed'* location.

There are two points to make to this. Firstly visual impacts are spatially related; they are the impacts on the visual settings of landscapes in a particular location. Secondly every person will have a different "dynamic view" based on a range of experiences current and past, knowledge, education, expectations, etc. In fact the full range of factors that affect our perception of landscape. These factors are said to influence a person's perception and resultant visual sensitivity to change.

In this context for example the working staff and management of Darley and Coolmore could have detail knowledge of the mine plan, including the Houston Visual Bund. They would therefore be aware of mining behind the bund and that the "successfully" developed Houston Bund is not part of the existing landscape but rather a visual screening element that borrows from existing land forms and vegetation patterns.

A visitor will have less local knowledge but will by travelling to Darley / Coolmore have knowledge that the Hunter Valley supports a range of rural land uses that include grazing, cropping, vineyards, specialist crops, e.g. olive groves, horse studs, mining, national parks and that all these land uses as well as natural features create a myriad of landscapes. Keeping mining out of the visual experience of visitors or those not familiar with local settings will remove visual effects and impacts.

"Visitors to the studs, who commonly would be clients, may find features of the adjacent mining landscape, compared to the scenic quality, character and blue ribbon imagery of the studs themselves and their wider settings to be discordant and a negative impact on both scenic quality and the image projected by the studs."

However once the Houston Bund and tree plantings are in place no such views, perceptions or impacts will be experienced by visitors, except from locations that already experience them (e.g. Trig Hill and such locations are already avoided by visitors for that very reason).

3.5 AT SECTION 8.4 & 9 OF DR LAMB'S REPORT: IMPACTS ON THE IMAGE OF THE STUDS & INDIRECT VISUAL EXPOSURE OF THE OPERATIONS

Dr Lamb explains how dynamic views from many sources including views experienced in trips, other valley areas as well as documented and digital information on mining activity in the region and locality, contribute to a person's perception.

Dr Lamb suggests that such "dynamic" imagery would be impacted by the slightest visual cues experienced on site. Dr Lamb suggests night light glow, dust and haulage trucks are potential visual cues.

This perception, no doubt occurs at various levels for different people. However is built for the greater part on what already is a well established land use and economic pattern in the Hunter Valley. Most trips to the Hunter Valley (whether by road, rail or air) would give views to grazing lands, improved pastures, vineyards, horse studs, mining areas, power generators, as well as more natural steep forested hills and mountains. The full gamut of land use visual expression and effects are part of the dynamic visual landscape experience of the valley.

The visual management goal for Drayton South is to screen mining activities from external view. Extensive planning, detailed design and management has been undertaken to achieve this goal. This is especially the case in relation to views from the south and such views will be far more successfully internalised than in many other locations in the valley. This will be the experience of the visitor on the ground.

Indirect views as defined by Dr Lamb are in fact direct views of temporary (ephemeral) visual effects. A natural temporary visual effect is one of cloud cover or different light conditions. In terms of mine operations it could be a dust cloud or on road signage indicating a location of some operation.

Dust

In the case of a dust cloud, such an effect could appear over a screening ridge or tree screen but will be infrequent and of short duration and therefore considered to be of very limited visual significance especially in relation to the more central parts of the horse stud operational areas at both Coolmore and Darley.

Dust could be generated by trucks, blasting or off pre-rehabilitated overburden (on very windy days).

Road dust from trucks on haul roads will be eliminated by watering and treatment of road surfaces. Dust associated with blasting of rock will be short lived. This activity would generally occur only once a day and would be co-ordinated through the working group through regular meetings and be carried out at times of low visitor activity. Dust from wind events during dry periods could occur at infrequent intervals. Dust effects are further discussed by the Air Quality Expert.

Signs

There will be no access to the Project from the Golden Highway with all mine vehicle access Thomas Mitchell Drive. As there will be no signage, such elements would not be part of the view from the Golden Highway and the realigned Edderton Road.

Night Light

As outlined in the visual impact assessment, study night light impacts result from direct and or diffuse light. There are no direct light impacts on sensitive land use areas to the south of the Project, unless there is night work carried out on the Houston Bund construction.. Dr Lamb's report suggests that there may be diffuse light impacts emanating from pits in the southern part of the mine lease area and closest to southern sensitive viewing locations and areas, especially the horse stud operational areas.

Diffuse night light effects depend in part on atmospheric conditions, being greatest when light can be reflected off airborne particles such as dust but generally, especially at night, moisture particles such as light fogs. Also needed is a strong light source. In the case of mines, such a source can only emanate from the concentrated source of lights at the mine infrastructure area.

The light sources at the mine infrastructure area are 15-18km north of the horse studs. Light sources at the closest points (2.5 to 5 km north) are limited to a bucket loader and trucks in the mine pit area. These sources generally do not provide sufficient light to generate night time glow or indirect lighting effects of any significance.

Visitor Experience

Following completion of the Houston Bund in the east and the tree planting to the west adjacent to the Golden Highway, a visitor will have no direct view to the mine areas from sensitive areas and the vast majority of horse stud areas including those visited by guests. It is most unlikely that they will experience night light effects at all due to time of visitation and outside experiencing of the local landscapes.

In travelling to the horse studs along the Golden Highway, visitors will currently experience views of the Warkworth Mine, Wambo Mine and rail facilities, United Mine, Hunter Valley Operations Mine, Redbank Power Station and the Bayswater Power Station, but not as Dr Lamb points out within the local landscape context of the horse studs. This visual context will be maintained.

In this context, the visitor will experience the natural land forms and landscapes of the Houston Bund, similar to existing landforms and landscapes and roadside tree planting for those travelling to Darley. These landscape 'treatments' are also in keeping with existing elements of the roadside tree-scapes and landscapes in the locality. Also these landscapes will be experienced in terms of their "dynamic' experiences that do not include any knowledge of these visual mitigation strategies being put in place. Therefore, visitors will view the landscape treatments as nothing more than natural or cultural parts of the landscape.

Further the experience of these natural landscape treatments is of very limited duration in the context of the 'dynamic views' experienced on the trip along the Golden Highway to reach the studs. The 1km for the Houston Bund and 4km of tree side planting are seen in the context of a greater than 50km trip along the Golden Highway and more if the New England Highway is considered.

If there were to be any experience of a dust cloud associated with a blasting event, this visual effect accounts for only a very short duration in the context of the trip to the studs. However, it is very unlikely that a driver's eye would be drawn to it due to lack of any strong audio cue due to engine, road and potential wind acting as screening noise.

For the above reasons, the development of the mine and its associated visual impact mitigation strategies will have no image or brandscape impacts based on visual experiences of the locality. Dust is an ephemeral visual effect that will occasionally be visible but will have limited impact on the image of visitors due to its infrequence and general short duration.

The effect of knowledge of the mine will be greatest in management and workers, but again the detailed knowledge of mine location etc is not likely to be part of a visitor's background perception.

3.6 AT SECTION 10 OF DR LAMB'S REPORT: OVERALL VISUAL IMPACTS OF THE PROPOSAL ON THE STUDS

Dr Lamb states:

"The proposed mine plan benefits from the conservation of the most of the existing appearance of the range of low hills that are along the south west and south sides of the area of proposed disturbance. There is significant (Authors emphasis) merit in utilizing a connection to the existing Drayton mine at which the existing infrastructure CHPP and rail load out facilities will be used.....

The location of these facilities distant from the subject horse studs is of significant advantage with regard to management and mitigation of the overall levels of visual impact. That benefit generally flows to the public domain as well in that a proportion of the views from the Golden Highway would not be subject to significant visual impact. Given the size of the proposed mine the overall level of mitigation of visual impact is of a generally satisfactory standard."

Despite this Dr Lamb considers that while these impacts and their mitigation are satisfactory for normal agricultural areas, "They are not satisfactory for these areas of heightened levels of sensitivity to visual impact of all three of the classes identified above, i.e. direct, indirect and impacts on image."

The heightened sensitivity of the intensively used areas of Coolmore and Darley are recognised and visual impact assessment and visual mitigation strategies are based on this. As Dr Lamb points out, visual mitigation strategies

if implemented will remove visual impact from the visual experience of special areas (Figure 1) within Coolmore and Darley. The only exception is the less used and less cultivated hill ridge line separating the two horse studs. This location is already impacted by mine and infrastructure (inc. Bayswater Power Station) views and is generally not visited by guests of the studs.

I consider indirect visual impacts to be direct but they are ephemeral, of limited occurrence and of short duration, and where possible, timed to avoid impact on high sensitivity times. Timing of activities that may produce such impacts will be co-ordinated through the ongoing workshops between mine management and surrounding property owners, particularly Coolmore and Darley.

3.7 AT SECTION 11.1 OF DR LAMB'S REPORT: RECOMMENDATIONS REGARDING THE HOUSTON PIT AND BUND

In section 11 of his report, Dr Lamb makes suggestions in relation to various project components that will improve the visual and landscape performance of the Drayton South project.

"The Houston Bund, notwithstanding the agreement by Anglo American to implement the Option 4A bund proposed by Coolmore, has significant potential direct impacts on views from the stud, including those experienced from the setting of the heritage property Stowan, Ellerslie, Oak Range Road and the landscape in the vicinity, the air strip, paddocks north of the Golden Highway and Quarry Hill.

The bund also has some negative visual impacts on the public domain of the Golden Highway and parts of Jerrys Plains, however in these locations, the bund is unlikely to be significantly screening the operations in the Houston Pit, as it is elevated, distant and the view angle is upward. The bund has little value to the public in protecting it from visual impacts and it has negative impacts on views and the imagery critical to the operations of Coolmore. The bund has a negative impact on the visual aspects of that image and is associated with direct and indirect visual impacts because it enables operations that can cause indirect impacts to be closer to the stud."

Dr Lamb considers that the Houston Bund, notwithstanding the agreement by Anglo American to implement the Option 4A bund proposed by Coolmore, has the potential for significant potential direct impacts on views from the study including those experienced from the settings of the heritage property Strowan, Ellerslie, Oak Rand Road and the landscape in the vicinity of the air strip paddocks north of the Golden Highway and Quarry Hill.

Dr Lamb also states that the bund also has some negative visual impacts on the public domain of the Golden Highway and parts of Jerrys Plains. He suggests that the bund should not be built.

I disagree with these opinions. The views of the project from the highly sensitive southern view locations that include locations on Coolmore and Darley are hidden from view by existing topography, remnant vegetation and the establishment of screen trees. The exception is the views of the Houston and part of the Whynot mining areas available through an existing valley on sensitive eastern parts of Coolmore Stud, parts of the Golden Highway and Jerrys Plains. To eliminate such views of the Project a visual bund will be constructed.

An initial preferred option (Option 3) has been replaced by an option (Option 4A) proposed by Coolmore that significantly reduces the scale of the bund and the build time required.

Option 4A as proposed by Coolmore is now the preferred visual bund and impact mitigation solution for the Houston and Whynot mining areas. By definition this bund will be visible to areas it is intended to protect, including: some areas within Coolmore; including the homesteads and work areas around Strowan, Ellerslie and Oak Range Road; as well as parts of the Golden Highway; and some western parts of Jerrys Plain Village. This would also apply to its short construction period were impact levels would be higher till earth shaping and initial grass covers are achieved.

The Houston Visual Bund (Option 4A) as proposed by Coolmore has been reduced to half the size to the initial proposed bund and will be built in half the time. A total construction time of 8 months is proposed. Visible operations will be restricted to approximately 5.25 months, with other build operations being screened by the outer pre-constructed southern wall of the bund.

The 4A option will be 79m high and 1095m long, creating an exposed face area of less than 86,505m2. This will be created in three lifts of less than 28,835m2 that will be shaped and grassed in periods of 5-6 weeks. These areas at a distance of 2.5km (distance to nearest residence) represent a small area of a view (less than 2.5% of a primary view as defined in the visual impact assessment for the project and less than 1% of a total view) and significantly less of the total landscape view north of the Golden Highway that is available to locations such as Strowan, etc.

These small areas of a total view create a moderate to high visual effects and impacts for short periods and will be restricted to 5.25 months, in blocks of 6-7 weeks, with the remaining work during the 8 month period occurring out of this view. These temporary short term visual impacts experienced in the construction of a visual mitigation structure do not seem inappropriate, given their small scale in an overall view from critical areas.

After these periods grass cover will dominate the southern exposed face of the bund and will achieve visual integration with surrounding landscapes that are dominated by grassland by visually emulating that grassland. When this occurs the visual effects will decrease and continue to do so as tree plantings become established (Figures 2 – 5)

The Houston Bund after a period of 8 months will have reducing visual impacts on all areas to the south of it and screen views from lower elevation viewpoints such as the Golden Highway (Figure 4), Jerrys Plains and the Sensitive view locations on Coolmore (Figures 2 &3).

Dr Lamb seems to suggest the Houston Bund does not screen the sensitive southern areas including all parts of Coolmore, the Golden Highway and Jerrys Plains from views to Houston and Whynot pits and goes onto suggest that their lower view locations and the upward direction of the view lines are upward. Oak Range Road photomontage location (Figure 2) is the highest of the sensitive view locations in the eastern part of the view shed that includes Coolmore the Golden Highway and Jerrys Plains. Clearly, even from this elevated location Houston and Whynot pits are screened. Therefore lower locations as illustrated in Figure 4 (Golden Highway) and Figure 3 (Ellerslie) will also be screened.

3.8 AT SECTION 11.1.1 &11.1. 2 OF DR LAMB'S REPORT: RECOMMENDATIONS IN RELATION TO THE HOUSTON PIT AND BUND AND WHYNOT PIT

"If the Houston Pit and therefore the bund was removed from the project, the nearest part of the Whynot Pit would be a further 1.5km away and only partly and obliquely visible from the eastern and more elevated parts of Coolmore. As mentioned above, the alignment of the south eastern part of the Whynot pit could be amended to minimise the potential visibility of future operations in that pit. In further support of that amendment, there would not appear to be a significant likelihood of view from most of Coolmore and it is unlikely that there would be any significant visibility of the operations in Whynot from the Golden Highway or Jerrys Plains. Recommendations that the Houston Bund not be constructed would mean impact management of the Houston and eastern half of the Whynot pit could not be achieved".

Construction of the Houston bund using new programmes such as Geo-Fluv for landform design (Figure 5) to integrate with surrounding land form as well as planting design that is co-ordinated between landscape architects for both the mine and the horse studs and implementation and management by Global Soil Systems an Australian expert in mine rehabilitation and constant overview by the working committee will ensure that the landscape integration sought is achieved.

The Houston Bund when constructed will not be discernible to those unaware of its construction as natural landforms and landscape patterns will be in keeping with surrounding landscapes in terms of scale, form, shape, pattern and colour.

Further it is noted that it is acknowledged by Dr Lamb that if the bund were not constructed there "would (be views, but) be a further 1.5km away and only partly and obliquely visible from the eastern and more elevated parts of Coolmore"; and "unlikely that there would be any significant visibility of the operations in Whynot from the Golden Highway or Jerrys Plains."

Clearly Dr Lamb suggests there would be views but would not be significant if the bund was not built. The project as planned is intended to remove all views from sensitive areas on Coolmore, the Golden Highway and Jerrys Plains not just significant views.

3.9 AT SECTION 11.2.1 OF DR LAMB'S REPORT: RECOMMENDATIONS WITH REGARD TO VEGETATION BUFFERS

"Design of appropriate tree screens that will be effective in mitigating impacts on the views from Coolmore and Darley Woodands and the section of the Golden Highway in the general vicinity should be the subject of specific conditions if the proposal is to be approved"

Dr Lamb agrees that if tree screens are appropriately designed, implemented and managed then they will be "effective." I agree with this position and consider that such detail design, mutually considered and monitored for

performance will achieve effective screening results and be in keeping with the landscape character of tree screens already established and extensively planted along the Golden Highway, especially in front of Coolmore Stud (Figure 1).

I also agree that it is desirable to establish a woodland character and that the effective creation of a mix of small bands of tall trees and small trees and shrubs across a minimum of 6 rows will create informal woodland that would block views. Such effectiveness and visual quality could be further enhanced by varying the roadside outline and setting back fence lines behind and screened by planting as has been done around the Coolmore entry.

3.10 AT SECTION 11.2.2 OF DR LAMB'S REPORT: RECOMMENDATIONS FOR INCREASED SETBACKS FOR REDBANK AND BLAKEFIELD.

"The Redbank Pit is at its closest to both studs, with high wall mining drives under the area between the Pit and the Golden Highway. Tree bands may block some views, but will have no effect on others and the Redbank and Blakefield Pits will have a significant direct visual impact on views from some elevated locations of both studs, but most notably from Trig Hill in Darley Woodlands Stud and high land in the vicinity in Coolmore. While the view will be significantly affected by the proposed mining operations, the viewing places are not considered to be of the highest intrinsic sensitivity, as they would not be accessible to most visitors to the stud and would in all likelihood be avoided as a place for staff to take visitors to because of the unimpeded views they provide over the Redbank and Blakefield Pits."

"It is noted Redbank and Blakefield Pits will have a significant direct visual impact on views from some elevated locations of both studs, but most notably from Trig Hill in Darley Woodlands Stud and high land in the vicinity in Coolmore."

The "some elevated areas" are all associated with the ridge system that supports Trig Hill. I agree with Dr Lamb that "the viewing places are not considered to be of the highest intrinsic sensitivity, as they would not be accessible to most visitors to the stud". The reasons for this are there are better view locations to view the significant areas within the studs, Batty Hill in the case of Coolmore and to the east of the river in the case of Darley (Figure 1). In addition to providing the desired overview of the studs, these locations do not have views to existing mining and electricity generating facilities and infrastructure.

Existing views from Trig Hill and associated high ground, on the other hand include: Mt Arthur Coal Mine and Drayton Mine; as well as Bayswater and Liddell Power Stations and other infrastructure. These existing views are undoubtedly undesirable to the studs so these locations are unlikely to be visited by guests to the studs. The Project does not alter this pattern of use.

In this context, the 'pulling back' of operations in the Redbank and Blakefield Pits to the suggested Buffers of 1-2 km will have still have those areas visible to views from Trig Hill and associated ridges. Further, any such pulling back will not be visible to the critical sensitive areas of Coolmore, Darley and the Golden Highway.

4. CONCLUSION

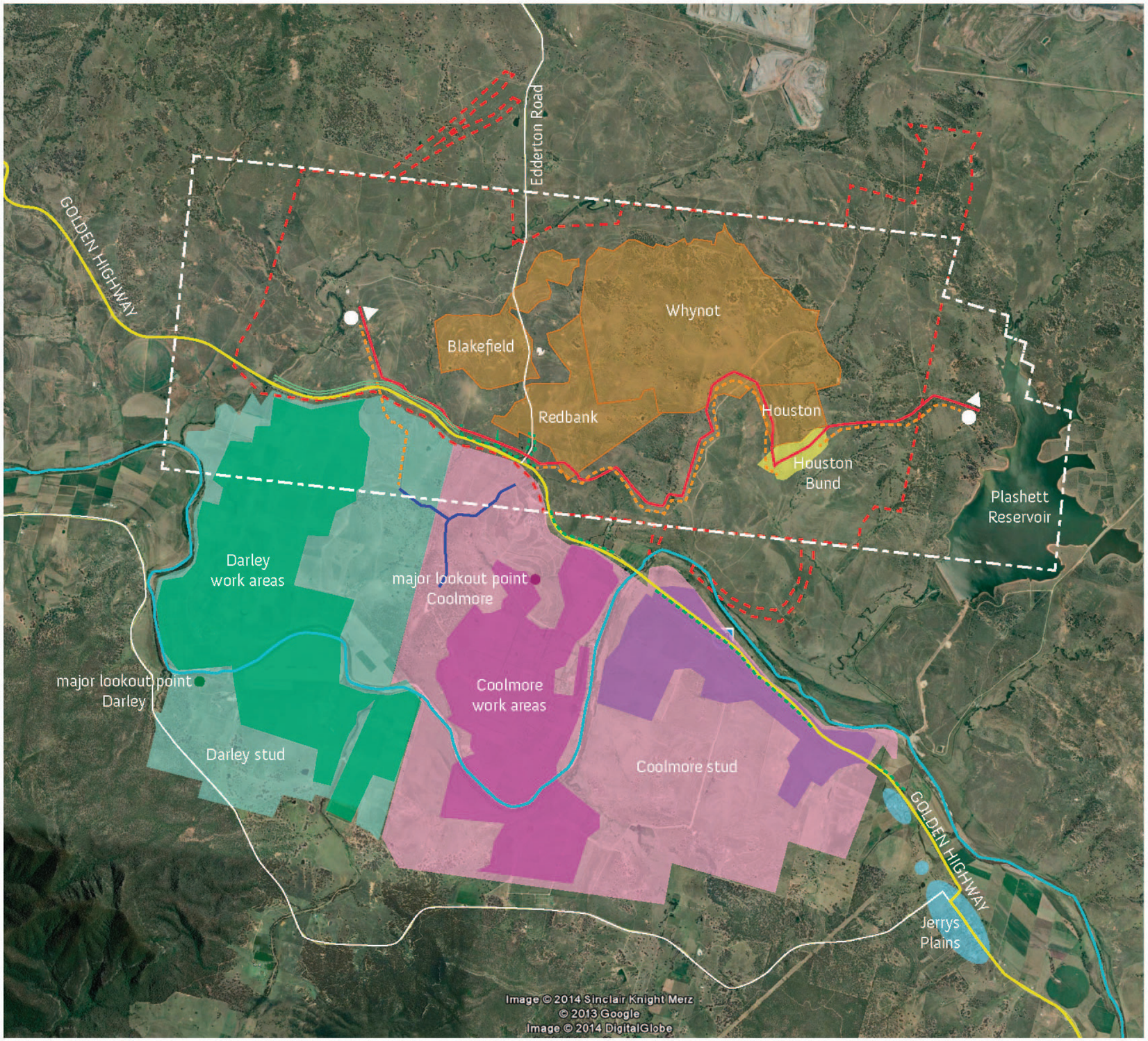
The Drayton South mine plan has been developed in the context of the sensitive landuses to the south of the mine lease area. This includes horse studs as well as a vineyard, other rural residences, the village of Jerrys Plains and the Golden Highway

For the greater part the operational areas of the proposed mine are screened by intervening ridge lines. Small gaps in this visual screen to the east are screened by the Houston Visual Bund and to the west by roadside screen planting.

These and other management visual mitigation strategies will remove the mine operational areas and operations from view, with only very short term ephemeral visual effects having any potential impact. This all but eliminates "direct" and "indirect" views. Any such effects would be limited to low sensitivity times when visitation is limited, e.g. early in morning and would be coordinated through a working group to ensure this is achieved.

The "dynamic" effects and effects on "image" are not affected by views to Drayton South as such views are totally eliminated especially when compared to currently available views of mining activity along the Golden Highway.

The effect on "dynamic" effects and "image" of knowledge of the project from sources other than visual experience ("direct" and "indirect" views) is likely to be limited to those involved in management of the studs rather than casual visitors who would be limited to visual experience to influence "image" of the horse studs and their landscape settings.



LEGEND

Visual Catchments:

+ Mine Areas: Visual catchment contains major mine areas and infrastructure elements
+ Cultural Agricultural Landscape: Visual catchment contains horse stud, vineyard, grazing lands, wooded hills and mountains
+ Existing roadside tree plantings

Mine Area Features:

+ Extent of mine areas & pits: Blakefield, Redbank, Whynot and Houston Pits
+ Location and extent of Houston Bund
+ Location proposed tree screen plantings
+ Ridgelines that screen operations

Sensitive Areas:

+ Coolmore Stud
+ Most sensitive Coolmore work areas
+ Highly sensitive eastern work areas and residences of Coolmore
+ Major visitation lookout Coolmore
+ Darley Stud
+ Most sensitive Darley work areas
+ Major visitation lookout Darley
+ Trig Hill & assoc. ridges: give views to existing mines and infrastructure in region and proposed Blakefield and Redbank Pits
+ Jerrys Plains and surrounding rural residences
+ Golden Highway

Project boundary
Mining authorisation boundary

0 0.5 1 2km

North

Figure 1 - Visual Analysis

Figure 2a: Existing setting

Figure 2b: View on completion of bund construction

Figure 2c: View on establishment of vegetation

Figure 2:
View from Oak Range Road following initial rehabilitation and on the establishment of tree growth

Figure 3a: Existing setting

Figure 3b: View on completion of bund construction

Figure 3c: View on establishment of vegetation

Figure 3:
View from Ellerslie following initial rehabilitation and on the establishment of tree growth

Figure 4a: Existing setting

Figure 4b: View on completion of bund construction

Figure 4c: View on establishment of vegetation

Figure 4:
View from Golden Highway following initial rehabilitation and on the establishment of tree growth

Figure 5a: Illustrations of more fluent land forms created by Geo-Fluv that can be used to design visual bund

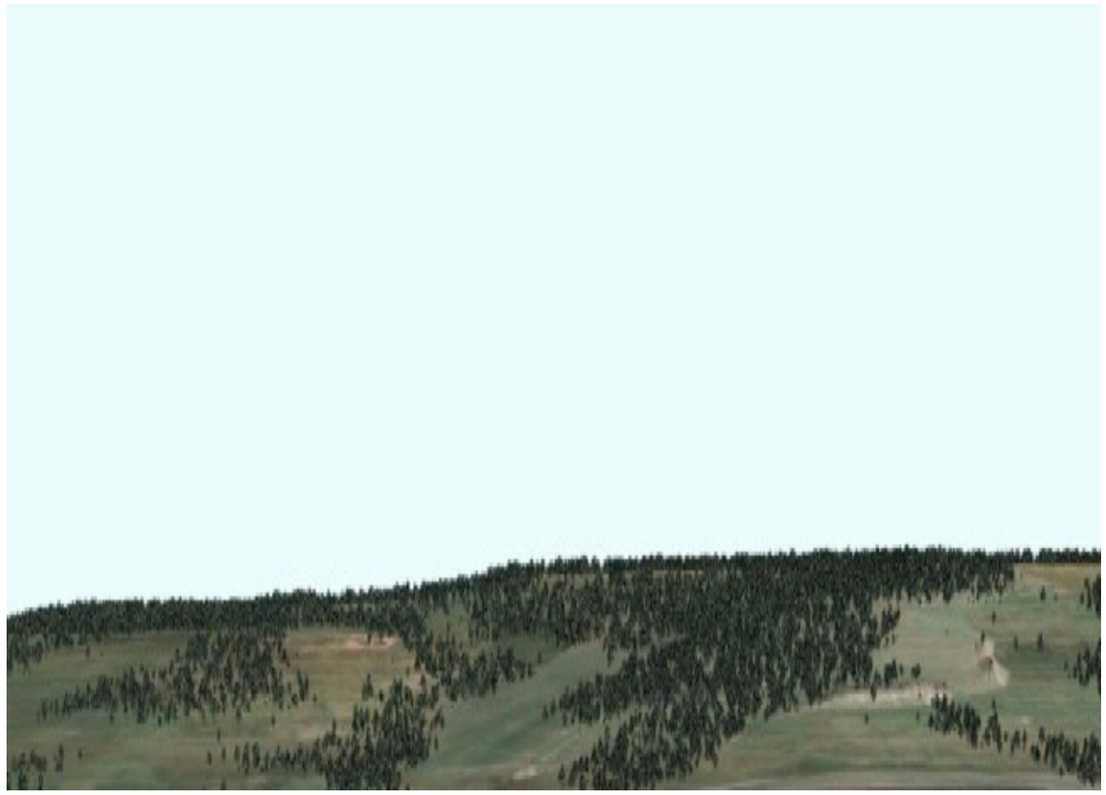


Figure 5b: Vegetation Patterning appropriate to the landscape setting can be tested in computer modelling

Figure 5:

The final design of the Houston Bund can achieve optimum micro-topographic features using design programmes such as Geo-Fluv and vegetation patterning to integrate with surrounding landscapes.

Appendix 3

Examples of Tree Screens and Bunds

1 TREE SCREENS

Plate 1
Dartbrook Mine: Infrastructure Tree Screen from Blairmore Lane

Plate 2
Dartbrook Mine: New England Highway East Side Tree Screen

Plate 3
Dartbrook Mine: Trees Providing Effective Ridge Top Screening to Infrastructure Area

Plate 4
Dartbrook Mine: Ridge Crest Screening to Infrastructure Area Line of Site from Aberdeen

Plate 5
Hunter Valley Mine: Roadside Plantings from Lemington Road looking SW

Plate 6
Bengalla Mine: Tree Screen Adjacent to Wybong Road Looking West

2 BUNDS

Plate 1
Dartbrook Mine: Access Road New England Highway Intersection Bund with Trees

Plate 2
Cumnock Mine: Trees on Overburden Emplacement Area Adjacent New England Highway

Plate 3
Muswellbrook Coal: Overburden Emplacement Area Screening Woodridge Subdivision

Plate 4
Muswellbrook Coal: Overburden Emplacement Area Screening Woodridge Subdivision

Appendix 4

Drayton South Historic Heritage Advice – PAC Review

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31 January 2014

Belinda Hale
Hansen Bailey
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Dear Ms Hale

Drayton South Historic Heritage Advice - PAC Review

Hansen Bailey engaged AECOM Australia Pty Ltd (AECOM) on behalf of Anglo American Metallurgical Coal Pty Ltd (Anglo American) to address the Planning Assessment Commission (PAC) report on the Drayton South Coal Project (the Project). Hansen Bailey have requested further clarification regarding the heritage significance and status of the structures and cultural landscapes of Coolmore and Darley Woodlands horse studs. This letter constitutes the requested clarification around the following points:

1. The process for listing items on the National Heritage List (NHL) and the State Heritage Register (SHR);
2. The likelihood that the items (Coolmore and Woodlands) will be listed on either or both the NHL and the SHR; and
3. If they were listed, whether or not the Project would potentially impact them.

1.0 Background

AECOM prepared a technical report regarding the historic heritage within and adjacent to the Project Boundary for the Project as part of the Environmental Assessment (EA). AECOM's report assessed the historic heritage significance of the Coolmore and Darley Woodlands horse studs, together with the potential impacts of the Project to the heritage significance.

AECOM assessed the Woodlands Homestead as being of State significance, while a smaller Homestead, Randwick, also located on the stud lands could not be assessed due to insufficient information regarding the history of the structure. The Coolmore stud incorporates two historic structures: Strowan homestead and Arrowfield cottage, which were assessed separately. The Strowan Homestead was assessed as being of national significance, while Arrowfield cottage was assessed as being of local significance. The impact assessment concluded that there would be no visual impacts to the Woodlands Homestead, due to its distance from the Project Boundary and topography. Arrowfield cottage has no direct lines of sight due to vegetation screens existing around the cottage. Strowan Homestead, however, directly faces the southern edge of the Project Boundary and as such there would be a visual impact resulting from the construction of the Houston visual bund between Year 3 and 5. The Houston visual bund will infill a valley that otherwise would afford views of the Project from Strowan Homestead. Once the construction and vegetation of the bund is completed, the visual impacts from Strowan would be minimised.

Following assessment of the Project by DP&I and alterations made to the Project by the proponent, Hansen Bailey prepared a Preferred Project Report (PPR) on behalf of AngloAmerican and the Project was referred to the PAC. As part of their public submission to the PAC, the Hunter Thoroughbred Breeders Association employed Godden Mackay Logan Heritage Consultants (GML) to undertake an independent assessment of the historic heritage technical report. While GML concurred with AECOM's assessment that the properties were of at least State heritage significance, and possibly also of National significance (in the case of Darley Woodlands), they also noted that the AECOM report did not include an assessment of the cultural landscape nor did it provide an assessment of the studs against the NHL criteria. GML argued in their report that the Coolmore and Darley landscapes have 'organically evolved' and demonstrate the historic processes of settlement and the subsequent modification of the landscape to facilitate agricultural pursuits, including the breeding of thoroughbred horses (GML 2013:11-14). Despite this assertion, GML themselves do not provide a significance assessment of the cultural landscapes against the criteria for listing items on the NHL or the SHR (see Section 2.0 for a detailed outline of these criteria).

2.0 Process for listing items

2.1 Process for listing an item on the National Heritage List

The NHL is formed under the *Environmental Protection and Biodiversity Conservation Act (1999)* (the EPBC Act). To be eligible for listing on the NHL, an item must meet one or more of the nine criteria used to assess nominations and be considered to be of outstanding significance to the nation of Australia. The criteria are as follows:

(a) the place has outstanding heritage value to the nation because of the place's importance in the course, or pattern, of Australia's natural or cultural history;

(b) the place has outstanding heritage value to the nation because of the place's possession of uncommon, rare or endangered aspects of Australia's natural or cultural history;

(c) the place has outstanding heritage value to the nation because of the place's potential to yield information that will contribute to an understanding of Australia's natural or cultural history;

(d) the place has outstanding heritage value to the nation because of the place's importance in demonstrating the principal characteristics of:

(i) a class of Australia's natural or cultural places; or

(ii) a class of Australia's natural or cultural environments;

(e) the place has outstanding heritage value to the nation because of the place's importance in exhibiting particular aesthetic characteristics valued by a community or cultural group;

(f) the place has outstanding heritage value to the nation because of the place's importance in demonstrating a high degree of creative or technical achievement at a particular period;

(g)the place has outstanding heritage value to the nation because of the place's strong or special association with a particular community or cultural group for social, cultural or spiritual reasons;

(h) the place has outstanding heritage value to the nation because of the place's special association with the life or works of a person, or group of persons, of importance in Australia's natural or cultural history.

(i) the place has outstanding heritage value to the nation because of the place's importance as part of Indigenous tradition.

Nominations to the NHL can be made by any person, organisation, corporation or other during the nominations period each year by submitting a nomination form. Nominations are assessed by the Australian Heritage Council (AHC) against the criteria and using comparative analysis of the item's integrity and authenticity (i.e. is the item intact and its origin undisputed). Using these concepts, the assessment must determine whether the item meets the threshold of outstanding heritage value to the nation. During this initial phase of assessment, the AHC is obligated to only consider information provided in the nomination form (Australian Heritage Council, 2009). Based on the nominations received, the AHC then develops a Proposed Priority Assessment List. Items included on this list will be the focus for assessment in the upcoming financial year.

Should the item be included in the PPAL, the AHC undertakes a process of consultation with the public, owners, occupiers and relevant Indigenous groups (Australian Heritage Council, 2009). Following the formal assessment by the AHC, a recommendation is made to the Minister for the Environment regarding the proposed item. The final decision is made by the Minister.

Further details regarding the process can be found on the Department of Environment's website at http://www.environment.gov.au/topics/heritage/heritage-organisations/australian-heritage-council/nominating-heritage-place

2.2 Process for listing an item on the State Heritage Register

The SHR is formally constituted under the NSW *Heritage Act (1977)* and is the responsibility of the Minister for Environment and Heritage.

Anyone can nominate an item for consideration by completing a nomination form, which can be submitted at any time of year. Nominations are initially considered by the Office of Environment and Heritage (OEH). To be included on the SHR an item must be of heritage significance to the State of NSW under **two** of the following criteria:

a) an item is important in the course, or pattern, of NSW's cultural or natural history;

b) an item has strong or special association with the life or works of a person, or group of persons, of importance in NSW's cultural or natural history;

c) an item is important in demonstrating aesthetic characteristics and/or a high degree of creative or technical achievement in NSW;

d) an item has strong or special association with a particular community or cultural group in NSW for social, cultural or spiritual reasons;

e) an item has potential to yield information that will contribute to an understanding of NSW's cultural or natural history;

f) an item possesses uncommon, rare or endangered aspects of NSW's cultural or natural history;

g) an item is important in demonstrating the principal characteristics of a class of NSW's

   i. cultural or natural places; or

   ii. cultural or natural environments.

An item is not to be excluded from the Register on the ground that items with similar characteristics have already been listed on the Register.

Should OEH consider that the item does fulfil this criteria, a nomination report is prepared and forwarded to the NSW Heritage Council (HC) for consideration. If the HC accepts the recommendation of OEH, a period of consultation with the owners, occupiers and the public begins. Based on the feedback received during the consultation, the nomination is again forwarded to the HC for consideration. Items that are still considered to be of State significance are recommended for listing by the Minister for Environment and Heritage. The Minister makes the final decision.

Further information about the listing process can be found on the OEH website at:

http://www.environment.nsw.gov.au/Heritage/listings/nominateshr.htm

3.0 Likelihood of Listing

The decision to include items on the NHL and SHR is ultimately made by the relevant Minister. The advice provided here is based on the significance of the items, as assessed by AECOM and GML.

The AECOM heritage assessment concluded that the historic homestead of Strowan, located on the Coolmore stud was of national significance, while a smaller cottage on the property, Arrowfield, was of local significance. A listing at the national or State level would be likely to include both the items within a single curtilage and include an assessment of the cultural landscape values.

Woodlands Homestead was assessed by AECOM to be of State heritage significance, while there was insufficient evidence to assess the individual significance of Randwick. A listing of Woodlands, however, is likely to incorporate Randwick, due to their close proximity, and a large portion of the property, if not all of it.

Given the assessed significance of the items, the Coolmore property could be nominated to the NHL. However, nominations are not currently open and it is unclear what items are likely to make the PPAL for financial year 2014-15. Listing on the NHL is unlikely to occur in the short to medium term, but should the AHC receive a nomination, it is considered highly likely that Coolmore would be inscribed on the NHL.

Both Coolmore and Woodlands studs would also be eligible for nomination to the SHR. It is unclear what timeframe may be involved in listing on the SHR. If the listing of the two cultural landscapes were considered by OEH, it is considered highly likely that they would be recommended for listing on the SHR.

4.0 Impact to Potentially Listed Items

Were Coolmore and Woodlands and their associated landscapes to be listed on the SHR or the NHL (in the case of Coolmore), the proponent would be required to consider the potential impacts of the Project to the adjacent heritage items, including visual impacts to the cultural landscape.

All modelling and environmental studies completed show that the Project is able to comply with all relevant environmental criteria and standards at the horse studs. Accordingly, the only concern to the Coolmore and Woodlands studs cultural landscapes would be as a result of potential visual impacts.

For the Woodlands studs, the only potential views of the Project would be from the highest points on the Trigg Hill ridgeline. As demonstrated in the Visual Impact Assessment for the Project, there would be no other views available to the Woodlands Stud as a result of existing topography. As such it is not considered that the visual impacts from the Project would impact the potential heritage significance of the Woodlands stud cultural landscape. Photomontages in the PPR indicate that there will be no appreciable difference in the view from Trigg Hill, with the mine being contained behind the existing ridgeline.

As described in the EA, the Project mine plan has been designed to reduce, as far as possible, the visual impacts on Coolmore Stud. As demonstrated by the Visual Impact Assessment this was largely achieved by ensuring that all active mining areas remain shielded behind existing natural ridgelines and by constructing the Houston visual bund. Since the EA, the design of the Houston visual bund has been modified to align with the suggestions made by Coolmore. It is understood that the revised design (Option 4A) will take approximately eight month to construct and that this will be undertaken in a seven stage lift process (limiting the total area of exposed face at any one time). As described in the Non-Aboriginal heritage assessment as part of the EA, the construction of the Houston visual bund will likely have an initial high visual effect at the Strowan homestead (and hence parts of the Coolmore landscape) from where it is visible. This visual effect will be reduced to moderate and then low as progressive rehabilitation is completed and the bund is integrated with the surrounding landscape.

It is noted, however, that the visual bund will alter the views from Strowan permanently. In recognising this, Anglo American have designed the bund to mimic the current undulating landscape. This design will avoid unnecessarily drawing the eye and will avoid highlighting the human intervention on the landscape. In addition the proposed staged revegetation process will allow vegetation to appear to grow in a natural state rather than be artificially planted. It is considered that this approach will further limit the visual impact to the cultural landscape.

5.0 Recommendations

AECOM makes the following recommendations regarding the revised Project in relation to the historical heritage values:

1. The Coolmore cultural landscape (the homestead and its wider property holdings) are of possible national significance;
2. The homesteads of Woodlands and Coolmore and their associated property holdings are of State significance and are highly likely to be listed on the SHR, if nominated;
3. The revised Project will not have a visual impact on the cultural landscape of the Woodlands stud. The stud is naturally shielded from the Project by the local topography;
4. The revised Project will still have an initial visual impact on the Coolmore stud, including views from the historical Strowan Homestead, as well as the associated cultural landscape;
5. Impacts to the Coolmore cultural landscape are considered to be minimised through the construction of the revised Houston visual bund (Option 4A); and
6. The design and construction of the Houston bund to mimic the surrounding undulating landscape, along with a staged revegetation process that includes locally occurring species will reduce the visual impacts to the Strowan homestead and therefore not detract from the surrounding cultural landscape.

Yours faithfully

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Appendix 5

Response to the Planning Assessment Commission Review – Acoustics

BRIDGES ACOUSTICS

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14 February 2014
Ref: J0130-47-L3

Hansen Bailey Pty Ltd
P.O. Box 473
SINGLETON NSW 2330

Attn: Ms Belinda Hale

Dear Belinda,

RE: DRAYTON SOUTH PROJECT

RESPONSE TO THE PLANNING ASSESSMENT COMMISSION REVIEW

Thank you for your instructions to review the Drayton South Coal Project Review Report (PAC Review) (Planning Assessment Commission, December 2013) with a focus on acoustics. A response to each section of the PAC Review follows, using the same section numbering system as used in the PAC Review. Sections not related to acoustics have been omitted from this response.

4.1.3.2 Environment

The PAC Review mentions noise, however it only notes that the proponent's expected ability to comply with relevant standards has been disputed by some parties. No other comments regarding noise have been made in this section which implies the PAC does not consider noise to be a significant environmental issue.

In relation to blasting the PAC Review discusses potential blasting impacts to the nearby Coolmore Stud and Woodlands Stud with a focus on people, structures and horses. The PAC acknowledged the proponent expects to be able to comply with well accepted criteria to protect people and structures and does not indicate opposition to the proponent's view.

In relation to blasting impacts on horses, the PAC Review discusses the lack of evidence regarding blasting impacts on horses and therefore adopts a conservative approach to the issue. The PAC Review also discusses the issue of 'perceived impacts' from blasting on the 'reputation and brand' of the two studs.

The PAC Review therefore recommends rejection of the Project because of uncertainty regarding blasting impacts on horses and unquantifiable and uncertain impacts to 'reputation and brand'. Expert evidence regarding equine health and related issues, from a veterinary surgeon experienced with thoroughbred horses and the racing industry, has been presented in *Drayton South Coal Project – Response to Planning Assessment Commission Report Equine Health and Industry Considerations* (Dr Nicholas Kannegieter, 2014). Dr Kannegieter concluded:

> "*Extensive research has been conducted and presented throughout the assessment process for the Drayton South Coal Project with regard to dust, noise, vibration and blast overpressure impacts on horses. It is my opinion that taking into consideration the findings as reported in the Equine Health Assessment as well as the other specialist technical reports there should be no impact on the horse studs in relation to horse health, behaviour, production or sales.*"

Based on this expert opinion from Dr Kannegieter, the PAC's recommended rejection of the Project due to 'perceived impacts' on the horse studs cannot be justified.

4.1.3.3 Impacts on horses, behaviour and breeding activities

This section of the PAC Review does not discuss noise impacts, which implies the PAC does not consider noise to be a significant issue for horses.

The PAC Review discusses the possible lack of opportunity for horses visiting both studs to become accustomed to blasting impacts, as some horses visit the studs for a very short time period such as a few hours. Any horses visiting the studs for a short period of time are presumed to visit for breeding purposes and would therefore be kept within or close to the stables and other infrastructure for the duration of their short stay. The blasting assessment in the EIS primarily considered blast effects to the closest residences and facilities, with significantly lower ground vibration and overpressure levels expected at the more remote stables and residences on both studs, therefore the short stay animals would receive ground vibration and overpressure levels significantly below the human comfort criteria.

The PAC Review commented on the tendency of newborn foals to be easily startled. Newborn foals and their mothers would presumably be kept within or close to the stables to provide adequate supervision and ensure prompt medical and other care is delivered as required, which would place these more sensitive animals in areas relatively remote from blasting events associated with the Project. Therefore, newborn foals and their mothers would also receive ground vibration and overpressure levels significantly below the human comfort criteria.

4.2.4 Recommended avoidance and minimisation measures

This section of the PAC Review suggests blast impacts will need to be carefully controlled and detailed management plans and protocols would be required to manage impacts. All of these suggestions were already committed to in the EIS.

The PAC suggested only one blast per day should be permitted to minimise blasting impacts to the studs. The Project will generally require only one blast event per day, with an increased number of blasts using smaller charge weights only likely to be required when blasting occurs in close proximity to Arrowfield Estate. Therefore, multiple blasts per days will only be required for limited periods of time during Project operation. The Blast Management Plan will detail how the proponent will manage multiple blasts on the same day to minimise impacts to the studs and other sensitive receivers.

The PAC recommends an increased setback distance from the studs to minimise or avoid a number of perceived impacts such as night lighting and visual. Any alternative mine plan and proposal incorporating an increased setback distance that is developed by the proponent in response to the PAC's suggestion could conceivably include less onerous blasting restrictions with no increase in received blasting impacts, as the restrictions discussed and considered in the EIS would no longer be required.

Environmental assessment in NSW is primarily performance based, where the proponent can trade off various mitigation options to best suit the project and surrounding environment to achieve acceptable performance outcomes required by the NSW government and generally expected by the NSW community. Mitigation options such as at-source controls or increased setback distances are typically considered by proponents when developing project plans. The PAC's suggestion regarding an increased setback distance does not acknowledge this widely adopted and successful approach to project planning and specifically excludes other mitigation options available to the proponent to achieve acceptable environmental outcomes.

5 Conclusions

The PAC concludes the Project should not proceed in its current form, however an alternative project may be approvable in a reduced form with increased buffer distances and shielding behind natural ridgelines. The PAC Review states:

> *Having regard to the topography of the area, open cut mining must not be allowed to extend through the second ridge to the north of the Golden Highway (opposite Arrowfield) to buffer against noise, dust, blasting and lighting.*

The EIS clearly demonstrates additional buffer distances suggested by the PAC are not required to achieve compliance with well accepted criteria for noise and blasting. In addition, considering advice provided by Dr Kannegieter, noise and blasting impacts predicted for the Project will not negatively impact on thoroughbred horses or the studs.

Yours faithfully,

BRIDGES ACOUSTICS

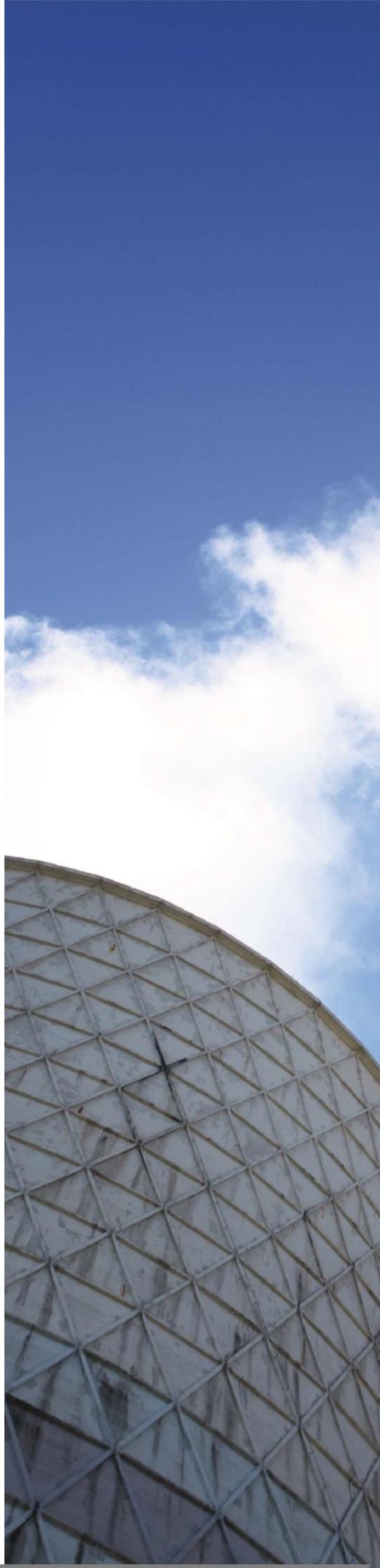
MARK BRIDGES BE (Mech) (Hons) MAAS
Principal Consultant

Appendix 6

Response to Planning Assessment Commission and EPA Submission – Air Quality

Pacific Environment Limited

Consulting • Technologies • Monitoring • Toxicology



REPORT

DRAYTON SOUTH – RESPONSE TO PLANNING ASSESSMENT COMMISSION AND EPA SUBMISSION – AIR QUALITY

Hansen Bailey on behalf of Anglo American

Job No: **3617P**

7 February 2014

PROJECT TITLE:	Drayton South – Response to Planning Assessment Commission and EPA Submission – Air Quality
JOB NUMBER:	3617P
PREPARED FOR:	Hansen Bailey on behalf of Anglo American
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VERSION	**DATE**	**PREPARED BY**	**REVIEWED BY**
01	07.02.2014	Judith Cox	Hansen Bailey

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1 INTRODUCTION

This letter provides response to the comments made in the Planning Assessment Commission (PAC) Review Report on the Drayton South Coal Project[1] (the Project) with respect to the potential air quality impacts of the Project. This includes, where relevant, responses to the issues raised by the NSW Environment Protection Authority (EPA) in their submission to the PAC.

It is noted that the comments by EPA are based on a meeting held between EPA and the PAC on 16 October 2013. This was prior to Anglo American receiving a copy of the SKM Review (received 22 October 2013), which forms the basis of many of the EPA comments, and prior to the provision by Pacific Environment of a detailed response to the SKM Review (submitted 6 November 2013).

The responses to the relevant comments are presented with the comments made by the PAC/EPA provided in ***bold italics***, followed by our response.

2 CUMULATIVE 24-HOUR AVERAGE PM_{10} ASSESSMENT

PAC comments

Submissions and presentations to the Commission raised concerns about air quality impacts from the mine. These included those from the NSW Environment Protection Authority (EPA), NSW Health, the horse studs and the Hunter Thoroughbred Breeders Association. Concerns particularly related to human health impacts, as well as the suitability and reliability of the modelling predictions provided by the Proponent. Some questions were also raised about the potential for air quality impacts on equine health.

Air quality in the Upper Hunter has come under increasing scrutiny in recent years. Human health criteria for particulates (24 hour average PM_{10} levels) are being exceeded near some key coal mining precincts (OEH, 2013). Annual average $PM_{2.5}$ levels around Muswellbrook and Singleton are also exceeding or close to exceeding the reporting standards (OEH, 2013).

Upper Hunter air quality monitoring data shows that the air quality (annual and 24 hour average PM_{10} levels) at Jerrys Plains, near the project site is generally well within the health criteria (OEH, 2013). Nonetheless, by year 10 of the proposed mine, the Proponent's modelling suggests that background air quality levels would exceed the 24 hour average PM_{10} criteria on 25 days that year. This proposed mine would add further emissions and would result in additional days when particulate levels would exceed the health criteria. When emissions from this proposed mine are included in the most recent modelling it is predicted that the human health criteria would be exceeded on 38 days in year 10 of mining.

EPA comments

Based on the available information, 24-hour PM10 is the constraining air quality assessment criteria for the proposal.

There are inherent difficulties associated with assessing large scale extractive industry operations, particularly where existing mining activities occur in the vicinity of the proposal. This issue is aptly raised on page 30 of the RTS, which advises that there is uncertainty associated with predicting 24- hour PM10 impacts from mining operations due to factors such as accurately resolving variability, intensity, duration and location of proposed activities. Additionally, predicting peak 24-hour PM impacts is confounded by variation in weather and background PM concentration, including impacts from existing nearby mines.

[1] Planning Assessment Commission: Drayton South Coal Project Review Report. December 2013. Available from https://majorprojects.affinitylive.com/public/f7a789b462d947ff113477971a9cbb3f/Drayton%20South%20-%20PAC%20Independent%20Review%20Report.pdf (accessed 9 January 2014)

On this basis, when advising on recent mining proposals, the EPA has focused its comments on the requirement for best management practice source control. This approach is consistent with the Dust Stop program administered by the EPA for existing open cut coal mines in NSW.

2.1 Response to cumulative 24-hour average PM_{10} assessment

2.1.1 Introduction

When considering the predicted contribution of the Project to ambient air quality concentrations, it is important to note that there are a number of inherent conservatisms in the emission calculations used in the dispersion modelling, resulting in a conservative assessment of the potential emissions and subsequently the predicted impacts.

The calculated emissions were based on years considered to be representative of worst-case operations; for example where coal and waste production were highest, where extraction or wind erosion areas were largest, or where operations were located closest to receivers. Further conservatism was introduced by the inclusion in the emission inventories of the closest modelled years the emissions from the years where highwall mining in each mine area is at its most intensive.

In addition, the dispersion modelling completed assumes that all dust-generating activities occur equally over each hour of the year. In reality activities on a coal mine vary significantly on a day-to-day basis. When combined with the fact that the emission calculations were in themselves based on worst-case operations, the results of the dispersion modelling are considered to be conservative.

Finally, dispersion models are not 100% accurate, but are a tool which uses the best-available science to guide policy-making decisions. As noted in the US Environmental Protection Agency Guideline on Air Quality Models[2]:

- Models are more reliable for estimating longer time-averaged concentrations (e.g. annual averages) than for estimating short-term concentrations at specific locations (e.g. 24-hour averages).
- The models are reasonably reliable in estimating the magnitude of highest concentrations occurring sometime, somewhere within an area. In other words, estimates of concentrations that occur at a specific time and location, are poorly correlated with actually observed concentrations and are much less reliable than the longer-term averages.

For all the reasons noted above, it is considered that the predicted 24-hour average PM_{10} concentrations due to the Project-alone are conservative and whilst Figure 3-4 of the Revised Air Quality Impact Assessment (submitted as Appendix C of the Response To Submissions[3] (provided as **Figure 1** - see **Section 2.1.2** - for ease of reference) does infer that in Year 10 the background concentrations would exceed the 24-hour average PM_{10} criteria on 25 days per year, and that the operation of the proposed Project is predicted to exceed the criteria by an additional 36 days (the PAC review report stated 38 days) at Residence 226B in Year 10, this conclusion requires some further explanation and interpretation, as detailed in **Section 2.1.2**.

The cumulative 24-hour average assessment is intended as a tool to identify potential risk areas and activities so that these can be appropriately managed by the operation on a day-to-day basis.

[2] 40 CFR Part 51 Revision to the Guideline on Air Quality Models: Adoption of Preferred General Purpose (Flat and Complex Terrain) Dispersion Model and Other Revisions; Final Rule. Federal Register/ Vol. 70 , No. 216/ Wednesday, November 9, 2005 /Rules and Regulations. Available from http://www.epa.gov/ttn/scram/guidance/guide/appw_05.pdf (accessed 30 January 2014)

[3] Response to Submissions. Appendix C. Available from https://majorprojects.affinitylive.com/public/8a7504627200 61db004924b407dc5b40/06.%20Drayton%20South%20-%20Response%20to%20Submissions%20Appendix%20C.pdf (accessed 13 January 2014)

Identified risks from the Project would be managed by the proposed predictive/pro-active mitigation and management options.

2.1.2 Monte Carlo explanation

The background concentrations presented on **Figure 1** are based on *measured* data. As there were no continuous monitoring data available close to the proposed Project, the background (that is, existing air quality) data were sourced from several years of monitoring from a number of locations (as presented in Table 2 of the Response to Submissions[4] (RTS) and replicated in **Table 1** for ease of reference). These data were then applied to clusters of residences as shown in **Figure 2** and a statistical approach using Monte Carlo was completed to determine the *probability* of cumulative concentrations.

The data used to determine the background concentrations for the most impacted receptors (located in the south and south-west) were sourced from data collected at the monitoring stations located at Mt Arthur Windmill (DF03) and Anglo American (HV2a) - see **Table 1** and **Figure 2**. There were a total of 1079* data points used to develop the background which is greater than the 365 days (equal to one year) in the predicted concentrations from the dispersion modelling. The Monte Carlo assessment uses a probabilistic approach to randomly combine these 1079 values from the background data set with the 365 values from the predicted concentrations data set 250,000 times. Probabilistic approaches enable the variation and uncertainty in data to be quantified, by using distributions instead of fixed values in the assessment.

From the results of the Monte Carlo calculations, the *probability* of the number of cumulative concentrations greater than 50 $\mu g/m^3$ was determined. This probability was translated to a number of days for information purposes, however, as previously noted (see Section 4.2.2 of the RTS), there is significant uncertainty in predicting the cumulative 24-hour average concentrations as they are compounded by the day-to-day variability in ambient dust levels and the spatial and temporal variation in any other anthropogenic activity (e.g. agricultural activity, bushfires etc), including mining in the future. Experience shows that the worst case 24-hour average PM_{10} concentrations are often strongly influenced by other sources, such as bushfires and dust storms, which are essentially unpredictable.

Whilst HVAS monitoring data were available for every sixth day, the data were deemed insufficient to provide a representative background for each day of the model simulation as required for a cumulative assessment. Even if there were continuous monitoring data available, this would only allow an assessment of the cumulative 24-h average PM_{10} concentrations based on the measured background concentrations in 2005. As presented in **Table 1**, the Monte Carlo method applied uses data from as early as 2000 through to late 2011, thus capturing all the variability in background concentrations from data available, not just those that occurred in 2005.

[4] Response to Submissions. Volume 1. Available from https://majorprojects.affinitylive.com/public/6328178238f1afbf8d12f9671ca8b3ad/01.%20Drayton%20South%20-%20Response%20to%20Submissions%20Main%20Report%20-%20Part%201.pdf (accessed 9 January 2014)

* There was a typographical error in Table 2 of the RTS. The actual number of data points used from DF03 was 577 plus 502 from DF02 which equals 1079.

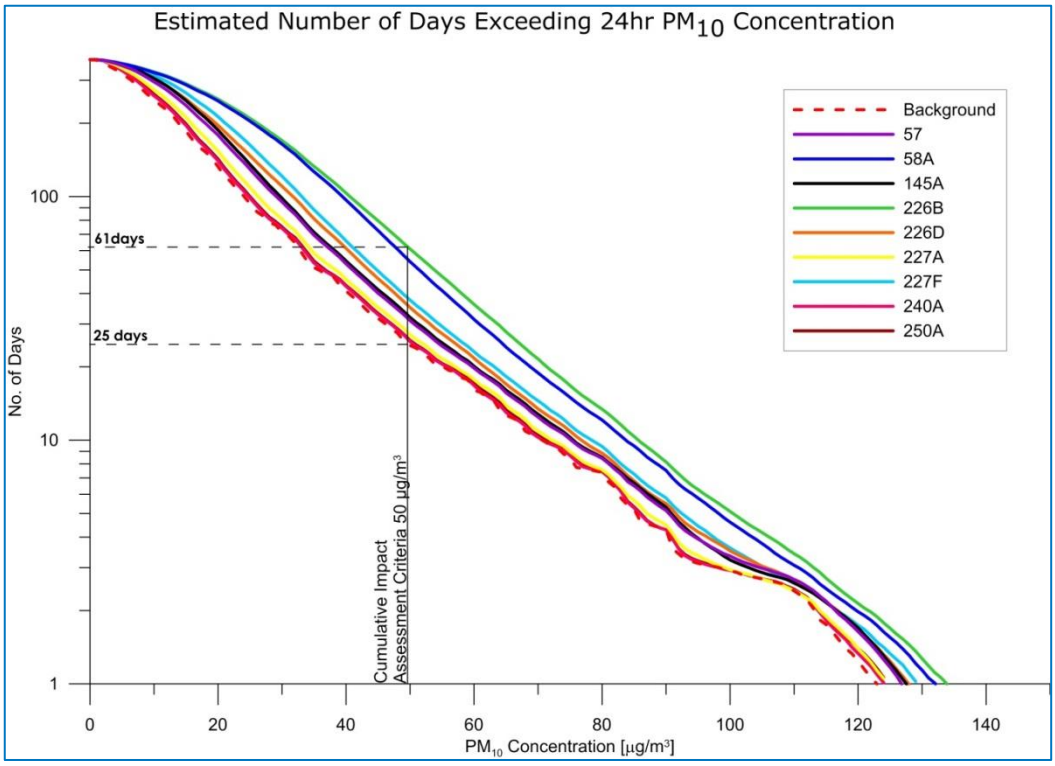

Figure 1: Year 10 – Number of days likely to exceed cumulative maximum 24-hr average PM_{10} concentration (50 µg/m³) for south/south-west residences

Table 1: Monitoring Data used to Determine Background

Monitoring Location	Monitoring Period	No. of daily 24-hour average concentrations	Data Source	Receiver ID
Mt Arthur Coal Edderton (DF04)	2002 – 2010	530	PAEHolmes (2009) BHP Billiton (2009) BHP Billiton (2010)	410 and 411
Anglo American (Lot 9)	2005 – 2009	288	Anglo American	
Mt Arthur Coal Windmill (DF03)	2002 – 2010	577[a]	PAEHolmes (2009) BHP Billiton (2009) BHP Billiton (2010)	57, 58A, 145A, 226B, 226D, 227A, 227F, 240A and 250A
Anglo American (HV2a)	2000 – Nov. 2011	502	Anglo American	
Anglo American (HV5)	May 2001 – Nov. 2011	477	Anglo American	209 and 217

a) There was a typographical error in Table 2 of the RTS. The actual number of data points used from DF03 was 577 not 528.

Source: **Table 2, RTS**

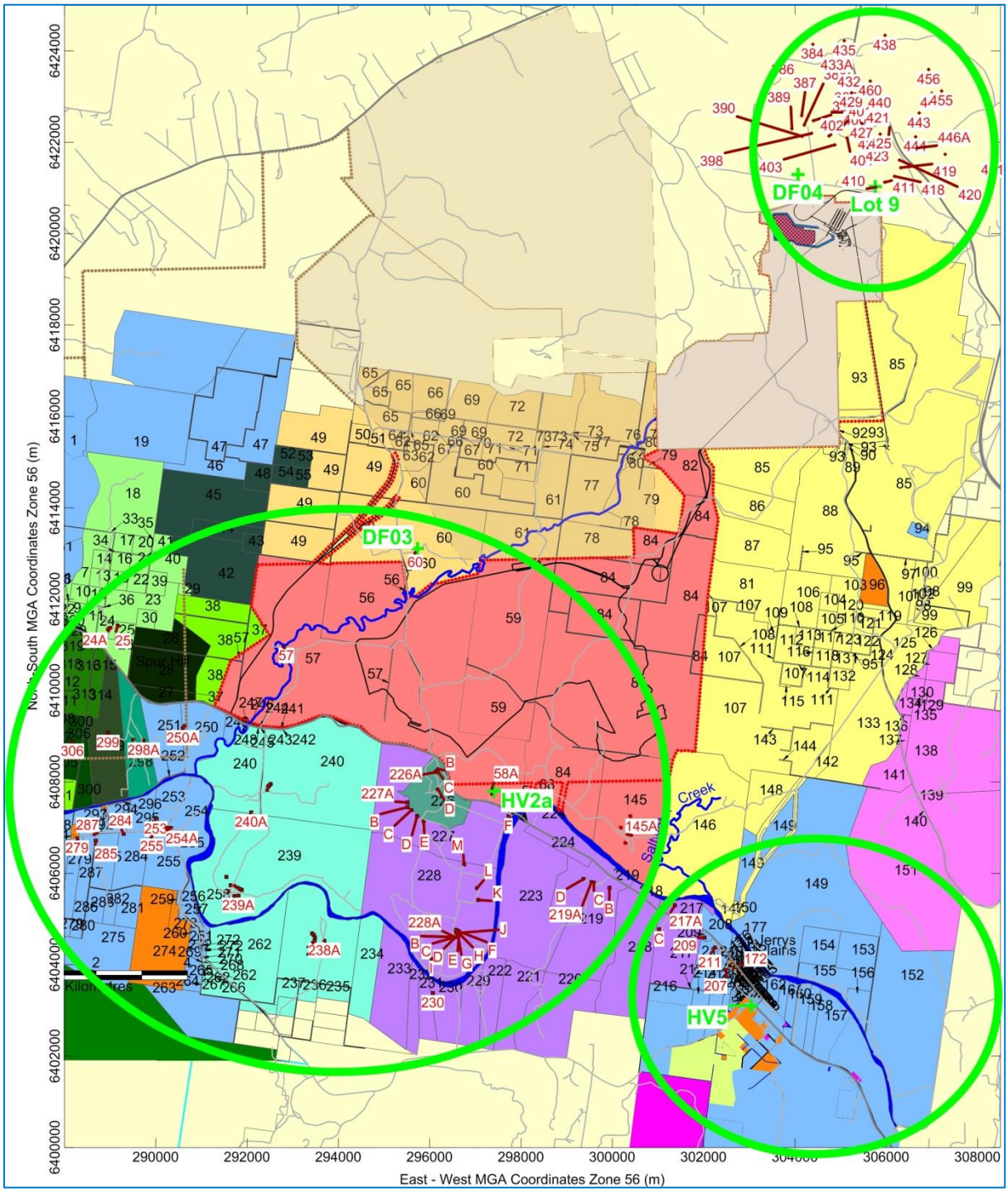

Figure 2: Representative residences and monitoring locations – cumulative 24-hour PM_{10} assessment

As presented in **Table 2**, there were a maximum of 19 exceedances recorded in any single year at HV2a and DF03. Since 2007 there has been a maximum of three exceedances recorded. The vast majority of the exceedances were recorded at HV2a. It was noted in the original Air Quality and Greenhouse Gas Assessment (Appendix F[5] of the EA) that HV2a was originally located near a cultivated farming paddock and was moved to a more representative location at the end of 2006. It is apparent in the monitoring data that the measured exceedances have dropped dramatically at HV2a since that time.

Monte Carlo is a statistical approach, therefore it uses the whole range of available data (in this case the 1079 data points form HV2a and DF03) and applies this to a single year. As **Figure 3** shows, approximately 6.7% of the data from HV2a and DF03 are greater than 50 μg/m^3, which equals approximately 24 days (6.7% * 365 days). As shown on **Figure 1**, running these data through Monte Carlo results in the conservative *probability* that 25 days would exceed the 50 μg/m^3 due to the background alone.

Table 2: Summary of monitoring data availability and exceedances of 24-hour criteria

	Llanillo (HV2a)		Mt Arthur Coal Windmill (DF03)	
Year	**Total no. of 24-hour averages**	**No. >50 μg/m^3**	**Total no. of 24-hour averages**	**No. >50 μg/m^3**
2001	14	0	1	0
2002	28	7	61	3
2003	27	5	60	4
2004	30	5	60	1
2005	55	15	61	1
2006	61	19	56	0
2007	56	2	57	0
2008	45	2	56	0
2009	57	3	58	1
2010	58	1	59	1
2011	56	0	49	2
Total	**502**	**59**	**578**	**13**

[5] Appendix F can be located here:

https://majorprojects.affinitylive.com/public/a5c1ba076a89bf966953b76f0f51f870/46.%20Drayton%20South%20-%20EA%20Appendix%20F%20-%20Air%20Quality%20and%20Greenhouse%20Gas%20Impact%20Assessment.pdf (accessed 14 January 2014)

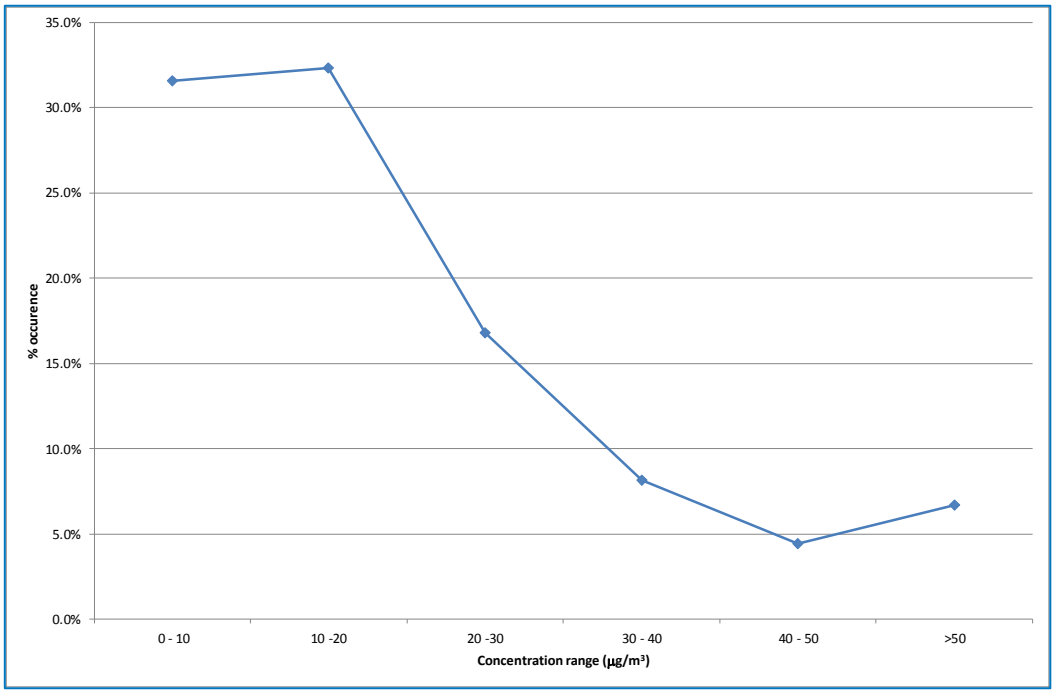

Figure 3: HVAS monitors DF03 and HV2a – percentage occurrence of 24-hour PM_{10} concentrations ($\mu g/m^3$)

Figure 4 shows the frequency distribution of the measured concentrations (background data) from HV2a and DF03, together with the distribution of the predicted concentrations due to the Project for residence 226B. Also shown are the 50th, 75th and 90th percentiles. The percentile values show the percent of the data that are below/above a certain value, for example, the 75th percentile of the measured data shows that 75% of the data are equal to 25.8 $\mu g/m^3$ or below, and conversely 25% of the data are greater than 25.8 $\mu g/m^3$. The predicted concentrations show that 75% are equal to 20.4 $\mu g/m^3$ or below, and conversely 25% of the data are greater than 20.4 $\mu g/m^3$.

As described above, the Monte Carlo approach uses a probabilistic approach to randomly combine the background data set with the predicted concentrations data set in a process repeated 250,000 times to determine the cumulative concentration. The more likely an event is to occur in the data provided to Monte Carlo, the more likely is it to be selected when the datasets are combined. In this example, this would mean that 75% of the time values equal to (or below) 25.8 $\mu g/m^3$ (from the monitoring data) would be combined with values equal to (or below) 20.4 $\mu g/m^3$ from the predicted data. This would result in the predicted cumulative concentrations being equal to (or below) 46.2 $\mu g/m^3$ for 50% of the time (75% * 75% = 50%). However, 25% of the time values greater than 25.8/20.4 $\mu g/m^3$ would be selected and it only needs an increase in one of the values selected of less than 5 $\mu g/m^3$ for there to be predicted cumulative concentration greater than the criteria of 50 $\mu g/m^3$.

It is apparent from the above discussion that the elevated number of cumulative concentrations above the criteria has been heavily influenced by the higher number of existing exceedances in the background data from 2006 (and earlier) than would typically occur in a single year (as seen in the data from 2007 onwards). The predicted project contribution at the closest residence, in the worst case year shows that 50% of the predicted concentrations are 9.3 $\mu g/m^3$ or below (see 50th percentile for 226B on **Figure 4**).

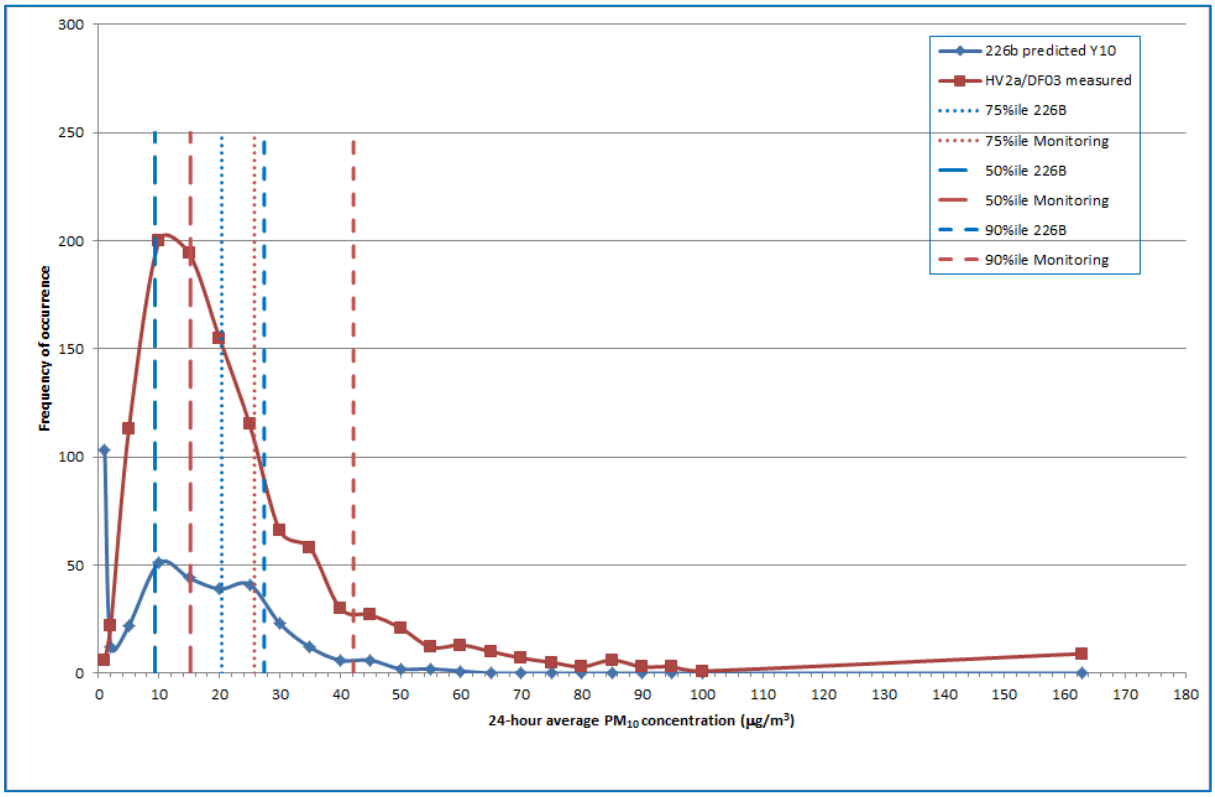

Figure 4: Frequency distribution and percentiles of 24-hour average PM_{10} background data and predicted concentrations at 226B in Year 10

2.1.3 Summary

Due to the assessment being based on worst-case operations, it is considered that the predictions of Project-only contribution to ambient air quality are conservative, particularly when considering the 24-hour average concentrations. It is apparent from the above discussion that the number of cumulative concentrations predicted above the 24-hour average PM_{10} criteria has been heavily influenced by the high number of exceedances in the background data for 2006 (and earlier) than would typically occur in a single year, resulting in an extremely conservative assessment of potential impacts.

Fifty percent of the predicted concentrations due to the Project-alone at the closest residence (226B) are below 10 µg/m^3 (see **Figure 4**), as such it is considered that the cumulative assessment presented was very conservative. It does serve to highlight to Anglo American that there is potential for impacts in that area and can therefore aid to plan the day-to-day management of operations and dust-generating operations accordingly by utilising the identified management and mitigation measures, consistent with the approach required by EPA.

Anglo American has implemented a best practice predictive and real-time dust management system at their Drayton site, which includes a daily risk forecast tool for planning and managing day-to-day operations and a real-time dust monitoring system to act and respond to short-term elevated dust. Also, as part of the "dust stop' PRP process, Drayton has identified adverse meteorological conditions for managing visible dust from overburden handling, also used for managing day-to-day operations. These systems would be extended to Drayton South if approved. .

The PAC also mentioned concerns regarding the air quality impacts on equine health. As detailed in **Section 5.1.2**, there are no predicted exceedances of any of the impact assessment criteria in areas where equine activity currently takes place.

3 SILT AND MOISTURE ASSUMPTIONS

PAC comments

Concerns have been raised regarding the suitability and reliability of the modelling results provided. The Department engaged SKM to undertake a peer review of the air quality assessment provided by the Proponent. SKM raised a number of concerns and these were subsequently corroborated by the EPA. While some of these concerns have now been addressed (Pacific Environment Limited, 2013), some of the inputs used (silt and moisture contents) require further verification.

EPA comments

SKM (2013) provides a thorough review of the air quality assessment included in the EA and RTS. The SKM review appears technically accurate and EPA agrees with the general recommendations contained within the review.

As noted above, the air quality assessment(s) generally fulfil the EPA's published assessment requirements and the scale of predicted impact appears consistent with similar proposals. However; there are several anomalies that could materially change the results of the assessment(s), including the number of receptors predicted to experience exceedances of the PM impact assessment criteria. A summary list of significant issues is provided below, with more detail provided in SKM (2013):

- ***Representativeness and applicability of moisture content used in emission estimation equations;***
- ***Representativeness and applicability of silt content used in emission estimation equations;***

3.1 Response to comments regarding silt and moisture assumptions

It is noted that the EPA comments (dated 26 November 2013) are based on a meeting held between EPA and PAC on 16 October 2013, prior to Anglo American and/or Pacific Environment being aware of the SKM review. A copy of the SKM Review was provided to Anglo American on 22 October 2013 and a detailed response was provided by Pacific Environment[6] on 6 November 2013 (and reviewed by the PAC). As detailed in this response, the silt and moisture inputs were based on site specific data. NSW EPA and the PAC have previously stated that site specific data *should be used in emission estimation*, as evidenced by highlighted sections of the submissions below related to the Coalpac Consolidation Project:

[6] Pacific Environment Limited. Re Response to SKM Review Comments on the EA and PPR Air Quality Impact Assessments for the Drayton South Project. 6 November 2013.

NSW EPA Submission to Coalpac Consolidation Project[7]

1. Emissions Inventory

Particle emissions from project operations were estimated using generic factors from published USEPA AP 42 literature. Emission factors used in the assessment were generally sourced and applied in an appropriate manner. Emissions calculated for the proposed future operations at Invincible Colliery are similar in magnitude (total kg emitted per year) to emissions reported in the Dust Stop Pollution Reduction Program (PRP) report titled "*Coalpac Particulate Matter Control Best Practice Pollution Reduction Program – Invincible Colliery*" (paeHolmes, 2012) and provided to the EPA February 2012.

There are two main deficiencies in the emissions inventory presented in the assessment.

1. No site specific parameterisation was provided to quality emission variables; and
2. Wind blown dust emission estimation techniques used are not the most up to date methods.

1.1. Site Specific Emission Parameterisation

Some emission estimation techniques used in the assessment require material parameterisation such as moisture content, and silt content. To enhance the reliability of the emission estimation techniques, site specific data should be used as input variables for the emission factor equations. The assessment does not include any data to support the values adopted.

The EPA recently reviewed the Dust Stop PRP report (paeHolmes, 2012) submitted by Invincible Colliery. The Dust Stop PRP review is equally relevant to the Coalpac Consolidation Project air quality assessment, namely:

- There is no evidence that site-specific silt and moisture content of materials and rainfall data, for example, have been used to estimate either baseline uncontrolled or controlled particle emissions.
- While some particulate emission control efficiency information from the literature is presented, it critically lacks site-specific data, so the reported particulate emission control efficiencies have not been clearly justified.

[7] NSW EPA Submission to Coalpac Consolidation Project EA. Dated 4 June 2012. Available from https://majorprojects.affinitylive.com/public/abfd5934e07fb7a9fe9335a5a5a1b9a0/%20Coalpac%20Consolidation%20Project%20-%20EPA.pdf#page=1&zoom=auto,0,842 (accessed 10 January 2014)

PAC Review on Coalpac Consolidation Project[8]

5.1.3 Modelling

The EPA submission on the EA raised concerns about the methodology for prediction of particulate emissions.[46] Specifically,

- the Air Quality Impact Assessment provided no site specific parameterisation to qualify emission variables;[47]
- the wind blown dust emission estimation techniques did not use the most up to date methods, and;
- the emission control efficiencies used in the assessment.

5.1.3.1 Parameterisation of Emission Variables

Emission estimation requires certain characteristics such as moisture content and silt content to be included to enhance the reliability of estimations and the EA provides no information to support the correct use of these variables. This limits the ability to verify the predictions in the EA. In its Response to Submissions (RTS) the Proponent states that relevant parameters including silt and moisture will be included in the Air Quality Management Plan (AQMP), when and if the project is

[46] EPA, submission to EA, 4 June 2012
[47] EA, Vol.2, Appendix G

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approved.[48] A subsequent EPA letter dated 14 September 2012 accepted this response from the Proponent. The Commission, however, is concerned that it may not be practical to provide any additional mitigation measures if the parameters used in the final AQMP show that the original assessment underestimated the emissions. The Commission therefore recommends these estimates be reassessed using the appropriate emission variables prior to any final approval for the project.

Recommendation 1 : The Commission recommends that the emission estimate predictions should be updated and reconfirmed using the most relevant emission variables as recommended by the EPA prior to any determination of the project.

Due to submissions such as those identified above, as detailed in the RTS, bulk samples of overburden and surface samples from active haul roads were collected at the existing Drayton mine in March 2013, with additional surface samples from haul roads collected in October 2013. These samples were analysed for silt and moisture content.

A summary of the data collected on-site were presented Table 3 of the RTS. For ease of reference a copy of the data are provided in **Table 3**. The analysis reports are included in **Appendix A**. It is noted that moisture content is not a parameter in the emission factor equation for haul roads, but the data are included for completeness.

[8] Coalpac Consolidation Project PAC Review Main Report. Dated 14 December 2012. Available from https://majorprojects.affinitylive.com/public/a7891537218338b99edc7515628f6485/11.%20Coalpac%20Consolidation%20Project_%20PAC%20Review%20Main%20Report.pdf (accessed 10 January 2014)

Table 3: Silt and moisture contents as measured at Drayton Coal Mine

Source	Sampling date	Silt (%)	Moisture (%)
Active OB	March 2013	10	1.8
Inactive OB		0.5	6.4
Reject coal		0.2	3.9
Product coal		0.8	5.4
ROM coal		1.1	6.6
Haul Roads main		0.4	2.8
Haul Roads in-Pit		4.1	2
Level 3 haul road	October 2013	0.7	0.9
Level 5 haul road		0.7	0.7
West haul road		1.6	0.7
North pit ring road*		4.3	1.1
Haul road		1.1	1.4

*road not in use therefore data not considered valid.

Subsequent to the submission of the EA, revised air quality modelling was provided with the RTS applying the measured values from site. As detailed in the Response to SKM comments, whilst there are no additional data for Drayton Mine, recent bulk samples from two mines in the Hunter Valley and one mine in the Gunnedah area have been collected and analysed for silt and moisture contents as part of a current ACARP project (at the time, the average silt and moisture values were 4.6% and 5.6%, respectively).

Since the Response to SKM comments was prepared, more data have been obtained as part of the ACARP project from a Hunter Valley mine. These data, together with other site-specific data used in other recent air quality assessments are shown in **Table 4**. As the ACARP project is not yet complete, the identity of the individual mines has not been included.

For overburden, the average silt content from the 21 samples (including those collected from Drayton for the Drayton South project) presented in **Table 4** is 3.8% (ranging from 0.5% to 9.6%, with a standard deviation of 2.1), and the average moisture content is 5.8% (ranging from 0.9% to 11.2%, with a standard deviation of 2.8). These samples were collected from a variety of overburden activities i.e. loading/unloading overburden in-pit, active and inactive overburden dumps, these values are considered to be representative of the range of values that can be found on a site.

For haul roads, the average silt content is 2.9% which is lower than the assumed value for in-pit haul roads assumed for Drayton South of 4.1%. Whilst the assumption for the out-of-pit haul roads was 0.7%, it is considered that this is representative based on five separate samples that have been collected and analysed from roads similar to that proposed.

If the industry sample average values for overburden are substituted into the Year 10 Revised Project inventory, there is an increase in total site TSP emissions of 4.9%. Copies of the original and updated inventories are provided in **Appendix B**. Extensive experience of dispersion modelling has shown that a change of ±10 to 20% in calculated emissions is unlikely to result in any significant change to the predicted concentrations.

Table 4: Summary of silt data collected via ACARP and other AQIAs

Site	Overburden		Haul Roads
	Moisture (%)	Silt content (%) (<0.075 mm)	Silt content (%) (<0.075 mm)
Data used in AQIAs			
Bulga[9]	5.5*	1.9	7.9
	6.5*	1.1	3.6
	-	-	2.4
	-	-	6.3
	-	-	3.3
	-	-	4.4
Coalpac[10]	4**	5**	2.8
Drayton[11]	10.9	1.8	4.1
	6.4	0.5	0.4
Drayton[12]	-	-	0.7
	-	-	0.7
	-	-	1.6
	-	-	1.1
Confidential	11.2	3.8	2
	11.1	3.6	-
ACARP DATA			
Site 1 (Hunter Valley site)	7.9	1.2	-
	5.2	5.5	-
	7.4	5.4	-
	4.5	4.9	-
	2.3	3.9	-
	0.9	2.8	-
	1.4	4.5	-
Site 2 (Hunter Valley site)	7.1	2.1	-
	5.4	9.6	-
	3.8	4.5	-
	5.7	4	-
Site 3 (Gunnedah site)	5.6	5.2	-
	4.4	5.8	-
	4.9	2.2	-
AVERAGE ALL DATA	**5.8**	**3.8**	**2.9**

* The value used in the Bulga AQIA was 2%. These are the measured values.

** Measurements were taken for the Coalpac Consolidation Project at both Cullen Valley Mine and Invincible Colliery. For the purposes of this review, the lowest reported moisture and highest reported silt values have been referenced to ensure a conservative calculation of emission rates from overburden activities.

3.2 Summary

It is apparent from the data collected from numerous coal-mines across NSW that there is a wide variability in the silt and moisture contents of overburden, even when the same site is considered.

Use of the average values results in a 4.9% increase in total TSP emissions compared with that used in the dispersion modelling. This is not considered to be a significant increase and extensive experience has demonstrated that an increase of less than 10-20% in total site emissions results in minimal, if any, change to the predicted impacts.

[9] Bulga Appendix 3 of the Revised and Amended Project located here: https://majorprojects.affinitylive.com/public/ea74b28d4e1223fd10d3c5d4bca33554/5.%20Bulga%20Mine%20Extension%20-%20RTS%20&%20RAPA%20-%20Appendices%20%203%20&%204.pdf (accessed 7 January 2014).

[10] Hansen Bailey (2013). "Coalpac Consolidation Project: Preferred Project Report". Prepared by Hansen Bailey for Coalpac Pty Limited, April 2013. https://majorprojects.affinitylive.com/public/0aa361a5b6d1308cd6c1ba8ea6adfd78/Coalpac%20Consolidation%20Project_Preferred%20Project%20Report.pdf (accessed 7 January 2014).

[11] Hansen Bailey (2013). "Drayton South Coal Project. Response to Submissions." May 2013. https://majorprojects.affinitylive.com/public/6328178238f1afbf8d12f9671ca8b3ad/01.%20Drayton%20South%20-%20Response%20to%20Submissions%20Main%20Report%20-%20Part%201.pdf (accessed 7 January 2014).

[12] Pacific Environment Limited. Re Response to SKM Review Comments on the EA and PPR Air Quality Impact Assessments for the Drayton South Project. 6 November 2013.

For haul roads, the average silt content is 2.9% which is lower than the assumed value for in-pit haul roads assumed for Drayton South of 4.1%. Whilst the assumption for the out-of-pit haul roads was 0.7%, it is considered that this is representative based on five separate samples that have been collected and analysed from roads similar to that proposed.

If the industry sample average values for overburden are substituted into the Year 10 Revised Project inventory, there is an increase in total site TSP emissions of 4.9%.

4 ASSUMED CONTROLS

PAC comments

Also, some of the assumptions (for example the 85% control of emissions in Redbank pit haul roads) appear optimistic given that the EPA has indicated 80% control is considered best practice. In short the Commission is not convinced the modelling represents the worst case impact scenario.

EPA comments

It is not clear if the assessed emission controls, as proposed, will be achieved in practice.

The EPA has implemented the Dust Stop program for all open cut coal mines in NSW. Dust Stop is a staged program aimed at identifying and implementing best management practice source control at NSW coal mines.

The EPA commissioned a review of international best practice particle controls from coal mines, NSW Coal Mining Benchmarking Study: International Best Practice Measures to Prevent and/or Minimise Emissions of Particulate Matter from Coal Mining (Katestone Environmental, 2010) *(referred to in this response as the Best Practice Report[13]).*

For each control method nominated, Table 2 compares the assessed level of control with documented levels from Katestone (2010).

Table 2 – Summary of assessed emission controls

Source	Method	Assessed control	Katestone (2010)
Haulage on unpaved roads ○ In pit haul roads ○ Out of pit haul roads	Application of suppressants[1]	80% 85%	84%
Wind erosion on exposed surfaces ○ Houston open mine area ○ Overburden dump and disturbed area	Aerial seeding[2] Watering	70% 50%	Not quantified 50%
Bulldozing topsoil	Water application	50%	50%
Drilling overburden and coal	Water injection[3]	70%	3%-96%

1) Documented results vary to considerably lower levels (Table 66, Katestone Environmental (2010))
2) Aerial seeding has been trialled however the effectiveness was not quantified (Table 71, Katestone Environmental (2010))
3) Considerable variation in documented effectiveness (Table 82, Katestone Environmental (2010)).

As shown in Table 2, the assessed controls represent a blanket percentage reduction in emissions based on the proposal broadly adopting a practice, such as watering. There is currently minimal information on the way each management practice will be implemented for the site, for example the suppressant application rate or frequency required to achieve the assessed level of control.

[13] Donnelly, S.J., Balch, A., Wiebe, A., Shaw, N., Welchman, S., Schloss, A., Castillo, E., Henville, K., Vernon, A., Planner, J. (2011). "NSW Coal Mining Benchmarking Study: International Best Practice Measures to Prevent and / or Minimise Emissions of Particulate Matter from Coal Mining" Prepared by Katestone Environmental Pty Ltd for Office of Environment and Heritage June 2011. Available from http://www.epa.nsw.gov.au/resources/air/KE1006953volumel.pdf (accessed 14 January 2014)

To ensure that assumed and assessed controls are achieved in practice, nominated management practices should be measurable and auditable with key performance indicators clearly identified. As a minimum, for each dust generating activity at the site, the proponent should implement following:

1. ***Key performance indicator(s);***
2. ***Monitoring method(s);***
3. ***Location, frequency and duration of monitoring;***
4. ***Record keeping;***
5. ***Response mechanisms; and***
6. ***Compliance reporting.***

In addition to control measures included in the assessment, proposed new or expanding mine projects should achieve the same level of emission control as existing mining operations, at a minimum. EPA has issued existing mines, including Anglo Coal's current Drayton Coal Mine, with three pollution reduction programs as part of the Dust Stop program

1. Wheel Generated Dust- The Licensee must achieve and maintain a dust control efficiency of 80% or more on all active haul roads.

2. Disturbing and Handling Overburden Under Adverse Weather Conditions - The Licensee must alter or cease the use of equipment on overburden and the loading and dumping of overburden during adverse weather conditions to minimise the generation of particulate matter.

3. Trial of Best Practice Measures for Disturbing and Handling Overburden -The Licensee must submit a report documenting an investigation and trial of best practice measures for the control of particulate matter from the use of equipment on overburden and the loading and dumping of overburden.

4.1 Response to comments regarding assumed controls

Anglo American is committed to the application of best-practice controls on dust-generating activities and is fully prepared to respond to the current, and any future, Dust Stop PRPs.

It is considered that Table 2 of the EPA letter demonstrates that the assumed controls are consistent with the Best Practice report.

4.1.1 Aerial seeding

With respect to aerial seeding, page 171 of Best Practice Report states that aerial seeding "*is a technique that has been used successfully to quickly establish vegetative cover at mine sites. Similarly, aerial seeding can be used to establish vegetative cover over broad and otherwise inaccessible areas at mine sites*." On this basis, it is considered that the assumption of 70% control is appropriate, as this is the level of control given in Table 71 of the Best Practice report for vegetative cover.

4.1.2 Haul roads

Regarding the haul road controls, Table 2 of the EPA letter (20 November 2013), and Table 66 of the 'Best Practice' report, show a control efficiency of 84% for the use of dust suppressants. As Drayton South is proposing to use a dust suppressant, it is not considered unreasonable to have assumed 85% control for Redbank pit. A difference of 1% to the assumed level of control would not change the conclusions of the dispersion modelling.

4.2 Summary

It is considered that the assumptions for control efficiency applied to aerial seeding and haul roads are consistent with the EPA Best Practice document.

5 AIR QUALITY HEALTH IMPACTS TO EQUINE HEALTH AND RESIDENTS LIVING ON THE STUD

PAC comments

The Proponent has proposed to implement best practice dust control measures, with particular attention to the Redbank pit, which is closest to the studs. Nonetheless dust control would be a significant challenge as the mine plan includes four pits and a large surface area would be exposed for much of the 27 year mine life.

The air quality impacts of the project are not considered acceptable due to the combined concerns about the additional amenity and health impacts to residents living on the studs (noting that the properties cannot be acquired by the mine as would usually be allowed) and the reputational damage that may be caused with the deterioration in air quality.

5.1 Response to comments on air quality health impacts to equine health and residents living on the studs

5.1.1 Residents living on the stud

None of the residences located on the horse-studs are predicted to experience concentrations above the DP&I acquisition criteria. The acquisition criteria and the range of predicted concentrations at the horse-stud residences are presented in **Table 5**.

Table 5: Acquisition criteria and predicted concentrations at horse-stud residences

Pollutant	Criterion	Averaging Period	Application	Range of predicted concentrations at horse-stud residences
TSP	90 µg/m^3	Annual	Cumulative	46 – 65 µg/m^3
PM_{10}	150 µg/m^3	24-hour	Cumulative	Maximum predicted at most impacted (Monte Carlo) = 130 µg/m^3
	50 µg/m^3	24-hour	Incremental	6 – 26 µg/m^3
	30 µg/m^3	Annual	Cumulative	17 – 24 µg/m^3
Deposited Dust	2 g/m^2/month	Annual	Incremental	0 g/m^2/month
	4 g/m^2/month	Annual	Cumulative	1 g/m^2/month

Table 6 shows the predicted concentrations at the horse-stud residences for the worst-case year (Year 10) of the proposed operations. All residences located on the horse-studs are predicted to experience air quality concentrations below the relevant assessment criteria for annual averages, even when other sources mines and other sources are considered. The maximum predicted contribution to 24-hour average PM_{10} concentrations from the Project-alone is below 20 µg/m^3 for the majority of the residences which is well below the criteria of 50 µg/m^3.

When the frequency distribution of the predicted 24-hour average PM_{10} concentrations from the Project-alone are considered (see **Figure 4**), it shows that the vast majority of the predicted concentration at the most affected residences (228M and 227F) due to the Project-alone are 1 µg/m³ or less. A Monte Carlo assessment was completed residences 228M and 227F - see **Figure 6**. Whilst this shows there is the low probability for additional days over the 24-hour average PM_{10} criteria at these residences, as discussed in **Section 2.1**, the cumulative assessment is extremely conservative and it is considered that the operations of the Project can be managed to avoid any exceedances of the cumulative criteria of 50 µg/m³.

Table 6: Year 10 – Predicted concentrations at the horse-stud residences

ID	Year 10								
	Project alone						Project and other mines and other sources		
	PM_{10} (µg/m³)		TSP (µg/m³)	Dust deposition (g/m²/month)	$PM_{2.5}$ (µg/m³)		PM_{10} (µg/m³)	TSP (µg/m³)	Dust deposition (g/m²/month)
	Averaging period								
	24-h	Annual	Annual	Annual	24-hr	Annual	Annual	Annual	Annual
	Assessment criteria				*Advisory reporting standard*		*Assessment criteria*		
	50	***-***	***-***	***2***	***25***	***8***	***30***	***90***	***4***
217A	12	3	5	0	2	0.4	22	59	1
217B	9	2	4	0	2	0.3	20	55	1
219A	12	3	5	0	2	0.4	20	57	1
219B	14	3	5	0	2	0.4	21	58	1
219C	12	3	5	0	2	0.4	21	57	1
219D	11	3	5	0	2	0.4	20	56	1
227A	18	2	3	0	3	0.2	18	51	1
227B	17	2	3	0	3	0.2	18	51	1
227C	18	2	3	0	3	0.2	18	51	1
227D	18	2	3	0	3	0.2	18	51	1
227E	18	2	3	0	3	0.2	18	51	1
227F	26	7	12	0	4	0.9	24	65	1
228A	13	1	1	0	2	0.1	17	48	1
228B	13	1	1	0	2	0.1	17	48	1
228C	13	1	1	0	3	0.1	17	48	1
228D	13	1	1	0	3	0.1	17	49	1
228E	13	1	1	0	3	0.1	17	49	1
228F	13	1	1	0	3	0.1	17	49	1
228G	14	1	1	0	3	0.1	17	49	1
228H	14	1	1	0	3	0.1	17	49	1
228I	10	0	1	0	2	0.1	17	47	1
228J	13	1	1	0	3	0.1	17	48	1
228K	18	1	2	0	3	0.2	18	51	1
228L	19	2	3	0	4	0.2	18	51	1
228M	24	2	3	0	4	0.2	18	52	1
230	8	0	1	0	2	0.1	17	47	1
238A	6	0	0	0	1	0.1	17	46	1
238B	6	0	0	0	1	0.0	17	46	1
238C	6	0	0	0	1	0.0	17	46	1
238D	6	0	0	0	1	0.0	17	46	1
238E	6	0	0	0	1	0.0	17	46	1
238F	6	0	0	0	1	0.0	17	46	1
239A	6	0	0	0	1	0.0	17	46	1
239B	6	0	0	0	1	0.1	17	46	1
239C	6	0	0	0	1	0.1	17	46	1
239D	6	0	0	0	1	0.1	17	46	1
239E	6	0	0	0	1	0.1	17	46	1
239F	6	0	0	0	1	0.0	17	46	1
239G	6	0	0	0	1	0.1	17	46	1
239H	6	0	0	0	1	0.1	17	46	1
239I	6	0	0	0	1	0.1	17	46	1
240A	9	1	1	0	2	0.1	17	47	1
240B	10	1	1	0	2	0.1	17	48	1
240C	10	1	1	0	2	0.1	17	48	1
240D	10	1	1	0	2	0.1	17	48	1
240E	10	1	1	0	2	0.1	17	48	1

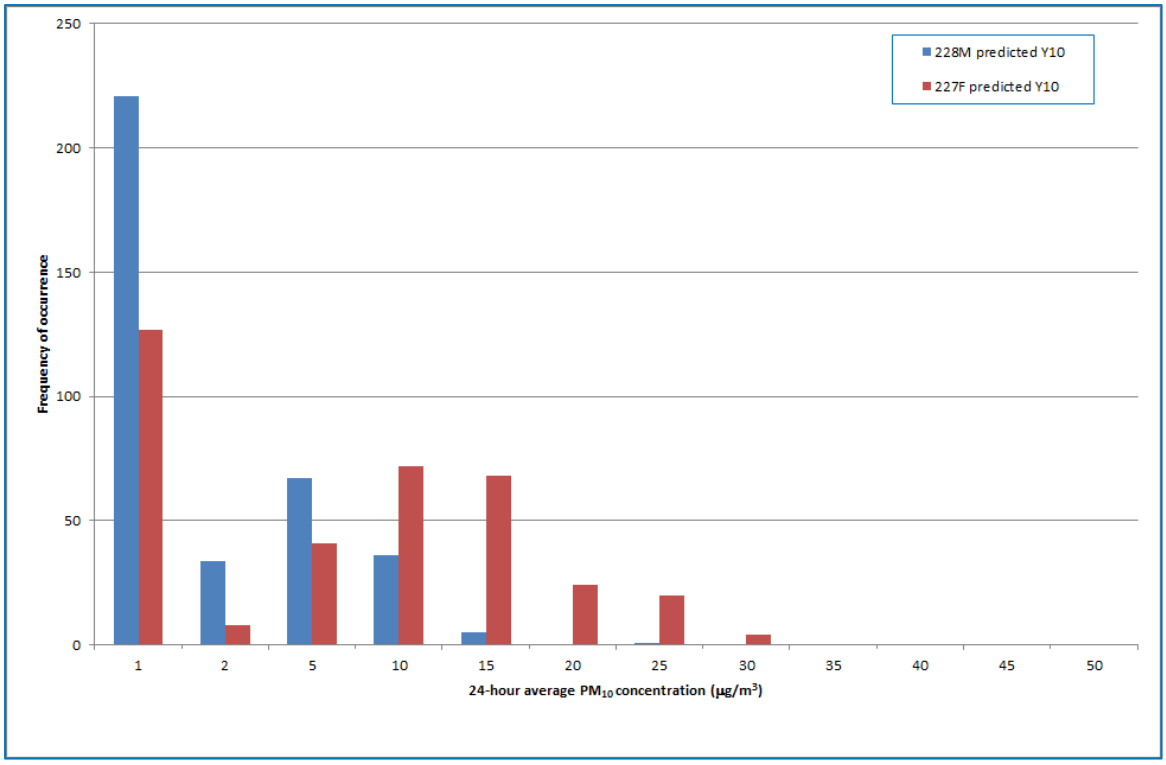

Figure 5: Frequency distribution of 24-hour average PM_{10} background data and predicted concentrations at most affected horse-stud residences (228M and 227F) in Year 10

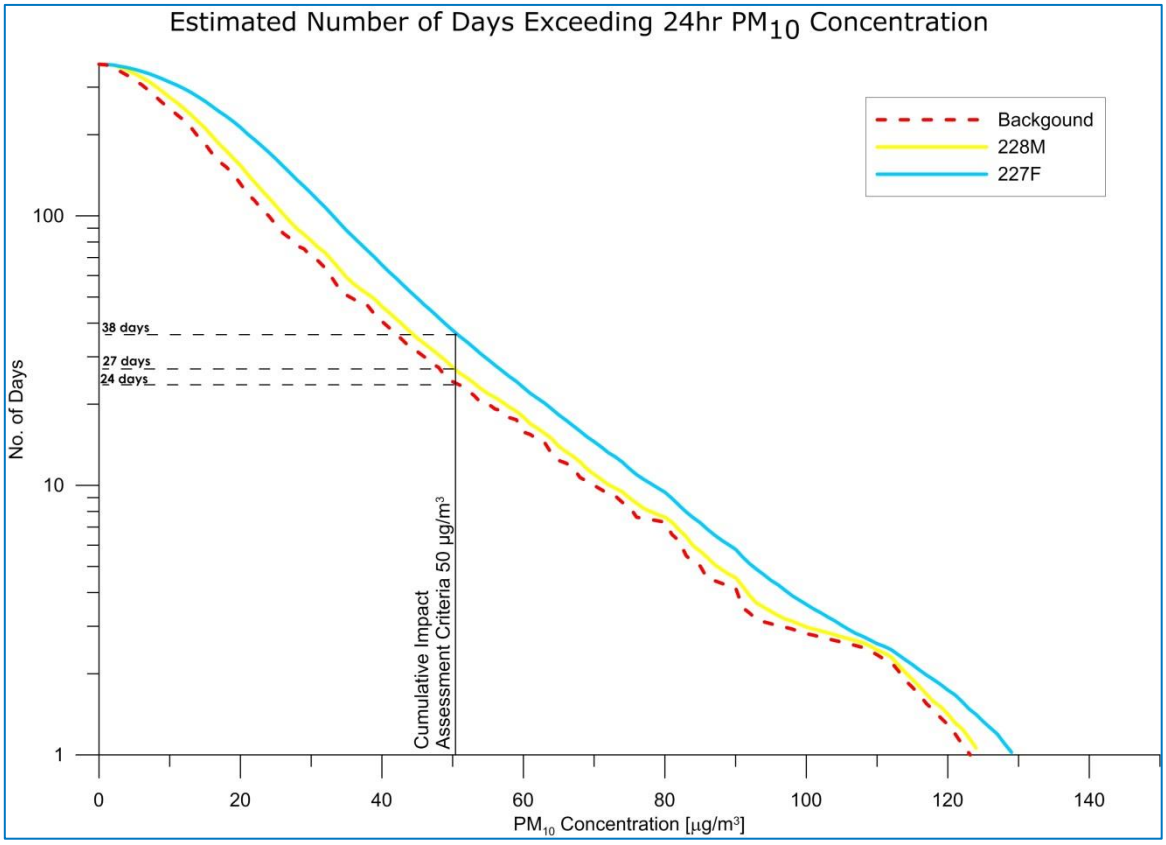

Figure 6: Year 10 – Number of days likely to exceed cumulative maximum 24-hr average PM_{10} concentration (50 µg/m³) – residences 228M and 227F

5.1.2 Equine health

Figure 7 shows the locations of primary thoroughbred horse activities on the horse-studs. Also shown are the predicted cumulative contours for annual average PM_{10}, TSP and dust deposition and the Project-only contribution to the 24-hour average PM_{10} criteria.

It is apparent from **Figure 7** that the locations where thoroughbred horse activities take place on the horse-studs are predicted to comply with all the relevant impact assessment criteria. Since the impact assessment criteria are set to protect the most vulnerable members in the population i.e. young children, the elderly, those with respiratory diseases, it is considered that compliance with these criteria is more than adequate to protect equine health as demonstrated in the EA and RTS.

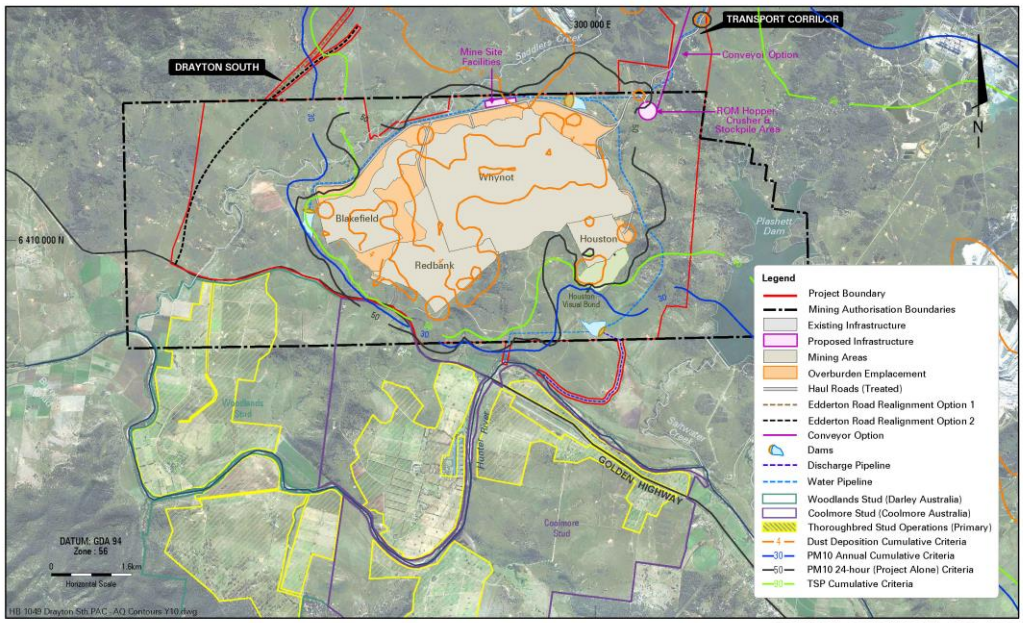

Figure 7: Drayton South Air Quality Contours – Year 10

5.1.3 Summary

None of the residences located on the horse-stud are predicted to exceed any of the EPA impact assessment criteria or DP&I acquisition criteria. The potential for any exceedance would be further minimised by the use of the identified management and mitigation measures, which include:

- real time air quality and meteorological monitoring
- meteorological forecasting
- processes to guide the day to day planning of mining operations
- proactive dust mitigation measures
- approaches to ensure that air quality criteria are achieved
- procedures for identifying the source(s) contributing to air quality impacts, using the air quality and meteorological monitoring network and appropriate investigative tools such as back track modelling of plume dispersion, as part of an integrated system.

It has been shown that there are no adverse air quality impacts across any of the areas where thoroughbred stud operations occur. It is also considered that compliance with impact assessment criteria that have been set to protect human health are more than adequate to protect the health of the horses.

6 IMPACTS OF CLIMATE CHANGE

PAC comments

Notwithstanding the setback requirements shown in Figure 5 *(not shown in this letter response)****, further work would be required to demonstrate that the impacts of the mine could be suitably managed within this reduced mine footprint. In particular, air quality modelling will need to be updated to reflect the revised activities that would occur on site, and also to consider the worst case scenarios for the mine, including the influence of climate change.***

The Commission considers that any redesign must include full consideration of the air quality issue. A cautious approach to air quality is recommended, having regard to the fact that high background particulate levels are expected in and around what was this mine plan's year ten (during the 2020 decade).

6.1 Response to comments on impacts of climate change

With respect to the influence of climate change, as discussed in Section 4.3.1 of the RTS, measurable changes to the climate (and thus the meteorology that is used in dispersion modelling) have occurred over a long period of time compared with the anticipated 27 year life of Drayton South. The meteorology used in dispersion modelling is, by necessity, based on historic data collected in the area. Further detail is available in Section 4.3.1 of the RTS, but below summarises the projected changes to climate in NSW by 2030 and how this may affect the predicted concentrations:

- Mean annual temperature (Hunter Valley) - increase by 0.6 to 1.0°C
  - Since the sources on a coal mine are essentially ground-based, any change in ambient temperature will have little to no effect on the predicted concentrations.
- Annual rainfall (NSW) - vary between ±2%
  - Since rainfall is NOT included in dispersion modelling, this would not impact on predicted concentrations.
- Humidity (NSW) – decrease by 1% plus 2% increase in evapotranspiration
  - May result in reduced soil moisture and subsequent marginal increase in emissions from wind erosion, however, it is important to note:
    - Soil moisture/evapotranspiration are not explicit input parameters to the dispersion modelling and emission estimation is based on the Best Available Techniques.
    - The emission estimation cannot be updated without generating the conditions under which these increased emissions may arise.
- Wind speed (NSW) - vary between ±2%
  - May marginally increase the predicted concentrations due to increased wind erosion and better dispersion over a wider area.

6.2 Summary

None of these predicted changes are considered to be significant enough to materially change the conclusions of the dispersion modelling.

Discussion regarding the significant uncertainty around background and predicted cumulative concentrations has been provided in **Section 2**.

7 CONCLUSION

This report has provided response to the air quality-related comments contained in the PAC Review and submissions by EPA to the PAC. In conclusion:

- It is considered that the assessment of the worst-case operations has provided a conservative conclusion regarding the potential air quality impacts of the Project alone.
  It is widely accepted that dispersion models are more reliable for estimating longer time-averaged concentrations (e.g. annual averages) than shorter-term averages such as 24-hour average concentrations and as such are a valuable tool in identifying the potential for impacts but cannot be relied upon to determine precisely when, where and at what magnitude these impacts may occur. This is further compounded by the inability to know precisely what dust-generating events will be occurring in a 24-hour period and what meteorological conditions will exist at that time. Notwithstanding this, the modelling predictions presented in the report are scientifically robust and based on best practice modelling techniques.
- The cumulative 24-hour average assessment is intended as a tool to identify potential risk areas and activities so that these can be appropriately managed by the operation on a day-to-day basis. Anglo American has implemented a best practice predictive and real-time dust management system at their Drayton site, which includes a daily risk forecast tool for planning and managing day-to-day operations and a real-time dust monitoring system to act and respond to short-term elevated dust. Also, as part of the "dust stop' PRP process, Drayton have identified adverse meteorological conditions for managing visible dust from overburden handling, also used for managing day-to-day operations. These systems would be extended to Drayton South if approved.
- The assumptions of silt and moisture content for overburden and haul roads are not dissimilar to data collected from a range of sites across the Hunter Valley and other nearby coalfields. The use of average data would increase the total emission estimation by less than 5% and would not change the conclusions of the assessment.
- The control efficiencies applied are consistent with information provided by the EPA in the Best Practice report.
- There are no residences on the horse-studs that are predicted to exceed any of the impact or acquisition criteria. The areas where equine activity takes places are all predicted to have cumulative impacts well below the impact assessment criteria set to protect human health. It is considered that demonstration of compliance with criteria set to protect the most vulnerable of humans is adequate to conclude there will be no adverse impacts on the health of the horses.
- With respect to the impacts of climate change, none of the predicted changes over the relatively short life of the mine (27 years compared with climate changes which have occurred over hundreds if not thousands of years) are considered to be significant enough to materially change the conclusions of the dispersion modelling.

Anglo American is committed to the application of best-practice controls on dust-generating activities and are fully prepared to comply with the requirements of any approval and respond to the current, and any future, Dust Stop PRPs.

Appendix A – Silt and moisture analysis reports

Environmental - Dust Emission

Client Pacific Environment
Job No 13-087
Report number 1
Sample point Coal Mine

Date sampled Sampled by
Date sample received 0/01/1900
Sampled by: *** NA
Macgeo Sample number 0

Threshold Friction Velocity EPA AP 42 13.2.5* (Material Size Distribution)

Sample 01 Active OB

Sieve Aperture (mm)	% retained on sieve (ad)
4.0	22.2
2.0	8.8
1.0	13.6
0.5	19.0
0.25	18.2
<0.25	18.2

Sample 02 Inactive OB

Sieve Aperture (mm)	% retained on sieve (ad)
4.0	34.1
2.0	15.7
1.0	14.3
0.5	12.2
0.25	11.5
<0.25	12.2

Sample 03 Reject Coal

Sieve Aperture (mm)	% retained on sieve (ad)
4.0	90.8
2.0	5.2
1.0	1.9
0.5	0.8
0.25	0.6
<0.25	0.8

Sample 04 Product Coal

Sieve Aperture (mm)	% retained on sieve (ad)
4.0	70.4
2.0	9.3
1.0	7.0
0.5	5.6
0.25	3.7
<0.25	3.9

Sample 05 ROM Coal

Sieve Aperture (mm)	% retained on sieve (ad)
4.0	61.2
2.0	11.4
1.0	10.1
0.5	6.4
0.25	5.1
<0.25	5.7

Sample 06 Main Haul Road

Sieve Aperture (mm)	% retained on sieve (ad)
4.0	60.3
2.0	17.2
1.0	10.7
0.5	6.1
0.25	2.9
<0.25	2.8

Sample 07 In Pit Haul Road

Sieve Aperture (mm)	% retained on sieve (ad)
4.0	24.4
2.0	14.6
1.0	16.8
0.5	12.4
0.25	12.4
<0.25	19.4

test methods
EPA AP 42 13.2.5 Threshold Friction Velocity
* Non accredited tests
*** MacQuarie Geotech takes no responsibility for correctness of sampling if sampled by client

MACQUARIE GEOTECH
NATA Accredited Laboratory Number: 14874

Macquarie Geotechnical
Unit 5/1 Castlereagh Hwy
Lidsdale NSW 2790
phone 02 6355 7991

Authorised signatory _____
R. Cox
Date

Environmental - Dust Emissions

Client Pacific Environment
Job No 13-087
Report number 1
Sample point Coal Mine

Date sampled 26/02/2013
Date sample received 27/02/2013
Sampled in accordance with AS4264.1 NA
Sampled by: *** Client

Sample date	Client Sample Identification	Moisture in Analysis* % EPA AP42 C2	Silt Content* % EPA AP42 C2	Threshold Friction Velocity* cm/s EPA AP 42 13.2.5			Macgeo sample no.
26/02/2013	Sample 01 Active OB	10.9	1.8	>100			L13-5999
26/02/2013	Sample 02 Inactive OB	6.4	0.5	>100			L13-6000
26/02/2013	Sample 03 Reject Coal	3.9	0.2	>100			L13-6001
26/02/2013	Sample 04 Product Coal	5.4	0.8	>100			L13-6002
26/02/2013	Sample 05 ROM Coal	6.6	1.1	>100			L13-6003
26/02/2013	Sample 06 Main Haul Road	2.8	0.4	>100			L13-6004
26/02/2013	Sample 07 In Pit Haul Road	2.0	4.1	>100			L13-6005

* Non accredited tests
*** MacQuarie Geotech takes no responsibility for correctness of sampling if sampled by client

Authorised signatory _____
R. Cox
Date 28/02/2013

NATA Accredited Laboratory Number: 14874

MACQUARIE GEOTECH

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Unit 5/1 Castlereagh Hwy
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BUREAU VERITAS MINERALS LABORATORIES
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Facsimile: (02) 4902 4899

CERTIFICATE OF ANALYSIS

Contents :
1. Cover Page (1)
2. Analysis Report Pages
3. Additional Reports - External (if applicable)

Report No.	:	L105862
Attention	:	Greer Laing
Client	:	Pacific Environment Limited Suite 1, Level 1, 146 Arthur St., North Sydney NSW 4060
Samples	:	5
Reference/Order	:	7813
Project	:	DRAYTON REX 7813
Received Samples	:	14/10/13
Date Reported	:	22/10/13

RESULTS

This report relates specifically to the samples as received. Results relate to the source material only to the extent that the samples as supplied are truly representative of the sample source.
This report replaces any preliminary results issued. This report has been auto-authorised for PDF format.

PLEASE SEE ATTACHED PAGES FOR RESULTS

E. Schonberger
Laboratory Manager Newcastle

Job Number : L105862
Client : Pacific Environment Limited
Reference/Order : 7813
Project : DRAYTON REX 7813

		Lab No	001	002	003	004
		Sample ID				
Analyte		DL	Sample 1	Sample 2	Sample 3	Sample 4
PC072 - Bulk Moisture Determination						
Total Moisture (@ 105.C)	%	0.1	0.90	0.70	0.70	1.1
NQ899 - Size Analysis of Misc.Material						
+ 31.5 mm	%	0.1	nd	nd	nd	nd
-31.5 + 16.0 mm	%	0.1	19.0	nd	nd	4.3
-16.0 + 8.0 mm	%	0.1	9.4	10.4	4.0	17.4
-8.0 + 4.0 mm	%	0.1	19.1	26.8	15.9	20.7
-4.0 + 0.85 mm	%	0.1	33.7	51.5	51.0	32.4
-0.85 + 0.425 mm	%	0.1	9.6	6.6	13.6	7.2
-0.425 + 0.150 mm	%	0.1	7.1	3.1	11.1	8.5
-0.150 + 0.075 mm	%	0.1	1.4	0.9	2.8	5.2
-0.075 mm	%	0.1	0.7	0.7	1.6	4.3

DL = Detection Limit
LNR = Samples Listed not Received
-- = Not Applicable
nd = < DL
db = Dry basis

Sample Description Key (if req'd)

001	LEVEL 3 HAUL Rd.
002	LEVEL 5 HAUL Rd.
003	WEST HAUL Rd.
004	NORTH PIT RING Rd.

Job Number : L105862
Client : Pacific Environment Limited
Reference/Order : 7813
Project : DRAYTON REX 7813

		Lab No	005
		Sample ID	
Analyte		DL	Sample 5
PC072 - Bulk Moisture Determination			
Total Moisture (@ 105.C)	%	0.1	1.4
NQ899 - Size Analysis of Misc.Material			
+ 31.5 mm	%	0.1	24.4
-31.5 + 16.0 mm	%	0.1	6.1
-16.0 + 8.0 mm	%	0.1	18.1
-8.0 + 4.0 mm	%	0.1	20.8
-4.0 + 0.85 mm	%	0.1	19.7
-0.85 + 0.425 mm	%	0.1	4.2
-0.425 + 0.150 mm	%	0.1	4.3
-0.150 + 0.075 mm	%	0.1	1.3
-0.075 mm	%	0.1	1.1

DL = Detection Limit
LNR = Samples Listed not Received
-- = Not Applicable
nd = < DL
db = Dry basis

Sample Description Key (if req'd)
005 LEVEL 2 HAUL Rd.

Appendix B – Year 10 Revised Project Inventory – original compared with revised silt and moisture

Table B.1: Year 10 – TSP Emissions – per Revised Project

ACTIVITY	TSP emissions (kg/y)	Intensity	units	Emission factor	units	Variable 1	units	Variable 2	units	Variable 3	units	Variable 4	Units	Variable 5	Units	CONTROL	Units
WHYNOT																	
Topsoil removal & Site preparation - Dozers on Whynot	30,319	3,623	h/y	16.7	kg/h	10	silt content in %	2	moisture content in %							50	% control
Topsoil removal - Sh/Ex/FELs loading topsoil - Whynot	174	185,253	t/y	0.0019	kg/t	1.59	average of (wind speed/2.2)^1.3 in m/s	2	moisture content in %							50	% control
Topsoil removal - Hauling topsoil to emplacement area (east) - Whynot	2,488	92,626	t/y	0.13	kg/t	222	t/load	275	Vehicle gross mass (t)	5.7	km/return trip	5.2	kg/VKT	4.1	% silt content	80	% control
Topsoil removal - Hauling topsoil to emplacement area (west) - Whynot	1,659	92,626	t/y	0.09	kg/t	222	t/load	275	Vehicle gross mass (t)	3.8	km/return trip	5.2	kg/VKT	4.1	% silt content	80	% control
Topsoil removal - Emplacing topsoil at emplacement area - Whynot	349	185,253	t/y	0.0019	kg/t	1.59	average of (wind speed/2.2)^1.3 in m/s	2	moisture content in %							0	% control
OB - Drilling - Whynot	4,596	25,964	holes/y	0.59	kg/hole											70	% control
OB - Blasting - Whynot	30,981	128	blasts/y	241	kg/blast	10638	Area of blast in square metres									0	% control
OB - Dozers on Dragline OB in-pit - Whynot	767	3,251	h/y	0.24	kg/h	1.8	silt content in %	10.9	moisture content in %							0	% control
OB - Dragline removal of OB - Whynot	210,383	11,012,155	bcm/y	0.02	kg/m3 (loose)	7.0	drop distance in m	10.9	moisture content in %							0	% control
OB - Dozers on Excavator OB in-pit - Whynot	694	2,943	h/y	0.24	kg/h	1.8	silt content in %	10.9	moisture content in %							0	% control
OB - Excavator loading OB to haul truck - Whynot	4,225	24,110,314	t/y	0.0002	kg/t	1.6	average of (wind speed/2.2)^1.3 in m/s	10.9	moisture content in %							0	% control
OB - Hauling excavator OB to emplacement area (east) - Whynot	323,849	12,055,157	t/y	0.13	kg/t	222	t/load	275.0	Vehicle gross mass (t)	5.7	km/return trip	5.2	kg/VKT	4.1	% silt content	80	% control
OB - Hauling excavator OB to emplacement area (west) - Whynot	215,862	12,055,157	t/y	0.09	kg/t	222	t/load	275.0	Vehicle gross mass (t)	3.8	km/return trip	5.2	kg/VKT	4.1	% silt content	80	% control
OB - Dozers on OB haul roads (east) - Whynot	315	1,335	h/y	0.24	kg/h	1.8	silt content in %	10.9	moisture content in %							0	% control
OB - Dozers on OB haul roads (west) - Whynot	315	1,335	h/y	0.24	kg/h	1.8	silt content in %	10.9	moisture content in %							0	% control
OB - Emplacing excavator OB at emplacement area - Whynot	4,225	24,110,314	t/y	0.0002	kg/t	1.6	average of (wind speed/2.2)^1.3 in m/s	10.9	moisture content in %							0	% control
OB - Dozers on OB emplacement area - Whynot	1,461	6,194	h/y	0.24	kg/h	1.8	silt content in %	10.9	moisture content in %							0	% control
OB - Dozers in-pit ancillary tasks - Whynot	1,690	7,164	h/y	0.24	kg/h	1.8	silt content in %	10.9	moisture content in %							0	% control
OB - Dozers ripping/pushing/clean-up Partings - Whynot	607	2,575	h/y	0.24	kg/h	1.8	silt content in %	10.9	moisture content in %							0	% control
OB - Loading partings to haul trucks - Whynot	277	1,579,656	t/y	0.0002	kg/t	1.59	average of (wind speed/2.2)^1.3 in m/s	10.9	moisture content in %							0	% control
OB - Hauling partings to emplacement area (east) - Whynot	21,218	789,828	t/y	0.13	kg/t	222	t/load	275	Vehicle gross mass (t)	5.7	km/return trip	5.2	kg/VKT	4.1	% silt content	80	% control
OB - Hauling partings to emplacement area (west) - Whynot	14,143	789,828	t/y	0.09	kg/t	222	t/load	275	Vehicle gross mass (t)	3.8	km/return trip	5.2	kg/VKT	4.1	% silt content	80	% control
OB - Emplacing Partings at emplacement area - Whynot	277	1,579,656	t/y	0.0002	kg/t	1.59	average of (wind speed/2.2)^1.3 in m/s	10.9	moisture content in %							0	% control
CL - Drilling coal and partings - Whynot	2,410	13,615	holes/y	0.59	kg/hole											70	% control
CL - Blasting coal and partings - Whynot	1,257	65	blasts/y	19	kg/blast	1985	Area of blast in square metres									0	% control
CL - Dozers ripping/pushing/clean-up ROM in-pit - Whynot	28,349	8,257	h/y	3.43	kg/h	1.1	silt content in %	6.6	moisture content in %							0	% control
CL - Sh/Ex/FELs loading open coal to trucks - Whynot	185,122	3,072,435	t/y	0.06	kg/t	6.6	moisture content in %									0	% control
CL - Hauling open coal in-pit roads (east) - Whynot	53,378	1,536,217	t/y	0.17	kg/t	70	t/load	65	Vehicle gross mass (t)	4.5	km/return trip	2.7	kg/VKT	4.1	% silt content	80	% control
CL - Hauling open coal to ROM pad (east) - Whynot	48,266	1,536,217	t/y	0.21	kg/t	70	t/load	65	Vehicle gross mass (t)	27.5	km/return trip	0.5	kg/VKT	0.4	% silt content	85	% control
CL - Hauling open coal in-pit roads (middle) - Whynot	31,898	1,536,217	t/y	0.10	kg/t	70	t/load	65	Vehicle gross mass (t)	2.7	km/return trip	2.7	kg/VKT	4.1	% silt content	80	% control
CL - Hauling open coal to ROM pad (middle) - Whynot	51,110	1,536,217	t/y	0.22	kg/t	70	t/load	65	Vehicle gross mass (t)	29.2	km/return trip	0.5	kg/VKT	0.4	% silt content	85	% control
CL - Unloading ROM to ROM stockpiles/hopper - Whynot	9,217	3,072,435	t/y	0.01	kg/t											70	% control
CL- Handle coal at CHPP - Whynot	995	3,072,435	t/y	0.0003	kg/t	1.46	average of (wind speed/2.2)^1.3 in m/s	6.6	moisture content in %							0	% control
CL - Rehandle ROM coal at stockpiles/hopper - Whynot	3,072	307,243	t/y	0.01	kg/t											0	% control
BLAKEFIELD																	
Topsoil removal & Site preparation - Dozers on Blakefield	5,989	716	h/y	16.7	kg/h	10	silt content in %	2	moisture content in %							50	% control
Topsoil removal - Sh/Ex/FELs loading topsoil - Blakefield	65	69,475	t/y	0.0019	kg/t	1.59	average of (wind speed/2.2)^1.3 in m/s	2	moisture content in %							50	% control
Topsoil removal - Hauling topsoil to emplacement area - Blakefield	1,057	69,475	t/y	0.08	kg/t	222	t/truck load	275	Vehicle gross mass (t)	3.2	km/return trip	5.2	kg/VKT	4.1	% silt content	80	% control
Topsoil removal - Emplacing topsoil at emplacement area - Blakefield	131	69,475	t/y	0.0019	kg/t	1.59	average of (wind speed/2.2)^1.3 in m/s	2	moisture content in %							0	% control
OB - Drilling - Blakefield	1,039	5,868	holes/y	0.59	kg/hole											70	% control
OB - Blasting - Blakefield	7,002	29	blasts/y	241	kg/blast	10638	Area of blast in square metres									0	% control
OB - Dozers on Dragline OB in-pit - Blakefield	157	667	h/y	0.24	kg/h	1.8	silt content in %	10.9	moisture content in %							0	% control
OB - Dragline removal of OB - Blakefield	87,691	4,590,029	bcm/y	0.02	kg/m3 (loose)	7	drop distance in m	10.9	moisture content in %							0	% control
OB - Dozers on Excavator OB in-pit - Blakefield	22	95	h/y	0.24	kg/h	1.8	silt content in %	10.9	moisture content in %							0	% control
OB - Excavator loading OB to haul truck - Blakefield	136	775,190	t/y	0.0002	kg/t	1.6	average of (wind speed/2.2)^1.3 in m/s	10.9	moisture content in %							0	% control
OB - Hauling excavator OB to emplacement area - Blakefield	11,794	775,190	t/y	0.08	kg/t	222	t/load	275	Vehicle gross mass (t)	3.2	km/return trip	5.2	kg/VKT	4.1	% silt content	80	% control
OB - Dozers on OB haul roads - Blakefield	20	86	h/y	0.24	kg/h	1.8	silt content in %	10.9	moisture content in %							0	% control
OB- Emplacing excavator OB at emplacement area - Blakefield	136	775,190	t/y	0.0002	kg/t	1.6	average of (wind speed/2.2)^1.3 in m/s	10.9	moisture content in %							0	% control
OB - Dozers on OB emplacement area - Blakefield	180	761	h/y	0.24	kg/h	1.8	silt content in %	10.9	moisture content in %							0	% control
OB - Dozers in-pit ancillary tasks -Blakefield	161	681	h/y	0.24	kg/h	1.8	silt content in %	10.9	moisture content in %							0	% control
OB - Dozers ripping/pushing/clean-up Partings - Blakefield	9	37	h/y	0.24	kg/h	1.8	silt content in %	10.9	moisture content in %							0	% control
OB - loading partings to trucks - Blakefield	17	96,964	t/y	0.0002	kg/t	1.6	average of (wind speed/2.2)^1.3 in m/s	10.9	moisture content in %							0	% control
OB - Hauling partings to emplacement area - Blakefield	1,475	96,964	t/y	0.08	kg/t	222	t/load	275.0	Vehicle gross mass (t)	3.2	km/return trip	5.2	kg/VKT	4.1	% silt content	80	% control
OB - Emplacing partings to emplacement area - Blakefield	17	96,964	t/y	0.0002	kg/t	1.6	average of (wind speed/2.2)^1.3 in m/s	10.9	moisture content in %							0	% control
CL - Drilling coal - Blakefield	229	1,294	holes/y	0.59	kg/hole											70	% control
CL - Blasting coal - Blakefield	119	6	blasts/y	19.4	kg/blast	1985	Area of blast in square metres									0	% control
CL - Dozers ripping/pushing/clean-up ROM in-pit - Blakefield	1,441	420	h/y	3.43	kg/h	1.1	silt content in %	6.6	moisture content in %							0	% control
CL - Sh/Ex/FELs loading open coal to trucks - Blakefield	17,593	291,991	t/y	0.06	kg/t	6.6	moisture content in %									0	% control
CL - Hauling open coal in-pit roads - Blakefield	5,823	291,991	t/y	0.10	kg/t	70	t/load	65	Vehicle gross mass (t)	2.6	km/return trip	2.7	kg/VKT	4.1	% silt content	80	% control
CL - Hauling open coal to ROM pad - Blakefield	12,245	291,991	t/y	0.28	kg/t	70	t/load	65	Vehicle gross mass (t)	36.7	km/return trip	0.5	kg/VKT	0.4	% silt content	85	% control
CL - Unloading ROM to ROM stockpiles/hopper - Blakefield	2,920	291,991	t/y	0.01	kg/t	70	% control									0	% control
CL - Handle coal at CHPP - Blakefield	61	291,991	t/y	0.0002	kg/t	1	average of (wind speed/2.2)^1.3 in m/s	9.0	moisture content in %							0	% control
CL - Rehandle ROM coal at stockpiles/hopper - Blakefield	292	29,199	t/y	0.01	kg/t											0	% control

REDBANK																		
Topsoil Removal - Dozers/Excavators stripping topsoil - Redbank	11,928	1,425	h/y	16.7	kg/h	10	silt content in %	2	moisture content in %							50	% control
Topsoil removal - Sh/Ex/FELs loading topsoil - Redbank	89	94,757	t/y	0.0019	kg/t	1.59	average of (wind speed/2.2)^1.3 in m/s	2	moisture content in %							50	% control
Topsoil removal - Hauling topsoil to emplacement area (north) - Redbank	1,319	71,068	t/y	0.12	kg/t	222	t/truck load	275	Vehicle gross mass (t)	5.3	km/return trip	5.2	kg/VKT	4.1	% silt content	85	% control
Topsoil removal - Hauling topsoil to emplacement area (south) - Redbank	522	23,689	t/y	0.15	kg/t	222	t/truck load	275	Vehicle gross mass (t)	6.3	km/return trip	5.2	kg/VKT	4.1	% silt content	85	% control
Topsoil removal - Emplacing topsoil at emplacement area - Redbank	178	94,757	t/y	0.0019	kg/t	1.59	average of (wind speed/2.2)^1.3 in m/s	2	moisture content in %							0	% control
OB - Drilling for excavator removal - Redbank	1,814	10,246	holes/y	0.59	kg/hole											70	% control
OB - Blasting for excavator removal - Redbank	12,227	51	blasts/y	241	kg/blast	10638	Area of blast in square metres									0	% control
OB - Dozers on Excavator OB in-pit - Redbank	643	2,727	h/y	0.24	kg/h	1.8	silt content in %	10.9	moisture content in %							0	% control
OB - Excavator loading OB to haul truck - Redbank	3,915	22,339,534	t/y	0.0002	kg/t	2	average of (wind speed/2.2)^1.3 in m/s	10.9	moisture content in %							0	% control
OB - Hauling to emplacement area (north) - Redbank	311,052	16,754,651	t/y	0.12	kg/t	222	t/load	275	Vehicle gross mass (t)	5.3	km/return trip	5.2	kg/VKT	4.1	% silt content	85	% control
OB - Hauling to emplacement area (south) - Redbank	123,132	5,584,884	t/y	0.15	kg/t	222	t/load	275	Vehicle gross mass (t)	6.3	km/return trip	5.2	kg/VKT	4.1	% silt content	85	% control
OB - Dozers on OB haul roads (north) - Redbank	292	1,237	h/y	0.24	kg/h	1.8	silt content in %	10.9	moisture content in %							0	% control
OB - Dozers on OB haul roads (south) - Redbank	292	1,237	h/y	0.24	kg/h	1.8	silt content in %	10.9	moisture content in %							0	% control
OB - Emplacing at emplacement area - Redbank	3,915	22,339,534	t/y	0.0002	kg/t	1.6	average of (wind speed/2.2)^1.3 in m/s	10.9	moisture content in %							0	% control
OB - Dozers on OB emplacement area -Redbank	643	2,727	h/y	0.24	kg/h	1.8	silt content in %	10.9	moisture content in %							0	% control
OB - Dozers in-pit ancillary tasks - Redbank	869	3,685	h/y	0.24	kg/h	1.8	silt content in %	10.9	moisture content in %							0	% control
OB - Dozers ripping/pushing/clean-up Partings - Redbank	243	1,031	h/y	0.24	kg/h	2	silt content in %	10.9	moisture content in %							0	% control
OB - Loading partings to trucks - Redbank	150	855,701	t/y	0.0002	kg/t	1.59	average of (wind speed/2.2)^1.3 in m/s	10.9	moisture content in %							0	% control
OB - Hauling partings to emplacement area (north) - Redbank	11,915	641,776	t/y	0.12	kg/t	222	t/load	275	Vehicle gross mass (t)	5.3	km/return trip	5.2	kg/VKT	4.1	% silt content	85	% control
OB - Hauling partings to emplacement area (south) - Redbank	4,716	213,925	t/y	0.15	kg/t	222	t/load	275	Vehicle gross mass (t)	6.3	km/return trip	5.2	kg/VKT	4.1	% silt content	85	% control
OB - Emplacing partings at emplacement area - Redbank	150	855,701	t/y	0.0002	kg/t	1.59	average of (wind speed/2.2)^1.3 in m/s	10.9	moisture content in %							0	% control
CL - Highwall transfer point - Redbank (Y8)	318	900,000	kg/t	0.0004	kg/t	1.59	average of (wind speed/2.2)^1.3 in m/s	6.6	moisture content in %							0	% control
CL - Highwall conveyor - Redbank	17	0	ha	0.40	kg/ha/h	8760	h/y									0	% control
CL - Drilling coal - Redbank	1,240	7,003	holes/y	0.59	kg/hole											70	% control
CL - Blasting coal - Redbank	646	33	blasts/y	19.4495	kg/blast	1985	Area of blast in square metres									0	% control
CL - Dozers ripping/pushing/clean-up ROM in-pit - Redbank	12,276	3,576	h/y	3.43	kg/h	1.1	silt content in %	6.6	moisture content in %							0	% control
CL - Sh/Ex/FELs loading open coal to trucks - Redbank	149,449	2,480,375	t/y	0.06	kg/t	6.6	moisture content in %									0	% control
CL - Hauling open coal in-pit roads - Redbank	160,224	2,480,375	t/y	0.43	kg/t	70	t/load	65	Vehicle gross mass (t)	11.1	km/return trip	2.7	kg/VKT	4.1	% silt content	85	% control
CL - Hauling open coal to ROM pad - Redbank	88,540	2,480,375	t/y	0.238	kg/t	70	t/load	65	Vehicle gross mass (t)	31.3	km/return trip	0.5	kg/VKT	0.4	% silt content	85	% control
CL - Unloading ROM to ROM stockpiles/hopper - Redbank	7,441	2,480,375	t/y	0.01	kg/t											70	% control
CL - Handle coal at CHPP - Redbank	803	2,480,375	t/y	0.0003	kg/t	1.5	average of (wind speed/2.2)^1.3 in m/s	6.6	moisture content in %							0	% control
CL - Rehandle ROM coal at stockpiles/hopper - Redbank	2,480	248,038	t/y	0.01	kg/t											0	% control
ROM/REJECTS HANDLING																		
CL - Dozers ROM Coal Handling & Rejects - ROM stockpile	19,792	5,765	h/y	3.43	kg/h	1.1	silt content in %	6.6	moisture content in %							0	% control
CL - Loading rejects	-	1,461,200	t/y	Rejects very wet therefore no dust												0	% control
CL - Transporting rejects	71,324	1,461,200	t/y	0.2441	kg/t	91	t/load	118	Vehicle gross mass (t)	6.2	km/return trip	3.6	kg/VKT	4.1	% silt content	80	% control
CL - Unloading rejects	-	1,461,200	t/y	Rejects very wet therefore no dust												0	% control
PRODUCT COAL																		
CL - Loading product stockpile	1,129	3,508,997	t/y	0.0004	kg/t	1.46	average of (wind speed/2.2)^1.3 in m/s	5.4	moisture content in %							25	% control
CL - Loading product coal to trains	1,505	3,508,997	t/y	0.0004	kg/t	1.46	average of (wind speed/2.2)^1.3 in m/s	5.4	moisture content in %							0	% control
WIND EROSION																		
WE - OB dump & disturbed area - Uncontrolled	1,202,360	343	ha	0.4	kg/ha/h	8760	h/y									0	% control
WE - OB dump & disturbed area - Controlled	66,798	38	ha	0.4	kg/ha/h	8760	h/y									50	% control
WE - Open mining area - Whynot	420,545	120	ha	0.4	kg/ha/h	8760	h/y									0	% control
WE - Open mining area - Blakefield	157,717	45	ha	0.4	kg/ha/h	8760	h/y									0	% control
WE - Open mining area - Redbank	215,110	61	ha	0.4	kg/ha/h	8760	h/y									0	% control
WE - Open mining area - Houston	26,064	25	ha	0.4	kg/ha/h	8760	h/y									70	% control
WE - ROM stockpiles	7,358	6	ha	0.4	kg/ha/h	8760	h/y									65	% control
WE - Product stockpiles	52,560	15	ha	0.4	kg/ha/h	8760	h/y									0	% control
Total TSP Yr 10	**4,599,468**																

Table B.2: Year 10 – TSP Emissions – updated overburden silt and moisture

ACTIVITY	TSP emissions (kg/y)	Intensity	units	Emission factor	units	Variable 1	units	Variable 2	units	Variable 3	units	Variable 4	Units	Variable 5	Units	CONTROL	Units
WHYNOT	NEW (all)																
Topsoil removal & Site preparation - Dozers on Whynot	30,319	3,623	h/y	16.7	kg/h	10	silt content in %	2	moisture content in %							50	% control
Topsoil removal - Sh/Ex/FELs loading topsoil - Whynot	174	185,253	t/y	0.0019	kg/t	1.59	average of (wind speed/2.2)^1.3 in m/s	2	moisture content in %							50	% control
Topsoil removal - Hauling topsoil to emplacement area (east) - Whynot	2,488	92,626	t/y	0.13	kg/t	222	t/load	275	Vehicle gross mass (t)	5.7	km/return trip	5.2	kg/VKT	4.1	% silt content	80	% control
Topsoil removal - Hauling topsoil to emplacement area (west) - Whynot	1,659	92,626	t/y	0.09	kg/t	222	t/load	275	Vehicle gross mass (t)	3.8	km/return trip	5.2	kg/VKT	4.1	% silt content	80	% control
Topsoil removal - Emplacing topsoil at emplacement area - Whynot	349	185,253	t/y	0.0019	kg/t	1.59	average of (wind speed/2.2)^1.3 in m/s	2	moisture content in %							0	% control
OB - Drilling - Whynot	4,596	25,964	holes/y	0.59	kg/hole											70	% control
OB - Blasting - Whynot	30,981	128	blasts/y	241	kg/blast	10638	Area of blast in square metres									0	% control
OB - Dozers on Dragline OB in-pit - Whynot	4,268	3,251	h/y	1.31	kg/h	3.8	silt content in %	5.8	moisture content in %							0	% control
OB - Dragline removal of OB - Whynot	254,220	11,012,155	bcm/y	0.02	kg/m3 (loose)	7	drop distance in m	5.8	moisture content in %							0	% control
OB - Dozers on Excavator OB in-pit - Whynot	3,864	2,943	h/y	1.31	kg/h	3.8	silt content in %	5.8	moisture content in %							0	% control
OB - Excavator loading OB to haul truck - Whynot	10,219	24,110,314	t/y	0.0004	kg/t	1.59	average of (wind speed/2.2)^1.3 in m/s	5.8	moisture content in %							0	% control
OB - Hauling excavator OB to emplacement area (east) - Whynot	323,849	12,055,157	t/y	0.13	kg/t	222	t/load	275	Vehicle gross mass (t)	5.7	km/return trip	5.2	kg/VKT	4.1	% silt content	80	% control
OB - Hauling excavator OB to emplacement area (west) - Whynot	215,862	12,055,157	t/y	0.09	kg/t	222	t/load	275	Vehicle gross mass (t)	3.8	km/return trip	5.2	kg/VKT	4.1	% silt content	80	% control
OB - Dozers on OB haul roads (east) - Whynot	1,753	1,335	h/y	1.31	kg/h	3.8	silt content in %	5.8	moisture content in %							0	% control
OB - Dozers on OB haul roads (west) - Whynot	1,753	1,335	h/y	1.31	kg/h	3.8	silt content in %	5.8	moisture content in %							0	% control
OB - Emplacing excavator OB at emplacement area - Whynot	10,219	24,110,314	t/y	0.0004	kg/t	1.59	average of (wind speed/2.2)^1.3 in m/s	5.8	moisture content in %							0	% control
OB - Dozers on OB emplacement area - Whynot	8,133	6,194	h/y	1.31	kg/h	3.8	silt content in %	5.8	moisture content in %							0	% control
OB - Dozers in-pit ancillary tasks - Whynot	9,406	7,164	h/y	1.31	kg/h	3.8	silt content in %	5.8	moisture content in %							0	% control
OB - Dozers ripping/pushing/clean-up Partings - Whynot	3,381	2,575	h/y	1.31	kg/h	3.8	silt content in %	5.8	moisture content in %							0	% control
OB - Loading partings to haul trucks - Whynot	670	1,579,656	t/y	0.0004	kg/t	1.59	average of (wind speed/2.2)^1.3 in m/s	5.8	moisture content in %							0	% control
OB - Hauling partings to emplacement area (east) - Whynot	21,218	789,828	t/y	0.13	kg/t	222	t/load	275	Vehicle gross mass (t)	5.7	km/return trip	5.2	kg/VKT	4.1	% silt content	80	% control
OB - Hauling partings to emplacement area (west) - Whynot	14,143	789,828	t/y	0.09	kg/t	222	t/load	275	Vehicle gross mass (t)	3.8	km/return trip	5.2	kg/VKT	4.1	% silt content	80	% control
OB - Emplacing Partings at emplacement area - Whynot	670	1,579,656	t/y	0.0004	kg/t	1.59	average of (wind speed/2.2)^1.3 in m/s	5.8	moisture content in %							0	% control
CL - Drilling coal and partings - Whynot	2,410	13,615	holes/y	0.59	kg/hole											70	% control
CL - Blasting coal and partings - Whynot	1,257	65	blasts/y	19	kg/blast	1985	Area of blast in square metres									0	% control
CL - Dozers ripping/pushing/clean-up ROM in-pit - Whynot	28,349	8,257	h/y	3.43	kg/h	1.1	silt content in %	6.6	moisture content in %							0	% control
CL - Sh/Ex/FELs loading open coal to trucks - Whynot	185,122	3,072,435	t/y	0.06	kg/t	6.6	moisture content in %									0	% control
CL - Hauling open coal in-pit roads (east) - Whynot	53,378	1,536,217	t/y	0.17	kg/t	70	t/load	65	Vehicle gross mass (t)	4.5	km/return trip	2.7	kg/VKT	4.1	% silt content	80	% control
CL - Hauling open coal to ROM pad (east) - Whynot	71,411	1,536,217	t/y	0.31	kg/t	70	t/load	65	Vehicle gross mass (t)	27.5	km/return trip	0.8	kg/VKT	0.7	% silt content	85	% control
CL - Hauling open coal in-pit roads (middle) - Whynot	31,898	1,536,217	t/y	0.10	kg/t	70	t/load	65	Vehicle gross mass (t)	2.7	km/return trip	2.7	kg/VKT	4.1	% silt content	80	% control
CL - Hauling open coal to ROM pad (middle) - Whynot	75,619	1,536,217	t/y	0.33	kg/t	70	t/load	65	Vehicle gross mass (t)	29.2	km/return trip	0.8	kg/VKT	0.7	% silt content	85	% control
CL - Unloading ROM to ROM stockpiles/hopper - Whynot	9,217	3,072,435	t/y	0.01	kg/t											70	% control
CL- Handle coal at CHPP - Whynot	995	3,072,435	t/y	0.0003	kg/t	1.46	average of (wind speed/2.2)^1.3 in m/s	6.6	moisture content in %							0	% control
CL - Rehandle ROM coal at stockpiles/hopper - Whynot	3,072	307,243	t/y	0.01	kg/t											0	% control
BLAKEFIELD																	
Topsoil removal & Site preparation - Dozers on Blakefield	5,989	716	h/y	16.7	kg/h	10	silt content in %	2	moisture content in %							50	% control
Topsoil removal - Sh/Ex/FELs loading topsoil - Blakefield	65	69,475	t/y	0.0019	kg/t	1.59	average of (wind speed/2.2)^1.3 in m/s	2	moisture content in %							50	% control
Topsoil removal - Hauling topsoil to emplacement area - Blakefield	1,057	69,475	t/y	0.08	kg/t	222	t/truck load	275	Vehicle gross mass (t)	3.2	km/return trip	5.2	kg/VKT	4.1	% silt content	80	% control
Topsoil removal - Emplacing topsoil at emplacement area - Blakefield	131	69,475	t/y	0.0019	kg/t	1.59	average of (wind speed/2.2)^1.3 in m/s	2	moisture content in %							0	% control
OB - Drilling - Blakefield	1,039	5,868	holes/y	0.59	kg/hole											70	% control
OB - Blasting - Blakefield	7,002	29	blasts/y	241	kg/blast	10638	Area of blast in square metres									0	% control
OB - Dozers on Dragline OB in-pit - Blakefield	875	667	h/y	1.31	kg/h	3.8	silt content in %	5.8	moisture content in %							0	% control
OB - Dragline removal of OB - Blakefield	105,963	4,590,029	bcm/y	0.02	kg/m3 (loose)	7	drop distance in m	5.8	moisture content in %							0	% control
OB - Dozers on Excavator OB in-pit - Blakefield	124	95	h/y	1.31	kg/h	3.8	silt content in %	5.8	moisture content in %							0	% control
OB - Excavator loading OB to haul truck - Blakefield	329	775,190	t/y	0.0004	kg/t	1.59	average of (wind speed/2.2)^1.3 in m/s	5.8	moisture content in %							0	% control
OB - Hauling excavator OB to emplacement area - Blakefield	11,794	775,190	t/y	0.08	kg/t	222	t/load	275	Vehicle gross mass (t)	3.2	km/return trip	5.2	kg/VKT	4.1	% silt content	80	% control
OB - Dozers on OB haul roads - Blakefield	113	86	h/y	1.31	kg/h	3.8	silt content in %	5.8	moisture content in %							0	% control
OB- Emplacing excavator OB at emplacement area - Blakefield	329	775,190	t/y	0.0004	kg/t	1.59	average of (wind speed/2.2)^1.3 in m/s	5.8	moisture content in %							0	% control
OB - Dozers on OB emplacement area - Blakefield	1,000	761	h/y	1.31	kg/h	3.8	silt content in %	5.8	moisture content in %							0	% control
OB - Dozers in-pit ancillary tasks -Blakefield	894	681	h/y	1.31	kg/h	3.8	silt content in %	5.8	moisture content in %							0	% control
OB - Dozers ripping/pushing/clean-up Partings - Blakefield	48	37	h/y	1.31	kg/h	3.8	silt content in %	5.8	moisture content in %							0	% control
OB - loading partings to trucks - Blakefield	41	96,964	t/y	0.0004	kg/t	1.59	average of (wind speed/2.2)^1.3 in m/s	5.8	moisture content in %							0	% control
OB - Hauling partings to emplacement area - Blakefield	1,475	96,964	t/y	0.08	kg/t	222	t/load	275	Vehicle gross mass (t)	3.2	km/return trip	5.2	kg/VKT	4.1	% silt content	80	% control
OB - Emplacing partings to emplacement area - Blakefield	41	96,964	t/y	0.0004	kg/t	1.59	average of (wind speed/2.2)^1.3 in m/s	5.8	moisture content in %							0	% control
CL - Drilling coal - Blakefield	229	1,294	holes/y	0.59	kg/hole											70	% control
CL - Blasting coal - Blakefield	119	6	blasts/y	19.4	kg/blast	1985	Area of blast in square metres									0	% control
CL - Dozers ripping/pushing/clean-up ROM in-pit - Blakefield	1,441	420	h/y	3.43	kg/h	1.1	silt content in %	6.6	moisture content in %							0	% control
CL - Sh/Ex/FELs loading open coal to trucks - Blakefield	17,593	291,991	t/y	0.06	kg/t	7	moisture content in %									0	% control
CL - Hauling open coal in-pit roads - Blakefield	5,823	291,991	t/y	0.10	kg/t	70	t/load	65	Vehicle gross mass (t)	2.6	km/return trip	2.7	kg/VKT	4.1	% silt content	80	% control
CL - Hauling open coal to ROM pad - Blakefield	18,117	291,991	t/y	0.41	kg/t	70	t/load	65	Vehicle gross mass (t)	36.7	km/return trip	0.8	kg/VKT	0.7	% silt content	85	% control
CL - Unloading ROM to ROM stockpiles/hopper - Blakefield	2,920	291,991	t/y	0.01	kg/t	70	% control									0	% control
CL - Handle coal at CHPP - Blakefield	95	291,991	t/y	0.0003	kg/t	1.46	average of (wind speed/2.2)^1.3 in m/s	7	moisture content in %							0	% control
CL - Rehandle ROM coal at stockpiles/hopper - Blakefield	292	29,199	t/y	0.01	kg/t											0	% control

REDBANK																		
Topsoil Removal - Dozers/Excavators stripping topsoil - Redbank	11,928	1,425	h/y	16.7	kg/h	10	silt content in %	2	moisture content in %							50	% control
Topsoil removal - Sh/Ex/FELs loading topsoil - Redbank	89	94,757	t/y	0.0019	kg/t	1.59	average of (wind speed/2.2)^1.3 in m/s	2	moisture content in %							50	% control
Topsoil removal - Hauling topsoil to emplacement area (north) - Redbank	1,319	71,068	t/y	0.12	kg/t	222	t/truck load	275	Vehicle gross mass (t)	5.3	km/return trip	5.2	kg/VKT	4.1	% silt content	85	% control
Topsoil removal - Hauling topsoil to emplacement area (south) - Redbank	522	23,689	t/y	0.15	kg/t	222	t/truck load	275	Vehicle gross mass (t)	6.3	km/return trip	5.2	kg/VKT	4.1	% silt content	85	% control
Topsoil removal - Emplacing topsoil at emplacement area - Redbank	178	94,757	t/y	0.0019	kg/t	1.59	average of (wind speed/2.2)^1.3 in m/s	2	moisture content in %							0	% control
OB - Drilling for excavator removal - Redbank	1,814	10,246	holes/y	0.59	kg/hole											70	% control
OB - Blasting for excavator removal - Redbank	12,227	51	blasts/y	241	kg/blast	10638	Area of blast in square metres									0	% control
OB - Dozers on Excavator OB in-pit - Redbank	3,580	2,727	h/y	1.31	kg/h	3.8	silt content in %	5.8	moisture content in %							0	% control
OB - Excavator loading OB to haul truck - Redbank	9,469	22,339,534	t/y	0.0004	kg/t	1.59	average of (wind speed/2.2)^1.3 in m/s	5.8	moisture content in %							0	% control
OB - Hauling to emplacement area (north) - Redbank	311,052	16,754,651	t/y	0.12	kg/t	222	t/load	275	Vehicle gross mass (t)	5.3	km/return trip	5.2	kg/VKT	4.1	% silt content	85	% control
OB - Hauling to emplacement area (south) - Redbank	123,132	5,584,884	t/y	0.15	kg/t	222	t/load	275	Vehicle gross mass (t)	6.3	km/return trip	5.2	kg/VKT	4.1	% silt content	85	% control
OB - Dozers on OB haul roads (north) - Redbank	1,624	1,237	h/y	1.31	kg/h	3.8	silt content in %	5.8	moisture content in %							0	% control
OB - Dozers on OB haul roads (south) - Redbank	1,624	1,237	h/y	1.31	kg/h	3.8	silt content in %	5.8	moisture content in %							0	% control
OB - Emplacing at emplacement area - Redbank	9,469	22,339,534	t/y	0.0004	kg/t	1.59	average of (wind speed/2.2)^1.3 in m/s	5.8	moisture content in %							0	% control
OB - Dozers on OB emplacement area -Redbank	3,580	2,727	h/y	1.31	kg/h	3.8	silt content in %	5.8	moisture content in %							0	% control
OB - Dozers in-pit ancillary tasks - Redbank	4,838	3,685	h/y	1.31	kg/h	3.8	silt content in %	5.8	moisture content in %							0	% control
OB - Dozers ripping/pushing/clean-up Partings - Redbank	1,354	1,031	h/y	1.31	kg/h	3.8	silt content in %	5.8	moisture content in %							0	% control
OB - Loading partings to trucks - Redbank	363	855,701	t/y	0.0004	kg/t	1.59	average of (wind speed/2.2)^1.3 in m/s	5.8	moisture content in %							0	% control
OB - Hauling partings to emplacement area (north) - Redbank	11,915	641,776	t/y	0.12	kg/t	222	t/load	275	Vehicle gross mass (t)	5.3	km/return trip	5.2	kg/VKT	4.1	% silt content	85	% control
OB - Hauling partings to emplacement area (south) - Redbank	4,716	213,925	t/y	0.15	kg/t	222	t/load	275	Vehicle gross mass (t)	6.3	km/return trip	5.2	kg/VKT	4.1	% silt content	85	% control
OB - Emplacing partings at emplacement area - Redbank	363	855,701	t/y	0.0004	kg/t	1.59	average of (wind speed/2.2)^1.3 in m/s	5.8	moisture content in %							0	% control
CL - Highwall transfer point - Redbank (Y8)	318	900,000	kg/t	0.0004	kg/t	1.59	average of (wind speed/2.2)^1.3 in m/s	6.6	moisture content in %							0	% control
CL - Highwall conveyor - Redbank	17	0	ha	0.40	kg/ha/h	8760	h/y									0	% control
CL - Drilling coal - Redbank	1,240	7,003	holes/y	0.59	kg/hole											70	% control
CL - Blasting coal - Redbank	646	33	blasts/y	19.4495	kg/blast	1985	Area of blast in square metres									0	% control
CL - Dozers ripping/pushing/clean-up ROM in-pit - Redbank	12,276	3,576	h/y	3.43	kg/h	1.1	silt content in %	6.6	moisture content in %							0	% control
CL - Sh/Ex/FELs loading open coal to trucks - Redbank	149,449	2,480,375	t/y	0.06	kg/t	6.6	moisture content in %									0	% control
CL - Hauling open coal in-pit roads - Redbank	160,224	2,480,375	t/y	0.43	kg/t	70	t/load	65	Vehicle gross mass (t)	11.1	km/return trip	2.7	kg/VKT	4.1	% silt content	85	% control
CL - Hauling open coal to ROM pad - Redbank	130,998	2,480,375	t/y	0.352	kg/t	70	t/load	65	Vehicle gross mass (t)	31.3	km/return trip	0.8	kg/VKT	0.7	% silt content	85	% control
CL - Unloading ROM to ROM stockpiles/hopper - Redbank	7,441	2,480,375	t/y	0.01	kg/t											70	% control
CL - Handle coal at CHPP - Redbank	803	2,480,375	t/y	0.0003	kg/t	1.5	average of (wind speed/2.2)^1.3 in m/s	6.6	moisture content in %							0	% control
CL - Rehandle ROM coal at stockpiles/hopper - Redbank	2,480	248,038	t/y	0.01	kg/t											0	% control
ROM/REJECTS HANDLING																		
CL - Dozers ROM Coal Handling & Rejects - ROM stockpile	19,792	5,765	h/y	3.43	kg/h	1.1	silt content in %	6.6	moisture content in %							0	% control
CL - Loading rejects	-	1,461,200	t/y	Rejects very wet therefore no dust												0	% control
CL - Transporting rejects	71,324	1,461,200	t/y	0.2441	kg/t	91	t/load	117.9	Vehicle gross mass (t)	6.2	km/return trip	3.6	kg/VKT	4.1	% silt content	80	% control
CL - Unloading rejects	-	1,461,200	t/y	Rejects very wet therefore no dust												0	% control
PRODUCT COAL																		
CL - Loading product stockpile	1,129	3,508,997	t/y	0.0004	kg/t	1.46	average of (wind speed/2.2)^1.3 in m/s	5.4	moisture content in %							25	% control
CL - Loading product coal to trains	1,505	3,508,997	t/y	0.0004	kg/t	1.46	average of (wind speed/2.2)^1.3 in m/s	5.4	moisture content in %							0	% control
WIND EROSION																		
WE - OB dump & disturbed area - Uncontrolled	1,202,360	343	ha	0.4	kg/ha/h	8760	h/y									0	% control
WE - OB dump & disturbed area - Controlled	66,798	38	ha	0.4	kg/ha/h	8760	h/y									50	% control
WE - Open mining area - Whynot	420,545	120	ha	0.4	kg/ha/h	8760	h/y									0	% control
WE - Open mining area - Blakefield	157,717	45	ha	0.4	kg/ha/h	8760	h/y									0	% control
WE - Open mining area - Redbank	215,110	61	ha	0.4	kg/ha/h	8760	h/y									0	% control
WE - Open mining area - Houston	26,064	25	ha	0.4	kg/ha/h	8760	h/y									70	% control
WE - ROM stockpiles	7,358	6	ha	0.4	kg/ha/h	8760	h/y									65	% control
WE - Product stockpiles	52,560	15	ha	0.4	kg/ha/h	8760	h/y									0	% control
Total TSP Yr 10	**4,825,169**																

Appendix B

Response to Mining & Petroleum Gateway Panel Advice

AngloAmerican

Real Mining. Real People. Real Difference.

Drayton South Coal Project

Response to Mining & Petroleum Gateway Panel Advice

February 2014

TABLE OF CONTENTS

1 INTRODUCTION

1.1 BACKGROUND

This document provides a response to the Mining & Petroleum Gateway Panel Advisory Report (Panel Report) on the Drayton South Coal Project (the Project).

On 13 November 2013, the Director General of Department of Planning and Infrastructure (DP&I) issued a request for advice to the Chairperson of the Mining & Petroleum Gateway Panel (the Panel) regarding the Project. The advice sought is on:

- The significance of the Project's potential impacts on the nearby Critical Industry Clusters (CICs); and
- Whether any additional reasonable and feasible mitigation measures could be implemented to materially reduce the potential impacts of the Project on these CICs.

The Director General requested this advice be provided by 10 December 2013.

It should be noted that Part 4AA of the Environmental Planning and Assessment Act 1979 (EP&A Act) does not apply to the environmental planning process for the Project as the application was prior to the introduction of the gateway process. It should also be noted that even if the Upper Hunter - Strategic Regional Land Use Plan (September 2013) (SRLUP) did apply none of the Project land is within Strategic Agricultural Land (SAL). Only three hectares of land mapped as Biophysical Strategic Agricultural Land (BSAL) is predicted to be impacted by the Project.

On submission of the Preferred Project Report (August, 2013), under the draft SRLUP mapping, the Project was predicted to impact six hectares of Equine and Viticulture CIC.

On 28 January 2014 the revised CIC mapping was released and as a result no land proposed to be disturbed by the Project is mapped as either Equine CIC or Viticulture CIC. As the Project disturbance boundary is not part of equine CIC land as defined under the State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007 (Mining SEPP), the specific criteria under the Mining SEPP for equine CICs and the Gateway Panel assessment in that context is no longer relevant.

Anglo American also notes with concern the apparent serious conflict of interest of the Chairperson, Terry Short of consultants La Tierra who also provided an expert report to the Planning Assessment Commission (PAC) on the 'equine industry' on which the PAC placed material reliance for its conclusions and recommendations. Mr Short through another consultancy is also advising a neighbouring mining competitor over its Gateway Application. These areas of apparent conflict of interest should have been declared by Mr Short in his report and in the very least identified by the PAC. To the best of Anglo American's knowledge, the conflict was not declared.

Despite Anglo American's view that this document is now no longer relevant for assessing potential impacts on the horse studs, it has nevertheless sought to provide a detailed response to the Panel report's findings in order to dispel the various perception arguments that have been raised.

1.2 BACKGROUND OF COOLMORE AND DARLEY

1.2.1 Coolmore Australia

Coolmore is a multi-national thoroughbred breeding operation with headquarters in Tipperary, Ireland and supported by operations in Kentucky and the Hunter Valley. Coolmore Stud in the Hunter Valley is Coolmore's only operation in Australia. Coolmore acquired this property from the Arrowfield Group in 1991.

Coolmore is a thoroughbred breeding operation with revenue generated primarily through standing fees for its stallions. The Coolmore website identifies the property as the best in Australia with three main reasons for success being stallions; Danehill, Encosta de Lago and Fastnet Rock. Many of the premium Coolmore stallions are shuttled between Australia and Ireland to enable full year breeding across both hemispheres. Coolmore also generates revenue through agistment of clients' broodmares and rearing of foals. Coolmore generally does not breed its own horses for racing. Also, Coolmore does not normally stand stallions other than its own.

1.2.2 Darley Australia

Darley is a multi-national thoroughbred breeding operation standing stallions in six countries. The Darley business model is quite different to Coolmore with a focus on breeding and raising thoroughbreds for the Darley racing operation. Darley Australia operates studs in both NSW and Victoria. In NSW, Darley operates the Kelvinside Stud at Aberdeen, Woodlands Stud at Jerrys Plains and Twin Hills Stud at Cootamundra. Within the Hunter Valley, Darley purchased the Kelvinside Stud from Hilton Cope in 2003 and the Woodlands Stud from Ingham Brothers in 2008.

Darley's business model incorporates a number of revenue streams including:

- Standing fees for its stallions;
- Fees for agistment of clients broodmares;
- Sales of horses produced by its own bloodstock; and
- Prize money earned through racing.

Darley offers the services of its stallions to its clients exclusively at the Kelvinside Stud. Many stallions are shuttled between the northern and southern hemisphere operations to enable breeding operations throughout the year. Darley also agists clients' broodmares at Kelvinside Stud.

The Woodlands Stud is used exclusively for the agistment of Darley's own broodmares. The offspring of Darley's internal breeding operations are either offered for sale at local and international sales or retained for participation in Darley's racing operations.

2 RESPONSE TO PANEL REPORT FINDINGS

This section provides a detailed response to the assessment undertaken by the Panel on the Project and the key findings presented in the Panel's report.

2.1 SIGNIFICANCE OF IMPACTS

2.1.1 Impacts on the Land through Surface Area Disturbance and Subsidence

Panel Statement

Due to the proximity of the proposed mine to the horse studs, in particular, and the importance of these studs to the Equine CIC (refer to Section 3.2.1), the Panel considers that surface area disturbance by the Project will have significant impacts on the adjoining Equine CIC land, Coolmore and Woodlands in particular, and deleterious flow-on consequences for the Equine CIC.

It is the Panel's opinion that these impacts will include dust, noise, vibration and blasting overpressure, and loss of visual amenity and landscape values. The proponent has failed to properly address these impacts and much uncertainty exists as to the extent that these can be adequately mitigated. Potential impacts of the proposed mine on the adjacent thoroughbred studs is poorly considered. Analysis of potential impacts on the Equine CIC is absent.

The Panel considers that the consequences of these impacts are twofold:

- Unquantified implications on horse health and behaviour, specifically in the context of thoroughbred breading, and stallion, broodmare and foal management; and
- Deterioration of landscape values.

Response

An Equine Health Impact Assessment (EHIA) was carried out for the Project (Kannegieter, 2012). The EHIA provides numerous comparative studies as to the impacts of dust, noise, vibration and blasting over pressure impacts and concludes that the Project will have no impact on horse health and/or behaviour.

The Panel claims that "*dust, noise, vibration and blasting overpressure impacts on the horse studs are poorly considered*". This statement is not supported by objective evidence or testimony and suggests that the Panel has not considered the significant amount of evidence to the contrary before them. The findings of the EHIA cannot be totally discounted as the Panel has done, with a generalised statement that the impacts of the Project on the adjacent thoroughbred studs have been "*poorly considered*" without citing of any further evidence or detail.

The Panel has simply ignored the large amount of scientific data and documentation which has been provided in the EHIA which clearly demonstrates that there will be no detrimental impact on equine health or behaviour as a result of dust, changes in lighting, noise or vibration (Kannegieter, 2014).

Dust

In consideration of the revised air quality modelling carried out as part of the RTS process, the Project is predicted to generate annual average cumulative PM_{10} concentrations of up to 24 µg/ m^3 over Coolmore Stud and up to 17 µg/m^3 over Woodlands Stud. These concentrations are below the cumulative annual average PM_{10} criterion (30 µg/m^3), which protects human amenity.

As provided in the EHIA and reproduced in Section 4.6 of the RTS, Cargill (1999) recommends a maximum inspirable (inhalable) dust concentration of 3,000 µg/m^3 and a maximum respirable dust concentration of 230 µg/m^3 in stables and 170 µg/m^3 for paddocks. The PM_{10} levels generated by the Project are well below the limits recommended by Cargill (1999). In this regard, dust concentrations produced by the Project, when considered in isolation of other factors, will not pose a risk to equine health, including adults and foals (Kannegieter, 2012).

Noise

Throughout the EHIA process, numerous studies were considered regarding noise impacts to horses. Under worst case meteorological and operating conditions, noise levels across the majority of Coolmore Stud and Woodlands Stud are predicted to be less than 30 to 33 dBA, which are comparable to the rating background noise level. A very small portion of these properties (nearest the boundary with the Golden Highway) will be subject to noise levels up to 40 dBA.

As outlined in Coolmore Australia's submission on the Drayton South Environmental Assessment (2012) (EA), Coolmore Stud's current facilities include an airstrip to cater for respective clientele. Using *AS 2021-2000 Acoustics – Aircraft Noise Intrusion – Building Siting and Construction* as a guide, a light general aviation aircraft has the potential to generate a maximum noise level of 83 dBA with a landing noise level of 72 dBA (based on a centreline distance of 1,500 to 3,000 m and a sideline distance of 200 m).

The existing operations at Coolmore Stud and Woodlands Stud frequently utilise tractors and slasher fittings to maintain the amenity of paddocks. When slashing grass at a mild speed on a slight uphill gradient, this machinery has the potential to generate noise levels of 52 dBA at 50 m or 46 dBA at 100 m (based on a measured noise level of a 44 horsepower diesel tractor/slasher configuration). These noise levels are significantly higher than the noise levels over Coolmore Stud and Woodlands Stud that are predicted to be generated by the Project. Despite being subject to these noise levels on a regular basis, the horses on both studs, including foals, show little reaction or anecdotal evidence of adverse health effects.

Given the limited reaction of horses subject to the higher noise levels outlined in Huybregts (2008) and produced by the studs' operational activities, it is highly unlikely that operational noise generated by the Project will impact on the health of horses at Coolmore Stud and Woodlands Stud. The Panel cited no scientific data to negate these findings or to support its statements about noise impacts (Kannegieter, 2012).

Vibration

Mining for the Project will occur in a north to south direction. As a result, the distance from blasting to the horse studs will be greatest at the beginning of the Project and vibration and overpressure levels will be significantly lower. As mining progresses southwards it is likely that horses will have developed an increased tolerance to vibration and overpressure associated with blasting due to habituation.

Horses are known to demonstrate habituation, which is the ability to become accustomed to certain stimuli. If a noise becomes familiar to the horse and is not associated with danger, the horse will not be startled by the noise. The concept of habituation is supported by studies undertaken by the United States Air Force (1994) and Le Blanc et al. (1991), which investigated the effects of jet aircraft noise on the survivability and reproductive success of horses situated within flight paths. It was reported that horses were initially startled by the noise generated from the jet air crafts. However, with an increase in the frequency of exposures, horses showed evidence of habituation with the intensity and the durations of the startle response decreasing. The studies also showed that this response did not affect the survivorship or conception rate when compared to control groups. This example has been provided as the same effect is expected in regards to vibration.

The worst case vibration levels predicted to be produced by blasting in the absence of mitigation measures at Coolmore Stud (1.2 to 3.7 mm/s at the Coolmore office which is the closest receiver at 1,610 m separation) and Woodlands Stud (0.4 to 1.3 mm/s at the Randwick Homestead which is the closest receiver at 3,130 m separation) would be lower than the levels experienced by horses during road and air transportation. Although there is little scientific research into the impacts of transportation on animal health, anecdotal evidence shows that horses do not suffer any ill effects from the vibrations experienced during transportation. There is also anecdotal evidence indicating that horses at the Muswellbrook Racecourse and nearby Edinglassie Stud are not startled by blasting at the neighbouring Bengalla or Mt Arthur Coal Mines (approximately 2.2 km and 2.7 km respectively to active mining). Therefore, the ground vibration caused by blasting is not considered to have any negative impacts on the health of horses on Coolmore Stud and Woodlands Stud (Kannegieter, 2012).

It should be noted that since completion of the EA, Coolmore Australia has purchased Arrowfield Estate. A vibration level of 4.7 mm/s is predicted at the closest residences on Arrowfield Estate when operations occur in the most southerly extent of the Redbank mining area and maximum

instantaneous charge weight is restricted to 500 kg. Due to the steep topography and existing land use it is considered unlikely Coolmore would consider standing horses in the area.

Overpressure

The Project is also predicted to generate noise from blasting (overpressure), which is typically short and sudden in nature and would be noticeably louder than the rating background level at neighbouring receivers. Noise levels from blasting (when closest to the receiver) are predicted in the range of 100 to 109 dBL for the Randwick Homestead and Coolmore office respectively. (Kannegieter, 2012)

BHP BMA (2009) investigated the behaviour of farm animals, including 100 horses, when subject to sonic boom conditions. The study found that the horses showed only mild reactions (as evidenced by temporary cessation of eating or rising of heads) when exposed to sonic booms ranging between 125 and 136 dBA. Given the limited reaction of horses subject to sonic boom conditions outlined in BHP BMA (2009), it is unlikely that blasting noise generated by the Project will impact on the health of horses at Coolmore Stud and Woodlands Stud.

Dr Nick Kannegieter (2014) states:

> *"Horses would be at far greater risk from thunder and lightning strikes than they would be from mine blasts. During a single storm horses may be exposed to more noise, accompanied by sudden flashes of light, than they might during the entire life of the Project."*

It is reported that a near thunderclap can range between 120 to 125 dBa, which is above the predicted of 93 to 109 dBL on locations on Coolmore and Woodlands.

In summary, the Panel's findings regarding dust, noise, vibration and blasting pressure are unsupported. The Panel claims there is a "*dearth of scientific literature*" however in the EHIA 28 separate studies have been cited, with significantly more (well over 100) reviewed as part of the background for the Project. In this regard, it is also incorrect to state that the proponent has not properly addressed the issues of dust, noise, vibration and blasting pressure or that "*much uncertainty exists*" in regard to their mitigation.

Panel Statement

The Panel notes the relevant mining impacts include: "*Dust from open cut mining (due to blasting, truck movements and other mining activities) blowing onto the farms where both pregnant brood mares and other prime thoroughbred horse stock are located. As future "athletes" in training, the potential impact of mining produced dust (as opposed to that from hay and feedstock) on lung function appears to be undefined, presumably due to a lack of comparable case studies whereby open cut mining has been allowed to occur in very close proximity to thoroughbred horse farms. Furthermore, the impact of mining produced dust being visibly obvious to third party investors is unknown, but again is potentially highly deleterious to the stud farms business model and attracting investment."*

Response

As explained in **Section 2.1.1**, dust generated by the Project is highly unlikely to have adverse impacts on the health of thoroughbred horses. Dr Nick Kannegieter (2014) states:

> *"The conclusions from evaluating the large amount of existing scientific data regarding equine dust exposure is that human safety levels would be more than adequate for horses. Although precise safe levels for dust exposure in horses have not been defined, given there are anatomical and physiological differences in the way each species respond (for example humans being upright, are far more likely to inhale dust into the lungs and keep it there as their nostrils are well above the height of their lungs - in contrast horses nostrils and windpipe are lower than the bulk of their lungs, which naturally favours easier removal of any dust and irritants) then it is highly probable the safe levels would be much higher."*

Additionally, the statement by the Panel that *"the impact of mining produced dust being visibly obvious to third party investors is unknown, but again is potentially highly deleterious to the stud farms business model and attracting investment"* is speculative and unsupported and therefore is an irrelevant consideration.

Accordingly, the Panel's statement again exaggerates and misstates the impact of the Project.

Panel Statement

The effect of vibration and overpressure due to nearby open cut blasting activities on thoroughbred horses is subject to significant debate and disagreement. The project proponents have argued that horses living on the farms will inevitably become accustomed to blasting activities over time, therefore the overall impact is negligible. However the stud farms have asserted that the proponents have failed to recognise the transient or short-term nature of many of the horses arriving and leaving the farms on a regular basis. It is also argued by the farm owners that there are attendant safety risks to personal handling horses if they become alarmed or distressed (for whatever reason) and again, the likely impact on third-party investors is un-quantified, but potentially highly significant.

Response

As explained in **Section 2.1.1**, overpressure and vibration are unlikely to have an impact on the health of thoroughbred horses. Dr Nick Kannegieter (2014) states:

> "*the data shows only positive potential effects with no possible adverse effects identified. Any habituation to vibration that may be required would be expected to occur probably within days, if not sooner, and at most a few weeks.*"

The Panel states that "*the likely impact on third-party investors is un-quantified, but potentially highly significant".* Once again it should be noted that this statement is speculative and unsupported and therefore is an irrelevant consideration. The primary consideration of 'third party investors' is the bloodline available through the stallions on offer by the horse studs and not infrequent, very short term, and mostly imperceptible overpressure and vibration

Panel Statement

Once dust is liberated from mining activities (noting that blasting, whilst representing the most visible source of dust, is usually a relatively low proportion of the total dust load generated by open cut mining), the only feasible controls against it impacting the farms are wind direction(s), distance from the site and any natural barriers that may exist.

Response

In preparing the air quality impact assessment (see Appendix F of the EA), a review was completed of all potential control options outlined in the *NSW Coal Mining Benchmarking Study: International Best Practice Measures to Prevent and/or Minimise Emissions of Particulate Matter from Coal Mining* (Donnelly et. al, 2011). All controls that were deemed reasonable, feasible and practicable were adopted and used to estimate dust emissions for the Project (see **Table 1**).

The air dispersion modelling conducted for this assessment was based on an advanced modelling system using the TAPM and CALMET/CALPUFF models. The dispersion conditions for the area where characterised based on regional and local meteorological data, generated using a diagnostic meteorological modelling system known as CALMET. The pit terrain for each year was also incorporated into the CALMET modelling to ensure any influence this may have on pollutant dispersion was also captured.

The annual winds predicted by CALMET correlate well with the windroses presented for the Saddlers Creek meteorological station in 2005 and nearby meteorological station at Macleans Hill. It is important to note that whilst terrain has a significant influence on the dispersion of pollutants, there are other 'natural barriers' such as trees and vegetation that will also have an influence. Given the uncertainty as to the magnitude of any reduction in impact that might result because of the presence of trees and vegetation, the modelling has conservatively assumed no benefit from it.

CALPUFF was used to predict the maximum 24-hour PM_{10}, annual average PM_{10}, annual average TSP and annual average dust deposition (insoluble solids) over an area extending approximately 30 km (east-west) and 36 km (north-south). The modelling was undertaken to show both the effects of the Project only and the cumulative effects of the Project with neighbouring mines and other sources of dust.

Therefore, it can be confirmed that wind direction(s), distance from the site and any natural barriers that could be incorporated (i.e. terrain) have all been considered in the air quality modelling for the Project.

Table 1
Summary of Dust Controls

Mining Activity	Best Practice Control
Pre-strip	Application of water
Hauling on unsealed roads	Grader speed reduction from 16 km/h to 8 km/h
	Watering (standard procedure)
	Dust suppressants (Dust-A-Side or Dust Block)
	Use of larger vehicles (from Year 10)
Wind erosion on exposed areas and overburden emplacement areas	Minimise pre-strip
	Watering
	Vegetative ground cover
Wind erosion and maintenance (coal stockpiles)	Water sprays
	Vegetative windbreaks
Blasting and drilling	Water injection while drilling
Dragline	Minimise drop height
Loading and dumping overburden	Water application
Loading and dumping ROM coal	Three-sided enclosure of ROM bin
	Water sprays at ROM hopper
Conveyors and transfers	Application of water at transfers
Stacking and reclaiming product coal	Variable height stack
	Bucket-wheel, portal or bridge reclaimer with water application

Panel Statement

In terms of open cut blasting and the associated impacts upon horse stock, potential controls are specific blast designs according to defined maximum criteria relating to the vibration levels and overpressures as can be tolerated at the farm sites. However such criteria have not been determined or considered by the project proponent at the current time.

Response

This statement is incorrect and not supported by the evidence before the Panel (i.e. the Acoustics Impact Assessment). Noise and vibration criteria for occupied residences are recommended in the Australian and New Zealand Environment and Conservation Council (ANZECC) Guidelines and are reproduced in **Table 2**. The ANZECC blasting guideline recommends that blasting is restricted to day light hours Monday to Saturday, excluding public holidays. These are the criteria adopted for the Project.

Table 2
Blasting Amenity Criteria

Criteria*	Overpressure (dBL)	Ground Vibration (mm/s)
Less than 5% of total blasts to exceed	115	5
No blasts to exceed	120	10

** Criteria do not apply where an agreement is in place with the land owner.*

Article 1.1 of the ANZECC blasting guideline stipulates that the criteria for airblast overpressure and vibration are “comfort criteria” and that “the intent of these criteria is to minimise annoyance and discomfort to persons at noise sensitive sites”. As such, compliance with these criteria ensures that there are no impacts on amenity.

The Acoustics Impact Assessment demonstrated that the criteria presented in **Table 2** are not predicted to be exceeded at residences on the Woodlands and Coolmore Studs. In addition the current Drayton Blast Management Plan, implements protocols around these identified conditions and implements strategies to mitigate impacts on neighbours. The Plan states that “Weather conditions must be assessed prior to blasting. Consideration must be given to wind direction, fog, temperature inversions, rainfall or misty conditions. If any of these occur, and dependent upon safety issues at the time, blasts may be delayed until conditions improve. This decision shall be carried out by the Drill and Blast Superintendent in consultation with the Drill and Blast Engineer, Environmental Coordinator, SHE Manager and the Mine Manager.

If it becomes necessary to blast in adverse weather conditions and it is considered that the blast may concern neighbours and/or risk licence breach then the Mine Manager, Safety Health and Environment Manager and the General Manager must give approval. In some instances the blast may be delayed”. These protocols will continue to be utilised in any blasting activities conducted at Drayton South. As such, the Project can operate without causing any impacts on the amenity of personnel at Darley, Coolmore and Arrowfield Estate.

Panel Statement

As compared to underground mining, open cut mining offers far fewer opportunities to mitigate mining impacts by external hard controls, particularly those related to visual amenity, mining dust and blasting induced vibrations/overpressures. Therefore, a relevant consideration in the overall impact assessment process is the proponent's decision, that was made largely on resource recovery and economic grounds (rightly or wrongly), to proceed with an open cut project with (a) high surface disturbances and (b) few options in terms of highly effective mitigating controls.

Response

As part of the project planning and as stated in the Preliminary Environmental Assessment, the potential to mine the open cut mineable resource by underground mining methods was investigated and deemed unviable as there are only a limited number of coal seams within the sequence that have any potential for underground mining. This approach would result in the sterilisation of significant coal reserves.

Removal of coal reserves will have an opportunity cost to NSW and Australia. For example, a buffer which prevents mining in the Houston pit and part of Whynot would sterilise approximately 30 million tonnes (Mt) of run-of-mine (ROM) coal and reduce the royalties to NSW by $223M ($18M present value) and company tax to Australia by $348M ($55M present value). It would also reduce payroll tax to the NSW Government by $173M ($9M present value) (Gillespie, 2014). These costs are likely to far outweigh any economic or regional economic activity benefits of the equine CIC.

A comparison of economic indicators for Coolmore and Darley and the Project is provided in **Table 3** (Gillespie, 2014).

The statement by the Panel that there are “*few options in terms of highly effective mitigating controls*” in reference of the open cut nature of the Project is strongly refuted. Extensive ongoing monitoring and management is carried out at mines nationally and worldwide. The Project incorporates all reasonable and feasible best practice controls in order to achieve the best possible environmental outcomes. These are described extensively in the EA and RTS which the Panel lists as having considered in its report.

Table 3
Contribution of Darley, Coolmore and the Project to the Economy

	Coolmore and Darley	Project3
Annual revenue	$100M ($124M)[1]	$417M
Annual royalties	$0M[2]	$33M
Annual company tax	$0M[2]	$29M
Annual direct employment	229 (280) [1]	463
Annual direct and indirect employment	591[1]	785
Direct value added	$79M[1]	$210M
Direct and indirect value added	$122M[1]	$264M

[1] Based Marsden Jacobs Associates (2013) Economic Impact of the Proposed Drayton South Open-cut Coal Mine Development on the Hunter Valley Thoroughbred Industry, report prepared for Coolmore Australia and Darley Australia

[2] Based on 2010 and 2011 financial statements.

[3] Based on Gillespie Economics (2012) Drayton South Coal Project Economic Impact Assessment.

Note: the brackets indicate conflicting information.

2.1.2 Reduced Access to, or Impacts on, Water Resources

WRM Water and Environment and AGE Groundwater and Environment have reviewed the Panel comments in relation to water resources. The following clarification is provided with a detailed response provided in **Appendix 1**.

Panel Statement

The Panel expressed concern regarding the estimate in the PPR of the long term salinity of water that has become saturated within the spoil. The Panel assert that while the PPR test results are an "*appropriate way to characterize the chemistry of water as it flows through the mine spoil on its way down to the water table in the rehabilitated pit. The KLC does not however characterize the salinity of pore water when it is continually exposed to the spoil, as occurs below the water table*".

The Panel asserts that after saturation "*the mine spoil is in constant contact with the void water and the salinity of the pore water will be higher than the KLC tests indicate*".
AGE (2013) estimated that it takes about 160 years to saturate the spoil below the base of the void.

Response

The previous calculations of spoil water TDS concentration used kinetic leach column testing (KLC) to determine the salinity of deep percolation of rainfall through the mine spoil (AGE, 2013). The KLC tests measured the salinity of water after it has been in contact with the spoil for a maximum of two weeks (RGS, 2011).

The mineralogy and chemical processes occurring within the saturated zone of a spoil emplacement area have been reviewed in detail for several coal mining operations in the Upper Hunter Valley of New South Wales by Mackie (2009).

The batch reaction trials show that salinity levels of spoil pore water were observed to increase significantly during initial saturation and thereafter increased more slowly towards a long term equilibrium value. Long term pore water TDS concentrations (projected out to 100 years) ranged between 500 mg/L and 5000 mg/L, with an average of 2150 mg/L. These projections compare to an average measured value of 600 mg/L after 70 days of saturation.

The previous calculations of spoil water TDS concentration (AGE, 2013) have been revised using the results of the batch reaction trials instead of the results from the KLC tests.

As a conservative estimate, the long term salinity of the spoil pore water is predicted to have an average TDS concentration of 2,150 mg/L. Further detail is provided in **Appendix 1**.

The relative concentrations of the Permian geology seepage to spoil (3,500 mg/L) and of the rainfall recharge to spoil (2,150 mg/L) were used to calculate a revised time series of the salinity of water held in the spoil, assuming perfect mixing. The TDS concentration of the mixture between spoil pore water and groundwater was calculated to be initially about 2,680 mg/L, which then decreased down to about 2,270 mg/L over time.

These results assume complete mixing occurs between the two different water sources. On this basis, the predicted spoil TDS concentrations given is likely to provide an upper limit of the TDS concentration reporting to the final void, whereas the spoil TDS concentrations given in the PPR is likely to represent the lower limit. Further detail is provided in **Appendix 1**.

Panel Statement

The Panel considers "*that the predicted salinities for the final void lake are likely too low (the PPR predicts it to be in the range 800---1300 mg/l)*".

Response

The Drayton South final void OPSIM model (as presented in the PPR) was modified to include the salinity concentration time series discussed above and detailed in **Appendix 1** to represent groundwater inflows to the final void. The modelling methodology and all other inputs (including the adopted gross inflow and outflow groundwater rates) remain unchanged from the work undertaken for the PPR. The TDS concentration leaving the void was calculated by OPSIM assuming full mixing of spoil inflow and direct rainfall and catchment runoff to the void, and taking into account evaporation from the void lake surface.

From **Appendix 1**, "*the results of the analysis are summarised as follows:*

- Consistent with the results provided in the PPR Report, the salinity in the final void will not begin to increase until seepage out of the void ceases and net groundwater inflow begins at about 160 years post-mining.
- Consistent with the results provided in the PPR Report, equilibrium is reached due to the final void acting as a "flow through system", as described in AGE's Groundwater Impact Assessment Addendum (2013), which provides a pathway for removal of salts from the void.
- The final void will reach an equilibrium TDS concentration of between about 3,600 - 6,700 mg/L (depending on the climatic conditions) after about 700 years. This is compared to an equilibrium of between 750 and 1,300 mg/L estimated for the PPR.
- The void water will have an average TDS concentration of 2,186 mg/L for the period between 160 and 300 years post mining. This concentration of TDS is comparable to the predicted TDS concentration of water stored within the spoil (ranging from 2,680 mg/L to 2,270 mg/L), but is lower than surrounding Permian coal measure groundwater which has an average TDS concentration of about 3,500 mg/L.
- The void water will have an average TDS concentration of 3,860 mg/L for the period between 300 and 500 years post mining. This concentration of TDS is comparable to the surrounding Permian coal measure groundwater. The elevated TDS concentration of void water during this period is caused by evaporative effects on the surface water body.
- The void water will have an average TDS concentration of 5,135 mg/L for the period between 500 and 1000 years post mining (i.e. equilibrium). This concentration of TDS is higher than the surrounding Permian coal measure groundwater."

Panel Statement

The Panel expressed concern that "*If the final void lake is more saline than predicted by the PPR then the salt load into the surrounding aquifers, Hunter River and Saltwater Creek will also be higher than indicated in the PPR*" and "*it is not clear if [the Project] meets the water quality criteria on connected waters in the long term (about 300 years). The AI [Aquifer Interference] policy allows a 1% increase in the salinity of connected waters, per activity*".

Response

A set of highly conservative assumptions were applied to assess a 'worst-case' scenario. Specifically, the TDS concentration of the seepage away from the mining area was assumed to be equal to the predicted average TDS concentration of void water. The TDS concentration of the seepage water was therefore assumed to be:

- 2,186 mg/L for the period between 160 – 300 years;
- 3,860 mg/L for the period between 300 – 500 years; and
- 5,135 mg/L for the period between 500 – 1000 years.

These TDS concentrations are likely to be highly conservative because they are based on the assumption that seepage from the mining area will have a TDS concentration equivalent to the TDS concentration of void water. But in reality this will not happen.

As seepage water migrates through the adjacent groundwater regime, the water will initially mix with groundwater stored within the Permian coal measures, then with groundwater stored within the Hunter River alluvial aquifer, prior to ultimately discharging into the Hunter River as baseflow.

The 'worst case' mixing results confirm that the long-term average salinity of the Hunter River is predicted to not increase above the 1% AI criteria. Therefore, "*on the basis of the above assessment, the impact of the proposed Drayton South Final Void on the long-term average salinity of the Hunter River is predicted to be below 1% and therefore satisfies the Aquifer Interference Policy minimum impact considerations. As a result, in WRM and AGE's opinion, the Panel assessment of the proposed risks to Hunter River were over-estimated.*" (**Appendix 1, pg 11**).

2.1.3 Reduced Access to Support Services and Infrastructure

Panel Statement

Impact of the proposed project on CIC social support services is anticipated through the increased workforce and the overall demand for increased social support and infrastructure, as other regional research by Franks et al. (2010) also indicates. The project would have a direct impact upon CIC support services if it were to threaten the core components of the Equine CIC comprising the Coolmore and Woodlands (Darley) businesses.

Response

The statement that an increased workforce will impact the CIC social support services is incorrect and is not supported by the evidence provided in the EA and RTS which clearly states that there is no material increase in workforce is proposed. This should have been given consideration by the Panel. A key element of the Project is the continued utilisation of the existing Drayton Mine workforce. Given that there is not predicted to be any material population increase as a result of operation of the Project, negligible strain will be placed on the local community services and facilities. Therefore, it is apparent that the statement that the Project "*would have a direct impact upon CIC support services if it were to threaten the core components of the Equine CIC*" is misleading. Anglo American does not accept that the Project will threaten the 'core components' of the Equine CIC, being Coolmore and Darley, as is implied by the Panel throughout its advisory report.

The constructions phase workforce comprises an estimated 369 employees over a 29 month period. A key assumption of the Social Impact Assessment carried out for the EA is that 90% (332) of the construction employees will be able to be sourced locally and are able to be accommodated in their current residences. As such, negligible strain will be placed on the local community services and facilities as a result of construction of the Project.

Additionally, a significant shift in the unemployment rate in the Muswellbrook LGA has occurred over the last 24 months (i.e. to September 2013) associated with the downturn in the coal mining industry. In September 2011, the unemployment rate for the Muswellbrook LGA was 2.2% which was slightly higher compared to the Singleton LGA, which was 1.1% (Department of Employment, 2013). In contrast, the unemployment rate in September 2013 in the Muswellbrook LGA was 4.5%, and 3% in the Singleton LGA.

This recent trend in unemployment indicates that even more so now than during the carrying out of the social impact assessment, there is ample availability in the labour market to accommodate the construction workforce locally, ensuring there is no increased demand for social support infrastructure as stated in the EA. In short, the Panel's statements on this matter are misconceived and baseless.

Panel Statement

The current limited capacity and ageing infrastructure of local wastewater processing facilities to support an increased mining workforce is raised by Muswellbrook Shire Council (2013) as a major challenge as major improvements are not presently planned before 2022. The panel notes this as an 'off mine site' issue which the project would impact upon. The Panel considers the project should, if approved, provide financial support for any necessary upgrade in proportion to the incremental demand.

Response

Anglo American considers that the Panel has given extraneous consideration to matters outside the scope of its advice. The advice sought is on:

- The significance of the Project's potential impacts on the nearby CICs; and
- Whether any additional reasonable and feasible mitigation measures could be implemented to materially reduce the potential impacts of the Project on these CICs.

As this Panel statement has no relation to Coolmore, Darley or CICs it is irrelevant.

In addition to the irrelevance of the statement, the Panel has again wrongly assessed an increased mining workforce. Additionally, the Panel does not appear to have given weight to Anglo American's previous response on this subject provided in the RTS.

Further, Muswellbrook Shire Council (MSC) has since received funding to the tune of $15.6 million, courtesy of the Hunter Infrastructure and Investment Fund (HIIF).' The government has allocated $9.6 million for the replacement of the Muswellbrook Sewerage Treatment Plant and $4 million for the reconstruction of Thomas Mitchell Drive, thus this issue is now redundant (Muswellbrook Chronicle, 13 September 2013).

2.1.4 Reduced Access to Transport Routes

Panel Statement

Existing roads are the key form of transport linkage between elements of existing CICs in the Upper Hunter region. Any incremental volume increase in traffic or size of loads carried by the Project will impact on CIC enterprises in the region, in variety of ways. Two particular impacts are noted here – by slowing travel times and by reducing the quality of the process of transport for CICs and all other transport users.

The project proposes realignment of 'Edderton Road' to accommodate mining. According to Muswellbrook Shire Council (2013) this alone will reduce traffic efficiency. The Council contends the current state of all roads, major and local, are such that major remediation and improvements are required to support present traffic patterns and the project would place incremental demand on traffic levels and exacerbate deficiencies presently occurring in the region.

On this basis, the project would impact upon local traffic levels and add to the burden, which the existing transport networks would incur. Road traffic and use patterns make significant upgrades to major intersections, noted above, necessary. The Project would add to traffic issues and reduce the present level of transport efficiency between elements of the CICs in the region.

Response

The Panel's statements overstate the likely ongoing impact of the Project on local traffic and are not supported by the facts. It appears that the Panel has given no consideration to the relevant evidence before it. As reported in the EA, during the construction phase of the Project, it is anticipated that an average of 126 persons will report to the Drayton Complex per day via the existing Drayton Mine Access Road off Thomas Mitchell Drive.

The construction workforce associated with the realignment of Edderton Road will not report to the Drayton Complex. The workforce has been assumed to peak in month 11 of the construction program, with 369 persons expected per day.

Construction works for the Edderton Road realignment and its associated intersection are not expected to significantly increase volumes or disrupt traffic on the existing Edderton Road/Golden Highway intersection.

The number of heavy vehicle deliveries to the Drayton Complex is anticipated to peak at 270 visits per month during months nine and 10 of the construction phase.

As discussed in the EA, mine access during the operations phase of the Project will continue to be via the existing Drayton Mine Access Road off Thomas Mitchell Drive. As the existing workforce is to be utilised, no increase in traffic volumes will occur as a result of the operations phase of the Project.

The existing portion of Edderton Road will remain operational throughout the construction phase and will only be closed once the new alignment has been completed. Edderton Road and the Golden Highway are used by thoroughbred horse breeding enterprises as equine ambulance routes. By ensuring that the existing portion of Edderton Road remains open until the completion of the realignment, these routes will remain available to thoroughbred horse breeding enterprises. As a result, the Project will not reduce the present level of transport efficiency between elements of the CICs in the region.

The realignment of Edderton Road will move the intersection with the Golden Highway to the west by approximately 5 km. As a result, the journey east from Edderton Road and the Golden Highway will be lengthened by 5 km. Conversely, vehicles travelling west from Edderton Road and the Golden Highway will travel 5 km less. This will increase or decrease the travel time by three to four minutes.

The improved conditions in the realigned section of the road will make the road more conducive to travel at 100 km/h. As a result, there will only be minimal impacts (in some cases a positive impact) on travel times and the Project will not reduce the present level of transport efficiency between elements of the CICs in the region.

Drayton South Project through consultation with the MSC continues to assist in development of improved traffic efficiency within the Shire. To this end, Anglo American has contributed $50,000 to assist MSC in their “Mine Affected Roads Strategy”.

In addition, Anglo American has always committed to offer a VPA to MSC which will assist in funding the maintenance and upgrade of the MSC road network.

2.1.5 The Loss of Scenic and Landscape Values

Panel Statement

The physical landscape, comprised of soils, water, topography and land use, is important to both CICs. Fertile soils, rolling topography and clean water are prerequisites to successful horse breeding (Watson, 2013) and viticulture. However, landscape value extends far beyond its physical characteristics.

MacManus et al. (2011) identify four landscape values that are important to the Upper Hunter Equine CIC. Understanding how the CIC values landscape provides insight to its serious concerns about competing land uses that alter the physical landscape and thereby threaten these landscape values. Each of the landscape values is engineered at considerable cost. Whilst this cost burden is not evenly apportioned across the industry, i.e. studs like Coolmore and Woodlands have invested heavily, the outcomes create a positive externality enjoyed by the whole cluster. Each landscape value is intrinsically linked to stud and cluster economics. These landscape values are rural idyll, landscapes of conspicuous consumption, brandscapes and landscapes of work.

The Chairman of Coolmore Advisory Board recently stated: "the visual quality of both Coolmore and Woodlands and the surround landscape setting is fundamental to the successful operation of our stud farms" (Coolmore, 2013b).

The Panel considers:

- The importance of landscape values to Coolmore and Woodlands (Darley) studs cannot be overstated;
- That the proposed mine will cause significant deterioration of landscape values which underpin the Coolmore and Woodlands (Darley) stud businesses. As this threatens the viability of these two businesses in the Upper Hunter region, then the sustainability of the Equine CIC itself is threatened by the proposed mine; and,
- Landscape values are similarly important to the Arrowfield Estate vineyard and winery as this business, and the Viticulture CIC, is dependent on wine tourism for much of its revenue.

Response

The Panel has vastly overstated the impact of the Project on the landscape of relevance to the studs and exaggerated its threat to the viability of their businesses. The claim that the importance of landscape values to Coolmore and Woodlands Studs "*cannot be overstated*" is rhetorical hyperbole and is not supported by any evidence before the Panel. No single issue should be afforded complete priority, especially when dealing with a subjective topic.

Dr Nick Kannegieter explains that:

> *"the attraction of Coolmore and Darley to breeders is primarily the stallions they stand. Success in racing and breeding is determined mostly by genetics. Owners wish to breed the best with the best and will do so irrespective of where the horse stands. The best stallions, which can demand the highest service fees, are determined purely by the success of their progeny on the racetrack. Owners do not choose a stallion based on the visual impact the stud presents. They will send a mare to a stallion anywhere in Australia if they consider him the most suitable mating for that mare."*

Dr Nick Kannegieter also advises that:

> *"owner's perceptions will not be affected by the presence of the mine provided the studs can give full assurance that the mine will not have any adverse impact on the health of the mare or any progeny born or raised on the stud. The scientific evidence strongly supports there will be no adverse impact on equine health, including mares, foals or reproductive rates."*

Accordingly, the statement that the minor and temporary visual impact of the Project upon the stud properties will "threaten (their) viability" is unsupportable.

As part of the Project planning phase and studies undertaken for the EA, a number of environmental constraints were identified, particularly with reference to avoiding potential impacts on the horse studs. In order to address these constraints, Anglo American made numerous refinements and changes to the mine plan for the Project. As a result of the concessions made in the EA to avoid impacts on the horse studs, 53 Mt of coal was removed from the mine plan resulting in a total loss of direct revenue in the order of
$5.3 Billion.

As part of the PPR, Anglo American made further concessions to its mine plan by designing and implementing the Option 4a visual bund as suggested by Coolmore. These additional changes, which were made to further minimise the potential impacts of the Project on the horse studs, resulted in a further loss of approximately 1.2 Mt of coal reserves.

Anglo American is of the opinion that it is apparent that any additional concessions with the horse studs are futile, as we continue to give ground without any concessions or recognition of the value lost to the Project by these stakeholders. This is substantiated by the comment made to Seamus French and Graham Bradley by Henry Plumptre on the 31 January 2013, stating "*no matter what you (Anglo American) do, we (Darley) would still oppose the project*." In consideration of these modifications and the statement above, Anglo American believes that adequate concessions have been made to the mine plan in consideration of two stakeholders who are not predicted to experience environmental impacts outside relevant criteria.

With consideration to Arrowfield Estate, the perception that the mine will impact on the quality of its products or effect the operations has not been identified as a concern and as such the visual impacts to Arrowfield Estate will be short lived throughout the construction of the Houston visual bund and not of material concern in relation to impacts to the CIC.

Panel Statement

The Panel notes the relevant mining impacts include: *"Visual impact of the proposed mine workings and associated mining equipment via the loss of an "idyllic rural landscape", this being an established foundation of the business model of the thoroughbred horse studs which rely heavily on third party investors either locating their horses at the farms or utilising other equine services."*

Response

The Panel cites McManus (2013) which explains that the rural idyll image is *"intended to convey the message that the stud is organized and caring, and that the care shown in the landscaping is transferred into care for the horses."* If the purpose of maintaining a visually pleasing environment is to demonstrate care for the livestock, changes to the landscape beyond the property boundaries that are a number of kilometres away and managed such that the final result blends into the surrounding landscape, should not detract from this positive impression. The reasonable person would understand that the stud does not have control over the landscape outside of their property, and would not associate changes in the surrounding landscape with lack of care on the part of the stud owner.

The areas on Coolmore Stud that may be visited by customers have been ascribed a high level of visual sensitivity. Such areas include the Coolmore office, reception building, stud facilities and paddocks. As explained above, landscape values may contribute to the appeal of the studs, but it is ultimately the quality of the stallions that determines the success of the studs. Landscape values are not so fundamental to the studs' operations that absolute protection from visual impacts is justified. The key operating areas of Coolmore were deemed to be high sensitivity locations, and the Project has been designed so that significant impacts occur for only a short period. This level of protection is considered appropriate for the level of sensitivity.

The fundamental element of the horse studs' businesses is the quality of its stallions. In this regard, the purported loss of "idyllic rural landscape" values will not affect Darley's operations at all. As discussed in **Section 1.2**, the Woodlands Stud is used solely for agistment of Darley's broodmares. Darley stands its stallions and agists some of its clients' broodmares exclusively at the Kelvinside Stud. As a result, client visits are generally to the Kelvinside Stud rather than the Woodlands Stud. Therefore, the visual impacts on the Woodlands Stud will not adversely affect Darley's business model.

Additionally, as outlined in the EA and RTS, Anglo American will ensure that sustainable farming practices on available agricultural areas outside the disturbance footprint will be maintained. This will ensure that land use activities (beef grazing) currently seen on the land adjacent to Coolmore and Woodlands will remain, diminishing the perceived loss of "idyllic rural landscape" values for Coolmore and Woodlands.

Panel Statement

Artificially formed bunds can be used to "hide" the mine workings and equipment from view, but by definition the construction of such bunds will materially change the visual landscape as viewed from the CICs and stud farms. Therefore such bunds can hardly be considered as an effective control against the defined visual impact of mining in this particular instance. The only apparent method by which the mine workings can be hidden from the farms and an idyllic or natural landscape be retained, is to utilise any "natural" bunds that may exist such as ridgelines.

Response

Anglo American does not dispute that the visual bund will result in high visual impacts during its construction. However, rehabilitation of the bund will achieve integration with the surrounding landscape, resulting in low visual impact.

GSS (2014) advises that placing topsoil on overburden is an accepted practice in mine rehabilitation. The greatest risk to the establishment of effective rehabilitation is lack of moisture. Anglo American will implement a irrigation system to ensure that there is sufficient water for effective rehabilitation of the visual bund. The seed mix to be used includes a combination of cover crops and longer lived native species. The cover crops will establish quickly and provide soil enhancement for the longer lived species. Fertiliser will be also be used in all stages of vegetation.

The option 4A visual bund was designed using the Geo-Fluv principles, resulting in a more undulating bund profile. This design achieves superior integration with the surrounding landscape. The planting design has been developed in consultation with the horse studs and will be managed by GSS, who are experts in mine rehabilitation.

Based on the land form and planting design for the bund, it will not be discernible from existing hills and vegetation patterns.

2.1.6 Speculative Findings

Panel Statement

Open-cut coal mining as proposed at Drayton South and thoroughbred horse studs of the nature and scale of Coolmore and Woodlands (Darley), and importance to the sustainability of the Upper Hunter Equine CIC, are incompatible land uses that cannot co-exist in close proximity to each other.

Response

This statement is based on the Panel's assertion that the studs will experience economic losses due to the perception of impacts on horse health and 'brandscape'. Perceived impacts should be given little weight where there is expert evidence establishing that there are minimal actual impacts. The stated potential action of the horse studs in reaction to a perceived impact should similarly be given little weight.

Further, Dr Nick Kannegieter explains that:

> *"The attraction of Coolmore and Darley to breeders is primarily the stallions they stand. Success in racing and breeding is determined mostly by genetics. Owners wish to breed the best with the best and will do so irrespective of where the horse stands. The best stallions, which can demand the highest service fees, are determined purely by the success of their progeny on the racetrack. Owners do not choose a stallion based on the visual impact the stud presents. They will send a mare to a stallion anywhere in Australia if they consider him the most suitable mating for that mare."*

Dr Nick Kannegieter also advises that:

> *"Owner's perceptions will not be affected by the presence of the mine provided the studs can give full assurance that the mine will not have any adverse impact on the health of the mare or any progeny born or raised on the stud. The scientific evidence strongly supports there will be no adverse impact on equine health, including mares, foals or reproductive rates."*

Gillespie Economics (2014) notes that:

> *"from an economic perspective one of the key barriers to the relocation of Coolmore and Darley is the level of physical infrastructure that has been sunk into the properties... While bloodstock is easily relocatable, the physical infrastructure is not."...*
> *..."the Brand of Coolmore and Darley is largely around the racing credentials of the stallions and brood mares it uses and the progeny that has been produced. Consequently, where no substantive physical impacts arise, the land would continue to have the same agricultural capability and suitability for horse breeding. Together with the physical infrastructure invested by Coolmore and Darley, the properties could continue to be used by Coolmore and Darley or, in the event of their relocation for their own commercial and other reasons, other horse breeders."*

In consideration of the expert advice provided by Dr Nick Kannegieter and Gillespie Economics, it is considered highly unlikely that Coolmore and Darley would relocate to another region outside the Hunter Valley.

Panel Statement

With regard to the Upper Hunter Equine CIC, the Panel considers that the continued viability of the Coolmore and Woodlands (Darley) studs is essential to the sustainability of the cluster. If these studs were to exit the Upper Hunter region, the consequence would be deleterious.

Response

As noted above, it is considered highly unlikely that either Coolmore or Darley would relocate as a result of the Project. However Dr Nick Kannegieter advises

> *"If as a worst case scenario, either or both studs chose to leave their current locations it is likely to have only a short term effect on the CIC. The CIC has developed over many years as result of the congregation of a large number of studs and the associated infrastructure and personnel. The history of the Hunter Valley Equine industry shows that over the years some studs have had periods of dominance followed by periods of less influence. New studs are developed while older studs may no longer operate or might relocate. This will continue to happen as part of the economics of the horse industry, the success associated with individual stallions, and the economic and personal situation of stud owners."*

Coolmore has had a presence at the current location for 23 years. Darley's ownership of Woodlands is just 6 years. Ownership of these properties has changed on several occasions over time as individuals and companies make their own business decisions.

In consideration of this expert advice and in light of the extensive reasons listed by Dr Nick Kannegieter (2014) and Gillespie Economics (2014) (summarised above and provided as an Appendix to the Drayton South Coal Project Response to PAC Review Report) regarding the low likelihood that either horse stud would relocate, little weight should be given to this consideration in the decision making process.

2.2 PANEL'S PROPOSED ADDITIONAL MITIGATION MEASURES

For the reasons stated in **Section 2.1** above, there are no potential impacts of significance to the horse studs. The matters relied on the Panel are largely perception-based and not an objective assessment of the available scientific information. Consequently, no additional mitigation measures as recommended by the Panel are necessary. Nevertheless, for completeness, the following response has been included on the Panel's proposed mitigation measures.

Panel Statement

Previous sections of this report have determined that several of the project's potential impacts on the Coolmore and Woodlands thoroughbred horse studs are significant. These impacts are likely to be highly deleterious to the future viability and sustainability of these two iconic horse studs and therefore by definition, the entire Upper Hunter Equine CIC which has these two stud farms at its head.

Response

Anglo American disagrees that "*Previous sections of this report have determined that several of the project's potential impacts on the Coolmore and Woodlands thoroughbred horse studs are significant*". The Panel report fails to provide any scientifically based evidence that would support this statement. The one issue raised by the Panel which the Panel has determined to be significant based on statements from the horse studs themselves is landscape value which is discussed in **Section 2.1.5** above. Given that the studs are strongly opposed to the Project, statements made by the studs cannot be considered logical probative evidence or accepted without qualification, as the Panel appears to do.

Dr Nick Kannegieter argues that the appearance of the surrounding landscape is not a dominant consideration for potential clients. The overriding factor that influences a client's choice of breeder is the quality of the stallions.

Dr Kannegieter explains that:

> *"The attraction of Coolmore and Darley to breeders is primarily the stallions they stand. Success in racing and breeding is determined mostly by genetics. Owners wish to breed the best with the best and will do so irrespective of where the horse stands. The best stallions, which can demand the highest service fees, are determined purely by the success of their progeny on the racetrack. Owners do not choose a stallion based on the visual impact the stud presents. They will send a mare to a stallion anywhere in Australia if they consider him the most suitable mating for that mare".*

Therefore, whilst the appearance of the landscape is valued by Coolmore and Darley, it is not fundamental to the successful operation of the studs. The fundamental element of the horse studs' businesses is the quality of its stallions.

Panel Statement

In terms of hiding the mine workings behind a natural feature and so eliminating the issue of visual impact, a natural ridgeline exists towards the southern extremity of the proposed mining pits. In their submission to the EIS, Coolmore (2013a) state that "at the very minimum, the mine should remain behind existing natural ridgelines i.e. that the Houston Pit should be excluded and that the Whynot Pit should be reduced such that it does not breach the natural ridgeline to the south".

Similarly, in their submission to the proponents EIS, Darley (2013) state that in their opinion, a buffer zone around coal mining activities should be applied in the same manner as the recently stipulated 2 km exclusion zone or buffer around CSG operations.

Response

The Panel appears to have accepted the submissions of two opponents of the Project that an arbitrarily defined buffer of several kilometres is required to protect the horse studs. None of Darley, Coolmore or the Panel have provided any scientific reasoning regarding the adequacy of the proposed 'minimum buffer' in contrast to the extensive analysis carried out as part of the environmental assessment process for the Project which appears not to have been taken into consideration by the Panel.

Rather than specify minimum buffers it would have been more appropriate to examine the potential impacts against accepted criteria and require that the relevant criteria should not be exceeded. This is a far more scientific and quantitative way to establish what (if any) buffers may be required. Selecting arbitrary distances because of some perceived potential impact, which is not demonstrated when scientific modelling is undertaken, is not the appropriate method for assessing a major project like the Drayton South Coal Project (KDC, 2014). Nor is this approach consistent with the longstanding policy of coexistence of mining and agriculture in the Hunter Valley.

Additionally as discussed by Anglo American (2014) with regard to Mr Terry Short's report to the PAC, the Panel "relies on [Coolmore's and Darley's] submissions to support a number of key findings, such as the incompatibility of mining and horse breeding, sensitivity of horse breeding to landscape impacts, and the risks posed by perceived impacts on equine health". Due to the subjective nature of Coolmore and Darley's submissions, these sources cannot be considered reliable. They are certainly not logical probative evidence.

Further, the revised CIC mapping, released 28 January 2014 as discussed in **Section** 1, removed the buffer around the CIC land which had been included in the draft mapping. Therefore indicating that a buffer is not required for protection of the CIC.

Panel Statement

At face value it would appear that the stud farms themselves have put forward a potential minimum solution to the issue of eliminating unacceptable visual impacts, if adopted this would then represent the maximum permissible encroachment of mining towards the stud farms. It is a matter for the proponent to then determine whether such a mining limit provides the necessary coal reserves and mine life to justify any capital investment in the project.

Response

As above, the Panel has recommended the arbitrary buffer distances based on submissions by opponents of the Project because of a perceived potential impact which is not demonstrated when scientific modelling is undertaken.

There is no expert advice or scientific evidence that has been provided throughout the environmental assessment process that supports this arbitrary buffer suggested by the Panel, nor is there any policy justification. The Panel has recommended imposing limits based on judgements that do not appropriately balance the economic benefits of the Project against its relevant environmental impacts. The imposition of this arbitrary buffer is very likely to significantly compromise the economic value of the project.

Panel Statement

The next obvious question is whether this same mining limit is able to reduce the other relevant impacts of dust and blasting vibrations/overpressures, both of which are an inevitable consequence of open cut mining, to acceptable and tolerable levels at the stud farms?

Response

As noted in **Section 2.1.1** and outlined in the EA and RTS, no mining setback is required to achieve acceptable levels as per the relevant criteria. As presented in the expert reports presented in the EA and RTS, the Project as proposed, already ensures that any impacts remain within these levels.

Panel Statement

All that can be stated at the current time is that it is conceptually feasible that both mining dust and blasting impacts on the stud farms could potentially be managed and evaluated via stringent approval conditions that are rigorously adhered to during mining operations. This type of approach is possible as a result of the mine workings commencing in the north and incrementally moving to the south towards the stud farms over time. Hence the impact of mining on the stud farms will gradually increase over time from the current negligible levels and therefore is well suited to a "monitor and manage" approach.

Response

All mining developments in NSW are subject to '*stringent approval conditions'*. Should the Project be approved, detailed conditions would be issued which will set appropriate levels within which the Project must remain Additionally Anglo American will be required to report annually on its environmental performance.

Following approval, Anglo American would also develop and operate under a Safety Health, Environment and Community Management System accredited to AS1940 and ISO 14000 standards which will incorporate all management and monitoring plans.

As stated in the EA, Anglo American will support the continuation of working groups with Coolmore Australia and Darley Australia with regard to the construction and operation of the Project. It has always been recognised that these important stakeholders will require special considerations.

Panel Statement

The specifics of such a process are well beyond the scope of this report, but may include the following considerations:

- Setting and agreeing on reasonable maximum criteria for dust concentrations, blasting vibrations and overpressures, all of which can be measured as both baseline pre-mining studies and during actual mining activities.
- Having the mine provide the stud farms with sufficient advanced warnings of blasting activities so that they are able to (a) manage any associated safety threats with livestock and (b) arrange for visitors to attend the farms outside of such periods.
- Have the entire process overseen and controlled by a committee including representatives of the mine, the stud farms and the NSW Government (perhaps the Land and Water Commissioner).

The Panel accepts that using a process whereby mining could theoretically be stopped prior to the planned mining limits being reached, introduces an element of investment risk on behalf of the project proponent. However the responsibility must rest with the proponent (not the stud farms) to undertake the necessary pre-mining investigations to satisfy themselves as to where the credible limits of mining (according to mining impacts on the stud farms) are likely to be located as part of making their investment decision. However, if the current state of the art in terms of making credible predictions in these critical mining impact areas is insufficient to allow the proponent to make their investment decision with confidence under this scenario, this in itself would lead to the inevitable conclusion that the project should not be given a mining approval due to the existence of demonstrable uncertainties regarding the predicted impacts upon the CICs generally, and the neighbouring thoroughbred studs and vineyard specifically.

Response

Again, the Panel has overstated the asserted "uncertainties regarding impacts upon the CICs". The Panel asserts the need for the proponent to determine the '*credible limits of mining'*. The EA has assessed the impacts of the Project, as proposed. The results of the environmental impact statements have established that the predicted dust, noise and vibration impacts of the Project are within acceptable limits and certainly well within the '*Non-discretionary development standards for mining*' described in Section 12AB of SEPP Mining. Therefore, there is no need to limit the extent of mining to less than what is proposed in the EA.

The Air Quality Impact Assessment determined that the annual average criteria are not exceeded at the horse studs' properties. There are only predicted to be exceedances of the 24-hr PM_{10} criterion. These exceedances only occur on days where the meteorological conditions are very unfavourable. These exceedances can be avoided through proactive management, whereby mining operations will be modified or temporarily suspended during unconducive meteorological conditions.

The Acoustics Impact Assessment determined that noise levels at the horse studs will be below the relevant criteria. This assessment also determined that blasting criteria can be satisfied, provided that smaller MICs are used when blasting in close proximity to the studs. Therefore, the noise and blasting impacts can be maintained at acceptable levels.

It has been scientifically determined that the Project, as proposed in the EA, will not cause unacceptable air quality, noise or vibration impacts at the horse studs. Accordingly, it is not necessary to impose further restrictions on the limit of mining.

As stated previously, Anglo American will support the continuation of working groups with Coolmore and Darley with regard to the construction and operation of the Project.

Panel Statement

Given the significance of potential impacts and uncertainties with regard to mitigation, and also a dearth of scientific literature concerning the potential impacts of open-cut coal mining on nearby equine breeding enterprises, particularly with respect to environmental stressors such as noise, dust and vibration, the Panel concludes that the Precautionary Principle should be applied.

Response

The precautionary principle is only triggered where there is a threat of serious or irreversible damage and a lack of scientific certainty regarding that damage. The threat must be adequately sustained by scientific evidence or scientifically plausible reasoning. With respect to equine responses to environmental stressors, there is a significant body of scientific research available. The Equine Health Impact Assessment presented in the EA considered over 100 scientific studies into the effects of dust, noise and vibration on horses and concluded that there would be no impact by the Project on equine health as a result of dust, noise, vibration or changes in lighting. The Panel's claim that there is a "dearth of scientific literature" is clearly incorrect. Where there is sufficient scientific understanding, planning decisions should be based on the available information.

The Panel appears to have relied on lay evidence from the Coolmore and Woodlands representatives for its conclusions and has made no express reference to the scientific evidence to support its analysis.

The Panel also has had no express regard to the scientific evidence to support its conclusion that there is scientific uncertainty as to the damage, but relies on a conclusion of a dearth of scientific literature concerning the impacts of open cut coal mining on nearby equine breeding enterprises. This is not a proper basis for application of the precautionary principle.

No scientifically plausible threat of serious or irreversible environmental damage has been established so there is no basis upon which the precautionary principle should be applied.

3 CONCLUSION

As the Project does not impact on equine CIC land, as defined under the Mining SEPP, the specific criteria under the Mining SEPP for assessing equine CICs and the Gateway Panel report in that context is no longer strictly relevant.

Further, it appears that the Panel has relied on the following in its assessment of the potential impacts and relevant mitigation measures for the Project:

- Incorrect information including workforce number increase and subsequent impacts to social infrastructure and the road network;
- Subjective and arguably biased submissions from Darley, Coolmore and Hunter Thoroughbred Breeders Association, and
- Findings or statements based on perceptions which have no supporting objective evidence, including claims that:
  - Air, noise, vibration and blasting overpressure impacts on Darley and Coolmore remain unquantified or poorly considered;
  - The perception of mining on third party investors, although unknown, is potentially highly deleterious; and
  - There is a 'dearth of scientific evidence' with regard to mining impacts on horse health.

The conclusions in the Panel report are rendered unreliable and unreasonable due to its basis in these sources and as such, the recommended mitigation measures have no tangible basis.

The Panel also failed to have regard to a wealth of scientific research and expert findings presented by Anglo American, specifically in the EA and RTS documents which was relevant to its consideration of the potential impacts of the Project. As presented throughout the EA, RTS and this response, there is no tangible impact predicted to be received by the horses which will increase the risk of health impacts. As there are no impacts, no additional mitigation measures are necessary.

The Panel failed to give adequate reasons for its findings, such that it is not possible to ascertain from the panel report the basis for its conclusions, which is a denial of procedural fairness. In particular, no or inadequate reasons were given for the following:

- The Panel considered the importance of landscape values to Coolmore and Woodlands studs cannot be overstated.
- The proposed mine will cause significant deterioration of land scape values(p 20);
- This threatens the viability of these two businesses in the Upper Hunter Region and the sustainability of the Equine CIC itself; (p 20)

The Panel has further misapplied the precautionary principle in this case.

For the above reasons, the decision-maker should place no weight on this report in assessing the potential impacts on the horse studs or Arrowfield Estate.

4 ABBREVIATIONS

Abbreviation	Description
(ANZECC)	Australian and New Zealand Environment and Conservation Council
AI	Aquifer Interference
Anglo American	Anglo American Metallurgical Coal Pty Ltd
AS	Australian Standard
BSAL	Biophysical Strategic Agricultural Land
CIC	Critical Industry Cluster
Coolmore	Coolmore Australia
Darley	Darley Australia
dBA	Rating Background Noise Level
dBL	Linear decibel
DP&I	NSW Department of Planning and Infrastructure
EA	*Drayton South Coal Project Environmental Assessment* (Hansen Bailey, 2012)
EARs	Environmental Assessment Requirements
EHIA	Equine Health Impact Assessment
EP&A Act	*Environmental Planning and Assessment Act 1979*
EPA	NSW Environment Protection Authority
ha	Hectare
Hansen Bailey	Hansen Bailey Environmental Consultants
HIIF	Hunter Infrastructure and Investment Fund
HTBA	Hunter Thoroughbred Breeders Association
ISO	International Organisation for Standardisation
kg	Kilogram
KLC	Kinetic leach column
km	Kilometre
km	Kilometre
km/h	Kilometres travelled per hour
LGA	Local Government Area
m	Metre
M	million
mg/L	Milligrams per litre
Mining SEPP	*State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007*
mm/s	Millimeters per second
MSC	Muswellbrook Shire Council
Mt	Million tonne
NSW	New South Wales
PA11_0062	Project Application 11_0062

Abbreviation	Description
PAC	Planning Assessment Commission
Panel Report	Mining & Petroleum Gateway Panel Advisory Report
PM_{10}	Particulate Matter <10 microns
PPR	*Drayton South Coal Project Preferred Project Report* (Hansen Bailey, 2013b)
ROM	run-of-mine
RTS	*Drayton South Coal Project Response to Submissions* (Hansen Bailey, 2013a)
SAL	Strategic Agricultural Land
SRLUP	Upper Hunter - Strategic Regional Land Use Plan (September 2013)
The Panel	Mining & Petroleum Gateway Panel
The Project	Drayton South Coal Project
TOR	Terms of Reference
TSP	Total Suspended Particulates
VPA	Voluntary Planning Agreement
Symbol	**Description**
%	Percent
$	Dollars

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State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007

Appendix 1

Drayton South Coal Project Response to Gateway Advisory Panel Report
Surface Water and Groundwater Issues

WRM Ref: 0770-04-B4
12 February 2014

Belinda Hale
Hansen Bailey
6/127-129 John Street
Singleton NSW 2330

Dear Belinda,

SUBJECT: DRAYTON SOUTH COAL PROJECT
RESPONSE TO GATEWAY ADVISORY PANEL REPORT
SURFACE WATER AND GROUNDWATER ISSUES

1 INTRODUCTION

The Mining & Petroleum Gateway Panel (the Panel) has assessed the significance of potential impacts from the Drayton South Project on nearby Critical Industry Clusters, both equine and viticulture. Their findings are presented in the *Drayton South Coal Project Advisory Report* (State of NSW, 2013). With respect to surface and groundwater impacts, the Panel raised concerns with the predictions of the final void salinity concentrations presented in the Preferred Project Report (PPR) (Hansen Bailey, 2013) and its flow-on effects to the connected waters of the Hunter River. The Panel stated:

> *"*Whilst the mining proposal appears to meet the minimal impact considerations for aquifer interference activities required by the Minister for Primary Industries in respect of impacts to the water table and groundwater pressure, it is not clear if it meets the water quality criteria on connected waters in the long term (about 300years). The *Aquifer Interference (*AI*)* policy allows a 1% increase in the salinity of connected waters per activity.*"*

The technical issues identified by the Panel in reaching this finding have been broken into the following:

- The adopted long term salinity concentration of spoil water was likely to be higher than what had been estimated in the PPR, due to saturation of the spoil water;
- The water entering the void would likely be more saline and thus the final void equilibrium salinity would subsequently be underestimated by the work undertaken for the PPR; and
- "If the final void lake is more saline than predicted by the PPR then the salt load into the surrounding aquifers, Hunter River and Saltwater Creek will also be higher than indicated in the PPR" and "it is not clear if it [the Project] meets the water quality criteria on connected waters in the long term (about 300 years). The AI [Aquifer Interference] policy allows a 1% increase in the salinity of connected waters, per activity".

Responses to these issues have been jointly prepared by WRM Water & Environment (WRM) and Australasian Groundwater and Environmental Consultants Pty Ltd (AGE) and are provided in the following sections.

2 BACKGROUND REPORTS

This response should be read in conjunction with the following reports for background information on assumptions and modelling methodologies:

- the Drayton South Coal Project Environmental Assessment (EA) (Hansen Bailey, 2012), including:
  - the relevant Appendix M - Surface Water Impact Assessment (SWIA) (WRM's report 0770-01-I [Rev 5], 2012);
  - the relevant Appendix N - Groundwater Impact Assessment (GWIA) (AGE's report G1544, 2012); and
- the Drayton South Coal Project - Preferred Project Report (PPR) (Hansen Bailey, 2013), including:
  - the relevant Appendix E - Surface Water Impact Assessment Addendum (WRM's report 0770-01-AB2, 2013);
  - The relevant Appendix F - Groundwater Impact Assessment Addendum (AGE's report G1544/F, 2013).

3 ISSUE 1: ADOPTED LONG TERM SALINITY OF SPOIL WATER

3.1 Issue

The Panel expressed concern regarding the estimate in the PPR of the long term salinity of water that has become saturated within the spoil. For the PPR report, the spoil water salinity concentration time series was determined from an adopted rainfall TDS concentration of 200 mg/L combining with the inflowing Permian groundwater recharge TDS concentrations based on recorded values. The rainfall recharge concentration was based on kinetic leach column tests (KLC) (AGE, 2013). The Panel assert that while these test results are an "appropriate way to characterize the chemistry of water as it flows through the mine spoil on its way down to the water table in the rehabilitated pit. The KLC does not however characterize the salinity of pore water when it is continually exposed to the spoil, as occurs below the water table".

The Panel asserts that after saturation "the mine spoil is in constant contact with the void water and the salinity of the pore water will be higher than the KLC tests indicate". AGE (2013) estimated that it takes about 160 years to saturate the spoil below the base of the void.

3.2 Response

3.2.1 Review of Background Information on Spoil Water Salinity

The previous calculations of spoil water TDS concentration used kinetic leach column testing (KLC) to determine the salinity of deep percolation of rainfall through the mine spoil (AGE, 2013). The KLC tests measured the salinity of water after it has been in contact with the spoil for a maximum of two weeks (RGS, 2011). However, the KLC tests do not characterise the salinity of pore water which is continually exposed to the spoil, as occurs below the water table (i.e. within the saturated zone). The long term salinity of this pore water within the saturated spoil is likely to be greater than water flowing through the unsaturated spoil (as measured by KLC tests).

The mineralogy and chemical processes occurring within the saturated zone of a spoil emplacement area have been reviewed in detail for several coal mining operations in the Upper Hunter Valley of New South Wales by Mackie (2009).

Using XRD analyses of interburden core samples, Mackie (2009) demonstrated a common mineral regime dominated by quartz with subordinate albite, kaolinite, illite-smectite, and dolomite. Batch reaction trials on

a range of these core samples (representing different overburden/interburden lithologies) indicated leachates exhibiting Na>>Mg>Ca and HCO_3>>Cl-SO_4 ionic species distributions.

Mackie (2009) carried out batch reaction trials on 58 rock cores from a number of locations and depths throughout the Upper Hunter Valley. The trials involved the submergence of rock samples in de-ionised water, whilst pH and salinity (electrical conductivity [EC] and total dissolved solids [TDS]) were recorded between two and eight months. The procedure is considered to simply replicate the "bath tub effect" where spoils are emplaced in a mine pit shell and progressively re-saturated with rainwater. The batch reaction trials assumed negligible contribution from groundwater and also assumed no mass transfers into or out of the mine pit other than CO_2.

Salinity within the batch reaction trials was observed by Mackie (2009) to "rise rapidly during the first days of saturations and thereafter at a reducing rate towards long term equilibration". The measured salinity trends during the trials were extrapolated to 100 years assuming equilibrium would occur during that time. The table in Attachment 1 summarises the results from the batch trials.

The batch reaction trials show that salinity levels of spoil pore water were observed to increase significantly during initial saturation and thereafter increased more slowly towards a long term equilibrium value. Long term pore water TDS concentrations (projected out to 100 years) ranged between 500 mg/L and 5000 mg/L, with an average of 2150 mg/L. These projections compare to an average measured value of 600 mg/L after 70 days of saturation.

3.2.2 Calculation of Spoil Water Salinity

The previous calculations of spoil water TDS concentration (AGE, 2013) have been revised using the results of the batch reaction trials instead of the results from the KLC tests. The salinity of water stored within the Drayton South spoil was predicted by using the relative contributions of the Permian geology seepage to spoil and of the rainfall recharge to spoil. Note that the adopted gross inflow rates of Permian geology seepage to spoil and of rainfall recharge to spoil have not changed from the previous modelling (AGE, 2013).

As a conservative estimate, the long term salinity of the spoil pore water is predicted to have an average TDS concentration of 2,150 mg/L. This TDS concentration is considered conservative because:

- the projected (100 year) data provided by Mackie (2009) shows that it is positively skewed (Figure 3.1), meaning that there were a greater number of values in the Mackie (2009) dataset that were less than the average TDS concentration of 2150 mg/L;
- the approach assumes that the spoil is instantaneously filled with rainwater that has infiltrated from the surface. This water within the spoil reacts with the spoil material in a trend similar to that projected by Mackie (2009); and
- the assumption does not allow for the addition of fresher rainwater to dilute the salt store.

The relative concentrations of the Permian geology seepage to spoil (3,500 mg/L) and of the rainfall recharge to spoil (2,150 mg/L) were used calculate a revised time series of the salinity of water held in the spoil, assuming perfect mixing and is shown in Figure 3.2.

The TDS concentration of the mixture between spoil pore water and groundwater was calculated to be initially about 2,680 mg/L, which then decreased down to about 2,270 mg/L over time, as shown in Figure 3.2. These results assume complete mixing occurs between the two different water sources.

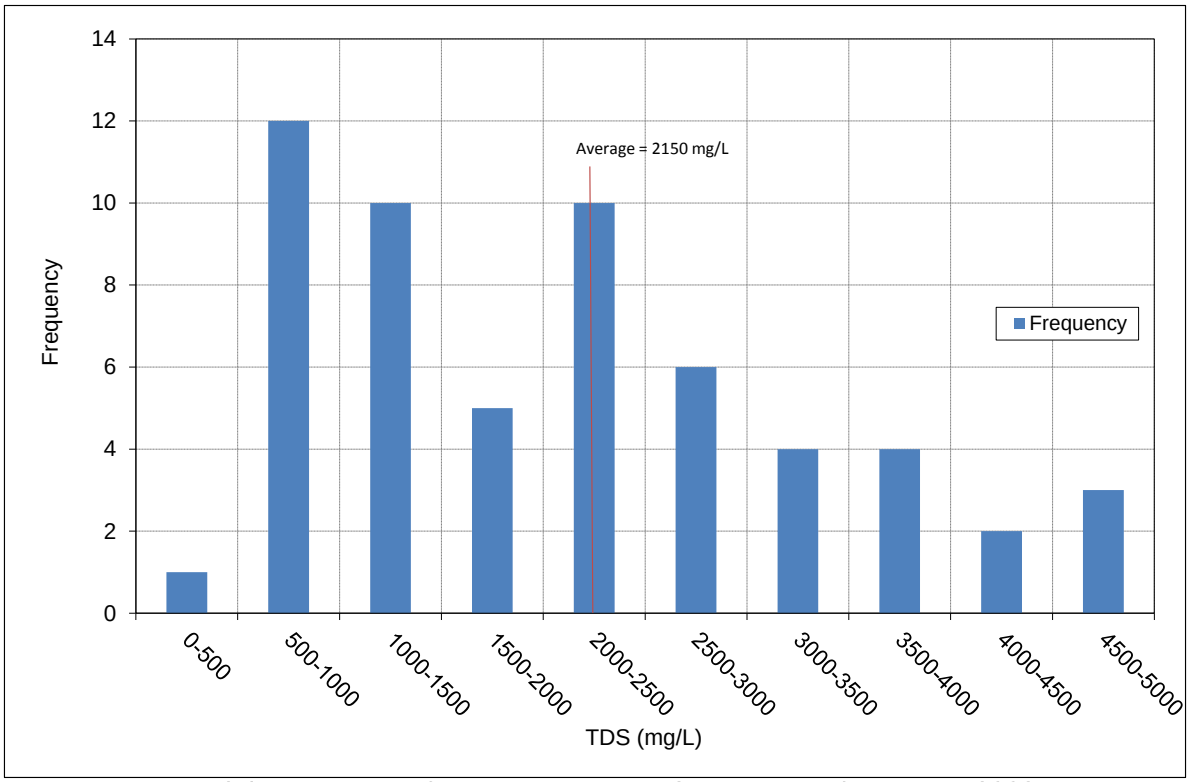

Figure 3.1 Distribution of Projected Long Term Salinity Data (after Mackie, 2009)

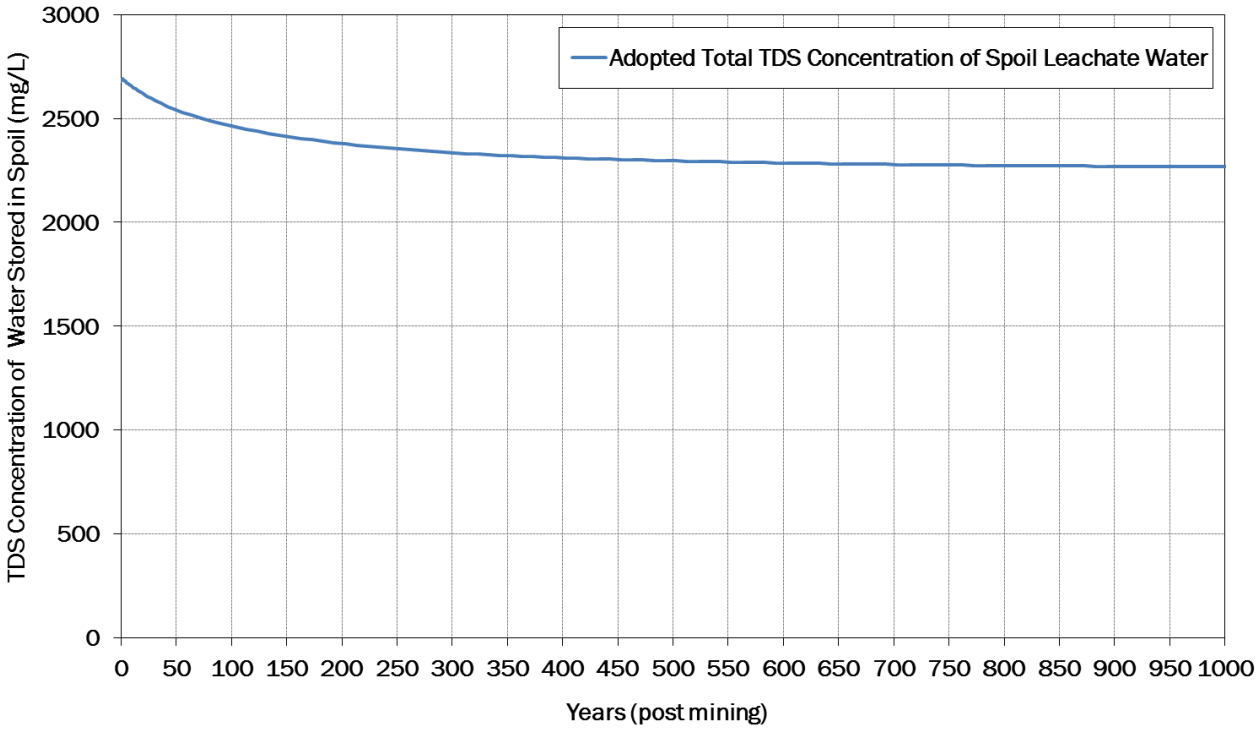

Figure 3.2 Adopted Time Series of TDS Concentration of Water Stored in Spoil

The assumption that mixing is complete provides a worst case scenario. In reality, complete mixing of water within the spoil profile is not likely to occur, as fresher (less dense) rainfall recharge water is likely to stratify above the more saline (more dense) groundwater seepage. The stratification is likely to lead to preferential seepage of fresher water from the spoil into the final void area and surrounding geological units. On this basis, the time series in Figure 3.2 is likely to provide an upper limit of the TDS concentration reporting to the final void, whereas the time series presented in Figure 14 of the AGE (2013) PPR report is likely to represent the lower limit.

4 ISSUE 2: POTENTIAL INCREASE IN PREDICTED FINAL VOID LONG TERM SALINITY

4.1 Issue

On the basis of Issue 1, the Panel considers "that the predicted salinities for the final void lake are likely too low (the PPR predicts it to be in the range 800---1300 mg/l)".

4.2 Response

The Drayton South final void OPSIM model (as presented in the PPR) was modified to include the salinity concentration time series given in Figure 3.2 to represent groundwater inflows to the final void. The modelling methodology and all other inputs (including the adopted gross inflow and outflow groundwater rates) remain unchanged from the work undertaken for the PPR. The TDS concentration leaving the void was calculated by OPSIM assuming full mixing of spoil inflow and direct rainfall and catchment runoff to the void, and taking into account evaporation from the void lake surface.

The predicted salt concentrations represented as TDS in the final void is shown in Figure 4.1. The results of the analysis are summarised as follows:

- Consistent with the results provided in the PPR Report, the salinity in the final void will not begin to increase until seepage out of the void ceases and net groundwater inflow begins at about 160 years post-mining.
- Consistent with the results provided in the PPR Report, equilibrium is reached due to the final void acting as a "flow through system", as described in AGE's Groundwater Impact Assessment Addendum (2013), which provides a pathway for removal of salts from the void.
- The final void will reach an equilibrium TDS concentration of between about 3,600 - 6,700 mg/L (depending on the climatic conditions) after about 700 years. This is compared to an equilibrium of between 750 and 1,300 mg/L estimated for the PPR.
- The void water will have an average TDS concentration of 2,186 mg/L for the period between 160 and 300 years post mining. This concentration of TDS is comparable to the predicted TDS concentration of water stored within the spoil (ranging from 2,680 mg/L to 2,270 mg/L), but is lower than surrounding Permian coal measure groundwater which has an average TDS concentration of about 3,500 mg/L.
- The void water will have an average TDS concentration of 3,860 mg/L for the period between 300 and 500 years post mining. This concentration of TDS is comparable to the surrounding Permian coal measure groundwater. The elevated TDS concentration of void water during this period is caused by evaporative effects on the surface water body.
- The void water will have an average TDS concentration of 5,135 mg/L for the period between 500 and 1000 years post mining (i.e. equilibrium). This concentration of TDS is higher than the surrounding Permian coal measure groundwater.

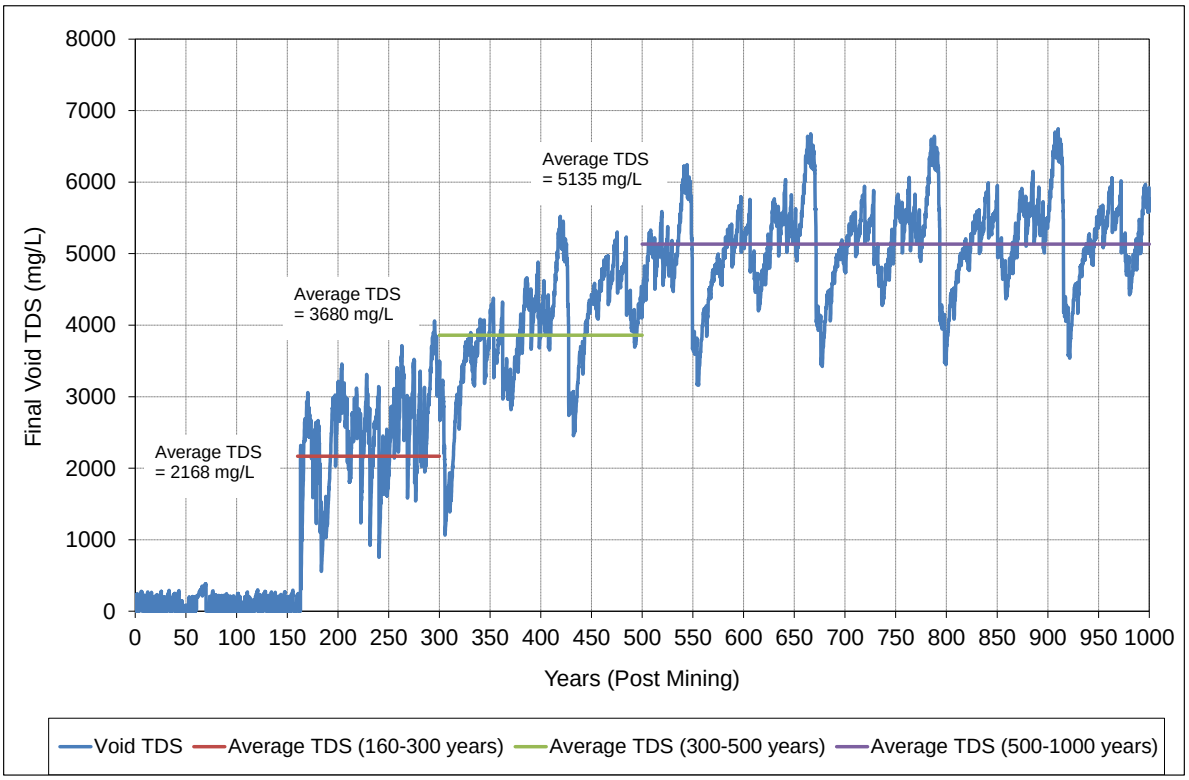

Figure 4.1 Final Void Total Dissolved Solids Concentration

5 ISSUE 3: POTENTIAL IMPACTS OF HIGHER SALINITY IN FINAL VOID

5.1 Issue

The Panel expressed concern that "If the final void lake is more saline than predicted by the PPR then the salt load into the surrounding aquifers, Hunter River and Saltwater Creek will also be higher than indicated in the PPR" and "it is not clear if [the Project] meets the water quality criteria on connected waters in the long term (about 300 years). The AI [Aquifer Interference] policy allows a 1% increase in the salinity of connected waters, per activity".

5.2 Response

5.2.1 Discussion on Aquifer Interference Policy

Connectivity Between the Hunter River and Alluvial Aquifer

Available data indicates that an upward hydraulic gradient induces flow of Permian coal measure (basement) groundwater up and into the overlying Hunter River alluvium. Groundwater level measurements and the occasional occurrence of moderate salinity levels within the Hunter River alluvial aquifers confirmed this. However, the volume of water transferred from the coal measures to the alluvium is small compared to recharge to the alluvium by river leakage and by rainfall. This fresher water effectively dilutes the more saline seepage from the Permian aquifers.

Groundwater sourced from the Hunter River alluvium has a quality that is commonly suitable for irrigation purposes. Because of this, the NSW Office of Water define the Hunter River alluvial aquifer as a 'highly productive' groundwater source. There are currently a relatively large number of private users of the alluvial groundwater source.

The Minimal Impact Considerations of the NSW Aquifer Interference Policy (the AIP) for highly productive groundwater require "no increase of more than 1% per activity in long-term average salinity in a highly connected surface water source at the nearest point to the activity".

This means that the Drayton South project is required to demonstrate that its operation during mining, and post-mining, will not increase the long-term average salinity of Hunter River water by more than 1%.

Existing Water Quality of the Hunter River

The AIP does not specify the long-term average salinity of the Hunter River, nor does it specify the river flow conditions from which to calculate the long-term average salinity. Flow duration curves and salinity monitoring records are available for Station No. 210083 (Hunter River at Liddell) located downstream of the Drayton South project. The flow rate within the Hunter River has been recorded as 250 ML/day during average flow conditions (i.e. the flow rate that is exceeded 50% of the time). The historical average total dissolved solids (TDS) concentration of water within the Hunter River (measured over 23 years at the Liddell gauge station) is 507 mg/L.

The AIP requires the salinity within the Hunter River to not increase by more than 1% as a result of the project. The AIP therefore requires the Hunter River long-term average salinity, as measured by TDS concentration, to not exceed 512 mg/L. From a practical point of view, the allowable increase is considered to be very low, and unlikely to be detectable due to natural variability and precision of measuring instruments. In effect, the guideline requires no detectable change.

5.2.2 Impact of Higher Final Void Equilibrium Salinity on Hunter River

The processes that control transport of salt from the void, through the subsurface strata to the Hunter River are complex. Hence, calculations representing these processes are not straightforward. Many assumptions are required and the timescale over which the assumptions are applied is long. Notwithstanding this however, simplified mixing calculations with conservative assumptions can be used to assess the impact on the Hunter River.

A set of highly conservative assumptions were applied to assess a 'worst-case' scenario. Specifically, the TDS concentration of the seepage away from the mining area was assumed to be equal to the predicted average TDS concentration of void water, as described in Section 4.2. The TDS concentration of the seepage water was therefore assumed to be:

- 2,186 mg/L for the period between 160 – 300 years;
- 3,860 mg/L for the period between 300 – 500 years; and
- 5,135 mg/L for the period between 500 – 1000 years.

These TDS concentrations are likely to be highly conservative because they are based on the assumption that seepage from the mining area will have a TDS concentration equivalent to the TDS concentration of void water. But in reality this will not happen. The elevated TDS concentration of void water is attained by evaporative effects on the surface water body. The TDS concentration of water stored within the spoil will not be impacted by evaporative effects, and is therefore likely to remain at a constant long-term equilibrium TDS concentration that is lower than water stored within void (i.e. ~2,270 mg/L). The seepage water from

the mining area is likely to be a mixture of spoil water and void water. Therefore, the seepage water from the mining area is likely to have a lower TDS concentration than the average concentrations adopted for the period from year 300 to year 1000.

As seepage water migrates through the adjacent groundwater regime, the water will initially mix with groundwater stored within the Permian coal measures, then with groundwater stored within the Hunter River alluvial aquifer, prior to ultimately discharging into the Hunter River as baseflow.

The 'worst case' mixing calculations have shown that the:

- long-term average TDS concentration of the Hunter River flow is predicted to not be increased by seepage water for at least the first 300 years post-mining. The average TDS concentrations of water stored within the spoil and void during the first 300 years is predicted to remain below the background TDS concentration of groundwater stored within the surrounding Permian coal measures (i.e. <3,500 mg/L);
- long-term average TDS concentration of the Hunter River flow is predicted to increase by 2 mg/L (~0.4%) between 300 and 500 years post mining; and
- long-term average TDS concentration of the Hunter River flow is predicted to increase by 5 mg/L (~1%) between 500 and 1000 years post mining.

The 'worst case' mixing results confirm that the long-term average salinity of the Hunter River is predicted to not increase above the 1% criteria, thus satisfying the AIP minimum impact considerations.

Table 5.1 summarises the rates and concentrations used to undertake the mixing calculations.

Table 5.1 Mixing Calculations of Seepage Water and the Hunter River

300 - 500 YEARS POST MINING							
Process	**Flow rate (ML/day)**	**TDS concentration (mg/L)**	**Salt (kg)**	**Total Salt (kg)**	**Total flow rate (ML/day)**	**Total TDS concentration (mg/L)**	**Percent above 507 mg/L**
Mixture of Seepage with Hunter River Alluvial Aquifer							
River recharge into aquifer	52.2	507	26465	28575	55.24	517	-
Rainfall recharge into aquifer	2.5	10	25				
Seepage from mining area	0.54	3860	2084				
Mixture of Hunter River Alluvial Aquifer with Hunter River Flow							
Average flow within river	247.5	507	125483	127313	250	509	0.44
River recharge into aquifer (loss)	-52.2	-507	-26465				
Recharge of aquifer to river (gain)	54.70	517	28295				
500 - 1000 YEARS POST MINING							
Process	**Flow rate (ML/day)**	**TDS concentration (mg/L)**	**Salt (kg)**	**Total Salt (kg)**	**Total flow rate (ML/day)**	**Total TDS concentration (mg/L)**	**Percent above 507 mg/L**
Mixture of Seepage with Hunter River Alluvial Aquifer							
River recharge into aquifer	52.2	507	26465	29263	55.24	530	-
Rainfall recharge into aquifer	2.5	10	25				
Seepage from mining area	0.54	5135	2773				
Mixture of Hunter River Alluvial Aquifer with Hunter River Flow							
Average flow within river	247.5	507	125483	127994	250	512	0.98
River recharge into aquifer (loss)	-52.2	-507	-26465				
Recharge of aquifer to river (gain)	54.70	530	28977				

6 SUMMARY

The Panel raised the following concerns regarding the surface water and groundwater impact assessments of the final void given in the PPR for the Drayton South Project:

- The adopted long term salinity concentration of spoil water was likely to be higher than what had been estimated in the PPR, due to saturation of the spoil water;
- The water entering the void would likely be more saline and thus the final void equilibrium salinity would subsequently be underestimated by the work undertaken for the PPR; and
- "If the final void lake is more saline than predicted by the PPR then the salt load into the surrounding aquifers, Hunter River and Saltwater Creek will also be higher than indicated in the PPR" and "it is not clear if it [the Project] meets the water quality criteria on connected waters in the long term (about 300 years). The AI [Aquifer Interference] policy allows a 1% increase in the salinity of connected waters, per activity".

The following is a summary of the further investigation and analysis undertaken jointly by WRM and AGE to address these concerns:

- Based on batch reaction trials on 58 rock cores from a number of locations and depths throughout the Upper Hunter Valley by Mackie (2009), it could be argued that rainfall recharge to spoil could have a higher salinity than what was adopted for the PPR.
- The resulting TDS concentration of the mixture between rainfall recharge to spoil and groundwater would then initially be about 2,680 mg/L, decreasing down to about 2,270 mg/L over time. This assumes complete mixing occurs between the two different water sources.
- The assumption that mixing is complete provides a worst case scenario. In reality, complete mixing of water within the spoil profile is not likely to occur, as fresher (less dense) rainfall recharge water is likely to stratify above the more saline (more dense) groundwater seepage. The stratification is likely to lead to preferential seepage of fresher water from the spoil into the final void area and surrounding geological units. On this basis, the predicted spoil TDS concentrations given in this assessment is likely to provide an upper limit of the TDS concentration reporting to the final void, whereas the spoil TDS concentrations given in the PPR is likely to represent the lower limit.
- The OPSIM water balance model was rerun with the higher spoil water salinity concentrations. The results showed that:
  - The final void will reach an equilibrium salinity level of between between 3,600 - 6,700 mg/L (depending on the climatic conditions) after about 700 years. This is compared to an equilibrium of between 750 and 1,300 mg/L, as reported in the PPR;
  - The void water will have an average TDS concentration of 2,186 mg/L for the period between 160 and 300 years post mining. This concentration of TDS is comparable to the predicted TDS concentration of water stored within the spoil (ranging from 2,680 mg/L to 2,270 mg/L), but is lower than surrounding Permian coal measure groundwater which has an average TDS concentration of about 3,500 mg/L;
  - The void water will have an average TDS concentration of 3,860 mg/L for the period between 300 and 500 years post mining. This concentration of TDS is comparable to the surrounding Permian coal measure groundwater. The elevated TDS concentration of void water is attained by evaporative effects on the surface water body; and
  - The void water will have an average TDS concentration of 5,135 mg/L for the period between 500 and 1000 years post mining (i.e. equilibrium). This concentration of TDS is higher than the surrounding Permian coal measure groundwater.
- The effect of this increased long term final void salinity on downstream environments was investigated by undertaking "worst-case" mixing calculations of groundwater stored within the

Permian coal measures, then with groundwater stored within the Hunter River alluvial aquifer, prior to ultimately discharging into the Hunter River as baseflow. The results of the mixing calculation suggest the following:

- long-term average TDS concentration of the Hunter River flow is predicted to not be increased by seepage water for at least the first 300 years post-mining. The average TDS concentrations of water stored within the spoil and void during the first 300 years is predicted to remain below the background TDS concentration of groundwater stored within the surrounding Permian coal measures (i.e. <3,500 mg/L);
- long-term average TDS concentration of the Hunter River flow is predicted to increase by 2 mg/L (~0.4%) between 300 and 500 years post mining; and
- long-term average TDS concentration of the Hunter River flow is predicted to increase by 5 mg/L (~1%) between 500 and 1000 years post mining.

On the basis of the above assessment, the impact of the proposed Drayton South Final Void on the long-term average salinity of the Hunter River is predicted to be below 1% and therefore satisfies the Aquifer Interference Policy minimum impact considerations. As a result, in WRM and AGE's opinion, the Panel assessment of the proposed risks to Hunter River were over-estimated.

For and on behalf of

WRM Water & Environment Pty Ltd

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Tim Armstrong
Senior Hydrogeologist
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7 REFERENCES

AGE, 2012 — *Groundwater Impact Assessment - Drayton South Coal Project EA,* Project No. G1544, Australasian Groundwater and Environmental Consultants Pty Ltd, October 2012 (Appendix N of the EA).

AGE, 2013 — *Groundwater Impact Assessment Addendum - Drayton South Coal Project Preferred Project Report,* Project No. G1544/F*, Australasian* Groundwater and Environmental Consultants Pty Ltd, August 2013 (Appendix F of the PPR).

Hansen Bailey, 2012 — *Drayton South Coal Project Environmental Assessment,* prepared by Hansen Bailey Environmental Consultants for Anglo American Metallurgical Coal Pty Ltd, 2012.

Hansen Bailey, 2013 — *Drayton South Coal Project Preferred Project Report,* prepared by Hansen Bailey Environmental Consultants for Anglo American Metallurgical Coal Pty Ltd, August 2013.

RGS, 2012 — *Drayton South Coal Project – Geochemical Impact Assessment of Overburden and Coal Rejects Materials*, Prepared for Hansen Bailey Environmental Consultants, Project No. 091018, RGS Environmental Consultants, 2012.

State of NSW, 2013 — *Drayton South Coal Project Advisory Report,* State of New South Wales through the NSW Mining & Petroleum Gateway Panel , December 2013.

WRM, 2012 — *Surface Water Impact Assessment – Drayton South Coal Project EA*, Report 0770-01-I(rev 5), WRM Water and Environment, October 2012 (Appendix M of the EA).

WRM, 2013 — *Surface Water Impact Assessment Addendum – Drayton South Coal Project Preferred Project Report*, Report 0770-01-AB2, WRM Water and Environment, August 2013 (Appendix E of the PPR).

Attachment 1

Summary of Batch Trials Results

Sample	Area	Measured				Projected	
		Trial Period	EC at End (µS/cm)	TDS at End (mg/L)	EC/TDS	EC 100 Years (µS/cm)	TDS 100 Years (mg/L)
ID1001-32.0	Mt Arthur	70	849	651	0.77	5355	4105
ID1001-54.0	Mt Arthur	70	828	625	0.75	2934	2214
ID1007-32.1	Mt Arthur	70	1076	615	0.57	3141	1797
ID1033-60.9*	Mt Arthur	70	802	647	0.81	2954	2383
ID1033-134.0	Mt Arthur	70	981	787	0.8	4676	3750
ID1037-83.1	Mt Arthur	70	734	632	0.86	3829	3298
ID1037-120.3	Mt Arthur	70	496	406	0.82	2851	2334
ID1044-33.0	Mt Arthur	70	489	291	0.6	1012	604
ID1044-101.4*	Mt Arthur	70	581	448	0.77	2884	2222
ID1052-60.0	Mt Arthur	70	488	347	0.71	1223	870
ID1052-115.1*	Mt Arthur	70	593	433	0.73	1856	1354
ID1052-242.5	Mt Arthur	70	787	649	0.83	4121	3400
DDH305-54.5*	Warkworth	91	552	361	0.65	1199	784
DDH305-91.5*	Warkworth	91	416	335	0.81	1127	907
DDH305-108	Warkworth	91	594	647	1.09	2025	2207
DDH305-125*	Warkworth	91	597	471	0.79	1839	1453
DDH305-140	Warkworth	91	579	469	0.81	2010	1630
DDH305-170*	Warkworth	91	425	396	0.93	1459	1359
DDH305-198.5	Warkworth	91	678	614	0.91	2953	2677
DDH305-226	Warkworth	91	585	555	0.95	2387	2261
703-45.8	Liddell	63	542	372	0.69	1087	747
703-72	Liddell	63	1169	988	0.85	5442	4600
703-107.1	Liddell	63	693	566	0.82	1798	1468
815-11	Liddell	63	533	321	0.6	1021	616
815-43	Liddell	63	466	355	0.76	1845	1406
815-75.7	Liddell	63	527	434	0.82	1418	1166
815-96.4	Liddell	63	1434	1215	0.85	5278	4472
815-146.1	Liddell	63	1091	970	0.89	5385	4787
821-42.7	Liddell	63	417	326	0.78	1371	1072
821-65	Liddell	63	286	225	0.78	957	750
821-95.7	Liddell	63	505	425	0.84	955	805
821-135.7	Liddell	63	835	720	0.89	3248	2801
821-185.4	Liddell	63	602	487	0.81	1953	1579
AV50/56.5-51.5	South Pit	226	1234	860	0.7	2547	1774
AV50/56.5-83.3*	South Pit	226	1316	1122	0.85	4100	3497
AV50/56.5-100.5	South Pit	226	1207	960	0.8	2740	2180
BAY004-130.2*	South Pit	226	1277	1216	0.95	4009	3818

Sample	Area	Measured				Projected	
		Trial Period	EC at End (µS/cm)	TDS at End (mg/L)	EC/TDS	EC 100 Years (µS/cm)	TDS 100 Years (mg/L)
BAY004-136.4	South Pit	226	747	639	0.85	4180	3574
BAY004-158.5*	South Pit	226	828	697	0.84	3869	3259
BZ1-37.6	South Pit	226	1306	1202	0.92	5395	4967
BZ1-44	South Pit	226	523	427	0.82	2274	1856
BZ1-62.1*	South Pit	226	1061	898	0.85	3533	2989
EL5423-21.7	West Pit	185	1037	585	0.56	1258	709
EL5423-36.3	West Pit	185	1360	1029	0.76	3552	2688
EL5423-77.0*	West Pit	185	1542	1230	0.8	5042	4023
EL5423-101.4	West Pit	185	996	723	0.73	2868	2084
EL5423-126.4*	West Pit	185	549	358	0.65	1028	671
EL5423-145.6*	West Pit	185	1179	934	0.79	4433	3513
EL5423-149.6	West Pit	185	958	703	0.73	3543	2600
EL5423-166.3*	West Pit	185	861	641	0.74	2833	2110
MOD662-28.0	Mt Owen	87	458	382	0.83	1359	1133
MOD662-68.0*	Mt Owen	87	510	345	0.68	1259	853
MOD662-134.6	Mt Owen	87	678	632	0.93	2888	2689
MOD662-174.1	Mt Owen	87	332	232	0.7	699	490
MOD662-203.4	Mt Owen	87	587	520	0.89	2547	2255
MOD662-248.2	Mt Owen	87	351	251	0.72	828	592
MOD662-269.0	Mt Owen	87	558	419	0.75	1757	1320
MOD662-292.0	Mt Owen	87	538	398	0.74	1576	1167

Appendix C

KDC Planning Advice

Final Review Report

Drayton South Coal Project

Prepared for Hansen Bailey | February 2014

KDC

PLANNING DEVELOPMENT PROPERTY

Statement of Environmental Effects

Final

Report Job No. 14004 | Prepared by KDC Pty Ltd for Hansen Bailey | February 2014

Prepared by	Sam Rowe & Steve O'Connor	Approved by	Steve O'Connor
Title	Planners KDC Pty Ltd	Title	Principal Planner KDC Pty Ltd
Signature		Signature	
Date	Revised 18th February 2014	Date	18th February 2014

This Report has been prepared in accordance with the brief provided Hansen Bailey and has relied upon the information collected at or under the times and conditions specified in the Report. All findings, conclusions or recommendations contained within the Report are based only on the aforementioned circumstances. Furthermore, the Report is for the use of the Client only and no responsibility will be taken for its use by other parties.

Approved by	Andrew Wu
Title	Environmental Engineer Hansen Bailey
Date	February 2014

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Annexures

1 Introduction

KDC Pty Ltd (KDC) has been commissioned by Hansen Bailey, environmental consultants, acting on behalf of its client Anglo American Metallurigical Coal Limited (Anglo), to provide planning advice in respect of the Drayton South Coal Project Review Report (PAC Report) prepared by the Planning and Assessment Commission (PAC) in December 2013. The PAC concluded in its report (page 28) that "*The mine plan proposed for the site should not be approved"*.

This review of the PAC Report has been conducted by Stephen O'Connor who is the principal planner with KDC. Details of Mr O'Connor's qualifications and experience are contained in his Ciriculum Vitae (CV) which is reproduced in Annex A. Mr O'Connor is a practicing planner with 37 years experience in assessing major projects.

1.1 Purpose of Report

The PAC interpreted its directive from the Minister as follows *"to review the Drayton South Open Cut Coal Mine proposal and its supporting studies; assess the potential impacts to the Coolmore and Woodlands horse studs and recommend any additional avoidance and mitigation measures required."* (extract from the first paragraph of the Executive Summary of PAC Report).

In undertaking its investigations the PAC commissioned a number of experts to provide advice including reports from environmental consultants la tierra (equine industry) and Dr Lamb (visual impacts). The PAC subsequently relied heavily on the advice contained in these reports in forming its conclusions as evidenced by the following extract from the Executive Summary of the PAC Report.

"The Commission has found that the Coolmore and Woodland studs are critical to the boarder equine Critical Industry Cluster and should be protected. Advice to the Commission from Mr Short and Dr Lamb has suggested that a buffer is necessary. A buffer of several kilometers has been nominated as appropriate."

The PAC has recommended (amongst other things) as follows:

- The mine plan proposed for the site should not be approved;
- Any open cut mining contemplated on the site should be required to demonstrate that its impacts will not effect the viability of the Coolmore and Woodlands horse studs.

The purpose of this report is to review the PAC Report and provide advice about whether the PAC Report's findings are reasonable and whether they should be relied upon by the Minister in determining the Project Application.

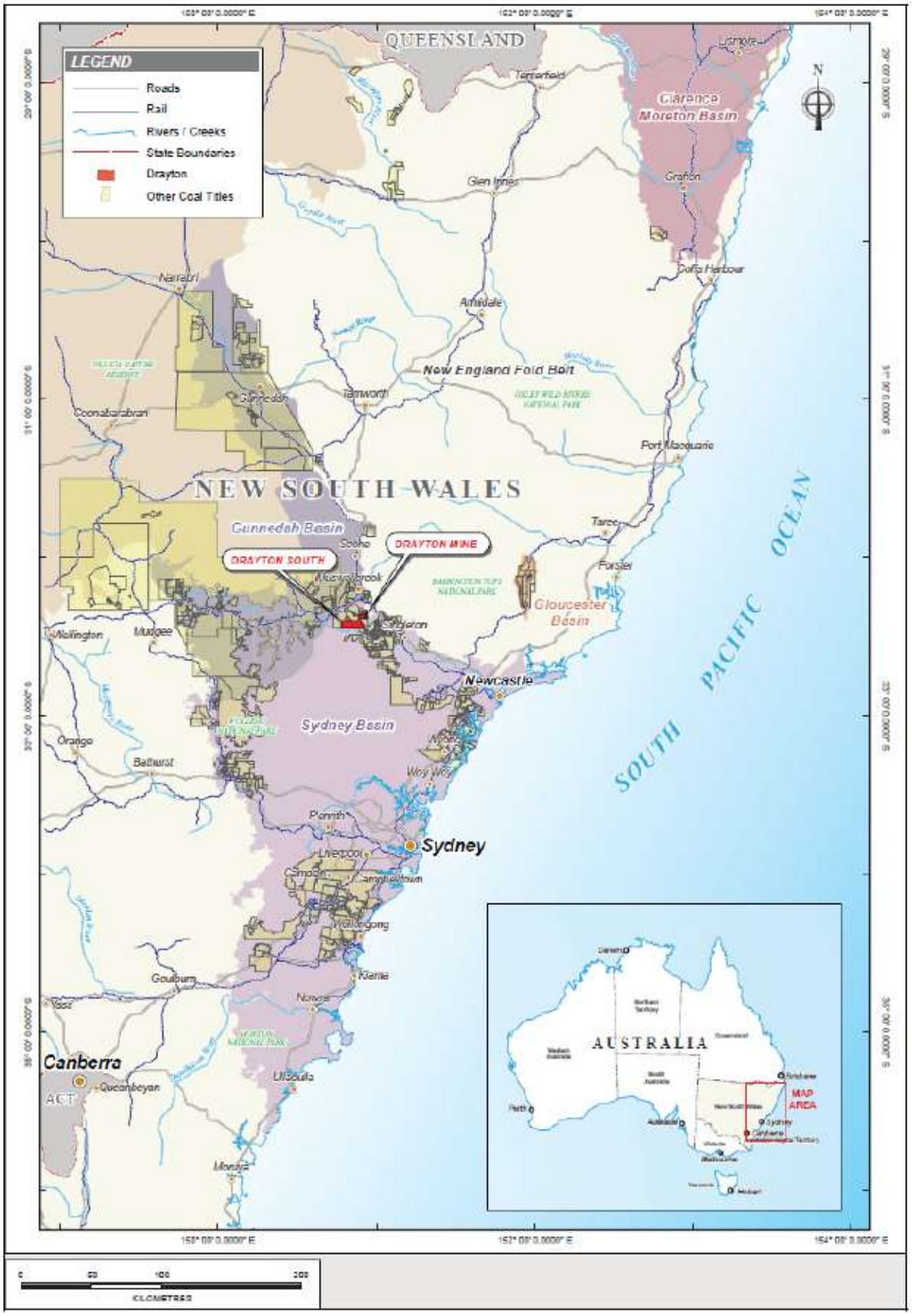
The location of the Dayton South Coal Project in the context of the Hunter and Gunnedah Coalfields is shown in Figure 1 which has been reproduced from the PAC report.

1.2 Structure of Report

The report has been structured as follows;

- Chapter 1 explains the purpose of the report and provides a brief outline of the findings of the PAC Report;
- Chapter 2 contains the terms of reference which the Minister issued to the PAC and discusses the approach the PAC adopted in preparing its report;
- Chapter 3 discusses the narrow focus of the PAC Report and examines the reports prepared by Dr Lamb and la tierra which heavily influenced the findings of the PAC Report;
- Chapter 4 draws conclusions and explains why minimal weight should be given to the PAC Report by the Minister when determining the Project.

Figure 1 – Mine Location



2 PAC Report

2.1 Terms of Reference

The Minister for Planning and Infrastructure issued the following terms of reference to the PAC on 22nd August 2013.

Drayton South Coal Project
Section 23D of the *Environmental Planning and Assessment Act 1979.*
Clauses 268R and 268V of the *Environmental Planning and Assessment Regulation 2000.*

"I, the Minister for Planning and Infrastructure request the Planning Assessment Commission to:

1. *Carry out a review of the Drayton South Coal Project, and:*

    a) *consider the EA for the project, the issues raised in submissions, the formal response to submissions, the Preferred Project Report, the review of the mine plan by Runge Pincock Minarco, and any other information provided on the project during the course of the review;*
    b) *assess the potential impacts of the project on the operations of the Coolmore and Woodlands horse studs; and*
    c) *recommend any additional measures required to avoid and/or minimise the potential impacts of the project on the horse studs.*

2. *Conduct public hearings during the review as soon as practicable after the Proponent provides its Preferred Project Report.*

3. *Submit its final report on the review to the Department of Planning and Infrastructure within 1 month of the public hearings, unless the Director-General of the Department agrees otherwise."*

2.2 PAC Approach

There are two ways to interpret how the PAC should have carried out its review of the Drayton South Coal Project. The two approaches which could have been adopted are outlined below:

1) Comprehensive Review – That the PAC assesses the potential impact of the Project in its entirety with special emphasis on items 1. b) and c) above; or

2) Narrow Review – That the PAC assesses only the potential impact of the Project on the two nearby horse studs, namely Coolmore and Woodlands, with a view to recommending any measures to avoid/minimise potential impacts on the horse studs.

The PAC has chosen to undertake a narrow review and not consider the wider potential impacts of the project.

2.3 PAC Report Conclusions

The PAC Report concludes that the open cut mine should not proceed on its planned scale in this location for two key reasons (page 27 of the PAC Report):

1) That the mine adjoins two thoroughbred studs of critical importance to the equine critical industry cluster; and
2) That the landscape in the area is a significant cultural landscape.

The PAC report relies heavily on the findings of two expert reports it commissioned in formulating its conclusions.

3 Concerns with PAC Report Approach

3.1 Narrow Focus

The manner in which an assessment of a complex development such as a coal mine should be undertaken under the Environmental Planning and Assessment Act 1979 (EP& A Act), has recently been the subject of review by the NSW Land and Environment Court. The judgement by the Chief Justice of the Court, Justice Preston, (herein referred to as the Warkworth Judgement - *Bulga Milbrodale Progress Association Inc. v Minister for Planning and Infrastructure and Warkworth Mining Limited* [2013] NSWLEC 48) provides a detailed account of how assessments should be undertaken and makes it clear what matters must be considered by a determining authority. At paragraph 36 of the Warkworth Judgement the process of decision making is outlined as follows;

> *"The process of decision making under s 75J of the EPA Act therefore involves; first, identification of the relevant matters needing to be considered; secondly, fact finding for each relevant matter; thirdly, determining how much weight each relevant matter should receive, and fourthly, balancing the weighted matters to arrive at a managerial decision."*

Each of these four steps are sequential and are discussed in the following pages with reference to the Warkworth Judgement. The four step process is a prerequisite to any decision being taken about whether an application should be approved, refused or modified in any way prior to approval.

Step 1

The first step is to identify the key issues which need to be considered. The PAC has focused in its report on just one key issue, namely, the likely impact on the two horse studs in the vicinity of the Project.

At clause 37 of the Warkworth Judgement the first step in the assessment process is discussed as follows;

> *"In an application for approval to carry out an application under Pt 3A, the relevant matters will include the various impacts on the environment the project is likely to have."*

There are a wide range of potential impacts on the environment as evidenced in the Environmental Assessment Report for the Project, the Response to Submissions Report and the Preferred Project Report which were all prepared by Hansen Bailey. The potential impact on the horse studs in the vicinity of the Project is just one of many potential impacts a determining authority will be required to consider before deciding whether to approve, refuse of modifiy the Project.

Step 2

Gathering relevant information about the key issues to be considered is the second step. At paragraph 38 of the Warkworth Judgement reference is made to fact finding as follows;

> *"The decision maker needs, as a second step, to undertake fact finding and inference drawing so as to undertake consideration of these matters".*

The PAC Report has sought advice from a number of experts to assist it to undertake fact finding. However the fact finding has been restricted to matters related to the influence of the Project on the Coolmore and Woodlands horse studs. The influence of the reports prepared by these experts is significant as evidenced in the PAC Report.

Step 3

Once the information relevant to the key issues is obtained, then comes the process of weighing the importance of relevant matters as discussed in paragraph 39 and 40 of the Warkworth Judgement as follows;

> *"The assigning of weight is a subjective task. The decision-maker needs to evaluate the relative importance of the relevant matters, each compared to the others. The decision-maker cannot delegate that task to others or subordinate it to the market place."*

There is no evidence of any weighting process being undertaken in the PAC Report as only one issue is examined in detail, namely the potential impact on the Coolmore and Woodlands horse studs.

Step 4

The final step is the balancing which must take place. This is discussed at paragraph 41 of the Warkworth Judgement as follows;

> *"The fourth step requires the weighted matters to be balanced, each against the others. Because all of the matters may not be, or be capable of being, reduced to a common unit of measurement, such as money, balancing of the weighed matters is a qualitative not a quantitative exercise. The ultimate decision involves an intuitive synthesis of the various matters.*

The final step is not undertaken at all in the PAC Report as only one issue is addressed. There is nothing to balance the potential of the impact of the horse studs in the vicinity of the Project against.

Polycentric Decision Making

At paragraph 31 of the Warkworth Judgement polycentric decision making is discussed as follows;

> *"The exercise of the power under s 75J to approve or disapprove the carrying out of the Project requires consideration, weighing and balancing of the environmental, social and economic impacts of the Project. The range of interests affected, the complexity of the issues and the interdependence of the issues means that decision-making involves a polycentric problem. A polycentric problem involves a complex network of relationships, with interacting points of influence."*

The consideration, weighing and balancing of the environmental, social and economic impacts of the Project are absent from the PAC Report. All that is provided is an analysis of the potential impacts of the Project on the two horse studs in the vicinity of the Project.

3.2 Relevance of the Warkworth Judgment

The Warkworth Judgement as referred to within Section 3.1 is considered of key relevance to the Drayton South Coal Project due to the striking similarities between the two projects which include:

- Both were submitted as Part 3A projects – Warkworth Submitted in 2010 and Drayton South in 2012;
- Both projects were for extensions to existing open cut mine operations – The Warkworth Project proposed to extend the production levels to up to 18 million tonnes per annum (Mtpa) and Drayton South proposes to extend production to up to 7 Mtpa; and
- Both Coal mine operations are located nearby in the Hunter Valley with similar potential impacts including dust, noise, vibration, water, views, lighting, etc.

3.3 Reliance on Buffers

The PAC Report refers to the need for adequate buffers and in the conclusions at page 27 states "*The Commission has found that these setbacks are the absolute minimum required and additional work would be needed to demonstrate that mining in the remaining northern area of the site would not cause any significant impacts to the two studs.*" The PAC Report appears to have accepted the recommendations of la tierra and Dr Lamb that a buffer of several kilometres is required to protect the horse studs.

Rather than specify minimum buffers it would have been more appropriate to examine the potential impacts against accepted criteria and require that the relevant criteria should not be exceeded. This is a far more

scientific and quantitative way to establish what (if any) buffers may be required. Selecting arbitrary distances because of some perceived potential impact which is not demonstrated when scientific modelling is undertaken is not an appropriate way to go about assessing a major project like the Drayton South Coal Project.

The insistence on buffers determined in this way is not a sound way to proceed with any assessment process.

3.4 Perceived Impacts

The PAC Report and supporting reports refer to the consideration of perceived impacts of the Project, namely;

- that the mine will have negative impacts on the horse studs, particularly horse health and performance; and
- potential damage to the horse studs' reputations resulting from the presence of a coal mine nearby.

There are various references to perceived impacts within the PAC Report, all of which demonstrate a detrimental or negative perceived impact which could result if the Project proceeded. Page 15 states:

> *"The properties are not purely agricultural operations, both have guest accommodation and historic homesteads. The sites, especially Coolmore, host organised events and also cater to VIPs. Any signs of mining, whether causing real or perceived impact, could create questions and doubt in the minds of buyers, investors and other industry representatives. In this fiercely competitive industry the Commission has little doubt that the studs would have to consider their futures in this area".*

In his report Dr Lamb states at page 15 that "*The image is not just what is visible at a given point in time or from a single or range of locations. The image is constructed to be ideal, timeless and is carried as much in the minds of people that come to and deal with the studs as in the day to day appearance of the places in the world.*" What Dr Lamb appears to be referring to are people's perceptions which may well differ enormously and are very likely to be based on personal experiences. So it is not real impacts which Dr Lamb is referring to, rather it is what he thinks others may perceive as impacts.

In the Warkworth Judgement the Chief Judge has this to say about perceived impacts (see paragraph 65);

> "*…the relevant considerations are those matters expressly specified in s 75J(1) and (2) of the EPA Act; matters arising from objects of the Act including the principles of ESD…other relevant Acts, and the public interest, which includes the principles of ESD and community responses to adverse effects on amenity, where those responses reflect more than an unjustified fear or concern and where based on logically probative evidence*."

Dr Lamb fails to provide evidence to support the concerns he raises about perceived impacts. He does not quote sources from the literature on this topic to support his views nor does it appear that he has undertaken any interviews to ascertain what perceptions others may have.

The PAC Report has given credence to these perceived impacts raised by Dr Lamb in his report as evidenced at page 21 of the PAC Report where it is stated that "*When combined with the visual and perceived impacts identified by Dr Lamb, the Commission considers that there is a real risk that if these impacts are unacceptable to Coolmore and Darley and they were to leave this area, there would be significant impacts on the whole Upper Hunter Equine Critical Industry Cluster*."

The PAC Report does not look in any detail at whether the potential for these studs to leave the Critical Industry Cluster is an unjustified fear or concern, but merely concludes that if this were to happen *"there would be significant impacts on the whole Upper Hunter Equine Critical Industry Cluster".*

As the Warkworth Judgement demonstrates there is a need to weigh the respective issues which have been identified. In paragraph 70 of his judgement the Chief Judge says "*Having considered each of the likely*

impacts, the task then is to determine the weight to be given to each factor, as an exercise of managerial authority, …… and to balance the factors in favour of and against granting approval. That assessment requires consideration of any conditions that might be imposed to mitigate or ameliorate any impacts." It is considered that little, if any, weight should be given to perceived impacts when there is scientific evidence available which demonstrates what the likely impacts will be.

In any complex decision making process decisions should be based on scientific and factual information/ assessments of the potential impacts of a project as described within section 3.1 of this report.

3.5 Reliance on La Tierra Report

The la tierra report commissioned by the PAC dated November 2013 was relied upon heavily by the PAC in preparing the PAC report. The PAC requested la tierra to provide advice on the potential impacts of the project on the operations of the Coolmore and Woodlands horse studs and to recommend any additional measures required to avoid and/ or minimise the potential impacts of the project on the horse studs. In order to prepare its report la tierra reviewed the available documentation relating to the Drayton South Coal Project and conducted its own review of available literature as referenced in its report. There is no indication in the la tierra report of the relevant experience and qualification which the authors of the report have in relation to the equine industry to be regarded as experts and to establish their credibility to prepare this report.

At page 6 of its report la tierra conclude that *"The potential impacts of the Project on Coolmore and Woodlands horse studs are not able to be fully determined because the Proponent's Environmental Assessment (EA) and Preferred Project Report, including the Agricultural Impact Statement (AIS), is non-conforming and non-compliant with requirements."* While it is not stated what the "requirements" are, it is likely to be referring to the Director General's Requirements (DGRs) which were issued on 3 August 2011 and updated on 30 April 2012. If the claim is that the EA is non-conforming and non-compliant with the DGRs then this is highly unlikely as the EA had to pass an adequacy test before it was placed on public exhibition where compliance with the DGRs would have been assessed by the Department of Planning and Infrastructure in consultation with a range of other government agencies. If the EA were found to be non-compliant with the DGRs the EA would not have been allowed to be placed on public exhibition.

Surprisingly there is no reference in the la tierra report to the Response to Submissions Report which was prepared by Hansen Bailey in May 2013 and has extensive references to the issue of the potential impact of the Project to the two horse studs. This detailed assessment is the type of assessment la tierra should have been interested in reviewing to inform their report.

At page 36 of their report la tierra discuss the compatibility of open cut mining and horse studs and state that *"It is more likely that co-existence will not always be possible at least at the micro-or property level, as the issues and impacts are enterprise or operation dependent, heightening the need for proper impact assessment."* Further on the same page, the report states *"With this in mind, acceptable levels of impacts from mining on horse studs should be variable, not fixed, and be determined carefully on a case-by-case basis."* We would agree with this notion that fixed buffers are not the most appropriate way to assess major developments and that careful individual assessments are what is required. However, at page 39 the conclusion is drawn that *"A suitable buffer between the Project and the studs is required to ensure mining impacts are avoided or prevented. This distance is likely to be at least several kilometres."*

The PAC Report also draws an opinion expressed in the la tierra report which is based on overseas experience. The PAC Report references the equine industry in Kentucky, USA to justify the prohibition of mining near horse breeding areas. Page 11 of the PAC Report states: *In Kentucky in particular, the Government has gone so far as to offer to purchase back landholders development rights (which amongst other things then prohibits activities such as mining and quarrying …)"*. It is not considered appropriate to draw conclusions about what should happen in Australia based upon overseas experience without a more thorough understanding of the circumstances surrounding the decisions taken elsewhere. Rather, a case by case assessment should be undertaken so that each project is considered on its merits. The potential impact of the Project (both positive and negative) in its entirety is what decision makers should be focussed on.

It appears that la tierra has not undertaken a scientific assessment of the potential impacts of the Project on the horse studs as has been prepared in the Response to Submissions Report prepared by Hansen Bailey. For some reason la tierra has not commented upon this assessment notwithstanding that it provides the *"proper impact assessment"* which la tierra have suggested is required. Any analysis of the potential impacts should be based on detailed assessment rather than relying on an arbitrary separation distance as a means of ensuring impacts are minimised.

Also at page 36 of their report la tierra state that *"The trigger-point for Coolmore and Woodlands to commence planning to exit the cluster can only be speculated at."* This implies that there is no way of knowing what the trigger-point might be. However, at page 38 la tierra conclude that the tipping point at which time Coolmore and Woodlands would exist the Upper Hunter equine CIC is *"Approval of the Project or another open-cut mine in close proximity with potential to cause impacts to the studs."*

So having confirmed that the trigger point can only be speculated at la tierra pronounce the tipping point would be approval of an open cut mine without providing any convincing evidence that this is the case. These contradictory statements significantly impact on the credibility of the la tierra report and bring into question the value of this report in assisting decision makers assess the Drayton South Coal Project.

4 Concerns with PAC Report Findings

4.1 Justification for Conclusions

The PAC Report is merely an analysis of one aspect of the potential impacts of the Project. It is not a comprehensive report investigating a wide range of issues which could be the basis for decision making about whether the Project should be approved, refused or modified in some manner. The PAC Report does not pretend to be a comprehensive investigation and acknowledges in the first paragraph of the Executive Summary that it is focused only on the potential impact of the Project on the Coolmore and Woodlands horse studs. It is therefore inappropriate that the PAC Report draws the conclusion that the Project should not be approved. Such a finding should only be made after following the exhaustive assessment process as described in the Warkworth Judgement. The PAC Report has drawn a conclusion that is not justified given the narrow focus of the investigation which it has undertaken. It was inappropriate of the PAC to draw the conclusion that the mine plan should not be approved given that it did not undertake a comprehensive review of the all the potential benefits and costs of the entire Project.

It is only after an extensive investigation of all the relevant issues that a decision should be made to approve, refuse or modify the Project and approve it subject to conditions. It is likely that the report to be prepared by the Department of Planning and Infrastructure known as the Director General's assessment report, will provide a comprehensive assessment of all relevant issues. It is this assessment report which should be given considerable weight by the determining authority.

4.2 Reference to Bickham PAC Report

The conclusion of the PAC Report states at page 27 that *"A previous review undertaken by the Planning and Assessment Commission indicated that "available evidence supports the view that open- cut coal mining and a viable international-scale thoroughbred breeding enterprise are incompatible land-uses."* The supporting reference in the PAC Report indicates that this statement was extracted from the Bickham Review which was undertaken by the PAC in 2010. The Bickham Review was focussed on a coal mining project proposed in an area of the Upper Hunter where there were no existing operational coal mines. There are no valid comparisons which can be made between the proposed project at Bickham adjacent to a key tributary to the Hunter River and the Drayton South Coal Project which represents a proposed extension to an existing open cut coal mine in an area which has been subject to coal mining for decades.

The Bickham Review makes it clear that it was looking at whether coal mining should be introduced in an area where coal mining had not been undertaken for almost a century. A relatively small resource was being proposed for extraction in an isolated area where there was no existing coal infrastructure. This bears no relationship with the Drayton South Coal Project which will take advantage of the existing coal infrastructure to the north of the site (Refer to Figure 1).

The la tierra report also references the Bickham Review at page 35 where exactly the same quote is reproduced. This reinforces the notion that the PAC Report was heavily influenced by the la tierra report.

To draw on the Bickham Review findings in such a limited manner and without adequate context is misleading and inappropriate and does not instil confidence in the reader that the findings of the PAC Report are justified.

4.3 The Way Forward

Pursuant to Section 75J of the EP&A Act, when deciding whether or not to approve the carrying out of a Part 3A project, the Minister (or his delegate) is required to consider the Director General's Report on the project and any findings or recommendations of the Planning and Assessment Commission following the preparation of a review in respect of the project. The Minister may also choose to (but is not required to) take into consideration any environmental planning policies which may apply to the project.

In the case of the Drayton South Coal Project the PAC has undertaken a review on one aspect of the Project, namely the potential impact of the Project on Coolmore and Woodlands horse studs. This PAC Report will therefore be a matter which the Minister will have to consider. However, given the concerns expressed in the previous chapter about the narrow approach the PAC adopted to undertaking their review, the significant weight which appears to have been given to perceived impacts, the reliance on arbitrary buffer zones and the fact that the expert report in relation to the equine industry the PAC relied upon in preparing their report contains a number of contradictions, it is considered appropriate that the Minister give little weight to this report in determining the Drayton South project application.

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Annex A

Ciriculum Vitae (CV) - Steve O'Connor

kdc
kobydevelopmentconsultants

Stephen O'Connor
Curriculum Vitae

37 years of experience within the Town Planning Profession.

Professionally qualified in town planning with both public and private sector experience.

Certified Practicing Planner

Fellow of the Planning Institute of Australia

Member of the Natural Resource Advisory Council 2010 -2011

Over 40 appearances as an Expert in the Land and Environment Court

Extensive experience with Major Projects, including provision of water pipelines, railways, electricity transmission lines, sewerage schemes, gas pipelines and major arterial roads.

Contributor to Professional Publications.

Justice of the Peace

Career

Summary

Steve O'Connor holds professional qualifications in planning and environmental science. He has been responsible for undertaking a wide range of major planning studies and environmental assessments since he first entered the workforce in 1974 and has worked as a professional planner and environmental manager at senior levels in both the public and private sector.

He has been the principal in charge of assessments for major infrastructure projects including the provision of water pipelines, railways, electricity transmission lines, sewerage schemes, gas pipelines and major arterial roads. He has also been in charge of assessments and ongoing monitoring associated with significant new developments in the fields of mining, extractive industries, construction, commercial, retail, tourism, industrial and residential estates, recreational infrastructure and waste management projects.

Steve was appointed as a member of the Natural Resource Advisory Council by the NSW Minister for the Environment in 2010. He is a Fellow of the Planning Institute of Australia and has participated as an Expert in the Land and Environment Court of New South Wales on over forty occasions.

Summary of Employment

- Grafton City Council 1974 – 1975
- Department of Lands, Northern Territory 1978 - 1980
- Port Stephens Council 1980 - 1995
- Environmental Resources Management 1995 - present
- KDC Pty Ltd 2011 - present

Academic Affiliations

- Part time teacher in the School of Civil Engineering, Newcastle TAFE 1985 –1989
- Occasional Lecturer in the School of Geography, University of NSW 1987 - 1994
- Member of an Academic Review Board investigating Environmental Studies Programs, University of Newcastle 1998

Community Positions

- President of Raymond Terrace Preschool 1987 - 1988
- Councillor for NSW Country Children's Services Association 1988 - 1998
- President of NSW Country Children's Services Association 1995

Education and qualifications

Education

- Bachelor of Town Planning (Hons)
- Masters of Science (Hons)
- Local Government Town Planning Certificate (NSW)

Professional Affiliations, Board Membership and Registrations

- Fellow of the Planning Institute of Australia
- Certified Practicing Planner
- Member of the Northern Territory Divisional Committee PIA 1978- 1980
- Member of the NSW Divisional Committee PIA 2010 - present
- Member of the Environmental Studies Board, University of Newcastle 1986 -1991
- Member of the NSW Natural Resource Advisory Council 2010 – 2011
- Member of the Water Delivery Alliance Leadership Team 2007 - present
- Justice of the Peace

Major Projects

Infrastructure Projects

Port Stephens Composting Plant, Bedminster
Preparation of an Environmental Impact Statement for new technology to compost municipal waste which became the first such plant constructed in Australia.

Nelson Bay Road Upgrade, Roads and Traffic Authority
Preparation of a Review of Environmental Factors for a seven kilometre dual carriage way arterial road. The project was highly controversial and required extensive ecological and archaeological investigations.

Gunnedah Sewage Effluent Reuse, Gunnedah Council
Environmental Impact Statement for a project which has redirected effluent which previously discharged into the Gwyder River, so that it now irrigates recreation and agricultural areas.

Tomago to Tomaree Water Supply Pipeline, Hunter Water Corporation
Preparation of an Environmental Impact Statement for the construction of a 40 km pipeline from Tomgao Water Treatment Works to the Tomaree Peninsula. The major constraints to the project were the existence of threatened flora and fauna which required sensitive management. Ongoing Environmental Management Plans and extensive community consultation in the construction phase was also undertaken.

Summerhill Recycling Study, Newcastle City Council
Waste reuse and recycling strategy for Newcastle including masterplan for development of Council's waste centre to maximise sustainability.

Strategic Planning

Maitland Settlement Strategy, Maitland City Council
Assessment of physical and social constraints to development and formulation of Comprehensive Urban Settlement Strategy for the city of Maitland.

Soldiers Point Project, Port Stephens Council
Masterplan and Environmental Assessment for tourist development which assisted in securing approvals and permits for a high profile tourist complex.

Fern Bay Master Plan, Winten Property Group
Preparation of a 950 residential lot masterplan for a sensitive coastal site at Fern Bay north of Newcastle. The masterplan was approved by the Minister and laid the foundation for the issue of a Project Approval.

Construction and Remediation Projects

Water Delivery Alliance, Sydney Water Corporation
As a member and for some time the chair of the Alliance Leadership Team for the WDA, Steve was involved in key decision making associated with the delivery of desalinated water from Kurnell to Erskineville via a pipeline which traversed Botany Bay.

Hunter River Remediation Project, Thiess
Undertaking environmental monitoring and occupational health and hygiene assessments for remediation work on the site of a former steel works in Newcastle. This work involved the dredging of contaminated sediments from the adjoining Hunter River and the treatment of these sediments in specially constructed buildings on the former steel works site.

Environmental Impact Assessment

Cobbora Open Cut Coal Project, Cobbora Unincorporated Joint Venture
Preparation of an Environmental Assessment (in draft form) for a proposed 20 million tonnes per annum run of mine black coal operation in central New South Wales, together with associated infrastructure including a rail spur line and two water pipelines.

South Bulga Underground Mine EIS, South Bulga Coal
Preparation of an underground coal mining Environmental Impact Statement for the expansion of an existing underground mine into new areas including, Commonwealth land used for Defence purposes.

Wallarah No2 Joint Venture Project, Kores
Assisted in presenting on behalf of Kores before an Independent Panel established to investigate whether mining should be permitted on the Central Coast of NSW by the NSW State Government.

Albion Park Quarry, CSR
Preparation of Environmental Impact Statement for continued operation of a major quarry under State Environmental Planning Policy No. 37. Key issues included transport, blasting, noise, visual, impact, threatened species and rehabilitation.

Angus Place and Springvale Section 96 Amendments, Centennial Coal.
Preparation of specialist studies and Section 96 Amendment Report seeking variations to existing development consents for adjoining mines in the Blue Mountains Location Government Area.

Rezoning Report for major Urban Release Area at Fern Bay, Boral
Preparation of a Comprehensive Constraints and Opportunities Report for a large site at Fern Bay currently used for quarry purposes was followed by a detailed rezoning report which was lodged with Port Stephens Council. The key issues addressed in the rezoning report were ecology, archaeology, water management, visual impact, compatibility with sand extraction activities, traffic, acoustics and planning context. A concept development plan was prepared which illustrated a combined tourist and residential development and highlighted the dedication of two thirds of the site for environmental conservation purposes.

Bulga Open Cut Continued Mining EIS, Bulga Coal.
Comprehensive coal mining Environmental Impact Statement which was subsequently approved to allow 10 million tonnes of coal to be extracted annually. Detailed ecological investigations were required to support the application for expansion lodged with the New South Wales Department of Planning.

Seaham Quarry Expansion, Boral
Preparation of all necessary Environmental Impact Assessment documentation for expanded operations at Boral's Seaham Quarry north of Newcastle. The expansion involved clearing of native vegetation which had to be assessed in accordance with State and Commonwealth legislative requirements. Approval was secured from Council following a successful rezoning of the site to facilitate the proposed expansion. This required Ministerial approval and the support of the local Council.

Nelson Bay Road Upgrade, Roads and Traffic Authority.
Options evaluation of several possible routes and preparation of a Review of Environmental Factors for the preferred route for a seven kilometre dual carriage way arterial road near Nelson Bay at Port Stephens. The project was highly controversial and required extensive ecological and archaeological investigations. In addition a comprehensive community consultation process was undertaken

including individual negotiations with all land owners the subject of possible future acquisition.

Fern Bay Sand Extraction, Boral
Environmental investigations including extensive ecological studies were undertaken as part of securing the approval for continued sand extraction from a major source of construction sand located on Stockton Bight north of Stockton in the Hunter Region. Rehabilitation processes were an integral part of demonstrating Boral's credibility in terms of compensating for biodiversity losses on site.

Expert Evidence

Buttai Quarry, Daracon.
Preparation of an Environmental Impact Statement for the establishment of a 200 000 tonnes per annum hard rock quarry. The consent issued by Council was subsequently challenged in the Land and Environment Court and successfully defended.

Litigation in relation to Transport Infrastructure and Steel Works, Premiers Department of NSW.
Preparation of evidence in support of the Environmental Impact Statement prepared for a port and seven kilometre long infrastructure corridor comprising a road/ conveyor to service a steel mill with an estimated output of over $1 billion worth of finished products per annum. The litigation was discontinued prior to the commencement of hearings.

Vincentia Compulsory Acquisition, Morton and Harris.
Preparation of a series of reports assessing the development potential of land acquired for community uses by Shoalhaven City Council. The final judgement substantially favoured Council.

Toronto Retail Centre, Lake Macquarie City Council
Represent Council as an expert witness in the successful defence of Council's refusal of a proposed expansion of a supermarket and specialty shops.

Salamander Project Litigation, Deacons Lawyers
Provided affidavits in respect of planning approval processes applicable during the 1980's and 1990's in relation to proceedings involving breach of contract.

Wagga Wagga City Council Litigation, Sparke Helmore Solicitors
Preparation of expert evidence in relation to a residential subdivision which had suffered the impacts of subsidence as it had been developed in a sawmill waste disposal area.

Whitebridge Small Lot Housing Appeal, Peter Rees Solicitor
Represented Council in the successful defence of its refusal of a development application for a small lot housing project adjoining

an established residential area.

Jesmond Medium Density Housing Appeal, Newcastle City Council v Private Developer
Presented evidence as a Court Appointed Expert in relation to a medium density housing project where the key issues were overshadowing, privacy, car parking adequacy and streetscape/ aesthetics.

Wambo Land and Environment Court Appeal, Excel Mining
Preparation of Expert Evidence and participation in joint expert conferences in relation to a challenge against the Minister's granting of consent for the expansion of Wambo coal mine in the Hunter Valley. The appeal was withdrawn shortly prior to the commencement of court proceedings, removing the obstacle to mining proceeding.

Dungog Shopping Centre, Dungog Council v Private Developer
Presented evidence as a Court Appointed Expert in relation to the proposed development of a new shopping complex adjoining the heritage declared town centre. The key issues were aesthetics, car parking, pedestrian linkages to the established town centre, adequacy of services and public interest.

Challenge Against Validity of Consent for Medium Density Development at Nelson Bay, Port Stephens Council
Represented Council as an expert witness in the defence of Council's approval of a medium density residential development at Nelson Bay overlooking Port Stephens.

Drayton Coal Mine, Fitzgerald White and Talbot
Complete review of all planning consents and related permits and approvals dating back to the commencement of mining as part of the due diligence exercise Anglo American Coal were undertaking.

Publications

The Canberra Syndrome. Published in *Canplan*, 1980.

An Innovative Approach to Assessing Urban Land Capability. Paper presented to the World Planning and Housing Congress, Adelaide, 1986.

Living in a Global Greenhouse - Coastal Planning and Development. Contribution to Occasional Paper No. 13, Board of Environmental Studies, University of Newcastle, 1989.

Sea Level and Greenhouse - Planning for Change. *Australian Planner* Vol. 29 (1) 1991.

Coastal Land Management. Paper presented to Biennial RAPI Congress on Planning for Sustainable Development, 1992.

The Koala. Australian Planner Vol. 33 (1) 1996.

The Changing Approach to Seeking Approvals for Coal Mining. Environmental Planning Law Association Annual

Conference, 1998.

DUAP Discussion Paper and Recent Trends in Mining Approvals. NSW Mineral's Council Environmental Workshop, 1999.

Integrated Development. New Planner, No 50, 2002.

Columbia New Town. PIA NSW Division Annual Conference, 2004.

Fern Bay Master Plan. Planning Institute of Australia Biennial Conference, 2005.

Community Title as a Means of Achieving Environmental and Social Outcomes. Town Centres and Communities Annual Conference, 2006.

Coastal Planning. New Planner, No 77, 2008.

Sustainable Housing. New Planner, No 78, 2009.

Sydney's Desalination Project. New Planner No 82, 2010.

Reform of NSW Planning System Part One Plan Making. New Planner No 84, 2010.

Reform of NSW Planning System Part Two Development Assessment. New Planner No 87, 2011.

Fundamental Problems with Integrated Development. New Planner No 88, 2011.

Appendix D

Dr Nick Kannegieter Equine Advice

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13 February 2014

Hansen Bailey Pty Ltd
P.O. Box 473
SINGLETON NSW 2330

Attn: Ms Belinda Hale

Drayton South Coal Project
Response to Planning Assessment Commission Report Equine Health and Industry Considerations

Dear Belinda,

Thank you for your instructions to place results from my previous technical assessment on equine health issues associated with the Drayton South Project into context, with a particular focus on the Planning Assessment Commissions (PAC) reliance on the "expert" advice received from Mr Terry Short (and Ms Tiffany Thompson) from La Tierra. In addition, I provide comment on some of the misconceptions that the PAC relies upon in their findings and recommendations particularly in regard to both horse health and behaviour, and the industry.

A. Assoc Professor Nicholas Kannegieter – Brief summary of background and qualifications.

I graduated in Veterinary Science at the University of Sydney in 1983 and undertook an internship at the university's Rural Veterinary Centre in 1984. The next four years were spent at Massey University in New Zealand as a Junior Lecturer/Lecturer undertaking a PhD in equine respiratory tract disease and receiving post graduate training in Equine surgery.

I took up the position of Registrar in Equine Medicine and Surgery at Sydney University in 1990 and was Senior Registrar from 1992-1995. I obtained Fellowship of the Australian College of Veterinary Scientists in Equine Surgery in 1990 and was granted Specialist registration in Equine Surgery by the NSW Veterinary Surgeons Board in 1991, by the ACT Vet Surgeons Board in 1997 and by Queensland in 2001. I was a member of the Executive of the Australian Equine Veterinary Association (AEVA) from 1990-2001 (President 1994), was on the AVA Board of Directors from 1996-2001 and is currently Chairman of the AVA Insurance Advisory Committee.

I was the Course Tutor for the University of Sydney Post-Graduate Foundation Education Program in Equine Surgery, becoming an Honorary Associate of the University Of Sydney School of Veterinary Science. More recently I was appointed an Adjunct Associate Professor in the School of Animal and Veterinary Sciences at Charles Sturt University, Wagga Wagga.

I have published approximately 45 scientific papers with special interests in respiratory tract and orthopaedic surgery, particularly arthroscopy. Since 1996, I have been a Consultant Equine Veterinary Surgeon in Private practice, providing surgical services and second opinions on cases and radiographs for veterinarians in equine clinics throughout NSW, the ACT, Queensland and other parts of Australia.

B. Response to Planning Assessment Commission (PAC) Review Report on the Drayton South Coal Project (the Project) in regard to the perceived impact on equine health and the equine industry (as described in the Mr Terry Short La Tierra report).

1. The PAC report has relied heavily on the "expert" advice received from Mr Terry Short (and Ms Tiffany Thompson) from La Tierra the Earth Natural Resource Scientists and Engineers. It is unclear on what basis Mr Short is considered an expert in the field of equine health, nor in the area of the equine industry in the Hunter Valley. According to information provided in the report the company run by Mr Short "provides objective scientific and engineering advice about the earth's natural resources." The website address provided by their company, La Tierra (Latierra.com.au) does not appear to exist so attempts to ascertain the qualifications and background that provide La Tierra with expertise in this area were unsuccessful.

2. The conclusion that "noise, blasting, lighting and maybe even air emission could have the potential to disrupt or impact the breeding operations of studs" is contrary to the scientific evidence presented in the Equine Health Impact Assessment.

   This conclusion appears to be based largely on the unsupported personal opinion of Mr Short (based apparently on misleading information obtained as a result of a "literature" search) and to a lesser extent public submissions (also unsupported by any scientific documentation) to the PAC. To the best of my knowledge no public submission presented any scientific claims to support the opinion that the mine would have an adverse impact on equine health or breeding.

   The report claims to have "conducted its own review of available and relevant literature which is cited throughout." There are just 3 references cited in regard to equine health, compared to well over 100 scientific veterinary documents reviewed and included in the equine health report submitted as part of the EA. Of even greater concern is that the three scientific articles quoted in regard to equine health are not relevant to the Project and are actually highly misleading.

The Short report advises (p17) that "this review has observed other studies that do correlate the equine and human response to particulate matter from dust (Martin and Harwood, 2002)". The article cited compares human asthma with recurrent airway obstruction (RAO) in horses and explores similarities in the genetic makeup of horses and people in regards to the allergenic response in the lungs. In this article RAO is specifically defined as chronic obstructive pulmonary disease (COPD) or heaves. The article specifically states that "equine RAO is a hypersensitivity reaction to mould spores present in hay and straw dust and / or other allergens". It is likely there is a strong genetic basis with a complex mode of inheritance for RAO (Racine et al 2011) however people with no mutations predisposing them to asthma would not develop the disease under any environmental conditions (Hall 2000, cited by Marti & Harwood 2002). Further RAO (or COPD) is purely a disease of stabled horses. It is extremely rare in the Southern Hemisphere, while being very common in the Northern Hemisphere.

There is no suggestion or indication that there will be mould or allergens in any dust generated by the Project so that the citation of this article is highly misleading for the PAC.
This reference actually supports the approach in the Equine Health Impact Assessment which advised that dust in stables was a good benchmark for occupational dust exposure by racing horses and posed far higher risks to horses than any potential increase in dust from the mine.

This article was also used as the basis for the statement in the Short report that "Unfounded assumption in the AIS and Equine Impact Assessment that the equine response would differ to the human response to dust exceedences. Further analysis is required". Horses do respond differently in many respects, yet as both are mammalian species there are many physiological features in common. The conclusions from evaluating the large amount of existing scientific data regarding equine dust exposure is that human safety levels would be more than adequate for horses. Although precise safe levels for dust exposure in horses have not been defined, given there are anatomical and physiological differences in the way each species respond (for example humans being upright, are far more likely to inhale dust into the lungs and keep it there as their nostrils are well above the height of their lungs - in contrast horses nostrils and windpipe are lower than the bulk of their lungs, which naturally favours easier removal of any dust and irritants) then it is highly probable the safe levels would be much higher. Despite this the Project has accepted human safety guidelines as a level to use for horses to provide even greater certainty about the safety of the Project in regards to equine health.

The other two equine health articles quoted are those by Schwart et al 1981 and Arenz et al 2001. Both these articles relate to a very specific disease, namely "silicate pneumoconiosis" or "pulmonary silicosis". This is an extremely rare condition with both these reports being the only reported cases and which documented similar animals affected by the disease from the Montesey-Carmel Peninsula in California USA. The authors advise this disease is found in arid or desert areas where the soils are rich in silicates. There is no indication of how the horses acquired the disease or any discussion of dust inhalation. Quoting these reports is very misleading as there is no indication that any soil disturbed by the Project is rich in silicates. Pulmonary silicosis will not be an issue in this case. Therefore claim in the Short report that "Other studies indicate that there are impacts from equine exposure to environmental inorganic particulate matter" is highly misleading and must not be relied upon by the PAC.

It is unfortunate that the Short report chose to select only three out of over 100 scientific articles to cite from, and those three articles were irrelevant to the current Project and has provided misleading advice to the PAC.

3. The Short report also states they have undertaken "additional analysis of potential impacts of noise, dust and lighting to equine breeding" under the heading "unstated impacts" (p14). There is no indication of what this analysis is or what facts or scientific information this statement is based on.

The Short report states (p38) that "No information does not equal no impact and precautionary principle must apply." This statement ignores the large amount of scientific data and documentation which has been provided and which clearly demonstrates there will be no impact on equine health as a result of dust, changes in lighting, noise or vibration.

In regards to the effects of light it is almost certain there will be no adverse effect. In order to manipulate breeding cycles in mares, artificial lighting needs to be of a certain intensity and prolonged exposure is required. The lighting used at Drayton South will only be intermittently visible from the studs and is unlikely to be of sufficient brightness to have any negative effect on breeding cycles.

In regard to vibration, the data shows only positive potential effects with no possible adverse effects identified. Any habituation to vibration that may be required would be expected to occur probably within days, if not sooner, and at most a few weeks.

The increase in dust levels, which will be minimal, will have no noticeable effect. The increase in dust levels the horses may be exposed to in a year in the worst case scenario could be seen as the equivalent of the dust exposure experienced by a horse placed in a stable in a few hours. Importantly the dust from the Project will be free of any other irritants, in particular endotoxins, moulds, bacteria and other allergens which are the primary causative factors in equine lower respiratory tract disease.

The noise from blasting will be barely perceptible and it occurs usually just once per day and will in most instances not be heard. When heard would not cause any alarm to any horses much less affect their breeding capacity. Horses would be at far greater risk from thunder and lightning strikes than they would be from mine blasts. During a single storm horses may be exposed to more noise, accompanied by sudden flashes of light, than they might during the entire life of the Project.

4. Observations on the Critical Industry Clusters

In regard to comments in the Short report about Critical Industry Clusters (CICs), I would make the following comments based on my 25 years practical experience in the Thoroughbred industry, both racing and breeding, in Australian and New Zealand, as well as my time growing up and still regularly working in the upper and lower Hunter Valley of NSW.

The concern has been raised in the review that studs may leave the Hunter. This seems to have evolved as a result of comments made by Dr Cameron Collins (current President of Hunter Valley Breeders Association as well as a Senior Partner in the Scone Equine Hospital which derives considerable fees from Coolmore and Darley) at the PAC Public hearing 10th October 2013. It is not, to my knowledge, supported by documentation or direct advice from Coolmore or Darley. The Short report has concentrated heavily on the impact on the CIC were Darley or Coolmore to leave. It is my opinion that the predicted impacts of the Project in regard to CIC have been heavily overstated.

Thoroughbred horse breeding in the Hunter Valley has been established for over 100 years. In that time many studs have risen to great prominence and dominance in the region and equally many studs have declined in influence. This occurs naturally as a result of many factors, being in particular the success of any stallion or stallions that may be standing at the studs. The commercial success of any stallion cannot be guaranteed and in some respects there is an element of good fortune in acquiring a good stallion. The chances of obtaining a successful stallion increases greatly if a stud has the financial resources to continually purchase well-bred and successful young, well-bred racehorse stallions. Studs such as Darley and Coolmore have these financial resources.

The attraction of Coolmore and Darley to breeders is primarily the stallions they stand. Success in racing and breeding is determined mostly by genetics. Owners wish to breed the best with the best and will do so irrespective of where the horse stands. The best stallions, which can demand the highest service fees, are determined purely by the success of their progeny on the racetrack. Owners do not choose a stallion based on the visual impact the stud presents. They will send a mare to a stallion anywhere in Australia if they consider him the most suitable mating for that mare.

Mare owners also expect that their horses will be well managed while at the stud. Good management consists of providing good nutrition, well grassed and fenced paddocks and regular monitoring to ensure any health issues are dealt with in an appropriate manner. The onsite veterinarians at the studs provide excellent veterinary care and routine breeding management expected in a major breeding operation.

The PAC also refers to the "Brand" of Coolmore and Darley being adversely impacted by the proximity to the Project rather than any significant physical effect from dust or noise etc on the property, personnel or equine health. Branding is important as it helps to identify one sellers good or service from competitors. As identified by Kevin Keller, Professor of Marketing at Dartmouth College[1], "A brand is a product, then, but one that adds other dimensions to differentiate it in some way from other products designed to satisfy the same need." These other dimensions include, at one extreme, intangible emotional elements such as satisfaction. At the other extreme are rational and tangible elements specific to the features and functions of a product such as safety.

However while the brand of these studs is important in the equine industry it primarily relates to the racing and breeding credentials of the stallions and brood mares it uses and the progeny that can be produced rather than the landscape within which they operate. By way of example most horse owners from Australia will never visit the operations base for Coolmore in Ireland but they will have great respect for the Coolmore brand in that country based on the horses it owns and races, in particular the breeding stallions. It is difficult to visit any stud in the Hunter Valley without seeing coal mines in close proximity to horse operations which has the effect of minimising any effect on any one equine stud "brand" in the Hunter Valley.

It should also be taken into consideration that Darley's Woodlands Stud is only used for broodmares and foals, with the stallions kept at a separate property (Kelvinside) which is well away from Woodlands Stud and the project. Even if Woodlands relocated their mares from the current property they would be very unlikely to move the stallions from Kelvinside as they are reliant on the high concentration of broodmares in the Hunter Valley for commercial success.

It is further noted that Coolmore Stud has recently acquired the Arrowfield property which is closest to the Project. This land is relatively steep and has historically been a winery with associated grape production. This topography of the majority of this land would not be considered ideal for use as an equine stud property, particularly with the high monetary value of many of the horses currently on the existing Coolmore property, and would be useful for other agricultural pursuits.

Owner's perceptions will not be affected by the presence of the mine provided the studs can give full assurance that the mine will not have any adverse impact on the health of the mare or any progeny born or raised on the stud. The scientific evidence strongly supports there will be no adverse impact on equine health, including mares, foals or reproductive rates. Both Coolmore and Darley should carefully review the documentation provided in the Equine Health Impact Assessment and if they agree with the extensive scientific analysis provided they should publicise this to ensure no clients gain the impression that the Project might have an adverse effect on the mares or progeny raised there.

If as a worst case scenario, either or both studs chose to leave their current locations it is likely to have only a short term effect on the CIC. The CIC has developed over many years as result of the congregation of a large number of studs and the associated infrastructure and personnel. The history of the Hunter Valley Equine industry shows that over the years some studs have had periods of dominance followed by periods of less influence. New studs are developed while older studs may no longer operate or might relocate. This will continue to happen as part of the economics of the horse industry, the success associated with individual stallions, and the economic and personal situation of stud owners.

For example, the Short report includes Patinack Farm, owned by coal mine owner Nathan Tinkler, as one of the "main actors in the CIC". Patinack had a rapid rise in prominence and influence in the CIC and could rightly be considered one of the "main actors" in the CIC. Unfortunately Patinack Farm no longer exists in its previous form. This "main actor" has effectively been lost to the CIC yet despite this the CIC has continued to function effectively. The horses owned by Patinack were taken over by other studs so that the gap left by the demise of Patinack was rapidly filled.

A major problem with relocating is the established infrastructure on both studs, in particular the extensive housing provided on site for staff, veterinary facilities, pasture improvement etc. Further if the studs were to relocate, many staff members would not follow the studs outside the Hunter Valley which may significantly affect the functioning of the stud, particularly in the short term.

It is highly unlikely that either stud would relocate overseas, the only realistic options would be considered to be New Zealand or possibly South Africa. The racing industries in both these countries are relatively weak, with prize money only a fraction of that available in Australia. More importantly there are probably insufficient broodmares and owners in either of these countries that would pay the service fees for the large number of stallions that are present on the studs. While the top few stallions may attract sufficient mares many of the other stallions would struggle to fill a book at the currently advertised service fees. Further, the progeny born are likely to be less valuable in these countries as the value of horses achieved at the two major sales in Australia (Inglis and Magic Millions main yearling sales) are unlikely to be achieved in New Zealand or South Africa. The option would be to bring them back to Australia to sell which results in additional risk and cost.

Relocating overseas to a northern hemisphere country would result in stallions serving only half the year generating half the income. This is very unlikely to occur given the strength of the Australian racing and breeding scenes.

If the studs were to relocate it is most likely to be elsewhere in the Hunter Valley, which would also not negatively affect the CIC.

The studs may choose to relocate to elsewhere in NSW or interstate, however there are few areas with the same infrastructure that is close to Sydney and both major sale centres.
Were they to leave the Hunter Valley, it is very likely that other “critical actors” would fill the void left. They may not be as dominant as Coolmore or Darley however many in the industry may view that as a benefit rather than a detrimental result. The high concentration of stallions in one or two studs may not be healthy for the CIC and can adversely affect the ability of smaller studs to operate or compete effectively. It is similar to the domination of Coles and Woolworths in the supermarket industry.

It is important to remember that stallions need mares to serve and were Coolmore or Darley to leave the Hunter Valley the mares would likely not follow in the numbers that currently use the stud. It is my understanding that the Hunter Valley has the highest concentration of Thoroughbred broodmares in Australia. Therefore while these studs are useful for the CIC it is equally important for them to be in the Hunter Valley. It is very much a symbiotic relationship with mare owners in that without the mares Darley and Coolmore could not maintain their position in the CIC.

Therefore while any change in the structure of the CIC has the potential to impact the CIC it is likely in the long term that it will return to its normal level. Scone could continue to promote itself as the “Horse Capital of Australia” with or without Darley and or Coolmore.

5. Comments on the perceived impact of noise as determined by the PAC

The PAC report cites several articles in regard to the potential effect of noise from the Project on equine health. These are reviewed and summarised below.

In regards to the report "Effects of Aircraft noise and sonic booms on domestic animals and wildlife: A literature synthesis (US Air Force, Mancini et al, 1988)" as cited by the PAC most of the conclusions in this report are the result of studies in rats and other laboratory animals subject to intense noise or the effects of noise on wildlife, primarily birds and marine animals. The only specific mention of horses is in relation to how much noise a horse can make. There is no mention of the effect of any sort of noise on horses. Some relevant comments extracted from this report are as follows:

- "*Animal reactions to sonic booms are similar to their reactions to low-altitude subsonic flights, helicopters and sudden noises"*
- *"Sound levels below about 90 dB usually cause much less adversive behaviour" although no references of this are provided.*
- *"Tractor engine sound at 97 dB significantly increased the glucose concentration and leucocyte counts in the blood of dairy cows and markedly reduced the level of haemoglobin (Brouck et al 1983)."*
- *"White noise or pure tone noise at 100dB appeared to have no detrimental effect on reproduction. Several reviewers of noise research on animals also stated that data presently available indicate no impaired reproduction in sheep due to exposure to sonic booms (Ewbank 1977; Cottereau 1978*)."

The correct conclusion from this report is that noise from the Project will likely have less effect on horses than will helicopters or light aircraft landing at the property or indeed the use of a farm tractor or motorbike. .

The Noisequest report made specific reference to horses with the conclusion that neither the safety or reproductive capability were affected by jet aircraft noise and that habituation regularly occurred. The primary reference citing adverse effects consisted of the following: "Observations made in 1966 and 1968 noted that horses galloped in response to jet flyovers (U.S. Air Force 1993)." This would seem to lack scientific credibility and should not be relied upon by the PAC.

The Huybregts report cited by the PAC was also referred to extensively in the Equine Health Impact Assessment. The noise the horses were exposed to in this report was measured at 54-70 dB and "the horses generally showed little response to the music noise except when the noise was associated with visible stimuli, or when the noise was of an alarming character such as short bursts of high pitched singing".

It was also reported that horses stabled on racetracks or during racing will be usually exposed to noises of 75-90dB. This has no adverse effects on the horses as they have become acclimatised to this during the course of their training as racehorses.

The report by Larkin (1966) refers exclusively to the effects of noise on wild life. There is not a single mention of horses or other domestic animals. It should be clearly acknowledged that there are major potential differences in the response of wild life, which might be assumed to be less accustomed to any noise, compared to racehorses horses who are exposed to many varieties and intensities of noise from birth. It is only extreme noise, likely far greater than 100dB, and particularly if accompanied by visual stimuli, that may cause an unexpected response in horses. This report concludes that "military and civilian blast noise had no unusual effects (beyond other human generated noise) on wildlife in most studies…and animals were probably habituated to blasts. Firearms are probably salient to hunted species, via learning".

The Wyle report provides general advice regarding noise. The sections relating to animals cite the same limited literature as other reports and provides no new information. The conclusion in regard to horses is that mares adapted to noise from air force flyovers within a month and that there was no effect on survivability or reproductive capacity.

In summary the literature cited by the PAC is largely repetitive, relying on a limited number of original sources, many of which provide very subjective opinions and lack scientific validity, They are similar in content (almost identical in regard to comments regarding horses as they all rely on the same data) and have not been published in recognised scientific journals.

The reason there is no "conclusive" data or conclusive opinions from the cited literature is because the studies review the effects of noise emanating from hundreds of different sources and the effects it may have on hundreds of different species in vastly different environments and which have been investigated by studies which have had greatly different, and often woefully inadequate, scientific protocols or no study protocol at all. It is inevitable that there will be "conflicting" results given the great conflict in acquiring and interpreting the data.

The literature does not support the conclusion in the PAC report "that there is uncertainty regarding the actual impact on horses, blasting could be perceived to put the horses on the studs at risk". In my opinion it is unreasonable for the PAC to make this conclusion and the claim that the articles discussed above in some way support this conclusion is misleading. The correct conclusion from the articles cited is that there is likely going to no adverse impact of noise from the Project in regards to the safety of the horses or their reproductive capacity.

The noise generated from blasting by the Project is anticipated to be at worst equivalent to that perceived "as a distinct rumble, similar to a thunderclap originating from lightning a few kilometres distant" (Bridges Acoustics, 2014 'ADDITIONAL ACOUSTIC ANALYSIS'). Thoroughbred horses are generally very resilient to noise. For example retired racehorses are highly sought after throughout the world for use as Police horses, partly because of their size however a major factor is also because they have become accustomed and habituated to a wide variety of unexpected and loud noises.

Habituation to noise is reported to take approximately one month, however that is for an animal unaccustomed to that particular type of noise or a similar type of noise. Given that the noise of blasting is anticipated to be very similar to many other noises horses currently hear eg plane and car engines, tractor noise, helicopters, motorbikes etc then it is likely there will be no acclimatisation period required. It is unreasonable to argue that a stallion that has flown half way around the world and been subjected to many "new" noises that they will then be concerned by low level background blasting. If there is any effect it would last only a few days at the very most however it is highly likely there will be no effect. It will have no effect on reproductive capacity. The same can be said for mares coming onto the stud. In any event even if they are mildly concerned about the noise in the first few days there are numerous reports in horses and in other domestic production species, that there will be no effect on reproductive capacity and rapid habituation.

6. Comments on the perceived visual impact of the stud.

This would seem to be the primary concern of the studs. The visual impact of the Project is greatly minimised, particularly from Coolmore aspect, so that clients arriving from Sydney via the most direct route, up the Golden Highway via Jerry's Plains, would not be concerned by the Project. This approach to the Hunter Valley was described in some submissions as the "alternate gateway to the horse breeding capital of Australia". Along this route many existing mines are very close to the road and highly visible.

Data regarding the number of owners or potential clients visiting these studs has not been provided by the studs. The vast majority of purchasers of yearlings would not visit the studs prior to bidding on horses at the major sales. Most buyers rely on the opinion of leading trainers or will inspect the horses at the sales site. Major buyer representatives at sales, such as trainers and bloodstock agents, will visit the stud however it is unlikely they would be greatly concerned by the presence of a mine given the long term association of mining with the Hunter Valley. It is not in the interests of these representatives to provide comment on the perceived negative impact of the Project when attempting to encourage clients to purchase horses they have selected. The primary consideration in selecting yearling horses is pedigree, followed by type and conformation. The area the horse has been raised is usually not a consideration and no scientific data exists to support the concept that one particular location is superior to another once the effects of pedigree have been removed.

Many mare owners would only send their mares to be served at the stud on a walk in walk out basis (daily or very short stay) so would not visit in that time. Broodmares owners whose mares reside at the stud may occasionally visit, usually to inspect new born foals or at stallion open days. It is my understanding that the majority of visitors to the stud would be just prior and during the breeding season, likely from July/August to November these owners would be greatly reassured were the Studs to provide the correct advice that the Project has no impact on equine health. Given the number of mines they would pass on their journey to the studs, many of which are relatively close to other equine breeding areas, they are likely to accept this as being part of the dynamic of the Hunter Valley.

7. It is my opinion that Coolmore and Darley are extremely unlikely to move their operations from their present locations. If they did relocate it would be to elsewhere in the Hunter Valley as they are reliant on a high concentration of broodmares to ensure they obtain full value from their stallions. If the studs did decide to relocate outside the Hunter Valley the CIC can more than adequately cope with their departure however these studs would encounter difficulties were they to relocate outside the Hunter Valley CIC.

C. Conclusion.

Extensive research has been conducted and presented throughout the assessment process for the Drayton South Coal Project with regard to dust, noise, vibration and blast overpressure impacts on horses. It is my opinion that taking into consideration the findings as reported in the Equine Health Assessment as well as the other specialist technical reports there should be no impact on the horse studs in relation to horse health, behaviour, production or sales.

With regard to the purported idea that the studs will leave the Upper Hunter CIC as a consequence of perceived impacts held by the studs' clientele, it is my opinion that the predicted impacts of the Project in regard to CIC have been heavily overstated. As discussed above there is a multitude of reasons why the studs would not leave the current locations. Additionally I do not believe that the relocation of Coolmore or Woodlands (Darley) would result in the demise of the Upper Hunter Equine CIC.

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Appendix E

Gillespie Economics Advice

Gillespie Economics

Environmental and Resource Economics: Environmental Planning and Assessment

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13 March 2014

James Bailey
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James

Re: Drayton South Project

In accordance with your request, I have prepared a short report (Appendix 1) evaluating the economic arguments presented in the Planning and Assessment Commission's (PAC's) Report for the Drayton South Project and analysing the economic implications of refusal of the Project and alternative mine plans.

While the PAC may have considered it to be outside the scope of its deliberations, from an economic perspective it is important that decision-makers consider all the costs and benefits of a Project not just select one potential impact and ignore the broader economic implications.

If the Project is not approved it needs to be recognised that there is an opportunity cost to NSW and Australia. That is, NSW will forego $859M in royalties ($320M present value) and Australia will forego another $664M in company tax ($170M present value). It is not clear that there would be any tangible benefit to Coolmore and Darley from refusing the Project.

A compromise set back that removes the Houston and a small portion of the Whynot open cut pits from the mine plan, as recommended by the PAC, would also have an opportunity cost to NSW and Australia. It would sterilise approximately 30 million tonnes of run-of-mine coal and reduce the royalties to NSW by in the order of $223M ($18M present value) and company tax to Australia by in the order of $348M ($55M present value). Again, it is not clear that there would be any tangible benefit to Coolmore and Darley from this set back mine plan.

While the PAC's Report places considerable emphasis on the importance of Coolmore and Darley to the equine cluster in the region, a comparison of the regional economic impact assessment undertaken of the Project and that undertaken by Marsden Jacob and Associates of Coolmore and Darley, indicates that the Project would provide significantly greater economic activity to the regional economy than Coolmore and Darley does.

Regards

Rob Gillespie

Appendix 1

Coal Resource

NSW has considerable coal resources which have the potential to meet some of the forecast growth in world demand for coal over the next thirty or so years. Coal will remain the cheapest source of fuel for electricity generation for many years. However, investment in alternative forms of energy will eventually bring down the comparative price of these alternative forms of energy and the energy market will gradually shift away from coal fired electricity. NSW has a window over the next few decades to realise the value of its coal resources. The NSW coal supply chain i.e. railway and ports, are being developed so as not to create an impediment to the mining and export of coal to meet world demand.

The Drayton South coal resource is located close to the Existing Drayton Mine infrastructure and the Port of Newcastle. The considerable existing investment in infrastructure at the site mean that the coal resource can be mined and delivered to port relatively cheaply and so the royalty and tax benefits for NSW and Australia from mining the resource can be maximised.

Incompatibility

The PAC refers to the Bickham PAC review that indicated that "available evidence supports the view that open-cut coal mining and a viable international–scale thoroughbred breeding enterprise are incompatible land-uses". The PAC also makes reference to the findings of Mr Short that "thoroughbred horse studs of the nature and scale of Coolmore and Woodlands, and open cut coal mining as proposed by the Project are incompatible land uses. These land uses cannot co-exist in close proximity to one another".

This is disputed. The coal mining industry and the equine industry have coexisted in the Hunter Valley for many years albeit with coal mining mainly concentrated in the lower part of the Hunter Valley and horse breeding concentrated in the Upper Hunter Valley. Similarly, coal mining and the equine industry have coexisted in the State of Kentucky, USA and many of the individual counties in Kentucky. While the equine industry is a significant industry in the State of Kentucky and many of its counties, Kentucky is also the third-highest coal producer in the United States employing around 14,100 on site[1].

Incompatibility of adjacent or nearby land uses is associated with whether and to what extent the activities of one land use affect the activities of another. It will vary from case to case and site to site. The incompatibility postulated by the PAC is related to potential noise, dust and visual impacts of the project on the studs and the impact of "proximity" on the brand and image of the studs.

The technical assessments of noise, dust and visual impacts show that these physical impacts will be minimal. The issue of proximity and image are discussed further in Kannegieter (2014)[2], with the conclusion that the image of Coolmore and Darley primarily relates to the racing credentials of the stallions and brood mares they use and the progeny that has been produced, not the landscape within which they operate.

[1] Kentucky Coal Associated (2013) *Kentucky Coal Facts 13th Edition*, Kentucky Energy Environment Cabinet, Department of Energy Development and Independence and Kentucky Coal Association.
[2] N Kannegieter (2014) Drayton South Coal Project – Response to Planning Assessment Commission Report Equine Health and Industry Considerations

CICs

The economics literature refers to critical industry clusters (CICs) simply as industry clusters. They are not "critical" but simply refer to "a group of proximate firms 'interlinked by input/output, knowledge and other flows that may give rise to agglomerative advantages' (Lublinski, 2003: 454[3]). As identified by Porter (1990)[4] in his seminal work on clusters, "clusters are not unique, they are highly typical". By any definition of clusters, the coal mining industry in the Hunter Valley is also a critical industry cluster which is many times larger and more significant than the identified equine CIC.

As identified by Johnston (2003)[5] clusters are not static, they grow, evolve, mature and die, primarily in relation to market forces. The equine cluster in the Hunter has also developed and changed over time in response to market forces e.g. the growth and decline of the Patinack Farm. The existence of the cluster and the agglomeration economies that it provides insulates it from the growth or decline of individual members of the clusters, as other "critical actors" would fill the void left by the decline or relocation of any individual operations, because of the benefits of being in the cluster.

Barriers to Relocation

A fundamental tenant of the PAC's deliberations is that there is a risk that Coolmore and Darley operations may leave the region as a result of the Project and that because they are highly important to the equine CIC and the broader region should be protected from the impacts of mining.

The issue of risk is considered separately below. However, from an economic perspective one of the key barriers to the relocation of Coolmore and Darley is the level of physical infrastructure that has been sunk into the properties. For example, staff facilities, pasture and other property improvements, veterinary facilities etc. While bloodstock is easily relocatable, the physical infrastructure is not. As identified above, the Brand of Coolmore and Darley is largely around the racing credentials of the stallions and brood mares it uses and the progeny that has been produced. Consequently, where no substantive physical impacts arise, the land would continue to have the same agricultural capability and suitability for horse breeding. Together with the physical infrastructure invested by Coolmore and Darley, the properties could continue to be used by Coolmore and Darley or, in the event of their relocation for their own commercial and other reasons, other horse breeders.

The agglomeration economies of being in the cluster provide a further disincentive to the relocation of Coolmore and Darley outside the region.

Benefit Cost Analysis Ignored

The PAC's review and recommendations are based on an economic argument that Coolmore and Darley are critical to the equine CIC and consequently the broader region and so should be afforded protection using a buffer. However this central economic argument ignores the NSW Government (2012) *Guideline for use of Cost Benefit Analysis in mining and coal seam gas proposals* (and the NSW DoP guideline (James and Gillespie 2002[6])) which identifies BCA as the key method for considering the economics of projects and specifically states that ***"it is not appropriate to examine only some types of impacts in isolation".***

The PAC's finding focuses on a single potential, but highly unlikely impact, and gives it trump status, ignoring the broader economic implications of any recommendation to refuse or constrain the Project.

[3] Lublinski AE (2003) Does geographic proximity matter? Evidence from clustered and non-clustered aeronautic firms in Germany. *Regional Studies* 37(5): 453–67.
[4] Porter, M.E. (1990) *The Competitive Advantage of Nations*, Macmillan, London.
[5] Johnston, R. (2003) Clusters: A Review, prepared for the Mapping Australia's Science and Innnovation System' Taskforce, Department of Education, Science and Training.
[6] James, D. and Gillespie, R. (2002) *Guideline on Economic Effects and Evaluation in EIA*, prepared for the Planning NSW.

BCA in Accordance with the NSW Government (2012) Guidelines

The BCA of the Project in accordance with the actual guidelines estimated it to have $490M in net production benefits to Australia, comprising $170M in company tax ($664M undiscounted) and $320M in royalties ($859M undiscounted).

Incorporating material environmental impacts gives net social benefits to Australia of between $443M and $741M.

The BCA didn't incorporate any impacts on the horse studs as it was based on technical assessments that did not identify any substantive impacts. But even if it is assumed the studs close (and don't relocate in Australia) it makes little difference to the BCA as the economic value of the studs to Australia as measured in accordance with the NSW Government (2012) guideline approximates zero as they are foreign owned, pay no royalties and largely break even so don't pay any company tax.

Opportunity Cost of the Decision Not to Approve the Project

If the Project is not approved it needs to be recognised that there is an opportunity cost to NSW and Australia. That is, NSW will forego $859M in royalties ($320M present value) and Australia will forego another $664M in company tax ($170M present value).

Opportunity Cost of Buffers and Setbacks

Dr Lamb has suggested a buffer of several kilometres as appropriate to protect horse studs from the impacts of mining. For the Project, the PAC has recommended a setback behind the line marked in yellow on Figure 5 of its report.

Specification of arbitrary buffers ignores the opportunity cost of foregone activities within those buffers. These costs are likely to far outweigh any economic or regional economic activity benefits of the equine CIC.

Anglo American has advised that it would not be financially viable to setback mining operations behind the yellow line in Figure 5 of the PAC's report. Consequently, the opportunity cost to NSW and Australia of adhering to this setback would be as identified above for not approving the Project i.e. NSW will forego $859M in royalties ($320M net present value) and Australia will forego another $664M in company tax ($170M net present value).

A compromise set back that removes the Houston pit and that part of Whynot pit that could be seen in the absence of the Houston Visual Bund would also have an opportunity cost to NSW and Australia. It would sterilise approximately 30 million tonnes of run-of-mine coal and reduce the royalties to NSW by $223M ($18M present value) and company tax to Australia by $348M ($55M present value).

It would also reduce payroll tax to the NSW Government by $173M ($9M present value).

Further Opportunity Costs to Investment

The majority of mining investments in NSW are from multinational corporations. They have the choice of investing in coal mining projects, other mining projects, or other forms of development in any country in the world. A critical driver in the choice of investment is the regulatory cost and probability of successful applications.

The PAC reports and the decisions made in relation to Bickham, Drayton South Project, Coalpac and the Warkworth Extension Project are highly likely to discourage mining investment in NSW resulting in further and substantial opportunity costs to NSW and Australia.

Comparative Regional Economics

Even if decision-makers were to focus on regional economics rather than BCA (ignoring the NSW Government (2012) guidelines):

- Coal mining is the largest industry cluster in the region;
- Coal mining provides 25% (7,195) of direct regional employment compared to 2% (586) provided by horse breeding (ABS 2011[7]);
- Employment in the region in horse breeding (586) is less than that in beef cattle farming (specialised) (748) (ABS 2011);
- The annual revenue from the Project ($417M) is greater than the revenue to the entire thoroughbred industry ($298M[8]);
- The annual revenue from the Project ($417M) is in the order of four times that of Coolmore and Darley;
- Project direct employment is in the order of twice that of the Coolmore and Darley;
- Direct and indirect employment associated with the Project (785) is also greater than that of Coolmore and Darley (591); and
- Coolmore and Darley pay no royalties to the NSW Government and financial records indicate that they pay no company tax. The Project would generate $33M in annual royalties and $32M in annual company tax.

A comparison of economic indicators for Coolmore and Darley and the Project is provided in Table 1.

Table 1 – Contribution of Darley, Coolmore and the Project to the Economy

	Coolmore and Darley	**Project[3]**
Annual revenue	$100M ($124M)[1]	$417M
Annual royalties	$0M[2]	$33M
Annual company tax	$0M[2]	$29M
Annual direct employment	229 (280) [1]	463
Annual direct and indirect employment	591[1]	785
Direct value added	$79M[1]	$210M
Direct and indirect value added	$122M[1]	$264M

[1] Based Marsden Jacobs Associates (2013) Economic Impact of the Proposed Drayton South Open-cut Coal Mine Development on the Hunter Valley Thoroughbred Industry, report prepared for Coolmore Australia and Darley Australia
[2] Based on 2010 and 2011 financial statements.
[3] Based on Gillespie Economics (2012) Drayton South Coal Project Economic Impact Assessment.
Note: the brackets indicate conflicting information.

[7] ABS (2011) *4 digit employment by industry data for Singleton, Muswellbrook and Upper Hunter LGAs*.
[8] Marsden Jacobs Associates (2013)

Risk

The PAC's report repeatedly refers to the risk to the viability of the studs. Even in the absence of any substantive physical impacts on horses the risk to the reputational image is identified. La Tierra identify that "even if the potential impacts to Coolmore and Woodlands were considered unlikely to occur, the consequences to the CIC should these studs be impacted by the Project are so significant, that when considered carefully, the risks are too great and should be avoided".

Formal risk analysis combines (multiplicatively) both the risk (probability) of an outcome occurring and the consequence if it does occur. Reference to risk without any quantification of it is unhelpful to evidence based decision-making. Bowden et al (2001)[9] refer to the following guide to assist in the identification of the likelihood of particular events.

Qualitative Description	Order of Magnitude Annual Probability	Basis
A. Certain	1 (or 0.999, 99.9%)	Certain, or as near to as makes no difference
B. Almost certain	0.2-0.9	One or more incidents of a similar nature has occurred here
C. Highly probable	0.1	A previous incident of a similar nature has occurred here
D. Possible	0.01	Could have occurred already without intervention
E. Unlikely	0.001	Recorded recently elsewhere
F. Very unlikely	1×10^{-4}	It has happened elsewhere
G. Highly improbable	1×10^{-5}	Published information exists, but in a slightly different context
H. Almost impossible	1×10^{-6}	No published information on a similar case

The risk of significant adverse actual physical impacts on the stud operations to the extent that they impact the viability of the operations could be considered unlikely based on specialist technical modelling e.g. 1:1000. Given that the Brand of Coolmore and Darley is primarily driven by the quality of the stallions and brood mares they use and the progeny that they have produced, the impact of proximity image impacts on the viability of the operations could also be considered to be unlikely i.e. 1:1000.

In economic value terms, consistent with the NSW Government (2012) guidelines, the consequence of the studs relocating is approximating zero i.e. the net production benefits of the stud operations are close to zero because the stud operations declare no profit and pay no royalties or company tax (see Table 1).

Focusing on regional economics rather than the correct measures of economic value referred to in the NSW Government (2012) guideline it is evident that the consequence of the (unlikely) closure of Coolmore and Darley is not as great as the consequence of refusing the Project.

[9] Bowden, A., Lane, M. and Martin, J. (2001) *Triple Bottom Line Risk Management: Enhancing Profit, Environmental Performance and Community Benefit*, Wiley and Sons, USA.

No Consideration to State Environmental Planning Policy 2013

The PAC report gives no consideration to SEPP (Mining, Petroleum Production and Extractive Industries) Amendment (Resource Significance) 2013 which requires the consent authority to give principal consideration to the significance of the resource having regard to:

- the economic benefits, both to the State and the region;
- any advice by the Director-General of the Department of Trade and Investment, Regional Infrastructure and Services as to the relative significance of the resource in comparison with other mineral resources across the State.

While the PAC has considered this to be outside its terms of reference, it is not outside the terms of reference of the decision-maker.