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Response to IPC Recommendations
Bloomfield Collieries Pty Limited
07-Dec-2018

Rix's Creek Continuation of Mining Project

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Quality Information

Document Rix's Creek Continuation of Mining Project

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Reviewed by Catherine Brady

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Rev	Revision Date	Details	Authorised	
			Name/Position	Signature
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1.0 Introduction

1.1 Project Overview

Bloomfield Collieries Pty Limited (Bloomfield) has operated the Rix's Creek Open Cut Mine (the Mine), 5km North of Singleton, since 1990. The mine currently operates under consent DA 49/94, granted on the 16th October 1995, and subsequent modifications.

Bloomfield is seeking approval for the continuation of mining at Rix's Creek Mine until 2038 and to extend open cut operations in Pit 3 (West Pit). A request for the Director General's Requirements (DGRs) was submitted to the Department of Planning and Environment (DPE) in November 2013 and project DGRs issued on 3 March 2014. An Environmental Impact Statement (EIS) was subsequently prepared and placed on public exhibition between 3 November 2015 and 3 December 2015.

Following the receipt of submissions, a Response to Submission Report (RTS) was prepared and submitted to DPE in October 2016. Following further questions in relation to the project and historical operations, the RTS was updated and a Revised Response to Submissions (RRTS) was prepared and submitted to DPE in November 2017.

In December 2017 the Minister for Planning requested the Independent Planning Commission (IPC) to conduct a public hearing and review the merits of the project. The public hearing was held on 6 June 2018. Subsequent to the hearing the IPC requested clarification or further information on a number of aspects about the project to assist with its merits review. Following this process, the IPC issued the *Rix's Creek Continuation of Mining Project SSD6300 Review Report* (Review Report) (IPC, August 2018). The Review Report included 26 recommendations which the applicant is required to consider and provide responses to, to further inform the IPCs merits review.

1.2 Purpose of this Report

The purpose of this report is to:

- Detail the recommendations made by the IPC in relation to the project;
- Provide the applicant's responses to the recommendations made by the IPC;
- Provide details of how the project has been altered in respect to the recommendations made by the IPC and demonstrate how these changes can occur within the limits of relevant assessment guidelines; and
- Enable the IPC to complete its merit assessment of the project.

For reference the IPC recommendation report is attached at Appendix A.

2.0 Response to Independent Planning Commission Recommendations

2.1 Air Quality

R1 that the applicant demonstrate how its operational procedures will incorporate continual improvement to further reduce the generation and dispersion of particulate matter.

Rix's Creek Mine has developed an Air Quality and Greenhouse Gas Management Plan which documents how the operational procedures of the mine incorporate continual improvement in management of air quality and methods to reduce the generation and dispersion of particulate matter. The following sections are an extract from the Combined Rix's Creek North and Rix's Creek South Combined Air Quality and Greenhouse Gas Management Plan- Version 1.3 Approved 19/12/2017.

The air quality management measures described in this section are designed to reduce the impact on the surrounding environment due to on-site activities. The measures will be continually revised and updated as required based on operational changes and advancements in technologies.

2.1.1 Dust mitigation measures

A range of proactive and reactive dust mitigation and management measures are currently used at the mine. The primary measures to control dust emissions for the Mine are set out in Table 1 with additional proactive and relative measures described further below.

Table 1 Summary of dust mitigation measures

Activity	Dust mitigation measure
General	• Where applicable, make use of trees and shrubs as windbreaks around permanent areas that have potential for wind generated dust. • Site induction is to include air quality requirements to provide employee awareness of potential dust impacts, especially with respect to the Hunter area. • Operate a proactive system to provide appropriate warning of adverse conditions when trigger levels may be exceeded. • Follow the process for acting on the dust trigger action response plan.
Drilling & blasting	• Utilise dust suppression systems in drill rigs. • Minimise disturbance of drill cuttings. • Stem blast holes. • Actively manage visible dust generated during drilling. • Conduct blasting during hours when dispersion is favourable, unless otherwise required for safety reasons. • Review meteorological and blast forecast prior to blasting. • Optimise blast design to reduce dust generation. • Blasting operations undertaken in accordance with Blast Management Plan and Blast Fume Management Strategy.
Hauling on unsealed roads	• Watering of haul road surfaces (typically at a rate of at least 1L/m^2/h) or the application of an equally effective dust suppressant. • Actively manage any material deposited / spilled on haul roads. • Impose speed limits on all roads. • Trafficable areas clearly marked, vehicle movements restricted to these areas. • Trafficable areas and vehicle manoeuvring areas regularly maintained. • Fleet optimisation to reduce vehicle kilometres travelled. • Rehabilitate disused roads.
Material extraction/unloading	• Preferentially undertake topsoil stripping when there is sufficient soil moisture to prevent or reduce significant dust lift-off. • Apply water on areas where dusty prior to extraction. • Sheltered dumping during periods of adverse weather. • Where possible, minimise the fall distance of materials during loading and unloading.

Activity	Dust mitigation measure
	• Actively manage spillage from loading/ unloading and clean up any spillage as soon as practicable. • Relocate / reschedule operations during high dusty periods, where practicable.
Dozer and grader operation	• Actively manage use during unfavourable conditions. • Reduce travel speed in dusty conditions. • Travel on watered routes between work areas. • Water haul roads as soon as practicable after grading
Exposed areas	• Reduce the area of advance clearing/site preparation which is a mine design parameter used to reduce the potential for wind erosion. • Reduce the disturbance area which is a key criteria in overburden placement design • Rehabilitate overburden emplacement areas as soon as feasible. • Apply interim stabilisation on areas inactive for long periods. • Consider temporary rehabilitation or application of chemical controls to unused areas or dump slopes if there is a delay with rehabilitation or the area may be used again. • Use cleared trees and branch material for stabilising rehabilitated landforms; this may include spreading of mulch branches on completed overburden landform. • Regularly water cleared areas where appropriate.
CHPP	• Water spraying to reduce dust when unloading ROM to hopper. • Slower tipping at ROM hopper during adverse weather conditions. • Use visual triggers for implementation of further dust mitigation. • Use water sprays at dust generation points. • Conveyors fitted with appropriate cleaning and collection devices. • Regularly clean areas where spilt material can build up, e.g. under transfer chutes and conveyors.
ROM and product stockpiles	• Use automated water sprays during high winds (>5.6m/s). • Reduce drop heights when stacking where practicable. • Manual implementation of water sprays and/or water cart during dusty periods. • Visual surveillance of dust plumes during activity. • Stockpiling and recovery on ROM coal is reduced as practical.
Rail operations	• Load streamlined and consistent profiled coal surface within rail wagons. • Actively manage spillage and parasitic loading. • Clean and collect spillage on a regular basis.
Adverse conditions	• Assess dust levels, weather conditions and operational activity to determine what mitigating action may be required. • Immediate potential mitigating measures include: - Increasing water application and/or application of chemical suppressants to stockpiles; - Modification of mining operations; and/or - Suspension of mining operations. • Review available forecasts for: - Weather; - Dustiness; - Potential dust impacts from Rix's Creek Mine; and - Potential dust impacts from nearby mines. • Act upon any automated proactive system trigger, warning or alert per the procedure for any such system. These actions may include: - Maintaining the availability of water cart fleet; - Scheduling of amended working hours during unfavourable dispersion conditions; - Temporary cessation of work within an area when identified to be a likely contributor to elevated dust measurements; - Temporary cessation of work when neighbouring operations are likely to emit high dust levels to prevent non-compliance of cumulative dust criteria; and

Activity	Dust mitigation measure
	- Coordinating with the neighbouring mines when it is likely that the Rix's Creek Mine will emit high dust levels or when adverse weather conditions are likely to occur to prevent non-compliance of cumulative dust criteria. • Regularly review the measured data to determine if the Project's operations are in fact a significant contributor to dust concentration measurements and revise trigger levels, and any ensuing mitigating actions that are being taken.

A complete review of particulate emission controls at the Rix's Creek Mine against industry best practice will be performed on a three yearly basis and the findings reported in the relevant Annual Review. The Mine will employ reasonable avoidance and mitigation measures.

2.1.2 Proactive and reactive management

The measures briefly described in Table 1 under adverse conditions are largely aimed at preventing potential exceedance of 24-hour average PM_{10} criteria and also to manage short-term events. The Mine will operate measures to respond to changing dust conditions using real-time weather and dust monitoring data and a range of approved potential actions that can be taken at short notice.

2.1.2.1 Proactive measures

The proactive system is primarily based on forecast weather data and mine emissions information and indicates the extent of dust emissions from the Mine at regular time steps into the future, e.g. hourly for one to two days into the future.

The proactive system is primarily used as an alert of possible elevated dust levels due to the Mine, allowing time to prepare and better respond to any actual issue based on measured data.

2.1.2.2 Reactive measures

The real-time monitoring data will be used to identify when ambient levels of PM_{10} are elevated (and are potentially due to Rix's Creek Mine and require contingency action).

The following trigger levels have been developed to provide a guide for identifying periods in which to investigate the most significant contributor(s) to elevated dust levels.

- **Trigger Level 1 – Alert level** applies when the 10-minute average PM_{10} concentration is greater than 150µg/m^3, and/or 1-hour average PM_{10} concentration is greater than 50µg/m^3. Actions would include checking the forecast for that day, identifying risk areas and notifying operations managers to be on alert.
- **Trigger Level 2 – Remedial action level** applies when 1-hour concentrations are above 50µg/m^3 for three consecutive hours or more and the wind is blowing from the Rix's Creek Mine towards sensitive receivers. Actions would include increased watering, decreasing and / or relocating dust generating activities identified to be a source of impact on those areas at risk.
- **Trigger Level 3 – Extreme action level** applies when the rolling 24-hour concentration is above 50µg/m^3 for six consecutive hours or more or 1-hour concentrations are above 150µg/m^3 for three consecutive hours or more and the wind is blowing from the Rix's Creek Mine towards sensitive receivers. Actions include cessation of dust generating activity at all, or parts of, the Rix's Creek Mine when the elevated PM_{10} concentrations are not caused by an external regional pollution event such as bushfires, prescribed burning, dust storms or fire incidents. This situation is tested by examining the 24-hour PM_{10} concentrations at all of the Tapered Element Oscillating Mass balance (TEOM) instruments. If 24-hour PM_{10} levels are commensurately high at upwind TEOM sites, it can be assumed that regional PM_{10} is elevated and the Project site is not causing an exceedance. If not, appropriate action is needed.

The above trigger levels will be refined and modified on an ongoing basis as the actual performance is confirmed, operational experience increases and as the mine operations change over time. Consideration of the prevailing winds and dispersion conditions is paramount in this method of analysis and it is anticipated that as operator experience with the mine operations and surrounding influences develops, more appropriate trigger levels would be developed over time.

Reactive controls may include operational measures such as scheduling certain operations during favourable meteorological conditions or to alternative areas and could, in extreme cases, require all dust generating activities to cease. Appropriate actions should take into account the type of dust source (i.e. wind sensitive or wind insensitive) and the prevailing meteorological conditions in undertaking dust mitigating action.

Table 2 provides a summary of potential mitigation options applicable to the various trigger levels.

Table 2 Air quality management actions- PM_{10} trigger actions

Trigger level	Averaging period	PM10 Value	Condition	Action
1	10- minute	150µg/m3	10-minute average PM_{10} concentration is greater than 150µg/m^3	This is a trigger to put the Environmental Officer on alert. Actions will include: Checking forecasts. Examining upwind / downwind dust levels. Notifying the Operations Manager to be on alert also.
	1-hour	50µg/m3	1-hour average PM_{10} concentration is greater than 50µg/m^3	
2	1-hour	50µg/m3	1-hour average PM_{10} concentration is greater than 50µg/m^3 for more than three consecutive hours AND When winds are blowing from the Project site in the general direction of the real-time dust monitor (representing a group of sensitive receptors), as recorded by the on-site weather station.	Increase dust control measures and/or modify activities. This would initially involve an assessment of weather conditions (i.e. strong winds or stable / calm) to identify most likely dust sources. Mitigation will include a combination of the following: Increase moisture content of haul roads, stockpiles and any other exposed areas. Implementation of water sprays at the site where loading / unloading of materials occurs. Relocation of activities.
3	Rolling 24-hour	50µg/m3	Rolling 24-hour concentration is above 50µg/m^3 for six consecutive hours OR 1-hour concentrations are above 150µg/m^3 for three consecutive hours AND When winds are blowing from the Project site in the general direction of the real-time dust monitor (representing a group of sensitive receptors), as recorded by the on-site weather station. AND Corresponding PM_{10} concentrations at upwind monitors are significantly lower.	Cease dust generating operations on-site or parts of the site as necessary to reduce dust levels.
	1-hour	100µg/m^3		

R2 that the applicant develop a protocol to assist those stakeholders concerned about air quality impacts to better: - access the data from the Upper Hunter Air Quality Network; and - provide instruction on how to use the Environment Line provided by the NSW Government.

A protocol has been developed to assist stakeholders who are unsure how to use the NSW EPA Environment Line or are concerned about air quality impacts of the Rix's Creek Mine. The protocol documents how effective communication is provided to stakeholders and the general community in relation to:

- Concerns about air quality surrounding Rix's Creek Mine; and
- Those unsure how to use the Environment Line provided by the NSW Government.

There are three main methods Rix's Creek uses to provide information;

1. Addressing complaints received via the Rix's Creek Community and Blasting Hotline;
2. Discussion and information sharing through the Community Consultative Committee; and
3. Provision of information via the Company Website.

Each of these methods are described further below

Received Complaints

When complaints are received the following protocol is followed:

- Environmental personnel discuss air quality concerns and provide real time information from the Upper Hunter Air Quality Monitoring Network (UHAQMN) when responding to the complaint;
- Environmental personnel provide the UHAQMN website address to the complainant and promote the use of the UHAQMN website to check for air quality concerns. Environmental personnel also discuss with the complainant the benefit of registering to receive air quality alerts; and
- If the stakeholder is not satisfied that their air quality concern has been addressed or they are unsure how to inform EPA, the Environmental personnel will discuss with the complainant their option to ring the Environment Line on 131 555.

Information Sharing at Community Consultative Committee Meetings

Information is shared via the following means:

- Following approval of the Rix's Creek Continuation Project, Rix's Creek Mine will hold a Community Consultative Committee (CCC) meeting and will provide all CCC members with details about the Upper Hunter Air Quality Monitoring Network and instruction on how to use the NSW Government Environment Line. This information will be provided in the presentation, with the presentation made available to the community and stakeholders in the CCC minutes section of the Bloomfield website; and
- A copy of this information will be provided to all new members of the Rix's Creek CCC at the first meeting after appointment by the Secretary of the NSW Department of Planning and Environment.

Provision of Information via the company website.

Information is made publicly available through the following avenues:

- A link to the Upper Hunter Air Quality Network is provided on the Rix's Creek Operations page of the Bloomfield Website;
- Contact details for the NSW Environment Line (131 555) are provided on the Rix's Creek Operations page of the Bloomfield Website; and
- A link to the instructions for the use of the NSW Environment Line are provided on the Rix's Creek Operations page of the Bloomfield Website. A screenshot of the Rix's Creek Operations page from the Bloomfield Group's website is shown in Figure 1 and the contact details as shown on the webpage are shown in Figure 2.

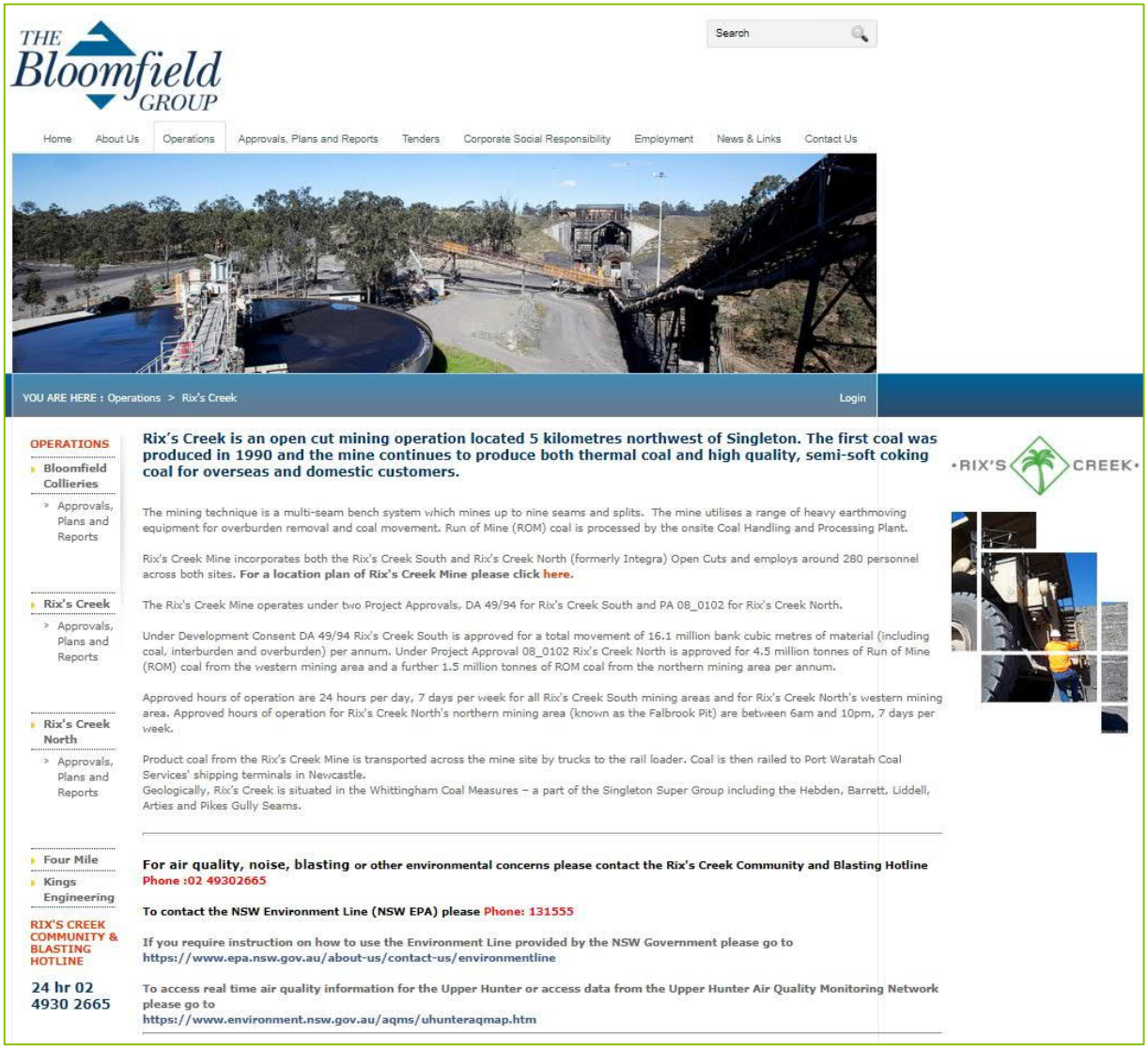


Figure 1 Bloomfield Group web page

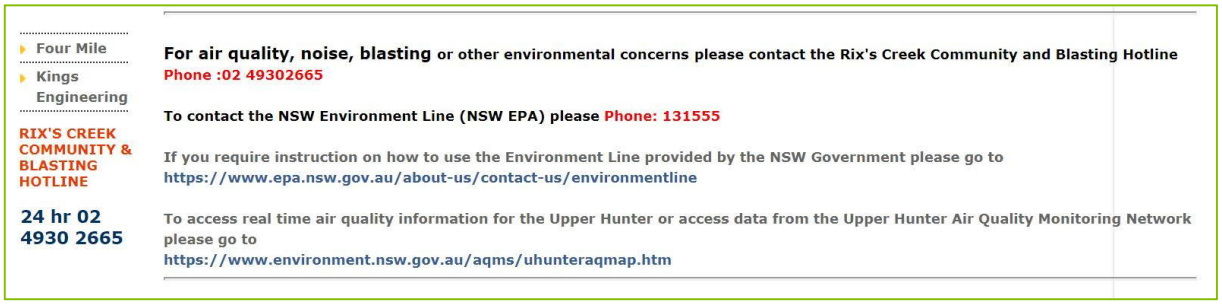


Figure 2 Environment line contact as shown on the web page

R3 that the applicant provide further evidence of the policies and protocols in place to manage mine-owned residences, including clarification as to whether termination rights are only triggered in relation to dust exceedances, or whether termination at any time is a general at will right of occupancy of a mine owned residence.

The primary tool for the management of mine owned residences are through negotiated tenancy agreements. Individual tenants have the opportunity to take action as per their tenancy agreement inclusive of termination clauses. Tenants are also provided a copy of the "Mine Dust and You Factsheet" developed by NSW Health to help inform them of associated risks and dust management practices. An updated hardcopy of the fact sheet was provided to the tenants surrounding Rix's Creek South in October 2018 and clarification was provided regarding their option to terminate without penalty due to air quality concerns.

Bloomfield consults closely with its tenants to manage impacts at its residences. Bloomfield considers a collaborative relationship with tenants important to the management of Bloomfield's larger land holding. Evidence of the success of this relationship is in the long tenure of many of the Bloomfield tenants. Should any mine related issue be raised by tenants, Bloomfield will take all practical steps to remedy the issue. If the issue cannot be remedied to the satisfaction of the tenant, Bloomfield acknowledges that it is in neither party's interest to continue with such arrangements and these would be dealt with on a case by case basis.

The commercial agreements with tenants are "commercial in confidence" and can be viewed by the Department and/or IPC upon request.

2.2 Noise and Blasting

R4 that the applicant make available on a timely basis information relating to how it is managing noise impacts, including its adaptive management practices and how it proposes to use such practices to manage the Project's noise impacts to conform to the ANC. Such information should include the Noise Management Plan, which should be made available to the public on the applicant's website or in hard copy where requested. The Noise Management Plan published by the applicant should outline the process to be undertaken by the applicant in modifying operations where noise exceedances occur, and include a 24/7 contact number for the applicant and details of the Environment Line provided by the NSW Government.

The Bloomfield Group website provides an up to date version of the approved Noise Management Plan. The Noise Management Plan details how Rix's Creek Mine manages the following:

- Noise impacts on surrounding receivers;
- Adaptive management practices to both monitor and manage noise;
- A Trigger Action response plan detailing how the mine actively modifies operations prior to exceeding noise limits and during periods when noise is close to or exceeding limits;
- Complaints handling procedures; and
- Compliance with operational noise limits.

Furthermore the Bloomfield website provides information on the following;

- 24 Hour contact details via the Rix's Creek Community and Blasting Hotline;
- Contact details for the NSW Government Environment Line;
- Instruction on the use of the NSW Government Environment Line; and
- Information on how to obtain hardcopies of Rix's Creek Management Plan.

A recent update to the Rix's Creek Mine Noise Management Plan has been submitted on 30 November 2018 to the NSW Department of Planning and Environment, Post Approval team for review. This version of the Management Plan has been updated to include the following information:

- Details of the 24 hour Rix's Creek Community and Blasting Hotline;
- Contact details for the NSW Government Environment Line; and

- Instruction on how to find further information on how to use the NSW Government Environment Line.

A copy of the updated Noise Management Plan is provided in Appendix B. The Rix's Creek Noise Management Plan is a live document and has been modified on three occasions since Rix's Creek Mine received approval to combine the Noise Management Plan for the Rix's Creek South and Rix's Creek North sites in March 2017. This Noise Management Plan will be further modified to document improvements in noise management when they are realised and to detail any reasonable and feasible adaptive management changes which may reduce noise impact on surrounding receivers. The Rix's Creek Mine Noise Management Plan will also be updated to address consent conditions if the Rix's Creek Continuation Project is approved.

R5 that the applicant provides a full and detailed list of all equipment to be used at the mine, including a schedule for noise attenuation, where it is planned.

A full list and detail of all equipment currently anticipated to be used at the mine is provided in Appendix C. This list includes details of installed and proposed sound attenuation equipment across the fleet.

R6 that the applicant commits to completing the cladding of the Coal Handling and Preparation Plant prior to the extraction of any coal under any Project consent, if approved

Bloomfield is committed to the cladding of the CHPP. The current project plan for this work envisages award of tender for fabrication by the end of December 2018 with works to be completed by the end of the first quarter of 2019.

R7 that the applicant update its Blast Impact Assessment to provide additional monitoring and management measures specifically related to the preservation of the Coke Ovens.

The specific blast assessment for the Coke Ovens has been undertaken and includes measures related to the management of blasting activities for the preservation of the Coke Ovens. A copy of the updated Blast Impact Assessment is attached at Appendix D.

2.3 Rehabilitation and mine closure planning

R8 that in order to address the principles of Strategic Framework for Mine Closure, the applicant implement the recommendations of the Unger Report requiring the applicant to prepare a stakeholder engagement strategy that ensures that stakeholders' specific issues of rehabilitation and closure are addressed appropriately in the Rehabilitation Strategy

Section 3.1 of the Rehabilitation Strategy (Appendix E) includes details of the proposed stakeholder engagement strategy. This information provides an outline that would be refined during the preparation of the final Rehabilitation Management Plan that is prepared in consultation with Department of Planning and Environment (DPE) and the Resources Regulator (RR). The engagement strategy is based on the need to establish functional two-way communications with stakeholders to help achieve the desired rehabilitation outcomes for the mine. Key features of the engagement strategy include:

- Opportunities for engaging with the community including both the Community Consultative Committee (CCC) and the wider community through avenues such as newsletters and the community information line;
- Identification of key agency stakeholders and the understanding that a collaborative approach is preferred to achieve best practice rehabilitation and closure outcomes;
- Maintaining a stakeholder feedback register or database to track feedback over time to monitor trends to identify opportunities or constraints and for transparency; and
- Providing a flexible approach that allows for consultation feedback to be incorporated in mine closure planning updates where appropriate. This is considered important due to the changing expectations regarding post mining land uses and the recognition that by the time the mine is due for closure, alternative post mining land uses may be preferred by the community.

R9 that the applicant records all targeted consultation on mine rehabilitation and closure planning within the Rehabilitation Strategy and demonstrate where issues raised in community consultation have been considered in the development of the Rehabilitation Strategy

As discussed in response to R8, the proposed stakeholder engagement strategy would include a register of consultation for recording all consultation activities. As part of this, actions and outcomes of the consultation process would also be recorded. It is noted that this process already occurs through the formal CCC process. Through maintaining an ongoing open dialogue, Bloomfield has also demonstrated its willingness to work with adjoining land owners through an open consultative approach by providing regular briefings and opportunities for feedback. These activities would continue to be recorded and reported through the stakeholder engagement strategy process.

R10 The applicant collates and includes all relevant rehabilitation objectives and practises identified within the MOP and other EIS documents into the Rehabilitation Strategy so that it is a consolidated reference for the rehabilitation and closure of the mine.

The updated Rehabilitation Strategy (Appendix E) includes objectives consistent with the MOP and EIS such that it is a consolidated reference document.

R11 In order to address the principles of the *Strategic Framework for Mine Closure,* the Commission recommends that the rehabilitation strategy:

- **a. Identify all mine closure domains**
- **b. Label and describe all domains including the proposed post-mining land use;**
- **c. Ensure that rehabilitation and closure objectives, performance standards and completion criteria exist for all domains**
- **d. Consider sudden unplanned closure and temporary closure (care and maintenance)**
- **e. Include a detailed commitment register**
- **f. Identify and consult with stakeholders to explore closure risks and opportunities further; and**
- **g. Include a plan to ensure that the Rehabilitation Strategy is updated and refined regularly to reflect changes in mine development and operational planning and environmental conditions.**

a. Identify all mine closure domains
All mine closure domains are listed in Table 5 of the Rehabilitation Strategy

b. Label and describe all domains including the proposed post-mining land use

c. Table 5.0 of the Rehabilitation Strategy includes a list of all primary and secondary domains. The subsequent sections of the document provide a detailed description of each of these domains including identification of the proposed post-mining land use.

d. Ensure that rehabilitation and closure objectives, performance standards and completion criteria exist for all domains

e. Table 9 in the Rehabilitation Strategy includes objectives, performance indicators, performance measures and completion criteria for each domain and each phase of the project.

f. Consider sudden unplanned closure and temporary closure (care and maintenance)

g. Section 4.0 of the Rehabilitation Strategy includes an assessment of key risks associated with the project. One of these key risks is that of a sudden or unexpected closure. In order to address this, Section 4.1 contains a dedicated closure risk assessment which in turn forms part of the overall project Environmental Risk Assessment.

h. Include a detailed commitment register

i. The Rehabilitation Strategy is an overarching document from which a Rehabilitation Management plan would be prepared. The Rehabilitation Management Plan would include a detailed list of commitments prepared in consultation with the relevant stakeholders.

j. Identify and consult with stakeholders to explore closure risks and opportunities further

k. Section 3.0 of the Rehabilitation Strategy includes details in regards to stakeholder consultation including a commitment to the preparation of a Stakeholder Engagement Strategy. The intent of the Stakeholder Engagement Strategy is to identify the key stakeholders who will be involved with consultation activities related to rehabilitation and mine closure and to also identify the extent of consultation activities. Throughout all consultation activities stakeholders will have the opportunity to provide feedback in regards to closure risks and opportunities. It is envisaged that as the project progresses closer to closure there will be an increased focus on undertaking dedicated stakeholder engagement in regards to end of life mine planning, closure and post mining land use.

l. Include a plan to ensure that the Rehabilitation Strategy is updated and refined regularly to reflect changes in mine development and operational planning and environmental conditions.

m. Section 4.4 of the Rehabilitation Strategy details how updates to rehabilitation and related practices would be managed. Changes to mine development and operational planning and environmental conditions are reported via the MOP / Rehabilitation Management Plan, rather than the Rehabilitation Strategy. The reason is that the current MOP provides a platform for a prescriptive approach to landform and landscape design that facilitates the ability to incorporate change in context of the land use component of mine closure. In doing so, opportunities are provided for optimising post mining land use in the environmental, social and economic context of the time.

R12 that the applicant carry out an evaluation of the socio-economic impacts of mine closure during the preparation of, and in the regular updates to, a Detailed Mine Closure Plan.

As detailed in Section 4.5 of the Rehabilitation Strategy, a key component of the mine rehabilitation and closure process is identifying and addressing potential social and economic impacts, both positive and negative, which may result from the project. As specific details regarding the nature and timing of mine closure cannot be confirmed at this stage and will evolve over the life of the project, an overarching approach to managing potential social and economic impact is proposed. The social and economic impact assessment prepared as part of the EIS will be used as a basis for reviewing and addressing potential social and economic impacts associated with closure as they develop over the life of the project.

From the outset, overall social and economic impacts from the project have been comprehensively assessed during the preparation of the EIS. Specifically the assessments are contained within the following documents:

- Rix’s Creek Extension Social Impact and Opportunity Assessment (Umwelt, July 2015); and
- Rix’s Creek Continuation Project – Economic Assessment (KPMG, July 2015).

As a result of the preparation of these documents, a range of management measures have been identified to manage social and economic impact over the life of the project including into the closure stages. A key management measure to be adopted by the project is to establish, or continue with established (for example the CCC), communications lines with key stakeholders regarding potential mine closure impacts. Details of the proposed approach to stakeholder consultation in relation to rehabilitation and closure are in Section 3.0 of Rehabilitation Strategy and include the development of a Stakeholder Engagement Strategy. The Strategy includes the following key elements:

- Keeping stakeholders informed - through newsletters, community information line etc;
- Consultation – through the CCC which is a direct forum for community representatives and clarification of the role of external stakeholders via the consultation process empowered by the CCC;
- Stakeholder active involvement - increased recognition that the process of stakeholder engagement needs to be based on two way communication such as open days and employee surveys followed by feedback and discussion forums;
- Collaboration - identifying current, potential and future stakeholders via:
    - Identifying opportunities for improved management and innovation via the Upper Hunter Mining Dialogue (UHMD);

  - Optimising communication in context of “next land use” as the focus of the mine rehabilitation and closure process e.g. active participation with Singleton Council during updates to the Local Environment Plan; and
  - Continued engagement throughout the life of the Mine with neighbouring mining operations e.g. optimising synergies related to the mine rehabilitation and closure process between neighbouring mines and across mining tenures at a landscape level.
- Empower - maintaining a register of stakeholder feedback, so that input can be tracked over time and the company responses are accessible; and
- Increased recognition that the mine rehabilitation and closure would be undertaken in a manner which reduces significant and ongoing impacts to the broader environment or socio-economic dynamics e.g. participation in careers days at local schools, sourcing of apprentices from the local region where possible to aid in ongoing employment even following the completion of coal extraction to encourage alternative employment opportunities.

The potential impacts of the project on social and economic factors have been comprehensively assessed as part of the EIS. Subject to approval, the development of a detailed Mine Closure Plan would be undertaken taking into consideration life of mine social and economic issues as identified in the EIS. This would be built on through the life of the mine as social and economic impacts have the potential to change. Through ongoing consultation with key stakeholders including DPE, the community and Singleton Council, the Mine Closure Plan would be regularly updated in order to addresses evolving stakeholder expectations.

R13 that the applicant include a section within the Rehabilitation Strategy outlining the knowledge base around past rehabilitation performance. This is intended to demonstrate that the site is able to achieve the proposed post-mining land use. This knowledge base should be a summary of all existing baseline aspects as they relate to mine closure and demonstrate the outcomes from past rehabilitation showing where any lessons learnt have been incorporated into the rehabilitation and mine closure planning for the site. The inclusion of this information in the Rehabilitation Strategy could further improve the provision of information to the community on progressive rehabilitation performance and site knowledge which would support the proposed post mining land uses.

Rix’s Creek has a proven track record in the development, implementation and continual improvement of rehabilitation strategies. As requested, the Rehabilitation Strategy has been updated to include a section (Section 2.1) which provides a summary of past practices to capture this information and knowledge so that it can be applied into the future. Table 3 provides a summary of the studies and trials undertaken at Rix’s Creek and the lessons learnt from these. Rix’s Creek Mine has recently engaged Mr Neil Nelson from Neil Nelson Agvice Pty Limited to conduct a Grazing Land Monitoring Assessment (Cattle Grazing Trial) of currently grazed, previously rehabilitated lands. The results of this trial will be used to further inform the rehabilitation strategy and allow for continual improvement through assessment of the outcomes of the study. Through the life of the project it is likely that additional studies and trials would also be undertaken. Information from these would also be included in the Rehabilitation Strategy as it is updated over the life of the project.

Table 3 Lessons learnt from past experience

Outcome	Lesson Learnt
University of Newcastle Masters Thesis by CP Phillips "Utilisation of Sewage Sludge for Mine Site Rehabilitation – The Rix's Creek Mine Trial – 1992-1993"	
16 plots which received an application of biosolids produced dry biomass yields at least 125% higher than that of the standard plot. The particular significance of this result is that plots of pure overburden that were amended by an application of biosolids were able to sustain high biomass yields.	The most important conclusion of the trial was that biosolids application improved mine site rehabilitation techniques. No problems were encountered with the integration of biosolids into a normal rehabilitation program.
Rix's Creek Beneficial use of Biosolids Trial collaboration with Thiess Services Pty Ltd and Sydney Water Corporation 2005	
Dewatered biosolids added nutrients and organic matters to topsoil and top soil substitutes which saved the need and cost of using artificial fertilisers. Biosolids were incorporated into the subsoil clay material layer and topsoil layer during the rehabilitation process. Biosolids application rates were 50 dried tonnes/ha (180mm thick) commensurate with current practice at State Forest NSW.	The application of biosolids improved mine site rehabilitation.
Resources Recovery Management – Rix's Creek Pasture Assessment Trial September 2014 – October 2017	
The purpose of this trial was to assess the quality and quantity of pasture produced on mine rehabilitation sites and determine the suitability of the site for the intended agricultural end use. Improved pasture was sown using four treatments, which included a Control using conventional fertiliser, Biosolids, and two Alternate Waste Treatment (AWT) Compost treatments. An un-grazed Native Pasture area was also sampled to gather comparable baseline data. Random quadrants were assessed along transect lines in each treatment for species diversity, herbage mass and forage quality. Data was collected annually for four years, commencing 12 months after sowing. The application of organic soil amendments increased pasture productivity and the dominance of the tall subtropical grasses (i.e. Rhodes and Green Panic), compared to the Control. This increased dominance of the Rhodes and Green Panic also reduced pasture diversity, with the Control plot demonstrating the highest diversity of pasture species. Grazing is likely to complement the long term objectives of improving pasture species diversity and forage quality. Weeds were suppressed on all treatments by subtropical grasses, but remained substantially higher in the Control. The weed content appeared inversely proportional to nutrient inputs and the productivity/dominance of subtropical grasses.	Due to variation within treatments, the impacts on the soils were difficult to identify. However, the application of biosolids and AWT Compost did significantly increase soil phosphate, with the AWT Compost 2 treatment demonstrating excessive soil phosphate levels. Soil nitrate levels were also higher in the Biosolids Treatment. In summary, all four treatments demonstrated that the sowing improved pasture species on rehabilitation sites was capable of producing more productive pastures than undisturbed native and naturalised pastures on land of equivalent class and soil type.

Outcome	Lesson Learnt
The most profound effect was the affinity of Green Panic for the Biosolids, which dominated the sward, but was nearly absent in the Compost Treatments. The Biosolids treatment also recorded significantly higher pasture mass, leaf mass, forage quality and potential stocking rates. The reason for this result is not entirely clear, but is partly attributed to the higher nitrogen availability in the biosolids.	
University of Newcastle Masters Thesis by Benedicte Lutken "The utilisation of biosolids to store carbon in mine soils" Rix's Creek Mine Study June 2018.	
This study sampled and analysed soil from two former mines along with soil from a reference site to assess the the carbon sequestration and improved general soil health. The site rehabilitated in 1992 showed significant improvements over the site rehabilitated in 2013 in healthier pH and decreased bulk density, greater amount of humic acid which indicates increased humic matter, increased carbon content (%), nitrogen content (%) and sulfur content (%). The field experiments furthermore revealed increased soil temperature and increased CO_2-flux in the site rehabilitated in 1992.	With the results of this study, it is concluded that biosolids amendments can improve soil heath and increase carbon sequestration in former mine soils.
2017 Independent Rehabilitation Monitoring	
Ground Cover - Ground cover protection was generally excellent and the benchmark of 70% cover was met at 33 of the 35 rehabilitation monitoring sites, with 27 sites achieving >90% ground cover. Of the two monitoring sites not meeting the benchmark in 2017, one consisted of young rehabilitation (i.e. still in the vegetation establishment phase) while the other showed deficiencies in the soil/growing media which likely hindered the successful establishment of vegetation. *Land Scape Function* - Consistent with previous monitoring years, the 2017 results highlighted good landscape function performance across most of the rehabilitation monitoring sites, as follows: • The soil stability benchmark was met at 34 of the 35 monitoring sites; • The soil infiltration benchmark was met at 33 of the 35 monitoring sites; and • The soil nutrient cycling benchmark was met at 32 of the 35 monitoring sites. *Pasture Performance* - Sampling and analysis of grass foliage was undertaken at a subset of monitoring sites across RCS to determine feed quality and enable calculations of indicative carrying capacities. These indicated that in their current condition, the rehabilitated pastures could support satisfactory dry stock stocking rates of between ~1.9 and 8.1 animals per hectare.	This report identified weed incursion as the main issue currently impeding rehabilitation performance across the site, particularly with widespread occurrence and locally severe infestations of Galenia (*Galenia pubescens*), and more localised incursions of Prickly Pear (*Opuntia spp.*), Coolatai grass (*Hyparrhenia hirta*) and *Acacia saligna*. In total, 12 of the 35 monitoring sites supported weed infestation levels exceeding the target benchmark of 15% weed cover and will require control works to be implemented. However and assuming successful management and control of the site's weed population, the monitoring results obtained in 2017 showed that rehabilitation condition was very satisfactory across the site and, when compared to previous years monitoring results, generally trajecting towards achieving the ultimate rehabilitation objective of re-establishing safe and stable landforms compatible with the surrounding landscape and with a land capability suitable

Outcome	Lesson Learnt
	for grazing (i.e. class IV-V).
Australian Coal Industry Research Program (ACARP) project C200015 Forestry Trial "Sustainable Management of Plantations for Rehabilitation, Carbon and Wood" NSW Department of Primary Industries October 2017.	
Following open cut coal mining operations there is a requirement for overburden to be rehabilitated. The typical land use following rehabilitation in the Upper Hunter is usually extensive grazing of pastures by livestock (namely cattle). However, in response to a request from the Upper Hunter Commercial Forests Steering Committee and the Muswellbrook Shire Council, a series of plantation forest trials were established in the late 1990s and early 2000s to investigate the potential commercial viability of growing plantation forests as an alternative to pastures post-mining. Following on from an earlier establishment trial (C10043), the focus of this research project was on the ongoing management of the dryland plantations with the objective of quantifying the benefits of an early non-commercial thinning and pruning regime. This project aimed to: • Gather a Valley wide data base on most of the oldest tree plantations; • Apply thinning and pruning regimes to assess the benefit of early application in dryland plantations; • Manage existing stands via thinning to reduce risk of death and to maximise high value wood products and carbon returns; • Provide strongly-based full rotation projections (from year 15 data) on performance of species, land type and the species/land type interaction; and • Quantify the commercial costs and returns from carbon and timber from Corymbia maculata (Spotted gum) plantations established in the Upper Hunter Coalfields; and Compare investment in plantation Forestry with Grazing and Agroforestry options.	Of the species trialled in this project, the best all round performer is *Corymbia maculata*. While it has grown well on Buffer sites, an interesting finding has been that most stands of C. maculata have performed as well or better on the Overburden as exemplified by comparative results from the un-thinned Bulga site. While in general thinning has not yet led to an increase in overall stand volume, at the majority of sites it has resulted in an increase in the mean dominant Diameter of Breast Height (DBH) and mean dominant height of trees. Visual assessments indicate that thinning is likely to result in stands of better form, potentially resulting in the growth of higher value timber products.
Penny Dunstan Thesis at RCM	
Through art work, connections are enacted and a storied sense of place is drawn from the rocks, trees and grasses. History becomes, marked by human impacts to the landscape which lead to the development of a co-constitution of place. Wayfinding enmeshes art-making and the walker; lines emerge from satellites, from graphite sticks, from kangaroo tracks, from words, connecting ancient pasts with modern futures; every footfall marking an honouring of new places emerging. In this context, the place of art is to transmute tracks into images and interactions into writings, creating an interactive way of knowing our land and making our minescapes matter.	This research contributes to a conversation between art and the mining industry, where each informs the other promoting discussion about legacy issues and the multiple possibilities of final landforms.

Outcome	Lesson Learnt
This approach describes propose a way of relating to land, of making minescapes matter. It involves reconsidering the world view where humans are outside of nature, where there is a disconnect between earth-others and humans, that allows us to turn away from areas and to illuminate the shadowlands of our modern lifestyles. It proposes an understanding that we are all part of the interactions with non-human others, and that caring about, and being accountable for, our environmental shadowlands constitute an important ethical stance. In combination with a discussion between earth science, environmental history and human geography, this research produced art works that contribute to the discourse surrounding ways of relating to terraformed environments. Informed through the use of a relational model of understanding the place of humans in the world, this research produces an empowering view of the possibility of bringing post-mining land back into the relationship with people.	

R14 that the Rehabilitation Strategy be revised to demonstrate a risk based approach to rehabilitation and closure. This would include the preparation of a register outlining the risks and opportunities relating to the closure of the mine. This should include not only the risks and opportunities relating to the physical closure and rehabilitation works, but also give regard to any existing legacy or residual (future) risks in accordance with the Principles of the Strategic Framework for Mine Closure.

The updated Rehabilitation Strategy now incorporates the Rix's Creek Mine Environmental Risk Assessment as an appendix. Section 4.0 of the updated document provides a summary of the likelihood and consequence approach taken to the risk assessment and provides specific consideration of project risks as they relate to mine closure. The mine overall risk assessment included a range of risks including the physical closure and rehabilitation risks as well as identified legacy risks.

Acknowledging that the risk register is a live document and should be updated as risks change, feedback mechanisms for the ongoing update and review of the risk register have been identified:

- Feedback received from stakeholders during events such as CCC meetings, open days and staff surveys and toolbox talks;
- Reviews to the Environmental Management System (EMS) which establishes environmental standards and procedures that are followed during construction, operation and decommissioning of its mining operations;
- Amendments to the Environmental Management Plans and site based procedures which underpin the day to day management of the mine activities;
- Site audits, inspections and recommendations; and
- Outcomes from and review of environmental reports.

It should also be noted that changes to mine development and operational planning and environmental conditions are reported via the MOP / Rehabilitation Management Plan, rather than the Rehabilitation Strategy. The reason is that the current MOP provides a platform for a prescriptive approach to landform and landscape design that facilitates the ability to incorporate change in context of the land use component of mine closure. In doing so opportunities are provided for optimising post mine land use in the environmental, social and economic context at the time. The risk assessment now included in the Rehabilitation Strategy is consistent with that which is in Rix's Creek Mine's existing MOP. Changes to this risk assessment would occur across both documents as required.

R15 that the Rehabilitation Strategy be revised to include additional detailed information around the final void water levels and water quality, including an assessment of any potential beneficial uses for the water that could be considered following closure of the mine

Section 5.8 of the Rehabilitation Strategy provides information on the anticipated final void characteristics following the completion of mining. The ground water assessment contained within the EIS and additional information provided in the RRTS indicated that final void water quality and equilibrium levels will ultimately be similar to connected regional groundwater aquifers and be moderated by inflows, evaporation and infiltration.

In regards to the identification of beneficial reuses, it is noted that there is a life of mine of approximately 20 years, over which time the range of potential beneficial uses may change significantly. With this in mind, rather than seeking to identify one or several options, Bloomfield, in the updated Rehabilitation Strategy has committed to the ongoing review of design alternatives for the final void. The updated Rehabilitation Strategy and mine plan include the final void and potential uses would continually be evaluated and will be prepared as part of the closure planning process. It should be noted that regardless of the final design or alternative use selected, the location and use of the final void is outside the 100-year recurrence interval flood prone area of the Hunter River.

During the operational phase of the project, Bloomfield commits to undertaking an assessment of any potential beneficial use for the water that could be considered following closure of the mine. This assessment will build on the works undertaken by the NSW Minerals Council (NSWMC) via the Upper Hunter Mining Dialogue (UHMD) "Upper Hunter Valley Voids Project" of which Bloomfield is an active member. The NSWMC:

- Conducted a Stakeholder Workshop as a forum to bring industry and community together to begin discussions, visioning and concepts for the future use of closed mine voids in the region;
- Commissioned a literature review, which examined national and international examples of pit void end uses; and
- Conducted a study of pit void lakes water quality to improve understanding of potential pit lake end uses for (UHMD) coal mining operations.

Bloomfield will continue to be actively involved in the UHMD and its operational assessment of post mining beneficial uses. This will allow input from key stakeholders to be included in the beneficial reuse planning and for the latest in community and regulator expectations regarding beneficial reuse to be incorporated into mine closure planning.

2.4 Final void and landform

R16 that the applicant prepare a trade-off study assessing the benefits of removing the western overburden emplacement area against the potential environmental impacts associated with increasing the heights of the existing North Pit Dump and South Pit Dump. Any outcomes of the trade-off study, including an assessment of any environmental impacts, would need to be submitted and considered as part of the final assessment of the Project.

A trade-off study has been undertaken with supporting documents attached as reference in the following sections.

2.5 Trade-off study

A trade-off study was undertaken to consider the impacts and benefits of alternate dump locations for the overburden that was allocated to the Western out of pit dump in the EIS. Two options were considered. The following aspects were assessed as part of the trade-off study

- Air quality impacts;
- Noise impacts;
- Biodiversity impacts and benefits;
- Final landform changes;
- Visual impact; and
- Operational changes required in haulage.

The study has addressed only the volume of overburden that would be placed in the Western out of pit dump in the EIS submission. This volume has been reassigned to the dump locations as defined in Option 1 and Option 2. The remaining waste mined in the years in which the Western out of pit dump was in use in the EIS submission, is the same as in the EIS submission. There is no change in the production schedule and equipment hours for all machines other than trucks.

The assessment is a comparative study, such that it is similar with that undertaken for the EIS submitted case although focuses on potential impacts resulting from the changed dump final landforms. Where an environmental aspect has not been reassessed here, it is considered to be largely consistent with the impacts presented in the EIS. This is the case for economic impacts.

2.5.1 Options Identification

Two options have been considered as part of the study:

- **Option 1** addresses the requirement of recommendation 16 and removes the requirement for the western overburden emplacement area completely. Instead, overburden would be stored on the existing North Pit dump and South Pit dump, by increasing the height of these dumps. The direct benefit of this option is to remove the need to disturb and clear the land within the footprint of the Western out of pit dump; and
- **Option 2** reduces the area required for the Western out of pit overburden emplacement area by removing the requirement to dump on the southern portion of the Western out of pit dump footprint. The residual overburden would be placed on the existing North Pit and South Pit dumps, with the difference from Option 1 being that the footprint and height of the North Pit dump would be smaller and lower. The South Pit dump profile is the same in both cases.

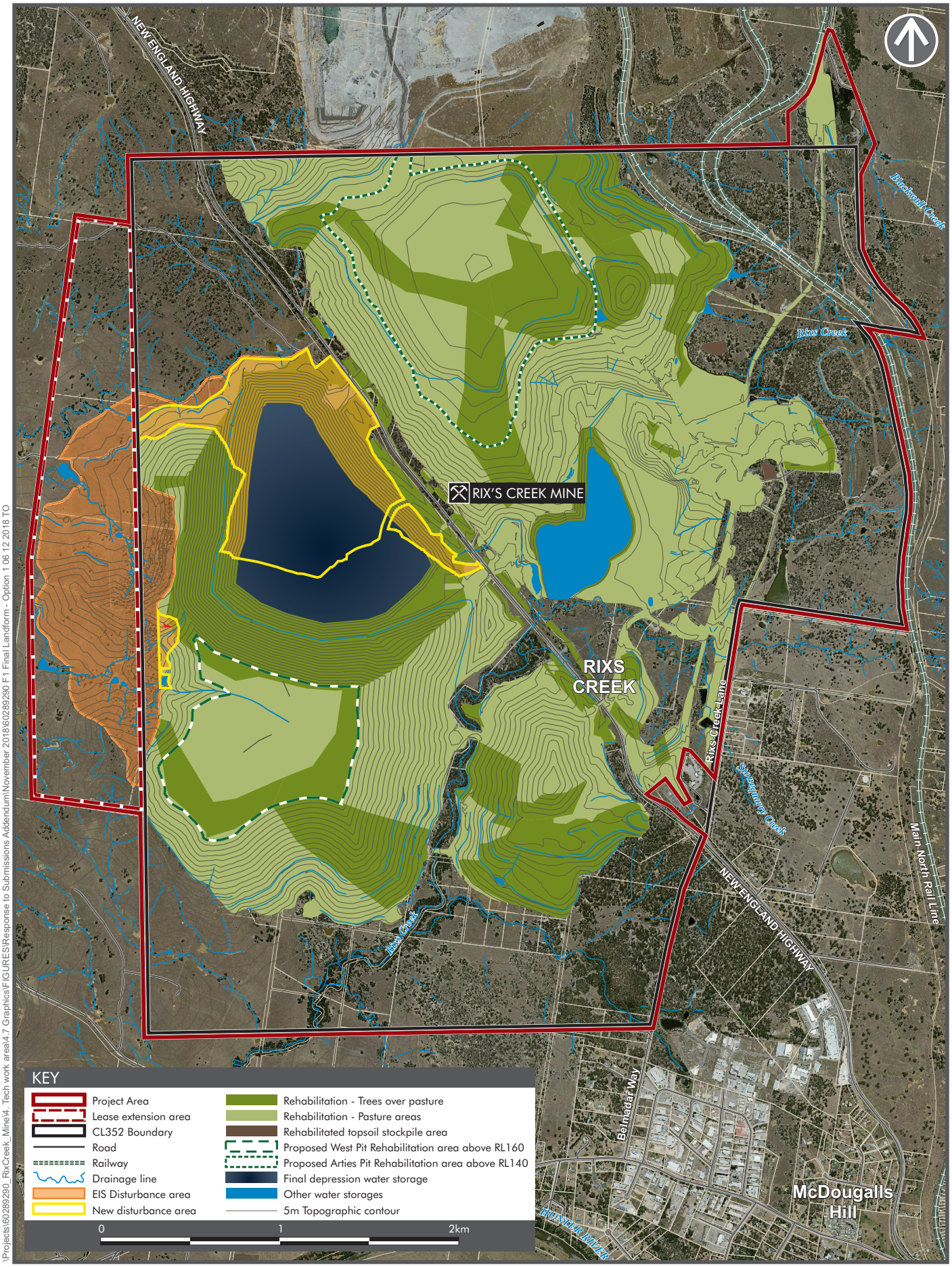
Table 4 provides a comparison of volumes allocated to each dump location for Option 1 and Option 2 relative to the EIS volume allocated to the Western out of pit dump. Also presented are the dump levels for each dump location and each option relative to the EIS submission.

Table 4 Dump quantity comparison

Unit	EIS Submission			Option 1			Option 2		
	Western out of pit dump	South Pit dump	North Pit dump	Western out of pit dump	South Pit dump	North Pit dump	Western out of pit dump	South Pit dump	North Pit dump
Volume Mbcm	17.51	-	-	0.00	1.41	16.11	9.01	1.41	7.09
Max Dump Level (RL)	165	115	154	160	145	170	165	145	160

- Mbcn = Million bank cubic metres
- RL = Reduced Level

The final landform for both Option 1 and Option 2 are shown in Figure 3 and Figure 4 respectively.



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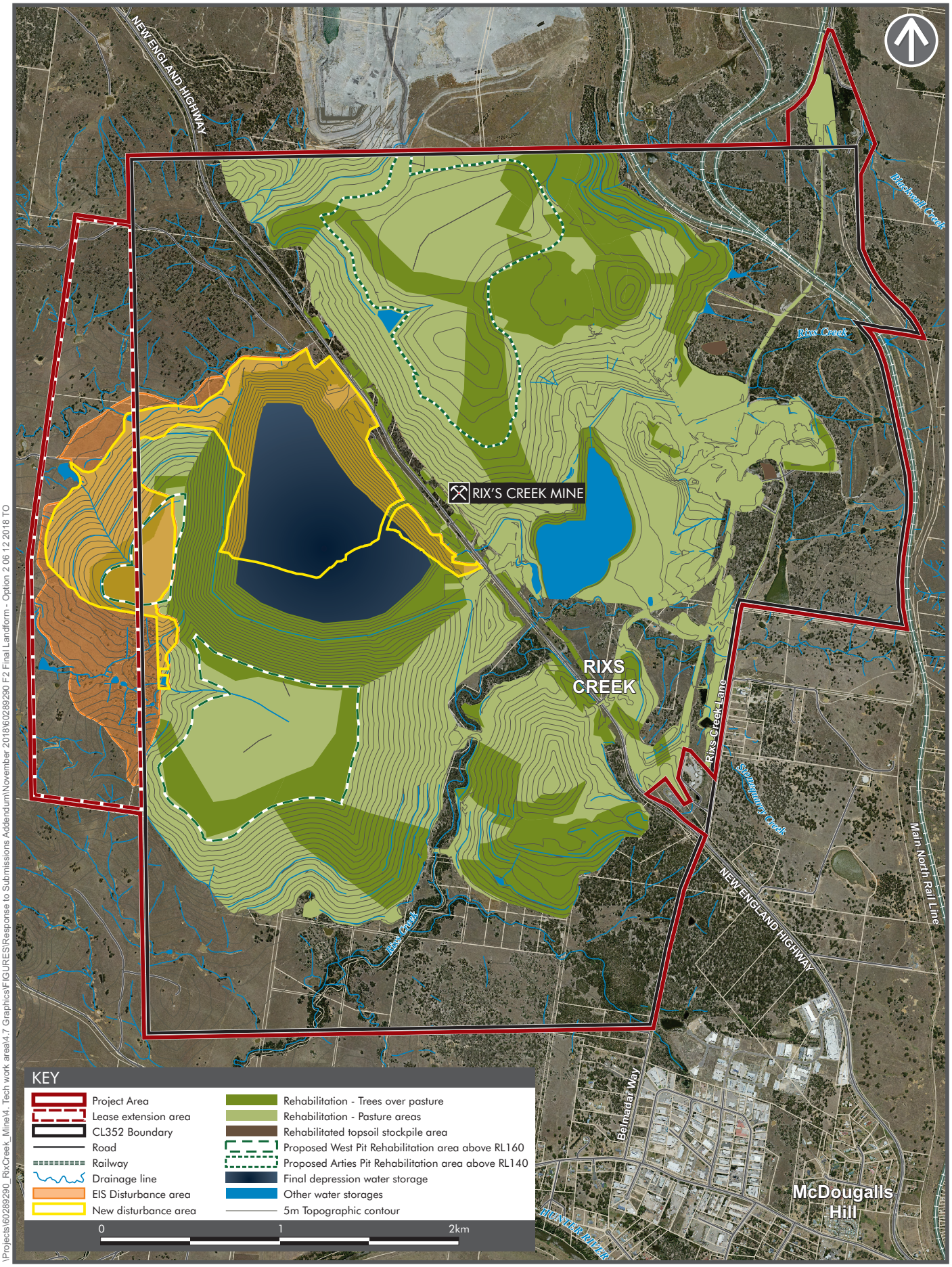
AECOM

FINAL LANDFORM - OPTION 1

Rix's Creek Continuation of Mining
Response to Submissions

FIGURE 1



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FINAL LANDFORM - OPTION 2

Rix's Creek Continuation of Mining
Response to Submissions

FIGURE 2

2.5.2 Environmental Assessment of the options

As part of the analysis of options, Bloomfield has undertaken a review of the key issues associated with each option in regards to air quality, noise and biodiversity.

2.5.2.1 Air Quality

The potential air quality impacts for the trade-off options were modelled by Todoroski Air Sciences and compared with those for the original scenario assessed for the Rix's Creek South Continuation Project. Details of the modelling outcomes are attached in Appendix F and summarised below.

The most current 2016 modelling results for the 2023 modelling option were considered for this comparison as the 2023 schedules represent the period of maximum production and hence maximum dust generation for the Rix's Creek South Continuation Project.

To investigate the extent of the effects on air quality due to the proposed trade-off options, air dispersion modelling was performed using the detailed air dispersion model previously developed for the Air Quality and Greenhouse Gas Assessment Rix's Creek Continuation of Mining Project (Todoroski Air Sciences, 2015).

The air dispersion model was setup identically (apart from adjusting activity associated with the proposed trade-off options) to allow for a direct comparison with the previous assessment.

The activities identified to change in the trade-off options include the hauling of overburden material to different emplacement locations, the emplacing of the overburden material, wind erosion areas and the hauling and emplacement of reject material.

The predicted air quality levels due to the proposed trade-off options are overlaid with the predictions for the original scenario (Todoroski Air Sciences, 2016).

The dispersion modelling results comparing the predicted incremental 24-hour average PM2.5, annual average PM2.5, 24-hour average PM10 and annual average PM10 are shown in Figure 5 to Figure 8.

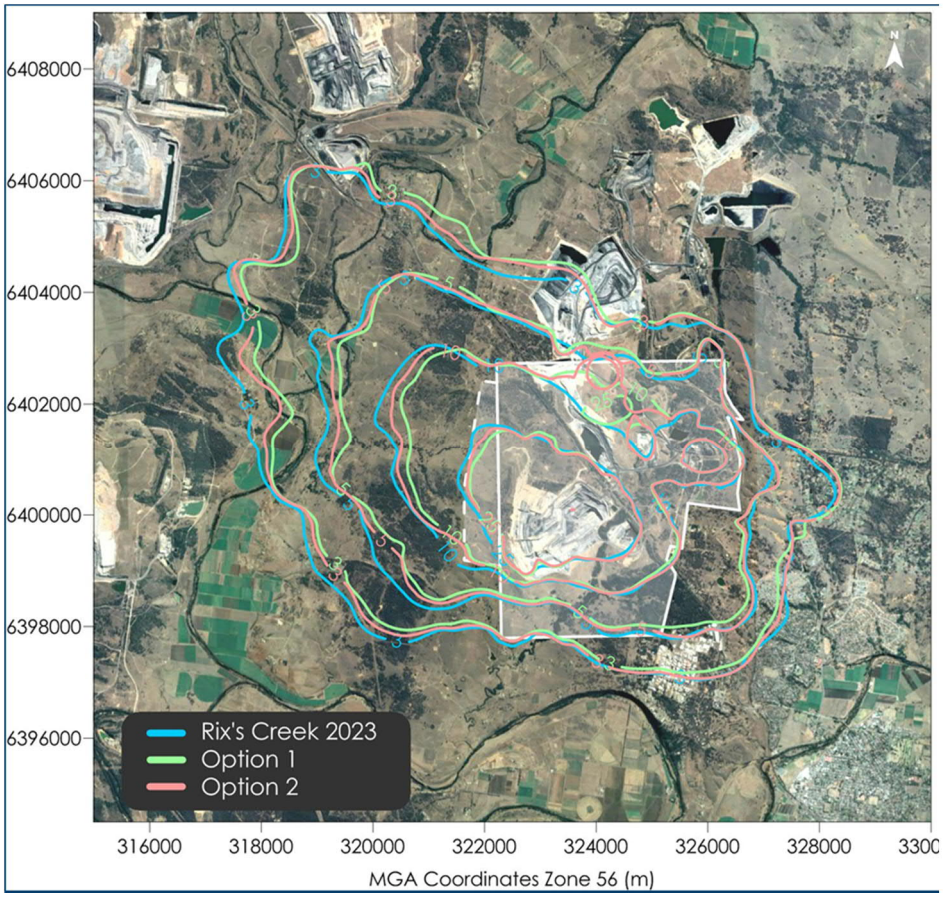

Figure 5 Comparison of incremental 24-hour average PM2.5 concentrations (µg/m³)

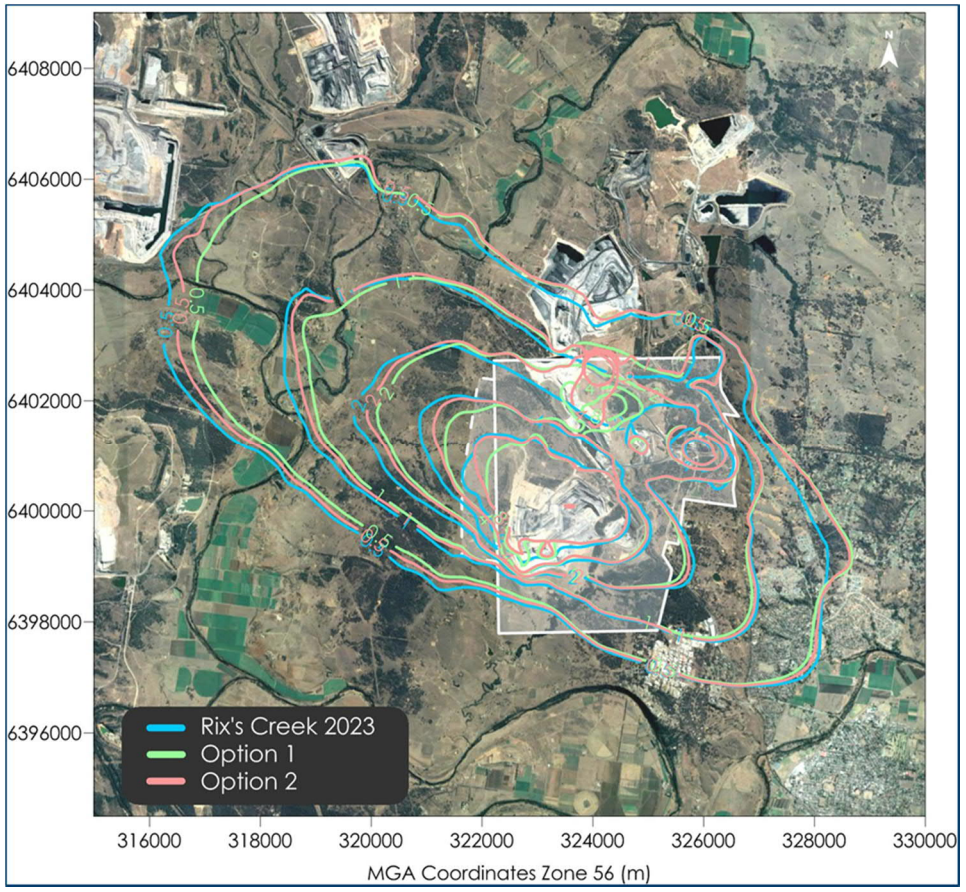

Figure 6 Comparison of incremental annual average PM2.5 concentrations (µg/m³)

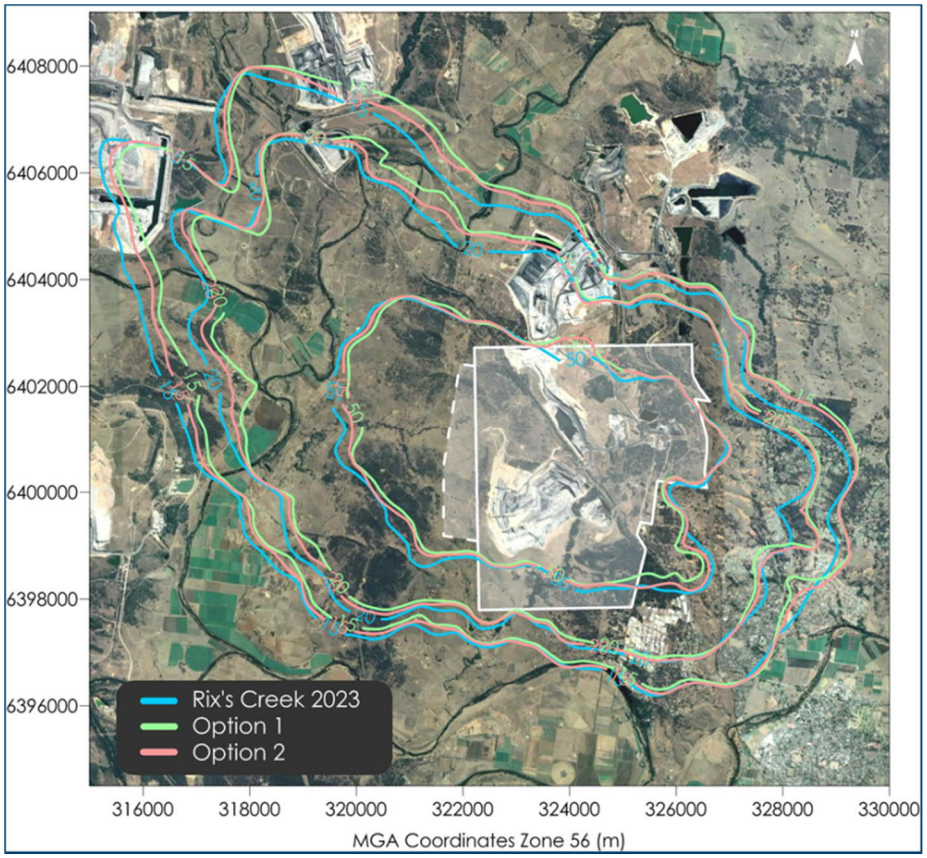

Figure 7 Comparison of incremental 24-hour average PM10 concentrations (µg/m³)

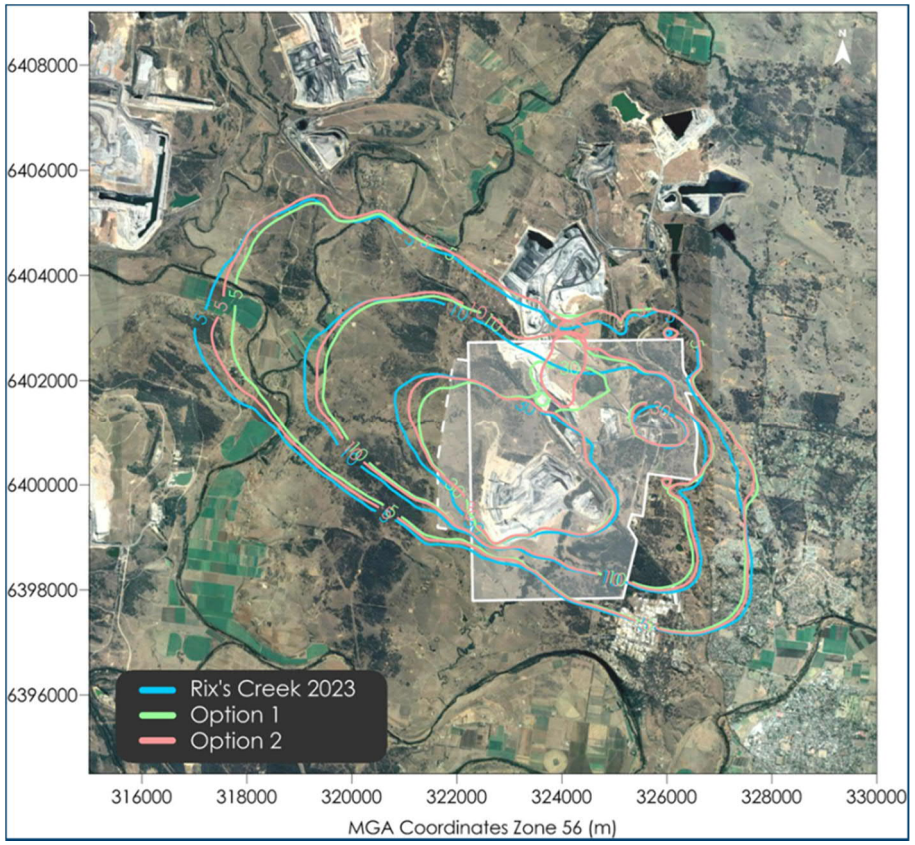

Figure 8 Comparison of incremental annual average PM10 concentrations (µg/m³)

The activities associated with the proposed trade-off options are predicted to generate between 1.0 to 1.5% more dust relative to the original scenario for 2023. In actual figures this equates to 0.2µg of PM10 which is a minor increase. This change arises primarily due to increased haul distances.

Notably, the predicted change in dust impacts is small, and within the modelling accuracy and the normal variation that naturally occurs in background dust levels daily or between years.

The comparison shows that the proposed trade-off options would only influence dust levels in the close vicinity to the site of the activity and that no significant or reasonably measurable change in dust level at any off-site receptor would occur from the mine as a result of the proposed trade-off options.

It is concluded that the proposed trade-off options will not result in any discernible additional impact above that presented in the Air Quality and Greenhouse Gas Assessment Rix's Creek Continuation of Mining Project (Todoroski Air Sciences, 2015) and Response to Agency Submissions for Rix's Creek Continuation of Mining Project (Todoroski Air Sciences, 2016).

2.5.2.2 Noise

The noise impact assessment for the trade-off study was prepared by Global Acoustics to evaluate changes to predicted site noise emission associated with reducing or eliminating the Western out of pit dump relative to the dump configurations used for the EIS noise impact assessment.

The two options were assessed for each of the 2020, 2023 and 2026 stage plans, as these stages cover the period that the Western out of pit dump would be used in accordance with the EIS stage plans.

Table 5 lists receptors included in the trade-off study models, and the Noise Assessment Groups (NAG) each receptor was allocated to in the EIS noise impact assessment. Receptors were selected so that those with the highest predicted impact within each NAG were assessed, based on the EIS noise impact assessment results. Where clusters of receptors exist with similar levels of predicted impact, a single receptor representative of the cluster was assessed against Environmental Protection Licence (EPL) criteria.

Table 5 Modelled receptors and Environmental Protection Licence criteria

NAG ID	NAG Name	Modelled Receptors	Receptor ID	EPL Criteria (dB)	
				$L_{Aeq,15minute}$	$L_{A1,1minute}$
A	Bridgman	4, 5, 6, 7, 10, 24	NMG05	41	47
B	Obanvale	15, 17, 19, 22	NMG06	42	47
C	Wattle Ponds	26, 27, 33, 37	NMG06	42	47
D	Singleton Heights North	57, 59, 61, 65, 71, 76, 79	NMG07	40	45
E	Hunterview	85, 89	NMG07	40	45
F	Singleton Heights South	68, 70, 81	NMG07	40	45
G	McDougalls Hill	44, 47, 55	NMG08	40	47
H	Gowrie	104, 106, 113, 117, 120	NMG08	40	47
I	Long Point	125, 130, 133	NMG10	40	47
J	Belmadar	137, 140, 155	NMG08	40	47
K	Maison Dieu East	146, 148, 160, 163	NMG11	40	47
L	Maison Dieu West	51, 164, 167, 168	NMG12	40	47
M	Camberwell South	171, 174	NMG01	40	48
N	Camberwell	173, 178	NA	NA	NA
O	Glennies Creek	180	NA	NA	NA

To allow a comparison of 'like with like', as many model parameters as possible were retained from the EIS noise impact assessment. In this way, any predicted differences between the EIS models and trade-off study models are due to differences in the stage plans (topography and equipment configurations), rather than changes to model input parameters.

The following points discuss model parameters used for both the EIS and trade-off study assessments:

- Roads and Maritime's Technology's Environmental Noise Model (ENM), a computer based environmental noise model was used to predict mining noise levels at off-site receptor locations. The model is described in Section 2.3 of the EIS noise impact assessment;
- The cumulative distribution of results methodology was employed for both assessments. This method is described in Section 2.3 of the EIS noise impact assessment;
- Meteorological conditions input to models (260 conditions) were unchanged. Meteorology is described in Section 4.1.1 of the EIS noise impact assessment;
- Historical meteorological distributions used to determine the cumulative distribution of model predictions were unchanged. Meteorology is described in Section 4.1.1 of the EIS noise impact assessment;
- Sound power of equipment was unchanged. Modelled sound powers are described in Section 4.1.4 of the EIS noise impact assessment;
- Noise controls and management strategies applied to the modelling process were unchanged. Modelled noise controls are described in Section 2.4 of the EIS noise impact assessment;
- Coal Handling and Preparation Plant (CHPP) sources were unchanged;
- Regional topography was unchanged;
- The RCS rail infrastructure option from the EIS noise impact assessment was retained. It should be noted that the approved RCS rail loop is unlikely to proceed, as RCM has since acquired RCN and have unrestricted access to the RCN rail loop. However, as EIS noise impact assessment outcomes were primarily based on the RCS rail option, and the RCN option was not modelled for all receptors, the RCS option has been retained for the trade-off study to allow comparison of 'like with like' for all receptors. Rail infrastructure options are described in Section 4.2.2 of the EIS noise impact assessment;
- Receptor locations were unchanged. However, a reduced set of 53 key receptors was assessed for the trade-off study to reduce model processing times. Receptors were selected so that those with the most affected receptors in each NAG were assessed. This is considered adequate for evaluating relative change between the EIS and trade-off study stage plans;
- Equipment quantities were unchanged, except where modified quantities were required to service alternate operating configurations associated with the trade-off study options, for example shorter or longer haul routes. Modelled equipment quantities are indicative to allow for assessment, and relevant to each specific scenario modelled. Different equipment quantities may be required at various times during the life of mine when alternate operating configurations are in effect; and
- Trade-off study scenarios were equivalent to EIS study scenarios. That is, where the EIS scenarios included mitigation controls such as partial fleet shut down, the trade-off study scenarios included the same controls. Scenario development is described in Section 4.1.2 of the EIS noise impact assessment.

Operational A-weighted noise and potential sleep disturbance impact associated with each mine plan stage was assessed.

A-weighted Predictions

Table 6, Table 7 and Table 8 present a summary of 90th percentile $L_{Aeq,15minute}$ operational noise predictions for the three modelled stages (2020, 2023 and 2026) respectively. Each table includes the following:

- NAG identification tag as used in the EIS noise impact assessment;
- NMG identification tag as used in the current EPL;
- The relevant EPL criterion for each NAG based on the NMG to which it is allocated in the EPL;
- The 90th percentile EIS noise impact assessment prediction for each NAG (based on the key set of 53 receptors);
- The 90th percentile trade-off study Option 1 prediction for each NAG, and, the difference relative to the EIS prediction; and
- The 90th percentile trade-off study Option 2 prediction for each NAG, and, the difference relative to the EIS prediction.

The result presented for each NAG is the highest prediction for each of the receptors within the NAG. Predictions for each individual receptor modelled for this assessment are included in Appendix G.

For each set of predictions, results for two night scenarios are presented (N1 and N2). The first represents normal night operations with all proposed night plant operational. The second scenario represents a modified night period scenario, where coaling equipment and reject haulage is excluded. As stated previously, trade-off study scenarios are equivalent to and consistent with EIS scenarios.

Predictions for neutral atmospheric conditions have not been presented in this report, as they have little to no bearing on overall assessment outcomes. Predictions for neutral atmospheric conditions included in the EIS noise impact assessment were in the order of 10 to 13 dB lower than 90th percentile predictions. Any change to model results due to the trade-off study options during these conditions would have no relevance to the evaluation of impact, as all predictions are well below EPL criteria.

Table 6 Year 2020 90th percentile operational predictions - $L_{Aeq,15minute}$ dB

NAG	NMG	EPL Criterion	EIS				Option 1 (change relative to EIS)				Option 2 (change relative to EIS)			
			Day	Eve	Night 1	Night 2	Day	Eve	Night 1	Night 2	Day	Eve	Night 1	Night 2
A	NMG05	41	39	39	40	38	40 (1)	39 (0)	40 (0)	38 (0)	39 (0)	39 (0)	40 (0)	38 (0)
B	NMG06	42	41	41	43	40	42 (1)	41 (0)	43 (0)	40 (0)	41 (0)	41 (0)	43 (0)	40 (0)
C	NMG06	42	41	41	43	38	42 (1)	41 (0)	43 (0)	38 (0)	41 (0)	41 (0)	43 (0)	38 (0)
D	NMG07	40	39	43	44	37	41 (2)	43 (0)	44 (0)	37 (0)	40 (1)	43 (0)	44 (0)	37 (0)
E	NMG07	40	38	39	39	34	38 (0)	39 (0)	39 (0)	34 (0)	38 (0)	39 (0)	39 (0)	34 (0)
F	NMG07	40	35	37	38	31	38 (3)	37 (0)	38 (0)	31 (0)	37 (2)	37 (0)	38 (0)	31 (0)
G	NMG08	40	43	42	44	40	44 (1)	42 (0)	44 (0)	40 (0)	43 (0)	42 (0)	44 (0)	40 (0)
H	NMG08	40	42	42	42	39	42 (0)	42 (0)	42 (0)	39 (0)	42 (0)	42 (0)	42 (0)	39 (0)
I	NMG10	40	38	36	35	33	36 (-2)	36 (0)	35 (0)	33 (0)	36 (-2)	36 (0)	35 (0)	33 (0)
J	NMG08	40	45	44	44	42	46 (1)	44 (0)	44 (0)	42 (0)	46 (1)	44 (0)	44 (0)	42 (0)
K	NMG11	40	42	43	43	37	42 (0)	43 (0)	43 (0)	37 (0)	41 (-1)	43 (0)	43 (0)	37 (0)
L	NMG12	40	38	38	35	33	35 (-3)	37 (-1)	35 (0)	33 (0)	37 (-1)	37 (-1)	35 (0)	33 (0)
M	NMG01	40	38	35	34	30	36 (-2)	35 (0)	34 (0)	30 (0)	36 (-2)	35 (0)	34 (0)	30 (0)
N	NA	40	35	35	35	33	37 (2)	35 (0)	35 (0)	33 (0)	35 (0)	35 (0)	35 (0)	33 (0)
O	NA	40	36	37	38	35	37 (1)	37 (0)	38 (0)	36 (1)G	36 (0)	36 (-1)	38 (0)	35 (0)

Notes:

- *Result in brackets is difference between EIS prediction and prediction for relevant option;*
- *Orange highlight indicates increase; and*
- *Green highlight indicates decrease.*

Table 7 Year 2023 90th percentile operational conditions - $L_{Aeq,15minute}$ dB

NAG	NMG	EPL Criterion	EIS				Option 1 (change relative to EIS)				Option 2 (change relative to EIS)			
			Day	Eve	Night 1	Night 2	Day	Eve	Night 1	Night 2	Day	Eve	Night 1	Night 2
A	NMG05	41	38	38	39	39	39 (1)	38 (0)	39 (0)	39 (0)	38 (0)	38 (0)	39 (0)	39 (0)
B	NMG06	42	40	40	42	41	40 (0)	40 (0)	42 (0)	41 (0)	40 (0)	40 (0)	42 (0)	41 (0)
C	NMG06	42	40	39	42	41	41 (1)	40 (1)	42 (0)	41 (0)	40 (0)	40 (1)	42 (0)	41 (0)
D	NMG07	40	38	39	40	38	39 (1)	39 (0)	40 (0)	38 (0)	39 (1)	39 (0)	40 (0)	38 (0)
E	NMG07	40	36	36	37	35	37 (1)	36 (0)	37 (0)	35 (0)	37 (1)	36 (0)	37 (0)	35 (0)
F	NMG07	40	34	33	33	29	35 (1)	33 (0)	33 (0)	29 (0)	34 (0)	33 (0)	33 (0)	30 (1)
G	NMG08	40	41	41	42	40	42 (1)	41 (0)	42 (0)	40 (0)	41 (0)	41 (0)	42 (0)	40 (0)
H	NMG08	40	39	39	40	38	41 (2)	39 (0)	40 (0)	38 (0)	40 (1)	39 (0)	40 (0)	38 (0)
I	NMG10	40	33	32	32	30	33 (0)	32 (0)	32 (0)	30 (0)	33 (0)	32 (0)	32 (0)	30 (0)
J	NMG08	40	42	40	41	37	43 (1)	40 (0)	42 (1)	38 (1)	42 (0)	40 (0)	42 (1)	38 (1)
K	NMG11	40	36	37	37	33	38 (2)	37 (0)	38 (1)	34 (1)	36 (0)	37 (0)	38 (1)	34 (1)
L	NMG12	40	36	39	35	34	36 (0)	39 (0)	35 (0)	34 (0)	36 (0)	39 (0)	35 (0)	34 (0)
M	NMG01	40	32	34	33	32	36 (4)	35 (1)	34 (1)	33 (1)	34 (2)	35 (1)	34 (1)	33 (1)
N	NA	40	34	36	36	35	38 (4)	36 (0)	37 (1)	35 (0)	35 (1)	36 (0)	37 (1)	35 (0)
O	NA	40	35	35	37	36	39 (4)	36 (1)	38 (1)	37 (1)	35 (0)	36 (1)	37 (0)	37 (1)

Notes:

- *Result in brackets is difference between EIS prediction and prediction for relevant option;*
- *Orange highlight indicates increase; and*
- *Green highlight indicates decrease.*

Table 8 Year 2026 90th percentile operational predictions - $L_{Aeq,15minute}$ dB

NAG	NMG	EPL Criterion	EIS				Option 1 (change relative to EIS)				Option 2 (change relative to EIS)			
			Day	Eve	Night 1	Night 2	Day	Eve	Night 1	Night 2	Day	Eve	Night 1	Night 2
A	NMG05	41	38	38	39	38	38 (0)	38 (0)	39 (0)	38 (0)	38 (0)	38 (0)	39 (0)	38 (0)
B	NMG06	42	40	40	42	41	40 (0)	40 (0)	42 (0)	41 (0)	40 (0)	40 (0)	42 (0)	41 (0)
C	NMG06	42	39	39	41	40	39 (0)	39 (0)	42 (1)	40 (0)	39 (0)	39 (0)	42 (1)	40 (0)
D	NMG07	40	38	39	39	38	38 (0)	39 (0)	39 (0)	38 (0)	38 (0)	39 (0)	39 (0)	38 (0)
E	NMG07	40	36	36	37	35	36 (0)	36 (0)	37 (0)	35 (0)	36 (0)	36 (0)	37 (0)	35 (0)
F	NMG07	40	33	34	35	32	33 (0)	34 (0)	34 (-1)	32 (0)	33 (0)	34 (0)	35 (0)	32 (0)
G	NMG08	40	40	40	41	39	40 (0)	40 (0)	41 (0)	39 (0)	40 (0)	40 (0)	41 (0)	39 (0)
H	NMG08	40	38	38	38	37	38 (0)	38 (0)	38 (0)	36 (-1)	38 (0)	38 (0)	38 (0)	36 (-1)
I	NMG10	40	34	34	34	32	34 (0)	34 (0)	34 (0)	32 (0)	34 (0)	34 (0)	34 (0)	32 (0)
J	NMG08	40	42	41	42	39	42 (0)	41 (0)	42 (0)	39 (0)	42 (0)	41 (0)	42 (0)	39 (0)
K	NMG11	40	39	37	38	33	39 (0)	38 (1)	38 (0)	33 (0)	39 (0)	38 (1)	38 (0)	33 (0)
L	NMG12	40	35	37	33	32	35 (0)	37 (0)	35 (2)	34 (2)	35 (0)	37 (0)	34 (1)	33 (1)
M	NMG01	40	33	32	31	30	33 (0)	32 (0)	31 (0)	30 (0)	33 (0)	32 (0)	31 (0)	29 (-1)
N	NA	40	34	35	35	34	34 (0)	35 (0)	35 (0)	34 (0)	34 (0)	35 (0)	35 (0)	34 (0)
O	NA	40	35	35	36	36	35 (0)	36 (1)	37 (1)	36 (0)	35 (0)	36 (1)	37 (1)	36 (0)

Notes:

- *Result in brackets is difference between EIS prediction and prediction for relevant option;*
- *Orange highlight indicates increase; and*
- *Green highlight indicates decrease.*

Model predictions in Table 6, Table 7 and Table 8 generally indicate the two trade-off study options would provide a similar level of impact to the EIS for the most impacted receptors within each NAG, particularly for the evening and night periods.

Evening and night period predictions are all within +/- 1 dB of EIS predictions, except for NAG L in Year 2026 for option 1 during the night period, for which an increase of 2 dB is predicted. In that case, predictions are well below the EPL criterion, so the increase is immaterial.

For the day period, the haul alignments associated with the Option 1 and Option 2 alternatives result in increases of up to 4 dB for the 2023 stage plan relative to the EIS, and up to 3 dB for the 2020 stage plan. No differences are predicted for the 2026 stage plan, as the day period scenario is relatively unchanged relative to the EIS model. Decreases of up to 3 dB are predicted for the 2020 stage plan for some NAG (I, L and M) due to redistribution of waste haulage from the Western OOPD to the South Pit and North Pit dumps.

Predicted increases for the trade-off study options are primarily due to increased exposure for haul trucks whilst hauling waste to the North Pit dump, as well as a requirement for additional trucks to service the longer and higher hauls. Changes to the degree of topographical shielding, which is increased for some receptors and decreased for others, is also a contributing factor.

Of the two trade-off study options, Option 1 generally causes greater increases relative to EIS predictions than Option 2, largely due to increased dumping height on the North Pit dump and lesser topographical shielding to the west. Although a minor difference, this supports Option 2.

Sleep Disturbance Assessment

Table 9 , Table 10 and Table 11 present 90th percentile $L_{A1,1minute}$ sleep disturbance noise predictions for the three modelled stages (2020, 2023 and 2026) respectively. The tables provide the same information as the operational noise tables above, with the exception that day and evening period results are not relevant for sleep disturbance, so are omitted.

For each NAG, the result presented is the highest prediction for each of the receptors within the NAG.

As for operational noise, results generally indicate the two trade-off study options would provide a similar level of impact to the EIS for the most impacted receptors within each NAG. Predictions are all within +/- 1 dB of EIS predictions, except for NAG L in Year 2026 for option 1, for which an increase of 2 dB is predicted. In that case, predictions are well below the EPL criterion, so the increase is immaterial.

Table 9 Year 2020 sleep disturbance predictions - $L_{A1,1minute}$ dB

NAG	NMG	EPL Criterion	EIS		Option 1 (change relative to EIS)		Option 2 (change relative to EIS)	
			Night 1	Night 2	Night 1	Night 2	Night 1	Night 2
A	NMG05	47	40	38	40 (0)	38 (0)	40 (0)	38 (0)
B	NMG06	47	44	41	44 (0)	41 (0)	44 (0)	41 (0)
C	NMG06	47	44	42	44 (0)	42 (0)	44 (0)	42 (0)
D	NMG07	45	45	42	45 (0)	42 (0)	45 (0)	42 (0)
E	NMG07	45	41	39	41 (0)	39 (0)	41 (0)	39 (0)
F	NMG07	45	41	38	41 (0)	38 (0)	41 (0)	38 (0)
G	NMG08	47	46	44	46 (0)	44 (0)	46 (0)	44 (0)
H	NMG08	47	45	43	45 (0)	43 (0)	45 (0)	43 (0)
I	NMG10	47	39	38	39 (0)	38 (0)	39 (0)	38 (0)
J	NMG08	47	48	46	48 (0)	46 (0)	48 (0)	46 (0)
K	NMG11	47	46	43	46 (0)	43 (0)	46 (0)	43 (0)
L	NMG12	47	38	37	38 (0)	37 (0)	38 (0)	37 (0)
M	NMG01	48	38	36	38 (0)	36 (0)	38 (0)	36 (0)
N	NA	45	38	37	38 (0)	37 (0)	38 (0)	37 (0)
O	NA	45	38	36	38 (0)	36 (0)	38 (0)	36 (0)

Notes:

- *Result in brackets is difference between EIS prediction and prediction for relevant option;*
- *Orange highlight indicates increase; and*
- *Green highlight indicates decrease.*

Table 10 Year 2023 sleep disturbance predictions - $L_{A1,1minute}$ dB

NAG	NMG	EPL Criterion	EIS		Option 1 (change relative to EIS)		Option 2 (change relative to EIS)	
			Night 1	Night 2	Night 1	Night 2	Night 1	Night 2
A	NMG05	47	39	39	39 (0)	39 (0)	39 (0)	39 (0)
B	NMG06	47	43	42	43 (0)	42 (0)	43 (0)	42 (0)
C	NMG06	47	43	42	43 (0)	42 (0)	43 (0)	42 (0)
D	NMG07	45	43	42	43 (0)	42 (0)	43 (0)	42 (0)
E	NMG07	45	40	39	40 (0)	39 (0)	40 (0)	39 (0)
F	NMG07	45	38	37	38 (0)	37 (0)	38 (0)	37 (0)
G	NMG08	47	45	44	45 (0)	44 (0)	45 (0)	44 (0)
H	NMG08	47	44	43	44 (0)	43 (0)	44 (0)	43 (0)
I	NMG10	47	37	37	37 (0)	37 (0)	37 (0)	37 (0)
J	NMG08	47	46	46	47 (1)	46 (0)	47 (1)	46 (0)
K	NMG11	47	43	43	43 (0)	43 (0)	43 (0)	43 (0)
L	NMG12	47	38	38	38 (0)	38 (0)	38 (0)	38 (0)
M	NMG01	48	37	37	38 (1)	37 (0)	38 (1)	37 (0)
N	NA	45	38	38	39 (1)	38 (0)	39 (1)	38 (0)
O	NA	45	37	36	38 (1)	37 (1)	37 (0)	37 (1)

Notes:

- *Result in brackets is difference between EIS prediction and prediction for relevant option;*
- *Orange highlight indicates increase; and*
- *Green highlight indicates decrease.*

Table 11 Year 2026 sleep disturbance predictions - $L_{A1,1minute}$ dB

NAG	NMG	EPL Criterion	EIS		Option 1 (change relative to EIS)		Option 2 (change relative to EIS)	
			Night 1	Night 2	Night 1	Night 2	Night 1	Night 2
A	NMG05	47	39	38	39 (0)	38 (0)	39 (0)	38 (0)
B	NMG06	47	43	42	43 (0)	42 (0)	43 (0)	42 (0)
C	NMG06	47	42	42	43 (1)	42 (0)	43 (1)	42 (0)
D	NMG07	45	42	41	42 (0)	41 (0)	42 (0)	41 (0)
E	NMG07	45	39	38	39 (0)	38 (0)	39 (0)	38 (0)
F	NMG07	45	38	37	38 (0)	37 (0)	38 (0)	37 (0)
G	NMG08	47	43	42	43 (0)	42 (0)	43 (0)	42 (0)
H	NMG08	47	42	41	42 (0)	41 (0)	42 (0)	41 (0)
I	NMG10	47	39	38	39 (0)	38 (0)	39 (0)	38 (0)
J	NMG08	47	45	44	45 (0)	44 (0)	45 (0)	44 (0)
K	NMG11	47	42	41	42 (0)	41 (0)	42 (0)	41 (0)
L	NMG12	47	34	34	36 (2)	35 (1)	35 (1)	34 (0)
M	NMG01	48	31	30	31 (0)	30 (0)	31 (0)	30 (0)
N	NA	NA	35	35	35 (0)	35 (0)	35 (0)	35 (0)
O	NA	NA	36	36	37 (1)	36 (0)	37 (1)	36 (0)

Notes:

- *Result in brackets is difference between EIS prediction and prediction for relevant option;*
- *Orange highlight indicates increase; and*
- *Green highlight indicates decrease.*

In conclusion, a primary outcome of the EIS noise impact assessment was that, during periods of strong meteorological enhancement, noise management strategies would need to be employed to maintain off-site noise levels at acceptable levels. RCM are well aware of this requirement, and operates under a comprehensive and industry best practice noise management system, which is documented in the site Noise Management Plan.

The trade-off options present no material differences to the overall noise impact assessment outcomes compared with the EIS noise impact assessment, and a similar degree of noise management would be required to deliver noise compliance during adverse weather conditions regardless.

2.5.2.3 Biodiversity

The assessment of the biodiversity impact for the trade-off study was undertaken by EMM (Refer Appendix H) using the Framework for Biodiversity Assessment method (FBA). This method is consistent with the assessment method provided in the Revised Response to Submissions – Biodiversity (EMM 2018).

The biodiversity impact for the trade-off study has a reduction in impact in both Option 1 and Option 2 with the reduction in disturbance in the area of the Western out of pit dump but this is partially offset by disturbance in the area of the North Pit dump.

The area of the Western out of pit dump consists primarily of native grasslands.

The South Pit dump area proposed in Options 1 and 2, consists of spoil dumps that are yet to be rehabilitated. The vegetation type is dominated by exotic grasses and has been assessed as not requiring any offsets under the FBA.

The North Pit dump area for the trade-off study consumes an area that includes areas yet to be fully backfilled and rehabilitated and areas that have previously been rehabilitated. The previously rehabilitated area consists mainly of exotic grasslands, however there are sections of planted native woodland. A continuous patch of woodland of approximately 20 ha was planted approximately 20 years ago with two smaller patches estimated at 5 to 10 years old.

The North Pit dump area for Option 1 includes the full assessment area including the planted native woodland. The footprint for the Option 2 dump in the North Pit avoids dumping over the 20 ha section of planted native vegetation but does require disturbance of the two smaller patches of woodland.

A summary of the total credits for the EIS Revised Response to Submissions, Option 1 and Option 2 is presented in Table 12. The reduction in credits associated with Options 1 and 2 are 34% and 24% respectively with the reduction in disturbance of areas requiring off-set credits being 39% for Option 1 and 25% for Option 2. Options 1 and 2 will involve disturbance of areas of exotic grasslands in permanent rehabilitated sections of the North Pit dump.

Table 12 Comparison of offsetting requirements

	EIS & RRTS Design		Option 1		Option 2	
	Vegetation Area (ha)	Credits required under FBA	Vegetation Area (ha)	Credits required under FBA	Vegetation Area (ha)	Credits required under FBA
Vegetation zone area for mining and the Western Out of Pit Dump	212.79	5,808	105.11	2,916	155.67	4,308
Vegetation zone area for the South Pit Dump	0	0	0	0	0	0
Vegetation zone area for the North Pit Dump	0	0	24.13	908	3.69	120
Total for Credits	212.79	5,808	129.24	3,824	159.36	4,428
Disturbed Exotic	-	-	105.13	0	97.81	0
TOTAL	**212.79**	**5,808**	**234.37**	**3,824**	**257.17**	**4,428**

2.5.2.4 Visual

A Landscape Character and Visual Impact Assessment (RPS, 2015) was prepared as part of the EIS submission. The assessment of the landscape character and visual impact of the proposed ongoing Rix's Creek Mine is undertaken in accordance with the RMS Environmental Impact Assessment Practice Note – Guideline for Landscape Character and Visual Impact Assessment (RMS Guideline) EIA-N04, issue 2.0 and dated 28 March 2013. In addition to these guidelines, the methodologies described in the Visual Management System prepared by the United States Department of Agriculture Forest Service in 1974 are also utilised in this assessment.

The landscape character of the locality is assessed by firstly defining landscape Character Zones and secondly, an analysis of any changes to these landscape Character Zones as a direct result of the ongoing mining operations at Rix's Creek Mine. RPS (2015) found that those locations with the greatest visual impacts as a result of the project are from transient viewing opportunities along the New England Highway corridor given that the New England Highway bisects the Mine Lease area and that visual receivers along the New England Highway are in close proximity (<100m) from the closest mining activities. The only non-highway location which was deemed to have a potential high level of visual impact was from the area characterised as Character Zone 9 by RPS. Character Zone 9 relates to residential receiver locations to the south of the West Pit along Maison Dieu Road. Typically receivers in Character Zone 9 are at distances of 1 – 2km from the West Pit overburden dump which has already been partially rehabilitated.

As part of the RRTS the potential visual impacts from these locations was also addressed further in response to comment received during the exhibition period. The RRTS demonstrated that through the application of the proposed mitigation measures, such as early establishment of visual screens and the early progression of rehabilitation the overall visual impacts would be appropriately managed. As part of the analysis of both Options 1 and 2 there is potential for both the:

- North Pit dump to be raised in height compared to the EIS base case by 16m and 6m under Options 1 and 2 respectively; and
- South Pit dump to be raised in height compared to the EIS base case by 30m under both options.

In relation to receiver locations along the New England Highway, visual screening planning has already been established along the New England Highway in proximity to its existing operations and is in the process of planning to extend the screening planting to enable adequate establishment time ahead of future mining. These works will commence subsequent to approval and the availability of topsoil and subsoil. Reference is made to Plates 7-7 to 7-11 of the RRTS which detail typical screening along the New England Highway corridor. Due to the ultimate height of the screening trees and their close proximity to the road, it is unlikely that the change in dump heights will have an appreciable impact to receivers at this location. To further highlight the existing screening vegetation on the New England Highway reference is made to Plate 1 - Plate 3 below which highlight the more established plantings on the eastern side of the New England Highway and the most recent screen plantings on the western side.

Plate 1 North Pit Dump from the New England Highway – Facing North

Plate 2 North Pit Dump from the New England Highway – Facing East

Plate 3 South Pit Dump from the New England Highway - Facing South

Based on the final height of the visual screening and the setback distances from the New England Highway corridor the amended landform would continue to be largely shielded from view or have broken views through the vegetation screen. Following achieving final level, progressive rehabilitation would further soften visible working areas and blending these into the landscape.

For receivers along Maison Dieu Road, due to the offset distance to the amended dump locations a significant change to the visual impacts of the project is unlikely, regardless of the potential change in dump height. What is important to note from this location is that progressing rehabilitation of the West Pit Dump is undertaken to blend back into the natural landscape. Progressive rehabilitation of modified and unmodified landforms on the site would continue to be implemented over the life of the Project and be undertaken in accordance with the existing Mining Operations: Landscape Management Plan (Bloomfield, 2011). Rehabilitation would include extensive planting of grasses, shrubs and tree species endemic to the locality when reasonable and feasible on all newly formed landforms to reduce contrast with natural landforms. Rehabilitation activities are planned to be undertaken as soon as practical following the completion of dump formations to final levels. The practice of progressive rehabilitation is well established at the mine.

In addition to screening and progressive rehabilitation, final landform design has also been undertaken to mimic natural topography to ultimately lead to a post-mining landscape with a natural appearance. Details of post-mining landform and micro relief are detailed in Section 2.5.1.

2.5.2.5 Truck haulage

The proposed trade-off study options will influence the mining operation due to the difference in distance and elevation of dumps compared with the EIS submitted Western Out of Pit dump. This impact will be reflected in the number of trucks required to haul the material previously allocated to the Western Out of Pit dump to the alternate locations. Note that this refers to internal mine traffic only with no impacts to the road network. Other activities in the mining sequence will not be affected.

In order to compare the haulage requirements, an updated schedule based on the EIS allocation of overburden was run. The overburden reporting to the Western out of Pit dump was filtered and hauls were assigned for each mining block and dump level. The two trade-off options were analysed using the same blocks but with alternate dump locations. Calculation of individual haulage paths involved a combination of the mining block centroid, common haul route and dumping centroid.

The volumes allocated to each dump for each option and the original EIS scenario are detailed in Table 4 in Section 2.5.1.

The haulage paths were weighted by waste volume to get the overall average haul for each option in terms of both elevation change and haul distance by mining pit and strip.

These distances and elevations generated were modelled in a Fleet Production and Cost Analysis program to calculate truck numbers required and costs to provide relative impacts of the dump changes on haulage. These are presented in Table 15 which shows that Option 2 results in lower overall trucking requirements compared to Option 1.

2.5.2.6 Final Landform

The final landform has been designed to achieve a landuse outcome of cattle grazing. Landform design has considered the following;

- Rehabilitated slopes, other than within the final void have been designed to a maximum of 10 degrees to facilitate cattle grazing;
- Rehabilitated slopes of 10 degrees and less to reduce potential erodibility of grazing areas;
- Micro and macro relief on the rehabilitated landforms to assist in the drainage of water from elevated areas to re-establish environmental flows in surrounding streams and creeks post mining; and
- Establishment of low areas within flow paths to reduce flow velocity and provide stock water dams for cattle.

In addition to the overall design considerations, the EIS submitted landform and the reduced Western Out of Pit dump area in Option 2, provides an overall larger area of reduced slope angle for increased land use productivity than Option 1 with no Western Out of Pit dump. Recent ACARP studies have shown that areas of mine rehabilitation are providing increased sustainable grazing in comparison to natural analogue areas.

Final Landform – Land Capability

Appendix Q to the EIS contained the proposed Rehabilitation Strategy for the Project. Table 4 of the Rehabilitation Strategy included a comparison of the pre-mining and post-mining land and soil capability classes across the Project Area as correct at the time of completion of the EIS. This was subsequently reviewed as part of the options assessment exercise for each option to allow a comparison of the land and soil capabilities pre and post mining for both options. This comparison focusses on the Western Out of Pit Dump due to that dump being the primary location of difference between the two options. Table 13 and Table 14 present the results of this analysis for Option 1 and Option 2 respectively.

Table 13 Option 1 Land and Soil Classification

Slope	Post Mining Total - In rehab areas*		Post Mining Total – Undisturbed*		Total (ha)	%
	Class	Area (ha)	Class	Area (ha)		
<10°	2	9.7	2	91	100.7	81
10°	4	9.8	4	4.1	13.9	11
10°-18°	5		5	9.1	9.1	7
>18°	6	-	6	0.2	0.2	0
	-	19.5	-	104.4	123.9	100

**Areas (ha) subject to rounding.*

Table 14 Option 2 Land and Soil Classification

Slope	Post Mining Total - In rehab areas*		Post Mining Total – Undisturbed*		Total (ha)	%
	Class	Area (ha)	Class	Area (ha)		
<10°	2	30.4	2	53.7	84.1	68
10°	4	34.9	4	2.6	37.5	30
10°-18°	5	-	5	2.1	2.1	2
>18°	6	-	6	0.2	0.2	0
	-	65.3	-	58.6	123.9	100

**Areas (ha) subject to rounding.*

As can be seen when comparing Options 1 and 2 in Table 13 and Table 14 the total percentages of each classification type remain similar across the both options with Option 2 resulting in a reduction in the steeper sections in the 10°-18° range of approximately 7 hectares.

2.5.3 Conclusion

The assessments completed for the trade-off study indicate that there are no material differences to the overall noise and dust impact assessment outcomes for both Option 1 and Option 2 compared with the EIS assessments. There will be impacts close to the site of the activity, notably in the North Pit dump, but no significant or reasonably measurable change would occur at any off-site receptor from the mine as a result of either of the proposed trade-off options.

One of the focus items behind Recommendation 16 was the potential reduction in biodiversity impacts by removing the need for the Western Out of Pit dump. While Option 1 achieves this outcome it does so at the expense of disturbing established planted woodland on the North Pit dump. Option 2 provides an alternate dump allocation that utilises the part of the Western out of pit dump that provides

the most efficient dump volume per area disturbed. This is the northern half of the Western Out of Pit dump footprint. In doing so, this removes the need to disturb the major area of established planted woodland on the North Pit dump.

A design for Option 1 to utilise the same North Pit dump footprint as Option 2 was investigated but the volume in a rehabilitated profile could not be achievable on the smaller footprint.

The reduction in the number of credits for both options, compared with the EIS submission are presented in Table 15. The cost reduction associated with the reduction in credits is based on an estimate of the cost to purchase credits via the NSW Biodiversity Conservation Trust at the time of completing this response and an estimate of the equivalent credits under the current calculator.

Options 1 and 2 both result in the disturbance of more ground, natural and rehabilitated, than in the EIS submission. The relative areas of disturbance compared to the EIS are presented in Table 15, along with the cost to undertake rehabilitation of the additional areas.

Option 2 provides an increased area of reduced slope angle compared with Option 1 for an additional more productive end landuse for the designed landform and a reduction in Class 5 land left following mine closure.

The two options considered, both have increased haul distances compared with the EIS submission. This is driven solely by the significantly longer distance to the North Pit dump compared to either the Western Out of Pit dump or the South Pit dump.

As noted in Section 2.5.1, the volume in Option 1 reporting to the North Pit dump is 92% of the total volume assigned to the Western Out of Pit dump in the EIS submission. In Option 2, only 41% of the volume is allocated to the North Pit dump and 51% is allocated to the reduced Western Out of Pit dump. The remaining 8% reports to the South Pit dump in both options.

Table 15 notes the average number of trucks required to haul the 17.5Mcm of overburden allocated to the Western Out of Pit dump and the cost for additional haulage compared with the EIS submission for Option 1 and Option 2.

Table 15 Options comparison

	Option 1	Option 2
Air quality	No significant impact	No significant impact
Noise	No significant evening or night time impact	No significant evening or night time impact
Visual	South Pit dump +30m North Pit dump +16m	South Pit dump +30m North Pit dump +6m
Biodiversity offsets		
Credits required under FBA	Reduction of 1,984 credits	Reduction of 1,380 credits
Estimate of credits under current BCT calculator	Reduction of 992 credits	Reduction of 690 credits
Cost @ $2,750.00 per credit	Reduction of $2.7M	Reduction of $1.9M
Cost differential for rehabilitation		
Additional area to be rehabilitated (ha)	21.6	44.4
Cost @ $10,500.00 per ha	$0.2M additional cost	$0.5M additional cost
Haulage		
Average truck numbers (EIS submission 7.5)	11.2	8.6
Cost	$10.4M additional cost	$2.6M additional cost
Total Change in cost	**$7.9M additional cost**	**$1.2M additional cost**

The financial costs associated with the two options indicate an overall additional cost of $7.9M associated with Option 1 and a cost of $1.2M for Option 2. The magnitude of these costs, while not insignificant, is not considered to be of a level that would rule in or out either of the options or the EIS submitted case.

The Western Out of Pit dump footprint does not cover any future coal reserves so utilising the full dump area, as envisaged in the EIS submission, does not affect resource recovery.

The existing landform of the Western Out of Pit dump footprint consists of a steep sided ridge and incorporates a number of very steep gullies. Historically the area has been used for grazing however much of the terrain is not ideal for access and is vulnerable to erosion due to the steep nature of the ground if over-grazed. The EIS submitted case and Option 2 both produce final landforms for the Western out of pit dump that are more appropriate for grazing activities.

Considering all of the aspects of the trade-off study, none of the three options (EIS, Option 1, Option 2) are considered impractical or unworkable. The preference is for Option 2 for the following reasons:

- Option 2 is essentially cost neutral compared with the EIS submission;
- Option 2 provides the greatest operational flexibility with additional dump destinations which allows for air quality and noise impacts to be better managed on a day and night time basis and also to manage variations that occur in daily weather patterns; and
- Access to the South Pit and North Pit dump locations are not constrained by the granting of the Mining Lease Application (MLA487) for the Western Out of Pit dump area.

2.6 Water – Surface water, groundwater and void water

R17 that the applicant explore opportunities to undertake an assessment of void water re-use. Where opportunities are identified, these should be included in the Rehabilitation Strategy

Section 5.8 of the Rehabilitation Strategy includes the commitment to undertake an assessment of opportunities for the reuse of void water. It is considered that it is best to undertake this assessment moving forward so as to allow a thorough review of potential reuse options. Bloomfield commits to undertaking this assessment.

R18 that the applicant investigate water impacts related to any interaction with the backfilled North Pit Void consistent with those undertaken for the South Pit Void.

RPS was originally engaged to prepare the Groundwater Impact Assessment (RPS, 2014) for the project. In order to further investigate water impacts from the interaction with the backfilled North Pit Void consistent with investigations undertaken for the South Pit Void, RPS was again engaged to review potential interactions of groundwater with the backfilled North Pit Void. A copy of this additional advice is attached at Appendix I and summarised below.

2.6.1 Pit void dynamics – general concepts

When considering interactions RPS considered the following key components of the backfilled pit void dynamics:

- The backfilled pit void, with material placed to elevations higher than predicted groundwater level recovery; and
- The above water table remnant pit void, to be utilised as a fresh water dam.

2.6.2 Below water table backfilled North Void

With the spoil material from the site backfilled into the North Void to a level above anticipated groundwater levels, a slow regional groundwater level recovery is expected to occur at a similar water quality and salinity level as the regional system. There will also be enhanced local groundwater recharge from ponded fresh water in the remaining depression that will locally accelerate groundwater recovery to equilibrium levels. The degree to which vertical infiltration can occur though the base of the dam would however be reduced by the preferential placement of lower permeable materials in the dam during construction.

Considering that the backfilled material landform has been placed to an elevation approximately 5m above the recovered regional groundwater level, the effects of evaporation on groundwater levels or quality would be limited.

2.6.3 Above water table backfilled North Void

The final pit void, to be utilised as a fresh water dam, will have a water balance driven by factors, including:

- Direct rainfall and runoff volumes from up-catchment areas;
- Evaporative losses from the dam water surface; and
- Infiltration losses from the dam vertically into the deeper regional groundwater system.

As with the groundwater system discussed above, there will be a development stage and an equilibrium stage for the clean water dam. The development stage will occur when the dam is undergoing its initial filling, which will take a number of rainfall events over several years to fill the clean water dam to its equilibrium level. After this dam equilibrium level is reached significant up-catchment rainfall events would induce an associated overtopping event which will flow into the down-stream catchment.

Between runoff (and overtopping) events, the water balance drivers of evaporation and infiltration will slowly reduce the volume of fresh water in the dam. Evaporation processes will also have a slight influence on the overall salt concentrations (building up over time) within the clean water dam. However, as rainfall events are relatively consistent on a seasonal basis, there is continual fresh water diluting and flushing to control and reverse salt build-up.

2.6.4 Pit void dynamics – Rix's Creek specific concepts

Fresh water dam dynamics

In applying the key hydrological processes for the clean water dam to the site-specific setting of the Rix's Creek North Void the following inputs were considered:

- Direct rainfall (on the surface area of the water dam) and up-catchment runoff volumes; and
- Evaporative losses from the dam water surface; and
- Infiltration losses from the dam vertically into the deeper regional groundwater system.

On this basis, it was observed that in the vast majority of years – average rainfall (650mm); wet year (2015 / 899mm); the inflows of direct rainfall and surface run-off were greater than the losses of evaporation and infiltration. However, in the driest years (i.e. 2006 / 424mm) on an annual basis, more water evaporated/infiltrated than entered the dam, meaning there could be infrequent years when overtopping events do not occur.

There will effectively be two key stages to the clean water dam development – the "filling" stage; and the "equilibrium" stage. The filling stage will be characterised by all the inflow volumes from rainfall and runoff accumulating within the dam as it fills. Based on the volume of the clean water dam, which is nine metres deep in the deepest areas, it may take a number of years for the clean water dam to approach its equilibrium stage. Subsequent inflow volumes would result in a commensurate outflow which would contribute to periodic creek flow events within Rix's Creek.

When the clean water dam reaches its equilibrium state, the water balance indicates that in all except the driest of years, more water flows into the dam than evaporates or infiltrates. Therefore the dam will push outflow volumes into the Rix's Creek drainage line. Another important implication of this water balance dynamic is that the clean water dam will maintain its fresh water quality.

Surface water – groundwater interaction

In terms of potential interactions between the fresh water dam and the underlying regional groundwater system, specifically at the North Void / fresh water dam area, the following are identified:

- Localised groundwater mounding beneath the fresh water dam, controlled initially by the ability of water to infiltrate through the base of the dam into the groundwater system, and controlled ultimately by the ability of groundwater to flow away (via regional permeability) from this local continual recharge, so mounding and recharge will "back-up" and ultimately stabilise; and
- Localised groundwater freshening beneath the fresh water dam, although this will likely mix and diffuse within the regional saline groundwater resource over time. This slightly "fresher" saline water will move in accordance with the regional groundwater gradient – which in the case of Rix's Creek, will be to drain towards the West Pit hydraulic sink associated with the pit lake left there.

Based on the above key outcomes, it is concluded that the above water table North Pit void (the fresh water dam), will sustainably operate as intended (i.e. a fresh water dam, with periodic fresh water releases into the Rix's Creek drainage line). It is also confirmed that such a dam in the above water table pit void will not impact upon future water quality of the regional groundwater resource.

2.7 Biodiversity

R19 that the applicant detail and commit to an offsetting approach for consideration by the consent authority, which includes, if necessary, details of how its approach will be staged, the timing, offset value and how it could be successfully undertaken

Section 3.2 and Appendix B of the Rix's Creek Continuation Project Revised Response to Submissions (AECOM, 2017) included details of the proposed offsetting strategy for the project. This offset strategy included the following key steps:

1. Identifying if suitable credits are available on the market to meet offset requirements;
2. Finding potential on-site or off-site offset sites with the biodiversity values required to compensate for the project's impacts. Note that Bloomfield has already engaged ecologists to review its landholdings for potentially suitable offset sites;

3. In the absence of suitable offset credits or properties, applying the variation criteria rules of the FBA and finding suitable offsets to meet the requirements; and
4. Payment into the Biodiversity Conservation Trust.

Bloomfield is committed to the implementation of this strategy and it is the intention to use this strategy as an approach to obtain the required credits through the market, finding appropriate property for suitable offsetting sites or to pay into the Biodiversity Conservation Trust to achieve offsetting requirements.

As at the date of this response, Bloomfield has purchased two properties for the purpose of off-setting credits. One of these properties has been fully assessed and an application for Stewardship Site has been made to the NSW Biodiversity Conservation Trust for this property. The second property is currently undergoing biodiversity assessment.

While it is acknowledged that some of the credits may need to be off-set by payment into the Biodiversity Conservation Trust, the majority of credits will be off-set through the purchase of off-site properties and the establishment of Stewardship Sites. The quantum and timing will be dependent upon the outcome of the trade-off study. Notwithstanding this, the intent is that Bloomfield will seek to secure all the required off-sets for the project within three years of the consent being granted.

2.8 Social and Economic Impacts

R20 that the applicant provide further information in relation to how it has determined its "base case" financial parameters, including the assumptions relating to commodity price and exchange rate forecasts, and references to other available commodity price and exchange rate forecasts.

The Base Case refers to what is assumed to occur in the absence of the project. The Project Case refers to the change in net economic benefits achieved by the project when compared to the Base Case. While Base Case and Project Case activities differ, the key financial parameters are used in the two scenarios are identical to deliver a like-for-like comparison.

Key financial parameters relevant to the development of the Base Case include coal commodity prices and exchange rates. It should be noted that the DPE *Guidelines for the economic assessment of mining and coal seam gas proposals* (2015) do not state a clear preference for any forecast of coal prices and exchange rates and suggest that 'the onus is on the proponent to clearly explain reasoning as to why the selected assumptions are representative of the project's costs and benefits'.

Coal price forecast assumptions

Future changes in coal prices are driven by a multitude of economic factors such as demand for coal fired power and steel, and international trade conditions. Rix's Creek South produces two types of coal: semi-soft coking coal and thermal coal. The two coal types have different respective uses, markets, customers and prices. Approximately 60 per cent of the historical and forecast production schedule at Rix's Creek is semi-soft coking coal.

The economic analysis uses forecast coal prices from Macquarie Bank due to:

- The consistent derivation of data by Macquarie Bank;
- The scope of available data (annual data until 2030); and
- The level of detail available for specific coal types relevant to Rix's Creek operations (thermal and semi-soft coking coal).

The forecasts are specific to Australian coal prices and show a higher correlation with actual historic and current coal prices received for coal produced by Rix's Creek compared to alternate sources (described below).

Estimates from the World Bank and International Monetary Fund (IMF) were used to conduct a sensitivity analysis. These estimates were not used as central assumptions because:

- There were fewer years of forecast data available; and
- Available data is limited to thermal coal only, rather than distinguishing between thermal coal and semi-soft coking coal.

Further detail regarding yearly forecast coal prices is provided in Appendix J.

Exchange rate forecast assumptions

Coal price assumptions are provided in US Dollars (USD) and Australian mines incur and pay costs in Australian Dollars (AUD) and therefore the forecast USD to AUD exchange rate is an important assumption for the Base Case.

The economic analysis uses forecast exchange rates from Macquarie Bank for the period 2019 to 2030 and the forecast 2030 rate was assumed for the remainder of the analysis period. Forecast exchange rates from Macquarie Bank were used for consistency with coal price forecast data and due to the lack of robust alternatives. There was no other publically available data that had forecast exchange rates in excess of five years into the future. A secondary source for exchange rates was therefore not used in the economic analysis.

Further detail regarding yearly forecast exchange rates is provided in Appendix J.

R21 that the applicant provide a more detailed discussion of the likelihood and range of feasible alternatives to the "base case" referred to above, including, but not limited to its selection of the downside coal price scenario of 25% and the World Bank commodity price scenario.

The DPE *Guidelines for the economic assessment of mining and coal seam gas proposals* (2015) provide guidance on how to adequately conduct sensitivity analysis. A sensitivity analysis for the project was included in the KPMG report dated 14 March 2018. Proportional changes in key financial parameters (including a 25% increase or decrease) have been considered in the sensitivity analysis in accordance with DPE guidelines.

The analysis included applying a variety of discount rates, cost and benefit rates, gross mining revenue, income tax variations, exchange rate variability and wage premiums. In addition the sensitivity analysis was also extended to include concurrent testing with a change in multiple key parameters. Details of the modelled scenarios and key outcomes from the analysis are provided in Appendix I.

In order to aid the IPCs interpretation on the likelihood of potential downside price scenarios occurring, KPMG has prepared a review of the historical variability of coal price and exchanges rates (refer Appendix I).

Further analysis of severe downside scenarios identified that decreases in coal prices and increase in exchange rates that would reduce the net economic benefits of the project to zero are generally outside the range of historical fluctuations.

Importantly, when considering the potential implication of the unfavourable exchange rates or prices Bloomfield notes that it is a relatively small company with an excellent relationship with its customers as evidenced through its long term customer relationships established over more than 30 years of operations. Over this same time Bloomfield has proven its ability to manage economic cycles in a manner which does not impact on the long term viability of the business.

R22 that the applicant provide further information (including relevant risk minimisation strategies) in relation to how it has considered severe downside scenarios (including, but not limited to, the World Bank commodity price scenario), in accordance with the Guideline for the Use of Cost Benefit Analysis in Mining and Coal Seam Gas Proposals 2012 and accompanying Technical Notes.

The cost-benefit analysis for the project was undertaken in accordance with the Guideline for the Use of Cost Benefit Analysis in Mining and Coal Seam Gas Proposals (NSW Government, 2012) and included the requisite discount rates, identification of risks and uncertainties and unquantified factors.

A sensitivity analysis was undertaken to examine the robustness of the mine during downside scenarios. The sensitivity analysis demonstrated that mine remains viable during the assessed downside scenarios.

Risk minimisation strategies are beyond the scope of a cost benefit analysis. Bloomfield considers risk minimisation strategies for downside scenarios as part of its normal operations, including:

- Setting aside prudent cash reserves during time of profitable and/or stable periods;
- Debt avoidance/minimisation;
- Capital rationing (or freezing);
- Scaling production to suit market conditions; and
- Taking advantage of the cyclical nature of pressures in the mining sector and capitalising on discount opportunities in the supply chain when demand decreases

2.9 Heritage

R23 that the applicant prepare a Heritage Management Plan to provide the applicant with further opportunities to minimise impacts on the Coke Ovens.

Bloomfield is committed to preparing a Heritage Management Plan which would include consideration of opportunities to minimise impacts on the Coke Ovens. Bloomfield has engaged a Chartered Structural Engineer who specialises in conservation of historical structures, (Bill Jordan and Associates), to prepare a Heritage Management Plan for the Coke Ovens.

R24 that the applicant's Heritage Management Plan include an evaluation of the options available to minimise the impact of any tree roots on the integrity of the Coke Ovens.

As part of the Heritage Management Plan that would be prepared in accordance with a development consent Bloomfield would include a research program and evaluation of options available to minimise the impact of tree roots on the integrity of the Coke Ovens.

R25 that the Heritage Management Plan identify what additional research should be undertaken regarding the Coke Ovens to determine whether salvage and recording is necessary and/or possible.

As part of the Heritage Management Plan that would be prepared in accordance with a development consent, Bloomfield commits to undertaking research to determine the potential for salvage and recording of some or all components of the Coke Ovens.

R26 that the applicant's Heritage Management Plan and Rehabilitation Strategy detail how the Coke Ovens will be better accessed by the public given the historical significance of the site and provide options on how the site can be managed throughout the life of the Project and beyond mine closure.

The updated Rehabilitation Strategy (Refer Appendix D) details how the Coke Ovens are currently managed in accordance with a current management plan being the *Rix's Creek Colliery Coke Ovens Conservation Plan* (Rixs Creek Mine, 2007). As detailed above, subject to consent, a new management plan would be prepared to detail how the Coke Ovens would be managed into the future. Historically public access to the Coke Ovens has been restricted due to their location within an active mine. For safety reasons it is not considered appropriate to allow the public to access the site. In addition, due to the fragile state of the Coke Ovens there is potential for vandalism and damage to occur.

Despite this, Bloomfield understands the historic importance of the Coke Ovens to the heritage of Singleton and in particular notes that beyond the life of the mine the ongoing preservation of the Coke Ovens is required. Therefore as part of the Heritage Management Plan, Bloomfield commits to reviewing potential ways to establish public access to the Coke Ovens, following mine closure. This process would be undertaken in consultation with Singleton Council and OEH.

3.0 Conclusion

This report has provided consideration of, and responses to, those recommendations made by the IPC in its report *Rix's Creek Continuation of Mining Project SSD 6300 Review Report* (IPC, 2018). In response to the recommendation this report has:

- Provided additional information regarding the mines noise and blasting management and complaints processing systems and provided assurances that a detailed and effective protocol is in place for reducing noise impacts;
- Included an updated Rehabilitation Strategy which provides a solid structure for the future management of rehabilitation and final landform management and commits to the preparation and ongoing update of Mine Operational Plans and Rehabilitation Management Plans;
- Has undertaken a review of two alternative final landform options that allow the overburden footprint identified in the EIS to be reduced. The comparison of alternatives shows:
    - There would only be minor differences in environmental impacts between the two options and final landform presented in the EIS;
    - Option 2 is essentially cost neutral compared with the EIS submission;
    - Option 2 provides the greatest operational flexibility with additional dump destinations which allows for air quality and noise impacts to be better managed on a day and night time basis and also to manage variations that occur in daily weather patterns;
    - Access to the South Pit and North Pit dump locations are not constrained by the granting of the Mining Lease Application (MLA487) for the Western Out of Pit dump; and
    - The final landform design of Option 2 compared with Option 1 provides a higher landuse value due to reduction in "steep country" associated with the Western Out of Pit dump and less potentially for visual impact due to low final North Pit dump height.
- There is a commitment to undertaking ongoing investigations into beneficial reuse options for final void water in consultation with the community, Singleton Council and DPE, noting that stakeholder expectations for beneficial reuses will likely change over the life of the project;
- Confirmed that the backfilled North Pit Void, and Final South Pit Void would interact with the regional groundwater aquifer in an acceptable manner during filing and once equilibrium is reached;
- Committed to the implementation of the biodiversity strategy;
- Demonstrated that the assumptions and inputs into the projects economic impact assessment are sound and reasonable; and
- Committed to the preparation of a Heritage Management Plan and research program for the future management of the Coke Ovens site, and to evaluate options for the future accessing of this site by the public, in consultation with Singleton Council and OEH.

With these matters now addressed, it is considered that the project's merits assessment can now be finalised and a determination made accordingly.

Appendix A

IPC Review Report

Appendix A IPC Review Report

Appendix B

Noise Management Plan

Appendix B Noise Management Plan

Appendix C

Equipment List

Appendix C Equipment List

Appendix D

Coke Ovens Blast Assessment

Appendix D Coke Ovens Blast Assessment

Appendix E

Rehabilitation Strategy

Appendix E Rehabilitation Strategy

Appendix F

Air Quality – Options Assessment

Appendix F Air Quality – Options Assessment

Appendix G

Noise - Options Assessment

Appendix G Noise - Options Assessment

Appendix H

Biodiversity - Options Assessment

Appendix H Biodiversity - Options Assessment

Appendix I

Groundwater Memo

Appendix I Groundwater Memo

Appendix J

Economic Assessment, Additional Information

Appendix J Economic Assessment, Additional Information