MALABAR COAL

MAXWELL PROJECT

APPENDIX S

Environmental Risk Assessment

Operational Risk Mentoring
Practical Solutions for Operational Risk Management

Malabar Coal Limited

Maxwell Project
Environmental Risk Assessment

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DOCUMENT CONTROL AND DISTRIBUTION

Document No.	RM1922
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General Description	This report summarises the results and recommends follow up actions from the team-based risk assessment conducted in November 2018.
Key Supporting Documentation	• AS/NZ ISO 31000:2018 *Risk management –Guidelines* (Standards Australia, 2018); • HB 203:2012 *Managing environment-related risk* (Standards Australia, 2012); • MDG1010 *Minerals Industry Safety and Health Risk Management Guideline* (Department of Trade and Investment, 2011). • *Impact and risk analysis for the Hunter subregion*. Product 3-4 for the Hunter subregion from the Northern Sydney Basin Bioregional Assessment, Department of the Environment and Energy, Bureau of Meteorology, CSIRO and Geoscience Australia, Australia (Herron et al., 2018).

Versions

Version	Date	Description	Created By
0	18/12/18	Draft report	PNS
1	16/1/19	Draft report incorporating specialist comments	PNS
2	10/7/19	Final report	PNS

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EXECUTIVE SUMMARY

This Environmental Risk Assessment (ERA) identifies risks associated with key potential environmental issues associated with the Maxwell Project (the Project). The Project provides for the development of an underground coal mining operation in the Upper Hunter Valley, New South Wales.

On 13th November 2018, a team consisting of representatives from Malabar Coal Limited (Malabar) and specialist consultants participated in a facilitated ERA workshop. The scope of the workshop was:

> *To conduct a risk assessment of the potential environmental impacts of the Project, identifying the key issues for further assessment.*

Key potential environmental issues were identified by the ERA team using a voting system, whereby team members were assigned a number of 'votes' to their key issues. The key potential environmental issues identified by the ERA team were considered to be key issues for further assessment in the Environmental Impact Statement (EIS). The key potential environmental issues identified in the ERA will be addressed in the EIS and the specialist reports included as appendices to the EIS.

The planned controls were considered for all identified risks. With the application of the identified controls, the team consensus was that potential environmental risks associated with the Project could be managed at a tolerable level of risk.

Recommendations made by the team in the risk assessment workshops are included in Table 1. The team understood that Malabar will track and review these actions and confirm the adequacy of the identified controls.

Table 1 – Consolidated Action Plan

Ref	Issue	Aspect Type	Action(s)	Status
IS013	Activities associated with mine construction and operations negatively affect the horse studs' customers' perceptions impacting these businesses and their contributions to the Equine Critical Industry Cluster (CIC).	Land and Agriculture	Implement engagement program beyond EIS submission.	Ongoing – Malabar has developed an ongoing engagement program for nearby equine and viticulture enterprises (Section 6 of the EIS). Engagement with the community would continue following EIS submission.
IS044	Poor consultation or engagement with neighbours, council and other stakeholders results in poor social outcomes and/or a poor relationship (e.g. mistrust) between Malabar and its neighbours and stakeholders.	Social/Economic		
IS014	Visual impacts result in a reduction in visitors to Hollydene Estate Wines or the region.	Visual		
IS049	Community fears or conflict arising from perceived impacts across several environmental and social aspects.	Social/Economic		
IS045	Existing landform at Maxwell Infrastructure proves a key constraint to achieving a desirable final landform.	Land and Agriculture	Continue to investigate beneficial uses of voids and engage with other miners, industrial operations, infrastructure developers and operators, agricultural enterprises, and councils in the region.	Ongoing – Consultation with neighbouring landholders and tenement holders is described in Section 5 of the EIS. Malabar would continue to encourage and be supportive of other community and government proposals or initiatives for the use of Malabar land or infrastructure that can co-exist with the Project.
IS046	Existing final voids at the Maxwell Infrastructure leave legacy issues for the community beyond the mine's closure.	Social/Economic		
IS039	Existing and proposed final landform at the Maxwell Infrastructure prevents diversion of surface water runoff from rehabilitated areas, affecting rehabilitation goals.	Water		
IS037	Excess mine water/groundwater generated on-site exceeds storage/usage requirements resulting in off-site impacts.	Water	Continue to investigate beneficial uses of excess water and engage with other miners, industrial operations, infrastructure developers and operators, agricultural enterprises, and councils in the region.	Ongoing – Consultation with neighbouring landholders and tenement holders is described in Section 5 of the EIS. Malabar would continue to investigate beneficial uses of any excess water.

Ref	Issue	Aspect Type	Action(s)	Status
IS034	Impacts on ecological communities or threatened species.	Biodiversity	Re-assess controls following completion of Biodiversity Development Assessment Report.	Complete – Strategies would be implemented to avoid, minimise, mitigate, manage and offset impacts to ecological communities and threatened species (Appendix E of the EIS).
IS047	Population effects due to Project workforce demands.	Social/Economic	Develop more detailed local employment philosophy.	Complete – A housing and workforce management strategy would be implemented for the Project (Appendix L of the EIS).
IS056	Visual impacts from Edderton Road as a result of views of the mine entry area.	Visual	Consider visual mitigation strategies to minimise visual impacts along Edderton Road.	Complete – On-site mitigation measures would be implemented to reduce potential visual impacts from Edderton Road (Appendix N of the EIS).
IS057	Night-lighting impacts on surrounding receivers.	Visual	Consider implementation of reasonable and feasible visible light mitigation.	Complete – Mitigation measures to minimise the potential for light "spill" from the Project would be implemented (Appendix N of the EIS).
IS001	Subsidence-related impacts on Edderton Road (i.e. cracking, stepping, etc.) results in impacts on safety and/or serviceability.	Built Features	Following stakeholder consultation, consider preferred approach to management.	Ongoing – Final strategy to be informed by consultation during EIS consultation period.
IS006	Subsidence-related impacts on the bridge across the Hunter River (i.e. far-field horizontal effects) results in adverse impacts on the structural integrity (i.e. bridge bearings, expansion joints, etc.).	Built Features	Consultation with Roads and Maritime Services (RMS) to confirm bridge tolerance can accommodate predicted far-field horizontal movements.	Complete – Malabar met with RMS in February 2019 to discuss the findings of the relevant studies and potential subsidence impacts on built features (Section 5 of the EIS).

Ref	Issue	Aspect Type	Action(s)	Status
IS023	Bore water drawdown reduces neighbouring landholders' access to water.	Water	Based on outcomes of groundwater modelling, implement engagement program with any potentially affected landholders.	Ongoing – No impacts on bores in 'highly productive' aquifers are predicted. Potential drawdowns in bores in 'less productive' aquifers are not expected to materially affect access to water, however monitoring and engagement with relevant landholders would be ongoing under a Groundwater Management Plan (Appendix B of the EIS).
IS038	Generation of highly saline brine impacts site water quality, wash plant and/or dust suppression usage.	Water	Develop Trigger Action Response Plan for brine transfer pipeline.	Ongoing – For inclusion in a Water Management Plan for the Project.
IS058	Impacts at night due to use of the site access road and transport and services corridor.	Visual	Consideration of strategies to reduce headlight wash at night.	Complete – Direct and diffuse night-lighting impacts would be minimal compared to existing diffuse lighting due to the mining operations and power stations surrounding the Project (Appendix N of the EIS).
IS063/IS064	Impacts on native fauna as a result of the site access road and transport and services corridor.	Biodiversity	Consideration of strategies to manage fauna interactions with mine traffic.	Complete – The design of the Project integrates measures to minimise potential impacts of vehicle strikes on native fauna (e.g. use of the existing site access road and a covered, overland conveyor). The site access road would be fenced and would have a speed limit imposed (Appendix E of the EIS).

1 INTRODUCTION

Maxwell Ventures (Management) Pty Ltd, a wholly owned subsidiary of Malabar Coal Limited (Malabar), is seeking consent to develop an underground coal mining operation, referred to as the Maxwell Project (the Project).

The Project is in the Upper Hunter Valley of New South Wales (NSW), east-southeast of Denman and south southwest of Muswellbrook (Figure 1).

Underground mining is proposed within Exploration Licence (EL) 5460, which was acquired by Malabar in February 2018. Malabar also acquired existing infrastructure within Coal Lease (CL) 229, Mining Lease (ML) 1531 and CL 395, known as the "Maxwell Infrastructure". The Project would include the use of the substantial existing Maxwell Infrastructure, along with the development of some new infrastructure (Figure 2).

This Environmental Risk Assessment (ERA) forms part of an Environmental Impact Statement (EIS) which has been prepared to accompany a Development Application for the Project in accordance with Part 4 of the NSW *Environmental Planning and Assessment Act, 1979*.

1.1 AIM AND OBJECTIVES

The aim of the workshop was:

> *To conduct a risk assessment of the potential environmental impacts of the Project, identifying the key issues for further assessment.*

The team identified the desired outcomes of the workshop and subsequent reporting was to:

1. identify key issues to be addressed in the EIS;
2. identify potential controls and consider whether these controls would be adequate; and
3. develop a document suitable for inclusion in the EIS and prepared in accordance with Australian Standard / New Zealand Standard International Standards Organisation (AS/NZS ISO) 31000:2018 *Risk management –Guidelines* (AS/NZS ISO 31000:2018).

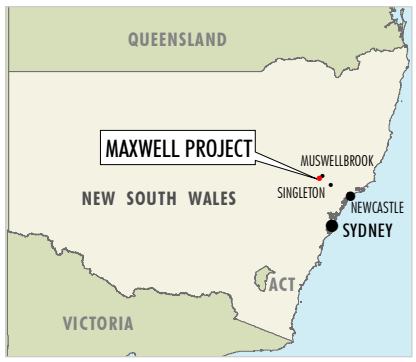
1.2 CLIENT

The client for the ERA is Maxwell Ventures (Management) Pty Ltd, a wholly owned subsidiary of Malabar.

1.3 SCOPE

The scope of the ERA was to conduct a risk assessment of the potential environmental impacts of the Project.

Section 1.7 outlines the methodology and key steps adopted for the ERA process.



LEGEND

- Mining Operation
- Proposed Mining Operation
- Railway
- Local Government Boundary
- State Forest
- National Parks and Wildlife Service Estate
- Maxwell Project Exploration Licence Boundary
- Maxwell Project Mining and Coal Lease Boundary
- Indicative Extent of Underground Development

Source: © NSW Department of Planning and Environment (2019); NSW Department of Finance, Services and Innovation (2019); Office of Environment and Heritage NSW (2019)

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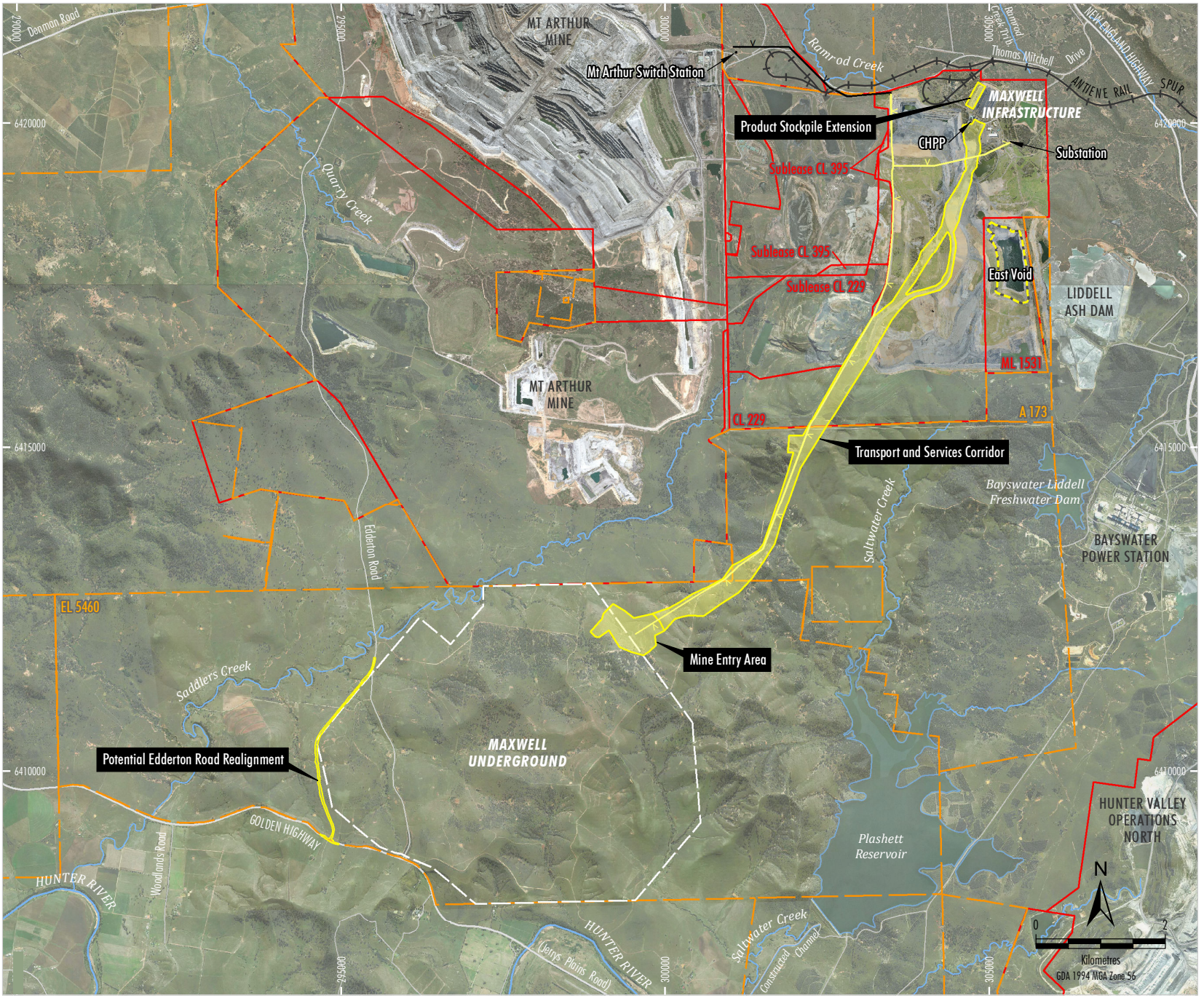
Regional Location

Figure 1

SHM-18-03 Maxwell_EIS_App_Figure 1_Rev D



LEGEND

- Railway
- Exploration Licence Boundary
- Mining and Coal Lease Boundary
- Indicative Extent of Underground Development
- Indicative Surface Development Area
- CHPP Reject Emplacement Area
- Proposed 66 kV Power Supply
- Proposed Ausgrid 66 kV Power Supply Extension#

Subject to separate assessment and approval.

Source: © NSW Department of Planning and Environment (2019); NSW Department of Finance, Services & Innovation (2019) Orthophoto Mosaic: 2018, 2016, 2011

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Project General Arrangement

Figure 2

SHM-18-03 Maxwell_EIS_App_ERA_201A

1.4 CLARIFYING POINTS

The team discussion of the scope raised the following clarifying points:

- Safety issues and business aspects of the Project were not within the scope of the workshop. (These non-environmental matters are considered by Malabar in other risk management forums and activities).
- The geographical extent of the Project was understood to include the Project area, which is described in Section 3 of the Main Report of the EIS.
- The risk assessment was intended to cover all aspects of the Project, including the key issues outlined in the Secretary's Environmental Assessment Requirements (SEARs) for the Project.
- Cumulative impacts of past, present and reasonably foreseeable actions should be considered.

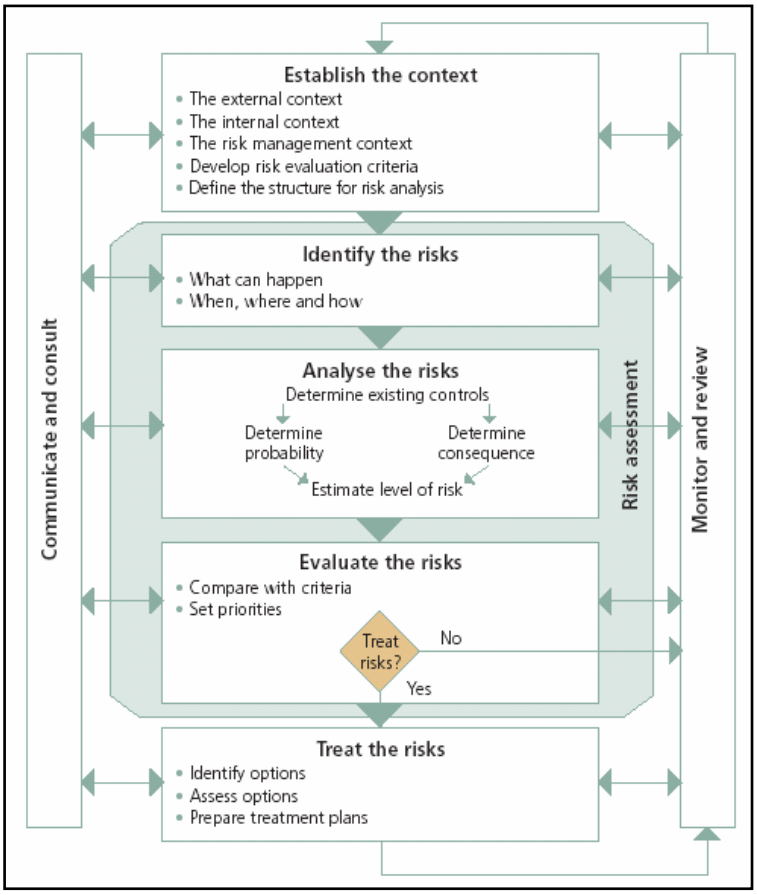
Definitions for key terms used in this ERA are provided in Attachment A.

1.5 RISK ASSESSMENT PROCESS

The risk assessment process was based on the framework provided in Figure 3 (based on AS/NZS ISO 31000:2018, MDG1010 *Minerals Industry Safety and Health Risk Management Guideline* [NSW Department of Trade and Investment, 2011] and Handbook (HB) 203:2012 *Managing environment-related risk* [HB 203:2012]).

This ERA draws upon the outcomes of the team workshop in November 2018.

Figure 3 – Risk Management Process (HB 203:2012)



Source: **after HB 203:2012.**

1.6 RESOURCING, SCHEDULE AND ACCOUNTABILITIES

The following resources were allocated to the workshop to conduct an effective ERA:

1. a team of personnel with suitable experience and knowledge of mining operations and environmental issues associated with the Project area;
2. an external facilitator for the risk assessment and documentation of the results; and
3. aerial photographs, drawings, and, the SEARs.

The outcomes of the ERA and associated accountabilities were understood by the team as being intended to be integrated into the EIS and Malabar's management systems so that they are effectively reviewed, implemented and monitored.

1.7 METHODOLOGY

1.7.1 Framework

Figure 3 outlines the overall framework utilised for the ERA. This framework is further discussed in Section 1.7.2 with respect to the Project area.

1.7.2 Key Steps

The key steps in the process included:

1. confirming the scope of the ERA;
2. listing the key assumptions on which the ERA is based;
3. reviewing available data on the Project including reports, plans, maps and aerial photos (both prior to and during the workshop);
4. reviewing documentation and presentations by Malabar personnel on the Project features;
5. conducting a team-based risk assessment that:
    a. provided detailed descriptions of the tasks to be undertaken and the proposed method;
    b. generally identified issues related to the Project;
    c. identified hazards and assessed the level of risk; and
    d. developed a list of recommended controls to treat the risks (through prevention, monitoring, management and remediation strategies);
6. preparing a draft report in accordance with AS/NZS ISO 31000:2018 for review by Malabar personnel and ERA team members;
7. incorporating comments from reviewers; and
8. finalising the report and issuing as a "controlled copy" for ongoing use.

With respect to the overall framework (Figure 3), Steps 1 to 4 above represent the 'establish the context' phase and Step 5 represents the 'identify risks', 'analyse risks', 'evaluate risks' and 'treat risks' phases.

1.7.3 External Facilitation

The team was facilitated through the process by ***Operational Risk Mentoring*** (OpRM) – a company specialising in risk assessment and risk management programmes. The facilitator, Dr Peter Standish, is experienced with underground coal mining and many aspects of safety management systems and environmental monitoring and rehabilitation.

The team was encouraged and challenged to identify a wide range of environmental impacts or hazards.

It is important to understand that the outcomes of this ERA:

1. are process driven;
2. challenge current thinking and may not necessarily appear appropriate or reflect “pre-conceived” ideas; and
3. are the result of the team assembled to review the topic and not the result of any one individual or organisation.

2 ESTABLISH THE CONTEXT

2.1 PROJECT DESCRIPTION

The Project would involve an underground mining operation that would produce high quality coals over a period of approximately 26 years.

At least 75% of coal produced by the Project would be capable of being used in the making of steel (coking coals). The balance would be export thermal coals suitable for the new generation High Efficiency, Low Emissions power generators.

The Project would involve extraction of run-of-mine (ROM) coal, from four seams within the Wittingham Coal Measures using the following underground mining methods:

- underground bord and pillar mining with partial pillar extraction in the Whynot Seam; and
- underground longwall extraction in the Woodlands Hill Seam, Arrowfield Seam and Bowfield Seam.

The substantial existing Maxwell Infrastructure would be used for handling, processing and transportation of coal for the life of the Project. The Maxwell Infrastructure includes an existing coal handling and preparation plant (CHPP), train load-out facilities and other infrastructure and services (including water management infrastructure, administration buildings, workshops and services).

A mine entry area would be developed for the Project in a natural valley in the north of EL 5460 (Figure 2) to support underground mining and coal handling activities and provide for personnel and materials access.

ROM coal brought to the surface at the mine entry area would be transported to the Maxwell Infrastructure area. Early ROM coal would be transported via internal roads during the construction and commissioning of a covered overland conveyor system. Subsequently, ROM coal would be transported to the Maxwell Infrastructure area via the covered overland conveyor system.

The Project would support continued rehabilitation of previously mined areas and overburden emplacements areas within CL 229, ML 1531 and CL 395. The volume of the East Void would be reduced through the emplacement of reject material generated by Project coal processing activities and would be capped and rehabilitated at the completion of mining.

A detailed description of the Project is provided in the main document of the EIS.

2.2 RISK MANAGEMENT CONTEXT

This ERA has been conducted with reference to the SEARs for the Project.

In addition, the ERA was prepared cognisant of the following documents:

- AS/NZ ISO 31000:2018;
- HB 203:2012; and
- MDG1010 *Minerals Industry Safety and Health Risk Management Guideline* (Department of Trade and Investment, 2011).

2.3 RISK CRITERIA

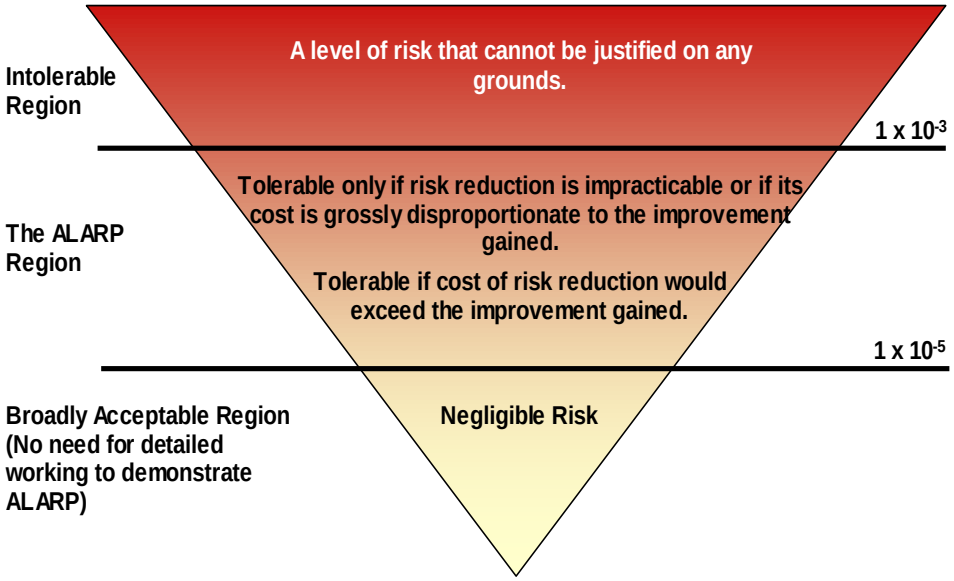
The risk criteria utilised is to reduce the risk to As Low as Reasonably Practicable (ALARP) or lower. Figure 4 schematically shows the three risk management zones *viz*. intolerable, ALARP and tolerable. The middle zone is referred to as the ALARP region.

The purpose of risk criteria is to allow an organisation to clearly define unacceptable levels of risk, or conversely the level of risk which is acceptable or tolerable. Through the use of the risk criterion, an organisation can prioritise proposed actions to control the risk during the risk assessment.

The ALARP principle, as represented in the diagram below, was developed to assist in the definition of the acceptability of risk and to demonstrate that an organisation has done all that is considered to be practical in reducing the level of exposure to a risk. More often this is done qualitatively rather than as a quantitative probability as shown on the right-hand side of the diagram presented in Figure 4. A risk may be tolerable in the ALARP zone if the cost of removing the risk is disproportionate to the benefits gained.

The risk ranking matrices used during the ERA workshop are presented in Section 4.

Figure 4 – Risk Criteria "ALARP"



3 IDENTIFY RISKS

3.1 OVERVIEW

The identification of risks involved the use of risk assessment "tools" appropriate for identifying potential loss scenarios associated with the Project. The tools used were:

- Introduction – before the potential issues were discussed it was important that the whole team had a good understanding of the Project, and this was confirmed by the facilitator.
- Presentation review – the Project was described in detail by knowledgeable team members and this generated development of potential loss scenarios that were added to the Risk Ranking Table (Section 4).
- Brain-writing – a process of encouraging the team to generate a range of issues.
- Modified Hazard and Operability (HAZOP) analysis – this involved the review of key words (drawn from the SEARs for the Project) and aerial photographs, plans, and the consequent identification of potential issues at each logical location/node during each phase of operation.

3.2 ENVIRONMENTAL RISK ASSESSMENT TEAM

The review team met for the ERA workshop at the Resource Strategies' offices in November 2018. A team-based approach was utilised in order to have an appropriate mix of skills and experience to identify the potential environmental issues and potential loss scenarios. Details of the team members and their relevant qualifications and experience are included in Table 2.

Table 2 – Review Team

Name	Role/Affiliation	Experience, Training and Skills
Bill Dean	Malabar - Project General Manager	BE, Stat Qualifications and over 40 years of industrial experience and project development.
Donna McLaughlin	Malabar - Environment and Community Manager	BEnvSc and over 10 years of environmental and industrial experience.
James Barbato	Mine Subsidence Engineering Consultants - Associate Director	BE (Civil), PhD and over 15 years of experience in the mining industry.
Noel Merrick	HydroSimulations - Director	PhD, MSc, BSc and over 45 years of experience in hydrogeology.
Greg Roads	WRM Water and Environment - Director	BE and over 30 years of industrial experience and 9 years experience in the Project area.
Paul Frazier	2rog Consulting - Director	PhD (EnvSc), Masters in Soils, BEd and over 30 years of scientific research and environmental assessment.
Dee Elliott	Elliott Whiteing - Director	BA (Psychology), Masters of Social Policy and over 30 years of experience in social impact assessment.
Colin Driscoll	HunterEco - Environmental Biologist	PhD, BSc and over 40 years of scientific and environmental assessment experience.
Aleks Todoroski	Todoroski Air Sciences - Director	BE and over 25 years of experience in air quality and noise analysis, assessment and management.
Roman Haverkamp	Wilkinson Murray - Project Manager	BA (Hons) and over 15 years of industrial experience in environmental noise and construction noise and vibration assessment.
Joanna Hinks	Resource Strategies - Senior Environmental Manager	BE (Environmental) and 12 years of experience in environmental management and project approvals in the resource industry.

Name	Role/Affiliation	Experience, Training and Skills
Justin Hocking	Resource Strategies - Environmental Project Manager	BE (Chemical and Environmental) and 2 years of experience in environmental management and project approvals in the resource industry.
Peter Standish	OpRM - Facilitator	Formal mining qualifications (PhD, BE), statutory manager qualifications and over 25 years of industrial and mining experience. Facilitator for over 30 environmental and approval risk analyses.

3.3 RISK IDENTIFICATION

3.3.1 Modified HAZOP

The main "tool" applied with the team was that of a modified HAZOP. In this process, aerial photographs and plans of the Project and surrounding area were referred to along with a consideration of the phases of operation and the potential impacts that could arise.

The generic key words used in the HAZOP process representing environmental issue subject areas (generally based on the headings in the SEARs for the Project) were:

- Built Features.
- Water.
- Noise.
- Air Quality.
- Biodiversity.
- Heritage.
- Visual.
- Road and Rail.
- Social.
- Economic.
- Land and Agriculture.

In addition, the causal pathway groups presented in the Bioregional Assessment for the Hunter subregion were also considered during the Modified HAZOP process (Figure 7 in Herron et al. 2018).

The key issues identified in the ERA (Attachment B) will be addressed in appropriately detailed assessments in Section 6 of the EIS and the assessments prepared by specialists included as appendices to the EIS.

3.3.2 Referred Issues

Issues raised during the ERA workshop brainstorming that were: outside the scope of the ERA; outside of the Project scope; and/or beyond the control of Malabar were considered 'referred issues'.

Notwithstanding, 'referred issues' may warrant consideration in the development of the EIS and/or may warrant consideration by Malabar for internal risk management purposes. The referred issues are listed in Attachment C.

4 ANALYSE AND EVALUATE RISKS

4.1 PRIORITISATION

The key potential hazards/issues were identified through a private points allocation system whereby team members were assigned points to allocate to what they considered to be the key hazards/issues.

The results are shown in Table 3 in descending priority. This provided a method to identify and sort initial concerns at an early stage.

Table 3 – Priority Issues

Ref	Issue	Aspect Type	Priority
IS024	Increase in leakage from the Hunter River reduces neighbouring landholder's access to water.	Water	117
IS013	Activities associated with mine construction and operations negatively affect the horse studs' customers' perceptions impacting these businesses and their contributions to the Equine Critical Industry Cluster (CIC).	Land and Agriculture	115
IS044	Poor consultation or engagement with neighbours, council and other stakeholders results in poor social outcomes and/or a poor relationship (e.g. mistrust) between Malabar and its neighbours and stakeholders.	Social/Economic	80
IS045	Existing landform at Maxwell Infrastructure proves a key constraint to achieving a desirable final landform.	Land and Agriculture	65
IS062	Impacts on biodiversity as a result of cumulative baseflow reductions in Saddlers Creek.	Water	65
IS014	Visual impacts result in a reduction in visitors to Hollydene Estate Wines or the region.	Visual	58
IS069	Off-site end user impacts from coal use.	Noise and Air Quality	55
IS020	Impacts on the wellbeing of neighbouring landholders as a result of noise, cumulative noise impacts or cumulative dust deposition from the Maxwell Infrastructure (e.g. sleep, outdoor amenity or rainwater tank water quality).	Social/Economic	51
IS008	Leakage between aquifers that diminishes the beneficial use value of aquifers due to changes in water quality.	Water	50
IS009	Leaching of contaminants into aquifers near the Maxwell Infrastructure that reduces their beneficial use.	Water	50
IS046	Existing final voids at the Maxwell Infrastructure leave legacy issues for the community beyond the mine's closure.	Social/Economic	50
IS034	Impacts on ecological communities or threatened species.	Biodiversity	17
IS033	Impacts on groundwater dependent ecosystems as a result of groundwater drawdown or direct disturbance.	Biodiversity	14
IS037	Excess mine water/groundwater generated on-site exceeds storage/usage requirements resulting in off-site impacts.	Water	12
IS059	Project traffic movements results in worsening of traffic conditions in Singleton.	Road and Rail	11

Ref	Issue	Aspect Type	Priority
IS015	Noise from Maxwell Infrastructure results in impacts on residential amenity of nearby properties.	Noise and Air Quality	10
IS017	Noise from mine entry area and conveyors results in impacts on residential amenity of neighbouring properties.	Noise and Air Quality	10
IS030	Subsidence-related impacts on Malabar-owned land results in reduced agricultural productivity (e.g. increased soil erosion, ponding, degraded agricultural infrastructure, degradation of drainage lines and creeks).	Land and Agriculture	10
IS047	Population effects due to Project workforce demands.	Social/Economic	10

4.2 PROBABILITY AND MAXIMUM REASONABLE CONSEQUENCE

Potential loss scenarios (primarily based on the key potential environmental issue or issues for each aspect type) were risk ranked by the ERA team. A tabular analysis was used for this risk ranking process, based on the probability and consequence of a loss scenario occurring.

The following definition of risk was used:

- the combination of the probability of an unwanted event occurring; and
- the maximum reasonable consequences (MRCs) should the event occur.

The level of analysis conducted was commensurate with the level of risk, and the value and condition of the relevant environmental assets.

Tables 4 to 6 present the ERA matrix tools that were utilised for ranking risks.

Table 4 – Qualitative Measures of Probability

Rank (P)	Probability	Descriptor
A	Almost Certain	Happens often.
B	Likely	Could easily happen.
C	Possible	Could happen and has occurred elsewhere.
D	Unlikely	Hasn't happened yet but could.
E	Rare	Conceivable, but only in extreme circumstances.

Table 5 – Qualitative Measures of Maximum Reasonable Consequence

	People	Environment	Asset/Production
1	Multiple fatalities	Extreme environmental harm (e.g. widespread catastrophic impact on environmental values of an area)	More than $1 billion (B) loss or production delay
2	Permanent total disabilities, single fatality	Major environmental harm (e.g. widespread substantial impact on environmental values of an area)	$100 million (M) to $1B loss or production delay
3	Major injury or health effects (e.g. major loss workday case/permanent disability)	Serious environmental harm (e.g. widespread and considerable impact on environmental values of an area)	$5M to $100M loss or production delay
4	Minor injury or health effects (e.g. restricted work or minor lost workday)	Material environmental harm (e.g. localised and considerable impact on environmental values of an area)	$250 thousand (k) to $5M loss or production delay
5	Slight injury or health effects (e.g. first aid/minor medical treatment level)	Minimal environmental harm (e.g. minor impact on environmental values of an area)	Less than $250k loss or production delay

Note: MRC is the worst-case consequence that could reasonably be expected, given the scenario and based upon experience within the mining industry.

Table 6 – Risk Ranking Table

		Likelihood				
		A	**B**	**C**	**D**	**E**
Consequence	**1**	1(H)	2(H)	4(H)	7(M)	11(M)
	2	3(H)	5(H)	8(M)	12(M)	16(L)
	3	6(H)	9(M)	13(M)	17(L)	20(L)
	4	10(M)	14(M)	18(L)	21(L)	23(L)
	5	15(M)	19(L)	22(L)	24(L)	25(L)

Notes: L – Low, M – Moderate, H – High.
Rank numbering: 1 – highest risk; 25 – lowest risk.

Legend – Risk Levels:

	Low – Tolerable
	ALARP – As low as reasonably practicable
	Intolerable

4.3 RISK RANKING

Risk ranking was undertaken by the team on loss scenarios based on the key potential environmental issues and is provided in Table 7.

Table 7 – Risk Ranking Results

Aspect Type	Risk Ranking Basis and Planned Controls	Probability	Consequence	Risk Score
Built Features	*Risk ranking basis:* Subsidence impacts on Edderton Road (as the most significant built feature in the Project area) and the potential for delays as a result of subsidence management. *Planned controls*: Realignment of Edderton Road or road maintenance of existing alignment to address issues.	B	5	19(L)
Water	*Risk ranking basis:* The potential for localised impacts on ecology along Saddlers Creek as a result of groundwater depressurisation. *Planned controls*: (i) Integrated groundwater, surface water and biodiversity impact assessment; (ii) acquisition of sufficient water licences; (iii) groundwater, surface water and biodiversity monitoring programs; and, (iv) the implementation of biodiversity offsets.	A	5	15(M)
Noise and Air Quality	*Risk ranking basis:* The potential for sleep disturbance of residents located proximal to the Maxwell Infrastructure. *Planned controls*: (i) Noise modelling to identify predicted performance; (ii) implementation of noise mitigation measures (including proactive and reactive measures); (iii) engagement with the Maxwell Infrastructure Community Consultative Committee (CCC) and near neighbours; and, (iv) noise monitoring program.	B	5	19(L)
Biodiversity	*Risk ranking basis:* The potential for an irreversible impact on biodiversity, based on available information at the time of the workshop. *Planned controls*: (i) Biodiversity surveys and impact assessment; and (ii) implementation of a biodiversity offset package.	C	3	13(M)
Heritage	*Risk ranking basis:* The potential for impacts on Aboriginal heritage items (artefact scatters and other open sites). *Planned controls*: (i) Aboriginal cultural heritage surveys; (ii) Aboriginal Cultural Heritage Assessment Report prepared in consultation with registered Aboriginal parties; and, (iii) implementation of Aboriginal cultural heritage management measures during construction and operation (including salvage and consultation).	D	5	24(L)

Aspect Type	Risk Ranking Basis and Planned Controls	Probability	Consequence	Risk Score
Visual	*Risk ranking basis:* The potential for impacts to the 'brand-scape' of equine enterprises. Considered to have been considerably addressed through the siting of infrastructure in areas that mitigate visual impacts. *Planned controls*: (i) Commitment to underground mining operation; (ii) siting of mine entry area; (iii) community and stakeholder engagement program, including meetings with key viticulture and equine stakeholders; and, (iv) viewshed modelling and visual impact assessment.	D	5	24(L)
Road and Rail	*Risk ranking basis:* The potential for impacts on road performance as a result of Project-related traffic. *Planned controls*: Road transport assessment to determine predicted performance (no additional mitigation measures considered necessary).	B	5	19(L)
Social/Economic	*Risk ranking basis:* The potential for impacts on the wellbeing of neighbouring landholders as a result of noise, cumulative noise impacts or cumulative dust deposition from the Maxwell Infrastructure (e.g. sleep, outdoor amenity or rainwater tank water quality). *Planned controls*: (i) Commitment to underground mining operation; (ii) siting of mine entry area; (iii) noise and air quality modelling to identify predicted performance; (iv) implementation of noise and dust mitigation measures across the operation; (v) engagement with the Maxwell Infrastructure CCC and near neighbours; (vi) noise and air quality monitoring programs; and, (vii) where necessary, voluntary noise mitigation measures offered for moderate noise impacts.	B	5	19(L)
Land and Agriculture	*Risk ranking basis:* The potential for long-term impacts on agricultural production. *Planned controls*: (i) Integrated subsidence, geomorphology, surface water and agricultural impact assessment; (ii) development of a rehabilitation strategy; (iii) subsidence monitoring and remediation; (iv) confining operating areas; (v) hydrocarbon and spill management; and, (vi) site water management.	D	5	24(L)

R= Risk - Ranking basis 1 (highest risk) to 25 (lowest risk).

Risk rankings defined as 1 to 6 – High; 7 to 15 - Medium (or ALARP) and 16 to 25 - Low.

5 TREAT RISKS

A selection of controls to reduce the likelihood of the risks associated with the topic under review were made with due regard to their prospective reliability. That is, good design and installing engineering modifications are superior controls to relying on operator training efforts. As part of the process, existing and planned controls were analysed and recommendations for amendments or additions made where these existing controls were deemed unacceptable or inadequate.

Further, the prospective reliability of the controls identified was also reviewed. These controls were qualitatively reviewed by considering their position on the hierarchy of controls, the ability to detect any deterioration in the control and the ability to mitigate.

Attachment B outlines the planned controls for each issue identified.

6 MONITOR AND REVIEW

6.1 NOMINATED CO-ORDINATOR

The nominated client review facilitator is Bill Dean, the Project General Manager.

It is understood the client review facilitator will co-ordinate the inclusion of the key potential environmental issues into the various studies undertaken as part of the EIS and the overall Malabar management systems.

6.2 COMMUNICATION AND CONSULTATION

Consultation, involvement of Malabar personnel (and advisers) and communication of the process and outcomes of the ERA are intended to be achieved by the inclusion of this report and the relevant specialist assessments addressing the key potential issues in the EIS, and consideration of the report's outcomes (Attachment B) in the overall Malabar management systems to be implemented for the Project.

6.3 CONCLUDING REMARKS

The risk assessment process conducted by the team was aligned with AS/NZS ISO 31000:2018 and MDG1010 *Minerals Industry Safety and Health Risk Management Guideline* (NSW Department of Trade and Investment, 2011), with the intention of identifying the key potential environmental issues for the Project.

Peter Standish, July 2019

ATTACHMENT A - DEFINITIONS

Table A1 - Definitions

Term	Explanation
ALARP	"As Low as Reasonably Practicable". The level of risk between tolerable and intolerable levels that can be achieved without expenditure of a disproportionate cost in relation to the benefit gained.
AS/NSZ ISO 31000:2018	Australian Standard/New Zealand Standard on Risk Management.
Causal Pathway	A term used to describe the "flow" of events beginning from a root cause and leading to an unwanted outcome. The flow is typically causes prevented from becoming incidents by preventative controls and incidents reduced in severity by mitigating controls which lead to different severity outcomes. A causal pathway is a cause *to* failed preventative controls *to* incident *to* successful mitigating controls *to* outcome.
Cause	A source of harm.
Control	An intervention by the proponent intended to either prevent a cause from becoming an incident or to reduce the outcome should an incident occur.
CHPP	Coal Handling and Preparation Plant.
Hazard	Is the source of potential harm or a situation with a potential to cause injury or illness to a person or harm to the environment.
SEARs	Secretary's Environmental Assessment Requirements.
ERA	Environmental Risk Assessment.
MDG1010	NSW Department of Primary Industries guideline on Risk Management.
OpRM	Operational Risk Mentoring a trading name of Salbury Pty. Ltd.
Outcome	The end result following the occurrence of an incident. Outcomes are analogous to impacts and have a risk ranking attached to them.
Personnel	Includes all people working in and around the site (e.g. all contractors, sub-contractors, visitors, consultants, project managers etc.).
Practicable	The extent to which actions are technically feasible, in view of cost, current knowledge and best practices in existence and under operating circumstances of the time.
Review	An examination of the effectiveness, suitability and efficiency of a system and its components.
Risk	The combination of the potential consequences arising from a specified hazard together with the likelihood of the hazard actually resulting in an unwanted event.

ATTACHMENT B – ISSUES IDENTIFIED

Table B1 presents a listing of all identified issues and the intended follow up (if required). The table is ordered by priority and aspect type.

Table B1 – Consolidated List of Issues

Ref	Aspect Type	Issue Requiring Consideration	Priority	Planned Controls	Action(s)
IS024	Water	Increase in leakage from the Hunter River reduces neighbouring landholder's access to water.	117	Integrated groundwater and surface water impact assessment. Acquisition of sufficient water licences, based on technical assessments (noting the Hunter River is a regulated river). Groundwater and surface water monitoring programs.	-
IS013	Land and Agriculture	Activities associated with mine construction and operations negatively affect the horse studs' customers' perceptions impacting these businesses and their contributions to the Equine CIC.	115	Commitment to underground mining operation. Siting of mine entry area. Community and stakeholder engagement program, including meetings with key equine stakeholders. Viewshed modelling and visual impact assessment.	Implement engagement program beyond EIS submission.
IS044	Social/Economic	Poor consultation or engagement with neighbours, council and other stakeholders results in poor social outcomes and/or a poor relationship (e.g. mistrust) between Malabar and its neighbours and stakeholders.	80	Community and stakeholder engagement program. Consistent messaging about commitments – being clear on what is achievable before going out to consultation.	Implement engagement program beyond EIS submission.
IS045	Land and Agriculture	Existing landform at Maxwell Infrastructure proves a key constraint to achieving a desirable final landform.	65	Emplacement of Project CHPP reject material in the East Void (reducing void volume). Development of Rehabilitation Strategy, based on consideration of landform alternatives. Community and stakeholder engagement regarding landform and land use outcomes.	Continue to investigate beneficial uses of voids and engage with other miners, industrial operations, infrastructure developers and operators, agricultural enterprises, and councils in the region.

Ref	Aspect Type	Issue Requiring Consideration	Priority	Planned Controls	Action(s)
IS062	Water	Impacts on biodiversity as a result of cumulative baseflow reductions in Saddlers Creek.	65	Integrated groundwater, surface water and biodiversity impact assessment. Acquisition of sufficient water licences, based on technical assessments. Groundwater, surface water and biodiversity monitoring programs. Implementation of biodiversity offsets.	-
IS014	Visual	Visual impacts result in a reduction in visitors to Hollydene Estate Wines or the region.	58	Commitment to underground mining operation. Siting of mine entry area. Community and stakeholder engagement program, including meetings with key viticulture and equine stakeholders. Viewshed modelling and visual impact assessment.	Implement engagement program beyond EIS submission.
IS069	Noise and Air Quality	Off-site end user impacts from coal use.	55	Product coal mix [At least 75% of coal produced would be capable of being used in the making of steel. The balance would be export thermal coals suitable for the new generation High Efficiency, Low Emissions power generators.] Controls imposed by others – State, Federal and International controls.	-

Ref	Aspect Type	Issue Requiring Consideration	Priority	Planned Controls	Action(s)
IS020	Social/Economic	Impacts on the wellbeing of neighbouring landholders as a result of noise, cumulative noise impacts or cumulative dust deposition from the Maxwell Infrastructure (e.g. sleep, outdoor amenity or rainwater tank water quality).	51	Commitment to underground mining operation. Siting of mine entry area. Noise and air quality modelling to identify predicted performance. Implementation of noise and dust mitigation measures across the operation Engagement with the Maxwell Infrastructure CCC and near neighbours. Noise and air quality monitoring programs. Where necessary, voluntary noise mitigation measures offered for moderate noise impacts.	-
IS008	Water	Leakage between aquifers that diminishes the beneficial use value of aquifers due to changes in water quality.	50	Not conceptualised to occur. Groundwater modelling to determine predicted performance. Groundwater monitoring program used to validate predictions during operations.	-
IS009	Water	Leaching of contaminants into aquifers near the Maxwell Infrastructure that reduces their beneficial use.	50	Groundwater modelling, including long-term groundwater recovery, to determine predicted performance. Groundwater monitoring program used to validate predictions during operations.	-
IS046	Social/Economic	Existing final voids at the Maxwell Infrastructure leave legacy issues for the community beyond the mine's closure.	50	Emplacement of Project CHPP reject material in the East Void (reducing void volume). Development of Rehabilitation Strategy, based on consideration of landform alternatives. Community and stakeholder engagement regarding landform and land use outcomes.	Continue to investigate beneficial uses of voids and engage with other miners, industrial operations, infrastructure developers and operators, agricultural enterprises, and councils in the region.
IS034	Biodiversity	Impacts on ecological communities or threatened species.	17	Biodiversity surveys and impact assessment. Implementation of a biodiversity offset package.	Re-assess controls following completion of Biodiversity Development Assessment Report.

Ref	Aspect Type	Issue Requiring Consideration	Priority	Planned Controls	Action(s)
IS033	Biodiversity	Impacts on groundwater dependent ecosystems as a result of groundwater drawdown or direct disturbance.	14	Integrated groundwater, surface water and biodiversity impact assessment. Acquisition of sufficient water licences, based on technical assessments. Groundwater, surface water and biodiversity monitoring programs. Implementation of biodiversity offsets.	-
IS037	Water	Excess mine water/groundwater generated on-site exceeds storage/usage requirements resulting in off-site impacts.	12	Managing water on site, including maximising on-site use. Groundwater modelling and site water balance to determine predicted performance. Groundwater monitoring program and site water balance reviews used to validate predictions during operations.	Continue to investigate beneficial uses of excess water and engage with other miners, industrial operations, infrastructure developers and operators, agricultural enterprises, and councils in the region.
IS059	Road and Rail	Project traffic movements results in worsening of traffic conditions in Singleton.	11	Road transport assessment indicates Project-related traffic would not materially contribute to the peak flow period.	-
IS015	Noise and Air Quality	Noise from Maxwell Infrastructure results in impacts on residential amenity of nearby properties.	10	Noise modelling to identify predicted performance. Implementation of noise mitigation measures. Engagement with the Maxwell Infrastructure CCC and near neighbours. Noise monitoring program. Where necessary, voluntary noise mitigation measures offered for moderate noise impacts.	-

Ref	Aspect Type	Issue Requiring Consideration	Priority	Planned Controls	Action(s)
IS017	Noise and Air Quality	Noise from mine entry area and conveyors impacts on residential amenity of neighbouring properties.	10	Commitment to underground mining operation. Siting of mine entry area. Noise modelling to identify predicted performance. Noise monitoring programs. Noise mitigation considered as part of the equipment design phase.	-
IS030	Land and Agriculture	Subsidence-related impacts on Malabar-owned land results in reduced agricultural productivity (e.g. increased soil erosion, ponding, degraded agricultural infrastructure, degradation of drainage lines and creeks).	10	Integrated subsidence, geomorphology, surface water and agricultural impact assessment. Subsidence monitoring and remediation, including erosion and sediment control.	-
IS047	Social/Economic	Population effects due to Project workforce demands.	10	Preferential engagement of local workforce.	Develop more detailed local employment philosophy.
IS022	Land and Agriculture	Land contamination results in impacts on future use of mined land.	6	Confining operating areas. Hydrocarbon and spill management. Site water management. Pollution Incident Response Management Plan.	-
IS016	Noise and Air Quality	Noise from Project rail movements results in impacts on residential amenity of nearby properties.	5	Noise modelling to determine predicted performance. Engagement with the Antiene Rail Spur CCC and near neighbours. Noise monitoring program. Operations managed to minimise extraneous noise.	-

Ref	Aspect Type	Issue Requiring Consideration	Priority	Planned Controls	Action(s)
IS040	Water	Lower groundwater inflows than predicted, results in importation of water to site.	5	Considered low likelihood. Managing water on site, including maximising on-site use. Groundwater modelling and site water balance to determine predicted performance. Groundwater monitoring program and site water balance reviews used to validate predictions during operations.	-
IS056	Visual	Visual impacts from Edderton Road as a result of views of the mine entry area.	4	Viewshed modelling and visual impact assessment.	Consider visual mitigation strategies to minimise visual impacts along Edderton Road.
IS057	Visual	Night-lighting impacts on surrounding receivers.	3	Visual impact assessment.	Consider implementation of reasonable and feasible visible light mitigation.
IS012	Water	Change in baseflow to streams diminishes the beneficial use value due to changes in water quality.	2	Integrated groundwater, surface water and biodiversity impact assessment. Groundwater, surface water and biodiversity monitoring programs.	-
IS018	Noise and Air Quality	Dust emissions from the Maxwell Infrastructure and Project rail movements result in impacts on residential amenity of nearby properties.	2	Air quality modelling to determine predicted performance. Implementation of dust mitigation measures. Engagement with the Maxwell Infrastructure CCC and near neighbours. Air quality monitoring program.	-
IS053	Water	Reduction in the water quality of Ramrod Creek, and further downstream in the Hunter River.	2	Integrated groundwater, surface water and biodiversity impact assessment. Groundwater, surface water and biodiversity monitoring programs.	-

Ref	Aspect Type	Issue Requiring Consideration	Priority	Planned Controls	Action(s)
IS031/ IS068	Land and Agriculture	Biodiversity offset areas significantly reduce the agricultural productivity of the agricultural properties.	2	Consideration of alternatives in the selection of biodiversity offset areas. Agricultural impact assessment.	-
IS001	Built Features	Subsidence-related impacts on Edderton Road (i.e. cracking, stepping, etc.) results in impacts on safety and/or serviceability.	-	Either a realignment of Edderton Road or road maintenance of existing alignment to address issues.	Following stakeholder consultation, consider preferred approach to management.
IS002	Built Features	Subsidence-related impacts on the 11 kilovolt powerline results in adverse impacts on the power poles or reduced cable clearances.	-	Subsidence predictions and assessment. Subsidence monitoring program. Implementation of mitigation measures in consultation with the asset owner.	-
IS005	Built Features	Subsidence-related impacts on the Golden Highway (i.e. anomalous movements at the small cutting or the surface projection of the East Graben Fault) results in impacts on safety.	-	Physical separation between the underground mining area and the Golden Highway. Subsidence predictions and assessment. Subsidence monitoring program. Implementation of Trigger Action Response Plan (TARP) in consultation with NSW Roads and Maritime Services (RMS).	-
IS006	Built Features	Subsidence-related impacts on the bridge across the Hunter River (i.e. far-field horizontal effects) results in adverse impacts on the structural integrity (i.e. bridge bearings, expansion joints, etc.).	-	Physical separation between the underground mining area and the Golden Highway. Subsidence predictions and assessment. Subsidence monitoring program. Implementation of TARP in consultation with RMS.	Consultation with RMS to confirm bridge tolerance can accommodate predicted far-field horizontal movements.
IS007	Built Features	Subsidence-related impacts on the Plashett Reservoir (i.e. far-field horizontal effects) results in adverse impacts on the structural integrity of the dam wall.	-	Significant physical separation between the underground mining area and Plashett Reservoir (outside Notification Area). Subsidence predictions and assessment. Subsidence monitoring program.	-

Ref	Aspect Type	Issue Requiring Consideration	Priority	Planned Controls	Action(s)
IS004	Water	Subsidence-related impacts on surface drainage results in adverse environmental impacts.	-	Integrated subsidence, geomorphology and surface water impact assessment. Subsidence monitoring and remediation, including erosion and sediment control.	-
IS010	Water	Leaching of contaminants into aquifers near the Maxwell Underground that reduce their beneficial use.	-	Hydrocarbon and spill management. Site water management. Pollution Incident Response Management Plan.	-
IS011	Water	Increased total suspended solids in waterways from soil eroded off-site; changes in stream salinity (due to subsidence and/or mine infrastructure).	-	Integrated subsidence, geomorphology and surface water impact assessment. Site water management system. Subsidence monitoring and remediation, including erosion and sediment control.	-
IS023	Water	Bore water drawdown reduces neighbouring landholders' access to water.	-	Groundwater modelling to determine predicted performance. Groundwater monitoring program used to validate predictions during operations.	Based on outcomes of groundwater modelling, implement engagement program with any potentially affected landholders.
IS038	Water	Generation of highly saline brine impacts site water quality, wash plant and/or dust suppression usage.	-	Site water balance. Site water management system, including brine management strategy.	Develop TARP for brine transfer pipeline.
IS039	Water	Existing and proposed final landform at the Maxwell Infrastructure prevents diversion of surface water runoff from rehabilitated areas, affecting rehabilitation goals.	-	Emplacement of Project CHPP reject material in the East Void (reducing void volume). Development of Rehabilitation Strategy, based on consideration of landform alternatives and integration with Mt Arthur Mine landform. Mining Operations Plan process.	Continue to investigate beneficial uses of voids and engage with other miners, industrial operations, infrastructure developers and operators, agricultural enterprises, and councils in the region.

Ref	Aspect Type	Issue Requiring Consideration	Priority	Planned Controls	Action(s)
IS019	Noise and Air Quality	Dust emissions from mine entry area results in off-site amenity impacts.	-	Siting of mine entry area. Air quality modelling to determine predicted performance. Implementation of dust mitigation measures. Air quality monitoring program. Dust mitigation considered as part of the equipment design phase.	-
IS025	Noise and Air Quality	Odour from spontaneous combustion at the Maxwell Infrastructure results in impacts on residential amenity of nearby properties.	-	Continued management in accordance with the Mining Operations Plan.	-
IS026	Noise and Air Quality	Spontaneous combustion event in the underground workings results in off-site odour or other amenity impacts.	-	Project resource is derived from Wittingham Coal Measures, which are very low sulphur compared to the higher sulphur content of the Greta Seam at the Maxwell Infrastructure area. Siting of mine entry area. Design, management and monitoring during operations.	-
IS063/ IS064	Biodiversity	Impacts on native fauna as a result of the site access road and transport and services corridor.	-	Biodiversity impact assessment.	Consideration of strategies to manage fauna interactions with mine traffic.
IS035	Heritage	Project impacts on the Nissen Hut and fence line result in loss of heritage values.	-	Historic Heritage Assessment, including Statement of Heritage Impact.	-
IS036	Heritage	Direct disturbance and subsidence-related impacts result in significant impact on Aboriginal cultural heritage.	-	Aboriginal cultural heritage surveys. Aboriginal Cultural Heritage Assessment Report prepared in consultation with registered Aboriginal parties. Implementation of Aboriginal cultural heritage management measures during construction and operation.	-
IS058	Visual	Impacts at night due to use of the site access road and transport and services corridor.	-	Landscape and visual impact assessment.	Consideration of strategies to reduce headlight wash at night.

Ref	Aspect Type	Issue Requiring Consideration	Priority	Planned Controls	Action(s)
IS027	Road and Rail	Project-related road movements affect the safety or performance of the road network.	-	Road transport assessment to determine predicted performance (no additional mitigation measures considered necessary).	-
IS067	Road and Rail	Impacts on safety or amenity of the road network as a result of the realignment of Edderton Road.	-	Design and construction of the potential Edderton Road Realignment (including new intersection with the Golden Highway) in accordance with relevant Austroads and RMS design guidelines.	-
IS028	Social/Economic	Minor blasting during construction activities results in public safety impacts.	-	Siting of Project activities in areas not publicly accessible. Construction management controls.	-
IS049	Social/Economic	Community fears or conflict arising from perceived impacts across several environmental and social aspects.	-	Community and stakeholder engagement program. Consistent messaging about commitments – being clear on what is achievable before going out to consultation.	Implement engagement program beyond EIS submission.
IS070	Social/Economic	Health impacts to Malabar employees results in social impacts.	-	Compliance with NSW work health and safety requirements, including ventilation and dust management.	-
IS003	Land and Agriculture	Subsidence-related impacts on the surface (i.e. cracking, stepping, etc.) results in safety impacts for lessees.	-	Subsidence predictions and assessment. Subsidence monitoring program. Communication protocol with lessees. Subsidence remediation.	-
IS021	Land and Agriculture	Subsidence/soil changes result in impacts on future use of mined land.	-	Integrated subsidence, geomorphology, surface water and agricultural impact assessment. Subsidence monitoring and remediation.	-
IS029	Land and Agriculture	Project subsidence impacts result in a loss of Biophysical Strategic Agricultural Land.	-	Integrated subsidence, geomorphology, surface water and agricultural impact assessment. Subsidence monitoring and remediation.	-

Ref	Aspect Type	Issue Requiring Consideration	Priority	Planned Controls	Action(s)
IS032/ IS061	Land and Agriculture	Mine infrastructure significantly reduces the agricultural productivity of the agricultural properties (e.g. reduction in available area, increased erosion).	-	Siting of Project infrastructure. Agricultural impact assessment.	-

ATTACHMENT C – REFERRED ISSUES

Referred issues identified during the ERA team's 'brainstorming' are presented below.

Table C1 – Consolidated List of Referred Issues

Ref	Aspect Type	Issue
IS041	Land and Agriculture	Implementation of measures to improve agricultural productivity of Malabar owned land.[1]
IS042	Social/Economic	Development of an Environmental Management System for the Project.[2]
IS043	Social/Economic	Implementation of measures to improve the visual amenity of Malabar's rural properties.[1]
IS048	Social/Economic	Consideration of potential alternate or complimentary land uses.[1]
IS050	Visual	Maintenance of visual mitigation measures (e.g. tree screening).[2]
IS051	Road and Rail	Assessment of heavy vehicle movements.[2]
IS052	Land and Agriculture	Creation of self-sustaining rehabilitation at the Maxwell Infrastructure.[2]
IS054	Visual	Consideration of cumulative visual impacts, while still identifying the Project's contribution.[2]
IS055	Road and Rail	Unauthorised third-party traffic accessing the site access road.[2]
IS060	Social/Economic	Beneficial impacts of the use of workshop areas at the Maxwell Infrastructure.[2]
IS065	Biodiversity	Investigation of alternatives to minimise biodiversity impacts at the mine entry area.[2]
IS066	Noise and Air Quality	Consideration of opportunities to mitigate methane (greenhouse gas) emissions associated with underground mining activities.[2]

1 Outside of the Project scope.

2 Outside the scope of the ERA (e.g. control related issue, technical assessment issue, regulatory/legislative issue, operational/safety issue).

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