ENVIRONMENTAL RISK ASSESSMENT

Abel Upgrade Modification Environmental Assessment

APPENDIX J

Resource Strategies

DONALDSONCOAL
Part of the Yancoal Australia Group

Donaldson Coal

Abel Upgrade Modification
Environmental Risk Assessment

Final Report
November 2012
HMS 1169

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Donaldson Coal

Abel Upgrade Modification Environmental Risk Assessment

Final Report
November 2012
HMS 1169

Client:
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This Report was prepared on the basis of information recorded by HMS Consultants Australia Pty. Ltd during the risk assessment review workshop held on the 26th July 2012, being group consensus opinion of the environmental risks associated with the Abel Mine 75W Upgrade Modifications.

File	Report	Prepared By	Peer Review	Client Review	Date
20121016 HMS1169 Abel Mine – 75W Upgrade Modifications ERA Draft Report	Draft	J Smith	D Swan		Oct.'12
20121106 HMS1169 Abel Mine – 75W Upgrade Modifications ERA Final Report	Final	J Smith	M Coull	J Steele	Nov. '12

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EXECUTIVE SUMMARY

In June 2012, HMS Consultants Australia Pty Ltd was engaged by Mr Tony Sutherland, Technical Services Manager, Donaldson Coal Pty Ltd, for the provision of consultancy services in accordance with the scope to facilitate an environmental risk assessment of the proposed Abel Underground Mine upgrade modifications.

This report details the outcomes of the risk assessment workshop undertaken at the Abel Underground Mine Offices on 26 July 2012. Following the workshop, the risk table was distributed to the attendees for review, where the "Further Actions" were designated as either "Completed following workshop" or "To be completed post-approval". This updated information is included in the Action Tables shown in Appendix A and the risk tables shown in Appendices B,C and D.

The reader should refer to Section 3 for details of the context of the risk assessment, including the scope and assumptions. Section 7 should be referred to for a summary of results. Risk ranking was undertaken in accordance with the GSS Environmental (GSSE) Risk Matrix, provided in Appendix E.

Forty-nine (49) risk issues were identified in the Abel Upgrade Modification Environmental Risk Assessment.

Nil (0) "High" risks were identified by the risk assessment. Seven (7) "Medium" risk issues were identified by the risk assessment team, and are summarised in risk rank order as:

- Risk issue #1.02.01 – Damage to Telstra optical fibre telecommunication lines from subsidence associated with the proposed mining method
- Risk issue #8.02.01 – Increased noise from site resulting in exceedance of criteria due to construction of the downcast shaft
- Risk issue #1.01.06 – Cracking resulting in slope failure / rock falls resulting in personal injury and / or equipment damage in Quarries from subsidence associated with the proposed mining method
- Risk issue #5.01.01 – Loss of Aboriginal heritage from subsidence associated with the proposed mining method and proposed construction activities
- Risk issue #1.01.07 – Subsidence impact on Blackhill road
- Risk issue #6.04.01 – Increased gases from mine
- Risk issue #7.01.01 – Increased greenhouse gas emissions

Nil (0) risks were identified by the team that had the potential to result in a "Catastrophic" consequence, while five (5) risks were identified that could result in a "Major" consequence. In addition to risk issue #1.01.06 summarised above, the remaining "Major" consequence risks are summarised below in risk rank order:

- Risk issue #1.01.05 – Impacts on the Hunter Expressway from subsidence associated with the proposed mining method
- Risk issue #1.02.02 – Damage to Optus optical fibre telecommunication lines from subsidence associated with the proposed mining method
- Risk issue #1.02.04 – Damage to Jemena gas mains from subsidence associated with the proposed mining method
- Risk issue #1.02.05 – Damage to TransGrid 330 kilovolt power lines from subsidence associated with the proposed mining method

1 INTRODUCTION

In June 2012, HMS Consultants Australia Pty Ltd (HMS) was engaged by Mr Tony Sutherland, Technical Services Manager, Donaldson Coal Pty Ltd (Donaldson Coal), for the provision of consultancy services in accordance with the scope to facilitate an environmental risk assessment of the proposed Abel Underground Mine (Abel) 75W upgrade modifications.

The risk assessment workshop was conducted at Abel Underground Mine on the 26 July 2012. This report incorporates the findings from the workshop which was facilitated on a team/consultative basis.

2 CONTEXT

2.1 BACKGROUND

The Abel Underground Mine is a bord and pillar coal mining operation located approximately 23 kilometres north-west of the Port of Newcastle, New South Wales (NSW) (Figure 1). Coal is processed at the Bloomfield Colliery Coal Handling and Preparation Plant (Bloomfield CHPP) before transport by rail to the Port of Newcastle. The Abel Underground Mine is owned and operated by Donaldson Coal, which is a wholly owned subsidiary of Yancoal Australia Limited.

Donaldson Coal is requesting a modification to the Abel Project Approval (05_0136) (the Modification) to enable the introduction of shortwall mining (120 metre [m] wide void) and longwall mining (230m wide void) in some areas of the mine within the existing approved mining area and seams.

As a result of the modifications to the Abel Project Approval there will be an increase in the annual production of run-of-mine coal from the Abel Underground Mine with an increased throughput at the Bloomfield CHPP. The modifications to the mine layout will be contained within the existing approved area (Figure 1), and will be developed to comply with the existing approved subsidence management commitments.

As part of the Director-General's requirements for the Modification an Environmental Risk Assessment is required as part of the Environmental Assessment.

2.2 PURPOSE

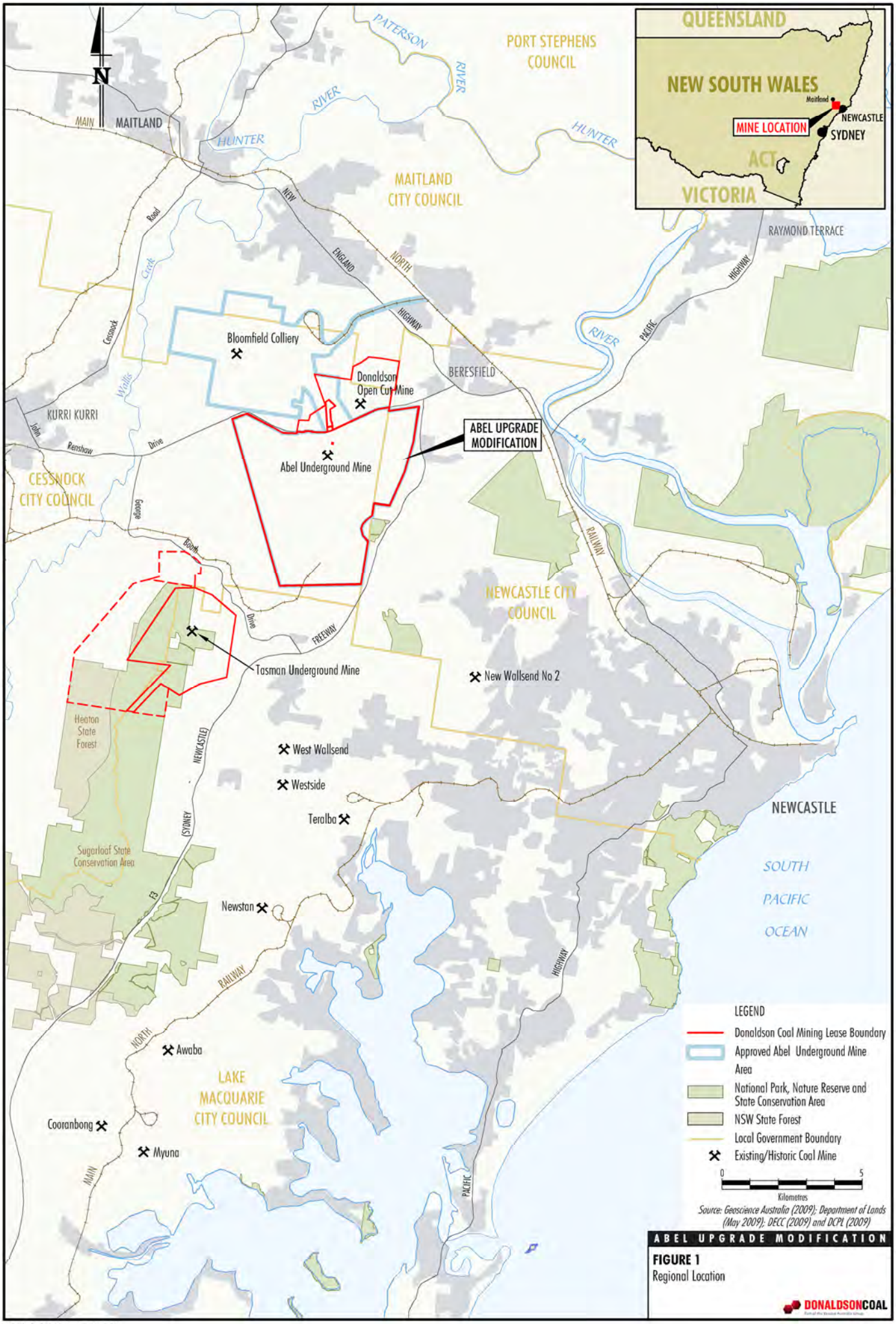
The purpose of the risk assessment was to identify the potential additional environmental risks associated with the Modification.

2.3 SCOPE

The scope of this risk assessment was to assess the potential environmental risks associated with the Modification.

The focus of the risk assessment was on environmental risks. A detailed scope of the areas examined is provided in Section 6.3.

The scope area is shown in Figures 2 and 3.



ABEL UPGRADE MODIFICATION

FIGURE 1
Regional Location

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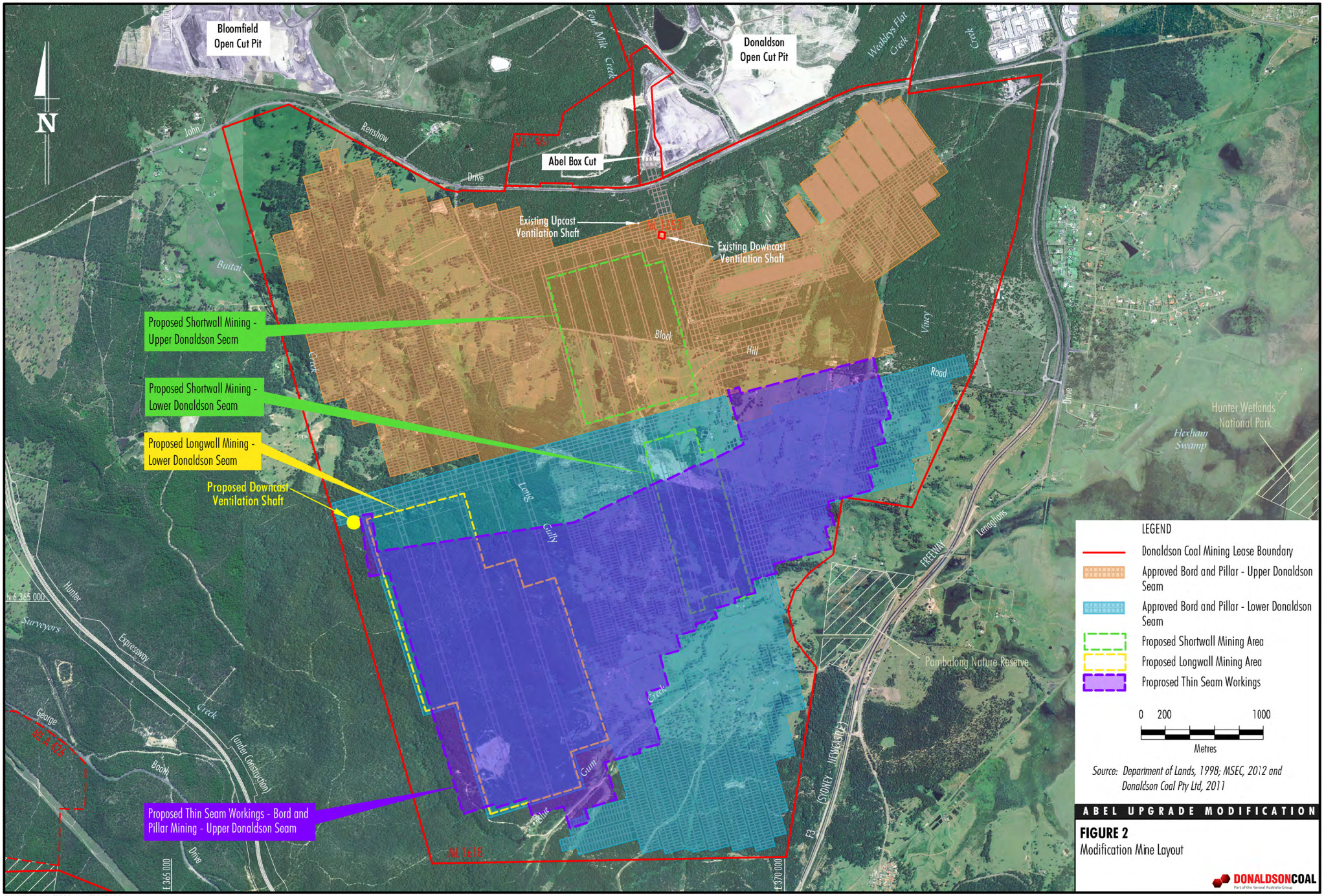
DCL-09-01 AMod2012_App ERA_101A



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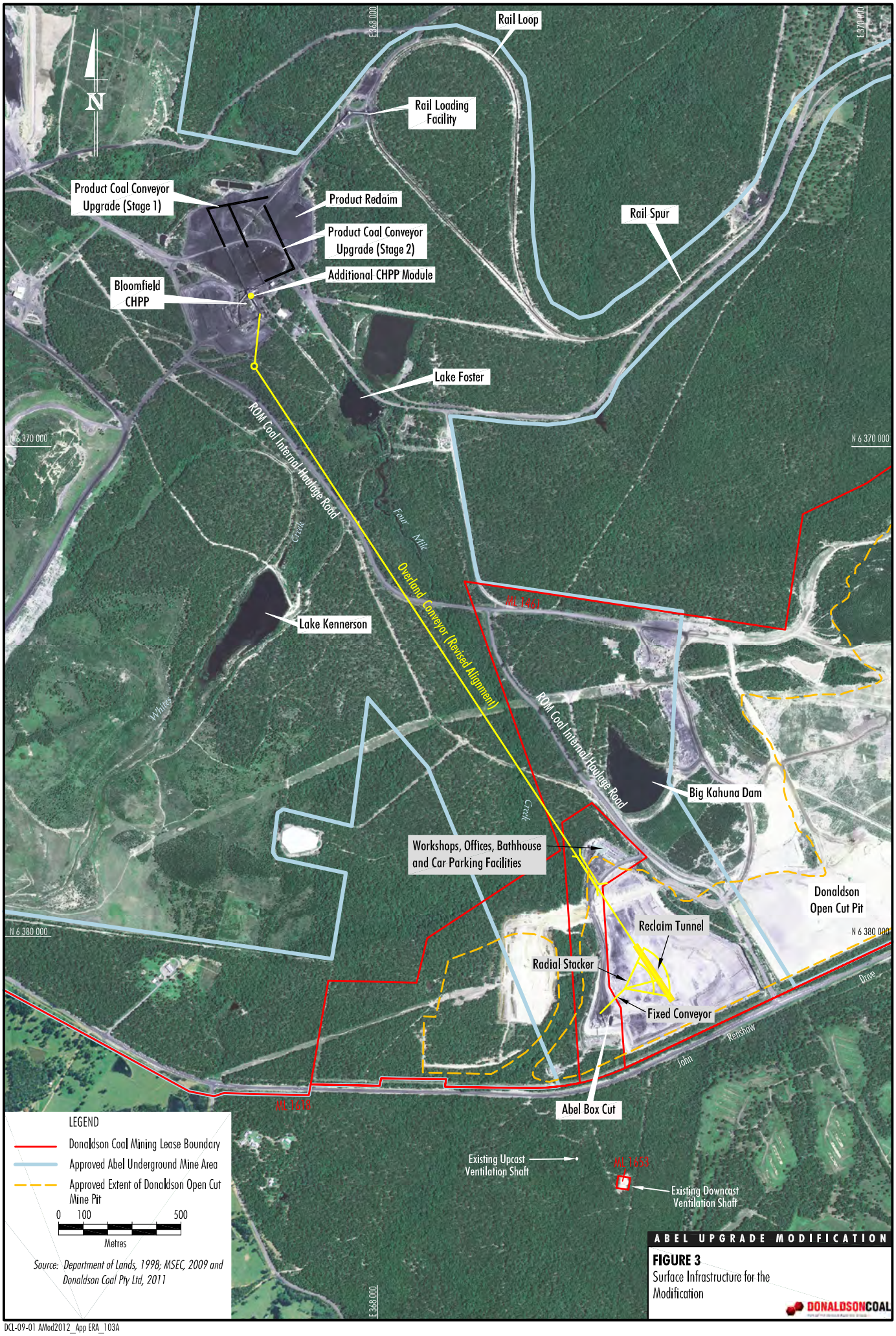


ABEL UPGRADE MODIFICATION

FIGURE 3
Surface Infrastructure for the Modification

DONALDSONCOAL

2.4 OBJECTIVES

The objective of the risk assessment was to facilitate a structured process to enable critical and objective challenges of the subject to assist Donaldson Coal to fulfil its obligations:

- Protecting the environment in accordance with the requirements of the:
  - *Environmental Planning and Assessment Act, 1979*
  - *Environmental Planning and Assessment Regulation, 2000*
  - *Protection of Environment Operations Act, 1997*
  - *State Environmental Planning Policy 2007 Mining, Petroleum Production and Extractive Industries*
  - *Water Management Act, 2000*
  - Other relevant legislation
- By involving relevant key stakeholders, operational personnel, mine management and a qualified and experienced facilitator

The risk assessment was undertaken in accordance with the Australian and New Zealand Standard and International Organization for Standardization 31000:2009 - *Risk Management – Principles and Guidelines*, and Mining Design Guidelines 1010 – *Minerals Industry Safety and Health Risk Management Guideline*.

2.5 ASSUMPTIONS

The following assumptions were made by the workshop team:

- Borehole seam workings as per mine record tracing
- There would be no change to the existing subsidence management commitments for the Modification

2.6 EXCLUSIONS

Nil exclusions were identified by the risk assessment team.

3 DEFINITIONS

Cause

The direct and indirect causal factors that must be present for identified risk issue / loss to occur.

Consequence

The outcome of an event expressed qualitatively or quantitatively, being a loss, injury, disadvantage or gain. There may be a range of possible outcomes associated with an event.

Likelihood

Presented as a qualitative description of the likelihood of a potential event based on its expected frequency of occurrence.

Risk Issue

Determined by the Risk Assessment Team – brain storming from a blank sheet or following a structured process and is related to the causes and material impacts on the strategic, operational and project objectives.

Risk Ranking

The numerical value and descriptor applied to a risk determined from GSS Environmental (GSSE) Risk Matrix, by reading the junction of Likelihood line and Consequence column.

Risk Level

The risk level is the categorisation of the risk issue for management action, in accordance with the GSSE Risk Matrix.

4 WORKSHOP PARTICIPANTS

A key factor in the effectiveness of the exercise is the availability of relevant information and expertise. A workshop team made up of technical and management personnel representing Donaldson Coal, together with external consultants with an independent facilitator achieved this.

The role of team members was to provide their expertise, experience and technical knowledge, and to respect input provided by others. Outcomes were dependent upon group consensus.

The facilitator's role was to understand the Client's requirements and offer advice as to the best approach to meet the workshop objectives. He assisted the team by providing a systematic process and maintaining focus on the Scope and Objectives. HMS documented the workshop process and outcomes, and offered post-workshop feedback to the Client and team.

The team members are listed in *Table 1*.

Name	Position	Organisation	Industry Experience (Yrs)	Site Experience (Yrs)	26/07/2012
Tony Sutherland	Tech Services Manager – UG Operations	Donaldson Coal	28+	5	X
Grant Lord	Mining Surveyor	Donaldson Coal	30+	4	X
Adam Heeney	Liaison Officer	Donaldson Coal	6	6	X
James Barbato	Subsidence Engineer	MSEC	9	-	X
Steve Perrens	Principal	Evans & Peck	30+	-	X
Colin Driscoll	Consultant	Hunter Eco	30+	-	X
Joanna Webster	Environmental Manager	Resource Strategies	6	-	X
James Steele	Environmental Manager	Resource Strategies	5	-	X
David Swan	Managing Director – Facilitating	HMS	30+	-	X
Jarrod Smith	Consultant – Assisting	HMS	5	-	X

Table 1 – Risk Assessment Participants

5 METHOD OF APPROACH

5.1 HMS RISK MANAGEMENT MODEL

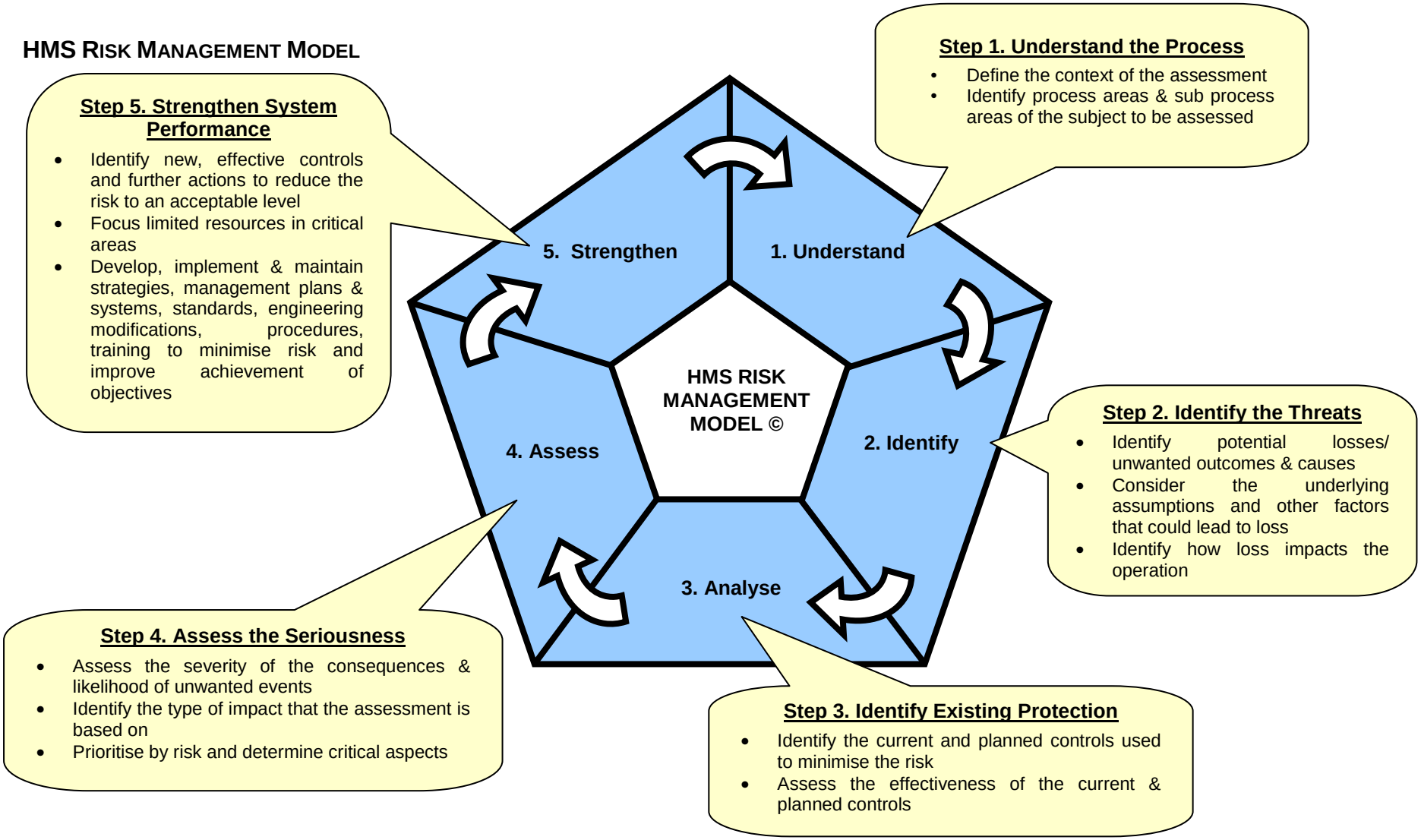


Figure 4 – HMS Risk Management Model

5.2 PRELIMINARIES

At the commencement of the workshop:

- A presentation was made by Tony Sutherland outlining the planned mine upgrade modifications and the potential impacts to the environment
- The purpose, scope, objectives, assumptions and limitations of the risk assessment were discussed, agreed and recorded
- The risk assessment team reviewed the scope prepared prior to the workshop and modified the content before commencement of the risk identification process

5.3 PROCESSES AND SUB-PROCESSES

The Process and Sub-process areas (*Table 2*) were determined in consultation with Donaldson Coal prior to the risk assessment, and were presented to the workshop team at the commencement of the risk assessment for review.

Process	#	Sub-Process
Subsidence	1.01	Surface structures including private roads
	1.02	Services (water pipes, communication cables, power lines, etc)
	1.03	Surface features (natural)
Land Management	2.01	Land management
Water Management	3.01	Groundwater
	3.02	Source water
	3.03	Water treatment
	3.04	Surface water
Biodiversity	4.01	Fauna
	4.02	Flora
Heritage	5.01	Aboriginal heritage
	5.02	European heritage
Air Quality	6.01	Dust
	6.02	Monitoring
	6.03	Particulate emissions
	6.04	Gases/odours
Greenhouse Gases	7.01	Greenhouse gases
Noise/lighting	8.01	Vehicle/train movements
	8.02	Construction activities
Traffic and Transport	9.01	Private vehicles
Visual	10.01	Visual amenity
Waste	11.01	Waste management
Social impacts	12.01	Social impacts
Rehabilitation	13.01	Rehabilitation

Table 2 – Process and Sub-Process Areas Considered

5.4 RISK ISSUES IDENTIFIED AND DEFINED

The risk assessment workshop team systematically considered each sub-process area to identify potential subsidence hazards that could affect the environment in the Abel Underground Mine area.

Each potential hazard was then assessed for risk and the results recorded.

For each identified risk issue thought to have potential for an impact on the environment, the underlying causes were identified and recorded. The risk assessment team then identified relevant controls that are currently implemented at the Abel Underground Mine which address the causes and control the particular risk issue.

Where an issue was determined to not represent any additional risk to current normal practice, this was recorded as such in the risk table.

5.5 RISK EVALUATION

Risk was determined on a residual risk basis, i.e. in consideration of the effectiveness of the existing controls. Whilst worst case scenarios were discussed by the risk assessment team, the worst case consequence scenario was not necessarily the consequence severity chosen for risk ranking. The risk assessment team used their industry and site experience, as well as their knowledge of the effectiveness of the existing controls, to choose the most appropriate consequence severity for risk ranking. Likelihood was chosen relative to the agreed consequence severity.

The facilitator played a key role in challenging the risk assessment team's perception and tolerance to risk at this stage.

The risk ranking and risk level were chosen using the GSSE Risk Matrix (see *Appendix E)* which was the risk matrix used in the previous Environmental Risk Assessment in August 2006*.*

5.6 RISK REDUCTION STRATEGY

The risk ranking and risk level were primary drivers for identifying risk issues where better risk control is required. Following evaluation of the residual risk, the team then identified additional risk controls that should be implemented to reduce each risk to a level as low as reasonably practical.

5.7 POST RISK ASSESSMENT

Following the completion of the risk assessment workshop, the risk table was reviewed individually by the workshop participants. This was undertaken to update "Existing Controls", add comments, and to address the status of the "Further Actions" identified during the workshop. Specifically, the completion time for "Further Actions" was designated as either "Completed following workshop" or "To be completed post-approval".

5.8 RISK ASSESSMENT FOLLOW-UP

Following completion of this risk assessment, it is recommended that an audit or review of existing controls and additional actions is carried out at an appropriate time to ensure they have been properly implemented to control the identified risk to an acceptable level.

Appendix A presents a summary of additional controls from this risk assessment in the form of an Action Plan.

6 RESULTS

There were forty-nine (49) risk issues identified in the Abel Upgrade Modification Environmental Risk Assessment.

6.1 RISK DISTRIBUTION

Table 3 summarises the risk distribution of all risks by risk rank.

RISK RANKING	No.	%
High	0	0
Moderate	7	14
Low	42	86
TOTAL	**49**	**100**

Table 3 – Risk Distribution by Risk Rank

Nil (0) "High" risks were identified by the risk assessment. Seven (7) "Medium" risks were identified by the risk assessment team, and are summarised in risk rank order as:

- Risk issue #1.02.01 – Damage to Telstra optical fibre telecommunication lines from subsidence associated with the proposed mining method
- Risk issue #8.02.01 – Increased noise from site resulting in exceedance of criteria due to construction of the downcast shaft
- Risk issue #1.01.06 – Cracking resulting in slope failure/rock falls resulting in personal injury and/or equipment damage in Quarries from subsidence associated with the proposed mining method
- Risk issue #5.01.01 – Loss of Aboriginal heritage from subsidence associated with the proposed mining method and proposed construction activities
- Risk issue #1.01.07 – Subsidence impact on Blackhill road
- Risk issue #6.04.01 – Increased gases from mine
- Risk issue #7.01.01 – Increased greenhouse gas emissions

6.2 CONSEQUENCE DISTRIBUTION

Table 4 summarises the risk distribution of all risks by consequence.

CONSEQUENCE	No.	%
Catastrophic	0	0
Major	5	10
Moderate	11	22
Minor	25	51
Insignificant	8	16
TOTAL	**49**	**100**

Table 4 – Risk Distribution by Consequence

Nil (0) risks were assessed as having potentially **"Catastrophic"** consequences. Five (5) risks were assessed as having potentially **"Major"** consequences and are summarised below in risk rank order:

- Risk issue #1.01.06 – Cracking resulting in slope failure / rock falls resulting in personal injury and/or equipment damage in Quarries from subsidence associated with the proposed mining method

- Risk issue #1.01.05 – Impacts on Hunter Expressway from subsidence associated with the proposed mining method
- Risk issue #1.02.02 – Damage to Optus optical fibre telecommunication lines from subsidence associated with the proposed mining method
- Risk issue #1.02.04 – Damage to Jemena gas mains from subsidence associated with the proposed mining method
- Risk issue #1.02.05 – Damage to TransGrid 330kV power lines from subsidence associated with the proposed mining method

6.3 ACTION PLAN

Two (2) action plans have been prepared (see Appendix A), listing the status of all additional controls (Actions) from the risk assessment. The two action plans relate firstly, to additional actions raised at the risk assessment which have since been completed; and secondly, to any actions still requiring completion following project approval. Actions still requiring completion are listed in risk priority order, with timing and responsible person indicated for each.

A full listing of all results is shown in Appendices B to D, being the risk registers in assessment, risk rank and consequence order respectively.

APPENDIX A

Donaldson Coal

Abel Upgrade Modification Risk Assessment

Action Plans

November 2012

Actions Completed Following Workshop

H# Process Subprocess Hazard	Further Actions Identified at RA	Comments	By Whom	By When
1.01.06 Subsidence Surface structures including private roads **Cracking resulting in slope failure / rock falls resulting in personal injury and / or equipment damage in Quarries**	1. Formalise consultation with Blackhill Quarry	Briefing material regarding the Modification provided to Blackhill Quarry.	Tony Sutherland, Donaldson Coal	September 2012
1.02.04 Subsidence Services (water pipes, communication cables, power lines etc.) **Damage to Jemena gas mains**	1. Verify location of Jemena gas mains relative to current plans	Distance verified as per MSEC Drawing No MSEC492-15 (prepared for the Abel Modification Subsidence Assessment)	Donaldson Coal	August 2012
3.01.01 Water Management Groundwater **Loss or reduction of groundwater for users**	1. Verify assumptions following completion of the groundwater study	Assumption regarding limited registered GW users verified. The GW Assessment prepared for the Modification states: *The majority of the bores located within 5 km of the Modification are monitoring or test bores, predominantly associated with monitoring the current and future impacts of mining activities within the area. Stock/domestic bore GW051353 is associated with the Abel Underground Mine; while farming bore GW078578 is associated with the Tasman Underground Mine.* *Of the bores not associated with Donaldson mining operations, two bores (GW058760 and GW0061307) are located to the north of Donaldson Open Cut Mine and to the north of the Newcastle Coal Measures sub-crop. This location is stratigraphically higher than the Modification and outside the sub-crop of the Donaldson Seam. Irrigation bores GW053411 and GW053412 are located within the down gradient section of Surveyor Creek near the confluence with Wallis Creek north of George Booth Drive.*	Resource Strategies	August 2012

H# Process Subprocess Hazard	Further Actions Identified at RA	Comments	By Whom	By When
3.01.02 Water Management Groundwater **Long term impact on groundwater dependent ecosystems**	1. Verify assumptions following completion of the groundwater study	In regard to potential impacts to GDEs, the GW Assessment prepared for the Modification states: *Impacts on flows and groundwater levels within the alluvium within the Project Area are predicted to be insignificant, both during mining and post-mining. Therefore, it is considered very unlikely that there would be any impact on the GDEs outlined above.*	Resource Strategies	August 2012
3.01.03 Water Management Groundwater **Impact on shallow perched / alluvial aquifers**	1. Verify assumptions following completion of the groundwater study	As above	Resource Strategies	August 2012
4.01.01 Biodiversity Fauna **Long term impacts on fauna**	1. Reassess impacts on fauna due to increased subsidence, new alignment of conveyor and downcast shaft	HunterEco has reassessed potential impacts to biodiversity associated with the Modification: *It is concluded that ecological impacts would be essentially the same as those described in the original proposal* [i.e. for the Abel Undergound Mine EA].	Resource Strategies	August 2012
4.02.01 Biodiversity Flora **Long term impacts on flora**	1. Reassess impacts on flora due to increased subsidence, new alignment of conveyor and downcast shaft	As above	Resource Strategies	August 2012
4.02.02 Biodiversity Flora **Long term impact on endangered ecological communities (EEC)**	1. Reassess impacts on flora due to increased subsidence, new alignment of conveyor and downcast shaft	As above	Resource Strategies	August 2012
5.01.01 Heritage Aboriginal heritage **Loss of Aboriginal heritage**	1. Review comments from Aboriginal stakeholders	Refer to management protocols outlined in the Supplementary Cultural Heritage Assessment for Abel Upgrade Modification, developed in consultation with Aboriginal stakeholders.	Resource Strategies	August 2012

H# **Process** **Subprocess** **Hazard**	**Further Actions Identified at RA**	**Comments**	**By Whom**	**By When**
5.02.01 Heritage European heritage **Loss of European heritage - Richmond Vale railway line corridor**	1. Determine location of Jewboy bushranger cave	UTM coordinates 366564mE, 6361222mS (Zone 56H). This location is outside of the Abel Underground Mine area.	Donaldson Coal	August 2012
8.02.01 Noise / lighting Construction activities **Increased noise from site resulting in exceedance of criteria**	1. Consider quantifying noise levels for construction based on industry experience 2. Consider installation of noise monitoring equipment	Following the ERA workshop, potential noise exceedances were predicted for construction of the downcast shaft during the daytime only.	SLR Consulting	August 2012

Actions to be Completed Post-Approval

H# Process Subprocess Hazard	Further Actions Identified at RA	Comments	By Whom
1.02.01 Subsidence Services (water pipes, communication cables, power lines etc.) **Damage to Telstra optical fibre telecommunication lines**	1. Potential for relocation of optical fibre lines or duplicate in PVC tubes 2. Development of optical fibre management plan which includes Optical Time Domain Reflectometry (OTDR) monitoring		Donaldson Coal
6.04.01 Air Quality Gases / odours **Increased gases from mine**	1. Consider options for reducing gas emissions		GeoGas, Donaldson Coal
1.02.02 Subsidence Services (water pipes, communication cables, power lines etc.) **Damage to Optus optical fibre telecommunication lines**	1. Consider development of optical fibre management plan which includes Optical Time Domain Reflectometry (OTDR) monitoring 2. Verify location of cable with Optus relative to current plans		Donaldson Coal
1.02.05 Subsidence Services (water pipes, communication cables, power lines etc.) **Damage to TransGrid 330kV power lines**	1. Update management plans 2. Review monitoring methods		Donaldson Coal
1.03.04 Subsidence Surface features (natural) **Impact on Schedule 2 (3rd and above order) creek beds resulting in change in water quality and quantity**	1. Review and update existing management plans / TARPs	Management Plan to be developed in consultation with Telstra.	Donaldson Coal
3.03.01 Water Management Water treatment **Unplanned release of brine water leading to an environmental consequence**	1. Development of brine storage / disposal system	Brine would be preferentially stored/disposed in the Donaldson Square Pit. Maximum storage capacity of Donaldson Square Pit designed with appropriate freeboard to prevent potential overflow. Unplanned discharge managed as per unplanned discharge of water from the site (i.e. inspections/monitoring).	Evans and Peck, Donaldson Coal

H# Process Subprocess Hazard	Further Actions Identified at RA	Comments	By Whom
1.02.07 Subsidence Services (water pipes, communication cables, power lines etc.) **Damage to private utilities (low voltage power lines, copper cables etc.)**	1. Update management plans		Donaldson Coal
1.02.06 Subsidence Services (water pipes, communication cables, power lines etc.) **Damage to Ausgrid 132kV power lines - loss of conductor clearance**	1. Update management plans		Donaldson Coal
1.03.02 Subsidence Surface features (natural) **Impact on topographic features (steep slopes, rock outcrops) causing long term environmental impact**	1. Review and update existing management plans		Donaldson Coal
1.03.03 Subsidence Surface features (natural) **Cracking of Schedule 1 (1st and 2nd order) creek beds resulting in long term change in water quality and quantity**	1. Review and update existing management plans / TARPs		Donaldson Coal
1.03.05 Subsidence Surface features (natural) **Altering Schedule 1 (1st and 2nd order) creek bed levels resulting in erosion and increased sediment**	1. Review and update existing management plans / TARPs		Donaldson Coal
2.01.01 Land Management Land management **Increased erosion causing long term impact**	1. Review and update existing management plans		Donaldson Coal

H# **Process** **Subprocess** **Hazard**	**Further Actions Identified at RA**	**Comments**	**By Whom**
6.04.02 Air Quality Gases / odours **Increased odours from mine resulting in complaint from neighbours**	1. Undertake further testing on Lower Donaldson seam		GeoGas, Donaldson Coal

APPENDIX B

Donaldson Coal

Abel Upgrade Modification Risk Assessment

Risk Table (Assessment Order)

November 2012

P#	Process	S#	Subprocess	H#	Hazard	Causes	Existing Controls	Loss Type	Consequence	Probability	Risk Rank	Risk Level	Further Actions Identified at RA	Further Action Status as at 3/10/12	Comments
1	Subsidence	1.01	Surface structures including private roads	1.01.01	Damage to principal residences requiring mitigation works	1. Tilt and strain associated with change in mining method and extension of Upper Donaldson workings	1. Statement of commitments limits mining to first workings 2. Pre mining inspections and surveys 3. No longwall / shortwalls under principal residences without owner permission 4. Negotiation to purchase potentially impacted properties by mine	R	3	D	17	L	Nil identified		
1	Subsidence	1.01	Surface structures including private roads	1.01.02	Damage to other residential structures requiring mitigation works	1. Tilt and strain associated with change in mining method and extension of Upper Donaldson workings	1. Statement of commitments includes plan of management for other residential structures 2. Pre mining inspections and surveys 3. Built features management plans	R	4	C	18	L	Nil identified		
1	Subsidence	1.01	Surface structures including private roads	1.01.03	Prohibiting future development potential / opportunities to the landholder	1. Impact on development during active subsidence	1. No change to this risk 2. Ongoing consultation with land owners 3. Community Consultative Committee (CCC) meetings 4. No long term legacy issues from mining method	R	4	C	18	L	Nil identified		
1	Subsidence	1.01	Surface structures including private roads	1.01.04	Damage to /water loss from farm dams	1. Tilt and strain associated with change in mining method and extension of Upper Donaldson workings	1. Statement of commitments includes plan of dam monitoring and management strategy 2. Pre mining inspections and surveys 3. Built features management plans	D	4	C	18	L	Nil identified		
1	Subsidence	1.01	Surface structures including private roads	1.01.05	Impacts on Hunter Expressway	1. Destabilisation of existing workings resulting in pillar run in overlying Borehole seam	1. Grouting underneath freeway bridges 2. Expressway is located more than 1km from proposed workings 3. Discontinuity of Borehole seam workings between subject area and freeway	F	2	E	16	L	Nil identified		
1	Subsidence	1.01	Surface structures including private roads	1.01.06	Cracking resulting in slope failure / rock falls resulting in personal injury and / or equipment damage in Quarries	1. Tilt and strain associated with change in mining method and extension of Upper Donaldson workings	1. SMP 2. Property Management Plan 3. Consultation with quarries 4. Stockrington quarry will potentially be closed prior to undermining 5. Stockrington quarry has flat (not vertical) batters 6. Predicted movements similar to previously approved mining method for Blackhill quarry	P	2	D	12	M	1. Formalise consultation with Blackhill Quarry	1. Completed following workshop	Briefing material regarding the Modification provided to Blackhill Quarry.
1	Subsidence	1.01	Surface structures including private roads	1.01.07	Impact on Blackhill road	1. Tilts, curvatures and strains associated with change in mining method and extension of Upper Donaldson workings	1. SMP 2. Built Features Management Plan 3. Consultation with Cessnock Council 4. Tilts, curvatures and strains along Blackhill Road are similar to previously approved mining method	F	4	B	14	M	Nil identified		

P#	Process	S#	Subprocess	H#	Hazard	Causes	Existing Controls	Loss Type	Consequence	Probability	Risk Rank	Risk Level	Further Actions Identified at RA	Further Action Status as at 3/10/12	Comments
1	Subsidence	1.02	Services (water pipes, communication cables, power lines etc.)	1.02.01	Damage to Telstra optical fibre telecommunication lines	1. Increase in curvature and strain associated with change in mining method and extension of Upper Donaldson workings	1. Infrastructure management plans as part of SMP approval 2. Predicted curvature and strains similar to previous approved mining method	F	3	B	9	M	1. Potential for relocation of optical fibre lines or duplicate in PVC tubes 2. Development of optical fibre management plan which includes Optical Time Domain Reflectometry (OTDR) monitoring	1. To be completed post-approval 2. To be completed post-approval	
1	Subsidence	1.02	Services (water pipes, communication cables, power lines etc.)	1.02.02	Damage to Optus optical fibre telecommunication lines	1. Increase in curvature and strain associated with change in mining method and extension of Upper Donaldson workings	1. Optical fibre cable is located ~200m away at the closest point from the proposed longwall mining area 2. Predicted movements at Optus cable is negligible due to shortwall widths	F	2	E	16	L	1. Consider development of optical fibre management plan which includes Optical Time Domain Reflectometry (OTDR) monitoring 2. Verify location of cable with Optus relative to current plans	1. To be completed post-approval 2. To be completed post-approval	
1	Subsidence	1.02	Services (water pipes, communication cables, power lines etc.)	1.02.03	Nil water mains were identified that could be impacted by the proposed mining area						n/a	n/a	Nil identified		
1	Subsidence	1.02	Services (water pipes, communication cables, power lines etc.)	1.02.04	Damage to Jemena gas mains	1. Increase in curvature and strain associated with change in mining method and extension of Upper Donaldson workings	1. Jemena gas main is located ~600m away at the closest point from the proposed longwall mining area 2. Predicted movements at Jemena gas mains is negligible due to shortwall widths	F	2	E	16	L	1. Verify location of Jemena gas mains relative to current plans	1. Completed following workshop	Distance verified as per MSEC Drawing No MSEC492-15 (prepared for the Abel Modification Subsidence Assessment)
1	Subsidence	1.02	Services (water pipes, communication cables, power lines etc.)	1.02.05	Damage to TransGrid 330kV power lines	1. Tilt and strain associated with change in mining method and extension of Upper Donaldson workings	1. Lines located greater than 100m away from proposed longwall mining area and mining layout limits predicted subsidence to less than 20mm 2. Cruciforms on suspension towers 3. Lines follow the Bluegum alluvium protection zone 4. TransGrid management plans (including real time monitoring)	F	2	E	16	L	1. Update management plans 2. Review monitoring methods	To be completed post-approval	
1	Subsidence	1.02	Services (water pipes, communication cables, power lines etc.)	1.02.06	Damage to Ausgrid 132kV power lines - loss of conductor clearance	1. Vertical displacement and tilts associated with change in mining method and extension of Upper Donaldson workings	1. Ausgrid management plans 2. Predicted movements do not increase with proposed mining method from previous approved mining method 3. Known methods to manage impacts lines 4. Ausgrid pre-mining assessment	F	4	D	21	L	1. Update management plans	To be completed post-approval	
1	Subsidence	1.02	Services (water pipes, communication cables, power lines etc.)	1.02.07	Damage to private utilities (low voltage power lines, copper cables etc.)	1. Tilt and strain associated with change in mining method and extension of Upper Donaldson workings	1. Property Management Plans 2. Infrastructure Management Plans	F	4	C	18	L	1. Update management plans	To be completed post-approval	
1	Subsidence	1.03	Surface features (natural)	1.03.01	Impact on topographic features (cliff lines)	1. Strains associated with change in mining method and extension of Upper Donaldson workings	1. Cliff line protection zones 2. Statement of commitments 3. Predicted movements are no greater than previous approved mining plan predicted movements	E	4	D	21	L	Nil identified		

P#	Process	S#	Subprocess	H#	Hazard	Causes	Existing Controls	Loss Type	Consequence	Probability	Risk Rank	Risk Level	Further Actions Identified at RA	Further Action Status as at 3/10/12	Comments
1	Subsidence	1.03	Surface features (natural)	1.03.02	Impact on topographic features (steep slopes, rock outcrops) causing long term environmental impact	1. Strains associated with change in mining method and extension of Upper Donaldson workings	1. Subsidence Monitoring Programs 2. Existing remediation methods	E	4	D	21	L	1. Review and update existing management plans	To be completed post-approval	
1	Subsidence	1.03	Surface features (natural)	1.03.03	Cracking of Schedule 1 (1st and 2nd order) creek beds resulting in long term change in water quality and quantity	1. Strains associated with change in mining method and extension of Upper Donaldson workings	1. Ephemeral streams 2. Surface water monitoring of downstream Schedule 2 streams 3. Visual inspections following mining and repairs as necessary 4. Environmental MP including TARPs	E	4	D	21	L	1. Review and update existing management plans / TARPs	To be completed post-approval	
1	Subsidence	1.03	Surface features (natural)	1.03.04	Impact on Schedule 2 (3rd and above order) creek beds resulting in change in water quality and quantity	1. Tilts and strains associated with change in mining method and extension of Upper Donaldson workings	1. Subsidence Control Zones for Schedule 2 streams to minimise risk of impact 2. Predicted movements are no greater than previous approved mining plan predicted movements 3. Environmental MP including TARPs	E	3	D	17	L	1. Review and update existing management plans / TARPs	To be completed post-approval	
1	Subsidence	1.03	Surface features (natural)	1.03.05	Altering Schedule 1 (1st and 2nd order) creek bed levels resulting in erosion and increased sediment	1. Tilts associated with change in mining method and extension of Upper Donaldson workings	1. Ephemeral streams 2. Surface water monitoring of downstream Schedule 2 streams 3. Visual inspections following mining and repairs as necessary 4. Environmental MP including TARPs	E	4	D	21	L	1. Review and update existing management plans / TARPs	To be completed post-approval	
1	Subsidence	1.03	Surface features (natural)	1.03.06	Long term alteration of vegetation North of Black Hill Rd due to ponding / waterlogging	1. Tilts associated with change in mining method and extension of Upper Donaldson workings	1. Remediation of ponding if required (has previously been undertaken onsite)	E	5	B	19	L	Nil identified		
1	Subsidence	1.03	Surface features (natural)	1.03.07	Long term alteration of vegetation due to ponding / waterlogging in Bluegum and Long gully catchment areas	1. Tilts associated with change in mining method and extension of Upper Donaldson workings	1. Naturally steep in Bluegum and Long gully catchment areas	E	5	D	24	L	Nil identified		
1	Subsidence	1.03	Surface features (natural)	1.03.08	Surface cracking resulting in long term environmental impact	1. Strains associated with change in mining method and extension of Upper Donaldson workings	1. Subsidence Monitoring Programs 2. Existing remediation methods	E	5	C	22	L	Nil identified		
1	Subsidence	1.03	Surface features (natural)	1.03.09	Impact on rainforest within ML1618	1. Tilts and strains associated with change in mining method and extension of Upper Donaldson workings resulting in increased erosion and / or water loss	1. Protection zones around Schedule 2 streams and main rainforest drainage lines 2. Ecological monitoring of Long Gully rainforest 3. Predicted movements are no greater than previous approved mining plan predicted movements	E	3	D	17	L	Nil identified		

P#	Process	S#	Subprocess	H#	Hazard	Causes	Existing Controls	Loss Type	Consequence	Probability	Risk Rank	Risk Level	Further Actions Identified at RA	Further Action Status as at 3/10/12	Comments
1	Subsidence	1.03	Surface features (natural)	1.03.10	Impact on Pambalong Nature Reserve wetland resulting in potential increased sedimentation or inflow water loss	1. Tilts and strains associated with change in mining method and extension of Upper Donaldson workings resulting in increased erosion and / or water loss	1. Protection zones around Schedule 2 streams and main rainforest drainage lines 2. Protection zone around Pambalong Nature Reserve 3. Water monitoring 4. Pambalong Nature Reserve was excluded from ML1618 5. Ecological monitoring of Pambalong Nature Reserve	E	3	D	17	L	Nil identified		
2	Land Management	2.01	Land management	2.01.01	Increased erosion causing long term impact	1. Strains associated with change in mining method and extension of Upper Donaldson workings	1. Subsidence Monitoring Programs 2. Existing remediation methods 3. Predicted movements are no greater for shortwalls in Upper Donaldson Seam than previous approved mining plan predicted movements	F	4	D	21	L	1. Review and update existing management plans	1. To be completed post-approval	
2	Land Management	2.01	Land management	2.01.02	Surface ponding impacting farm productivity	1. Subsidence associated with change in mining method and extension of Upper Donaldson workings	1. Subsidence Monitoring Programs 2. Existing remediation methods 3. Predicted movements are no greater for shortwalls in Upper Donaldson Seam than previous approved mining plan predicted movements	F	4	C	18	L	Nil identified		
3	Water Management	3.01	Groundwater	3.01.01	Loss or reduction of groundwater for users	1. Groundwater drawdown	1. Licencing of bores 2. Limited registered groundwater users 3. Groundwater monitoring program 4. Make good provisions	R	4	D	21	L	1. Verify assumptions following completion of the groundwater study	1. Completed following workshop	Assumption regarding limited registered GW users verified. The GW Assessment prepared for the Modification states: *The majority of the bores located within 5 km of the Modification are monitoring or test bores, predominantly associated with monitoring the current and future impacts of mining activities within the area. Stock/domestic bore GW051353 is associated with the Abel Underground Mine; while farming bore GW078578 is associated with the Tasman Underground Mine.* *Of the bores not associated with Donaldson mining operations, two bores (GW058760 and GW0061307) are located to the north of Donaldson Open Cut Mine and to the north of the Newcastle Coal Measures sub-crop. This location is stratigraphically higher than the Modification and outside the sub-crop of the Donaldson Seam. Irrigation bores GW053411 and GW053412 are located within the down gradient section of Surveyor Creek near the confluence with Wallis Creek north of George Booth Drive.*
3	Water Management	3.01	Groundwater	3.01.02	Long term impact on groundwater dependent ecosystems	1. Extensive connective cracking leading to loss of base flow	1. High depth of cover in most rainforest zones and contributing catchments 2. Groundwater monitoring program 3. Predicted movements are no greater for shortwalls in Upper Donaldson Seam than previous approved mining plan predicted movements 4. Set back from rainforest protection zone 5. Lower Donaldson Seam is not predicted to have connective cracking from the seam to the surface	E	4	D	21	L	1. Verify assumptions following completion of the groundwater study	1. Completed following workshop	In regard to potential impacts to GDEs, the GW Assessment prepared for the Modification states: *Impacts on flows and groundwater levels within the alluvium within the Project Area are predicted to be insignificant, both during mining and post-mining. Therefore, it is considered very unlikely that there would be any impact on the GDEs outlined above.*

P#	Process	S#	Subprocess	H#	Hazard	Causes	Existing Controls	Loss Type	Consequence	Probability	Risk Rank	Risk Level	Further Actions Identified at RA	Further Action Status as at 3/10/12	Comments
3	Water Management	3.01	Groundwater	3.01.03	Impact on shallow perched / alluvial aquifers	1. Extensive connective cracking leading to loss of base flow	1. Subsidence Control Zones for alluvium i.e. no connective cracking 2. Lower Donaldson Seam is not predicted to have connective cracking from the seam to the surface 3. Environmental MP including TARPs 4. Groundwater monitoring	E	4	D	21	L	1. Verify assumptions following completion of the groundwater study	1. Completed following workshop	As above
3	Water Management	3.01	Groundwater	3.01.04	Impacts on Hexham swamp	1. Regional lowering of groundwater from changes in mining method	1. Shallow aquifers in Hexham Swamp are compartmentalised from mining area. 2. Groundwater monitoring 3. Distance from proposed mining area to Hexham Swamp (~1.2km at closest point)	E	3	E	20	L	Nil identified		
3	Water Management	3.02	Source water for CHPP	3.02.01	No risk identified						n/a	n/a	Nil identified		
3	Water Management	3.03	Water treatment	3.03.01	Unplanned release of brine water leading to an environmental consequence	1. Unsuitable brine storage system		E	3	D	17	L	1. Development of brine storage / disposal system	1. To be completed post-approval	Brine would be preferentially stored/disposed in the Donaldson Square Pit. Maximum storage capacity of Donaldson Square Pit designed with appropriate freeboard to prevent potential overflow. Unplanned discharge managed as per unplanned discharge of water from the site (i.e. inspections/monitoring).
3	Water Management	3.04	Surface water	3.04.01	Increased sediments	1.Construction of conveyor (new alignment) / downcast shaft 2. Runoff from larger stockpiles	1. Construction MP 2. Sediment MP for overland conveyor 3. Incremental change is negligible 4. Water MP	E	5	D	24	L	Nil identified		
3	Water Management	3.04	Surface water	3.04.02	Unplanned discharge from site	1. LTA storage 2. Increased groundwater make 3. Pipe failure	1. Transfer of water to Bloomfield 2. Inspections / monitoring	E	3	D	17	L	Nil identified		
3	Water Management	3.04	Surface water	3.04.03	Spillage of storage tailings	1. Failure of Square Pit proposed embankment	1. Design and construct embankment (if required) in accordance with relevant standards	E	3	D	17	L	Nil identified		
4	Biodiversity	4.01	Fauna	4.01.01	Long term impacts on fauna	1. Downcast shaft / overland conveyor (new alignment) construction and operation 2. Subsidence	1. Flora and Fauna Management Plan	E	4	D	21	L	1. Reassess impacts on fauna due to increased subsidence, new alignment of conveyor and downcast shaft	1. Completed following workshop	HunterEco has reassessed potential impacts to biodiversity associated with the Modification: *It is concluded that ecological impacts would be essentially the same as those described in the original proposal* [i.e. for the Abel Undergound Mine EA].
4	Biodiversity	4.02	Flora	4.02.01	Long term impacts on flora	1. Downcast shaft / overland conveyor (new alignment) construction and operation 2. Subsidence	1. Flora and Fauna Management Plan 2. Abel Conveyor Weed Management Plan	E	4	D	21	L	1. Reassess impacts on flora due to increased subsidence, new alignment of conveyor and downcast shaft	1. Completed following workshop	As above
4	Biodiversity	4.02	Flora	4.02.02	Long term impact on endangered ecological communities (EEC)	1. Downcast shaft / overland conveyor (new alignment) construction and operation 2. Subsidence	1. Flora and Fauna Management Plan 2. Commitment to maintain existing standoff distances to rainforests 3. Predicted movements are no greater than previous approved mining plan predicted movements 4. Abel Conveyor Weed Management Plan	E	4	D	21	L	1. Reassess impacts on flora due to increased subsidence, new alignment of conveyor and downcast shaft	1. Completed following workshop	As above

P#	Process	S#	Subprocess	H#	Hazard	Causes	Existing Controls	Loss Type	Consequence	Probability	Risk Rank	Risk Level	Further Actions Identified at RA	Further Action Status as at 3/10/12	Comments
5	Heritage	5.01	Aboriginal heritage	5.01.01	Loss of Aboriginal heritage	1. Downcast shaft construction and operation 2. Damage from subsidence 3. Conveyor construction	1. Additional surveys have been undertaken to identify heritage sites in consultation with Aboriginal groups 2. Subsidence predictions indicate minimal impact on scatters and scarred trees 3. Aboriginal Heritage MP including pre-clearance surveys	E	3	C	13	M	1. Review comments from Aboriginal stakeholders	1. To be completed post-approval	Refer to management protocols outlined in the Supplementary Cultural Heritage Assessment for Abel Upgrade Modification, developed in consultation with Aboriginal stakeholders.
5	Heritage	5.02	European heritage	5.02.01	Loss of European heritage - Richmond Vale railway line corridor	1. Damage from subsidence	No impacts predicted	E	5	E	25	L	1. Determine location of Jewboy bushranger cave	1. Completed following workshop	UTM coordinates 366564mE, 6361222mS (Zone 56H). This location is outside of the Abel Underground Mine area.
6	Air Quality	6.01	Dust	6.01.01	Impact on community	1. Increased loading / unloading at stockpiles 2. Increased vehicle movements 3. Increased coal transport movements 4. Increased throughput at CHPP	1. Air quality monitoring sites 2. Air quality MP detailing existing controls 3. Predictive air quality model for modification 4. Donaldson Open Cut is scheduled for completion in 2013	E	4	D	21	L	Nil identified		
6	Air Quality	6.02	Monitoring	6.02.01	No increased risk identified						n/a	n/a	Nil identified		
6	Air Quality	6.03	Particulate emissions	6.03.01	As per 6.01.01						n/a	n/a	Nil identified		
6	Air Quality	6.04	Gases / odours	6.04.01	Increased gases from mine	1. Deeper mining 2. Increased tonnages	1. Geogas currently undertaking longwall and development emissions study	E	5	A	15	M	1. Consider options for reducing gas emissions	1. To be completed post-approval	
6	Air Quality	6.04	Gases / odours	6.04.02	Increased odours from mine resulting in complaint from neighbours	1. Spontaneous Combustion	1. Spontaneous Combustion MP	E	4	D	21	L	1. Undertake further testing on Lower Donaldson seam	1. To be completed post-approval	
7	Greenhouse Gases	7.01	Greenhouse gases	7.01.01	Increased greenhouse gas emissions	1. Increased production 2. Construction and operation of downcast ventilation shaft 3. Increased activity onsite	1. Carbon tax 2. Energy savings action plan 3. Annual greenhouse gas monitoring and reporting under NGERS 4. Greenhouse gas emissions study is currently being undertaken	E	5	A	15	M	Nil identified		
8	Noise / lighting	8.01	Vehicle / train movements	8.01.01	Increased noise from site resulting in exceedance of criteria	1. Increased production 2. Increased vehicle movements 3. Increased train movements	1. Noise monitoring sites 2. Noise MP detailing existing controls 3. Predictive noise model for modification 4. Donaldson Open Cut is scheduled for completion in 2013	E	4	D	21	L	Nil identified		
8	Noise / lighting	8.01	Vehicle / train movements	8.01.02	Community complaint	1. Increased production 2. Increased vehicle movements 3. Increased train movements	1. Noise monitoring sites 2. Noise MP detailing existing controls 3. Predictive noise model for modification 4. Donaldson Open Cut is scheduled for completion in 2013	E	4	D	21	L	Nil identified		
8	Noise / lighting	8.02	Construction activities	8.02.01	Increased noise from site resulting in exceedance of criteria	1. Construction of downcast shaft	1. Full enclosure in shed for drilling operations (24 hours per day noise source during construction) 2. All other construction during the daytime only 2. Noise agreement / further mitigation 3. Consultation with closest residents 4. Short term noise sources	E	3	B	9	M	1. Consider quantifying noise levels for construction based on industry experience 2. Consider installation of noise monitoring equipment	1. To be completed post-approval 2. To be completed post-approval	Following the ERA workshop, potential noise exceedances were predicted for construction of the downcast shaft during the daytime only.

P#	Process	S#	Subprocess	H#	Hazard	Causes	Existing Controls	Loss Type	Consequence	Probability	Risk Rank	Risk Level	Further Actions Identified at RA	Further Action Status as at 3/10/12	Comments
8	Noise / lighting	8.02	Construction activities	8.02.02	Community complaint	1. Construction of downcast shaft	1. Direction of lighting away from neighbours 2. Consultation with neighbours	E	4	D	21	L	Nil identified		
9	Traffic and Transport	9.01	Private vehicles	9.01.01	Impact on capacity and safety of public road network	1. Increased vehicle movements associated with increased number of employees 2. Construction activities 3. Deliveries	1. Upgraded intersection on entrance to mine 2. Minor increase in private vehicles accessing site from current activities 3. Donaldson Open Cut is scheduled for completion in 2013 with reduction in vehicles entering / exiting site	P	4	D	21	L	Nil identified		
10	Visual	10.01	Visual amenity	10.01.01	Community complaint	1. CHPP module 2. Stockpiles 3. LTA tree cover 4. Downcast shaft construction / operation	1. Location of modifications / upgrades is obscured from public view 2. No significant change to existing approvals 3. Short term impacts for construction of downcast shaft	E	4	D	21	L	Nil identified		
11	Waste	11.01	Waste management	11.01.01	LTA waste management	1. Increase in employees at Abel	1. Donaldson Open Cut is scheduled for completion in 2013 2. Integration of waste management	E	5	D	24	L	Nil identified		
12	Social impacts	12.01	Social impacts	12.01.01	No additional risk identified to current approved plan						n/a	n/a	Nil identified		
13	Rehabilitation	13.01	Rehabilitation	13.01.01	No additional risk identified to current approved plan						n/a	n/a	Nil identified		

APPENDIX C

Donaldson Coal

Abel Upgrade Modification Risk Assessment

Risk Table (Risk Rank Order)

November 2012

P#	Process	S#	Subprocess	H#	Hazard	Causes	Existing Controls	Loss Type	Consequence	Probability	Risk Rank	Risk Level	Further Actions Identified at RA	Further Action Status as at 3/10/12	Comments
1	Subsidence	1.02	Services (water pipes, communication cables, power lines etc.)	1.02.01	Damage to Telstra optical fibre telecommunication lines	1. Increase in curvature and strain associated with change in mining method and extension of Upper Donaldson workings	1. Infrastructure management plans as part of SMP approval 2. Predicted curvature and strains similar to previous approved mining method	F	3	B	9	M	1. Potential for relocation of optical fibre lines or duplicate in PVC tubes 2. Development of optical fibre management plan which includes Optical Time Domain Reflectometry (OTDR) monitoring	1. To be completed post-approval 2. To be completed post-approval	
8	Noise / lighting	8.02	Construction activities	8.02.01	Increased noise from site resulting in exceedance of criteria	1. Construction of downcast shaft	1. Full enclosure in shed for drilling operations (24 hours per day noise source during construction) 2. All other construction during the daytime only 2. Noise agreement / further mitigation 3. Consultation with closest residents 4. Short term noise sources	E	3	B	9	M	1. Consider quantifying noise levels for construction based on industry experience 2. Consider installation of noise monitoring equipment	1. To be completed post-approval 2. To be completed post-approval	Following the ERA workshop, potential noise exceedances were predicted for construction of the downcast shaft during the daytime only.
1	Subsidence	1.01	Surface structures including private roads	1.01.06	Cracking resulting in slope failure / rock falls resulting in personal injury and / or equipment damage in Quarries	1. Tilt and strain associated with change in mining method and extension of Upper Donaldson workings	1. SMP 2. Property Management Plan 3. Consultation with quarries 4. Stockrington quarry will potentially be closed prior to undermining 5. Stockrington quarry has flat (not vertical) batters 6. Predicted movements similar to previously approved mining method for Blackhill quarry	P	2	D	12	M	1. Formalise consultation with Blackhill Quarry	1. Completed following workshop	Briefing material regarding the Modification provided to Blackhill Quarry.
5	Heritage	5.01	Aboriginal heritage	5.01.01	Loss of Aboriginal heritage	1. Downcast shaft construction and operation 2. Damage from subsidence 3. Conveyor construction	1. Additional surveys have been undertaken to identify heritage sites in consultation with Aboriginal groups 2. Subsidence predictions indicate minimal impact on scatters and scarred trees 3. Aboriginal Heritage MP including pre-clearance surveys	E	3	C	13	M	1. Review comments from Aboriginal stakeholders	1. To be completed post-approval	Refer to management protocols outlined in the Supplementary Cultural Heritage Assessment for Abel Upgrade Modification, developed in consultation with Aboriginal stakeholders.
1	Subsidence	1.01	Surface structures including private roads	1.01.07	Impact on Blackhill road	1. Tilts, curvatures and strains associated with change in mining method and extension of Upper Donaldson workings	1. SMP 2. Built Features Management Plan 3. Consultation with Cessnock Council 4. Tilts, curvatures and strains along Blackhill Road are similar to previously approved mining method	F	4	B	14	M	Nil identified		
6	Air Quality	6.04	Gases / odours	6.04.01	Increased gases from mine	1. Deeper mining 2. Increased tonnages	1. Geogas currently undertaking longwall and development emissions study	E	5	A	15	M	1. Consider options for reducing gas emissions	1. To be completed post-approval	
7	Greenhouse Gases	7.01	Greenhouse gases	7.01.01	Increased greenhouse gas emissions	1. Increased production 2. Construction and operation of downcast ventilation shaft 3. Increased activity onsite	1. Carbon tax 2. Energy savings action plan 3. Annual greenhouse gas monitoring and reporting under NGERS 4. Greenhouse gas emissions study is currently being undertaken	E	5	A	15	M	Nil identified		

P#	Process	S#	Subprocess	H#	Hazard	Causes	Existing Controls	Loss Type	Consequence	Probability	Risk Rank	Risk Level	Further Actions Identified at RA	Further Action Status as at 3/10/12	Comments
1	Subsidence	1.01	Surface structures including private roads	1.01.05	Impacts on Hunter Expressway	1. Destabilisation of existing workings resulting in pillar run in overlying Borehole seam	1. Grouting underneath freeway bridges 2. Expressway is located more than 1km from proposed workings 3. Discontinuity of Borehole seam workings between subject area and freeway	F	2	E	16	L	Nil identified		
1	Subsidence	1.02	Services (water pipes, communication cables, power lines etc.)	1.02.02	Damage to Optus optical fibre telecommunication lines	1. Increase in curvature and strain associated with change in mining method and extension of Upper Donaldson workings	1. Optical fibre cable is located ~200m away at the closest point from the proposed longwall mining area 2. Predicted movements at Optus cable is negligible due to shortwall widths	F	2	E	16	L	1. Consider development of optical fibre management plan which includes Optical Time Domain Reflectometry (OTDR) monitoring 2. Verify location of cable with Optus relative to current plans	1. To be completed post-approval 2. To be completed post-approval	
1	Subsidence	1.02	Services (water pipes, communication cables, power lines etc.)	1.02.04	Damage to Jemena gas mains	1. Increase in curvature and strain associated with change in mining method and extension of Upper Donaldson workings	1. Jemena gas main is located ~600m away at the closest point from the proposed longwall mining area 2. Predicted movements at Jemena gas mains is negligible due to shortwall widths	F	2	E	16	L	1. Verify location of Jemena gas mains relative to current plans	1. Completed following workshop	Distance verified as per MSEC Drawing No MSEC492-15 (prepared for the Abel Modification Subsidence Assessment)
1	Subsidence	1.02	Services (water pipes, communication cables, power lines etc.)	1.02.05	Damage to TransGrid 330kV power lines	1. Tilt and strain associated with change in mining method and extension of Upper Donaldson workings	1. Lines located greater than 100m away from proposed longwall mining area and mining layout limits predicted subsidence to less than 20mm 2. Cruciforms on suspension towers 3. Lines follow the Bluegum alluvium protection zone 4. TransGrid management plans (including real time monitoring)	F	2	E	16	L	1. Update management plans 2. Review monitoring methods	To be completed post-approval	
1	Subsidence	1.01	Surface structures including private roads	1.01.01	Damage to principal residences requiring mitigation works	1. Tilt and strain associated with change in mining method and extension of Upper Donaldson workings	1. Statement of commitments limits mining to first workings 2. Pre mining inspections and surveys 3. No longwall / shortwalls under principal residences without owner permission 4. Negotiation to purchase potentially impacted properties by mine	R	3	D	17	L	Nil identified		
1	Subsidence	1.03	Surface features (natural)	1.03.04	Impact on Schedule 2 (3rd and above order) creek beds resulting in change in water quality and quantity	1. Tilts and strains associated with change in mining method and extension of Upper Donaldson workings	1. Subsidence Control Zones for Schedule 2 streams to minimise risk of impact 2. Predicted movements are no greater than previous approved mining plan predicted movements 3. Environmental MP including TARPs	E	3	D	17	L	1. Review and update existing management plans / TARPs	To be completed post-approval	
1	Subsidence	1.03	Surface features (natural)	1.03.09	Impact on rainforest within ML1618	1. Tilts and strains associated with change in mining method and extension of Upper Donaldson workings resulting in increased erosion and / or water loss	1. Protection zones around Schedule 2 streams and main rainforest drainage lines 2. Ecological monitoring of Long Gully rainforest 3. Predicted movements are no greater than previous approved mining plan predicted movements	E	3	D	17	L	Nil identified		

P#	Process	S#	Subprocess	H#	Hazard	Causes	Existing Controls	Loss Type	Consequence	Probability	Risk Rank	Risk Level	Further Actions Identified at RA	Further Action Status as at 3/10/12	Comments
1	Subsidence	1.03	Surface features (natural)	1.03.10	Impact on Pambalong Nature Reserve wetland resulting in potential increased sedimentation or inflow water loss	1. Tilts and strains associated with change in mining method and extension of Upper Donaldson workings resulting in increased erosion and / or water loss	1. Protection zones around Schedule 2 streams and main rainforest drainage lines 2. Protection zone around Pambalong Nature Reserve 3. Water monitoring 4. Pambalong Nature Reserve was excluded from ML1618 5. Ecological monitoring of Pambalong Nature Reserve	E	3	D	17	L	Nil identified		
3	Water Management	3.03	Water treatment	3.03.01	Unplanned release of brine water leading to an environmental consequence	1. Unsuitable brine storage system		E	3	D	17	L	1. Development of brine storage / disposal system	1. To be completed post-approval	Brine would be preferentially stored/disposed in the Donaldson Square Pit. Maximum storage capacity of Donaldson Square Pit designed with appropriate freeboard to prevent potential overflow. Unplanned discharge managed as per unplanned discharge of water from the site (i.e. inspections/monitoring).
3	Water Management	3.04	Surface water	3.04.02	Unplanned discharge from site	1. LTA storage 2. Increased groundwater make 3. Pipe failure	1. Transfer of water to Bloomfield 2. Inspections / monitoring	E	3	D	17	L	Nil identified		
3	Water Management	3.04	Surface water	3.04.03	Spillage of storage tailings	1. Failure of Square Pit proposed embankment	1. Design and construct embankment (if required) in accordance with relevant standards	E	3	D	17	L	Nil identified		
1	Subsidence	1.01	Surface structures including private roads	1.01.02	Damage to other residential structures requiring mitigation works	1. Tilt and strain associated with change in mining method and extension of Upper Donaldson workings	1. Statement of commitments includes plan of management for other residential structures 2. Pre mining inspections and surveys 3. Built features management plans	R	4	C	18	L	Nil identified		
1	Subsidence	1.01	Surface structures including private roads	1.01.03	Prohibiting future development potential / opportunities to the landholder	1. Impact on development during active subsidence	1. No change to this risk 2. Ongoing consultation with land owners 3. CCC meetings 4. No long term legacy issues from mining method	R	4	C	18	L	Nil identified		
1	Subsidence	1.01	Surface structures including private roads	1.01.04	Damage to /water loss from farm dams	1. Tilt and strain associated with change in mining method and extension of Upper Donaldson workings	1. Statement of commitments includes plan of dam monitoring and management strategy 2. Pre mining inspections and surveys 3. Built features management plans	D	4	C	18	L	Nil identified		
1	Subsidence	1.02	Services (water pipes, communication cables, power lines etc.)	1.02.07	Damage to private utilities (low voltage power lines, copper cables etc.)	1. Tilt and strain associated with change in mining method and extension of Upper Donaldson workings	1. Property Management Plans 2. Infrastructure Management Plans	F	4	C	18	L	1. Update management plans	To be completed post-approval	
2	Land Management	2.01	Land management	2.01.02	Surface ponding impacting farm productivity	1. Subsidence associated with change in mining method and extension of Upper Donaldson workings	1. Subsidence Monitoring Programs 2. Existing remediation methods 3. Predicted movements are no greater for shortwalls in Upper Donaldson Seam than previous approved mining plan predicted movements	F	4	C	18	L	Nil identified		
1	Subsidence	1.03	Surface features (natural)	1.03.06	Long term alteration of vegetation North of Black Hill Rd due to ponding / waterlogging	1. Tilts associated with change in mining method and extension of Upper Donaldson workings	1. Remediation of ponding if required (has previously been undertaken onsite)	E	5	B	19	L	Nil identified		

P#	Process	S#	Subprocess	H#	Hazard	Causes	Existing Controls	Loss Type	Consequence	Probability	Risk Rank	Risk Level	Further Actions Identified at RA	Further Action Status as at 3/10/12	Comments
3	Water Management	3.01	Groundwater	3.01.04	Impacts on Hexham swamp	1. Regional lowering of groundwater from changes in mining method	1. Shallow aquifers in Hexham Swamp are compartmentalised from mining area. 2. Groundwater monitoring 3. Distance from proposed mining area to Hexham Swamp (~1.2km at closest point)	E	3	E	20	L	Nil identified		
1	Subsidence	1.02	Services (water pipes, communication cables, power lines etc.)	1.02.06	Damage to Ausgrid 132kV power lines - loss of conductor clearance	1. Vertical displacement and tilts associated with change in mining method and extension of Upper Donaldson workings	1. Ausgrid management plans 2. Predicted movements do not increase with proposed mining method from previous approved mining method 3. Known methods to manage impacts lines 4. Ausgrid pre-mining assessment	F	4	D	21	L	1. Update management plans	To be completed post-approval	
1	Subsidence	1.03	Surface features (natural)	1.03.01	Impact on topographic features (cliff lines)	1. Strains associated with change in mining method and extension of Upper Donaldson workings	1. Cliff line protection zones 2. Statement of commitments 3. Predicted movements are no greater than previous approved mining plan predicted movements	E	4	D	21	L	Nil identified		
1	Subsidence	1.03	Surface features (natural)	1.03.02	Impact on topographic features (steep slopes, rock outcrops) causing long term environmental impact	1. Strains associated with change in mining method and extension of Upper Donaldson workings	1. Subsidence Monitoring Programs 2. Existing remediation methods	E	4	D	21	L	1. Review and update existing management plans	To be completed post-approval	
1	Subsidence	1.03	Surface features (natural)	1.03.03	Cracking of Schedule 1 (1st and 2nd order) creek beds resulting in long term change in water quality and quantity	1. Strains associated with change in mining method and extension of Upper Donaldson workings	1. Ephemeral streams 2. Surface water monitoring of downstream Schedule 2 streams 3. Visual inspections following mining and repairs as necessary 4. Environmental MP including TARPs	E	4	D	21	L	1. Review and update existing management plans / TARPs	To be completed post-approval	
1	Subsidence	1.03	Surface features (natural)	1.03.05	Altering Schedule 1 (1st and 2nd order) creek bed levels resulting in erosion and increased sediment	1. Tilts associated with change in mining method and extension of Upper Donaldson workings	1. Ephemeral streams 2. Surface water monitoring of downstream Schedule 2 streams 3. Visual inspections following mining and repairs as necessary 4. Environmental MP including TARPs	E	4	D	21	L	1. Review and update existing management plans / TARPs	To be completed post-approval	
2	Land Management	2.01	Land management	2.01.01	Increased erosion causing long term impact	1. Strains associated with change in mining method and extension of Upper Donaldson workings	1. Subsidence Monitoring Programs 2. Existing remediation methods 3. Predicted movements are no greater for shortwalls in Upper Donaldson Seam than previous approved mining plan predicted movements	F	4	D	21	L	1. Review and update existing management plans	1. To be completed post-approval	

P#	Process	S#	Subprocess	H#	Hazard	Causes	Existing Controls	Loss Type	Consequence	Probability	Risk Rank	Risk Level	Further Actions Identified at RA	Further Action Status as at 3/10/12	Comments
3	Water Management	3.01	Groundwater	3.01.01	Loss or reduction of groundwater for users	1. Groundwater drawdown	1. Licencing of bores 2. Limited registered groundwater users 3. Groundwater monitoring program 4. Make good provisions	R	4	D	21	L	1. Verify assumptions following completion of the groundwater study	1. Completed following workshop	Assumption regarding limited registered GW users verified. The GW Assessment prepared for the Modification states: *The majority of the bores located within 5 km of the Modification are monitoring or test bores, predominantly associated with monitoring the current and future impacts of mining activities within the area. Stock/domestic bore GW051353 is associated with the Abel Underground Mine; while farming bore GW078578 is associated with the Tasman Underground Mine.* *Of the bores not associated with Donaldson mining operations, two bores (GW058760 and GW0061307) are located to the north of Donaldson Open Cut Mine and to the north of the Newcastle Coal Measures sub-crop. This location is stratigraphically higher than the Modification and outside the sub-crop of the Donaldson Seam. Irrigation bores GW053411 and GW053412 are located within the down gradient section of Surveyor Creek near the confluence with Wallis Creek north of George Booth Drive.*
3	Water Management	3.01	Groundwater	3.01.02	Long term impact on groundwater dependent ecosystems	1. Extensive connective cracking leading to loss of base flow	1. High depth of cover in most rainforest zones and contributing catchments 2. Groundwater monitoring program 3. Predicted movements are no greater for shortwalls in Upper Donaldson Seam than previous approved mining plan predicted movements 4. Set back from rainforest protection zone 5. Lower Donaldson Seam is not predicted to have connective cracking from the seam to the surface	E	4	D	21	L	1. Verify assumptions following completion of the groundwater study	1. Completed following workshop	In regard to potential impacts to GDEs, the GW Assessment prepared for the Modification states: *Impacts on flows and groundwater levels within the alluvium within the Project Area are predicted to be insignificant, both during mining and post-mining. Therefore, it is considered very unlikely that there would be any impact on the GDEs outlined above.*
3	Water Management	3.01	Groundwater	3.01.03	Impact on shallow perched / alluvial aquifers	1. Extensive connective cracking leading to loss of base flow	1. Subsidence Control Zones for alluvium i.e. no connective cracking 2. Lower Donaldson Seam is not predicted to have connective cracking from the seam to the surface 3. Environmental MP including TARPs 4. Groundwater monitoring	E	4	D	21	L	1. Verify assumptions following completion of the groundwater study	1. Completed following workshop	As above
4	Biodiversity	4.01	Fauna	4.01.01	Long term impacts on fauna	1. Downcast shaft / overland conveyor (new alignment) construction and operation 2. Subsidence	1. Flora and Fauna Management Plan	E	4	D	21	L	1. Reassess impacts on fauna due to increased subsidence, new alignment of conveyor and downcast shaft	1. Completed following workshop	The Ecology Review conducted for the Modification has reassessed potential impacts to biodiversity associated with the Modification: *It is concluded that ecological impacts would be essentially the same as those described in the original proposal* [i.e. for the Abel Undergound Mine EA].
4	Biodiversity	4.02	Flora	4.02.01	Long term impacts on flora	1. Downcast shaft / overland conveyor (new alignment) construction and operation 2. Subsidence	1. Flora and Fauna Management Plan 2. Abel Conveyor Weed Management Plan	E	4	D	21	L	1. Reassess impacts on flora due to increased subsidence, new alignment of conveyor and downcast shaft	1. Completed following workshop	As above
4	Biodiversity	4.02	Flora	4.02.02	Long term impact on endangered ecological communities (EEC)	1. Downcast shaft / overland conveyor (new alignment) construction and operation 2. Subsidence	1. Flora and Fauna Management Plan 2. Commitment to maintain existing standoff distances to rainforests 3. Predicted movements are no greater than previous approved mining plan predicted movements 4. Abel Conveyor Weed Management Plan	E	4	D	21	L	1. Reassess impacts on flora due to increased subsidence, new alignment of conveyor and downcast shaft	1. Completed following workshop	As above

P#	Process	S#	Subprocess	H#	Hazard	Causes	Existing Controls	Loss Type	Consequence	Probability	Risk Rank	Risk Level	Further Actions Identified at RA	Further Action Status as at 3/10/12	Comments
6	Air Quality	6.01	Dust	6.01.01	Impact on community	1. Increased loading / unloading at stockpiles 2. Increased vehicle movements 3. Increased coal transport movements 4. Increased throughput at CHPP	1. Air quality monitoring sites 2. Air quality MP detailing existing controls 3. Predictive air quality model for modification 4. Donaldson Open Cut is scheduled for completion in 2013	E	4	D	21	L	Nil identified		
6	Air Quality	6.04	Gases / odours	6.04.02	Increased odours from mine resulting in complaint from neighbours	1. Spontaneous Combustion	1. Spontaneous Combustion MP	E	4	D	21	L	1. Undertake further testing on Lower Donaldson seam	1. To be completed post-approval	
8	Noise / lighting	8.01	Vehicle / train movements	8.01.01	Increased noise from site resulting in exceedance of criteria	1. Increased production 2. Increased vehicle movements 3. Increased train movements	1. Noise monitoring sites 2. Noise MP detailing existing controls 3. Predictive noise model for modification 4. Donaldson Open Cut is scheduled for completion in 2013	E	4	D	21	L	Nil identified		
8	Noise / lighting	8.01	Vehicle / train movements	8.01.02	Community complaint	1. Increased production 2. Increased vehicle movements 3. Increased train movements	1. Noise monitoring sites 2. Noise MP detailing existing controls 3. Predictive noise model for modification 4. Donaldson Open Cut is scheduled for completion in 2013	E	4	D	21	L	Nil identified		
8	Noise / lighting	8.02	Construction activities	8.02.02	Community complaint	1. Construction of downcast shaft	1. Direction of lighting away from neighbours 2. Consultation with neighbours	E	4	D	21	L	Nil identified		
9	Traffic and Transport	9.01	Private vehicles	9.01.01	Impact on capacity and safety of public road network	1. Increased vehicle movements associated with increased number of employees 2. Construction activities 3. Deliveries	1. Upgraded intersection on entrance to mine 2. Minor increase in private vehicles accessing site from current activities 3. Donaldson Open Cut is scheduled for completion in 2013 with reduction in vehicles entering / exiting site	P	4	D	21	L	Nil identified		
10	Visual	10.01	Visual amenity	10.01.01	Community complaint	1. CHPP module 2. Stockpiles 3. LTA tree cover 4. Downcast shaft construction / operation	1. Location of modifications / upgrades is obscured from public view 2. No significant change to existing approvals 3. Short term impacts for construction of downcast shaft	E	4	D	21	L	Nil identified		
1	Subsidence	1.03	Surface features (natural)	1.03.08	Surface cracking resulting in long term environmental impact	1. Strains associated with change in mining method and extension of Upper Donaldson workings	1. Subsidence Monitoring Programs 2. Existing remediation methods	E	5	C	22	L	Nil identified		
1	Subsidence	1.03	Surface features (natural)	1.03.07	Long term alteration of vegetation due to ponding / waterlogging in Bluegum and Long gully catchment areas	1. Tilts associated with change in mining method and extension of Upper Donaldson workings	1. Naturally steep in Bluegum and Long gully catchment areas	E	5	D	24	L	Nil identified		
3	Water Management	3.04	Surface water	3.04.01	Increased sediments	1.Construction of conveyor (new alignment) / downcast shaft 2. Runoff from larger stockpiles	1. Construction MP 2. Sediment MP for overland conveyor 3. Incremental change is negligible 4. Water MP	E	5	D	24	L	Nil identified		

P#	Process	S#	Subprocess	H#	Hazard	Causes	Existing Controls	Loss Type	Consequence	Probability	Risk Rank	Risk Level	Further Actions Identified at RA	Further Action Status as at 3/10/12	Comments
11	Waste	11.01	Waste management	11.01.01	LTA waste management	1. Increase in employees at Abel	1. Donaldson Open Cut is scheduled for completion in 2013 2. Integration of waste management	E	5	D	24	L	Nil identified		
5	Heritage	5.02	European heritage	5.02.01	Loss of European heritage - Richmond Vale railway line corridor	1. Damage from subsidence	No impacts predicted	E	5	E	25	L	1. Determine location of Jewboy bushranger cave	1. Completed following workshop	UTM coordinates 366564mE, 6361222mS (Zone 56H). This location is outside of the Abel Underground Mine area.
1	Subsidence	1.02	Services (water pipes, communication cables, power lines etc.)	1.02.03	Nil water mains were identified that could be impacted by the proposed mining area						n/a	n/a	Nil identified		
3	Water Management	3.02	Source water for CHPP	3.02.01	No risk identified						n/a	n/a	Nil identified		
6	Air Quality	6.02	Monitoring	6.02.01	No increased risk identified						n/a	n/a	Nil identified		
6	Air Quality	6.03	Particulate emissions	6.03.01	As per 6.01.01						n/a	n/a	Nil identified		
12	Social impacts	12.01	Social impacts	12.01.01	No additional risk identified to current approved plan						n/a	n/a	Nil identified		
13	Rehabilitation	13.01	Rehabilitation	13.01.01	No additional risk identified to current approved plan						n/a	n/a	Nil identified		

APPENDIX D

Donaldson Coal

Abel Upgrade Modification
Risk Assessment

Risk Table (Consequence Order)

November 2012

P#	Process	S#	Subprocess	H#	Hazard	Causes	Existing Controls	Loss Type	Consequence	Probability	Risk Rank	Risk Level	Further Actions Identified at RA	Further Action Status as at 3/10/12	Comments
1	Subsidence	1.01	Surface structures including private roads	1.01.06	Cracking resulting in slope failure / rock falls resulting in personal injury and / or equipment damage in Quarries	1. Tilt and strain associated with change in mining method and extension of Upper Donaldson workings	1. SMP 2. Property Management Plan 3. Consultation with quarries 4. Stockrington quarry will potentially be closed prior to undermining 5. Stockrington quarry has flat (not vertical) batters 6. Predicted movements similar to previously approved mining method for Blackhill quarry	P	2	D	12	M	1. Formalise consultation with Blackhill Quarry	1. Completed following workshop	Briefing material regarding the Modification provided to Blackhill Quarry.
1	Subsidence	1.01	Surface structures including private roads	1.01.05	Impacts on Hunter Expressway	1. Destabilisation of existing workings resulting in pillar run in overlying Borehole seam	1. Grouting underneath freeway bridges 2. Expressway is located more than 1km from proposed workings 3. Discontinuity of Borehole seam workings between subject area and freeway	F	2	E	16	L	Nil identified		
1	Subsidence	1.02	Services (water pipes, communication cables, power lines etc.)	1.02.02	Damage to Optus optical fibre telecommunication lines	1. Increase in curvature and strain associated with change in mining method and extension of Upper Donaldson workings	1. Optical fibre cable is located ~200m away at the closest point from the proposed longwall mining area 2. Predicted movements at Optus cable is negligible due to shortwall widths	F	2	E	16	L	1. Consider development of optical fibre management plan which includes Optical Time Domain Reflectometry (OTDR) monitoring 2. Verify location of cable with Optus relative to current plans	1. To be completed post-approval 2. To be completed post-approval	
1	Subsidence	1.02	Services (water pipes, communication cables, power lines etc.)	1.02.04	Damage to Jemena gas mains	1. Increase in curvature and strain associated with change in mining method and extension of Upper Donaldson workings	1. Jemena gas main is located ~600m away at the closest point from the proposed longwall mining area 2. Predicted movements at Jemena gas mains is negligible due to shortwall widths	F	2	E	16	L	1. Verify location of Jemena gas mains relative to current plans	1. Completed following workshop	Distance verified as per MSEC Drawing No MSEC492-15 (prepared for the Abel Modification Subsidence Assessment)
1	Subsidence	1.02	Services (water pipes, communication cables, power lines etc.)	1.02.05	Damage to TransGrid 330kV power lines	1. Tilt and strain associated with change in mining method and extension of Upper Donaldson workings	1. Lines located greater than 100m away from proposed longwall mining area and mining layout limits predicted subsidence to less than 20mm 2. Cruciforms on suspension towers 3. Lines follow the Bluegum alluvium protection zone 4. TransGrid management plans (including real time monitoring)	F	2	E	16	L	1. Update management plans 2. Review monitoring methods	To be completed post-approval	
5	Heritage	5.01	Aboriginal heritage	5.01.01	Loss of Aboriginal heritage	1. Downcast shaft construction and operation 2. Damage from subsidence 3. Conveyor construction	1. Additional surveys have been undertaken to identify heritage sites in consultation with Aboriginal groups 2. Subsidence predictions indicate minimal impact on scatters and scarred trees 3. Aboriginal Heritage MP including pre-clearance surveys	E	3	C	13	M	1. Review comments from Aboriginal stakeholders	1. To be completed post-approval	Refer to management protocols outlined in the Supplementary Cultural Heritage Assessment for Abel Upgrade Modification, developed in consultation with Aboriginal stakeholders.

P#	Process	S#	Subprocess	H#	Hazard	Causes	Existing Controls	Loss Type	Consequence	Probability	Risk Rank	Risk Level	Further Actions Identified at RA	Further Action Status as at 3/10/12	Comments
1	Subsidence	1.01	Surface structures including private roads	1.01.01	Damage to principal residences requiring mitigation works	1. Tilt and strain associated with change in mining method and extension of Upper Donaldson workings	1. Statement of commitments limits mining to first workings 2. Pre mining inspections and surveys 3. No longwall / shortwalls under principal residences without owner permission 4. Negotiation to purchase potentially impacted properties by mine	R	3	D	17	L	Nil identified		
1	Subsidence	1.03	Surface features (natural)	1.03.04	Impact on Schedule 2 (3rd and above order) creek beds resulting in change in water quality and quantity	1. Tilts and strains associated with change in mining method and extension of Upper Donaldson workings	1. Subsidence Control Zones for Schedule 2 streams to minimise risk of impact 2. Predicted movements are no greater than previous approved mining plan predicted movements 3. Environmental MP including TARPs	E	3	D	17	L	1. Review and update existing management plans / TARPs	To be completed post-approval	
1	Subsidence	1.03	Surface features (natural)	1.03.09	Impact on rainforest within ML1618	1. Tilts and strains associated with change in mining method and extension of Upper Donaldson workings resulting in increased erosion and / or water loss	1. Protection zones around Schedule 2 streams and main rainforest drainage lines 2. Ecological monitoring of Long Gully rainforest 3. Predicted movements are no greater than previous approved mining plan predicted movements	E	3	D	17	L	Nil identified		
1	Subsidence	1.03	Surface features (natural)	1.03.10	Impact on Pambalong Nature Reserve wetland resulting in potential increased sedimentation or inflow water loss	1. Tilts and strains associated with change in mining method and extension of Upper Donaldson workings resulting in increased erosion and / or water loss	1. Protection zones around Schedule 2 streams and main rainforest drainage lines 2. Protection zone around Pambalong Nature Reserve 3. Water monitoring 4. Pambalong Nature Reserve was excluded from ML1618 5. Ecological monitoring of Pambalong Nature Reserve	E	3	D	17	L	Nil identified		
3	Water Management	3.03	Water treatment	3.03.01	Unplanned release of brine water leading to an environmental consequence	1. Unsuitable brine storage system		E	3	D	17	L	1. Development of brine storage / disposal system	1. To be completed post-approval	Brine would be preferentially stored/disposed in the Donaldson Square Pit. Maximum storage capacity of Donaldson Square Pit designed with appropriate freeboard to prevent potential overflow. Unplanned discharge managed as per unplanned discharge of water from the site (i.e. inspections/monitoring).
3	Water Management	3.04	Surface water	3.04.02	Unplanned discharge from site	1. LTA storage 2. Increased groundwater make 3. Pipe failure	1. Transfer of water to Bloomfield 2. Inspections / monitoring	E	3	D	17	L	Nil identified		
3	Water Management	3.04	Surface water	3.04.03	Spillage of storage tailings	1. Failure of Square Pit proposed embankment	1. Design and construct embankment (if required) in accordance with relevant standards	E	3	D	17	L	Nil identified		
3	Water Management	3.01	Groundwater	3.01.04	Impacts on Hexham swamp	1. Regional lowering of groundwater from changes in mining method	1. Shallow aquifers in Hexham Swamp are compartmentalised from mining area. 2. Groundwater monitoring 3. Distance from proposed mining area to Hexham Swamp (~1.2km at closest point)	E	3	E	20	L	Nil identified		

P#	Process	S#	Subprocess	H#	Hazard	Causes	Existing Controls	Loss Type	Consequence	Probability	Risk Rank	Risk Level	Further Actions Identified at RA	Further Action Status as at 3/10/12	Comments
1	Subsidence	1.02	Services (water pipes, communication cables, power lines etc.)	1.02.01	Damage to Telstra optical fibre telecommunication lines	1. Increase in curvature and strain associated with change in mining method and extension of Upper Donaldson workings	1. Infrastructure management plans as part of SMP approval 2. Predicted curvature and strains similar to previous approved mining method	F	3	B	9	M	1. Potential for relocation of optical fibre lines or duplicate in PVC tubes 2. Development of optical fibre management plan which includes Optical Time Domain Reflectometry (OTDR) monitoring	1. To be completed post-approval 2. To be completed post-approval	
8	Noise / lighting	8.02	Construction activities	8.02.01	Increased noise from site resulting in exceedance of criteria	1. Construction of downcast shaft	1. Full enclosure in shed for drilling operations (24 hours per day noise source during construction) 2. All other construction during the daytime only 2. Noise agreement / further mitigation 3. Consultation with closest residents 4. Short term noise sources	E	3	B	9	M	1. Consider quantifying noise levels for construction based on industry experience 2. Consider installation of noise monitoring equipment	1. To be completed post-approval 2. To be completed post-approval	Following the ERA workshop, potential noise exceedances were predicted for construction of the downcast shaft during the daytime only.
1	Subsidence	1.01	Surface structures including private roads	1.01.07	Impact on Blackhill road	1. Tilts, curvatures and strains associated with change in mining method and extension of Upper Donaldson workings	1. SMP 2. Built Features Management Plan 3. Consultation with Cessnock Council 4. Tilts, curvatures and strains along Blackhill Road are similar to previously approved mining method	F	4	B	14	M	Nil identified		
1	Subsidence	1.01	Surface structures including private roads	1.01.02	Damage to other residential structures requiring mitigation works	1. Tilt and strain associated with change in mining method and extension of Upper Donaldson workings	1. Statement of commitments includes plan of management for other residential structures 2. Pre mining inspections and surveys 3. Built features management plans	R	4	C	18	L	Nil identified		
1	Subsidence	1.01	Surface structures including private roads	1.01.03	Prohibiting future development potential / opportunities to the landholder	1. Impact on development during active subsidence	1. No change to this risk 2. Ongoing consultation with land owners 3. CCC meetings 4. No long term legacy issues from mining method	R	4	C	18	L	Nil identified		
1	Subsidence	1.01	Surface structures including private roads	1.01.04	Damage to /water loss from farm dams	1. Tilt and strain associated with change in mining method and extension of Upper Donaldson workings	1. Statement of commitments includes plan of dam monitoring and management strategy 2. Pre mining inspections and surveys 3. Built features management plans	D	4	C	18	L	Nil identified		
1	Subsidence	1.02	Services (water pipes, communication cables, power lines etc.)	1.02.07	Damage to private utilities (low voltage power lines, copper cables etc.)	1. Tilt and strain associated with change in mining method and extension of Upper Donaldson workings	1. Property Management Plans 2. Infrastructure Management Plans	F	4	C	18	L	1. Update management plans	To be completed post-approval	
2	Land Management	2.01	Land management	2.01.02	Surface ponding impacting farm productivity	1. Subsidence associated with change in mining method and extension of Upper Donaldson workings	1. Subsidence Monitoring Programs 2. Existing remediation methods 3. Predicted movements are no greater for shortwalls in Upper Donaldson Seam than previous approved mining plan predicted movements	F	4	C	18	L	Nil identified		

P#	Process	S#	Subprocess	H#	Hazard	Causes	Existing Controls	Loss Type	Consequence	Probability	Risk Rank	Risk Level	Further Actions Identified at RA	Further Action Status as at 3/10/12	Comments
1	Subsidence	1.02	Services (water pipes, communication cables, power lines etc.)	1.02.06	Damage to Ausgrid 132kV power lines - loss of conductor clearance	1. Vertical displacement and tilts associated with change in mining method and extension of Upper Donaldson workings	1. Ausgrid management plans 2. Predicted movements do not increase with proposed mining method from previous approved mining method 3. Known methods to manage impacts lines 4. Ausgrid pre-mining assessment	F	4	D	21	L	1. Update management plans	To be completed post-approval	
1	Subsidence	1.03	Surface features (natural)	1.03.01	Impact on topographic features (cliff lines)	1. Strains associated with change in mining method and extension of Upper Donaldson workings	1. Cliff line protection zones 2. Statement of commitments 3. Predicted movements are no greater than previous approved mining plan predicted movements	E	4	D	21	L	Nil identified		
1	Subsidence	1.03	Surface features (natural)	1.03.02	Impact on topographic features (steep slopes, rock outcrops) causing long term environmental impact	1. Strains associated with change in mining method and extension of Upper Donaldson workings	1. Subsidence Monitoring Programs 2. Existing remediation methods	E	4	D	21	L	1. Review and update existing management plans	To be completed post-approval	
1	Subsidence	1.03	Surface features (natural)	1.03.03	Cracking of Schedule 1 (1st and 2nd order) creek beds resulting in long term change in water quality and quantity	1. Strains associated with change in mining method and extension of Upper Donaldson workings	1. Ephemeral streams 2. Surface water monitoring of downstream Schedule 2 streams 3. Visual inspections following mining and repairs as necessary 4. Environmental MP including TARPs	E	4	D	21	L	1. Review and update existing management plans / TARPs	To be completed post-approval	
1	Subsidence	1.03	Surface features (natural)	1.03.05	Altering Schedule 1 (1st and 2nd order) creek bed levels resulting in erosion and increased sediment	1. Tilts associated with change in mining method and extension of Upper Donaldson workings	1. Ephemeral streams 2. Surface water monitoring of downstream Schedule 2 streams 3. Visual inspections following mining and repairs as necessary 4. Environmental MP including TARPs	E	4	D	21	L	1. Review and update existing management plans / TARPs	To be completed post-approval	
2	Land Management	2.01	Land management	2.01.01	Increased erosion causing long term impact	1. Strains associated with change in mining method and extension of Upper Donaldson workings	1. Subsidence Monitoring Programs 2. Existing remediation methods 3. Predicted movements are no greater for shortwalls in Upper Donaldson Seam than previous approved mining plan predicted movements	F	4	D	21	L	1. Review and update existing management plans	1. To be completed post-approval	
3	Water Management	3.01	Groundwater	3.01.01	Loss or reduction of groundwater for users	1. Groundwater drawdown	1. Licencing of bores 2. Limited registered groundwater users 3. Groundwater monitoring program 4. Make good provisions	R	4	D	21	L	1. Verify assumptions following completion of the groundwater study	1. Completed following workshop	Assumption regarding limited registered GW users verified. The GW Assessment prepared for the Modification states: *The majority of the bores located within 5 km of the Modification are monitoring or test bores, predominantly associated with monitoring the current and future impacts of mining activities within the area. Stock/domestic bore GW051353 is associated with the Abel Underground Mine; while farming bore GW078578 is associated with the Tasman Underground Mine.* *Of the bores not associated with Donaldson mining operations, two bores (GW058760 and GW0061307) are located to the north of Donaldson Open Cut Mine and to the north of the Newcastle Coal Measures sub-crop. This location is stratigraphically higher than the Modification and outside the sub-crop of the Donaldson Seam. Irrigation bores GW053411 and GW053412 are located within the down gradient section of Surveyor Creek near the confluence with Wallis Creek north of George Booth Drive.*

P#	Process	S#	Subprocess	H#	Hazard	Causes	Existing Controls	Loss Type	Consequence	Probability	Risk Rank	Risk Level	Further Actions Identified at RA	Further Action Status as at 3/10/12	Comments
3	Water Management	3.01	Groundwater	3.01.02	Long term impact on groundwater dependent ecosystems	1. Extensive connective cracking leading to loss of base flow	1. High depth of cover in most rainforest zones and contributing catchments 2. Groundwater monitoring program 3. Predicted movements are no greater for shortwalls in Upper Donaldson Seam than previous approved mining plan predicted movements 4. Set back from rainforest protection zone 5. Lower Donaldson Seam is not predicted to have connective cracking from the seam to the surface	E	4	D	21	L	1. Verify assumptions following completion of the groundwater study	1. Completed following workshop	In regard to potential impacts to GDEs, the GW Assessment prepared for the Modification states: *Impacts on flows and groundwater levels within the alluvium within the Project Area are predicted to be insignificant, both during mining and post-mining. Therefore, it is considered very unlikely that there would be any impact on the GDEs outlined above.*
3	Water Management	3.01	Groundwater	3.01.03	Impact on shallow perched / alluvial aquifers	1. Extensive connective cracking leading to loss of base flow	1. Subsidence Control Zones for alluvium i.e. no connective cracking 2. Lower Donaldson Seam is not predicted to have connective cracking from the seam to the surface 3. Environmental MP including TARPs 4. Groundwater monitoring	E	4	D	21	L	1. Verify assumptions following completion of the groundwater study	1. Completed following workshop	As above
4	Biodiversity	4.01	Fauna	4.01.01	Long term impacts on fauna	1. Downcast shaft / overland conveyor (new alignment) construction and operation 2. Subsidence	1. Flora and Fauna Management Plan	E	4	D	21	L	1. Reassess impacts on fauna due to increased subsidence, new alignment of conveyor and downcast shaft	1. Completed following workshop	The Ecology Review conducted for the Modification has reassessed potential impacts to biodiversity associated with the Modification: *It is concluded that ecological impacts would be essentially the same as those described in the original proposal* [i.e. for the Abel Undergound Mine EA].
4	Biodiversity	4.02	Flora	4.02.01	Long term impacts on flora	1. Downcast shaft / overland conveyor (new alignment) construction and operation 2. Subsidence	1. Flora and Fauna Management Plan 2. Abel Conveyor Weed Management Plan	E	4	D	21	L	1. Reassess impacts on flora due to increased subsidence, new alignment of conveyor and downcast shaft	1. Completed following workshop	As above
4	Biodiversity	4.02	Flora	4.02.02	Long term impact on endangered ecological communities (EEC)	1. Downcast shaft / overland conveyor (new alignment) construction and operation 2. Subsidence	1. Flora and Fauna Management Plan 2. Commitment to maintain existing standoff distances to rainforests 3. Predicted movements are no greater than previous approved mining plan predicted movements 4. Abel Conveyor Weed Management Plan	E	4	D	21	L	1. Reassess impacts on flora due to increased subsidence, new alignment of conveyor and downcast shaft	1. Completed following workshop	As above
6	Air Quality	6.01	Dust	6.01.01	Impact on community	1. Increased loading / unloading at stockpiles 2. Increased vehicle movements 3. Increased coal transport movements 4. Increased throughput at CHPP	1. Air quality monitoring sites 2. Air quality MP detailing existing controls 3. Predictive air quality model for modification 4. Donaldson Open Cut is scheduled for completion in 2013	E	4	D	21	L	Nil identified		
6	Air Quality	6.04	Gases / odours	6.04.02	Increased odours from mine resulting in complaint from neighbours	1. Spontaneous Combustion	1. Spontaneous Combustion MP	E	4	D	21	L	1. Undertake further testing on Lower Donaldson seam	1. To be completed post-approval	
8	Noise / lighting	8.01	Vehicle / train movements	8.01.01	Increased noise from site resulting in exceedance of criteria	1. Increased production 2. Increased vehicle movements 3. Increased train movements	1. Noise monitoring sites 2. Noise MP detailing existing controls 3. Predictive noise model for modification 4. Donaldson Open Cut is scheduled for completion in 2013	E	4	D	21	L	Nil identified		

P#	Process	S#	Subprocess	H#	Hazard	Causes	Existing Controls	Loss Type	Consequence	Probability	Risk Rank	Risk Level	Further Actions Identified at RA	Further Action Status as at 3/10/12	Comments
8	Noise / lighting	8.01	Vehicle / train movements	8.01.02	Community complaint	1. Increased production 2. Increased vehicle movements 3. Increased train movements	1. Noise monitoring sites 2. Noise MP detailing existing controls 3. Predictive noise model for modification 4. Donaldson Open Cut is scheduled for completion in 2013	E	4	D	21	L	Nil identified		
8	Noise / lighting	8.02	Construction activities	8.02.02	Community complaint	1. Construction of downcast shaft	1. Direction of lighting away from neighbours 2. Consultation with neighbours	E	4	D	21	L	Nil identified		
9	Traffic and Transport	9.01	Private vehicles	9.01.01	Impact on capacity and safety of public road network	1. Increased vehicle movements associated with increased number of employees 2. Construction activities 3. Deliveries	1. Upgraded intersection on entrance to mine 2. Minor increase in private vehicles accessing site from current activities 3. Donaldson Open Cut is scheduled for completion in 2013 with reduction in vehicles entering / exiting site	P	4	D	21	L	Nil identified		
10	Visual	10.01	Visual amenity	10.01.01	Community complaint	1. CHPP module 2. Stockpiles 3. LTA tree cover 4. Downcast shaft construction / operation	1. Location of modifications / upgrades is obscured from public view 2. No significant change to existing approvals 3. Short term impacts for construction of downcast shaft	E	4	D	21	L	Nil identified		
6	Air Quality	6.04	Gases / odours	6.04.01	Increased gases from mine	1. Deeper mining 2. Increased tonnages	1. Geogas currently undertaking longwall and development emissions study	E	5	A	15	M	1. Consider options for reducing gas emissions	1. To be completed post-approval	
7	Greenhouse Gases	7.01	Greenhouse gases	7.01.01	Increased greenhouse gas emissions	1. Increased production 2. Construction and operation of downcast ventilation shaft 3. Increased activity onsite	1. Carbon tax 2. Energy savings action plan 3. Annual greenhouse gas monitoring and reporting under NGERS 4. Greenhouse gas emissions study is currently being undertaken	E	5	A	15	M	Nil identified		
1	Subsidence	1.03	Surface features (natural)	1.03.06	Long term alteration of vegetation North of Black Hill Rd due to ponding / waterlogging	1. Tilts associated with change in mining method and extension of Upper Donaldson workings	1. Remediation of ponding if required (has previously been undertaken onsite)	E	5	B	19	L	Nil identified		
1	Subsidence	1.03	Surface features (natural)	1.03.08	Surface cracking resulting in long term environmental impact	1. Strains associated with change in mining method and extension of Upper Donaldson workings	1. Subsidence Monitoring Programs 2. Existing remediation methods	E	5	C	22	L	Nil identified		
1	Subsidence	1.03	Surface features (natural)	1.03.07	Long term alteration of vegetation due to ponding / waterlogging in Bluegum and Long gully catchment areas	1. Tilts associated with change in mining method and extension of Upper Donaldson workings	1. Naturally steep in Bluegum and Long gully catchment areas	E	5	D	24	L	Nil identified		
3	Water Management	3.04	Surface water	3.04.01	Increased sediments	1.Construction of conveyor (new alignment) / downcast shaft 2. Runoff from larger stockpiles	1. Construction MP 2. Sediment MP for overland conveyor 3. Incremental change is negligible 4. Water MP	E	5	D	24	L	Nil identified		

P#	Process	S#	Subprocess	H#	Hazard	Causes	Existing Controls	Loss Type	Consequence	Probability	Risk Rank	Risk Level	Further Actions Identified at RA	Further Action Status as at 3/10/12	Comments
11	Waste	11.01	Waste management	11.01.01	LTA waste management	1. Increase in employees at Abel	1. Donaldson Open Cut is scheduled for completion in 2013 2. Integration of waste management	E	5	D	24	L	Nil identified		
5	Heritage	5.02	European heritage	5.02.01	Loss of European heritage - Richmond Vale railway line corridor	1. Damage from subsidence	No impacts predicted	E	5	E	25	L	1. Determine location of Jewboy bushranger cave	1. Completed following workshop	UTM coordinates 366564mE, 6361222mS (Zone 56H). This location is outside of the Abel Underground Mine area.
1	Subsidence	1.02	Services (water pipes, communication cables, power lines etc.)	1.02.03	Nil water mains were identified that could be impacted by the proposed mining area						n/a	n/a	Nil identified		
3	Water Management	3.02	Source water for CHPP	3.02.01	No risk identified						n/a	n/a	Nil identified		
6	Air Quality	6.02	Monitoring	6.02.01	No increased risk identified						n/a	n/a	Nil identified		
6	Air Quality	6.03	Particulate emissions	6.03.01	As per 6.01.01						n/a	n/a	Nil identified		
12	Social impacts	12.01	Social impacts	12.01.01	No additional risk identified to current approved plan						n/a	n/a	Nil identified		
13	Rehabilitation	13.01	Rehabilitation	13.01.01	No additional risk identified to current approved plan						n/a	n/a	Nil identified		

APPENDIX E

Donaldson Coal

Abel Upgrade Modification Environmental Risk Assessment

GSS Environmental Risk Matrix

November 2012

Consequence

1: Catastrophic

A major event which could cause severe or irreversible damage to the natural and/or human environment.

- Major Closure Costs (i.e. estimated closure costs > $5M).
- Permanent premature closure of the mine.
- Severe or irreversible damage to natural environment.
- Could kill or permanently disable people.
- Actual or potential loss of credibility with key stakeholders (community / government).
- Long term environmental liability/legacy to the Company.
- Loss of global reputation for the Company.
- Regulatory intervention, prosecution would occur (ie. Fines).
- Negative publicity/complaints (National & Global media exposure).
- Pollution event causes major downstream damage that is rectified by a long term remediation program over 12 months (e.g. failure of major tailings dam that pollutes *international* waters).
- Total destruction of Cultural Heritage Sites and Artefacts.

2: Major

An event which could have a substantial and permanent consequence to the natural and / or human environment.

- Major Closure Costs (i.e. estimated closure costs $1M - $5M).
- Could cause temporary or long term closure of mine.
- Substantial and permanent consequences to the natural environment.
- Could cause serious injury or disease to people
- Potential loss of credibility with key stakeholders (community / government)
- Reported incident, regulatory intervention which would result in prosecution.
- Adverse publicity and community complaints (National media exposure).
- Pollution event which causes serious downstream damage that is rectified by a medium term remediation program over 1-12 months (e.g. failure of major tailings dam that pollutes *regional/national* waters).
- Major permanent unrepairable damage to Cultural Heritage Sites and
- Artefacts.

3: Moderate

An event which could create substantial temporary or minor permanent damage to the natural and / or human environment.

- Moderate Closure Costs (ie. estimated closure costs $500K - $1M).
- Could cause temporary closure of the mine or disruptions to the operation.
- Substantial temporary or minor permanent damage to the natural environment.
- A reportable incident not likely to result in prosecution.
- Could cause typical lost time injury (LTI) to people
- Potential loss of credibility with key stakeholders (community / government)
- Adverse local publicity and community complaints (Local media exposure).
- Event which causes substantial temporary damage that is rectified by medium term remediation program over 3 – 6 months (i.e. earthworks to fix surface cracking under public roads or works required to stop water leaking from water storage structures).
- Substantial permanent unrepairable damage to Cultural Heritage Sites and
- Artefacts.

4: Minor An event which could have temporary and minor effects to the natural and / or human environment.

- Minor Closure Costs (ie. estimated closure costs $100K - $500K).
- Temporary minor damage to the natural environment.
- Could cause a first aid injury to people.
- Complaints received from near neighbours.
- Could result in government intervention but not likely to result in prosecution.
- Event which causes temporary minor damage which may require some minor rectification works (i.e. cracking on surface causing minor erosion in drainage lines).
- Minor repairable damage to Cultural Heritage Sites and Artefacts.

5: Insignificant

No detrimental impact on the natural and / or human environment is measured or envisaged.

- Minor Closure Costs (ie. estimated closure costs <$100K)
- No detrimental impact to the natural environment.
- Couldn't cause injury or disease to people.
- No detrimental impacts to Cultural Heritage Sites and Artefacts.

PROBABILITY:

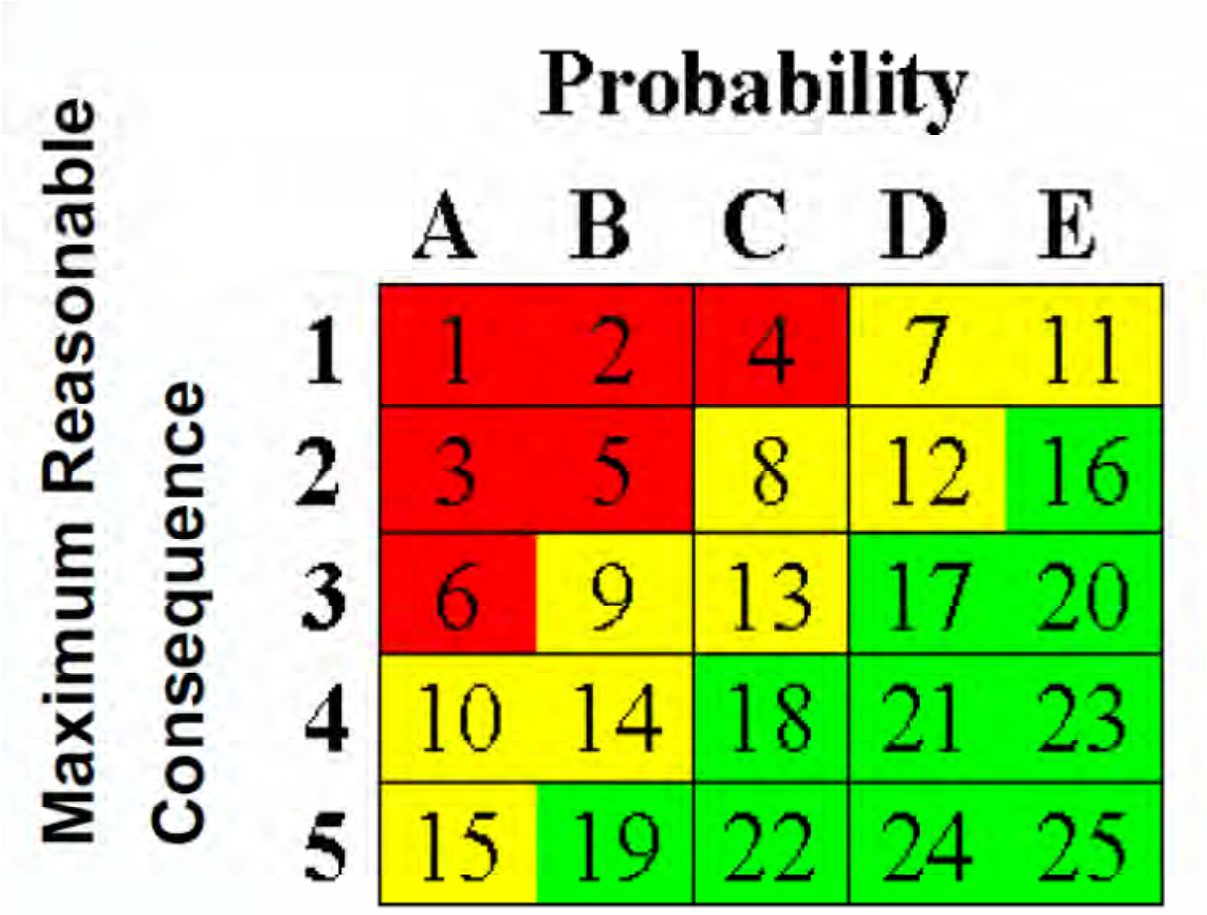
A - Almost certain to happen

B - Likely to happen at some point

C - Moderate: possible, heard of so it might happen

D - Unlikely: not likely to happen

E - Rare: practically impossible



Risk Classification System :

High Risk (H)	1 to 6 (Red)
Medium Risk (M)	7 to 15 (Yellow)
Low Risk (L)	16 to 25 (Green)

H (high) being a *Class 1 Risk* - requires immediate management attention, a stop/stand down until rectified if deemed necessary.

M (moderate) being a *Class 2 Risk* - acceptable with current controls but requires attention if controls absent or ineffective, and where practicable develop other controls to mitigate the risk.

L (low) being a *Class 3 Risk* - assess and control as required.

APPENDIX F

Donaldson Coal

Abel Upgrade Modification Environmental Risk Assessment

November 2012

Mining Design Guidelines 1014 Checklist

1 MINERAL RESOURCES MDG 1014 CHECKLIST

To ensure this risk assessment complies with the Minerals Resources MDG 1010 Risk Management Handbook, the following checklist/ sign-off (MDG 1014) has been included.

Sub-sections 1.1, 1.2 and 1.3 are to be completed by Abel Management.

1.1 Report Checklist

1.	Is there a description of the operation or equipment being assessed?	(Yes) / No
2.	Is there a summary of the strategic, corporate and risk management context?	(Yes) / No
3.	Is there a list of the people involved in the risk identification step, together with their organisational roles and experience relevant to the risk assessment topic?	(Yes) / No
4.	Is there an adequately detailed outline of the approach used to identify the risks?	(Yes) / No
5.	Is there an outline of the method used for assessing the likelihood and consequences of the risks?	(Yes) / No
6.	Are there two lists of identified risks, ranked by: a) risk magnitude , and b) consequence magnitude	(Yes) / No
7.	Is there discussion of the basis for defining either the safety standard to be achieved, or the level of risk management expenditure?	(Yes) / No
8.	Is there a list of the main actions to be taken to reduce risks and to manage risks?	(Yes) / No
9.	Is there a timetable for implementing main actions?	(Yes) / No
10.	Does the report specify a requirement for a working audit required after completion of all implementation stages?	(Yes) / No

1.2 Risk Assessment Process Evaluation

How do you rate the following:		Poor (Please Circle)				Good
1.	The range of expertise of team which did the study	1	2	3	4	(5)
2.	The appropriateness of the degree of detail of the study	1	2	3	4	(5)
3.	The comprehensiveness of the systematic approach	1	2	3	4	(5)
4.	The identification of the key risk scenarios to be addressed	1	2	3	4	(5)
5.	The bases for deciding the required safety level or effort	1	2	3	4	(5)
6.	The method for assessing likelihood and consequences	1	2	3	4	(5)
7.	The thoroughness of consideration of planned risk reduction actions	1	2	3	4	(5)
8.	The thoroughness of consideration of existing or planned risk controls	1	2	3	4	(5)
9.	The objectivity and balance of the study (i.e. not unduly optimistic or pessimistic	1	2	3	4	(5)

1.3 Risk Assessment Process Signoff

Name: Tony Sutherland

Position: Technical Services Manager – Donaldson Coal Underground Operations

Signature: T Sutherland. Date: 27 – 11 – 12