APPENDIX U

Preliminary hazard assessment

Cobbora Holding Company Pty Limited

EMGA Mitchell McLennan

Preliminary hazard assessment

Cobbora Coal Project

Prepared for Cobbora Holding Company Pty Limited | 14 September 2012

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Preliminary hazard assessment

Final

Report J11030RP10 | Prepared for Cobbora Holding Company Pty Limited | 14 September 2012

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Executive Summary

The Cobbora Coal Project (the Project) is a new open cut coal mine proposed by Cobbora Holding Company Pty Limited (CHC). The primary purpose of the Project is to provide coal for five major NSW power stations. The project application area (PAA) is located approximately 5 km south of Cobbora, 22 km south-west of Dunedoo, 64 km north-west of Mudgee and 60 km east of Dubbo in the central west of NSW.

This preliminary hazard assessment has been prepared by EMGA Mitchell McLennan Pty Ltd to determine:

- if the Project is a hazardous or offensive development under State Environmental Planning Policy No. 33 (Hazardous and Offensive Development) (SEPP 33) based on the hazardous materials to be stored and used onsite; and

- the risk from the Project to people (not including the Project's workforce), property and the environment, assessed against the Department of Planning and Infrastructure's qualitative risk criteria in *Hazardous Industry Planning Advisory Paper No 4: Risk Criteria for Land Use Safety Planning* (DP&I 2011a).

ES1 Hazardous materials

Hazardous materials that will be used onsite were identified along with the quantity and the locations where they will be stored. This information was compared to SEPP 33 criteria to determine if the Project is classified as a hazardous or offensive development. This comparison showed that the Project will not be a hazardous or offensive development.

ES2 Risks

Risks have been determined in accordance with *Australian/New Zealand Standard International Organisation for Standardisation 31000:2009 Risk Management – Principles and Guidelines*.

Hazards associated with scenarios based on atypical events (eg accidents) were identified. The risks from these scenarios in the presence of engineering and administrative controls were determined.

Comparison of the risks to the DP&I (2011a) risk criteria shows that the Project generally represents a low risk. However, where there are elevated risks associated with parts of the Project, these risks will be managed to achieve acceptable outcomes through the application of engineering and administrative controls. Further risk assessments will be conducted during the Project design and construction phases.

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1 Introduction

This preliminary hazard assessment (PHA) has been prepared by EMGA Mitchell McLennan Pty Limited (EMM) to assess the hazards associated with the Cobbora Coal Project (the Project), as required by the Director General's Environmental Assessment Requirements (DGRs) issued on 23 December 2011.

This PHA is the initial stage of the Project's hazard assessment process. It provides information to allow government agencies to determine if Project risks are acceptable. As described in *Major Hazards Planning* (DP&I 2011b), a hazard and operability study, fire safety study, emergency plan and updated hazard analysis will be undertaken during Project design (Figure 1.1). A construction safety study will be undertaken prior to the construction phase of the Project. There will be regular hazard audits during operations to ensure that the Project's hazards and risks are being recognised and managed effectively.

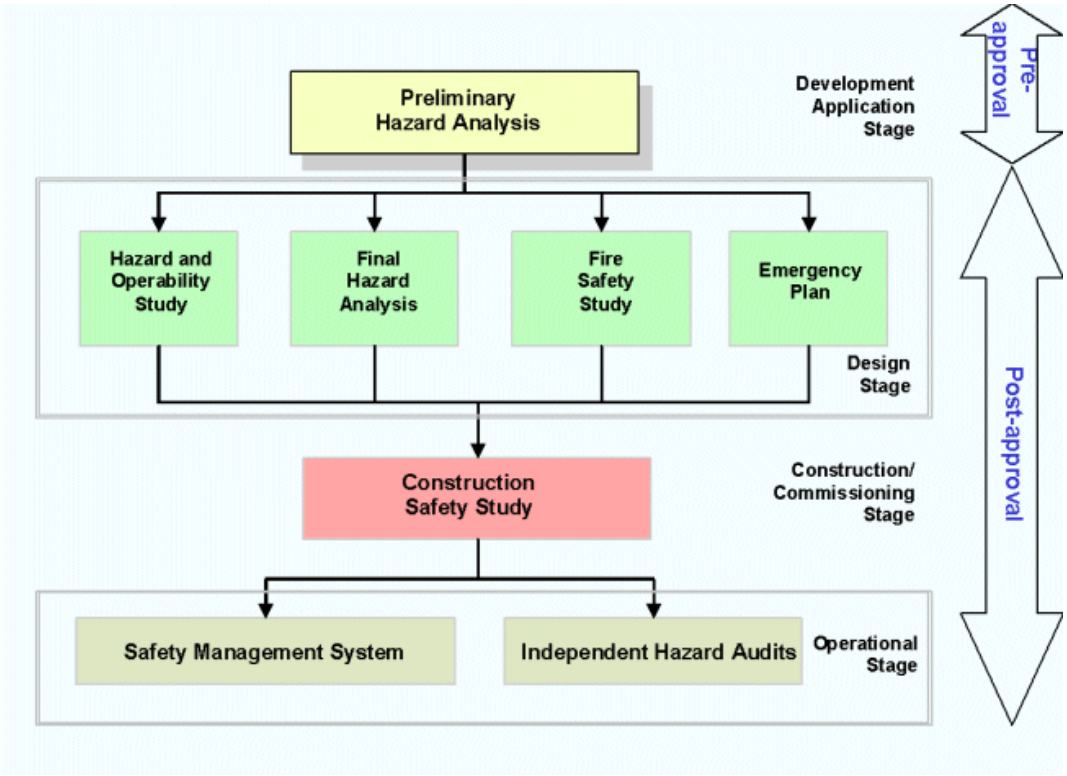


Figure 1.1 The hazard assessment process (DP&I 2011b)

1.1 Project description

1.1.1 Overview

The Project is a new open cut coal mine that will be developed near Dunedoo in the central west of New South Wales (NSW). The Project Application Area (PAA) is approximately 274 square kilometres (km^2). The primary purpose of the Project is to provide coal for five major NSW power stations.

The mine will extract around 20 million tonnes per annum (Mtpa) of run-of-mine (ROM) coal. From this, approximately 9.5 Mtpa of product coal will be sold to Macquarie Generation, Origin Energy and Delta Electricity under long term contract. In addition, approximately 2.5 Mtpa will be produced for export or for the spot domestic market.

The Project's key elements are:

- an open cut mine;
- a coal handling and preparation plant (CHPP);
- a train loading facility and rail spur;
- a mine infrastructure area; and
- supporting infrastructure including access roads; water supply and storage; and electricity supply.

It is envisaged that construction activities will commence in mid-2013 with coal supplied to customers from the second half of 2015.The mine life will be 21 years.

1.1.2 Open cut mine

Multiple open cut mining pits will be developed within three mining areas:

- Mining Area A north of the infrastructure area;
- Mining Area B south of the infrastructure area; and
- Mining Area C north-east of the infrastructure area.

There will be three out-of-pit waste rock emplacements:

- AC-OOP between mining areas A and C;
- B-OOP E adjacent to Mining Area B on the east side of Laheys Creek; and
- B-OOP W adjacent to Mining Area B on the west side of Laheys Creek.

A conventional load and haul operation is proposed using excavators, front-end loaders and trucks. Initially, trucks will haul waste rock to out-of-pit emplacements. Following this, the majority of the waste rock will be placed in the mined-out voids.

Trucks will haul excavated ROM coal to the CHPP where it will be tipped into dump hoppers above the primary crushers or onto secondary ROM stockpiles for later rehandling.

1.1.3 Coal handling and preparation plant

The CHPP will treat up to 20 Mtpa of ROM coal to produce a product coal that meets the sizing and coal quality requirements of the customers. Subject to the level of impurities (rejects) in the coal and washability characteristics, the ROM will be either crushed and bypassed or treated (washed) in the preparation plant. The rejects will typically include waste rock from above and below the coal seam as well as material dispersed within the coal.

The CHPP processes will be typical of those used in the majority of CHPPs in NSW with product coal separated from rejects in a series of coal cleaning circuits. The CHPP area will also contain a truck dump station; crushing plants; coal stockpiles; and the infrastructure to move and stockpile the coal. Rejects from the CHPP will be disposed within the footprint of the mining area.

1.1.4 Train loading facility and rail spur

Coal will be transported by rail to the Project's customers, including Bayswater and Liddell power stations in the Upper Hunter Valley and Eraring, Vales Point and Munmorah power stations on Lake Macquarie on the NSW Central Coast.

Product coal will be loaded onto trains from an overhead train loading bin located on a rail spur balloon loop. Approximately five trains will be loaded each day. The rail spur will be approximately 28 km long and will join the Dunedoo-Gulgong rail line near Tallawang. A locomotive provisioning facility and a siding for fuel delivery may be located adjacent to the balloon loop.

1.1.5 Mine infrastructure area

The mine infrastructure area will be located adjacent to the mining areas. It will include workshops; hardstand and lay-down areas; bulk storage buildings; bulk fuel storage and a fuelling station; office buildings; an operations building and change-house; parking; an explosives magazine; and vehicle washdown bays.

1.1.6 Supporting infrastructure

i Access roads

The main access to the mine will be from the Golden Highway to the north of the operations, via a road diversion that will replace an existing section of Spring Ridge Road. There will be limited light vehicle access from the south via Spring Ridge Road.

Internal roads will connect the access road to the workshop, administration buildings and to the mine infrastructure area. Internal roads will also connect the various areas of the Project.

ii Water supply

The Project will require water primarily for the CHPP and for dust suppression. Water will be sourced by intercepting surface water and by pumping groundwater that enters the mine pits in accordance with the relevant permits and licences. Water will also be sourced from the Cudgegong River and pumped approximately 26 km to the primary raw water dam south-east of the mining area. Pre-existing high security water access licences have been purchased for the Project to allow up to 3.3 gigalitres (GL) of water to be extracted from the river.

iii Electricity supply

The Project will require approximately 20 megawatts (MW) of electrical power. The Project will be connected to the grid at a small switching yard adjacent to the Castlereagh Highway. A power line, generally running parallel to the rail spur, will deliver the electricity to a substation in the mine infrastructure area.

An 11 kV powerline will supply the Cudgegong River pump station from the existing grid approximately 2 km south of the pump station site.

1.1.7 Workforce and operating hours

The proposed mine construction workforce will average approximately 350 persons, peaking at approximately 550 persons over a 26 month period covering Q3 2013 to Q2 2016.

The proposed mine operation workforce is estimated to be 300 persons during the first two years of full production in 2016 and 2017. This will increase steadily over the next ten years to reach a peak level of approximately 590 persons between 2027 and 2030.

Mine construction is expected to occur up to 12 hours per day. However, construction may occur up to 24 hours per day at times (eg during major concrete pours).

Mine operation will occur up to 24 hours per day, 7 days per week, 52 weeks per year.

1.1.8 Major Project application

A Major Project application under Part 3A of the NSW *Environmental Planning and Assessment Act 1979* (NSW) (EP&A Act) was submitted to the NSW Department of Planning on 5 January 2010 (application number MP 10_0001). The DGRs for the Project were issued on 4 March 2010. Revised DGRs were issued for the Project on 23 December 2011 in response to changes in the proposed Project and government assessment requirements.

1.2 Objective

This PHA has been prepared to:

- determine if the Project is a hazardous or offensive development under State Environmental Planning policy No. 33 (Hazardous and Offensive Development) (SEPP 33) based on the hazardous materials to be stored and used onsite; and

- assess the general risks from the Project to people, property and the environment against the Department of Planning and Infrastructure's qualitative risk criteria in *Hazardous Industry Planning Advisory Paper No 4: Risk Criteria for Land Use Safety Planning* (DP&I 2011a). This advisory paper provides criteria to guide assessments of the acceptability of public safety risks from a development.

Risks have been determined in accordance with *Australian/New Zealand Standard International Organisation for Standardisation 31000:2009 Risk Management – Principles and guidelines* (AS/NZS ISO 31000:2009).

Risks specific to the Project's workforce and to CHC's property will be considered as part of the design phase hazard assessments. Risks associated with bushfires are considered in the *Cobbora Coal Project Bushfire Assessment* (EMM 2011).

1.3 Hazard control measures

A range of hazard control measures will be implemented during construction and operation of the Project. Each of these will be appropriate for the hazard they are designed to control, and will generally follow the Work Cover (2008) 'hierarchy of hazard controls':

- Engineering controls:
  - Design — Project components will be designed and constructed to comply with relevant standards;
  - Enclosure — Project components will be enclosed as appropriate. For example, tanks will be bunded and explosives will be stored in a magazine; and
  - Isolation — Project components will be located away from sensitive receivers where required. For example, there will be a buffer between the explosives magazine and publicly accessible areas.
- Administrative controls:
  - operating procedures;
  - scheduled maintenance; and
  - training and reinforcing correct work procedures.

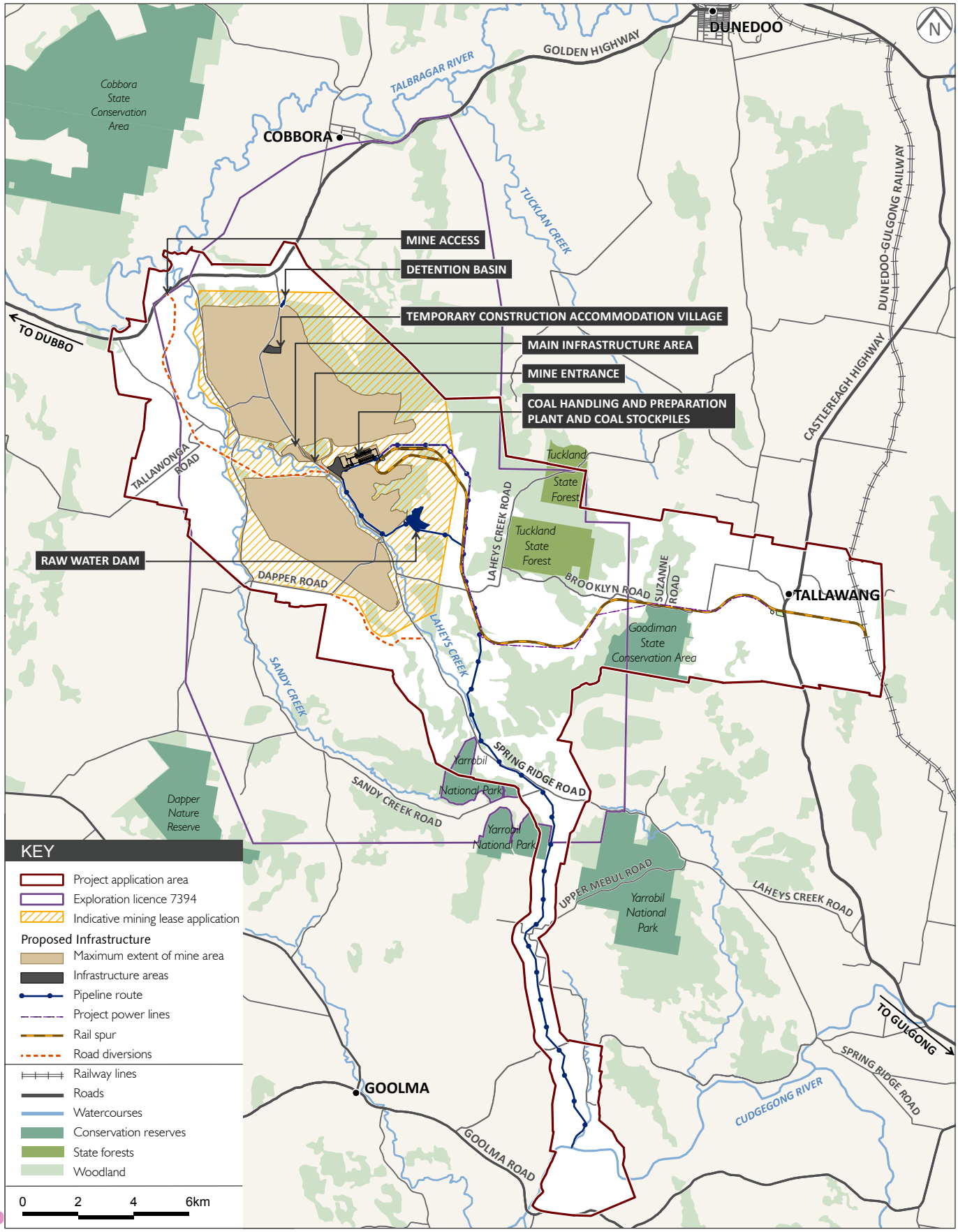
Engineering controls will be implemented where practical to remove or minimise hazards, ie the design of processes or structures will aim to minimise the hazards. However, not all hazards can be engineered out, and administrative controls may also be required.

Hazard control measures will be described in further detail in safety management plans that will be developed for the Project in accordance with the NSW *Coal Mine Health and Safety Act 2002*, NSW *Work Health and Safety Act 2011*, NSW Coal Mine Health and Safety Regulation 2002 and NSW Work Health and Safety Regulation 2011. The safety management plans will describe engineering and administrative controls.

1.4 Definitions

Definitions for the purposes of this PHA are as follows:

- Onsite areas — areas that will be under the control of CHC and that will not be accessible to the general public;
- Hazard — a potential source of harm to people, property or the environment; and
- Risk — the likelihood of a hazard occurring and how much damage it could cause.



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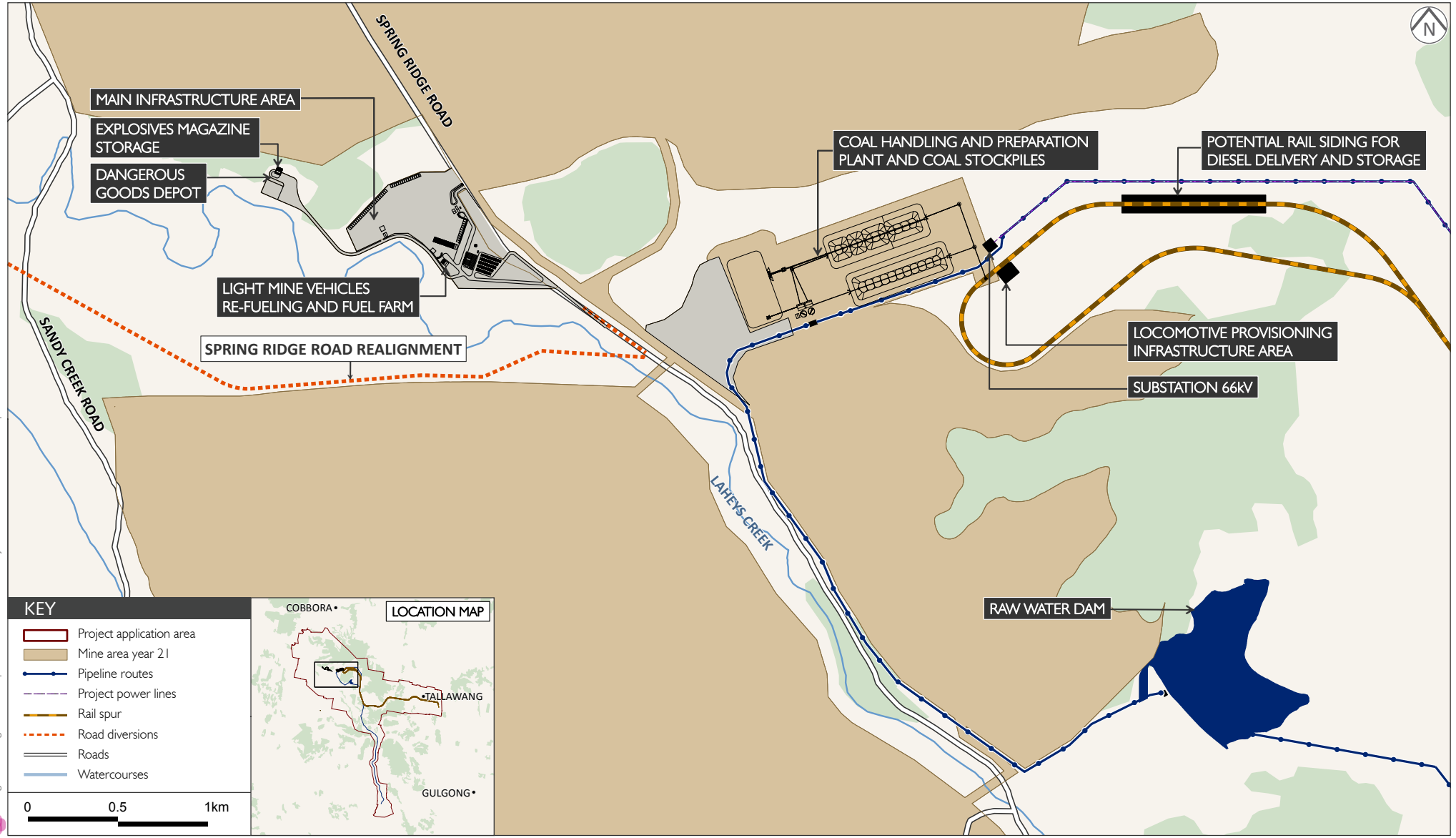
Indicative Cobbora Coal Project Layout

Cobbora Coal Project - Preliminary Hazard Assessment

Figure 1.2



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Indicative Cobbora Coal Project Infrastructure Area Layout

Cobbora Coal Project - Preliminary Hazard Assessment

FIGURE 1.3

2 Hazardous materials

Potentially hazardous or offensive development is defined by SEPP 33 as development which poses a significant risk to, or which would have a significant adverse impact on, human health, life, property or the biophysical environment, if it were to operate without employing any control measures. This includes developments for the handling, storing or processing of hazardous materials. A development is classified as a hazardous or offensive development if the thresholds in DP&I (2011c) are exceeded. These thresholds are provided in a series of tables and figures in DP&I (2011c) which compare the quantities of stored or used hazardous materials to the distance from publicly accessible areas. The hazardous materials classifications in *Australian Code for the Transport of Dangerous Goods by Road and Rail* (National Transport Commission 2007) (the Dangerous Goods Code) are used by DP&I (2011c).

The bulk hazardous materials that will be used by the Project are diesel, petrol, other hydrocarbons (oils, greases, degreaser and kerosene), liquid petroleum gas (LPG) and explosives. These materials will be stored at a number of locations (Figure 1.2). These materials and their SEPP 33 thresholds are described below.

2.1 Diesel

Australian Standard 1940:2004 The Storage and Handling of Flammable and Combustible Liquids (AS 1940:2004) classifies diesel as a combustible liquid (Class C1). However, diesel is not classified as a dangerous good (for transport purposes) under the Dangerous Goods Code as its flash point is above 60°C. Approximately 1 ML of diesel will be stored on site. It will be stored in bunded tanks at least 50 m from publicly accessible areas. Diesel will be stored and handled on site in accordance with AS 1940:2004.

2.2 Petrol

Petrol is classified as a Class 3 flammable liquid under AS 1940:2004 and the Dangerous Goods Code. The quantities of petrol stored onsite will be less than the SEPP 33 'potentially hazardous region' threshold (less than 2 tonnes stored more than 3 m from the boundary, as shown on Figure 2.1). Petrol will be stored and handled on site in accordance with AS 1940:2004.

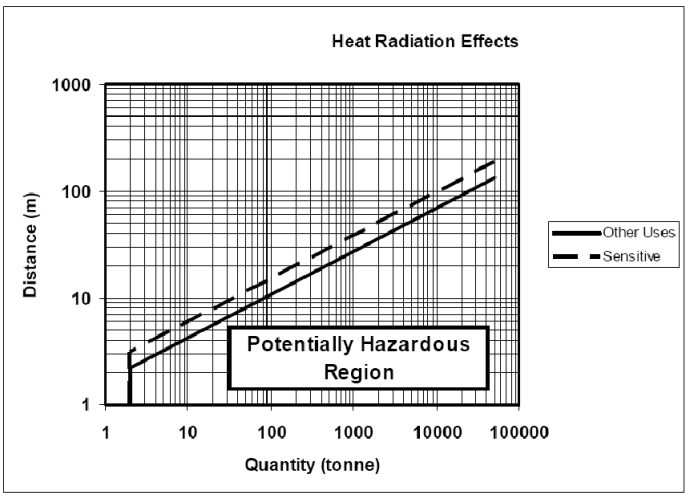

Figure 2.1 SEPP 33 criteria for Class 3 flammable liquids (DP&I 2011c)

2.3 Other hydrocarbons

Oil is classified as a Class C2 combustible liquid under AS 1940:2004 and a Class 3 flammable liquid under the Dangerous Goods Code. The quantities of hydrocarbons including grease, degreaser, kerosene and oil stored will be less than the SEPP 33 'potentially hazardous region' threshold (less than 2 tonnes stored more than 3 m from the boundary, as shown on Figure 2.1). Hydrocarbons will be stored and handled in accordance with AS 1940:2004. Waste hydrocarbons will be stored in bunded areas and collected by licensed waste contractors for offsite disposal.

2.4 Liquid petroleum gas

The Dangerous Goods Code classifies LPG as a Class 2.1 flammable gas. The quantities of LPG stored will be less than the SEPP 33 potentially hazardous region threshold of 10 tonnes (DP&I 2011c). LPG will be stored in accordance with *Australian Standard/New Zealand Standard 1596:2008 The Storage and Handling of LP Gas.*

2.5 Explosives

Up to 5 tonnes of detonators, primers and charge cord (initiating explosives), and 1,000 tonnes of ammonium nitrate will be stored on site. The Dangerous Goods Code classifies detonators, primers and charge cord as Class 1.1 explosives. Ammonium nitrate will be stored in a low sensitivity state (ie without impurities or additives) and separate to initiating explosives. The Dangerous Goods Code classifies ammonium nitrate as a Class 5.1 oxidizing substance when it contains less than 0.2% combustible substances. It classifies ammonium nitrate as a Class 1.1 explosive when it contains more than 0.2% combustible substances. As ammonium nitrate can explode when exposed to contaminants, high temperatures (when in confinement) and external shocks (eg from an explosion), this PHA considers a case where it becomes a Class 1.1 explosive as a result of failed controls.

Explosives storage will be designed and constructed in accordance with *Australian Standard 2187:1998 Explosives – Storage, Transport and Use: Storage.* The explosives storage areas will be just over 1,000 m from the nearest publically accessible area, the Spring Ridge Road realignment (see Figure 1.2).

Initiating explosives will be stored separately from ammonium nitrate such that an explosion at the magazine would not initiate an explosion at the ammonium nitrate store in accordance with AS2187:1998. Therefore, potentially hazardous regions for the magazine and the ammonium nitrate store are considered separately below.

The potentially hazardous region recommended by DP&I (2011c) for offsite risks from explosions is shown in Figure 2.2.

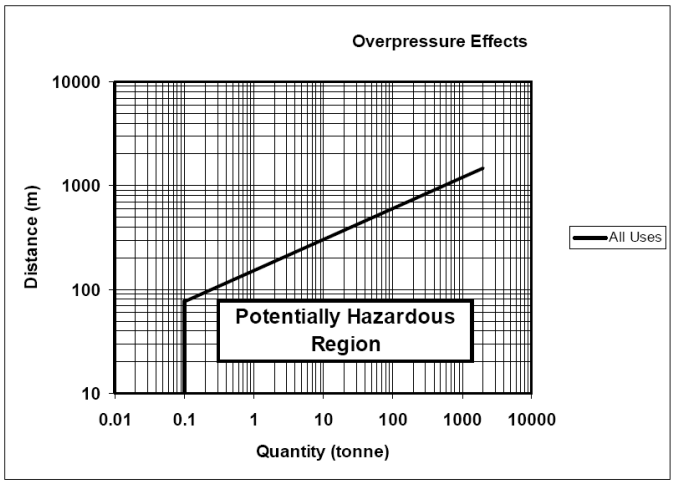

Figure 2.2 SEPP 33 criteria for Class 1.1 explosives (DP&I 2011c)

A potentially hazardous region of between 1,000 m and 2,000 m radius is recommended for 1,000 t of explosives (Figure 2.2). Therefore, a further analysis of offsite risks will be required as part of detailed design of the bulk ammonium nitrate store. These stores will be designed to ensure that risk levels are within acceptable limits.

Initiating explosives will be stored in a magazine which will be over 300 m from publicly accessible areas. This is outside the SEPP 33 potentially hazardous region (Figure 2.2).

2.6 Summary

The Project will not be a potentially hazardous or offensive development, as defined by SEPP 33.

The storage and use of hazardous materials will be undertaken in accordance with the following Australian Standards:

- *Australian Standard 1940:2004 The Storage and Handling of Flammable and Combustible Liquids*;
- *Australian Standard 1596:2008 The Storage and Handling of LP Gas;* and
- *Australian Standard 2187:1998 Explosives – Storage, Transport and Use – Storage.*

3 Risks from the Project

This section identifies hazard scenarios for atypical events (eg accidents) from the Project. It describes qualitative criteria for rating the consequences, likelihoods and risks of these scenarios. Risk ratings are compared to the DP&I (2011a) qualitative risk criteria in Section 4, to determine if the Project, in the presence of controls, represents an acceptable risk.

3.1 Method

The elements of risk analysis described in AS/NZS ISO 31000:2009 have been used in this PHA. A risk workshop was conducted on 5 December 2011 and was attended by:

- Trish McDonald, Environment and Approvals Manager, CHC: an environmental scientist with 14 years of experience in environmental management and compliance roles, including impact assessment;
- William Dean, Mining Engineer, Engenicom: an engineer with 30 years of coal mining experience in operational, (including mine manager) and technical roles;
- Gavin Heydon, Project Engineer, Engenicom: an engineer with 15 years of mining and infrastructure construction experience;
- Dr Philip Towler, Environmental Assessment Project Manager, EMM: an environmental chemist with 15 years of experience assessing the risks and impacts of mining projects; and
- Mark Roberts, Environmental Scientist, EMM: an environmental scientist with 3 years of environmental impact assessment experience.

The following tasks were undertaken at the workshop and during subsequent discussions.

- the Project was divided into a series of components (Section 3.2);
- hazards and incident types were identified (Section 3.3);
- Scenarios presenting a risk to individuals, society and/or the environment were identified (Section 3.5);
- potential controls were identified (Section 3.5); and
- a consequence and likelihood rating was qualitatively determined for each scenario in the presence of engineering and administrative controls (Section 3.4).

The risk of each incident was determined by comparing the consequence and likelihood rating (Section 3.4).

3.2 Project components

The Project was divided into the following components for hazard identification and assessment (Figure 1.1):

- public roads;
- mine area including haul roads;
- mine infrastructure area;
- water infrastructure (dams, pipelines, pump station); and
- rail spur and train provisioning area.

3.3 Incident types

The following incident types, sub-types and combinations of these could occur at the above Project components:

- leaks/spills;
- fire/explosion;
- safety loss (eg accidents, collisions, train derailment and dust plume); and
- security breach (eg theft and unauthorised entry).

3.4 Risk criteria

Qualitative ratings were assigned to the potential consequences of incidents to individuals, society and/or the environment (Table 3.1) and to the likelihood of these incidents occurring (Table 3.2). The likelihood and consequence ratings were combined to determine the risk rating (Table 3.3).

Table 3.1 Qualitative measures of consequence

Level	Potential consequences to individuals	Potential consequences to the environment and society
1	Minor injury or short-term health effect (eg requiring first aid)	Limited environmental impacts to a small area of low significance Low level repairable damage to commonplace structures Short-term local social issues or disruptions
2	Minor injury or short-term health effects requiring restricted work	Minor short-term environmental impacts not affecting environmental systems Moderate damage to items of local cultural significance or minor damage to items of regional significance Minor medium-term social impacts on local population

Table 3.1 Qualitative measures of consequence

Level	Potential consequences to individuals	Potential consequences to the environment and society
3	Major injury or health effects (eg lost time injuries or permanent disabilities) Minor injury or health effects to multiple people	Medium-term environmental impacts affecting local environmental systems Moderate damage to items of regional cultural significance Ongoing local social issues
4	Permanent total disability Major injuries or health effects to multiple people	Long-term environmental impacts with significant effects locally and some effects regionally Irreparable damage to items of regional cultural significance Widespread local social issues and moderate regional social issues
5	Fatality or multiple fatalities	Regional long-term environmental impacts on critical species, habitat or environmental systems Irreparable damage to items of national cultural significance Ongoing major regional social impacts

Table 3.2 Qualitative measures of likelihood

Level	Likelihood	Approximate chance of occurring during the life of the Project*
A	Practically impossible	0.1%
B	Not likely to happen	10.0%
C	Possible or could happen	50.0%
D	Likely to happen at some point	90.0%
E	Almost certain to happen	99.9%

Note: **Two years construction and 21 years operations.*

Table 3.3 Risk rating

	Likelihood				
Consequence	A	B	C	D	E
5	**LEVEL 2**				**LEVEL 1**
4					
3					
2					
1	**LEVEL 3**				

3.5 Results

The preliminary hazard identification and risk assessment for the Project is presented in Table 3.4.

Table 3.4 Hazard identification and risk assessment

ID	Project component	Incident type	Scenario	Proposed controls	Consequences	Probability	Risk rating
1	Public roads	Leak/spill	Delivery vehicle roll over, collision, poor maintenance or operator error results in spill of fuels, hydrocarbons, chemicals and dangerous goods leading to property damage and injury or environmental harm.	Road design in accordance with NSW Road Design Guideline (RTA 2002), use of licensed contractors (Australian Standards and NSW legislation), safe work methods, emergency management and response plans/training/equipment, environmental management plan, transport management plan, hazardous material manifest/material safety data sheet/substance evaluation form, operator training, spill response equipment and training, contractor incident investigation, emergency agency response.	4	C	2
2		Leak/spill	Delivery vehicle roll over, collision, poor maintenance or operator error results in discharge of radioactive material leading to exposure to elevated radiation levels.	As for Item 1 and compliance with NSW Radiation Control Regulation (2003).	4	C	2
3		Fire/explosion	Delivery vehicle roll over, collision, poor maintenance or operator error results in fire or explosion.	As for Item 1 and separate transport of detonators and explosives, transport of explosives in accordance with NSW *Explosives Act 2003,* NSW Explosives Regulation 2005*, AS 2187.1-1998 Explosives - Storage, transport and use,* and the Dangerous Goods Code.	5	B	2
4		Fire/explosion	Delivery vehicle roll over, collision, poor maintenance or operator error results in fire or explosion which leads to a bushfire.	As for Item 3.	5	B	2

Table 3.4 Hazard identification and risk assessment

ID	Project component	Incident type	Scenario	Proposed controls	Consequences	Probability	Risk rating
5		Safety loss	Changed road alignments and new intersections result in road accident.	Road design in accordance with *NSW Road Design Guideline* (RTA 2002) and appropriate signage.	4	B	2
6		Safety loss	Dust plume results in reduced visibility on public roads.	Buffer between working areas and public roads plus planned mine dust control measures.	1	C	3
7		Safety loss	Collision or accident on public roads results from fatigued employees travelling to or from mine.	Provision of accommodation onsite for majority of construction workforce, shift times and breaks structured to control fatigue.	4	B	2
8		Safety loss	Overloaded, uncovered or poorly placed load in vehicle results in dust and debris on public road.	Secured loads, covered where required, use of appropriate vehicles, compliance with safe work methods, use of licensed contractors (Australian Standards and NSW legislation), transport management plan, operator training, spill response equipment and training, incident investigation.	1	C	3
9		Safety loss	Intoxicated worker driving on public road results in collision or accident.	Provision of accommodation onsite for majority of construction workforce, drug and alcohol testing, workforce education and reinforcement and as for Item 1.	4	B	2
10		Safety loss	Road work during construction results in accident.	Compliance with *AS 1742.3-2009 Manual of uniform traffic control devices - Traffic Control for Works on Roads*, transport management plan.	4	A	3
11		Safety loss	Cargo on trucks collides with overhead powerlines across roads results in traffic impacts, property damage or injury.	As for Item 1 and appropriate signage.	4	A	3

Table 3.4 Hazard identification and risk assessment

ID	Project component	Incident type	Scenario	Proposed controls	Consequences	Probability	Risk rating
12	Mine area, including haul roads	Leak/spill	Vehicle rolls over, collision, poor maintenance or operator error results in spill close to sensitive environmental area (eg a creek).	As for Item 2 and considered in mine road design process, internal road speed limits, operator training/education.	2	B	3
13		Fire/explosion	Onsite fire or explosion results in bushfire.	Storage of ammonium nitrate and explosives in accordance with NSW *Explosives Act 2003,* NSW Explosives Regulation 2005*, AS 2187.1-1998 Explosives - Storage, transport and use,* the Dangerous Goods Code, emergency management and response plans/training/equipment, emergency agency response, bushfire risk assessment, fire policy including appropriate times for hot work, provision of a fire tender and water carts onsite.	3	C	2
14		Security breach	Changed road alignment results in accidental entry to mine area by people not associated with the mine.	Clear marking of site boundaries and fencing of working areas, security patrols.	3	B	3
15		Security breach	Unauthorised entry to mine area by people not associated with the mine results in injury from being crushed by mobile plant or moving parts of stationary infrastructure (eg conveyors).	Clear marking of site boundaries and fencing of working areas, clear identification of lease boundaries, emergency management and response plans/training/equipment, emergency agency response.	5	B	2
16		Security breach	Unauthorised entry to mine area by people not associated with the mine results in injury from drowning in dams, falling down mine faces, being caught in blasting explosion.	As for Item 14 and pre-blast signage, radio alerts.	5	B	2

Table 3.4 Hazard identification and risk assessment

ID	Project component	Incident type	Scenario	Proposed controls	Consequences	Probability	Risk rating
17		Security breach	Unauthorised entry to mine area by people not associated with the mine, eg for trail biking, timber collecting, hunting or to deliberating disrupt mining, results in injury.	Clear marking of site boundaries and fencing of working areas, security patrols, clear notification of penalties for trespassing, police response.	4	B	2
18		Security breach	Unauthorised entry to mine area by people not associated with the mine results in electrocution at substation.	As for Item 15 and lock up of built structures, emergency management and response plans/training/equipment.	5	B	2
19		Fire/explosion	Nitrogen dioxide cloud from blasting results in public health impacts.	Buffer between working areas and public roads/ residences, blast planning by appropriately skilled and trained personnel, only conduct blasting during favourable weather conditions informed by previous blast monitoring, operator training.	2	B	3
20		Fire/explosion	Flyrock from blasting results in public injury or property damage.	As for Item 19.	5	B	2
21		Fire/explosion	Excessive air blast from blasting results in property damage.	As for Item 19.	2	B	3
22		Fire/explosion	Excessive ground vibration from blasting results in property damage.	Blast designed to provide a sufficient buffer between working areas and public roads/ residences, blast planning, operator training.	2	B	3
23		Security breach	Theft of materials and equipment results in injury.	Lock-up of structures and as for Item 17.	3	B	3

Table 3.4 Hazard identification and risk assessment

ID	Project component	Incident type	Scenario	Proposed controls	Consequences	Probability	Risk rating
24	Mine infrastructure area	Leak/spill	Rupture, poor maintenance or operator error at a tank results in leak or spill of fuels, hydrocarbons or dangerous goods results in property damage, injury or environmental harm.	Siting of tanks away from waterways, appropriate containment structures ie bunding, safe work methods, emergency management and response plans/training/equipment, environmental management plan, hazardous material manifest/material safety data sheet/substance evaluation form, operator training, spill response equipment and training.	3	B	3
25		Leak/spill	Vehicle roll over, collision, poor maintenance or operator error in infrastructure area results in spills or leaks fuels, hydrocarbons, chemicals and dangerous goods results in property damage, injury or environmental harm.	Location of roads away from sensitive receivers where practical, good onsite drainage design and as for Item 12.	4	B	2
26		Leak/spill	Pollution from sewage spill at amenities block results in health and environmental impacts.	Design of amenities in accordance with *AS/NZS 3500.2:2003 - Plumbing and Drainage - Sanitary Plumbing and Drainage,* location of amenities away from sensitive receivers where practical, appropriate containment structures (ie bunding), good onsite drainage design, programmed maintenance of amenities, safe work methods, use of licensed contractors (Australian Standards and NSW legislation), emergency management and response plans/training/equipment, environmental management plan, operator training, spill response equipment and training, contractor incident investigation.	2	B	3

Table 3.4 Hazard identification and risk assessment

ID	Project component	Incident type	Scenario	Proposed controls	Consequences	Probability	Risk rating
27		Leak/spill	Unplanned offsite discharge of coal or coal wash.	Engineered onsite drainage design, programmed maintenance of coal handling facilities, appropriate containment structures (ie bunding), emergency management and response plans/training/equipment, environmental management plan, operator training, safe work methods, use of licensed contractors (Australian Standards and NSW legislation), spill response equipment and training, contractor incident investigation.	2	B	3
28		Fire/explosion	Vehicle roll over, collision, poor maintenance or operator error in mine infrastructure area results in fire or explosion which results in offsite fire, property damage or injury.	As for Item 1.	5	B	2
29		Fire/explosion	Onsite fire or explosion results in bushfire.	As for Item 13.	3	B	3
30		Fire/explosion	Mishandling of explosives results in explosion leading to offsite property damage, injury or fire.	As for Item 13, separate transport and storage of detonators and explosives, safe work methods, use of licensed contractors (Australian Standards and NSW legislation), transport management plan, hazardous material manifest/material safety data sheet/substance evaluation form, operator training, spill response equipment and training, contractor incident investigation, emergency agency response.	5	B	2
31		Fire/explosion	Lightning strike, malicious act, poor maintenance or operator error at magazine results in explosion leading to offsite property damage, injury or fire.	Design of magazine in accordance with *AS/NZS 1768(int) 2003, Lightning Protection*, locating the magazine away from mine boundary and areas of vegetation, separate storage of ammonium nitrate and explosives, programmed maintenance of magazine and as for items 17 and 18.	5	B	2

Table 3.4 Hazard identification and risk assessment

ID	Project component	Incident type	Scenario	Proposed controls	Consequences	Probability	Risk rating
32		Fire/explosion	Boiling liquid expanding vapour explosion at LPG tank results in offsite property damage, injury or fire.	Design of LPG tank in accordance with *AS/NZS 1596:2008 - The Storage and Handling of LP Gas*, siting of tank away from mine boundary and areas of vegetation, programmed maintenance of tank, emergency management and response plans/training/equipment, environmental management plan, emergency agency response.	5	B	2
33		Security breach	Unauthorised entry to infrastructure area by people not associated with the mine results in electrocution at substation.	As for Item 18.	5	B	2
34		Security breach	Theft and malicious use of explosives results in explosion leading to offsite property damage, injury or fire.	As for Item 18.	5	B	2
35		Security breach	Theft and malicious use of materials, equipment, fuels, hydrocarbons, chemicals and dangerous goods results in explosion or fire leading to offsite property damage or injury.	As for Item 18.	5	B	2
36	Water infrastructure	Leaks/spills	Rupture, failure, poor maintenance, operator error or sabotage at water pipeline or pump results in property and environmental damage or injury.	Engineered drainage design, programmed maintenance, pipeline pressure monitoring, regular pipeline inspections, environmental management plan, spill response equipment and training, operator training and as for Item 18.	2	B	3

Table 3.4 Hazard identification and risk assessment

ID	Project component	Incident type	Scenario	Proposed controls	Consequences	Probability	Risk rating
37		Leaks/spills	Groundwater or surface water contamination from a failure of a tailings dam.	Engineered dam design and maintenance, emergency management and response plans/training/equipment, environmental management plan, spill response equipment and training, emergency agency response.	3	B	3
38		Leaks/spills	Damage to property and environment from water dam failure eg erosion.	As for Item 37 and good drainage design.	2	B	3
39		Safety loss	Unauthorised entry to water infrastructure areas by people not associated with the mine results in electrocution at substation.	As for Item 18.	5	B	2
40	Rail spur and train provisioning area	Safety loss	Train derailment or collision results in injury and property damage.	Railway design in accordance with Australian Rail Track Corporation guidelines and as for Item 1 (with the exception of road design guideline).	5	B	2
41		Safety loss	Train impact with a member of the public leading to serious injury or death.	Clear marking of site boundaries, clear notification of penalties for trespassing, fencing as appropriate to restrict access from publically accessible areas, emergency management and response plans/training/equipment, emergency agency response, train speed limits.	5	B	2

Table 3.4 Hazard identification and risk assessment

ID	Project component	Incident type	Scenario	Proposed controls	Consequences	Probability	Risk rating
42		Leak/spill	Rupture, poor maintenance, operator error or sabotage at tank in train provisioning area results in leak or spill of fuels, hydrocarbons, chemicals and dangerous goods leading to property damage, injury or environmental harm.	As for Item 24.	3	B	3

Forty two scenarios were identified and of these there were:

- no level 1 risks;
- 24 level 2 risks; and
- 18 level 3 risks.

The level 2 risks and the project components with which they were associated are as follows:

- nine were associated with road transport (materials or workers) on public roads and the mine infrastructure area;
- two were associated with rail transport;
- one was associated with flyrock from blasting;
- one was associated with fire or explosion in the mine area leading to a bushfire;
- eight were associated with injury from entry to the Project area by people not associated with the Project; and
- three were associated with fire or explosions in the mine infrastructure area.

These level 2 risks are discussed below.

3.6 Identified risks

3.6.1 Road transport

Nine level 2 risks were associated with road transport. This is in line with the societal risks associated with road transport.

The risk of traffic accidents involving vehicle roll-overs and collisions resulting in injuries, spills, fire or explosion (seven of the level 2 road transport risks) will be minimised through a range of engineering (including local road and intersection upgrades) and administrative controls (including transport management systems).

The risk of traffic accidents as a result of fatigue or intoxication (two of the level 2 road transport risks) will be reduced during construction by the use of a construction accommodation village that will house the majority of the construction workforce in close proximity to the worksites. Administration controls will also be applied during construction and operations including the consideration of fatigue when designing the shift rosters; and the implementation of drug and alcohol testing programs.

The risk of traffic accidents as a result of changed road alignments and new intersections (one of the level 2 road transport risks) principally will be managed by designing new roads in accordance with the *NSW Road Design Guideline* (RTA 2002).

Road transport risks are likely to remain level 2 risks following the implementation of all controls as a major injury or fatality is a potential consequence of these types of incidents.

3.6.2 Rail transport

The risk of a train derailment or collision at the rail spur or train provisioning area will be minimised by implementing a range of administrative and engineering controls, including rail design in accordance with Australian Rail Track Corporation guidelines. However, this is likely to remain a level 2 risk as a major injury or fatality is a potential consequence of a train derailment or collision.

The risk of a member of the public being struck by a train along the rail spur will be minimised by clearly notifying penalties for trespassing and fencing of publicly accessible areas. However, this is likely to remain a level 2 risk as a major injury or fatality is a potential consequence of being struck by a train.

3.6.3 Unauthorised entry to mine area and mine infrastructure area

Eight level 2 risks were associated with unauthorised entry to mine area and mine infrastructure area.

The risks resulting from unauthorised entry by people not associated with the mine, eg for trail biking, timber collecting or to deliberately disrupt mining, could result in major injury or death from electrocution, drowning in dams or being crushed by mobile plant and moving parts of stationary infrastructure. Controlling access to the mining and infrastructure areas will be considered during detailed design. Measures implemented will need to be re-assessed to reflect changes to the operation.

3.6.4 Blasting

The risks from flyrock will be minimised through appropriate mine design, blast design and by management of buffer zones on land owned by CHC. The risk rating is likely to be reduced in future risk assessments (see Section 1) based on more detailed design inputs.

3.6.5 Fire and explosions

The risks associated with fires and explosions in the mine area and mine infrastructure area (four level 2 risks) will be minimised by transporting, storing and using explosives in compliance with relevant legislation, codes of practice and Australian Standards. This includes appropriate construction of storage areas and provision of adequate buffers between storages and publicly accessible areas. However, these risks are likely to remain level 2 risks as a fatality, major injury or major property damage is a potential consequence of fire or explosions.

3.7 Hazardous materials

This PHA has identified potential hazards and assessed risks to people offsite, property and the environment. The comparison of proposed hazardous materials quantities and storage locations with SEPP 33 criteria in Section 2 shows that the Project will not be classified as a potentially hazardous or offensive industry.

The *Hazardous Industry Planning Advisory Paper No 4: Risk Criteria for Land Use Safety Planning* (DP&I 2011a) provides qualitative risk criteria. Risks from hazardous materials are compared to these criteria below.

a. All avoidable risks should be avoided by investigating alternative locations and technologies.

Hazardous material storages that could present an offsite risk will be located away from publicly accessible areas and environmental features, eg waterways, so that there is low risk to individuals, property and the environment.

b. The risk from a major hazard should be reduced irrespective of the cumulative level of the whole development. The likelihood of the risk occurring should be made very low by adopting all feasible measures.

No major hazards associated with the hazardous materials have been identified.

c. The consequences of risks which are likely to occur should be contained within the boundaries of the development.

Hazardous material storages and tanks in the mine infrastructure and train provisioning areas will be constructed and located so that potential incidents are contained within the site.

d. Existing high risks at developments should not be contributed to by risks from additional developments.

This criterion is not applicable as the Project is at a 'greenfields' site which is not surrounded by other potentially hazardous or offensive industry and is not likely to be developed for industry during the life of the Project.

3.8 Risks from the Project

Risks from the Project are generally low. However, there are some elevated risks associated with road and rail use; injury from entry to the Project area of people not associated with the Project; fires and explosions and blasting. These risks will be examined as part of detailed project design and re-assessed in the ongoing hazard assessment process to ensure that risks are as low as reasonably possible.

Risks from the Project are compared to the DP&I (2011a) criteria below.

a. All avoidable risks should be avoided by investigating alternative locations and technologies.

No level 1 risks have been identified and 24 level 2 risks have been identified. Proposed control measures are presented in Table 3.4. Detailed project design work will investigate controls to further reduce level 2 risks. This will include investigating alternative locations and technologies.

b. The risk from a major hazard should be reduced irrespective of the cumulative level of the whole development. The likelihood of the risk occurring should be made very low by adopting all feasible measures.

No major hazards from the construction or operation of the Project have been identified.

c. The consequences of risks which are likely to occur should be contained within the boundaries of the development.

The consequences of risks from the Project will generally be contained within the boundaries of the development. Exceptions include the potential for bushfire which is assessed in the *Cobbora Coal Project Bushfire Assessment* (EMM 2012) and risks associated with road and rail transport which are by definition offsite risks. These risks will be minimised to be as low as reasonably possible via a range of engineering and administrative controls.

d. Existing high risks at developments should not be contributed to by risks from additional developments.

This criterion is not applicable as the Project is at a ‘greenfields’ site which is not surrounded by other potentially hazardous or offensive industry and is not likely to be developed for industry during the life of the Project.

4 Conclusion

4.1 Hazardous materials

Hazardous materials that will be used onsite were identified along with the quantity and the locations where they will be stored. This information was compared to SEPP 33 criteria to determine if the Project is classified as a hazardous or offensive development. This comparison showed that the Project will not be a hazardous or offensive development.

4.2 Risks

Risks have been determined in accordance with *Australian/New Zealand Standard International Organisation for Standardisation 31000:2009 Risk Management – Principles and Guidelines*.

Hazards associated with scenarios based on atypical events (eg accidents) were identified. The risks from these scenarios in the presence of engineering and administrative controls were determined.

Comparison of the risks to the DP&I (2011a) risk criteria shows that the Project generally represents a low risk. However, where there are elevated risks associated with parts of the Project, these risks will be managed to achieve acceptable outcomes through the application of engineering and administrative controls. Further risk assessments will be conducted during the Project design and construction phases.

References

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