

WATERMARK

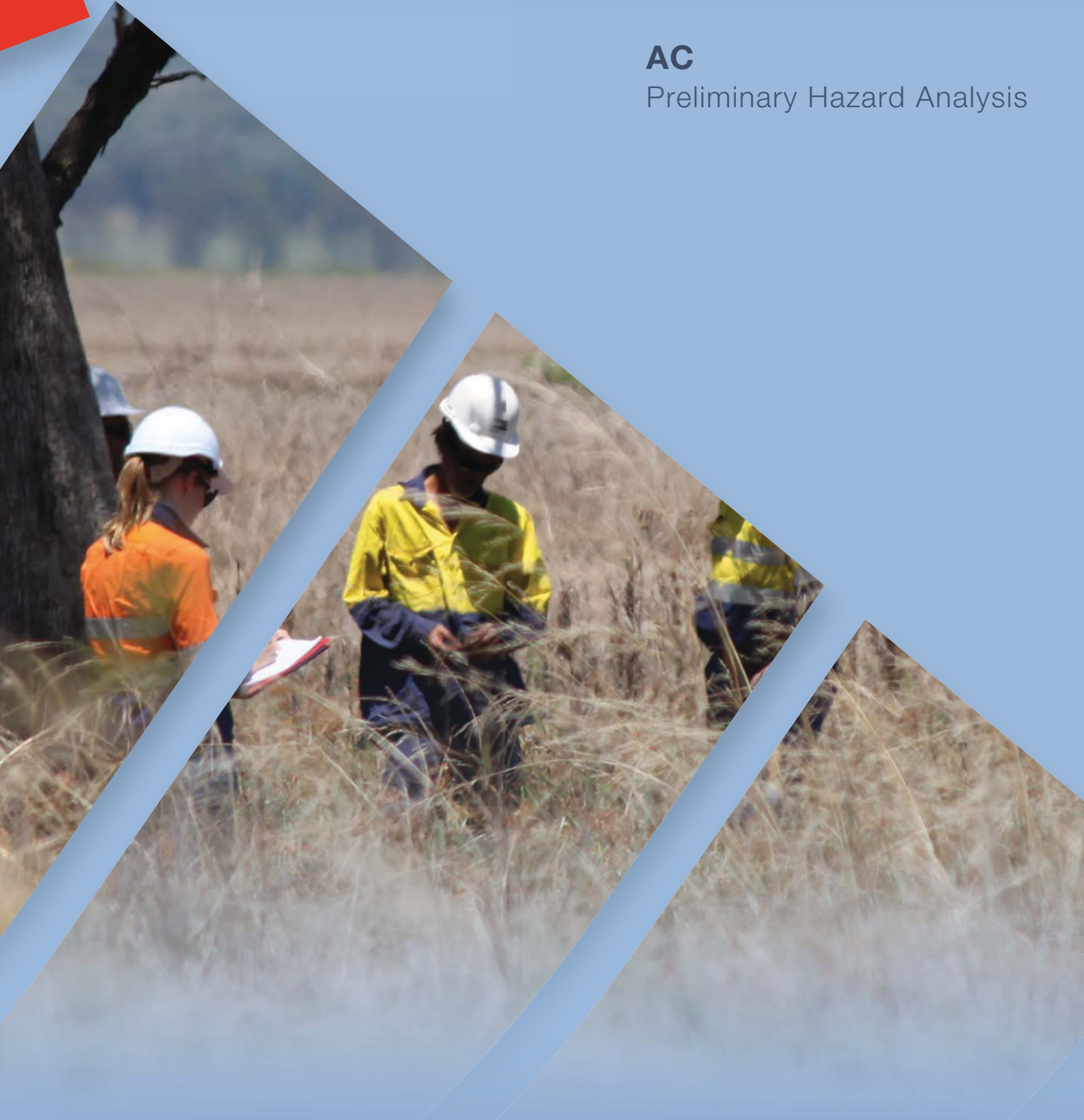
COAL PROJECT

ENVIRONMENTAL IMPACT STATEMENT

February 2013

AC

Preliminary Hazard Analysis



WATERMARK COAL PROJECT

PRELIMINARY HAZARD ANALYSIS

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WATERMARK COAL PROJECT PRELIMINARY HAZARD ANALYSIS

for
Shenhua Watermark Coal Pty Limited

1 INTRODUCTION

1.1 BACKGROUND

In October 2008, Shenhua Watermark Coal Pty Limited (Shenhua Watermark) was granted Exploration Licence (EL) 7223. Shenhua Watermark is a subsidiary of the Shenhua Corporation.

The Watermark Coal Project (the Project) is located within EL 7223, approximately 25 km south south-east of the township of Gunnedah and to the immediate west of the village of Breeza, within the Gunnedah Local Government Area (LGA). The Project is approximately 282 km by rail from the export Port of Newcastle. **Figure 1** illustrates the regional locality of the Project in relation to the nearest town centres of Breeza and Gunnedah.

1.2 PROJECT OVERVIEW

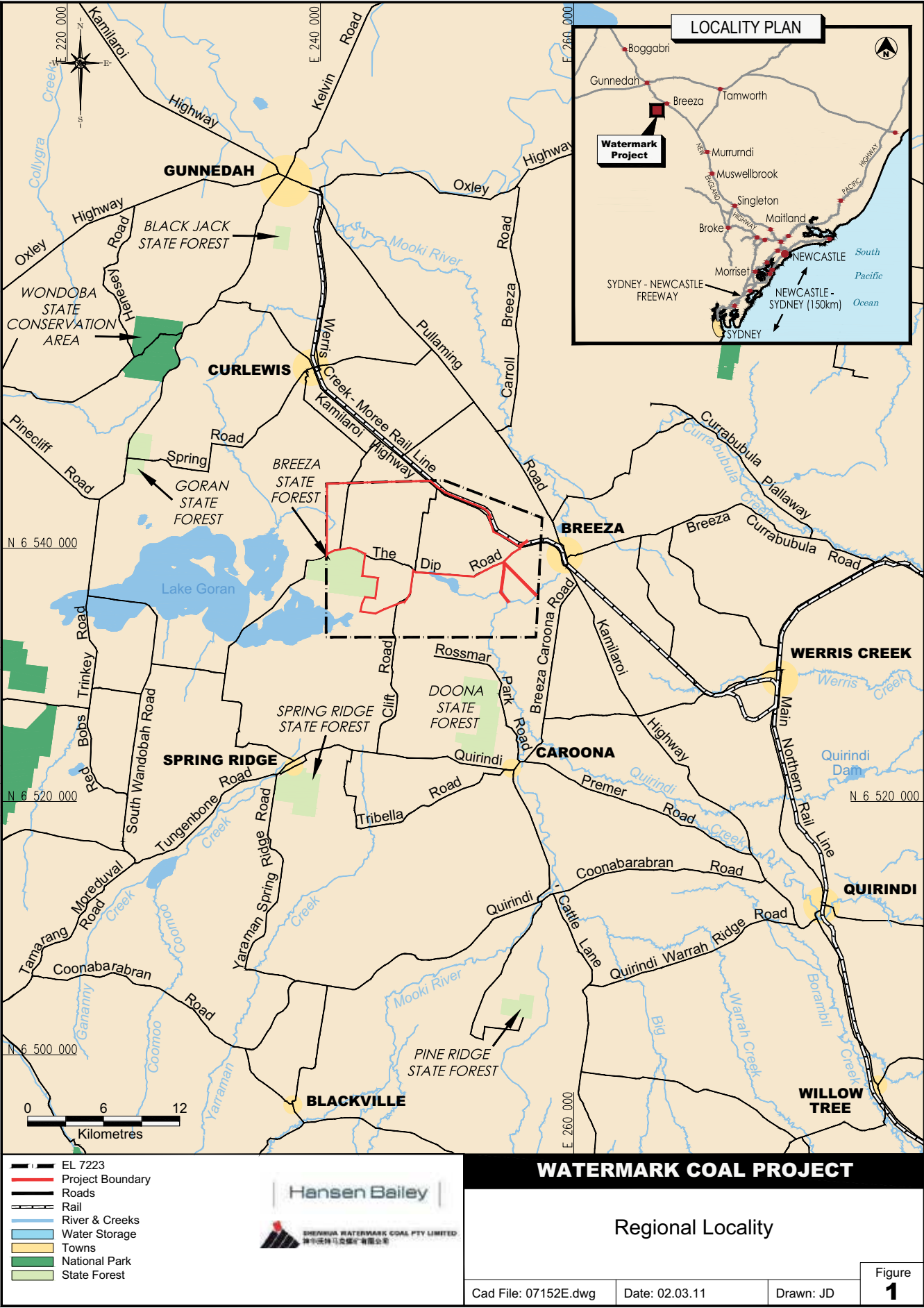
Shenhua Watermark is seeking State Significant Development Consent under Division 4.1 of Part 4 of the *Environmental Planning & Assessment Act 1979* (EP&A Act) for the Project. The Project Application Boundary (Project Boundary) is shown on **Figure 2**.

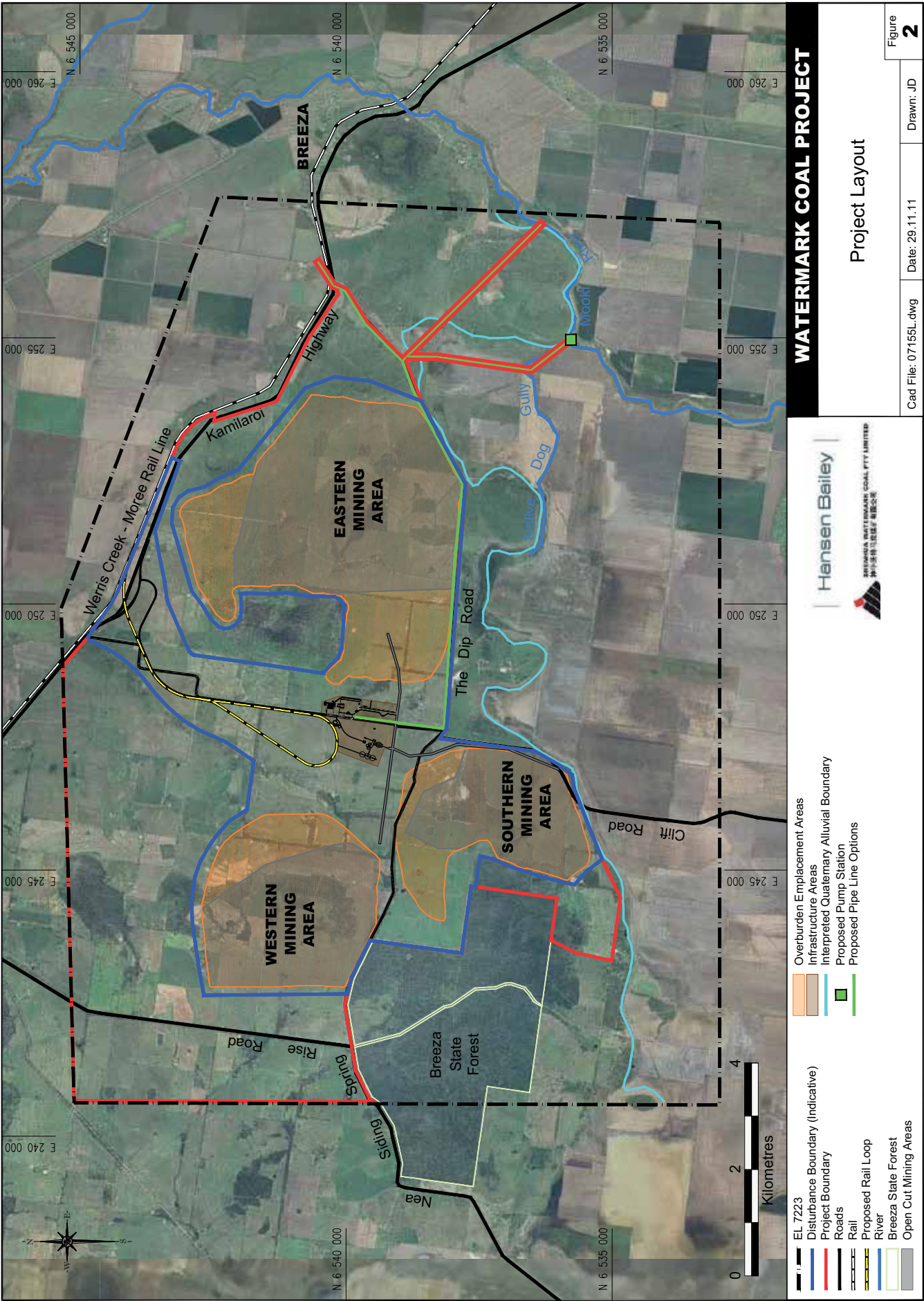
The Project generally comprises:

- The construction and operation of an open cut mining operation extracting up to 10 Million tonnes per annum (Mtpa) of Run of Mine (ROM) coal for a 30 year period;
- An open cut mining fleet of excavators and shovels, supported by haul trucks, dozers, graders, drill rigs and water carts;
- Progressive rehabilitation of all disturbed areas;
- The construction and operation of a Coal Handling and Preparation Plant (CHPP) with a throughput of 10 Mtpa ROM coal;
- The co-disposal of tailings and coarse reject within the Overburden Emplacement Areas (OEA);
- The construction and operation of a rail spur, rail loop, Kamilaroi Highway rail overpass, associated load out facility and connection to the Werris Creek - Moree Railway Line;
- The construction and operation of a Mine Access Road;

- The construction and operation of administration, workshop and related facilities;
- The construction and operation of ground and surface water management and reticulation infrastructure including pipelines, pumping stations and associated infrastructure for access to water from groundwater aquifers, the Mooki River and private dams to the north-east of the Project Boundary;
- The installation of communications and electricity reticulation infrastructure; and
- A workforce of up to approximately 600 full-time equivalent employees during construction and up to 600 full-time equivalent employees during the operation of the Project.

The conceptual layout of the Project is shown in **Figure 2**.





1.3 DOCUMENT PURPOSE & OBJECTIVES

The purpose of this Preliminary Hazard Analysis (PHA) is to form part of the Environmental Impact Statement (EIS) being prepared by Hansen Bailey to support an application for State Significant Development Consent under Division 4.1 of Part 4 of the EP&A Act.

This PHA also addresses the relevant Director-General's Environmental Assessment Requirements (DGRs) issued for the EIS by the NSW Department of Planning and Infrastructure (DP&I) on 19 April 2012 which states:

"The EIS must address the following specific issues...Hazards..."

The specific objectives of this PHA were to:

- Identify the potential hazards and incidents relating to hazardous materials associated with the Project;
- Assess the significance of each potential incident in terms of its potential off-site impact;
- Quantify where appropriate and assess the potential off-site levels of risk to people, property and the environment due to the proposed plant and its operation; and
- Provide a clear, concise report of the analysis in line with the requirements of *Hazardous Industry Planning Advisory Paper No. 6 – Hazard Analysis*.

This PHA focuses on hazardous materials associated with the Project. Environmental hazards associated with the Project are assessed in the Environmental Risk Assessment prepared for the EIS and were therefore excluded from this PHA.

1.4 DOCUMENT STRUCTURE

The remainder of this report is structured as follows:

- **Section 2** describes the methodology used for this PHA to identify hazards associated with hazardous materials identified for the Project, analyse the consequences of the identified hazards and estimate the likelihood of occurrence of identified hazardous events;
- **Section 3** describes of the main hazards associated with hazardous materials identified for the Project;
- **Section 4** outlines the precautionary measures that will be implemented by Shenhua Watermark in order to minimise the risks associated with the hazards identified by this PHA;
- **Section 5** provides a conclusion for the PHA; and
- **Section 6** lists references provided throughout the PHA.

Appendix A provides a summary table presenting the potential hazardous materials identified for the Project and levels of risk associated with these hazardous materials.

2 METHODOLOGY

2.1 INTRODUCTION

This PHA has been prepared in accordance with DGRs, *State Environmental Planning Policy No. 33 – Hazardous and Offensive Development* (SEPP 33) and the following guidelines:

- *SEPP 33 – Hazardous and Offensive Development Application Guidelines* (NSW Department of Urban Affairs and Planning, 1994) (SEPP 33 Guidelines); and
- *Hazardous Industry Planning Advisory Paper No. 6 – Hazard Analysis* (DP&I, 2011) (HIPAP 6).

The methodology applied as per HIPAP 6 included:

1. Identification of potential hazards associated with the Project;
2. Examine the potential consequences of identified events;
3. Qualitatively estimate the likelihood of events;
4. Examine any proposed mitigation measures;
5. Qualitatively assess the risks to the environment, members of the public and their property arising from sudden and unexpected incidents and compare these to the applicable qualitative criteria; and
6. Recommend further risk mitigation or remedial measures if required and repeat process.

2.2 HAZARDOUS MATERIAL IDENTIFICATION

A hazard identification summary table is provided in **Appendix A** of this report. This summary table presents the potential hazardous materials identified for the Project and levels of risk associated with these hazardous materials.

In order to identify and assess risks associated with hazardous materials, activities were subdivided into target categories and scenarios were developed in which hazardous incidents could transpire while carrying out each activity. This is explained further in **Section 3**.

2.3 RISK ANALYSIS

The potential hazards and risks identified during the hazard identification process for the Project were assessed according to qualitative risk assessment criteria. This was achieved via a consideration of the various levels of consequences of an event and the likelihood of such an event occurring.

The qualitative risk assessment criteria are based on the following principles:

- All '*avoidable*' risks associated with the Project should be avoided. This may require the investigation of alternative locations and technologies;
- The level of risk from a significant hazard should be reduced wherever possible, irrespective of the level of cumulative risk from the Project as a whole; and
- The consequences of the more likely hazardous events should, wherever possible be contained within the Project Boundary.

2.3.1 Consequence Analysis

The likelihood and risk acceptability criterion for potential hazardous events was developed considering Shenhua Watermark's Risk Assessment Matrix (which meets Standards Australia requirements). The qualitative scale of consequences for potential hazardous events is provided below in **Table 1**.

Table 1
Qualitative Consequence Scale

Loss Type	Consequence				
	A Minor	B Major	C Severe	D Critical	E Catastrophic
Schedule / Timeline	Less than 1% impact on the overall project timeline	May result in overall project timeline overrun equal to or more than 1% and less than 5%	May result in overall project timeline overrun equal to or more than 5% and less than 20%	May result in overall project timeline overrun equal to or more than 20% and less than 50%	May result in overall project timeline overrun of 50% or more
Cost / Budget	Less than 1% impact on the budget of the project	May result in overall project budget overrun equal to or more than 1% and less than 5%	May result in overall project budget overrun equal to or more than 5% and less than 20%	May result in overall project budget overrun equal to or more than 20% and less than 50%	May result in overall project budget overrun of 50% or more
Quality of Deliverables	No significant impact on quality of deliverables	Quality issues than can be addressed prior to handover	Quality issues which can be addressed during ramp-up	Quality issues that require significant intervention	Quality issues that require significant intervention to achieve performance
Safety / Health	First Aid case / Exposure to minor health risk	Medical treatment case / Exposure to major health risk	Lost time injury / Reversible impact on health	Single fatality or loss of quality of life / irreversible impact on health	Multiple Fatalities / Impact on health ultimately fatal
Environment	Minimal environmental harm	Material environmental harm	Serious environmental harm	Major Environmental harm	Extreme environmental harm
Legal & Regulatory	Low level legal issue	Minor legal issue; noncompliance and breaches of the law	Serious breach of law; investigation/report to authority, prosecution and or moderate penalty possible	Major Breach of the law; considerable prosecution and penalties	Very considerable penalties and prosecutions. Multiple law suits and jail terms
Reputation / Social / Community	Slight impact – public awareness may exist but no public concern	Limited impact – local public concern	Considerable impact – regional public concern	National impact – national public concern	International impact – international public attention

2.3.2 Estimation of Likelihood

A qualitative scale of likelihood for hazardous events is provided below in **Table 2**.

Table 2
Qualitative Likelihood Scale

Level	Descriptor	Probability of Occurring
5	Almost certain	90% and higher probability of occurring
4	Likely	Between 60% and less than 90% probability of occurring
3	Possible	Between 30% and less than 60% probability of occurring
2	Unlikely	Between 1% and less than 30% probability of occurring
1	Very Unlikely	Less than 1% probability of occurring

2.3.3 Level of Risk

The level of risk was determined using the risk levels provided below by combining the consequence and likelihood of the hazardous event from **Table 1** and **Table 2** above and identifying the level of risk associated with the hazardous event from **Table 3** below.

The levels of risk include:

- Low;
- Medium;
- Significant; and
- High.

Response guidelines for appropriate mitigation of each of these levels of risk are presented in **Table 4**.

Table 3
Qualitative Risk Matrix

Likelihood Label	Consequence Label				
	A (Minor)	B (Major)	C (Severe)	D (Critical)	E (Catastrophic)
5 (Almost Certain)	11 (Medium)	16 (Significant)	20 (Significant)	23 (High)	25 (High)
4 (Likely)	7 (Medium)	12 (Medium)	17 (Significant)	21 (High)	24 (High)
3 (Possible)	4 (Low)	8 (Medium)	13 (Significant)	18 (Significant)	22 (High)
2 (Unlikely)	2 (Low)	5 (Low)	9 (Medium)	14 (Significant)	19 (Significant)
1 (Very Unlikely)	1 (Low)	3 (Low)	6 (Medium)	10 (Medium)	15 (Significant)

Table 4
Risk Categories and Response Guidelines

Risk Rating	Risk Level	Guidelines for Risk Matrix
21 to 25	High	A high risk exists that objectives may not be achieved. Appropriate mitigation strategy to be devised immediately.
13 to 20	Significant	A significant risk exists that objectives may not be achieved. Appropriate mitigation strategy to be devised as soon as possible.
6 to 12	Medium	A moderate risk exists that objectives may not be achieved. Appropriate mitigation strategy to be devised as part of the normal management process.
1 to 5	Low	A low risk exists that objectives may be achieved. Monitor risk, no further mitigation required.

3 POTENTIAL HAZARD IDENTIFICATION

3.1 DESCRIPTION OF HAZARDOUS MATERIALS

The main potentially hazardous materials identified will be stored within the fuel delivery, storage and refill area the Dangerous Goods Store and include diesel, explosives products, oils, coolant and other minor hazardous materials. Flocculant and radiation emitting equipment will also be utilised as part of the CHPP process. A brief description of each is hazardous material is provided below.

3.1.1 Diesel

Diesel is a combustible liquid as classified by Australian Standard (AS) 1940 – 2004: *The Storage and Handling of Flammable and Combustible Liquids* (AS 1940:2004) (Class C1) for the purposes of storage and handling. However, this hazardous material is not classified as a dangerous good under the Australian Dangerous Goods Code (National Transport Commission, 2007) (ADG Code).

Diesel has a flashpoint of around 61.5°C and has the potential to result in a fire if ignited. Diesel can be damaging to the surrounding environment if a significant spill is experienced. If the spill leaves site, it has the potential to cause material harm to soils and/or the aquatic environment.

The Project includes the storage of approximately 776,000 litres of diesel within eight 97,000 litres capacity diesel storage tanks which will be stored within a self bunded facility that is accredited to AS 1940:2004.

These diesel storage tanks will be located within a designated fuel delivery, fuel storage, and refill facility so any spills that occur will be contained within the dirty water drainage system and contained. This facility will be refilled as required by a fully licensed contractor, who will be inducted and fully familiarised with procedures on refilling the system. Operators using the facility will also be familiarised with procedures on dispensing diesel fuel into explosives trucks.

The diesel storage tanks will be connected by pipelines to the service vehicle filling facility and the light vehicle refuelling pad.

3.1.2 Explosives Storage and Transport

Shenhua Watermark will utilise initiating products, detonators, and emulsion explosives for blasting activities to facilitate open cut coal mining. The Project includes the storage minor volumes of ammonium nitrate and fuel oil (ANFO) explosives, which will be stored in a storage magazine within the Dangerous Goods Store. The store will be constructed in accordance with *AS 2187:1998 Explosives - Storage, Transport and Use – Storage* (AS 2187:1998) and relevant NSW Occupational Health and Safety (OH&S) regulations.

All storage facilities will be located a minimum of 200 m from facilities such as offices and a sufficient distance from the Project Boundary to ensure that in the case of a fire or explosion there would be no offsite impacts.

These products will be generally sourced locally and transported by trucks. Vessels used to transport explosives will be appropriately designed and licensed.

3.1.3 Oils and Waste Oil

The fuel delivery, storage and refill area will contain separate storage tanks for five different oil products. The facility will also provide for the reclaiming and storage of waste oil resulting from vehicle and servicing repair. Specifically, the fuel delivery, storage and refill area will contain the following above ground oil storage tanks:

- One 15,000 L tank for engine oil storage (SAE 15W-40);
- One 10,000 L tank for gear oil storage (SAE 85W-140);
- One 10,000 L tank for transmission oil storage (SAE 30);
- One 10,000 L tank for hydraulic oil storage (ISO 46);
- One 10,000 L tank for final drive oil storage (SAE 50); and
- One 17,000 L tank for waste oil storage.

These tanks will be stored within the self bunded fuel delivery, storage and refill area, which will be constructed to comply with AS 1940:2004.

The oil storage tanks will be connected by pipelines to the maintenance workshop for use in vehicle servicing.

3.1.4 Liquid Petroleum Gas

Liquid Petroleum Gas (LPG) is classified as a flammable gas (Class 2.1) by AS 1940:2004 for the purposes of storage and handling and as such is classified as a dangerous good by the ADG Code. Minor volumes of LPG will be required to be used for the Project. Gas cylinders would be stored in accordance with AS/NZS 1596:2008 *The Storage and Handling of LP Gas*.

3.1.5 Other Flammable Gases

Minor volumes oxy-acetylene and other flammable gasses (classified as Class 2.1 by AS 1940:2004) will be required for the Project. Flammable gases are classified as a dangerous good by the ADG Code. Gas cylinders would be stored in accordance with AS 1940:2004.

3.1.6 Coolant and Waste Coolant

Concentrated engine coolant is a combustible liquid (Class C1) as classified by AS 1940:2004 for the purposes of storage and handling. However, concentrated engine coolant is not classified as a dangerous good under the ADG Code.

The fuel delivery, storage and refill area will contain separate storage tanks for concentrated engine coolant and waste coolant. Specifically, the fuel delivery, storage and refill area will contain one above ground 10,800 L tank for concentrated engine coolant storage; and one above ground 10,800 L tank for waste coolant storage.

The coolant storage tanks will be connected by pipelines to the maintenance workshop for use in vehicle servicing.

3.1.7 Flocculating Agents

As part of the CHPP operations, small amounts of flocculating agent, which may be classified as a dangerous good under the ADG Code, will be utilised to separate tailings and reject from the product coal.

3.1.8 Coal Density Gauges

The CHPP will also include multiple density gauges and coal scanners, which will allow for the real time monitoring of coal quality throughout CHPP operations. These density gauges and coal scanners contain minor volumes of a radioactive material and will be stored and handed in accordance with the relevant licences under the *Radiation Control Act 1990*.

3.1.9 Other Hazardous Materials

Some minor hazardous materials will also be stored within the proposed Dangerous Goods Store. These products will be stored in accordance with relevant Australian Standards and guidelines. However, the quantities of these products were below the thresholds for the purposes of this assessment.

3.2 HAZARD IDENTIFICATION PROCESS

For the purpose of hazardous material identification and risk analysis, Project processes were subdivided into the following target categories:

- Transportation of explosives, fuel, chemicals and general goods to the Project Boundary;
- Delivery of fuel, chemicals and general goods to the Project Boundary (i.e. drop off);
- Transportation of coal product out of the Project Boundary (rail loop and conveyor operations);
- Storage of explosives, fuel, chemicals and general goods;
- CHPP operations, including flocculation and management of reject materials;
- Transportation of explosives, fuel, chemicals and general goods to the Project Boundary;
- Blasting activities required for the removal of overburden and interburden materials;
- General Project operations including the construction phase of the Project; and
- Exploration and monitoring activities.

The following generic incident categories were identified in relation to hazardous materials associated with the above processes:

- Leaks / Spills;
- Fire;
- Explosion;
- Malfunction of radiation emitting equipment;
- Vandalism or theft; and
- Unauthorised access to the Project Boundary leading to personal injury.

Scenarios were identified where each of the incidents above have the potential to transpire and management measures were developed to minimise the likelihood and / or severity of the consequence resulting from each scenario.

4 RISK ASSESSMENT ANALYSIS

Significant planning in relation to the infrastructure design of the Project was undertaken prior to the PHA being conducted. This involved the location of infrastructure in a manner that would not significantly impact on the neighbouring community and the location of the Dangerous Goods Store, which is planned to be located over 1.5 km from any resident or public area, a minimum of 200 m from facilities such as offices and a sufficient distance from the Project Boundary to ensure that in the case of a fire or explosion there would be no off-site impacts. The facility will also be located on Shenhua Watermark owned land. The Dangerous Goods Store will be designed in accordance with AS 2187:1998.

A range of Project specific management plans will be developed by Shenhua Watermark in accordance with the *Coal Mine Health and Safety Act 2002* and the *Coal Mine Health and Safety Regulation 2006*, which will thoroughly identify any risks associated with Project related activities, including the storage and utilisation of hazardous materials, and develop specific management measures for each identified risk. Relevant management plans to be developed will include:

- Emergency Management / Response Plans;
- Environmental Emergency Management Plan;
- Environmental Incident Response Plan;
- Emergency Control Measures / Procedures and Structure;
- Transport Management Plan;
- Public Road Management Plan;
- Fire and Explosion Management Plan;
- Fire and Emergency Provisions;
- Training and Competency Management Plan;
- Bushfire Management Plan;
- Spontaneous Combustion Plan; and
- Shot firing and Explosives Management Plan.

Preventative measures were also developed to address specific concerns raised by this PHA. These measures include:

- The Project Boundary will be fenced with warning signage and personnel entering the Project Boundary will be authorised to do so, in accordance with the Site Management Protocol. Any visitors entering this area will need a site induction and will need to 'sign on';
- Operational Procedures will be developed to minimise the chance of a hazardous incident occurring;

- Shenhua Watermark will develop a Hazard Management Plan to support an application for a 'License to Store' (formerly termed Dangerous Goods License) from WorkCover under the *Occupational Health and Safety Act 2000* (OH&S Act). This will outline procedures for transport and storage of substances, storage location with respect to the Project Boundary, quantity of material and detailed procedures should an event such as fire, explosion or spill occur;
- Shenhua Watermark will develop a database to assist in the recording and management of chemicals. The chemical management database will contain Material Safety Data Sheets (MSDS) for all chemicals used within the Project Boundary;
- Temporary work sites created for exploration and monitoring activities will require fencing and restricted access to prevent theft and vandalism;
- All hazardous materials associated with the Project will be transported by a licensed contractor in accordance with the relevant Australian Standards and NSW Legislation;
- Storage facilities, vehicles and transport vessels will be regularly inspected for leaks, spills and other damage or faults;
- All storage facilities for explosives, diesel, oil and other hazardous materials will be designed in accordance with applicable Australian Standards and NSW Legislation to minimise any offsite impacts and minimise the severity of an incident in the case of fire, explosion or hazardous substance spills;
- An electronic automated tank gauging system will be installed to monitor the level of diesel, oil and coolant in the above ground storage tanks located in the fuel delivery, storage, and refill area, which will allow the storage levels to be monitored remotely from the site office. The system will also allow the tanker drivers to check (electronically dip) the storage level prior to delivery;
- The Dangerous Goods Store will be located a minimum of 200 m from Project facilities such as offices;
- The Dangerous Goods Store will be securely fenced with restricted access;
- Storage areas will be located at a sufficient distance from the Project Boundary to ensure there would be no offsite impacts in the event of an incident;
- All construction workers will have a WorkCover induction card (green card);
- Workforce training will include (but will not be limited to) a general induction, Safe Work procedures, housekeeping requirements and safety drills;
- All transport vehicles will have communication services on-board, including two way radios and mobile phones;
- Storage areas will be constructed in accordance with AS/NZS 1768:2007 *Lightning Protection* to minimise the risk of ignition of flammable or explosive materials due to a lightning strike;

- Spill kits will be stored on transport vehicles and operators will have the relevant training required for the usage of spill kits;
- 'Hot work' permits will be required prior to undertaking any hot work or welding;
- Fire fighting and emergency response equipment will be available on each vehicle and throughout the Project Boundary;
- Regular inspections will be conducted of fire fighting and emergency response equipment in accordance with relevant Australian Standards and NSW Legislation;
- All explosives will be stored in a purpose built magazine constructed in accordance with AS 2187:1998;
- Magazines will be designed and maintained in accordance with AS 2187:1998 and the *Dangerous Goods Amendment Regulations 2005*;
- A suitably qualified person will be appointed as the radiation safety officer to assist in coordinating radiation safety;
- Radiation warning signs will be installed in visible locations to notify personnel of the location of radiation emitting equipment; and
- Maintenance and testing of radiation emitting equipment will be undertaken on a regular basis by an accredited contractor.

5 CONCLUSION

The qualitative risk assessment presented in **Appendix A** identifies potential hazards associated with hazardous materials for the Project and identifies appropriate management techniques. This PHA has confirmed that the Project is not considered to be Potentially Hazardous or Offensive.

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for
HANSEN BAILEY



Melissa Walker
Senior Environmental Scientist



James Bailey
Director

6 REFERENCES

- National Transport Commission (2007). *Australian Dangerous Goods Code 7th Edition*.
- NSW Department of Planning and Infrastructure (2011). *Hazardous Industry Planning Advisory Paper No. 6 – Hazard Analysis*.
- NSW Department of Urban Affairs and Planning (1994). *SEPP 33 – Hazardous and Offensive Development Application Guidelines*.

APPENDIX A

Qualitative Risk Assessment Summary

Table 1
Qualitative Risk Assessment

Functional / Operational Area	Incident Type	Scenario	Proposed Management Measures	Likelihood	Consequence	Risk
Transport to Site (Explosives, Fuel, Chemicals and General Goods)	Leaks / Spills	Vehicle collision, poor maintenance, or human error leading to off-site impacts	- Emergency Management / Response Plans - Environmental Emergency Management Plan - Environmental Incident Response Plan - Emergency Control Measures / Procedures and Structure - Transport Management Plan - Fire and Explosion Management Plan - General Fire and Emergency Provisions - Training and Competency Management Plan - Operator training (including Safe Work Procedures) - Licensed contractors to transport and operate in accordance with Australian Standards and NSW Legislation - Records of all hazardous materials aboard the vehicle, including relevant Material Safety Data Sheets (MSDS) - Fire fighting and emergency response equipment to be stored with vehicle - Regular inspections of fire fighting and emergency response equipment - Development of a Bushfire Management Plan - Transport vehicles to have communication (e.g. mobile, radio etc) - Spill kit stored on transport vehicles (and relevant training of operator for usage of spill kit) - Load covers on trucks - Contractor incident investigation - In the event of an incident, contact the rural fire service and / or the police	2 (Unlikely)	B (Major)	5 (Low)
	Fire	Fuel or explosive material ignited following spill		1 (Very Unlikely)	C (Severe)	6 (Medium)
	Explosion			1 (Very Unlikely)	D (Critical)	10 (Medium)

Functional / Operational Area	Incident Type	Scenario	Proposed Management Measures	Likelihood	Consequence	Risk
Delivery to Site (Filling Storage Containers / Drop Off of Explosives, Chemicals, and General Goods)	Theft	Theft of dangerous goods during transport, leading to off-site impacts	- Emergency Management / Response Plans - Environmental Emergency Management Plan - Environmental Incident Response Plan - Emergency Control Measures / Procedures and Structure - Transport Management Plan - Public Road Management Plan - Transport vehicles to have communication (e.g. mobile, radio etc) - Follow specified route outlined in the Transport Management Plan - Separate transportation of explosives and detonators / primers - Fencing of the Project Boundary and security - Site presence 24/7 - Routine inspections - In the event of an incident, contact the police	1 (Very Unlikely)	D (Critical)	10 (Medium)
	Leaks / Spills	Collision, overfill tanks, leaking pipeline, human error, leaking storage container	- Emergency Management / Response Plans - Environmental Emergency Management Plan - Environmental Incident Response Plan - Emergency Control Measures / Procedures and Structure - Transport Management Plan - Fire and Explosion Management Plan - General Fire and Emergency Provisions - Training and Competency Management Plan - Licensed contractors to transport and operate in accordance with Australian Standards and NSW Legislation - Operator training (including Safe Work Procedures) - Fencing of the Project Boundary and security	2 (Unlikely)	B (Major)	5 (Low)
	Fire	Material catching on fire, with possible spread to other materials		1 (Very Unlikely)	C (Severe)	6 (Medium)
	Explosion	Explosion as a result of mixed materials		1 (Very Unlikely)	D (Critical)	10 (Medium)

Functional / Operational Area	Incident Type	Scenario	Proposed Management Measures	Likelihood	Consequence	Risk
			- Fuel delivery, storage and refill area, minor chemical storage areas including oxy acetylene storage and Dangerous Goods Store, including storage containers, bunding, drainage and pipelines designed to relevant Australian Standards and NSW legislation - Electronic volume gauges on storage tanks, allowing for remote monitoring of storage levels from the site office and electronic dipping of the tanks by licensed contractors during delivery - Operator training (including Safe Work Procedures) - Licensed contractors to deliver in accordance with Australian Standards and NSW Legislation - Records of all hazardous materials aboard the vehicle, including relevant Material Safety Data Sheets (MSDS) - Transport vehicles to have communication (e.g. mobile, radio etc) - Contractor sign-on prior to entering site - Daily inspections of facilities - Fire fighting and emergency response equipment to be stored with vehicle and on-site - Regular inspections of fire fighting and emergency response equipment - Development and maintenance of appropriate fire breaks - Development of a Bushfire Management Plan - Spill kit stored on transport vehicles (and relevant training of operator for usage of spill kit) - Contractor incident investigation - In the event of an incident, contact the rural fire service and / or the police			

Functional / Operational Area	Incident Type	Scenario	Proposed Management Measures	Likelihood	Consequence	Risk
Transport Off-Site (Rail Loop and Conveyor Operations)	Leaks / Spills	Overloading, derailment or collision leading to coal or fuel spillage off-site	- Emergency Management / Response Plans - Environmental Emergency Management Plan - Environmental Incident Response Plan - Emergency Control Measures / Procedures and Structure - Transport Management Plan - Training and Competency Management Plan - Transport vehicles to have communication (e.g. mobile, radio etc) - Regular inspections of train loading activities and rail infrastructure and intervention / maintenance where required - Appropriately qualified engineers to design the rail infrastructure and signalling systems	2 (Unlikely)	B (Major)	5 (Low)
On-Site Storage (Explosives, Fuel and Chemicals)	Leaks / Spills	Failed tank or pipe	- Emergency Management / Response Plans - Environmental Emergency Management Plan - Environmental Incident Response Plan - Emergency Control Measures / Procedures and Structure - Fire and Explosion Management Plan - General Fire and Emergency Provisions - Training and Competency Management Plan - Fuel delivery, storage and refill area, minor chemical storage areas including oxy acetylene storage and Dangerous Goods Store, including Storage containers, bunding, drainage and pipelines designed to relevant Australian Standards and NSW legislation - Electronic volume gauges on storage tanks, allowing for remote monitoring of storage levels from the site office and electronic dipping of the tanks by licensed contractors during delivery - Daily inspections of facilities - Maintenance when required	1 (Very Unlikely)	B (Major)	3 (Low)

Functional / Operational Area	Incident Type	Scenario	Proposed Management Measures	Likelihood	Consequence	Risk
			Operating procedures followed			
	Theft	Unauthorised personnel removing product from facility, which could result in off-site impact	- Emergency Management / Response Plans - Environmental Emergency Management Plan - Environmental Incident Response Plan - Emergency Control Measures / Procedures and Structure - Transport Management Plan - Follow specified route outlined in the Transport Management Plan - Separate transportation of explosives and detonators / primers - Fencing of the Project Boundary and security - Site presence 24/7 - Routine inspections - In the event of an incident, contact the police	1 (Very Unlikely)	D (Critical)	10 (Medium)
	Fire	Flammable or combustible materials ignited causing a fire which has potential to spread	- Emergency Management / Response Plans - Environmental Emergency Management Plan - Environmental Incident Response Plan - Emergency Control Measures / Procedures and Structure - Fire and Explosion Management Plan - General Fire and Emergency Provisions - Training and Competency Management Plan - Operator procedures (including Safe Work Procedures) - Records of all hazardous materials stored within the Project Boundary, including relevant Material Safety Data Sheets (MSDS) - Fuel delivery, storage and refill area, minor chemical storage areas including oxy acetylene storage and Dangerous Goods Store, including Storage containers, bunding, drainage and pipelines designed to relevant Australian Standards and NSW legislation	1 (Very Unlikely)	C (Severe)	6 (Medium)
	Explosion	Possible explosion if fire spreads		1 (Very Unlikely)	D (Critical)	10 (Medium)

Functional / Operational Area	Incident Type	Scenario	Proposed Management Measures	Likelihood	Consequence	Risk
			- Daily inspections of facilities - Maintenance when required - Fire fighting and emergency response equipment available on-site - Regular inspections of fire fighting and emergency response equipment - Development and maintenance of appropriate fire breaks - Development of a Bushfire Management Plan - In the event of an incident, contact the rural fire service and / or the police - All spillage to be cleaned up in an appropriate manner			
		Explosives magazine detonates by lightning strike, malicious act, or accidental ignition	- Emergency Management / Response Plans - Environmental Emergency Management Plan - Environmental Incident Response Plan - Emergency Control Measures / Procedures and Structure - Fire and Explosion Management Plan - General Fire and Emergency Provisions - Training and Competency Management Plan - Dangerous Goods Store to be securely fenced with restricted access - Operator training (including Safe Work procedures) - Storage license for explosives and dangerous goods - Explosives storage facility to comply with relevant Australian Standards and NSW legislation; - Lightning protection to Australian Standards - Explosives to be handled by authorised personnel with appropriate licenses - Separate storage of explosives and detonators / primers - Availability of fire fighting and emergency response equipment	1 (Very Unlikely)	D (Critical)	10 (Medium)

Functional / Operational Area	Incident Type	Scenario	Proposed Management Measures	Likelihood	Consequence	Risk
			- Regular inspections of fire fighting and emergency response equipment; - Development and maintenance of appropriate fire breaks - Development of a Bushfire Management Plan - In the event of an incident, contact the rural fire service and / or the police			
CHPP (Coal transport and reject management)	Leaks / Spills	Vehicle collision, poor maintenance, procedures absent, leading to off-site impacts	- Emergency Management / Response Plans - Environmental Emergency Management Plan - Environmental Incident Response Plan - Emergency Control Measures / Procedures and Structure - Transport Management Plan - Training and Competency Management Plan - Storage containers, bunding, drainage and pipelines designed to Australian Standards - Regular inspections of facilities - Maintenance when required - Operators using the facility to be inducted and trained - Operating procedures followed	2 (Unlikely)	B (Major)	5 (Low)
	Fire / Explosion	Mobile plant, powerlines, fixed plant, human action or spontaneous combustion leading to off-site fire related impacts	- Emergency Management / Response Plans - Environmental Emergency Management Plan - Environmental Incident Response Plan - Emergency Control Measures / Procedures and Structure - Fire and Explosion Management Plan - General Fire and Emergency Provisions - Training and Competency Management Plan - Regular maintenance of mobile plant and fire fighting equipment - Development and maintenance of appropriate fire breaks - Development of a Bushfire Management Plan	1 (Very Unlikely)	D (Critical)	10 (Medium)

Functional / Operational Area	Incident Type	Scenario	Proposed Management Measures	Likelihood	Consequence	Risk
			- Regular inspections of mobile and fixed plant, coal stockpiles, fire fighting equipment and fire breaks - Development and implementation of a Spontaneous Combustion Plan - Training and competency assessment of plant operators - In the event of an incident, contact the rural fire service and / or the police			
	Exposure to Radiation	Malfunction of radiation emitting equipment leading to exposure of personnel to radiation.	- Emergency Management / Response Plans - Emergency Control Measures / Procedures and Structure - Transport Management Plan - Operator training (including Safe Work Procedures) - Emergency response (internal and external emergency response agencies) - Appointment of a radiation safety officer - Installation of radiation warning signs - Regular maintenance and testing of radiation emitting equipment	1 (Very Unlikely)	C (Severe)	6 (Medium)
	Leaks / Spills	Vehicle collision, poor maintenance, procedures absent	- Emergency Management / Response Plans - Environmental Emergency Management Plan - Environmental Incident Response Plan - Emergency Control Measures / Procedures and Structure - Transport Management Plan - Training and Competency Management Plan - Operator training (including Safe Work Procedures) - Records of all hazardous materials aboard the vehicle, including relevant Material Safety Data Sheets (MSDS) - Transport vehicles to have communication (e.g. mobile, radio etc) - Spill kit stored on transport vehicles (and relevant training of operator for usage of spill kit)	2 (Unlikely)	B (Major)	5 (Low)

Functional / Operational Area	Incident Type	Scenario	Proposed Management Measures	Likelihood	Consequence	Risk
			• Load covers on trucks • Fuel delivery, storage and refill area, minor chemical storage areas including oxy acetylene storage and Dangerous Goods Store, including Storage containers, bunding, drainage and pipelines designed to relevant Australian Standards and NSW legislation • Daily inspections of facilities • Maintenance when required • Establishment of appropriate run-off controls (drains and sumps) during construction • Operating procedures followed			
	Fire	Flammable or combustible materials ignited causing a fire which has potential to spread	• Emergency Management / Response Plans • Environmental Emergency Management Plan • Environmental Incident Response Plan • Emergency Control Measures / Procedures and Structure • Transport Management Plan • Fire and Explosion Management Plan • Fire and Emergency Provisions – General • Training and Competency Management Plan • Operator training (including Safe Work Procedures) • Emergency response (internal and external emergency response agencies) • Fuel delivery, storage and refill area, minor chemical storage areas including oxy acetylene storage and Dangerous Goods Store, including Storage containers, bunding, drainage and pipelines designed to relevant Australian Standards and NSW legislation • Daily inspections of facilities • Maintenance when required	1 (Very Unlikely)	C (Severe)	6 (Medium)
	Explosion	Possible explosion if fire spreads		1 (Very Unlikely)	D (Critical)	10 (Medium)

Functional / Operational Area	Incident Type	Scenario	Proposed Management Measures	Likelihood	Consequence	Risk
			- Staff training (including general induction, Safe Work procedures, housekeeping requirements, and safety drills) - WorkCover requirements – construction induction card (green card) 'Hot work' permits - Availability of fire fighting and emergency response equipment - Regular inspections of fire fighting and emergency response equipment			
	Unauthorised Access to Site	Unauthorised access to site leading to injury	- Emergency Management / Response Plans - Environmental Emergency Management Plan - Environmental Incident Response Plan - Emergency Control Measures / Procedures and Structure - Fencing of the Project Boundary and security - Site presence 24/7 - Routine inspections - Warning signage	1 (Very Unlikely)	D (Critical)	10 (Medium)
Exploration / Monitoring Activities	Leaks / Spills	Vandalism or theft leading to off-site impacts	- Emergency Management / Response Plan - Environmental Emergency Management Plan - Environmental Incident Response Plan - Emergency Control Measures / Procedures and Structure; - Transport Management Plan - Follow specified route outlined in the Transport Management Plan - Fencing and restricted access to temporary work areas; - Routine inspections - In the event of an incident, contact the police	1 (Very Unlikely)	C (Severe)	6 (Medium)

Functional / Operational Area	Incident Type	Scenario	Proposed Management Measures	Likelihood	Consequence	Risk
	Fire / Explosion	Vehicle fire, fuel fire, or electrical fire resulting in off-site impacts	- Emergency Management / Response Plans - Environmental Emergency Management Plan - Environmental Incident Response Plan - Emergency Control Measures / Procedures and Structure - Transport Management Plan - Public Road Management Plan - Fire and Explosion Management Plan - Fire and Emergency Provisions – General - Training and Competency Management Plan - Staff training (including general induction, Safe Work procedures, housekeeping requirements, and safety drills) - WorkCover requirements – construction induction card (green card) ‘Hot work’ permits - Emergency response (internal and external emergency response agencies) - Licensed contractors to transport and operate in accordance with Australian Standards and NSW Legislation - Records of all hazardous materials aboard the vehicle, including relevant Material Safety Data Sheets (MSDS) - Fire fighting and emergency response equipment to be stored with vehicle - Regular inspections of fire fighting and emergency response equipment - Development and maintenance of appropriate fire breaks; - Development of a Bushfire Management Plan - Transport vehicles to have communication (e.g. mobile, radio etc);	1 (Very Unlikely)	D (Critical)	10 (Medium)

Functional / Operational Area	Incident Type	Scenario	Proposed Management Measures	Likelihood	Consequence	Risk
			• Spill kit stored on transport vehicles (and relevant training of operator for usage of spill kit) • Load covers on trucks • In the event of an incident, contact the rural fire service and / or the police			