

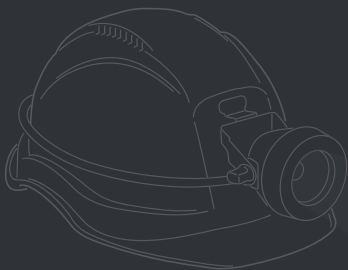
# Wallarrah 2 Coal Project

## Environmental Impact Statement

April 2013

### **Appendix AB**

Preliminary Hazard Analysis



# **WALLARAH 2 COAL PROJECT ENVIRONMENTAL IMPACT STATEMENT**

## **PRELIMINARY HAZARD ANALYSIS**

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## WALLARAH 2 COAL PROJECT EIS PRELIMINARY HAZARD ANALYSIS

*for*  
**Wyang Areas Coal Joint Venture**

### 1 OVERVIEW

#### 1.1 INTRODUCTION

Hansen Bailey has been commissioned on behalf of Wyong Areas Coal Joint Venture (WACJV) to undertake a Preliminary Hazard Analysis (PHA) for the Wallarah 2 Coal Project (the Project). This PHA will form part of the Environmental Impact Statement (EIS) supporting an application for Development Consent under Part 4, Division 4.1 of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

The Project is located approximately 4.7 km north-west of central Wyong, NSW as shown on **Figure 1**. The Project involves the construction and operation of an underground mining operation extracting up to 5.0 Million tonnes per annum (Mtpa) of export quality thermal coal by longwall mining methods.

Surface infrastructure at the Tooheys Road Site will generally include a rail loop and spur, stockpiles, water and gas management facilities, workshop and offices.

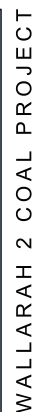
Surface infrastructure at the Buttonderry Site will generally include access to the mine, main ventilation facilities, offices and employee amenities.

#### 1.2 PROJECT DESCRIPTION

Development Consent is sought to mine coal within the Extraction Area for a period of 28 years. The majority of this resource lies beneath the Wyong State Forest and surrounding ranges (including the Jilliby State Conservation Area) while a proportion occurs beneath a section of the Dooralong Valley and the Hue Hue area.

Key features of the Project include:

- The construction and operation of an underground mining operation extracting up to 5.0 Mtpa of export quality thermal coal by longwall methods at a depth of between 350 m and 690 m below the surface within the underground Extraction Area;
- Mining and related activities will occur 24 hours a day, 7 days a week for a Project period of 28 years;
- Tooheys Road Site surface facilities on company owned and third party land (subject to a mining lease) between the Motorway Link Road and the F3 Freeway which will include (at least) a rail loop and spur, stockpiles, water and gas management facilities, workshop and offices;



Regional Locality

# FIGURE 1

- Buttonderry Site Surface Facilities on company owned land at Hue Hue Road between Sparks Road and the Wyong Shire Council's (WSC) Buttonderry Waste Management Facility. This facility will include (at least) the main personnel access to the mine, main ventilation facilities, offices and employee amenities;
- An inclined tunnel constructed from the coal seam beneath the Buttonderry Site to the surface at the Tooheys Road Site;
- Construction and use of various mining related infrastructure including water management structures, water treatment plant (reverse osmosis or similar), generator, second air intake ventilation shaft, boreholes, communications, water discharge point, powerlines, and easements to facilitate connection to the WSC (after July 2013, the Central Coast Water Corporation) water supply and sewerage system;
- Capture of methane for treatment, initially involving flaring as practicable for greenhouse gas emissions management and ultimately for beneficial use of methane such as electricity generation at the Tooheys Road Site;
- Transport of coal by rail to either the Newcastle port for export or to domestic power stations;
- A workforce of approximately 300 full-time employees (plus an additional 30 contractors); and
- Rehabilitation and closure of the site at cessation of mining operations.

The proposed layout of Project is shown in **Figure 2**.







### 1.3 DOCUMENT PURPOSE

This PHA was undertaken in accordance with *Hazardous and Offensive Development Application Guidelines – Applying SEPP 33* (DoP, 2011) (SEPP 33 Guidelines).

The SEPP 33 Guidelines require a risk screening process to determine whether a proposed development is a potentially hazardous industry. This screening process has been conducted and is included at **Section 4**. This process confirmed that the Project is a potentially hazard industry and that a PHA is necessary.

The specific objectives of this PHA were to:

- Provide a clear hazard analysis for the Project which satisfies any relevant legislative requirements;
- Identify potential hazards and risks including hazardous materials, storage areas, transportation and other activities that may relate to the Project;
- Analyse the significance of each hazard in terms of likelihood of occurrence and potential off-site consequences; and
- Quantify where appropriate and assess the off-site levels of risk due to the potential hazards.

## 2 METHODOLOGY

The SEPP 33 Guidelines prescribe a screening process to determine whether a proposed development is potentially hazardous. The risk screening process is described in Section 7 of the SEPP 33 guidelines and is summarised below:

- Identify all hazardous materials that will be used by the development;
- Determine the dangerous goods classification for each material using the *Australian Code for the Transport of Dangerous Goods by Road & Rail* (National Transport Commission, 2007) (Australian Dangerous Goods Code);
- Determine the quantities of each dangerous good that will be stored on site;
- Compare the quantities of each dangerous goods class to the screening thresholds prescribed in Table 1 of the SEPP 33 guidelines.
- Determine the average annual and weekly road movements for dangerous goods and the typical quantities in each movement; and
- Compare the number of road movements and the transport quantities of dangerous goods to the screening thresholds in Table 2 of the SEPP 33 guidelines.

If none of the screening thresholds are exceeded, the development is not considered to be a potentially hazardous development. As such, a PHA is not required for the development.

If any of the screening thresholds are exceeded, the development is deemed to be a potentially hazardous development. A PHA must be completed in accordance with the SEPP 33 guidelines and HIPAP No. 6.

The methodology for a PHA is described in Appendix 5 of the SEPP 33 guidelines. This introduces a multi-level approach to risk assessment. There are three levels of analysis:

- Level 1 is an essentially qualitative approach based on comprehensive hazard identification to demonstrate that the activity does not pose a significant risk;
- Level 2 supplements the qualitative analysis by sufficiently quantifying the main risk contributors to show that risk criteria will not be exceeded; and
- Level 3 is a full quantitative analysis.

The level of analysis required is dependent on the types of hazards present, the management measures employed and the nature of the surrounding land use. A Level 1 qualitative approach was deemed to be appropriate for this PHA (see **Section 5**).

### 3 POTENTIAL HAZARD IDENTIFICATION

The PHA identified a number of Project-related activities which may require the use of potentially hazardous materials.

The Project will require the transportation and storage of diesel, minor amounts of explosives and other substances which may be considered potentially hazardous (discussed further below).

WACJV is committed to the implementation of environmental management and remedial measures for any potentially hazardous activities including the handling, storage and transport of any hazardous substances.

#### 3.1 POTENTIALLY HAZARDOUS MATERIALS

The key hazardous materials required for the Project include explosives, hydrocarbons and other hazardous chemicals including fuels such as diesel, degreaser, greases and explosives.

Potentially hazardous materials identified in this PHA are stored in a minimal number of areas within the Project Boundary. A description of the bulk storage locations proposed for the each of the Project infrastructure areas is provided below with locations shown on **Figure 3** and **Figure 4**.

##### 3.1.1 Explosives

The preferred approach for the management of explosives required for the Project would be to have the required materials delivered to the Tooheys Road site on an as needed basis, with no long term storage. However, to accommodate the maximum volumes that WACJV may intermittently require, a 'Licence to Store' (issued by Work Cover NSW) for the explosives storage facility at the Tooheys Road site will be sought for the Project.

To accommodate the maximum volumes of explosives required, an explosives storage facility will be constructed at the Tooheys Road site at the location indicated on **Figure 4**. This facility will be designed in accordance with the relevant Standards and Guidelines including *AS 2187.1 – 1998: Explosives – Storage, Transport and Use – Storage*, *AEISG Code of Practice – Precursors for Explosives* (1999) and the relevant WACJV hazard management plans and procedures.

The key potential hazards associated with explosives include the Tooheys Road storage facility, transportation of potentially hazardous materials, the proximity to fuel and workshop areas and possible explosions as a result of mixed materials.

### 3.1.2 Fuels

Diesel is a combustible liquid as classified by *AS 1940 – 2004: The Storage and Handling of Flammable and Combustible Liquids* (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 (ADG Code).

The key potential hazards associated with fuels required by the Project include diesel storage, spills and fires. Diesel has a flashpoint of approximately 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 damage soils and/or aquatic environments.

### 3.1.3 Water Treatment Agents

The Project will utilise a Water Treatment Plant (WTP) to treat mine water for reuse on site or discharge into Wallarah Creek. The following likely chemicals will be used in the water treatment process:

- Sodium Hypochlorite (NaOCl);
- Ammonium Hydroxide (NH<sub>4</sub>OH);
- Sodium Metabisulfite (SBS);
- Hydrochloric Acid (HCl);
- Antiscalant (Hypersperse MSI410);
- Sodium Hydroxide (NaOH);
- Antifoam (Foamtrol AF2290); and
- Specialty cleaning chemical for the brine concentrator.

These chemicals will be stored on site in Industrial Bulk Containers (IBCs) generally within infrastructures areas and each with a storage capacity of 1,000 L. Only one IBC for each chemical will be present on site at any given time. Therefore, the maximum quantity of each substance that will be stored on site is 1,000 L. The exception is hydrochloric acid, where up to 15,000 L may be stored on site.

The antifoam product, antiscalant and cleaning chemical for the brine concentrator are not classified as dangerous goods under the ADG Code.

These chemicals will be transported to the site approximately every three weeks. The chemicals will be safely contained in IBCs during transportation to site.



### 3.1.4 Other Hazardous Materials

Some other hazardous materials will also be utilised and stored within the workshop areas at the surface facilities. The Project will require the use of a number of hazardous chemicals including oil and degreaser. The oils used by the Project will consist of hydraulic oils and gear oils. These oils are not classified as dangerous under the ADG Code. However, oil is classified as a combustible liquid (Class C2) by AS 1940:2004. All hazardous materials will be managed in accordance with AS 1940:2004 and the relevant WACJV management plans and procedures.

The Project will also utilise solcenic fluid (Solcenic 801D) as a hydraulic fluid for longwall mining. Solcenic fluid is not classified as a dangerous good under the ADG Code.

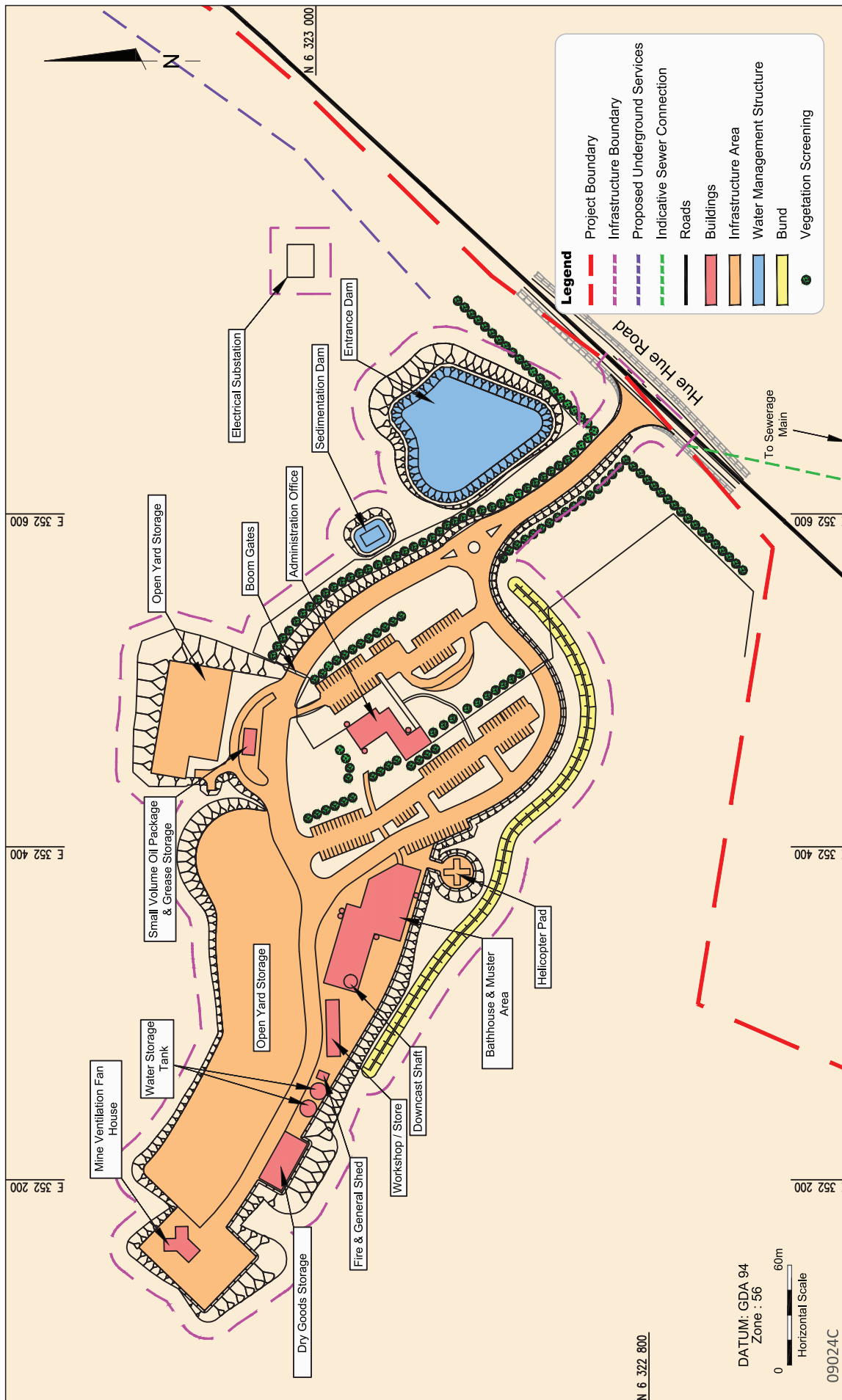
The greases and degreasers used by the Project are not classified as dangerous under the ADG Code.

## 3.2 POTENTIALLY HAZARDOUS ACTIVITIES

This PHA includes a detailed assessment of any potentially hazardous activities as summarised below, and is provided in full in **Appendix A**. In order to identify and assess risks associated with the Project, activities were divided into the following areas:

- Storage of hazardous materials on-site;
- Transportation of materials including on-site and off-site handling;
- Spill, leakage or runoff causing land contamination;
- Project operations; and
- Natural events (e.g. bushfire).

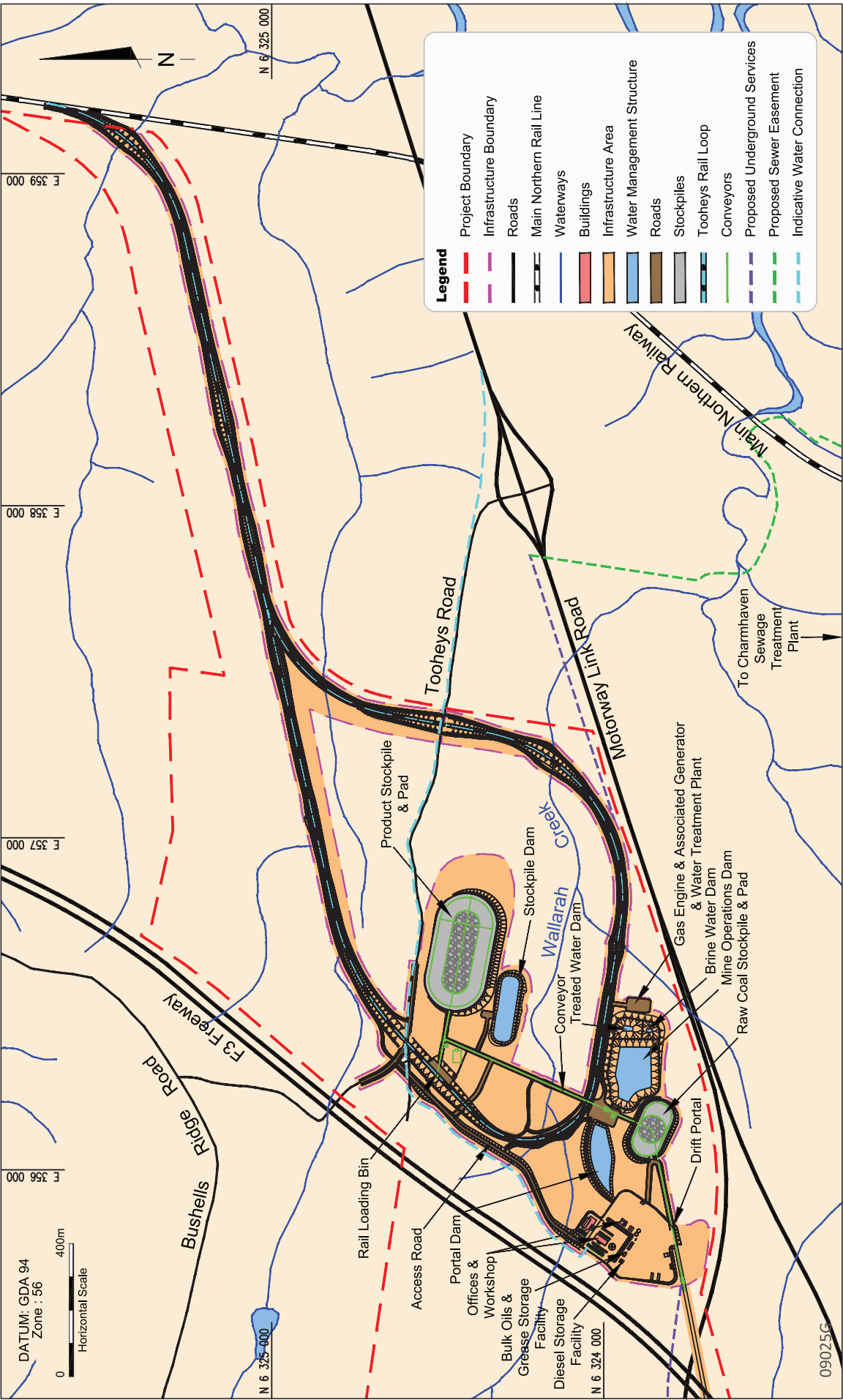
Potentially hazardous materials identified in this PHA are stored in a limited number of areas within the Tooheys Road Site and Buttonderry Site.



WALLARAH 2 COAL PROJECT

Conceptual Layout Butterydy Site

**FIGURE 3**



WALLARAH 2 COAL PROJECT

Conceptual Layout Tooheys Road Site

FIGURE 4

A description of each of the materials handling and bulk storage locations for existing operations and the Project is provided in the following sections. Key storage facilities for the Project include:

- Explosives and related materials storage facilities;
- Diesel storage facilities; and
- Other potentially hazardous materials storage.

Each location is shown on **Figure 3** and **Figure 4**.

### **3.2.1 Explosives Storage Facility**

As noted above, the preferred approach for the use of explosives for the Project will be to have these materials delivered to site for immediate use as required. However to ensure that an adequate storage facility is available, WACJV proposes to construct and maintain explosives storages for the Project which will be sited within the Tooheys Road Infrastructure area in strict accordance with the relevant regulatory requirements. This facility will have the capacity required to store a maximum of 10 kg of Powergel Permitted 3000 and a single 500 package of Carrick R detonators (or equivalent).

The products stored at these facilities will be stored and handled in accordance with AS 2187.2-2006 – *Explosives – Storage, Transport and Use*. Detonators will be stored in a secure, separate earth-bunded compound sited according to above standard. The entire explosives storage compound shall be fully fenced and locked from general access.

WACJV will develop and implement a management plan for the explosives storage facility as part of the 'Hazard Management Plan' to manage the operation of this area for the Project. Only appropriately qualified and licensed personnel, familiar with site procedures will access the area and handle explosive materials and explosive precursors.

### **3.2.2 Fuel Storage Facilities**

The diesel storage facilities proposed for the Project are shown on **Figure 4** and include a 55,000 L bunded diesel storage tank at the Tooheys Road Site.

WACJV will seek an 'Acknowledgement of Notification of Dangerous Goods on Premises' for this facility. All fuel storage areas will be constructed with bunding, in accordance with the relevant Australian Standards including (however not limited to) the NSW Occupational Health & Safety (OH&S) Regulations and AS1940-2004.

Small volumes of oils and greases may be stored in the workshop. Small volumes of diesel fuels oils and greases may also be held temporarily in an underground service trailer and self bunded Hazardous substance bins for maintenance purposes.

### 3.2.3 Storage of Other Hazardous Materials

Any hazardous materials required for the Project will be stored within infrastructure areas in accordance with relevant Australian Standards and Guidelines. Substances will be stored on-site in above ground facilities at the Buttonderry Site and Tooheys Road Site at a distance from any diesel or explosive storage areas to minimise any potential risks. These substances will be located in a bunded area in accordance with the NSW OH&S Regulations, which will minimise the risk and consequence should a fire or explosion occur and prevent any contamination of the surrounding environment.

Smaller quantities of other chemicals including paints, oils, solvents, glues and degreasers may be required for operational support and maintenance activities. These will be predominantly stored in the hazardous chemicals storage cabinet in the workshop at the Tooheys Road Site. No licence is required for the maximum storage volumes needed. The maximum total storage capacity of these materials includes:

- 20,000 L of storage for hydraulic and gear oil;
- 20,000 L of storage for solcenic fluid;
- 5,000 L mixing tank for solcenic fluid; and
- 1,000 kg bulk grease.

The workshop floor area will be bunded and drained to a dirty water sump and oily water separator system. The air compressor house will consist of a concrete ground slab, block wall construction, metal deck roof, all of which will be acoustically insulated. An oil containment and separation system will be provided for the compressors.

All storage buildings (flammable goods, bulk dry goods, etc) will consist of a prefabricated, steel frame, metal clad structure founded on a concrete slab. WACJV will develop a chemical management system to include a tracking database to assist in the recording and management of chemicals and a Material Safety Data Sheet (MSDS) for all chemicals used.

### 3.2.4 Transport of Hazardous Materials

All bulk materials will be transported to Project by a licensed contractor in accordance with the relevant contractor transport codes and standards. The vehicles used for the transport of hazardous substances will have appropriate signage displayed in accordance with the *Australian Code for the Transport of Dangerous Goods*, *Australian Code for the Transport of Explosives* and relevant NSW legislation.

### 3.2.5 Spills / Leakage and Contaminated Runoff

Any hazardous material releases will be managed in accordance with emergency response procedures to be developed by WACJV for the Project. These procedures will stipulate techniques and handling requirements that assist in preventing spills and leakages from occurring and ensure that prompt and effective clean-up practices are employed should any spills occur.

An emergency spill response procedure will also be developed for the Project, including appropriate training, implementation of best practice procedures and undertaking remediation measures if required.

### 3.2.6 Natural Events

Natural events such as floods and bushfires can also create hazardous conditions. Consideration of these natural hazards and their management has been included as part of this assessment (see **Appendix 1**).

The bushfire risk assessment has been undertaken in accordance with the *Guideline for Bush Fire Prone Land Mapping* (NSW Rural Fire Service, 2006) (Bushfire Guideline). A Bushfire Prone Area is defined as “an area that can support a bushfire or is likely to be subject to bushfire attack”. The Bushfire Guideline requires all vegetation to be classified into three groups:

- Vegetation Group 1 – Forest;
- Vegetation Group 2 – Woodlands, heaths and wetlands; and
- Vegetation Group 3 – Moist rainforests, shrubland, open woodlands, mallee and grasslands.

The vegetation groups are divided into two vegetation categories. Areas of Vegetation Groups 1 and 2 that are greater than 1 ha are categorised as Vegetation Category 1. Areas of Vegetation Group 3 that are greater than 1 ha are categorised as Vegetation Category 2.

Bushfire Prone Land mapping also includes buffer zones for the two vegetation categories. A 100 m vegetation buffer is applied around areas classified as Vegetation Category 1, whereas a 30 m buffer is applied to areas of Vegetation Category 2.

Mapping of Bushfire Prone Land in the Wyong area was completed by the Rural Fire Service in 2011. The majority of land within the Project Boundary has been classified as either Vegetation Category 1 or Vegetation Category 2. The distribution of bushfire prone land in the vicinity of the Project is shown in **Figure 5**.

The Tooheys Road Site is surrounded predominantly by Vegetation Category 1, with a small area of Vegetation Category 2 to the north. The Buttonderry Site is located on and surrounded by Vegetation Category 1 and Vegetation Buffer land. The Western Ventilation Shaft is located on and surrounded by Vegetation Category 1, with areas of Vegetation Category 2 to the south-east. The land to the north of the Western Ventilation Shaft is within the Jilliby Jilliby Creek floodplain, which is not bushfire prone land.



The Wyong State Forest is located within the south-western portion of the Project Boundary and the Jiliby State Conservation Area is located within the north-western portion of the Project Boundary, extending further north (**Figure 1**). Both areas pose a bushfire risk to the Project due to the presence of fuel sources, dense vegetation, leaf drop and tinder and current land use practices. However, Jiliby Jiliby Creek runs through the middle of the Project Boundary, providing a corridor-like barrier between the two primary bushfire risk areas and the surface facilities where hazardous materials are stored. This decreases the potential bushfire risk.

The Wyong Bush Fire Management Committee has prepared the *Bush Fire Management Plan* (WBFMC, 2011) for the Wyong area. This plan identifies community assets at risk from bushfire and sets out a program to reduce that risk to the identified assets. This management plan ascribes a risk rating to each of the developments described as an asset. The bushfire risk at the Tooheys Road and Buttonderry Sites has been assessed by considering the risk ratings for assets in the vicinity of these sites.

The Buttonderry Site is in close proximity to assets 124 and 432 identified in the *Bush Fire Management Plan*. Asset 124 has been deemed to be high risk and asset 432 has been deemed to be medium risk.

The Tooheys Road Site is close to assets 236 and 329. The levels of bushfire risk for these assets are high and medium respectively. Assuming that the bushfire risks determined for these assets are representative of bushfire risks near those locations, there is a medium to high bushfire risk at the two infrastructure sites for the Project. WACJV will consult closely with the Wyong Bushfire Management Committee prior to and during the construction period for advice and ongoing guidance.

The bushfire season in the Wyong regions occurs predominately during the hotter months from early October to late March. The prevailing weather conditions associated with localised coastal conditions including north-westerly winds accompanied by high daytime temperatures and low relative humidity.

Depending on factors such as temperature, available fuel loads and rainfall, the frequency and intensity of bushfires will vary. The main sources of bushfire ignition in the region are occasional dry lightning storms occurring during the bushfire season (WBFMC, 2011).

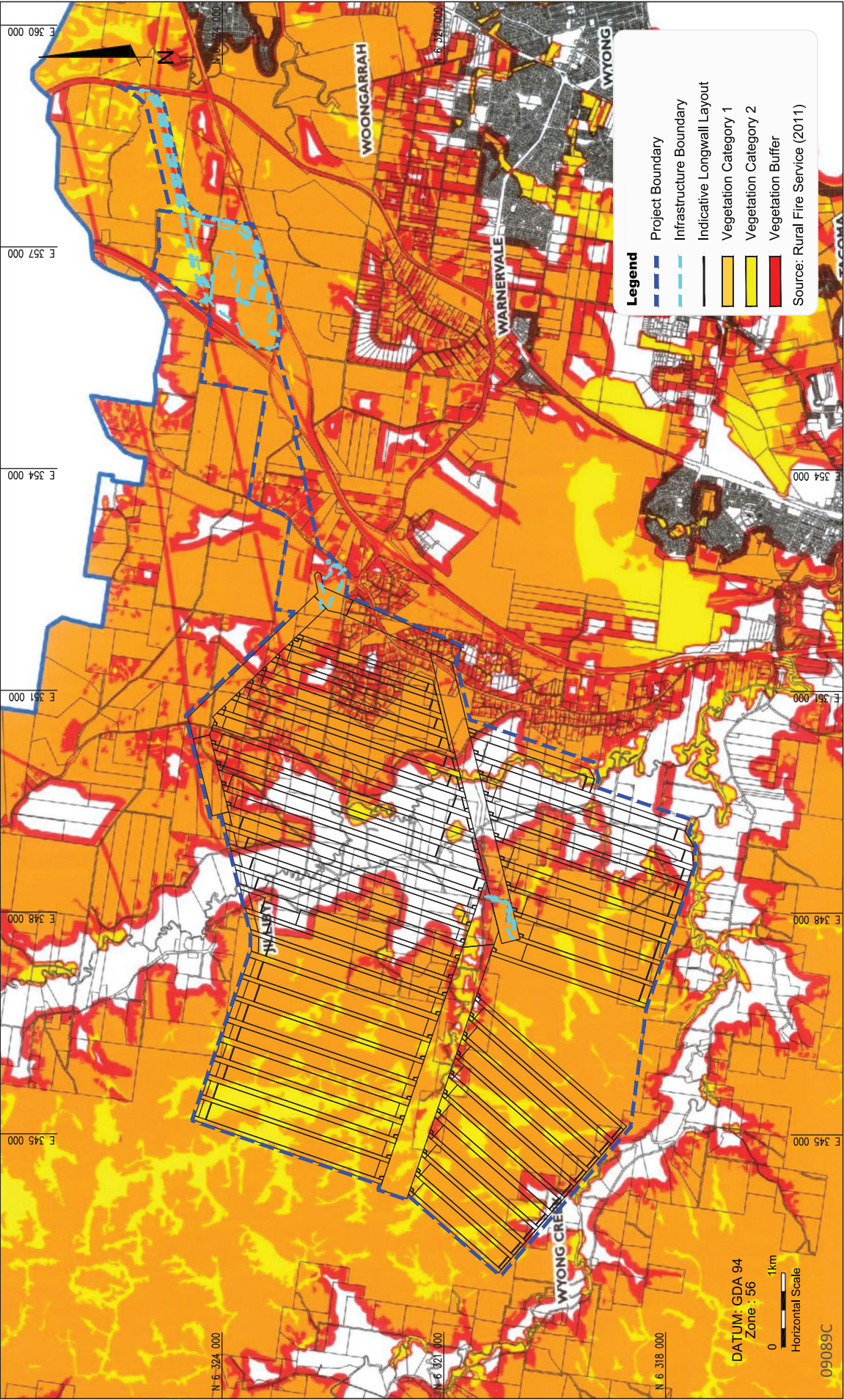
Infrastructure development is largely proposed in sparsely vegetated areas and has been designed to largely avoid densely vegetated areas, which would pose a higher bushfire risk. To address residual bushfire risk, during construction and operation of the Project, a combination of select activities, equipment and fuel sources which could lead to the ignition of a bushfire will be documented in the Bushfire Management Plan (BMP). Mitigation and management measures will be included in the BMP and implemented to minimise the risk of fires being induced by the Project.

A Bushfire Management Plan for the Project will be prepared in accordance with the *Rural Fires Act 1997* and *Coal Mine Health and Safety Act 2002*. Consultation will be undertaken with the Rural Fire Service, Wyong Shire Council, Forests NSW and OEH over the ongoing management of bushfire risks.

Bushfire risks will continue to be managed by the Wyong Bush Fire Management Committee. WACJV will continue to assist the Wyong Rural Fire Service by monitoring and reporting any fires, suspect behaviours and fuel load within the Project Boundary, particularly within the Wyong State Forest and Jilliby State Conservation Area.

All infrastructure areas will be equipped with appropriate fire control infrastructure, with fire fighting equipment at key points.





WALLARAH 2 COAL PROJECT

Bushfire Prone Land

FIGURE 5

## 4 RISK SCREENING

In accordance with the risk screening process prescribed by the SEPP 33 Guidelines, the hazardous materials used by the development have been classified using the Australian Dangerous Goods Code. The dangerous goods classes for the materials used on site and the quantities of each material are outlined in **Table 1**.

**Table 1**  
**Indicative Dangerous Goods Stored On Site**

Dangerous Good	Class	Volume	Quantity (kg)
Powergel Permitted 3000 (explosives)	1.1	N/A	10 kg
Carrick R Detonators	1.1	500 units	0.5 kg
Diesel Fuel	3PGIII	55,000 L	48,400 kg
Sodium Hypochlorite (NaOCl)	8PGIII	2,000 L	2,400 kg
Ammonium Hydroxide (NH <sub>4</sub> OH)	8PGIII	2,000 L	1,840 kg
Sodium Metabisulfite (Optireg 1020)	8PGIII	2,000 L	2,600 kg
Hydrochloric Acid (HCl)	8PGII	15,000 L	15,804 kg
Sodium Hydroxide (NaOH)	8PGII	2,000 L	2,660 kg

Additional, oils, greases, degreasers and solcenic fluid used on site are not classified as dangerous goods. The antiscalant, antifoam and cleaning products used in the Water Treatment Plant are also not classified as dangerous goods.

The quantities of each dangerous good's class was totalled and compared to the relevant screening thresholds as presented in **Table 2**.

**Table 2**  
**Risk Screening for Dangerous Goods Quantities**

Dangerous Goods Class	Total Quantity (kg)	Screening Threshold	Threshold Exceeded
1.1	10.5 kg	100 kg	No
3PGIII	48,400 kg	5,000 kg*	Yes
8PGII	18,464 kg	25,000 kg	No
8PGIII	6,840 kg	50,000 kg	No

\* The screening threshold of 5,000 kg is the threshold where the distance to the nearest neighbouring land use is 1 km. The Boral Montoro Quarry is situated approximately 1 km to the east of the Tooheys Road Site.

As shown in **Table 2**, the screening threshold is exceeded for dangerous goods class 3PGIII (i.e. diesel for the Project). The risk screening process has confirmed that the Project is a potentially hazard industry. Accordingly, the risk assessment in **Section 5** has been conservatively undertaken to satisfy the requirements of SEPP 33.

Since the Project is potentially hazardous due to the quantities of diesel stored on site, it is not necessary to further consider the quantities that are transported and the number of deliveries to site.



## 5 RISK ASSESSMENT

The requirements for a PHA are prescribed by Appendix 5 of the SEPP 33 Guidelines. The risk assessment component of the PHA can be undertaken qualitatively, semi-quantitatively or fully quantitatively, depending on the circumstances.

Appendix 5 of the SEPP 33 Guidelines states that a qualitative assessment is sufficient where the following conditions are satisfied:

- Screening and risk classification and prioritisation indicate that there are no major off site consequences and societal risk is negligible;
- The necessary technical and management safeguards are well understood and readily implemented; and
- Where the surrounding land uses are relatively non-sensitive.

The proposed storage and management safeguards will ensure that there are no major risks of off site consequences. All dangerous goods will be stored in facilities designed in accordance with the relevant standards. The explosives (when kept onsite) will be stored in accordance with AS 2187.2-2006 – *Explosives – Storage, Transport and Use*.

When kept at site, detonators will be stored in a secure, separate earth-bunded compound sited according to above standard.

Diesel fuel will be stored in a bunded storage tank designed in compliance with AS 1940 – 2004: *The Storage and Handling of Flammable and Combustible Liquids*. The dangerous goods used in the Water Treatment Plant will be contained within IBCs which are fit for the purpose of storing these corrosive substances. The Hydrochloric Acid used in the water treatment process will be stored in a fibreglass reinforced plastic vessel. This vessel will be manufactured to Australian Standards and will be certified by a qualified engineer.

Therefore, dangerous goods will be stored in accordance with established standards and in storages that are fit for purpose (e.g. IBCs). These technical and management safeguards are well established practices and are known to be effective.

All dangerous goods are stored at the Tooheys Road Site. The surrounding land uses in the immediate vicinity of the Tooheys Road Site are relatively non-sensitive. To the east of the site is the inactive Boral Montoro Quarry. The area to the north of the site is industrial land. There are some large rural properties to the north-west; however, these are segregated by the Tooheys Road Site by the F3 Freeway. Similarly, rural properties to the south of the site are segregated from the site by the Motorway Link Road. The land to the west is owned by WACJV and is currently used for grazing. There are no residential areas in close proximity to the Tooheys Road Site. **Figure 5** in the main volume of the EIS illustrates these land uses.

The conditions where a qualitative risk assessment is sufficient have been satisfied. 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 through a consideration of the various levels of consequences of an event should it occur and the likelihood of such an event occurring.

Predicted impact risk ratings associated with the Project are detailed in **Appendix A**, which details:

- A consequence analysis;
- The estimated likelihood of a potential hazard occurring;
- The consequences, particularly to the surrounding environment should a potential hazard occur; and
- The subsequent risk rating for each potential hazard identified specific to the Project.

### **5.1 CONSEQUENCE ANALYSIS**

The consequence criteria and descriptors were developed based on the WACJV Risk Assessment Matrix.

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.

The qualitative scale used to assess the severity of consequences is presented in **Table 3**.

**Table 3**  
**Qualitative Consequences Scale**

Severity Level	Consequences Types				
	Health & Safety	Natural Environment	Social/ Cultural Heritage	Community/ Government/ Reputation/Media	Legal & Regulatory
5	No medical treatment required or requiring first aid treatment at the most	Minor environmental effects (near the source, confined and quick to reverse)	Minor medium-term social impacts on local population. Mostly repairable	Minor, adverse local public or media attention or complaints	Minor legal issues, non-compliances and breaches or regulation. Low potential for impact
4	Objective but reversible disability requiring hospitalisation	Moderate, short-term effects on environment (near the source, reversible and confined)	On-going social issues. Permanent damage to items of cultural significance	Attention from media and/or heightened concern by local community. Criticism by NGOs	
3	Moderate irreversible disability or impairment (>30%) to one or more persons	Serious but confined medium term environmental effects near the source	On-going serious social issues. Significant damage to structures/items of cultural significance	Significant adverse national media/public/NGO attention	Serious breach of regulation with investigation or report to authority with prosecution and/or moderate fine possible
2	Single fatality and/or severe irreversible disability (>30%) to one or more persons	Very serious, long-term environmental impact that is widespread and unconfined, leaves major damage		Serious public or media outcry (international coverage)	Major breach of regulation. Major litigation. High potential for prosecution
1	Multiple fatalities, or significant irreversible effects to >50 persons			Significant prosecution and fines. Very serious litigation including class actions. Suspended or reduced operation	

## 5.2 LIKELIHOOD OF HAZARDOUS EVENT OCCURRING

The likelihood and risk acceptability criterion for potential hazardous events was developed based on the WACJV Risk Assessment Matrix. A qualitative scale of likelihood for potential hazardous events is provided below in **Table 4**.

**Table 4**  
**Qualitative Likelihood Scale**

Likelihood	Descriptor	Definition
A	Almost Certain	Occurs once a year or more frequently. Recurring event during the lifetime of the Project.
B	Likely	Typically occurs once every three years.
C	Possible	Typically occurs once every ten years
D	Unlikely	Typically occurs once every thirty years
E	Rare	Typically occurs once every 100 years

## 5.3 RISK ASSESSMENT CRITERIA

The level of risk for each hazardous activity identified was determined using the risk levels provided below by combining the consequence and likelihood of the event and identifying the level of risk associated with potential hazards identified in **Section 3**.

The final critical qualitative risk classification was determined using the WACJV Risk Matrix as presented in **Table 5**.

**Table 5**  
**WACJV Risk Matrix**

Likelihood	Consequence				
	1	2	3	4	5
A	Extreme – 1	Extreme – 2	High – 6	High – 10	Medium – 15
B	Extreme – 3	Extreme – 4	High – 9	Medium – 14	Medium – 19
C	Extreme – 5	High – 8	High – 13	Medium – 18	Low – 22
D	High – 7	High – 12	Medium – 17	Low – 21	Low – 24
E	High – 11	Medium – 16	Medium – 20	Low – 23	Low – 25

## 6 RISK ASSESSMENT ANALYSIS

The risk assessment presented in **Appendix A** presents a qualitative risk assessment of the hazards associated with the Project. The risk assessment identified a need for the following preventative measures:

- Personnel entering the explosives storage facility must be licensed and authorised to do so. Personnel will also be trained in relevant procedures for the loading, transport and preparation of hazardous substances. No unauthorised persons shall enter the explosives storage areas.
- At no time will the use of unapproved substances be permitted within the Project site. All chemicals will be assessed according to their Material Safety Data Sheets, as supplied by the Manufacturer/Supplier and the National Occupational Health and Safety Commission (NOHSC) criteria prior to use. In addition, all chemicals introduced to site will require approval prior to use by the Health & Safety Specialist (or contemporary Manager) for use in a specific area;
- All storage facilities will satisfy the following requirements:
  - Facilities will be designed, constructed, inspected and maintained in accordance with the requirements of the *Work Health and Safety Act 2012*, *Explosives Act 2003* and the relevant Australian Standards;
  - Dangerous chemicals used in the Water Treatment Plant will be stored in IBCs that are fit for purpose;
  - All facilities will be secure and protected from damage and theft;
  - Designs will ensure easy access for fire fighting should a fire occur;
  - Where possible, any chemical containers and storage facilities will be designed to minimise any physical damage due to temperature extremes, moisture, corrosive mists or vapours and vehicles; and
  - All substances shall be stored in the areas or facilities provided.

WACJV will develop and maintain relevant plans and procedures to ensure that hazards and risks that may be associated with the Project are appropriately managed. A Hazard Management Plan will be developed in consultation with the relevant regulators.

Explosives will be utilised in accordance with site procedures and the requirements of *AS/NZS 2187 – 1998: Explosives – Storage, Transport and Use* (Standards Australia, 1998), the *Explosive Act 2003*, the *Explosive Regulations 2005*, the *Coal Mines Health and Safety Act 2002*, the *Coal Mines Health & Safety Regulations 2006* and other relevant codes.

## 7 CONCLUSION

The qualitative risk assessment presented in **Appendix A** identifies potential hazards associated with the Project and ensures that adequate risk mitigation and response measures will be implemented.

This risk assessment has confirmed that the Project will not impose an unacceptable level of risk, with appropriate management and is therefore not a hazardous or offensive development.

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for  
**HANSEN BAILEY**



Andrew Wu  
*Environmental Engineer*



Dianne Munro  
*Principal*



## 8 REFERENCES

- Australian Explosive Industry Safety Group (1999), *Code of Good Practice – Precursors for Explosives*, Edition 1 – 1999. Prepared by Australian Explosives Manufactures Safety Committee.
- NSW Department of Planning (2011a) *Hazardous and Offensive Development Application Guidelines – Applying SEPP 33*
- NSW Department of Planning (2011a), *Hazardous Industry Planning Advisory Paper No 3 – Risk Assessment*
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- NSW Rural Fire Service (2006), *Bushfire Prone Land Mapping 2006*
- NSW Rural Fire Service (2011), *Wyong Shire LGA – Bush Fire Prone Land Map*
- National Transport Commission (2011), *Australian Code for the Transport of Dangerous Goods by Road and Rail*. Seventh Edition.
- Standards Australia (1998), *AS 2187.1 - 1998: Explosives – Storage, Transport and Use – Storage*
- Standards Australia (2004), *AS 1940 – 2004: The Storage and Handling of Flammable and Combustible Liquids*
- Standards Australia (2006), *AS 2187.2-2006 – Explosives – Storage, Transport and Use*
- Wyong Bush Fire Management Committee (2011), *Bush Fire Risk Management Plan*

## **APPENDIX A**

### ***Project Hazards & Risk Assessment Summary***

**Table A1**  
**Project Hazards & Risk Assessment Summary**

Operational Activity / Hazard	Incident Type	Scenario	Proposed Management Measures	Likelihood	Consequence	Risk
Transport to Site	Spill	Vehicle collision, poor maintenance, or human error leading to off-site impacts	<ul style="list-style-type: none"> <li>Approved contractors to transport and operate in accordance with Australian Codes &amp; Standards;</li> <li>Licensed drivers in control of vehicles.</li> </ul>	D	3	Medium
	Fire	Material ignited following spill	<ul style="list-style-type: none"> <li>Contractors having completed competency based site induction which includes <u>mine transport rules</u>;</li> <li>Spill response kit stored in transport vehicles;</li> <li>Fire fighting equipment to be stored in vehicle;</li> <li>Transport vehicles to have communication (e.g. mobile, radio etc.).</li> </ul>	D	2	High
	Explosion			D	2	High
	Theft	Theft of dangerous goods during transport, leading to off-site impacts	<ul style="list-style-type: none"> <li>Transportation in accordance with the <i>Australian Code for Transport of Dangerous Goods and Explosives</i>;</li> <li>Follow specified route to the Project site.</li> </ul>	D	1	High

Operational Activity / Hazard	Incident Type	Scenario	Proposed Management Measures	Likelihood	Consequence	Risk
Delivery to Site (filling storages)	Spill	Vehicle collision, overflow of storages, leaking pipeline, human error, leaking storage container	<ul style="list-style-type: none"> <li>Storage facility, containers, bunding, drainage and pipelines designed in accordance with Australian Standards;</li> </ul>	C	3	High
	Fire	Material catching on fire, with possible spread to other hazardous materials	<ul style="list-style-type: none"> <li>All personnel having completed competency based site induction which includes <u>mine transport rules</u>;</li> </ul>	D	2	High
	Explosion	Explosion as a result of mixed materials	<ul style="list-style-type: none"> <li>Loading/Unloading procedures;</li> <li>Approved contractors to fill storages following operating procedures;</li> <li>Contractor 'sign-on' prior to entering storage facilities;</li> <li>Regular inspections of storages daily and before delivery.</li> </ul>	D	2	High
On-Site Storage (Explosives Facility, Water Treatment Plant agents, Fuel and Workshop Storages)	Leak/Spill	Failed storage tank / facility / pipeline	<ul style="list-style-type: none"> <li>Storage facility, containers, bunding, drainage and pipelines designed in accordance with Australian Standards;</li> <li>Operating and response procedures followed;</li> <li>Regular inspections and maintenance works.</li> </ul>	D	3	Medium

Operational Activity / Hazard	Incident Type	Scenario	Proposed Management Measures	Likelihood	Consequence	Risk
	Theft	Unauthorised personnel removing product from facility, which could lead to off-site impact	<ul style="list-style-type: none"> <li>Explosives Facility designed for compliance with NSW legislation;</li> <li>Explosives storages to be securely fenced.</li> </ul>	D	1	High
	Fire	Flammable or combustible materials ignited causing a fire which has potential to spread	<ul style="list-style-type: none"> <li>Storage facility, containers, bunding, drainage and pipelines designed in accordance with Australian Standards;</li> <li>All personnel having completed competency based site induction which includes <u>emergency response</u></li> <li>Regular inspections of storages;</li> <li>Maintenance activities;</li> <li>Fire fighting equipment available on site and at storage locations;</li> <li>All spillage cleaned up following operating and response procedures; and</li> <li>Emergency response procedures in place.</li> </ul>	D	2	High
	Explosion	Possible explosion if fire spreads		D	2	High

Operational Activity / Hazard	Incident Type	Scenario	Proposed Management Measures	Likelihood	Consequence	Risk
General Project Operations	Spill	Vehicle collision, poor maintenance, procedures absent	<ul style="list-style-type: none"> <li>Storage facility, containers, bunding, drainage and pipelines designed in accordance with Australian Standards;</li> <li>All personnel having completed competency based site induction which includes <u>emergency response</u></li> <li>Daily inspections of facilities;</li> <li>Maintenance works as required;</li> <li>Operating procedures followed for spill response.</li> </ul>	B	3	High
	Fire	Flammable or combustible materials ignited causing a fire, which has potential to spread	<ul style="list-style-type: none"> <li>Storage facility, containers, bunding, drainage and pipelines designed in accordance with Australian Standards;</li> <li>Contractors having completed competency based site induction which includes <u>emergency response</u></li> <li>Regular inspections of storages;</li> <li>Maintenance works as required;</li> <li>Fire fighting equipment available on site;</li> <li>Spill response and clean-up procedures; and</li> <li>Emergency response procedure in place.</li> </ul>	D	2	High
	Explosion	Possible explosion if fire spreads		D	1	High

Operational Activity / Hazard	Incident Type	Scenario	Proposed Management Measures	Likelihood	Consequence	Risk
Natural Events	Bushfire	Bushfire spreading to operational areas and wider area	<ul style="list-style-type: none"> <li>WACJV Bushfire Management Plan and employee training;</li> <li>All Personnel having completed competency based site induction which includes <u>emergency response</u></li> <li>Slashing grass around storage areas;</li> <li>Maintaining fire breaks around surface facilities; and</li> <li>Communications with the NSW Rural Fire Service.</li> </ul>	C	4	Medium
	Flooding	Flooding of hazardous materials storage areas	<ul style="list-style-type: none"> <li>Storage facility design in accordance with Australian Standards;</li> <li>Storage facility location outside of 1:100 year flood limits;</li> <li>WACJV Surface Water Management Plan.</li> </ul>	D	2	Medium