APPENDIX S

Preliminary Hazard Analysis

COALPAC CONSOLIDATION PROJECT

PRELIMINARY HAZARD ANALYSIS

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For

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PRELIMINARY HAZARD ANALYSIS

for

Coalpac Pty Limited

1 OVERVIEW

1.1 INTRODUCTION

Coalpac Pty Ltd owns and operates Invincible Colliery and Cullen Valley Mine which are located adjacent to the Castlereagh Highway, approximately 25 km north-west of Lithgow, NSW, proximate to the township of Cullen Bullen (see **Figure 1**). Coal is extracted from the Illawarra Coal Measures at both operations and product is supplied to the domestic coal market by truck, with the adjacent Mount Piper Power Station (MPPS) the primary destination.

Coalpac Pty Ltd now seeks a contemporary Project Approval under Part 3A of the EP&A Act to consolidate and extend the coal mining operations and management of the Invincible Colliery and Cullen Valley Mine sites under a single planning approval (the Project). This application is supported by the *Coalpac Consolidation Project Environmental Assessment* to which this Preliminary Hazard Analysis (PHA) applies.

The Project is generally comprised of the following:

- Consolidation and extension of the existing Cullen Valley Mine and Invincible Colliery operations to produce up to a total of 3.5 Mtpa of product coal, including:
    - The continuation of mining operations at Cullen Valley Mine (the area west of the Castlereagh Highway) via both open cut and highwall mining methods to access an additional resource of approximately 40.1 Mt ROM; and
    - The continuation of mining operations at Invincible Colliery (including an extension north into the East Tyldesley area) via open cut and highwall mining methods to access an additional resource of approximately 68.4 Mt ROM;
- Continuation of coal supply to the local MPPS via a dedicated coal conveyor over the Castlereagh Highway (to be constructed), and emergency supply to MPPS (via road), with flexibility for supply to additional domestic destinations and Port Kembla (via rail) for export;
- Continued used of and upgrades to existing Invincible Colliery Coal Preparation Plant, administration and other infrastructure (including hazardous goods storage areas);
- Construction and operation of additional offices at Cullen Valley Mine;
- Construction and use of the East Tyldesley Coal Preparation Plant (incorporating the previously approved CDP at Cullen Valley Mine);

- Construction and operation of a bridge and haul road across the Wallerawang - Gwabegar Railway Line to permit access to mine the previously approved Hillcroft resource;
- The extraction of the Marangaroo Sandstone horizon from immediately below the Lithgow Coal Seam in the Northern coal mining area of Cullen Valley Mine. This material will be trucked to an onsite crushing/screening station prior to sale into the Sydney (and surrounds) industrial sand market;
- Construction of a rail siding and associated infrastructure to permit transport of coal and sand products;
- Integration of water management infrastructure on both sites into a single system; and
- Integration of the management of mine rehabilitation and conceptual final landform outcomes for Cullen Valley Mine and Invincible Colliery.

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

1.2 BACKGROUND

Coalpac maintains compliance with its 'Licence to Store' (formerly termed Dangerous Goods Licence) 07-100153-004 issued by WorkCover NSW under the Occupational Health and Safety Act 2000 (OH&S Act). The Licence to Store is held for the explosives storage facility and the explosive precursor storage facility located at Cullen Valley Mine (see **Section 3.1.1**).

It is not proposed to materially change any locations, change types of materials stored, or increase quantities to that currently held on site, due to the operation of the Project.

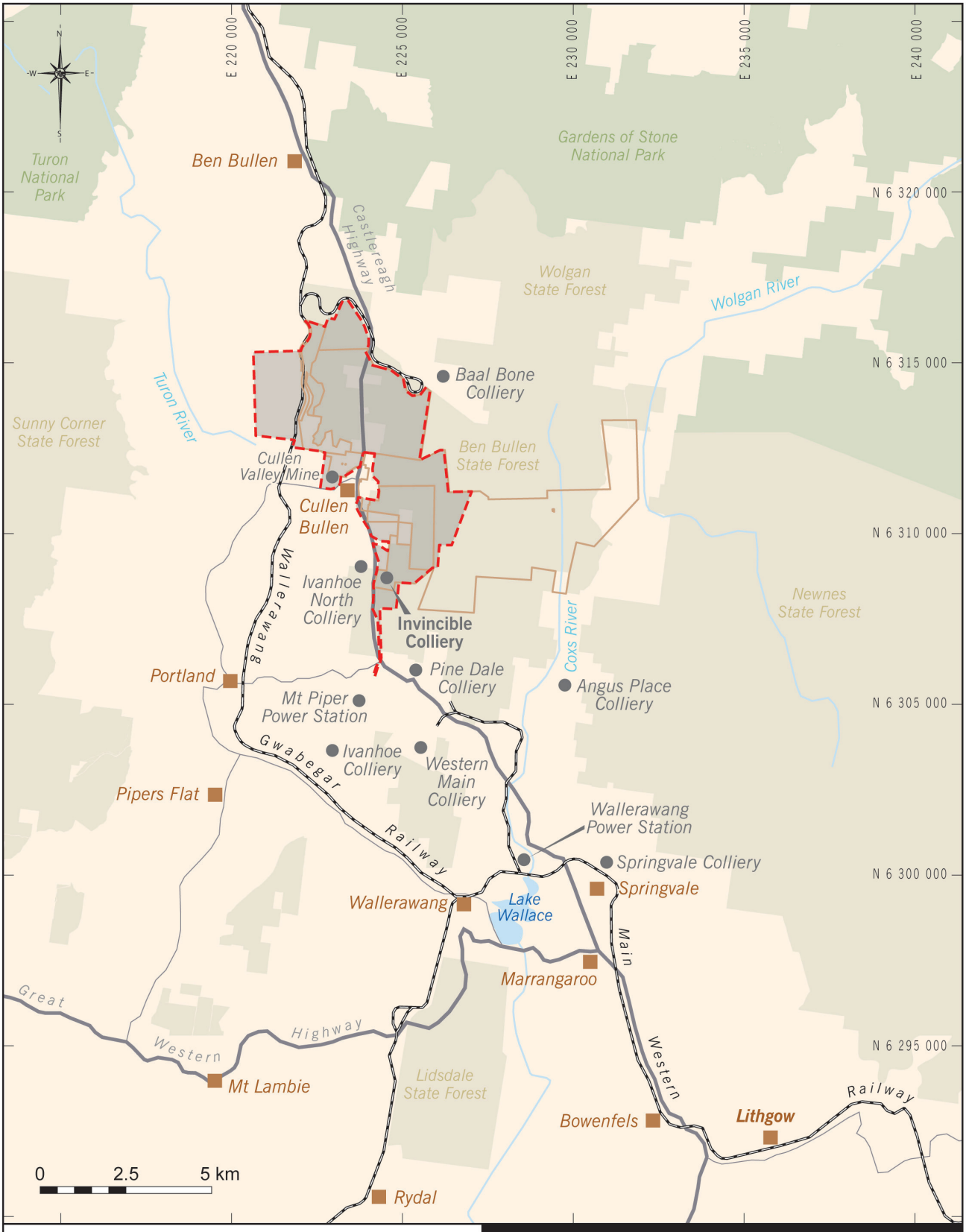
Coalpac also operates under separate Environmental Protection Licences (EPL) 10341 and 1095 issued under the *Protection of the Environment Operations Act 1997* (POEO Act) for Cullen Valley Mine and Invincible Colliery, respectively.

1.3 DOCUMENT PURPOSE

This PHA has been prepared in accordance with *SEPP 33 – Hazardous and Offensive Development Application Guidelines* (DUAP 1994) (SEPP 33 Guidelines), and the *Hazardous Industry Planning Advisory Paper No. 6 – Hazard Analysis* (HIPAP No. 6) (NSW Department of Planning (DoP) 2011b). The *Hazardous Industry Planning Advisory Paper No 4 – Risk Criteria for Land Use Planning* (HIPAP No. 4) was also considered throughout the preparation of this document (DoP 2011a).

The specific objectives of this PHA were to:

- Identify the relevant explosive precursor, explosives, dangerous goods or hazardous activities that may relate to the Project;
- Assess the significance of each hazard in terms of its potential off-site impact;
- Quantify where appropriate and assess the off-site levels of risk due to the Project hazards and operations; and
- Provide a clear analysis in line with the requirements of the HIPAP No. 6 (DoP 2011b).



Project Boundary

Coalpac Mining Authorities

HansenBailey

Coalpac Pty Ltd

COALPAC CONSOLIDATION PROJECT

Regional Locality

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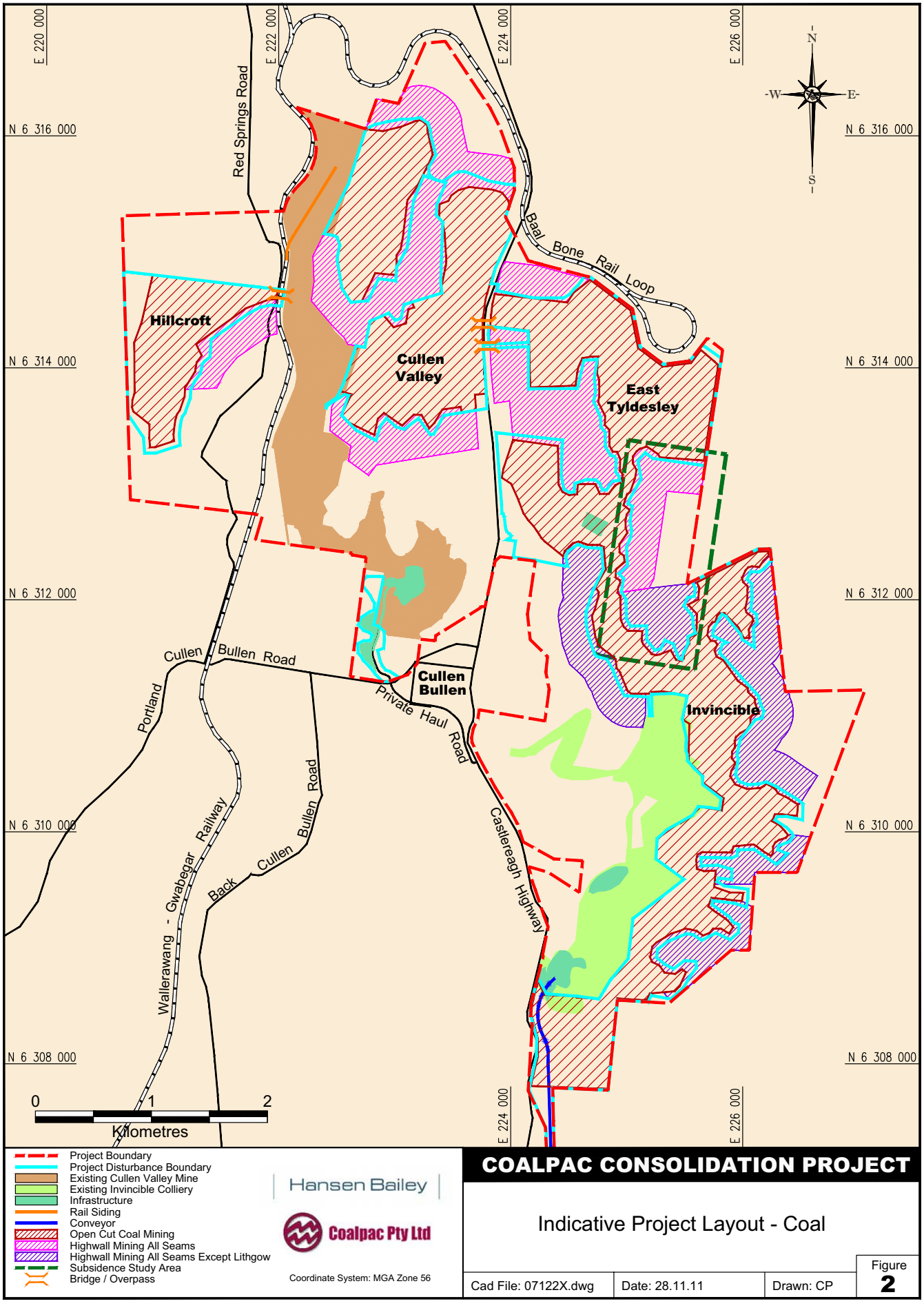
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Red Springs Road
Beal Bone Rail Loop
Hillcroft
Cullen Valley
East Tyldesley
Cullen Bullen
Invincible
Cullen Bullen Road
Portland
Private Haul Road
Castlereagh Highway
Back Cullen Bullen Road
Wallerawang - Gwabegar Railway
0
1
2
Kilometres
Project Boundary
Project Disturbance Boundary
Existing Cullen Valley Mine
Existing Invincible Colliery
Infrastructure
Rail Siding
Conveyor
Open Cut Coal Mining
Highwall Mining All Seams
Highwall Mining All Seams Except Lithgow
Subsidence Study Area
Bridge / Overpass
Hansen Bailey
Coalpac Pty Ltd
Coordinate System: MGA Zone 56
COALPAC CONSOLIDATION PROJECT
Indicative Project Layout - Coal
Cad File: 07122X.dwg
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Figure 2

2 METHODOLOGY

The PHA requires the key components of the Project are reviewed against the SEPP 33 Guidelines and the HIPAP No. 6 (DoP 2011b).

The methodology applied as per HIPAP Guidelines included:

1. Identification of potentially hazardous materials 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 for the Project and repeat the assessment process.

3 POTENTIAL HAZARD IDENTIFICATION

3.1 POTENTIALLY HAZARDOUS MATERIALS

Coalpac holds a number of licences and approvals for the management of hazardous materials. Compliance is maintained with its Licence to Store 07-100153-004 issued by WorkCover NSW under the OH&S Act. This is held for the explosive precursor and explosives storage facilities located at Cullen Valley Mine (see **Section 3.1.1** below). Coalpac also currently operates under separate EPL 10341 and 1095 issued under the POEO Act for Cullen Valley Mine and Invincible Colliery, respectively.

Potentially hazardous materials identified in this PHA are stored in a number of areas within the Project Boundary.

A description of each of the bulk storage locations for existing operations and the Project is provided below and includes:

- Explosives Storage Facility;
- Explosive Precursor Storage Facility:
- Diesel Storage Facilities; and
- Other Potentially Hazardous Materials Storage.

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

3.1.1 Explosives Storage Facility

Coalpac holds a Licence to Store explosives materials (07-100153-004) for the existing explosive precursor storage facility and explosives storage facility located at Cullen Valley Mine. These facilities will continue to be used as the sole storage location for explosive precursors and explosives required for the Project. Under the Licence to Store, these facilities are approved to store the following materials:

- Up to 2 tonnes of explosives (of Class: 1.1D);
- Up to 7,000 units of explosives (of Class 1.1B); and
- Up to 155 tonnes of oxidising substances (of Class 5.1).

The products stored at these facilities are stored and handled in accordance with *AS 2187.1 – 1998: Explosives – Storage, Transport and Use – Storage*, AEISG *Code of Practice – Precursors for Explosives* (1999) and several management plans prepared by the blasting contractor (presently Downer EDI). These include the Health & Safety Management Plan, Emergency Management Plan and Security Management Plan (current versions prepared by Downer EDI).

These management plans will continue to be utilised and updated regularly to manage the operation of this facility for the Project, with only appropriately qualified and licensed contract personnel, familiar with site procedures to access the area and handle explosive materials and explosive precursors.

The explosives storage facility is securely fenced and enclosed by an earthen safety bund. The precursor storage facility is also securely fenced. The nearest residential dwelling is located at a distance of 544 m from the facility, with the closest dwelling in Cullen Bullen township located approximately 600 m away.

All bulk materials will continue to be transported to the precursor facility in semi-trailers by a licensed contractor in accordance with the relevant contractor transport and site operation procedures (currently Downer EDI 2009b). Explosive material will be transported to the explosive storage facility in accordance with the relevant transport codes and standards.

The vehicles used for the transport of hazardous substances will continue to 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.

Deliveries to the Project are expected to occur up to three times per week.

3.1.2 Diesel Storage Facilities

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 ADG Code.

Diesel has a flashpoint of around 61.5ºC and has the potential 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 environment.

The main diesel storage facilities that will be required for the Project are shown on **Figure 3** and will continue to include:

- A 75,000 Litre (L) bunded diesel storage tank within the Cullen Valley Mine infrastructure area;
- A 10,000 L bunded diesel storage tank approved for the explosives storage facility at Cullen Valley Mine;
- A 40,000 L underground diesel storage tank located near the existing Invincible Colliery infrastructure area;
- A 75,000 L bunded diesel storage tank located near the Invincible Colliery infrastructure area;

- Up to 12 oil storage pods at the infrastructure and workshop areas of Cullen Valley Mine and Invincible Colliery, which will continue to be stored and transported within self-bunded containers; and
- Up to four self-bunded diesel storage tanks of 75,000 L capacity will be used for the Project. One of these storages will be used in each of the four mining areas of Hillcroft, Cullen Valley, East Tyldesley and Invincible proposed for the Project to support mining operations. These storages shall be periodically relocated as open cut operations in each area progress during the life of the Project.

Small volumes of petrol will also be required for some site maintenance equipment (i.e. mowers, etc) and in workshop areas.

3.1.3 Other Hazardous Materials Storage

Some other hazardous materials will also be stored within the workshop areas at Cullen Valley Mine, Invincible Colliery and the proposed ETCPP. These products will be held in accordance with relevant Australian Standards and Guidelines. The volumes of these products to be stored will remain below the thresholds for the purposes of this assessment.

A Chemwatch system (or equivalent) is used by Coalpac for the Project to assist in chemical and hazardous materials management. This system is a chemical management database that is used to provide an up to date register of MSDS for all chemicals used on-site and information on environmental hazards and management measures required for the appropriate use of each.

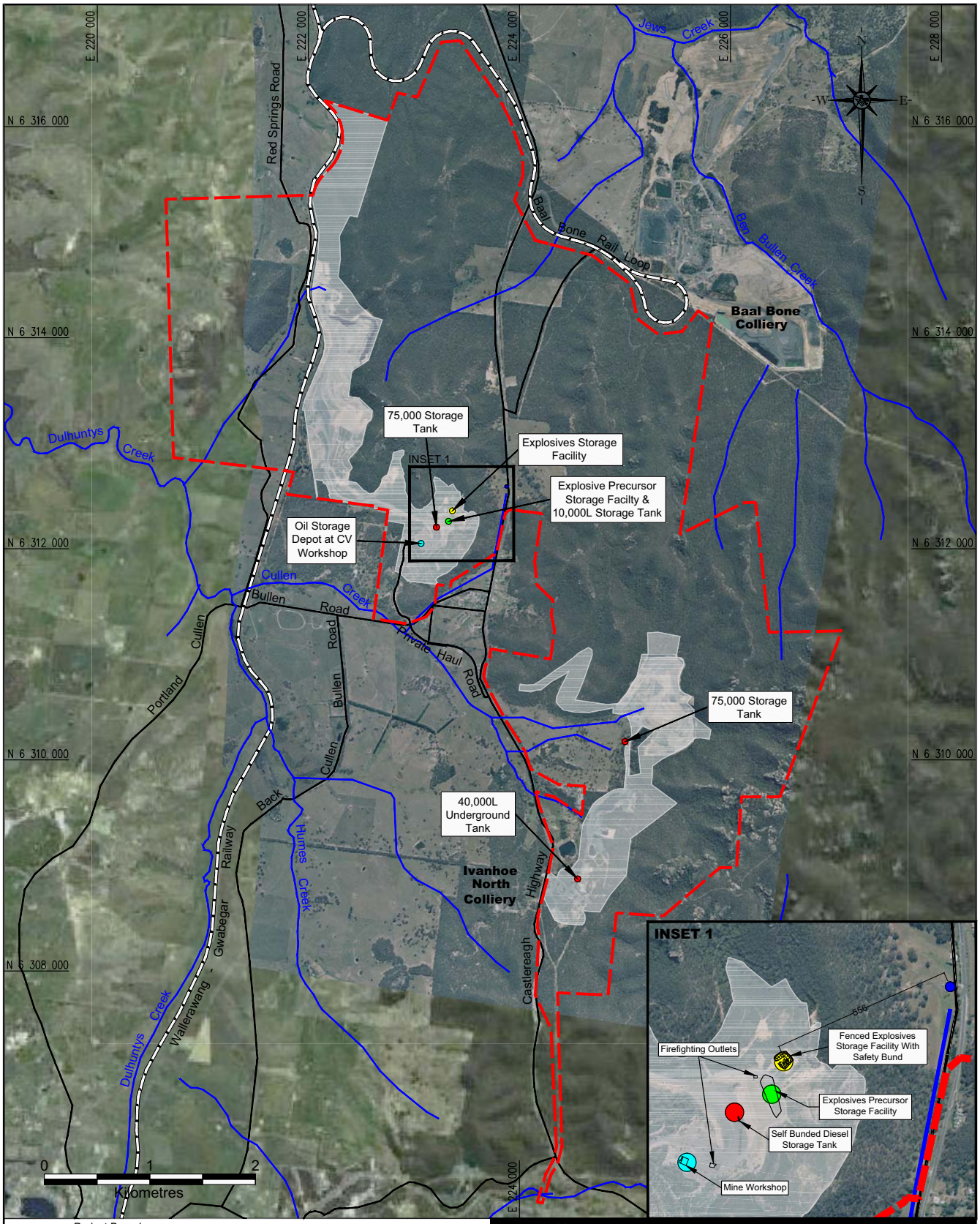
The blast contractor (currently Downer EDI) is also required to have appropriate MSDS for all products supplied and used by them on site. Contractor management plans must also include measures for the transport, storage and use of the relevant hazardous materials supplied by them.

3.2 HAZARDS

A hazard identification summary table is provided in **Appendix A** of this report. This summary table identifies the potential off-site hazards identified for the Project and levels of risk associated with these hazards.

In order to identify and assess risks associated with the Project, activities were subdivided into the following areas:

- Transportation to the Project;
- Loading storage facilities on-site;
- Storage of goods on-site;
- Re-loading and transportation of goods within the Project site; and
- Project operations.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Red Springs Road
Jews Creek
Baal Bone Rail Loop
Bee Bullen Creek
Baal Bone Colliery
75,000 Storage Tank
INSET 1
Explosives Storage Facility
Explosive Precursor Storage Facilty & 10,000L Storage Tank
Oil Storage Depot at CV Workshop
Dulhuntys Creek
Cullen Creek
Bullen Road
Private Haul Road
Portland
Cullen
Bullen
Back
Humes Creek
Railway
Gwabegar
Wallerawang
Ivanhoe North Colliery
40,000L Underground Tank
Highway
Castlereagh
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Kilometres
INSET 1
556
Fenced Explosives Storage Facility With Safety Bund
Firefighting Outlets
Explosives Precursor Storage Facility
Self Bunded Diesel Storage Tank
Mine Workshop
Project Boundary
Creeks
Approved Coalpac Operations
Diesel Storage Location
Explosives Precursor Storage Facility
Explosives Storage Facility
Oil Storage Depot
Hansen Bailey
Coalpac Pty Ltd
Coordinate System: MGA Zone 56
Source: AGE (2011), Coalpac (2011)
COALPAC CONSOLIDATION PROJECT
Hazardous Material Storage
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Figure 3

3.3 CONSEQUENCE ANALYSIS

The potential hazards and risks identified during the hazard identification process for the Project were assessed according to qualitative risk assessment criteria. This is achieved through 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.

A qualitative scale of consequences for potential hazardous events is provided below in **Table 1**. The likelihood and risk acceptability criterion for potential hazardous events was developed considering HIPAP No. 6 and Coalpac's risk assessment matrix. A qualitative scale of likelihood for potential hazardous events is provided below in **Table 2**.

Table 1
Qualitative Consequence Scale

Descriptor	Definition
Negligible	Insignificant impact. No injury, minimal financial loss
Minor	Minor effect that are easily repaired. First-aid treatment required, release contained on-site, medium financial loss
Moderate	Some significant impact. Medical treatment required, release contained on-site with outside assistance, high financial loss.
Major	Extensive injuries, loss of operation capability, off-site release with no detrimental effects, major financial loss.
Severe	Fatality, offsite release with significant effect, severe financial loss

Table 2
Qualitative Likelihood Scale

Descriptor	Definition
Certain	Event may occur once every 10 years.
Probable	Event may occur once every 100 years.
Possible	Event may occur once every 1,000 years.
Remote	Event may occur once every 10,000 years.
Improbable	May occur in exceptional circumstances. Once every 100,000 years.

3.4 ESTIMATION OF THE LIKELIHOOD OF HAZARDOUS EVENTS

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

The levels of risk presented below as rated by the Coalpac Risk Matrix, include the following:

- Low Risk – manage by routine procedures, implementing corrective action where practicable;
- Moderate Risk – Manage by corrective action and specific monitoring or response mechanism, with management responsibilities specified;
- Significant Risk – Senior management attention required. Corrective action needed;
- High Risk – Senior management attention required. Action plans and responsibility required to eliminate or reduce risk to lower level through introduction of additional risk controls; and
- Extreme Risk – As per the High Risk ranking category, however immediate action to reduce risk level is required.

Table 3
Coalpac Risk Matrix

Likelihood	Rating				
	Insignificance	**Minor**	**Moderate**	**Major**	**Catastrophic**
Certain	Significant	High	High	Extreme	Extreme
Probable	Moderate	Significant	High	Extreme	Extreme
Possible	Low	Moderate	Significant	High	High
Remote	Low	Low	Moderate	Significant	Significant
Improbable	Low	Low	Low	Moderate	Significant

4 RISK ASSESSMENT ANALYSIS

The risk assessment presented in **Appendix A** presents a qualitative risk assessment of the hazards associated with the Project. These will continue to be managed in accordance with existing management measures and procedures in place for existing Coalpac operations by Coalpac staff, contractors and the specific management plans for the Cullen Valley Mine explosives storage and explosives precursor storage facilities.

The existing explosives precursor and explosives storage facilities are located 544 m from the closest private residence. These facilities have been designed in accordance with AS 2187.1-1998 *Explosives – Storage, Transport and Use – Storage* and the AEISG *Code of Practice - Precursors*.

The risk assessment identified a need for the following preventative measures:

- Personnel entering the explosive precursor and explosives storage facilities will be authorised to do so and trained in relevant procedures for the loading, transport and preparation of hazardous substances. Any visitors entering this area must be site inducted and will need to 'sign on';
- A review of Coalpac Waste Management Plans and management procedures for infrastructure and workshop areas is required to minimise the chance of a hazardous incident occurring for the Project as a result of operations in these areas; and
- An Emergency Response Plan prepared by the explosive supplier for the existing explosives and precursor storage facilities will be put in place for the Project and reviewed on at least a five yearly basis.

As noted in **Section 3**, Coalpac will update the relevant management plans in place for existing operations to manage other hazards and risks associated with the Project. In particular, this will include revising the Waste Management Plans and the Coalpac Environmental Management Strategy to reflect the hazards and risks that would be associated with the Project.

The diesel storage tanks will continue to be refilled by a fully licensed contractor, who is inducted and fully familiarised with procedures on refilling the system.

Explosives will continue to 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* (CMH&S), the *CMH&S Regulations 2006* and other relevant codes.

5 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.

* * *

for
HANSEN BAILEY

Dorian Walsh
Environmental Scientist

Dianne Munro
Principal

6 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 DoP (2011a), *Hazardous Industry Planning Advisory Paper No 4 – Risk Criteria for Land Use Planning.*
- NSW DoP (2011b), *Hazardous Industry Planning Advisory Paper No. 6 – Hazard Analysis*.
- Downer EDI (2009a), *Emergency Plan for Downer EDI Mining Blasting Services in the Lithgow Region*. Prepared by Downer Blasting Services.
- Downer EDI (2009b), *Health & Safety Management Plan for Downer EDI Mining Employees in the Lithgow Region*. Prepared by Downer Blasting Services.
- DUAP (1994), *SEPP 33 – Hazardous and Offensive Development Application Guidelines.*
- National Transport Commission (2011), *Australian Code for the Transport of Dangerous Goods by Road and Rail*. Seventh Edition.

APPENDIX A

Project 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	• Approved contractors to transport and operate in accordance with Australian Codes & Standards; • Spill kit stored in transport vehicles; • Fire fighting equipment to be stored in vehicle; • Transport vehicles to have communication (e.g. mobile, radio etc).	Probable	Moderate	High
	Fire	Material ignited following spill		Remote	Moderate	Moderate
	Explosion			Remote	Moderate	Moderate
	Theft	Theft of dangerous goods during transport, leading to offsite impacts	• Transportation in accordance with the *Australian Code for Transport of Dangerous Goods and Explosives*; • Follow specified route to the Project.	Remote	Major	Moderate
Delivery to Site (filling storages)	Spill	Vehicle collision, overfill of storages, leaking pipeline, human error, leaking storage container	• Storage facility, containers, bunding, drainage and pipelines designed in accordance with Australian Standard; • Approved contractors to fill storages following operating procedures; • Contractor 'sign-on' prior to entering site to fill storages;	Probable	Minor	Moderate
	Fire	Material catching on fire, with possible spread to other hazardous materials		Remote	Minor	Low
	Explosion	Explosion as a result of mixed materials		Remote	Moderate	Moderate

Operational Activity / Hazard	Incident Type	Scenario	Proposed Management Measures	Likelihood	Consequence	Risk
			• Regular inspections of storages and daily before delivery.			
On-Site Storage (Explosives Facility, Fuel and Workshop Storages)	Leak/Spill	Failed storage tank / facility / pipeline	• Storage facility, containers, bunding, drainage and pipelines designed in accordance with Australian Standard; • Operating procedures followed; • Maintenance activities as required.	Possible	Minor	Moderate
	Theft	Unauthorised personnel removing product from facility, which could lead to offsite impact	• Explosives Facility designed for compliance with NSW legislation; • Explosives storages to be securely fenced.	Remote	Major	Moderate
	Fire	Flammable or combustible materials ignited causing a fire which has potential to spread	• Storage facility, containers, bunding, drainage and pipelines designed in accordance with Australian Standard; • Regular inspections of storages; • Maintenance activities; • Fire fighting equipment available on site and at storage locations; • All spillage cleaned up following operating procedures; and • Emergency response procedure in place.	Remote	Moderate	Moderate
	Explosion	Possible explosion if fire spreads		Remote	Moderate	Moderate

Operational Activity / Hazard	Incident Type	Scenario	Proposed Management Measures	Likelihood	Consequence	Risk
General Project Operations	Spill	Vehicle collision, poor maintenance, procedures absent	• Storage facility, containers, bunding, drainage and pipelines designed in accordance with Australian Standard; • Daily inspections of facilities; • Maintenance when required; • Operating procedures followed for response.	Probable	Minor	Significant
	Fire	Flammable or combustible materials ignited causing a fire which has potential to spread	• Storage facility, containers, bunding, drainage and pipelines designed in accordance with Australian Standard; • Regular inspections of storages; • Maintenance activities as required; • Fire fighting equipment available on site; • All spillage cleaned up in accordance with response procedures; • Emergency response procedure in place.	Remote	Moderate	Moderate
	Explosion	Possible explosion if fire spreads		Remote	Major	Significant