

DRAYTON SOUTH COAL PROJECT ENVIRONMENTAL IMPACT STATEMENT

PRELIMINARY HAZARD ANALYSIS

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For

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DRAYTON SOUTH COAL PROJECT EIS PRELIMINARY HAZARD ANALYSIS

for
Anglo American Coal Pty Limited

1 OVERVIEW

1.1 INTRODUCTION

Hansen Bailey has been commissioned on behalf of Anglo American to undertake a Preliminary Hazard Analysis (PHA) for the Drayton South Coal Project (the Project). The Project is a 15 year mine life extension of the existing Drayton open cut coal mine (Drayton Mine) located in the Upper Hunter Valley of NSW. The Drayton Mine is located approximately 13 km south of the township of Muswellbrook. 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 Amendment (Part 3A Repeal) Act 2011* (EP&A Act).

Anglo American has successfully operated the existing Drayton Mine, under Project Approval 06_0202 for over 30 years and provides thermal coal to export and domestic markets at a maximum of 8 Mtpa of Run of Mine (ROM) coal. Project Approval 06_0202 expires in 2017. The Antiene Rail Spur (approved under Development Consent 106-04-00) is utilised to transport export coal to the Port of Newcastle via the Main Northern Railway Line.

The Project boundary is defined by ridgelines nominated in the 'Drayton South Coal Project Planning Assessment Commission (PAC) Review Report' issued in December 2013 (see **Figure 1**).

1.2 PROJECT DESCRIPTION

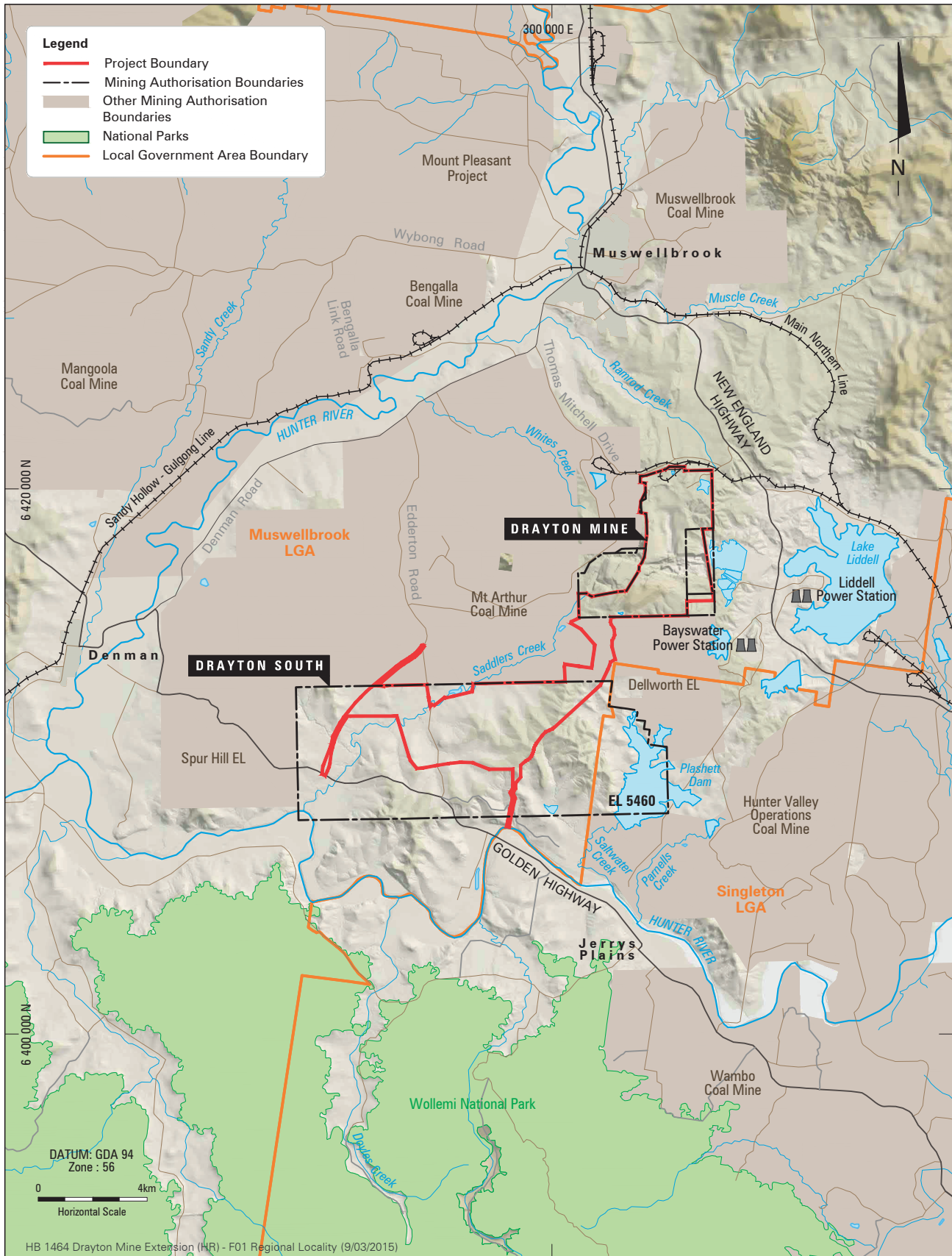
The Project will allow for the continuation of the existing Drayton Mine for up to 15 years, by developing an open cut mining area within EL 5460. The Project will extract on average 6 Mtpa, and up to 6.4 Mtpa in any one year, of export quality thermal coal by utilising existing Drayton Mine assets and infrastructure.

The Project activities will be limited to two active open cut mining areas, which will be developed utilising excavator and dragline mining methods. The mine plan is designed such that the Whynot and Blakefield Mining Areas fall within and to the north of the Drayton South PAC nominated ridgeline limits.

Under this new application, Anglo American proposes to extend the Drayton operations beyond 2015 by:

- Continuation of operations at Drayton Mine as currently approved with minor additional mining within the existing East, North and South Mining Areas for a period of 15 years;
- Development of a new open cut mining area with EL 5460 mining up to 6.4 Mtpa and on average 6 Mtpa ROM;
- Ongoing employment of a workforce of up to 500 full time equivalent employees;
- Utilisation of the existing Drayton Mine equipment fleet;
- Storage of water, and emplacement of tailings and rejects generated by the Project in existing Drayton Mine voids;
- Utilisation of the existing Drayton Mine infrastructure including the Coal Handling and Processing Plant (CHPP), rail loop and associated infrastructure, workshops, bath houses and administration offices;
- Construction of a transport corridor to the new mining area;
- Continued utilisation of the Antiene Rail Spur off the Main Northern Railway Line to transport product coal to the Port of Newcastle for export;
- Realigning and upgrading a section of Edderton Road;
- Continuation of mutually beneficial arrangements with neighbours Macquarie Generation and Mt Arthur Coal Mine;
- Installation of further water management and power reticulation infrastructure to support the new mining areas; and
- Progressive rehabilitation of disturbed areas as mining operations are completed.

Figure 2 illustrates the conceptual layout of the Project.

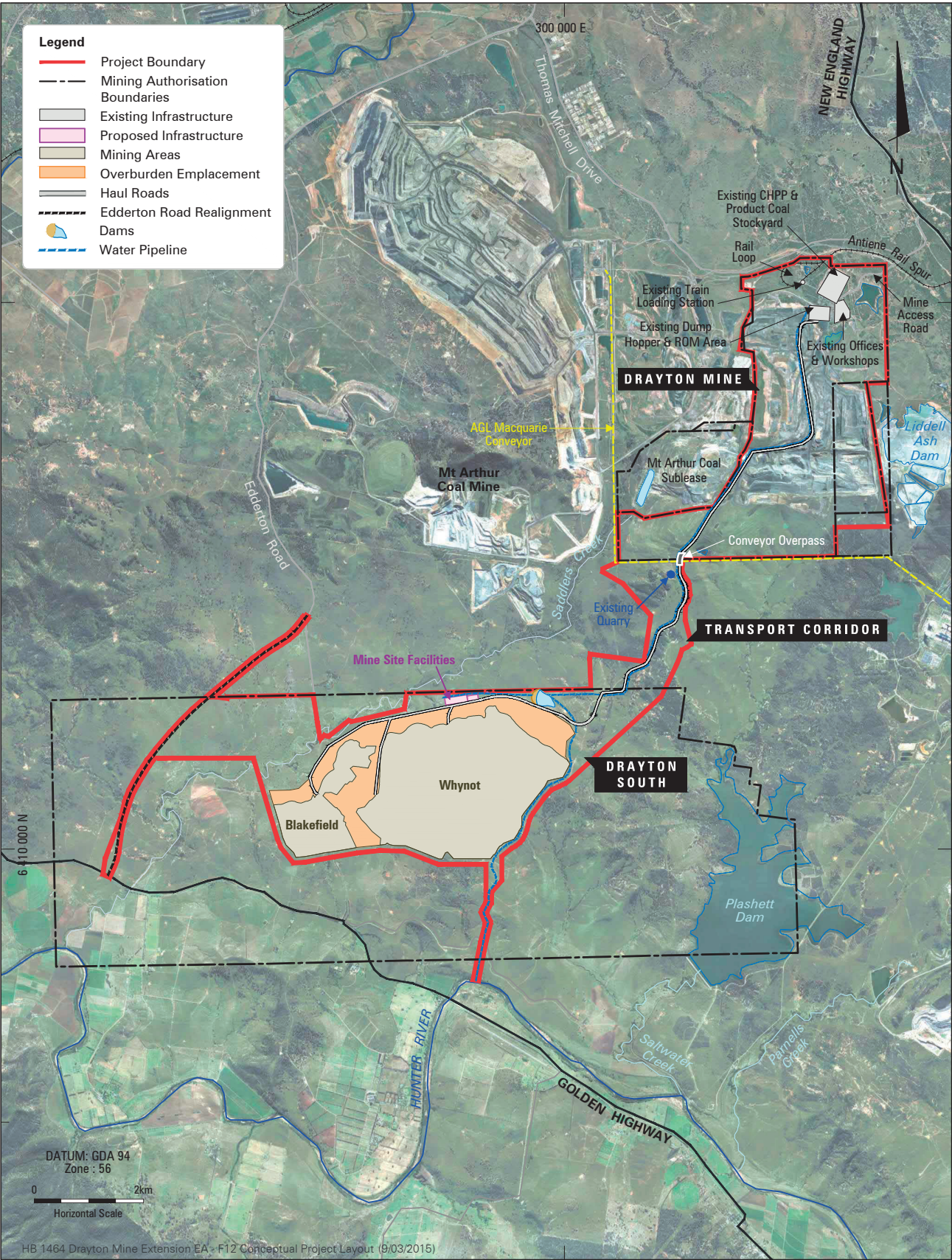


DRAYTON SOUTH COAL PROJECT



Regional Locality

FIGURE 1



DRAYTON SOUTH COAL PROJECT



Conceptual Project Layout

FIGURE 2

1.3 BACKGROUND

The results of Drayton Mine's environmental performance are published in the Annual Review (formerly the Annual Environmental Management Report). Anglo American currently maintains compliance with its 'Licence to Store' (formerly termed Dangerous Goods Licence) XSTR100017, '*Notification of Dangerous Goods on Premises*' NDG019387 (the details of which are provided in **Section 3.2.1**), Radiation Management Licence (RML 31157) and Environmental Protection Licence (EPL) 1323.

Drayton Mine operates under a Safety, Health, Environment and Community Management System (SHECMS) which is accredited to ISO 14001 standards. The SHECMS is designed to enable Drayton Mine to:

- Effectively manage its environmental issues;
- Ensure compliance with regulatory requirements;
- Continually improve its environmental performance through review and auditing; and
- Satisfy the expectations of stakeholders.

The SHECMS is based on a suite of legislative requirements, procedures and standards, which have been prepared to ensure that operational activities, objectives and targets avoid or have minimal impact to the environment. Under the system, all employees and contractors are accountable for environmental performance.

Drayton Mine's environmental performance is measured against the SHECMS by regular auditing (internal and external), reporting and review. Drayton Mine is also actively involved in communicating its environmental performance to its employees, regulators, near neighbours, visitors and the broader community through:

- Engagement with the Drayton Mine Community Consultative Committee (Drayton CCC);
- Community Newsletters;
- Annual Environmental Management Report (Annual Review);
- The Anglo American website;
- Mine open days and tours; and
- Participation in local show days and community events.

All hazardous materials required to be used at Drayton will continue to be checked for their safety and potential environmental impacts. The CHEMALERT database (or similar) and Material Safety Data Sheets are utilised on site to assist in chemical management.

The Project will utilise existing facilities at the Drayton Mine and the SHECMS will be updated to incorporate the Project. There are no additional hazardous materials required or new permanent storage facilities proposed for the Project. Portable fuel pods will service the Project and will be relocated or replaced as required to meet the needs of the Project.

1.4 DOCUMENT PURPOSE

This PHA was undertaken in accordance with *SEPP 33 – Hazardous and Offensive Development Application Guidelines* (DUAP, 1994) (SEPP 33 Guidelines). The Hazardous Industry Planning Advisory Papers (HIPAPs) developed under SEPP 33 were also considered throughout the assessment. HIPAPs of particular relevance to this PHA included:

- The *Hazardous Industry Planning Advisory Paper No 3 – Risk Assessment* (HIPAP No. 3);
- The *Hazardous Industry Planning Advisory Paper No 4 – Risk Criteria for Land Use Planning* (HIPAP No. 4); and
- The *Hazardous Industry Planning Advisory Paper No. 6 – Guidelines for Hazard Analysis* (HIPAP No 6).

The specific objectives of this PHA are to:

- Provide a clear hazard analysis which satisfies any relevant legislative requirements and existing Anglo American management procedures, standards and plans;
- Identify any additional 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 Project hazards and operations.

2 METHODOLOGY

The PHA requires that the key components of the Project are reviewed against the threshold SEPP 33 Guidelines and HIPAP No. 6.

The methodology applied as per HIPAP Guidelines included:

1. Identification of potentially hazardous materials and events associated with the Project;
2. Examination of the potential consequences of identified hazards;
3. A qualitative estimate the likelihood of Project hazards occurring;
4. Examination of any proposed mitigation measures;
5. Qualitatively assessing the risks to the environment, safety of members of the public and their property arising from sudden and unexpected incidents and compare these to the applicable qualitative criteria;
6. Recommendation of any further risk mitigation, management or remedial measures as required for the Project, in consideration of the relevance and adequacy of proposed safeguards; and
7. Determination of the acceptability and level of risk associated with the Project, to allow industry classification and the implementation of appropriate management procedures.

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 continue to require the transport and storage of diesel, materials for explosives and other substances, which may be considered potentially hazardous and are discussed further below. Anglo American will continue to improve and implement environmental management and remedial measures for any hazardous events including the handling, storage and transport of any hazardous substances.

3.1 POTENTIALLY HAZARDOUS MATERIALS

The key potentially hazardous materials required for the Project include explosives, hydrocarbons, fixed radiation devices in the Drayton Mine coal handling plant and other hazardous chemicals. The key hazardous chemicals are predicted to include, although not limited to, fuels such as diesel and petrol, degreaser, kerosene, greases and explosives.

Potentially hazardous materials identified in this PHA will continue to be stored in bulk in a number of areas at the Drayton Mine. A description of each of the bulk storage locations for existing operations and the Project is provided below and shown on **Figure 3**.

3.1.1 Explosives

The Project will require the continued use of explosives and other related materials. The existing explosives storage facilities at the Drayton Mine will continue to be utilised. The location for explosives storage at the Drayton Mine is presented on **Figure 3**.

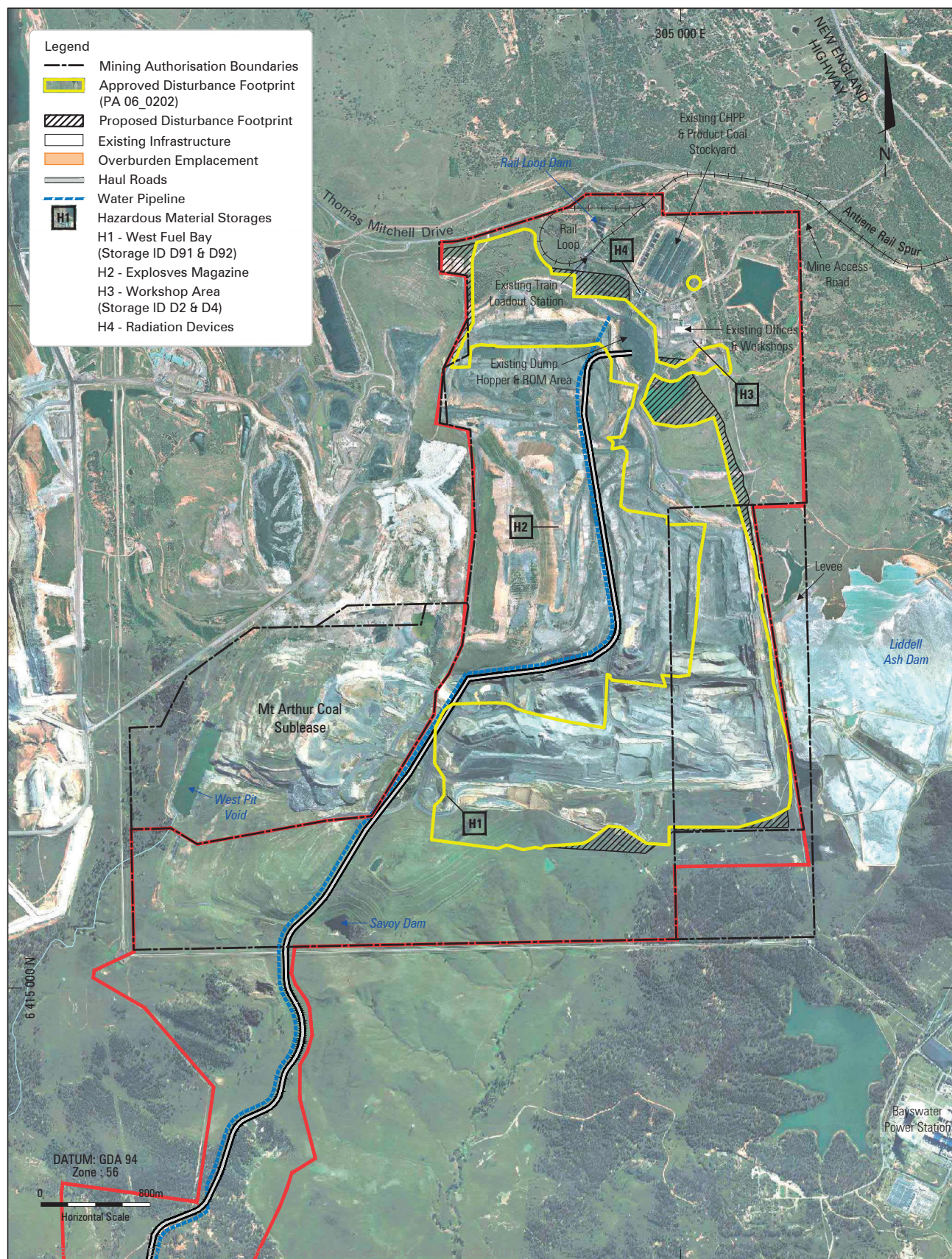
The existing facility is designed and maintained in accordance with the relevant Standards and Guidelines including *AS 2187.1 – 1998: Explosives – Storage, Transport and Use – Storage, AEISG Code of Practice – Precursors for Explosives* (1999) and the Anglo American relevant management plans and procedures.

The key potential hazards associated with explosives include the on-site storage facility, transportation of potentially hazardous materials, the proximity to fuel and workshop 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 ADG Code.

Petroleum is classified as a flammable liquid (Class 3) by AS 1940:2004 and as such is classified as a dangerous good by the criteria of the ADG Code. Only very small volumes of petrol will be required for Project-related activities, such as some site maintenance equipment (i.e. mowers) and in workshop areas.



DRAYTON SOUTH COAL PROJECT

Hazardous Materials Storage Locations

FIGURE 3



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. Diesel will be utilised for the Project in bunded mobile fuel pods.

3.1.3 Other Hazardous Materials

Some other hazardous materials will also be utilised and stored within the workshop areas. The Project will require the use of a number of hazardous chemicals, which will include however not be limited to, the use of oil, degreaser and kerosene. Oil is classified as a combustible liquid (Class C2) by AS 1940:2004.

Liquid Petroleum Gas will continue to be stored in a tank with a 500 L storage capacity near the warehouse yard at the Drayton Mine. In the same area up to 500 L of Acetylene Gas can also be stored. The tanks are bunded and tested regularly for their integrity.

The Drayton Mine utilises fixed radiation gauges within the Coal Scan of the Coal Handling Processing Plant (CHPP) to measure or infer density of coal.

All hazardous materials will continue to be managed in accordance with AS 1940:2004 and the relevant Anglo American management plans and procedures.

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 subdivided 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.

Potentially hazardous materials identified in this PHA are stored in a number of areas at the Drayton Mine.

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 Drayton Mine include:

- Explosives and related materials storage facilities;
- Diesel storage facilities; and

- Other potentially hazardous materials storage.

The location of these storage areas is shown on **Figure 3**.

3.2.1 Explosives Storage Facility

Anglo American currently holds a 'Licence to Store' XSTR100017 for explosives and explosive precursors issued by Workcover. The existing explosive storage facility is surrounded by a 2.1 m high man-proof fence, including barbed wire extension with two security gates at either end. Explosive accessories such as detonating cords and boosters are secured in an explosives magazine. The existing explosive storage facility will continue to be utilised by the Project.

Under the existing Licence to Store, explosives and/or explosive precursors authorised for storage include the following:

- Class 1.1D explosives, blasting, Type E;
- Class 1.1B Detonators, electric for blasting; and
- Class 1.1D Detonating cord, flexible

Maximum volumes of the following materials are also approved to be stored:

- Class 1.1D 10,000 kg of boosters (without detonators);
- Class 1.4S 10,800kg Primers, cap type; and
- Class 1.1B 10,000 kg non-electric detonator assemblies for blasting.

The products stored at Drayton Mine are stored and handled in accordance *AS 2187.2-2006 – Explosives – Storage, Transport and Use* and internal Anglo American management plans and procedures. Explosive accessories such as detonating cords and boosters are secured in an explosives magazine. The location of the storage facilities is shown on **Figure 3**.

The continuation of mining operations for the Project will require ongoing blasting to achieve suitable fracturing and fragmentation of hard rock overburden to enable efficient removal of these materials.

Mine planning has predicted on average five blast events per week will be required once a stable production rate is achieved. Blasting will only be undertaken during the hours of 9:00 am to 5:00 pm Monday to Saturday, excluding Sundays and public holidays unless granted prior approval from the Office of Environment and Heritage.

Existing management plans will continue to be utilised and updated as required to manage the operation of the existing explosives facility for the Project, with only appropriately qualified and licensed personnel, familiar with site procedures to access the area and handle explosive materials and explosive precursors.

3.2.2 Fuel Storage Facilities

Anglo American holds an 'Acknowledgement of Notification of Dangerous Goods on Premises' NDG019387 for diesel and gas storage on-site. The existing Drayton diesel and gas storage facilities are shown on **Figure 3** and include:

- A primary above ground diesel tank with a capacity of 860, 000L, located near the workshop;
- Two 110, 000 L in-pit above ground diesel tanks;
- A 500 L Liquid Petroleum Gas tank; and
- A 500 L Acetylene Gas tank.

For heavy vehicles and equipment that will not be regularly transported back to the existing Drayton Mine, fuel and lubricant facilities will be constructed adjacent to the Drayton South Mine Infrastructure Area. Portable bunds will be used for transient storage or transportation of oils and fuels around the Project. Spill kits, containing oil absorbent materials will be located in the vicinity of the storage areas. Project personnel will be trained in the use of the spill kits and to ensure appropriate disposal of contaminated materials.

Small volumes of petrol will also be required for some site maintenance equipment (i.e. mowers, etc.) and in workshop areas. Small volumes of diesel, fuels, oils, flammables and hydrocarbons are also stored in the CHPP workshop.

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 continue to be stored on-site at the Drayton Mine, at a distance from any diesel or explosive storage areas to minimise any potential risks. These substances will be located in bunded areas in accordance with the NSW OH&S Regulations, which will minimise the risk and consequence should a fire or explosion occur and prevent any toxic contamination of the surrounding environment.

Activities undertaken in the Drayton Mine CHPP require the use of certain chemicals. Approximately 15, 000 litres of undiluted anionic flocculent is stored in an above ground bunded tank near the CHPP. A total of approximately 70 tonnes of magnetite is stored in an open sump on the floor of the washery. The magnetite is dosed at a rate of approximately 0.4 kg per tonne of washed coal.

Smaller quantities of other chemicals including paints, oils, solvents, glues and degreasers are required in the CHPP and for maintenance activities. These are predominantly stored in the hazardous chemicals storage cabinet in the CHPP Workshop area. No licence is required for the maximum storage volumes needed. The maximum storage capacity for storage tanks and cabinets within the CHPP and workshop includes:

- 10,000 L of storage for waste coolant;
- 10,000 L for coolant;
- 114,200 L for oil;
- Various gases held in the cylinder store (25G sized gas cylinders - 31.5kg);
- 350 L flammables cabinet; and
- 4000 L bulk grease.

The lube shed also contains various lubricants in small containers with a combined capacity not exceeding 15, 000L.

Several radiation devices are located within the on-site CHPP. The devices contain a sealed radioactive source which prevents escape or dispersion of the radioactive substance and allows the emission of ionising radiation. Anglo American will continue to manage the device to ensure compliance with the obligations of their RML.

3.2.4 Transport of Hazardous Materials

All bulk materials will continue to be transported to the Drayton Mine by a licensed contractor in accordance with the relevant contractor transport codes and standards and site operation procedures. Diesel will continue to be delivered to site by trucks at a rate of approximately 500,000 L per week, with each truck delivering up to 48, 000L diesel. 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.

3.2.5 Spills / Leakage and Contaminated Runoff

All bulk storage tanks and containers will continue to be stored in appropriate bunding and kept in neat and tidy condition at the Drayton Mine. Contamination will be kept to a minimum, with any moderate spillages being reported internally through Drayton's incident reporting system. Tanks and storage areas are located such that incidents will not lead to offsite discharge or impacts. Any hazardous material releases will be managed in accordance with Anglo American Emergency Response procedures. These procedures implement techniques and handling requirements that assist in preventing spills and leakages from occurring and ensure prompt and effective clean-up practices are employed should any spills occur.

Anglo American will continue to incorporate appropriate training, implementation of best practice procedures and the undertaking of appropriate remediation measures when required. Emergency Oil Spill Response Kits are readily available; particularly in areas where work involving activities that require the use of hydrocarbons.

Drayton Mine will continue to operate the Oil Pollution Control Dam, located below the main workshop, vehicle washdown bays and fuels facilities. Any runoff from the industrial area reports to this dam via an oil water separator to remove contaminants from the water.

From the Oil Pollution Control Dam, water passes through a second oil separator before flowing to the Industrial Dam for reuse on site. The system is currently inspected weekly.

3.2.6 Natural Events

Natural events such as floods, bushfires and landslides can also create hazardous conditions. Consideration of these natural hazards and their management has been included as part of this assessment.

The potential risk of fires will continue to be managed in accordance with the existing Bushfire Management Plan. A Bushfire Risk Assessment and associated update of the existing Bushfire Management Plan will be undertaken for the Project.

The bushfire danger period in NSW runs from 1 October to 31 March (inclusive) of the following year depending upon the seasonal weather conditions. Anglo American will continue to monitor fuel supplies and climatic conditions to determine the risk of a fire occurring. Severe conditions may result from:

- Wet, late summer and autumn promoting heavy fuel accumulation;
- Dry and windy winters with heavy frosts;
- Dry springs and the early onset of summer conditions; or
- An extended drought period.

Anglo American will continue to implement control measures for the Project to minimise any potential hazards including:

- Maintenance of peripheral roads that act as fire breaks;
- Slashing grass around infrastructure, particularly electrical substations and fuel storages; and
- Inspections of the Drayton property boundaries and neighbouring properties to address bushfire risks.

Anglo American has installed and maintained fire control infrastructure at the Drayton Mine, with fire fighting equipment at key points, and an emergency response team. As part of the emergency response management plan, mine equipment such as water carts, graders and dozers can be made available for on-site fires.

The Project is located in an area with no recorded history of landslides and exhibits no evidence of instability. Slope angles and shapes are negligible across the development area. On this basis the geological and geomorphological conditions indicate very low risk of landslide occurrence.

All components of the Project are located outside the 1 in 100 year flood extent of the Hunter River and therefore the flood risks are considered low.

4 IMPACT ASSESSMENT

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, in particular to the surrounding environment should a potential hazard occur; and
- The subsequent risk rating for each potential hazard identified specific to the Project.

4.1 CONSEQUENCE ANALYSIS

The consequence criteria and descriptors were developed based on the Anglo American Risk Assessment Matrix. A qualitative scale of consequences for potential hazardous events is provided in **Table 1**.

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.

Table 1
Anglo American Qualitative Consequence Descriptors

Loss Type	Consequence (C)				
	1 Insignificant	2 Minor	3 Moderate	4 High	5 Major
(S/H) Harm to People (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.
(EI) Environmental Impact	Minimal environmental harm (L1 incident).	Material environmental harm (L2 incident, remediable short term).	Serious environmental harm (L2 incident remediable with LOM).	Major environmental harm (L2 incident remediable post LOM).	Extreme environmental harm (L3 incident irreversible).
(BI/MD) Business Interruption/ Material Damage and Other Consequential Losses	No disruption to operation. Five percent loss of budgeted operating profit.	Brief disruption of operation. Ten percent loss of budgeted operating profit/listed assets.	Partial shutdown. Fifteen percent loss of budgeted operating profit/listed assets.	Partial loss of operation. Twenty percent loss of budgeted operating profit/listed assets.	Substantial or total loss of operation. Twenty-five percent of loss budgeted operating profit/listed assets.
(L&R) Legal and Regulatory	Low level legal issue.	Minor legal issue. Non compliance and breaches of the law.	Serious breach of the law. Investigation/report to authority, prosecution and/or moderate penalty.	Major breach of the law. Considerable prosecution and penalties.	Very considerable penalties and prosecutions. Multiple law suits and jail terms
(R/S/C) Impact on 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.

4.2 LIKELIHOOD OF HAZARDOUS EVENTS OCCURRING

The likelihood and risk acceptability criterion for potential hazardous events was developed based on the Anglo American Risk Matrix. A qualitative scale of likelihood for potential hazardous events is provided below in **Table 2**.

4.3 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 from **Table 1** and **Table 2** and identifying the level of risk associated with potential hazards identified in **Section 3**.

The final critical qualitative risk classification was determined using the Anglo American Risk Matrix, as presented in **Table 3**. The levels of risk presented below as rated by the Risk Matrix, may be described by the following:

- Low (L): A low risk exists that management's objectives may not be achieved. Monitor risk, no further mitigation required.
- Medium (M): A moderate risk exists that management's objectives may not be achieved. Appropriate mitigation strategy to be devised as part of the normal management process.
- Significant (S): A significant risk exists that management's objectives may not be achieved. Appropriate mitigation strategy to be devised as soon as possible.
- High (H): A high risk exists that management's objectives may not be achieved. Appropriate mitigation strategy to be devised immediately.

Table 2
Qualitative Likelihood Rating

Likelihood	Examples
5 Almost Certain	The unwanted event has occurred frequently; occurs in order of one or more times per year and is likely to reoccur within one year
4 Likely	The unwanted event has occurred infrequently; occurs in order of less than once per year and is likely to reoccur within five years
3 Possible	The unwanted event has happened in the business at sometime or could happen within 10 years
2 Unlikely	The unwanted event has happened in the business at sometime or could happen within 20 years
1 Rare	The unwanted event has never been known to occur in the business or it is highly unlikely that it will occur within 20 years

Table 3
Anglo American - Risk Assessment Tools: Matrix for Determining Level of Risk

Loss Type	Consequence (C)				
	1 Insignificant	2 Minor	3 Moderate	4 High	5 Major
(S/H) Harm to People (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.
(EI) Environmental Impact	Minimal environmental harm (L1 incident).	Material environmental harm (L2 incident, remediable short term).	Serious environmental harm (L2 incident remediable with LOM).	Major environmental harm (L2 incident remediable post LOM).	Extreme environmental harm (L3 incident irreversible).
(BI/MD) Business Interruption/Material Damage and Other Consequential Losses	No disruption to operation. Five percent loss of budgeted operating profit.	Brief disruption of operation. Ten percent loss of budgeted operating profit/loss assets.	Partial shutdown. Fifteen percent loss of budgeted operating profit/loss assets.	Partial loss of operation. Twenty percent loss of budgeted operating profit/loss assets.	Substantial or total loss of operation. Twenty-five percent of loss budgeted operating profit/loss assets.
(L&R) Legal and Regulatory	Low level legal issue.	Minor legal issue. Non compliance and breaches of the law.	Serious breach of the law. Investigation/report to authority, prosecution and/or moderate penalty.	Major breach of the law. Considerable prosecution and penalties.	Very considerable penalties and prosecutions. Multiple law suits and jail terms
(R/S/C) Impact on 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.
Likelihood (L)	Risk Rating				
5 Almost Certain	11 (M)	16 (S)	20 (S)	23 (H)	25 (H)
4 Likely	7 (M)	12 (M)	17 (S)	21 (H)	24 (H)
3 Possible	4 (L)	8 (M)	13 (S)	18 (S)	22 (H)
2 Unlikely	2 (L)	5 (L)	9 (M)	14 (S)	19 (S)
1 Rare	1 (L)	3 (L)	6 (M)	10 (M)	15 (S)

5 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 management measures and procedures in place for existing Drayton Mine operations.

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';
- At no time will the use of unapproved substances be permitted within the Project site. All chemicals must be assessed according to their MSDS as supplied by the Manufacturer/Supplier and the National Occupational Health and Safety Commission (NOHSC) criteria prior to use. In addition, the chemicals are to be approved by the Department Manager, the Environmental Specialist and the Health & Safety Specialist, 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 Dangerous Goods Act and the relevant Australian Standards;
 - 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.

Anglo American will update the relevant management plans in place for existing Drayton operations to improve performance and manage any additional hazards and risks that may be associated with the Project.

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.

6 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.

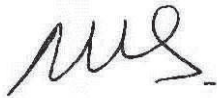
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for

HANSEN BAILEY



Nicole Dobbins
Environmental Scientist



Daniel Sullivan
Senior Environmental Scientist

7 REFERENCES

- Australian Explosive Industry Safety Group (1999) *Code of Good Practice – Precursors for Explosives*, Edition 1 – 1999. Prepared by Australian Explosives Manufactures Safety Committee.
- DoP (2011a), *Hazardous Industry Planning Advisory Paper No 4 – Risk Criteria for Land Use Planning*.
- DoP (2011b), *Hazardous Industry Planning Advisory Paper No. 6 – Hazard Analysis*.
- DoP (2011c), *Hazardous and Offensive Development Application Guidelines. Applying SEPP 33*.
- 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 Hazards and Risk Assessment Summary

Table A1
Project Hazards & Risk Assessment Summary

Issue	Aspect	Impact	Preliminary Risk Assessment			Proposed Management Measures	Revised Risk Assessment		
			C	L	R		C	L	R
Transport to Site	Spill	Vehicle collision, poor maintenance, or human error leading to soil or water contamination	2	3	8 (M)	- Approved contractors to transport and operate in accordance with Australian Codes & Standards; - Spill kit stored in transport vehicles; - Transport vehicles to have communication (e.g. mobile, radio etc.) to aid response time; and - Regular inspections.	1	3	4 (L)
	Fire	Material ignited following spill	3	2	9 (M)	- Transportation in accordance with the <i>Australian Code for Transport of Dangerous Goods and Explosives</i>; - Fire fighting equipment to be stored in vehicle.	3	1	6 (M)
	Explosion		3	2	9 (M)	- Transportation in accordance with the <i>Australian Code for Transport of Dangerous Goods and Explosives</i>; - Fire fighting equipment to be stored in vehicle.	3	1	6 (M)
	Theft	Theft of dangerous goods during transport, leading to off-site impacts	5	2	19 (S)	- Transportation in accordance with the <i>Australian Code for Transport of Dangerous Goods and Explosives</i>; - Follow specified route to the Project.	5	1	15 (S)

Issue	Aspect	Impact	Preliminary Risk Assessment			Proposed Management Measures	Revised Risk Assessment		
			C	L	R		C	L	R
Delivery to Site (filling storages)	Spill	Vehicle collision, overfill of storages, leaking pipeline or storages or human error.	2	3	8 (M)	- On-site containment; - 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; and - Regular inspections of storages.	2	2	5 (L)
	Fire	Material catching on fire, with possible spread to other hazardous materials	3	3	13 (S)	- Zero ignition points (no smoking policy); - Operating procedures followed; and - Maintenance activities as required.	2	1	3 (L)
	Explosion	Explosion as a result of mixed materials	3	2	9 (M)	- Storage facility, containers, bunding, drainage and pipelines designed and labelled in accordance with Australian Standards. - Site emergency response procedures; and - Fire fighting equipment available on site and at storage locations.	3	1	6 (L)

Issue	Aspect	Impact	Preliminary Risk Assessment			Proposed Management Measures	Revised Risk Assessment		
			C	L	R		C	L	R
On-Site Storage (Explosives Facility, Gas, Fuel, Workshop Storages and radioactive device)	Leak/Spill	Failed storage tank / facility / pipeline leading to soil or water contamination	2	2	5 (L)	- Storage facility, containers, bunding, drainage and pipelines designed and operated in accordance with Australian Standards; - Tanks and storage areas are located such that incidents will not lead to offsite discharge or impacts; - Regular inspections of bunding and facilities; and - Maintenance conducted as required.	1	4	12 (M)
	Theft	Unauthorised personnel removing product from facility, which could lead to off-site impact	4	2	14 (S)	- Explosives facility securely fenced and designed for compliance with NSW legislation; - Access by authorised personnel only; and - On site security.	4	1	10 (M)
	Fire	Flammable or combustible materials ignited causing a fire which has potential to spread offsite	3	3	13 (S)	- Storage facility, containers, bunding, drainage and pipelines designed in accordance with Australian Standard; - Regular inspections of storages; - Maintenance conducted as required; - Fire fighting equipment available on site and at storage locations; - All spillage cleaned up following operating procedures; and - Site Emergency Response procedures in place.	2	1	3 (L)
	Explosion	Possible explosion if fire spreads	3	3	13 (S)	- Site Emergency Response procedures; and - Fire fighting equipment available on site and at storage locations.	2	1	3 (L)

Issue	Aspect	Impact	Preliminary Risk Assessment			Proposed Management Measures	Revised Risk Assessment		
			C	L	R		C	L	R
	Radiation	Poor handling or storage of radioactive device leading to contamination of property or person.	2	1	3 (L)	No additional management measures required. Continue with current management procedure for radioactive devices in the CHPP.	2	1	3 (L)
General Project Operations	Spill	Vehicle collision with permanent storage facilities or poor maintenance leading to soil or water contamination	2	2	5 (L)	- Storage facility, containers, bunding, drainage and pipelines designed in accordance with Australian Standard; - Tanks and storage areas are located such that incidents will not lead to offsite discharge or impacts; - Regular inspections of facilities and maintenance when required; and - Procedures followed for spill response.	1	2	3 (L)
		Heavy/light vehicle collision at Project with hydrocarbon mobile storage pods leading to soil or water contamination	2	3	8 (M)	- Designated areas for mobile pod storage and mobile bunding to meet Australian and Anglo American Standards; - Storage areas are located such that incidents will not lead to offsite discharge or impacts; and - Regular inspection of facilities.	1	2	2 (L)

Issue	Aspect	Impact	Preliminary Risk Assessment			Proposed Management Measures	Revised Risk Assessment		
			C	L	R		C	L	R
Fire	Fire	Flammable or combustible materials ignited causing a fire which has potential to spread	2	3	9 (M)	- 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; and - Emergency Response procedure in place.	2	1	3 (L)
			3	3	13 (S)	- Site emergency response procedures; and - Fire fighting equipment available on site and at storage locations.	2	1	3 (L)
Spontaneous Combustion	Fire	Release of harmful emissions/ fire	2	2	5 (L)	The potential impacts arising from spontaneous combustion were addressed as a component of the air quality and greenhouse gas impact assessment prepared for the Project. The Geochemical assessment report indicates a very low propensity for spontaneous combustion. Any risks associated with spontaneous combustion will be managed in accordance with the Drayton Spontaneous Combustion Management Plan.	2	2	5 (L)

Issue	Aspect	Impact	Preliminary Risk Assessment			Proposed Management Measures	Revised Risk Assessment		
			C	L	R		C	L	R
Natural Events	Bushfire	Bushfire spreading to operational areas and wider area	4	2	14 (S)	- Anglo American will operate in accordance with the Bushfire Management Plan which includes: - Slashing grass around site and storage areas; and - Maintaining fire breaks as required.	2	1	3 (L)
	Flooding	Flooding of hazardous materials storage areas	1	2	3 (L)	Nil required.	1	2	3 (L)